



Catalog
FI 01


















Edition
2023

PROCESS AUTOMATION

Products for Process Instrumentation

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Related catalogs

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Products for Process Instrumentation

Process Automation



Catalog FI 01 · 2023

Supersedes:
Catalog FI 01 · 2021

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this catalog:

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For comfortable, fast and error free product selection you
will get support in our PIA Life Cycle Portal:

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Please contact your local Siemens branch.

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The products and systems described in
this catalog are manufactured/distributed
under application of a certified quality
management system in accordance with
DIN EN ISO 9001 (Certified Registration
No. 000656 QM08). The certificate is recog-
nized by all IQNet countries.

Measuring everything that matters

Siemens offers a complete service package as well as all measuring instruments to assist you in engineering, designing, supplying, installing and commissioning measurement solutions for complete industrial plants. Our “one-stop shop” concept supports selection of all process instrumentation and analytics all the way to integration with your process control system. Additional industrial components and systems are easily incorporated into the overall plant and ensure smooth process flows.



Whether process instrumentation, process analytics or weighing and dosing systems, our solutions meet the requirements of process industries such as chemicals, oil and gas and hydrocarbon processing, water and wastewater, pharmaceuticals, mining, aggregates, cement, pulp and paper, food and beverage or shipbuilding.





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Measuring everything that matters

Siemens Process Instrumentation offers you innovative, single-source measurement solutions to increase plant efficiency and enhance product quality. Our intelligent instruments are also designed for seamless interplay with the larger world of industrial automation and control systems – enabling greater process transparency and smarter decisions for your business. Benefit from the competence of Siemens: a full automation vendor operating around the globe, with service available 24 hours a day, 365 days a year.

Takes pressure off your business: **SITRANS P**

SITRANS P is a complete range of measurement instruments for measuring relative pressure, differential pressure and absolute pressure. In addition to high measuring accuracy and ruggedness, the modular system features superb operating convenience and functionality as well as a perfect safety concept.



SITRANS P320/420 – the first pressure transmitter for remote commissioning of functional safety

- Time and effort savings due to remote commissioning of SIL devices
- Developed in accordance with the IEC 61508 standard for use in SIL 2/3
- Reduced response time increases process efficiency by speeding up the control system's response to changing process conditions
- Ready for plant digitalization with the HART 7 pressure transmitter: Data logging functions and event control deliver users in-depth control and analysis.
- User-friendly display due to clear display and diagnostic icons in accordance with NAMUR NE107
- Maintenance cost reduction due to proof test interval of up to 10 years
- FM-approved



SITRANS LH100/LH300

- Suitable for applications ranging from drinking water or wastewater to corrosive liquids thanks to stainless steel enclosure
- Rugged submersible sensors for hydrostatic level measurement
- Installation possible in pipes with 1" inner diameter



SITRANS P200/210/220

- Single-range transmitter for relative, absolute and hydrostatic pressure
- Pressure sensors: stainless steel sensors (SITRANS P210 and SITRANS P220) as well as sensors with ceramic membrane (SITRANS P200)
- Conversion of measured pressure into either 4–20 mA or 0–10 V signal



SITRANS P300

- More than 90 different process connection variants offer the highest degree of flexibility
- Versatile communication connection via HART protocol, PROFIBUS PA or FOUNDATION Fieldbus
- Fulfills EHEDG, FDA and 3A requirements
- Maximum measurement deviation of 0.075%
- Can be combined with flushmounted absolute or relative pressure measuring cells



SITRANS P compact

- Analog transmitter for absolute and relative pressure
- Hygienic design in accordance with EHEDG, FDA and GMP recommendations
- Stainless steel process connections and enclosure
- Measurement deviation $\leq 0.2\%$

Because every degree matters: **SITRANS T**

SITRANS T products are the temperature measurement champions, even in extreme conditions. Whether used in hot, cold or hazardous environments – the communicative SITRANS T product family meets all expectations. Not matter whether head, rail or field mounting – all transmitters or sensors are available individually or as complete measuring points. They offer high precision in every application and are quick and easy to connect to thermocouples or resistance thermometers. The SIMATIC PDM intelligent software package permits parameterization in just minutes, and input errors are avoided.



SITRANS TS500 temperature sensors for pipes and vessels – from simple applications to solutions for harsh environments

- Modular system with thermowell made of tubular or barstock material, extension, connection head and optional transmitter or display
- Intrinsic safety, flameproof and nonsparking versions are available

Transmitters for head mounting



SITRANS TH100

- Pt100 single-input transmitter
- Diagnostics LED
- Supports four-wire Pt100
- 4–20 mA
- Low-cost and compact



SITRANS TH100slim

- Pt100 single-input transmitter
- Supports four-wire Pt100
- 4...20mA output with M12 socket
- Low-cost and compact in stainless steel enclosure to weld on compact thermometer



SITRANS TH320

- Universal single-input transmitter
- Diagnostics LED
- Supports four-wire RTD/TC/mV and resistances
- Supports Callendar-van Dusen
- HART 7 + SIL 2/3 (IEC 61508)
- 4–20 mA
- Interface for local HMI



SITRANS TH420

- Universal dual-input transmitter
- Hot backup function
- Diagnostics LED
- Supports two four-wire RTD/TC/mV and resistances
- Supports Callendar-van Dusen
- HART 7 + SIL 2/3 (IEC 61508)
- Interface for local HMI

Transmitters for field installation

Transmitters for rail mounting



SITRANS TR320

- Universal and single-input transmitter
- Diagnostics LED
- Supports four-wire RTD/TC/mV and resistances
- Supports Callendar-van Dusen
- HART 7 + SIL 2/3 (IEC 61508)
- 4–20 mA

SITRANS TR420

- Universal dual-input transmitter
- Hot backup function
- Diagnostics LED
- Supports two four-wire RTD/TC/mV and resistances
- Supports Callendar-van Dusen
- HART 7 + SIL 2/3 (IEC 61508)



SITRANS TS100

- For multiple applications
- Supplied with directly installed cable
- ATEX and IEC EX approvals; can be operated in Zone 0
- Wide range of options thanks to modular principle



SITRANS TR320/420

- Stainless steel or aluminum enclosure
- Temperature field transmitter for multiple applications
- Configurable via local display
- Full redundancy via hot backup function (TF420)
- SIL 2/3-certified
- HART 7
- 4–20 mA
- Combined types of protection available, such as Ex d + Ex i



SITRANS TS200 compact design

- For multiple applications
- Compact design with directly installed fixed connection (M12, Lemo, etc.)
- ATEX and IEC EX approvals; can be operated in Zone 0
- Wide range of options thanks to modular principle



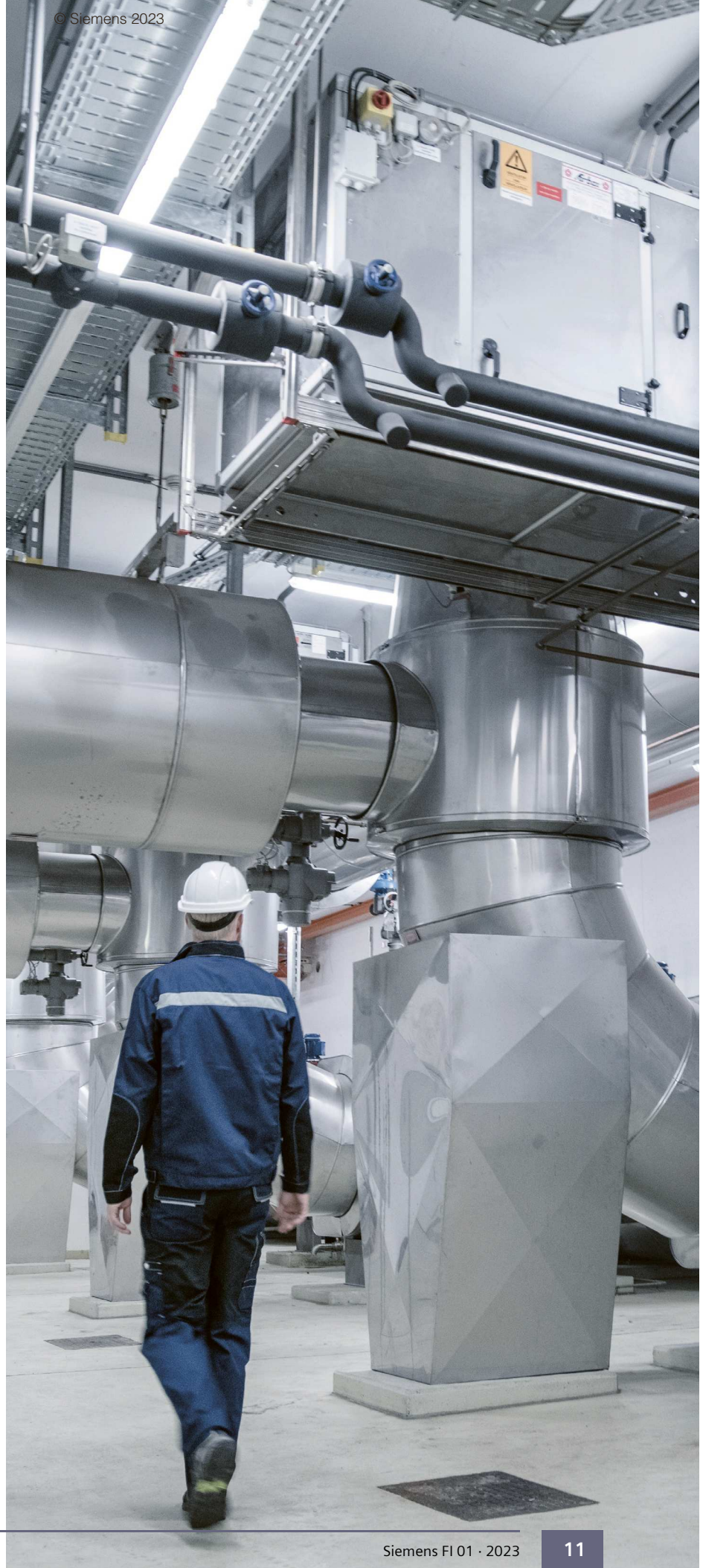
SITRANS TS300

- Clamp-on temperature sensor
- Design meets EHEDG recommendations and is therefore suitable for use in the food and beverage and pharmaceutical industries
- Replaceable measuring inserts



SITRANS TS Thermowell

- Wide range of lengths and materials
- Comprehensive coverage of applications
- Customer-specific options are possible
- High stability thanks to high-quality materials
- Comprehensive material and quality controls available



Everything flows: SITRANS F

Whether measuring gases, liquids or steam – choosing the right flowmeter is decisive for productivity. This is where the SITRANS F line comes in. Our portfolio contains the fitting flowmeter for every application and medium, with five different flow technologies available to suit a wide range of operating conditions: electromagnetic, Coriolis, ultrasonic, vortex and differential pressure.



SITRANS FCT070/FST070 transmitter: flowmeter solutions

- Full control and parameterization via the control system
- Direct integration into SIMATIC S7, TIA Portal and PCS 7
- Coriolis or ultrasonic technology module for ET 200SP
- Selection via TIA Selector (secures easy integration in SIMATIC)
- Fast digital signal to sensor with 10 ms update rate
- Full advanced transmitter functionality via automation control
- Via PROFINET, the measurement data is transmitted to the automation system in real time
- Full hazardous area solutions with use of SITRANS I300 barrier
- Coriolis-specific flowmeter: SITRANS FC230
- Ultrasonic-specific flowmeter: SITRANS FS230
- Integration function blocs available for all Siemens automation systems

SITRANS FC

Coriolis mass flowmeters

Our multivariable devices measure the direct mass flow rate of liquids and gases in almost any application. They deliver reliable and repeatable information on mass flow, volume flow, temperature, density and concentration (for example, Brix or Plato). They are available in sensor sizes DN 1.5 to 150 mm with different flowmeter transmitter versions to fulfill requirements for high performance in oil and gas, chemicals, food and beverage, pharmaceuticals and automotive applications.

Full range of digital transmitters: The uniform sensor and transmitter platform offers solutions for sizes from Di 1.5 to DN 150 mm with three different transmitters.

The innovative and user-friendly FCT030, FCT010 and FCT070 transmitters feature audit trails, trend curves, data logger and advanced diagnostic functionalities.



SITRANS FCS300

- Dual splitflow design in sizes from DN 15 to DN 150 in different versions, wetted material in AISI 316 as well as nickel alloy
- Remote- or compact-mounted
- Available with broad range of FCT030, FCT010 and FCT070 transmitters
- Solid performance with mass flow accuracy of 0.1% or 0.2% and density accuracy of down to 2 kg/m³
- Robust frame and housing isolate from external vibrations, allowing ideal measurement in difficult environments
- Ideal for the chemical, petrochemical and oil and gas industries



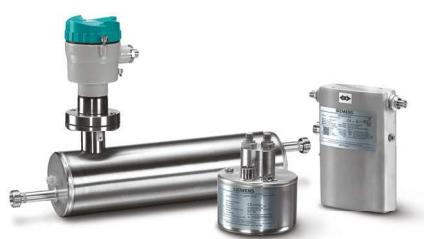
SITRANS FCT010 single digital channel transmitter

- Full multiparameter Modbus output ideal for PLC integration
- Robust aluminum housing mounted directly on the different sensors, for most sensor sizes
- Small in size, ideal for skids and compact machines
- Full performance in a cost-efficient solution



SITRANS FCT030 advanced full-range transmitter

- Available as compact, remote field-mounting and remote wall-mounting enclosures
- Four I/O channels, freely configurable and programmable
- Full communication package: HART; PROFIBUS PA and DP; Modbus
- Advanced, large-size graphical display including trend curve and multilevel display views
- Integrated data logger, ideal for diagnostics on advanced applications
- Advanced diagnostic functionality
- Built-in programmable settings for optimizing pulsating flow and aerated flow
- 16+ integrated unique fraction tables for concentration measurements
- Built-in batch controller for two-stage batch applications



SITRANS FCS low flow

- Single-tube design in sizes from DI 1.5 to DI 15, with a wide selection of available connections
- High-performance accuracy: 0.1% on massflow and down to 0.5 kg/m³ density
- Available with broad range of FCT030, FCT010 and FCT070 transmitters
- DN 4 design withstands pressure rates up to 1000 bar
- Ideal for a broad range of low-flow applications within the automotive, chemicals, and food and beverage industries
- Easy installation using a plug-and-play interface
- Optimal hygiene and CIP cleanability for the food and beverage industry as well as pharmaceutical applications, thanks to single-tube construction without internal welds, reductions or flow splitters



SITRANS FCS400

- Dual splitflow design in sizes DN 15 to DN 50
- Most compact design on the market
- Available with all common process connections including a variety of common sanitary connections
- Available with broad range of FCT030, FCT010 and FCT070 transmitters
- High-performance accuracy: 0.1% on massflow and down to 0.5 kg/m³ density
- Ideal for OEM, skids, machine builder, marine, sanitary and chemical applications

SITRANS FM electromagnetic flowmeters

SITRANS FM electromagnetic flowmeters measure flow volumes of electrically conducting fluids such as water, chemicals, food and beverage, slurries, sludge, paper stock, and mining slurries with magnetic particles.



Modular pulsed DC meters:

SITRANS FM MAG (DN 2 to DN 2200)

- Full transmitter program includes MAG 5000/MAG 6000/MAG 6000 I; compact- or remote-mounted
- Multiple I/O as standard and communication modules PROFIBUS PA/DP
- DeviceNet, FOUNDATION Fieldbus, HART and Modbus RTU are available
- MAG 5100 W sensor for water and wastewater applications
- MAG 3100 P sensor for process industries and the harsh requirements in the chemical industry
- MAG 3100 P available as quick ship variant
- MAG 3100/MAG 3100 HT sensor for general process industries
- MAG 1100/1100 HT sensor for general process industries
- MAG 1100 F sensor for food and beverage and pharmaceutical industries



**Battery-operated water meters:
SITRANS FM MAG 8000/MAG 8000 CT
(DN 25 to DN 1200)**

- Battery lifetime of up to 15 years*
- IP68 (NEMA 6P) enclosure and sensor painting in accordance with ISO 12944 class C5M (up to 15 years protection) corrosivity for burial and submerged applications
- Easy installation without straight inlet/outlet
- Rich add-on communication modules: Modbus RTU, encoder card, 3G/UMTS module and IIoT Wireless communication module
- IIoT Wireless Communication Module consisting of a hardware part and a Web-hosted application for device management and measurement data transfer
- Remote configuration of all parameters, remote diagnostics

**SITRANS FM MAG 8000 with
3G/UMTS module**

- Built-in Remote Qualification Certificate enables comprehensive device diagnostics and off-site audits
- Configurable analog input for external ratiometric pressure transmitter
- MAG 8000 clock synchronization with Internet NTP server

*for 4 D-cell external battery pack



**High-powered AC meters:
SITRANS FM TRANSMAG 2 /
(DN 15 to DN 1000)**

- Specially designed for heavy mining slurries with or without magnetic particles as well
- Also suitable for the most difficult applications in the pulp and paper industry
- Low conductive medias $\geq 1 \mu\text{S/cm}$ ($0.1 \mu\text{S/cm}$ depending on medium)
- No movable parts
- Stable zero point/pulsed alternating field for accurate flow signal and excellent signal strength
- SmartPLUG concept
- Comprehensive self-diagnostics



**Threaded SITRANS FM100:
Making engineering and design
even simpler**

- Measuring and monitoring small and medium flows. Robust stainless steel design (threaded: 1/2", 3/4", 1", 2")
- Generation of two process values, simultaneous flow and temperature measurement
- Dosing function with external control input
- Four optical buttons, easy local operation in the field possible with gloves
- The display can be electronically rotated in 90° steps
- Bidirectional measurement
- Integration in many standard applications possible, since there are two individually configurable outputs (pulse/frequency/alarm and analog output)
- Total and partial volume counters to track flow rates
- IO-Link communication available

SITRANS FS – Flow Sonic

Our ultrasonic flow measurements work as inline systems or with clamp-on.

Inline systems

Inline systems come into contact with media and are mostly complete and calibrated pipe segments. Suitable for operational measurements in industrial areas and heat quantity measurements that are subject to billing, but can also be retrofitted in existing systems.



SITRANS FS SONO 3100 / SONO 3300

- Suitable for water applications in sizes DN 50 to DN 500
- Available as 1- or 2-path systems in combination with SITRANS FUS060 transmitter
- Choice between mild steel and stainless steel on request
- Sensors can be exchanged without interrupting operation



SITRANS FS SONOKIT

- The SONOKIT system is designed for inline retrofitting on existing water pipelines up to DN 1200 as a 1- or 2-track flowmeter
- For use with the dedicated SITRANS FUS060 transmitter (up to DN 500) or battery-powered FUS080 transmitter (up to DN 1200)
- The unique design enables installation on empty pipes or pipes under pressure without process shutdown
- Robust version can be buried and withstands constant flooding
- Outstanding accuracy; the bigger the pipe, the more accurate the result



SITRANS FUS380 and FUE380

- FUE380 for billable energy measurements according to MID004
- FUS380 for industrial billing measurements without MID004 requirements with more extensive measuring ranges available
- FUS/FUE380 in dual-track version for measuring water flow in district heating systems, local networks, boiler stations, substations and other general water applications
- Also suitable for chiller plants (including glycol mixes without type approval)
- Suitable for pipe diameters from DN50 to DN1200 and approved for billable heat measurements with official approval (MID MI-004)
- With SITRANS FUS 080 transmitter for battery or mains power supply, battery life up to 6 years
- Ideal for energy metering together with the SITRANS FUE950 energy calculator
- With heat meter type approval for FUE380 (MID MI-004)

SITRANS FS – clamp-on ultrasonic flowmeters

Clamp-on is the ideal technology for retrofits in existing systems. Sensors can be strapped onto existing pipes without disrupting or stopping the process. Since these sensors measure without direct contact with the liquid, this type of measurement is also becoming increasingly important for new systems. The transmitter is designed for very fast and highly accurate measurements. Up to four measuring paths per pipe enable significantly better flow-profile recording even under non-ideal measuring conditions and thus results that only calibrated measuring devices actually deliver.



SITRANS FSS200 – clamp-on sensor family

- Available as high-precision, universal and high-temperature sensor
- High-precision sensor: typical Lamb-wave sensors, working in harmony with steel pipes; selection according to pipe wall thickness; mandatory for oil and gas as well as other liquids when accuracy is required; different sizes with different frequencies for wall thickness up to 35 mm
- High-temperature sensor: for applications up to 230°C
- Universal sensor: for portable purposes and non-steel pipes, but also for steel pipes with lower performance and accuracy requirements; available in five basic sizes for pipes up to DN 6000 and special versions for difficult applications
- Suitable material for simple and permanent mounting, even with different requirements



SITRANS FS290 – portable clamp-on system

- With FSS200 ultrasonic flow sensor family 200 (clamp-on) and FST090 ultrasonic flow transmitter
- For quick and easy checking of the flow in pipes
- Portable SITRANS FST090 transmitter in use with SITRANS FSS220 clamp-on sensors
- For pipes up to DN5000 and a wall thickness up to 40 mm, for temperatures of 120°C or higher
- Operation with mains unit or alternatively with rechargeable batteries for more than 24 hours
- Time-limited measured value monitoring and control measurement to validate built-in flow meters
- Four pushbuttons, illuminated graphical display, 240 x 160 pixels
- Inputs/outputs, Communication Modbus RTU RS 485, USB service port, 4GB SD-Card



SITRANS FS230 with FSS200 sensors and FST030 transmitter

- Designed as a wall housing (Ex zone 2) or as an industrial housing (Ex zone 1) with external DSL
- External Digital Sensor Link (DSL) contains 4-path measured value electronics and generates the measured value directly with the FSS200 sensors
- High-precision measurement of slightly viscous liquids (industrial version), different crude oil mixtures or petroleum products with temperature, pressure and viscosity consideration (oil version), natural and industrial gases from approx. 8 bar (gas version)
- WideBeam® transit time technology with FSS200 high-precision sensors for high accuracy and the best signal quality in all areas of use
- Transmitter electronics for billable measurement accuracy better than 0.15%
- Anomaly tool, patented bi-directional flow profile correction for anomalies in the upstream and downstream areas of the pipe
- High EMC security and secure digital data transmission to the transmitter, up to 150 m and more



SITRANS FS220 – with FSS200 sensors and FST020 transmitter

- For simple measurement tasks with one pair of sensors (single-path) and a practical accuracy of 1%.
- Highly reliable, cost-effective system for simple accuracy
- Enhanced zero stability results in minimal need to set a zero point, ideal for use in municipal utilities for network monitoring and leak detection
- Frequently used in the water and wastewater sector, for energy and HVAC as well as in the chemical industry (non Ex)
- WideBeam® transit time technology with FSS200 universal and high-precision sensors

SITRANS FP differential pressure flow measurement

The SITRANS FP product line offers a complete solution for differential pressure flow measurements. SITRANS FP330 and SITRANS FPS230 are both suitable for a vast range of different applications under various process conditions and parameters.



SITRANS FPS230/FP330

- Flexible mounting
- One pressure transmitter for all applications
- Single source supplier for the hole measuring point
- Pre-mounted flowmeter delivered in "one box"
- Easy traceability throughout the ordering process

SITRANS FX330

- Accurate measurement of steam, gas, and both conductive and non-conductive liquids
- Available in sizes DN 15 to DN 300 mm
- Integrated pressure and temperature compensation for lower installation costs and increased accuracy
- Integrated reduction of nominal diameter results in a large turndown ratio, reducing installation costs and potential for leakage
- Provides redundant storage of all calibration and configuration data within the display memory and the electronics module
- Designed from the ground up to be fully compliant with the IEC 61508 SIL 2 safety standard
- Cost-efficient energy calculation including net heat measurement
- Remote version available with cable length up to 50 m

A new level of experience: SITRANS L and more

Siemens provides a complete range of level measurement devices for every application built on its global experience in the field. With the knowledge that no single technology can address the needs of all industrial challenges, Siemens offers a full range of contacting and non-contacting instrumentation for continuous and point-level measurement.



SITRANS LR100 series –

for hassle-free level measurement

- Compact 80 GHz radar transmitter for liquid and solid applications
- Featuring Bluetooth® wireless technology for easy and quick setup with Siemens SITRANS mobile IQ App
- Ideal for chemical storage vessels, bulk solids hoppers, produced water and drilling mud

Continuous level measurement

Continuous level measurement constantly monitors dynamic processes. The measurements are transmitted as an analog signal or digital value. We offer a wide range of transmitters based on a variety of technologies, including ultrasonic, radar, guided wave radar, capacitance, gravimetric and hydrostatic.

Process intelligence

The signal processing technologies differentiate between the true echo from the material and false echoes from obstructions or electrical noise. The sophisticated software is supported by field data gained from more than a million applications. This in-depth knowledge and experience is built into the software's advanced algorithms to provide intelligent processing of echo profiles. The result is a repeatable, fast and reliable measurement.

Radar level measurement with intelligent signal processing

- Non-contacting and low-maintenance
- Microwaves require no carrier medium for precise measurements even under harsh process conditions
- High performance and easy implementation using just a few parameter entries



SITRANS LR560

- The world's first 78 GHz level transmitter
- 2-wire, 78 GHz FMCW for ranges up to 100 m (328 ft)
- Very narrow 4-degree beam angle with 3" lens antenna
- Aiming flanges with purge, easy to install
- Integrated Process Intelligence and plug-and-play performance



SITRANS LR250

- 2-wire, 25 GHz pulse radar level transmitter up to a range of 20 m
- For liquids and slurries in storage and process vessels with high temperatures and pressures
- 316L stainless horns, flanged antenna with PTFE facing and budget-friendly polypropylene lens and flange options for versatile applications



SITRANS LR200

- 2-wire, 6 GHz pulse radar level transmitter for liquids with a range of up to 20 m
- Ideal for process vessels with turbulence and heavy deposit, as well as high temperatures and pressures with a range of up to 20 m

Ultrasonic level measurement

Our market-leading ultrasonic level measurement is an extremely cost-effective solution. The self-cleaning face makes it suitable for harsh environmental conditions. The non-contacting technology is used in numerous industries to monitor liquids, bulk solids and slurries.



SITRANS Probe LU240

- Cost-effective, compact, intelligent level solution for liquid chemical inventory, monitoring small process vessels and level monitoring measurement in the environmental industry



Echomax transducers

- Fully encapsulated robust ultrasonic transducers for use with Siemens ultrasonic controllers
- Various approvals for use in hazardous applications
- Self-cleaning face for harsh applications with buildup



Level controllers

Our product portfolio of level controllers feature intuitive navigation via the local user interface and are ideal for applications in all industries. Whether you need the world's highest accuracy in your open channels, rugged wet well pump control or dual point monitoring, Siemens controllers have you covered.

Continuous capacitance

Our unique inverse frequency shift approach to capacitance technology ensures accurate, reliable and repeatable measurements, even in dusty, turbulent and vaporous environments or in situations with product buildup. Because even a small level change creates a large change in frequency, our instruments provide better resolution and consistently outperform conventional devices. With special features such as Active-Shield technology, they protect the measurement from the effects of moisture, vapors, foam, temperature and pressure variations, and buildup. Together with the modular probe options available on various models, they offer practical solutions to a wide variety of continuous level and interface applications.



SITRANS LC300

- Ideal for standard and industrial applications in the chemicals, hydrocarbon processing, food and beverage, mining, aggregate and cement industries

Guided wave radar

SITRANS LG guided wave radar transmitter for a range of contact level and interface applications from general to harsh conditions and everything in between. With little to no configuration necessary you'll be operational in minutes, saving you time and money.

Extreme process conditions don't stand a chance, and these transmitters feature SIL options for applications requiring functional safety. Advanced diagnostics including trending, profiles and event logging give you the data you need at every step of your process. Rapid response times and advanced echo processing deliver accurate and reliable readings over the full application range, even in small containers and in low dielectric constant material. And with field-replaceable and adjustable probes, if your process changes, your measurement device can, too.



SITRANS LG240

- For use in hygienic and corrosive applications

SITRANS LG250

- Highly flexible solution for liquid level and interface applications. Extremely versatile for many applications

SITRANS LG260

- Ideal for measuring the level in medium-range solids applications, including grains, plastics and cement

SITRANS LG270

- Offers configuration options for extreme conditions, including high-temperature and high-pressure applications

All versions include:

- Automatic buildup adjustment
- Remote display and electronics options
- 2 mm accuracy
- Backlight with full graphic display, top- or side-mountable
- SIL 2/3 approval options
- Field-replaceable probes
- Quick setup wizards
- USB service port option

Hydrostatic

Low-cost level measurement for direct mounting or mounting with remote seals on tanks and vessels



SITRANS LH100 and SITRANS P DS III

- Suitable for a wide range of applications in the chemical and petrochemical industries
- Highly resistant to extreme chemical and mechanical loads as well as electromagnetic interference

Gravimetric

Gravimetric level measurement with SIWAREX weighing technology offers highly precise measurement without material contact independent of medium temperature, tank shape, built-in parts or material characteristics.



SIWAREX WP321

- Technology module for the SIMATIC ET 200SP distributed I/O system
- For level measurements in silos and bunkers; convenient and seamless integration of platform scales directly into the automation environment

Point level detection

We offer you a comprehensive portfolio for extremely reliable and precise point level detection. Our wide selection includes ultrasonic, rotating and vibrating level switches as well as RF capacitance switches with inverse frequency shift technology that are cost-effective and suitable for point level, interface detection, dry run and safety back-up applications including bulk solids, liquids and slurries.

Vibrating, rotary paddle

- Especially suitable for low bulk density applications
- Ideal for use in harsh and abrasive environments, thanks to their rugged design
- For detecting high, low and demand levels in solids, liquids and slurry applications
- A wide variety of configuration options makes them suitable for any environment
- Simple to use with no complicated setup or configuration
- Stainless steel, aluminum and plastic enclosure options and highgrade steel process connections provide exceptional resistance to mechanical forces, a long service life and low cost of ownership
- Options for SIL 2 / redundant SIL 3



SITRANS LPS200

- Rotary paddle switch that detects solids with densities as low as 15 g/l
- Motor protection
- SIL 2 certification for best-in-class reliability and performance
- Options for fail-safe rotation monitoring and alarming



SITRANS LVL100 and LVL200

- Vibrating level switches for liquid and slurry applications, including high, low and demand level alarms and pump protection
- Wide application range including high temperatures and pressures, hygienic versions, large variety of enclosure materials, SIL 2/redundant SIL 3 options and remote testing



SITRANS LVS100, LVS200 and LVS300

- Vibrating level switches that detect solids with densities as low as 5 g/l
- Best-in-class sensitivity detection
- Ability to handle and monitor buildup
- Options to detect solids interface within a liquid

RF Capacitance

Pointek RF capacitance point level switches measure interfaces, solids, liquids, slurries and foam. The inverse frequency shift technology provides accurate and reliable measurement results even in dusty, turbulent and vaporous environments or in applications with product buildup. Small changes in level create large changes in frequency. Consequently, Pointek devices have greater sensitivity and consistently outperform conventional devices. With their rugged aluminum or chemically resistant plastic enclosures and wide variety of process connections, Siemens Pointek switches are compatible with most applications



SITRANS LCS050 and Pointek CLS100

- Suitable for level detection in constricted spaces
- Options available
- Starting from 1/2 inch process connections
- IO-Link communication
- M12 connector
- Sensguard protection of probe for harsh and abrasive environments and chemically resistive probe types available

Pointek CLS200 and CLS300

- Suitable for level detection in demanding conditions with high pressures and temperatures
- Suitable for aggressive applications including very high temperatures and pressures
- SIL 2 options
- Smart PROFIBUS versions with digital display
- Remote operation via PROFIBUS for status and function testing
- Remote detection of buildup and monitoring of other process condition changes

Ultrasonic

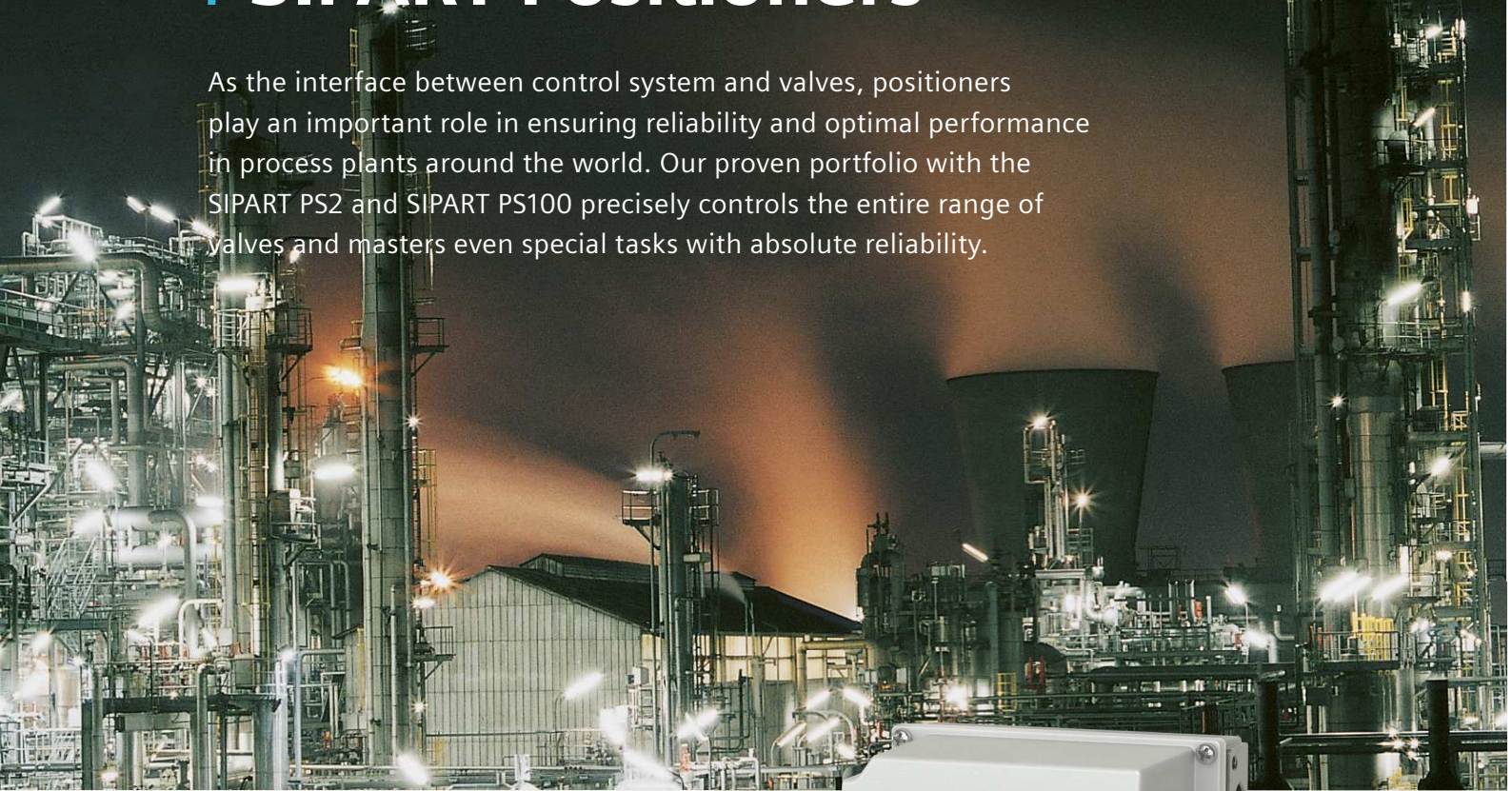


Pointek ULS200

- Non-contacting ultrasonic level switch with two switch points
- Ideal for sticky materials and an effective solution for bulk solids, liquids and slurries

Always in pole position: SIPART Positioners

As the interface between control system and valves, positioners play an important role in ensuring reliability and optimal performance in process plants around the world. Our proven portfolio with the SIPART PS2 and SIPART PS100 precisely controls the entire range of valves and masters even special tasks with absolute reliability.



SIPART PS100 – easy to use, fast to commission and simply robust

- One-push initialization: fast commissioning at the push of a button
- Application parameters to select different modes of valve positioning, such as exact, fast, on-off or booster
- Internal non-contacting sensor: non-wearing and vibration-resistant
- Non-corrosive sound absorber for use in harsh environments
- Plain-text display with status icons in accordance with NAMUR NE107 and four operation buttons
- Remote operation via smartphone or tablet with retrofitable Bluetooth adapter and SITRANS mobile IQ app





SIPART PS2 – the all-around positioner

SIPART PS2 has grown to become the most widely used positioner for linear and part-turn actuators. It is constructed to meet a wide variety of requirements:

- Polycarbonate, aluminum or stainless steel enclosure
- 316L stainless steel enclosure for nearshore, offshore as well as oil and gas applications in hazardous areas
- Ex d explosion-proof version
- Communication via PROFIBUS PA, FOUNDATION Fieldbus or HART
- Integrated booster option for quick control of large drives
- Low operating costs thanks to minimal air consumption



More functions, more possibilities

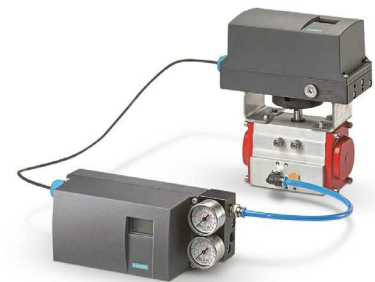
SIPART PS2 comes with an extensive range of functions and diagnostic capabilities, which we have improved even further:

- Optional pressure sensors: improved valve diagnostics and parameter monitoring
- Ready for digitalization: fast and predictive determination of valve maintenance requirements using the valve monitoring app
- Regular partial stroke tests: ensured movement of emergency shutdown (ESD) valves and other open/close valves in the event of an emergency
- Fail in Place: the valve remains in its last position upon loss of electrical and/or pneumatic power
- Fail Safe: the valve moves to the safety position; also suitable for SIL2 applications
- Valve performance tests (VPT): immediate, on-site assessment of valve maintenance requirements



Positioner with remote control electronics

- Suitable for use in environmental conditions with high-energy radiation



Positioner with various external position transmitters

- Easier access to positioner for valves at not easily accessible locations

Early detection protects your process

Process protection devices can be used as early-warning systems to avoid costly interruptions and breakdowns of equipment. They detect flow problems, blockages, screen faults, machinery slowdowns or burst filter bags. Their rugged construction makes them impervious to dust, dirt, buildup and moisture.



SITRANS AS100 – acoustic sensor used for solids flow detection, featuring a compact, stainless steel construction for harsh environments and non-invasive mounting

- Detection of high-frequency acoustic emissions from friction or the impact of dust, powders, granulates and other solids
- Signaling of flow/no flow or high/low flow
- Compatible with SITRANS CU02, which processes signals from the sensor
- Provision of relay and analog outputs for connection into a process or direct connection to a PLC analog output

Acoustic sensors

Non-invasive acoustic sensors detect inaudible, high-frequency acoustic emissions generated by friction and impact, caused by materials in motion.



SITRANS DA400

- Acoustic analyzer for condition monitoring of oscillating displacement pumps
- Simultaneous and continuous monitoring of up to four independent delivery valves
- Easy system operation and configuration either locally by LCD and keyboard or via PROFIBUS DP/PA

Motion sensors

Non-contacting motion sensors detect changes in motion and speed of conveying, reciprocating and rotating machinery.



SITRANS WM100

- For detecting the absence or presence of motion of rotating, reciprocating and conveying equipment
- Heavy-duty alarm switch



SITRANS WM300 MFA

- Motion failure alarm (MFA), differential speed detection (DSD) and non-contacting tachometer (NCT)
- Multiple alarms powered by four relays for overspeed or underspeed conditions from the sensors
- Intuitive programming thanks to a simple menu structure, along with an on-board display and push buttons



Milltronics MFA 4p

- Plant protection through the detection of absence of motion, as well as underspeed or overspeed conditions
- Probes usable in hazardous, high-temperature and harsh conditions, thanks to their superior design
- With MSP or XPP probes

Process controllers

SIPART DR controllers are outstanding thanks to their extreme reliability and ease of use. Various software packages are available to make their handling easy and intuitive and to extend their scope of application. The standard version already offers comprehensive controller hardware that can be upgraded quickly and easily for specific applications by means of a large number of optional input and output modules. Plug-in modules for communications over RS 232/RS 485 or PROFIBUS DP are also available.



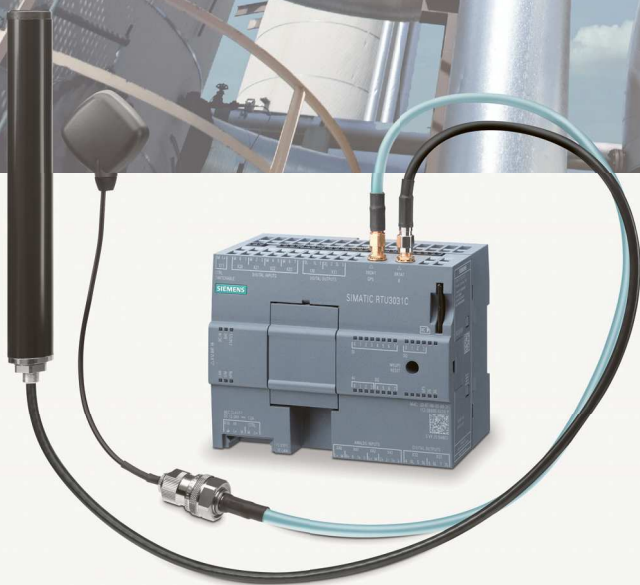
Process recorders

SIREC D200, 300 and 400 display recorders are used for continuous monitoring of process quantities, plant maintenance, process optimization or troubleshooting. Our complete range of process recorders offers state-of-the-art solutions for the most demanding requirements.



Information where it is needed

Supplementary components enhance your operations through seamless wireless communications, remote displays and remote monitoring solutions. Data capturing and alarming anywhere, at anytime? Remote monitoring is your answer. Opening up new communications options? WirelessHART meets that challenge. Whatever your need, Siemens' supplementary components are here to help.



SIMATIC RTU3000C

The compact remote terminal unit enables remote measuring points, even when no local power grid is available

- Easy configuration using a Web browser instead of programming
- Flexible power supply from batteries, solar energy or 24 V DC
- Connection of process instrumentation by means of integrated digital or analog inputs (4...20 mA) or HART and Modbus RTU devices via Extension Board HART/RS485
- Works with every instrumentation via 4...20mA, HART and Modbus RTU
- Secure communication via integrated mobile wireless modem or via LAN port and industrial router such as SCALANCE M
- Extended temperature range from $-40\text{ }^{\circ}\text{C}$ to $+70\text{ }^{\circ}\text{C}$ as well as an optional enclosure meeting the IP68 standard
- Perfect companion for SITRANS serve IQ (csv files & emails) or direct interaction to Mindsphere apps (such as SITRANS store IQ) with MQTT native communication

Four versions are available:

- RTU3010C – only IE interface
- RTU3030C – 3G modem integrated
- RTU3031C – 3G modem and GPS modem integrated
- RTU3041C – 4G modem and GPS modem integrated



SITRANS RD150

- Remote display for 4 to 20 mA and HART devices
- Easy-to-use basic configuration of HART instruments using HART commands
- Ease of use through backlit menu-driven display with four buttons and flexible mounting options

Remote digital displays

The universal remote digital displays allow users to view and access measurement data remotely from a convenient location. Our advanced range of remote displays includes options for pump control with communications including HART and Modbus RTU with flexible output options.



SITRANS RD200 and RD300

- Universal and full-featured versions
- Ideal for flow rate, total and control applications as well as for use with most field devices
- Data logged and displayed on the PC with the free RD software
- Sunlight-readable display
- Standard serial communications output (Modbus RTU)
- Pump alternation control, linearization and square root and math functions



SITRANS RD100

- Loop-powered display
- Suitable for level, flow, pressure, temperature and weighing applications
- Can be used in a large variety of environments (low/high temperatures, hazardous areas)
- Simple setup and installation



IE/PB Link PN IO

- Can constitute the gateway between PROFINET and PROFIBUS
- From the IO-controller viewpoint, all DP slaves are treated like IO devices with a PROFINET interface
- Use as a data records router for parameter assignment of field devices via SIMATIC PDM (Process Device Manager) in all plants with PROFIBUS DP

Fully exploit the potential of **your process data**

From design and commissioning to operation and performance monitoring – Siemens provides software, tools and services for digitalization in every phase of a plant's lifecycle. End-to-end digitalization from a single source optimizes plant operations by reducing downtime and improving cost efficiency.

Ensure Asset Uptime



AE Thyro App



Asset Performance Suite



Valve Monitoring



SIMATIC PCS myExpert



SITRANS SCM IQ



Siemens Predictive Analytics



SIWA Burst



SIWA LeakPlus

Improve Processes



Control Performance Analytics



Process Event Analytics



eBatch Reviewer



Water Quality Inspector



SieTrace



SIWA Optim Dynamics



SIWA Blockage Predictor



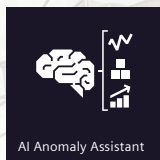
SIWA Optim



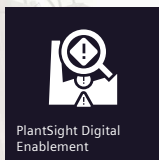
SIWA Pump Guardian

The smart interaction of our digital services and extensive portfolio of applications gives you complete transparency over the entire plant lifecycle. Select the right app suite to investigate root causes quickly, allocate resources efficiently and achieve significant cost savings. Take advantage of advanced data analytics that provide easy and secure collection and processing of plant data, allowing you to implement optimization measures and reach the highest operational efficiency.

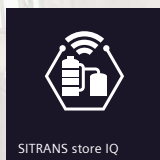
Manage Operations



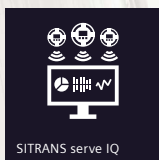
AI Anomaly Assistant



PlantSight Digital Enablement

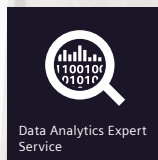


SITRANS store IQ

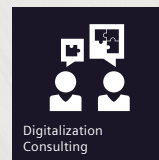


SITRANS serve IQ

Digital Services



Data Analytics Expert Service



Digitalization Consulting

SITRANS IQ lets you talk with your plant

An immense amount of condition data is generated in a process plant. Our SITRANS IQ portfolio extracts this data, evaluates it and edits it according to the specific needs of the operator. This sets completely new standards for improving processes.

Our SITRANS IQ portfolio provides a flexible, scalable suite of solutions to capitalize on your already smart instrumentation. Typically, we only read a primary variable from these smart instruments and dig deeper once we have a problem. But there is an immense amount of other valuable, but unused condition data in a plant. Why not read this stranded data and prevent problems in commissioning, operation or maintenance? Our SITRANS IQ connectivity solutions establish a second data channel to access stranded data without affecting your process.

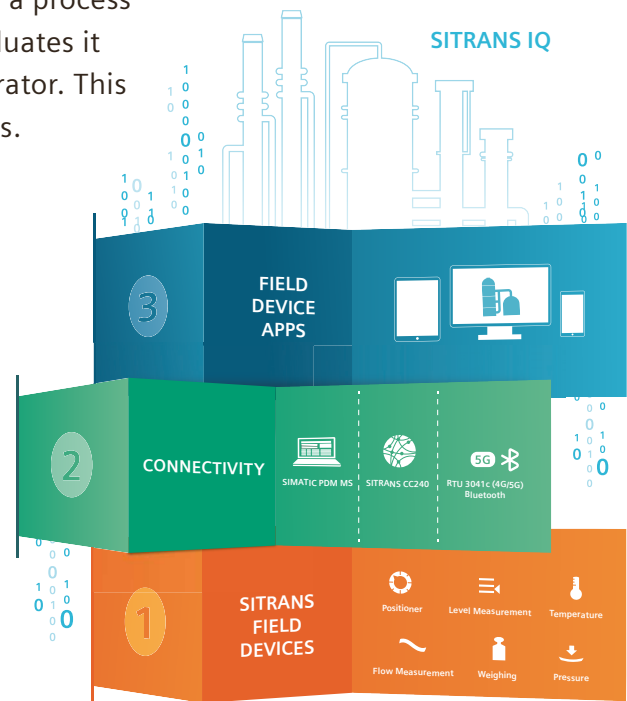
Free yourself of routine tasks like manually capturing remote measurements, monitoring thresholds yourself or doing extra rounds to check your mechanical assets. SITRANS IQ sets completely new standards for improving processes, enabling predictive maintenance and increasing plant performance. Start now!



SITRANS SCM IQ

SITRANS SCM IQ provides smart condition monitoring for mechanical plant assets to detect imminent equipment failures and prevent unexpected plant downtimes.

- Condition monitoring of all vibrating or rotating plant components, such as pumps, compressors, gearboxes, agitators, etc.
- Mechanical assets are equipped with SITRANS MS200 multisensors and a SITRANS CC220 industry gateway for data collection and transmission
- Already existing smart machinery with data integration in Siemens MindSphere can also be monitored



- Analysis of condition data based on artificial intelligence, allowing early detection of potential failures before they occur
- Event-related warnings enable predictive maintenance
- Graphical status display of monitored assets in SITRANS SCM IQ app





SITRANS store IQ

SITRANS store IQ is a cloud-based tool for intelligent inventory monitoring and management.

- Real-time monitoring of fill levels, for example of tank farms or silos, as well as stock levels on shelves
- Variety of scaling possibilities like strapping table, linear scaling function or via silo geometries
- Configurable dashboard allows adaptation to every specific use case scenario
- Alarms and notifications via SMS or e-mail
- Possibility to integrate a wide range of measured variables and technologies providing extra information beyond inventory
- Benefits from broad Siemens MindSphere connectivity options – data transmission directly from HART devices but also from PLC level



Analyzer System Manager (ASM)

ASM is a monitoring & optimization solution for process analyzers.

- Monitoring of all analyzer-related assets
- Analysis of measurement values and device data for anomalies
- Execution and evaluation of validation/calibration data
- Maintenance management
- KPI reporting



SITRANS serve IQ

The server-based SITRANS serve IQ application is used to acquire and monitor process data from remote measuring points.

- Suitable for all remote measurements, including flow, level or pressure, in industrial or municipal applications, for example for environmental or customer reporting needs
- Data transmission to local server (on premises) via mobile network, such as 3G or 4G
- Access to measurement data via Web browser application, with overview of device locations and detailed trend recording of all process values
- Integration into existing SCADA system possible through standard interface



SITRANS AID IQ

SITRANS AID IQ is an on-premise solution to predict the need for maintenance of Siemens Analyzer.

- Provision of diagnostic data of each analyzer to evaluate health status
- Analysis of diagnostic data to predict device downtime
- Provision of service recommendations
- Access via HMI or Web-based application
- Plug & play principle for easy commissioning



SITRANS mobile IQ

SITRANS mobile IQ is a free app for easy commissioning, parameterization and monitoring of Bluetooth-enabled field instrumentation via smartphone or tablet.

- Automatically detects and displays all supported and difficult-to-access field devices in the vicinity
- Convenient quick commissioning or detailed setup, including graphical support
- Displays device status and profile of selected measured and diagnostic values
- Currently supported field devices:
 - SITRANS LR1xx series
 - SITRANS Probe LU240 with retrofittable SITRANS AW050 Bluetooth adapter
 - SIPART PS100 with retrofittable SITRANS AW050 Bluetooth adapter
- Free download: www.siemens.com/siossitransmobileiq



Seamless data flow throughout the entire lifecycle of your plant

Empower your data! Clever, integrated engineering tools and solutions such as COMOS and SIMIT let you take control – and greatly increase the efficiency of processing and manufacturing plants.

SIMIT

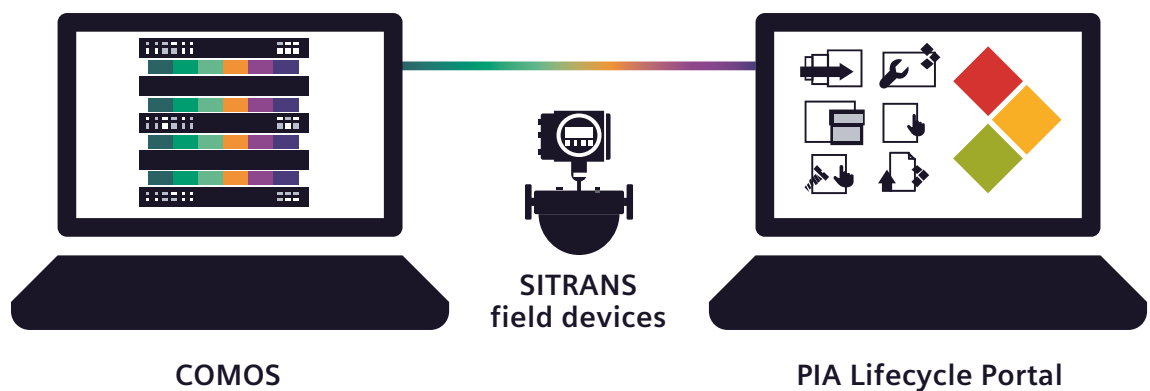
The SIMIT simulation platform enables comprehensive tests of automation applications and provides a realistic training environment for operators even before the real startup. This creates opportunities for process optimization and know-how retention, which results in a reduced commissioning time and significantly shortened time-to-market.

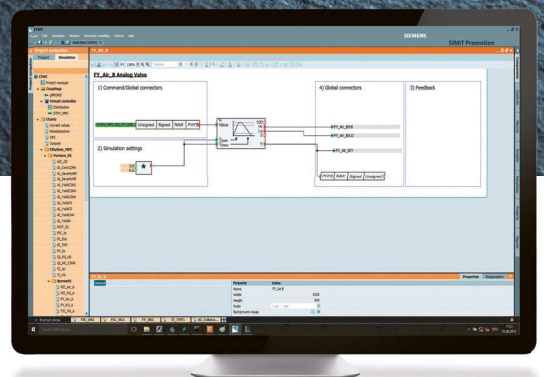
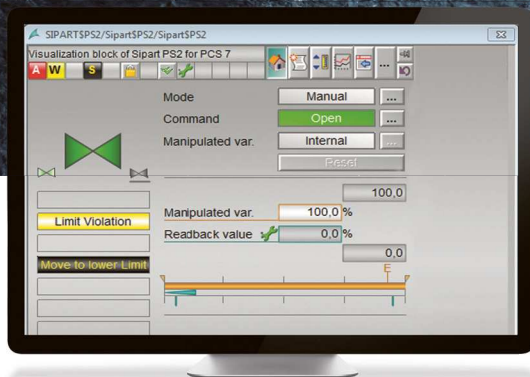
COMOS

COMOS is the engineering tool from Siemens for the entire lifecycle of your plant. Through direct integration of our PIA Lifecycle Portal, we guarantee the seamless integration of our field devices in the engineering environment. We can offer you the field devices best suited to your processes, properties and measuring requirements.

PIA Lifecycle Portal

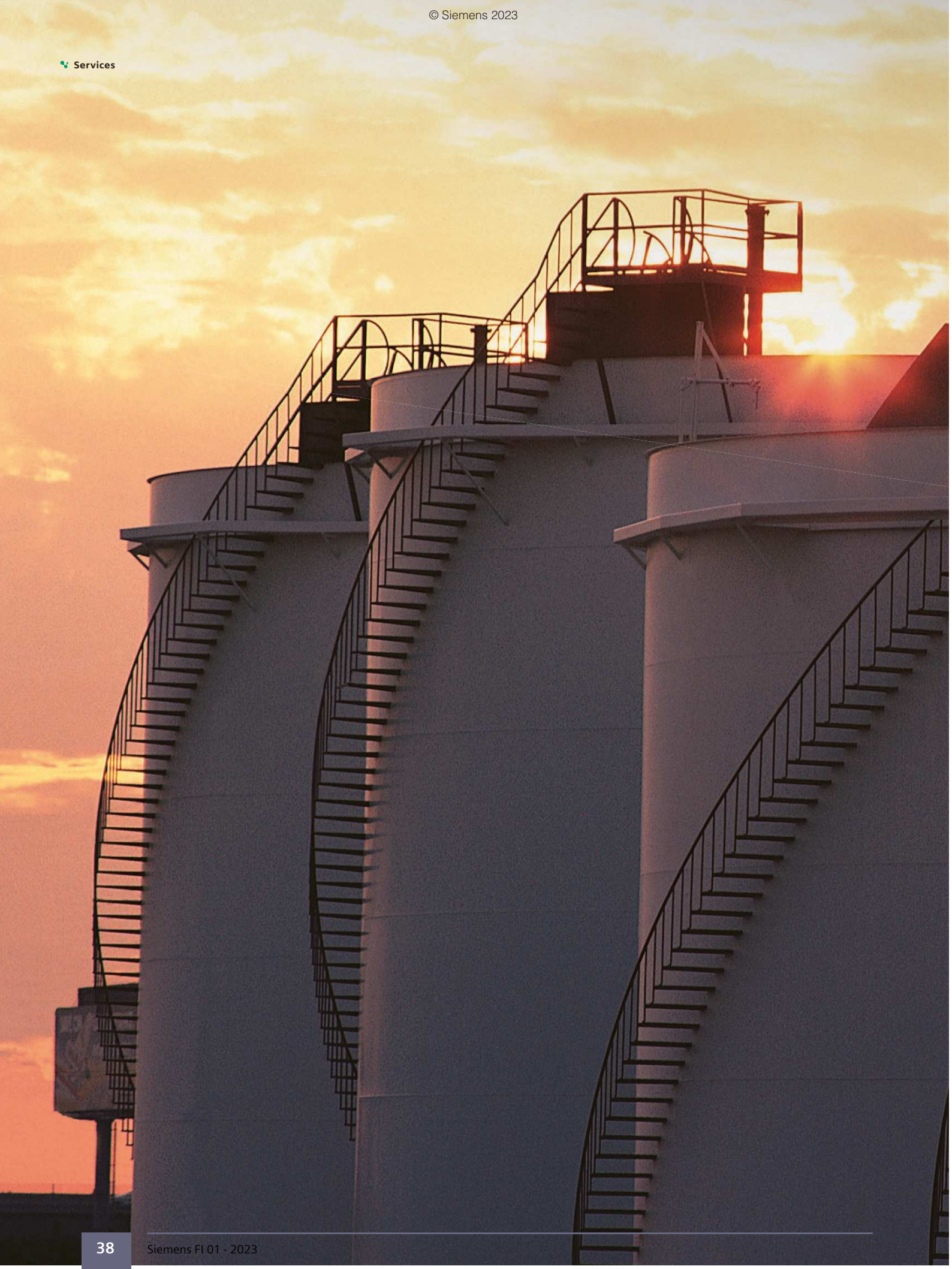
This portal helps you select, size and configure your ideal piece of instrumentation. Interfaces to COMOS and exports to the online ordering portal of Siemens: the Industry Mall (mall.industry.siemens.com). You are able to track the lifecycle of your instrument, see warranty and extended exchange option information as well additional information such as factory certificates (for example for calibration or validation).

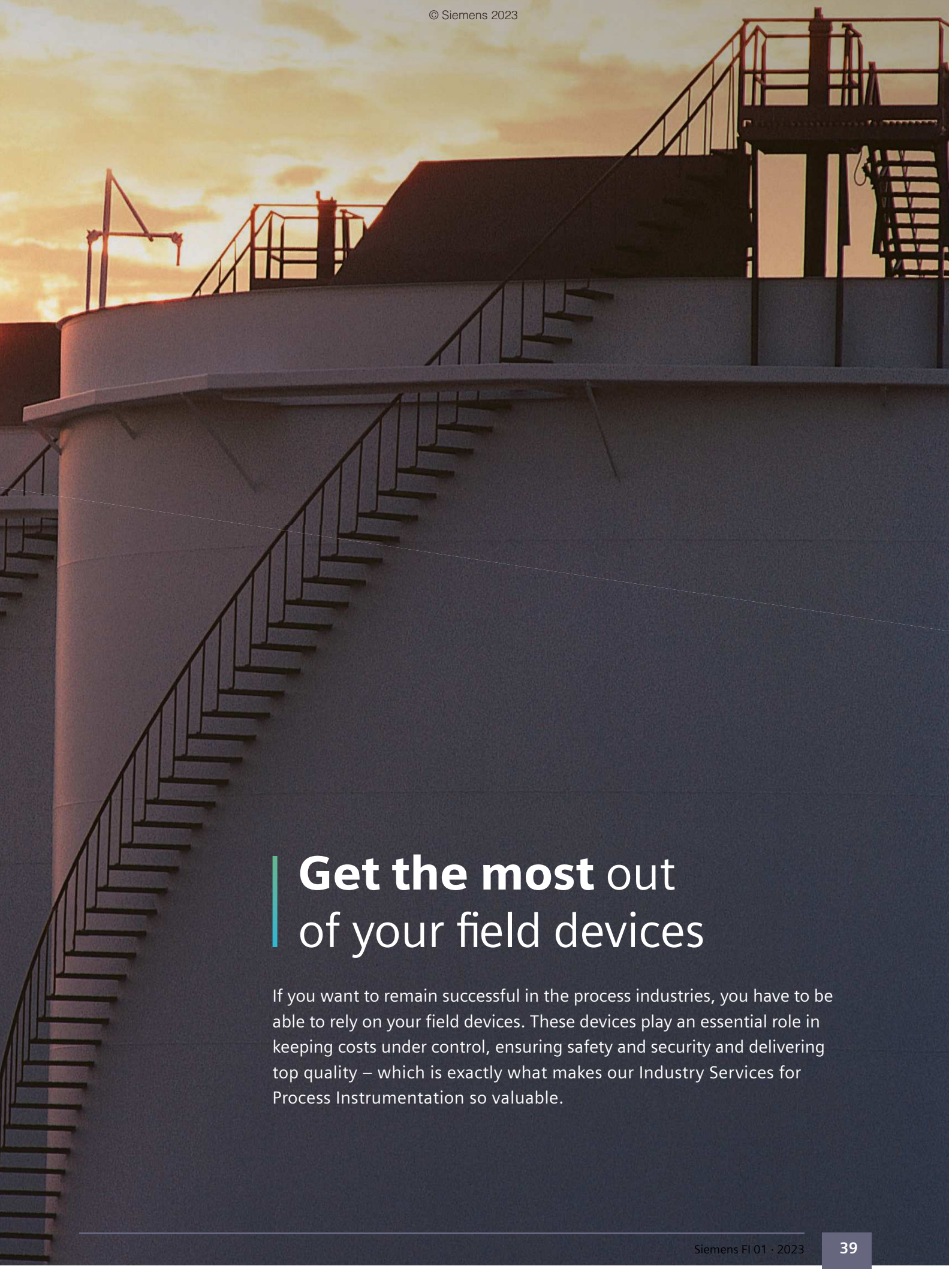




SITRANS Library

- Easy use of device-specific functions and data from devices of the SITRANS and SIPART product families, such as dosing or totalizer functions in solutions with SIMATIC PCS 7
- Library with device-specific function blocks, block symbols and faceplates
- Fully compatible with SIMATIC PCS 7 Standard Advanced Process Library (APL) throughout the entire lifecycle, from engineering to running of the plant



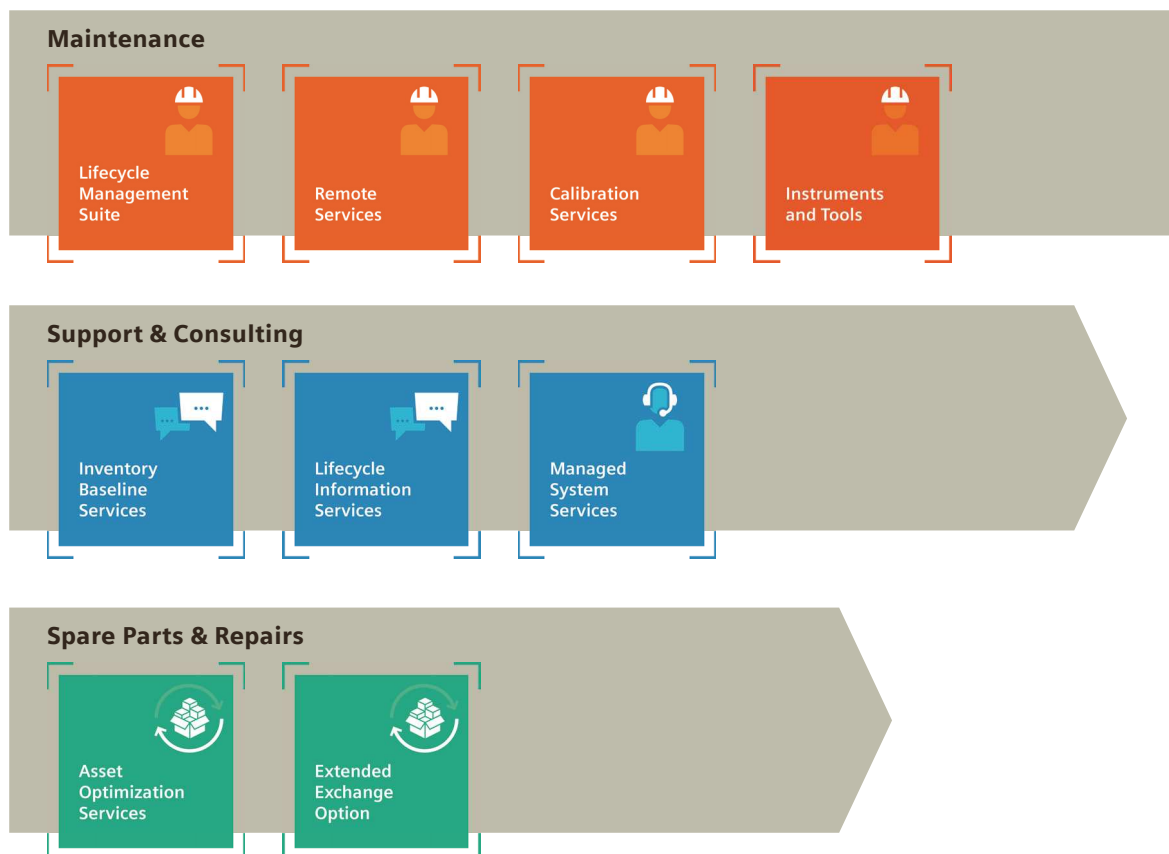


Get the most out of your field devices

If you want to remain successful in the process industries, you have to be able to rely on your field devices. These devices play an essential role in keeping costs under control, ensuring safety and security and delivering top quality – which is exactly what makes our Industry Services for Process Instrumentation so valuable.

Individually adaptable range of **expert services**

Whether you want to protect your investments, ensure the availability of your plant, plan your maintenance costs over the long term or modernize your plant at optimized costs – with our comprehensive range of services and support for all aspects of process instrumentation, we provide you with an efficient lever for achieving these goals. Our modular service portfolio can be tailored precisely to your specific requirements.



Maintenance

Maintaining field instruments is time-consuming, labor-intensive and – depending on whether it’s performed inside or outside explosion-risk zones – involves a substantial outlay. In addition, the ever-growing demands for IT security play an increasingly important role. Our range of on-site services, platform-based remote services and comprehensive calibration services supports you in all your activities, from engineering and commissioning to maintenance.

Support and consulting

Siemens’ Inventory Baseline Services and Lifecycle Information Services provide convenient and powerful portfolio elements for your installed base. We offer a comprehensive training program for design, operation and maintenance personnel that can take place either at the Siemens Training Center or on your premises. Managed System Services are focused on the efficient, centrally coordinated processing of complex support requests. They not only make all service and support activities transparent, they also significantly reduce service time.

Spare parts and repairs

Asset Optimization Services take a structured, systematic approach to the comprehensive optimization of your supply of spare parts. With the Extended Exchange Option, you can protect any Siemens process instrumentation products you order from unforeseeable repair costs.

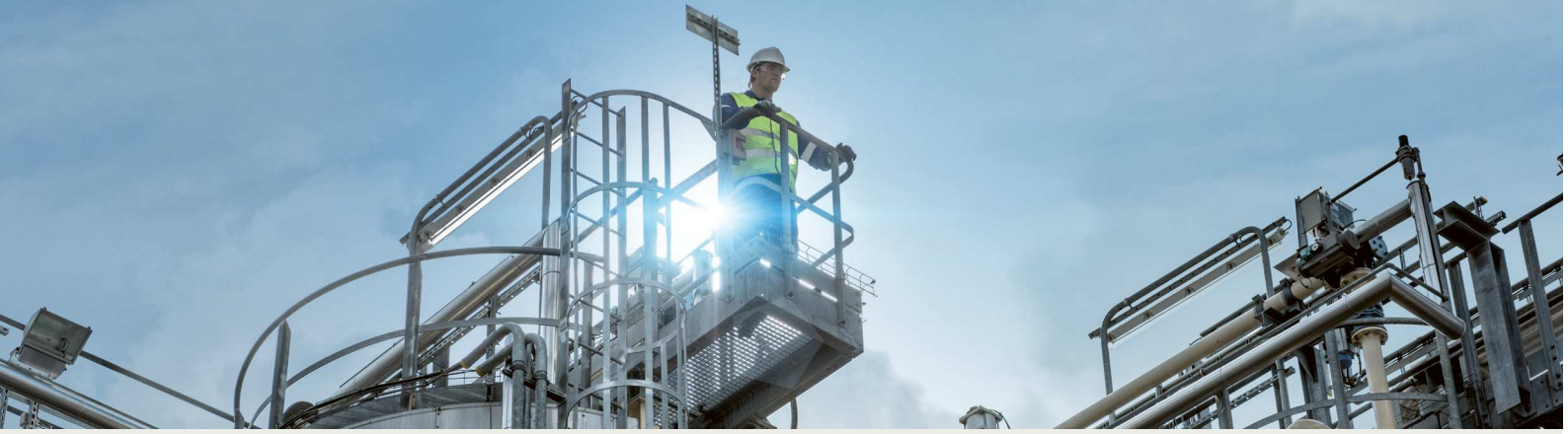
Lifecycle services contracts

A modular lifecycle services contract is composed of defined service elements and contract-specific parameters. Long-term investment protection and assured of serviceability are the essential benefits of a contract solution.



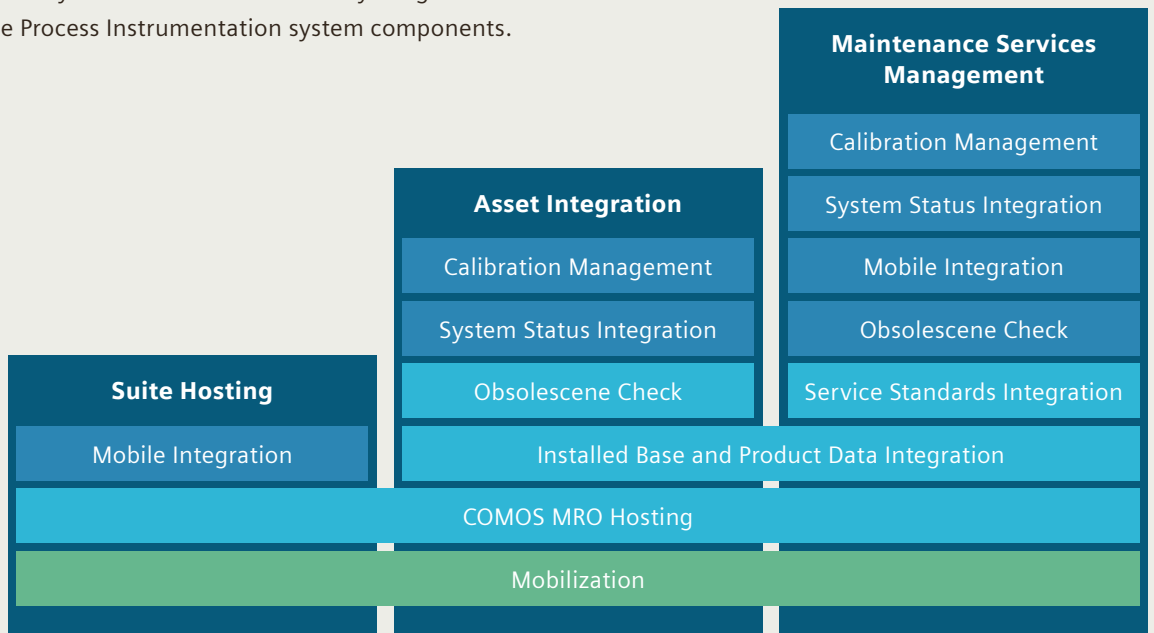
IT tools for everlasting plant performance

Siemens offers various platforms and tools for flexible, mobile asset management and maintenance planning, documentation and optimization. Whether remote or on site, they provide customers with the applications and knowledge needed to minimize lifecycle costs while increasing performance.



Lifecycle Management Suite

The Lifecycle Management Suite optimizes plant maintenance during the planning, execution and documentation of all service activities. The pre-configured, COMOS MRO-based system provides Standard Operating Procedures (SOPs) for lifecycle services that are already assigned to the SIMATIC PCS 7 and the Process Instrumentation system components.



Lifecycle Management Suite – Module structure

Mobile Asset Management Program

Our SIPIX-based Mobile Asset Management Program is your virtual service technician for flexible process monitoring and optimized maintenance. It enhances service efficiency in every phase of the plant life cycle: from data acquisition of the installed base and mobile processing of maintenance orders to augmented reality-supported remote services by Siemens or manufacturer-independent experts. The platform series is robust, powerful and preconfigured with many service apps, making it ready for efficient service operations at the field level or for remote service access.



Engineering

If required, the project engineer can involve a Siemens expert in a specific task at short notice so that they can solve it together on the same screen. The Siemens expert also has the possibility to guide the project engineer through the engineering tool and to make entries independently.



Commissioning

Devices that have already been installed are not yet connected to the higher-level control system. In addition, there are often no networks available for communication with the outside world. This is where our Remote Assisted Collaboration approach comes into play. The SIPIX SD Tablet offers numerous communication options.



Maintenance

In general, maintenance is mostly carried out on site at the unit and in the installed state. This makes it particularly difficult to call in experts from outside during the maintenance phase. Here, Remote Assisted Collaboration based on SIPIX SD offers a wide range of options for technical support by a Siemens expert.

Field device management

Wireless connection via Bluetooth HART modem for parameterization and troubleshooting of process instrumentation with SIMATIC PDM

Recurring mobile maintenance

Targeted maintenance with the COMOS mobile app and standard checklists with the aid of the Lifecycle Management Suite

Installation, commissioning, operation and modernization

Versatile use of the SIPIX tool in every phase of the plant life cycle – in the PLC/control room, over networks via Wi-Fi, point-to-point directly to assets such as field devices, etc.

Universally expandable

Application-specific and customer-specific use cases are possible by installing additional software tools and using existing interfaces such as RFID HF readers, GPS and Bluetooth



Remote services

Fully integrated remote service solution for on-site support with the SIPIX RC video/audio app using the remote infrastructure of Siemens or customers

PCS 7 process visualization and monitoring

Process-level access to information and operation of the plant and asset management, including contactless identification of the assets (RFID scanner), even in hazardous areas

Data recording

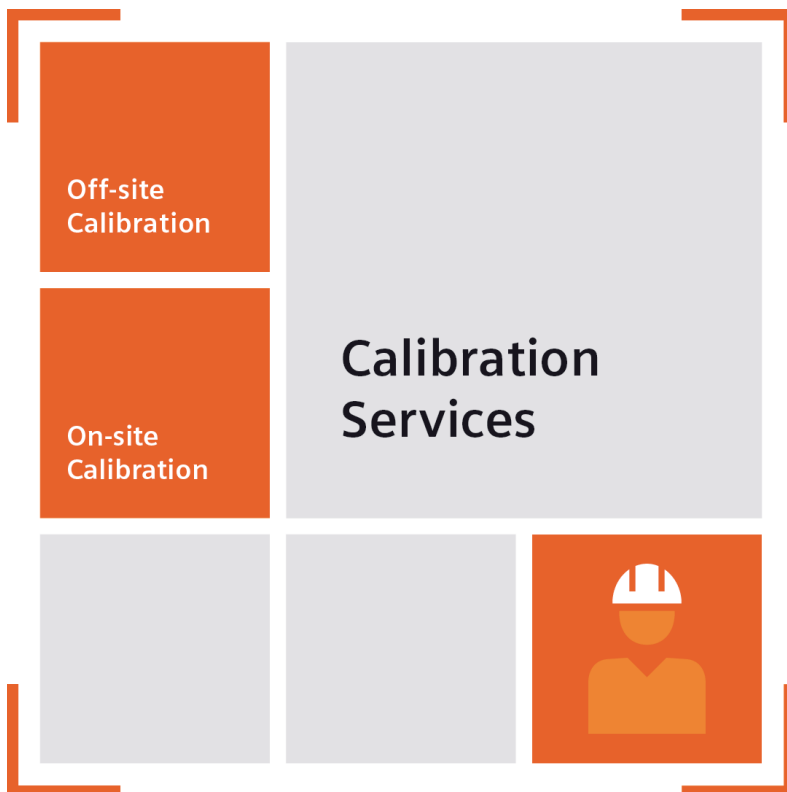
Measuring point recording during service call or digitalization of the plant by means of app-driven manual data recording with SASDCmobile

Calibration services

Paperless solution for execution and documentation of calibration for process instrumentation with bMobile app and CMX cloud-based calibration management

Ensuring the highest level of precision and process quality

Calibration of the measuring and inspection equipment used is vital for precision, quality assurance and compliance in production, maintenance and service. Calibrating measuring and inspection equipment, like any precision engineering activity, requires proper expertise: This is the only way to ensure that equipment performs to long-term expectations and can be trusted for the job at hand.



Off-site Calibration

Make sure your measuring equipment meets industry standards and remains operational throughout its lifecycle. Regular certification of the accuracy of your measuring instruments provides peace of mind.

Our DIN EN ISO/IEC 17025:2018-accredited lab is fully equipped with state-of-the-art precision instrumentation providing a broad range of calibrations for dimensional, electronic and process equipment.

On-site Calibration

Maintaining and calibrating measuring equipment in time is an important matter during the operational phase of a plant's lifecycle. In selected regions, we can also provide our calibration services directly at your facility to ensure your processes do not suffer from extended downtime.

	Pressure	Temperature	Flow	Dynamic Weighing
Off-site Calibration according to ISO 9001	x	x	x	
Off-site Calibration according to ISO 17025	x	x	x	
Off-site Domestic Custody Transfer Verification			x	
On-site Calibration according to ISO 9001*				x

* On-site services will be performed by local Siemens Customer Services. Please contact the Siemens office in your region for further information.

Our global support database

Access to accurate information is a huge asset in the field. Siemens Industry Online Support (SIOS) provides up-to-date information about specific products quickly and easily. Available in the online portal or in the downloadable smartphone app for maximum convenience.

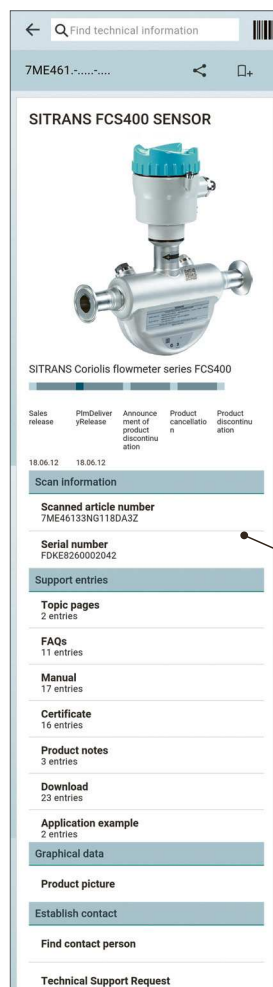


SIOS Portal

24 hours a day, 365 days a year – this portal provides comprehensive information on the entire Siemens portfolio for process and discrete industries.

Find information on automation, communication and process instrumentation under:

- Product support: handbooks, manuals, FAQs, product notes, certificates
- Services: the service portfolio
- Support request: help – just state your issue and we will contact you within four working hours
- My support: activate notifications according to your needs



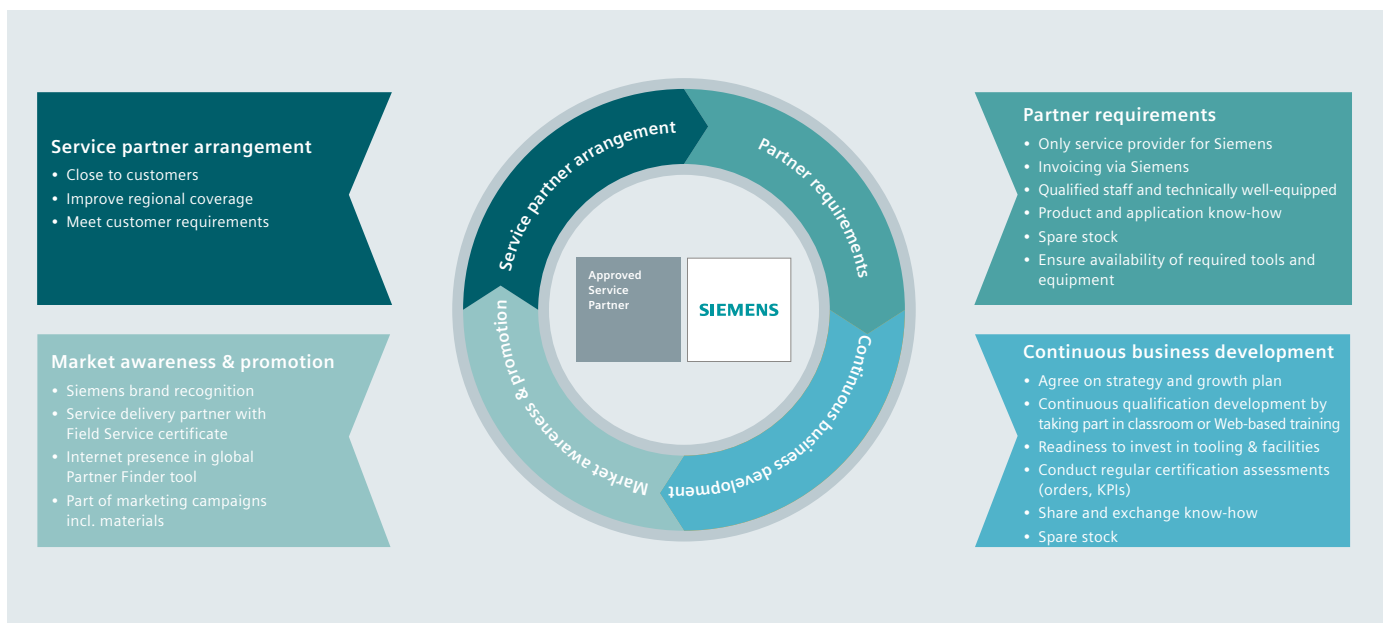
Industry Support App

- Download and install the app on your smartphone
- Scan the QR code of any device in the field
- Access comprehensive information including device-specific information like handbooks, manuals, FAQs, product notes
- Submit a support request and we will contact you within four working hours (even quicker with a premium service contact)



Approved and certified – near you

Siemens partners stand for proven expertise and excellent customer support. The companies we accept as partners have proven their capabilities and been certified in accordance with rigorous standards. At the same time, we support our partners with the same criteria we apply to the training of our own employees.



Role of partners

- Act as a competent service provider on behalf of Siemens
- Regional on-site support
- Bring expertise and service capability
- Secure ongoing development of new service offers together with Siemens
- Win new service customers

Siemens delivers quality

- Based on shared interest (Siemens and partner)
- Partners attend Siemens training programs on a regular basis
- Build on existing long-term relationships between Siemens and partners
- An extensive and standardized process for selection, onboarding and management of partners provides globally uniform quality and standards

Your benefits

- Competent service delivery
- Close to customers (short reaction time)
- Fast access to critical spares (partner stock)
- Increased flexibility
- Partners typically enjoy a high degree of regional acceptance



Pressure measurement



1/3	Product overview
1/6	Pressure transmitters
1/6	Single-range transmitters
1/6	SITRANS P200
1/12	SITRANS P210
1/17	SITRANS P220
1/23	SITRANS LH100
1/30	SITRANS LH300
1/38	SITRANS P Compact
1/50	for food, pharmaceuticals and biotechnology
1/50	SITRANS P300
1/80	Factory mounting of valve manifolds on SITRANS P300
1/82	for the paper industry
1/82	SITRANS P300 with PMC connection
1/95	for applications with advanced requirements
1/95	SITRANS P320/420
1/95	Technical reference
1/102	Gauge pressure (pressure series)
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1/318	Shut-off valves for gauge and absolute pressure



- 1/318 Shut-off valves acc. to DIN 16270, DIN 16271 and DIN 16272
- 1/321 Angled adapter
- 1/322 Shut-off valves
- 1/325 Accessories for shut-off valves
- 1/325 Mounting kit
- 1/326 Measuring instrument holder
- 1/327 Shut-off valves for differential pressure
- 1/327 DN 5 2-, 3- and 5-spindle valve manifold
- 1/332 PN 100 multiway cock
- 1/335 DN 5 3-way and 5-way valve manifold
- 1/339 DN 8 3-way valve manifold
- 1/343 DN 5/DN 8 valve manifold combination
- 1/346 DN 8 valve manifold combination
- 1/349 2-, 3- and 5-spindle valve manifold for protective casing
- 1/355 3- and 5-spindle valve manifold for vertical differential pressure lines
- 1/359 Low-pressure multiway cock
- 1/362 Accessories
- 1/362 Oval flange
- 1/364 Connection pieces
- 1/366 Connection glands
- 1/367 Connection parts G 1/2
- 1/369 Water traps
- 1/370 Sealing rings acc. to EN 837-1
- 1/371 Pressure surge reducers
- 1/372 Primary shut-off valves
- 1/375 Compensation vessels
- 1/377 Connection parts

Overview



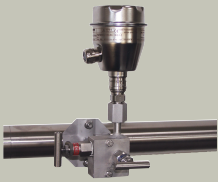


SITRANS P single-range transmitters for general applications			
	Area of application	Device description	Software for parameterization
SITRANS P2xx 	2-wire or 3-wire transmitters for measuring gauge and absolute pressure	SITRANS P200 <ul style="list-style-type: none"> Single-range transmitters for gauge and absolute pressure Ceramic measuring cell For general applications SITRANS P210 <ul style="list-style-type: none"> Single-range transmitters for gauge pressure Stainless steel measuring cell For low-pressure applications SITRANS P220 <ul style="list-style-type: none"> Single-range transmitters for gauge pressure Stainless steel measuring cell, fully welded version For high-pressure applications and refrigeration technology 	–
SITRANS LH100 	2-wire transmitter for measuring hydrostatic level	<ul style="list-style-type: none"> For measuring liquid levels in wells, vessels, channels, dams etc. With ceramic diaphragm, Ø 23.4 mm (0.92 inch) 	–
SITRANS LH300 	2-wire transmitter for measuring hydrostatic level	<ul style="list-style-type: none"> For measuring liquid levels in wells, vessels, channels, dams etc. With ceramic diaphragm, Ø 30 mm (1.18 inches) Suitable for small measuring ranges 	–
SITRANS P Compact 	Transmitters for gauge and absolute pressure for food, pharmaceuticals and biotechnology	<ul style="list-style-type: none"> Single-range transmitters with 2-wire system Hygienic design with various aseptic connections in accordance with EHEDG, FDA and GMP recommendations 	–



Pressure measurement


Product overview

Overview (continued)

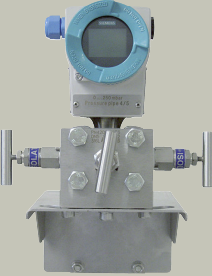

SITRANS P transmitters for food, pharmaceuticals and biotechnology			
	Area of application	Device description	Software for parameterization
 <p>SITRANS P300</p>	<p>2-wire transmitter for measuring gauge and absolute pressure</p> 	<ul style="list-style-type: none"> Hygiene-based design according to EHEDG, 3A, FDA and GMP Parameterization using 3 buttons and communication over HART, PROFIBUS PA or FOUNDATION Fieldbus Standard process connection G$\frac{1}{2}$" , $\frac{1}{2}$-NPT and flush-mounted process connections available Measuring range adjustment 100: 1 	SIMATIC PDM
 <p>Factory mounting of valve manifolds</p>		<p>Factory-mounting of valve manifolds on SITRANS P300 gauge or absolute pressure transmitters</p> <ul style="list-style-type: none"> Simplified assembly With pressure test Stainless steel valve manifolds 	–
SITRANS P transmitters for the paper industry			
	Area of application	Device description	Software for parameterization
 <p>SITRANS P300 with PMC connection</p>	<p>2-wire transmitter for measuring gauge pressure</p>	<ul style="list-style-type: none"> Measuring range adjustment 100: 1 Process connections for the paper industry Parameterization using 3 pushbuttons and HART, PROFIBUS PA or FOUNDATION Fieldbus 	SIMATIC PDM
SITRANS P transmitters for applications with advanced requirements			
	Area of application	Device description	Software for parameterization
 <p>SITRANS P320/P420</p>	<p>2-wire transmitter for measuring:</p> <ul style="list-style-type: none"> Gauge pressure, Absolute pressure, Differential pressure and Flow or Level 	<ul style="list-style-type: none"> Measuring accuracy <ul style="list-style-type: none"> - SITRANS P320: 0.065% - SITRANS P420: 0.04% Fast step response time of up to 105 ms Developed according to IEC 61508, SIL2/3 applications SIL validation remotely Diagnostics according to Namur NE107 4-button operation 	SIMATIC PDM

Overview (continued)

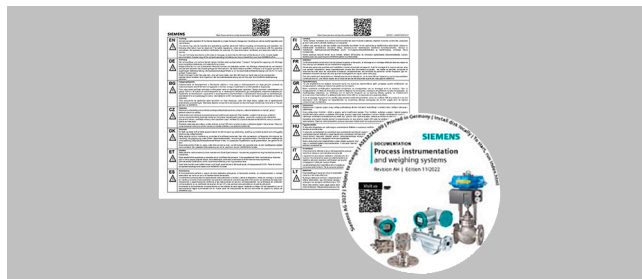
Remote seal for SITRANS P transmitters

	Area of application Remote seals for measuring viscous, corrosive or fibrous media (as well as media at extreme temperatures)	Device description Remote seal for SITRANS P300 and SITRANS P320/420 <ul style="list-style-type: none"> • Remote seal in sandwich and flange designs • Remote seal with quick-release for the food and beverages industry • Wide range of diaphragm materials and filling liquid available 	Software for parameterization –
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Valves

	Area of application	Device description	Software for parameterization
Shut-off valves and valve manifolds 	Shutting off the medium and differential pressure lines Mounting of transmitter on valve manifold or shut-off valve	Shut-off valves and valve manifolds available in steel, brass or stainless steel Valve manifolds available for the various process connections of the SITRANS P transmitters	–
Accessories for valves 		The following parts are available as accessories for valves: <ul style="list-style-type: none"> • Oval flange • Connection pieces • Connection glands • Connection parts G½ • Water traps • Sealing rings acc. to EN 837-1 • Pressure surge reducers • Primary shut-off valves • Compensation vessels • Connection parts 	–

Supplied product documentation on DVD and safety notes



The scope of delivery of the Siemens products for process instrumentation includes a multilingual instruction sheet with **safety notes** as well as a uniform **mini DVD – Process Instrumentation and Weighing Systems**.

This DVD contains the most important manuals and certificates for the Siemens process instrumentation and weighing technology portfolio. The delivery may also contain product-specific or order-specific printed materials.

For more information, refer to section 10 "Appendix".

Pressure measurement

Pressure transmitters

Single-range transmitters / SITRANS P200

Overview



The SITRANS P200 pressure transmitter measures the gauge and absolute pressure of liquids, gases and vapors.

- With ceramic measuring cell
- Gauge and absolute measuring ranges 1 to 60 bar (15 to 1000 psi)
- For general applications

Benefits

- High measurement accuracy
- Rugged stainless steel enclosure
- High overload withstand capability
- For corrosive and non-corrosive media
- For measuring the pressure of liquids, gases and vapors
- Compact design

Application

The SITRANS P200 pressure transmitter for gauge and absolute pressure is used in the following industrial areas:

- Mechanical engineering
- Shipbuilding
- Power engineering
- Chemical industry
- Water supply

Design

Device structure without explosion protection

The pressure transmitter consists of a piezoresistive measuring cell with a diaphragm, installed in a stainless steel enclosure. It can be connected electrically with a device plug to EN 175301-803-A (IP65), an M12 device plug (IP67), a cable (IP67) or a Quickon cable quick screw connection (IP67). The output signal is between 4 and 20 mA or 0 and 10 V

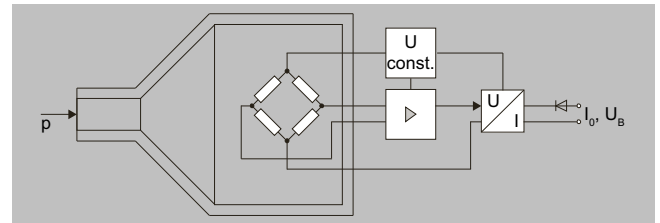
Device structure with explosion protection

The pressure transmitter consists of a piezoresistive measuring cell with a diaphragm, installed in a stainless steel enclosure. It can be connected electrically with a device plug fulfilling EN 175301-803-A (IP65) or an M12 device plug (IP67). The output signal is between 4 and 20 mA.

Function

The pressure transmitter measures the gauge and absolute pressure of liquids, gases and vapors.

Mode of operation



SITRANS P200 pressure transmitters (7MF1565-...), functional diagram

The ceramic measuring cell has a thick-film resistance bridge, to which the operating pressure p is transmitted through a ceramic diaphragm.

The voltage output from the measuring cell is converted by an amplifier into an output current of 4 to 20 mA or an output voltage of 0 to 10 V DC.

The output current and voltage are linearly proportional to the input pressure.

Selection and ordering data

								Article No.	Order code
SITRANS P200 pressure transmitter, for pressure and absolute pressure for general applications								7MF1565-	
								● ● ● ● ● - ● ● ● ● ● ● ● ●	
Typical characteristic curve deviation 0.25 %, material of wetted parts: Ceramic and stainless steel + gasket material Material of non-wetted parts: Stainless steel									
Click the article number for online configuration in the PIA Life Cycle Portal.									
Measuring range	Minimum overload limit	Maximum overload limit	Burst pressure						
For gauge pressure									
0 ... 1 bar	(0 ... 14.5 psi)	-1 bar	(-14.5 psi)	2.5 bar	(36.26 psi)	> 2.5 bar	(> 36.3 psi)	3 B A	
0 ... 1.6 bar	(0 ... 23.2 psi)	-1 bar	(-14.5 psi)	4 bar	(58.02 psi)	> 4 bar	(> 58.0 psi)	3 B B	
0 ... 2.5 bar	(0 ... 36.3 psi)	-1 bar	(-14.5 psi)	6.25 bar	(90.65 psi)	> 6.25 bar	(> 90.7 psi)	3 B D	
0 ... 4 bar	(0 ... 58.0 psi)	-1 bar	(-14.5 psi)	10 bar	(145 psi)	> 10 bar	(> 145 psi)	3 B E	
0 ... 6 bar	(0 ... 87.0 psi)	-1 bar	(-14.5 psi)	15 bar	(217 psi)	> 15 bar	(> 217 psi)	3 B G	
0 ... 10 bar	(0 ... 145 psi)	-1 bar	(-14.5 psi)	25 bar	(362 psi)	> 25 bar	(> 362 psi)	3 C A	
0 ... 16 bar	(0 ... 232 psi)	-1 bar	(-14.5 psi)	40 bar	(580 psi)	> 40 bar	(> 580 psi)	3 C B	
0 ... 25 bar	(0 ... 363 psi)	-1 bar	(-14.5 psi)	62.5 bar	(906 psi)	> 62.5 bar	(> 906 psi)	3 C D	
0 ... 40 bar	(0 ... 580 psi)	-1 bar	(-14.5 psi)	100 bar	(1450 psi)	> 100 bar	(> 1450 psi)	3 C E	
0 ... 60 bar	(0 ... 870 psi)	-1 bar	(-14.5 psi)	150 bar	(2175 psi)	> 150 bar	(> 2175 psi)	3 C G	
Other version; Add order code and plain text: Measuring range: ... to ... bar (psi)								9 A A	H 1 Y
For absolute pressure									
0 ... 0.6 bar a	(0 ... 8.7 psi a)	0 bar a	(0 psi a)	2.5 bar a	(36.26 psi a)	> 2.5 bar a	(> 36.3 psi a)	5 A G	
0 ... 1 bar a	(0 ... 14.5 psi a)	0 bar a	(0 psi a)	2.5 bar a	(36.26 psi a)	> 2.5 bar a	(> 36.3 psi a)	5 B A	
0 ... 1.6 bar a	(0 ... 23.2 psi a)	0 bar a	(0 psi a)	4 bar a	(58.02 psi a)	> 4 bar a	(> 58.0 psi a)	5 B B	
0 ... 2.5 bar a	(0 ... 36.3 psi a)	0 bar a	(0 psi a)	6.25 bar a	(90.65 psi a)	> 6.25 bar a	(> 90.7 psi a)	5 B D	
0 ... 4 bar a	(0 ... 58.0 psi a)	0 bar a	(0 psi a)	10 bar a	(145 psi a)	> 10 bar a	(> 145 psi a)	5 B E	
0 ... 6 bar a	(0 ... 87.0 psi a)	0 bar a	(0 psi a)	15 bar a	(217 psi a)	> 15 bar a	(> 217 psi a)	5 B G	
0 ... 10 bar a	(0 ... 145 psi a)	0 bar a	(0 psi a)	25 bar a	(362 psi a)	> 25 bar a	(> 362 psi a)	5 C A	
0 ... 16 bar a	(0 ... 232 psi a)	0 bar a	(0 psi a)	40 bar a	(580 psi a)	> 40 bar a	(> 580 psi a)	5 C B	
Other version; Add order code and plain text: Measuring range: ... to ... mbar a (psi a)								9 A A	H 2 Y
Measuring ranges for gauge pressure									
0 ... 15 psi		-14.5 psi		35 psi		> 35 psi		4 B B	
3 ... 15 psi		-14.5 psi		35 psi		> 35 psi		4 B C	
0 ... 20 psi		-14.5 psi		50 psi		> 50 psi		4 B D	
0 ... 30 psi		-14.5 psi		80 psi		> 80 psi		4 B E	
0 ... 60 psi		-14.5 psi		140 psi		> 140 psi		4 B F	
0 ... 100 psi		-14.5 psi		200 psi		> 200 psi		4 B G	
0 ... 150 psi		-14.5 psi		350 psi		> 350 psi		4 C A	
0 ... 200 psi		-14.5 psi		550 psi		> 550 psi		4 C B	
0 ... 300 psi		-14.5 psi		800 psi		> 800 psi		4 C D	
0 ... 500 psi		-14.5 psi		1 400 psi		> 1400 psi		4 C E	
0 ... 750 psi		-14.5 psi		2 000 psi		> 2 000 psi		4 C F	
0 ... 1 000 psi		-14.5 psi		2 000 psi		> 2 000 psi		4 C G	
Other version; Add order code and plain text: Measuring range: ... to ... psi								9 A A	H 1 Y
Measuring ranges for absolute pressure									
0 ... 10 psi a		0 psi a		35 psi a		> 35 psi a		6 A G	
0 ... 15 psi a		0 psi a		35 psi a		> 35 psi a		6 B A	
0 ... 20 psi a		0 psi a		50 psi a		> 50 psi a		6 B B	
0 ... 30 psi a		0 psi a		80 psi a		> 80 psi a		6 B D	
0 ... 60 psi a		0 psi a		140 psi a		> 140 psi a		6 B E	
0 ... 100 psi a		0 psi a		200 psi a		> 200 psi a		6 B G	
0 ... 150 psi a		0 psi a		350 psi a		> 350 psi a		6 C A	
0 ... 200 psi a		0 psi a		550 psi a		> 550 psi a		6 C B	
0 ... 300 psi a		0 psi a		800 psi a		> 800 psi a		6 C C	
Other version; Add order code and plain text: Measuring range: ... to ... psi a								9 A A	H 2 Y
Output signal									
4 ... 20 mA; 2-wire system; auxiliary power 7 ... 33 V DC (10 ... 30 V DC for ATEX devices)								0	
0 ... 10 V; 3-wire system; auxiliary power 12 ... 33 V DC								1 0	

Pressure measurement

Pressure transmitters

Single-range transmitters / SITRANS P200

Selection and ordering data (continued)

	Article No.	Order code
SITRANS P200 pressure transmitter, for pressure and absolute pressure for general applications	7MF1565-	
0 ... 5 V; 3-wire system; auxiliary power 7 ... 33 V DC	2 0	
Ratiometric 10 ... 90%; 3-wire system; auxiliary power 5 V DC ± 10%	3 0	
Explosion protection (only 4 ... 20 mA)		
None	0	
With explosion protection Ex ia IIC T4	1	
Electrical connection		
Plug according to EN 175301-803-A, stuffing box thread M16 (with coupling)		1
M12 device plug according to IEC 61076-2-101		2
Connection via permanently installed cable, 2 m (6.6 ft); not for "Intrinsic safety" type of protection	0	3
Quick-screw cable gland Quickon PG9; not for "Intrinsic safety" type of protection	0	4
Plug according to EN 175301-803-A, stuffing box thread 1/2"-14 NPT (with coupling)		5
Plug according to EN 175301-803-A, stuffing box thread PG11 (with coupling)		6
Permanently installed cable, length 5 m (16.4 ft)	0	7
Special design		9
		N 1 Y
Process connection		
G½" male according to EN 837-1 (½" BSP male): Standard for metric pressure ranges mbar, bar		A
G½" male and G1/8" female		B
G¼" male according to EN 837-1 (¼" BSP male)		C
7/16"-20 UNF male		D
¼"-18 NPT male: Standard for pressure ranges inH ₂ O and psi		E
¼"-18 NPT female		F
½"-14 NPT male		G
½"-14 NPT female		H
7/16"-20 UNF female		J
M20×1.5 male		P
G¼" according to EN ISO 1179-2 (formerly DIN 3852 form E)		Q
G½" according to EN ISO 1179-2 (formerly DIN 3852 form E)		R
Special design		Z
		P 1 Y
Gasket material between sensor and enclosure		
Viton (FPM, standard)		A
Neoprene (CR)		B
Perbunan (NBR)		C
EPDM		D
Special design		Z
		Q 1 Y
Version		
Standard version		1

Options	Order code
Add "-Z" to article number and specify order code.	
Quality inspection certificate (5-point characteristic curve test) according to IEC 62828-2	C11
Oxygen version, free of oil and degreased, max. operating pressure 60 bar (870.2 psi), max. medium temperature +85 °C (185 °F)	E10
Notice	
Only with Viton gasket material between sensor and enclosure, and not with explosion protection version!	

Technical specifications

SITRANS P200 for gauge and absolute pressure	
Area of application Gauge and absolute pressure measurement	Liquids, gases and vapors
Mode of operation Measuring principle	Piezo-resistive measuring cell (ceramic diaphragm)
Measured variable	Gauge and absolute pressure
Input Measuring range	
• Gauge pressure	
- Metric	1 ... 60 bar (15 ... 870 psi)
- US measuring range	15 ... 1000 psi
• Absolute pressure	
- Metric	0.6 ... 16 bar a (10 ... 232 psi a)
- US measuring range	10 ... 300 psi a
Output Current signal	4 ... 20 mA
• Load	($U_b - 10 V$)/0.02 A
• Auxiliary power U_b	7 ... 33 V DC (10 ... 30 V for Ex)
Voltage signal	0 ... 10 V DC
• Load	$\geq 10 k\Omega$
• Auxiliary power U_b	12 ... 33 V DC
• Current consumption	< 7 mA at 10 k Ω
Radiometric output	10 ... 90%
• Load	$\geq 10 k\Omega$
• Auxiliary power U_b	DC 5 V \pm 10%
• Current consumption	< 7 mA at 10 Ω
Characteristic curve	Linear rising
Measuring accuracy Measurement deviation at limit setting including hysteresis and reproducibility	<ul style="list-style-type: none"> Typical: 0.25% of measuring span Maximum: 0.5% of measuring span
Step response time T_{99}	< 5 ms
Long-term stability	
• Lower range value and measuring span	0.25% of measuring span/year
Effect of ambient temperature	
• Lower range value and measuring span	0.25%/10 K of measuring span
• Influence of power supply	0.005%/V
Operating conditions Process temperature with gasket made of:	
• FPM (standard)	-15 ... +125 °C (5 ... 257 °F)
• Neoprene	-35 ... +100 °C (-31 ... +212 °F)
• Perbunan	-20 ... +100 °C (-4 ... +212 °F)
• EPDM	-40 ... +125 °C (-40 ... +257 °F), usable for drinking water
Ambient temperature	-25 ... +85 °C (-13 ... +185 °F)
Storage temperature	-50 ... +100 °C (-58 ... +212 °F)
Degree of protection according to IEC 60529	<ul style="list-style-type: none"> IP65 with plug according to EN 175301-803-A IP67 with M12 device plug IP67 with cable IP67 with cable quick screw connection
Electromagnetic compatibility	<ul style="list-style-type: none"> According to IEC 61326-1/2/-3 According to NAMUR NE21 for ATEX devices only, and with a max. measurement error of \leq 1%
Structural design Weight	Approx. 0.090 kg (0.198 lbs)
Process connections	See dimension drawings

Technical specifications (continued)

SITRANS P200 for gauge and absolute pressure	
Electrical connections	<ul style="list-style-type: none"> Plug according to EN 175301-803-A Form A with cable entry M16x1.5 or 1/2-14 NPT or Pg 11 Device plug M12 2 or 3-wire (0.5 mm²) cable ($\varnothing \pm 5.4$ mm) Quickon cable quick screw connection
Material of wetted parts	
• Measuring cell	Al ₂ O ₃ - 96%
• Process connection	Stainless steel, mat. no. 1.4404 (SST 316 L)
• Gasket	<ul style="list-style-type: none"> FPM (standard) Neoprene Perbunan EPDM
Material of non-wetted parts	
• Enclosure	Stainless steel, mat. no. 1.4404 (SST 316 L)
• Connector housing	Plastic
• Cable	PVC
Certificates and approvals Classification according to pressure equipment directive (PED 2014/68/EU)	For gases of fluid group 1 and liquids of fluid group 1; complies with requirements of article 4, paragraph 3 (sound engineering practice)
Lloyd's Register of Shipping (LR) ¹⁾	12/20010
Germanischer Lloyd (GL) ¹⁾	GL19740 11 HH00
American Bureau of Shipping (ABS) ¹⁾	ABS_11_HG 789392_PDA
Bureau Veritas (BV) ¹⁾	BV 271007A0 BV
Det Norske Veritas (DNV) ¹⁾	A 12553
Drinking water approval (ACS) ¹⁾	ACS 15 ACC NY 360
EAC ¹⁾	№ TC RU C-DE.F505.B.00732 OC НАННО «ЦБ3»
Underwriters Laboratories (UL) ¹⁾	
• For USA and Canada	UL 20110217 - E34453
• Worldwide	IEC UL DK 21845
Explosion protection Intrinsic safety "i" (only with current output)	Ex II 1/2 G Ex ia IIC T4 Ga/Gb Ex II 1/2 D Ex ia IIC T125 °C Da/Db
EC type-examination certificate	SEV 10 ATEX 0146
Connection to certified intrinsically safe ohmic circuits with maximum values	$U_i \leq$ DC 30 V; $I_i \leq$ 100 mA; $P_i \leq$ 0.75 W
Effective internal inductance and capacity for versions with plugs according to EN 175301-803-A and M12	$L_i = 0$ nH; $C_i = 0$ nF

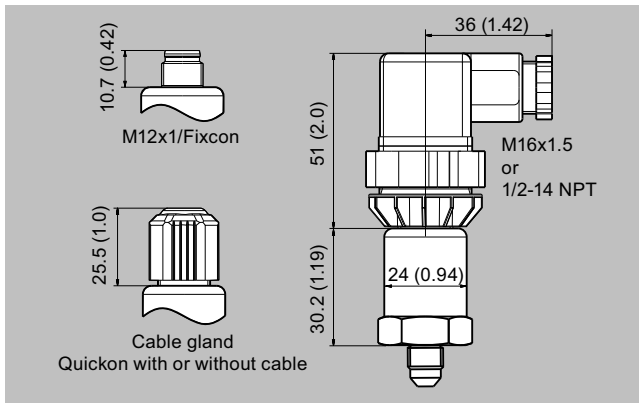
¹⁾ For variants with output signal 0 ... 5 V and radiometric output available soon.

Pressure measurement

Pressure transmitters

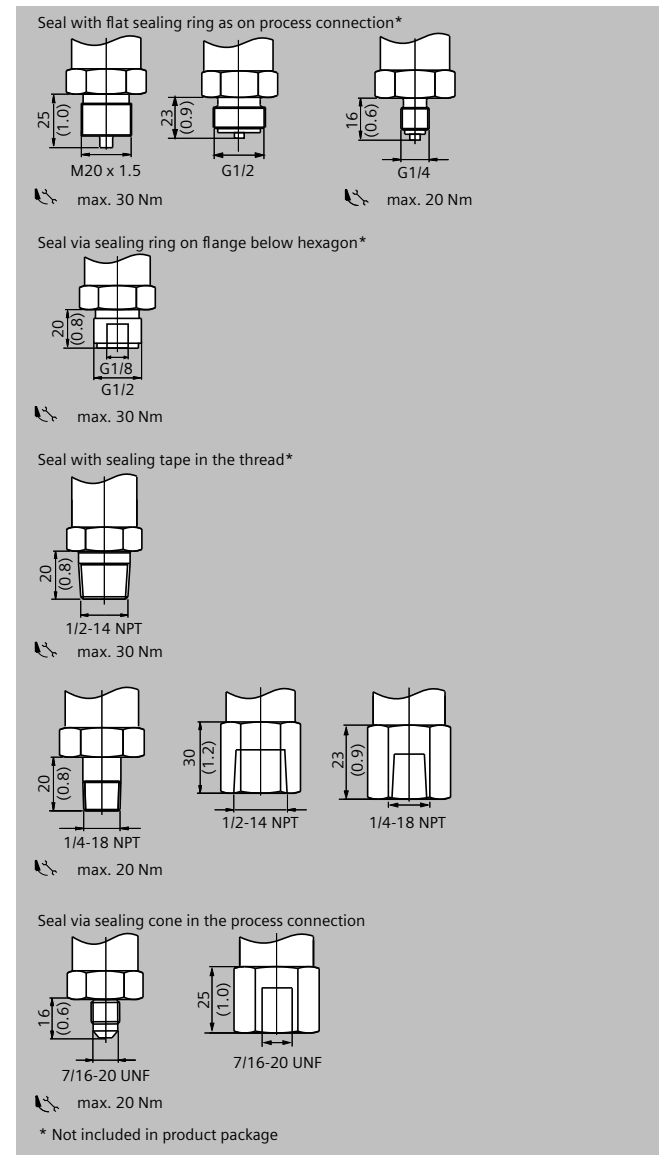
Single-range transmitters / SITRANS P200

Dimensional drawings



SITRANS P200, electrical connections, dimensions in mm (inch)

Dimensional drawings (continued)



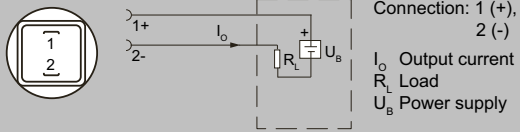
SITRANS P200, process connections, dimensions in mm (inch)

Pressure measurement

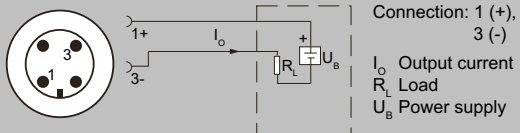
Pressure transmitters

Single-range transmitters / SITRANS P200

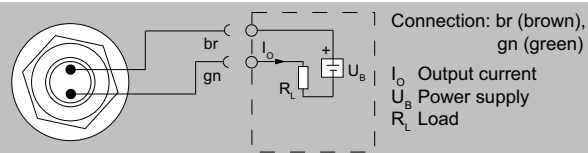
Circuit diagrams



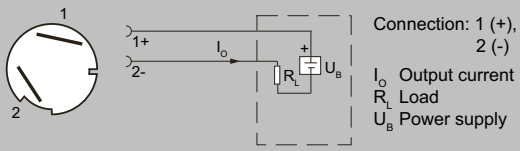
Connection with current output and plug according to EN 175301



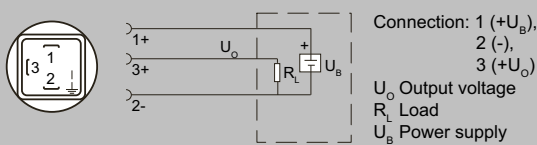
Connection with current output and M12x1 device plug



Connection with current output and cable

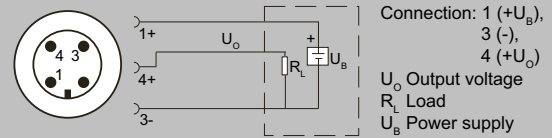


Connection with current output and Quickon cable quick screw connection

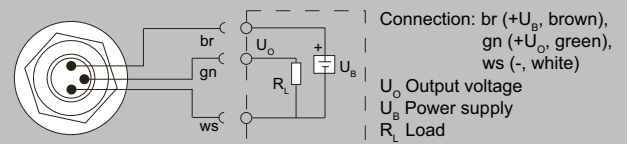


Connection with voltage output, ratiometric output and plug according to EN 175301

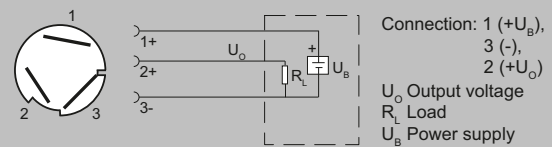
Circuit diagrams (continued)



Connection with voltage output, ratiometric output and M12x1 device plug



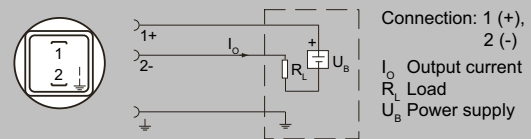
Connection with voltage output, ratiometric output and cable



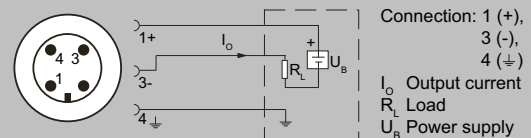
Connection with voltage output, ratiometric output and Quickon fast cable termination

Device design with explosion protection: 4 to 20 mA

The grounding connection is conductively bonded to the transmitter enclosure.



Connection with current output and plug according to EN 175301 (Ex)



Connection with current output and M12x1 (Ex) device plug

Pressure measurement

Pressure transmitters

Single-range transmitters / SITRANS P210

Overview



The SITRANS P210 pressure transmitter measures the gauge pressure of liquids, gases and vapors.

- Stainless steel measuring cell
- Measuring ranges 100 to 600 mbar (1.45 to 8.7 psi) relative
- For low-pressure applications

Benefits

- High measurement accuracy
- Rugged stainless steel enclosure
- High overload withstand capability
- For corrosive and non-corrosive media
- For measuring the pressure of liquids, gases and vapors
- Compact design

Application

The SITRANS P210 pressure transmitter for gauge pressure is used in the following industrial areas:

- Mechanical engineering
- Shipbuilding
- Energy development
- Chemical industry
- Water supply

Design

Device structure without explosion protection

The pressure transmitter consists of a piezoresistive measuring cell with a diaphragm, installed in a stainless steel enclosure. It can be connected electrically with a device plug to EN 175301-803-A (IP65), an M12 device plug (IP67), a cable (IP67) or a Quickon cable quick screw connection (IP67). The output signal is between 4 and 20 mA or 0 and 10 V

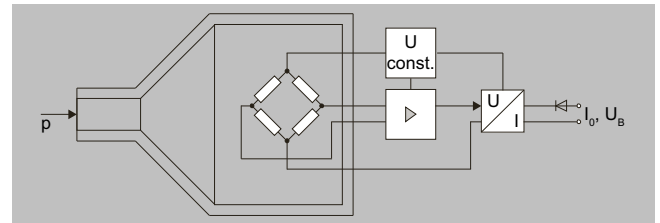
Device structure with explosion protection

The pressure transmitter consists of a piezoresistive measuring cell with a diaphragm, installed in a stainless steel enclosure. It can be connected electrically with a device plug fulfilling EN 175301-803-A (IP65) or an M12 device plug (IP67). The output signal is between 4 and 20 mA.

Function

The pressure transmitter measures the gauge pressure of liquids and gases as well as the level of liquids.

Mode of operation



SITRANS P210 pressure transmitter (7MF1566-...), functional diagram

The stainless steel measuring cell with silicone oil filling has a thin-film resistance bridge to which the operating pressure p is transmitted through a stainless steel diaphragm.

The voltage output from the measuring cell is converted by an amplifier into an output current of 4 to 20 mA or an output voltage of 0 to 10 V DC.

The output current and voltage are linearly proportional to the input pressure.

Selection and ordering data

SITRANS P210 pressure transmitter for gauge pressure, for low-pressure applications							Article No.	Order code
							7MF1566-	● ● ● ● ● - ● ● ● ● ● ● ● ●
Measurement deviation typ. 0.25%								
Material of wetted parts: Stainless steel + gasket material								
Material of non-wetted parts: Stainless steel								
Click the article number for online configuration in the PIA Life Cycle Portal.								
Measuring range	Minimum overload limit	Maximum overload limit	Burst pressure					
For gauge pressure								
0...100 mbar (1.45 psi)	-400 mbar (-5.8 psi)	400 mbar (5.8 psi)	1 bar (14.5 psi)				3 A A	
0...160 mbar (2.32 psi)	-400 mbar (-5.8 psi)	400 mbar (5.8 psi)	1 bar (14.5 psi)				3 A B	
0...250 mbar (3.63 psi)	-800 mbar (-11.6 psi)	1 000 mbar (14.5 psi)	2 bar (29.0 psi)				3 A C	
0...400 mbar (5.8 psi)	-800 mbar (-11.6 psi)	1 000 mbar (14.5 psi)	2 bar (29.0 psi)				3 A D	
0...600 mbar (8.7 psi)	-1 000 mbar (-14.5 psi)	2 000 mbar (29.0 psi)	3 bar (43.5 psi)				3 A G	
Other version; Add order code and plain text: Measuring range: ... to ... mbar (psi)							9 A A	H 1 Y
Output signal								
4 ... 20 mA; 2-wire system; auxiliary power 7 ... 33 V DC (10 ... 30 V DC for ATEX devices)							0	
0 ... 10 V; 3-wire system; auxiliary power 12 ... 33 V DC							1 0	
0 ... 5 V; 3-wire system; auxiliary power 7 ... 33 V DC							2 0	
Ratiometric 10 ... 90%; 3-wire system; auxiliary power 5 V DC ± 10%							3 0	
Explosion protection (only 4 ... 20 mA)								
None							0	
With explosion protection Ex ia IIC T4							1	
Electrical connection								
Plug according to EN 175301-803-A, stuffing box thread M16 (with coupling)								1
M12 device plug according to IEC 61076-2-101								2
Connection via permanently installed cable, 2 m (6.6 ft); not for "Intrinsic safety" type of protection							0	3
Quick-screw cable gland Quickon PG9; not for "Intrinsic safety" type of protection							0	4
Plug according to EN 175301-803-A, stuffing box thread 1/2"-14 NPT (with coupling)								5
Plug according to EN 175301-803-A, stuffing box thread PG11 (with coupling)								6
Permanently installed cable, length 5 m (16.4 ft)							0	7
Special design								9 N 1 Y
Process connection								
G½" male according to EN 837-1 (½" BSP male): Standard for metric pressure ranges mbar, bar								A
G½" male and G1/8" female								B
G¼" male according to EN 837-1 (¼" BSP male)								C
7/16"-20 UNF male								D
¼"-18 NPT male: Standard for pressure ranges inH₂O and psi								E
¼"-18 NPT female								F
½"-14 NPT male								G
½"-14 NPT female								H
7/16"-20 UNF female								J
M20×1.5 male								P
G¼" according to EN ISO 1179-2 (formerly DIN 3852 form E)								Q
G½" according to EN ISO 1179-2 (formerly DIN 3852 form E)								R
Special design								Z P 1 Y
Gasket material between sensor and enclosure								
Viton (FPM, standard)								A
Neoprene (CR)								B
Perbunan (NBR)								C
EPDM								D
Special design								Z Q 1 Y
Version								
Standard version								1

Options	Order code
Add "-Z" to article number and specify order code.	
Quality inspection certificate (5-point characteristic curve test) according to IEC 62828-2	C11

Pressure measurement

Pressure transmitters

Single-range transmitters / SITRANS P210

Technical specifications

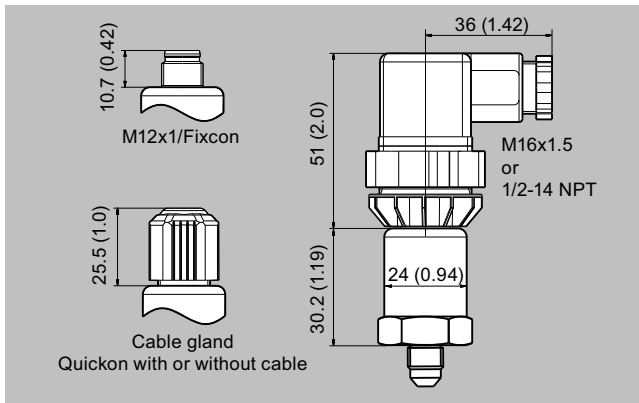
SITRANS P210 for gauge pressure	
Area of application Gauge pressure measurement	Liquids, gases and vapors
Mode of operation Measuring principle	Piezoresistive measuring cell (stainless steel diaphragm)
Measured variable	Gauge pressure
Input Measuring range	
• Gauge pressure	100 ... 600 mbar (1.45 ... 8.7 psi)
Output Current signal	4 ... 20 mA
• Load	$(U_B - 10 \text{ V})/0.02 \text{ A}$
• Auxiliary power U_B	7 ... 33 V DC (10 ... 30 V for Ex)
Voltage signal	0 ... 10 V DC
• Load	$\geq 10 \text{ k}\Omega$
• Auxiliary power U_B	12 ... 33 V DC
• Current consumption	$< 7 \text{ mA}$ at 10 k Ω
Radiometric output	10 ... 90%
• Load	$\geq 10 \text{ k}\Omega$
• Auxiliary power U_B	DC 5 V \pm 10%
• Current consumption	$< 7 \text{ mA}$ at 10 k Ω
Characteristic curve	Linear rising
Measuring accuracy Measurement deviation at limit setting including hysteresis and reproducibility	<ul style="list-style-type: none"> • Typical: 0.25% of measuring span • Maximum: 0.5% of measuring span
Step response time T_{99}	$< 5 \text{ ms}$
Long-term stability	
• Lower range value and measuring span	0.25% of measuring span/year
Effect of ambient temperature	
• Lower range value and measuring span	<ul style="list-style-type: none"> • 0.25%/10 K of measuring span • 0.5%/10 K of measuring span for a measuring range 100 ... 400 mbar (40 ... 240 inH₂O)
• Influence of power supply	0.005%/V
Operating conditions Process temperature with gasket made of:	
• FPM (standard)	-15 ... +125 °C (5 ... 257 °F)
• Neoprene	-35 ... +100 °C (-31 ... +212 °F)
• Perbunan	-20 ... +100 °C (-4 ... +212 °F)
• EPDM	-40 ... +125 °C (-40 ... +257 °F), usable for drinking water
Ambient temperature	-25 ... +85 °C (-13 ... +185 °F)
Storage temperature	-50 ... +100 °C (-58 ... +212 °F)
Type of protection according to IEC 60529	<ul style="list-style-type: none"> • IP65 with plug according to EN 175301-803-A • IP67 with M12 device plug • IP67 with cable • IP67 with cable quick screw connection
Electromagnetic compatibility	<ul style="list-style-type: none"> • According to IEC 61326-1/-2/-3 • According to NAMUR NE21 for ATEX devices only, and with a max. measurement error of $\leq 1\%$
Mounting position	Vertical, facing up
Structural design Weight	Approx. 0.090 kg (0.198 lbs)
Process connections	See dimension drawings

Technical specifications (continued)

SITRANS P210 for gauge pressure	
Electrical connections	<ul style="list-style-type: none"> • Plug according to EN 175301-803-A Form A with cable entry M16x1.5 or 1/2-14 NPT or Pg 11 • Device plug M12 • 2 or 3-wire (0.5 mm²) cable ($\varnothing \pm 5.4 \text{ mm}$) • Quickon cable quick screw connection
Material of wetted parts	
• Measuring cell	Stainless steel, mat. no. 1.4435
• Process connection	Stainless steel, mat. no. 1.4404 (SST 316 L)
• Gasket	<ul style="list-style-type: none"> • FPM (standard) • Neoprene • Perbunan • EPDM
Material of non-wetted parts	
• Enclosure	Stainless steel, mat. no. 1.4404 (SST 316 L)
• Connector housing	Plastic
• Cable	PVC
Certificates and approvals Classification according to pressure equipment directive (PED 2014/68/EU)	For gases of fluid group 1 and liquids of fluid group 1; meets requirements as per article 4, paragraph 3 (sound engineering practice)
Lloyd's Register of Shipping (LR) ¹⁾	12/20010
Germanischer Lloyd (GL) ¹⁾	GL19740 11 HH00
American Bureau of Shipping (ABS) ¹⁾	ABS_11_HG 789392_PDA
Bureau Veritas (BV) ¹⁾	BV 271007A0 BV
Det Norske Veritas (DNV) ¹⁾	A 12553
Drinking water approval (ACS) ¹⁾	ACS 15 ACC NY 360
EAC ¹⁾	№ TC RU C-DE.Г505.В.00732 OC НАННО «ЦСБЗ»
Underwriters Laboratories (UL) ¹⁾	
• For the USA and Canada	UL 20110217 - E34453
• Worldwide	IEC UL DK 21845
Explosion protection Intrinsic safety "i" (only with current output)	Ex II 1/2 G Ex ia IIC T4 Ga/Gb Ex II 1/2 D Ex ia IIC T125 °C Da/Db
EC type-examination certificate	SEV 10 ATEX 0146
Connection to certified intrinsically safe ohmic circuits with maximum values	$U_i \leq \text{DC } 30 \text{ V}$; $I_i \leq 100 \text{ mA}$; $P_i \leq 0.75 \text{ W}$
Effective internal inductance and capacity for versions with plugs according to EN 175301-803-A and M12	$L_i = 0 \text{ nH}$; $C_i = 0 \text{ nF}$

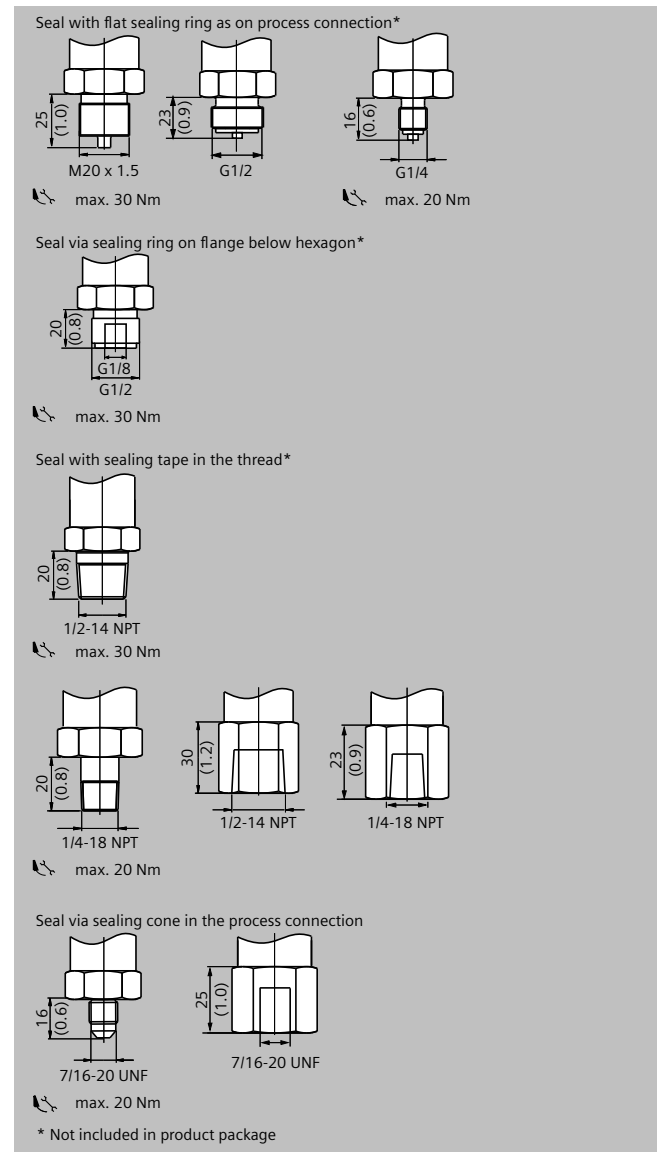
¹⁾ For variants with output signal 0 ... 5 V and radiometric output available soon.

Dimensional drawings



SITRANS P210, electrical connections, dimensions in mm (inch)

Dimensional drawings (continued)



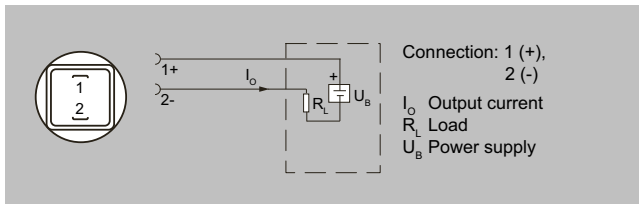
SITRANS P210, process connections, dimensions in mm (inch)

Pressure measurement

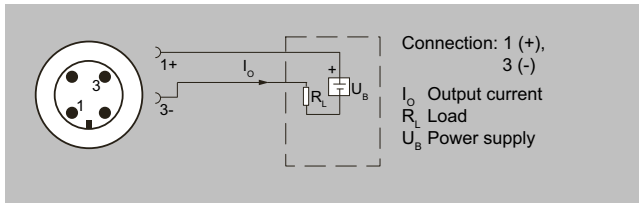
Pressure transmitters

Single-range transmitters / SITRANS P210

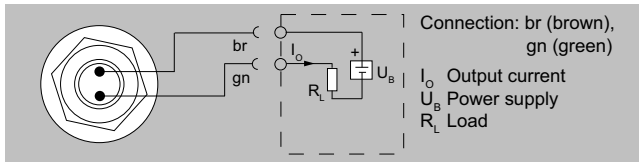
Circuit diagrams



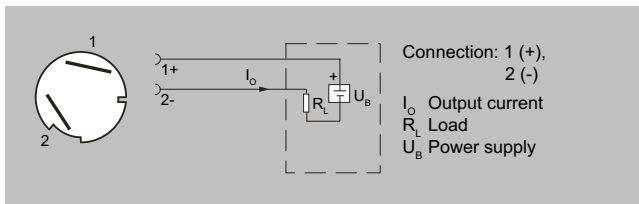
Connection with current output and plug according to EN 175301



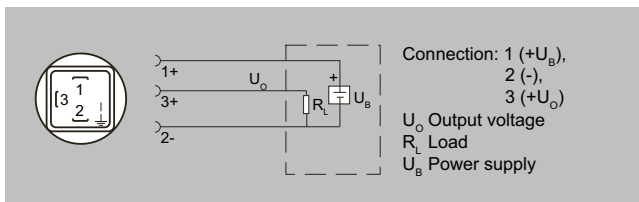
Connection with current output and M12x1 device plug



Connection with current output and cable

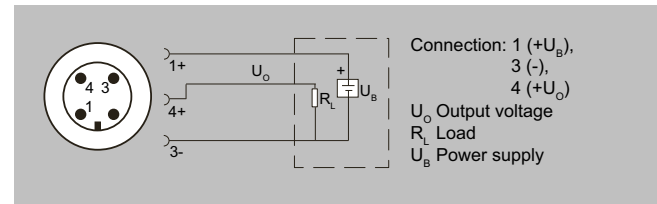


Connection with current output and Quickon cable quick screw connection

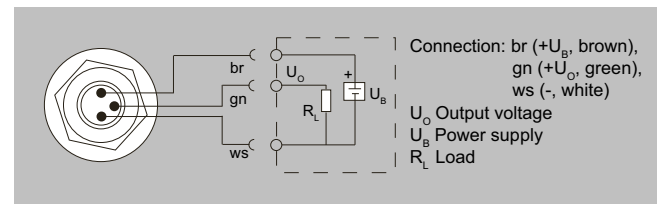


Connection with voltage output, ratiometric output and plug according to EN 175301

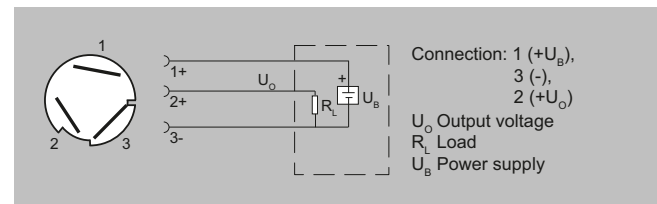
Circuit diagrams (continued)



Connection with voltage output, ratiometric output and M12x1 device plug



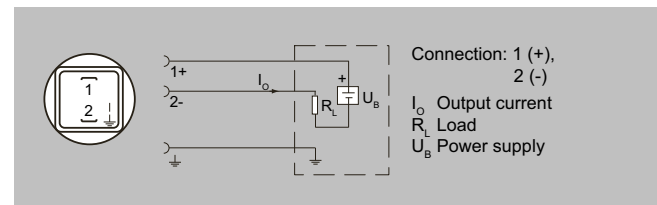
Connection with voltage output, ratiometric output and cable



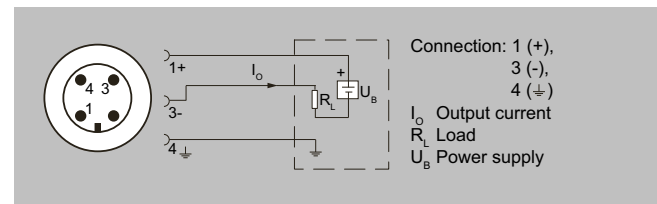
Connection with voltage output, ratiometric output and Quickon fast cable termination

Device design with explosion protection: 4 to 20 mA

The grounding connection is conductively bonded to the transmitter enclosure.



Connection with current output and plug according to EN 175301 (Ex)



Connection with current output and M12x1 (Ex) device plug

Overview



The SITRANS P220 pressure transmitter measures the gauge pressure of liquids, gases and vapors.

- Stainless steel measuring cell, fully welded
- Measuring ranges 2.5 to 1 000 bar (36.3 to 14 500 psi) relative
- For high-pressure applications and refrigeration technology

Benefits

- High measurement accuracy
- Rugged stainless steel enclosure
- High overload withstand capability
- For corrosive and non-corrosive media
- For measuring the pressure of liquids, gases and vapors
- Compact design
- Gasket-less

Application

The SITRANS P220 pressure transmitter for gauge pressure is used in the following industrial areas:

- Mechanical engineering
- Shipbuilding
- Energy development
- Chemical industry
- Water supply

Design

Device structure without explosion protection

The pressure transmitter consists of a piezoresistive measuring cell with a diaphragm, installed in a stainless steel enclosure. It can be connected electrically with a device plug to EN 175301-803-A (IP65), an M12 device plug (IP67), a cable (IP67) or a Quickon cable quick screw connection (IP67). The output signal is between 4 and 20 mA or 0 and 10 V

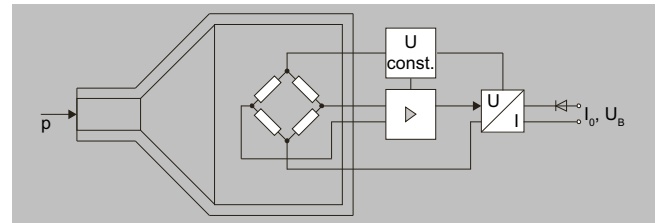
Device structure with explosion protection

The pressure transmitter consists of a piezoresistive measuring cell with a diaphragm, installed in a stainless steel enclosure. It can be connected electrically with a device plug fulfilling EN 175301-803-A (IP65) or an M12 device plug (IP67). The output signal is between 4 and 20 mA.

Function

The pressure transmitter measures the gauge pressure of liquids and gases as well as the level of liquids.

Mode of operation



SITRANS P220 pressure transmitters (7MF1567-...), functional diagram

The stainless steel measuring cell has a thick-film resistance bridge to which the operating pressure p is transmitted through a stainless steel diaphragm.

The voltage output from the measuring cell is converted by an amplifier into an output current of 4 to 20 mA or an output voltage of 0 to 10 V DC.

The output current and voltage are linearly proportional to the input pressure.

Pressure measurement

Pressure transmitters

Single-range transmitters / SITRANS P220

Selection and ordering data

								Article No.	Order code
SITRANS P220 pressure transmitter for gauge pressure, for high-pressure and cold applications, fully-welded version								7MF1567-	
								● ● ● ● ● - ● ● A ● ● ● ●	
Measurement deviation typ. 0.25%									
Material of wetted parts: Stainless steel									
Material of non-wetted parts: Stainless steel									
Click the article number for online configuration in the PIA Life Cycle Portal.									
Measuring range	Minimum overload limit	Maximum overload limit	Burst pressure						
For gauge pressure									
0 ... 2.5 bar (0 ... 36.3 psi)	-1 bar (-14.5 psi)	6.25 bar (90.7 psi)	25 bar (363 psi)	3	B	D			
0 ... 4 bar (0 ... 58 psi)	-1 bar (-14.5 psi)	10 bar (145 psi)	40 bar (580 psi)	3	B	E			
0 ... 6 bar (0 ... 87 psi)	-1 bar (-14.5 psi)	15 bar (217 psi)	60 bar (870 psi)	3	B	G			
0 ... 10 bar (0 ... 145 psi)	-1 bar (-14.5 psi)	25 bar (362 psi)	60 bar (870 psi)	3	C	A			
0 ... 16 bar (0 ... 232 psi)	-1 bar (-14.5 psi)	40 bar (580 psi)	96 bar (1 392 psi)	3	C	B			
0 ... 25 bar (0 ... 363 psi)	-1 bar (-14.5 psi)	62.5 bar (906 psi)	150 bar (2 176 psi)	3	C	D			
0 ... 40 bar (0 ... 580 psi)	-1 bar (-14.5 psi)	100 bar (1 450 psi)	240 bar (3 481 psi)	3	C	E			
0 ... 60 bar (0 ... 870 psi)	-1 bar (-14.5 psi)	150 bar (2 175 psi)	360 bar (5 221 psi)	3	C	G			
0 ... 100 bar (0 ... 1450 psi)	-1 bar (-14.5 psi)	250 bar (3 625 psi)	600 bar (8 702 psi)	3	D	A			
0 ... 160 bar (0 ... 2320 psi)	-1 bar (-14.5 psi)	400 bar (5 801 psi)	960 bar (13 924 psi)	3	D	B			
0 ... 250 bar (0 ... 3625 psi)	-1 bar (-14.5 psi)	625 bar (9 064 psi)	1 500 bar (21 756 psi)	3	D	D			
0 ... 400 bar (0 ... 5801 psi)	-1 bar (-14.5 psi)	1 000 bar (14 503 psi)	2 400 bar (34 809 psi)	3	D	E			
0 ... 600 bar (0 ... 8702 psi)	-1 bar (-14.5 psi)	1 500 bar (21 755 psi)	3 600 bar (52 200 psi)	3	D	G			
0 ... 1000 bar (0 ... 14500 psi)	-1 bar (-14.5 psi)	1 500 bar (21 755 psi)	5 000 bar (72 520 psi)	3	E	A			
Other version; Add order code and plain text: Measuring range: ... to ... bar (psi)								9	A A H 1 Y
Measuring ranges for gauge pressure									
0 ... 30 psi	-14.5 psi	75 psi	360 psi	4	B	E ¹⁾			
0 ... 60 psi	-14.5 psi	150 psi	580 psi	4	B	F ¹⁾			
0 ... 100 psi	-14.5 psi	250 psi	580 psi	4	B	G ¹⁾			
0 ... 150 psi	-14.5 psi	375 psi	870 psi	4	C	A ¹⁾			
0 ... 200 psi	-14.5 psi	500 psi	1 390 psi	4	C	B ¹⁾			
0 ... 300 psi	-14.5 psi	750 psi	2 170 psi	4	C	D ¹⁾			
0 ... 500 psi	-14.5 psi	1 250 psi	3 481 psi	4	C	E ¹⁾			
0 ... 750 psi	-14.5 psi	1 875 psi	5 220 psi	4	C	F ¹⁾			
0 ... 1 000 psi	-14.5 psi	2 500 psi	5 220 psi	4	C	G ¹⁾			
0 ... 1 500 psi	-14.5 psi	3 750 psi	8 700 psi	4	D	A ¹⁾			
0 ... 2 000 psi	-14.5 psi	5 000 psi	13 920 psi	4	D	B ¹⁾			
0 ... 3 000 psi	-14.5 psi	7 500 psi	21 750 psi	4	D	D ¹⁾			
0 ... 5 000 psi	-14.5 psi	12 500 psi	34 800 psi	4	D	E ¹⁾			
0 ... 6 000 psi	-14.5 psi	15 000 psi	34 800 psi	4	D	F ¹⁾			
0 ... 8 700 psi	-14.5 psi	21 755 psi	52 200 psi	4	D	G ¹⁾			
0 ... 14 500 psi	-14.5 psi	21 755 psi	72 520 psi	4	E	A			
Other version; Add order code and plain text: Measuring range: ... to ... psi								9	A A H 1 Y
Output signal									
4 ... 20 mA; 2-wire system, auxiliary power 7 ... 33 V DC (10 ... 30 V DC for ATEX devices) ¹⁾								0	
0 ... 10 V; 3-wire system; auxiliary power 12 ... 33 V DC								1	0
0 ... 5 V; 3-wire system; auxiliary power 7 ... 33 V DC								2	0
Ratiometric 10 ... 90%; 3-wire system; auxiliary power 5 V DC ± 10%								3	0
Explosion protection (only 4 ... 20 mA)									
None								0	
With explosion protection Ex ia IIC T4 ¹⁾								1	
Electrical connection									
Plug according to EN 175301-803-A, stuffing box thread M16 (with coupling) ¹⁾									1
M12 device plug according to IEC 61076-2-101									2
Connection via permanently installed cable, 2 m (6.6 ft); not for "Intrinsic safety" type of protection								0	3
Quick-screw cable gland Quickon PG9; not for "Intrinsic safety" type of protection								0	4
Plug according to EN 175301-803-A, stuffing box thread 1/2"-14 NPT (with coupling) ¹⁾									5
Plug according to EN 175301-803-A, stuffing box thread PG11 (with coupling) ¹⁾									6
Permanently installed cable, length 5 m (16.4 ft)								0	7
Special design									9
									N 1 Y

Selection and ordering data (continued)

	Article No.	Order code
SITRANS P220 pressure transmitter for gauge pressure, for high-pressure and cold applications, fully-welded version	7MF1567-	
	● ● ● ● ● - ● ● A ● ● ● ● ●	
Process connection		
G½" male according to EN 837-1 (½" BSP male) (standard for metric pressure ranges mbar, bar)		A
G½" male and G1/8" female		B
G¼" male according to EN 837-1 (¼" BSP male)		C
7/16"-20 UNF male		D
¼"-18 NPT male (standard for pressure ranges inH ₂ O and psi) ¹⁾		E
¼"-18 NPT female		F
½"-14 NPT male		G
½"-14 NPT female		H
7/16"-20 UNF female		J
M20×1.5 male		P
G¼" according to EN ISO 1179-2 (formerly DIN 3852 form E)		Q
G½" according to EN ISO 1179-2 (formerly DIN 3852 form E)		R
Special design		Z
Version		P 1 Y
Standard version ¹⁾		1

¹⁾ Order code E21 required for complete configurations with CRN and cCSA_{US} Ex approval.

Options	Order code
Add "-Z" to article number and specify order code.	
Quality inspection certificate (5-point characteristic curve test) according to IEC 62828-2 (not possible for measuring ranges > 0 ... 600 bar/0 ... 8 702 psi)	C11
Oxygen version, free of oil and degreased (not in combination with explosion protection version!)	E10
With CRN and cCSA _{US} Ex approval (only for measuring ranges 0 ... 30 psi to 0 ... 8 700 psi)	E21

Pressure measurement

Pressure transmitters

Single-range transmitters / SITRANS P220

Technical specifications

SITRANS P220 for gauge pressure	
Area of application Gauge pressure measurement	Liquids, gases and vapors
Mode of operation Measuring principle	Piezoresistive measuring cell (stainless steel diaphragm)
Measured variable	Gauge pressure
Input Measuring range	
• Gauge pressure	
- Metric	2.5 ... 1 000 bar (36 ... 14 500 psi)
- US measuring range	30 ... 14 500 psi
Output Current signal	4 ... 20 mA
• Load	($U_B - 10 V$)/0.02 A
• Auxiliary power U_B	7 ... 33 V DC (10 ... 30 V for Ex)
Voltage signal	0 ... 10 V DC
• Load	$\geq 10 k\Omega$
• Auxiliary power U_B	12 ... 33 V DC
• Current consumption	< 7 mA at 10 k Ω
Radiometric output	10 ... 90%
• Load	$\geq 10 k\Omega$
• Auxiliary power U_B	DC 5 V \pm 10%
• Current consumption	< 7 mA at 10 k Ω
Characteristic curve	Linear rising
Measuring accuracy Measurement deviation at limit setting including hysteresis and reproducibility	<ul style="list-style-type: none"> • Typical: 0.25% of measuring span • Maximum: 0.5% of measuring span
Step response time T_{99}	< 5 ms
Long-term stability	
• Lower range value and measuring span	0.25% of measuring span/year
Effect of ambient temperature	
• Lower range value and measuring span	0.25%/10 K of measuring span
• Influence of power supply	0.005%/V
Operating conditions Process temperature	-40 ... +120 °C (-40 ... +248 °F)
Ambient temperature	-25 ... +85 °C (-13 ... +185 °F)
Storage temperature	-50 ... +100 °C (-58 ... +212 °F)
Degree of protection according to IEC 60529	<ul style="list-style-type: none"> • IP65 with plug according to EN 175301-803-A • IP67 with M12 device plug • IP67 with cable • IP67 with cable quick screw connection
Electromagnetic compatibility	<ul style="list-style-type: none"> • According to IEC 61326-1/-2/-3 • According to NAMUR NE21 for ATEX devices only, and with a max. measurement error of $\leq 1\%$
Structural design Weight	Approx. 0.090 kg (0.198 lbs)
Process connections	See dimension drawings
Electrical connections	<ul style="list-style-type: none"> • Plug according to EN 175301-803-A Form A with cable entry M16x1.5 or 1/2-14 NPT or PG 11 • Device plug M12 • 2 or 3-wire (0.5 mm²) cable ($\varnothing \pm 5.4$ mm) • Quickon cable quick screw connection
Material of wetted parts	
• Measuring cell	Stainless steel, mat. no. 1.4016

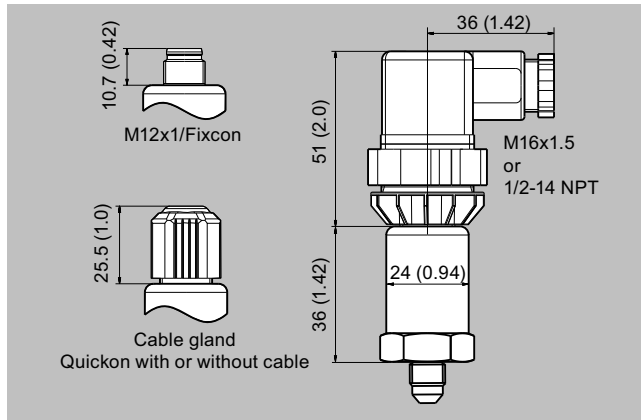
Technical specifications (continued)

SITRANS P220 for gauge pressure	
• Process connection	Stainless steel, mat. no. 1.4404 (SST 316 L)
Material of non-wetted parts	
• Enclosure	Stainless steel, mat. no. 1.4404 (SST 316 L)
• Connector housing	Plastic
• Cable	PVC
Certificates and approvals Classification according to pressure equipment directive (PED 2014/68/EU)	For gases of fluid group 1 and liquids of fluid group 1; complies with requirements of article 4, paragraph 3 (sound engineering practice)
Lloyd's Register of Shipping (LR) ¹⁾	12/20010
Germanischer Lloyd (GL) ¹⁾	GL19740 11 HH00
American Bureau of Shipping (ABS) ¹⁾	ABS_11_HG 789392_PDA
Bureau Veritas (BV) ¹⁾	BV 271007AO BV
Det Norske Veritas (DNV) ¹⁾	A 12553
Drinking water approval (ACS) ¹⁾	ACS 15 ACC NY 360
EAC ¹⁾	№ TC RU C-DE.ГБ05.В.00732 OC НАННО «ЦСБЭ»
CRN ²⁾	OF18659.5C
Underwriters Laboratories (UL) ¹⁾	
• For USA and Canada	UL 20110217 - E34453
• Worldwide	IEC UL DK 21845
Explosion protection Intrinsic safety "i" (only with current output)	Ex II 1/2 G Ex ia IIC T4 Ga/Gb Ex II 1/2 D Ex ia IIC T125 °C Da/Db
EC type-examination certificate	SEV 10 ATEX 0146
Connection to certified intrinsically safe ohmic circuits with maximum values	$U_i \leq DC 30 V$; $I_i \leq 100 mA$; $P_i \leq 0.75 W$
Effective internal inductance and capacity for versions with plugs according to EN 175301-803-A and M12	$L_i = 0 nH$; $C_i = 0 nF$
CSA ²⁾	70006348 Class I, Division I, Groups A, B, C&D; Class II, Division 1, Groups E, F and G, Class III Class I, Division 2, Groups A, B, C and D; Class II, Division 2, Groups F and G, Class III A/Ex ia IIC T4 Ga/Gb A/Ex ia IIC T125°C Da/Db

1) For variants with output signal 0 ... 5 V and radiometric output available soon.

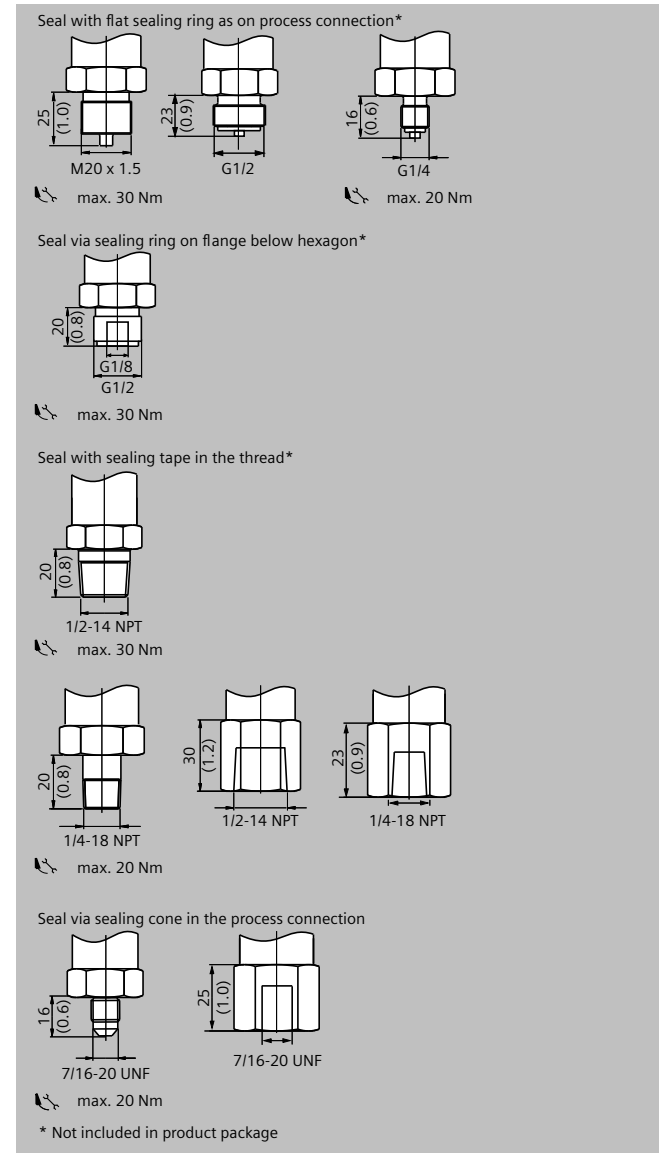
2) See ordering data for available versions.

Dimensional drawings



SITRANS P220, electrical connections, dimensions in mm (inch)

Dimensional drawings (continued)



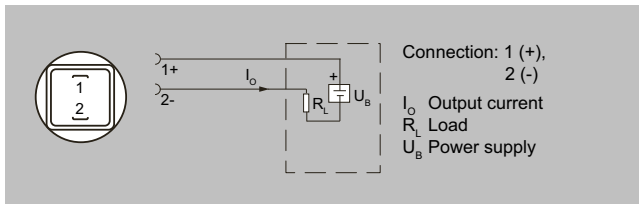
SITRANS P220, process connections, dimensions in mm (inch)

Pressure measurement

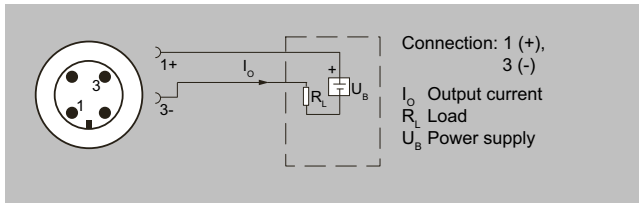
Pressure transmitters

Single-range transmitters / SITRANS P220

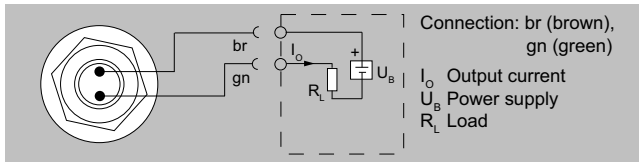
Circuit diagrams



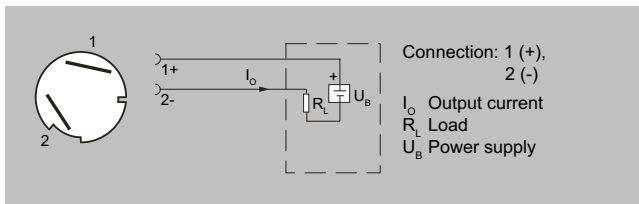
Connection with current output and plug according to EN 175301



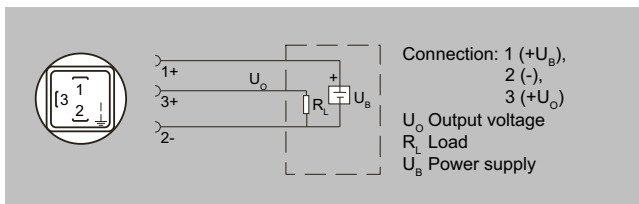
Connection with current output and M12x1 device plug



Connection with current output and cable

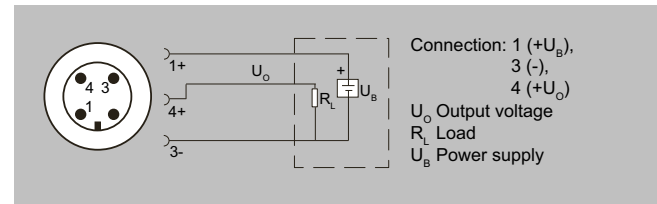


Connection with current output and Quickon cable quick screw connection

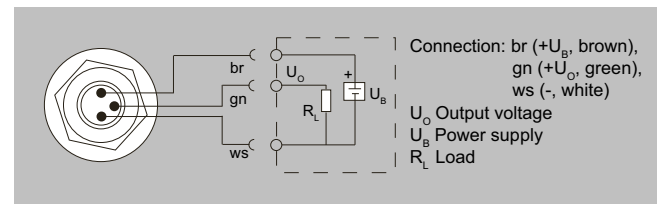


Connection with voltage output, ratiometric output and plug according to EN 175301

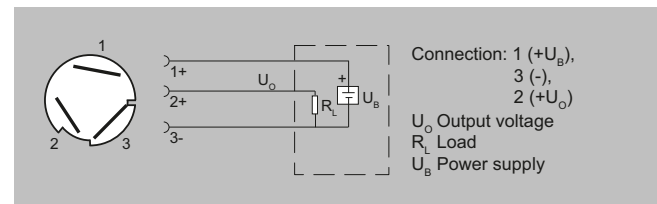
Circuit diagrams (continued)



Connection with voltage output, ratiometric output and M12x1 device plug



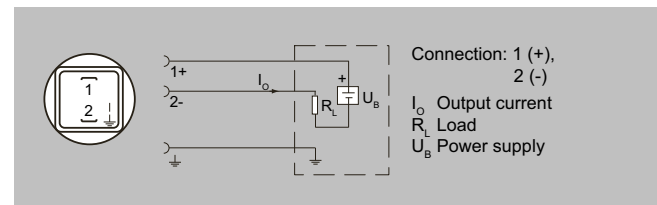
Connection with voltage output, ratiometric output and cable



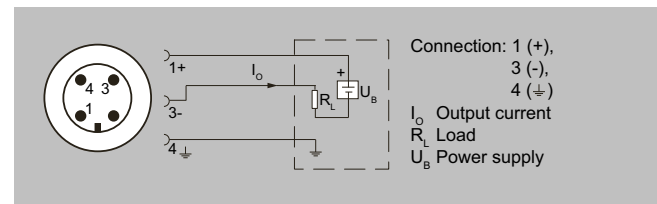
Connection with voltage output, ratiometric output and Quickon fast cable termination

Device design with explosion protection: 4 to 20 mA

The grounding connection is conductively bonded to the transmitter enclosure.



Connection with current output and plug according to EN 175301 (Ex)



Connection with current output and M12x1 (Ex) device plug

Overview



The pressure transmitter SITRANS LH100 is a submersible sensor for hydrostatic level measurement.

The pressure transmitter measures the liquid levels in tanks, containers, channels and dams. The SITRANS LH100 pressure transmitters are available for various measuring ranges and with explosion protection as an option.

A cable box and an anchoring clamp are available as accessories for simple installation.

Benefits

- Compact design
- Simple installation
- Small error in measurement (0.3 %)
- Degree of protection IP68

Application

SITRANS LH100 pressure transmitters are used in the following branches, for example:

- Shipbuilding
- Water/waste water supply
- For use in unpressurized/open vessels and wells

Design

The pressure transmitter has a built-in ceramic sensor which is equipped with a Wheatstone resistance bridge.

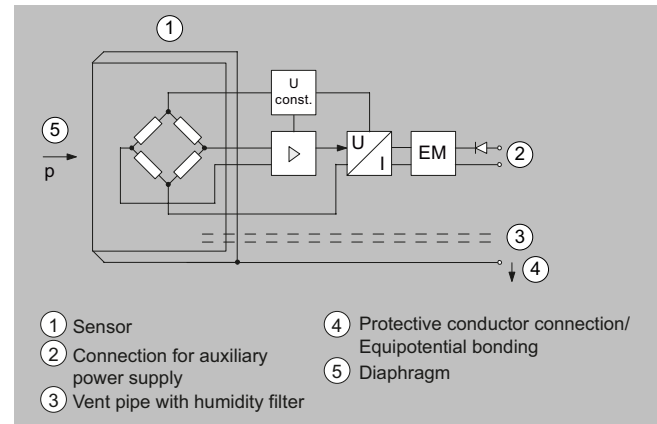
These pressure transmitters are equipped with an electronic circuit fitted together with the sensor in a stainless steel enclosure. In addition, the connecting cable contains a vent pipe which is equipped with a humidity filter to prevent the build-up of condensation.

The diaphragm is protected against external influences by a protective cap.

The sensor, the electronics and the connecting cable are housed in an enclosure with small dimensions.

The pressure transmitter is temperature-compensated for a wide temperature range.

Function



SITRANS LH100 pressure transmitter, mode of operation and connection diagram

On one side of the sensor (1), the diaphragm (5) is exposed to the hydrostatic pressure which is proportional to the submersion depth. This pressure is compared with atmospheric pressure. Pressure compensation is carried out using the vent pipe (3) in the connecting cable. The vent pipe is equipped with a humidity filter which prevents the build-up of condensation in the vent pipe.

The hydrostatic pressure of the liquid column acts on the diaphragm of the sensor and transmits the pressure to the Wheatstone resistance bridge in the sensor.

The output voltage signal of the sensor is applied to the electronic circuit where it is converted into an output current signal of 4 to 20 mA.

The protective conductor connection/equipotential bonding (4) is connected to the enclosure.

Pressure measurement

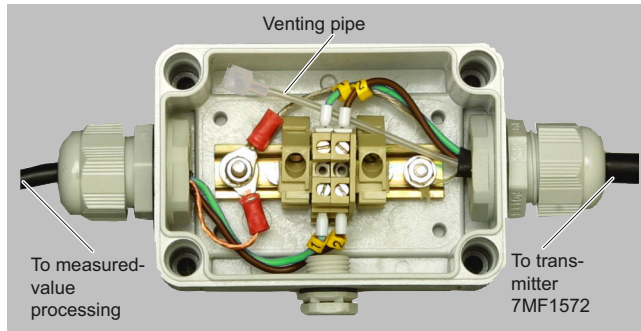
Pressure transmitters

Single-range transmitters / SITRANS LH100

Integration

It is generally recommended that the connecting cable of the SITRANS LH100 transmitter is connected to the cable box, which can be ordered separately, and secured with the anchoring clamp, also available separately. The cable box has to be installed near the measuring point.

If the medium is anything other than water, it is also necessary to check compatibility with the specified materials of the transmitter.



Cable box 7MF1572-8AA, open, schematic diagram



Measuring point setup, generally with cable box 7MF1572-8AA and 7MF1572-8AB cable hanger

Selection and ordering data

SITRANS LH100 pressure transmitter		Article No.	Order code
		7MF1572-	• • A • • • • •
For the measurement of the hydrostatic fill level through submersion 2-wire system, 4 ... 20 mA, enclosure material mat. no. 1.4404 (316 L) Measuring cell Al ₂ O ₃ ceramic, with permanently mounted PE cable			
Click the article number for online configuration in the PIA Life Cycle Portal.			
Measuring range	Cable length		
0 ... 3 mH ₂ O	10 m (≈ 30 ft)	1 C	
0 ... 4 mH ₂ O	10 m (≈ 30 ft)	1 D	
0 ... 5 mH ₂ O	10 m (≈ 30 ft)	1 E	
0 ... 6 mH ₂ O	10 m (≈ 30 ft)	1 F	
0 ... 10 mH ₂ O	20 m (≈ 60 ft)	1 H	
0 ... 20 mH ₂ O	30 m (≈ 90 ft)	1 K	
0 ... 9 ftH ₂ O ¹⁾	33 ft	2 C	
0 ... 12 ftH ₂ O	33 ft	2 D	
0 ... 15 ftH ₂ O	33 ft	2 E	
0 ... 18 ftH ₂ O	33 ft	2 F	
0 ... 30 ftH ₂ O	66 ft	2 H	
0 ... 60 ftH ₂ O	98 ft	2 K	
0 ... 0.3 bar ¹⁾	10 m (≈ 30 ft)	3 C	
0 ... 0.4 bar	10 m (≈ 30 ft)	3 D	
0 ... 0.5 bar	10 m (≈ 30 ft)	3 E	
0 ... 0.6 bar	10 m (≈ 30 ft)	3 F	
0 ... 1 bar	20 m (≈ 60 ft)	3 H	
0 ... 2 bar	30 m (≈ 90 ft)	3 K	
Special designs			
Measuring ranges for special designs between:			
• 0 ... 3 mH ₂ O and 0 ... 30 mH ₂ O			
• 0 ... 9 ftH ₂ O and 0 ... 100 ftH ₂ O			
• 0 ... 0.3 bar and 0 ... 3 bar			
Special cable length/special measuring range			
Add "Z" to article number, specify order code and plain text. Note: Specification of the measuring range Y01 is mandatory!		9 A	H . . + Y 0 1
The following applies to determining the maximum cable length for Ex versions: Transmitters:			
• C _i = 0 µF, L _i = 0 µH			
Cables:			
• C _k = 0.19 nF per meter cable			
• L _k = 1.5 µH per meter cable			
The max. permissible data of the transmitter infeed device must be taken into account!			
3 m (10 ft)			H 1 A
5 m (16 ft)			H 1 B
7 m (23 ft)			H 1 C
10 m (33 ft)			H 1 D
15 m (49 ft)			H 1 E
20 m (66 ft)			H 1 F
25 m (82 ft)			H 1 G
30 m (98 ft)			H 1 H
40 m (131 ft)			H 1 J
50 m (164 ft)			H 1 K
60 m (198 ft)			H 1 L
70 m (231 ft)			H 1 M
80 m (264 ft)			H 1 N
90 m (297 ft)			H 1 P
100 m (330 ft)			H 1 Q
Gasket material between sensor and enclosure			
FPM (standard)		1	
EPDM (for drinking water applications)		2	
Explosion protection			
None		0	
With explosion protection ATEX II 1 G Ex ia IIC T4 Ga and IECEx Ex ia IIC T4 Ga		1	

Pressure measurement

Pressure transmitters

Single-range transmitters / SITRANS LH100

Selection and ordering data (continued)

Options	Order code
Add "-Z" to article number and specify order code.	
Quality inspection certificate (5-point characteristic curve test) according to IEC 62828-2	C11
Specification of measuring range (only with special cable lengths) in: "... to ... mH ₂ O" or "... to ... ftH ₂ O" or "... to ... bar"	Y01

Accessories/spare parts

	Article No.
Cable plug for connecting the transmitter cable	7MF1572-8AA
Anchoring clamp For mounting the pressure transmitter	7MF1572-8AB
Protective caps As a replacement (pack of 10)	7MF1572-8AD
Humidity filter As a replacement (pack of 10)	7MF1572-8AE

Technical specifications

Pressure transmitter SITRANS LH100 (submersible sensor)	
Mode of operation	
Measuring principle	Piezo-resistive
Input	
Measured variable	Hydrostatic level
Measuring range	Max. permissible operating pressure
• 0 ... 3 mH ₂ O (0 ... 9 ftH ₂ O)	• 1.5 bar (21.8 psi) (corresponds to 15 mH ₂ O (45 ftH ₂ O))
• 0 ... 4 mH ₂ O (0 ... 12 ftH ₂ O)	• 1.5 bar (21.8 psi) (corresponds to 15 mH ₂ O (45 ftH ₂ O))
• 0 ... 5 mH ₂ O (0 ... 15 ftH ₂ O)	• 1.5 bar (21.8 psi) (corresponds to 15 mH ₂ O (45 ftH ₂ O))
• 0 ... 6 mH ₂ O (0 ... 18 ftH ₂ O)	• 1.5 bar (21.8 psi) (corresponds to 15 mH ₂ O (45 ftH ₂ O))
• 0 ... 10 mH ₂ O (0 ... 30 ftH ₂ O)	• 3.0 bar (43.5 psi) (corresponds to 30 mH ₂ O (90 ftH ₂ O))
• 0 ... 20 mH ₂ O (0 ... 60 ftH ₂ O)	• 5.0 bar (72.5 psi) (corresponds to 50 mH ₂ O (150 ftH ₂ O))
• 0 ... 0.3 bar	• 1.5 bar
• 0 ... 0.4 bar	• 1.5 bar
• 0 ... 0.5 bar	• 1.5 bar
• 0 ... 0.6 bar	• 1.5 bar
• 0 ... 1 bar	• 3.0 bar
• 0 ... 2 bar	• 5.0 bar
Output	
Output signal	4 ... 20 mA
Measuring accuracy	According to IEC 62828-1
Measurement deviation at limit setting including hysteresis and reproducibility	
Measuring range	
• 0 ... 3 mH ₂ O (0 ... 9 ftH ₂ O or 0 ... 0.3 bar)	• 0.5% measuring range end value (typical) • 1.0% of measuring range end value (maximum)
• For all other measuring ranges	• 0.3% of measuring range end value (typical) • 0.6% of measuring range end value (maximum)
Effect of ambient temperature	
Measuring range	Zero and span
• 3 mH ₂ O (9 ftH ₂ O or 0.3 bar)	0.45%/10 K of measuring range end value
• 4 ... 6 mH ₂ O (12 ... 18 ftH ₂ O or 0.4...0.6 bar)	0.45%/10 K of measuring range end value
• > 6 mH ₂ O (> 18 ftH ₂ O or > 0.6 bar)	0.3%/10 K of measuring range end value
Long-term stability	
Measuring range	Zero and span
• 3 mH ₂ O (9 ftH ₂ O or 0.3 bar)	0.4% of measuring range end value/year
• 4 ... 6 mH ₂ O (12 ... 18 ftH ₂ O or 0.4...0.6 bar)	0.25% of measuring range end value/year
• > 6 mH ₂ O (> 18 ftH ₂ O or > 0.6 bar)	0.2% of measuring range end value/year
Operating conditions	
Ambient conditions	
• Process temperature	-10 ... +80 °C (14 ... 176 °F)
• Storage temperature	-40 ... +80 °C (-40 ... +176 °F)
Degree of protection according to IEC 60529	IP68
Structural design	
Weight	
• Pressure transmitter	≈ 0.2 kg (≈ 0.44 lb)

Technical specifications (continued)

Pressure transmitter SITRANS LH100 (submersible sensor)	
• Cable; maximum cable length 100 m (330 ft)	0.025 kg/m (≈ 0.015 lb/ft)
Electrical connection	Cable with 3 conductors, vent pipe and integrated humidity filter
Material	
• Seal diaphragm	Al ₂ O ₃ ceramic, 96%
• Enclosure	Stainless steel, mat. no. 1.4404/316L
• Gasket	• FPM (standard) • EPDM (optional)
• Connecting cable	• PE-HD (standard) • PE-LD (in the case of versions with EPDM seal, suitable for drinking water applications)
Auxiliary power	
Terminal voltage on pressure transmitter U _B	• 10 ... 33 V DC • 10 ... 30 V DC for transmitter with intrinsic safety explosion protection
Certificates and approvals	
Drinking water approval (ACS)	15 ACC NY 360
EAC	№ TC RU C-DE.ГБ05.В.00732 OC НАННО «ЦСБЭ»
Underwriters Laboratories (UL)	2014-11-17 - E344532
The device is not subject to the pressure equipment directive (PED 2014/68/EU)	
Explosion protection	
• Intrinsic safety "i"	IECEx SEV 14.0003 SEV 14 ATEX 0109
- Marking	II 1 G Ex ia IIC T4 Ga
• EAC Ex	TC RU C-DE.AA87.B.00324

Cable box

Cable box	
Area of application	For connecting the transmitter cable
Structural design	
Weight	0.2 kg (0.44 lb)
Electrical connection	2 x 3-way (28 to 18 AWG)
Cable entry	2 x Pg 9
Enclosure material	Polycarbonate
Vent valve for atmospheric pressure	
Operating conditions	
Degree of protection according to IEC 60529	IP65

Anchoring clamp

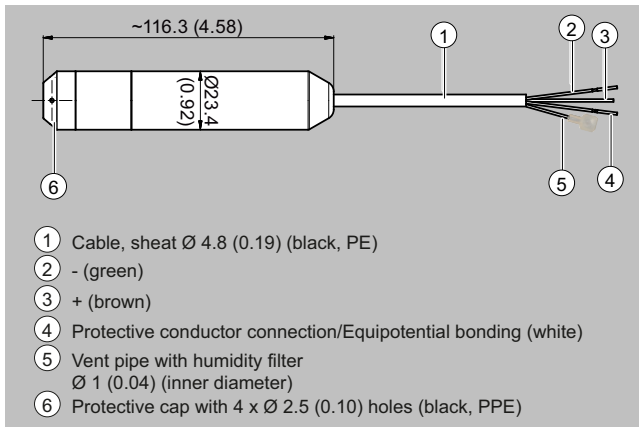
Anchoring clamp	
Area of application	For mounting the transmitter
Structural design	
Weight	0.16 kg (0.35 lb)
Material	Zinc-plated steel, polyamide

Pressure measurement

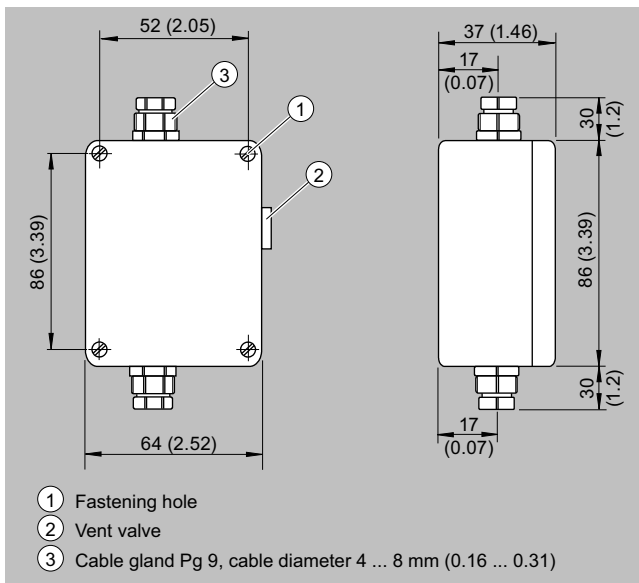
Pressure transmitters

Single-range transmitters / SITRANS LH100

Dimensional drawings

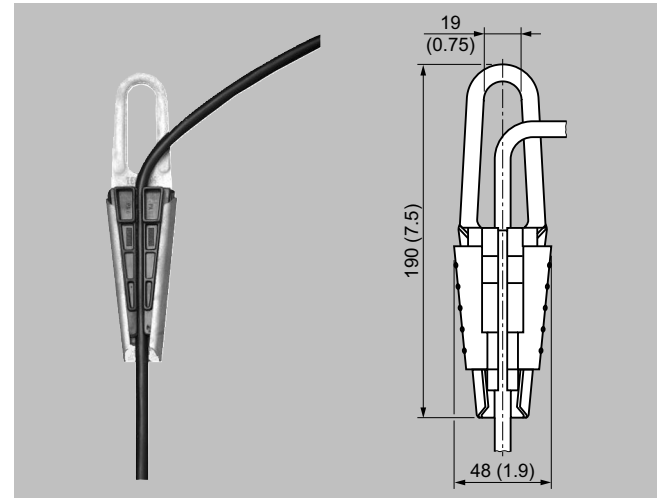


SITRANS LH100 pressure transmitter, dimensions in mm (inch)



Junction box, dimensions in mm (inch)

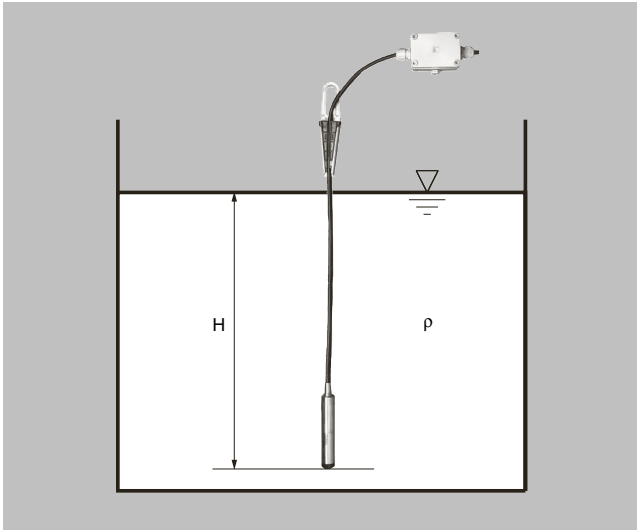
Dimensional drawings (continued)



Anchoring clamp, dimensions in mm (inch)

More information

Establishing the measuring range with water as process medium



Calculation of the measuring range

$$p = \rho \times g \times H$$

with:

ρ = density of medium

g = local gravitational acceleration

H = maximum level

Example:

Medium: Water, $\rho = 1\,000\text{ kg/m}^3$

Gravitational acceleration: 9.81 m/s^2

Lower range value: 0 m

Maximum level: 6.0 m

Cable length: 10 m

Calculation:

$$p = 1\,000\text{ kg/m}^3 \times 9.81\text{ m/s}^2 \times 6.0\text{ m}$$

$$p = 58\,860\text{ N/m}^2$$

$$p = 589\text{ mbar}$$

Transmitter to be ordered:

7MF1572-1FA10

Plus, if required, cable box 7MF1572-8AA and anchoring clamp

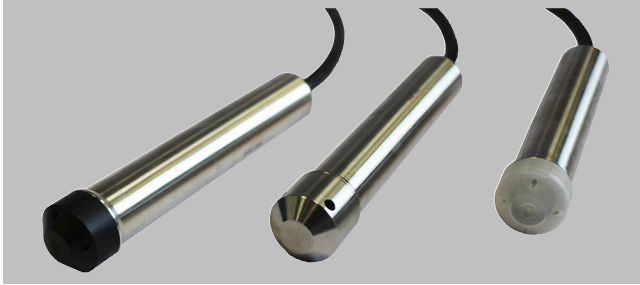
7MF1572-8AB

Pressure measurement

Pressure transmitters

Single-range transmitters / SITRANS LH300

Overview



The pressure transmitter SITRANS LH300 is a submersible sensor for hydrostatic level measurement with a protective capability made of PPE (left), stainless steel (center) and ETFE (right).

The pressure transmitter measures the liquid levels in tanks, containers, channels and dams. The SITRANS LH300 pressure transmitters are available for various measuring ranges and with explosion protection as an option.

A cable box and an anchoring clamp are available as accessories for simple installation.

Benefits

- Compact design
- Simple installation
- Small error in measurement (typically 0.15%)
- Degree of protection IP68

Application

SITRANS LH300 pressure transmitters are used in the following fields of industry, for example:

- Shipbuilding
- Water/waste water supply
- Drinking water treatment plants
- For use in unpressurized/open vessels and wells
- Desalination plants

Design

The pressure transmitter has a built-in ceramic sensor which is equipped with a Wheatstone resistance bridge.

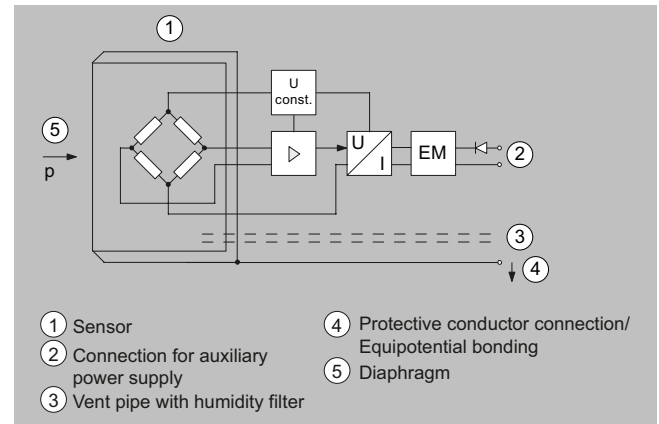
These pressure transmitters are equipped with an electronic circuit fitted together with the sensor in a stainless steel enclosure. In addition, the connecting cable contains a vent pipe which is equipped with a humidity filter to prevent the build-up of condensation.

The diaphragm is protected against external influences by a protective cap.

The sensor, the electronics and the connecting cable are housed in an enclosure with small dimensions.

The pressure transmitter is temperature-compensated for a wide temperature range.

Function



SITRANS LH300 pressure transmitter, mode of operation and connection diagram

On one side of the sensor (1), the diaphragm (5) is exposed to the hydrostatic pressure which is proportional to the submersion depth. This pressure is compared with atmospheric pressure. Pressure compensation is carried out using the vent pipe (3) in the connecting cable. The vent pipe is equipped with a humidity filter which prevents the build-up of condensation in the vent pipe.

The hydrostatic pressure of the liquid column acts on the diaphragm of the sensor and transmits the pressure to the Wheatstone resistance bridge in the sensor.

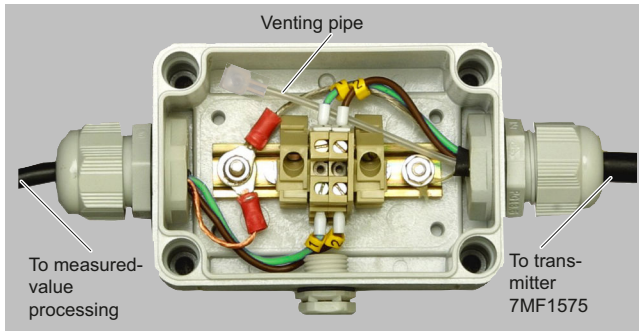
The output voltage signal of the sensor is applied to the electronic circuit where it is converted into an output current signal of 4 to 20 mA.

The protective conductor connection/equipotential bonding (4) is connected to the enclosure.

Integration

It is generally recommended that the connecting cable of the SITRANS LH300 transmitter is connected to the cable box, which can be ordered separately, and secured with an anchoring clamp, also available separately. The cable box is to be installed near the measuring point, but outside the process medium.

Likewise, in the case of process media other than water, the compatibility with the specified materials of the transmitter, cable and seal must be checked.



Cable box 7MF1575-8AA, opened, schematic representation



Measurement location setup, in principle with cable box 7MF1575-8AA and anchoring clamp 7MF1575-8AB

Pressure measurement

Pressure transmitters

Single-range transmitters / SITRANS LH300

Selection and ordering data

SITRANS LH300 pressure transmitter		Article No. 7MF1575-	Order code
For the measurement of the hydrostatic level, immersion probe, 2-wire system, 4 ... 20 mA, for enclosure material see ordering option, measuring cell Al ₂ O ₃ ceramic (99.6% purity), with permanently mounted cable. Material of protective cap for PE cable: PPE (color: black). Material of protective cap for FEP cable: PPE (color: white). <u>Note:</u> Cable box and cable hanger must be ordered separately.		● ● ● ● ● ● ● ●	● ● ● ● ● ● ● ●
Click the article number for online configuration in the PIA Life Cycle Portal.			
Measuring range	Cable length (PE cable)		
0 ... 1 mH ₂ O	5 m (≈ 15 ft)	1 A	
0 ... 2 mH ₂ O	5 m (≈ 15 ft)	1 B	
0 ... 3 mH ₂ O	10 m (≈ 30 ft)	1 C	
0 ... 4 mH ₂ O	10 m (≈ 30 ft)	1 D	
0 ... 5 mH ₂ O	10 m (≈ 30 ft)	1 E	
0 ... 6 mH ₂ O	10 m (≈ 30 ft)	1 F	
0 ... 10 mH ₂ O	20 m (≈ 60 ft)	1 H	
0 ... 20 mH ₂ O	30 m (≈ 90 ft)	1 K	
0 ... 40 mH ₂ O	50 m (≈ 150 ft)	1 L	
0 ... 3 ftH ₂ O	5 m (≈ 15 ft)	2 A	
0 ... 6 ftH ₂ O	5 m (≈ 15 ft)	2 B	
0 ... 9 ftH ₂ O	10 m (≈ 30 ft)	2 C	
0 ... 12 ftH ₂ O	10 m (≈ 30 ft)	2 D	
0 ... 15 ftH ₂ O	10 m (≈ 30 ft)	2 E	
0 ... 18 ftH ₂ O	10 m (≈ 30 ft)	2 F	
0 ... 30 ftH ₂ O	20 m (≈ 60 ft)	2 H	
0 ... 60 ftH ₂ O	30 m (≈ 90 ft)	2 K	
0 ... 120 ftH ₂ O	50 m (≈ 150 ft)	2 L	
0 ... 0.1 bar	5 m (≈ 15 ft)	3 A	
0 ... 0.2 bar	5 m (≈ 15 ft)	3 B	
0 ... 0.3 bar	10 m (≈ 30 ft)	3 C	
0 ... 0.4 bar	10 m (≈ 30 ft)	3 D	
0 ... 0.5 bar	10 m (≈ 30 ft)	3 E	
0 ... 0.6 bar	10 m (≈ 30 ft)	3 F	
0 ... 1 bar	20 m (≈ 60 ft)	3 H	
0 ... 2 bar	30 m (≈ 90 ft)	3 K	
0 ... 4 bar	50 m (≈ 150 ft)	3 L	
Special designs			
Measuring ranges for special designs between:			
0 ... 1 mH ₂ O and 0 ... 160 mH ₂ O or			
0 ... 3 ftH ₂ O and 0 ... 530 ftH ₂ O or			
0 ... 0.1 bar and 0 ... 16 bar possible.			
PE cable for general applications and drinking water applications			
Special cable length		9 X	H . .
Add "-Z" to article number, specify order code and plain text:			
Y01: Cable length			
3 m (≈ 10 ft)			H 1 A
5 m (≈ 16 ft)			H 1 B
7 m (≈ 23 ft)			H 1 C
10 m (≈ 33 ft)			H 1 D
15 m (≈ 50 ft)			H 1 E
20 m (≈ 65 ft)			H 1 F
25 m (≈ 80 ft)			H 1 G
30 m (≈ 100 ft)			H 1 H
40 m (≈ 130 ft)			H 1 J
50 m (≈ 160 ft)			H 1 K
60 m (≈ 200 ft)			H 1 L
70 m (≈ 230 ft)			H 1 M
80 m (≈ 265 ft)			H 1 N
90 m (≈ 295 ft)			H 1 P
100 m (≈ 330 ft)			H 1 Q
125 m (≈ 410 ft)			H 1 R
150 m (≈ 495 ft)			H 1 S

Selection and ordering data (continued)

SITRANS LH300 pressure transmitter	Article No. 7MF1575-					Order code		
	●	●	●	●	●	●	●	●
175 m (≈ 575 ft)						H	1	T
200 m (≈ 650 ft)						H	1	U
225 m (≈ 740 ft)						H	1	V
250 m (≈ 820 ft)						H	1	W
275 m (≈ 900 ft)						H	1	X
300 m (≈ 990 ft)						H	2	A
350 m (≈ 1150 ft)						H	2	B
400 m (≈ 1320 ft)						H	2	C
450 m (≈ 1480 ft)						H	2	D
500 m (≈ 1650 ft)						H	2	E
550 m (≈ 1815 ft)						H	2	F
600 m (≈ 1980 ft)						H	2	G
650 m (≈ 2145 ft)						H	2	H
700 m (≈ 2310 ft)						H	2	J
750 m (≈ 2475 ft)						H	2	K
800 m (≈ 2640 ft)						H	2	L
850 m (≈ 2800 ft)						H	2	M
900 m (≈ 2970 ft)						H	2	N
950 m (≈ 3135 ft)						H	2	P
1 000 m (≈ 3300 ft)						H	2	Q
Additional special cable lengths	9	X				H	1	Y
Add "-Z" to article number, specify order code and plain text: H1Y: Cable length						+		
Y01: Measuring range						Y	0	1
FEP cable for corrosive process media								
Special cable length	9	X				H	.	.
Add "-Z" to article number, specify order code and plain text: Y01: Cable length						+		
						Y	0	1
3 m (≈ 10 ft)						H	5	A
5 m (≈ 16 ft)						H	5	B
7 m (≈ 23 ft)						H	5	C
10 m (≈ 33 ft)						H	5	D
15 m (≈ 50 ft)						H	5	E
20 m (≈ 65 ft)						H	5	F
25 m (≈ 80 ft)						H	5	G
30 m (≈ 100 ft)						H	5	H
40 m (≈ 130 ft)						H	5	J
50 m (≈ 160 ft)						H	5	K
60 m (≈ 200 ft)						H	5	L
70 m (≈ 230 ft)						H	5	M
80 m (≈ 265 ft)						H	5	N
90 m (≈ 295 ft)						H	5	P
100 m (≈ 330 ft)						H	5	Q
125 m (≈ 410 ft)						H	5	R
150 m (≈ 495 ft)						H	5	S
175 m (≈ 575 ft)						H	5	T
200 m (≈ 650 ft)						H	5	U
225 m (≈ 740 ft)						H	5	V
250 m (≈ 820 ft)						H	5	W
275 m (≈ 900 ft)						H	5	X
300 m (≈ 990 ft)						H	6	A
350 m (≈ 1150 ft)						H	6	B
400 m (≈ 1320 ft)						H	6	C
450 m (≈ 1480 ft)						H	6	D
500 m (≈ 1650 ft)						H	6	E
550 m (≈ 1815 ft)						H	6	F
600 m (≈ 1980 ft)						H	6	G

Pressure measurement

Pressure transmitters

Single-range transmitters / SITRANS LH300

Selection and ordering data (continued)

SITRANS LH300 pressure transmitter		Article No. 7MF1575-					Order code			
		●	●	●	●	●	●	●	●	
650 m (≈ 2145 ft)								H	6	H
700 m (≈ 2310 ft)								H	6	J
750 m (≈ 2475 ft)								H	6	K
800 m (≈ 2640 ft)								H	6	L
850 m (≈ 2800 ft)								H	6	M
900 m (≈ 2970 ft)								H	6	N
950 m (≈ 3135 ft)								H	6	P
1000 m (≈ 3300 ft)								H	6	Q
Additional special cable lengths		9	X					H	5	Y
Add "-Z" to article number, specify order code and plain text: H1Y: Cable length Y01: Measuring range								+		
								Y	0	1
Material of the enclosure	Protective cap material									
Stainless steel 316L (1.4404)	Protective cap made of PPE (recommended for PE cable)							A		
Stainless steel 316L (1.4404)	Protective cap made of ETFE (standard with FEP cable)							B		
Stainless steel 316L (1.4404)	Stainless steel 316L (1.4404)							C		
Stainless steel 904L (1.4539) for seawater applications	Protective cap made of PPE							D		
Stainless steel 904L (1.4539) for seawater applications	Protective cap made of ETFE							E		
Stainless steel 904L (1.4539) for seawater applications	Stainless steel 904L (1.4539) for seawater applications							F		
Gasket material between sensor and enclosure										
FPM (standard)								1		
EPDM (for drinking water applications)								2		
Explosion protection										
None								0		
With ATEX II 1 G Ex ia IIC T4 Ga, IECEx Ex ia IIC T4 Ga and EAC Ex explosion protection (only possible for cable length ≤ 300 m (990 ft))								1		

Options	Order code
Quality test certificate (factory calibration) according to IEC 62828-2 (6 points upward)	C11

Accessories/spare parts

	Article No.
Cable box	7MF1575-8AA
Anchoring clamp	7MF1575-8AB
Protective cap, PPE As spare part (pack of 10)	7MF1575-8AD
Protective cap, ETFE As spare part (pack of 10)	7MF1575-8AE
Humidity filter As spare part (pack of 10)	7MF1575-8AF
Protective cap, stainless steel 316L (1.4404) For wastewater applications	7MF1575-8AG
Protective cap, stainless steel 904L (1.4539) For seawater applications	7MF1575-8AH

Technical specifications

Pressure transmitter SITRANS LH300 (submersible sensor)	
Mode of operation	
Measuring principle	Piezo-resistive
Input	
Measured variable	Hydrostatic level
Measuring range	Max. permissible operating pressure
• 0 ... 1 mH ₂ O (0 ... 3 ftH ₂ O)	• 1.5 bar (21.8 psi) (corresponds to 15 mH ₂ O (45 ftH ₂ O))
• 0 ... 2 mH ₂ O (0 ... 6 ftH ₂ O)	• 1.5 bar (21.8 psi) (corresponds to 15 mH ₂ O (45 ftH ₂ O))
• 0 ... 3 mH ₂ O (0 ... 9 ftH ₂ O)	• 1.5 bar (21.8 psi) (corresponds to 15 mH ₂ O (45 ftH ₂ O))
• 0 ... 4 mH ₂ O (0 ... 12 ftH ₂ O)	• 2 bar (29 psi) (corresponds to 20 mH ₂ O (60 ftH ₂ O))
• 0 ... 5 mH ₂ O (0 ... 15 ftH ₂ O)	• 2 bar (29 psi) (corresponds to 20 mH ₂ O (60 ftH ₂ O))
• 0 ... 6 mH ₂ O (0 ... 18 ftH ₂ O)	• 2 bar (29 psi) (corresponds to 20 mH ₂ O (60 ftH ₂ O))
• 0 ... 10 mH ₂ O (0 ... 30 ftH ₂ O)	• 5 bar (72.5 psi) (corresponds to 50 mH ₂ O (150 ftH ₂ O))
• 0 ... 20 mH ₂ O (0 ... 60 ftH ₂ O)	• 10 bar (145 psi) (corresponds to 100 mH ₂ O (300 ftH ₂ O))
• 0 ... 40 mH ₂ O (0 ... 120 ftH ₂ O)	• 20 bar (290 psi) (corresponds to 200 mH ₂ O (600 ftH ₂ O))
Special measuring ranges	
• Up to 100 mH ₂ O (0 ... 300 ftH ₂ O)	• 20 bar (290 psi) (corresponds to 200 mH ₂ O (600 ftH ₂ O))
• Up to 160 mH ₂ O (0 ... 480 ftH ₂ O)	• 24 bar (348 psi) (corresponds to 240 mH ₂ O (720 ftH ₂ O))
Measuring range	
• 0 ... 0.1 bar	• 1.5 bar
• 0 ... 0.2 bar	• 1.5 bar
• 0 ... 0.3 bar	• 1.5 bar
• 0 ... 0.4 bar	• 2 bar
• 0 ... 0.5 bar	• 2 bar
• 0 ... 0.6 bar	• 2 bar
• 0 ... 1 bar	• 5 bar
• 0 ... 2 bar	• 10 bar
• 0 ... 4 bar	• 20 bar
Special measuring ranges	
• Up to 10 bar	• 20 bar
• Up to 20 bar	• 24 bar
Output	
Output signal	4 ... 20 mA
Measuring accuracy	According to IEC 62828-1
Measurement deviation at limit setting including hysteresis and reproducibility	• ≤ 0.15% of the measuring range end value (typical) • ≤ 0.3% of the measuring range end value (max.)
Effect of ambient temperature	≤ 0.05%/10 K of the measuring range end value (zero point and span)
Long-term stability	≤ 0.15% of the measuring range end value/year (zero point and span)
Operating conditions	
Ambient conditions	
• Process temperature	-10 ... +80 °C (14 ... 176 °F)
• Storage temperature	-20 ... +80 °C (-4 ... +176 °F)
Degree of protection according to IEC 60529	IP68
Structural design	
Weight	
• Pressure transmitter	≈ 0.4 kg (≈ 0.88 lb)

Technical specifications (continued)

Pressure transmitter SITRANS LH300 (submersible sensor)	
• Cable	0.08 kg/m (≈ 0.059 lb/ft)
Maximum of freely hanging length	300 m (990 ft)
Electrical connection	Cable with 2 wires, vent pipe and integrated humidity filters
Material	
• Seal diaphragm	Al ₂ O ₃ ceramic, 96%
• Enclosure	Stainless steel, mat. no. 1.4404/316L or 1.4539/904L for seawater applications
• Gasket	• FPM (standard) • EPDM (optional)
• Connecting cable	• PE (standard/drinking water applications) • FEP (for corrosive process media)
• Protective cap	Stainless steel, PPE or ETFE
Auxiliary power	
Terminal voltage on pressure transmitter U _B	• 10 ... 33 V DC for transmitter without explosion protection • 10 ... 30 V DC for transmitter with intrinsic safety explosion protection
Certificates and approvals	
Drinking water approval (ACS)	17 ACC NY 055
EAC	TC N RU Д-DE.ΓA02.B.05092
Underwriters Laboratories (UL)	ML File No. E344532, issued 2017-08-17
Marine approval (LR)	LR_18/20074
Marine approval (DNV/GL)	TAA00000CE
Marine approval (BV)	56926/A0 BV
Marine approval (ABS)	HG1881314_P
Marine approval (RINA)	ELE067319XG
Pressure Equipment Directive	The transmitter is not subject to the pressure equipment directive (DGRL 2014/68/EU)
Explosion protection	
• ATEX	SEV 16 ATEX 0121
• IEC Ex	IEC Ex SEV 16.0003
• EAC Ex	TC RU C-DE.AA87.B.00324
Intrinsic safety "i"	
• Marking	II 1 G Ex ia IIC T4 Ga

Cable box

Area of application	For connecting the transmitter cable
Structural design	
Weight	0.2 kg (0.44 lb)
Electrical connection	2 x 3-way (28 to 18 AWG)
Cable entry	2 x PG 13.5
Enclosure material	Polycarbonate
Vent valve for atmospheric pressure	
Operating conditions	
Degree of protection according to IEC 60529	IP65

Anchoring clamp

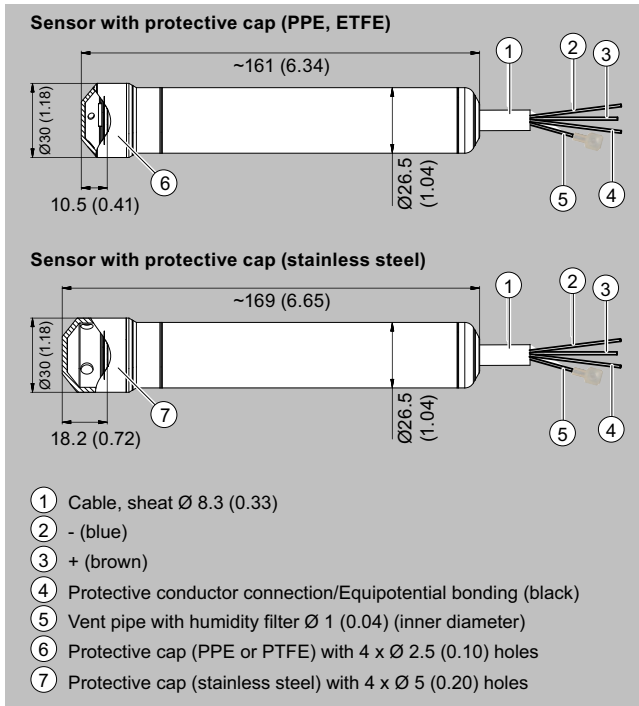
Area of application	For mounting the transmitter
Structural design	
Weight	0.16 kg (0.35 lb)
Material	Zinc-plated steel, polyamide
Terminal area	For cable with a diameter of 5.5 ... 9.5 mm

Pressure measurement

Pressure transmitters

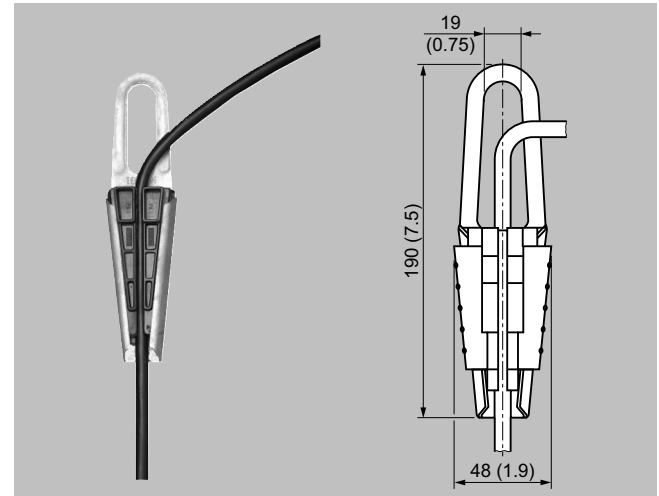
Single-range transmitters / SITRANS LH300

Dimensional drawings

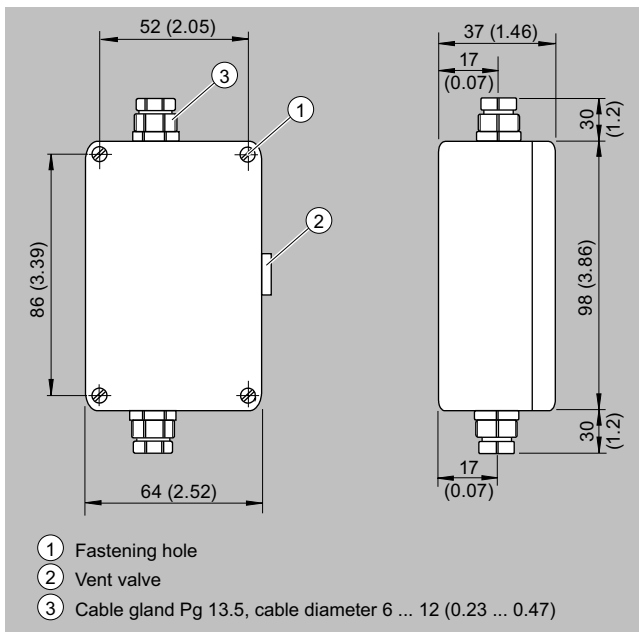


SITRANS LH300 pressure transmitter, dimensions in mm (inch)

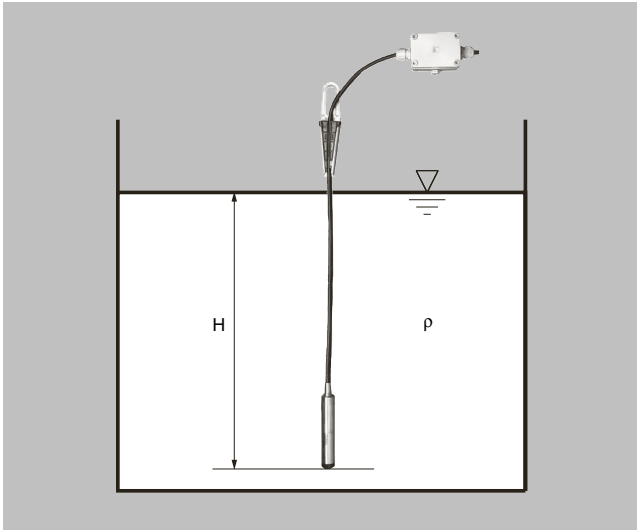
Dimensional drawings (continued)



Anchoring clamp, dimensions in mm (inch)



Cable box, dimensions in mm (inch)

More information**Determination of the measuring range for water as process medium**

Calculation of the measuring range:

$$p = \rho \times g \times H$$

with:

ρ = density of medium

g = local gravitational acceleration

H = maximum level

Example:

Medium: Water, $\rho = 1\,000\text{ kg/m}^3$

Gravitational acceleration: 9.81 m/s^2

Lower range value: 0 m

Maximum level: 6.0 m

Cable length: 10 m

Calculation:

$$p = 1\,000\text{ kg/m}^3 \times 9.81\text{ m/s}^2 \times 6.0\text{ m}$$

$$p = 58\,860\text{ N/m}^2$$

$$p = 589\text{ mbar}$$

Transmitter to be ordered:

7MF1575-1FA10

Plus, if required, cable box 7MF1575-8AA and anchoring clamp

7MF1575-8AB

Pressure measurement

Pressure transmitters

Single-range transmitters / SITRANS P Compact

Overview



The SITRANS P Compact pressure transmitter is designed for the specific requirements of the food, pharmaceuticals and biotechnology industries.

The use of high-quality materials guarantees adherence to hygiene provisions.

Particular importance was placed on high surface quality. In addition, the system can be electropolished.

A further important feature is the hygienic design of the process connection with different aseptic connections.

The fully welded stainless steel enclosure can be designed with degree of protection up to IP67.

By means of corresponding temperature decouplers, the SITRANS P Compact transmitter can be used for temperatures up to 200 °C (392 °F).

Benefits

- Measuring ranges from 0 to 160 mbar (0 to 2.32 psi) to 0 to 40 bar (0 to 580 psi)
- Linearity error incl. hysteresis < +0.2% of the full-scale value
- Piezo-resistive measurement system, vacuum-proof and overload-proof
- Hygiene-based design according to EHEDG, FDA and GMP recommendations
- Material and surface quality according to hygiene requirements
- Wetted parts made of stainless steel; completely welded
- Signal output 4 to 20 mA (0 to 20 mA as option)
- Stainless steel enclosure with degree of protection IP65 (IP67 as option)
- Process temperature up to 200 °C (392 °F)
- Explosion protection II 2G EEx [ib] IIC T6 to ATEX
- Easy and safe to clean

Application

The SITRANS P Compact pressure transmitter is designed for the specific requirements of the food, pharmaceuticals and biotechnology industries.

The use of high-quality materials guarantees adherence to hygiene provisions.

The SITRANS P Compact pressure transmitter can be ordered in a large number of different variants. This enables precise adaptation of the pressure transmitter to the conditions of the usage location.

Design

The electronics are potted for protection against humidity, corrosive atmospheres and vibrations.

Operating instructions for the pressure transmitter

Atmospheric internal pressure compensation

The atmospheric internal pressure compensation of the SITRANS P Compact pressure transmitter is designed as follows in the over-pressure measuring range:

- With connector designs via plug cable gland (IP65)
- In field enclosures via an integrated sinter filter (IP65) or a ventilated connecting cable (IP67)
- In versions with cable outlet via ventilated connecting cable (IP67)

In the absolute pressure area, no internal pressure compensation to the atmosphere is necessary.

Note: The degrees of protection specified above are only achieved under the following conditions:

- Proper mounting of the pressure transmitter
- Firmly tightened plug cable glands
- Cable diameters match nominal diameters of sealing inserts in the enclosure

Note: The integrated measures for EMC are only effective with a properly connected ground connection.

CE marking

The CE marking of the pressure transmitter certifies adherence with the guidelines of the European Council (9/336/EEC), the EMC legislation (13 Nov. 1992) and the applicable generic standards.

Problem-free operation in systems and plants is only achieved when the conditions for shielding, grounding, cable routing and electrical isolation are complied with during installation and mounting.

Hazardous areas

Note: In hazardous areas, electrical equipment can only be installed and operated by qualified expert personnel.

Changes at devices and connections void the Ex protection and the warranty.

In intrinsically safe circuits, equipotential bonding must be ensured over the entire course of the cable run, within and outside of the hazardous area. The limit values listed in the ATEX approval need to be considered.

Function

Process pressure acts on a piezo-resistive semi-conductor measuring bridge via a remote seal diaphragm by means of a transfer fluid. The pressure transmitter converts the measured pressure values into a load-independent current signal.

A compensation network achieves a large degree of independence of the output signal from the ambient temperature. With a specially adapted remote seal connection with minimized system volume, the influence of the process temperature on the output signal is reduced significantly as compared to a conventional screw connection.

The pressure transmitters can be supplied with an unregulated DC voltage of 10 to 30 V. The output signals common in measuring technology are available.

Selection and ordering data

	Article No.	Order code
SITRANS P Compact pressure transmitter for gauge and absolute pressure, with flush-mounted diaphragm	7MF8010-	
	1 ● ● ● ● - ● ● ● ● ● ● ● ●	
2-wire system, process temperature up to 140 °C (284 °F), measurement deviation: 0.2% of full-scale value, output 4 ... 20 mA		
Click the article number for online configuration in the PIA Life Cycle Portal.		
Diaphragm seal with quick-release		
Milk pipe union acc. to DIN 11851 with slotted union nut		
• DN 25	A D	
• DN 32	A E	
• DN 40	A F	
• DN 50	A G	
• DN 65	A H	
Dairy connection according to DIN 11851 with screwed connector		
• DN 25	B D	
• DN 32	B E	
• DN 40	B F	
• DN 50	B G	
• DN 65	B H	
Clamp connection acc. to DIN 32676		
• DN 25	C D	
• DN 40	C F	
• DN 50	C G	
Clamp connection acc. to ISO 2852		
• 1 inch	D M	
• 1½ inches	D N	
• 2 inches	D P	
• 2½ inches	D Q	
IDF standard with slotted union nut		
• 1 inch	E M	
• 1½ inches	E N	
• 2 inches	E P	
IDF standard with screwed connector		
• 1 inch	F M	
• 1½ inches	F N	
• 2 inches	F P	
SMS standard with slotted union nut		
• 1 inch	G M	
• 1½ inches	G N	
• 2 inches	G P	
SMS standard with screwed connector		
• 1 inch	H M	
• 1½ inches	H N	
• 2 inches	H P	
DRD flange without welded flange		
• DN 50, PN 40	J H	
Varivent connection (Tuchenhausen Co.)		
• D = 50 for Varivent enclosure DN 25 and 1 inch	K F	
• D = 68 for Varivent enclosure DN 40 ... DN 125 and 1½ ... 6 inches	K L	
Special design (specify order code and plain text)	Z A	J 1 Y
Filling liquid		
Food-grade oil, FDA-listed	3	
Special design (specify order code and plain text)	9	L 1 Y

Pressure measurement

Pressure transmitters

Single-range transmitters / SITRANS P Compact

Selection and ordering data (continued)

	Article No.	Order code
SITRANS P Compact pressure transmitter for gauge and absolute pressure, with flush-mounted diaphragm	7MF8010-	
	1 ● ● ● ● - ● ● ● ● ● ● ● ●	
Output signal		
4 ... 20 mA	1	
Special design (specify order code and plain text)	9	M 1 Y
Diaphragm seal with aseptic connection		
Aseptic screw gland according to DIN 11864-1, Form A, with slotted union nut		
• 1 inch	P M	
• 1½ inches	P N	
• 2 inches	P P	
• 2½ inches	P Q	
Aseptic screw gland according to DIN 11864-1, Form A, with screwed connector		
• 1 inch	Q M	
• 1½ inches	Q N	
• 2 inches	Q P	
• 2½ inches	Q Q	
NEUMO BioConnect aseptic screw gland with slotted union nut ¹⁾		
• DN 25	R D	
• DN 32	R E	
• DN 40	R F	
• DN 50	R G	
NEUMO BioConnect aseptic screw gland with screwed connector ¹⁾		
• DN 25	S D	
• DN 32	S E	
• DN 40	S F	
• DN 50	S G	
NEUMO BioConnect aseptic clamp connection, form R ¹⁾		
• DN 25	T D	
• DN 32	T E	
• DN 40	T F	
• DN 50	T G	
NEUMO BioConnect aseptic clamp connection, form V ¹⁾		
• DN 25	U D	
• DN 32	U E	
• DN 40	U F	
• DN 50	U G	
Male thread according to DIN 3852, form A		
• G1", min. measuring span. 0.4 bar (5.8 psi)	X C	
• G1½", min. measuring span. 0.25 bar (3.63 psi)	X D	
• G2", min. measuring span. 0.16 bar (2.32 psi)	X E	
Special design (specify order code and plain text)	Z A	J 1 Y
Filling liquid		
Food-grade oil, FDA-listed	3	
Special design (specify order code and plain text)	9	L 1 Y
Output signal		
4 ... 20 mA	1	
Special design (specify order code and plain text)	9	M 1 Y
Enclosure version (stainless steel, mat. no. 1.4404/316L) / electrical connection		
Enclosure with angled device plug according to DIN 43650, IP65	1	
Enclosure with M12 device plug, IP65, fastening union nut made of polyamide	2	
Enclosure with M12 device plug, IP65, fastening union nut made of stainless steel	3	
Field enclosure (small) made of stainless steel with cable gland, IP65	4	
Field enclosure (small) made of stainless steel with cable gland, IP67, internal ventilation for measuring ranges < 16 bar (< 232 psi)	5	

Selection and ordering data (continued)

		Article No.	Order code
SITRANS P Compact pressure transmitter for gauge and absolute pressure, with flush-mounted diaphragm		7MF8010-	
		1 ● ● ● ● - ● ● ● ● ● ● ● ●	
Measuring range	Overload pressure		
0 ... 160 mbar (0 ... 2.32 psi)	1 bar (14.5 psi)		B B
0 ... 250 mbar (0 ... 3.63 psi)	1 bar (14.5 psi)		B C
0 ... 400 mbar (0 ... 5.8 psi)	3 bar (43.5 psi)		B D
0 ... 600 mbar (0 ... 8.7 psi)	3 bar (43.5 psi)		B E
0 ... 1 bar (0 ... 14.5 psi)	3 bar (43.5 psi)		C A
0 ... 1.6 bar (0 ... 23.2 psi)	10 bar (145 psi)		C B
0 ... 2.5 bar (0 ... 36.3 psi)	10 bar (145 psi)		C C
0 ... 4 bar (0 ... 58 psi)	20 bar (290 psi)		C D
0 ... 6 bar (0 ... 87 psi)	60 bar (870 psi)		C E
0 ... 10 bar (0 ... 145 psi)	60 bar (870 psi)		D A
0 ... 16 bar (0 ... 232 psi)	60 bar (870 psi)		D B
0 ... 25 bar (0 ... 363 psi)	60 bar (870 psi)		D C
0 ... 40 bar (0 ... 580 psi)	100 bar (1450 psi)		D D
-160 ... 0 mbar (-2.32 ... 0 inH ₂ O)	1 bar (14.5 psi)		E B
-250 ... 0 mbar (-3.73 ... 0 inH ₂ O)	1 bar (14.5 psi)		E C
-400 ... 0 mbar (-5.8 ... 0 inH ₂ O)	3 bar (43.5 psi)		E D
-600 ... 0 mbar (-8.7 ... 0 inH ₂ O)	3 bar (43.5 psi)		E E
-1 ... 0 bar (-14.5 ... 0 psi)	3 bar (43.5 psi)		F A
-1 ... 0.6 bar (-14.5 ... 8.7 psi)	10 bar (145 psi)		F B
-1 ... 1.5 bar (-14.5 ... 21.8 psi)	10 bar (145 psi)		F C
-1 ... 3 bar (-14.5 ... 43.5 psi)	20 bar (290 psi)		F D
-1 ... 5 bar (-14.5 ... 72.5 psi)	20 bar (290 psi)		F E
-1 ... 9 bar (-14.5 ... 130.5 psi)	60 bar (870 psi)		G A
-1 ... 15 bar (-14.5 ... 217.6 psi)	60 bar (870 psi)		G B
0 ... 1 bar a (0 ... 14.5 psi a)	3 bar a (43.5 psi a)		H A
0 ... 1.6 bar a (0 ... 23.2 psi a)	10 bar a (145 psi a)		H B
0 ... 2.5 bar a (0 ... 36.3 psi a)	10 bar a (145 psi a)		H C
0 ... 4 bar a (0 ... 58 psi a)	10 bar a (145 psi a)		H D
0 ... 6 bar a (0 ... 87 psi a)	60 bar a (870 psi a)		H E
0 ... 10 bar a (0 ... 145 psi a)	60 bar a (870 psi a)		J A
Special design (specify order code and plain text)			Z A P 1 Y
Explosion protection			
None			1
With, according to ATEX 100a, II 2 G, Ex ib IIC T6			2

1) Please make sure to also specify: Connections for pipes: R01, R02 or R03, see "Options" table.

		Article No.	Order code
SITRANS P Compact pressure transmitter for gauge and absolute pressure, with inline seal 2-wire system, process temperature up to 140 °C (284 °F), measurement deviation: 0.2% of full-scale value, output 4 ... 20 mA		7MF8010-	
		2 ● ● ● ● - ● ● ● ● ● ● ● ●	
Click the article number for online configuration in the PIA Life Cycle Portal.			
Inline seal (screw gland at each end) with quick-release clamps			
Dairy connection according to DIN 11851 with screwed connector			
• DN 25			A D
• DN 32			A E
• DN 40			A F
• DN 50			A G
• DN 65			A H
Clamp connection acc. to DIN 32676			
• DN 25			C D
• DN 32			C E
• DN 40			C F
• DN 50			C G

Pressure measurement

Pressure transmitters

Single-range transmitters / SITRANS P Compact

Selection and ordering data (continued)

	Article No.	Order code
SITRANS P Compact pressure transmitter for gauge and absolute pressure, with inline seal 2-wire system, process temperature up to 140 °C (284 °F), measurement deviation: 0.2% of full-scale value, output 4 ... 20 mA	7MF8010- 2 ● ● ● ● - ● ● ● ● ● ● ● ●	
• DN 65	C H	
Clamp connection acc. to ISO 2852 ¹⁾		
• 1 inch	D M	
• 1½ inches	D N	
• 2 inches	D P	
• 2½ inches	D Q	
Special design (specify order code and plain text)	Z A	J 1 Y
Filling liquid		
Food-grade oil, FDA-listed	3	
Special design (specify order code and plain text)	9	L 1 Y
Output signal		
4 ... 20 mA	1	
Special design (specify order code and plain text)	9	M 1 Y
Inline seals with aseptic connection		
Aseptic screw gland according to DIN 11864-1, Form A, with screwed connector		
• 1 inch	Q M	
• 1½ inches	Q N	
• 2 inches	Q P	
NEUMO BioConnect aseptic screw gland with screwed connector ²⁾		
• DN 25	S D	
• DN 32	S E	
• DN 40	S F	
• DN 50	S G	
• DN 65	S H	
NEUMO BioConnect aseptic clamp connection, form R ²⁾		
• DN 25	T D	
• DN 32	T E	
• DN 40	T F	
• DN 50	T G	
SÜDMO aseptic screw gland with W 501 screwed connector ²⁾		
• 1 inch	V M	
• 1½ inches	V N	
• 2 inches	V P	
SÜDMO aseptic screw gland with W 601 clamp connection ²⁾		
• 1 inch	W M	
• 1½ inches	W N	
• 2 inches	W P	
Special design (specify order code and plain text)	Z A	J 1 Y
Filling liquid		
Food-grade oil, FDA-listed	3	
Special design (specify order code and plain text)	9	L 1 Y
Output signal		
4 ... 20 mA	1	
Special design (specify order code and plain text)	9	M 1 Y
Enclosure version (stainless steel, mat. no. 1.4404/316L) / electrical connection		
Enclosure with angled device plug according to DIN 43650, IP65, securing union nut made of polyamide		1
Enclosure with M12 device plug, IP65, fastening union nut made of polyamide		2
Enclosure with M12 device plug, IP65, fastening union nut made of stainless steel		3
Field enclosure (small) made of stainless steel with cable gland, IP65		4
Field enclosure (small) made of stainless steel with cable gland, IP67, internal ventilation for measuring ranges < 16 bar (< 232 psi)		5

Selection and ordering data (continued)

		Article No.	Order code
SITRANS P Compact pressure transmitter for gauge and absolute pressure, with inline seal 2-wire system, process temperature up to 140 °C (284 °F), measurement deviation: 0.2% of full-scale value, output 4 ... 20 mA		7MF8010-	
		2 ● ● ● ● - ● ● ● ● ● ● ● ●	
Measuring range	Overload pressure		
0 ... 160 mbar (0 ... 2.32 psi)	1 bar (14.5 psi)		B B
0 ... 250 mbar (0 ... 3.63 psi)	1 bar (14.5 psi)		B C
0 ... 400 mbar (0 ... 5.8 psi)	3 bar (43.5 psi)		B D
0 ... 600 mbar (0 ... 8.7 psi)	3 bar (43.5 psi)		B E
0 ... 1 bar (0 ... 14.5 psi)	3 bar (43.5 psi)		C A
0 ... 1.6 bar (0 ... 23.2 psi)	10 bar (145 psi)		C B
0 ... 2.5 bar (0 ... 36.3 psi)	10 bar (145 psi)		C C
0 ... 4 bar (0 ... 58 psi)	20 bar (290 psi)		C D
0 ... 6 bar (0 ... 87 psi)	60 bar (870 psi)		C E
0 ... 10 bar (0 ... 145 psi)	60 bar (870 psi)		D A
0 ... 16 bar (0 ... 232 psi)	60 bar (870 psi)		D B
0 ... 25 bar (0 ... 363 psi)	60 bar (870 psi)		D C
0 ... 40 bar (0 ... 580 psi)	100 bar (1450 psi)		D D
-160 ... 0 mbar (-2.32 ... 0 psi)	1 bar (14.5 psi)		E B
-250 ... 0 mbar (-3.63 ... 0 psi)	1 bar (14.5 psi)		E C
-400 ... 0 mbar (-5.8 ... 0 psi)	3 bar (43.5 psi)		E D
-600 ... 0 mbar (-8.7 ... 0 psi)	3 bar (43.5 psi)		E E
-1 ... 0 bar (-14.5 ... 0 psi)	3 bar (43.5 psi)		F A
-1 ... 0.6 bar (-14.5 ... 8.7 psi)	10 bar (145 psi)		F B
-1 ... 1.5 bar (-14.5 ... 21.8 psi)	10 bar (145 psi)		F C
-1 ... 3 bar (-14.5 ... 43.5 psi)	20 bar (290 psi)		F D
-1 ... 5 bar (-14.5 ... 72.5 psi)	20 bar (290 psi)		F E
-1 ... 9 bar (-14.5 ... 130.5 psi)	60 bar (870 psi)		G A
-1 ... 15 bar (-14.5 ... 217.6 psi)	60 bar (870 psi)		G B
0 ... 1 bar a (0 ... 14.5 psi a)	3 bar a (43.5 psi a)		H A
0 ... 1.6 bar a (0 ... 23.2 psi a)	10 bar a (145 psi a)		H B
0 ... 2.5 bar a (0 ... 36.3 psi a)	10 bar a (145 psi a)		H C
0 ... 4 bar a (0 ... 58 psi a)	10 bar a (145 psi a)		H D
0 ... 6 bar a (0 ... 87 psi a)	60 bar (870 psi a)		H E
0 ... 10 bar a (0 ... 145 psi a)	60 bar (870 psi a)		J A
Special design (specify order code and plain text)			Z A P 1 Y
Explosion protection			
None			1
With explosion protection according to ATEX 100a, II 2 G, Ex ib IIC T6			2

- 1) Observe inside diameter of the pipe. Please specify pipe classes (see "Options").
 2) Please make sure to also specify: Connections for pipes: R01, R02 or R03, see "Options" table.

Options	Order code
Add "-Z" to article number, specify order code and plain text or entry from drop-down list.	
Hygiene version Roughness process connection: Foil $R_a < 0.8 \mu\text{m}$ ($3.15 \cdot 10^{-8}$ inches); welding seams $R_a < 1.5 \mu\text{m}$ ($5.9 \cdot 10^{-8}$ inches)	P01
Integrated cooling element Process temperature max. 200 °C (392 °F) instead of 140 °C (284 °F)	K01
Connections for pipes	
Pipes according to DIN 11850	R01
ISO pipes according to DIN 2463	R02
Pipes acc. to >>>O. D. Tubing "BS 4825 Part 1"<<<	R03
Certificates	
Quality inspection certificate (5-point characteristic curve test) according to IEC 62828-2	C11
Inspection certificate according to EN 10204-3.1	C12

Pressure measurement

Pressure transmitters

Single-range transmitters / SITRANS P Compact

Selection and ordering data (continued)

Options	Order code
Add "-Z" to article number, specify order code and plain text or entry from drop-down list.	
Use of FDA-listed remote seal filling liquids certified with a factory certificate according to EN 10204-2.2	C17
Roughness depth measurement R_a certified with a factory certificate according to EN 10204-3.1	C18
Certification according to EHEDG for inline seal with aseptic screw gland according to DIN 11864	C19

Technical specifications

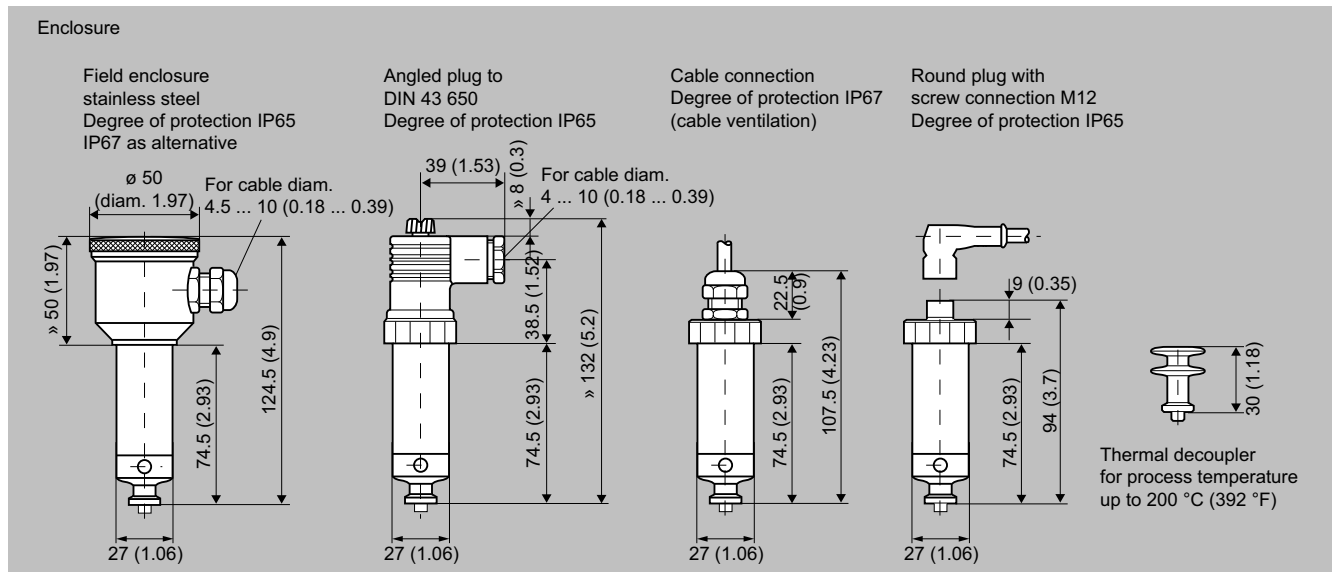
Pressure transmitters for food, pharmaceuticals and biotechnology	
Mode of operation	
Measuring principle	Piezo-resistive
Input	
Measured variable	Gauge or absolute pressure
Measuring range	0 ... 160 mbar (0 ... 2.32 psi) ... 0 ... 40 bar (0 ... 580 psi)
Output	
Output signal	
• 2-wire system	4 ... 20 mA
• 3-wire system	0 ... 20 mA
Measuring accuracy	
Measurement deviation at limit setting including hysteresis and reproducibility	According to IEC 62828-1 ≤ 0.2% of full-scale value
Adjustment accuracy	± 0.2% of full-scale value
Step response time	< 20 ms
Effect of ambient temperature	
On the enclosure	
• Zero point	< 0.2%/10 K of full-scale value
• Measuring span	< 0.2%/10 K of full-scale value
On the process connection (remote seals)	
• Flange remote seal	Zero-point error (dependent on design) ¹⁾
- DN 25/1"	4.8 mbar/10 K (0.069 psi/10 K)
- DN 32/1¼"	2.3 mbar/10 K (0.033 psi/10 K)
- DN 40/1½"	1.6 mbar/10 K (0.023 psi/10 K)
- DN 50/2"	0.6 mbar/10 K (0.009 psi/10 K)
• Inline seal	
- DN 25/1"	9.5 mbar/10 K (0.138 psi/10 K)
- DN 32/1¼"	4.1 mbar/10 K (0.060 psi/10 K)
- DN 40/1½"	3.9 mbar/10 K (0.057 psi/10 K)
- DN 50/2"	3.9 mbar/10 K (0.057 psi/10 K)
Operating conditions	
Installation conditions	
• Mounting position	Any, vertical as standard
Ambient conditions	
• Ambient temperature	-10 ... +70 °C (14 ... 158 °F)
• Storage temperature	-10 ... +90 °C (14 ... 194 °F)
• Process temperature	Max. 200 °C (392 °F), depending on design
• Vacuum-resistant	0 mbar (0 psi) absolute at max. 50 °C. Higher process temperatures on request.
• Degree of protection according to IEC 60529	IP65, optional IP67

Technical specifications (continued)

Pressure transmitters for food, pharmaceuticals and biotechnology	
Electromagnetic Compatibility	
- Emitted interference	To EN 50081 Part 1, issue 1993 (residential and industrial areas). The device has no own emissions.
- Noise immunity to	EN 50082 Part 2, issue March 1995 (industrial areas)
Structural design	
Weight (without remote seal)	
• Field enclosure	≈ 460 G (≈ 1.01 lb)
• Enclosure with plug	≈ 200 g (≈ 0.44 lb)
Enclosure	
• Designs	<ul style="list-style-type: none"> Field enclosure IP65 or IP67, with screw gland Angled device plug DIN 43650, IP65 Cable connection, IP67 M12 device plug, IP65
• Material	Stainless steel, mat. no. 1.4404/316L/1.4305
Material of union nut	
	Polyamide (with electrical connection using plug or cable) Electronics unit potted with silicone Internal ventilation for measuring ranges < 16 bar (< 232 psi), through enclosure thread or connecting cable depending on design
Process connection	
• Versions	See ordering data
• Material of coupling	Stainless steel, mat. no. 1.4404/316L
Auxiliary power	
Terminal voltage on transmitter	10 ... 30 V DC
Nominal voltage	24 V DC
Certificates and approvals	
Classification according to pressure equipment directive (PED 2014/68/EU)	
• For 7MF8010-1... (with diaphragm seal)	For gases of fluid group 1 and liquids of fluid group 1; complies with requirements of article 4, paragraph 3 (sound engineering practice)
• For 7MF8010-2... (with inline seal)	For gases of fluid group 1 and liquids of fluid group 1; complies with the requirements of article 4, paragraph 1 (annex 1); assigned to category III, conformity evaluation module H by the TÜV Nord
Explosion protection	
• Intrinsic safety "i"	TÜV 03 ATEX 2099 X
- Marking	Ex II 2G EEx ib IIC T6

¹⁾ The zero-point error specified for the process connection should be considered as a guide value for a standard design. We will make a detailed system calculation on request. Systems with reduced remote seal error are available on request.

Dimensional drawings



SITRANS P Compact, dimensions in mm (inch)

Process connections

Quick-release diaphragm seals

Dairy connection according to DIN 11851 with slotted union nut

	DN	PN	H mm (inch)	G
	25	40	24 (0.95)	Radius 52 x 1/6 inch
	32	40	24 (0.95)	Radius 58 x 1/6 inch
	40	40	24 (0.95)	Radius 65 x 1/6 inch
	50	25	25.1 (0.99)	Radius 78 x 1/6 inch
	65	25	28.6 (1.13)	Radius 95 x 1/6 inch

Dairy connection according to DIN 11851 with screwed connector

	DN	PN	H mm (inch)	G
	25	40	-	Radius 52 x 1/6 inch
	32	40	20 (0.79)	Radius 58 x 1/6 inch
	40	40	20 (0.79)	Radius 65 x 1/6 inch
	50	25	20 (0.79)	Radius 78 x 1/6 inch
	65	25	22 (0.87)	Radius 95 x 1/6 inch

SMS standard with union nut

	DN	PN	H mm (inch)	G
	1 inch	40	16 (0.63)	Radius 40 x 1.6 inches
	1½ inches	40	16 (0.63)	Radius 60 x 1.6 inches
	2 inches	25	16 (0.63)	Radius 70 x 1.6 inches

SMS standard with threaded socket

	DN	PN	H mm (inch)	G
	1 inch	40	16 (0.63)	Radius 40 x 1.6 inches
	1½ inches	40	20 (0.79)	Radius 60 x 1.6 inches
	2 inches	25	20 (0.79)	Radius 70 x 1.6 inches

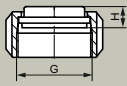
Pressure measurement

Pressure transmitters

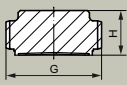
Single-range transmitters / SITRANS P Compact

Dimensional drawings (continued)

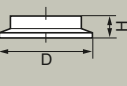
IDF standard with union nut

	DN	PN	H mm (inch)	G
	1 inch	40	21 (0.83)	1 inch
	1½ inches	40	13.5 (0.53)	1½ inches
	2 inches	25	15 (0.59)	2 inches

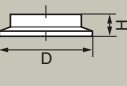
IDF standard with screwed connector

	DN	PN	H mm (inch)	G
	1 inch	40	21 (0.83)	1 inch
	1½ inches	40	13.5 (0.53)	1½ inches
	2 inches	25	15 (0.59)	2 inches

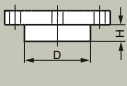
Clamp connection according to DIN 32676

	DN	PN	H mm (inch)	D mm (inches)
	25	16	14 (0.55)	50.5 (2)
	40	16	14 (0.55)	50.5 (2)
	50	16	14 (0.55)	64 (2.52)

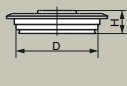
Clamp connection according to ISO 2852

	DN	PN	H mm (inch)	D mm (inches)
	1 inch	16	14 (0.55)	50.5 (2)
	1½ inches	16	12 (0.47)	50.5 (2)
	2 inches	16	14 (0.55)	64 (2.52)
	2½ inches	16	14 (0.55)	77.5 (3.05)

DRD flange without welded flange

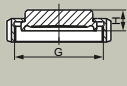
	DN	PN	H mm (inch)	D mm (inches)
	50	40	16.7 (0.66)	65.5 (2.58)

Varivent connection

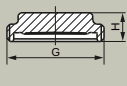
	DN	PN	H mm (inch)	D mm (inches)
	25	25	19 (0.75)	50 (1.97)
	40 ... 125	25/10	19 (0.75)	68 (2.68)

Diaphragm seal with aseptic connection

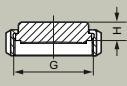
Aseptic screw gland according to DIN 11864-1, form A, with slotted union nut

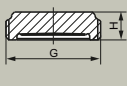
	DN	PN	H mm (inch)	D mm (inches)
	1 inch	40	20 (0.79)	Radius 52 x 1/6 inch
	1½ inches	40	20 (0.79)	Radius 58 x 1/6 inch
	2 inches	25	20 (0.79)	Radius 65 x 1/6 inch
	2½ inches	25	20 (0.79)	Radius 78 x 1/6 inch

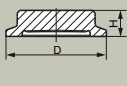
Aseptic screw gland according to DIN 11864-1, form A, with screwed connector

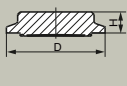
	DN	PN	H mm (inch)	D mm (inches)
	1 inch	40	15 (0.59)	Radius 52 x 1/6 inch
	1½ inches	40	15 (0.59)	Radius 58 x 1/6 inch
	2 inches	25	15 (0.59)	Radius 65 x 1/6 inch
	2½ inches	25	15 (0.59)	Radius 78 x 1/6 inch

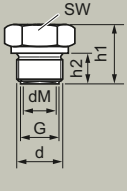
Dimensional drawings (continued)

NEUMO BioConnect aseptic screw gland with slotted union nut					
	DN	PN	H mm (inch)	D mm (inches)	
	25	16	15 (0.59)	M 42 x 2	
	32	16	15 (0.59)	M 52 x 2	
	40	16	15 (0.59)	M 56 x 2	
	50	16	15 (0.59)	M 68 x 2	

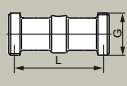
NEUMO BioConnect aseptic screw gland with screwed connector					
	DN	PN	H mm (inch)	D mm (inches)	
	25	16	20 (0.79)	M 42 x 2	
	32	16	20 (0.79)	M 52 x 2	
	40	16	20 (0.79)	M 56 x 2	
	50	16	20 (0.79)	M 68 x 2	

NEUMO BioConnect aseptic clamp connection, form R					
	DN	PN	H mm (inch)	D mm (inches)	
	25	40	20 (0.79)	50.5 (2)	
	32	40	20 (0.79)	50.5 (2)	
	40	40	20 (0.79)	64 (2.52)	
	50	25	20 (0.79)	77.4 (3.05)	

NEUMO BioConnect aseptic clamp connection, form V					
	DN	PN	H mm (inch)	D mm (inches)	
	25	40	15 (0.59)	50.5 (2)	
	32	40	15 (0.59)	50.5 (2)	
	40	40	20 (0.79)	64 (2.52)	
	50	25	20 (0.79)	77.4 (3.05)	

Connecting socket for screw-in thread according to DIN 3852, form A						
	G	d mm (inches)	d _M mm (inch)	h ₁ mm (inch)	h ₂ mm (inch)	SW mm (inch)
	G½A	26 (1.02)	17.5 (0.69)	27 (1.06)	14 (0.55)	27 (1.06)
	G¾A	32 (1.26)	22.6 (0.89)	31 (1.22)	16 (0.63)	32 (1.26)
	G1A	39 (1.54)	27 (1.06)	33 (1.30)	18 (0.71)	51 (2.01)
	G1½A	55 (2.17)	40 (1.57)	40 (1.57)	22 (0.87)	55 (2.17)
	G2A	68 (2.68)	51 (2.00)	42 (1.65)	24 (0.94)	70 (2.76)

Inline seal (screw gland at each end) with quick-release clamps

Dairy connection according to DIN 11851 with screwed connector					
	DN	PN	L mm (inch)	G	
	25	40	110 (4.33)	Radius 52 x 1/6 inch	
	32	40	110 (4.33)	Radius 58 x 1/6 inch	
	40	40	110 (4.33)	Radius 65 x 1/6 inch	
	50	25	110 (4.33)	Radius 78 x 1/6 inch	
	65	25	110 (4.33)	Radius 95 x 1/6 inch	

Pressure measurement

Pressure transmitters


Single-range transmitters / SITRANS P Compact

Dimensional drawings (continued)

Clamp connection according to DIN 32676

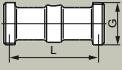
	DN	PN	L mm (inch)	D mm (inches)
	25	16	110 (4.33)	50.5 (2)
	32	16	110 (4.33)	50.5 (2)
	40	16	110 (4.33)	50.5 (2)
	50	16	110 (4.33)	64 (2.52)
	65	10	110 (4.33)	91 (3.58)

Clamp connection according to ISO 2852

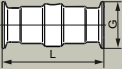
	DN	PN	L mm (inch)	D mm (inches)
	1 inch	16	110 (4.33)	50.5 (2)
	1½ inches	16	110 (4.33)	50.5 (2)
	2 inches	16	110 (4.33)	64 (2.52)
	2½ inches	16	110 (4.33)	91 (3.58)

Inline seals with aseptic connection

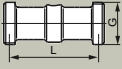
Aseptic screwed gland according to DIN 11864-1, form A, with screwed connector

	DN	PN	L mm (inch)	G
	1 inch	40	110 (4.33)	Radius 52 x 1/6 inch
	1½ inches	40	110 (4.33)	Radius 65 x 1/6 inch
	2 inches	25	110 (4.33)	Radius 78 x 1/6 inch

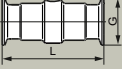
NEUMO BioConnect aseptic screwed gland with screwed connector

	DN	PN	L mm (inch)	G
	25	16	110 (4.33)	M 42 x 2
	32	16	110 (4.33)	M 52 x 2
	40	16	110 (4.33)	M 56 x 2
	50	16	110 (4.33)	M 68 x 2
	65	16	110 (4.33)	M 90 x 3

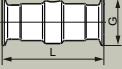
SÜDMO aseptic screwed gland with W 501 screwed connector

	DN	PN	L mm (inch)	G
	1 inch	25	110 (4.33)	Radius 44 x 1/6 inch
	1½ inches	25	110 (4.33)	Radius 58 x 1/6 inch
	2 inches	20	110 (4.33)	Radius 78 x 1/6 inch

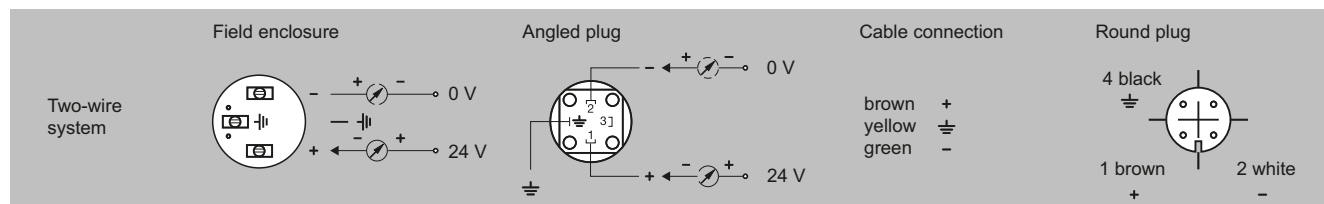
NEUMO BioConnect aseptic screwed gland clamp connection, form R

	DN	PN	L mm (inch)	D mm (inches)
	25	16	110 (4.33)	50.4 (2)
	32	16	110 (4.33)	50.4 (2)
	40	16	110 (4.33)	64 (2.52)
	50	16	110 (4.33)	77.4 (3.05)

SÜDMO aseptic screwed gland with W 601 screwed connector

	DN	PN	L mm (inch)	D mm (inches)
	1 inch	16	110 (4.33)	50.5 (2)
	1½ inches	16	110 (4.33)	64 (2.52)
	2 inches	16	110 (4.33)	77.5 (3.05)

Circuit diagrams



SITRANS P Compact, connection diagram

Pressure measurement

Pressure transmitters

for food, pharmaceuticals and biotechnology / SITRANS P300

Overview



The SITRANS P300 is a digital pressure transmitter for relative and absolute pressure. The conventional thread versions are available as process connections, as are flush-mounted versions. A large number of the flush-mounted versions are suitable for food and pharmaceutical applications, and satisfy the EHEDG and 3A hygiene requirements.

The output signal is a load-independent direct current from 4 to 20 mA or a PROFIBUS PA or FOUNDATION Fieldbus signal, which is linearly proportional to the input pressure. Communication is via HART protocol or PROFIBUS PA or FOUNDATION Fieldbus interface. The basic settings of the pressure transmitter can be made easily on-site by means of three buttons.

The SITRANS P300 has a single-chamber stainless steel enclosure. The pressure transmitter is approved for "intrinsically safe" type of protection. It can be used in zone 1 or zone 0.

Benefits

- High quality and service life
- High reliability even under extreme chemical and mechanical loads
- Extensive diagnostics and simulation functions
- Minimal conformity error
- Small long-term drift
- Wetted parts made of high-grade materials (e.g., stainless steel, Hastelloy)
- Measuring range 0.008 bar to 400 bar (0.1 psi to 5802 psi)
- High measuring accuracy
- Parameterization using control keys and HART and/or PROFIBUS PA or FOUNDATION Fieldbus

Application

The pressure transmitter is available in versions for gauge pressure and for absolute pressure. The output signal is always a load-independent direct current from 4 to 20 mA or a PROFIBUS PA or FOUNDATION Fieldbus signal, which is linearly proportional to the input pressure. The pressure transmitter measures corrosive, non-corrosive and hazardous gases, vapors and liquids.

It can be used for the following measurement types:

- Gauge pressure
- Absolute pressure

With appropriate parameter settings, it can also be used for the following additional measurement types:

- Level
- Volume
- Mass

The "intrinsically safe" Ex ia type of protection version of the transmitter can be installed in hazardous areas (Zone 1). The devices are provided with an EC type-examination certificate and comply with the respective harmonized European standards of ATEX.

Gauge pressure

This variant measures the gauge pressure of corrosive, non-corrosive and hazardous gases, vapors and liquids.

The smallest measuring span is 0.01 bar (0.15 psi), the largest 400 bar (5802 psi).

Level

With appropriate parameter settings, the gauge pressure variant measures the level of corrosive, non-corrosive and hazardous liquids.

For level measurement in an open vessel, you require one device; for level measurement in a closed vessel, you require two devices and a process control system.

Absolute pressure

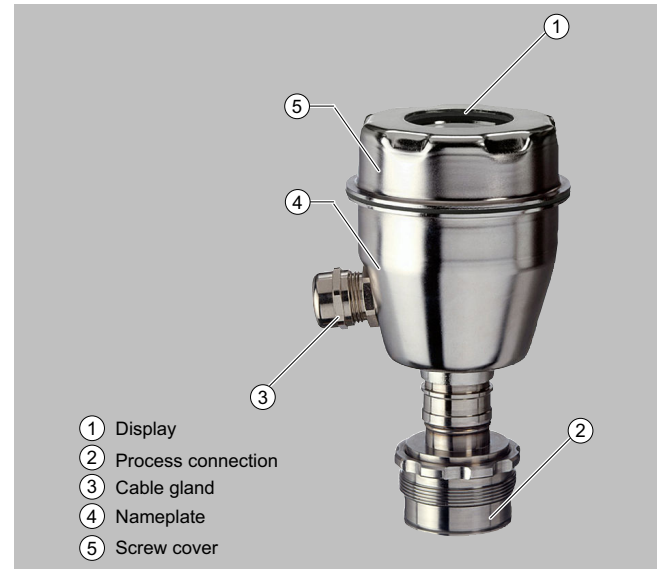
This variant measures the absolute pressure of corrosive, non-corrosive and hazardous gases, vapors and liquids.

The smallest measuring span is 0.008 bar a (0.12 psi a), the largest is 30 bar a (435 psi a).

Design

The device comprises:

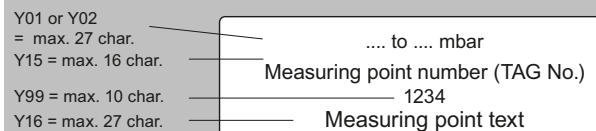
- electronics
- Enclosure
- Measuring cell



Perspective view of SITRANS P300

The enclosure has a screw-on cover (5) and, depending on the version, comes with or without an inspection window. The electrical terminal compartment, the buttons for operation of the device are located under this cover and, depending on the version, the display. The connections for the auxiliary power U_H and the shield are in the terminal compartment. The cable gland is mounted on the side of the enclosure. The measuring cell with the process connection (2) is located on the bottom of the enclosure. The measuring cell with the process connection may differ from the one shown in the diagram, depending on the device version.

Example of attached measuring points sign



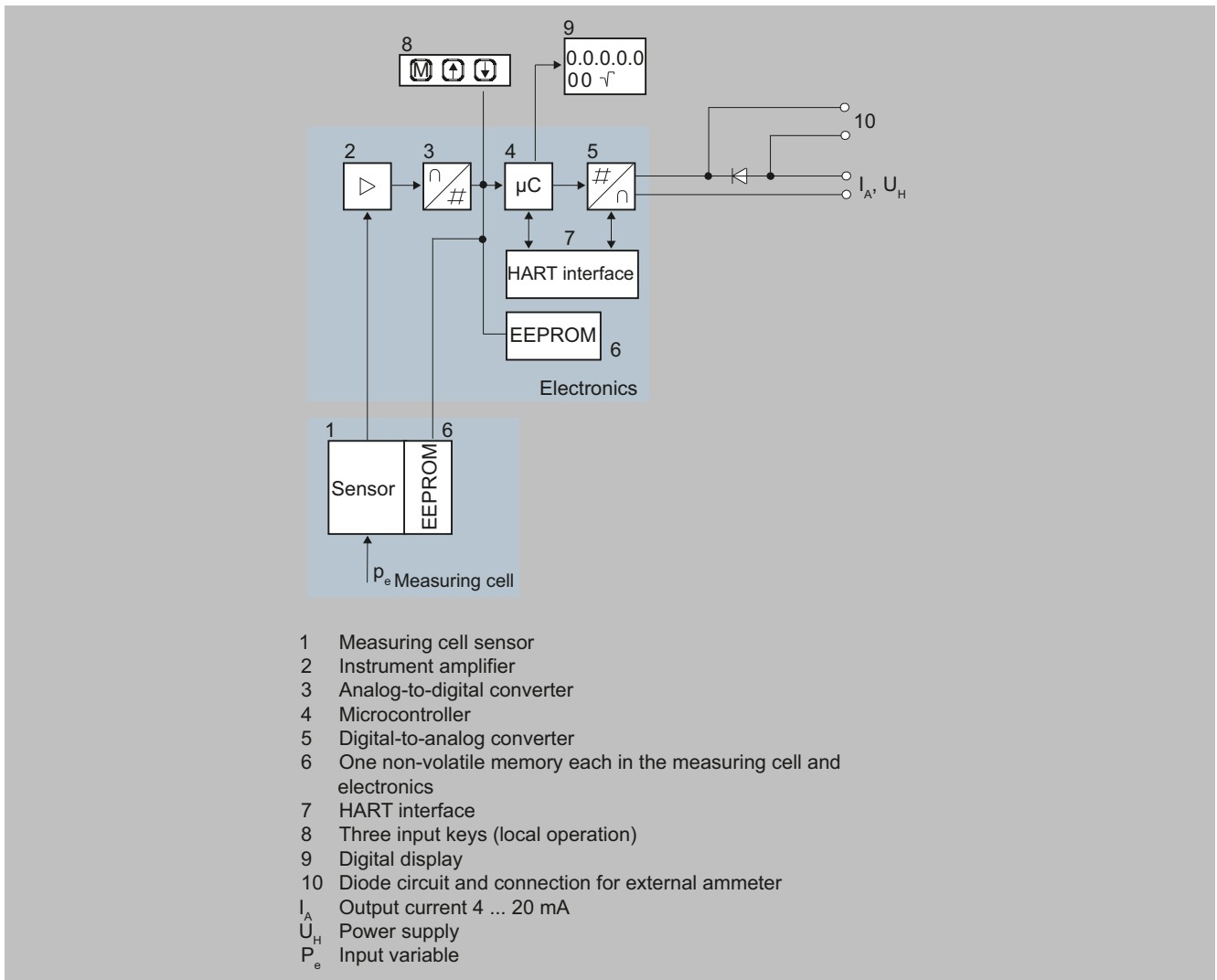
Pressure measurement

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Function

Mode of operation of electronics with HART communication



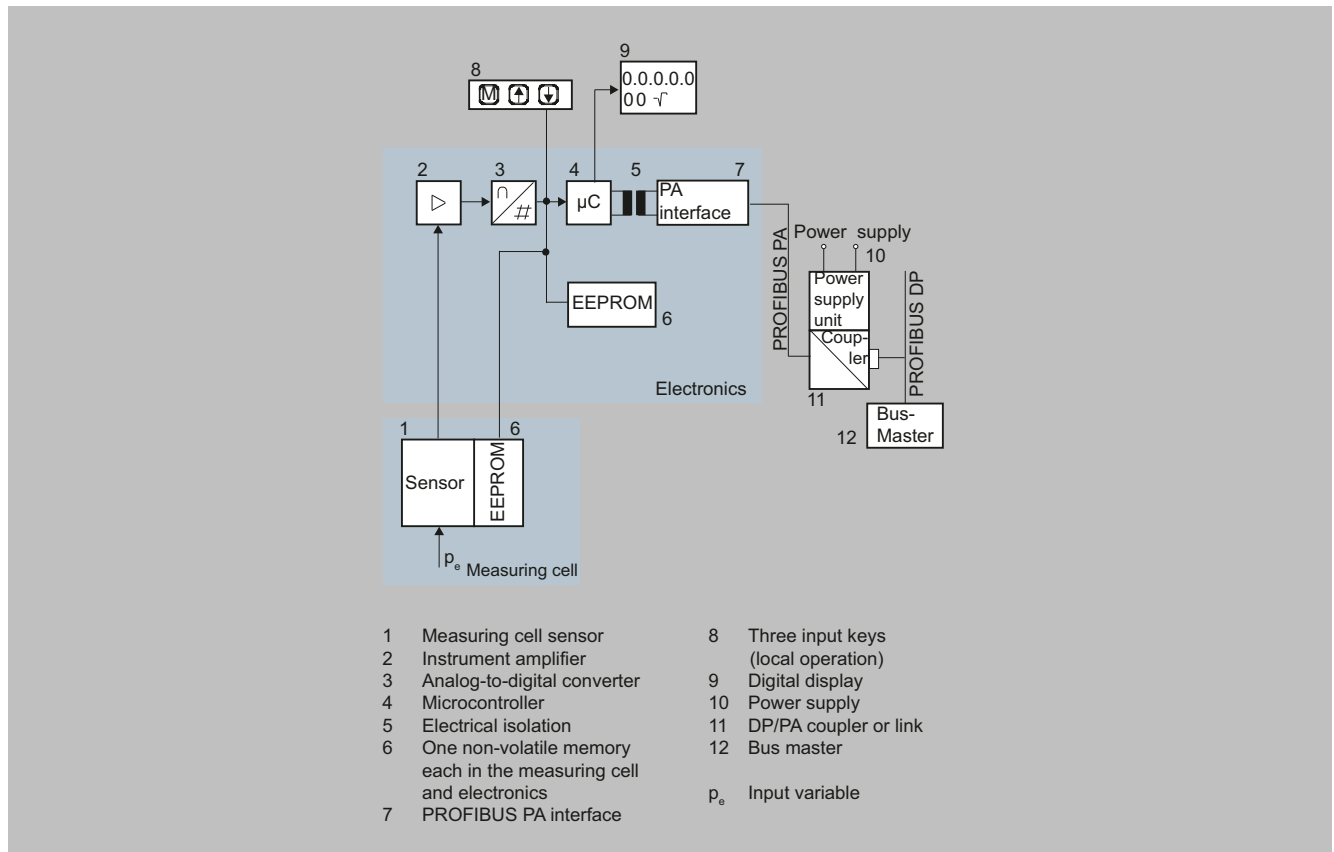
Function diagram of electronics

The input pressure is converted into an electrical signal by the sensor (1). This signal is amplified by the instrument amplifier (2) and digitalized in an analog-to-digital converter (3). The digital signal is analyzed in a microcontroller (4) and corrected for linearity and temperature response. In a digital-to-analog converter (5) it is then converted into the output current of 4 to 20 mA. A diode circuit provides reverse polarity protection. You can make an uninterrupted current measurement with a low-ohm ammeter at the connection (10). The data specific to the measuring cell, the electronic data and parameter settings are stored in two non-volatile memories (6). The first storage is linked to the measuring cell, the second to the electronics.

The buttons (8) can be used to call up individual functions, so-called modes. If you have a device with a local display (9), you can use this to track mode settings and other messages. The basic mode settings can be changed with a computer via the HART modem (7).

Function (continued)

Mode of operation of electronics with PROFIBUS PA communication



Function diagram of electronics

The input pressure is converted into an electrical signal by the sensor (1). This signal is amplified by the instrument amplifier (2) and digitalized in an analog-to-digital converter (3). The digital signal is analyzed in a microcontroller (4) and corrected for linearity and temperature response. It is then made available on the PROFIBUS PA via an electrically isolated PROFIBUS PA interface (7). The data specific to the measuring cell, the electronic data and parameter settings are stored in two non-volatile memories (6). The first storage is linked to the measuring cell, the second to the electronics.

The buttons (8) can be used to call up individual functions, so-called modes. If you have a device with a local display (9), you can use this to track mode settings and other messages. The basic mode settings can be changed with a computer over the bus master (12).

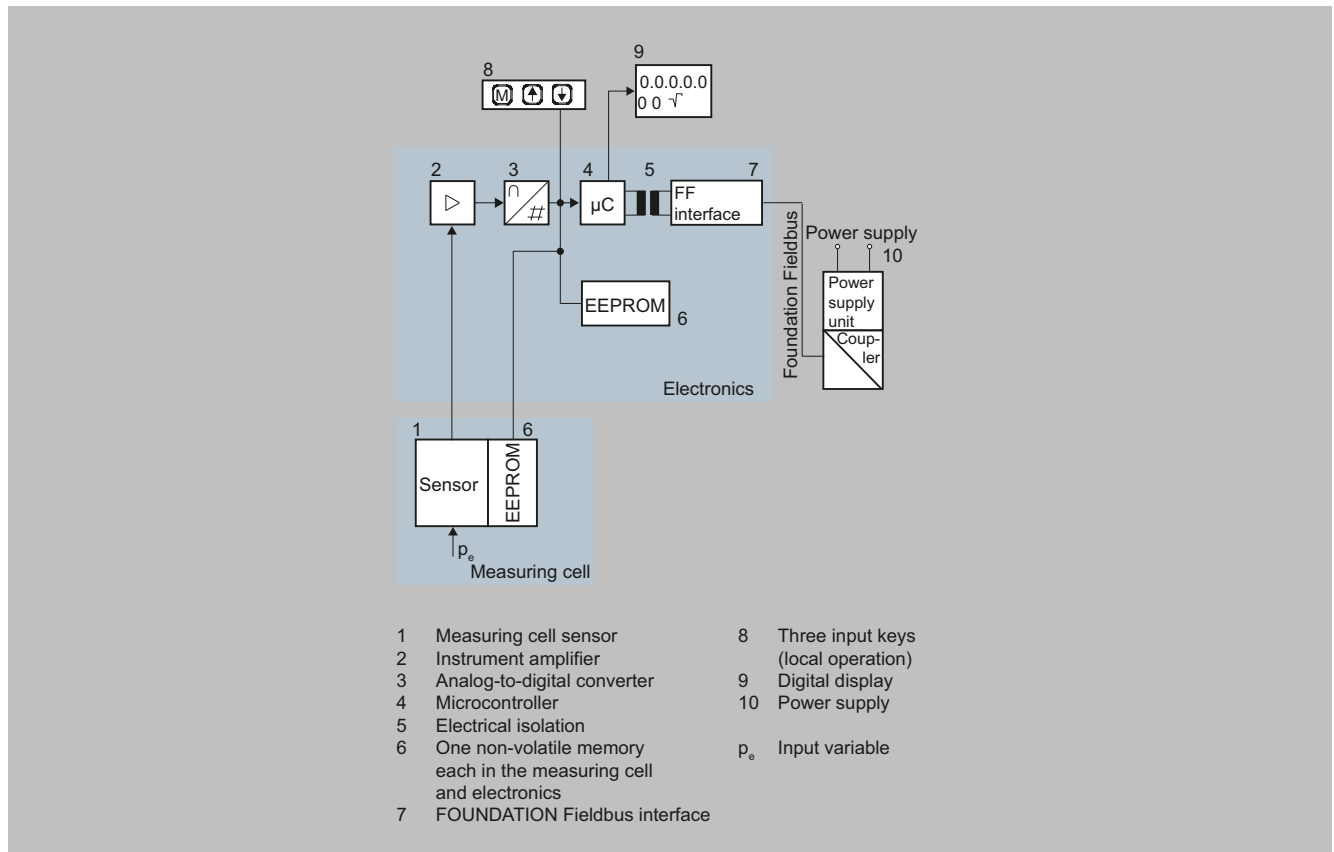
Pressure measurement

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Function (continued)

Mode of operation of electronics with FOUNDATION Fieldbus communication



Function diagram of electronics

The bridge output voltage created by the sensor (1, Figure "Function diagram of electronics") is amplified by the instrument amplifier (2) and digitalized in the analog-to-digital converter (3). The digital information is evaluated in the microcontroller, corrected for linearity and temperature response and made available on the FOUNDATION Fieldbus via an electrically isolated FOUNDATION Fieldbus interface (7).

The data specific to the measuring cell, the electronics data, and the parameter data are stored in the two non-volatile memories (6). One storage is coupled to the measuring cell, the other to the electronics. As the result of this modular design, the electronics and the measuring cell can be replaced separately from each other.

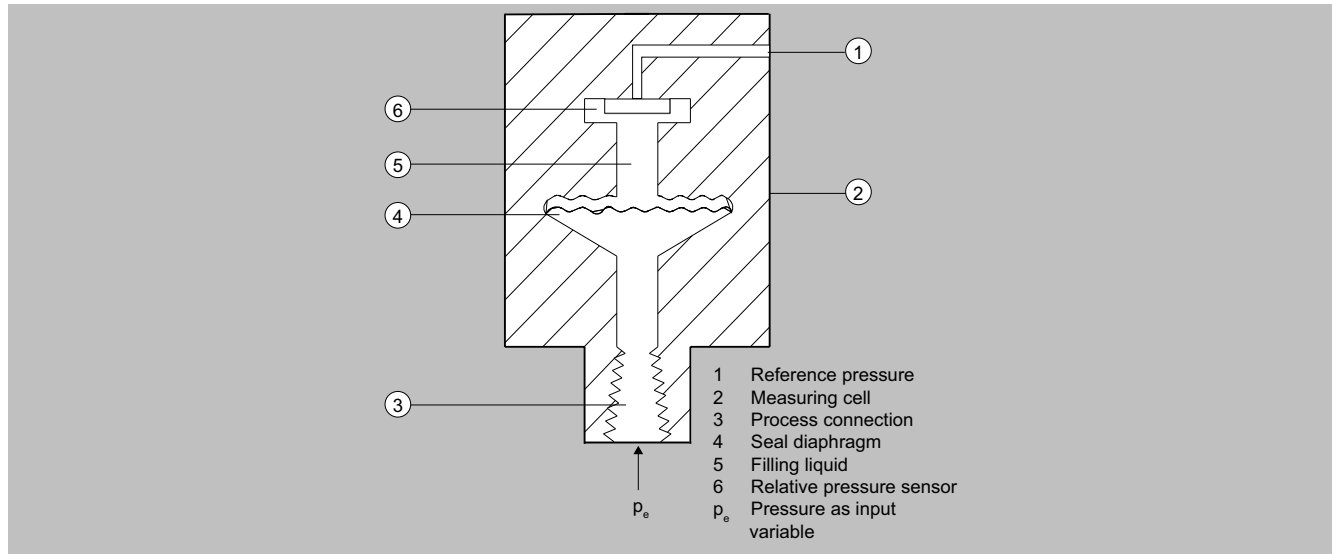
Using the three input keys (8), you can assign parameters to the pressure transmitter directly at the measuring point. The input keys can also be used to control the view of the measurement results, the error messages and the operating modes on the local display (9).

The results with status values and diagnostics data are transferred by cyclic data transmission on the FOUNDATION Fieldbus. Parameterization data and error messages are transferred by acyclic data transmission. Special software such as National Instruments Configurator is required for this.

Mode of operation of the measuring cells

The process connections available include the following:

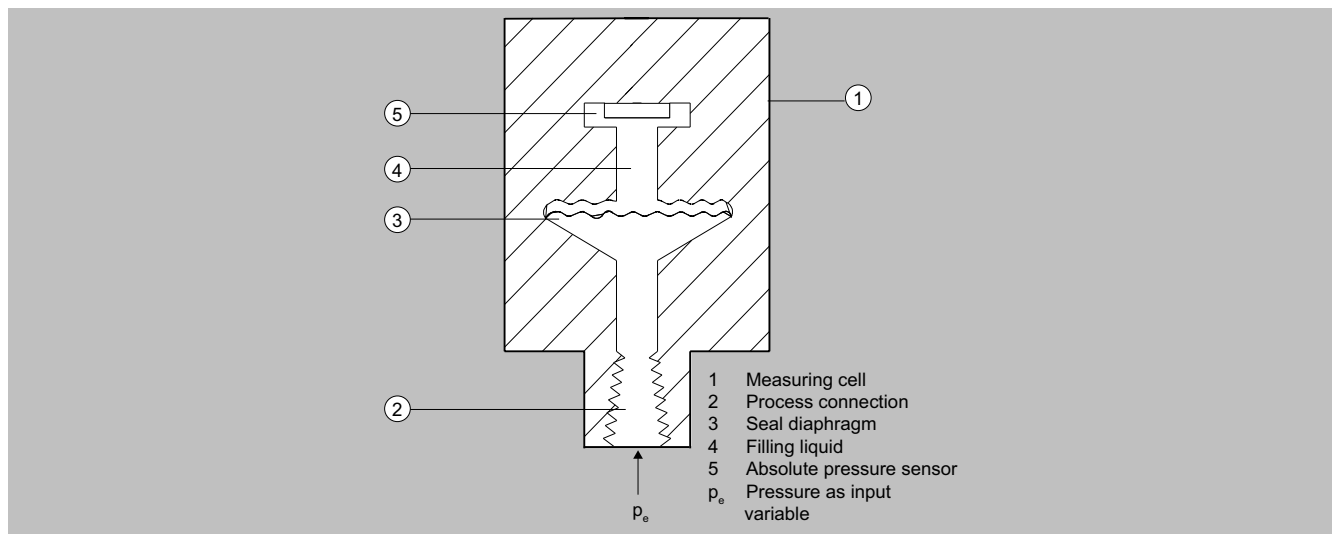
- G½
- ½-14 NPT
- Flush-mounted diaphragm:
 - Flanges according to EN
 - Flanges according to ASME
 - NuG and pharmaceutical connections

Function (continued)Measuring cell for gauge pressure

Measuring cell for gauge pressure, function diagram

The input pressure (p_e) is transferred via the seal diaphragm (4) and the filling liquid (5) to the gauge pressure sensor (6), displacing its measuring diaphragm. The displacement changes the resistance value of the four piezo resistors in the measuring diaphragm in a bridge circuit. The change in the resistance causes a bridge output voltage proportional to the input pressure.

Transmitters with measuring spans ≤ 63 bar (≤ 926.1 psi) measure the input pressure compared to atmospheric, transmitters with measuring spans of ≥ 160 bar (≥ 2352 psi) compared to a vacuum.

Measuring cell for absolute pressure

Measuring cell for absolute pressure, function diagram

The input pressure (p_e) is transferred via the seal diaphragm (3) and the filling liquid (4) to the absolute pressure sensor (5), displacing its measuring diaphragm. The displacement changes the resistance value of the four piezo resistors in the measuring diaphragm in a bridge circuit. The change in the resistance causes a bridge output voltage proportional to the input pressure.

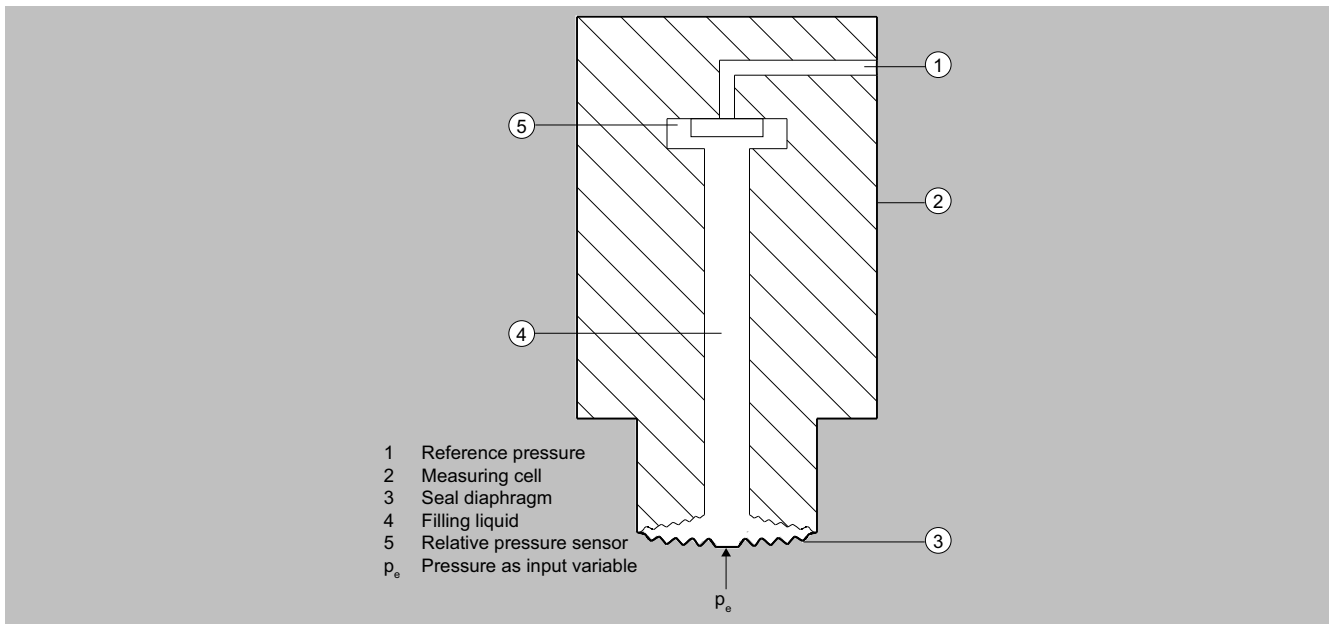
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Function (continued)

Measuring cell for gauge pressure, flush-mounted diaphragm

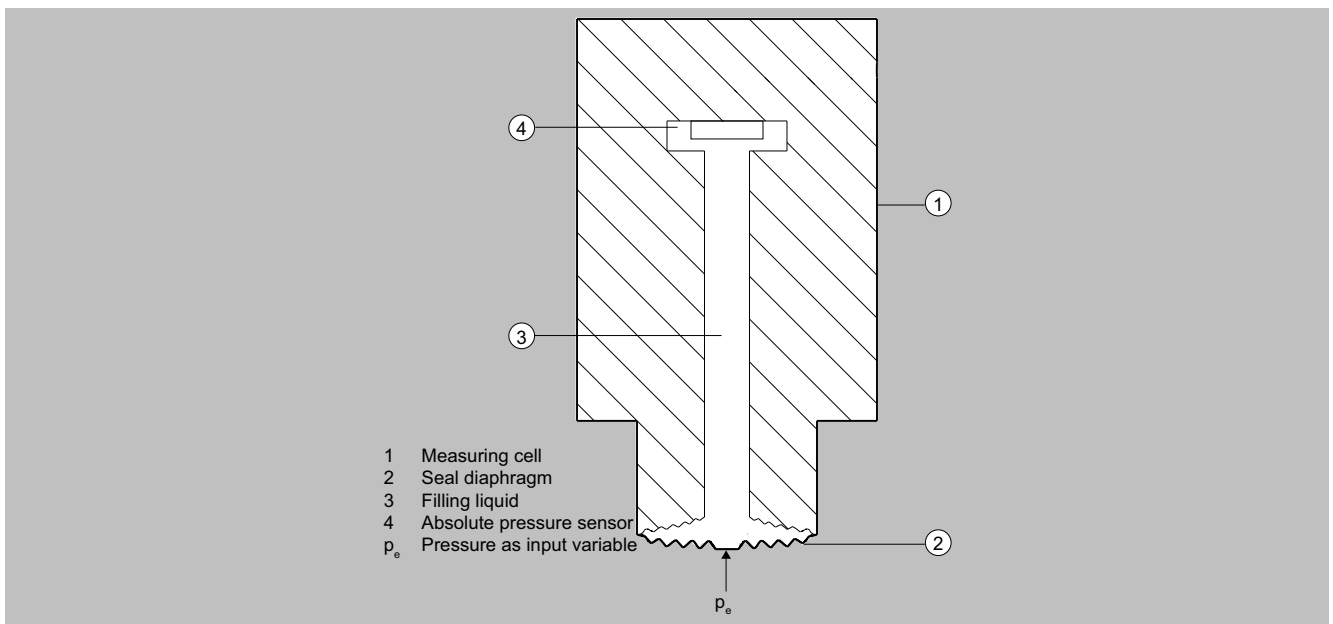


Measuring cell for gauge pressure, flush-mounted diaphragm, function diagram

The input pressure (p_e) is transferred via the seal diaphragm (3) and the filling liquid (4) to the gauge pressure sensor (5), displacing its measuring diaphragm. The displacement changes the resistance value of the four piezo resistors in the measuring diaphragm in a bridge circuit. The change in the resistance causes a bridge output voltage proportional to the input pressure.

Transmitters with measuring spans ≤ 63 bar (≤ 926.1 psi) measure the input pressure compared to atmospheric, transmitters with measuring spans of ≥ 160 bar (≥ 2352 psi) compared to a vacuum.

Measuring cell for absolute pressure, front-flush membrane



Measuring cell for absolute pressure, flush-mounted diaphragm, function diagram

Function (continued)

The input pressure (p_e) is transferred via the seal diaphragm (2) and the filling liquid (3) to the absolute pressure sensor (4), displacing its measuring diaphragm. The displacement changes the resistance value of the four piezo resistors in the measuring diaphragm in a bridge circuit. The change in the resistance causes a bridge output voltage proportional to the input pressure.

Parameterization

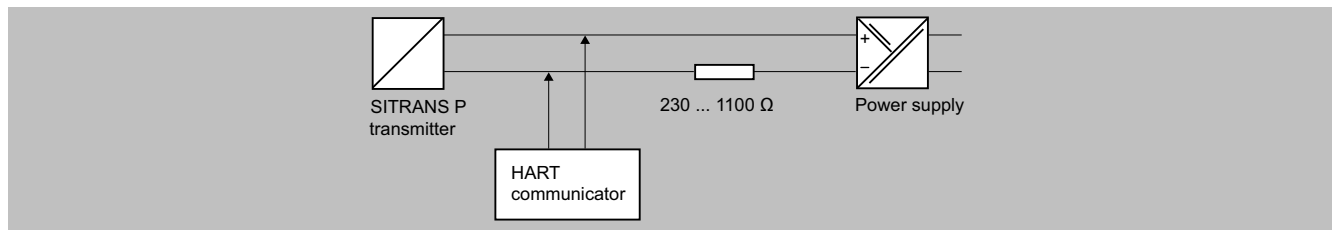
Depending on the version, there are a range of options for parameterizing the pressure transmitter and for setting or scanning the parameters.

Parameterization using the input keys (local operation)

With the input keys, you can easily set the most important parameters without any additional equipment.

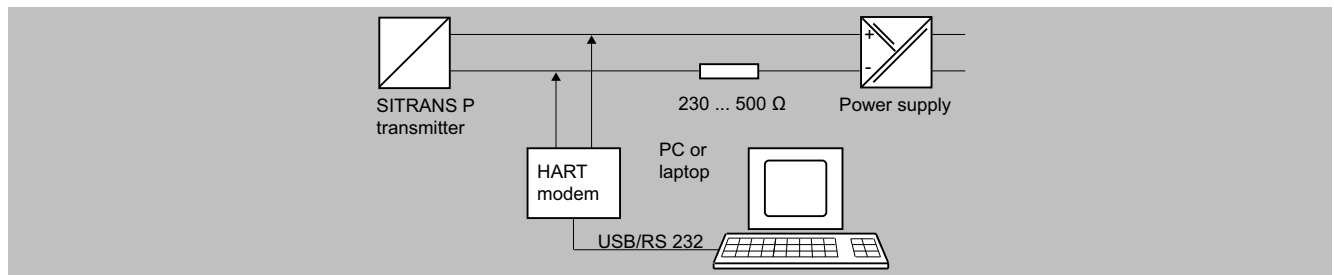
Parameterization using HART

Parameterization using HART is performed with a HART Communicator or a PC.



Communication between a HART Communicator and a pressure transmitter

When parameterizing with the HART Communicator, the connection is made directly to the 2-wire cable.



HART communication between a PC communicator and a pressure transmitter

When parameterizing with a PC, the connection is made through a HART modem.

The signals needed for communication in conformity with the HART 5.x or 6.x protocols are superimposed on the output current using FSK (Frequency Shift Keying).

Adjustable SITRANS P300 parameters with HART

Parameters	Input keys	HART
Lower range value	x	x
Upper range value	x	x
Electrical damping	x	x
Blind adjustment of the lower range value	x	x
Blind adjustment of the upper range value	x	x
Zero adjustment	x	x
Current simulator	x	x
Fault current	x	x
Disabling of buttons, write protection	x	x ¹⁾
Type of unit, unit	x	x
Input of characteristic curve		x
Freely-programmable LCD		x
Diagnostic functions		x

¹⁾ Except cancel write protection.

Diagnostic functions for SITRANS P300 with HART

- Zero correction display
- Event counter

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Function (continued)

- Limit transmitter
- Saturation alarm
- Min/max pointer
- Simulation functions
- Maintenance timer

Available physical units of display for SITRANS P300 with HART

Physical variable	Physical units
Pressure (can also be preset in the factory)	Pa, MPa, kPa, bar, mbar, torr, atm, psi, g/cm ² , kg/cm ² , in H ₂ O, in H ₂ O (4 °C), mmH ₂ O, ftH ₂ O (20 °C), inHg, mmHg
Level (height data)	m, cm, mm, ft, in
Volume	m ³ , dm ³ , hl, yd ³ , ft ³ , in ³ , US gallon, Imp. gallon, bushel, barrel, barrel liquid
Mass	g, kg, t, lb, Ston, Lton, oz
Temperature	K, °C, °F, °R
Other	%, mA

Parameterization through PROFIBUS interface

Fully digital communication through PROFIBUS PA, profile 3.0, is particularly user-friendly. PROFIBUS connects the SITRANS P300 PA to a process control system, e.g. SIMATIC PSC 7. Communication is possible even in a hazardous area.

For parameter assignment via PROFIBUS, you need suitable software, e.g. SIMATIC PDM (Process Device Manager)

Parameterization through FOUNDATION Fieldbus interface

Fully digital communication through FOUNDATION Fieldbus is particularly user-friendly. Through the FOUNDATION Fieldbus the P300 is connected to a process control system. Communication is possible even in a hazardous area.

For parameterization through the FOUNDATION Fieldbus you need suitable software, e.g. National Instruments Configurator.

Adjustable parameters for SITRANS P300 with PROFIBUS PA and FOUNDATION Fieldbus

Adjustable parameters	Input keys	PROFIBUS PA and FOUNDATION Fieldbus
Electrical damping	x	x
Zero adjustment (correction of position)	x	x
Buttons and/or function disabling	x	x
Source of measured value display	x	x
Physical unit of display	x	x
Position of decimal point	x	x
Bus address	x	x
Adjustment of characteristic curve	x	x
Input of characteristic curve		x
Freely-programmable LCD		x
Diagnostic functions		x

Diagnostic functions for SITRANS P300 with PROFIBUS PA and FOUNDATION Fieldbus

- Event counter
- Min/max pointer
- Maintenance timer
- Simulation functions
- Zero correction display
- Limit transmitter
- Saturation alarm

Function (continued)Physical units available for the display

Physical variable	Physical units
Pressure (can also be preset in the factory)	Mpa, kPa, Pa, bar, mbar, torr, atm, psi, g/cm ² , kg/cm ² , mmH ₂ O, mmH ₂ O (4 °C), in H ₂ O, in H ₂ O (4 °C), ftH ₂ O (20 °C), mmHg, inHg
Level (height data)	m, cm, mm, ft, in, yd
Mass	g, kg, t, lb, Ston, Lton, oz
Volume	m ³ , dm ³ , hl, yd ³ , ft ³ , in ³ , US gallon, Imp. gallon, bushel, barrel, barrel liquid
Volume flow	m ³ /s, m ³ /min, m ³ /h, m ³ /d, l/s, l/min, l/h, l/d, Ml/d, ft ³ /s, ft ³ /min, ft ³ /h, ft ³ /d, US gallon/s, US gallon/min, US gallon/h, US gallon/d, bbl/s, bbl/min, bbl/h, bbl/d
Mass flow	g/s, g/min, g/h, g/d, kg/s, kg/min, kg/h, kg/d, t/s, t/min, t/h, t/d, lb/s, lb/min, lb/h, lb/d, STon/s, STon/min, STon/h, STon/d, LTon/s, LTon/min, LTon/h, LTon/d
Temperature	K, °C, °F, °R
Other	%

Hygiene version

In the case of the SITRANS P300 with 7MF812.-... flush-mounted diaphragm, selected connections comply with the requirements of the EHEDG or 3A. You can find further details in the order form. Please note in particular that the seal materials used must comply with the requirements of 3A. Similarly, the filling liquids used must be FDA-compliant.

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Selection and ordering data

		Article No.
SITRANS P300 pressure transmitters for gauge pressure and absolute pressure, single chamber enclosure, nameplate inscription in English		
4 ... 20 mA / HART		7MF8023-
PROFIBUS PA (PA)		7MF8024-
FOUNDATION Fieldbus (FF)		7MF8025-
		● ● ● ● ● - ● ● ● ●
Click the article number for online configuration in the PIA Life Cycle Portal.		
Measuring cell filling	Measuring cell cleaning	
Silicone oil	Normal	1
Inert liquid	Cleanliness level 2 according to DIN 25410	3
Measuring span (min. ... max.)		
8.3 ... 250 mbar (0.12 ... 3.63 psi)		A
0.01 ... 1 bar (0.15 ... 14.5 psi)		B
0.04 ... 4 bar (0.58 ... 58 psi)		C
0.16 ... 16 bar (2.32 ... 232 psi)		D
0.63 ... 63 bar (9.14 ... 914 psi)		E
1.6 ... 160 bar (23.2 ... 2320 psi)		F
4 ... 400 bar (58 ... 5802 psi)		G
8.34 ... 250 mbar a (0.13 ... 3.63 psi a)		Q
43.34 ... 1300 mbar a (0.63 ... 18.86 psi a)		S
0.17 ... 5 bar a (2.43 ... 72.5 psi a)		T
1 ... 30 bar a (14.6 ... 435 psi a)		U
Material of wetted parts		
<u>Seal diaphragm</u>	<u>Measuring cell</u>	
Stainless steel	Stainless steel	A
Hastelloy	Stainless steel	B
Hastelloy	Hastelloy	C
Version for diaphragm seal in combination with "internal thread 1/2-14 NPT" process connection (recommended version) ^{1) 2) 3) 4) 5)}		Y 1
Process connection		
Connection shank G1/2B according to EN 837-1		0
Internal thread 1/2-14 NPT		1
Oval flange with process connection out of stainless steel (oval flange has no internal thread) ⁶⁾		
• Fastening thread 7/16 20 UNF according to EN 61518		2
• Fastening thread M10 according to DIN 19213		3
• Mounting thread M12 according to DIN 19213		4
External thread M20 × 1.5		5
External thread 1/2-14 NPT		6
Material of non-wetted parts		
Stainless steel, deep-drawn and electrolytically polished		4
Version		
Standard version		1
Explosion protection		
None		A
With ATEX, type of protection:		
"Intrinsic safety (Ex ia)"		B
Zone 20/21/22 ⁷⁾		C
Ex nA/nL (Zone 2) ⁸⁾		E
With FM "Intrinsic safety" (cFM _{US})		M
Electrical connection/cable entry		
Screw gland M20×1.5 (polyamide) ⁹⁾		A
Screw gland M20×1.5 (metal)		B
Screw gland M20×1.5 (stainless steel)		C
Device plug M12 (stainless steel, without cable socket)		G
1/2-14 NPT gland threading metal ¹⁰⁾		H
1/2-14 NPT gland threading stainless steel ¹⁰⁾		J
Display		
Without local display, with buttons, closed lid		1
With local display and buttons, closed lid ¹¹⁾		2

Selection and ordering data (continued)

	Article No.
SITRANS P300 pressure transmitters for gauge pressure and absolute pressure, single chamber enclosure, nameplate inscription in English	
4 ... 20 mA / HART	7MF8023-
PROFIBUS PA (PA)	7MF8024-
FOUNDATION Fieldbus (FF)	7MF8025-
	● ● ● ● ● - ● ● ● ● ●
With local display and buttons, lid with polycarbonate pane (setting for HART devices: mA, for PROFIBUS PA and FOUNDATION Fieldbus devices: Pressure units ¹¹⁾)	4
With local display and buttons (setting acc. to specifications, order code "Y21" or "Y22" required), lid with polycarbonate pane ¹¹⁾)	5
With local display and buttons, lid with glass pane (setting for HART devices: mA, for PROFIBUS and FOUNDATION Fieldbus devices: Pressure units ¹¹⁾)	6
With local display and buttons (setting acc. to specifications, order code "Y21" or "Y22" required), lid with glass pane ¹¹⁾)	7

Note:

See section "Supplementary components" for supply units. A quick-start guide is included in the scope of delivery of the device.

- 1) If the quality inspection certificate (factory calibration) according to IEC 60770-2 is to be ordered for transmitters with mounted diaphragm seals, it is recommended that this certificate be ordered exclusively for the remote seals. Here, the measuring accuracy of the entire combination is certified.
- 2) If Inspection Certificate 3.1. is to be ordered for transmitters with mounted diaphragm seals, this certificate must also be ordered with the respective remote seals.
- 3) The diaphragm seal is to be specified with a separate article number and must be included with the transmitter article number, for example 7MF802-..Y..-.... and 7MF0810-.....-0...
- 4) The standard measuring cell filling for configurations with remote seals (Y) is silicone oil.
- 5) Remote seal for direct mounting only available in combination with process connection 1/2-14 NPT.
- 6) M10 fastening thread: Max. measuring span 160 bar (2320 psi) fastening thread 7/16-20 UNF and M12: Max. measuring span 400 bar (5802 psi)
- 7) Can only be ordered together with electrical connection option A.
- 8) Can only be ordered together with electrical connection option B, C or G.
- 9) Only together with HART electronics.
- 10) Without cable gland.
- 11) Local display cannot be rotated.

	Article No.
SITRANS P300 pressure transmitters for gauge pressure and absolute pressure with flush mounted membrane, single chamber enclosure, nameplate inscription in English	
4 ... 20 mA / HART	7MF8123-
PROFIBUS PA (PA)	7MF8124-
FOUNDATION Fieldbus (FF)	7MF8125-
	● ● ● ● ● - ● ● ● ● ●
Click the article number for online configuration in the PIA Life Cycle Portal.	
Measuring cell filling	Measuring cell cleaning
Silicone oil	Normal
Inert liquid	
Food grade oil	
• Neobee oil	Normal
Measuring span (min. ... max.)	
0.01 ... 1 bar (0.15 ... 14.5 psi)	B
0.04 ... 4 bar (0.58 ... 58 psi)	C
0.16 ... 16 bar (2.32 ... 232 psi)	D
0.63 ... 63 bar (9.14 ... 914 psi)	E
43.34 ... 1300 mbar a (0.63 ... 18.86 psi a) ¹⁾	S
0.17 ... 5 bar a (2.43 ... 72.5 psi a) ¹⁾	T
1 ... 30 bar a (14.6 ... 435 psi a) ¹⁾	U
Material of wetted parts	
Seal diaphragm	Measuring cell
Stainless steel	Stainless steel
Hastelloy ²⁾	Stainless steel
Process connection	
Flange version with order code M.., N.., R.. or Q.. (see "Options")	7
Material of non-wetted parts	
Stainless steel, deep-drawn and electrolytically polished	4
Version	
Standard version	1
Explosion protection	
None	A
With ATEX, type of protection:	

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Selection and ordering data (continued)

	Article No.
SITRANS P300 pressure transmitters for gauge pressure and absolute pressure with flush mounted membrane, single chamber enclosure, nameplate inscription in English	
4 ... 20 mA / HART	7MF8123-
PROFIBUS PA (PA)	7MF8124-
FOUNDATION Fieldbus (FF)	7MF8125-
	● ● ● ● ● - ● ● ● ●
"Intrinsic safety (Ex ia)"	
Zone 20/21/22 ³⁾	
Ex nA/nL (Zone 2) ⁴⁾	
With FM "Intrinsic safety" (cFM _{US})	
Electrical connection/cable entry	
Screw gland M20×1.5 (polyamide) ⁵⁾	
Screw gland M20×1.5 (metal)	
Screw gland M20×1.5 (stainless steel)	
Device plug M12 (stainless steel, without cable socket)	
Screw gland ½-14 NPT threading metal ⁶⁾	
½-14 NPT gland threading stainless steel ⁶⁾	
Display	
Without local display, with buttons, closed lid	
With local display and buttons, closed lid ⁷⁾	
With local display and buttons, lid with polycarbonate pane (setting for HART devices: mA, for PROFIBUS PA and FOUNDATION Fieldbus devices: Pressure units ⁷⁾)	
With local display and buttons (setting acc. to specifications, order code "Y21" or "Y22" required), lid with polycarbonate pane ⁷⁾	
With local display and buttons, lid with glass pane (setting for HART devices: mA, for PROFIBUS and FOUNDATION Fieldbus devices: pressure units ⁷⁾)	
With local display and buttons (setting acc. to specifications, order code "Y21" or "Y22" required), lid with glass pane ⁷⁾	
	B C E M A B C G H J 1 2 4 5 6 7

Note:

See section "Supplementary components" for supply units. A quick-start guide is included in the scope of delivery of the device.

- 1) Not with temperature decoupler P00, not for process connections R01, R02, R04, R10 and R11 and can only be ordered together with silicone oil.
- 2) Only available for flanges with option M., N. and Q...
- 3) Can only be ordered together with electrical connection option A.
- 4) Can only be ordered together with electrical connection option B, C or G.
- 5) Only together with HART electronics.
- 6) Without cable gland.
- 7) Local display cannot be rotated.

Options	Order code	Communication
Add "-Z" to article number and specify order code.		
Pressure transmitter with mounting bracket (2 brackets, 4 nuts, 4 U washers, 1 angle) Completely of stainless steel, for wall and pipe mounting	A02	HART / PQ / FF
Cable socket for M12 device plug, stainless steel	A51	HART / PQ / FF
Nameplate inscription (in place of English)		HART / PQ / FF
• German	B10	HART / PQ / FF
• French	B12	HART / PQ / FF
• Spanish	B13	HART / PQ / FF
• Italian	B14	HART / PQ / FF
English nameplate Pressure units in inH ₂ O or psi	B21	HART / PQ / FF
Quality inspection certificate (5-point characteristic curve test) according to IEC 62828-2 ¹⁾	C11	HART / PQ / FF
Inspection certificate according to EN 10204-3.1 ²⁾	C12	HART / PQ / FF
Factory certificate according to EN 10204-2.2	C14	HART / PQ / FF
IP65/IP68 degree of protection, only for M20×1.5 and ½-14 NPT	D12	HART / PQ / FF
IP6k9k degree of protection, only for M20×1.5	D46	HART / PQ / FF
CRN Approval Canada (Canadian Registration Number)	E22	HART / PQ / FF
Export approval Korea	E11	HART / PQ / FF

Selection and ordering data (continued)

Options	Order code	Communication
Add "-Z" to article number and specify order code.		
Explosion protection Ex ia according to EAC Ex (Russia)	E80	HART / PQ / FF
Ex approval Ex ia/ib NEPSI	E55	HART / PQ / FF
Only for SITRANS P300 with flush-mounted diaphragm (7MF81...-...)		
Flange according to EN 1092-1 Form B1		
DN 25, PN 40 ³⁾	M11	HART / PQ / FF
DN 40, PN 40	M13	HART / PQ / FF
DN 40, PN 100	M23	HART / PQ / FF
DN 50, PN 16	M04	HART / PQ / FF
DN 50, PN 40	M14	HART / PQ / FF
DN 80, PN 16	M06	HART / PQ / FF
DN 80, PN 40	M16	HART / PQ / FF
Flange according to ASME B16.5		
1", Class 150 ³⁾	M40	HART / PQ / FF
1½", Class 150	M41	HART / PQ / FF
2", Class 150	M42	HART / PQ / FF
3", Class 150	M43	HART / PQ / FF
4", Class 150	M44	HART / PQ / FF
1½", Class 300	M46	HART / PQ / FF
2", Class 300	M47	HART / PQ / FF
3", Class 300	M48	HART / PQ / FF
4", Class 300	M49	HART / PQ / FF
Threaded connection according to DIN 3852-2 Form A, thread according to ISO 228		
G ¾" A, flush mounted ⁴⁾	R01	HART / PQ / FF
G 1" A, flush mounted ⁴⁾	R02	HART / PQ / FF
G 2" A, flush mounted	R04	HART / PQ / FF
Tank connection⁵⁾ Seal not included in scope of delivery		
TG 52/50, PN 40	R10	HART / PQ / FF
TG 52/150, PN 40	R11	HART / PQ / FF
Sanitary process connection according to DIN 11851 (dairy connection with slotted union nut)		
DN 50, PN 25	N04	HART / PQ / FF
DN 80, PN 25	N06	HART / PQ / FF
Tri-Clamp connection according to DIN 32676/ ISO 2852 3A compliant ⁶⁾		
DN 50/2", PN 16	N14	HART / PQ / FF
DN 65/2.5", PN 10	N15	HART / PQ / FF
Clamp 2" ISO 2852, PN 16	N22	HART / PQ / FF
Clamp 3" ISO 2852, PN 10	N23	HART / PQ / FF
Varivent connection 3A and EHEDG compliant ⁶⁾		
Type N = 68 for Varivent enclosure DN 40 ... 125 and 1½" ... 6", PN 40	N28	HART / PQ / FF
Temperature decoupler up to 200 °C⁷⁾ For version with flush-mounted diaphragm		
P00	P00	HART / PQ / FF
Sanitary process connection according to DRD		
DN 50, PN 40	M32	HART / PQ / FF
SMS screwed connector		
2"	M73	HART / PQ / FF
2½"	M74	HART / PQ / FF
3"	M75	HART / PQ / FF
Sanitary process screw connection according to NEUMO BioConnect screw connection, 3A and EHEDG compliant⁶⁾		
DN 50, PN 16	Q05	HART / PQ / FF
DN 65, PN 16	Q06	HART / PQ / FF

Pressure measurement

Pressure transmitters

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Selection and ordering data (continued)

Options	Order code	Communication
Add "-Z" to article number and specify order code.		
DN 80, PN 16	Q07	HART / PQ / FF
DN 100, PN 16	Q08	HART / PQ / FF
DN 2", PN 16	Q13	HART / PQ / FF
DN 2½", PN 16	Q14	HART / PQ / FF
DN 3", PN 16	Q15	HART / PQ / FF
DN 4", PN 16	Q16	HART / PQ / FF
Sanitary process flange connection according to NEUMO Connect S		
DN 2", PN 16	Q72	HART / PQ / FF
Aseptic screwed connector according to DIN 11864-1 Form A 3A compliant⁵⁾		
DN 50, PN 25	N33	HART / PQ / FF
DN 65, PN 25	N34	HART / PQ / FF
DN 80, PN 25	N35	HART / PQ / FF
DN 100, PN 25	N36	HART / PQ / FF
Aseptic flange with notch according to DIN 11864-2 Form A 3A compliant⁵⁾		
DN 50, PN 16	N43	HART / PQ / FF
DN 65, PN 16	N44	HART / PQ / FF
DN 80, PN 16	N45	HART / PQ / FF
DN 100, PN 16	N46	HART / PQ / FF
Aseptic flange with groove according to DIN 11864-2 Form A 3A compliant⁵⁾		
DN 50, PN 16	N43 + P11	HART / PQ / FF
DN 65, PN 16	N44 + P11	HART / PQ / FF
DN 80, PN 16	N45 + P11	HART / PQ / FF
DN 100, PN 16	N46 + P11	HART / PQ / FF
Aseptic clamp with groove according to DIN 11864-3 Form A 3A compliant⁵⁾		
DN 50, PN 25	N53	HART / PQ / FF
DN 65, PN 25	N54	HART / PQ / FF
DN 80, PN 16	N55	HART / PQ / FF
DN 100, PN 16	N56	HART / PQ / FF
Additional information Add "-Z" to article number, specify order code and plain text.		
Measuring range to be set Specify in plain text (max. 5 digits): Y01: ... to ... mbar, bar, kPa, MPa, psi	Y01	HART / PQ ⁸⁾
Tag plate made of stainless steel and entry in the device variable (measuring point description) Max. 16 characters; specify in plain text: Y15:	Y15	HART / PQ / FF
Measuring point text (entry in device variable) Max. 27 characters; specify in plain text: Y16:	Y16	HART / PQ / FF
Entry of HART TAG Max. 8 characters; specify in plain text: Y17:	Y17	HART
Setting of the local display in pressure units Specify in plain text (default setting: bar): Y21: mbar, bar, kPa, MPa, psi, ...	Y21	HART / PQ / FF
Note The following pressure units can be selected: bar, mbar, mm H ₂ O ¹⁰⁾ , inH ₂ O ¹⁰⁾ , ftH ₂ O ¹⁰⁾ , mmHG, inHG, psi, Pa, kPa, MPa, g/cm ² , kg/cm ² , Torr, ATM or %		
Setting of the local display in non-pressure units⁹⁾ Specify in plain text: Y22: to l, m ³ , m, USg, ... (Specification of measuring range in pressure units "Y01" is essential, unit with max. 5 characters)	Y22 + Y01	HART

Selection and ordering data (continued)

Options	Order code	Communication
Add "-Z" to article number and specify order code.		
Preset bus address, possible range 1 ... 126 Specify in plain text: Y25:	Y25	PQ / FF

Note:

Factory-mounting of valve manifolds, see Accessories. Only Y01, Y15, Y16, Y17, Y21, Y22 and Y25 are possible as factory preset.

- 1) If the quality inspection certificate (factory calibration) according to IEC 60770-2 is to be ordered for transmitters with mounted diaphragm seals, it is recommended that this certificate be ordered exclusively for the remote seals. Here, the measuring accuracy of the entire combination is certified.
- 2) If Inspection Certificate 3.1. is to be ordered for transmitters with mounted diaphragm seals, this certificate must also be ordered with the respective remote seals.
- 3) Special Viton seal included in scope of delivery (FKM; temperature range -20 ... +200 °C (-4 ... +392 °F))
- 4) Cannot be combined with order code P00. Can only be ordered together with silicon oil measuring cell filling.
- 5) Weld-in sockets can be ordered under Accessories.
- 6) 3A compliance ensured only when 3A compliant sealing rings are used.
- 7) Conformity according to 3A and EHEDG. The maximum permissible medium temperatures depend on the respective measuring cell fillings (see process conditions).
- 8) Measuring accuracies for PROFIBUS PA transmitters with option Y01 are calculated in the same way as for HART devices.
- 9) Preset value can only be change via SIMATIC PDM
- 10) 20 °C reference temperature.

Spare parts/accessories	Article number
Mounting bracket and fastening parts kit Made of stainless steel	7MF8997-1AA
Lid without inspection window Gasket not included	7MF8997-1BA
Lid with glass inspection window Gasket not included	7MF8997-1BD
NBR enclosure sealing	7MF8997-1BG
Measuring point label Unlabeled	7MF8997-1CA
Cable gland	
• Metal	7MF8997-1EA
• Plastic (blue)	7MF8997-1EB
Weldable sockets for PMC connection	
• PMC style Standard: Thread 1½"	7MF4997-2HA
• PMC style Minibolt: Flush-mounted 1"	7MF4997-2HB
Gaskets for PMC connection (Packing unit: 5 units)	
• PTFE seal for PMC Style Standard: Thread 1½"	7MF4997-2HC
• Gasket made of Viton for PMC Style Minibolt: Flush-mounted 1"	7MF4997-2HD
Weldable sockets for TG 52/50 and TG 52/150 connection	
• TG 52/50 connection	7MF4997-2HE
• TG 52/150 connection	7MF4997-2HF
Seals for TG 52/50 and TG 52/150 made of silicone	7MF4997-2HG
Seals for flange connection with flush-mounted diaphragm Material FKM (Viton); temperature range:-20 ... +200 °C (-4 ... +392 °F), 10 units	
• DN 25, PN 40 (M11)	7MF4997-2HH
• 1", Class 150 (M40)	7MF4997-2HK

Pressure measurement

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Selection and ordering data (continued)

Documentation	Article number
The entire documentation is available for download free of charge in various languages at: http://www.siemens.com/processinstrumentation/documentation	
Compact operating instructions • English, German, Spanish, French, Italian, Dutch	A5E03434657
HART modem	
With USB interface	7MF4997-1DB

Note:

See section "Supplementary components" for supply units.

Ordering example	
Item line:	7MF8023-1DB24-1AB7-Z
B line	A02 + Y01 + Y21
C-line	Y01: 1 ... 10 bar (14.5 ... 145 psi)
C-line	Y21: bar (psi)

Technical specifications

SITRANS P300 for gauge and absolute pressure

Gauge pressure input

Measured variable
 Measuring span (infinitely adjustable) or nominal measuring range, max. permissible operating pressure (in accordance with 2014/68/EU Pressure Equipment Directive) and max. permissible test pressure (pursuant to DIN 16086)
 (for oxygen measurement, max. 100 bar/10 MPa/1450 psi and 60 °C (140 °F) ambient temperature/medium temperature)

Gauge pressure

HART

Measuring span

8.3 ... 250 mbar
 0.83 ... 25 kPa
 0.12 ... 3.6 psi
 0.01 ... 1 bar
 1 ... 100 kPa
 0.15 ... 14.5 psi
 0.04 ... 4 bar
 4 ... 400 kPa
 0.58 ... 58 psi
 0.16 ... 16 bar
 16 ... 1600 kPa
 2.3 ... 232 psi
 0.63 ... 63 bar
 63 ... 6300 kPa
 9.1 ... 914 psi
 1.6 ... 160 bar
 0.16 ... 16 MPa
 23 ... 2321 psi
 4 ... 400 bar
 0.4 ... 40 MPa
 58 ... 5802 psi

PROFIBUS PA/FOUNDATION Fieldbus

Nominal measuring range

250 mbar
 25 kPa
 3.6 psi
 1 bar
 100 kPa
 14.5 psi
 4 bar
 400 kPa
 58 psi
 16 bar
 1600 kPa
 232 psi
 63 bar
 6300 kPa
 914 psi
 160 bar
 16 MPa
 2321 psi
 400 bar
 40 MPa
 5802 psi

Max. permissible operating pressure MAWP (PS)

4 bar
 400 kPa
 58 psi
 4 bar
 400 kPa
 58 psi
 7 bar
 0.7 Mpa
 102 psi
 21 bar
 2.1 MPa
 305 psi
 67 bar
 6.7 MPa
 972 psi
 167 bar
 16.7 MPa
 2422 psi
 400 bar
 40 MPa
 5802 psi

Max. permissible test pressure

6 bar
 600 kPa
 87 psi
 6 bar
 600 kPa
 87 psi
 10 bar
 1 MPa
 145 psi
 32 bar
 3.2 MPa
 464 psi
 100 bar
 10 MPa
 1450 psi
 250 bar
 25 MPa
 3626 psi
 600 bar
 60 MPa
 8702 psi

Lower measuring limit

For 250 mbar/25 kPa/3.6 psi measuring cells, the lower measuring limit is 750 mbar a/75 kPa a/10.8 psi a. The measuring cell is vacuum-resistant up to 30 mbar a/3 kPa a/0.44 psi a.

- Measuring cell with silicone oil filling
- Measuring cell with inert filling liquid

30 mbar a/3 kPa a/0.44 psi a

30 mbar a/3 kPa a/0.44 psi a

Upper measuring limit

100% of the max. measuring span (for oxygen measurement max. 100 bar/10 MPa/1450 psi and 60 °C (140 °F) ambient temperature/medium temperature)

Absolute pressure input

Measured variable
 Measuring span (continuously adjustable) or nominal measuring range, max. permissible operating pressure (in accordance with 2014/68/EU Pressure Equipment Directive) and max. permissible test pressure (pursuant to DIN 16086)

Absolute pressure

HART

Measuring span

8.34 ... 250 mbar a
 0.83 ... 25 kPa a
 3.35 ... 100 inH₂O a
 0.13 ... 3.63 psi a
 43.34 ... 1300 mbar a
 4.33 ... 130 kPa a
 17.42 ... 522.4 inH₂O a
 0.63 ... 18.86 psi a
 0.17 ... 5 bar a
 17 ... 500 kPa a
 2.43 ... 72.5 psi a
 1 ... 30 bar a
 0.1 ... 3 MPa a
 14.6 ... 435 psi a

PROFIBUS PA/FOUNDATION Fieldbus

Nominal measuring range

250 mbar a
 25 kPa a
 100 inH₂O a
 1300 mbar a
 130 kPa a
 525 inH₂O a
 5000 mbar a
 500 kPa a
 72.5 psi a
 30 bar a
 3 MPa a
 435 psi a

Max. permissible operating pressure MAWP (PS)

1.5 bar a
 150 kPa a
 21.8 psi a
 2.6 bar a
 260 kPa a
 37.7 psi a
 10 bar a
 1 MPa a
 145 psi a
 45 bar a
 4.5 MPa a
 653 psi a

Max. permissible test pressure

6 bar a
 600 kPa a
 87 psi a
 10 bar a
 1 MPa a
 145 psi a
 30 bar a
 3 MPa a
 435 psi a
 100 bar a
 10 MPa a
 1450 psi a

Lower measuring limit

- Measuring cell with silicone oil filling
 - Measuring cell with inert liquid
- For medium temperature -20 °C < ϑ ≤ +60 °C
 (-4 °F < ϑ ≤ +140 °F)

0 mbar a/3 kPa a/0.44 psi a

30 mbar a/0 kPa a/0 psi a

Pressure measurement

Pressure transmitters

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Technical specifications (continued)

SITRANS P300 for gauge and absolute pressure			
- For medium temperature $60\text{ °C} < \vartheta \leq +100\text{ °C}$ (max. 85 °C for measuring cell 30 bar) ($140\text{ °F} < \vartheta \leq +212\text{ °F}$ (max. 185 °F for measuring cell 435 psi))			
$30\text{ mbar a} + 20\text{ mbar a} \cdot (\vartheta - 60\text{ °C})/\text{°C}$ $3\text{ kPa a} + 2\text{ kPa a} \cdot (\vartheta - 60\text{ °C})/\text{°C}$ $0.44\text{ psi a} + 0.29\text{ psi a} \cdot (\vartheta - 140\text{ °F})/\text{°F}$			
Upper measuring limit	100% of the max. measuring span (for oxygen measurement max. 100 bar/10 MPa/1450 psi and 60 °C (140 °F) ambient temperature/medium temperature)		
Lower range value	Between the measuring limits (continuously adjustable)		
Input of gauge pressure with front-flush diaphragm			
Measured variable	Gauge pressure, flush-mounted		
Measuring span (continuously adjustable) or nominal measuring range, max. permissible operating pressure and max. permissible test pressure	HART	PROFIBUS PA/FOUNDATION Fieldbus	
	Measuring span	Nominal measuring range	Max. permissible operating pressure MAWP (PS)
			Max. permissible test pressure
	0.01 ... 1 bar	1 bar	4 bar
	1 ... 100 kPa	100 kPa	400 kPa
	0.15 ... 14.5 psi	14.5 psi	58 psi
	0.04 ... 4 bar	4 bar	7 bar
	4 ... 400 kPa	400 kPa	0.7 MPa
	0.58 ... 58 psi	58 psi	102 psi
	0.16 ... 16 bar	16 bar	21 bar
	16 ... 1600 kPa	1600 kPa	2.1 MPa
	2.3 ... 232 psi	232 psi	305 psi
	0.63 ... 63 bar	63 bar	67 bar
	63 ... 6300 kPa	6300 kPa	6.7 MPa
	9.1 ... 914 psi	914 psi	972 psi
			1450 psi
Lower measuring limit	100 mbar a (1.45 psi a)		
• Measuring cell with silicone oil	100 mbar a/10 kPa a/1.45 psi a		
• Measuring cell with inert liquid	100 mbar a/10 kPa a/1.45 psi a		
• Measuring cell with neobee	100 mbar a/10 kPa a/1.45 psi a		
Upper measuring limit	100% of max. measuring span		
Input of absolute pressure, with flush-mounted diaphragm			
Measured variable	Absolute pressure, flush-mounted		
Measuring span (continuously adjustable) or nominal measuring range and max. permissible test pressure	HART	PROFIBUS PA/FOUNDATION Fieldbus	
	Measuring span	Nominal measuring range	Max. permissible operating pressure MAWP (PS)
			Max. permissible test pressure
	43 ... 1300 mbar a	1300 mbar a	2.6 bar a
	4.3 ... 130 kPa a	130 kPa a	260 kPa a
	17 ... 525 inH ₂ O a	525 inH ₂ O a	37.7 psi a
	160 ... 5000 mbar a	5000 mbar a	10 bar a
	16 ... 500 kPa a	500 kPa a	1 MPa a
	2.32 ... 72.5 psi a	72.5 psi a	145 psi a
	1 ... 30 bar a	30 bar a	45 bar a
	0.1 ... 3 MPa a	3 MPa a	4.5 MPa a
	14.5 ... 435 psi a	435 psi a	653 psi a
			1450 psi a
Lower measuring limit	Depending on the process connection, the measuring span may differ from these values		
	0 mbar a/0 kPa a/0 psi a		
Upper measuring limit	100% of max. measuring span		
Output			
Output signal	HART	PROFIBUS PA/FOUNDATION Fieldbus	
Physical bus	4 ... 20 mA	Digital PROFIBUS PA signal	
Protection against polarity reversal	-	IEC 61158-2	
	Protected against short-circuit and polarity reversal. Each connection against the other with max. supply voltage.	Protected against short-circuit and polarity reversal. Each connection against the other with max. supply voltage.	
Electrical damping (step width 0.1 s)	Set to 2 s (0 ... 100 s)	Set to 2 s (0 ... 100 s)	

Technical specifications (continued)

SITRANS P300 for gauge and absolute pressure	
Measuring accuracy for gauge pressure	According to IEC 62828-1
Reference conditions	<ul style="list-style-type: none"> • Rising characteristic curve • Lower range value 0 bar • Seal diaphragm stainless steel • Measuring cell with silicone oil • Room temperature 25 °C (77 °F)
Measuring span ratio (spread, Turn-Down)	r = maximum measuring span/set measuring span or nominal measuring range
<u>Measurement deviation at limit setting including hysteresis and reproducibility</u>	
<ul style="list-style-type: none"> • Linear characteristic curve 	
- 250 mbar/25 kPa/3.6 psi	$r \leq 1.25: \leq 0.075\%$ $1.25 < r \leq 30: \leq (0.008 \cdot r + 0.065)\%$
- 1 bar/100 kPa/14.5 psi 4 bar/400 kPa/58 psi 16 bar/1.6 MPa/232 psi 63 bar/6.3 MPa/914 psi 160 bar/16 MPa/2321 psi	$r \leq 5: \leq 0.075\%$ $5 < r \leq 100: \leq (0.005 \cdot r + 0.05)\%$
- 400 bar/40 MPa/5802 psi	$r \leq 3: \leq 0.075\%$ $3 < r \leq 10: \leq (0.0029 \cdot r + 0.071)\%$ $10 < r \leq 100: \leq (0.005 \cdot r + 0.05)\%$
<u>Influence of ambient temperature (in percent per 28 °C (50 °F))</u>	
<ul style="list-style-type: none"> • 250 mbar/25 kPa/3.6 psi 	$\leq (0.16 \cdot r + 0.1)\%$
<ul style="list-style-type: none"> • 1 bar/100 kPa/14.5 psi 4 bar/400 kPa/58 psi 16 bar/1.6 MPa/232 psi 63 bar/6.3 MPa/914 psi 160 bar/16 MPa/2321 psi 400 bar/40 MPa/5802 psi 	$\leq (0.07 \cdot r + 0.08)\%$
<u>Long-term stability (temperature change ± 30 °C (± 54 °F))</u>	
<ul style="list-style-type: none"> • 250 mbar/25 kPa/3.6 psi 	$\leq (0.16 \cdot r)\%$ per year
<ul style="list-style-type: none"> • 1 bar/100 kPa/14.5 psi 4 bar/400 kPa/58 psi 	$\leq (0.25 \cdot r)\%$ in 5 years
<ul style="list-style-type: none"> • 16 bar/1.6 MPa/232 psi 63 bar/6.3 MPa/914 psi 160 bar/16 MPa/2321 psi 400 bar/40 MPa/5802 psi 	$\leq (0.125 \cdot r)\%$ in 5 years
Influence of mounting position	≤ 0.05 mbar/0.005 kPa/0.000725 psi per 10° incline (zero offset is possible with position error compensation)
Effect of auxiliary power (in percent per voltage change)	0.005% per 1 V
Measured value resolution for PROFIBUS PA and FOUNDATION Fieldbus	$3 \cdot 10^{-5}$ of nominal measuring range
Measuring accuracy for absolute pressure	According to IEC 62828-1
Reference conditions (All error information always refers to the set measuring span)	<ul style="list-style-type: none"> • Rising characteristic curve • Lower range value 0 bar • Seal diaphragm stainless steel • Silicone oil filling • Room temperature 25 °C (77 °F)
Measuring span ratio r (spread, Turn-Down)	r = maximum measuring span/set measuring span or nominal measuring range
<u>Measurement deviation at limit setting including hysteresis and reproducibility</u>	
<ul style="list-style-type: none"> • Linear characteristic curve 	
- $r \leq 10$	$\leq 0.1\%$
- $10 < r \leq 30$	$\leq 0.2\%$
<u>Influence of ambient temperature (in percent per 28 °C (50 °F))</u>	
<ul style="list-style-type: none"> • 250 mbar a/25 kPa a/3.6 psi a 	$\leq (0.15 \cdot r + 0.1)\%$

Pressure measurement

Pressure transmitters

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Technical specifications (continued)

SITRANS P300 for gauge and absolute pressure		
<ul style="list-style-type: none"> 1300 mbar a/130 kPa a/18.8 psi a 5 bar a/500 kPa a/72.5 psi a 30 bar a/3000 kPa a/435 psi a 	$\leq (0.08 \cdot r + 0.16)\%$	
Long-term stability (temperature change $\pm 30\text{ °C}$ ($\pm 54\text{ °F}$))	$\leq (0.25 \cdot r)\%$ in 5 years	
Effect of mounting position (in pressure per change of angle)	$\leq 0.05\text{ mbar}/0.005\text{ kPa}/0.000725\text{ psi}$ per 10° incline (zero-point correction is possible with position error compensation)	
Effect of auxiliary power (in percent per voltage change)	0.005% per 1 V	
Measured value resolution for PROFIBUS PA and FOUNDATION Fieldbus	$3 \cdot 10^{-5}$ of nominal measuring range	
Measuring accuracy for gauge and absolute pressure, with flush-mounted diaphragm		
Reference conditions (All error information always refers to the set measuring span)	According to IEC 62828-1	
	<ul style="list-style-type: none"> Rising characteristic curve Lower range value 0 bar Seal diaphragm stainless steel Silicone oil filling Room temperature 25 °C (77 °F) 	
Measuring span ratio r (spread, Turn-Down)	$r = \text{maximum measuring span}/\text{set measuring span or nominal measuring range}$	
<u>Measurement deviation at limit setting including hysteresis and reproducibility</u>		
<ul style="list-style-type: none"> Linear characteristic curve 	Gauge pressure with flush-mounted diaphragm	Absolute pressure with flush-mounted diaphragm
- $r \leq 5$	$\leq 0.075\%$	-
- $5 < r \leq 100$	$\leq (0.005 \cdot r + 0.05)\%$	-
- $r \leq 10$	-	$\leq 0.2\%$
- $10 < r \leq 30$	-	$\leq 0.4\%$
Influence of ambient temperature (in percent per 28 °C (50 °F))	$\leq (0.08 \cdot r + 0.16)\%$	$\leq (0.16 \cdot r + 0.24)\%$
<u>Influence of the medium temperature (in pressure per temperature unit)</u>		
<ul style="list-style-type: none"> Temperature difference between medium temperature and ambient temperature 	3 mbar/0.3 kPa/0.04 psi per 10 K	
Long-term stability (temperature change $\pm 30\text{ °C}$ ($\pm 54\text{ °F}$))	$\leq (0.25 \cdot r)\%$ in 5 years	
Effect of mounting position (in pressure per change of angle)	0.4 mbar/0.04 kPa/0.006 per 10° incline (zero offset is possible with position error compensation)	
Effect of auxiliary power (in percent per voltage change)	0.005% per 1 V	
Measured value resolution for PROFIBUS PA and FOUNDATION Fieldbus	$3 \cdot 10^{-5}$ of nominal measuring range	

Operating conditions

Installation conditions

Ambient temperature	Observe the temperature class in hazardous areas.
<ul style="list-style-type: none"> Measuring cell with silicone oil 	-40 ... +85 °C (-40 ... +185 °F)
<ul style="list-style-type: none"> Measuring cell with Neobee oil (FDA-compliant, with flush-mounted diaphragm) 	-10 ... +85 °C (14 ... 185 °F)
<ul style="list-style-type: none"> Measuring cell with inert liquid 	-40 ... +85 °C (-40 ... +185 °F)
<ul style="list-style-type: none"> Display readable 	-30 ... +85 °C (-22 ... +185 °F)
<ul style="list-style-type: none"> Storage temperature 	-50 ... +85 °C (-58 ... +185 °F) - For Neobee: -20 ... +85 °C (-4 ... +185 °F) - For high-temperature oil: -10 ... +85 °C (14 ... +185 °F)
<ul style="list-style-type: none"> Climatic class 	
- Condensation	Relative humidity 0 ... 100% Condensation permissible, suitable for use in the tropics

Technical specifications (continued)

Operating conditions	
Degree of protection	
• According to IEC 60529	IP65, IP68
• According to NEMA 250	Type 4X, enclosure cleaning, resistant to lyes, steam to 150 °C (302 °F)
Electromagnetic compatibility	
• Emitted interference and interference immunity	According to IEC 61326 and NAMUR NE 21
Process conditions	
Medium temperature	The max. medium temperature of the flush-mounted process connections is to be taken into account in accordance with the relevant connection standards (e.g. DIN 32676, DIN 11851, etc.).
• Measuring cell with silicone oil	-40 ... +100 °C (-40 ... +212 °F)
• Measuring cell with silicone oil (with flush-mounted diaphragm)	-40 ... +150 °C (-40 ... +302 °F)
• Measuring cell with Neobee oil (FDA-compliant, with flush-mounted diaphragm)	-10 ... +150 °C (14 ... 302 °F)
• Measuring cell with silicone oil, with temperature decoupler (only for gauge pressure version with flush-mounted diaphragm)	-40 ... +200 °C (-40 ... +392 °F)
• Measuring cell with Neobee oil, with temperature decoupler (only for gauge pressure version with flush-mounted diaphragm)	-10 ... +200 °C (14 ... 392 °F)
• Measuring cell with inert liquid	-20 ... +100 °C (-4 ... +212 °F)
Structural design (standard version)	
Weight (without options)	Approx. 800 g (1.8 lbs)
Enclosure material	Stainless steel, mat. no. 1.4301/304
Material of wetted parts	
• Connection shank	Stainless steel, mat. no. 1.4404/316L or Hastelloy C276, mat. no. 2.4819
• Oval flange	Stainless steel, mat. no. 1.4404/316L
• Seal diaphragm	Stainless steel, mat. no. 1.4404/316L or Hastelloy C276, mat. no. 2.4819
• Measuring cell filling	<ul style="list-style-type: none"> • Silicone oil • Inert filling liquid
Process connection	<ul style="list-style-type: none"> • G½B according to EN 837-1 • Internal thread ½-14 NPT • Oval flange PN 160 (MAWP 2320 psi) with fastening thread: <ul style="list-style-type: none"> - 7/16-20 UNF according to with IEC 61518/EN 61518 - M10 according to DIN 19213
Structural design (version with flush-mounted diaphragm)	
Weight (without options)	Approx. 1 ... 13 kg (2.2 ... 29 lbs)
Enclosure material	Stainless steel, mat. no. 1.4301/304
Material of wetted parts	
• Process connection	Stainless steel, mat. no. 1.4404/316L
• Seal diaphragm	Stainless steel, mat. no. 1.4404/316L

Pressure measurement

Pressure transmitters

for food, pharmaceuticals and biotechnology / SITRANS P300

Technical specifications (continued)

Operating conditions			
Measuring cell filling	<ul style="list-style-type: none"> Silicone oil Inert filling liquid Food grade oil (Neobee oil) 		
Process connection	<ul style="list-style-type: none"> Flanges according to EN and ASME F&B and pharmaceutical flanges 		
Surface quality touched-by-media	R_a values $\leq 0.8 \mu\text{m}$ (32 $\mu\text{-inch}$)/welds $R_a \leq 1.6 \mu\text{m}$ (64 $\mu\text{-inch}$) (Process connections according to 3A; R_a values $\leq 0.8 \mu\text{m}$ (32 μinch)/welds $R_a \leq 0.8 \mu\text{m}$ (32 μinch))		
Auxiliary power U_H	<table border="0"> <tr> <td>HART</td> <td>PROFIBUS PA/FOUNDATION Fieldbus</td> </tr> </table>	HART	PROFIBUS PA/FOUNDATION Fieldbus
HART	PROFIBUS PA/FOUNDATION Fieldbus		
Terminal voltage on transmitter	<table border="0"> <tr> <td>10.5 ... 42 V DC 10.5 ... 30 V DC for intrinsically safe operation</td> <td>-</td> </tr> </table>	10.5 ... 42 V DC 10.5 ... 30 V DC for intrinsically safe operation	-
10.5 ... 42 V DC 10.5 ... 30 V DC for intrinsically safe operation	-		
Auxiliary power	Bus-powered		
Separate supply voltage	Not necessary		
Bus voltage			
<ul style="list-style-type: none"> Without Ex 	9 ... 32 V		
<ul style="list-style-type: none"> With intrinsically safe operation 	9 ... 24 V		
Current consumption			
<ul style="list-style-type: none"> Max. basic current 	12.5 mA		
<ul style="list-style-type: none"> Starting current \leq basic current 	Yes		
<ul style="list-style-type: none"> Max. fault current in the event of an error 	15.5 mA		
Fault disconnection electronics (FDE) available	Yes		
Certificates and approvals	<table border="0"> <tr> <td>HART</td> <td>PROFIBUS PA/FOUNDATION Fieldbus</td> </tr> </table>	HART	PROFIBUS PA/FOUNDATION Fieldbus
HART	PROFIBUS PA/FOUNDATION Fieldbus		
Classification according to pressure equipment directive (PED 2014/68/EU)	For gasses of fluid group 1 and liquids of fluid group 1; complies with requirements of Article 4, Paragraph 3 (sound engineering practice)		
Water, waste water	Available soon		
Explosion protection			
Intrinsic safety "i"	PTB 05 ATEX 2048		
<ul style="list-style-type: none"> Marking 	II1/2 G Ex ia IIC/IB T4/T5/T6 Ga/Gb		
<ul style="list-style-type: none"> Permissible ambient temperature 			
- Temperature class T4	-40 ... +85 °C (-40 ... +185 °F)		
- Temperature class T5	-40 ... +70 °C (-40 ... +158 °F)		
- Temperature class T6	-40 ... +60 °C (-40 ... +140 °F)		
<ul style="list-style-type: none"> Connection 	<table border="0"> <tr> <td>To certified intrinsically safe circuits with peak values: $U_i = 30 \text{ V}$, $I_i = 100 \text{ mA}$, $P_i = 750 \text{ mW}$, $R_i = 300 \Omega$</td> <td>To certified intrinsically safe circuits with peak values: FISCO supply unit: $U_i = 17.5 \text{ V}$, $I_i = 380 \text{ mA}$, $P_i = 5.32 \text{ W}$ Linear barrier: $U_i = 24 \text{ V}$, $I_i = 250 \text{ mA}$, $P_i = 1.2 \text{ W}$</td> </tr> </table>	To certified intrinsically safe circuits with peak values: $U_i = 30 \text{ V}$, $I_i = 100 \text{ mA}$, $P_i = 750 \text{ mW}$, $R_i = 300 \Omega$	To certified intrinsically safe circuits with peak values: FISCO supply unit: $U_i = 17.5 \text{ V}$, $I_i = 380 \text{ mA}$, $P_i = 5.32 \text{ W}$ Linear barrier: $U_i = 24 \text{ V}$, $I_i = 250 \text{ mA}$, $P_i = 1.2 \text{ W}$
To certified intrinsically safe circuits with peak values: $U_i = 30 \text{ V}$, $I_i = 100 \text{ mA}$, $P_i = 750 \text{ mW}$, $R_i = 300 \Omega$	To certified intrinsically safe circuits with peak values: FISCO supply unit: $U_i = 17.5 \text{ V}$, $I_i = 380 \text{ mA}$, $P_i = 5.32 \text{ W}$ Linear barrier: $U_i = 24 \text{ V}$, $I_i = 250 \text{ mA}$, $P_i = 1.2 \text{ W}$		
<ul style="list-style-type: none"> Effective internal capacitance 	$C_i = 6 \text{ nF}$		
<ul style="list-style-type: none"> Effective internal inductance 	$L_i = 0.4 \text{ mH}$		
Explosion protection to FM for USA and Canada (cFMus)			
<ul style="list-style-type: none"> Identification (DIP) or (IS); (NI) 	Certificate of Compliance 3025099 CL I, DIV 1, GP ABCD T4 ... T6; CL II, DIV 1, GP EFG; CL III; CL I, ZN 0/1 AEx ia IIC T4 ... T6 CL I, DIV 2, GP ABCD T4 ... T6; CL II, DIV 2, GP FG; CL III		

Technical specifications (continued)

Operating conditions		
• Identification (DIP) or (IS)	Certificate of Compliance 3025099C CL I, DIV 1, GP ABCD T4 ... T6; CL II, DIV 1, GP EFG; CL III; Ex ia IIC 4 ... T6 CL I, DIV 2, GP ABCD T4 ... T6; CL II, DIV 2, GP FG; CL III	
Dust explosion protection for Zone 20/21/22	PTB 05 ATEX 2048	
• Marking	II 1 D Ex ia IIIC T ₂₀₀ 122 °C Da II 1/2 D Ex ia IIIC T ₂₀₀ 122 °C Da/Db II 2 D Ex ib IIIC T ₂₀₀ 122 °C Db	
• Permissible ambient temperature		
- Temperature class T4	-40 ... +85 °C (-40 ... +185 °F) (for mineral glass window -20 ... +85 °C (-4 ... +185 °F))	
- Temperature class T5	-40 ... +70 °C (-40 ... +158 °F) (for mineral glass window -20 ... +70 °C (-4 ... +158 °F))	
- Temperature class T6	-40 ... +60 °C (-40 ... +140 °F) (for mineral glass window -20 ... +60 °C (-4 ... +140 °F))	
• Connection	To certified intrinsically safe circuits with peak values: U _i = 30 V, I _i = 100 mA, P _i = 750 mW	To certified intrinsically safe circuits with peak values: U _i = 24 V, I _i = 380 mA, P _i = 5.-32 W
• Effective internal capacitance	C _i = 6 nF	C _i = 5 nF
• Effective internal inductance	L _i = 0.4 µH	L _i = 10 µH
Type of protection Ex nA/nL/ic (Zone 2)	PTB 05 ATEX 2048	
• Marking	II 3 G Ex ic IIC T6 ... T4 Gc II 3 G Ex ec IIC T6 ... T4 Gc II 3 G Ex ic IIC T6 ... T4 Gc	
• Permissible ambient temperature		
- Temperature class T4	-40 ... +85 °C (-40 ... +185 °F) (only for mineral glass window -20 ... +85 °C (-4 ... +185 °F))	
- Temperature class T5	-40 ... +70 °C (-40 ... +158 °F) (only for mineral glass window -20 ... +70 °C (-4 ... +158 °F))	
- Temperature class T6	-40 ... +60 °C (-40 ... +140 °F) (only for mineral glass window -20 ... +60 °C (-4 ... +140 °F))	
• Ex nA/nL connection	To certified intrinsically safe circuits with peak values: U _m = 45 V	To certified intrinsically safe circuits with peak values: U _m = 32 V
• Ex ic connection	To certified intrinsically safe circuits with peak values: U _i = 45 V	To certified intrinsically safe circuits with peak values: U _i = 32 V
• Effective internal capacitance	C _i = 6 nF	C _i = 5 nF
• Effective internal inductance	L _i = 0.4 mH	L _i = 20 µH

Communication

Communication	
HART	
HART	230 ... 1100 Ω
Protocol	HART version 5.x
Software for computer	SIMATIC PDM
PROFIBUS PA	
Simultaneous communication with master class 2 (max.)	4
The address can be set using	Configuration tool or local operation (standard setting Address 126)
Cyclic data usage	
• Output byte	5 (one measured value) or 10 (two measured values)
• Input byte	0, 1 or 2 (totalizer mode and reset function for dosing)
Internal preprocessing	
Device profile	PROFIBUS PA Profile for Process Control Devices Version 3.0, Class B
Function blocks	2

Pressure measurement

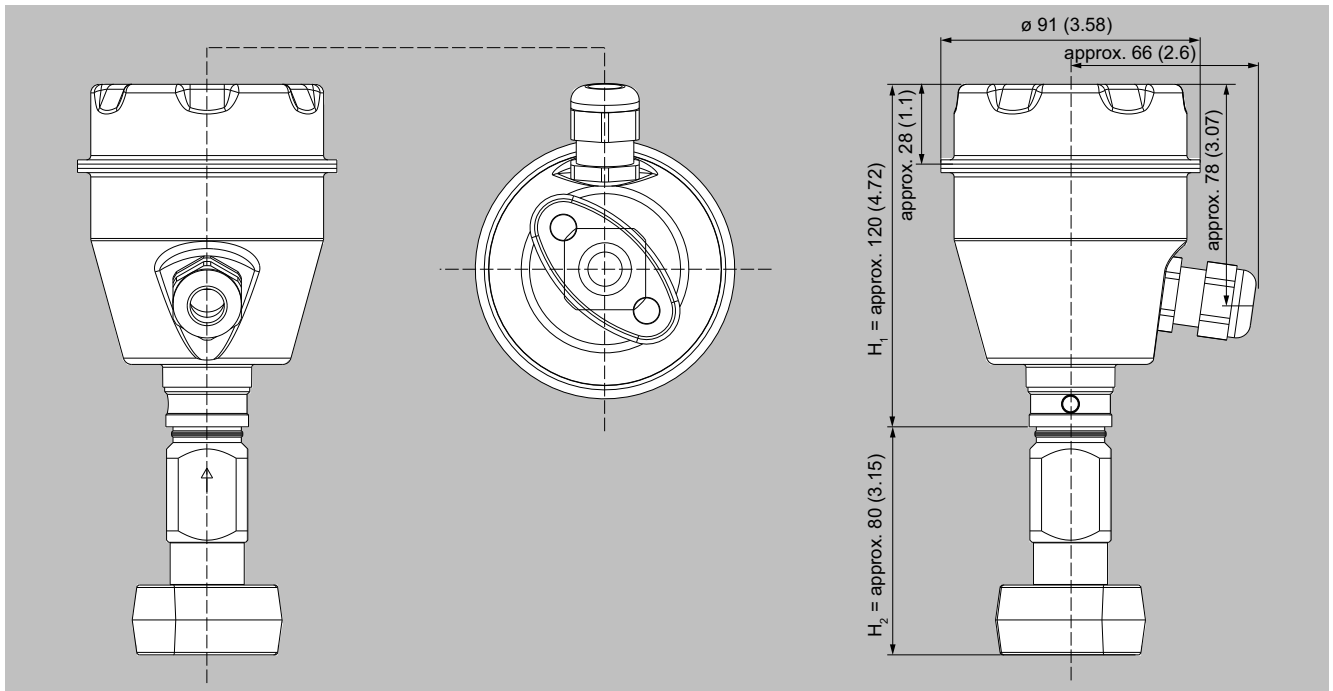
Pressure transmitters

for food, pharmaceuticals and biotechnology / SITRANS P300

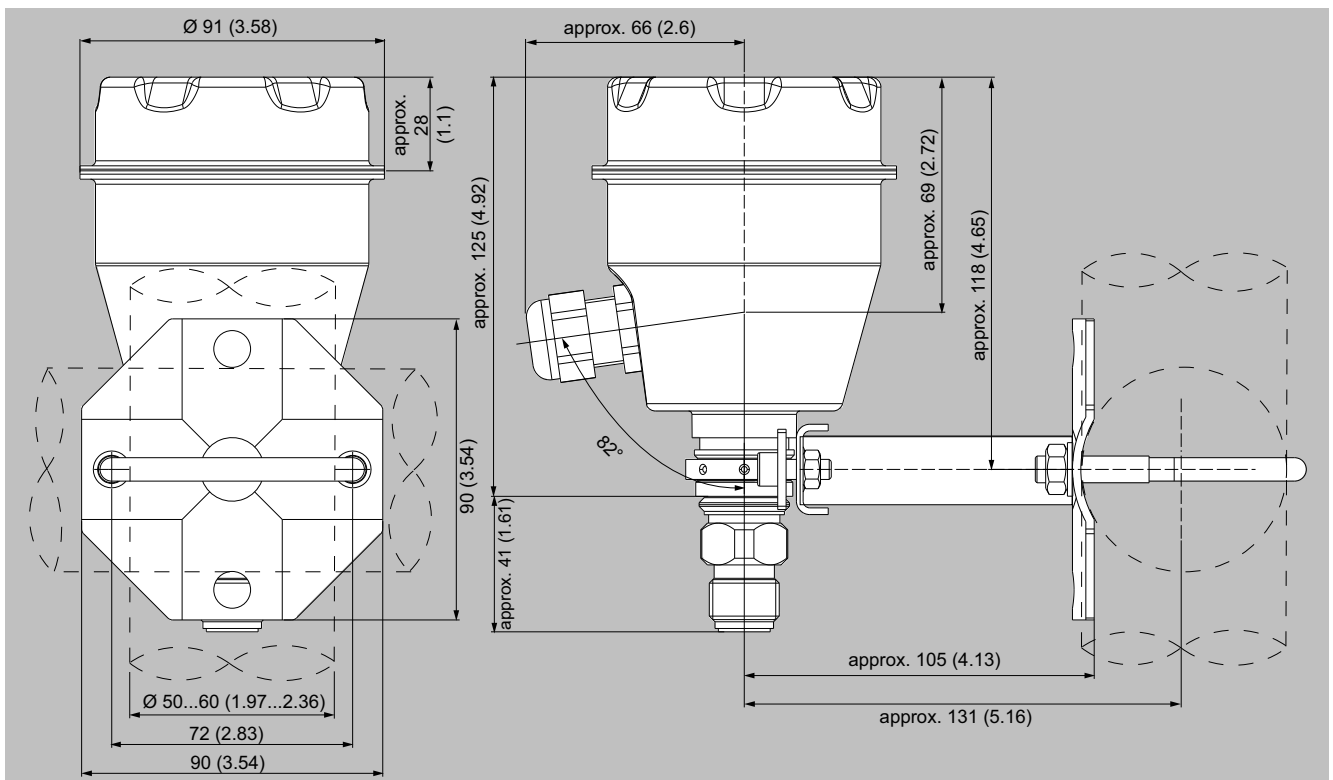
Technical specifications (continued)

Communication	
• Analog input	
- Adaptation to user-specific process variable	Yes, linearly rising or falling characteristic curve
- Electrical damping adjustable	0 ... 100 s
- Simulation function	Output/input
- Failure mode	Parameterizable (last good value, substitute value, incorrect value)
- Limit monitoring	Yes, one upper and lower warning limit and one alarm limit respectively
• Register (totalizer)	Can be reset, preset, optional direction of counting, simulation function of register output
- Failure mode	Parameterizable (summation with last good value, continuous summation, summation with incorrect value)
- Limit monitoring	One upper and lower warning limit and one alarm limit respectively
• Physical block	1
Transducer blocks	2
• Pressure transducer block	
- Can be calibrated by applying two pressures	Yes
- Monitoring of sensor limits	Yes
- Specification of a vessel characteristic curve with	Max. 30 nodes
- Simulation function for measured pressure value and sensor temperature	Constant value or by means of parameterizable ramp function
FOUNDATION Fieldbus	
Function blocks	3 function blocks analog input, 1 function block PID
• Analog input	
- Adaptation to user-specific process variable	Yes, linearly rising or falling characteristic curve
- Electrical damping adjustable	0 ... 100 s
- Simulation function	Output/input (can be locked within the device with a bridge)
- Failure mode	Parameterizable (last good value, substitute value, incorrect value)
- Limit monitoring	Yes, one upper and lower warning limit and one alarm limit respectively
- Square-rooted characteristic curve for flow measurement	Yes
• PID	Standard-FOUNDATION Fieldbus function block
• Physical block	1 resource block
Transducer blocks	1 transducer block Pressure with calibration, 1 transducer block LCD
• Pressure transducer block	
- Can be calibrated by applying two pressures	Yes
- Monitoring of sensor limits	Yes
- Simulation function: Measured pressure value, sensor temperature and electronics temperature	Constant value or by means of parameterizable ramp function

Dimensional drawings



SITRANS P300, with oval flange, dimensions in mm (inch)



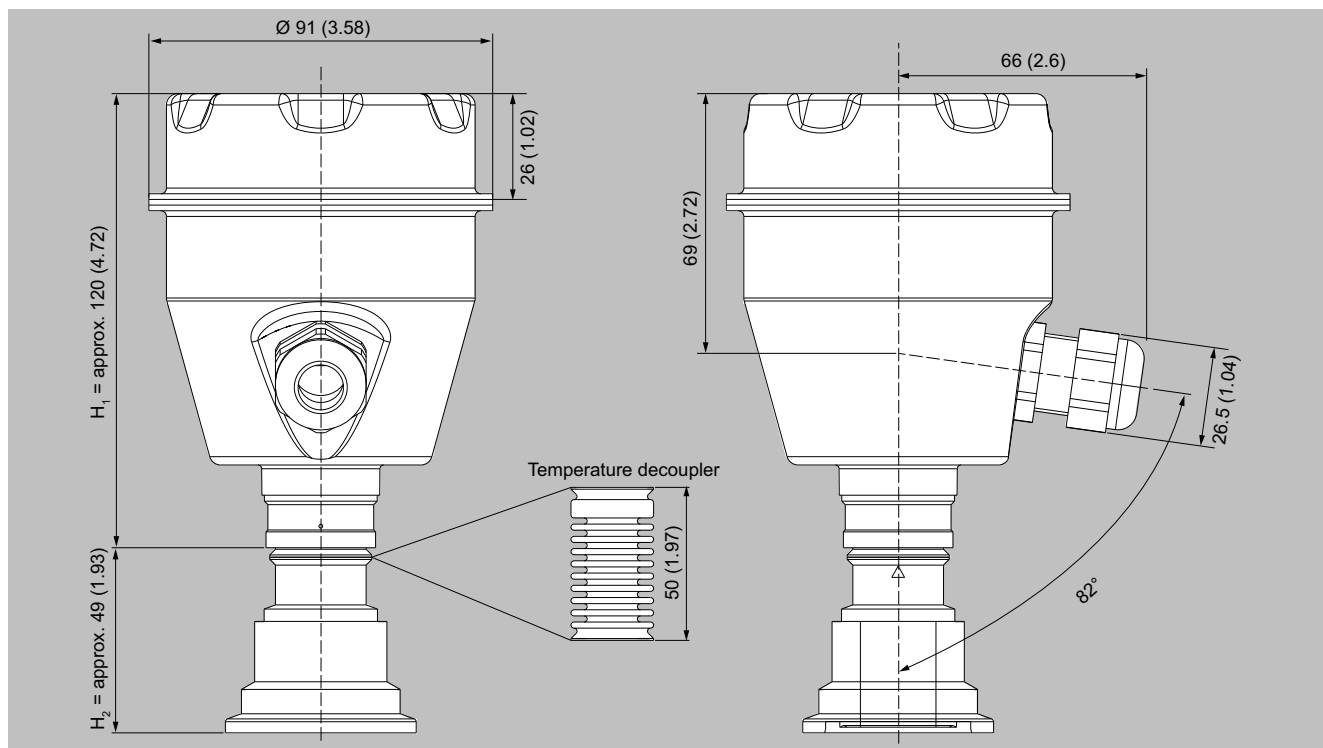
SITRANS P300, process connection M20 × 1.5, with built-in mounting bracket, dimensions in mm (inch)

Pressure measurement

Pressure transmitters

for food, pharmaceuticals and biotechnology / SITRANS P300

Dimensional drawings (continued)



SITRANS P300, flush-mounted, dimensions in mm (inch)

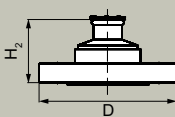
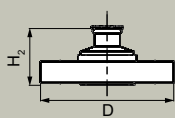
The figure shows a SITRANS P300 with an example flange. In this drawing the height is subdivided into H_1 and H_2 .

H_1 = Height of the SITRANS P300 up to a defined cross-section

H_2 = Height of the flange up to this defined cross-section

Only the height H_2 is indicated in the dimensions of the flanges.

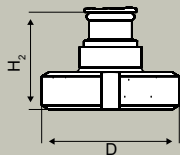
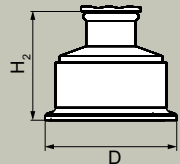
Flanges according to EN and ASME

Flange	Order code	DN	PN	ØD	H_2
EN 1092-1 	M11	25	40	115 mm (4.5 inches)	Approx. 52 mm (2 inches)
	M13	40	40	150 mm (5.9 inches)	
	M23	40	100	170 mm (6.7 inches)	
	M04	50	16	165 mm (6.5 inches)	
	M14	50	40	165 mm (6.5 inches)	
	M06	80	16	200 mm (7.9 inches)	
	M16	80	40	200 mm (7.9 inches)	
ASME B16.5 	M40	1 inch	150	110 mm (4.3 inches)	Approx. 52 mm (2 inches)
	M41	1½ inches	150	130 mm (5.1 inches)	
	M42	2 inches	150	150 mm (5.9 inches)	
	M43	3 inches	150	190 mm (7.5 inches)	
	M44	4 inches	150	230 mm (9.1 inches)	
	M45	1 inch	300	125 mm (4.9 inches)	
	M46	1½ inches	300	155 mm (6.1 inches)	
	M47	2 inches	300	165 mm (6.5 inches)	
	M48	3 inches	300	210 mm (8.1 inches)	
	M49	4 inches	300	255 mm (10.0 inches)	

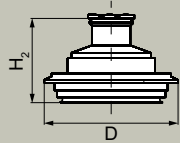
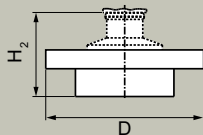
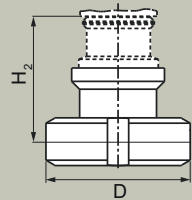
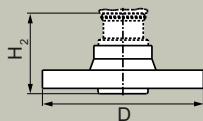
Dimensional drawings (continued)

NuG and pharmaceutical connections

Connections according to DIN

Connection	Order code	DN	PN	ØD	H ₂
DIN 11851 (dairy connection with slotted union nut) 	N04	50	25	92 mm (3.6 inches)	Approx. 52 mm (2 inches)
	N06	80	25	127 mm (5.0 inches)	
Tri-Clamp acc. to DIN 32676 	N14	50	16	64 mm (2.5 inches)	Approx. 52 mm (2 inches)
	N15	65	10	91 mm (3.6 inches)	

Other connections

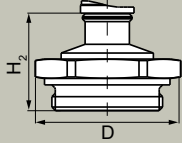
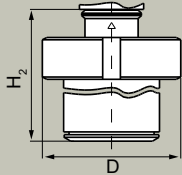
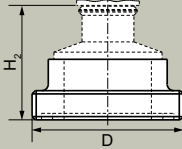
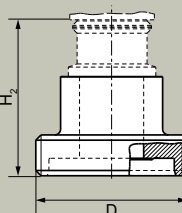
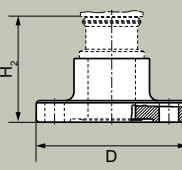
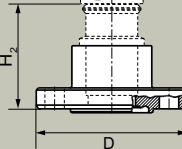
Connection	Order code	DN	PN	ØD	H ₂
Varivent connection 	N28	40 ... 125	40	84 mm (3.3 inches)	Approx. 52 mm (2 inches)
Sanitary process connection according to DRD 	M32	50	40	105 mm (4.1 inches)	Approx. 52 mm (2 inches)
Sanitary process screw connection according to NEUMO BioConnect 	Q05	50	16	82 mm (3.2 inches)	Approx. 52 mm (2 inches)
	Q06	65	16	105 mm (4.1 inches)	
	Q07	80	16	115 mm (4.5 inches)	
	Q08	100	16	145 mm (5.7 inches)	
	Q13	2 inches	16	82 mm (3.2 inches)	
	Q14	2½ inches	16	105 mm (4.1 inches)	
	Q15	3 inches	16	105 mm (4.1 inches)	
Q16	4 inches	16	145 mm (5.7 inches)		
Sanitary process connection according to NEUMO BioConnect S flange connection 	Q72	2 inches	16	125 mm (4.9 inches)	Approx. 52 mm (2 inches)

Pressure measurement

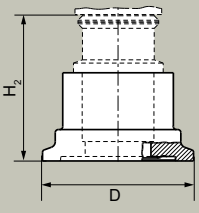
Pressure transmitters

for food, pharmaceuticals and biotechnology / SITRANS P300

Dimensional drawings (continued)

Connection	Order code	DN	PN	ØD	H ₂
Threaded connection G $\frac{3}{4}$ inch, G1 inch and G2 inch according to DIN 3852-2 Form A 	R01	$\frac{3}{4}$ inch	60	37 mm (1.5 inches)	Approx. 45 mm (1.8 inches)
	R02	1 inch	60	48 mm (1.9 inches)	Approx. 47 mm (1.9 inches)
	R04	2 inches	60	78 mm (3.1 inches)	Approx. 52 mm (2 inches)
Tank connection TG 52/50 and TG 52/150 	R10	25	40	63 mm (2.5 inches)	Approx. 63 mm (2.5 inches)
	R11	25	40	63 mm (2.5 inches)	Approx. 170 mm (6.7 inches)
SMS screwed connector 	M73	2 inches	25	70 x 1/6 mm	Approx. 52 mm (2.1 inches)
	M74	2½ inches	25	85 x 1/6 mm	
	M75	3 inches	25	98 x 1/6 mm	
Aseptic screwed connector according to DIN 11864-1 Form A 	N33	50	25	78 x 1/6 inch	Approx. 52 mm (2.1 inches)
	N34	65	25	95 x 1/6 inch	
	N35	80	25	110 x ¼ inch	
	N36	100	25	130 x ¼ inch	
Aseptic flange with notch according to DIN 11864-2 Form A 	N43	50	16	94	Approx. 52 mm (2.1 inches)
	N44	65	16	113	
	N45	80	16	133	
	N46	100	16	159	
Aseptic flange with groove according to DIN 11864-2 Form A 	N43 + P11	50	16	94	Approx. 52 mm (2.1 inches)
	N44 + P11	65	16	113	
	N45 + P11	80	16	133	
	N46 + P11	100	16	159	

Dimensional drawings (continued)

Connection	Order code	DN	PN	ØD	H ₂
Aseptic clamp with groove according to DIN 11864-3 Form A 	N53	50	25	77.5	Approx. 52 mm (2.1 inches)
	N54	65	25	91	
	N55	80	16	106	
	N56	100	16	130	

Pressure measurement

Pressure transmitters

for food, pharmaceuticals and biotechnology / Factory mounting of valve manifolds on SITRANS P300

Overview

The SITRANS P300 transmitter for gauge and absolute pressure can be delivered factory-fitted with the following valve manifold 7MF9011-4EA and 7MF9011-4FA.

Design

The 7MF9011-4EA valve manifolds are sealed with PTFE sealings between the transmitter and the valve manifold as standard. Soft iron, stainless steel and copper sealings are also available for sealing purposes if preferred.

The 7MF9011-4FA valve manifolds are sealed with PTFE sealing tape between the transmitter and the valve manifold.

The complete unit is checked for leaks under pressure after assembly (air pressure 6 bar (87 psi)) and certified with a factory certificate according to EN 10204 - 2.2.

All valve manifolds should preferably be secured with the corresponding mounting brackets. The transmitters are mounted on the valve manifold and not on the unit itself.

If you order a mounting bracket when choosing the option "Factory-mounting of valve manifolds", you will receive a mounting bracket for the valve manifold instead of a bracket for mounting the transmitter.

If you order an inspection certificate 3.1 to EN 10204 after choosing the option "Factory-mounting of valve manifolds", a separate certificate is provided for the transmitter and for the valve manifold.

Selection and ordering data

Valve manifolds

7MF9011-4FA valve manifold on gauge and absolute pressure transmitters



Add -Z to the article number of the transmitter and specify order codes

SITRANS P300

7MF802-...1-...

With process connection internal thread 1/2-14 NPT, in-sealed with PTFE sealing tape
Delivery including high-pressure test certified by factory certificate according to EN 10204-2.2

Additional versions:

Delivery includes mounting bracket and stainless steel mounting clips (instead of the mounting bracket supplied with the transmitter)

Inspection certificate according to EN 10204-3.1 for transmitter and mounted valve manifold

Order code

T03

A02

C12

7MF9011-4EA valve manifold on gauge and absolute pressure transmitters



Add -Z to the article number of the transmitter and specify order codes

SITRANS P300

7MF802-...0-...

With process connection shank G1/2 A according to EN 837-1, gasket made of PTFE between valve manifold and transmitter

Alternative gasket material:

- Soft iron
- Stainless steel, mat. no. 14571
- Copper

Delivery including high-pressure test certified by factory certificate according to EN 10204-2.2

Additional versions:

Delivery includes mounting bracket and stainless steel mounting clips (instead of the mounting bracket supplied with the transmitter)

Inspection certificate according to EN 10204- 3.1 for transmitters and mounted valve manifold

Order code

T02

A70

A71

A72

A02

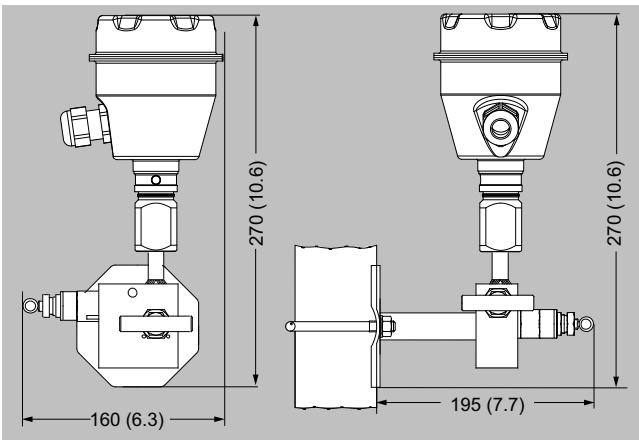
C12

Dimensional drawings

Valve manifolds mounted on SITRANS P300



7MF9011-4EA valve manifold with mounted gauge pressure and absolute pressure transmitters

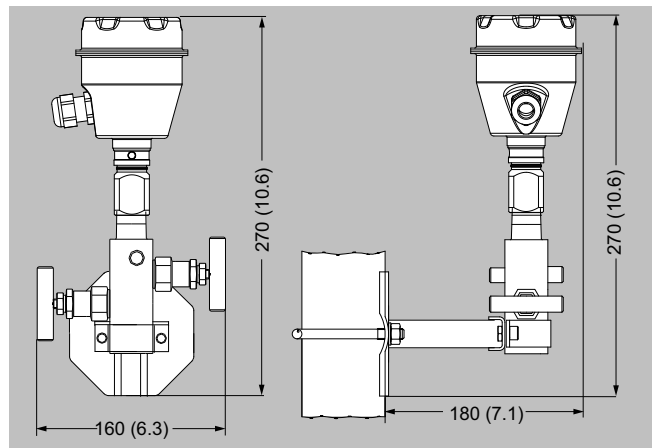


7MF9011-4EA valve manifold with mounted gauge pressure and absolute pressure transmitters, dimensions in mm (inch)

Dimensional drawings (continued)



7MF9011-4FA valve manifold with mounted gauge pressure and absolute pressure transmitters



7MF9011-4FA valve manifold with mounted gauge pressure and absolute pressure transmitters, dimensions in mm (inch)

Pressure measurement

Pressure transmitters

for the paper industry / SITRANS P300 with PMC connection

Overview



SITRANS P300, pressure transmitter with PMC connection for paper industry

The SITRANS P300 pressure transmitter has been fitted with special process connections for the paper industry. With the two process connection threads 1½" and 1" flush at the front, the SITRANS P300 transmitter can be used in all processes of the paper industry.

The SITRANS P300 pressure transmitter is a digital pressure transmitter featuring extensive user-friendliness and high accuracy. The parameterization is performed using control keys or via HART communication or via PROFIBUS PA or FOUNDATION Fieldbus interface.

The comprehensive functionality makes for precise adjustment of the pressure transmitter to the requirements of the plant. Operation is very simple in spite of the numerous setting options.

Pressure transmitters of the "Intrinsic safety" and "Flameproof" type of protection can be installed within hazardous areas (zone 1) or in zone 0. The devices are provided with an EC type-examination certificate and comply with the corresponding harmonized European standards (ATEX).

Various versions of the pressure transmitters are available for measuring:

- Gauge pressure
- Level
- Volume level
- Mass level

Benefits

- High quality and service life
- High reliability even under extreme chemical and mechanical loads, e.g. abrasion
- For corrosive and non-corrosive gases, vapors and liquids
- Extensive diagnostics and simulation functions
- Minimal conformity error
- Small long-term drift
- Wetted parts made of Hastelloy
- Continuously adjustable measuring spans from 0.03 bar to 16 bar (0.43 psi to 232 psi) with HART interface
- Nominal measuring ranges from 1 bar to 16 bar (14.5 psi to 232 psi) with PROFIBUS PA interface
- High measuring accuracy
- Parameterization using control keys or HART and/or PROFIBUS PA or FOUNDATION Fieldbus

Application

The SITRANS P300 pressure transmitter for gauge pressure with PMC connection is used in the paper industry.

Pressure transmitters of the "Intrinsic safety" and "Flameproof" type of protection can be installed within hazardous areas (zone 1) or in zone 0. The pressure transmitters are provided with an EC type-examination certificate and comply with the corresponding harmonized European standards (ATEX).

Pressure transmitters with the type of protection "Intrinsic safety" for use in zone 0 may be operated with power supply units of category "ia" and "ib".

The pressure transmitters can be equipped with various designs of remote seals for special applications such as the measurement of highly viscous substances.

The pressure transmitter can be operated locally over 3 input buttons or programmed externally over HART or over PROFIBUS PA or FOUNDATION Fieldbus interface.

Measuring span (continuously adjustable)

P300 with HART: 0.01 to 16 bar (0.15 to 232 psi)

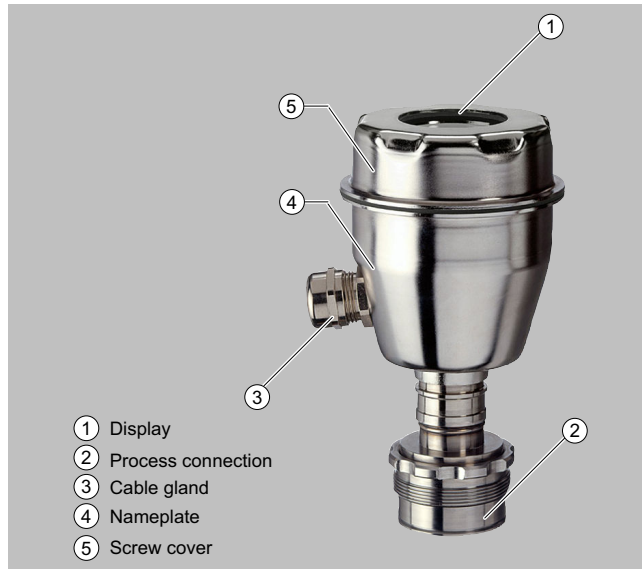
Nominal measuring range

For P300 with PROFIBUS PA and FOUNDATION Fieldbus:
1 to 16 bar (14.5 to 232 psi)

Design

The SITRANS P300 pressure transmitter consists of:

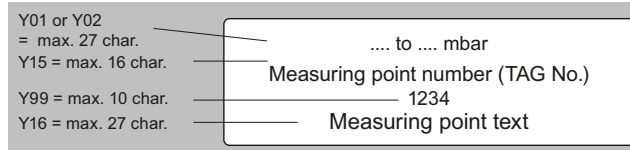
- electronics
- Enclosure
- Measuring cell



Perspective view of the SITRANS P300

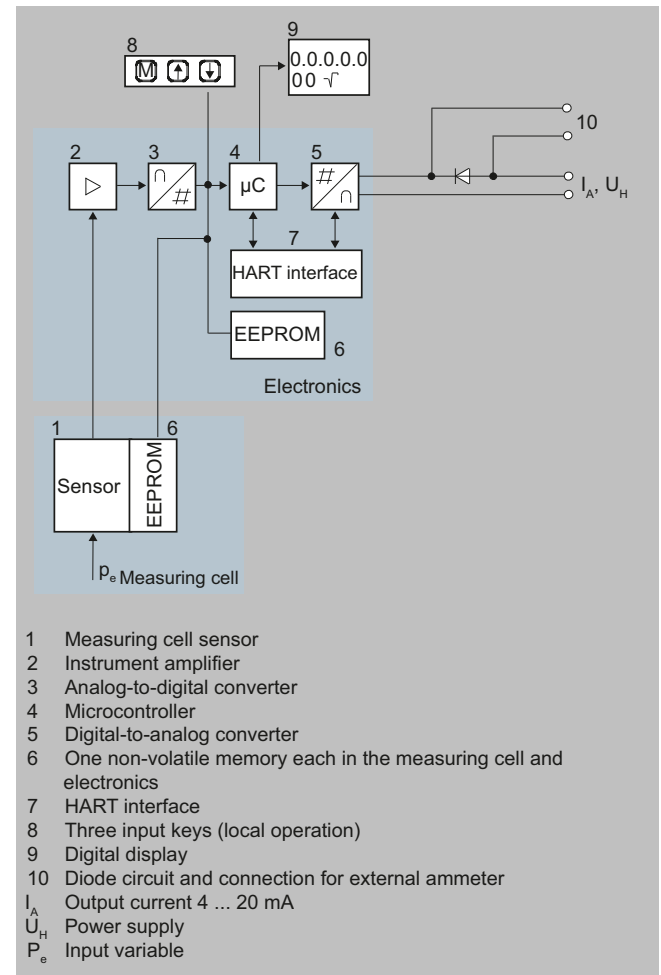
The enclosure has a screw-on cover (5) and, depending on the version, comes with or without an inspection window. The electrical terminal compartment, the buttons for operation of the device and, depending on the version, the display are located under this cover. The connections for the auxiliary power U_H and the shield are in the terminal compartment. The cable gland is on the side of the enclosure. The measuring cell with the process connection (2) is located on the bottom of the enclosure. The measuring cell with the process connection may differ from the one shown in the diagram, depending on the device design.

Example of attached measuring point label



Function

Operation of electronics with HART communication



Function diagram of electronics

The bridge output voltage created by the sensor (1, Figure "Function diagram of electronics") is amplified by the measuring amplifier (2) and digitalized in the analog-to-digital converter (3). The digital information is evaluated in a microcontroller, corrected for linearity and temperature response, and converted in a digital-to-analog converter (5) into an output current of 4 to 20 mA.

The diode circuit (10) protects against incorrect polarity.

The data specific to the measuring cell, the electronics data, and the parameter data are stored in the two non-volatile memories (6). One memory is coupled to the measuring cell, the other to the electronics. As the result of this modular design, the electronics and the measuring cell can be replaced separately from each other.

Using the 3 input buttons (8), you can parameterize the pressure transmitter directly at the measuring point. The input buttons can also be used to control the view of the measurement results, the error messages and the operating modes on the display (9).

The HART modem (7) permits parameterization using a protocol according to the HART specification.

The pressure transmitters with measuring spans ≤ 63 bar measure the input pressure compared to atmosphere, transmitters with spans ≥ 160 bar the input pressure compared to vacuum.

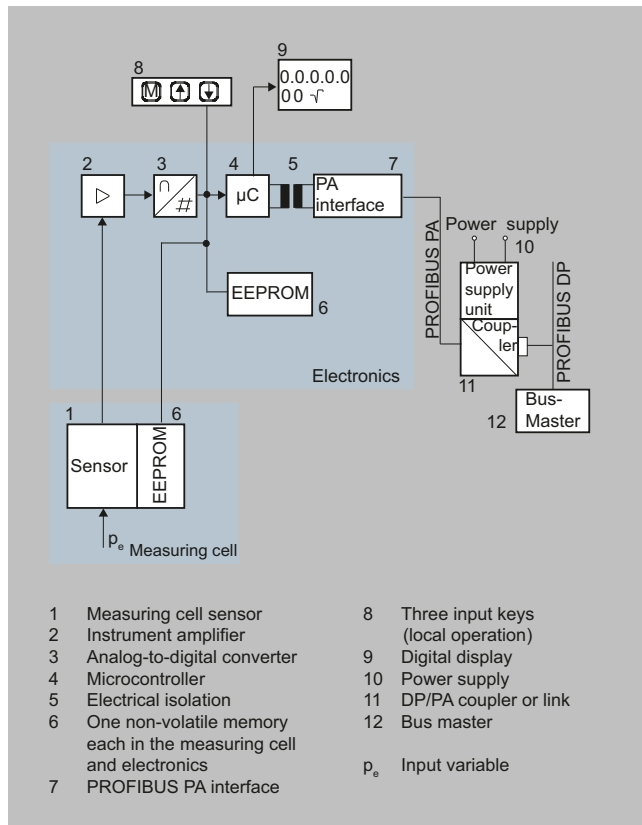
Pressure measurement

Pressure transmitters

for the paper industry / SITRANS P300 with PMC connection

Function (continued)

Operation of electronics with PROFIBUS PA communication



Function diagram of electronics

The bridge output voltage created by the sensor (1, Figure "Function diagram of electronics") is amplified by the measuring amplifier (2) and digitalized in the analog-to-digital converter (3). The digital information is evaluated in the microcontroller, corrected for linearity and temperature response, and made available on the PROFIBUS PA via an electrically isolated PA interface (7).

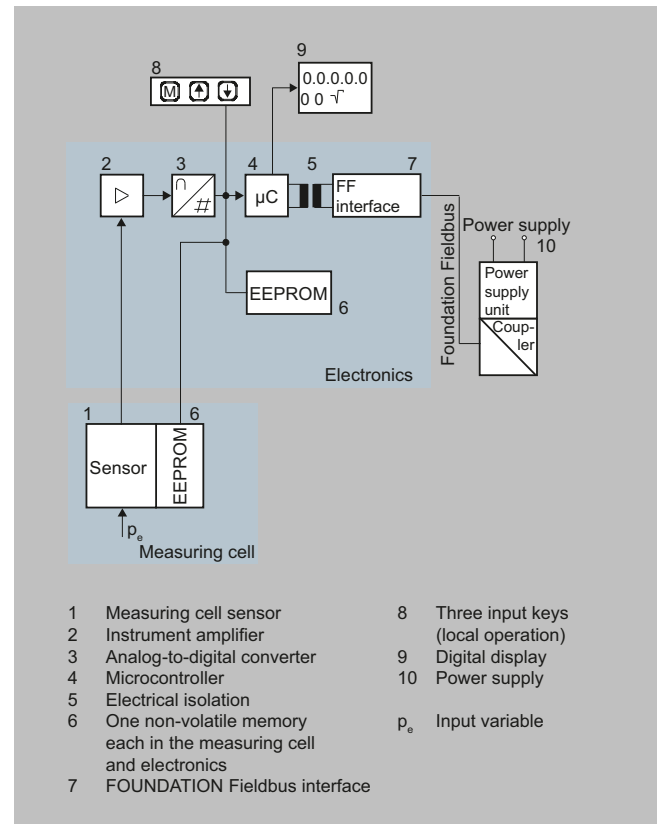
The data specific to the measuring cell, the electronics data, and the parameter data are stored in the two non-volatile memories (6). One memory is coupled to the measuring cell, the other to the electronics. As the result of this modular design, the electronics and the measuring cell can be replaced separately from each other.

Using the three input buttons (8), you can parameterize the pressure transmitter directly at the measuring point. The input buttons can also be used to control the view of the measurement results, the error messages and the operating modes on the display (9).

The results with status values and diagnostics data are transferred by cyclic data transmission on the PROFIBUS PA. Parameterization data and error messages are transferred by acyclic data transmission. Special software such as SIMATIC PDM is required for this.

Function (continued)

Operation of electronics with FOUNDATION Fieldbus communication



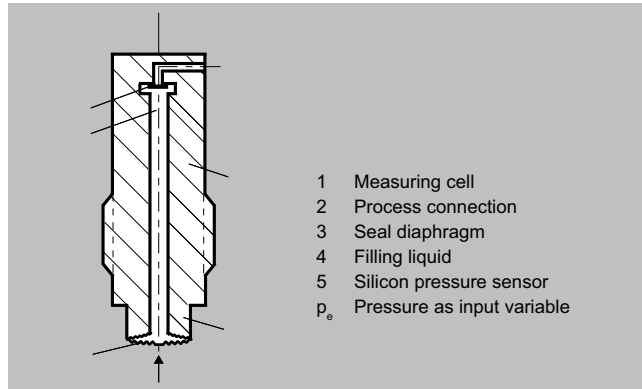
Function diagram of electronics

The bridge output voltage created by the sensor (1, Figure "Function diagram of electronics") is amplified by the measuring amplifier (2) and digitalized in the analog-to-digital converter (3). The digital information is evaluated in the microcontroller, corrected for linearity and temperature response and made available on the FOUNDATION Fieldbus via an electrically isolated FOUNDATION Fieldbus interface (7).

The data specific to the measuring cell, the electronics data, and the parameter data are stored in the two non-volatile memories (6). One memory is coupled to the measuring cell, the other to the electronics. As the result of this modular design, the electronics and the measuring cell can be replaced separately from each other.

Using the three input buttons (8), you can parameterize the pressure transmitter directly at the measuring point. The input buttons can also be used to control the view of the measurement results, the error messages and the operating modes on the display (9).

The results with status values and diagnostics data are transferred by cyclic data transmission on the FOUNDATION Fieldbus. Parameterization data and error messages are transferred by acyclic data transmission. Special software such as National Instruments Configurator is required for this.

Function (continued)**Mode of operation of the measuring cell****Measuring cell for gauge pressure with flush-mounted diaphragm**

- 1 Measuring cell
 - 2 Process connection
 - 3 Seal diaphragm
 - 4 Filling liquid
 - 5 Silicon pressure sensor
- p_e Pressure as input variable

Measuring cell for gauge pressure, with flush-mounted diaphragm for paper industry, function diagram

The pressure p_e is applied through the process connection (2, Figure "Measuring cell for gauge pressure, with flush-mounted diaphragm for paper industry, function diagram") to the measuring cell (1). This pressure is subsequently transmitted further through the seal diaphragm (3) and the filling liquid (4) to the silicon pressure sensor (5) whose measuring diaphragm is then flexed. This changes the resistance of the four piezo-resistors fitted in the diaphragm in a bridge circuit. This change in resistance results in a bridge output voltage proportional to the input pressure.

Parameterization

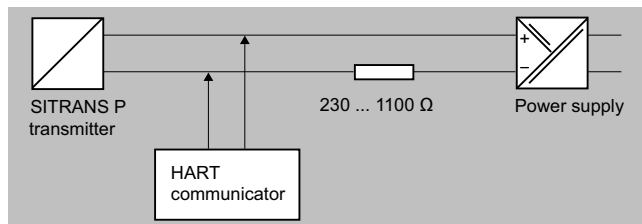
Depending on the version, there are a range of options for parameterizing the pressure transmitter and for setting or scanning the parameters.

Parameterization using the input buttons (local operation)

With the input buttons, you can easily set the most important parameters without any additional equipment.

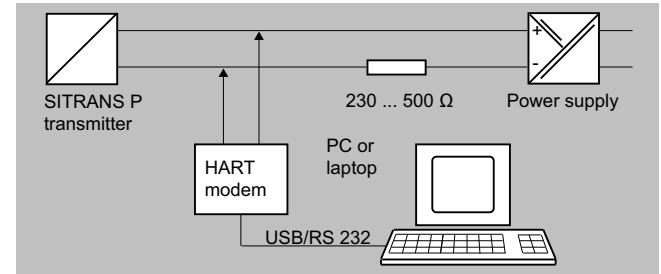
Parameterization using HART

Parameterization using HART is performed with a HART Communicator or a PC.



Communication between a HART Communicator and a pressure transmitter

When parameterizing with the HART Communicator, the connection is made directly to the 2-wire cable.

Function (continued)

HART communication between a PC communicator and a pressure transmitter

When parameterizing with a PC, the connection is made through a HART modem.

The signals needed for communication in conformity with the HART 5.x or 6.x protocols are superimposed on the output current using FSK (Frequency Shift Keying).

Adjustable parameters for SITRANS P300 with HART

Parameters	Input buttons HART	
Lower range value	x	x
Upper range value	x	x
Electrical damping	x	x
Blind adjustment of the lower range value	x	x
Blind adjustment of the upper range value	x	x
Zero adjustment	x	x
Current simulator	x	x
Fault current	x	x
Disabling of buttons, write protection	x	x ¹⁾
Type of unit, unit	x	x
Characteristic curve (linear)	x	x
Input of characteristic curve		x
Freely-programmable LCD		x
Diagnostic functions		x

¹⁾ Except cancel write protection.

Diagnostic functions for SITRANS P300 with HART

- Zero correction display
- Event counter
- Limit transmitter
- Saturation alarm
- Min/max pointer
- Simulation functions
- Maintenance timer

Available physical units of display for SITRANS P300 with HART

Physical variable	Physical units
Pressure (can also be preset in the factory)	Pa, MPa, kPa, bar, mbar, torr, atm, psi, g/cm ² , kg/cm ² , inH ₂ O, inH ₂ O (4 °C), mmH ₂ O, ftH ₂ O (20 °C), inHg, mmHg
Level (height data)	m, cm, mm, ft, in
Volume	m ³ , dm ³ , hl, yd ³ , ft ³ , in ³ , US gallon, Imp. gallon, bushel, barrel, barrel liquid
Mass	g, kg, t, lb, Ston, Lton, oz
Temperature	K, °C, °F, °R
Other	%, mA

Pressure measurement

Pressure transmitters

for the paper industry / SITRANS P300 with PMC connection

Function (continued)

Parameterization through PROFIBUS interface

Fully digital communication through PROFIBUS PA, profile 3.0, is particularly user-friendly. Communication is possible even in a hazardous area.

For parameter assignment via PROFIBUS, you need suitable software, e.g. SIMATIC PDM (Process Device Manager)

Parameterization through FOUNDATION Fieldbus interface

Fully digital communication through FOUNDATION Fieldbus is particularly user-friendly. Communication is possible even in a hazardous area.

For parameterization through the FOUNDATION Fieldbus you need suitable software, e.g. National Instruments Configurator.

Adjustable parameters for SITRANS P300 with PROFIBUS PA and FOUNDATION Fieldbus

Adjustable parameters	Input buttons	PROFIBUS PA and FOUNDATION Fieldbus
Electrical damping	x	x
Zero adjustment (correction of position)	x	x
Buttons and/or function disabling	x	x
Source of measured value display	x	x
Physical unit of display	x	x
Position of decimal point	x	x
Bus address	x	x
Adjustment of characteristic curve	x	x
Input of characteristic curve		x
Freely-programmable LCD		x
Diagnostic functions		x

Diagnostic functions for SITRANS P300 with PROFIBUS PA and FOUNDATION Fieldbus

- Event counter
- Min/max pointer
- Maintenance timer
- Simulation functions
- Zero correction display
- Limit transmitter
- Saturation alarm

Physical units available for the display

Physical variable	Physical units
Pressure (can also be preset in the factory)	MPa, hPa, kPa, Pa, bar, mbar, torr, atm, psi, g/cm ² , kg/cm ² , mmH ₂ O, mmH ₂ O (4 °C), inH ₂ O, inH ₂ O (4 °C), ftH ₂ O, mmHg, inHg
Level (height data)	m, cm, mm, ft, in, yd
Mass	g, kg, t, lb, Ston, Lton, oz
Volume	m ³ , dm ³ , hl, yd ³ , ft ³ , in ³ , US gallon, Imp. gallon, bushel, barrel, barrel liquid
Temperature	K, °C, °F, °R
Other	%

Selection and ordering data

		Article No.
SITRANS P300 pressure transmitters with PMC connection, single chamber enclosure, nameplate inscription in English		
4 ... 20 mA / HART		7MF8123-
PROFIBUS PA		7MF8124-
FOUNDATION Fieldbus (FF)		7MF8125-
		● ● ● ● ● - ● ● ● ●
Click the article number for online configuration in the PIA Life Cycle Portal.		
Measuring cell filling	Measuring cell cleaning	
Silicone oil	Normal	1
Inert liquid	Cleanliness level 2 according to DIN 25410	3
Measuring span		
1 bar (14.5 psi) ¹⁾		B
4 bar (58 psi)		C
16 bar (232 psi)		D
Material of wetted parts		
<u>Seal diaphragm</u>	<u>Measuring cell</u>	
Hastelloy	Stainless steel	B
Process connection		
PMC style Standard: Thread 1 1/2"		2
PMC style Minibolt: Flush-mounted 1" (minimum measuring span: 500 mbar (200 inH ₂ O), cannot be ordered with 1 bar measuring cell (option B))		3
Material of non-wetted parts		
Stainless steel, deep-drawn and electrolytically polished		4
Version		
Standard version		1
Explosion protection		
None		A
With ATEX, type of protection:		
• "Intrinsic safety (Ex ia)"		B
• Zone 20/21/22 ²⁾		C
• Ex nA/nL (Zone 2) ³⁾		E
With FM + CSA, type of protection:		
• "Intrinsic Safe (is)" (planned) ⁴⁾		M
Electrical connection/cable entry		
Screw gland M20×1.5 (polyamide) ⁵⁾		A
Screw gland M20×1.5 (metal)		B
Screw gland M20×1.5 (stainless steel)		C
Device plug M12 (stainless steel, without cable socket)		G
1/2-14 NPT threaded metal ⁶⁾		H
1/2-14 NPT threaded stainless steel ⁶⁾		J
Display		
Without local display, with buttons, closed lid		1
With local display and buttons, closed lid ⁷⁾		2
With local display and buttons, lid with polycarbonate pane (setting for HART devices: mA, for PROFIBUS PA and FOUNDATION Fieldbus devices: pressure units) ⁷⁾		4
With local display and buttons (setting acc. to specifications, order code "Y21" or "Y22" required), lid with polycarbonate pane ⁷⁾		5
With local display and buttons, lid with glass pane (setting for HART devices: mA, for PROFIBUS PA and FOUNDATION Fieldbus devices: pressure unit) ⁷⁾		6
With local display and buttons (setting acc. to specifications, order code "Y21" or "Y22" required), lid with glass pane ⁷⁾		7

Note

See section "Supplementary components" for supply units. The device's scope of delivery includes a brochure and a sealing ring.

- 1) Only with "Standard" process connection
- 2) Can only be ordered together with electrical connection option A.
- 3) Can only be ordered together with electrical connection option B, C or G.
- 4) Explosion protection acc. to FM/CSA: suitable for installations according to NEC 500/505. 5) Only together with HART electronics.
- 6) Without cable gland.
- 7) Local display cannot be rotated.

Pressure measurement

Pressure transmitters

for the paper industry / SITRANS P300 with PMC connection

Selection and ordering data (continued)

Options	Order code	Communication
Add "-Z" to article number and specify order code.		
Cable socket for M12 device plug Stainless steel	A51	HART / PQ / FF
Nameplate inscription (in place of English)		
• German	B10	HART / PQ / FF
• French	B12	HART / PQ / FF
• Spanish	B13	HART / PQ / FF
• Italian	B14	HART / PQ / FF
English nameplate, pressure units in inH₂O or psi	B21	HART / PQ / FF
Quality inspection certificate (5-point characteristic curve test) according to IEC 62828-2¹⁾	C11	HART / PQ / FF
Inspection certificate according to EN 10204-3.1²⁾	C12	HART / PQ / FF
Factory certificate according to EN 10204-2.2	C14	HART / PQ / FF
Setting of the upper saturation limit of the output signal to 22.0 mA	D05	HART / PQ / FF
IP65/IP68 degree of protection only for M20x1.5 and ½-14 NPT	D12	HART / PQ / FF
Mounting		
Weld-in sockets for standard threaded connection 1½"	P01	HART / PQ / FF
Weld-in sockets for minibolt connection 1" (including screw 5/16-18 UNC-2B and washer)	P02	HART / PQ / FF
Additional information Add "-Z" to article number, specify order code and plain text.		
Measuring range to be set Specify in plain text (max. 5 digits): Y01: ... to ... mbar, bar, kPa, MPa, psi	Y01	HART / PQ ¹⁾
Tag plate made of stainless steel and entry in the device variable (measuring point description) Max. 16 characters; specify in plain text: Y15:	Y15	HART / PQ / FF
Measuring point text (entry in device variable) Max. 27 characters; specify in plain text: Y16:	Y16	HART / PQ / FF
Entry of HART TAG Max. 8 characters; specify in plain text: Y17:	Y17	HART
Setting of the local display in pressure units Specify in plain text (default setting: bar): Y21: mbar, bar, kPa, MPa, psi, ... Note The following pressure units can be selected: bar, mbar, mm H ₂ O ³⁾ , inH ₂ O ³⁾ , ftH ₂ O ³⁾ , mmHG, inHG, psi, Pa, kPa, MPa, g/cm ² , kg/cm ² , Torr, ATM or %	Y21	HART / PQ / FF
Setting of the local display in non-pressure units⁹⁾ Specify in plain text: Y22: to l, m ³ , m, USg, ... (Specification of measuring range in pressure units "Y01" is essential, unit with max. 5 characters)	Y22 + Y01	HART
Preset bus address, possible range 1 ... 126 Specify in plain text: Y25:	Y25	PQ / FF

Note:

Only "Y01" and "Y21" can be factory preset.

¹⁾ Measuring accuracies for PROFIBUS PA transmitters with option Y01 are calculated in the same way as for HART devices.

²⁾ Preset values can only be changed via SIMATIC PDM.

³⁾ 20 °C reference temperature.

Technical specifications

SITRANS P300 for gauge pressure with PMC connection for the paper industry				
Input				
Measured variable	Gauge pressure (flush-mounted)			
Measuring span (continuously adjustable) or nominal measuring range and max. permissible test pressure	HART	PROFIBUS PA/FOUNDATION Fieldbus		
	Measuring span	Nominal measuring range	Max. permissible operating pressure MAWP (PS)	Max. permissible test pressure
	0.01 ... 1 bar	1 bar	4 bar	6 bar
	1 ... 100 kPa	100 kPa	400 kPa	600 kPa
	0.15 ... 14.5 psi	14.5 psi	58 psi	87 psi
	0.04 ... 4 bar	4 bar	7 bar	10 bar
	4 ... 400 kPa	400 kPa	0.71 MPa	1 MPa
0.58 ... 58 psi	58 psi	102 psi	145 psi	
0.16 ... 16 bar	16 bar			
16 ... 1600 kPa	1600 kPa	21 bar	32 bar	
2.3 ... 232 psi	232 psi	2.1 MPa	3.2 MPa	
		305 psi	464 psi	
Lower measuring limit (for PMC Style Minibolt no measuring span < 500 mbar adjustable)	100 mbar a/10 kPa a/1.45 psi a			
Upper measuring limit	100% of max. measuring span			
Output				
Output signal	HART	PROFIBUS PA/FOUNDATION Fieldbus		
	4 ... 20 mA	Digital PROFIBUS PA signal		
• Lower limit (continuously adjustable)	3.55 mA, factory set to 3.84 mA	-		
• Upper limit (continuously adjustable)	23 mA, factory-set to 20.5 mA or optionally set to 22.0 mA	-		
Load				
• Without HART	$R_B \leq (U_H - 10.5 \text{ V}) / 0.023 \text{ A in } \Omega$, U_H : Auxiliary power in V	-		
• With HART	$R_B = 230 \dots 500 \Omega$ (SIMATIC PDM) or $R_B = 230 \dots 1100 \Omega$ (HART communicator)	-		
Physical bus	-	IEC 61158-2		
Protection against polarity reversal	Protected against short-circuit and polarity reversal. Each connection against the other with max. supply voltage.			
Electrical damping (step width 0.1 s)	Set to 2 s (0 ... 100 s)			
Measuring accuracy				
Reference conditions	According to IEC 62828-1			
	<ul style="list-style-type: none"> • Rising characteristic curve • Lower range value 0 bar • Seal diaphragm stainless steel • Silicone oil filling • Room temperature (25 °C (77 °F)) 			
Measuring span ratio r (spread, Turn-Down)	r = maximum measuring span/set measuring span or nominal measuring range			
Measurement deviation at limit setting including hysteresis and reproducibility				
• Linear characteristic curve				
- r ≤ 5	≤ 0.075%			
- 5 < r ≤ 100	≤ (0.005 · r + 0.05)%			
Effect of ambient temperature	≤ (0.08 · r + 0.16)%			
Long-term stability (temperature change ±30 °C (± 54 °F))	≤ (0.25 · r)% in 5 years			
Influence of mounting position	≤ 0.1 mbar/0.01 kPa/0.00145 psi per 10° incline (zero offset is possible with position error compensation)			
Effect of auxiliary power (in percent per voltage change)	0.005% per 1 V			
Measured value resolution for PROFIBUS PA and FOUNDATION Fieldbus	3 · 10 ⁻⁵ of nominal measuring range			
Operating conditions				
Installation conditions				
Ambient temperature	Observe the temperature class in hazardous areas.			
• Measuring cell with silicone oil	-40 ... +85 °C (-40 ... +185 °F)			
• Display readable	-30 ... +85 °C (-22 ... +185 °F)			
• Storage temperature	-50 ... +85 °C (-58 ... +185 °F)			

Pressure measurement

Pressure transmitters

for the paper industry / SITRANS P300 with PMC connection

Technical specifications (continued)

SITRANS P300 for gauge pressure with PMC connection for the paper industry		
Climatic class		
Condensation	Relative humidity 0 ... 100% Condensation permissible, suitable for use in the tropics	
Degree of protection		
• According to EN 60529	IP65, IP68	
• According to NEMA 250	Type 4X, enclosure cleaning, resistant to lyes, steam to 150 °C (302 °F)	
Electromagnetic compatibility		
• Emitted interference and interference immunity	Acc. to EN 61326 and NAMUR NE 21	
Process conditions		
Medium temperature		
• Measuring cell with silicone oil	-40 ... +100 °C (-40 ... +212 °F)	
Structural design		
Weight (without options)	Approx. 1 kg (2.2 lbs)	
Enclosure material	Stainless steel, mat. no. 1.4301/304	
Material of wetted parts		
• Seal diaphragm	Hastelloy C276, mat. no. 2.4819	
• Measuring cell filling	Silicone oil	
Surface quality touched-by-media	R _a -values ≤ 0.8 μm (32 μ-inch)/welds Ra ≤ 1.6 μm (64 μ-inch)	
Auxiliary power U_H	HART	PROFIBUS PA/FOUNDATION Fieldbus
Terminal voltage on transmitter	10.5 ... 42 V DC for intrinsically safe operation: 10.5 ... 30 V DC	-
Auxiliary power	-	Bus-powered
Separate supply voltage	-	Not necessary
Bus voltage		
• Without EEx	-	9 ... 32 V
• With intrinsically safe operation	-	9 ... 24 V
Current consumption		
• Max. basic current	-	12.5 mA
• Starting current ≤ basic current	-	Yes
• Max. fault current in the event of an error	-	15.5 mA
Fault disconnection electronics (FDE) available	-	Yes
Certificates and approvals	HART	PROFIBUS PA/FOUNDATION Fieldbus
Classification according to pressure equipment directive (PED 2014/68/EU)	For gases of fluid group 1 and liquids of fluid group 1; complies with requirements of article 4, paragraph 3 (sound engineering practice)	
Explosion protection		
Intrinsic safety "i"	PTB 05 ATEX 2048	
Marking	II 1/2 G Ex ia IIC/IIB T4/T5/T6 Ga/Gb	
Permissible ambient temperature		
• Temperature class T4	-40 ... +85 °C (-40 ... +185 °F)	
• Temperature class T5	-40 ... +70 °C (-40 ... +158 °F)	
• Temperature class T6	-40 ... +60 °C (-40 ... +140 °F)	
Connection	To certified intrinsically safe circuits with peak values: U _i = 30 V, I _i = 100 mA, P _i = 750 mW, R _i = 300 Ω	To certified intrinsically safe circuits with peak values: FISCO supply unit: U _i = 17.5 V, I _i = 380 mA, P _i = 5.32 W Linear barrier: U _i = 24 V, I _i = 250 mA, P _i = 1.2 W
Effective internal capacitance	C _i = 6 nF	C _i = 1.1 nF
Effective internal inductance	L _i = 0.4 mH	L _i = 7 μH

Technical specifications (continued)

SITRANS P300 for gauge pressure with PMC connection for the paper industry

Explosion protection to FM for USA and Canada (cFM_{US})

- Identification (DIP) or (IS); (NI)

Certificate of Compliance 3025099

CL I, DIV 1, GP ABCD T4 ... T6; CL II, DIV 1, GP EFG; CL III; CL I, ZN 0/1 AEx ia IIC T4 ... T6
CL I, DIV 2, GP ABCD T4 ... T6; CL II, DIV 2, GP FG; CL III

- Identification (DIP) or (IS)

Certificate of Compliance 3025099C

CL I, DIV 1, GP ABCD T4 ... T6; CL II, DIV 1, GP EFG; CL III; Ex ia IIC T4 ... T6
CL I, DIV 2, GP ABCD T4 ... T6; CL II, DIV 2, GP FG; CL III

Communication

Communication	
HART	
HART	230 ... 1 100 Ω
Protocol	HART version 5.x
Software for computer	SIMATIC PDM
PROFIBUS PA	
Simultaneous communication with master class 2 (max.)	4
The address can be set using	Configuration tool or local operation (default setting address 126)
Cyclic data usage	
• Output byte	1 measured value: 5 bytes 2 measured values: 10 bytes
• Input byte	Register operation mode: 1 byte Reset function due to dosing: 1 byte
Device profile	PROFIBUS PA Profile for Process Control Devices Version 3.0, Class B
Function blocks	2
• Analog input	
- Adaptation to user-specific process variable	Linearly rising or falling characteristic curve
- Electrical damping	0 ... 100 s adjustable
- Simulation function	Output/input
- Limit monitoring	One upper and lower warning limit and one alarm limit respectively
• Register (totalizer)	Can be reset and preset Selectable direction of counting Simulation function of the register output
- Limit monitoring	One upper and lower warning limit and one alarm limit respectively
• Physical block	1
Transducer blocks	2
• Pressure transducer block	
- Monitoring of sensor limits	Yes
- Specification of a vessel characteristic curve with	Max. 31 nodes
- Characteristic curve	Linear
- Simulation function	Available
• Transducer block "Electronics temperature"	
Simulation function	Available
FOUNDATION Fieldbus	
Function blocks	3 function blocks analog input, 1 function block PID
• Analog input	
- Adaptation to user-specific process variable	Yes, linearly rising or falling characteristic curve
- Electrical damping adjustable	0 ... 100 s
- Simulation function	Output/input (can be locked within the device with a bridge)

Pressure measurement

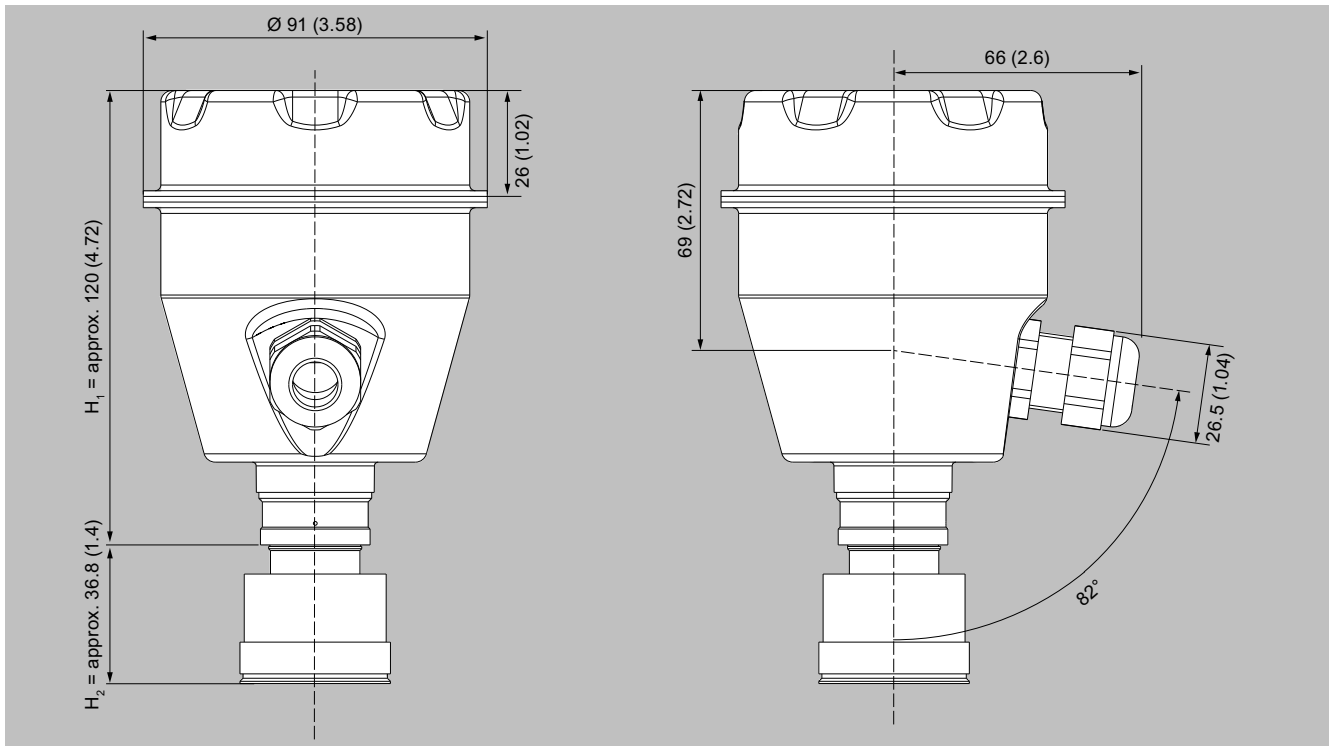
Pressure transmitters

for the paper industry / SITRANS P300 with PMC connection

Technical specifications (continued)

Communication	
- Failure mode	Parameterizable (last good value, substitute value, incorrect value)
- Limit monitoring	Yes, one upper and lower warning limit and one alarm limit respectively
- Square-rooted characteristic curve for flow measurement	Yes
• PID	Standard FOUNDATION Fieldbus function block
• Physical block	1 resource block
Transducer blocks	1 transducer block Pressure with calibration, 1 transducer block LCD
• Pressure transducer block	
- Can be calibrated by applying two pressures	Yes
- Monitoring of sensor limits	Yes
- Simulation function: pressure measurement, sensor temperature and electronics temperature	Constant value or by means of parameterizable ramp function

Dimensional drawings

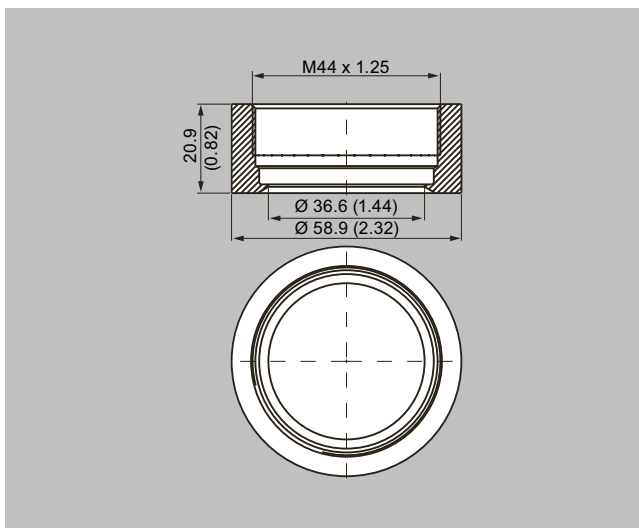


SITRANS P300 pressure transmitter for gauge pressure, with PMC connection, dimensions in mm (inch)

The figure shows a SITRANS P300 with an example flange. In this drawing, the height is subdivided into H_1 and H_2 :

- H_1 = Height of the SITRANS P300 up to a defined cross-section
- H_2 = Height of the flange up to this defined cross-section

Only the height H_2 is indicated in the dimensions of the flanges.

PMC Style standard weldable sockets

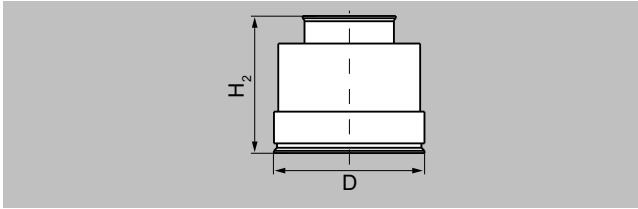
PMC Style Standard weldable sockets, dimensions in mm (inch)

Pressure measurement

Pressure transmitters

for the paper industry / SITRANS P300 with PMC connection

Dimensional drawings (continued)

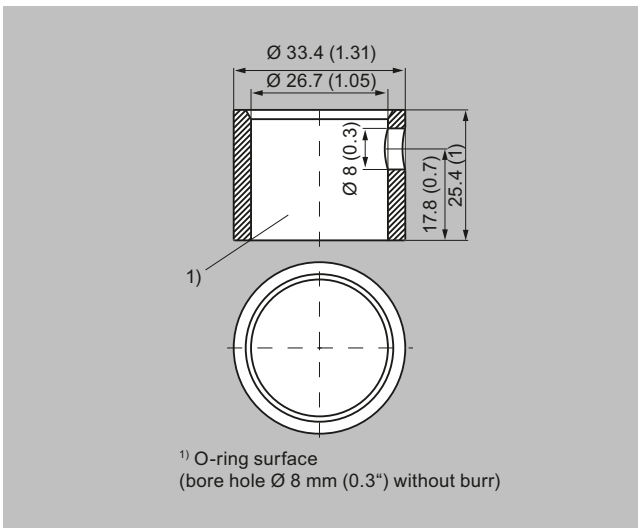


Material: Stainless steel, mat. no. 1.4404/316L

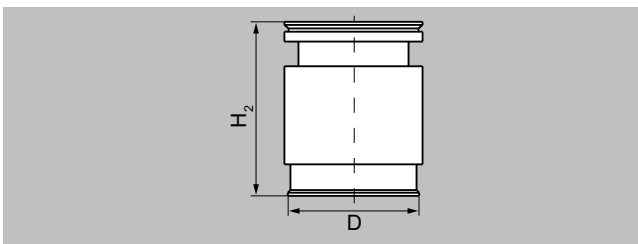
$\varnothing D = 40.9 \text{ mm (1.6")}$

$H_2 = \text{approx. } 36.8 \text{ mm (1.4")}$

PMC Style Minibolt weldable sockets



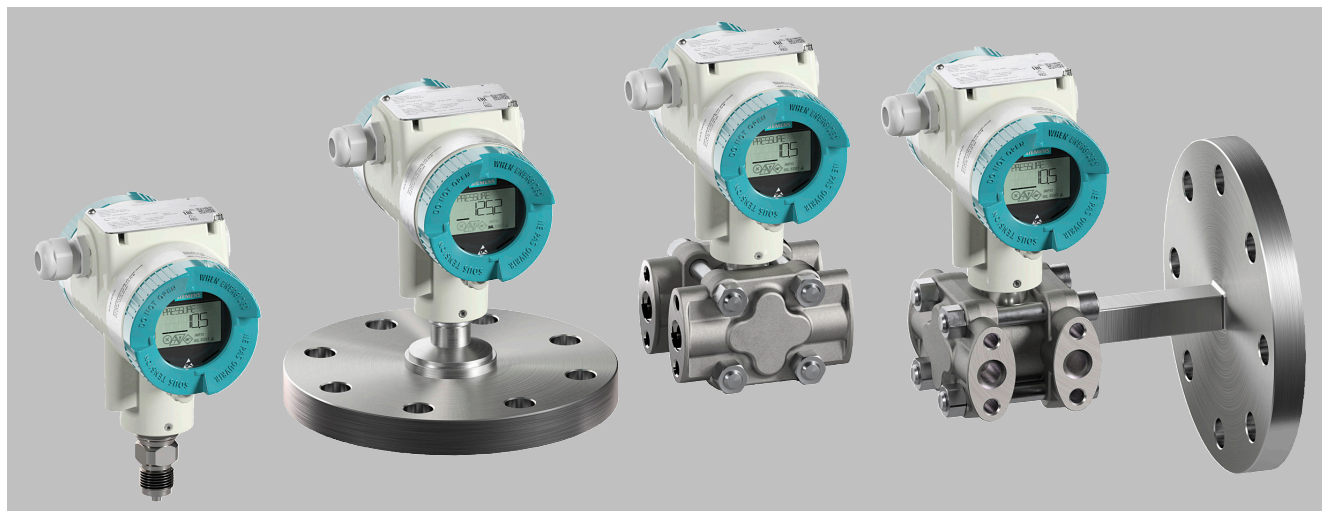
PMC Style Minibolt weldable sockets, dimensions in mm (inch)



$\varnothing D = 26.3 \text{ mm (1.0")}$

$H_2 = \text{approx. } 33.1 \text{ mm (1.3")}$

Overview



SITRANS P320/P420 pressure transmitters are digital pressure transmitters featuring extensive user-friendliness and high accuracy. The parameter assignment is performed using input buttons or the HART interface.

The comprehensive functionality makes for precise adjustment of the pressure transmitter to the requirements of the plant. Operation is very user-friendly in spite of the numerous setting options.

Due to their advanced diagnostic functionalities according to NAMUR NE107, the SITRANS P320/P420 pressure transmitters are very suitable for use in chemical plants. Thanks to the advanced diagnostic functions and the process value storage, the SITRANS P420 is "Ready for Digitalization".

The "Remote Safety Handling" function saves customers significant amounts of time and money, because the SIL function can be switched on and validated remotely via SIMATIC PDM. This eliminates travel times and on-site operation via the local display or keyboard.

Parameter assignment using the HART protocol is very easy and quick thanks to the innovative EDD with integrated Quick Start wizard.

The transmitters can be equipped with various types of remote seals for special applications such as the measurement of highly viscous substances.

SITRANS P320/P420 pressure transmitters are available in various versions for measuring:

- Gauge pressure
- Absolute pressure
- Differential pressure
- Level
- Volume flow
- Mass flow

Pressure measurement

Pressure transmitters

for applications with advanced requirements / SITRANS P320/420 / Technical reference

Benefits

- Diagnostic functions in accordance with NAMUR recommendation NE107
- SIL devices developed according to IEC 61508
- SIL validation on the device or remotely with SIMATIC PDM
- Reduction of internal inductance for Ex applications to LI = 0
- Step response time for pressure type T63 = 105 ms and for differential pressure type 135 ms.
- Minimal conformity error
- Very low temperature influence
- Very good long-term stability
- High quality and service life
- High reliability even under extreme chemical and mechanical loads
- For corrosive and non-corrosive gases, vapors and liquids
- Extensive diagnostics and simulation functions
- Separate replacement of measuring cell and electronics without recalibration
- Wetted parts made of high-grade materials (e.g., stainless steel, alloy, gold, Monel, tantalum)
- Infinitely adjustable spans from 0.01 bar to 700 bar (0.15 psi to 10153 psi)
- Convenient parameterization over 4 input buttons and HART interface

Application

SITRANS P320/P420 pressure transmitters can be used in industrial areas with extreme chemical and mechanical loads.

The pressure transmitters can be used in zone 1 or zone 0 with the corresponding Ex approval.

The pressure transmitters can be equipped with various designs of remote seals for special applications such as the measurement of highly viscous substances.

The pressure transmitter can be operated locally over 4 input buttons or programmed externally over HART interface.

Pressure transmitters for gauge pressure

Measured variable:

- Gauge pressure of corrosive and non-corrosive gases, vapors and liquids.

Measuring span (infinitely adjustable)

- For SITRANS P320/P420 with HART: 0.01 bar to 700 bar (0.15 psi to 10153 psi)

There are two series:

- Gauge pressure series
- Differential pressure series

Pressure transmitters for absolute pressure

Measured variable:

- Absolute pressure of corrosive and non-corrosive gases, vapors and liquids.

Measuring span (infinitely adjustable)

- For SITRANS P320/P420 with HART: 8.3 mbar a to 160 bar a (0.12 to 2 321 psi a)

There are two series:

- Gauge pressure series
- Differential pressure series

Pressure transmitters for differential pressure and flow

Measured variables:

- Differential pressure
- Small positive or negative overpressure
- Flow $q \sim \sqrt{\Delta p}$ (together with a primary differential pressure transducer (see section "Flowmeters"))

Measuring span (infinitely adjustable)

- For SITRANS P320/P420 with HART: 1 mbar to 160 bar (0.0145 to 2 321 psi)

Pressure transmitters for level

Measured variable:

- Level of corrosive and non-corrosive liquids in open and closed vessels.

Measuring span (infinitely adjustable)

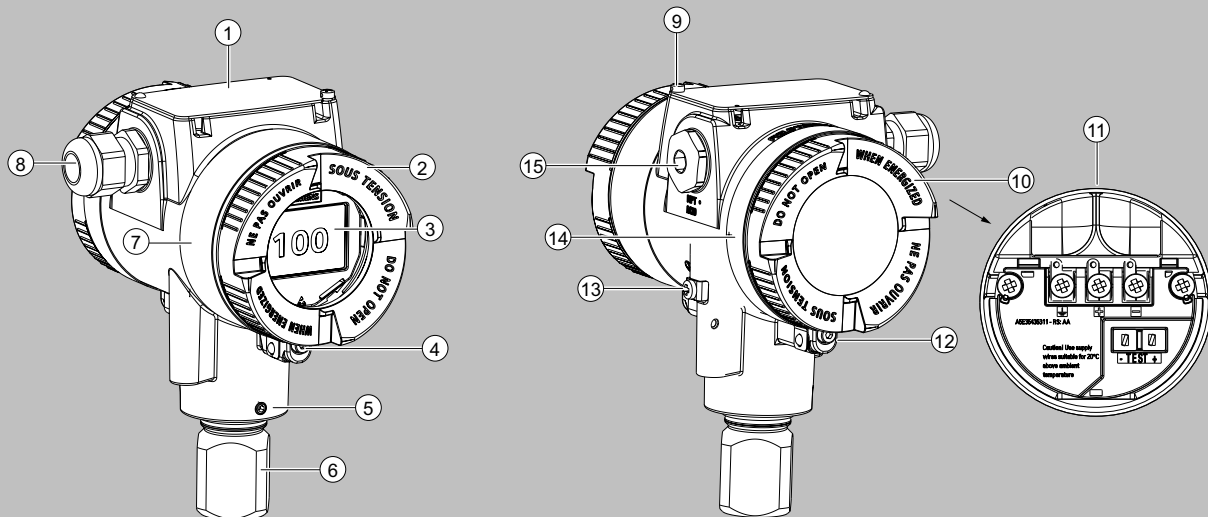
- For SITRANS P320/P420 with HART: 25 mbar to 5 bar (0.363 to 72.5 psi)

Type of the mounting flange:

- EN 1092-1 flanges
- ASME B16.5 flanges
- J.I.S. flanges
- Diverse range of sealing surface forms available

Design

Depending on the customer-specific order, the device comprises different parts.



- ① Cover over buttons and nameplate with general information
- ② Cover (front) with glass pane (optional)
- ③ Display (optional)
- ④ Safety catch (front)
- ⑤ Locking screw for locking the enclosure
- ⑥ Process connection
- ⑦ Approval label with approval information
- ⑧ Cable inlet, optionally with cable gland

- ⑨ Locking screw for the cover over the buttons
- ⑩ Cover (rear) for electrical terminal compartment
- ⑪ Electrical terminal compartment
- ⑫ Safety catch (back)
- ⑬ Ground terminal
- ⑭ Nameplate with information on the remote seal
- ⑮ Blanking plug

Device front view

- The electronics enclosure is made of die cast aluminum or precision cast stainless steel.
- The enclosure has a removable cover at the front and the back.
- Depending on the device design, the front cover (2) may be designed with a glass pane.
- The cable inlet (8) to the electrical terminal compartment is at the side; either the left or right-hand one can be used. The unused opening is closed with a blanking plug (15).
- The ground terminal (13) is located on the side.
- The electrical terminal compartment (11) for the auxiliary power and shield is accessible when you remove the back cover (10).
- The measuring cell with process connection (6) is located in the bottom part of the enclosure. The measuring cell is prevented from rotating by a locking screw (5).
- Thanks to the modular design of the pressure transmitter, the measuring cell and application electronics or terminal compartment can be replaced if required.
- The button cover (1) is located on the upper face of the enclosure. The nameplate with general information is located on the cover over the buttons.

Nameplates

Nameplate

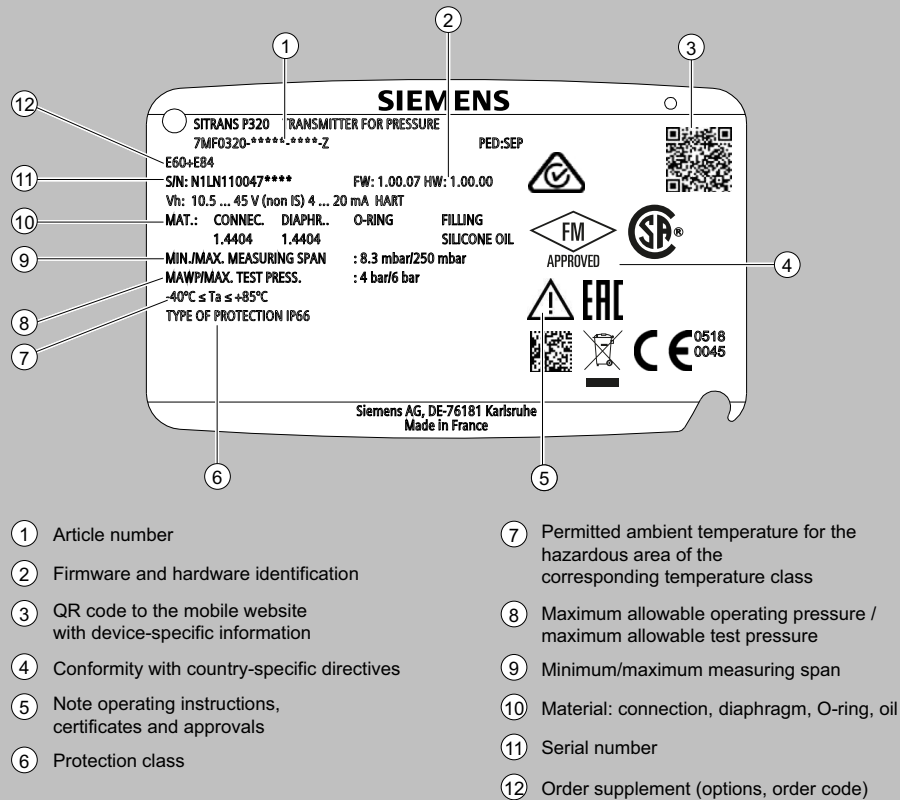
The nameplate with the article no. and other important information, such as design details and technical data, is located on the cover over the buttons.

Pressure measurement

Pressure transmitters

for applications with advanced requirements / SITRANS P320/420 / Technical reference

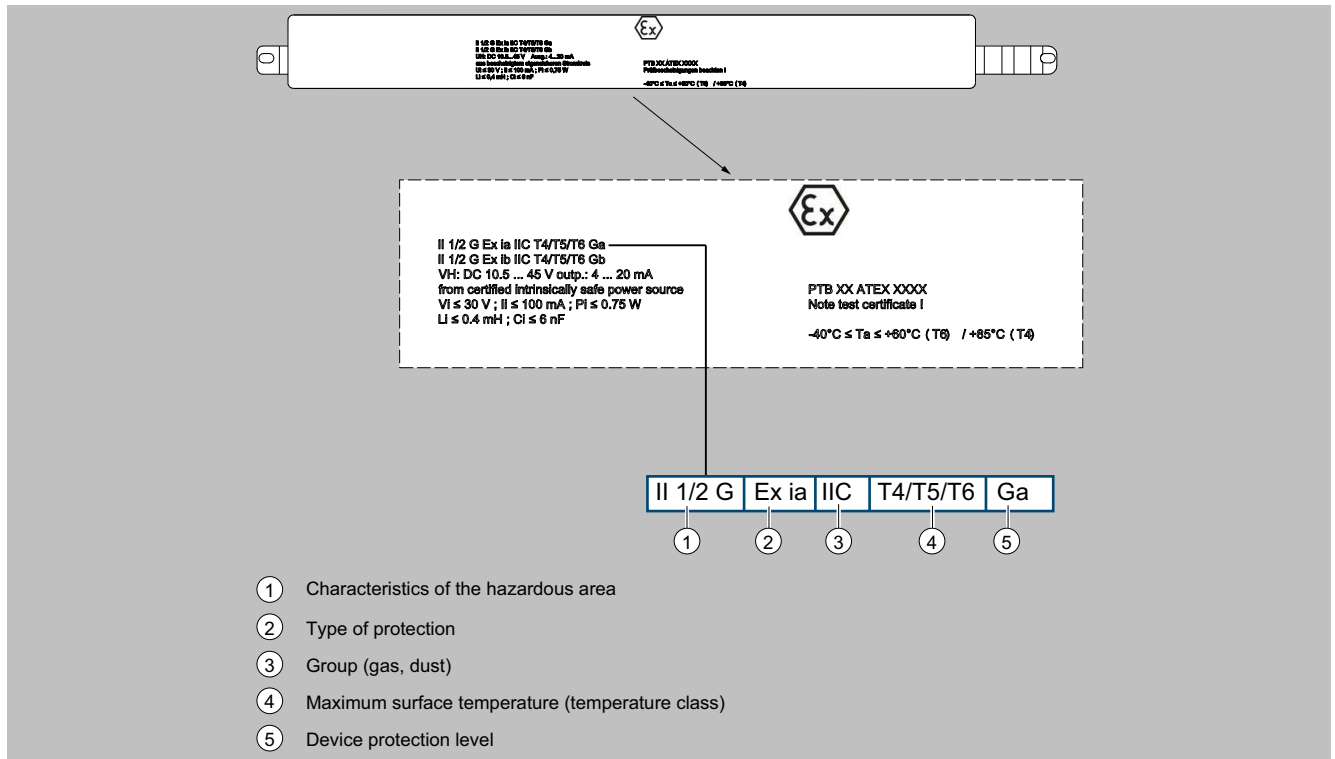
Design (continued)



Certification label with approval information

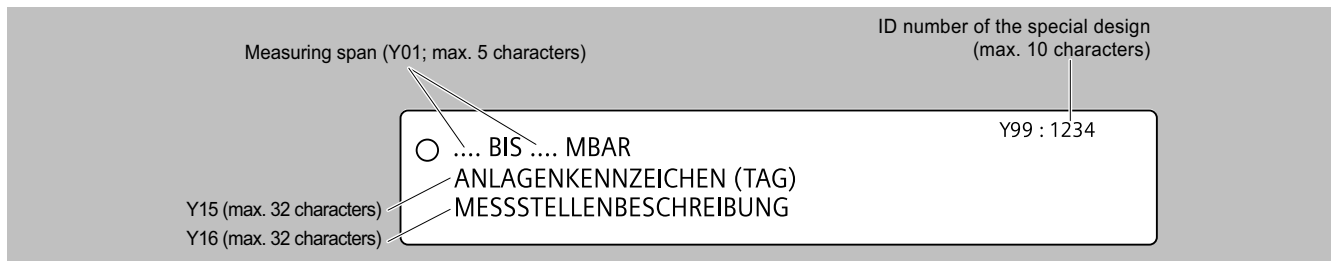
The certification label with approval information is located on the front of the enclosure.

Design (continued)



Tag plate

The tag plate is fastened with a wire under the front cover.



Nameplate with information on the remote seals

The nameplate with information on the remote seals is located on the back of the enclosure.

Pressure measurement

Pressure transmitters

for applications with advanced requirements / SITRANS P320/420 / Technical reference

Design (continued)

The diagram shows a rectangular label for a Siemens pressure transmitter. The label is divided into several sections. On the left, there is a 'SIEMENS' logo and a list of specifications: 'DIAPHRAGM SEALS SANDWICH TYPE', '(1P) 7MF0800-1AA11-0AA0-Z', 'C11+C12+E80', and 'S N1J6129120109'. In the center, there is a list of technical specifications: 'OPER. TEMP: -40-85 °C', 'VACUUM SERVICE: NO | OXYGEN ≤60°C; ≤50bar', 'NOMI SIZE/PRES: 4"EXTENSION 2" CLASS 600', 'FILLING LIQUID: FOOD GRADE OIL (FDA GRADE)', and 'WETTED MAT: DIAPH+FLAN DUPLEX, 1.4462'. On the right, there is a QR code and the text: 'Siemens AG', 'DE-76181', 'Karlsruhe', 'Assembled in Canada', and 'Components of France'. Callouts 1 through 11 point to various parts of the label: 1 points to 'DIAPHRAGM SEALS SANDWICH TYPE', 2 to '(1P) 7MF0800-1AA11-0AA0-Z', 3 to 'C11+C12+E80', 4 to 'S N1J6129120109', 5 to 'OPER. TEMP: -40-85 °C', 6 to 'VACUUM SERVICE: NO | OXYGEN ≤60°C; ≤50bar', 7 to 'NOMI SIZE/PRES: 4"EXTENSION 2" CLASS 600', 8 to 'FILLING LIQUID: FOOD GRADE OIL (FDA GRADE)', 9 to 'WETTED MAT: DIAPH+FLAN DUPLEX, 1.4462', 10 to the QR code, and 11 to 'Assembled in Canada'.

① Diaphragm seals of sandwich type	⑦ Nominal diameter/pressure: 4 inch, 50 mm tube length, CLASS 600
② Article number	⑧ Filling liquid: Food grade oil (FDA-compliant)
③ Order supplement (options, order code)	⑨ Wetted materials: Diaphragm duplex, 1.4462
④ Serial number	⑩ QR code to mobile website with device-specific information
⑤ Operating temperature	⑪ Assembly and manufacturing location
⑥ Vacuum pressure service: No, oxygen ≤ 60 °C; ≤ 50 bar	

Function

Adjustable parameters and diagnostics

SITRANS P320/P420 with HART communication

Parameters	Input buttons	SITRANS P320	SITRANS P420
Application, measurement type	x	x	x
Adjusting lower range value/upper range value	x	x	x
Setting lower range value/upper range value	x	x	x
Electrical damping	x	x	x
Zero adjustment	x	x	x
Fault current	x	x	x
Saturation limits	x	x	x
Scaling of the display	x	x	x
Characteristic curve selection	x	x	x
Temperature unit	x	x	x
Button lock	x	x	x
Change user PIN	x	x	x
Functional safety	x	x	x
Loop test	x	x	x
Start view	x	x	x
Pressure reference	x	x	x
Reset	x	x	x
Diagnostics and trend log			
Min/max pointer	–	x	x
Limit monitoring	–	2	2
Event counter (overrun/undershoot)	–	2	2
Maintenance and service timer	–	x	x
Trend log	–	–	2, max. 1 500 values
Diagnostic log	–	x	x
Parameters change log	–	–	x

Available physical units of display for SITRANS P320/P420

Physical variable	Physical units
Pressure (can also be preset in the factory)	Pa, MPa, kPa, hPa, bar, mbar, psi, g/cm ² , kg/cm ² , kgf/cm ² , inH ₂ O, inH ₂ O (4 °C), ftH ₂ O, mmH ₂ O, mmH ₂ O (4 °C), mH ₂ O (4 °C), mmHg, inHg, atm, torr
Level (height data)	m, cm, mm, ft, in
Volumes (fill level)	m ³ , l, hl, in ³ , ft ³ , yd ³ , gal, gal (UK), bu, bbl, bbl (US), SCF, Nm ³ , NI
Volume (flow)	m ³ /sec, m ³ /h, m ³ /d, l/sec, l/min, l/h, Ml/d, ft ³ /sec, ft ³ /h, ft ³ /d, SCF/min, SCF/h, NI/h, Nm ³ /hgal/sec, gal/min, gal/h, gal/d, Mgal/d, gal (UK)/sec, gal (UK)/min, gal (UK)/h, gal (UK)/d, bbl/sec, bbl/min, bbl/h, bbl/d,
Mass (flow)	Kg/sec, kg/min, kg/h, kg/d, g/sec, g/min, g/h, t/min, t/h, t/d, lb/sec, lb/min, lb/h, lb/d, ton/min, ton/h, ton/d, ton (UK)/h, ton (UK)/d
Temperature	°C, °F
Other	%, mA, free text max. 12 characters

For more device information and technical specifications, refer to the individual device versions.

Pressure measurement

Pressure transmitters

for applications with advanced requirements / SITRANS P320/420 / Gauge pressure (pressure series)

Selection and ordering data

	Article No.	
Pressure transmitters for gauge pressure (pressure series)	7MF030	● - ● ● ● ● ● - ● ● ● ●
SITRANS P320	7MF040	● - ● ● ● ● ● - ● ● ● ●
SITRANS P420		
Click the article number for online configuration in the PIA Life Cycle Portal.		
Communication		
HART, 4 ... 20 mA	0	
PROFIBUS PA	1	
FOUNDATION Fieldbus (FF)	2	
Measuring cell filling		
Silicone oil	1	
Inert liquid	3	
Neobee oil	4	
Maximum measuring span		
250 mbar (3.6 psi)		F
1 000 mbar (14.5 psi)		J
4 000 mbar (58 psi)		N
16 bar (232 psi)		Q
63 bar (914 psi)		T
160 bar (2 321 psi)		V
400 bar (5 802 psi)		W
700 bar (10 153 psi)		X
Process connection		
External thread M20 × 1.5		B
External thread G½ (EN 837-1)		D
Internal thread ½-14 NPT		E
External thread ½-14 NPT		F
Oval flange, fastening thread: 7/16-20 UNF (IEC 61518)		G
Oval flange, fastening thread: M10 (DIN 19213)		H
Oval flange, fastening thread: M12 (DIN 19213)		J
Version for diaphragm seal pressure		U
Material of wetted parts: Process connection, seal diaphragm		
Stainless steel 316L/1.4404, stainless steel 316L/1.4404		0
Stainless steel 316L/1.4404, alloy C276/2.4819		1
Alloy C22/2.4602, alloy C276/2.4819		2
Stainless steel 316L/1.4404, stainless steel 316L/1.4404 gold-plated		7
Material of non-wetted parts		
Die-cast aluminum		1
Stainless steel precision casting CF3M/1.4409 similar to 316L		2
Enclosure		
Dual chamber device		5
Type of protection		
Without Ex		A
Intrinsic safety		B
Flameproof enclosure		C
Flameproof enclosure, intrinsic safety		D
Dust protection by enclosure Zone 21/22 (DIP), increased safety Zone 2		L
Intrinsic safety, dust protection by enclosure Zone 20/21/22 (DIP), increased safety Zone 2		M
Combination of options B, C and L (Zone model)		S
Combination of options B, C and L (Zone model, Class Division)		T
Electrical connections/cable entries		
Thread for cable gland: Cable gland must be ordered separately as option (Axx)		
• 2 × M20 × 1.5		F
• 2 × ½-14 NPT		M
Local operation/display		
Without local display (lid closed)		0
With local display (lid closed)		1
With local display (lid with glass pane)		2

Selection and ordering data (continued)

Options	Order code
Add "-Z" to article no., add order code and plain text or entry from drop-down list.	
Cable glands included	
Plastic	A00
Metal	A01
Stainless steel	A02
Stainless steel 316L/1.4404	A03
CMP, for XP devices	A10
CAPRI ADE 4F, CuZn, cable inner diameter 7 ... 12 mm, cable outer diameter 10 ... 16 mm	A11
CAPRI ADE 4F, stainless steel, cable inner diameter 7 ... 12 mm, cable outer diameter 10 ... 16 mm	A12
Sealing plug included, plastic	A20
Sealing plug included, metal	A21
Sealing plug included, stainless steel	A22
Sealing plug included, stainless steel 316L/1.4404	A23
Device plug Han mounted left	
Device plug Han 7D (plastic, straight)	A30
Device plug Han 7D (plastic, angled)	A31
Device plug Han 7D (metal, straight)	A32
Device plug Han 7D (metal, angled)	A33
Device plug Han 8D (plastic, straight)	A34
Device plug Han 8D (plastic, angled)	A35
Device plug Han 8D (metal, straight)	A36
Device plug Han 8D (metal, angled)	A37
Cable socket included	
Plastic, for device plug Han 7D and Han 8D	A40
Metal, for device plug Han 7D and Han 8D	A41
Device plug M12 mounted left	
Stainless steel, without cable socket	A62
Stainless steel, with cable socket	A63
Cable entry/device plug mounting	
2 × sealing plugs M20 × 1.5, IP66/68 installed on both sides	A90
2 × sealing plugs ½-14 NPT, IP66/68 installed on both sides	A91
Cable gland/device plug mounted left	A97
Cable gland/device plug mounted right	A99
Nameplate labeling (standard labeling: English, unit bar)	
German (bar)	B11
French (bar)	B12
Spanish (bar)	B13
Italian (bar)	B14
Chinese (bar)	B15
Russian (bar)	B16
English (psi)	B20
English (Pa)	B30
Chinese (Pa)	B35
Certificates	
Quality inspection certificate, 5-point factory calibration (IEC 62828-2)	C11
Inspection certificate (EN 10204-3.1) - Material of pressurized and wetted parts	C12
Factory certificate - NACE (MR 0103-2012 and MR 0175-2009)	C13
Factory certificate (EN 10204-2.2) - Wetted parts	C14
Inspection certificate (EN 10204-3.1) - PMI test of pressurized and wetted parts	C15

Pressure measurement

Pressure transmitters

for applications with advanced requirements / SITRANS P320/420 / Gauge pressure (pressure series)

Selection and ordering data (continued)

Options	Order code
Add "-Z" to article no., add order code and plain text or entry from drop-down list.	
Certificates for functional safety	
Functional Safety (IEC 61508) - SIL2/3	C20
Device options	
PDF file with device settings	D10
Double layer coating (epoxy resin and polyurethane) 120 µm of enclosure and lid	D20
FVMQ enclosure sealing	D21
IP66/IP68 degree of protection (not for device plug M12 and Han)	D30
Unlabeled TAG plate	D40
Without labeling of the measuring range on the TAG plate	D41
Stainless steel Ex plate 1.4404/316L	D42
Overvoltage protection up to 6 kV (internal)	D70
Overvoltage protection up to 6 kV (external)	D71
Labels on transport packaging (provided by customer)	D90
General approval without Ex approval	
Worldwide (CE, UKCA, RCM) except EAC, FM, CSA, KCC	E00
Worldwide (CE, UKCA, RCM, EAC, FM, CSA, KCC)	E01
CSA (USA and Canada)	E06
EAC	E07
FM	E08
KCC	E09
Explosion protection approvals	
ATEX (Europe)	E20
CSA (USA and Canada) ¹⁾	E21
FM (USA and Canada) ¹⁾	E22
IECEX (Worldwide)	E23
EACEx (GOST-R, -K, -B)	E24
INMETRO (Brazil)	E25
KCs (Korea)	E26
NEPSI (China)	E27
PESO (India)	E28
UKR Sepro (Ukraine)	E30
UKEX (United Kingdom)	E33
ATEX (Europe), IECEX (Worldwide) and UKEX (UK)	E47
CSA (Canada) and FM (USA) ¹⁾	E48
ATEX (Europe) and IECEX (Worldwide) + CSA (Canada) and FM (USA) ¹⁾	E49
Marine approvals	
DNV-GL (Det Norske Veritas/Germanischer Lloyd)	E50
LR (Lloyds Register)	E51
BV (Bureau Veritas)	E52
ABS (American Bureau of Shipping)	E53
RMR (Russian Maritime Register)	E55
KR (Korean Register of Shipping)	E56
RINA (Registro Italiano Navale)	E57
CCS (China Classification Society)	E58
Country-specific approvals	
CRN approval Canada (Canadian Registration Number)	E60
Special approvals	
Oxygen application (with inert liquid, max. 160 bar (2 320 psi) at 100 °C (212 °F))	E80
Dual Seal	E81

Selection and ordering data (continued)

Options	Order code
Add "-Z" to article no., add order code and plain text or entry from drop-down list.	
WRC/WRAS (drinking water); only with process flange O-rings made of EPDM	E83
NSF61 (drinking water)	E84
ACS (drinking water)	E85
Mounting bracket	
Steel, zinc-plated	H01
Stainless steel 1.4301/304	H02
Stainless steel 1.4404/316L	H03
Flange connections with flange EN 1092-1	
With flange adapter G½ Form B1	
• DN 25 PN 40, stainless steel 1.4571/316Ti	J80
• DN 50 PN 40, stainless steel 1.4571/316Ti	J81
• DN 80 PN 40, stainless steel 1.4571/316Ti	J82
With water trap G½ form B1	
• DN 25 PN 40, stainless steel 1.4571/316Ti	J83
• DN 50 PN 40, stainless steel 1.4571/316Ti	J84
• DN 80 PN 40, stainless steel 1.4571/316Ti	J85
• DN 25 PN 100, stainless steel 1.4571/316Ti	J86
Process flanges, gaskets (instead of standard gaskets FKM (FPM))	
Gasket (EN 837-1) material Fe (soft iron)	K60
Gasket (EN 837-1) material 1.4571	K61
Gasket (EN 837-1) material Cu	K62
Process connection	
Process connection external thread G½, bore hole 11 mm	K80
Shut-off valves, valve manifolds	
With mounted valve manifold 7MF9011-4EA, process connection at transmitter G½ shank, PTFE sealing ring and pressure test certified in factory certificate (EN 10204-2.2)	T02
With mounted valve manifold 7MF9011-4FA, process connection at transmitter internal thread ½-14 NPT, sealing tape. With PTFE sealing ring and pressure test certified in factory certificate (EN 10204-2.2)	T03
With mounted valve manifold 7MF9411-5AA, process connection at transmitter oval flange with PTFE sealing ring, steel fixing screws, pressure test certified in factory certificate (EN 10204-2.2)	T05
With mounted valve manifold 7MF9411-5AA, process connection at transmitter oval flange with PTFE sealing ring, stainless steel fixing screws, pressure test certified in factory certificate (EN 10204-2.2)	T06
Device settings	
Measuring span: Lower range value (max. 5 characters), upper range value (max. 5 characters), unit [mbar, bar, kPa, MPa, psi, ...], example: -0.5 ... 10.5 psi	Y01
TAG (on stainless steel plate and device parameters, max. 32 characters)	Y15
Measuring point description (on stainless steel plate and device parameters, max. 32 characters)	Y16
TAG short (device parameters, max. 8 characters)	Y17
Local display: [Pressure, Percent], reference [None, Absolute, Gauge], example: Pressure gauge	Y21
Local display: Scaling with standard units [m³/s, l/s, m, inch, ...]; example 1 ... 5 m	Y22
Local display: Scaling with user-specific units (max. 12 characters), example 1 ... 5 m	Y23
Set PROFIBUS PA device address (1 ... 126)	Y25

Pressure measurement

Pressure transmitters

for applications with advanced requirements / SITRANS P320/420 / Gauge pressure (pressure series)

Selection and ordering data (continued)

Options	Order code
Add "-Z" to article no., add order code and plain text or entry from drop-down list.	
Saturation limits instead of 3.8 ... 20.5 mA, example: 3.8 ... 22.0 mA	Y30
Fault current instead of 3.6 mA [22.5 mA, 22.8 mA]	Y31
Damping in seconds instead of 2 s (0.0 ... 100.0 s)	Y32
ID number of special design	Y99

¹⁾ Explosion protection acc. to FM/CSA: suitable for installation according to NEC 500/505.

Technical specifications

SITRANS P320/SITRANS P420 for gauge pressure (pressure series)

Input			
Measured variable	Gauge pressure		
Measuring span (continuously adjustable) or measuring range, max. permissible operating pressure (in accordance with Pressure Equipment Directive 2014/68/EU) and max. permissible test pressure (pursuant to DIN 16086) (for oxygen measurement, max. 100 bar/10 MPa/1450 psi and 60 °C (140 °F) ambient temperature/medium temperature)	Measuring span	Max. permissible operating pressure (PS)	Maximum permissible test pressure
	8.3 ... 250 mbar 0.83 ... 25 kPa 0.12 ... 3.6 psi	4 bar 0.4 MPa 58 psi	6 bar 0.6 MPa 87 psi
	0.01 ... 1 bar 1 ... 100 kPa 0.15 ... 14.5 psi	6 bar 0.6 MPa 87 psi	9 bar 0.9 MPa 130 psi
	0.04 ... 4 bar 4 ... 400 kPa 0.58 ... 58 psi	20 bar 2 MPa 290 psi	30 bar 3 MPa 435 psi
	0.16 ... 16 bar 0.016 ... 1.6 MPa 2.3 ... 232 psi	45 bar 4.5 MPa 652 psi	70 bar 7 MPa 1015 psi
	0.63 ... 63 bar 0.063 ... 6.3 MPa 9.1 ... 914 psi	80 bar 8 MPa 1160 psi	120 bar 12 MPa 1740 psi
	1.6 ... 160 bar 0.16 ... 16 MPa 23 ... 2321 psi	240 bar 24 MPa 3481 psi	360 bar 36 MPa 5221 psi
	4 ... 400 bar 0.4 ... 40 MPa 58 ... 5802 psi	400 bar 40 MPa 5802 psi	600 bar 60 MPa 8702 psi
	7 ... 700 bar 0.7 ... 70 MPa 102 ... 10153 psi	800 bar 80 MPa 11603 psi	800 bar 80 MPa 11603 psi
Measuring limits	For 250 mbar/25 kPa/3.6 psi measuring cells, the lower measuring limit is 750 mbar a/75 kPa a/10.8 psi a. The measuring cell is vacuum-resistant up to 30 mbar a/3 kPa a/0.44 psi a.		
• Lower measuring limit			
- Measuring cell with silicone oil filling	30 mbar a/3 kPa a/0.44 psi a		
- Measuring cell with inert oil	30 mbar a/3 kPa a/0.44 psi a		
- Measuring cell with FDA-compliant oil	100 mbar a/10 kPa a/1.45 psi a		
• Upper measuring limit	100% of the max. measuring span (for oxygen measurement max. 100 bar/10 MPa/1450 psi and 60 °C (140 °F) ambient temperature/medium temperature)		
• Lower range value	Between the measuring limits (continuously adjustable)		
Output			
Output signal	HART		
• Lower saturation limit (continuously adjustable)	4 ... 20 mA 3.55 mA, factory set to 3.8 mA		
• Upper saturation limit (continuously adjustable)	22.8 mA, factory-set to 20.5 mA or optionally 22.0 mA		
• Ripple (without HART communication)	$I_{pp} \leq 0.5\%$ of max. output current		
Adjustable damping	0 ... 100 s, continuously adjustable over remote operation 0 ... 100 s, in increments of 0.1 s, adjustable over display		

Technical specifications (continued)

SITRANS P320/SITRANS P420 for gauge pressure (pressure series)	
• Current simulator	3.55 ... 22.8 mA
• Failure signal	3.55 ... 22.8 mA (factory set to 3.55 mA)
Load	Resistance R [Ω]
• Without HART communication	$R = (U_H - 10.5 \text{ V}) / 22.8 \text{ mA}$, U_H : Auxiliary power in V
• With HART communication	$R = 230 \dots 1100 \Omega$
Characteristic curve	<ul style="list-style-type: none"> • Linearly increasing or linearly decreasing • Linear increase or decrease or according to the square root (only for differential pressure and flow)
Physical bus	-
Polarity-independent	-
Measuring accuracy	
Reference conditions	<ul style="list-style-type: none"> • According to IEC 62828-1 • Rising characteristic curve • Lower range value 0 bar/kPa/psi • Seal diaphragm stainless steel • Measuring cell with silicone oil filling • Room temperature 25 °C (77 °F)
Conformity error at limit point setting, including hysteresis and repeatability	
Measuring span ratio r (spread, Turn-Down)	$r = \text{max. measuring span/set measuring span and nominal measuring range}$
• Linear characteristic curve	
- 250 mbar/25 kPa/3.6 psi	$r \leq 1.25$: $\leq 0.075\%$ (SITRANS P320) $\leq 0.065\%$ (SITRANS P420)
- 1 bar/100 kPa/14.5 psi 4 bar/400 kPa/58 psi 16 bar/1.6 MPa/232 psi 63 bar/6.3 MPa/914 psi 160 bar/16 MPa/2321 psi	$1.25 < r \leq 30$: $\leq (0.008 \cdot r + 0.065)\%$ $r \leq 5$: $\leq 0.065\%$ (SITRANS P320) $\leq 0.04\%$ (SITRANS P420)
- 400 bar/40 MPa/5802 psi 700 bar/70 MPa/10152 psi	$5 < r \leq 100$: $\leq (0.004 \cdot r + 0.045)\%$ $r \leq 5$: $\leq 0.075\%$ (SITRANS P320) $5 < r \leq 100$: $\leq (0.005 \cdot r + 0.05)\%$ (SITRANS P320)
- 700 bar/70 MPa/10152 psi	$r \leq 5$: $\leq 0.075\%$ (SITRANS P420) $5 < r \leq 100$: $\leq (0.005 \cdot r + 0.05)\%$ (SITRANS P420)
Influence of ambient temperature in % per 28 °C (50 °F)	
• 250 mbar/25 kPa/3.6 psi	$\leq (0.16 \cdot r + 0.1)\%$
• 1 bar/100 kPa/14.5 psi	$\leq (0.05 \cdot r + 0.1)\%$
• 4 bar/400 kPa/58 psi 16 bar/1.6 MPa/232 psi 63 bar/6.3 MPa/914 psi 160 bar/16 MPa/2321 psi 400 bar/40 MPa/5802 psi	$\leq (0.025 \cdot r + 0.125)\%$
• 700 bar/70 MPa/10152 psi	$\leq (0.08 \cdot r + 0.16)\%$
Long-term stability at $\pm 30 \text{ °C}$ ($\pm 54 \text{ °F}$)	
• 250 mbar/25 kPa/3.6 psi	$\leq (0.25 \cdot r)\%$ per year
• 1 bar/100 kPa/14.5 psi	In 5 years $\leq (0.25 \cdot r)\%$ In 10 years $\leq (0.35 \cdot r)\%$
• 4 bar/400 kPa/58 psi 16 bar/1.6 MPa/232 psi 63 bar/6.3 MPa/914 psi 160 bar/16 MPa/2321 psi 400 bar/40 MPa/5802 psi	In 5 years $\leq (0.125 \cdot r)\%$ In 10 years $\leq (0.15 \cdot r)\%$
• 700 bar/70 MPa/10152 psi	In 5 years $\leq (0.25 \cdot r)\%$ In 10 years $\leq (0.35 \cdot r)\%$
Step response time T_{63} (without electrical damping)	$\leq 0.105 \text{ s}$
Effect of mounting position (in pressure per change of angle)	$\leq 0.05 \text{ mbar}/0.005 \text{ kPa}/0.000725 \text{ psi}$ per 10° incline (zero offset is possible with position error compensation)
Effect of auxiliary power (in % per voltage change)	0.005% per 1 V

Pressure measurement

Pressure transmitters

for applications with advanced requirements / SITRANS P320/420 / Gauge pressure (pressure series)

Technical specifications (continued)

SITRANS P320/SITRANS P420 for gauge pressure (pressure series)	
Operating conditions	
Medium temperature	
<ul style="list-style-type: none"> Measuring cell with silicone oil filling 	-40 ... +100 °C (-40 ... +212 °F)
<ul style="list-style-type: none"> Measuring cell with inert oil 	-40 ... +100 °C (-40 ... +212 °F)
<ul style="list-style-type: none"> 1 bar/100 kPa/14.5 psi 4 bar/400 kPa/58 psi 16 bar/1.6 MPa/232 psi 63 bar/6.3 MPa/914 psi 	-40 ... +100 °C (-40 ... +212 °F)
<ul style="list-style-type: none"> 160 bar/16 MPa/2321 psi 400 bar/40 MPa/5802 psi 700 bar/70 MPa/10152 psi 	-20 ... +100 °C (-4 ... +212 °F)
<ul style="list-style-type: none"> Measuring cell with FDA-compliant oil 	-10 ... +100 °C (14 ... +212 °F)
Ambient conditions	
<ul style="list-style-type: none"> Ambient temperature/enclosure 	Observe the temperature class in hazardous areas.
<ul style="list-style-type: none"> Measuring cell with silicone oil filling 	-40 ... +85 °C (-40 ... +185 °F)
<ul style="list-style-type: none"> Measuring cell with inert oil for gauge pressure measuring cells: 1 bar/100 kPa/14.5 psi 4 bar/400 kPa/58 psi 16 bar/1.6 MPa/232 psi 63 bar/6.3 MPa/914 psi 	-40 ... +85 °C (-40 ... +185 °F)
<ul style="list-style-type: none"> Measuring cell with inert oil 	-40 ... +85 °C (-40 ... +185 °F)
<ul style="list-style-type: none"> Measuring cell with FDA-compliant oil 	-10 ... +85 °C (14 ... +185 °F)
<ul style="list-style-type: none"> Display 	-20 ... +80 °C (-4 ... +176 °F)
<ul style="list-style-type: none"> Storage temperature 	-50 ... +85 °C (-58 ... +185 °F) (with FDA-compliant oil: -20 ... +85 °C (-4 ... +185 °F))
<ul style="list-style-type: none"> Climatic class in accordance with IEC 60721-3-4 	4K4H
<ul style="list-style-type: none"> Degree of protection 	
<ul style="list-style-type: none"> According to IEC 60529 	IP66, IP68
<ul style="list-style-type: none"> According to NEMA 250 	Type 4X
<ul style="list-style-type: none"> Electromagnetic compatibility 	
<ul style="list-style-type: none"> Emitted interference and interference immunity 	According to IEC 61326 and NAMUR NE 21
Structural design	
Weight	
	<ul style="list-style-type: none"> Aluminum enclosure: Approx. 1.8 kg (3.9 lbs) Stainless steel enclosure: Approx. 3.8 kg (8.3 lbs)
Material	
<ul style="list-style-type: none"> Material of wetted parts 	
<ul style="list-style-type: none"> Process connection 	Stainless steel, material no. 1.4404/316L or Alloy C22, material no. 2.4602
<ul style="list-style-type: none"> Oval flange 	Stainless steel, mat. no. 1.4404/316L
<ul style="list-style-type: none"> Seal diaphragm 	Stainless steel, material no. 1.4404/316L or Alloy C276, material no. 2.4819
<ul style="list-style-type: none"> Material of non-wetted parts 	
<ul style="list-style-type: none"> Electronics enclosure 	<ul style="list-style-type: none"> Low-copper die-cast aluminum GD-ALSi 12 or stainless steel precision casting, mat. no. 1.4409/ CF-3M Standard: Powder coating with polyurethane Option: 2 coats: Coat 1: Epoxy-based; coat 2: Polyurethane Coating: The layer structure and thickness correspond to EN ISO 12944 Corrosion Class C3-M (for standard transmitter) and C5-H (for transmitter with double layer coating) Stainless steel nameplate (1.4404/316L)

Technical specifications (continued)

SITRANS P320/SITRANS P420 for gauge pressure (pressure series)	
- Mounting bracket	Zinc-plated steel or stainless steel
Process connection	<ul style="list-style-type: none"> • Connection shank G1/2A according to EN 837-1 • Female thread 1/2-14 NPT • Oval flange (PN 160 (MWP 2320 psi g)) with fastening thread: <ul style="list-style-type: none"> - 7/16-20 UNF according to EN 61518 - M10 according to DIN 19213 • Oval flange (PN 420 (MWP 2320 psi g)) with fastening thread: <ul style="list-style-type: none"> - 7/16-20 UNF according to EN 61518 - M12 according to DIN 19213 • Male thread M20 × 1.5 and 1/2-14 NPT
Electrical connection	Cable entry via the following screw glands: <ul style="list-style-type: none"> • M20 × 1.5 • 1/2-14 NPT • Device plug Han 7D/Han 8D¹⁾ • Device plug M12
Displays and controls	
Buttons	4 buttons for operation directly on the device
Display	<ul style="list-style-type: none"> • With or without integrated display (optional) • Lid with inspection window (optional)
Auxiliary power U_H	
Terminal voltage on pressure transmitter	10.5 ... 45 V DC 10.5 ... 30 V DC in intrinsically safe mode
Ripple	U _{SS} ≤ 0.2 V (47 ... 125 Hz)
Noise	U _{eff} ≤ 1.2 mV (0.5 ... 10 kHz)
Auxiliary power	–
Separate supply voltage	–
Certificates and approvals	
Classification according to pressure equipment directive (PED 2014/68/EU)	For gases of fluid group 1 and liquids of fluid group 1; complies with requirements of article 4, paragraph 3 (sound engineering practice)
Drinking water	
• WRAS (England)	No.: 1903094 (option E83)
• ACS (France)	No.: 18 ACC LY 277 (option E85)
• NSF (USA)	No.: 20180920-MH61350 (option E84)
CRN (Canada)	No.: 0F9863.5C (option E60)
Explosion protection acc. to NEPSI (China)	No.: GYJ19.1058X (option E27)
Explosion protection acc. to INMETRO (Brazil)	No.: BRA-18-GE-0035X (option E25)
Explosion protection	
• Intrinsic safety "i"	
- Marking	II 1/2 G Ex ia/ib IIC T4/T6 Ga/Gb
- Permissible ambient temperature	-40 ... +80 °C (-40 ... +176 °F) temperature class T4 -40 ... +55 °C (-40 ... +131 °F) temperature class T6
- Permissible medium temperature	-40 ... +100 °C (-40 ... +212 °F) temperature class T4 -40 ... +70 °C (-40 ... +158 °F) temperature class T6
- Connection	To certified intrinsically safe circuits with peak values: U _i = 30 V, I _i = 101 mA, P _i = 760 mW U _i = 29 V, I _i = 110 mA, P _i = 800 mW
- Effective internal inductance/capacitance	L _i = 0.24 μH/C _i = 3.29 nF
• Flameproof enclosure "d"	
- Marking	Ex II 1/2 G Ex ia/db IIC T4/T6 Ga/Gb
- Permissible ambient temperature	-40 ... +80 °C (-40 ... +176 °F) temperature class T4 -40 ... +70 °C (-40 ... +158 °F) temperature class T6
- Permissible medium temperature	-40 ... +100 °C (-40 ... +212 °F) temperature class T4 -40 ... +70 °C (-40 ... +158 °F) temperature class T6
- Connection	To a circuit with the operating values: U _n = 10.5 ... 45 V, 4 ... 20 mA

Pressure measurement

Pressure transmitters

for applications with advanced requirements / SITRANS P320/420 / Gauge pressure (pressure series)

Technical specifications (continued)

SITRANS P320/SITRANS P420 for gauge pressure (pressure series)

• Dust explosion protection for Zones 21, 22	
- Marking	Ex II 2D Ex tb IIIC T120 °C Db Ex II 3D Ex tc IIIC T120 °C Dc
- Permissible ambient temperature	-40 ... +80 °C (-40 ... +176 °F)
- Permissible medium temperature	-40 ... +100 °C (-40 ... +212 °F)
- Max. surface temperature	120 °C (248 °F)
- Connection	To a circuit with the operating values: $U_n = 10.5 \dots 45 \text{ V}$, $4 \dots 20 \text{ mA}$
• Dust explosion protection for Zones 20, 21, 22	
- Marking	Ex II 1D Ex ia IIIC T120 °C Da Ex II 2D Ex ib IIIC T120 °C Db
- Permissible ambient temperature	-40 ... +80 °C (-40 ... +176 °F)
- Permissible medium temperature	-40 ... +100 °C (-40 ... +212 °F)
- Connection	To certified intrinsically safe circuits with peak values: $U_i = 30 \text{ V}$, $I_i = 101 \text{ mA}$, $P_i = 760 \text{ mW}$ $U_i = 29 \text{ V}$, $I_i = 110 \text{ mA}$, $P_i = 800 \text{ mW}$ $L_i = 0.24 \mu\text{H}/C_i = 3.29 \text{ nF}$
- Effective internal inductance/capacitance	
• Type of protection for Zone 2	
- Marking	Ex II 3G Ex ec IIC T4/T6 Gc
- Permissible ambient temperature "ec"	-40 ... +80 °C (-40 ... +176 °F) temperature class T4 -40 ... +40 °C (-40 ... +104 °F) temperature class T6
- Permissible medium temperature	-40 ... +100 °C (-40 ... +212 °F) temperature class T4 -40 ... +70 °C (-40 ... +158 °F) temperature class T6
- "ec" connection	To a circuit with the operating values: $U_n = 10.5 \dots 30 \text{ V}$, $4 \dots 20 \text{ mA}$
• Explosion protection acc. to FM	Available soon
- Marking (XP/DIP) or IS; NI; S	CL I, DIV 1, GP ABCD T4 ... T6; CL II, DIV 1, GP EFG; CL III; Ex ia IIC T4 ... T6: CL I, DIV 2, GP ABCD T4 ... T6; CL II, DIV 2, GP FG; CL III
• Explosion protection according to CSA	Available soon
- Marking (XP/DIP) or (IS)	CL I, DIV 1, GP ABCD T4 ... T6; CL II, DIV 1, GP EFG; CL III; Ex ia IIC T4 ... T6: CL I, DIV 2, GP ABCD T4 ... T6; CL II, DIV 2, GP FG; CL III
NAMUR recommendations	
• NE 06	Standardized Electrical Signals and Questions Relating to Engineering Technology
• NE 21	Electromagnetic Compatibility (EMC) of Industrial Process and Laboratory Control Equipment
• NE 23	Extra Low Voltage Circuits with Safe Separation
• NE 43	Standardization of the Signal Level for the Failure Information of Digital Transmitters
• NE 53	Software and Hardware of Field Devices and Signal Processing Devices with Digital Electronics
• NE 80	The Application of the Pressure Equipment Directive to Process Control Devices
• NE 105	Specifications for Integrating Fieldbus Devices in Engineering Tools for Field Devices
• NE 107	Self-Monitoring and Diagnosis of Field Devices
• NE 131	NAMUR Standard Device - Field Devices for Standard Applications

¹⁾ Han 8D is identical to Han 8U.

Communication	
HART	
HART	230 ... 1 100 Ω
Protocol	HART 7
Software for computer	SIMATIC PDM
PROFIBUS PA	
Simultaneous communication with master class 2 (max.)	4
The address can be set using	Configuration tool or local operation (default setting address 126)
Cyclic data usage	
• Output byte	≤ 35 (7 measured values)
• Input byte	0, 1, or 2 (register operation mode and reset function for dosing)

Technical specifications (continued)

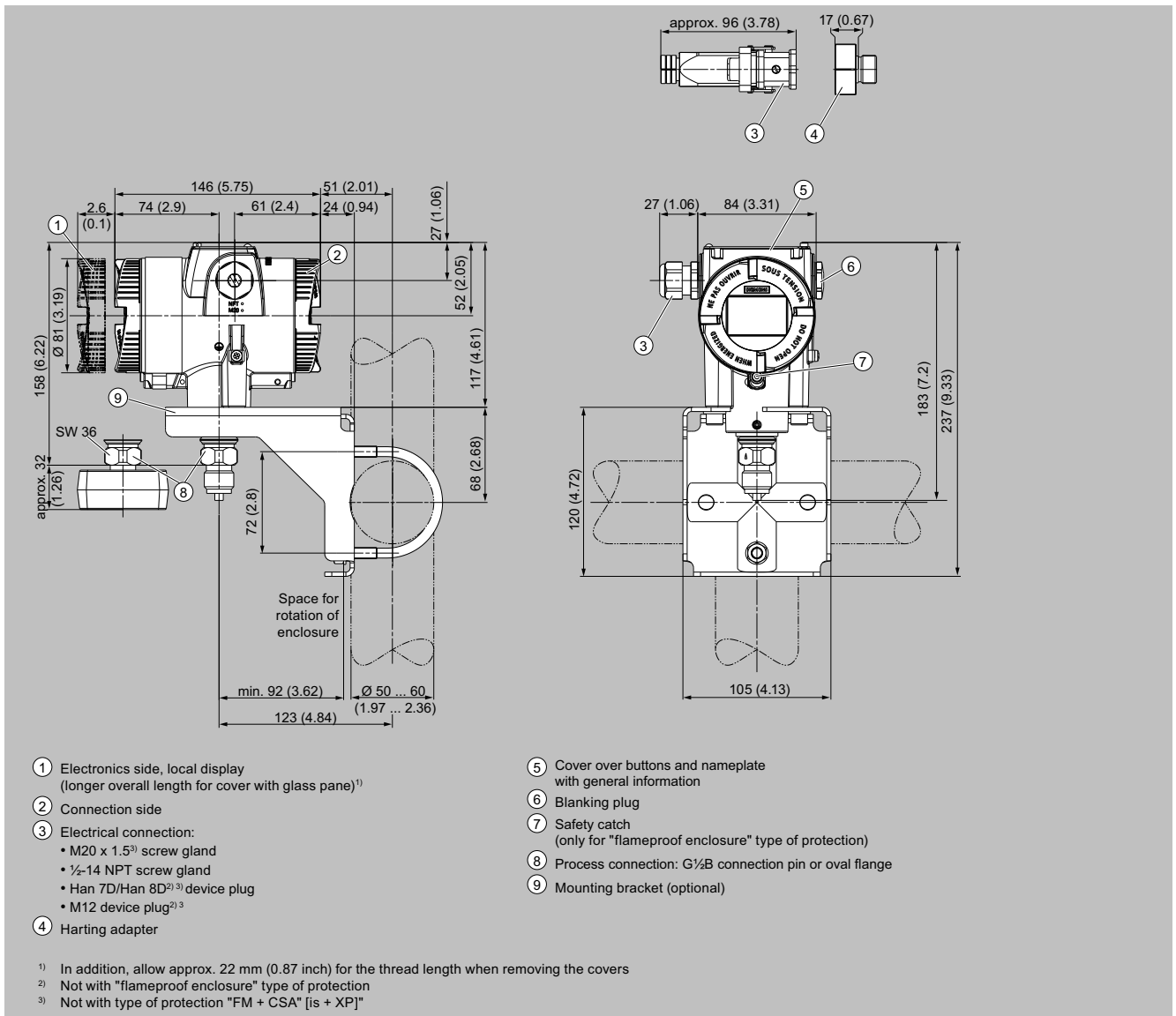
Communication	
Internal preprocessing	
Device profile	PROFIBUS PA Profile Version 4.01 Class B. Cyclic data usage compatible with version 3.XX
Number of function blocks	7
• Analog input	
- Adaptation to user-specific process variable	Yes, linearly rising or falling characteristic curve
- Electrical damping adjustable	0 ... 100 s
- Simulation function	Output/input
- Limit monitoring	Yes, one upper and lower warning limit and one alarm limit respectively
• Register (totalizer)	Can be reset, preset, optional direction of counting, simulation function of register output
- Limit monitoring	One upper and lower warning limit and one alarm limit respectively
• Physical block	1
Transducer blocks	1
• Pressure transducer block	
- Can be calibrated by applying two pressures	Yes
- Monitoring of sensor limits	Yes
- Specification of a vessel characteristic curve with	Max. 30 nodes
- Square-rooted characteristic curve for flow measurement	Yes
- Tank characteristic curve for volume measurement	Yes
- Low flow cut-off and implementation point of square-root extraction	Parameterizable
- Simulation function for measured pressure value and sensor temperature	Constant value or by means of parameterizable ramp function
FOUNDATION Fieldbus	
Device profile	FF ITK 6
Function blocks	3 function blocks analog input, 1 function block PID
• Analog input	
- Adaptation to user-specific process variable	Yes, linearly rising or falling characteristic curve
- Electrical damping adjustable	0 ... 100 s
- Simulation function	Output/input (can be locked within the device with a bridge)
- Failure mode	Parameterizable (last good value, substitute value, incorrect value)
- Limit monitoring	Yes, one upper and lower warning limit and one alarm limit respectively
- Square-rooted characteristic curve for flow measurement	Yes
• PID	Standard FOUNDATION Fieldbus function block
• Physical block	1 resource block
Transducer blocks	1 transducer block Pressure with calibration, 1 transducer block LCD
• Pressure transducer block	
- Can be calibrated by applying two pressures	Yes
- Monitoring of sensor limits	Yes
- Simulation function: pressure measurement, sensor temperature and electronics temperature	Constant value or by means of parameterizable ramp function

Pressure measurement

Pressure transmitters

for applications with advanced requirements / SITRANS P320/420 / Gauge pressure (pressure series)

Dimensional drawings



SITRANS P320/P420 pressure transmitter for gauge pressure (pressure series), dimensions in mm (inch)

Selection and ordering data

	Article No.	
Pressure transmitters for gauge pressure (differential pressure series)	7MF031	● - ● ● ● ● ● ● - ● ● ● ●
SITRANS P320		
SITRANS P420	7MF041	● - ● ● ● ● ● ● - ● ● ● ●
Click the article number for online configuration in the PIA Life Cycle Portal.		
Communication		
HART, 4 ... 20 mA		0
PROFIBUS PA		1
FOUNDATION Fieldbus (FF)		2
Measuring cell filling		
Silicone oil		1
Inert filling liquid		3
Maximum measuring span		
20 mbar (8.037 inH ₂ O)		B
60 mbar (24.11 inH ₂ O)		D
250 mbar (1005 inH ₂ O)		G
600 mbar (241.1 inH ₂ O)		H
1 600 mbar (643 inH ₂ O)		M
5 000 mbar (2009 inH ₂ O)		P
30 bar (435 psi)		R
160 bar (2 320 psi)		Y
Process connection		
Oval flange, fastening thread: 7/16-20 UNF (IEC 61518)		L
Oval flange, fastening thread: M10 (PN 160), (DIN 19213)		M
Oval flange, fastening thread: 7/16-20 UNF (IEC 61518) with lateral ventilation		N
Oval flange, fastening thread: M10 (PN 160) (DIN 19213) with lateral ventilation		P
Material of wetted parts: Process connection, seal diaphragm		
Stainless steel 316L/1.4404, stainless steel 316L/1.4404, process flange stainless steel 316/1.4408		0
Stainless steel 316L/1.4404, alloy C276/2.4819, process flange stainless steel 316/1.4408		1
Alloy C22/2.4602, alloy C276/2.4819, process flange stainless steel 316/1.4408		2
Tantalum/tantalum, process flange stainless steel 316/1.4408 (not in combination with maximum measuring span 20 mbar (0.29 psi) and 60 mbar (0.87 psi))		4
Monel 400/2.4360, Monel 400/2.4360, process flange stainless steel 316/1.4408 (not in combination with maximum measuring span 20 mbar (0.29 psi) and 60 mbar (0.87 psi))		6
Stainless steel 316L/1.4404 gold-plated, process flange stainless steel 316/1.4408 (not in combination with maximum measuring span 20 mbar (0.29 psi) and 60 mbar (0.87 psi))		8
Material of non-wetted parts		
Die-cast aluminum		1
Stainless steel precision casting CF3M/1.4409 similar to 316L		2
Enclosure		
Dual chamber device		5
Type of protection		
Without Ex		A
Intrinsic safety		B
Flameproof enclosure		C
Flameproof enclosure, intrinsic safety		D
Dust protection by enclosure Zone 21/22 (DIP), increased safety Zone 2		L
Intrinsic safety, dust protection by enclosure Zone 20/21/22 (DIP), increased safety Zone 2		M
Combination of options B, C and L (Zone model)		S
Combination of options B, C and L (Zone model, Class Division)		T
Electrical connections/cable entries		
Thread for cable gland: Cable gland must be ordered separately as option (Axx)		
• 2 × M20 × 1.5		F
• 2 × ½-14 NPT		M
Local operation/display		
Without local display (lid closed)		0
With local display (lid closed)		1
With local display (lid with glass pane)		2

Pressure measurement

Pressure transmitters

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Selection and ordering data (continued)

Options	Order code
Add "-Z" to article no., add order code and plain text or entry from drop-down list.	
Cable glands included	
Plastic	A00
Metal	A01
Stainless steel	A02
Stainless steel 316L/1.4404	A03
CMP, for XP devices	A10
CAPRI ADE 4F, CuZn, cable inner diameter 7 ... 12 mm, cable outer diameter 10 ... 16 mm	A11
CAPRI ADE 4F, stainless steel, cable inner diameter 7 ... 12 mm, cable outer diameter 10 ... 16 mm	A12
Sealing plug included, plastic	A20
Sealing plug included, metal	A21
Sealing plug included, stainless steel	A22
Sealing plug included, stainless steel 316L/1.4404	A23
Device plug Han mounted left	
Device plug Han 7D (plastic, straight)	A30
Device plug Han 7D (plastic, angled)	A31
Device plug Han 7D (metal, straight)	A32
Device plug Han 7D (metal, angled)	A33
Device plug Han 8D (plastic, straight)	A34
Device plug Han 8D (plastic, angled)	A35
Device plug Han 8D (metal, straight)	A36
Device plug Han 8D (metal, angled)	A37
Cable socket included	
Plastic, for device plug Han 7D and Han 8D	A40
Metal, for device plug Han 7D and Han 8D	A41
Device plug M12 mounted left	
Stainless steel, without cable socket	A62
Stainless steel, with cable socket	A63
Cable entry/device plug mounting	
2 × sealing plugs M20 × 1.5, IP66/68 installed on both sides	A90
2 × sealing plugs ½-14 NPT, IP66/68 installed on both sides	A91
Cable gland/device plug mounted left	A97
Cable gland/device plug mounted right	A99
Nameplate labeling (standard labeling: English, unit bar)	
German (bar)	B11
French (bar)	B12
Spanish (bar)	B13
Italian (bar)	B14
Chinese (bar)	B15
Russian (bar)	B16
English (psi)	B20
English (Pa)	B30
Chinese (Pa)	B35
Certificates	
Quality inspection certificate - 5-point factory calibration (IEC 62828-2)	C11
Inspection certificate (EN 10204-3.1) - Material of pressurized and wetted parts	C12
Factory certificate - NACE (MR 0103-2012 and MR 0175-2009)	C13
Factory certificate (EN 10204-2.2) - Wetted parts	C14
Inspection certificate (EN 10204-3.1) - PMI test of pressurized and wetted parts	C15

Selection and ordering data (continued)

Options	Order code
Add "-Z" to article no., add order code and plain text or entry from drop-down list.	
Certificates for functional safety	
Functional Safety (IEC 61508) - SIL2/3	C20
Device options	
PDF file with device settings	D10
Double layer coating (epoxy resin and polyurethane) 120 µm of enclosure and lid	D20
FVMQ enclosure sealing	D21
IP66/IP68 degree of protection (not for device plug M12 and Han)	D30
Unlabeled TAG plate	D40
Without labeling of the measuring range on the TAG plate	D41
Stainless steel Ex plate 1.4404/316L	D42
Extension of the medium temperature to -40 °C for meas- uring cell filling with inert filling liquid Please note step response time T63: 5.5 s (20 and 60 mbar); 1.4 s (250 and 600 mbar); 0.3 s (1.6 and 5 bar)	D52
Overvoltage protection up to 6 kV (internal)	D70
Overvoltage protection up to 6 kV (external)	D71
Labels on transport packaging (provided by customer)	D90
General approval without Ex approval	
Worldwide (CE, UKCA, RCM) except EAC, FM, CSA, KCC	E00
Worldwide (CE, UKCA, RCM, EAC, FM, CSA, KCC)	E01
CSA (USA and Canada)	E06
EAC	E07
FM	E08
KCC	E09
Explosion protection approvals	
ATEX (Europe)	E20
CSA (USA and Canada) ¹⁾	E21
FM (USA and Canada) ¹⁾	E22
IECEX (Worldwide)	E23
EACEx (GOST-R, -K, -B)	E24
INMETRO (Brazil)	E25
KCs (Korea)	E26
NEPSI (China)	E27
PESO (India)	E28
UKR Sepro (Ukraine)	E30
UKEX (United Kingdom)	E33
ATEX (Europe), IECEX (Worldwide) and UKEX (UK)	E47
CSA (Canada) and FM (USA) ¹⁾	E48
ATEX (Europe) and IECEX (Worldwide) + CSA (Canada) and FM (USA) ¹⁾	E49
Marine approvals	
DNV-GL (Det Norske Veritas/Germanischer Lloyd)	E50
LR (Lloyds Register)	E51
BV (Bureau Veritas)	E52
ABS (American Bureau of Shipping)	E53
RMR (Russian Maritime Register)	E55
KR (Korean Register of Shipping)	E56
RINA (Registro Italiano Navale)	E57
CCS (China Classification Society)	E58
Country-specific approvals	
CRN approval Canada (Canadian Registration Number)	E60

Pressure measurement

Pressure transmitters

for applications with advanced requirements / SITRANS P320/420 / Gauge pressure (differential pressure series)

Selection and ordering data (continued)

Options	Order code
Add "-Z" to article no., add order code and plain text or entry from drop-down list.	
Special approvals	
Oxygen application (with inert liquid, max. 160 bar (2 320 psi) at 100 °C (212 °F))	E80
Dual Seal	E81
WRC/WRAS (drinking water); only with process flange O-rings made of EPDM	E83
NSF61 (drinking water)	E84
ACS (drinking water)	E85
Mounting bracket	
Steel, zinc-plated	H01
Stainless steel 1.4301/304	H02
Stainless steel 1.4404/316L	H03
Process flanges; screw plug with vent valve	
Welded in on right	J08
Welded in on left	J09
Glued in on right	J10
Glued in on left	J11
Flange connections with flange EN 1092-1	
Form B1	
• DN 25 PN 40, stainless steel 1.4571/316Ti	J70
• DN 50 PN 40, stainless steel 1.4571/316Ti	J71
• DN 80 PN 40, stainless steel 1.4571/316Ti	J72
• DN 15 PN 40, stainless steel 1.4571/316Ti	J78
Form C	
• DN 25 PN 40, stainless steel 1.4571/316Ti	J73
• DN 50 PN 40, stainless steel 1.4571/316Ti	J74
• DN 80 PN 40, stainless steel 1.4571/316Ti	J75
Flange connection options	
Flange connection and temperature extension	J76
Flange connection with epoxy resin coating	J77
Process flanges; special materials	
Reserved for 7MF7: without process flanges, without screws, without gaskets	K00
Process flange material alloy C22/2.4602	K01
Process flange material Monel 400/2.4360	K02
Process connection material PVDF, on the side ½-14 NPT	K05
Process flanges/process connection material PVDF, flange on the side EN 1092-1 Form B1 DN 25 PN 40, MAWP 4 bar	K06
Process flanges/process connection material PVDF, flange on the side EN 1092-1 Form B1 DN 40 PN 40, MAWP 4 bar	K07
Process flanges; process connection option	
Process flange with process connection G½ welded on	K20
Process connection NAM (ASTAVA)	K21
Process flanges chambered with gaskets	
1 × chambered, graphite	K40
1 × chambered, PTFE (FDA-compliant), recommended for gas measurements	K41
Process flanges, gaskets (instead of standard gaskets FKM (FPM))	
O-ring, process flanges, PTFE	K50
O-ring, process flanges, FEP (with silicone core, approved for food)	K51

Selection and ordering data (continued)

Options	Order code
Add "-Z" to article no., add order code and plain text or entry from drop-down list.	
O-ring, process flanges, FFKM (FFPM)	K52
O-ring, process flanges, NBR	K53
O-ring, process flanges, EPDM	K54
Process flange options	
Process flanges for vertical differential pressure lines (half process flange)	K81
Process flanges (+) - side front	K82
Process flange screws, process flange nuts, material Monel 400/2.4360	K83
Valve ¼-18 NPT, material same as process flanges	K84
Valve mounted on the side, measured medium: Gas	K85
Oval flange attached, PTFE seal + fixing screws	K86
Valve manifolds	
With mounted valve manifold (3-way) 7MF9411-5BA, PTFE sealing rings, chrome-plated steel screws and pressure test certified in factory certificate (EN 10204-2.2)	U01
With mounted valve manifold (3-way) 7MF9411-5BA, PTFE sealing rings, stainless steel screws and pressure test certified in factory certificate (EN 10204-2.2)	U02
With mounted valve manifold (5-way) 7MF9411-5CA, PTFE sealing rings, chrome-plated steel screws and pressure test certified in factory certificate (EN 10204-2.2)	U03
With mounted valve manifold (5-way) 7MF9411-5CA, PTFE sealing rings, stainless steel screws and pressure test certified in factory certificate (EN 10204-2.2)	U04
Device settings	
Measuring span: Lower range value (max. 5 characters), upper range value (max. 5 characters), unit [mbar, bar, kPa, MPa, psi, ...], example: -0.5 ... 10.5 psi	Y01
TAG (on stainless steel plate and device parameters, max. 32 characters)	Y15
Measuring point description (on stainless steel plate and device parameters, max. 32 characters)	Y16
TAG short (device parameters, max. 8 characters)	Y17
Local display: [Pressure, Percent], reference [None, Absolute, Gauge], example: Pressure gauge	Y21
Local display: Scaling with standard units [m³/s, l/s, m, inch, ...]; example 1 ... 5 m	Y22
Local display: Scaling with user-specific units (max. 12 characters), example 1 ... 5 m	Y23
Set PROFIBUS PA device address (1 ... 126)	Y25
Saturation limits instead of 3.8 ... 20.5 mA, example: 3.8 ... 22.0 mA	Y30
Fault current instead of 3.6 mA [22.5 mA, 22.8 mA]	Y31
Damping in seconds instead of 2 s (0.0 ... 100.0 s)	Y32
ID number of special design	Y99

1) Explosion protection acc. to FM/CSA: suitable for installation according to NEC 500/505.

Pressure measurement

Pressure transmitters

for applications with advanced requirements / SITRANS P320/420 / Gauge pressure (differential pressure series)

Technical specifications

SITRANS P320 / SITRANS P420 for gauge pressure (differential pressure series)			
Input			
Measured variable	Gauge pressure		
Measuring span (continuously adjustable) or measuring range and max. permissible operating pressure (pursuant to Pressure Equipment Directive 2014/68/EU)	Measuring span	Max. permissible operating pressure MAWP (PS)	Maximum permissible test pressure
	1 ... 20 mbar	160 bar	240 bar
	0.1 ... 2 kPa	16 MPa	24 MPa
	0.4019 ... 8.037 inH ₂ O	2 320 psi	3 481 psi
	1 ... 60 mbar	160 bar	240 bar
	0.1 ... 6 kPa	16 MPa	24 MPa
	0.4019 ... 24.11 inH ₂ O	2 320 psi	3 481 psi
	2.5 ... 250 mbar	160 bar	240 bar
	0.2 ... 25 kPa	16 MPa	24 MPa
	1.005 ... 100.5 inH ₂ O	2 320 psi	3 481 psi
	6 ... 600 mbar	160 bar	240 bar
	0.6 ... 60 kPa	16 MPa	24 MPa
	2.41 ... 241.1 inH ₂ O	2 320 psi	3 481 psi
	16 ... 1 600 mbar	160 bar	240 bar
	1.6 ... 160 kPa	16 MPa	24 MPa
	6.43 ... 643 inH ₂ O	2 320 psi	3 481 psi
	50 ... 5 000 mbar	160 bar	240 bar
	5 ... 500 kPa	16 MPa	24 MPa
	20.09 ... 2 009 inH ₂ O	2 320 psi	3 481 psi
	0.3 ... 30 bar	160 bar	240 bar
0.03 ... 3 MPa	16 MPa	24 MPa	
4.35 ... 435 psi	2 320 psi	3 481 psi	
8 ... 160 bar	160 bar	240 bar	
0.8 ... 16 MPa	16 MPa	24 MPa	
116 ... 2 320 psi	2 320 psi	3 481 psi	
Measuring limits			
• Lower measuring limit			
- Measuring cell with silicone oil filling	30 mbar a/3 kPa a/0.44 psi a		
- Measuring cell with inert oil	30 mbar a/3 kPa a/0.44 psi a		
- Measuring cell with FDA-compliant oil	100 mbar a/10 kPa a/1.45 psi a		
• Upper measuring limit	100% of the max. measuring span (for oxygen measurement max. 100 bar/10 MPa/1450 psi and 60 °C (140 °F) ambient temperature/medium temperature)		
• Lower range value	Between the measuring limits (continuously adjustable)		
Output			
Output signal	HART		
• Lower saturation limit (continuously adjustable)	4 ... 20 mA		
• Upper saturation limit (continuously adjustable)	3.55 mA, factory set to 3.8 mA		
• Ripple (without HART communication)	22.8 mA, factory-set to 20.5 mA or optionally 22.0 mA		
Adjustable damping	$I_{pp} \leq 0.5\%$ of max. output current		
• Current simulator	0 ... 100 s, continuously adjustable over remote operation		
• Failure signal	0 ... 100 s, in increments of 0.1 s, adjustable over display		
Load	3.55 ... 22.8 mA		
• Without HART communication	3.55 ... 22.8 mA		
• With HART communication	Resistance R [Ω]		
Characteristic curve	R = (U _H - 10.5 V) / 22.8 mA, U _H : Auxiliary power in V		
Physical bus	R = 230 ... 1100 Ω		
Polarity-independent	<ul style="list-style-type: none"> • Linearly increasing or linearly decreasing • Linear increase or decrease or according to the square root (only for differential pressure and flow) 		

Technical specifications (continued)

SITRANS P320 / SITRANS P420 for gauge pressure (differential pressure series)	
Measuring accuracy	
Reference conditions	<ul style="list-style-type: none"> • According to IEC 62828-1 • Rising characteristic curve • Lower range value 0 bar/kPa/psi • Seal diaphragm stainless steel • Measuring cell with silicone oil filling • Room temperature 25 °C (77 °F)
Conformity error at limit point setting, including hysteresis and repeatability	
Measuring span ratio r (spread, Turn-Down)	r = max. measuring span/set measuring span and nominal measuring range
<ul style="list-style-type: none"> • Linear characteristic curve 	
- 20 mbar/2 kPa/8.031 inH ₂ O	$r \leq 5:$ $\leq 0.075\%$ $5 < r \leq 20:$ $\leq (0.005 \cdot r + 0.05)\%$
- 60 mbar/6 kPa/24.09 inH ₂ O	$r \leq 5:$ $\leq 0.075\%$ $5 < r \leq 60:$ $\leq (0.005 \cdot r + 0.05)\%$
- 250 mbar/25 kPa/3.6 psi 600 mbar/60 kPa/240.9 inH ₂ O 1 600 mbar/160 kPa/642.4 inH ₂ O 5 000 mbar/500 kPa/2008 inH ₂ O 30 bar/3 MPa/435 psi	$r \leq 5:$ $\leq 0.065\%$ (SITRANS P320) $\leq 0.04\%$ (SITRANS P420) $5 < r \leq 100:$ $\leq (0.004 \cdot r + 0.045)\%$
- 160 bar/16 MPa/2 320 psi	$r \leq 5:$ $\leq 0.065\%$ (SITRANS P320) $\leq 0.04\%$ (SITRANS P420) $5 < r \leq 20:$ $\leq (0.004 \cdot r + 0.045)\%$
Influence of ambient temperature in % per 28 °C (50 °F)	
• 20 mbar/2 kPa/8.031 inH ₂ O	$\leq (0.15 \cdot r + 0.1)\%$
• 60 mbar/6 kPa/24.09 inH ₂ O	$\leq (0.075 \cdot r + 0.1)\%$
• 250 mbar/25 kPa/3.6 psi 600 mbar/60 kPa/240.9 inH ₂ O 1 600 mbar/160 kPa/642.4 inH ₂ O 5 000 mbar/500 kPa/2008 inH ₂ O 30 bar/3 MPa/435 psi 160 bar/16 MPa/2 320 psi	$\leq (0.025 \cdot r + 0.125)\%$ (SITRANS P320)
• 250 mbar/25 kPa/3.6 psi 5 000 mbar/500 kPa/2008 inH ₂ O	$\leq (0.025 \cdot r + 0.0625)\%$ (SITRANS P420)
• 600 mbar/60 kPa/240.9 inH ₂ O 1 600 mbar/160 kPa/642.4 inH ₂ O 30 bar/3 MPa/435 psi 160 bar/16 MPa/2 320 psi	$\leq (0.0125 \cdot r + 0.0625)\%$ (SITRANS P420)
Long-term stability at ± 30 °C (± 54 °F)	
• 20 mbar/2 kPa/8.031 inH ₂ O	$\leq (0.2 \cdot r)\%$ per year
• 60 mbar/6 kPa/24.09 inH ₂ O	In 5 years $\leq (0.25 \cdot r)\%$
• 250 mbar/25 kPa/3.6 psi 600 mbar/60 kPa/240.9 inH ₂ O 1 600 mbar/160 kPa/642.4 inH ₂ O 5 000 mbar/500 kPa/2008 inH ₂ O 30 bar/3 MPa/435 psi 160 bar/16 MPa/2 320 psi	In 5 years $\leq (0.125 \cdot r)\%$ In 10 years $\leq (0.15 \cdot r)\%$
Step response time T ₆₃ (without electrical damping)	
• 20 mbar/2 kPa/8.031 inH ₂ O	Approx. 0.160 s
• 60 mbar/6 kPa/24.09 inH ₂ O	Approx. 0.150 s
• 250 mbar/25 kPa/3.6 psi 600 mbar/60 kPa/240.9 inH ₂ O 1 600 mbar/160 kPa/642.4 inH ₂ O 5 000 mbar/500 kPa/2008 inH ₂ O 30 bar/3 MPa/435 psi 160 bar/16 MPa/2 320 psi	Approx. 0.135 s
Effect of mounting position (in pressure per change of angle)	≤ 0.7 mbar/0.07 kPa/0.010 psi per 10° incline (zero offset is possible with position error compensation)
Effect of auxiliary power (in % per voltage change)	0.005% per 1 V

Pressure measurement

Pressure transmitters

for applications with advanced requirements / SITRANS P320/420 / Gauge pressure (differential pressure series)

Technical specifications (continued)

SITRANS P320 / SITRANS P420 for gauge pressure (differential pressure series)	
Operating conditions	
Medium temperature	
• Measuring cell with silicone oil filling	-40 ... +100 °C (-40 ... +212 °F)
- Measuring cell 30 bar (435 psi)	-20 ... +100 °C (-4 ... +212 °F)
- Measuring cell 160 bar (2 320 psi)	-20 ... +100 °C (-4 ... +212 °F)
• Measuring cell with inert oil	-20 ... +100 °C (-4 ... +212 °F)
Ambient conditions	
• Ambient temperature/enclosure	Observe the temperature class in hazardous areas.
- Measuring cell with silicone oil filling	-40 ... +85 °C (-40 ... +185 °F)
- Measuring cell with inert oil	-40 ... +85 °C (-40 ... +185 °F)
- Display	-20 ... +80 °C (-4 ... +176 °F)
• Storage temperature	-50 ... +85 °C (-58 ... +185 °F)
• Climatic class in accordance with IEC 60721-3-4	4K4H
• Degree of protection	
- According to IEC 60529	IP66, IP68
- According to NEMA 250	Type 4X
• Electromagnetic compatibility	
- Emitted interference and interference immunity	According to IEC 61326 and NAMUR NE 21
Structural design	
Weight	
	<ul style="list-style-type: none"> • Aluminum enclosure: Approx. 3.9 kg (8.5 lbs) • Stainless steel enclosure: Approx. 5.9 kg (13 lbs)
Material	
• Material of wetted parts	
- Seal diaphragm	Stainless steel, mat. no. 1.4404/316L, Alloy C276, mat. no. 2.4819, Monel, mat. no. 2.4360, tantalum or gold
- Process flanges	Stainless steel, mat. no. 1.4408 to PN 160, mat. no. 1.4571/316Ti for PN 420, Alloy C22, 2.4602 or Monel, mat. no. 2.4360
- Sealing plug	1.4404 or as option alloy C22; 2.4602 or Monel mat. no. 2.4360
- O-ring	FPM (Viton) or optionally: PTFE, FEP, FEPM and NBR
• Material of non-wetted parts	
- Electronics enclosure	<ul style="list-style-type: none"> • Low-copper die-cast aluminum GD-AISI 12 or stainless steel precision casting, mat. no. 1.4409/ CF-3M • Standard: Powder coating with polyurethane Option: 2 coats: Coat 1: epoxy-based; coat 2: Polyurethane • Stainless steel nameplate (1.4404/316L)
- Process flange screws	Stainless steel ISO 3506-1 A4-70
- Mounting bracket	Steel, zinc-plated steel, or stainless steel
Process connection	¼-18 NPT female thread and flange connection with 7/16-20 UNF fastening thread according to EN 61518 or M10 according to DIN 19213 (M12 for PN 420 (MWP 6092 psi))
Electrical connection	Screw terminals Cable entry via the following screw glands: <ul style="list-style-type: none"> • M20 × 1.5 • ½-14 NPT • Device plug Han 7D/Han 8D¹⁾ • Device plug M12
Displays and controls	
Buttons	4 buttons for operation directly on the device
Display	<ul style="list-style-type: none"> • With or without integrated display (optional) • Lid with inspection window (optional)
Auxiliary power U_H	
Terminal voltage on pressure transmitter	10.5 ... 45 V DC 10.5 ... 30 V DC in intrinsically safe mode
Ripple	U _{SS} ≤ 0.2 V (47 ... 125 Hz)

Technical specifications (continued)

SITRANS P320 / SITRANS P420 for gauge pressure (differential pressure series)	
Noise	$U_{\text{eff}} \leq 1.2 \text{ mV}$ (0.5 ... 10 kHz)
Auxiliary power	–
Separate supply voltage	–
Certificates and approvals	
Classification according to pressure equipment directive (PED 2014/68/EU)	For gases of fluid group 1 and liquids of fluid group 1; complies with requirements of article 4, paragraph 3 (sound engineering practice)
Drinking water	
• WRAS (England)	No.: 1903094 (option E83)
• ACS (France)	No.: 18 ACC LY 277 (option E85)
• NSF (USA)	No.: 20180920-MH61350 (option E84)
CRN (Canada)	No.: 0F9863.5C (option E60)
Explosion protection acc. to NEPSI (China)	No.: GYJ19.1058X (option E27)
Explosion protection acc. to INMETRO (Brazil)	No.: BRA-18-GE-0035X (option E25)
Explosion protection	
• Intrinsic safety "i"	
- Marking	II 1/2 G Ex ia/ib IIC T4/T6 Ga/Gb
- Permissible ambient temperature	-40 ... +80 °C (-40 ... +176 °F) temperature class T4 -40 ... +70 °C (-40 ... +158 °F) temperature class T6
- Permissible medium temperature	-40 ... +100 °C (-40 ... +212 °F) temperature class T4 -40 ... +70 °C (-40 ... +158 °F) temperature class T6
- Connection	To certified intrinsically safe circuits with peak values: $U_i = 30 \text{ V}$, $I_i = 101 \text{ mA}$, $P_i = 760 \text{ mW}$ $U_i = 29 \text{ V}$, $I_i = 110 \text{ mA}$, $P_i = 800 \text{ mW}$
- Effective internal inductance/capacitance	$L_i = 0.24 \text{ } \mu\text{H}$ / $C_i = 3.29 \text{ nF}$
• Flameproof enclosure "d"	
- Marking	Ex II 1/2 G Ex ia/db IIC T4/T6 Ga/Gb
- Permissible ambient temperature	-40 ... +80 °C (-40 ... +176 °F) temperature class T4 -40 ... +70 °C (-40 ... +158 °F) temperature class T6
- Permissible medium temperature	-40 ... +100 °C (-40 ... +212 °F) temperature class T4 -40 ... +70 °C (-40 ... +158 °F) temperature class T6
- Connection	To a circuit with the operating values: $U_n = 10.5 \dots 45 \text{ V}$, $4 \dots 20 \text{ mA}$
• Dust explosion protection for Zones 21, 22	
- Marking	Ex II 2D Ex tb IIIC T120 °C Db Ex II 3D Ex tc IIIC T120 °C Dc
- Permissible ambient temperature	-40 ... +80 °C (-40 ... +176 °F)
- Permissible medium temperature	-40 ... +100 °C (-40 ... +212 °F)
- Max. surface temperature	120 °C (248 °F)
- Connection	To a circuit with the operating values: $U_n = 10.5 \dots 45 \text{ V}$, $4 \dots 20 \text{ mA}$
• Dust explosion protection for Zones 20, 21, 22	
- Marking	Ex II 1D Ex ia IIIC T120 °C Da Ex II 2D Ex ib IIIC T120 °C Db
- Permissible ambient temperature	-40 ... +80 °C (-40 ... +176 °F)
- Permissible medium temperature	-40 ... +100 °C (-40 ... +212 °F)
- Connection	To certified intrinsically safe circuits with peak values: $U_i = 30 \text{ V}$, $I_i = 101 \text{ mA}$, $P_i = 760 \text{ mW}$ $U_i = 29 \text{ V}$, $I_i = 110 \text{ mA}$, $P_i = 800 \text{ mW}$
- Effective internal inductance/capacitance	$L_i = 0.24 \text{ } \mu\text{H}$ / $C_i = 3.29 \text{ nF}$
• Type of protection for Zone 2	
- Marking	Ex II 3G Ex ec IIC T4/T6 Gc
- Permissible ambient temperature "ec"	-40 ... +80 °C (-40 ... +176 °F) temperature class T4 -40 ... +40 °C (-40 ... +104 °F) temperature class T6
- Permissible medium temperature	-40 ... +100 °C (-40 ... +212 °F) temperature class T4 -40 ... +70 °C (-40 ... +158 °F) temperature class T6
- "ec" connection	To a circuit with the operating values: $U_n = 10.5 \dots 30 \text{ V}$, $4 \dots 20 \text{ mA}$
• Explosion protection acc. to FM	Available soon

Pressure measurement

Pressure transmitters

for applications with advanced requirements / SITRANS P320/420 / Gauge pressure (differential pressure series)

Technical specifications (continued)

SITRANS P320 / SITRANS P420 for gauge pressure (differential pressure series)	
- Marking (XP/DIP) or IS; NI; S	CL I, DIV 1, GP ABCD T4 ... T6; CL II, DIV 1, GP EFG; CL III; Ex ia IIC T4 ... T6: CL I, DIV 2, GP ABCD T4 ... T6; CL II, DIV 2, GP FG; CL III
• Explosion protection according to CSA	Available soon
- Marking (XP/DIP) or (IS)	CL I, DIV 1, GP ABCD T4 ... T6; CL II, DIV 1, GP EFG; CL III; Ex ia IIC T4 ... T6: CL I, DIV 2, GP ABCD T4 ... T6; CL II, DIV 2, GP FG; CL III
NAMUR recommendations	
• NE 06	Standardized Electrical Signals and Questions Relating to Engineering Technology
• NE 21	Electromagnetic Compatibility (EMC) of Industrial Process and Laboratory Control Equipment
• NE 23	Extra Low Voltage Circuits with Safe Separation
• NE 43	Standardization of the Signal Level for the Failure Information of Digital Transmitters
• NE 53	Software and Hardware of Field Devices and Signal Processing Devices with Digital Electronics
• NE 80	The Application of the Pressure Equipment Directive to Process Control Devices
• NE 105	Specifications for Integrating Fieldbus Devices in Engineering Tools for Field Devices
• NE 107	Self-Monitoring and Diagnosis of Field Devices
• NE 131	NAMUR Standard Device - Field Devices for Standard Applications

¹⁾ Han 8D is identical to Han 8U.

Communication	
HART	
HART	230 ... 1 100 Ω
Protocol	HART 7
Software for computer	SIMATIC PDM
PROFIBUS PA	
Simultaneous communication with master class 2 (max.)	4
The address can be set using	Configuration tool or local operation (default setting address 126)
Cyclic data usage	
• Output byte	≤ 35 (7 measured values)
• Input byte	0, 1, or 2 (register operation mode and reset function for dosing)
Internal preprocessing	
Device profile	PROFIBUS PA Profile Version 4.01 Class B. Cyclic data usage compatible with version 3.XX
Number of function blocks	7
• Analog input	
- Adaptation to user-specific process variable	Yes, linearly rising or falling characteristic curve
- Electrical damping adjustable	0 ... 100 s
- Simulation function	Output/input
- Limit monitoring	Yes, one upper and lower warning limit and one alarm limit respectively
• Register (totalizer)	Can be reset, preset, optional direction of counting, simulation function of register output
- Limit monitoring	One upper and lower warning limit and one alarm limit respectively
• Physical block	1
Transducer blocks	1
• Pressure transducer block	
- Can be calibrated by applying two pressures	Yes
- Monitoring of sensor limits	Yes
- Specification of a vessel characteristic curve with	Max. 30 nodes
- Square-rooted characteristic curve for flow measurement	Yes
- Tank characteristic curve for volume measurement	Yes

Technical specifications (continued)

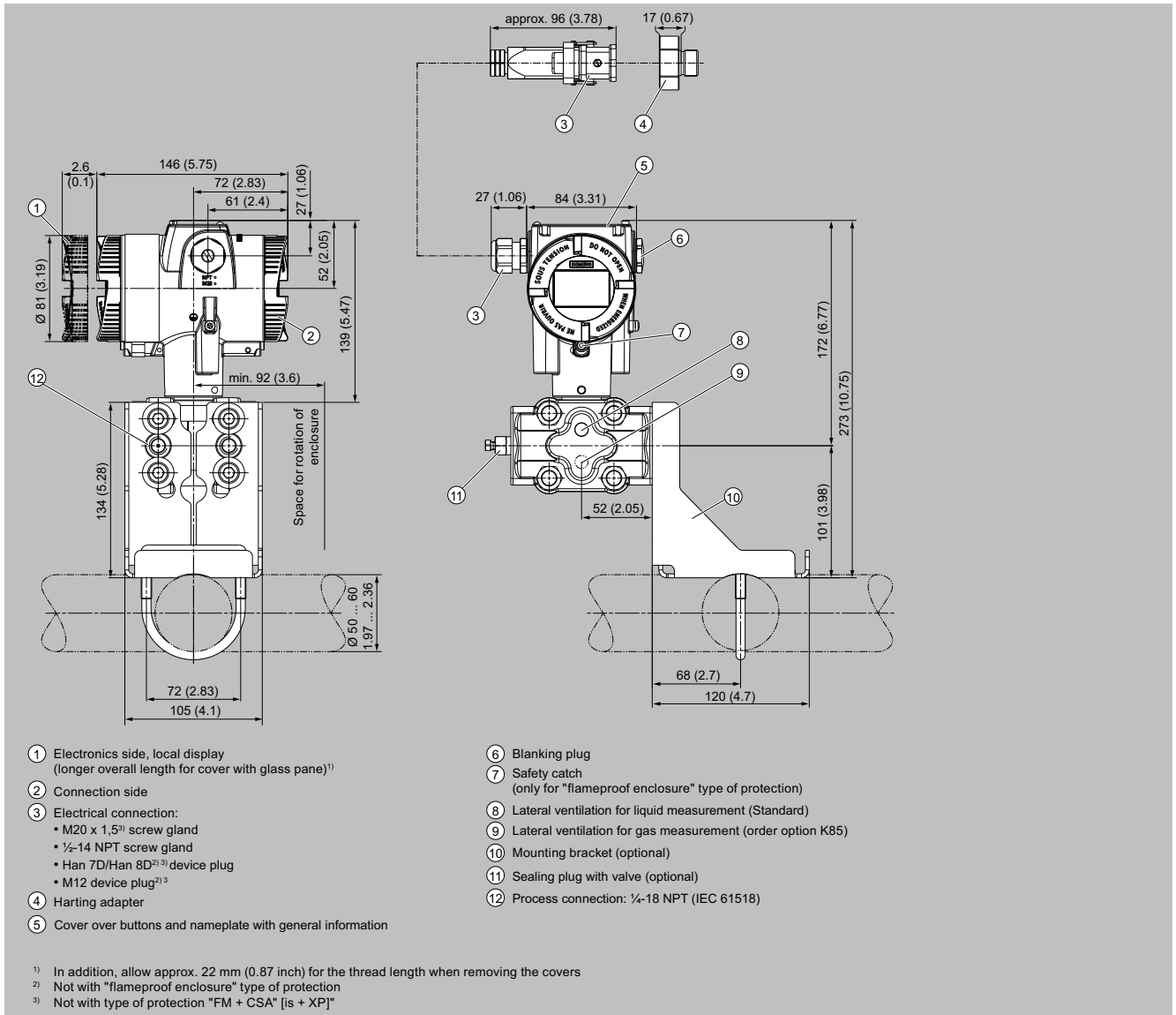
Communication	
- Low flow cut-off and implementation point of square-root extraction	Parameterizable
- Simulation function for measured pressure value and sensor temperature	Constant value or by means of parameterizable ramp function
FOUNDATION Fieldbus	
Device profile	FF ITK 6
Function blocks	3 function blocks analog input, 1 function block PID
• Analog input	
- Adaptation to user-specific process variable	Yes, linearly rising or falling characteristic curve
- Electrical damping adjustable	0 ... 100 s
- Simulation function	Output/input (can be locked within the device with a bridge)
- Failure mode	Parameterizable (last good value, substitute value, incorrect value)
- Limit monitoring	Yes, one upper and lower warning limit and one alarm limit respectively
- Square-rooted characteristic curve for flow measurement	Yes
• PID	Standard FOUNDATION Fieldbus function block
• Physical block	1 resource block
Transducer blocks	1 transducer block Pressure with calibration, 1 transducer block LCD
• Pressure transducer block	
- Can be calibrated by applying two pressures	Yes
- Monitoring of sensor limits	Yes
- Simulation function: pressure measurement, sensor temperature and electronics temperature	Constant value or by means of parameterizable ramp function

Pressure measurement

Pressure transmitters

for applications with advanced requirements / SITRANS P320/420 / Gauge pressure (differential pressure series)

Dimensional drawings



SITRANS P320/P420 pressure transmitter for gauge pressure (differential pressure series), dimensions in mm (inch)

for applications with advanced requirements / SITRANS P320/420 / Gauge and absolute pressure, flush-mounted

Selection and ordering data

	Article No.								
Pressure transmitters for gauge and absolute pressure, with flush-mounted diaphragm									
SITRANS P320 for gauge pressure	7MF030	●	-	●	●	●	●	●	●
SITRANS P420 for gauge pressure	7MF040	●	-	●	●	●	●	●	●
SITRANS P320 for absolute pressure	7MF032	●	-	●	●	●	●	●	●
SITRANS P420 for absolute pressure	7MF042	●	-	●	●	●	●	●	●
Click the article number for online configuration in the PIA Life Cycle Portal.									
Communication									
HART, 4 ... 20 mA								0	
PROFIBUS PA								1	
FOUNDATION Fieldbus (FF)								2	
Measuring cell filling									
Silicone oil								1	
Inert filling liquid								3	
Neobee oil								4	
Maximum measuring span									
1 000 mbar (14.5 psi)								J	
4 000 mbar (58 psi)								N	
16 bar (232 psi)								Q	
63 bar (914 psi)								T	
1 300 mbar a (18.9 psi a)								L	
5 000 mbar a (72.5 psi a)								P	
30 bar a (435 psi a)								R	
Process connection									
Flush-mounted diaphragm								K	
Material of wetted parts: Process connection, seal diaphragm									
Stainless steel 316L/1.4404, stainless steel 316L/1.4404								0	
Stainless steel 316L/1.4404, alloy C276/2.4819								1	
Alloy C22/2.4602, alloy C276/2.4819								2	
Material of non-wetted parts									
Die-cast aluminum								1	
Stainless steel precision casting CF3M/1.4409 similar to 316L								2	
Enclosure									
Dual chamber device								5	
Type of protection									
Without Ex									A
Intrinsic safety									B
Flameproof enclosure									C
Flameproof enclosure, intrinsic safety									D
Dust protection by enclosure Zone 21/22 (DIP), increased safety Zone 2									L
Intrinsic safety, dust protection by enclosure Zone 20/21/22 (DIP), increased safety Zone 2									M
Combination of options B, C and L (Zone model)									S
Combination of options B, C and L (Zone model, Class Division)									T
Electrical connections/cable entries									
Thread for cable gland: Cable gland must be ordered separately as option (Axx)									
• 2 × M20 × 1.5									F
• 2 × ½-14 NPT									M
Local operation/display									
Without local display (lid closed)									0
With local display (lid closed)									1
With local display (lid with glass pane)									2

Options	Order code
Add "Z" to article no., add order code and plain text or entry from drop-down list.	
Cable glands included	
Plastic	A00
Metal	A01

Pressure measurement

Pressure transmitters

for applications with advanced requirements / SITRANS P320/420 / Gauge and absolute pressure, flush-mounted

Selection and ordering data (continued)

Options	Order code
Add "-Z" to article no., add order code and plain text or entry from drop-down list.	
Stainless steel	A02
Stainless steel 316L/1.4404	A03
CMP, for XP devices	A10
CAPRI ADE 4F, CuZn, cable inner diameter 7 ... 12 mm, cable outer diameter 10 ... 16 mm	A11
CAPRI ADE 4F, stainless steel, cable inner diameter 7 ... 12 mm, cable outer diameter 10 ... 16 mm	A12
Sealing plug included, plastic	A20
Sealing plug included, metal	A21
Sealing plug included, stainless steel	A22
Sealing plug included, stainless steel 316L/1.4404	A23
Device plug Han mounted left	
Device plug Han 7D (plastic, straight)	A30
Device plug Han 7D (plastic, angled)	A31
Device plug Han 7D (metal, straight)	A32
Device plug Han 7D (metal, angled)	A33
Device plug Han 8D (plastic, straight)	A34
Device plug Han 8D (plastic, angled)	A35
Device plug Han 8D (metal, straight)	A36
Device plug Han 8D (metal, angled)	A37
Cable socket included	
Plastic, for device plug Han 7D and Han 8D	A40
Metal, for device plug Han 7D and Han 8D	A41
Device plug M12 mounted left	
Stainless steel, without cable socket	A62
Stainless steel, with cable socket	A63
Cable entry/device plug mounting	
2× sealing plugs M20 × 1.5, IP66/68 installed on both sides	A90
2× sealing plugs ½-14 NPT, IP66/68 installed on both sides	A91
Cable gland/device plug mounted left	A97
Cable gland/device plug mounted right	A99
Nameplate labeling (standard labeling: English, unit bar)	
German (bar)	B11
French (bar)	B12
Spanish (bar)	B13
Italian (bar)	B14
Chinese (bar)	B15
Russian (bar)	B16
English (psi)	B20
English (Pa)	B30
Chinese (Pa)	B35
Certificates	
Quality inspection certificate, 5-point factory calibration (IEC 62828-2)	C11
Inspection certificate (EN 10204-3.1) - Material of pressurized and wetted parts	C12
Factory certificate - NACE (MR 0103-2012 and MR 0175-2009)	C13
Factory certificate (EN 10204-2.2) - Wetted parts	C14
Inspection certificate (EN 10204-3.1) - PMI test of pressurized and wetted parts	C15
Certificates for functional safety	
Functional Safety (IEC 61508) - SIL2/3	C20

Selection and ordering data (continued)

Options	Order code
Add "-Z" to article no., add order code and plain text or entry from drop-down list.	
Device options	
PDF file with device settings	D10
Double layer coating (epoxy resin and polyurethane) 120 µm of enclosure and lid	D20
FVMQ enclosure sealing	D21
IP66/IP68 degree of protection (not for device plug M12 and Han)	D30
Unlabeled TAG plate	D40
Without labeling of the measuring range on the TAG plate	D41
Stainless steel Ex plate 1.4404/316L	D42
Overvoltage protection up to 6 kV (internal)	D70
Overvoltage protection up to 6 kV (external)	D71
Labels on transport packaging (provided by customer)	D90
General approval without Ex approval	
Worldwide (CE, UKCA, RCM) except EAC, FM, CSA, KCC	E00
Worldwide (CE, UKCA, RCM, EAC, FM, CSA, KCC)	E01
CSA (USA and Canada)	E06
EAC	E07
FM	E08
KCC	E09
Explosion protection approvals	
ATEX (Europe)	E20
CSA (USA and Canada) ¹⁾	E21
FM (USA and Canada) ¹⁾	E22
IECEx (Worldwide)	E23
EACEx (GOST-R, -K, -B)	E24
INMETRO (Brazil)	E25
KCs (Korea)	E26
NEPSI (China)	E27
PESO (India)	E28
UKR Sepro (Ukraine)	E30
UKEX (United Kingdom)	E33
ATEX (Europe), IECEx (Worldwide) and UKEX (UK)	E47
CSA (Canada) and FM (USA) ¹⁾	E48
ATEX (Europe) and IECEx (Worldwide) + CSA (Canada) and FM (USA) ¹⁾	E49
Marine approvals	
DNV-GL (Det Norske Veritas/Germanischer Lloyd)	E50
LR (Lloyds Register)	E51
BV (Bureau Veritas)	E52
ABS (American Bureau of Shipping)	E53
RMR (Russian Maritime Register)	E55
KR (Korean Register of Shipping)	E56
RINA (Registro Italiano Navale)	E57
CCS (China Classification Society)	E58
Country-specific approvals	
CRN approval Canada (Canadian Registration Number)	E60
Special approvals	
Oxygen application (with inert liquid, max. 160 bar (2 320 psi) at 100 °C (212 °F))	E80
Dual Seal	E81

Pressure measurement

Pressure transmitters

for applications with advanced requirements / SITRANS P320/420 / Gauge and absolute pressure, flush-mounted

Selection and ordering data (continued)

Options	Order code
Add "-Z" to article no., add order code and plain text or entry from drop-down list.	
WRC/WRAS (drinking water); only with process flange O-rings made of EPDM	E83
NSF61 (drinking water)	E84
ACS (drinking water)	E85
3A (hygiene)	E86
EHEDG (hygiene)	E87
Process flanges, gaskets (instead of standard gaskets FKM (FPM))	
Seal (EN 837-1) material Fe (soft iron)	K60
Seal (EN 837-1) material 1.4571	K61
Seal (EN 837-1) material Cu	K62
Process connection	
Process connection external thread G½, bore hole 11 mm	K80
Flanges according to EN 1092-1 Form B1 and ASME standard B16.5	
EN 1092-1 Form B1	
• DN 50 PN 16	M03
• DN 80 PN 16	M05
• DN 25 PN 40	M10
• DN 40 PN 40	M12
• DN 50 PN 40	M13
• DN 80 PN 40	M15
• DN 40 PN 100	M22
ASME B16.5	
• 1" Class 150 RF	M30
• 1 ½" Class 150 RF	M31
• 2" Class 150 RF	M32
• 3" Class 150 RF	M33
• 4" Class 150 RF	M34
• 1 ½" Class 300 RF	M36
• 2" Class 300 RF	M37
• 3" Class 300 RF	M38
• 4" Class 300 RF	M39
Sanitary connections in accordance with the standard	
Sanitary flange DIN 11851	
• With slotted union nut DN 50 PN 25	N03
• With slotted union nut DN 80 PN 25	N05
Tri-Clamp	
• DIN 32676 DN 50 PN 16	N14
• DIN 32676 DN 65 PN 10	N15
• ISO 2852 2" PN 40	N22
• ISO 2852 3" PN 40	N23
Aseptic screwed connector	
• DIN 11864-1 Form A DN 50 PN 25	N33
• DIN 11864-1 Form A DN 65 PN 25	N34
• DIN 11864-1 Form A DN 80 PN 25	N35
• DIN 11864-1 Form A DN100 PN 25	N36
Aseptic flange with notch	

Selection and ordering data (continued)

Options	Order code
Add "-Z" to article no., add order code and plain text or entry from drop-down list.	
• DIN 11864-2 Form A DN 50 PN 16	N43
• DIN 11864-2 Form A DN 65 PN 16	N44
• DIN 11864-2 Form A DN 80 PN 16	N45
• DIN 11864-2 Form A DN100 PN 16	N46
Aseptic clamp with groove	
• DIN 11864-3 Form A DN 50 PN 25	N53
• DIN 11864-3 Form A DN 65 PN 25	N54
• DIN 11864-3 Form A DN 80 PN 16	N55
• DIN 11864-3 Form A DN100 PN 16	N56
Sanitary connections manufacturer-specific	
Varivent type N for pipes DN 40 ... DN 125 PN 40	P06
Sanitary connections special design	
Tank connection	
• TG 52/50 PN 40 with seal	Q00
• TG 52/150 PN 40 with seal	Q01
DRD flange D = 65 mm DN 50 PN 40	Q15
SMS socket	
• With thread 2" PN 25	Q28
• With thread 2 ½" PN 25	Q29
• With thread 3" PN 25	Q30
Weldable sockets for tank connection	
Weldable piece for TG52/50	Q90
Weldable piece for TG52/150	Q91
Connections for the paper industry	
Process connection PMC Style Standard	R00
Process connection PMC Style Minibolt	R01
Weldable sockets for PMC Style Standard	R02
Weldable sockets for PMC Style Minibolt	R03
Threaded connection	
External thread G¾-A DIN 3852-2 Form A	R11
External thread G1-A DIN 3852-2 Form A	R12
External thread G2-A DIN 3852-2 Form A	R14
Special options front-flush	
Temperature decoupler (media temperature up to 200 °C)	R85
Mating connector including seal	R90
Device settings	
Measuring span: Lower range value (max. 5 characters), upper range value (max. 5 characters), unit [mbar, bar, kPa, MPa, psi, ...], example: -0.5 ... 10.5 psi	Y01
TAG (on stainless steel plate and device parameters, max. 32 characters)	Y15
Measuring point description (on stainless steel plate and device parameters, max. 32 characters)	Y16
TAG short (device parameters, max. 8 characters)	Y17
Local display: [Pressure, Percent], reference [None, Absolute, Gauge], example: Pressure gauge	Y21
Local display: Scaling with standard units [m³/s, l/s, m, inch, ...]; example 1 ... 5 m	Y22
Local display: Scaling with user-specific units (max. 12 characters), example 1 ... 5 m	Y23
Set PROFIBUS PA device address (1 ... 126)	Y25

Pressure measurement

Pressure transmitters

for applications with advanced requirements / SITRANS P320/420 / Gauge and absolute pressure, flush-mounted

Selection and ordering data (continued)

Options	Order code
Add "-Z" to article no., add order code and plain text or entry from drop-down list.	
Saturation limits instead of 3.8 ... 20.5 mA, example: 3.8 ... 22.0 mA	Y30
Fault current instead of 3.6 mA [22.5 mA, 22.8 mA]	Y31
Damping in seconds instead of 2 s (0.0 ... 100.0 s)	Y32
ID number of special design	Y99

1) Explosion protection acc. to FM/CSA: suitable for installation according to NEC 500/505.

Technical specifications

SITRANS P320 / SITRANS P420 for gauge and absolute pressure, with flush-mounted diaphragm			
Input of gauge pressure with front-flush diaphragm			
Measured variable	Gauge pressure		
Measuring span (continuously adjustable) or measuring range, max. permissible operating pressure and max. permissible test pressure	Measuring span	Max. permissible operating pressure MAWP (PS)	Maximum permissible test pressure
	0.01 ... 1 bar 1 ... 100 kPa 0.15 ... 14.5 psi 0.04 ... 4 bar 4 ... 400 kPa 0.58 ... 58 psi 0.16 ... 16 bar 0.016 ... 1.6 MPa 2.3 ... 232 psi 0.6 ... 63 bar 0.063 ... 6.3 MPa 9.1 ... 914 psi	Refer to the information on the nameplate of the pressure transmitter and the data on the mounting flange ¹⁾	
Measuring limits			
• Lower measuring limit			
- Measuring cell with silicone oil filling	100 mbar a/10 kPa a/1.45 psi a		
- Measuring cell with inert oil	100 mbar a/10 kPa a/1.45 psi a		
- Measuring cell with FDA-compliant oil	100 mbar a/10 kPa a/1.45 psi a		
• Upper measuring limit	100% of max. measuring span		
Input of absolute pressure, with flush-mounted diaphragm			
Measured variable	Absolute pressure		
Measuring span (continuously adjustable) or measuring range, max. permissible operating pressure and max. permissible test pressure	Measuring span	Max. permissible operating pressure MAWP (PS)	Maximum permissible test pressure
	43 ... 1300 mbar a 4.3 ... 130 kPa a 17 ... 525 inH ₂ O a 166 ... 5 000 mbar a 16.6 ... 500 kPa a 2.41 ... 72.5 psi a 1 ... 30 bar a 0.1 ... 3 MPa a 14.5 ... 435 psi a	Refer to the information on the nameplate of the pressure transmitter and the data on the mounting flange ¹⁾	
Measuring limits			
• Lower measuring limit			
- Measuring cell with silicone oil filling	0 bar a/0 kPa a/0 psi a		
• Upper measuring limit	100% of max. measuring span		
Lower range value	Between the measuring limits (continuously adjustable)		

for applications with advanced requirements / SITRANS P320/420 / Gauge and absolute pressure, flush-mounted

Technical specifications (continued)

SITRANS P320 / SITRANS P420 for gauge and absolute pressure, with flush-mounted diaphragm	
Output	HART
Output signal	4 ... 20 mA
• Lower saturation limit (continuously adjustable)	3.55 mA, factory set to 3.8 mA
• Upper saturation limit (continuously adjustable)	22.8 mA, factory-set to 20.5 mA or optionally 22.0 mA
• Ripple (without HART communication)	$I_{pp} \leq 0.5\%$ of max. output current
Adjustable damping	0 ... 100 s, continuously adjustable over remote operation 0 ... 100 s, in increments of 0.1 s, adjustable over local display
• Current simulator	3.55 ... 22.8 mA
• Failure signal	3.55 ... 22.8 mA
Load	Resistance R [Ω]
• Without HART communication	$R = (U_H - 10.5 \text{ V}) / 22.8 \text{ mA}$, U_H : Auxiliary power in V
• With HART communication	$R = 230 \dots 1100 \Omega$
Characteristic curve	<ul style="list-style-type: none"> • Linearly increasing or linearly decreasing • Linear increase or decrease or according to the square root (only for differential pressure and flow)
Physical bus	-
Polarity-independent	-
Gauge pressure measuring accuracy, with front-flush diaphragm	
Reference conditions	<ul style="list-style-type: none"> • According to IEC 62828-1 • Rising characteristic curve • Lower range value 0 bar/kPa/psi • Seal diaphragm stainless steel • Measuring cell with silicone oil filling • Room temperature 25 °C (77 °F)
Characteristic curve deviation at limit point setting, including hysteresis and repeatability	
Measuring span ratio r (spread, Turn-Down)	$r = \text{maximum measuring span/set measuring span or nominal measuring range}$
• Linear characteristic curve	
- 1 bar/100 kPa/14.5 psi	$r \leq 5:$
4 bar/400 kPa/58 psi	$\leq 0.075\%$
16 bar/1.6 MPa/232 psi	$5 < r \leq 100:$
63 bar/6.3 MPa/914 psi	$\leq (0.005 \cdot r + 0.05)\%$
Influence of ambient temperature in % per 28 °C (50 °F)	
• 1 bar/100 kPa/14.5 psi	$\leq (0.08 \cdot r + 0.16)\%$
4 bar/400 kPa/58 psi	
16 bar/1.6 MPa/232 psi	
63 bar/6.3 MPa/914 psi	
Influence of the medium temperature (in pressure per temperature unit)	
• Temperature difference between medium temperature and ambient temperature	3 mbar/0.3 kPa/0.04 psi per 10 K
Long-term stability at $\pm 30 \text{ °C}$ ($\pm 54 \text{ °F}$)	
• 1 bar/100 kPa/14.5 psi	In 5 years $\leq (0.25 \cdot r)\%$
4 bar/400 kPa/58 psi	
• 16 bar/1.6 MPa/232 psi	In 5 years $\leq (0.125 \cdot r)\%$
63 bar/6.3 MPa/914 psi	
Step response time T_{63} (without electrical damping)	$\leq 0.105 \text{ s}$
Effect of mounting position (in pressure per change of angle)	0.4 mbar/0.04 kPa/0.006 per 10° incline (zero offset is possible with position error compensation)
Effect of auxiliary power (in % per voltage change)	0.005% per 1 V

Pressure measurement

Pressure transmitters

for applications with advanced requirements / SITRANS P320/420 / Gauge and absolute pressure, flush-mounted

Technical specifications (continued)

SITRANS P320 / SITRANS P420 for gauge and absolute pressure, with flush-mounted diaphragm									
Absolute pressure measuring accuracy with flush diaphragm									
Reference conditions	<ul style="list-style-type: none"> • According to IEC 62828-1 • Rising characteristic curve • Lower range value 0 bar/kPa/psi • Seal diaphragm stainless steel • Measuring cell with silicone oil filling • Room temperature 25 °C (77 °F) 								
Characteristic curve deviation at limit point setting, including hysteresis and repeatability									
Measuring span ratio r (spread, Turn-Down)	r = maximum measuring span/set measuring span or nominal measuring range								
• Linear characteristic curve									
- All measuring cells	<table border="0"> <tr> <td>r ≤ 10:</td> <td>≤ 0.2%</td> </tr> <tr> <td>10 < r ≤ 30:</td> <td>≤ 0.4%</td> </tr> </table>	r ≤ 10:	≤ 0.2%	10 < r ≤ 30:	≤ 0.4%				
r ≤ 10:	≤ 0.2%								
10 < r ≤ 30:	≤ 0.4%								
Influence of ambient temperature in % per 28 °C (50 °F)									
• All measuring cells	≤ (0.16 · r + 0.24)%								
Influence of the medium temperature (in pressure per temperature unit)									
• Temperature difference between medium temperature and ambient temperature	3 mbar/0.3 kPa/0.04 psi per 10 K								
Long-term stability at ±30 °C (± 54 °F)									
• All measuring cells	In 5 years ≤ (0.25 · r)%								
Step response time T ₆₃ (without electrical damping)	≤ 0.105 s								
Effect of mounting position (in pressure per change of angle)	0.4 mbar/0.04 kPa/0.006 per 10° incline (zero offset is possible with position error compensation)								
Effect of auxiliary power (in % per voltage change)	0.005% per 1 V								
Operating conditions									
Medium temperature ²⁾									
• Measuring cell with silicone oil filling	-40 ... +150 °C (-40 ... +302 °F) -40 ... +200 °C (-40 ... +392 °F) with temperature decoupler								
• Measuring cell with inert oil	-20 ... +100 °C (-4 ... +212 °F)								
• Measuring cell with FDA-compliant oil	-10 ... +150 °C (14 ... 302 °F)								
Ambient conditions									
• Ambient temperature/enclosure	Observe the temperature class in hazardous areas.								
- Measuring cell with silicone oil filling	-40 ... +85 °C (-40 ... +185 °F)								
- Measuring cell with inert fill oil (different pressure classes)	<table border="0"> <tr> <td>1 bar/100 kPa/14.5 psi</td> <td>-40 ... +85 °C (-40 ... +185 °F)</td> </tr> <tr> <td>4 bar/400 kPa/58 psi</td> <td></td> </tr> <tr> <td>16 bar/1.6 MPa/232 psi</td> <td></td> </tr> <tr> <td>63 bar/6.3 MPa/914 psi</td> <td></td> </tr> </table>	1 bar/100 kPa/14.5 psi	-40 ... +85 °C (-40 ... +185 °F)	4 bar/400 kPa/58 psi		16 bar/1.6 MPa/232 psi		63 bar/6.3 MPa/914 psi	
1 bar/100 kPa/14.5 psi	-40 ... +85 °C (-40 ... +185 °F)								
4 bar/400 kPa/58 psi									
16 bar/1.6 MPa/232 psi									
63 bar/6.3 MPa/914 psi									
- Measuring cell with FDA-compliant oil	-10 ... +85 °C (14 ... +185 °F)								
- Local display	-20 ... +80 °C (-4 ... +176 °F)								
• Storage temperature	-50 ... +85 °C (-58 ... +185 °F) (with FDA-compliant oil: -20 ... +85 °C (-4 ... +185 °F))								
• Climatic class in accordance with IEC 60721-3-4	4K4H								
• Type of protection									
- According to IEC 60529	IP66, IP68								
- According to NEMA 250	Type 4X								
• Electromagnetic compatibility									
- Emitted interference and interference immunity	According to IEC 61326 and NAMUR NE 21								
Structural design									
Weight	Pressure transmitter without mounting flange <ul style="list-style-type: none"> • Aluminum enclosure: Approx. 1.8 kg (3.9 lb) • Stainless steel enclosure: Approx. 3.8 kg (8.3 lb) 								
Material									

Technical specifications (continued)

SITRANS P320 / SITRANS P420 for gauge and absolute pressure, with flush-mounted diaphragm	
<ul style="list-style-type: none"> • Material of wetted parts - Process connection - Seal diaphragm • Material of non-wetted parts - Electronics enclosure - Mounting bracket Process connection Electrical connection 	<p>Stainless steel, mat. no. 1.4404/316L</p> <p>Stainless steel, material no. 1.4404/316L or Alloy C276, material no. 2.4819</p> <ul style="list-style-type: none"> • Low-copper die-cast aluminum GD-ALSi 12 or stainless steel precision casting, mat. no. 1.4409/ CF-3M • Standard: Powder coating with polyurethane Option: 2 coats: Coat 1: Epoxy-based; coat 2: Polyurethane • Stainless steel nameplate (1.4404/316L) <p>Steel, zinc-plated steel, or stainless steel</p> <ul style="list-style-type: none"> • Flanges according to EN and ASME • F&B and pharmaceutical flanges • BioConnect/BioControl • PMC style <p>Cable entry via the following screw glands:</p> <ul style="list-style-type: none"> • M20 × 1.5 • ½-14 NPT • Device plug Han 7D/Han 8D³⁾ • Device plug M12
<p>Displays and controls</p> <p>Buttons</p> <p>Local display</p>	<p>4 buttons for operation directly on the device</p> <ul style="list-style-type: none"> • With or without integrated local display (optional) • Lid with inspection window (optional)
<p>Auxiliary power U_H</p> <p>Terminal voltage on pressure transmitter</p> <p>Ripple</p> <p>Noise</p> <p>Auxiliary power</p> <p>Separate supply voltage</p>	<p>10.5 ... 45 V DC</p> <p>10.5 ... 30 V DC in intrinsically safe mode</p> <p>$U_{SS} \leq 0.2 \text{ V}$ (47 ... 125 Hz)</p> <p>$U_{\text{eff}} \leq 1.2 \text{ mV}$ (0.5 ... 10 kHz)</p> <p>–</p> <p>–</p>
<p>Certificates and approvals</p> <p>Classification according to pressure equipment directive (PED 2014/68/EU)</p> <p>Drinking water</p> <ul style="list-style-type: none"> • WRAS (England) • ACS (France) • NSF (USA) <p>CRN (Canada)</p> <p>Explosion protection acc. to NEPSI (China)</p> <p>Explosion protection acc. to INMETRO (Brazil)</p> <p>Explosion protection</p> <ul style="list-style-type: none"> • Intrinsic safety "i" - Marking - Permissible ambient temperature - Permissible medium temperature - Connection - Effective internal inductance/capacitance • Flameproof enclosure "d" - Marking 	<p>For gases of fluid group 1 and liquids of fluid group 1; complies with requirements of article 4, paragraph 3 (sound engineering practice)</p> <p>No.: 1903094 (option E83)</p> <p>No.: 18 ACC LY 277 (option E85)</p> <p>No.: 20180920-MH61350 (option E84)</p> <p>No.: 0F9863.5C (option E60)</p> <p>No.: GYJ19.1058X (option E27)</p> <p>No.: BRA-18-GE-0035X (option E25)</p> <p>II 1/2 G Ex ia/ib IIC T4/T6 Ga/Gb</p> <p>-40 ... +80 °C (-40 ... +176 °F) temperature class T4</p> <p>-40 ... +70 °C (-40 ... +158 °F) temperature class T6</p> <p>-40 ... +100 °C (-40 ... +212 °F) temperature class T4</p> <p>-40 ... +70 °C (-40 ... +158 °F) temperature class T6</p> <p>To certified intrinsically safe circuits with peak values:</p> <p>$U_i = 30 \text{ V}$, $I_i = 101 \text{ mA}$, $P_i = 760 \text{ mW}$</p> <p>$U_i = 29 \text{ V}$, $I_i = 110 \text{ mA}$, $P_i = 800 \text{ mW}$</p> <p>$L_i = 0.24 \mu\text{H}/C_i = 3.29 \text{ nF}$</p> <p>Ex II 1/2 G Ex ia/db IIC T4/T6 Ga/Gb</p>

Pressure measurement

Pressure transmitters

for applications with advanced requirements / SITRANS P320/420 / Gauge and absolute pressure, flush-mounted

Technical specifications (continued)

SITRANS P320 / SITRANS P420 for gauge and absolute pressure, with flush-mounted diaphragm	
- Permissible ambient temperature	-40 ... +80 °C (-40 ... +176 °F) temperature class T4 -40 ... +70 °C (-40 ... +158 °F) temperature class T6
- Permissible medium temperature	-40 ... +100 °C (-40 ... +212 °F) temperature class T4 -40 ... +70 °C (-40 ... +158 °F) temperature class T6
- Connection	To a circuit with the operating values: $U_n = 10.5 \dots 45 \text{ V}$, 4 ... 20 mA
• Dust explosion protection for Zones 21, 22	
- Marking	Ex II 2D Ex tb IIIC T120 °C Db Ex II 3D Ex tc IIIC T120 °C Dc
- Permissible ambient temperature	-40 ... +80 °C (-40 ... +176 °F)
- Permissible medium temperature	-40 ... +100 °C (-40 ... +212 °F)
- Max. surface temperature	120 °C (248 °F)
- Connection	To a circuit with the operating values: $U_n = 10.5 \dots 45 \text{ V}$, 4 ... 20 mA
• Dust explosion protection for Zones 20, 21, 22	
- Marking	Ex II 1D Ex ia IIIC T120 °C Da Ex II 2D Ex ib IIIC T120 °C Db
- Permissible ambient temperature	-40 ... +80 °C (-40 ... +176 °F)
- Permissible medium temperature	-40 ... +100 °C (-40 ... +212 °F)
- Connection	To certified intrinsically safe circuits with peak values: $U_i = 30 \text{ V}$, $I_i = 101 \text{ mA}$, $P_i = 760 \text{ mW}$ $U_i = 29 \text{ V}$, $I_i = 110 \text{ mA}$, $P_i = 800 \text{ mW}$ $L_i = 0.24 \mu\text{H}/C_i = 3.29 \text{ nF}$
- Effective internal inductance/capacitance	
• Type of protection (Ex) for zone 2	
- Marking	Ex II 3G Ex ec IIC T4/T6 Gc
- Permissible ambient temperature "ec"	-40 ... +80 °C (-40 ... +176 °F) temperature class T4 -40 ... +40 °C (-40 ... +104 °F) temperature class T6
- Permissible medium temperature	-40 ... +100 °C (-40 ... +212 °F) temperature class T4 -40 ... +70 °C (-40 ... +158 °F) temperature class T6
- "ec" connection	To a circuit with the operating values: $U_n = 10.5 \dots 30 \text{ V}$, 4 ... 20 mA
• Explosion protection acc. to FM	Available soon
- Marking (XP/DIP) or IS; NI; S	CL I, DIV 1, GP ABCD T4 ... T6; CL II, DIV 1, GP EFG; CL III; Ex ia IIC T4 ... T6; CL I, DIV 2, GP ABCD T4 ... T6; CL II, DIV 2, GP FG; CL III
• Explosion protection according to CSA	Available soon
- Marking (XP/DIP) or (IS)	CL I, DIV 1, GP ABCD T4 ... T6; CL II, DIV 1, GP EFG; CL III; Ex ia IIC T4 ... T6; CL I, DIV 2, GP ABCD T4 ... T6; CL II, DIV 2, GP FG; CL III
NAMUR recommendations	
• NE 06	Standardized Electrical Signals and Questions Relating to Engineering Technology
• NE 21	Electromagnetic Compatibility (EMC) of Industrial Process and Laboratory Control Equipment
• NE 23	Extra Low Voltage Circuits with Safe Separation
• NE 43	Standardization of the Signal Level for the Failure Information of Digital Transmitters with analog output signal
• NE 53	Software and Hardware of Field Devices and Signal Processing Devices with Digital Electronics
• NE 80	The Application of the Pressure Equipment Directive to Process Control Devices
• NE 105	Specifications for Integrating Fieldbus Devices in Engineering Tools for Field Devices
• NE 107	Self-Monitoring and Diagnosis of Field Devices
• NE 131	NAMUR Standard Device - Field Devices for Standard Applications

- The MAWP value of the pressure transmitter can be lower than the PN value of the mounting flange and vice versa.
To determine the maximum permissible operating pressure and the maximum permissible test pressure, use the lowest value as reference.
- Observe the temperature limits in the process connection standards (e.g. DIN 32676 and DIN 11851) for the maximum medium temperature for flush-mounted process connections.
- Han 8D is identical to Han 8U.

Communication

HART	
HART Protocol	230 ... 1 100 Ω
Software for computer	HART 7 SIMATIC PDM

Technical specifications (continued)

Communication	
PROFIBUS PA	
Simultaneous communication with master class 2 (max.)	4
The address can be set using	Configuration tool or local operation (default setting address 126)
Cyclic data usage	
• Output byte	≤ 35 (7 measured values)
• Input byte	0, 1, or 2 (register operation mode and reset function for dosing)
Internal preprocessing	
Device profile	PROFIBUS PA Profile Version 4.01 Class B. Cyclic data usage compatible with version 3.XX
Number of function blocks	7
• Analog input	
- Adaptation to user-specific process variable	Yes, linearly rising or falling characteristic curve
- Electrical damping adjustable	0 ... 100 s
- Simulation function	Output/input
- Limit monitoring	Yes, one upper and lower warning limit and one alarm limit respectively
• Register (totalizer)	Can be reset, preset, optional direction of counting, simulation function of register output
- Limit monitoring	One upper and lower warning limit and one alarm limit respectively
• Physical block	1
Transducer blocks	1
• Pressure transducer block	
- Can be calibrated by applying two pressures	Yes
- Monitoring of sensor limits	Yes
- Specification of a vessel characteristic curve with	Max. 30 nodes
- Square-rooted characteristic curve for flow measurement	Yes
- Tank characteristic curve for volume measurement	Yes
- Low flow cut-off and implementation point of square-root extraction	Parameterizable
- Simulation function for measured pressure value and sensor temperature	Constant value or by means of parameterizable ramp function
FOUNDATION Fieldbus	
Device profile	FF ITK 6
Function blocks	3 function blocks analog input, 1 function block PID
• Analog input	
- Adaptation to user-specific process variable	Yes, linearly rising or falling characteristic curve
- Electrical damping adjustable	0 ... 100 s
- Simulation function	Output/input (can be locked within the device with a bridge)
- Failure mode	Parameterizable (last good value, substitute value, incorrect value)
- Limit monitoring	Yes, one upper and lower warning limit and one alarm limit respectively
- Square-rooted characteristic curve for flow measurement	Yes
• PID	Standard FOUNDATION Fieldbus function block
• Physical block	1 resource block

Pressure measurement

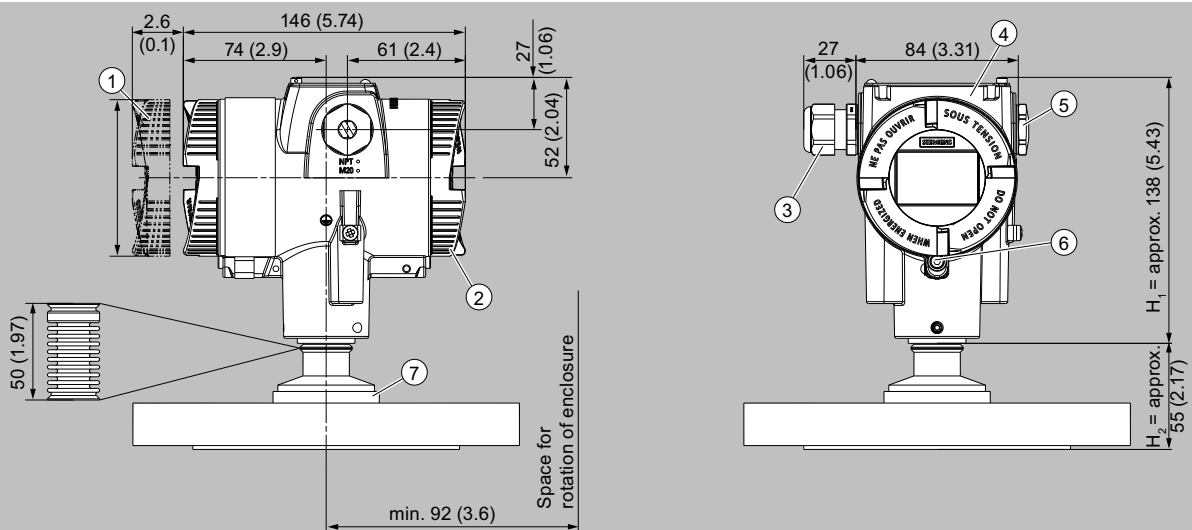
Pressure transmitters

for applications with advanced requirements / SITRANS P320/420 / Gauge and absolute pressure, flush-mounted

Technical specifications (continued)

Communication	
Transducer blocks	1 transducer block Pressure with calibration, 1 transducer block LCD
• Pressure transducer block	
- Can be calibrated by applying two pressures	Yes
- Monitoring of sensor limits	Yes
- Simulation function: pressure measurement, sensor temperature and electronics temperature	Constant value or by means of parameterizable ramp function

Dimensional drawings



- ① Electronics side, local display (longer overall length for cover with glass pane)¹⁾
- ② Connection side
- ③ Electrical connection:
 - M20 x 1,5³⁾ screw gland
 - ½-14 NPT screw gland
 - Han 7D/Han 8D^{2) 3)} device plug
 - M12 device plug^{2) 3)}

¹⁾ In addition, allow approx. 22 mm (0.87 inch) for the thread length when removing the covers

²⁾ Not with "flameproof enclosure" type of protection

³⁾ Not with type of protection "FM + CSA" [is + XPJ]"

- ④ Cover over buttons and nameplate with general information
- ⑤ Blanking plug
- ⑥ Safety catch (only for "flameproof enclosure" type of protection)
- ⑦ Process connection

SITRANS P320/P420 pressure transmitter, with flush-mounted diaphragm, dimensions in mm (inch)

This figure consists of a SITRANS P320/P420 with an example flange. In this figure, the height is divided into H₁ and H₂.

H₁ = Height of the SITRANS P320/P420 up to a defined cross-section

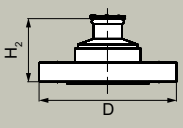
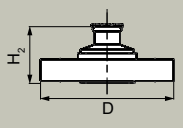
H₂ = Height of the flange up to this defined cross-section

Only the height H₂ is indicated in the dimensions of the flanges.

for applications with advanced requirements / SITRANS P320/420 / Gauge and absolute pressure, flush-mounted

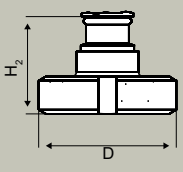
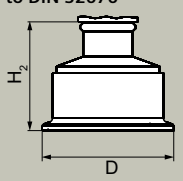
Dimensional drawings (continued)

Flanges according to EN and ASME

Flange	Order code	DN	PN	ØD	H ₂
EN 1092-1 	M03	50	16	165 mm (6.5 inches)	Approx. 52 mm (2 inches)
	M05	80	16	200 mm (7.9 inches)	
	M10	25	40	115 mm (4.5 inches)	
	M12	40	40	150 mm (5.9 inches)	
	M13	50	40	165 mm (6.5 inches)	
	M15	80	40	200 mm (7.9 inches)	
	M22	40	100	170 mm (6.7 inches)	
ASME B16.5 	M30	1 inch	150	110 mm (4.3 inches)	Approx. 52 mm (2 inches)
	M31	1½ inches	150	125 mm (4.9 inches)	
	M32	2 inches	150	150 mm (5.9 inches)	
	M33	3 inches	150	190 mm (7.5 inches)	
	M34	4 inches	150	230 mm (9.1 inches)	
	M36	1½ inches	300	155 mm (6.1 inches)	
	M37	2 inches	300	165 mm (6.5 inches)	
	M38	3 inches	300	210 mm (8.1 inches)	
	M39	4 inches	300	255 mm (10.0 inches)	

NuG and pharmaceutical connections

Connections according to DIN

Connection	Order code	DN	PN	ØD	H ₂
DIN 11851 (dairy connection with slotted union nut) 	N03	50	25	92 mm (3.6 inches)	Approx. 52 mm (2 inches)
	N05	80	25	127 mm (5.0 inches)	
Tri-Clamp acc. to DIN 32676 	N14	50	16	64 mm (2.5 inches)	Approx. 52 mm (2 inches)
	N15	65	16	91 mm (3.6 inches)	
	N22	2 inches	16	64 mm (2.5 inches)	
	N23	3 inches	10	91 mm (3.6 inches)	

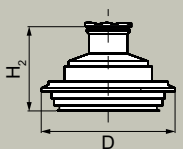
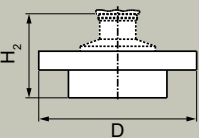
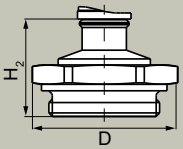
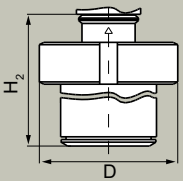
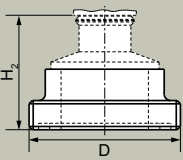
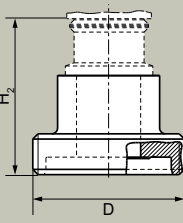
Pressure measurement

Pressure transmitters

for applications with advanced requirements / SITRANS P320/420 / Gauge and absolute pressure, flush-mounted

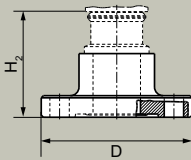
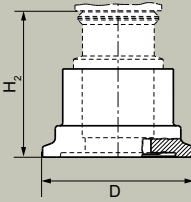
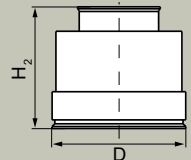
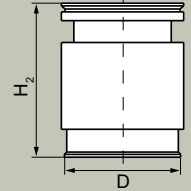
Dimensional drawings (continued)

Other connections

Connection	Order code	DN	PN	ØD	H ₂
Varivent connection 	P06	40 ... 125	40	84 mm (3.3 inches)	Approx. 52 mm (2 inches)
Sanitary process connection according to DRD 	Q15	65	40	105 mm (4.1 inches)	Approx. 52 mm (2 inches)
Threaded connection G^{3/4}", G1" and G2" according to DIN 3852-2 form A 	R11 R12 R14	3/4 inch 1 inch 2 inches	60 60 60	37 mm (1.5 inches) 48 mm (1.9 inches) 78 mm (3.1 inches)	Approx. 45 mm (1.8 inches) Approx. 47 mm (1.9 inches) Approx. 52 mm (2 inches)
Tank connection TG 52/50 and TG52/150 	Q00 Q01	25 25	40 40	63 mm (2.5 inches) 63 mm (2.5 inches)	Approx. 63 mm (2.5 inches) Approx. 170 mm (6.7 inches)
SMS screwed connector 	Q28 Q29 Q30	2 inches 2 1/2 inches 3 inches	25 25 25	70 x 1/6 mm 85 x 1/6 mm 98 x 1/6 mm	Approx. 52 mm (2.1 inches)
Aseptic screwed connector according to DIN 11864-1 Form A 	N33 N34 N35 N36	50 65 80 100	25 25 25 25	78 x 1/6 inch 95 x 1/6 inch 110 x 1/4 inch 130 x 1/4 inch	Approx. 52 mm (2.1 inches)

for applications with advanced requirements / SITRANS P320/420 / Gauge and absolute pressure, flush-mounted

Dimensional drawings (continued)

Connection	Order code	DN	PN	ØD	H ₂
Aseptic flange with notch according to DIN 11864-2 Form A 	N43 N44 N45 N46	50 65 80 100	16 16 16 16	94 (3.7 inches) 113 (4.4 inches) 133 (5.2 inches) 159 (6.3 inches)	Approx. 52 mm (2.1 inches)
Aseptic clamp with groove according to DIN 11864-3 Form A 	N53 N54 N55 N56	50 65 80 100	25 25 16 16	77.5 (3.1 inch) 91 (3.6 inch) 106 (4.2 inches) 130 (5.1 inches)	Approx. 52 mm (2.1 inches)
Process connection PMC Style Standard 	R00	-	-	40.9 mm (1.6 inches)	Approx. 36.8 mm (1.4 inches)
Process connection PMC Style Minibolt 	R01	-	-	26.3 mm (1.0 inch)	Approx. 33.1 mm (1.3 inches)

Pressure measurement

Pressure transmitters

for applications with advanced requirements / SITRANS P320/420 / Absolute pressure (pressure series)

Selection and ordering data

	Article No.	
Pressure transmitters for absolute pressure (pressure series)		
SITRANS P320	7MF032	● - ● ● ● ● ● - ● ● ● ●
SITRANS P420	7MF042	● - ● ● ● ● ● - ● ● ● ●
Click the article number for online configuration in the PIA Life Cycle Portal.		
Communication		
HART, 4 ... 20 mA	0	
PROFIBUS PA	1	
FOUNDATION Fieldbus (FF)	2	
Measuring cell filling		
Silicone oil	1	
Inert filling liquid	3	
Maximum measuring span		
250 mbar a (100.5 inH ₂ O a)		F
1 300 mbar a (522 inH ₂ O a)		L
5 000 mbar a (72.5 psi a)		P
30 bar a (435 psi a)		R
160 bar a (2 321 psi a)		V
400 bar a (5 802 psi a)		W
700 bar a (10 153 psi a)		X
Process connection		
External thread M20 × 1.5		B
External thread G½ (EN 837-1)		D
Internal thread ½-14 NPT		E
External thread ½-14 NPT		F
Oval flange, fastening thread: 7/16-20 UNF (IEC 61518)		G
Oval flange, fastening thread: M10 (DIN 19213)		H
Oval flange, fastening thread: M12 (DIN 19213)		J
Version for diaphragm seal pressure		U
Material of wetted parts: Process connection, seal diaphragm		
Stainless steel 316L/1.4404, stainless steel 316L/1.4404		0
Stainless steel 16L/1.4404, alloy C276/2.4819		1
Alloy C22/2.4602, alloy C276/2.4819		2
Stainless steel 316L/1.4404, stainless steel 316L/1.4404 gold-plated		7
Material of non-wetted parts		
Die-cast aluminum		1
Stainless steel precision casting CF3M/1.4409 similar to 316L		2
Enclosure		
Dual chamber device		5
Type of protection		
Without Ex		A
Intrinsic safety		B
Flameproof enclosure		C
Flameproof enclosure, intrinsic safety		D
Dust protection by enclosure Zone 21/22 (DIP), increased safety Zone 2		L
Intrinsic safety, dust protection by enclosure Zone 20/21/22 (DIP), increased safety Zone 2		M
Combination of options B, C and L (Zone model)		S
Combination of options B, C and L (Zone model, Class Division)		T
Electrical connections/cable entries		
Thread for cable gland: Cable gland must be ordered separately as option (Axx)		
• 2 × M20 × 1.5		F
• 2 × ½-14 NPT		M
Local operation/display		
Without local display (lid closed)		0
With local display (lid closed)		1
With local display (lid with glass pane)		2

Selection and ordering data (continued)

Options	Order code
Add "-Z" to article number, specify order code and plain text or entry from drop-down list.	
Cable glands included	
Plastic	A00
Metal	A01
Stainless steel	A02
Stainless steel 316L/1.4404	A03
CMP, for XP devices	A10
CAPRI ADE 4F, CuZn, cable inner diameter 7 ... 12 mm, cable outer diameter 10 ... 16 mm	A11
CAPRI ADE 4F, stainless steel, cable inner diameter 7 ... 12 mm, cable outer diameter 10 ... 16 mm	A12
Sealing plug included, plastic	A20
Sealing plug included, metal	A21
Sealing plug included, stainless steel	A22
Sealing plug included, stainless steel 316L/1.4404	A23
Device plug Han mounted left	
Device plug Han 7D (plastic, straight)	A30
Device plug Han 7D (plastic, angled)	A31
Device plug Han 7D (metal, straight)	A32
Device plug Han 7D (metal, angled)	A33
Device plug Han 8D (plastic, straight)	A34
Device plug Han 8D (plastic, angled)	A35
Device plug Han 8D (metal, straight)	A36
Device plug Han 8D (metal, angled)	A37
Cable socket included	
Plastic, for device plug Han 7D and Han 8D	A40
Metal, for device plug Han 7D and Han 8D	A41
Device plug M12 mounted left	
Stainless steel, without cable socket	A62
Stainless steel, with cable socket	A63
Cable entry/device plug mounting	
2× sealing plugs M20 × 1.5, IP66/68 installed on both sides	A90
2× sealing plugs ½-14 NPT, IP66/68 installed on both sides	A91
Cable gland/device plug mounted left	A97
Cable gland/device plug mounted right	A99
Nameplate labeling (standard labeling: English, unit bar)	
German (bar)	B11
French (bar)	B12
Spanish (bar)	B13
Italian (bar)	B14
Chinese (bar)	B15
Russian (bar)	B16
English (psi)	B20
English (Pa)	B30
Chinese (Pa)	B35
Certificates	
Quality inspection certificate, 5-point factory calibration (IEC 62828-2)	C11
Inspection certificate (EN 10204-3.1) - Material of pressurized and wetted parts	C12
Factory certificate - NACE (MR 0103-2012 and MR 0175-2009)	C13
Factory certificate (EN 10204-2.2) - Wetted parts	C14
Inspection certificate (EN 10204-3.1) - PMI test of pressurized and wetted parts	C15

Pressure measurement

Pressure transmitters

for applications with advanced requirements / SITRANS P320/420 / Absolute pressure (pressure series)

Selection and ordering data (continued)

Options	Order code
Add "-Z" to article number, specify order code and plain text or entry from drop-down list.	
Certificates for functional safety	
Functional Safety (IEC 61508) - SIL2/3	C20
Device options	
PDF file with device settings	D10
Double layer coating (epoxy resin and polyurethane) 120 µm of enclosure and lid	D20
FVMQ enclosure sealing	D21
IP66/IP68 degree of protection (not for device plug M12 and Han)	D30
Unlabeled TAG plate	D40
Without labeling of the measuring range on the TAG plate	D41
Stainless steel Ex plate 1.4404/316L	D42
Overvoltage protection up to 6 kV (internal)	D70
Overvoltage protection up to 6 kV (external)	D71
Labels on transport packaging (provided by customer)	D90
General approval without Ex approval	
Worldwide (CE, UKCA, RCM) except EAC, FM, CSA, KCC	E00
Worldwide (CE, UKCA, RCM, EAC, FM, CSA, KCC)	E01
CSA (USA and Canada)	E06
EAC	E07
FM	E08
KCC	E09
Explosion protection approvals	
ATEX (Europe)	E20
CSA (USA and Canada) ¹⁾	E21
FM (USA and Canada) ¹⁾	E22
IECEX (Worldwide)	E23
EACEx (GOST-R, -K, -B)	E24
INMETRO (Brazil)	E25
KCs (Korea)	E26
NEPSI (China)	E27
PESO (India)	E28
UKR Sepro (Ukraine)	E30
UKEX (United Kingdom)	E33
ATEX (Europe), IECEX (Worldwide) and UKEX (UK)	E47
CSA (Canada) and FM (USA) ¹⁾	E48
ATEX (Europe) and IECEX (Worldwide) + CSA (Canada) and FM (USA) ¹⁾	E49
Marine approvals	
DNV-GL (Det Norske Veritas/Germanischer Lloyd)	E50
LR (Lloyds Register)	E51
BV (Bureau Veritas)	E52
ABS (American Bureau of Shipping)	E53
RMR (Russian Maritime Register)	E55
KR (Korean Register of Shipping)	E56
RINA (Registro Italiano Navale)	E57
CCS (China Classification Society)	E58
Country-specific approvals	
CRN approval Canada (Canadian Registration Number)	E60
Special approvals	
Oxygen application (with inert liquid, max. 160 bar (2 320 psi) at 100 °C (212 °F))	E80
Dual Seal	E81

Selection and ordering data (continued)

Options	Order code
Add "-Z" to article number, specify order code and plain text or entry from drop-down list.	
WRC/WRAS (drinking water); only with process flange O-rings made of EPDM	E83
NSF61 (drinking water)	E84
ACS (drinking water)	E85
Mounting bracket	
Steel, zinc-plated	H01
Stainless steel 1.4301/304	H02
Stainless steel 1.4404/316L	H03
Flange connections with flange EN 1092-1	
With flange adapter G½ Form B1	
• DN 25 PN 40, stainless steel 1.4571/316Ti	J80
• DN 50 PN 40, stainless steel 1.4571/316Ti	J81
• DN 80 PN 40, stainless steel 1.4571/316Ti	J82
With water trap G½ form B1	
• DN 25 PN 40, stainless steel 1.4571/316Ti	J83
• DN 50 PN 40, stainless steel 1.4571/316Ti	J84
• DN 80 PN 40, stainless steel 1.4571/316Ti	J85
• DN 25 PN 100, stainless steel 1.4571/316Ti	J86
Process flanges, gaskets (instead of standard gaskets FKM (FPM))	
Gasket (EN 837-1) material Fe (soft iron)	K60
Gasket (EN 837-1) material 1.4571	K61
Gasket (EN 837-1) material Cu	K62
Process connection	
Process connection external thread G½, bore hole 11 mm	K80
Shut-off valves, valve manifolds	
With mounted valve manifold 7MF9011-4EA, process connection at transmitter G½ shank, PTFE sealing ring and pressure test certified in factory certificate (EN 10204-2.2)	T02
With mounted valve manifold 7MF9011-4FA, process connection at transmitter internal thread ½-14 NPT, sealing tape. With PTFE sealing ring and pressure test certified in factory certificate (EN 10204-2.2)	T03
With mounted valve manifold 7MF9411-5AA, process connection at transmitter oval flange with PTFE sealing ring, steel fixing screws, pressure test certified in factory certificate (EN 10204-2.2)	T05
With mounted valve manifold 7MF9411-5AA, process connection at transmitter oval flange with PTFE sealing ring, stainless steel fixing screws, pressure test certified in factory certificate (EN 10204-2.2)	T06
Device settings	
Measuring span: Lower range value (max. 5 characters), upper range value (max. 5 characters), unit [mbar, bar, kPa, MPa, psi, ...], example: -0.5 ... 10.5 psi	Y01
TAG (on stainless steel plate and device parameters, max. 32 characters)	Y15
Measuring point description (on stainless steel plate and device parameters, max. 32 characters)	Y16
TAG short (device parameters, max. 8 characters)	Y17
Local display: [Pressure, Percent], reference [None, Absolute, Gauge], example: Pressure gauge	Y21
Local display: Scaling with standard units [m³/s, l/s, m, inch, ...]; example 1 ... 5 m	Y22
Local display: Scaling with user-specific units (max. 12 characters), example 1 ... 5 m	Y23
Set PROFIBUS PA device address (1 ... 126)	Y25

Pressure measurement

Pressure transmitters

for applications with advanced requirements / SITRANS P320/420 / Absolute pressure (pressure series)

Selection and ordering data (continued)

Options	Order code
Add "-Z" to article number, specify order code and plain text or entry from drop-down list.	
Saturation limits instead of 3.8 ... 20.5 mA, example: 3.8 ... 22.0 mA	Y30
Fault current instead of 3.6 mA [22.5 mA, 22.8 mA]	Y31
Damping in seconds instead of 2 s (0.0 ... 100.0 s)	Y32
ID number of special design	Y99

¹⁾ Explosion protection acc. to FM/CSA: suitable for installation according to NEC 500/505.

Technical specifications

SITRANS P320 / SITRANS P420 for absolute pressure (pressure series)

Input	Absolute pressure		
Measured variable	Measuring span	Max. permissible operating pressure MAWP (PS)	Maximum permissible test pressure
Measuring span (continuously adjustable) or measuring range, max. permissible operating pressure (in accordance with Pressure Equipment Directive 2014/68/EU) and max. test pressure (pursuant to DIN 16086)	8.3 ... 250 mbar a	4 bar a	6 bar a
	0.83 ... 25 kPa a	0.4 MPa a	0.6 MPa a
	3.3 ... 100.5 inH ₂ O a	58 psi a	87 psi a
	43 ... 1300 mbar a	6.6 bar a	10 bar a
	4.3 ... 130 kPa a	0.66 MPa a	1 MPa a
	17.3 ... 522 inH ₂ O a	95 psi a	145 psi a
	166 ... 5 000 mbar a	20 bar a	30 bar a
	16.6 ... 500 kPa a	2 MPa a	3 MPa a
	2.41 ... 72.5 psi a	290 psi a	435 psi a
	1 ... 30 bar a	65 bar a	100 bar a
	0.1 ... 3 MPa a	6.5 MPa a	10 MPa a
	14.5 ... 435 psi a	942 psi a	1450 psi a
	5.3 ... 160 bar a	240 bar	380 bar a
	0.53 ... 16 MPa a	24 MPa	38 MPa a
	77 ... 2321 psi a	3481 psi	5511 psi a
13.3 ... 400 bar a	400 bar a	600 bar a	
1.3 ... 40 MPa a	40 MPa a	60 MPa a	
192 ... 5802 psi a	5802 psi a	8702 psi a	
23.3 ... 700 bar a	800 bar a	800 bar a	
2.3 ... 70 MPa a	80 MPa a	80 MPa a	
337 ... 10153 psi a	11603 psi a	11603 psi a	
Measuring limits			
• Lower measuring limit			
- Measuring cell with silicone oil filling	0 mbar a/kPa a/psi a		
- Measuring cell with inert oil	For medium temperature -20 °C < ϑ ≤ +60 °C (-4 °F < ϑ ≤ +140 °F)	30 mbar a/3 kPa a/0.44 psi a	
	For medium temperature 60 °C < ϑ ≤ +100 °C (max. 85 °C for measuring cell 30 bar) (140 °F < ϑ ≤ +212 °F (max. 185 °F for measuring cell 435 psi))	30 mbar a + 20 mbar a · (ϑ - 60 °C)/°C 3 kPa a + 2 kPa a · (ϑ - 60 °C)/°C 0.44 psi a + 0.29 psi a · (ϑ - 140 °F)/°F	
• Upper measuring limit	100% of the max. measuring span (for oxygen measurement max. 100 bar/10 MPa/1450 psi and 60 °C (140 °F) ambient temperature/medium temperature)		
• Lower range value	Between the measuring limits (continuously adjustable)		
Output	HART		
Output signal	4 ... 20 mA		
• Lower saturation limit (continuously adjustable)	3.55 mA, factory set to 3.8 mA		
• Upper saturation limit (continuously adjustable)	22.8 mA, factory-set to 20.5 mA or optionally 22.0 mA		
• Ripple (without HART communication)	$I_{pp} \leq 0.5\%$ of max. output current		
Adjustable damping	0 ... 100 s, continuously adjustable over remote operation 0 ... 100 s, in increments of 0.1 s, adjustable over display		

Technical specifications (continued)

SITRANS P320 / SITRANS P420 for absolute pressure (pressure series)	
• Current simulator	3.55 ... 22.8 mA
• Failure signal	3.55 ... 22.8 mA (factory set to 3.55 mA)
Load	Resistance R [Ω]
• Without HART communication	$R = (U_H - 10.5 \text{ V}) / 22.8 \text{ mA}$, U_H : Auxiliary power in V
• With HART communication	$R = 230 \dots 1100 \Omega$
Characteristic curve	<ul style="list-style-type: none"> • Linearly increasing or linearly decreasing • Linear increase or decrease or according to the square root (only for differential pressure and flow)
Physical bus	-
Polarity-independent	-
Measuring accuracy	
Reference conditions	<ul style="list-style-type: none"> • According to IEC 62828-1 • Rising characteristic curve • Lower range value 0 bar/kPa/psi • Seal diaphragm stainless steel • Measuring cell with silicone oil filling • Room temperature 25 °C (77 °F)
Conformity error at limit point setting, including hysteresis and repeatability	
Measuring span ratio r (spread, Turn-Down)	$r = \text{maximum measuring span/set measuring span or nominal measuring range}$
• Linear characteristic curve (all measuring cells)	
- $r \leq 10$	$\leq 0.1\%$
- $10 < r \leq 30$	$\leq 0.2\%$
Influence of ambient temperature (in % per 28 °C (50 °F))	
• 250 mbar a/25 kPa a/3.6 psi a	$\leq (0.15 \cdot r + 0.1)\%$
• 1300 mbar a/130 kPa a/18.8 psi a 5 bar a/500 kPa a/72.5 psi a 30 bar a/3000 kPa a/435 psi a 160 bar a/16 MPa a/2321 psi a 400 bar a/40 MPa a/5802 psi a 700 bar a/70 MPa a/10153 psi a	$\leq (0.08 \cdot r + 0.16)\%$
Long-term stability at $\pm 30 \text{ °C}$ ($\pm 54 \text{ °F}$)	In 5 years $\leq (0.25 \cdot r)\%$
Step response time T_{63} (without electrical damping)	Approx. 0.105 s
Effect of mounting position (in pressure per change of angle)	$\leq 0.05 \text{ mbar}/0.005 \text{ kPa}/0.000725 \text{ psi}$ per 10° incline (zero offset is possible with position error compensation)
Effect of auxiliary power (in % per voltage change)	0.005% per 1 V
Operating conditions	
Medium temperature	
• Measuring cell with silicone oil filling	-40 ... +100 °C (-40 ... +212 °F)
• Measuring cell with inert filling liquid	-20 ... +100 °C (-4 ... +212 °F)
Ambient conditions	
• Ambient temperature/enclosure	Observe the temperature class in hazardous areas.
- Measuring cell with silicone oil filling	-40 ... +85 °C (-40 ... +185 °F)
- Measuring cell with inert filling liquid	-40 ... +85 °C (-40 ... +185 °F)
- Display	-20 ... +80 °C (-4 ... +176 °F)
• Storage temperature	-50 ... +85 °C (-58 ... +185 °F) (with FDA-compliant oil: -20 ... +85 °C (-4 ... +185 °F))
• Climatic class in accordance with IEC 60721-3-4	4K4H
• Degree of protection	
- According to IEC 60529	IP66, IP68
- According to NEMA 250	Type 4X
• Electromagnetic compatibility	
- Emitted interference and interference immunity	According to IEC 61326 and NAMUR NE 21

Pressure measurement

Pressure transmitters

for applications with advanced requirements / SITRANS P320/420 / Absolute pressure (pressure series)

Technical specifications (continued)

SITRANS P320 / SITRANS P420 for absolute pressure (pressure series)	
Structural design	
Weight	<ul style="list-style-type: none"> Aluminum enclosure: Approx. 1.8 kg (3.9 lbs) Stainless steel enclosure: Approx. 3.8 kg (8.3 lbs)
Material	
• Material of wetted parts	
- Process connection	Stainless steel, material no. 1.4404/316L or Alloy C22, material no. 2.4602
- Oval flange	Stainless steel, mat. no. 1.4404/316L
- Seal diaphragm	Stainless steel, material no. 1.4404/316L or Alloy C276, material no. 2.4819
• Material of non-wetted parts	
- Electronics enclosure	<ul style="list-style-type: none"> Low-copper die-cast aluminum GD-AISI 12 or stainless steel precision casting, mat. no. 1.4409/ CF-3M Standard: Powder coating with polyurethane Option: 2 coats: Coat 1: Epoxy-based; coat 2: Polyurethane Stainless steel nameplate (1.4404/316L)
- Mounting bracket	Zinc-plated steel or stainless steel
Process connection	<ul style="list-style-type: none"> Connection shank G1/2A according to EN 837-1 Female thread 1/2-14 NPT Oval flange (PN 160 (MWP 2320 psi g)) with fastening thread: <ul style="list-style-type: none"> 7/16-20 UNF according to EN 61518 M10 according to DIN 19213 Oval flange (PN 420 (MWP 2320 psi g)) with fastening thread: <ul style="list-style-type: none"> 7/16-20 UNF according to EN 61518 M12 according to DIN 19213 Male thread M20 × 1.5 and 1/2-14 NPT
Electrical connection	Cable entry via the following screw glands: <ul style="list-style-type: none"> M20 × 1.5 1/2-14 NPT Device plug Han 7D/Han 8D¹⁾ Device plug M12
Displays and controls	
Buttons	4 buttons for operation directly on the device
Display	<ul style="list-style-type: none"> With or without integrated display (optional) Lid with inspection window (optional)
Auxiliary power U_H	
Terminal voltage on pressure transmitter	10.5 ... 45 V DC 10.5 ... 30 V DC in intrinsically safe mode
Ripple	$U_{SS} \leq 0.2 \text{ V}$ (47 ... 125 Hz)
Noise	$U_{eff} \leq 1.2 \text{ mV}$ (0.5 ... 10 kHz)
Auxiliary power	–
Separate supply voltage	–
Certificates and approvals	
Classification according to pressure equipment directive (PED 2014/68/EU)	For gases of fluid group 1 and liquids of fluid group 1; complies with requirements of article 4, paragraph 3 (sound engineering practice)
Drinking water	
• WRAS (England)	No.: 1903094 (option E83)
• ACS (France)	No.: 18 ACC LY 277 (option E85)
• NSF (USA)	No.: 20180920-MH61350 (option E84)
CRN (Canada)	No.: 0F9863.5C (option E60)
Explosion protection acc. to NEPSI (China)	No.: GYJ19.1058X (option E27)
Explosion protection acc. to INMETRO (Brazil)	No.: BRA-18-GE-0035X (option E25)
Explosion protection	
• Intrinsic safety "i"	
- Marking	II 1/2 G Ex ia/ib IIC T4/T6 Ga/Gb

Technical specifications (continued)

SITRANS P320 / SITRANS P420 for absolute pressure (pressure series)	
- Permissible ambient temperature	-40 ... +80 °C (-40 ... +176 °F) temperature class T4 -40 ... +70 °C (-40 ... +158 °F) temperature class T6
- Permissible medium temperature	-40 ... +100 °C (-40 ... +212 °F) temperature class T4 -40 ... +70 °C (-40 ... +158 °F) temperature class T6
- Connection	To certified intrinsically safe circuits with peak values: U _i = 30 V, I _i = 101 mA, P _i = 760 mW U _i = 29 V, I _i = 110 mA, P _i = 800 mW
- Effective internal inductance/capacitance	L _i = 0.24 µH/C _i = 3.29 nF
• Flameproof enclosure "d"	
- Marking	Ex II 1/2 G Ex ia/db IIC T4/T6 Ga/Gb
- Permissible ambient temperature	-40 ... +80 °C (-40 ... +176 °F) temperature class T4 -40 ... +70 °C (-40 ... +158 °F) temperature class T6
- Permissible medium temperature	-40 ... +100 °C (-40 ... +212 °F) temperature class T4 -40 ... +70 °C (-40 ... +158 °F) temperature class T6
- Connection	To circuit with the operating values U _n = 10.5 ... 45 V, 4 ... 20 mA
• Dust explosion protection for Zones 21, 22	
- Marking	Ex II 2D Ex tb IIIC T120 °C Db Ex II 3D Ex tc IIIC T120 °C Dc
- Permissible ambient temperature	-40 ... +80 °C (-40 ... +176 °F)
- Permissible medium temperature	-40 ... +100 °C (-40 ... +212 °F)
- Max. surface temperature	120 °C (248 °F)
- Connection	To circuit with the operating values U _n = 10.5 ... 45 V, 4 ... 20 mA
• Dust explosion protection for Zones 20, 21, 22	
- Marking	Ex II 1D Ex ia IIIC T120 °C Da Ex II 2D Ex ib IIIC T120 °C Db
- Permissible ambient temperature	-40 ... +80 °C (-40 ... +176 °F)
- Permissible medium temperature	-40 ... +100 °C (-40 ... +212 °F)
- Connection	To certified intrinsically safe circuits with peak values: U _i = 30 V, I _i = 101 mA, P _i = 760 mW U _i = 29 V, I _i = 110 mA, P _i = 800 mW
- Effective internal inductance/capacitance	L _i = 0.24 µH/C _i = 3.29 nF
• Type of protection for Zone 2	
- Marking	Ex II 3G Ex ec IIC T4/T6 Gc
- Permissible ambient temperature "ec"	-40 ... +80 °C (-40 ... +176 °F) temperature class T4 -40 ... +40 °C (-40 ... +104 °F) temperature class T6
- Permissible medium temperature	-40 ... +100 °C (-40 ... +212 °F) temperature class T4 -40 ... +70 °C (-40 ... +158 °F) temperature class T6
- "ec" connection	To circuit with the operating values U _n = 10.5 ... 30 V, 4 ... 20 mA
• Explosion protection acc. to FM	Available soon
- Marking (XP/DIP) or IS; NI; S	CL I, DIV 1, GP ABCD T4 ... T6; CL II, DIV 1, GP EFG; CL III; Ex ia IIC T4 ... T6: CL I, DIV 2, GP ABCD T4 ... T6; CL II, DIV 2, GP FG; CL III
• Explosion protection according to CSA	Available soon
- Marking (XP/DIP) or (IS)	CL I, DIV 1, GP ABCD T4 ... T6; CL II, DIV 1, GP EFG; CL III; Ex ia IIC T4 ... T6: CL I, DIV 2, GP ABCD T4 ... T6; CL II, DIV 2, GP FG; CL III
NAMUR recommendations	
• NE 06	Standardized Electrical Signals and Questions Relating to Engineering Technology
• NE 21	Electromagnetic Compatibility (EMC) of Industrial Process and Laboratory Control Equipment
• NE 23	Extra Low Voltage Circuits with Safe Separation
• NE 43	Standardization of the Signal Level for the Failure Information of Digital Transmitters
• NE 53	Software and Hardware of Field Devices and Signal Processing Devices with Digital Electronics
• NE 80	The Application of the Pressure Equipment Directive to Process Control Devices
• NE 105	Specifications for Integrating Fieldbus Devices in Engineering Tools for Field Devices
• NE 107	Self-Monitoring and Diagnosis of Field Devices

Pressure measurement

Pressure transmitters

for applications with advanced requirements / SITRANS P320/420 / Absolute pressure (pressure series)

Technical specifications (continued)

SITRANS P320 / SITRANS P420 for absolute pressure (pressure series)

• NE 131 NAMUR Standard Device - Field Devices for Standard Applications

¹⁾ Han 8D is identical to Han 8U.

Communication	
HART	
HART	230 ... 1 100 Ω
Protocol	HART 7
Software for computer	SIMATIC PDM
PROFIBUS PA	
Simultaneous communication with master class 2 (max.)	4
The address can be set using	Configuration tool or local operation (default setting address 126)
Cyclic data usage	
• Output byte	≤ 35 (7 measured values)
• Input byte	0, 1, or 2 (register operation mode and reset function for dosing)
Internal preprocessing	
Device profile	PROFIBUS PA Profile Version 4.01 Class B. Cyclic data usage compatible with version 3.XX
Number of function blocks	7
• Analog input	
- Adaptation to user-specific process variable	Yes, linearly rising or falling characteristic curve
- Electrical damping adjustable	0 ... 100 s
- Simulation function	Output/input
- Limit monitoring	Yes, one upper and lower warning limit and one alarm limit respectively
• Register (totalizer)	Can be reset, preset, optional direction of counting, simulation function of register output
- Limit monitoring	One upper and lower warning limit and one alarm limit respectively
• Physical block	1
Transducer blocks	1
• Pressure transducer block	
- Can be calibrated by applying two pressures	Yes
- Monitoring of sensor limits	Yes
- Specification of a vessel characteristic curve with	Max. 30 nodes
- Square-rooted characteristic curve for flow measurement	Yes
- Tank characteristic curve for volume measurement	Yes
- Low flow cut-off and implementation point of square-root extraction	Parameterizable
- Simulation function for measured pressure value and sensor temperature	Constant value or by means of parameterizable ramp function
FOUNDATION Fieldbus	
Device profile	FF ITK 6
Function blocks	3 function blocks analog input, 1 function block PID
• Analog input	
- Adaptation to user-specific process variable	Yes, linearly rising or falling characteristic curve
- Electrical damping adjustable	0 ... 100 s

Technical specifications (continued)

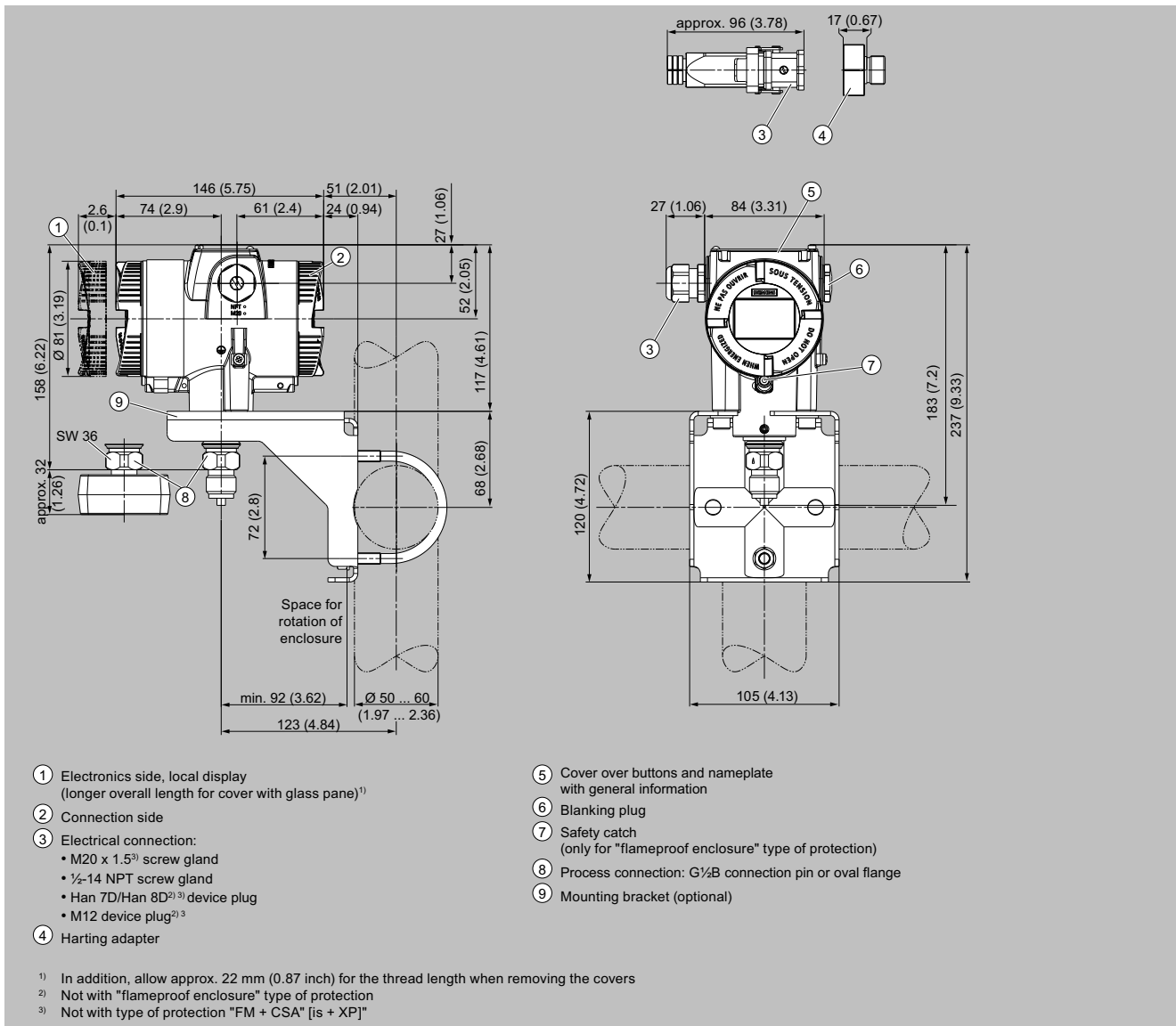
Communication	
- Simulation function	Output/input (can be locked within the device with a bridge)
- Failure mode	Parameterizable (last good value, substitute value, incorrect value)
- Limit monitoring	Yes, one upper and lower warning limit and one alarm limit respectively
- Square-rooted characteristic curve for flow measurement	Yes
• PID	Standard FOUNDATION Fieldbus function block
• Physical block	1 resource block
Transducer blocks	1 transducer block Pressure with calibration, 1 transducer block LCD
• Pressure transducer block	
- Can be calibrated by applying two pressures	Yes
- Monitoring of sensor limits	Yes
- Simulation function: pressure measurement, sensor temperature and electronics temperature	Constant value or by means of parameterizable ramp function

Pressure measurement

Pressure transmitters

for applications with advanced requirements / SITRANS P320/420 / Absolute pressure (pressure series)

Dimensional drawings



SITRANS P320/P420 pressure transmitter for absolute pressure (pressure series), dimensions in mm (inch)

for applications with advanced requirements / SITRANS P320/420 / Absolute pressure (differential pressure series)

Selection and ordering data

	Article No.	
Pressure transmitters for absolute pressure (differential pressure series)		
SITRANS P320	7MF033	● - ● ● ● ● ● - ● ● ● ●
SITRANS P420	7MF043	● - ● ● ● ● ● - ● ● ● ●
Click the article number for online configuration in the PIA Life Cycle Portal.		
Communication		
HART, 4 ... 20 mA		0
PROFIBUS PA		1
FOUNDATION Fieldbus (FF)		2
Measuring cell filling		
Silicone oil		1
Inert filling liquid		3
Maximum measuring span		
250 mbar a (100.5 inH ₂ O a)		G
1300 mbar a (522 inH ₂ O a)		L
5000 mbar a (72.5 psi a)		P
30 bar a (435 psi a)		R
160 bar (2 320 psi)		Y
Process connection		
Oval flange, fastening thread: 7/16"-20 UNF (IEC 61518)		Q
Oval flange, fastening thread: M10 (DIN 19213)		R
Oval flange, fastening thread: 7/16"-20 UNF (IEC 61518) with lateral ventilation		S
Oval flange, fastening thread: M10 (DIN 19213) with lateral ventilation		T
Version for diaphragm seal with fastening thread 7/16"-20 UNF (IEC 61518)		V
Version for diaphragm seal with fastening thread M10 (DIN 19213)		W
Material of wetted parts: Process connection, seal diaphragm		
Stainless steel 316L/1.4404, stainless steel 316L/1.4404, process flange stainless steel 316/1.4408		0
Stainless steel 316L/1.4404, alloy C276/2.4819, process flange stainless steel 316/1.4408		1
Alloy C22/2.4602, alloy C276/2.4819, process flange stainless steel 316/1.4408		2
Tantalum/tantalum, process flange stainless steel 316/1.4408		4
Monel 400/2.4360, Monel 400/2.4360, process flange stainless steel 316/1.4408		6
Stainless steel 316L/1.4404 gold-plated, process flange stainless steel 316/1.4408		8
Material of non-wetted parts		
Die-cast aluminum		1
Stainless steel precision casting CF3M/1.4409 similar to 316L		2
Enclosure		
Dual chamber device		5
Type of protection		
Without Ex		A
Intrinsic safety		B
Flameproof enclosure		C
Flameproof enclosure, intrinsic safety		D
Dust protection by enclosure Zone 21/22 (DIP), increased safety Zone 2		L
Intrinsic safety, dust protection by enclosure Zone 20/21/22 (DIP), increased safety Zone 2		M
Combination of options B, C and L (Zone model)		S
Combination of options B, C and L (Zone model, Class Division)		T
Electrical connections/cable entries		
Thread for cable gland: Cable gland must be ordered separately as option (Axx)		
• 2 × M20 × 1.5		F
• 2 × ½"-14 NPT		M
Local operation/display		
Without local display (lid closed)		0
With local display (lid closed)		1
With local display (lid with glass pane)		2

Pressure measurement

Pressure transmitters

for applications with advanced requirements / SITRANS P320/420 / Absolute pressure (differential pressure series)

Selection and ordering data (continued)

Options	Order code
Add "-Z" to article no., add order code and plain text or entry from drop-down list.	
Cable glands included	
Plastic	A00
Metal	A01
Stainless steel	A02
Stainless steel 316L/1.4404	A03
CMP, for XP devices	A10
CAPRI ADE 4F, CuZn, cable inner diameter 7 ... 12 mm, cable outer diameter 10 ... 16 mm	A11
CAPRI ADE 4F, stainless steel, cable inner diameter 7 ... 12 mm, cable outer diameter 10 ... 16 mm	A12
Sealing plug included, plastic	A20
Sealing plug included, metal	A21
Sealing plug included, stainless steel	A22
Sealing plug included, stainless steel 316L/1.4404	A23
Device plug Han mounted left	
Device plug Han 7D (plastic, straight)	A30
Device plug Han 7D (plastic, angled)	A31
Device plug Han 7D (metal, straight)	A32
Device plug Han 7D (metal, angled)	A33
Device plug Han 8D (plastic, straight)	A34
Device plug Han 8D (plastic, angled)	A35
Device plug Han 8D (metal, straight)	A36
Device plug Han 8D (metal, angled)	A37
Cable socket included	
Plastic, for device plug Han 7D and Han 8D	A40
Metal, for device plug Han 7D and Han 8D	A41
Device plug M12 mounted left	
Stainless steel, without cable socket	A62
Stainless steel, with cable socket	A63
Cable entry/device plug mounting	
2× sealing plugs M20 × 1.5, IP66/68 installed on both sides	A90
2× sealing plugs ½-14 NPT, IP66/68 installed on both sides	A91
Cable gland/device plug mounted left	A97
Cable gland/device plug mounted right	A99
Nameplate labeling (standard labeling: English, unit bar)	
German (bar)	B11
French (bar)	B12
Spanish (bar)	B13
Italian (bar)	B14
Chinese (bar)	B15
Russian (bar)	B16
English (psi)	B20
English (Pa)	B30
Chinese (Pa)	B35
Certificates	
Quality inspection certificate - 5-point factory calibration (IEC 62828-2)	C11
Inspection certificate (EN 10204-3.1) - Material of pressurized and wetted parts	C12
Factory certificate - NACE (MR 0103-2012 and MR 0175-2009)	C13
Factory certificate (EN 10204-2.2) - wetted parts	C14
Inspection certificate (EN 10204-3.1) - PMI test of pressurized and wetted parts	C15

Selection and ordering data (continued)

Options	Order code
Add "-Z" to article no., add order code and plain text or entry from drop-down list.	
Certificates for functional safety	
Functional Safety (IEC 61508) - SIL2/3	C20
Device options	
PDF file with device settings	D10
Double layer coating (epoxy resin and polyurethane) 120 µm of enclosure and lid	D20
FVMQ enclosure sealing	D21
IP66/IP68 degree of protection (not for device plug M12 and Han)	D30
Unlabeled TAG plate	D40
Without labeling of the measuring range on the TAG plate	D41
Stainless steel Ex plate 1.4404/316L	D42
Overvoltage protection up to 6 kV (internal)	D70
Overvoltage protection up to 6 kV (external)	D71
Labels on transport packaging (provided by customer)	D90
General approval without Ex approval	
Worldwide (CE, UKCA, RCM) except EAC, FM, CSA, KCC	E00
Worldwide (CE, UKCA, RCM, EAC, FM, CSA, KCC)	E01
CSA (USA and Canada)	E06
EAC	E07
FM	E08
KCC	E09
Explosion protection approvals	
ATEX (Europe)	E20
CSA (USA and Canada) ¹⁾	E21
FM (USA and Canada) ¹⁾	E22
IECEX (Worldwide)	E23
EACEx (GOST-R, -K, -B)	E24
INMETRO (Brazil)	E25
KCs (Korea)	E26
NEPSI (China)	E27
PESO (India)	E28
UKR Sepro (Ukraine)	E30
UKEX (United Kingdom)	E33
ATEX (Europe), IECEX (Worldwide) and UKEX (UK)	E47
CSA (Canada) and FM (USA) ¹⁾	E48
ATEX (Europe) and IECEX (Worldwide) + CSA (Canada) and FM (USA) ¹⁾	E49
Marine approvals	
DNV-GL (Det Norske Veritas/Germanischer Lloyd)	E50
LR (Lloyds Register)	E51
BV (Bureau Veritas)	E52
ABS (American Bureau of Shipping)	E53
RMR (Russian Maritime Register)	E55
KR (Korean Register of Shipping)	E56
RINA (Registro Italiano Navale)	E57
CCS (China Classification Society)	E58
Country-specific approvals	
CRN approval Canada (Canadian Registration Number)	E60
Special approvals	
Oxygen application (with inert liquid, max. 160 bar (2 320 psi) at 100 °C (212 °F))	E80
Dual Seal	E81

Pressure measurement

Pressure transmitters

for applications with advanced requirements / SITRANS P320/420 / Absolute pressure (differential pressure series)

Selection and ordering data (continued)

Options Add "-Z" to article no., add order code and plain text or entry from drop-down list.	Order code
WRC/WRAS (drinking water); only with process flange O-rings made of EPDM	E83
NSF61 (drinking water)	E84
ACS (drinking water)	E85
Mounting bracket	
Steel, zinc-plated	H01
Stainless steel 1.4301/304	H02
Stainless steel 1.4404/316L	H03
Process flanges; screw plug with vent valve	
Welded in on right	J08
Welded in on left	J09
Glued in on right	J10
Glued in on left	J11
Flange connections with flange EN 1092-1	
Form B1	
• DN 25 PN 40, stainless steel 1.4571/316Ti	J70
• DN 50 PN 40, stainless steel 1.4571/316Ti	J71
• DN 80 PN 40, stainless steel 1.4571/316Ti	J72
• DN 15 PN 40, stainless steel 1.4571/316Ti	J78
Form C	
• DN 25 PN 40, stainless steel 1.4571/316Ti	J73
• DN 50 PN 40, stainless steel 1.4571/316Ti	J74
• DN 80 PN 40, stainless steel 1.4571/316Ti	J75
Flange connection options	
Flange connection and temperature extension	J76
Flange connection with epoxy resin coating	J77
Process flanges; special materials	
Reserved for 7MF7: without process flanges, without screws, without gaskets	K00
Process flange material alloy C22/2.4602	K01
Process flange material Monel 400/2.4360	K02
Process connection material PVDF, on the side ½-14 NPT	K05
Process flanges/process connection material PVDF, flange on the side EN 1092-1 Form B1 DN 25 PN 40, MAWP 4 bar	K06
Process flanges/process connection material PVDF, flange on the side EN 1092-1 Form B1 DN 40 PN 40, MAWP 4 bar	K07
Process flanges; process connection option	
Process flange with process connection G½ welded on	K20
Process connection NAM (ASTAVA)	K21
Process flanges chambered with gaskets	
1 × chambered, graphite	K40
1 × chambered, PTFE (FDA-compliant), recommended for gas measurements	K41
Process flanges, gaskets (instead of standard gaskets FKM (FPM))	
O-ring, process flanges, PTFE	K50
O-ring, process flanges, FEP (with silicone core, approved for food)	K51
O-ring, process flanges, FFKM (FFPM)	K52
O-ring, process flanges, NBR	K53
O-ring, process flanges, EPDM	K54

Selection and ordering data (continued)

Options	Order code
Add "-Z" to article no., add order code and plain text or entry from drop-down list.	
Process flange options	
Process flanges for vertical differential pressure lines (half process flange)	K81
Process flanges (+) - side front	K82
Process flange screws, process flange nuts, material Monel 400/2.4360	K83
Valve 1/4-18 NPT, material same as process flanges	K84
Valve mounted on the side, measured medium: Gas	K85
Oval flange attached, PTFE seal + fixing screws	K86
Valve manifolds	
With mounted valve manifold (3-way) 7MF9411-5BA, PTFE sealing rings, chrome-plated steel screws and pressure test certified in factory certificate (EN 10204-2.2)	U01
With mounted valve manifold (3-way) 7MF9411-5BA, PTFE sealing rings, stainless steel screws and pressure test certified in factory certificate (EN 10204-2.2)	U02
With mounted valve manifold (5-way) 7MF9411-5CA, PTFE sealing rings, chrome-plated steel screws and pressure test certified in factory certificate (EN 10204-2.2)	U03
With mounted valve manifold (5-way) 7MF9411-5CA, PTFE sealing rings, stainless steel screws and pressure test certified in factory certificate (EN 10204-2.2)	U04
Device settings	
Measuring span: Lower range value (max. 5 characters), upper range value (max. 5 characters), unit [mbar, bar, kPa, MPa, psi, ...], example: -0.5 ... 10.5 psi	Y01
TAG (on stainless steel plate and device parameters, max. 32 characters)	Y15
Measuring point description (on stainless steel plate and device parameters, max. 32 characters)	Y16
TAG short (device parameters, max. 8 characters)	Y17
Local display: [Pressure, Percent], reference [None, Absolute, Gauge], example: Pressure gauge	Y21
Local display: Scaling with standard units [m ³ /s, l/s, m, inch, ...]; example 1 ... 5 m	Y22
Local display: Scaling with user-specific units (max. 12 characters), example 1 ... 5 m	Y23
Set PROFIBUS PA device address (1 ... 126)	Y25
Saturation limits instead of 3.8 ... 20.5 mA, example: 3.8 ... 22.0 mA	Y30
Fault current instead of 3.6 mA [22.5 mA, 22.8 mA]	Y31
Damping in seconds instead of 2 s (0.0 ... 100.0 s)	Y32
ID number of special design	Y99

¹⁾ Explosion protection acc. to FM/CSA: suitable for installation according to NEC 500/505.

Pressure measurement

Pressure transmitters

for applications with advanced requirements / SITRANS P320/420 / Absolute pressure (differential pressure series)

Technical specifications

SITRANS P320 / SITRANS P420 for absolute pressure (differential pressure series)

Input	Absolute pressure	Max. permissible operating pressure MAWP (PS)	Maximum permissible test pressure
Measured variable	Absolute pressure		
Measuring span (continuously adjustable) or measuring range and max. permissible operating pressure (pursuant to Pressure Equipment Directive 2014/68/EU)	Measuring span		
	8.3 ... 250 mbar a	160 bar a	240 bar a
	0.83 ... 25 kPa a	16 MPa a	24 MPa a
	3.3 ... 100.5 inH ₂ O a	2 320 psi a	3 481 psi a
	43 ... 1300 mbar a	160 bar a	240 bar a
	4.3 ... 130 kPa a	16 MPa a	24 MPa a
	17.3 ... 522 inH ₂ O a	2 320 psi a	3 481 psi a
	166 ... 5 000 mbar a	160 bar a	240 bar a
	16.6 ... 500 kPa a	16 MPa a	24 MPa a
	2.41 ... 72.5 psi a	2 320 psi a	3 481 psi a
	1 ... 30 bar a	160 bar a	240 bar a
	0.1 ... 3 MPa a	16 MPa a	24 MPa a
	14.5 ... 435 psi a	2 320 psi a	3 481 psi a
	8 ... 160 bar	160 bar a	240 bar a
	0.8 ... 16 MPa	16 MPa a	24 MPa a
	116 ... 2 320 psi	2 320 psi a	3 481 psi a
Measuring limits			
• Lower measuring limit			
- Measuring cell with silicone oil filling	0 mbar a/kPa a/psi a		
- Measuring cell with inert liquid	For medium temperature -20 °C < ϑ ≤ +60 °C (-4 °F < ϑ ≤ +140 °F)		30 mbar a/3 kPa a/0.44 psi a
	For medium temperature 60 °C < ϑ ≤ +100 °C (max. 85 °C for measuring cell 30 bar) (140 °F < ϑ ≤ +212 °F (max. 185 °F for measuring cell 435 psi))		30 mbar a + 20 mbar a · (ϑ - 60 °C)/°C 3 kPa a + 2 kPa a · (ϑ - 60 °C)/°C 0.44 psi a + 0.29 psi a · (ϑ - 140 °F)/°F
• Upper measuring limit	100% of the max. measuring span (for oxygen measurement max. 100 bar/10 MPa/1450 psi and 60 °C (140 °F) ambient temperature/medium temperature)		
• Lower range value	Between the measuring limits (continuously adjustable)		
Output	HART		
Output signal	4 ... 20 mA		
• Lower saturation limit (continuously adjustable)	3.55 mA, factory set to 3.8 mA		
• Upper saturation limit (continuously adjustable)	22.8 mA, factory-set to 20.5 mA or optionally 22.0 mA		
• Ripple (without HART communication)	$I_{pp} \leq 0.5\%$ of max. output current		
Adjustable damping	0 ... 100 s, continuously adjustable over remote operation 0 ... 100 s, in increments of 0.1 s, adjustable over display		
• Current simulator	3.55 ... 22.8 mA		
• Failure signal	3.55 ... 22.8 mA		
Load	Resistance R [Ω]		
• Without HART communication	$R = (U_H - 10.5 \text{ V}) / 22.8 \text{ mA}$, U_H : Auxiliary power in V		
• With HART communication	$R = 230 \dots 1100 \Omega$		
Characteristic curve	<ul style="list-style-type: none"> • Linearly increasing or linearly decreasing • Linear increase or decrease or according to the square root (only for differential pressure and flow) 		
Physical bus	-		
Polarity-independent	-		
Measuring accuracy			
Reference conditions	<ul style="list-style-type: none"> • According to IEC 62828-1 • Rising characteristic curve • Lower range value 0 bar/kPa/psi • Seal diaphragm stainless steel • Measuring cell with silicone oil filling • Room temperature 25 °C (77 °F) 		
Conformity error at limit point setting, including hysteresis and repeatability			

Technical specifications (continued)

SITRANS P320 / SITRANS P420 for absolute pressure (differential pressure series)	
Measuring span ratio r (spread, Turn-Down)	$r = \text{max. measuring span/set measuring span and nominal measuring range}$
<ul style="list-style-type: none"> Linear characteristic curve 	
- 250 mbar/25 kPa/3.63 psi	$r \leq 5:$ $\leq 0.075\%$ $5 < r \leq 30:$ $\leq (0.02 \cdot r + 0.05)\%$
- 1300 mbar a/130 kPa a/18.8 psi a 5 bar a/500 kPa a/72.5 psi a 30 bar a/3000 kPa a/435 psi a	$r \leq 5:$ $\leq 0.075\%$ $5 < r \leq 30:$ $\leq (0.005 \cdot r + 0.05)\%$
- 160 bar/16 MPa/2 320 psi	$r \leq 5:$ $\leq 0.075\%$ $5 < r \leq 20:$ $\leq (0.005 \cdot r + 0.05)\%$
Influence of ambient temperature (in % per 28 °C (50 °F))	
<ul style="list-style-type: none"> 250 mbar a/25 kPa a/3.6 psi a 	$\leq (0.1 \cdot r + 0.1)\%$
<ul style="list-style-type: none"> 1300 mbar a/130 kPa a/18.8 psi a 5 bar a/500 kPa a/72.5 psi a 30 bar a/3000 kPa a/435 psi a 160 bar a/16 MPa a/2 320 psi a 	$\leq (0.0025 \cdot r + 0.125)\%$
Long-term stability at ± 30 °C (± 54 °F)	
<ul style="list-style-type: none"> 250 mbar a/25 kPa a/3.6 psi a 	In 5 years $\leq (0.2 \cdot r)\%$
<ul style="list-style-type: none"> 1300 mbar a/130 kPa a/18.8 psi a 5 bar a/500 kPa a/72.5 psi a 30 bar a/3000 kPa a/435 psi a 160 bar a/16 MPa a/2 320 psi a 	In 5 years $\leq (0.1 \cdot r)\%$ In 10 years $\leq (0.15 \cdot r)\%$
Step response time T_{63} (without electrical damping)	
<ul style="list-style-type: none"> 250 mbar a/25 kPa a/3.6 psi a 1300 mbar a/130 kPa a/18.8 psi a 5 bar a/500 kPa a/72.5 psi a 30 bar a/3000 kPa a/435 psi a 160 bar a/16 MPa a/2 320 psi a 	Every 0.135 s
Effect of mounting position (in pressure per change of angle)	≤ 0.7 mbar/0.07 kPa/0.010 psi per 10° incline (zero offset is possible with position error compensation)
Effect of auxiliary power (in % per voltage change)	0.005% per 1 V
Operating conditions	
Medium temperature	
<ul style="list-style-type: none"> Measuring cell with silicone oil filling 	-40 ... +100 °C (-40 ... +212 °F)
- Measuring cell 30 bar (435 psi)	-20 ... +100 °C (-4 ... +212 °F)
- Measuring cell 160 bar (2 320 psi)	-20 ... +100 °C (-4 ... +212 °F)
<ul style="list-style-type: none"> Measuring cell with inert oil 	-20 ... +100 °C (-4 ... +212 °F)
Ambient conditions	
<ul style="list-style-type: none"> Ambient temperature/enclosure 	Observe the temperature class in hazardous areas.
- Measuring cell with silicone oil filling	-40 ... +85 °C (-40 ... +185 °F)
- Measuring cell with inert oil	-40 ... +85 °C (-40 ... +185 °F)
- Display	-20 ... +80 °C (-4 ... +176 °F)
<ul style="list-style-type: none"> Storage temperature 	-50 ... +85 °C (-58 ... +185 °F) (with FDA-compliant oil: -20 ... +85 °C (-4 ... +185 °F))
<ul style="list-style-type: none"> Climatic class in accordance with IEC 60721-3-4 	4K4H
<ul style="list-style-type: none"> Degree of protection 	
- According to IEC 60529	IP66, IP68
- According to NEMA 250	Type 4X
<ul style="list-style-type: none"> Electromagnetic compatibility 	
- Emitted interference and interference immunity	According to IEC 61326 and NAMUR NE 21
Structural design	
Weight	<ul style="list-style-type: none"> Aluminum enclosure: Approx. 3.9 kg (8.5 lbs) Stainless steel enclosure: Approx. 5.9 kg (13 lbs)
Material	

Pressure measurement

Pressure transmitters

for applications with advanced requirements / SITRANS P320/420 / Absolute pressure (differential pressure series)

Technical specifications (continued)

SITRANS P320 / SITRANS P420 for absolute pressure (differential pressure series)	
<ul style="list-style-type: none"> • Material of wetted parts - Seal diaphragm - Process flanges - Sealing plug - O-ring • Material of non-wetted parts - Electronics enclosure - Process flange screws - Mounting bracket Process connection Electrical connection 	<p>Stainless steel, mat. no. 1.4404/316L, Alloy C276, mat. no. 2.4819, Monel, mat. no. 2.4360, tantalum or gold</p> <p>Stainless steel, mat. no. 1.4408 to PN 160, mat. no. 1.4571/316Ti for PN 420, Alloy C22, 2.4602 or Monel, mat. no. 2.4360</p> <p>1.4404 or as option alloy C22; 2.4602 or Monel mat. no. 2.4360</p> <p>FPM (Viton) or optionally: PTFE, FEP, FEPM and NBR</p> <ul style="list-style-type: none"> • Low-copper die-cast aluminum GD-AISI 12 or stainless steel precision casting, mat. no. 1.4409/ CF-3M • Standard: Powder coating with polyurethane <li style="padding-left: 20px;">Option: 2 coats: Coat 1: Epoxy-based; coat 2: Polyurethane • Stainless steel nameplate (1.4404/316L) <p>Stainless steel ISO 3506-1 A4-70</p> <p>Steel, zinc-plated steel, or stainless steel</p> <p>¼-18 NPT female thread and flange connection with 7/16-20 UNF fastening thread according to EN 61518 or M10 according to DIN 19213 (M12 for PN 420 (MWP 6092 psi))</p> <p>Screw terminals</p> <p>Cable entry via the following screw glands:</p> <ul style="list-style-type: none"> • M20 × 1.5 • ½-14 NPT • Device plug Han 7D/Han 8D¹⁾ • Device plug M12
<p>Displays and controls</p> <p>Buttons</p> <p>Display</p>	<p>4 buttons for operation directly on the device</p> <ul style="list-style-type: none"> • With or without integrated display (optional) • Lid with inspection window (optional)
<p>Auxiliary power U_H</p> <p>Terminal voltage on pressure transmitter</p> <p>Ripple</p> <p>Noise</p> <p>Auxiliary power</p> <p>Separate supply voltage</p>	<p>10.5 ... 45 V DC</p> <p>10.5 ... 30 V DC in intrinsically safe mode</p> <p>$U_{SS} \leq 0.2 \text{ V}$ (47 ... 125 Hz)</p> <p>$U_{eff} \leq 1.2 \text{ mV}$ (0.5 ... 10 kHz)</p> <p>–</p> <p>–</p>
<p>Certificates and approvals</p> <p>Classification according to pressure equipment directive (PED 2014/68/EU)</p> <p>Drinking water</p> <ul style="list-style-type: none"> • WRAS (England) • ACS (France) • NSF (USA) <p>CRN (Canada)</p> <p>Explosion protection acc. to NEPSI (China)</p> <p>Explosion protection acc. to INMETRO (Brazil)</p> <p>Explosion protection</p> <ul style="list-style-type: none"> • Intrinsic safety "i" <ul style="list-style-type: none"> - Marking - Permissible ambient temperature - Permissible medium temperature - Connection - Effective internal inductance/capacitance • Flameproof enclosure "d" - Marking 	<p>For gases of fluid group 1 and liquids of fluid group 1; complies with requirements of article 4, paragraph 3 (sound engineering practice)</p> <p>No.: 1903094 (option E83)</p> <p>No.: 18 ACC LY 277 (option E85)</p> <p>No.: 20180920-MH61350 (option E84)</p> <p>No.: 0F9863.5C (option E60)</p> <p>No.: GYJ19.1058X (option E27)</p> <p>No.: BRA-18-GE-0035X (option E25)</p> <p>II 1/2 G Ex ia/ib IIC T4/T6 Ga/Gb</p> <p>-40 ... +80 °C (-40 ... +176 °F) temperature class T4</p> <p>-40 ... +70 °C (-40 ... +158 °F) temperature class T6</p> <p>-40 ... +100 °C (-40 ... +212 °F) temperature class T4</p> <p>-40 ... +70 °C (-40 ... +158 °F) temperature class T6</p> <p>To certified intrinsically safe circuits with peak values:</p> <p>$U_i = 30 \text{ V}$, $I_i = 101 \text{ mA}$, $P_i = 760 \text{ mW}$</p> <p>$U_i = 29 \text{ V}$, $I_i = 110 \text{ mA}$, $P_i = 800 \text{ mW}$</p> <p>$L_i = 0.24 \text{ } \mu\text{H}$/$C_i = 3.29 \text{ nF}$</p> <p>Ex II 1/2 G Ex ia/db IIC T4/T6 Ga/Gb</p>

for applications with advanced requirements / SITRANS P320/420 / Absolute pressure (differential pressure series)

Technical specifications (continued)

SITRANS P320 / SITRANS P420 for absolute pressure (differential pressure series)	
- Permissible ambient temperature	-40 ... +80 °C (-40 ... +176 °F) temperature class T4 -40 ... +70 °C (-40 ... +158 °F) temperature class T6
- Permissible medium temperature	-40 ... +100 °C (-40 ... +212 °F) temperature class T4 -40 ... +70 °C (-40 ... +158 °F) temperature class T6
- Connection	To a circuit with the operating values: $U_n = 10.5 \dots 45 \text{ V}$, 4 ... 20 mA
• Dust explosion protection for zones 21, 22	
- Marking	Ex II 2D Ex tb IIIC T120 °C Db Ex II 3D Ex tc IIIC T120 °C Dc
- Permissible ambient temperature	-40 ... +80 °C (-40 ... +176 °F)
- Permissible medium temperature	-40 ... +100 °C (-40 ... +212 °F)
- Max. surface temperature	120 °C (248 °F)
- Connection	To a circuit with the operating values: $U_n = 10.5 \dots 45 \text{ V}$, 4 ... 20 mA
• Dust explosion protection for Zones 20, 21, 22	
- Marking	Ex II 1D Ex ia IIIC T120 °C Da Ex II 2D Ex ib IIIC T120 °C Db
- Permissible ambient temperature	-40 ... +80 °C (-40 ... +176 °F)
- Permissible medium temperature	-40 ... +100 °C (-40 ... +212 °F)
- Connection	To certified intrinsically safe circuits with peak values: $U_i = 30 \text{ V}$, $I_i = 101 \text{ mA}$, $P_i = 760 \text{ mW}$ $U_i = 29 \text{ V}$, $I_i = 110 \text{ mA}$, $P_i = 800 \text{ mW}$ $L_i = 0.24 \mu\text{H}/C_i = 3.29 \text{ nF}$
- Effective internal inductance/capacitance	
• Type of protection for Zone 2	
- Marking	Ex II 3G Ex ec IIC T4/T6 Gc
- Permissible ambient temperature "ec"	-40 ... +80 °C (-40 ... +176 °F) temperature class T4 -40 ... +40 °C (-40 ... +104 °F) temperature class T6
- Permissible medium temperature	-40 ... +100 °C (-40 ... +212 °F) temperature class T4 -40 ... +70 °C (-40 ... +158 °F) temperature class T6
- "ec" connection	To a circuit with the operating values: $U_n = 10.5 \dots 30 \text{ V}$, 4 ... 20 mA
• Explosion protection acc. to FM	Available soon
- Marking (XP/DIP) or IS; NI; S	CL I, DIV 1, GP ABCD T4 ... T6; CL II, DIV 1, GP EFG; CL III; Ex ia IIC T4 ... T6: CL I, DIV 2, GP ABCD T4 ... T6; CL II, DIV 2, GP FG; CL III
• Explosion protection according to CSA	Available soon
- Marking (XP/DIP) or (IS)	CL I, DIV 1, GP ABCD T4 ... T6; CL II, DIV 1, GP EFG; CL III; Ex ia IIC T4 ... T6: CL I, DIV 2, GP ABCD T4 ... T6; CL II, DIV 2, GP FG; CL III
NAMUR recommendations	
• NE 06	Standardized Electrical Signals and Questions Relating to Engineering Technology
• NE 21	Electromagnetic Compatibility (EMC) of Industrial Process and Laboratory Control Equipment
• NE 23	Extra Low Voltage Circuits with Safe Separation
• NE 43	Standardization of the Signal Level for the Failure Information of Digital Transmitters
• NE 53	Software and Hardware of Field Devices and Signal Processing Devices with Digital Electronics
• NE 80	The Application of the Pressure Equipment Directive to Process Control Devices
• NE 105	Specifications for Integrating Fieldbus Devices in Engineering Tools for Field Devices
• NE 107	Self-Monitoring and Diagnosis of Field Devices
• NE 131	NAMUR Standard Device - Field Devices for Standard Applications

¹⁾ Han 8D is identical to Han 8U.

Communication	
HART	
HART	230 ... 1 100 Ω
Protocol	HART 7
Software for computer	SIMATIC PDM

Pressure measurement

Pressure transmitters

for applications with advanced requirements / SITRANS P320/420 / Absolute pressure (differential pressure series)

Technical specifications (continued)

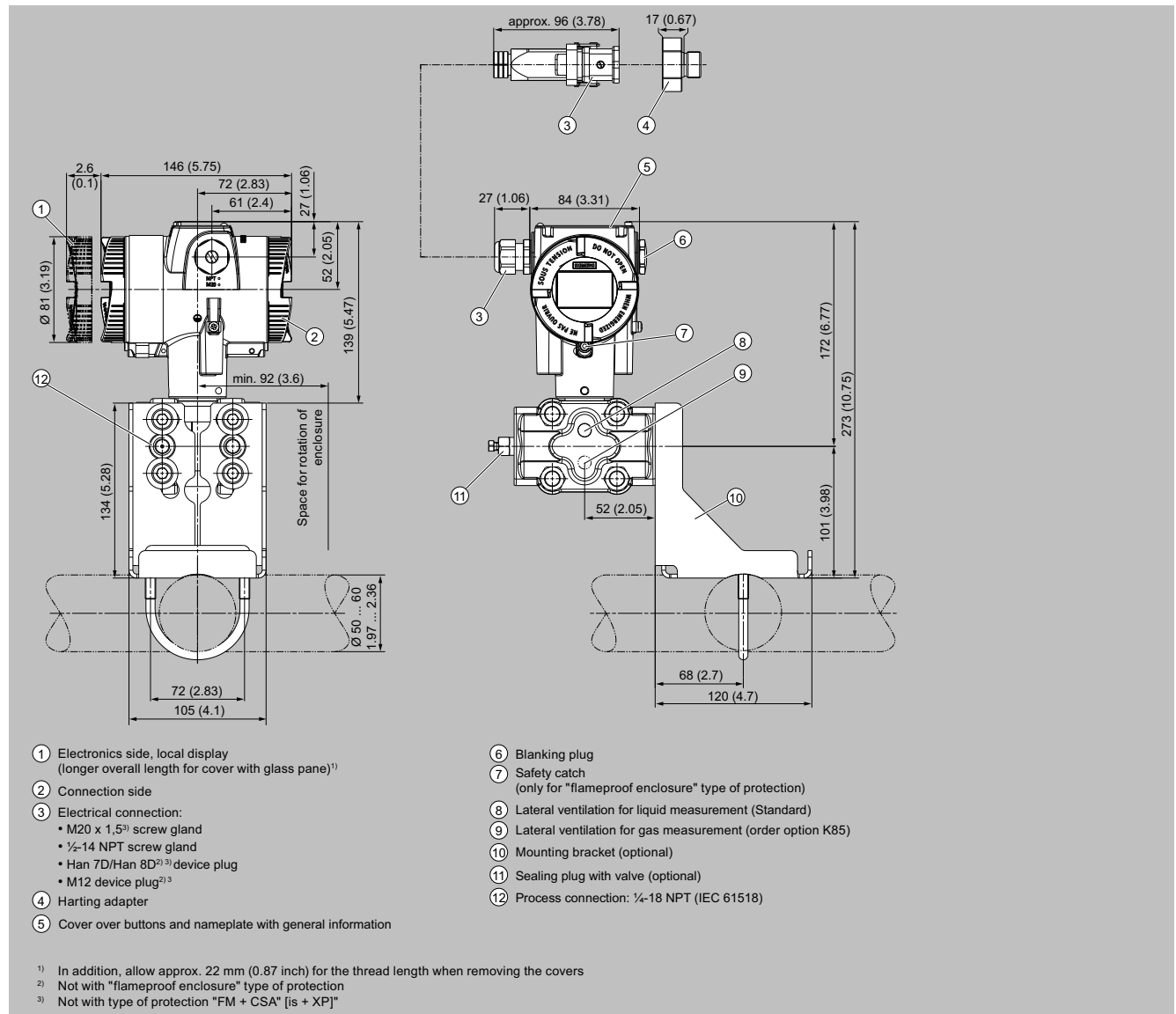
Communication	
PROFIBUS PA	
Simultaneous communication with master class 2 (max.)	4
The address can be set using	Configuration tool or local operation (default setting address 126)
Cyclic data usage	
• Output byte	≤ 35 (7 measured values)
• Input byte	0, 1, or 2 (register operation mode and reset function for dosing)
Internal preprocessing	
Device profile	PROFIBUS PA Profile Version 4.01 Class B. Cyclic data usage compatible with version 3.XX
Number of function blocks	7
• Analog input	
- Adaptation to user-specific process variable	Yes, linearly rising or falling characteristic curve
- Electrical damping adjustable	0 ... 100 s
- Simulation function	Output/input
- Limit monitoring	Yes, one upper and lower warning limit and one alarm limit respectively
• Register (totalizer)	Can be reset, preset, optional direction of counting, simulation function of register output
- Limit monitoring	One upper and lower warning limit and one alarm limit respectively
• Physical block	1
Transducer blocks	1
• Pressure transducer block	
- Can be calibrated by applying two pressures	Yes
- Monitoring of sensor limits	Yes
- Specification of a vessel characteristic curve with	Max. 30 nodes
- Square-rooted characteristic curve for flow measurement	Yes
- Tank characteristic curve for volume measurement	Yes
- Low flow cut-off and implementation point of square-root extraction	Parameterizable
- Simulation function for measured pressure value and sensor temperature	Constant value or by means of parameterizable ramp function
FOUNDATION Fieldbus	
Device profile	FF ITK 6
Function blocks	3 function blocks analog input, 1 function block PID
• Analog input	
- Adaptation to user-specific process variable	Yes, linearly rising or falling characteristic curve
- Electrical damping adjustable	0 ... 100 s
- Simulation function	Output/input (can be locked within the device with a bridge)
- Failure mode	Parameterizable (last good value, substitute value, incorrect value)
- Limit monitoring	Yes, one upper and lower warning limit and one alarm limit respectively
- Square-rooted characteristic curve for flow measurement	Yes
• PID	Standard FOUNDATION Fieldbus function block
• Physical block	1 resource block

for applications with advanced requirements / SITRANS P320/420 / Absolute pressure (differential pressure series)

Technical specifications (continued)

Communication	
Transducer blocks	1 transducer block Pressure with calibration, 1 transducer block LCD
• Pressure transducer block	
- Can be calibrated by applying two pressures	Yes
- Monitoring of sensor limits	Yes
- Simulation function: pressure measurement, sensor temperature and electronics temperature	Constant value or by means of parameterizable ramp function

Dimensional drawings



SITRANS P320/P420 pressure transmitter for absolute pressure (differential pressure series), dimensions in mm (inch)

Pressure measurement

Pressure transmitters

for applications with advanced requirements / SITRANS P320/420 / Differential pressure and flow

Selection and ordering data

	Article No.	
Pressure transmitters for differential pressure and flow, PN 160 (MAWP 2320 psi)		
SITRANS P320	7MF034	● - ● ● ● ● ● - ● ● ● ●
SITRANS P420	7MF044	● - ● ● ● ● ● - ● ● ● ●
Click the article number for online configuration in the PIA Life Cycle Portal.		
Communication		
HART, 4 ... 20 mA	0	
PROFIBUS PA	1	
FOUNDATION Fieldbus (FF)	2	
Measuring cell filling		
Silicone oil	1	
Inert liquid	3	
Neobee oil	4	
Maximum measuring span		
20 mbar (8.037 inH ₂ O)		B
60 mbar (24.11 inH ₂ O)		D
250 mbar (100.5 inH ₂ O)		G
600 mbar (241.1 inH ₂ O)		H
1 600 mbar (643 inH ₂ O)		M
5 000 mbar (2009 inH ₂ O)		P
30 bar (435 psi)		R
160 bar (2 320 psi)		Y
Process connection		
Oval flange, fastening thread: 7/16"-20 UNF (IEC 61518)		L
Oval flange, fastening thread: M10 (PN 160) (DIN 19213)		M
Oval flange, fastening thread: 7/16"-20 UNF (IEC 61518) with lateral ventilation		N
Oval flange, fastening thread: M10 (PN 160) (DIN 19213) with lateral ventilation		P
Version for diaphragm seal with fastening thread 7/16"-20 UNF (IEC 61518)		V
Version for diaphragm seal with fastening thread M10 (PN 160) (DIN 19213)		W
Version for diaphragm seal (one side mounted directly; other side with capillary line) with fastening thread 7/16"-20 UNF (IEC 61518)		X
Material of wetted parts: Process connection, seal diaphragm		
Stainless steel 316L/1.4404, stainless steel 316L/1.4404, process flange stainless steel 316/1.4408		0
Stainless steel 316L/1.4404, alloy C276/2.4819, process flange stainless steel 316/1.4408		1
Alloy C22/2.4602, alloy C276/2.4819, process flange stainless steel 316/1.4408		2
Tantalum/tantalum, process flange stainless steel 316/1.4408 (not in combination with maximum measuring span 20 mbar (0.29 psi) and 60 mbar (0.87 psi))		4
Monel 400/2.4360, Monel 400/2.4360, process flange stainless steel 316/1.4408 (not in combination with maximum measuring span 20 mbar (0.29 psi) and 60 mbar (0.87 psi))		6
Stainless steel 316L/1.4404 gold-plated, process flange stainless steel 316/1.4408 (not in combination with maximum measuring span 20 mbar (0.29 psi) and 60 mbar (0.87 psi))		8
Material of non-wetted parts		
Die-cast aluminum		1
Stainless steel precision casting CF3M/1.4409 similar to 316L		2
Enclosure		
Dual chamber device		5
Type of protection		
Without Ex		A
Intrinsic safety		B
Flameproof enclosure		C
Flameproof enclosure, intrinsic safety		D
Dust protection by enclosure Zone 21/22 (DIP), increased safety Zone 2		L
Intrinsic safety, dust protection by enclosure Zone 20/21/22 (DIP), increased safety Zone 2		M
Combination of options B, C and L (Zone model)		S
Combination of options B, C and L (Zone model, Class Division)		T
Electrical connections/cable entries		
Thread for cable gland: Cable gland must be ordered separately as option (Axx)		
• 2 × M20 × 1.5		F
• 2 × 1/2"-14 NPT		M
Local operation/display		
Without local display (lid closed)		0
With local display (lid closed)		1

Pressure measurement

Pressure transmitters

for applications with advanced requirements / SITRANS P320/420 / Differential pressure and flow

Selection and ordering data (continued)

	Article No.		
Pressure transmitters for differential pressure and flow, PN 160 (MAWP 2320 psi)			
SITRANS P320	7MF034	● - ● ● ● ● ● - ● ● ● ●	
SITRANS P420	7MF044	● - ● ● ● ● ● - ● ● ● ●	
With local display (lid with glass pane)			2
Pressure transmitters for differential pressure and flow, PN 420 (MAWP 6092 psi)			
SITRANS P320	7MF035	● - ● ● ● ● ● - ● ● ● ●	
SITRANS P420	7MF045	● - ● ● ● ● ● - ● ● ● ●	
Click the article number for online configuration in the PIA Life Cycle Portal.			
Communication			
HART, 4 ... 20 mA			0
PROFIBUS PA			1
FOUNDATION Fieldbus (FF)			2
Measuring cell filling			
Silicone oil			1
Inert liquid			3
Neobee oil			4
Maximum measuring span			
250 mbar (100.5 inH ₂ O)		G	
600 mbar (241.1 inH ₂ O)		H	
1600 mbar (643 inH ₂ O)		M	
5000 mbar (2009 inH ₂ O)		P	
30 bar (435 psi)		R	
Process connection			
Oval flange, fastening thread: $\frac{7}{16}$ -20 UNF (IEC 61518)		L	
Oval flange, fastening thread: M12 (PN 420) (DIN 19213)		M	
Oval flange, fastening thread: $\frac{7}{16}$ -20 UNF (IEC 61518) with lateral ventilation		N	
Oval flange, fastening thread: M12 (PN 420) (DIN 19213) with lateral ventilation		P	
Version for diaphragm seal with fastening thread $\frac{7}{16}$ -20 UNF (IEC 61518)		V	
Version for diaphragm seal with fastening thread M10 (DIN 19213)		W	
Version for diaphragm seal (one side mounted directly; other side with capillary line) with fastening thread $\frac{7}{16}$ -20 UNF (IEC 61518)		X	
Material of wetted parts: Process connection, seal diaphragm			
Stainless steel 316L/1.4404, stainless steel 316L/1.4404, process flange stainless steel 316/1.4408			0
Stainless steel 316L/1.4404, alloy C276/2.4819, process flange stainless steel 316/1.4408			1
Stainless steel 316L/1.4404 gold-plated, process flange stainless steel 316/1.4408			8
Material of non-wetted parts			
Die-cast aluminum			1
Stainless steel precision casting CF3M/1.4409 similar to 316L			2
Enclosure			
Dual chamber device			5
Type of protection			
Without Ex			A
Intrinsic safety			B
Flameproof enclosure			C
Flameproof enclosure, intrinsic safety			D
Dust protection by enclosure Zone 21/22 (DIP), increased safety Zone 2			L
Dust protection by enclosure Zone 20/21/22 (DIP), increased safety Zone 2			M
Combination of options B, C and L (Zone model)			S
Combination of options B, C and L (Zone model, Class Division)			T
Electrical connections/cable entries			
Thread for cable gland: Cable gland must be ordered separately as option (Axx)			
• 2 × M20 × 1.5			F
• 2 × ½-14 NPT			M
Local operation/display			
Without local display (lid closed)			0
With local display (lid closed)			1

Pressure measurement

Pressure transmitters

for applications with advanced requirements / SITRANS P320/420 / Differential pressure and flow

Selection and ordering data (continued)

	Article No.	
Pressure transmitters for differential pressure and flow, PN 420 (MAWP 6092 psi)		
SITRANS P320	7MF035	● - ● ● ● ● ● - ● ● ● ●
SITRANS P420	7MF045	● - ● ● ● ● ● - ● ● ● ●
With local display (lid with glass pane)		

Options	Order code
Add "-Z" to article no., add order code and plain text or entry from drop-down list.	
Cable glands included	
Plastic	A00
Metal	A01
Stainless steel	A02
Stainless steel 316L/1.4404	A03
CMP, for XP devices	A10
CAPRI ADE 4F, CuZn, cable inner diameter 7 ... 12 mm, cable outer diameter 10 ... 16 mm	A11
CAPRI ADE 4F, stainless steel, cable inner diameter 7 ... 12 mm, cable outer diameter 10 ... 16 mm	A12
Sealing plug included, plastic	A20
Sealing plug included, metal	A21
Sealing plug included, stainless steel	A22
Sealing plug included, stainless steel 316L/1.4404	A23
Device plug Han mounted left	
Device plug Han 7D (plastic, straight)	A30
Device plug Han 7D (plastic, angled)	A31
Device plug Han 7D (metal, straight)	A32
Device plug Han 7D (metal, angled)	A33
Device plug Han 8D (plastic, straight)	A34
Device plug Han 8D (plastic, angled)	A35
Device plug Han 8D (metal, straight)	A36
Device plug Han 8D (metal, angled)	A37
Cable socket included	
Plastic, for device plug Han 7D and Han 8D	A40
Metal, for device plug Han 7D and Han 8D	A41
Device plug M12 mounted left	
Stainless steel, without cable socket	A62
Stainless steel, with cable socket	A63
Cable entry/device plug mounting	
2 × sealing plugs M20 × 1.5, IP66/68 installed on both sides	A90
2 × sealing plugs ½-14 NPT, IP66/68 installed on both sides	A91
Cable gland/device plug mounted left	A97
Cable gland/device plug mounted right	A99
Nameplate labeling (standard labeling: English, unit bar)	
German (bar)	B11
French (bar)	B12
Spanish (bar)	B13
Italian (bar)	B14
Chinese (bar)	B15
Russian (bar)	B16
English (psi)	B20
English (Pa)	B30
Chinese (Pa)	B35

Selection and ordering data (continued)

Options	Order code
Add "-Z" to article no., add order code and plain text or entry from drop-down list.	
Certificates	
Quality inspection certificate, 5-point factory calibration (IEC 62828-2)	C11
Inspection certificate (EN 10204-3.1) - Material of pressurized and wetted parts	C12
Factory certificate - NACE (MR 0103-2012 and MR 0175-2009)	C13
Factory certificate (EN 10204-2.2) - Wetted parts	C14
Inspection certificate (EN 10204-3.1) - PMI test of pressurized and wetted parts	C15
Certificates for functional safety	
Functional Safety (IEC 61508) - SIL2/3	C20
Device options	
PDF file with device settings	D10
Double layer coating (epoxy resin and polyurethane) 120 µm of enclosure and lid	D20
FVMQ enclosure sealing	D21
IP66/IP68 degree of protection (not for device plug M12 and Han)	D30
Unlabeled TAG plate	D40
Without labeling of the measuring range on the TAG plate	D41
Stainless steel Ex plate 1.4404/316L	D42
Increase of pressure rating from PN 420 to PN 500 (Tested according to IEC 61010. Only permissible for process media of fluid group 2 acc. to DGRL. Not suitable for use with hazardous process media.)	D50
Extension of the medium temperature to -40 °C for measuring cell filling with inert filling liquid Please note step response time T63: 5.5 s (20 and 60 mbar); 1.4 s (250 and 600 mbar); 0.3 s (1.6 and 5 bar)	D52
Overvoltage protection up to 6 kV (internal)	D70
Overvoltage protection up to 6 kV (external)	D71
Labels on transport packaging (provided by customer)	D90
General approval without Ex approval	
Worldwide (CE, UKCA, RCM) except EAC, FM, CSA, KCC	E00
Worldwide (CE, UKCA, RCM, EAC, FM, CSA, KCC)	E01
CSA (USA and Canada)	E06
EAC	E07
FM	E08
KCC	E09
Explosion protection approvals	
ATEX (Europe)	E20
CSA (USA and Canada) ¹⁾	E21
FM (USA and Canada) ¹⁾	E22
IECEX (Worldwide)	E23
EACEx (GOST-R, -K, -B)	E24
INMETRO (Brazil)	E25
KCs (Korea)	E26
NEPSI (China)	E27
PESO (India)	E28
UKR Sepro (Ukraine)	E30
UKEX (United Kingdom)	E33
ATEX (Europe), IECEX (Worldwide) and UKEX (UK)	E47
CSA (Canada) and FM (USA) ¹⁾	E48
ATEX (Europe) and IECEX (Worldwide) + CSA (Canada) and FM (USA) ¹⁾	E49

Pressure measurement

Pressure transmitters

for applications with advanced requirements / SITRANS P320/420 / Differential pressure and flow

Selection and ordering data (continued)

Options	Order code
Add "-Z" to article no., add order code and plain text or entry from drop-down list.	
Marine approvals	
DNV-GL (Det Norske Veritas/Germanischer Lloyd)	E50
LR (Lloyds Register)	E51
BV (Bureau Veritas)	E52
ABS (American Bureau of Shipping)	E53
RMR (Russian Maritime Register)	E55
KR (Korean Register of Shipping)	E56
RINA (Registro Italiano Navale)	E57
CCS (China Classification Society)	E58
Country-specific approvals	
CRN approval Canada (Canadian Registration Number)	E60
Special approvals	
Oxygen application (with inert liquid, max. 160 bar (2 320 psi) at 100 °C (212 °F))	E80
Dual Seal	E81
WRC/WRAS (drinking water); only with process flange O-rings made of EPDM	E83
NSF61 (drinking water)	E84
ACS (drinking water)	E85
Mounting bracket	
Steel, zinc-plated	H01
Stainless steel 1.4301/304	H02
Stainless steel 1.4404/316L	H03
Process flanges; screw plug with vent valve	
Welded in on right	J08
Welded in on left	J09
Glued in on right	J10
Glued in on left	J11
Flange connections with flange EN 1092-1	
Form B1	
• DN 25 PN 40, stainless steel 1.4571/316Ti	J70
• DN 50 PN 40, stainless steel 1.4571/316Ti	J71
• DN 80 PN 40, stainless steel 1.4571/316Ti	J72
• DN 15 PN 40, stainless steel 1.4571/316Ti	J78
Form C	
• DN 25 PN 40, stainless steel 1.4571/316Ti	J73
• DN 50 PN 40, stainless steel 1.4571/316Ti	J74
• DN 80 PN 40, stainless steel 1.4571/316Ti	J75
Flange connection options	
Flange connection and temperature extension	J76
Flange connection with epoxy resin coating	J77
Process flanges; special materials	
Reserved for 7MF7: without process flanges, without screws, without gaskets	K00
Process flange material alloy C22/2.4602	K01
Process flange material Monel 400/2.4360	K02
Stainless steel with PVDF insert max. PN 10 (MAWP 145 psi), max. medium temperature 90 °C (194 °F) Process connection ½-14 NPT, on the side in the middle of the process flanges, no vent valves possible	K05
Process flanges; process connection option	
Process connection NAM (ASTAVA)	K21

Selection and ordering data (continued)

Options	Order code
Add "-Z" to article no., add order code and plain text or entry from drop-down list.	
Process flanges chambered with gaskets	
1 × chambered, graphite	K40
1 × chambered, PTFE (FDA-compliant), recommended for gas measurements	K41
Process flanges, gaskets (instead of standard gaskets FKM (FPM))	
O-ring, process flanges, PTFE	K50
O-ring, process flanges, FEP (with silicone core, approved for food)	K51
O-ring, process flanges, FFKM (FFPM)	K52
O-ring, process flanges, NBR	K53
O-ring, process flanges, EPDM	K54
Process flange options	
Process flanges for vertical differential pressure lines (half process flange)	K81
Process flanges (+) - side front	K82
Process flange screws, process flange nuts, material Monel 400/2.4360	K83
Valve ¼-18 NPT, material same as process flanges	K84
Valve mounted on the side, measured medium: Gas	K85
Oval flange attached, PTFE seal + fixing screws	K86
Valve manifolds	
With mounted valve manifold (3-way) 7MF9411-5BA, PTFE sealing rings, chrome-plated steel screws and pressure test certified in factory certificate (EN 10204-2.2)	U01
With mounted valve manifold (3-way) 7MF9411-5BA, PTFE sealing rings, stainless steel screws and pressure test certified in factory certificate (EN 10204-2.2)	U02
With mounted valve manifold (5-way) 7MF9411-5CA, PTFE sealing rings, chrome-plated steel screws and pressure test certified in factory certificate (EN 10204-2.2)	U03
With mounted valve manifold (5-way) 7MF9411-5CA, PTFE sealing rings, stainless steel screws and pressure test certified in factory certificate (EN 10204-2.2)	U04
Device settings	
Measuring span: Lower range value (max. 5 characters), upper range value (max. 5 characters), unit [mbar, bar, kPa, MPa, psi, ...], example: -0.5 ... 10.5 psi	Y01
Square-rooted characteristic curve [VSLN2, MSLN2]; example: VSLN2	Y02
TAG (on stainless steel plate and device parameters, max. 32 characters)	Y15
Measuring point description (on stainless steel plate and device parameters, max. 32 characters)	Y16
TAG short (device parameters, max. 8 characters)	Y17
Local display: [Pressure, Percent], reference [None, Absolute, Gauge], example: Pressure gauge	Y21
Local display: Scaling with standard units [m³/s, l/s, m, inch, ...], example 1 ... 5 m³/s	Y22
Local display: Scaling with user-specific units (max. 12 characters), example 1 ... 5 m	Y23
Set PROFIBUS PA device address (1 ... 126)	Y25
Saturation limits instead of 3.8 ... 20.5 mA, example: 3.8 ... 22.0 mA	Y30
Fault current instead of 3.6 mA [22.5 mA, 22.8 mA]	Y31
Damping in seconds instead of 2 s (0.0 ... 100.0 s)	Y32
ID number of special design	Y99

1) Explosion protection acc. to FM/CSA: suitable for installation according to NEC 500/505.

Pressure measurement

Pressure transmitters

for applications with advanced requirements / SITRANS P320/420 / Differential pressure and flow

Technical specifications

SITRANS P320 / SITRANS P420 for differential pressure and flow

Input	Differential pressure and flow		
Measured variable	Measuring span	Max. permissible operating pressure MAWP (PS)	Maximum permissible test pressure
Measuring span (continuously adjustable) or measuring range and max. permissible operating pressure (pursuant to Pressure Equipment Directive 2014/68/EU)	1 ... 20 mbar	160 bar	240 bar
	0.1 ... 2 kPa	16 MPa	24 MPa
	0.4019 ... 8.037 inH ₂ O	2 320 psi	3 481 psi
	1 ... 60 mbar	160 bar	240 bar
	0.1 ... 6 kPa	16 MPa	24 MPa
	0.4019 ... 24.11 inH ₂ O	2 320 psi	3 481 psi
	2.5 ... 250 mbar	160 bar	240 bar
	0.2 ... 25 kPa	16 MPa	24 MPa
	1.005 ... 100.5 inH ₂ O	2 320 psi	3 481 psi
	6 ... 600 mbar	160 bar	240 bar
	0.6 ... 60 kPa	16 MPa	24 MPa
	2.41 ... 241.1 inH ₂ O	2 320 psi	3 481 psi
	16 ... 1600 mbar	160 bar	240 bar
	1.6 ... 160 kPa	16 MPa	24 MPa
	6.43 ... 643 inH ₂ O	2 320 psi	3 481 psi
	50 ... 5 000 mbar	160 bar	240 bar
	5 ... 500 kPa	16 MPa	24 MPa
	20.09 ... 2009 inH ₂ O	2 320 psi	3 481 psi
	8 ... 160 bar	160 bar	240 bar
	0.8 ... 16 MPa	16 MPa	24 MPa
	116 ... 2 320 psi	2 320 psi	3 481 psi
	0.3 ... 30 bar	160 bar	240 bar
	0.03 ... 3 MPa	16 MPa	24 MPa
	4.35 ... 435 psi	2 320 psi	3 481 psi
	2.5 ... 250 mbar	420 bar	630 bar
	0.25 ... 25 kPa	42 MPa	63 MPa
	1.005 ... 100.5 inH ₂ O	6 092 psi	9 137 psi
	6 ... 600 mbar	420 bar	630 bar
	0.6 ... 60 kPa	42 MPa	63 MPa
	2.41 ... 241.1 inH ₂ O	6 092 psi	9 137 psi
16 ... 1600 mbar	420 bar	630 bar	
1.6 ... 160 kPa	42 MPa	63 MPa	
6.43 ... 643 inH ₂ O	6 092 psi	9 137 psi	
50 ... 5 000 mbar	420 bar	630 bar	
5 ... 500 kPa	42 MPa	63 MPa	
20.09 ... 2009 inH ₂ O	6 092 psi	9 137 psi	
0.3 ... 30 bar	420 bar	630 bar	
0.03 ... 3 MPa	42 MPa	63 MPa	
4.35 ... 435 psi	6 092 psi	9 137 psi	
Measuring limits	All measuring cells:		
• Lower measuring limit	<ul style="list-style-type: none"> -100% of max. measuring range or 30 mbar a /3 kPa a /0.44 psi a 		
- Measuring cell with silicone oil filling	Measuring cell 160 bar/16 MPa/2 320 psi: <ul style="list-style-type: none"> -25% of maximum measuring range or 30 mbar a /3 kPa a /0.44 psi a 		
- Measuring cell with inert liquid	For medium temperature -20 °C < ϑ ≤ +60 °C (-4 °F < ϑ ≤ +140 °F)	-100% of maximum measuring range or 30 mbar a /3 kPa a /0.44 psi a	
	For medium temperature 60 °C < ϑ ≤ +100 °C (max. 85 °C for measuring cell 30 bar with PN 420) (140 °F < ϑ ≤ +212 °F (max. 185 °F for measuring cell 435 psi))	-100% of maximum measuring range or 30 mbar a /3 kPa a /0.44 psi a	
		30 mbar a + 20 mbar a · (ϑ - 60 °C)/°C 3 kPa a + 2 kPa a · (ϑ - 60 °C)/°C 0.44 psi a + 0.29 psi a · (ϑ - 140 °F)/°F	
- Measuring cell with FDA-compliant oil	For medium temperature -10 °C < ϑ ≤ +100 °C (-14 °F < ϑ ≤ +212 °F)	-100% of maximum measuring range or 100 mbar a /10 kPa a /14.5 psi a	
• Upper measuring limit	100% of the max. measuring span (for oxygen measurement max. 100 bar/10 MPa/1450 psi and 60 °C (140 °F) ambient temperature/medium temperature)		

Technical specifications (continued)

SITRANS P320 / SITRANS P420 for differential pressure and flow	
• Lower range value	Between the measuring limits (continuously adjustable)
Output	HART
Output signal	4 ... 20 mA
• Lower saturation limit (continuously adjustable)	3.55 mA, factory set to 3.8 mA
• Upper saturation limit (continuously adjustable)	22.8 mA, factory-set to 20.5 mA or optionally 22.0 mA
• Ripple (without HART communication)	$I_{pp} \leq 0.5\%$ of max. output current
Adjustable damping	0 ... 100 s, continuously adjustable over remote operation 0 ... 100 s, in increments of 0.1 s, adjustable over local display
• Current simulator	3.55 ... 22.8 mA
• Failure signal	3.55 ... 22.8 mA
Load	Resistance R [Ω]
• Without HART communication	$R = (U_H - 10.5 \text{ V}) / 22.8 \text{ mA}$, U_H : Auxiliary power in V
• With HART communication	$R = 230 \dots 1100 \Omega$
Characteristic curve	<ul style="list-style-type: none"> • Linearly increasing or linearly decreasing • Linear increase or decrease or according to the square root (only for differential pressure and flow)
Physical bus	-
Polarity-independent	-
Measuring accuracy	
Reference conditions	<ul style="list-style-type: none"> • According to IEC 62828-1 • Rising characteristic curve • Lower range value 0 bar/kPa/psi • Seal diaphragm stainless steel • Measuring cell with silicone oil filling • Room temperature 25 °C (77 °F)
Characteristic curve deviation at limit point setting, including hysteresis and repeatability	
Measuring span ratio r (spread, Turn-Down)	$r = \text{maximum measuring span/set measuring span or nominal measuring range}$
• Linear characteristic curve	
- 20 mbar/2 kPa/0.29 psi	$r \leq 5:$ $\leq 0.075\%$ $5 < r \leq 20:$ $\leq (0.005 \cdot r + 0.05)\%$
- 60 mbar/6 kPa/0.87 psi	$r \leq 5:$ $\leq 0.075\%$ $5 < r \leq 60:$ $\leq (0.005 \cdot r + 0.05)\%$
- 250 mbar/25 kPa/3.63 psi 600 mbar/60 kPa/8.7 psi 1600 mbar/160 kPa/23.21 psi 5 bar/500 kPa/72.5 psi 30 bar/3 MPa/435 psi	$r \leq 5:$ $\leq 0.065\%$ (SITRANS P320) $5 < r \leq 100:$ $\leq (0.004 \cdot r + 0.045)\%$ (SITRANS P320)
- 160 bar/16 MPa/2 320 psi	$r \leq 5:$ $\leq 0.065\%$ (SITRANS P320) $5 < r \leq 20:$ $\leq (0.004 \cdot r + 0.045)\%$ (SITRANS P320)
- 250 mbar/25 kPa/3.63 psi (PN 160) 600 mbar/60 kPa/8.7 psi 1600 mbar/160 kPa/23.21 psi 5 bar/500 kPa/72.5 psi 30 bar/3 MPa/435 psi	$r \leq 5:$ $\leq 0.04\%$ (SITRANS P420) $5 < r \leq 100:$ $\leq (0.004 \cdot r + 0.045)\%$ (SITRANS P420)
- 160 bar/16 MPa/2 320 psi	$r \leq 5:$ $\leq 0.04\%$ (SITRANS P420) $5 < r \leq 20:$ $\leq (0.004 \cdot r + 0.045)\%$ (SITRANS P420)
- 250 mbar/25 kPa/3.63 psi (PN 420)	$r \leq 5:$ $\leq 0.065\%$ (SITRANS P420)
• Square-rooted characteristic curve (flow > 50%)	
- 20 mbar/2 kPa/0.29 psi	$r \leq 5:$ $\leq 0.075\%$ $5 < r \leq 20:$ $\leq (0.005 \cdot r + 0.05)\%$
- 60 mbar/6 kPa/0.87 psi	$r \leq 5:$ $\leq 0.075\%$ $5 < r \leq 60:$ $\leq (0.005 \cdot r + 0.05)\%$
- 250 mbar/25 kPa/3.63 psi	$r \leq 5:$ $\leq 0.065\%$ (SITRANS P320) $\leq 0.04\%$ (SITRANS P420)

Pressure measurement

Pressure transmitters

for applications with advanced requirements / SITRANS P320/420 / Differential pressure and flow

Technical specifications (continued)

SITRANS P320 / SITRANS P420 for differential pressure and flow		
600 mbar/60 kPa/8.7 psi 1600 mbar/160 kPa/23.21 psi 5 bar/500 kPa/72.5 psi 30 bar/3 MPa/435 psi	5 < r ≤ 100:	≤ (0.004 · r + 0.045)%
- 160 bar/16 MPa/2 320 psi	r ≤ 5:	≤ 0.065% (SITRANS P320) ≤ 0.04% (SITRANS P420)
• Square-rooted characteristic curve (flow 25 ... 50%)	5 < r ≤ 20:	≤ (0.004 · r + 0.045)%
- 20 mbar/2 kPa/0.29 psi	r ≤ 5:	≤ 0.15%
- 60 mbar/6 kPa/0.87 psi	5 < r ≤ 20:	≤ (0.01 · r + 0.1)%
- 250 mbar/25 kPa/3.63 psi 600 mbar/60 kPa/8.7 psi 1600 mbar/160 kPa/23.21 psi 5 bar/500 kPa/72.5 psi 30 bar/3 MPa/435 psi	r ≤ 5:	≤ 0.15%
- 160 bar/16 MPa/2 320 psi	5 < r ≤ 60:	≤ (0.01 · r + 0.1)%
- 250 mbar/25 kPa/3.63 psi 600 mbar/60 kPa/8.7 psi 1600 mbar/160 kPa/23.21 psi 5 bar/500 kPa/72.5 psi 30 bar/3 MPa/435 psi	r ≤ 5:	≤ 0.13% (SITRANS P320) ≤ 0.08% (SITRANS P420)
- 160 bar/16 MPa/2 320 psi	5 < r ≤ 100:	≤ (0.008 · r + 0.09)%
- 160 bar/16 MPa/2 320 psi	r ≤ 5:	≤ 0.13% (SITRANS P320) ≤ 0.08% (SITRANS P420)
- 160 bar/16 MPa/2 320 psi	5 < r ≤ 20:	≤ (0.008 · r + 0.09)%
Influence of ambient temperature (in % per 28 °C (50 °F))		
- 20 mbar/2 kPa/0.29 psi		≤ (0.15 · r + 0.1)%
- 60 mbar/6 kPa/0.87 psi		≤ (0.075 · r + 0.1)%
- 250 mbar/25 kPa/3.63 psi 600 mbar/60 kPa/8.7 psi 1600 mbar/160 kPa/23.21 psi 5 bar/500 kPa/72.5 psi 30 bar/3 MPa/435 psi 160 bar/16 MPa/2 320 psi		≤ (0.025 · r + 0.125)% (SITRANS P320)
- 250 mbar/25 kPa/3.63 psi 5 bar/500 kPa/72.5 psi		≤ (0.025 · r + 0.0625)% (SITRANS P420)
- 600 mbar/60 kPa/8.7 psi 1600 mbar/160 kPa/23.21 psi 30 bar/3 MPa/435 psi 160 bar/16 MPa/2 320 psi		≤ (0.0125 · r + 0.0625)% (SITRANS P420)
Effect of static pressure		
• At the lower range value	Zero offset is possible with position error compensation	
- 20 mbar/2 kPa/0.29 psi		≤ (0.3 · r)% per 70 bar (SITRANS P320) ≤ (0.2 · r)% per 70 bar (SITRANS P420)
- 60 mbar/6 kPa/0.87 psi 250 mbar/25 kPa/3.63 psi 600 mbar/60 kPa/8.7 psi 1600 mbar/160 kPa/23.21 psi 30 bar/3 MPa/435 psi 160 bar/16 MPa/2 320 psi		≤ (0.1 · r)% per 70 bar
- 5 bar/500 kPa/72.5 psi		≤ (0.15 · r)% per 70 bar
• On the measuring span		
- 20 mbar/2 kPa/0.29 psi		≤ 0.2% per 70 bar
- 60 mbar/6 kPa/0.87 psi 250 mbar/25 kPa/3.63 psi 600 mbar/60 kPa/8.7 psi 1600 mbar/160 kPa/23.21 psi 5 bar/500 kPa/72.5 psi 30 bar/3 MPa/435 psi 160 bar/16 MPa/2 320 psi		≤ 0.1% per 70 bar
Long-term stability at ±30 °C (± 54 °F)	Static pressure max. 70 bar/7 MPa/1015 psi	

Technical specifications (continued)

SITRANS P320 / SITRANS P420 for differential pressure and flow	
<ul style="list-style-type: none"> • 20 mbar/2 kPa/0.29 psi • 60 mbar/6 kPa/0.87 psi • 250 mbar/25 kPa/3.63 psi • 600 mbar/60 kPa/8.7 psi • 1600 mbar/160 kPa/23.21 psi • 5 bar/500 kPa/72.5 psi • 160 bar/16 MPa/2 320 psi • 30 bar/3 MPa/435 psi 	<ul style="list-style-type: none"> ≤ (0.2 · r)% per year In 5 years ≤ (0.25 · r)% In 5 years ≤ (0.125 · r)% In 10 years ≤ (0.15 · r)% In 5 years ≤ (0.25 · r)% In 10 years ≤ (0.35 · r)%
Step response time T_{63} (without electrical damping for pressure rating PN 160)	
<ul style="list-style-type: none"> • 20 mbar/2 kPa/0.29 psi • 60 mbar/6 kPa/0.87 psi • 250 mbar/25 kPa/3.63 psi • 600 mbar/60 kPa/8.7 psi • 1600 mbar/160 kPa/23.21 psi • 5 bar/500 kPa/72.5 psi • 30 bar/3 MPa/435 psi • 160 bar/16 MPa/2 320 psi 	<ul style="list-style-type: none"> Approx. 0.160 s Approx. 0.150 s Approx. 0.135 s
Effect of mounting position (in pressure per change of angle)	≤ 0.7 mbar/0.07 kPa/0.028 inH ₂ O per 10° incline (zero offset is possible with position error compensation)
Effect of auxiliary power (in % per voltage change)	0.005% per 1 V
Operating conditions	
Medium temperature	
<ul style="list-style-type: none"> • Measuring cell with silicone oil filling - Measuring cell 30 bar (435 psi) - Measuring cell 160 bar (2 320 psi) • Measuring cell with inert oil • Measuring cell with FDA-compliant oil 	<ul style="list-style-type: none"> -40 ... +100 °C (-40 ... +212 °F) -20 ... +100 °C (-4 ... +212 °F) -20 ... +100 °C (-4 ... +212 °F) -20 ... +100 °C (-4 ... +212 °F) -10 ... +100 °C (14 ... +212 °F)
Ambient conditions	
<ul style="list-style-type: none"> • Ambient temperature/enclosure - Measuring cell with silicone oil filling - Measuring cell with inert oil - Measuring cell with FDA-compliant oil - Local display • Storage temperature • Climatic class in accordance with IEC 60721-3-4 • Degree of protection - According to IEC 60529 - According to NEMA 250 • Electromagnetic compatibility - Emitted interference and interference immunity 	<ul style="list-style-type: none"> Observe the temperature class in hazardous areas. -40 ... +85 °C (-40 ... +185 °F) -40 ... +85 °C (-40 ... +185 °F) -10 ... +85 °C (14 ... +185 °F) -20 ... +80 °C (-4 ... +176 °F) -50 ... +85 °C (-58 ... +185 °F) (with FDA-compliant oil: -20 ... +85 °C (-4 ... +185 °F)) 4K4H IP66, IP68 Type 4X According to IEC 61326 and NAMUR NE 21
Structural design	
Weight	<ul style="list-style-type: none"> • Aluminum enclosure: Approx. 3.9 kg (8.5 lbs) • Stainless steel enclosure: Approx. 5.9 kg (13 lbs)
Material	
<ul style="list-style-type: none"> • Material of wetted parts - Seal diaphragm - Process flanges - Sealing plug - O-ring • Material of non-wetted parts 	<ul style="list-style-type: none"> Stainless steel, mat. no. 1.4404/316L, Alloy C276, mat. no. 2.4819, Monel, mat. no. 2.4360, tantalum or gold Stainless steel, mat. no. 1.4408 to PN 160, mat. no. 1.4571/316Ti for PN 420, Alloy C22, 2.4602 or Monel, mat. no. 2.4360 1.4404 or as option alloy C22; 2.4602 or Monel mat. no. 2.4360 FPM (Viton) or optionally: PTFE, FEP, FEPM and NBR

Pressure measurement

Pressure transmitters

for applications with advanced requirements / SITRANS P320/420 / Differential pressure and flow

Technical specifications (continued)

SITRANS P320 / SITRANS P420 for differential pressure and flow	
- Electronics enclosure	<ul style="list-style-type: none"> Low-copper die-cast aluminum GD-ALSi 12 or stainless steel precision casting, mat. no. 1.4409/ CF-3M Standard: Powder coating with polyurethane Option: 2 coats: Coat 1: Epoxy-based; coat 2: Polyurethane Stainless steel nameplate (1.4404/316L)
- Process flange screws	Stainless steel ISO 3506-1 A4-70
- Mounting bracket	Steel, zinc-plated steel, or stainless steel
Process connection	¼-18 NPT internal thread and flange connection with 7/16-20 UNF fastening thread according to EN 61518 or M10 according to DIN 19213 (M12 for PN 420 (MWP 6 092 psi))
Electrical connection	Screw terminals Cable entry via the following screw glands: <ul style="list-style-type: none"> M20 × 1.5 ½-14 NPT Device plug Han 7D/Han 8D¹⁾ Device plug M12
Displays and controls	
Buttons	4 buttons for operation directly on the device
Local display	<ul style="list-style-type: none"> With or without integrated local display (optional) Lid with inspection window (optional)
Auxiliary power U_H	
Terminal voltage on pressure transmitter	10.5 ... 45 V DC 10.5 ... 30 V DC in intrinsically safe mode
Ripple	$U_{SS} \leq 0.2 \text{ V}$ (47 ... 125 Hz)
Noise	$U_{eff} \leq 1.2 \text{ mV}$ (0.5 ... 10 kHz)
Auxiliary power	–
Separate supply voltage	–
Certificates and approvals	
Classification according to pressure equipment directive (PED 2014/68/EU)	For gases of fluid group 1 and liquids of fluid group 1; complies with requirements of article 4, paragraph 3 (sound engineering practice) For flow only For gases of fluid group 1 and liquids of fluid group 1; fulfills the basic safety requirements as per article 3, paragraph 1 (appendix 1); classified as category III, module H conformity evaluation by TÜV Nord
Drinking water	
• WRAS (England)	No.: 1903094 (option E83)
• ACS (France)	No.: 18 ACC LY 277 (option E85)
• NSF (USA)	No.: 20180920-MH61350 (option E84)
CRN (Canada)	No.: 0F9863.5C (option E60)
Explosion protection acc. to NEPSI (China)	No.: GYJ19.1058X (option E27)
Explosion protection acc. to INMETRO (Brazil)	No.: BRA-18-GE-0035X (option E25)
Explosion protection	
• Intrinsic safety "i"	
- Marking	II 1/2 G Ex ia/ib IIC T4/T6 Ga/Gb
- Permissible ambient temperature	-40 ... +80 °C (-40 ... +176 °F) temperature class T4 -40 ... +70 °C (-40 ... +158 °F) temperature class T6
- Permissible medium temperature	-40 ... +100 °C (-40 ... +212 °F) temperature class T4 -40 ... +70 °C (-40 ... +158 °F) temperature class T6
- Connection	To certified intrinsically safe circuits with peak values: $U_i = 30 \text{ V}$, $I_i = 101 \text{ mA}$, $P_i = 760 \text{ mW}$ $U_i = 29 \text{ V}$, $I_i = 110 \text{ mA}$, $P_i = 800 \text{ mW}$
- Effective internal inductance/capacitance	$L_i = 0.24 \mu\text{H}/C_i = 3.29 \text{ nF}$
• Flameproof enclosure "d"	
- Marking	Ex II 1/2 G Ex ia/db IIC T4/T6 Ga/Gb
- Permissible ambient temperature	-40 ... +80 °C (-40 ... +176 °F) temperature class T4 -40 ... +70 °C (-40 ... +158 °F) temperature class T6
- Permissible medium temperature	-40 ... +100 °C (-40 ... +212 °F) temperature class T4 -40 ... +70 °C (-40 ... +158 °F) temperature class T6
- Connection	To a circuit with the operating values: $U_n = 10.5 \dots 45 \text{ V}$, $4 \dots 20 \text{ mA}$

Technical specifications (continued)

SITRANS P320 / SITRANS P420 for differential pressure and flow

• Dust explosion protection for Zones 21, 22	
- Marking	Ex II 2D Ex tb IIIC T120 °C Db Ex II 3D Ex tc IIIC T120 °C Dc
- Permissible ambient temperature	-40 ... +80 °C (-40 ... +176 °F)
- Permissible medium temperature	-40 ... +100 °C (-40 ... +212 °F)
- Max. surface temperature	120 °C (248 °F)
- Connection	To a circuit with the operating values: $U_n = 10.5 \dots 45 \text{ V}$, $4 \dots 20 \text{ mA}$
• Dust explosion protection for Zones 20, 21, 22	
- Marking	Ex II 1D Ex ia IIIC T120 °C Da Ex II 2D Ex ib IIIC T120 °C Db
- Permissible ambient temperature	-40 ... +80 °C (-40 ... +176 °F)
- Permissible medium temperature	-40 ... +100 °C (-40 ... +212 °F)
- Connection	To certified intrinsically safe circuits with peak values: $U_i = 30 \text{ V}$, $I_i = 101 \text{ mA}$, $P_i = 760 \text{ mW}$ $U_i = 29 \text{ V}$, $I_i = 110 \text{ mA}$, $P_i = 800 \text{ mW}$ $L_i = 0.24 \mu\text{H}/C_i = 3.29 \text{ nF}$
- Effective internal inductance/capacitance	
• Type of protection for Zone 2	
- Marking	Ex II 3G Ex ec IIC T4/T6 Gc
- Permissible ambient temperature "ec"	-40 ... +80 °C (-40 ... +176 °F) temperature class T4 -40 ... +40 °C (-40 ... +104 °F) temperature class T6
- Permissible medium temperature	-40 ... +100 °C (-40 ... +212 °F) temperature class T4 -40 ... +70 °C (-40 ... +158 °F) temperature class T6
- "ec" connection	To a circuit with the operating values: $U_n = 10.5 \dots 30 \text{ V}$, $4 \dots 20 \text{ mA}$
• Explosion protection acc. to FM	Available soon
- Marking (XP/DIP) or IS; NI; S	CL I, DIV 1, GP ABCD T4 ... T6; CL II, DIV 1, GP EFG; CL III; Ex ia IIC T4 ... T6: CL I, DIV 2, GP ABCD T4 ... T6; CL II, DIV 2, GP FG; CL III
• Explosion protection according to CSA	Available soon
- Marking (XP/DIP) or (IS)	CL I, DIV 1, GP ABCD T4 ... T6; CL II, DIV 1, GP EFG; CL III; Ex ia IIC T4 ... T6: CL I, DIV 2, GP ABCD T4 ... T6; CL II, DIV 2, GP FG; CL III
NAMUR recommendations	
• NE 06	Standardized Electrical Signals and Questions Relating to Engineering Technology
• NE 21	Electromagnetic Compatibility (EMC) of Industrial Process and Laboratory Control Equipment
• NE 23	Extra Low Voltage Circuits with Safe Separation
• NE 43	Standardization of the signal level for the failure information of digital transmitters with analog output signal
• NE 53	Software and Hardware of Field Devices and Signal Processing Devices with Digital Electronics
• NE 80	The Application of the Pressure Equipment Directive to Process Control Devices
• NE 105	Specifications for Integrating Fieldbus Devices in Engineering Tools for Field Devices
• NE 107	Self-Monitoring and Diagnosis of Field Devices
• NE 131	NAMUR Standard Device - Field Devices for Standard Applications

Communication

HART	
HART Protocol	230 ... 1 100 Ω HART 7
Software for computer	SIMATIC PDM
PROFIBUS PA	
Simultaneous communication with master class 2 (max.)	4
The address can be set using	Configuration tool or local operation (default setting address 126)
Cyclic data usage	
• Output byte	≤ 35 (7 measured values)
• Input byte	0, 1, or 2 (register operation mode and reset function for dosing)

Pressure measurement

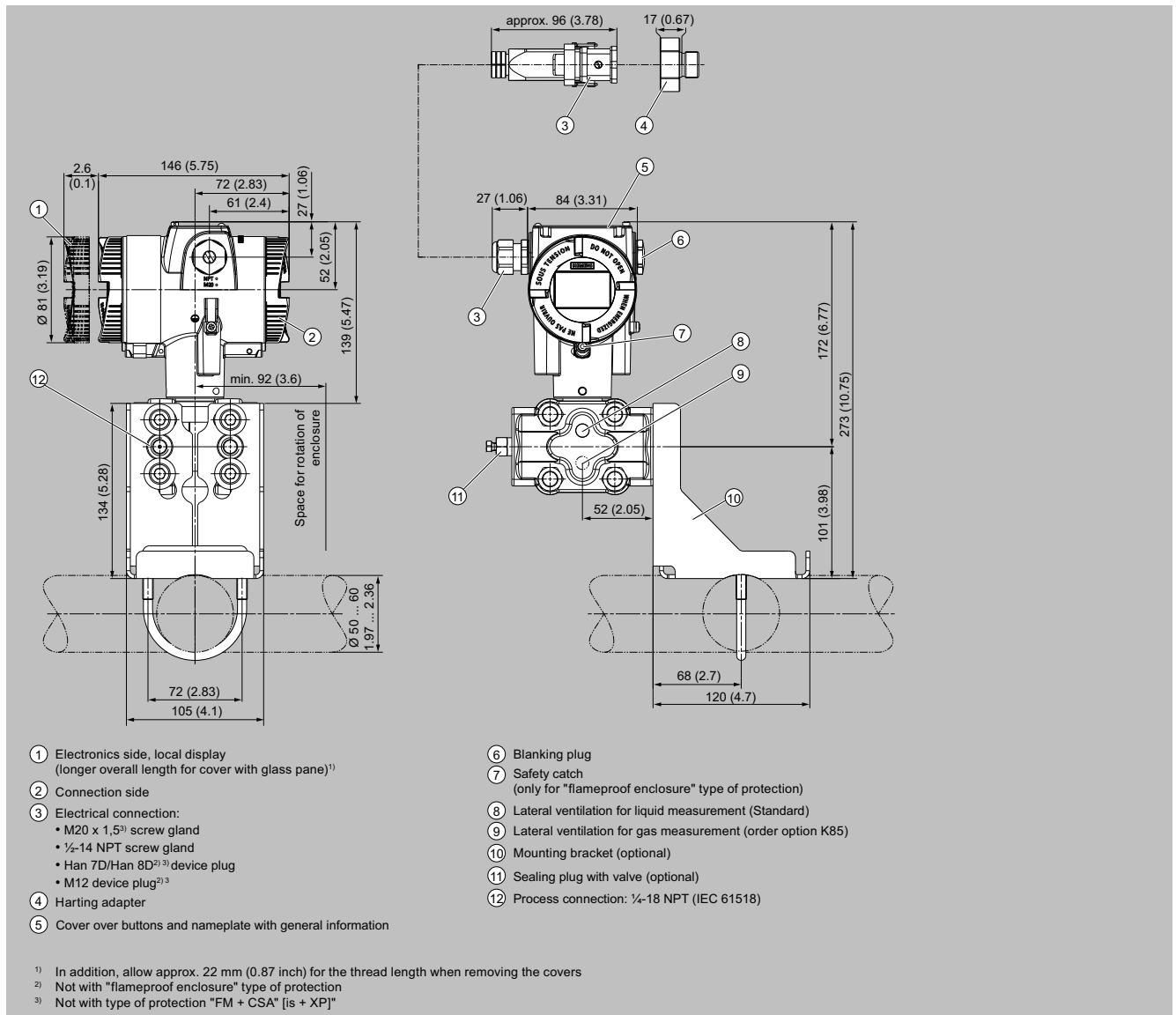
Pressure transmitters

for applications with advanced requirements / SITRANS P320/420 / Differential pressure and flow

Technical specifications (continued)

Communication	
Internal preprocessing	
Device profile	PROFIBUS PA Profile Version 4.01 Class B. Cyclic data usage compatible with version 3.XX
Number of function blocks	7
• Analog input	
- Adaptation to user-specific process variable	Yes, linearly rising or falling characteristic curve
- Electrical damping adjustable	0 ... 100 s
- Simulation function	Output/input
- Limit monitoring	Yes, one upper and lower warning limit and one alarm limit respectively
• Register (totalizer)	Can be reset, preset, optional direction of counting, simulation function of register output
- Limit monitoring	One upper and lower warning limit and one alarm limit respectively
• Physical block	1
Transducer blocks	1
• Pressure transducer block	
- Can be calibrated by applying two pressures	Yes
- Monitoring of sensor limits	Yes
- Specification of a vessel characteristic curve with	Max. 30 nodes
- Square-rooted characteristic curve for flow measurement	Yes
- Tank characteristic curve for volume measurement	Yes
- Low flow cut-off and implementation point of square-root extraction	Parameterizable
- Simulation function for measured pressure value and sensor temperature	Constant value or by means of parameterizable ramp function
FOUNDATION Fieldbus	
Device profile	FF ITK 6
Function blocks	3 function blocks analog input, 1 function block PID
• Analog input	
- Adaptation to user-specific process variable	Yes, linearly rising or falling characteristic curve
- Electrical damping adjustable	0 ... 100 s
- Simulation function	Output/input (can be locked within the device with a bridge)
- Failure mode	Parameterizable (last good value, substitute value, incorrect value)
- Limit monitoring	Yes, one upper and lower warning limit and one alarm limit respectively
- Square-rooted characteristic curve for flow measurement	Yes
• PID	Standard FOUNDATION Fieldbus function block
• Physical block	1 resource block
Transducer blocks	1 transducer block Pressure with calibration, 1 transducer block LCD
• Pressure transducer block	
- Can be calibrated by applying two pressures	Yes
- Monitoring of sensor limits	Yes
- Simulation function: pressure measurement, sensor temperature and electronics temperature	Constant value or by means of parameterizable ramp function

Dimensional drawings



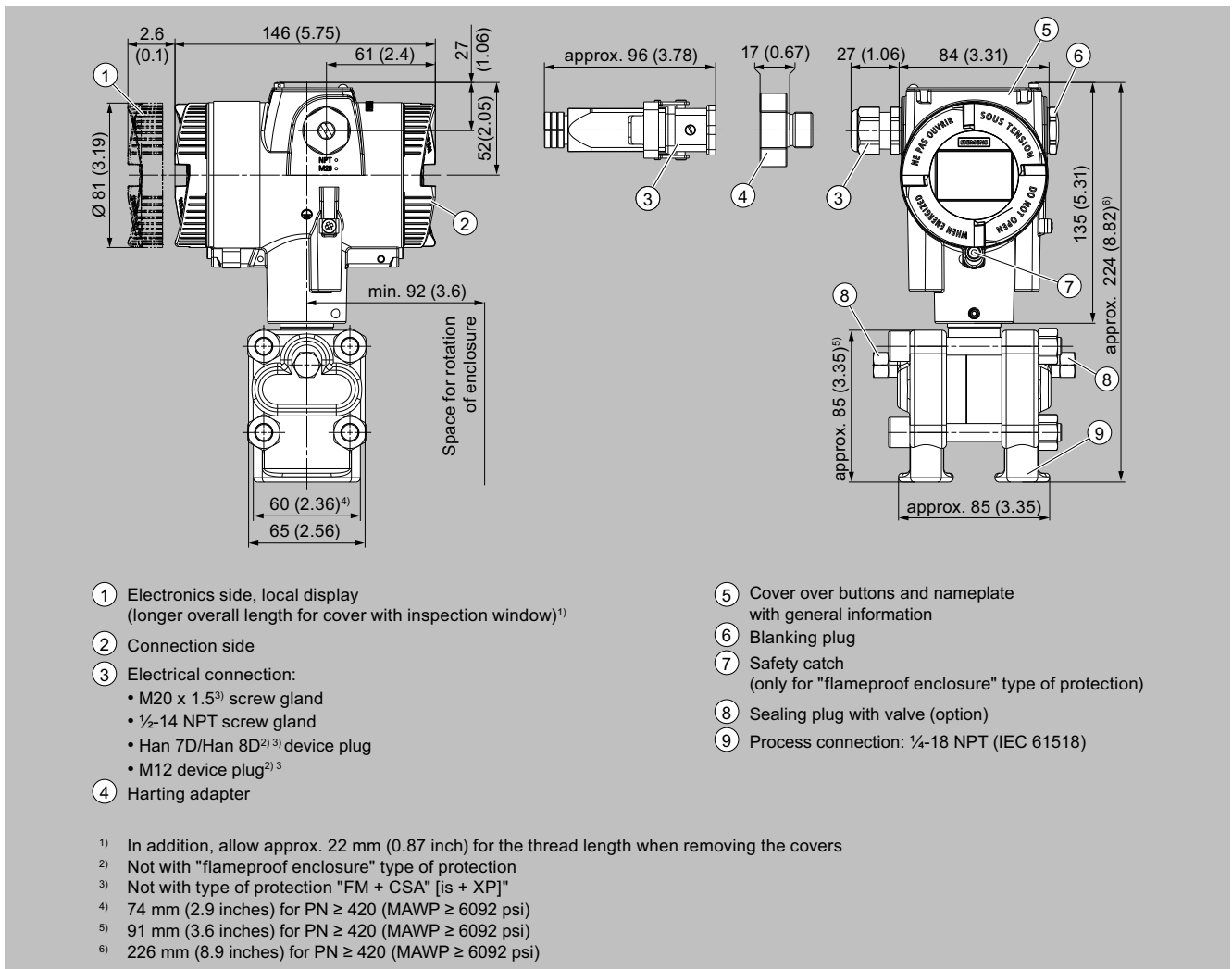
SITRANS P320/P420 pressure transmitter for differential pressure and flow, dimensions in mm (inch)

Pressure measurement

Pressure transmitters

for applications with advanced requirements / SITRANS P320/420 / Differential pressure and flow

Dimensional drawings (continued)



SITRANS P320/P420 pressure transmitter for differential pressure and flow with process covers for vertical differential pressure lines (option "K81"), dimensions in mm (inch)

Selection and ordering data

	Article No.								
Pressure transmitters for level									
SITRANS P320	7MF036	●	-	●	●	●	●	●	●
SITRANS P420	7MF046	●	-	●	●	●	●	●	●
Click the article number for online configuration in the PIA Life Cycle Portal.									
Communication									
HART, 4 ... 20 mA									0
PROFIBUS PA									1
FOUNDATION Fieldbus (FF)									2
Measuring cell filling									
Silicone oil									1
Maximum measuring span									
60 mbar (24.11 inH ₂ O)									D
250 mbar (100.5 inH ₂ O)									G
600 mbar (241 inH ₂ O)									H
1600 mbar (643 inH ₂ O)									M
5000 mbar (72.5 psi)									P
30 bar (435 psi)									R
160 bar (2321 psi)									Y
Process connection									
Version for diaphragm seal with fastening thread $7/16$ -20 UNF (IEC 61518): Remote seal 7MF0814 must be ordered separately.									
									V
Material of wetted parts: Process connection, seal diaphragm									
Stainless steel 316L/1.4404, stainless steel 316L/1.4404, process flange stainless steel 316/1.4408									0
Stainless steel 316L/1.4404; alloy C276/2.4819, process flange stainless steel 316/1.4408									1
Sensor pressure: Alloy C22/2.4602, alloy C276/2.4819									2
Sensor differential pressure: Alloy C276/2.4819, alloy C276/2.4819; process flange stainless steel 316/1.4408									
Tantalum, tantalum, process flange stainless steel 316/1.4408									4
Monel 400/2.4360, Monel 400/2.4360; process flange: Stainless steel 316/1.4408									6
Stainless steel 316L/1.4404, gold-plated; process flange stainless steel 316/1.4408									8
Material of non-wetted parts									
Die-cast aluminum									1
Stainless steel precision casting CF3M/1.4409 similar to 316L									2
Enclosure									
Dual chamber device									5
Type of protection									
Without Ex									A
Intrinsic safety									B
Flameproof enclosure									C
Flameproof enclosure, intrinsic safety									D
Dust protection by enclosure Zone 21/22 (DIP), increased safety Zone 2									L
Intrinsic safety, dust protection by enclosure Zone 20/21/22 (DIP), increased safety Zone 2									M
Combination of options B, C and L (Zone model)									S
Combination of options B, C and L (Zone model, Class Division)									T
Electrical connections/cable entries									
Thread for cable gland: Cable gland must be ordered separately as option (Axx)									
• 2 × M20 × 1.5									F
• 2 × ½-14 NPT									M
Local operation/display									
Without local display (lid closed)									0
With local display (lid closed)									1
With local display (lid with glass pane)									2

Options	Order code
Add "-Z" to article number, specify order code and plain text or entry from drop-down list.	
Cable glands included	
Plastic	A00
Metal	A01

Pressure measurement

Pressure transmitters

for applications with advanced requirements / SITRANS P320/420 / Level

Selection and ordering data (continued)

Options	Order code
Add "-Z" to article number, specify order code and plain text or entry from drop-down list.	
Stainless steel	A02
Stainless steel 316L/1.4404	A03
CMP, for XP devices	A10
CAPRI ADE 4F, CuZn, cable inner diameter 7 ... 12 mm, cable outer diameter 10 ... 16 mm	A11
CAPRI ADE 4F, stainless steel, cable inner diameter 7 ... 12 mm, cable outer diameter 10 ... 16 mm	A12
Sealing plug included, plastic	A20
Sealing plug included, metal	A21
Sealing plug included, stainless steel	A22
Sealing plug included, stainless steel 316L/1.4404	A23
Device plug Han mounted left	
Device plug Han 7D (plastic, straight)	A30
Device plug Han 7D (plastic, angled)	A31
Device plug Han 7D (metal, straight)	A32
Device plug Han 7D (metal, angled)	A33
Device plug Han 8D (plastic, straight)	A34
Device plug Han 8D (plastic, angled)	A35
Device plug Han 8D (metal, straight)	A36
Device plug Han 8D (metal, angled)	A37
Cable socket included	
Plastic, for device plug Han 7D and Han 8D	A40
Metal, for device plug Han 7D and Han 8D	A41
Device plug M12 mounted left	
Stainless steel, without cable socket	A62
Stainless steel, with cable socket	A63
Cable entry/device plug mounting	
2× sealing plugs M20 × 1.5, IP66/68 installed on both sides	A90
2× sealing plugs ½-14 NPT, IP66/68 installed on both sides	A91
Cable gland/device plug mounted left	A97
Cable gland/device plug mounted right	A99
Nameplate labeling (standard labeling: English, unit bar)	
German (bar)	B11
French (bar)	B12
Spanish (bar)	B13
Italian (bar)	B14
Chinese (bar)	B15
Russian (bar)	B16
English (psi)	B20
English (Pa)	B30
Chinese (Pa)	B35
Certificates	
Quality inspection certificate, 5-point factory calibration (IEC 62828-2)	C11
Inspection certificate (EN 10204-3.1) - Material of pressurized and wetted parts	C12
Factory certificate - NACE (MR 0103-2012 and MR 0175-2009)	C13
Factory certificate (EN 10204-2.2) - Wetted parts	C14
Inspection certificate (EN 10204-3.1) - PMI test of pressurized and wetted parts	C15
Certificates for functional safety	
Functional Safety (IEC 61508) - SIL2/3	C20

Selection and ordering data (continued)

Options	Order code
Add "-Z" to article number, specify order code and plain text or entry from drop-down list.	
Device options	
PDF file with device settings	D10
Double layer coating (epoxy resin and polyurethane) 120 µm of enclosure and lid	D20
FVMQ enclosure sealing	D21
IP66/IP68 degree of protection (not for device plug M12 and Han)	D30
Unlabeled TAG plate	D40
Without labeling of the measuring range on the TAG plate	D41
Stainless steel Ex plate 1.4404/316L	D42
Overvoltage protection up to 6 kV (internal)	D70
Overvoltage protection up to 6 kV (external)	D71
Labels on transport packaging (provided by customer)	D90
General approval without Ex approval	
Worldwide (CE, UKCA, RCM) except EAC, FM, CSA, KCC	E00
Worldwide (CE, UKCA, RCM, EAC, FM, CSA, KCC)	E01
CSA (USA and Canada)	E06
EAC	E07
FM	E08
KCC	E09
Explosion protection approvals	
ATEX (Europe)	E20
CSA (USA and Canada) ¹⁾	E21
FM (USA and Canada) ¹⁾	E22
IECEX (Worldwide)	E23
EACEx (GOST-R, -K, -B)	E24
INMETRO (Brazil)	E25
KCs (Korea)	E26
NEPSI (China)	E27
PESO (India)	E28
UKR Sepro (Ukraine)	E30
UKEX (United Kingdom)	E33
ATEX (Europe), IECEX (Worldwide) and UKEX (UK)	E47
CSA (Canada) and FM (USA) ¹⁾	E48
ATEX (Europe) and IECEX (Worldwide) + CSA (Canada) and FM (USA) ¹⁾	E49
Marine approvals	
DNV-GL (Det Norske Veritas/Germanischer Lloyd)	E50
LR (Lloyds Register)	E51
BV (Bureau Veritas)	E52
ABS (American Bureau of Shipping)	E53
RMR (Russian Maritime Register)	E55
KR (Korean Register of Shipping)	E56
RINA (Registro Italiano Navale)	E57
CCS (China Classification Society)	E58
Country-specific approvals	
CRN approval Canada (Canadian Registration Number)	E60
Special approvals	
Oxygen application (with inert liquid, max. 160 bar (2 320 psi) at 100 °C (212 °F))	E80
Dual Seal	E81

Pressure measurement

Pressure transmitters

for applications with advanced requirements / SITRANS P320/420 / Level

Selection and ordering data (continued)

Options	Order code
Add "-Z" to article number, specify order code and plain text or entry from drop-down list.	
WRC/WRAS (drinking water); only with process flange O-rings made of EPDM	E83
NSF61 (drinking water)	E84
ACS (drinking water)	E85
Process flanges	
Gasket process flange 1 × chambered, graphite	K40
Gasket process flange, 1 × chambered, PTFE	K41
Vent valve in the material of the process flange	K84
Device settings	
Measuring span: Lower range value (max. 5 characters), upper range value (max. 5 characters), unit [mbar, bar, kPa, MPa, psi, ...], example: -0.5 ... 10.5 psi	Y01
TAG (on stainless steel plate and device parameters, max. 32 characters)	Y15
Measuring point description (on stainless steel plate and device parameters, max. 32 characters)	Y16
TAG short (device parameters, max. 8 characters)	Y17
Local display: [Pressure, Percent], reference [None, Absolute, Gauge], example: Pressure gauge	Y21
Local display: Scaling with standard units [m ³ /s, l/s, m, inch, ...]; example 1 ... 5 m	Y22
Local display: Scaling with user-specific units (max. 12 characters), example 1 ... 5 m	Y23
Set PROFIBUS PA device address (1 ... 126)	Y25
Saturation limits instead of 3.8 ... 20.5 mA, example: 3.8 ... 22.0 mA	Y30
Fault current instead of 3.6 mA [22.5 mA, 22.8 mA]	Y31
Damping in seconds instead of 2 s (0.0 ... 100.0 s)	Y32
ID number of special design	Y99

¹⁾ Explosion protection acc. to FM/CSA: suitable for installation according to NEC 500/505.

		Article No.	Order code
Diaphragm seal		7MF0814-	
In flange design, directly installed on a pressure transmitter for level		● ● ● 0 3 - 0 ● ● ● ● ● ●	
SITRANS P320/P420			
7MF03../7MF04.. to be ordered separately, scope of delivery: 1 unit			
Click the article number for online configuration in the PIA Life Cycle Portal.			
Standard of process connection EN 1092-1			
Nominal diameter	Nominal pressure		
DN 25	PN 10/16/25/40	0 B D	
	PN 63/100	0 B F	
	PN 160	0 B G	
	PN 250	0 B H	
DN 40	PN 10/16/25/40	0 D D	
	PN 63/100	0 D F	
	PN 160	0 D G	
DN 50	PN 10/16/25/40	0 E D	
	PN 63/100	0 E E	
	PN 160	0 E F	
DN 80	PN 10/16/25/40	0 G D	
	PN 100	0 G F	
DN 100	PN 10/16	0 H B	
	PN 25/40	0 H D	
DN 125	PN 16	0 J B	
	PN 40	0 J D	
Process connection standard ASME B16.5			
Nominal diameter	Nominal pressure		
1 inch	Class 150	1 K L	

Selection and ordering data (continued)

		Article No.	Order code													
Diaphragm seal		7MF0814-	●	●	●	0	3	-	0	●	●	●	●	●	●	
In flange design, directly installed on a pressure transmitter for level SITRANS P320/P420 7MF03../7MF04.. to be ordered separately, scope of delivery: 1 unit																
1½ inches	Class 300	1	K	M												
	Class 600	1	K	N												
	Class 1500	1	K	P												
2 inches	Class 150	1	L	A												
	Class 300	1	L	B												
	Class 400/600	1	L	D												
3 inches	Class 150	1	M	A												
	Class 300	1	M	B												
	Class 400/600	1	M	D												
4 inches	Class 900/1500	1	M	F												
	Class 150	1	P	A												
	Class 300	1	P	B												
5 inches	Class 600	1	P	D												
	Class 1500	1	P	F												
	Class 150	1	Q	A												
5 inches	Class 300	1	Q	B												
	Class 400	1	Q	D												
	Class 1500	1	Q	F												
5 inches	Class 150	1	R	A												
	Class 300	1	R	B												
	Class 400	1	R	C												
Process connection standard J.I.S.																
Nominal diameter	Nominal pressure															
DN 50	10K	2	E	S												
	20k	2	E	T												
	40K	2	E	U												
DN 80	10K	2	G	S												
	20k	2	G	T												
	40K	2	G	U												
DN 100	10K	2	H	S												
	20k	2	H	T												
	40K	2	H	U												
Other version, add order code and plain text		9	Z	A									H	1	Y	
Filling liquid																
Silicone oil M50													B			
High-temperature oil													C			
Silicone oil M5													A			
Food oil (FDA-listed)													E			
Neobee M20 (FDA-listed)													R			
Halocarbon oil													D			
Other version, add order code and plain text													Z	P	1	Y
Material of wetted parts																
Stainless steel 316L																
• Without coating													A			
• With PFA coating													D			
• With PTFE coating													E	0		
• With ECTFE coating													F			
Monel 400, 2.4360													G			
Hastelloy C276, 2.4819													J			
Tantalum													K			
Titanium, 3.7035													L	0		
Nickel 201													M	0		
Diaphragm Duplex, 1.4462													Q			

Pressure measurement

Pressure transmitters

for applications with advanced requirements / SITRANS P320/420 / Level

Selection and ordering data (continued)

	Article No.	Order code
Diaphragm seal	7MF0814-	● ● ● 0 3 - 0 ● ● ● ● ● ●
In flange design, directly installed on a pressure transmitter for level SITRANS P320/P420 7MF03../7MF04.. to be ordered separately, scope of delivery: 1 unit		
Diaphragm and flange Duplex, 1.4462		R
Stainless steel 316L, gold-plated		S 0
Hastelloy C4, 2.4610		U 0
Hastelloy C22, 2.4602		V 0
Other version, add order code and plain text		Z Q 1 Y
Tube length		
None		0
50 mm (2 inches)		1
100 mm (4 inches)		2
150 mm (6 inches)		3
200 mm (8 inches)		4
250 mm (10 inches)		5
Other version, add order code and plain text		Z 8 R 1 Y
Customer-specific tube length		
• Wetted parts: Stainless steel without coating		
Range	Standard length	
20 ... 50 mm (0.79 ... 1.97 inches)	50 mm (1.97 inches)	A 1
51 ... 100 mm (2.01 ... 3.94 inches)	100 mm (3.94 inches)	A 2
101 ... 150 mm (3.98 ... 5.91 inches)	150 mm (5.91 inches)	A 3
151 ... 200 mm (5.94 ... 7.87 inches)	200 mm (7.87 inches)	A 4
201 ... 250 mm (7.91 ... 9.84 inches)	250 mm (9.84 inches)	A 5
• Wetted parts: Stainless steel with ECTFE coating		
Range	Standard length	
20 ... 50 mm (0.79 ... 1.97 inches)	50 mm (1.97 inches)	F 1
51 ... 100 mm (2.01 ... 3.94 inches)	100 mm (3.94 inches)	F 2
101 ... 150 mm (3.98 ... 5.91 inches)	150 mm (5.91 inches)	F 3
151 ... 200 mm (5.94 ... 7.87 inches)	200 mm (7.87 inches)	F 4
201 ... 250 mm (7.91 ... 9.84 inches)	250 mm (9.84 inches)	F 5
• Wetted parts: Stainless steel with PFA coating		
Range	Standard length	
20 ... 50 mm (0.79 ... 1.97 inches)	50 mm (1.97 inches)	D 1
51 ... 100 mm (2.01 ... 3.94 inches)	100 mm (3.94 inches)	D 2
101 ... 150 mm (3.98 ... 5.91 inches)	150 mm (5.91 inches)	D 3
151 ... 200 mm (5.94 ... 7.87 inches)	200 mm (7.87 inches)	D 4
201 ... 250 mm (7.91 ... 9.84 inches)	250 mm (9.84 inches)	D 5
• Wetted parts: Monel 400		
Range	Standard length	
20 ... 50 mm (0.79 ... 1.97 inches)	50 mm (1.97 inches)	G 1
51 ... 100 mm (2.01 ... 3.94 inches)	100 mm (3.94 inches)	G 2
101 ... 150 mm (3.98 ... 5.91 inches)	150 mm (5.91 inches)	G 3
151 ... 200 mm (5.94 ... 7.87 inches)	200 mm (7.87 inches)	G 4
• Wetted parts: Hastelloy C276		
Range	Standard length	
20 ... 50 mm (0.79 ... 1.97 inches)	50 mm (1.97 inches)	J 1
51 ... 100 mm (2.01 ... 3.94 inches)	100 mm (3.94 inches)	J 2
101 ... 150 mm (3.98 ... 5.91 inches)	150 mm (5.91 inches)	J 3
151 ... 200 mm (5.94 ... 7.87 inches)	200 mm (7.87 inches)	J 4
• Wetted parts: Tantalum		
Range	Standard length	
20 ... 50 mm (0.79 ... 1.97 inches)	50 mm (1.97 inches)	K 1
51 ... 100 mm (2.01 ... 3.94 inches)	100 mm (3.94 inches)	K 2
101 ... 150 mm (3.98 ... 5.91 inches)	150 mm (5.91 inches)	K 3
151 ... 200 mm (5.94 ... 7.87 inches)	200 mm (7.87 inches)	K 4

Selection and ordering data (continued)

Options	Order code
Add "-Z" to article number, specify order code and plain text or entry from drop-down list.	
Factory certificates	
Quality inspection certificate (5-point characteristic curve test) according to IEC 62828-2	C11
Inspection certificate according to EN 10204-3.1 for main body and diaphragm	C12
Manufacturer code according to NACE (MR 0103-2012 and MR 0175-2009) (only in combination with wetted parts made of stainless steel 316 L and Hastelloy)	C13
Inspection certificate according to EN 10204-3.1, PMI test of pressure containing and wetted parts	C15
Test report on the FDA listing of the oil according to EN 10204-2.2	C17
Factory certificate functional safety (SIL2/3), suitability of devices for use according to IEC 61508 and IEC 61511 (contains SIL Declaration of Conformity)	C20
Accessories	
Epoxy resin coating Color: Transparent Scope: Front and rear of the remote seal, connecting pipe, process connection of the transmitter. Maximum medium temperature with epoxy resin coating: 140 °C	D15
Remote seal nameplate Attached, made of stainless steel, contains Article No. and order number of the remote seal	D42
Volume deflagration flame arrester (VDEF) for differential pressure transmitter	D62
Negative pressure service	
Negative pressure service for differential pressure transmitters	D83
Extended negative pressure service for differential pressure transmitters	D88
Approvals and certificates	
Country-specific approval CRN approval Canada (Canadian Registration Number)	E60
Note:	
If the order code E60 is selected, the option E60 must also be selected for the transmitter!	
Oil-free and grease-free cleaned version for oxygen application including EN 10204-2.2 certificates (only with filling liquid halocarbon oil and at max. temperature 60 °C and max. pressure 50 bar)	E80
Oil-free and grease-free cleaned version not for oxygen application, including EN 10204-2.2 certificates	E87
Sealing surface	
Sealing surface smooth, form B2/EN1092-1 or RFSF/ANSI 16.5 (only for wetted parts made of stainless steel 316L)	M50
Sealing surface groove according to EN 1092-1, form D (instead of sealing surface B1, only for wetted parts made of stainless steel 316L)	M54
Sealing surface RJF (groove) according to ASME B16.5 (instead of sealing surface RF 125 ... 250AA, only for wetted parts made of stainless steel 316L)	M64
Sealing surface with tongue to EN 1092-1, form C (for wetted parts made of stainless steel 316L only)	
• DN 40	M71
• DN 50	M72
• DN 80	M73
• DN 100	M74

Pressure measurement

Pressure transmitters

for applications with advanced requirements / SITRANS P320/420 / Level

Selection and ordering data (continued)

Options	Order code
Add "-Z" to article number, specify order code and plain text or entry from drop-down list.	
• DN 125	M75
Sealing surface with spigot according to EN 1092-1, form E (for wetted parts made of stainless steel 316L only)	
• DN 40	M77
• DN 50	M78
• DN 80	M79
• DN 100	M80
• DN 125	M81
Sealing surface internal face according to EN 1092-1, form F (only for wetted parts made of stainless steel 316L)	
• DN 50	M84
• DN 80	M85
• DN 100	M86
• DN 125	M87
Remote seal connection	
Elongated pipe, 150 mm (5.9 inches) instead of 100 mm (3.9 inches)	S05
Elongated pipe, 200 mm (7.9 inches) instead of 100 mm (3.9 inches)	S06
Desired remote seal supplier	
Note:	
If the remote seal is to be supplied only by one of the suppliers specified below, this option needs to be selected. For orders without this option, the remote seal supplier is selected through the dispatch center.	
Company WIKA, Klingenberg	W01
Company Labom, Hude	W02
Special design	
Welded filling hole	X01
Customer-specific tube length	
Customer-specific tube length (specify in plain text in mm)	Y44
Specification of process conditions¹⁾	
Ambient temperature range	
• -10 ... +50 °C (14 ... +122 °F) preset	D66
• -40 ... +50 °C (-40 ... +122 °F)	D67
• -10 ... +85 °C (14 ... +185 °F)	D68
Process temperature min. ... °C/(°F)/max. ... °C/(°F)	Y50

¹⁾ See also "Specification of process conditions for selection and ordering data" below the "More information" section.

Technical specifications

SITRANS P320 / SITRANS P420 for level

Input		Level	Max. permissible operating pressure MAWP (PS)	Maximum permissible test pressure
Measured variable	Level			
Measuring span (continuously adjustable) or measuring range and max. permissible operating pressure (pursuant to Pressure Equipment Directive 2014/68/EU)	Measuring span	25 ... 250 mbar 2.5 ... 25 kPa 10 ... 100.5 inH ₂ O 25 ... 600 mbar 2.5 ... 60 kPa 10 ... 241 inH ₂ O 53 ... 1 600 mbar 5.3 ... 160 kPa 21 ... 643 inH ₂ O 166 ... 5 000 mbar 16.6 ... 500 kPa 2.41 ... 72.5 psi	See "Mounting flange"	
Measuring limits				
• Lower measuring limit				
- Measuring cell with silicone oil filling		-100% of max. measuring range or 30 mbar a/3 kPa a/0.44 psi a depending on the mounting flange		
- Measuring cell with inert oil		-100% of max. measuring range or 30 mbar a/3 kPa a/0.44 psi a depending on the mounting flange		
- Measuring cell with FDA-compliant oil		-100% of max. measuring range or 100 mbar a/10 kPa a/1.45 psi a		
• Upper measuring limit		100% of max. measuring span		
• Lower range value		Between the measuring limits (continuously adjustable)		
Output		HART		
Output signal		4 ... 20 mA		
• Lower saturation limit (continuously adjustable)		3.55 mA, factory set to 3.8 mA		
• Upper saturation limit (continuously adjustable)		22.8 mA, factory-set to 20.5 mA or optionally 22.0 mA		
• Ripple (without HART communication)		$I_{pp} \leq 0.5\%$ of max. output current		
Adjustable damping		0 ... 100 s, continuously adjustable over remote operation 0 ... 100 s, in increments of 0.1 s, adjustable over display		
• Current simulator		3.55 ... 22.8 mA		
• Failure signal		3.55 ... 22.8 mA		
Load		Resistance R [Ω]		
• Without HART communication		$R = (U_H - 10.5 \text{ V}) / 22.8 \text{ mA}$, U_H : Auxiliary power in V		
• With HART communication		$R = 230 \dots 1100 \Omega$		
Characteristic curve		<ul style="list-style-type: none"> Linearly increasing or linearly decreasing Linear increase or decrease or according to the square root (only for differential pressure and flow) 		
Physical bus		-		
Polarity-independent		-		
Measuring accuracy				
Reference conditions		<ul style="list-style-type: none"> According to IEC 62828-1 Rising characteristic curve Lower range value 0 bar/kPa/psi Seal diaphragm stainless steel Measuring cell with silicone oil filling Room temperature 25 °C (77 °F) 		
Conformity error at limit point setting, including hysteresis and repeatability				
Measuring span ratio r (spread, Turn-Down)		$r = \text{maximum measuring span/set measuring span or nominal measuring range}$		
• Linear characteristic curve		$r \leq 5$	$\leq 0.125\%$	

Pressure measurement

Pressure transmitters

for applications with advanced requirements / SITRANS P320/420 / Level

Technical specifications (continued)

SITRANS P320 / SITRANS P420 for level		
<ul style="list-style-type: none"> - 250 mbar/25 kPa/3.6 psi - 600 mbar/60 kPa/8.7 psi - 1600 mbar/160 kPa/23.21 psi - 5 bar/500 kPa/72.5 psi 	5 < r ≤ 10:	≤ (0.007 · r + 0.09)%
Influence of ambient temperature in % per 28 °C (50 °F)		
<ul style="list-style-type: none"> • SITRANS P320 - 250 mbar/25 kPa/3.6 psi - 600 mbar/60 kPa/8.7 psi - 1600 mbar/160 kPa/23.21 psi - 5 bar/500 kPa/72.5 psi 	≤ (0.025 · r + 0.125)%	
<ul style="list-style-type: none"> • SITRANS P420 - 250 mbar/25 kPa/3.6 psi - 5 bar/500 kPa/72.5 psi 	≤ (0.025 · r + 0.0625)%	
<ul style="list-style-type: none"> - 600 mbar/60 kPa/8.7 psi - 1600 mbar/160 kPa/23.21 psi 	≤ (0.125 · r + 0.0625)%	
Effect of static pressure		
<ul style="list-style-type: none"> • At the lower range value - 250 mbar/25 kPa/3.63 psi - 600 mbar/60 kPa/8.7 psi - 1.6 bar/160 kPa/23.21 psi - 5 bar/500 kPa/72.52 psi 	≤ (0.3 · r)% per nominal pressure	
	≤ (0.15 · r)% per nominal pressure	
<ul style="list-style-type: none"> • On the measuring span 	≤ (0.1 · r)% per nominal pressure	
Long-term stability at ±30 °C (± 54 °F)		
<ul style="list-style-type: none"> • All measuring cells 	In 5 years ≤ (0.25 · r)% static pressure max. 70 bar/7 MPa/1015 psi	
Step response time T ₆₃ (without electrical damping)	Depends on the installed remote seal	
Influence of mounting position	Depends on the filling liquid in the mounting flange	
Effect of auxiliary power (in % per voltage change)	0.005% per 1 V	
Operating conditions		
Medium temperature		
Measuring cell with silicone oil filling	<ul style="list-style-type: none"> • High side: See "Mounting flange" • Low side: -40 ... +100 °C (-40 ... +212 °F) 	
Ambient conditions		
<ul style="list-style-type: none"> • Ambient temperature/enclosure 	Always consider the assignment of max. permissible operating temperature to max. permissible operating pressure of the respective flange connection.	
- Measuring cell with silicone oil filling	-40 ... +85 °C (-40 ... +185 °F)	
- Display	-20 ... +80 °C (-4 ... +176 °F)	
<ul style="list-style-type: none"> • Storage temperature 	-50 ... +85 °C (-58 ... +185 °F)	
<ul style="list-style-type: none"> • Climatic class in accordance with IEC 60721-3-4 	4K4H	
<ul style="list-style-type: none"> • Degree of protection 		
- According to IEC 60529	IP66, IP68	
- According to NEMA 250	Type 4X	
<ul style="list-style-type: none"> • Electromagnetic compatibility 		
- Emitted interference and interference immunity	According to IEC 61326 and NAMUR NE 21	
Structural design		
Weight	Pressure transmitter with mounting flange, without tube	
<ul style="list-style-type: none"> • According to EN 	<ul style="list-style-type: none"> • Aluminum enclosure: Approx. 11 ... 13 kg (24.2 ... 28.7 lbs) • Stainless steel enclosure: Approx. 13 ... 15 kg (28.7 ... 33 lbs) 	
<ul style="list-style-type: none"> • According to ASME 	<ul style="list-style-type: none"> • Aluminum enclosure: Approx. 11 ... 18 kg (24.2 ... 39.7 lbs) • Stainless steel enclosure: Approx. 13 ... 20 kg (28.7 ... 44 lbs) 	
Material		
<ul style="list-style-type: none"> • Material of wetted parts 		

Technical specifications (continued)

SITRANS P320 / SITRANS P420 for level		
- High side	Seal diaphragm of mounting flange	Stainless steel, mat. no. 1.4404/316L, Monel 400, mat. no. 2.4360, Alloy B2, mat. no. 2.4617, Alloy C276, mat. no. 2.4819, Alloy C22, mat. no. 2.4602, tantalum, PTFE, PFA, ECTFE
	Sealing surface	Smooth according to EN 1092-1, form B1 or ASME B16.5 RF 125 ... 250 AA for stainless steel 316L, EN 2092-1 form B2 or ASME B16.5 RFSF for the remaining materials
- Gasket material in the process flanges	For standard applications	Viton
	For negative pressure applications on the mounting flange	Copper
- Low side	Seal diaphragm	Stainless steel, mat. no. 1.4404/316L
	Process flanges	Stainless steel, mat. no. 1.4408/316
	Process flange screw	Stainless steel ISO 3506-1 A4-70
	O-ring	FPM (Viton)
• Material of non-wetted parts		
- Electronics enclosure		<ul style="list-style-type: none"> • Low-copper die-cast aluminum GD-AlSi 12 or stainless steel precision casting, mat. no. 1.4409/ CF-3M • Standard: Powder coating with polyurethane Option: 2 coats: Coat 1: Epoxy-based; coat 2: Polyurethane • Stainless steel nameplate (1.4404/316L)
Process flange screws		Stainless steel ISO 3506-1 A4-70
Measuring cell filling		Silicone oil
• Mounting flange filling liquid		Silicone oil or other material
Process connection		
• High side		Flange according to EN and ASME
• Low side		¼-18 NPT female thread and flange connection with M10 fastening thread according to DIN 19213 (M12 for PN 420 (MWP 6092 psi)) or 7/16-20 UNF according to EN 61518
Electrical connection		Screw terminals Cable entry via the following screw glands: <ul style="list-style-type: none"> • M20 × 1.5 • ½-14 NPT • Device plug Han 7D/Han 8D¹⁾ • Device plug M12
Displays and controls		
Buttons		4 buttons for operation directly on the device
Display		<ul style="list-style-type: none"> • With or without integrated display (optional) • Lid with inspection window (optional)
Auxiliary power U_H		
Terminal voltage on pressure transmitter		10.5 ... 45 V DC 10.5 ... 30 V DC in intrinsically safe mode
Ripple		U _{SS} ≤ 0.2 V (47 ... 125 Hz)
Noise		U _{eff} ≤ 1.2 mV (0.5 ... 10 kHz)
Auxiliary power		–
Separate supply voltage		–
Certificates and approvals		
Classification according to pressure equipment directive (PED 2014/68/EU)		For gases of fluid group 1 and liquids of fluid group 1; complies with requirements of article 4, paragraph 3 (sound engineering practice)
Drinking water		
• WRAS (England)		No.: 1903094 (option E83)
• ACS (France)		No.: 18 ACC LY 277 (option E85)
• NSF (USA)		No.: 20180920-MH61350 (option E84)
CRN (Canada)		No.: 0F9863.5C (option E60)
Explosion protection acc. to NEPSI (China)		No.: GYJ19.1058X (option E27)
Explosion protection acc. to INMETRO (Brazil)		No.: BRA-18-GE-0035X (option E25)
Explosion protection		
• Intrinsic safety "i"		
- Marking		II 1/2 G Ex ia/ib IIC T4/T6 Ga/Gb

Pressure measurement

Pressure transmitters

for applications with advanced requirements / SITRANS P320/420 / Level

Technical specifications (continued)

SITRANS P320 / SITRANS P420 for level	
- Permissible ambient temperature	-40 ... +80 °C (-40 ... +176 °F) temperature class T4 -40 ... +70 °C (-40 ... +158 °F) temperature class T6
- Permissible medium temperature	-40 ... +100 °C (-40 ... +212 °F) temperature class T4 -40 ... +70 °C (-40 ... +158 °F) temperature class T6
- Connection	To certified intrinsically safe circuits with peak values: $U_i = 30\text{ V}$, $I_i = 101\text{ mA}$, $P_i = 760\text{ mW}$ $U_i = 29\text{ V}$, $I_i = 110\text{ mA}$, $P_i = 800\text{ mW}$
- Effective internal inductance/capacitance	$L_i = 0.24\text{ }\mu\text{H}/C_i = 3.29\text{ nF}$
• Flameproof enclosure "d"	
- Marking	Ex II 1/2 G Ex ia/db IIC T4/T6 Ga/Gb
- Permissible ambient temperature	-40 ... +80 °C (-40 ... +176 °F) temperature class T4 -40 ... +70 °C (-40 ... +158 °F) temperature class T6
- Permissible medium temperature	-40 ... +100 °C (-40 ... +212 °F) temperature class T4 -40 ... +70 °C (-40 ... +158 °F) temperature class T6
- Connection	To a circuit with the operating values: $U_n = 10.5 \dots 45\text{ V}$, $4 \dots 20\text{ mA}$
• Dust explosion protection for Zones 20, 21, 22	
- Marking	Ex II 1D Ex tb IIIC T120 °C Da Ex II 2D Ex tb IIIC T120 °C Db Ex II 3D Ex tc IIIC T120 °C Dc
- Permissible ambient temperature	-40 ... +80 °C (-40 ... +176 °F)
- Permissible medium temperature	-40 ... +100 °C (-40 ... +212 °F)
- Max. surface temperature	120 °C (248 °F)
- Connection	To a circuit with the operating values: $U_n = 10.5 \dots 45\text{ V}$, $4 \dots 20\text{ mA}$
• Dust explosion protection for Zones 21, 22	
- Marking	Ex II 2D Ex ib IIIC T120 °C Db
- Permissible ambient temperature	-40 ... +80 °C (-40 ... +176 °F)
- Permissible medium temperature	-40 ... +100 °C (-40 ... +212 °F)
- Connection	To certified intrinsically safe circuits with peak values: $U_i = 30\text{ V}$, $I_i = 101\text{ mA}$, $P_i = 760\text{ mW}$ $U_i = 29\text{ V}$, $I_i = 110\text{ mA}$, $P_i = 800\text{ mW}$
- Effective internal inductance/capacitance	$L_i = 0.24\text{ }\mu\text{H}/C_i = 3.29\text{ nF}$
• Type of protection for Zone 2	
- Marking	Ex II 3G Ex ec IIC T4/T6 Gc
- Permissible ambient temperature "ec"	-40 ... +80 °C (-40 ... +176 °F) temperature class T4 -40 ... +40 °C (-40 ... +104 °F) temperature class T6
- Permissible medium temperature	-40 ... +100 °C (-40 ... +212 °F) temperature class T4 -40 ... +70 °C (-40 ... +158 °F) temperature class T6
- "ec" connection	To a circuit with the operating values: $U_n = 10.5 \dots 30\text{ V}$, $4 \dots 20\text{ mA}$
• Explosion protection acc. to FM	Available soon
- Marking (XP/DIP) or IS; NI; S	CL I, DIV 1, GP ABCD T4 ... T6; CL II, DIV 1, GP EFG; CL III; Ex ia IIC T4 ... T6: CL I, DIV 2, GP ABCD T4 ... T6; CL II, DIV 2, GP FG; CL III
• Explosion protection according to CSA	Available soon
- Marking (XP/DIP) or (IS)	CL I, DIV 1, GP ABCD T4 ... T6; CL II, DIV 1, GP EFG; CL III; Ex ia IIC T4 ... T6: CL I, DIV 2, GP ABCD T4 ... T6; CL II, DIV 2, GP FG; CL III
NAMUR recommendations	
• NE 06	Standardized Electrical Signals and Questions Relating to Engineering Technology
• NE 21	Electromagnetic Compatibility (EMC) of Industrial Process and Laboratory Control Equipment
• NE 23	Extra Low Voltage Circuits with Safe Separation
• NE 43	Standardization of the Signal Level for the Failure Information of Digital Transmitters
• NE 53	Software and Hardware of Field Devices and Signal Processing Devices with Digital Electronics
• NE 80	The Application of the Pressure Equipment Directive to Process Control Devices
• NE 105	Specifications for Integrating Fieldbus Devices in Engineering Tools for Field Devices
• NE 107	Self-Monitoring and Diagnosis of Field Devices
• NE 131	NAMUR Standard Device - Field Devices for Standard Applications

¹⁾ Han 8D is identical to Han 8U.

Technical specifications (continued)

Mounting flange	
Nominal diameter	Nominal pressure
<ul style="list-style-type: none"> • According to EN 1092-1 	
- DN 80	PN 40
- DN100	PN 16, PN 40
<ul style="list-style-type: none"> • According to ASME B16.5 	
- 3 inches	Class 150, Class 300
- 4 inches	Class 150, Class 300

Communication	
HART	
HART	230 ... 1 100 Ω
Protocol	HART 7
Software for computer	SIMATIC PDM
PROFIBUS PA	
Simultaneous communication with master class 2 (max.)	4
The address can be set using	Configuration tool or local operation (default setting address 126)
Cyclic data usage	
• Output byte	≤ 35 (7 measured values)
• Input byte	0, 1, or 2 (register operation mode and reset function for dosing)
Internal preprocessing	
Device profile	PROFIBUS PA Profile Version 4.01 Class B. Cyclic data usage compatible with version 3.XX
Number of function blocks	7
• Analog input	
- Adaptation to user-specific process variable	Yes, linearly rising or falling characteristic curve
- Electrical damping adjustable	0 ... 100 s
- Simulation function	Output/input
- Limit monitoring	Yes, one upper and lower warning limit and one alarm limit respectively
• Register (totalizer)	Can be reset, preset, optional direction of counting, simulation function of register output
- Limit monitoring	One upper and lower warning limit and one alarm limit respectively
• Physical block	1
Transducer blocks	1
• Pressure transducer block	
- Can be calibrated by applying two pressures	Yes
- Monitoring of sensor limits	Yes
- Specification of a vessel characteristic curve with	Max. 30 nodes
- Square-rooted characteristic curve for flow measurement	Yes
- Tank characteristic curve for volume measurement	Yes
- Low flow cut-off and implementation point of square-root extraction	Parameterizable
- Simulation function for measured pressure value and sensor temperature	Constant value or by means of parameterizable ramp function
FOUNDATION Fieldbus	
Device profile	FF ITK 6
Function blocks	3 function blocks analog input, 1 function block PID

Pressure measurement

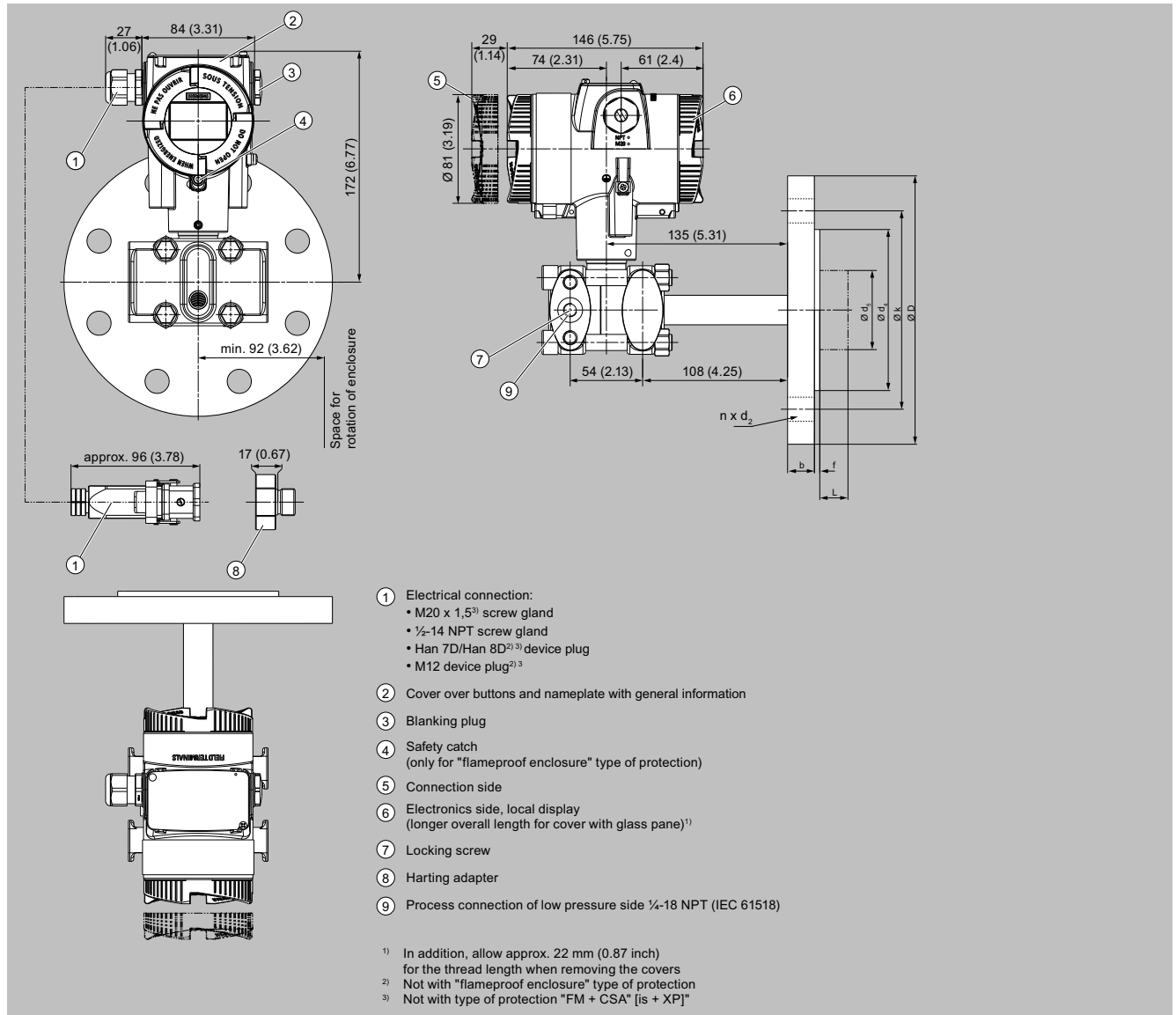
Pressure transmitters

for applications with advanced requirements / SITRANS P320/420 / Level

Technical specifications (continued)

Communication	
• Analog input	
- Adaptation to user-specific process variable	Yes, linearly rising or falling characteristic curve
- Electrical damping adjustable	0 ... 100 s
- Simulation function	Output/input (can be locked within the device with a bridge)
- Failure mode	Parameterizable (last good value, substitute value, incorrect value)
- Limit monitoring	Yes, one upper and lower warning limit and one alarm limit respectively
- Square-rooted characteristic curve for flow measurement	Yes
• PID	Standard FOUNDATION Fieldbus function block
• Physical block	1 resource block
Transducer blocks	1 transducer block Pressure with calibration, 1 transducer block LCD
• Pressure transducer block	
- Can be calibrated by applying two pressures	Yes
- Monitoring of sensor limits	Yes
- Simulation function: pressure measurement, sensor temperature and electronics temperature	Constant value or by means of parameterizable ramp function

Dimensional drawings



SITRANS P320/P420 pressure transmitter for level, including mounting flange, dimensions in mm (inch)

Connection to EN 1092-1

Nominal diameter	Nominal pressure	b	D	d ₂	d ₄	d ₅	d _M with tube	d _M Without tube	f	k	n	L
		mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
DN 40	PN 10/16/25/40	16	150	18	88	38	30	42	2	110	4	0, 50, 100, 150 or 200
	PN 63/100	24	170	22	88	38	30	42	2	125	4	
	PN 160	26	170	22	88	38	30	42	2	125	4	
DN 50	PN 10/16/25/40	18	165	18	102	48.3	40	51	2	125	4	
	PN 63/100	26	195	26	102	48.3	40	51	2	145	4	
	PN 160	28	195	26	102	48.3	40	51	2	145	4	
DN 80	PN 10/16/25/40	22	200	18	138	76	65	85	2	160	8	
	PN 100	30	230	26	138	76	65	85	2	180	8	

Pressure measurement

Pressure transmitters

for applications with advanced requirements / SITRANS P320/420 / Level

Dimensional drawings (continued)

Nominal diameter	Nominal pressure	b	D	d ₂	d ₄	d ₅	d _M with tube	d _M Without tube	f	k	n	L
		mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	
DN 100	PN 10/16	18	220	18	158	94	85	85	2	180	8	0, 50, 100, 150 or 200
	PN 25/40	22	235	22	162	94	85	85	2	190	8	
DN 125	PN 16	20	250	18	188	127	85	116	2	210	8	
	PN 40	24	270	26	188	127	85	116	2	220	8	

Connection according to ASME B16.5

Nominal diameter	Nominal pressure	b	D	d ₂	d ₄	d ₅	d _M with tube	d _M Without tube	f	k	n	L
		lb/sq.in.	Inch (mm)	Inch (mm)	Inch (mm)	Inch (mm)	Inch (mm)	Inch (mm)	Inch (mm)	Inch (mm)	Inch (mm)	
1½ inches	150	0.63 (15.9)	4.92 (125)	0.63 (15.9)	2.87 (73)	1.5 (38)	1,18 (30)	1.42 (36)	0.08 (2)	3.87 (98.4)	4	0, 2, 3.94, 5.94 or 7.87 (0, 50, 100, 150 or 200)
	300	0.75 (19.1)	6.10 (155)	0.87 (22.2)	2.87 (73)	1.5 (38)	1,18 (30)	1.42 (36)	0.08 (2)	4.5 (114.3)	4	
	400/600	0.88 (22.3)	6.10 (155)	0.87 (22.2)	2.87 (73)	1.5 (38)	1,18 (30)	1.42 (36)	0.28 (7)	4.5 (114.3)	4	
	900/1500	1.25 (31.8)	7.09 (180)	1.13 (28.6)	2.87 (73)	1.5 (38)	1,18 (30)	1.42 (36)	0.28 (7)	4.87 (123.8)	4	
2 inches	150	0.69 (17.5)	5.91 (150)	0.75 (19.1)	3.63 (92.1)	1.9 (48.3)	1.57 (40)	2.01 (51)	0.08 (2)	4.75 (120.7)	4	
	300	0.81 (20.7)	6.5 (165)	0.75 (19.1)	3.63 (92.1)	1.9 (48.3)	1.57 (40)	2.01 (51)	0.08 (2)	5 (127)	8	
	400/600	1.00 (25.4)	6.5 (165)	0.75 (19.1)	3.63 (92.1)	1.9 (48.3)	1.57 (40)	2.01 (51)	0.28 (7)	5 (127)	8	
	900/1500	1.5 (38.1)	8.46 (215)	1.00 (25.4)	3.63 (92.1)	1.9 (48.3)	1.57 (40)	2.01 (51)	0.28 (7)	6.5 (165.1)	8	
3 inches	150	0.88 (22.3)	7.48 (190)	0.75 (19.1)	5 (127)	3 (76)	2.65 (65)	3.35 (85)	0.08 (2)	6 (152.4)	4	
	300	1.06 (27)	8.27 (210)	0.87 (22.2)	5 (127)	3 (76)	2.65 (65)	3.35 (85)	0.08 (2)	6.63 (168.3)	8	
	600	1.23 (31.8)	8.27 (210)	0.87 (22.2)	5 (127)	3 (76)	2.65 (65)	3.35 (85)	0.28 (7)	6.63 (168.3)	8	
	1500	1.88 (47.7)	10.43 (265)	1.25 (31.8)	5 (127)	3 (76)	2.65 (65)	3.35 (85)	0.28 (7)	8 (203.2)	8	
4 inches	150	0.88 (22.3)	9.06 (230)	0.75 (19.1)	6.19 (157.2)	3.69 (94)	3.35 (85)	3.35 (85)	0.08 (2)	7.5 (190.5)	8	
	300	1.19 (30.2)	10.04 (255)	0.87 (22.2)	6.19 (157.2)	3.69 (94)	3.35 (85)	3.35 (85)	0.08 (2)	7.87 (200)	8	
	400	1.38 (35)	10.04 (255)	0.87 (22.2)	6.19 (157.2)	3.69 (94)	3.35 (85)	3.35 (85)	0.28 (7)	7.87 (200)	8	
	1500	2.13 (54)	12.20 (310)	1.37 (34.9)	6.19 (157.2)	3.69 (94)	3.35 (85)	3.35 (85)	0.28 (7)	9.5 (241.3)	8	
5 inches	150	0.88 (22.3)	10.04 (255)	0.87 (22.2)	7.31 (185.7)	5 (127)	4.57 (116)	4.57 (116)	0.08 (2)	8.5 (215.9)	8	
	300	1.31 (33.4)	11.02 (280)	0.87 (22.2)	7.31 (185.7)	5 (127)	4.57 (116)	4.57 (116)	0.08 (2)	9.25 (235)	8	
	400	1.50 (38.1)	11.02 (280)	0.87 (22.2)	7.31 (185.7)	5 (127)	4.57 (116)	4.57 (116)	0.28 (7)	9.25 (235)	8	

Process connection according to J.I.S

Nominal diameter	Nominal pressure	b	D	d ₂	d ₄	d ₅	d _M with tube	d _M Without tube	f	k	n	L
		mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	
DN 50	10 K	14 (0.55)	155 (6.10)	19 (0.75)	96 (3.78)	48.3 (1.9)	40 (1.57)	51 (2.01)	2	120 (4.72)	4	0, 50, 100, 150 or 200 (0, 2, 3.94, 5.94 or 7.87)
	20 K	16 (0.63)	165 (6.50)	19 (0.75)	96 (3.78)	48.3 (1.9)	40 (1.57)	51 (2.01)	2	120 (4.72)	8	
	40 K	26 (1.02)	165 (6.50)	19 (0.75)	105 (4.13)	48.3 (1.9)	40 (1.57)	51 (2.01)	2	130 (5.12)	8	
DN 80	10 K	16 (0.63)	185 (7.28)	19 (0.75)	126 (4.96)	76 (2.99)	65 (2.56)	85 (3.35)	2	150 (5.91)	8	
	20 K	20 (0.79)	200 (7.87)	23 (0.91)	132 (5.20)	76 (2.99)	65 (2.56)	85 (3.35)	2	160 (6.30)	8	
	40 K	32 (1.26)	210 (8.27)	23 (0.91)	140 (5.51)	76 (2.99)	65 (2.56)	85 (3.35)	2	170 (6.30)	8	
DN 100	10 K	16 (0.63)	210 (8.27)	19 (0.75)	151 (5.94)	94 (3.7)	85 (3.35)	85 (3.35)	2	175 (6.89)	8	
	20 K	22 (0.87)	225 (8.86)	23 (0.91)	160 (6.30)	94 (3.7)	85 (3.35)	85 (3.35)	2	185 (7.28)	8	
	40 K	36 (1.42)	250 (9.84)	25 (0.98)	165 (6.50)	94 (3.7)	85 (3.35)	85 (3.35)	2	205 (8.07)	8	

d: Inside diameter of gasket according to DIN 2690

d_M: Effective diaphragm diameter

More information

Specification of process conditions for selection and ordering data

Ambient temperature range

The standard remote seal systems are optimized for an ambient temperature range of -10 to +50 °C (14 to +122 °F). Therefore, in the ordering options, the **order code "D66"** is preset.

If the range of the ambient temperature deviates from this, you have the possibility to choose other ambient temperature ranges:

- With the **order code D67**, a range from -40 to +50 °C (-40 to +122 °F)
- With the **order code D68**, a range from -10 to +85 °C (14 to +185 °F)

In the case of a **special design**, which you can select with the **order option Y99** in the device settings, it is possible to enter the ambient temperature as a numerical value.

Process temperature

The standard optimization for the process temperature depends on the filling liquid used:

Filling liquid	Code	Optimized temperature range as standard
Silicone M50	B	-10 ... +200 °C (14 ... +392 °F)
High-temperature oil	C	-10 ... +300 °C (14 ... +572 °F)
Silicone oil M5	A	-40 ... +140 °C (-40 ... +284 °F)
Food oil (FDA-listed)	E	-10 ... +140 °C (14 ... +284 °F)
Halocarbon oil	D	-20 ... +60 °C (-4 ... +140 °F)
Neobee M20 (FDA-listed)	R	-10 ... +140 °C (14 ... +284 °F)

- If the **process temperatures** deviate from the temperature ranges mentioned in the table above, we ask you to send the process temperature with the **order code Y50** along with the order.
- If the remote seal has a small diameter (< DN 50/2") or a long capillary (> 4 m), we also ask you to provide the process data with the **following order code** when ordering.

These entries are transmitted and ensure the correct functioning of the remote seal systems.

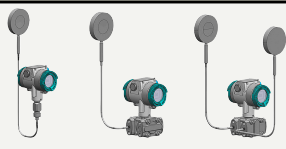
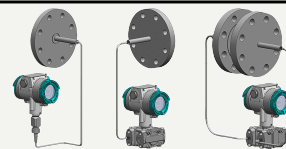
	Order code
Ambient temperature range	
• -10 ... +50 °C (14 ... +122 °F) preset	D66
• -40 ... +50 °C (-40 ... +122 °F)	D67
• -10 ... +85 °C (14 ... +185 °F)	D68
Process temperature min. ... °C/(°F)/max. ... °C/(°F)	Y50

Pressure measurement

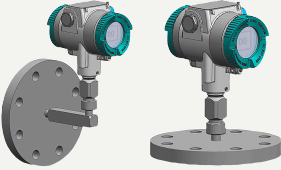
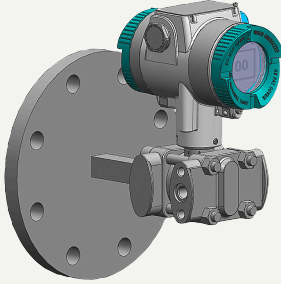
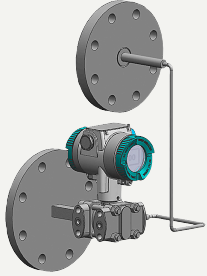
Remote seals

Detailed product overview

Overview

Type	7MF0800, 7MF0801, 7MF0802		7MF0810, 7MF0811, 7MF0812	
				
Description	Diaphragm seal		Diaphragm seal	
Application	For the process industry		For the process industry	
Version	Sandwich design		Flange design	
Type	Flexible with flexible capillary		Flexible with flexible capillary	
Article No.	7MF0800*, 7MF0801*, 7MF0802*		7MF0810*/7MF0811*/7MF0812*	
Process connection standard	Nominal diameter	Nominal pressure	Nominal diameter	Nominal pressure
• EN 1092-1	DN 25, DN 40, DN 50, DN 65, DN 80, DN 100, DN 125	PN 16 ... 400	DN 25 DN 40 DN 50 DN 80 DN 100 DN 125	PN 10, PN 16, PN 25, PN 40, PN 63, PN 100, PN 160, PN 250 PN 10, PN 16, PN 25, PN 40, PN 63, PN 100, PN 160 PN 10, PN 16, PN 25, PN 40, PN 63, PN 100 PN 10, PN 16, PN 25, PN 40, PN 100 PN 10, PN 16, PN 25, PN 40 PN 16, PN 40
• SME B16.5	1", 1½", 2", 2½", 3", 4", 5"	Class 150 ... 2500	1" 1½" 2" 3" 4" 5"	Class 150/300/600/1500 Class 150/300/400/600/900/1500 Class 150/300/400/600/900/1500 Class 150/300/600/1500 Class 150/300/400/1500 Class 150/300/400
• J.I.S.	DN 25, DN 40, DN 50, DN 65, DN 80, DN 100, DN 125	10 ... 63K	DN 50, DN 80, DN 100	10K/20K/40K
Sealing surface	For stainless steel mat. no. 1.4404/316L According to EN 1092-1, form B1 or ASME B16.5 RF 125 ... 250 AA For the other materials according to EN 1092-1, form B2 or ASME B16.5 RFSF		For stainless steel mat. no. 1.4404/316L According to EN 1092-1, form B1 or ASME B16.5 RF 125 ... 250 AA For the other materials according to EN 1092-1, form B2 or ASME B16.5 RFSF	
Materials	<ul style="list-style-type: none"> • Basic body stainless steel mat. no. 1.4404/316L • Wetted parts • Stainless steel, mat. no. 1.4404/316L <ul style="list-style-type: none"> - No coating - PTFE coating - ECTFE coating - PFA coating • Monel 400, mat. no. 2.4360 • Hastelloy C276, mat. no. 2.4819 • Hastelloy C4, mat. no. 2.4610 • Hastelloy C22, mat. no. 2.4602 • Tantalum • Titanium, mat. no. 3.7035 • Nickel 201 • Duplex 2205, mat. no. 1.4462 • Stainless steel 316L, gold plated, layer thickness approx. 25 µm 		<ul style="list-style-type: none"> • Basic body stainless steel mat. no. 1.4404/316L • Wetted parts • Stainless steel, mat. no. 1.4404/316L <ul style="list-style-type: none"> - No coating - PTFE coating - ECTFE coating - PFA coating • Monel 400, mat. no. 2.4360 • Hastelloy C276, mat. no. 2.4819 • Hastelloy C4, mat. no. 2.4610 • Hastelloy C22, mat. no. 2.4602 • Tantalum • Titanium, mat. no. 3.7035 • Nickel 201 • Duplex 2205, mat. no. 1.4462 • Stainless steel 316L, gold plated, layer thickness approx. 25 µm 	
Capillary length	≤ 10 m (32.8 ft), longer lengths on request		≤ 10 m (32.8 ft), longer lengths on request	
Filling liquid	Silicone oil M5, silicone oil M50, high-temperature oil, halocarbon oil (for O2 measurements), food oil (FDA listed), Neobee M20 (FDA listed)		Silicone oil M5, silicone oil M50, high-temperature oil, halocarbon oil (for O2 measurements), food oil (FDA listed), Neobee M20 (FDA listed)	
Tube length	Without tube, 50 mm (1.97"), 100 mm (3.94"), 150 mm (5.91"), 200 mm (7.87"), 250 mm (9.84")		Without tube, 50 mm (1.97"), 100 mm (3.94"), 150 mm (5.91"), 200 mm (7.87"), 250 mm (9.84")	

Overview (continued)

Type	7MF0810		7MF0814		7MF0813	
						
Description	Diaphragm seal		Diaphragm seal		Diaphragm seal	
Application	For the process industry		For the process industry		For the process industry	
Version	Flange design		Flange design		Flange design	
Type	Mounted directly		Mounted directly		Mounting flange (with optional tube) Direct mounting at high side and with flexible capillary connected at low side	
Article No.	7MF0810*		7MF0814*		7MF0813*	
Process connection standard	Nominal diameter	Nominal pressure	Nominal diameter	Nominal pressure	Nominal diameter	Nominal pressure
• EN 1092-1	DN 25	PN 10, PN 16, PN 25, - PN 40, PN 63, PN 100, PN 160, PN 250	-	-	-	-
	DN 40	PN 10, PN 16, PN 25, PN 40, PN 63, PN 100, PN 160	DN 40	PN 10, PN 16, PN 25, PN 40, PN 63, PN 100, PN 160	DN 40	PN 10, PN 16, PN 25, PN 40, PN 63, PN 100, PN 160
	DN 50	PN 10, PN 16, PN 25, PN 40, PN 63, PN 100	DN 50	PN 10, PN 16, PN 25, PN 40, PN 63, PN 100	DN 50	PN 10, PN 16, PN 25, PN 40, PN 63, PN 100
	DN 80	PN 10, PN 16, PN 25, PN 40, PN 100	DN 80	PN 10, PN 16, PN 25, PN 40, PN 100	DN 80	PN 10, PN 16, PN 25, PN 40, PN 100
	DN 100	PN 10, PN 16, PN 25, PN 40	DN 100	PN 10, PN 16, PN 25, PN 40	DN 100	PN 10, PN 16, PN 25, PN 40
	DN 125	PN 16, PN 40	DN 125	PN 16, PN 40	DN 125	PN 16, PN 40
• SME B16.5	1"	Class 150/300/600/- 1500	-	-	-	-
	1½"	Class 150/300/400/- 600/900/1500	1½"	Class 150/300/400/- 600/900/1500	1½"	Class 150/300/400/- 600/900/1500
	2"	Class 150/300/400/- 600/900/1500	2"	Class 150/300/400/- 600/900/1500	2"	Class 150/300/400/- 600/900/1500
	3"	Class 150/300/600/- 1500	3"	Class 150/300/600/- 1500	3"	Class 150/300/600/- 1500
	4"	Class 150/300/400/- 1500	4"	Class 150/300/400/- 1500	4"	Class 150/300/400/- 1500
	5"	Class 150/300/400	5"	Class 150/300/400	5"	Class 150/300/400
• J.I.S.	DN 50, DN 80, DN 100	10K/20K/40K	DN 50, DN 80, DN 100	10K/20K/40K	DN 50, DN 80, DN 100	10K/20K/40K
Sealing surface	For stainless steel mat. no. 1.4404/316L According to EN 1092-1, form B1 or ASME B16.5 RF 125 ... 250 AA For the other materials according to EN 1092-1, form B2 or ASME B16.5 RFSF		For stainless steel mat. no. 1.4404/316L According to EN 1092-1, form B1 or ASME B16.5 RF 125 ... 250 AA For the other materials according to EN 1092-1, form B2 or ASME B16.5 RFSF		For stainless steel mat. no. 1.4404/316L According to EN 1092-1, form B1 or ASME B16.5 RF 125 ... 250 AA For the other materials according to EN 1092-1, form B2 or ASME B16.5 RFSF	

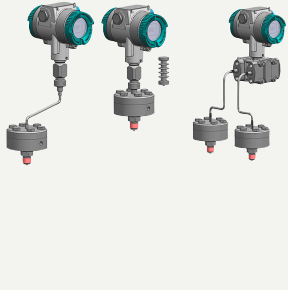
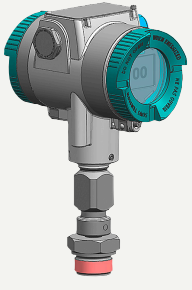
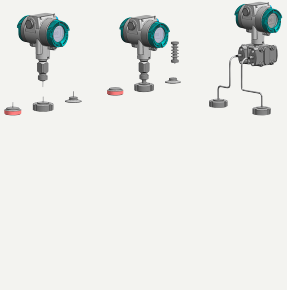
Pressure measurement

Remote seals

Detailed product overview

Overview (continued)

Type	7MF0810	7MF0814	7MF0813
Materials	<ul style="list-style-type: none"> Basic body stainless steel mat. no. 1.4404/316L Wetted parts Stainless steel, mat. no. 1.4404/316L <ul style="list-style-type: none"> No coating PTFE coating ECTFE coating PFA coating Monel 400, mat. no. 2.4360 Hastelloy C276, mat. no. 2.4819 Hastelloy C4, mat. no. 2.4610 Hastelloy C22, mat. no. 2.4602 Tantalum Titanium, mat. no. 3.7035 Nickel 201 Duplex 2205, mat. no. 1.4462 Stainless steel 316L, gold plated, layer thickness approx. 25 µm 	<ul style="list-style-type: none"> Basic body stainless steel mat. no. 1.4404/316L Wetted parts Stainless steel, mat. no. 1.4404/316L <ul style="list-style-type: none"> No coating PTFE coating ECTFE coating PFA coating Monel 400, mat. no. 2.4360 Hastelloy C276, mat. no. 2.4819 Hastelloy C4, mat. no. 2.4610 Hastelloy C22, mat. no. 2.4602 Tantalum Titanium, mat. no. 3.7035 Nickel 201 Duplex 2205, mat. no. 1.4462 Stainless steel 316L, gold plated, layer thickness approx. 25 µm 	<ul style="list-style-type: none"> Basic body stainless steel mat. no. 1.4404/316L Wetted parts Stainless steel, mat. no. 1.4404/316L <ul style="list-style-type: none"> No coating PTFE coating ECTFE coating PFA coating Monel 400, mat. no. 2.4360 Hastelloy C276, mat. no. 2.4819 Hastelloy C4, mat. no. 2.4610 Hastelloy C22, mat. no. 2.4602 Tantalum Titanium, mat. no. 3.7035 Nickel 201 Duplex 2205, mat. no. 1.4462 Stainless steel 316L, gold plated, layer thickness approx. 25 µm
Capillary length			≤ 10 m (32.8 ft), longer lengths on request
Filling liquid	Silicone oil M5, silicone oil M50, high-temperature oil, halocarbon oil (for O2 measurements), food oil (FDA listed), Neobee M20 (FDA listed)	Silicone oil M5, silicone oil M50, high-temperature oil, halocarbon oil (for O2 measurements), food oil (FDA listed), Neobee M20 (FDA listed)	Silicone oil M5, silicone oil M50, high-temperature oil, halocarbon oil (for O2 measurements), food oil (FDA listed), Neobee M20 (FDA listed)
Tube length	Without tube, 50 mm (1.97"), 100 mm (3.94"), 150 mm (5.91"), 200 mm (7.87"), 250 mm (9.84")	Without tube, 50 mm (1.97"), 100 mm (3.94"), 150 mm (5.91"), 200 mm (7.87"), 250 mm (9.84")	Without tube, 50 mm (1.97"), 100 mm (3.94"), 150 mm (5.91"), 200 mm (7.87"), 250 mm (9.84")

Type	7MF0840, 7MF0842		7MF0850	7MF0830, 7MF0832		
						
Description	Diaphragm seal		Diaphragm seal	Diaphragm seal		
Application	For the process industry		For the process industry	For the process industry		
Version	With inner membrane (nominal diameter 50/2"), process connection: open		Mounted directly	Flange design		
Type	Direct mounting or connected via flexible capillary		Remote seal, miniature type	With quick release, with flexible capillary or direct mounting		
Article No.	7MF0840*, 7MF0842*		7MF0850*	7MF0830*, 7MF0832*		
Process connection standard, nominal diameter and rated pressure	Nominal diameter	Nominal pressure	Nominal diameter	Nominal pressure	Nominal diameter	Nominal pressure
	<i>Open flange according to EN 1092-1</i>		<i>DIN 3852, form A</i>		<i>DIN 11851 with groove nut</i>	
	DN 15	PN 10, PN 16, PN 25, PN 40, PN 63, PN 100, PN 160, PN 250	G 1"	PN 400	DN 25, DN 32, DN 40	PN 40

Overview (continued)

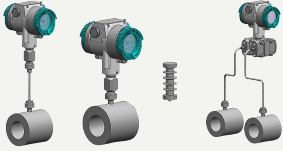
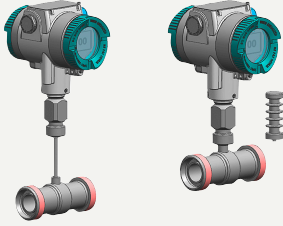
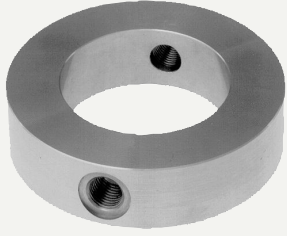
Type	7MF0840, 7MF0842	7MF0850	7MF0830, 7MF0832	
Process connection standard, nominal diameter and rated pressure	DN 20	PN 10, PN 16, PN 25, G 1½"	PN 250	
	DN 25	PN 10, PN 16, PN 25, G 2" PN 40, PN 63, PN 100, PN 160, PN 250	PN 250	
	Open flange per ASME B16.5		ASME B1.20.1	DN 50, DN 65, DN 80
	½", ¾", 1"	Class 150/300/600/ 1500	1" NPT-M	DIN 11851 with thread
	Thread according to EN 837-1		1½" NPT-M	DN 25, DN 32, DN 40
	G¼"B, G½"B, G¾"B, G1"B	PN 100, PN 250	2" NPT-M	PN 25
	Thread per ASME B1.20.1		Class 1450	Clamp ISO 2852
	¼" NPT-M, ¼" NPT-F	Class 1500/3675	Class 1450	DN 25, DN 38, DN 51
	½" NPT-M, ½" NPT-F	Class 1500/3675		DN 63.5, DN 76.1
	¾" NPT-M, ¾" NPT-F	Class 1500/3675		Clamp DIN 32676, series C
1" NPT-M, 1" NPT-F	Class 1500/3675		1", 1½"	
			2", 2½"	
			3"	
			Clamp DIN 32676, series A metric	
			DN 25, DN 32, DN 40	
			DN 50	
			DN 65	
			Varivent	
			DN 25, DN 32, DN 40, DN 50	
			DRD flange	
			DN 50	
			PN 25	
			PN 16	
			PN 10	
			PN 40	
Sealing surface	For stainless steel mat. no. 1.4404/316L According to EN 1092-1, form B1 or ASME B16.5 RF 125 ... 250 AA			
Materials	Base: <ul style="list-style-type: none"> Stainless steel, mat. no. 1.4404/316L Membrane: <ul style="list-style-type: none"> Stainless steel, mat. no. 1.4404/316L No coating PTFE coating Monel 400, mat. no. 2.4360 Hastelloy C276, mat. no. 2.4819 Hastelloy C4, mat. no. 2.4610 Hastelloy C22, mat. no. 2.4602 Tantalum Titanium, mat. no. 3.7035 Nickel 201 Stainless steel 316L, gold-plated, layer thickness approx. 25 µm 	Basic body: <ul style="list-style-type: none"> Stainless steel, mat. no. 1.4404/316L or Hastelloy C276, mat. no. 2.4819 Membrane: <ul style="list-style-type: none"> Stainless steel, mat. no. 1.4404/316L or Hastelloy C276, mat. no. 2.4819 	Basic body: <ul style="list-style-type: none"> Stainless steel, mat. no. 1.4404/316L Wetted parts: <ul style="list-style-type: none"> Stainless steel, mat. no. 1.4404/316L Capillary: <ul style="list-style-type: none"> Stainless steel 	
Capillary length	≤ 10 m (32.8 ft), longer lengths on request		≤ 10 m (32.8 ft), longer lengths on request	
Filling liquid	Silicone oil M5, silicone oil M50, high-temperature oil, halocarbon oil (for O2 measurements), food oil (FDA listed), Neobee M20 (FDA listed)	Silicone oil M5, food oil (FDA listed), Neobee M20 (FDA listed)	Food oil (FDA-listed), Neobee M20 (FDA-listed)	

Pressure measurement

Remote seals

Detailed product overview

Overview (continued)

Type	7MF0900, 7MF0902	7MF0930	7MF4925
			
Description	Diaphragm seal	Diaphragm seal	Flushing ring
Application	For the process industry	For the process industry	For the process industry
Version	Inline seal	Inline seal	
Type	In sandwich design, direct mounting or with a flexible capillary	With quick release, flange type design, with flexible capillary or direct mounting	Flushing ring for diaphragm seals 7MF0800 to 7MF0814
Article No.	7MF0900*, 7MF0902*	7MF0930*	7MF4925*
Process connection standard, nominal diameter and rated pressure	<p>EN 1092-1</p> <p>DN 25, DN 40, DN 50, DN 65, DN 80, DN 100, DN 125</p> <p>ASME B16.5</p> <p>1", 1½", 2", 2½", 3", 4", 5"</p>	<p>DIN 11851 with thread</p> <p>DN 25, DN 32, DN 40</p> <p>DN 50, DN 65, DN 80</p> <p>Clamp ISO 2852</p> <p>DN 25, DN 38, DN 51</p> <p>DN 63.5, DN 76.1, DN 51</p> <p>Clamp DIN 32676, series C</p> <p>1", 1½"</p> <p>2", 2½"</p> <p>3"</p> <p>Clamp DIN 32676, series A metric</p> <p>DN 25, DN 32, DN 40</p> <p>DN 50</p> <p>DN 65</p>	<p>EN 1092-1 1</p> <p>DN 50, DN 80, DN 100, DN 125</p> <p>ASME B 16.5</p> <p>2", 3", 4", 5"</p>
Sealing surface	For stainless steel mat. no. 1.4404/316L According to EN 1092-1, form B1 or ASME B16.5 RF 125 ... 250 AA For the other materials Smooth according to EN 1092-1, form B2 or ASME B16.5 RFSF		<p>EN 1092-1</p> <p>Form B1</p> <p>Form B2</p> <p>Form D/Form D</p> <p>Form C/Form C</p> <p>Form D/Form C</p> <p>Form E</p> <p>Form F</p> <p>ASME B16.5</p> <p>RF 125 ... 250 AA</p> <p>RFSF</p> <p>RJF ring groove</p>
Materials	<p>Main body</p> <p>Stainless steel, mat. no. 1.4404/316L</p> <p>Diaphragm</p> <p>Stainless steel, mat. no. 1.4404/316L</p> <p>Wetted parts</p> <p>Stainless steel, mat. no. 1.4404/316L, no coating</p> <p>Capillary</p> <p>Stainless steel</p>	<p>Main body</p> <p>Stainless steel, mat. no. 1.4404/316L</p> <p>Diaphragm</p> <p>Stainless steel, mat. no. 1.4404/316L</p> <p>Capillary</p> <p>Stainless steel</p>	Stainless steel 1.4404/316L

Overview (continued)

Type	7MF0900, 7MF0902	7MF0930	7MF4925
Capillary length	≤ 10 m (32.8 ft), longer lengths on request	≤ 10 m (32.8 ft), longer lengths on request	
Filling liquid	Silicone oil M5, silicone oil M50, high-temperature oil, halocarbon oil (for O2 measurements), food oil (FDA listed), Neobee M20 (FDA listed)	Silicone oil M5, food oil (FDA listed), Neobee M20 (FDA listed)	Food oil (FDA-listed), Neobee M20 (FDA-listed) Flushing holes (2 units), female thread: G $\frac{1}{4}$, G $\frac{1}{2}$, $\frac{1}{4}$ -18 NPT, $\frac{1}{2}$ -14 NPT

Pressure measurement

Remote seals

for SITRANS P320/P420 pressure transmitters / Technical reference

Overview

In many cases, the pressure transmitter and the measured medium have to be physically separated. It is then necessary to use a remote seal.

The remote seals can be used with the following SITRANS P320/420 pressure transmitter series:

- Gauge pressure
- Absolute pressure
- Differential pressure and flow

Note

When configuring your remote seal, be sure to read the information about transmission response, temperature error and response time to be found in the sections "Function" and "Technical specification". Only then will the remote seal work to optimum effect.

Benefits

- No direct contact between pressure transmitter and medium
- Individual configuration of the pressure transmitter for perfect adaptation to the operating conditions
- Available in many versions
- Specially designed for difficult operating conditions
- Quick-release versions available for the food industry

Application

Remote seal systems should be used when it is necessary or expedient to separate the medium and measuring instrument.

Some examples of such cases:

- The medium temperature is outside the limits specified for the pressure transmitter.
- The medium is corrosive and requires diaphragm materials that are not available for the pressure transmitter.
- The medium is highly viscous or has a high solids content and would block the sample chambers of the pressure transmitter.
- The medium could freeze in the sample chambers or the pulse cable.
- The medium is heterogeneous or fibrous.
- The medium has a tendency towards polymerization or crystallization.
- The process requires quick-release remote seals, as required in the food & beverages industry for fast cleaning, for example.
- The process requires cleaning of the measuring point, like in a batch process, for example.

Design

A remote seal system consists of the following components.

- Pressure transmitter
- One or two remote seals
- Filling liquid
- Connection between the pressure transmitter and remote seal (direct mounting or via a capillary)

The space for the medium is sealed off with a flat embedded elastic diaphragm. Between the diaphragm and the pressure transmitter is the filling liquid.

In many cases, a capillary must be connected between the remote seal and the pressure transmitter in order, for example, to reduce the temperature effects on the pressure transmitter when the measured medium is hot.

However, the capillary influences the response time and the temperature response of the overall remote seal system. When capillaries are used to connect a remote seal to a pressure transmitter for differential pressure, two capillaries of equal length must always be used.

Optionally, the remote seal with diaphragm extension (tube) can be ordered.

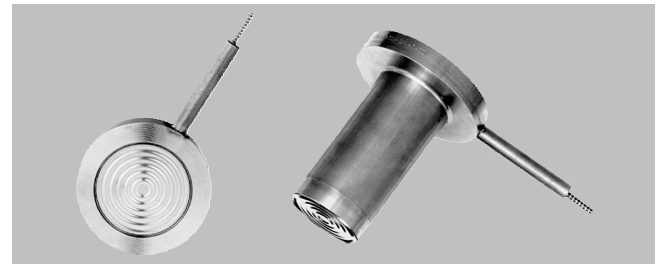
The remote seals in sandwich design are secured with a blank flange.

Designs

Diaphragm seal

With diaphragm seals, the pressure is sensed by a flat embedded diaphragm.

Diaphragm seals are differentiated as follows:



Diaphragm seal in sandwich design without (left) and with diaphragm extension (tube)

- Sandwich design
- Sandwich design with diaphragm extension (tube) according to EN or ASME and secured with a blank flange

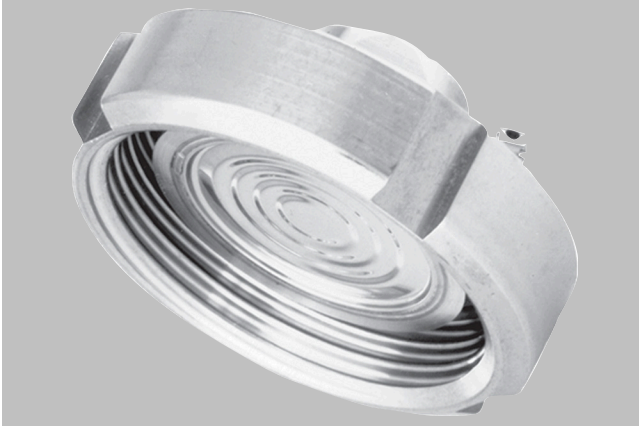


Diaphragm seal in flange design without (left) and with diaphragm extension (tube)

- Flange design

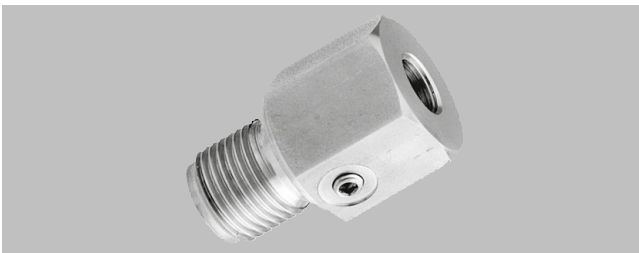
Design (continued)

- Flange design with diaphragm extension (tube) according to EN or ASME and secured using holes on the flange



Quick-release diaphragm seal

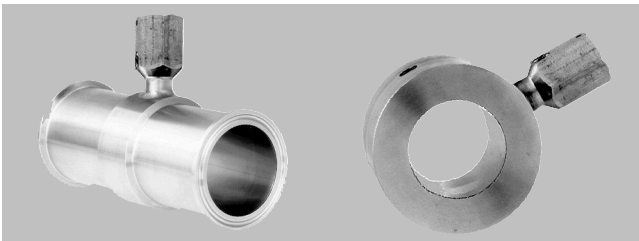
- Remote seal with quick release, e.g., according to DIN 11851, SMS Standard, IDF Standard, APV-RJF Standard, clamp connection, etc.
- Miniature remote seal with male thread for screwing into threaded holes
- Remote seal with customer-specific process connections



Miniature diaphragm seal with flush-mounted diaphragm

- Miniature diaphragm seal

Remote seals with quick release are used mainly in the food industry. Their design means that the medium cannot accumulate in dead volumes. The remote seal's quick release mechanism enables fast disassembly for cleaning.

Inline seal

Quick-release inline seal (left) and for flange mounting

With inline seals, the pressure is sensed using a cylindrical diaphragm inside the pipe and then transmitted with the filling liquid to the pressure transmitter.

Design (continued)

The inline seal is a special design for flowing media. It consists of a cylindrical pipe in which a cylindrical diaphragm is embedded. Because it is completely integrated in the process line, there are no turbulences, dead spaces or other obstacles in the flow direction. The inline seal is also piggable.

Inline seals are differentiated as follows:

- Quick-release inline seal, e.g., according to DIN 11851, SMS Standard, IDF Standard, APV/RJF Standard, clamp connection, etc. The remote seal's quick release mechanism enables fast disassembly for cleaning.
- Inline seal for flange mounting according to EN or ASME
- Inline seal with customer-specific process connections

Note:

The pressure information on the transmitter and the remote seal must be observed in accordance with the pressure-temperature relationship.

Pressure measurement

Remote seals

for SITRANS P320/P420 pressure transmitters / Technical reference

Function

The measured pressure is transferred to the filling liquid by the diaphragm and enters the measuring chamber of the pressure transmitter through the capillary. The filling liquid completely fills the inside of the diaphragm seal, the capillary and the measuring chamber of the pressure transmitter so that it is free of gas.

Transmission response

The transmission response of a remote seal is characterized by the following variables:

- Temperature error
- Adjustment time

Temperature error

Temperature errors are caused by changes in the volume of the filling liquid as a result of temperature fluctuations. To select the right remote seal, you must calculate the temperature error.

Below is an overview of the factors which affect the extent of the temperature error, and information on how to calculate the temperature error.

The temperature error depends on the following variables:

- Rigidity of the diaphragm used
- Filling liquid used
- Effect of the filling liquid underneath the process flanges or in the connection shank of the pressure transmitter
- Inside diameter of the capillary: The greater the inside diameter, the greater the temperature error
- Capillary length: The longer the capillary, the greater the temperature error

Diaphragm rigidity

The rigidity of the diaphragm is extremely important. The greater the diameter of the diaphragm, the softer the diaphragm and the more sensitive it is to temperature-induced changes in the volume of the filling liquid.

Large-diameter diaphragms are therefore always required for small measuring ranges.

Apart from diaphragm rigidity, the following factors are also important:

- Diaphragm thickness
- Diaphragm material
- Any coatings

Filling liquid

Temperature fluctuations cause volume changes in all filling liquids. Choosing the right filling liquid can minimize the temperature error; however, the filling liquid must be appropriate for the temperature limits and operating pressure. The filling liquid must also be harmless to health.

There is filling liquid underneath the diaphragm, in the capillary and under the process flange of the pressure transmitter (or in the connection shank). The temperature error must therefore be calculated separately for each combination.

Note:

A vacuum-resistant remote seal is recommended for continuous negative pressure operation at 500 mbar or below, including during commissioning (see ordering data).

You can find an example of how to calculate the temperature error in "Technical specifications".

Adjustment time

The adjustment time depends on the following factors:

- Inside diameter of the capillary: The greater the inside diameter, the shorter the adjustment time.
- Filling liquid viscosity: The greater the viscosity, the longer the adjustment time.
- Capillary length: The longer the capillary, the longer the adjustment time.
- Pressure in the pressure measurement system: The higher the pressure, the shorter the adjustment time.

Recommendations

For the best possible pressure transmitter and remote seal combination, please note the following:

- Use a diameter as large as possible for the remote seal. This makes the effective diameter of the remote seal diaphragms larger and reduces the temperature error.
- Use a capillary as short as possible. This reduces the adjustment time and the temperature error.
- Use the filling liquid with the lowest viscosity and smallest coefficients of expansion. Make sure, however, that the filling liquid meets the high-pressure, low-pressure and temperature process requirements. The filling liquid and the medium must also be compatible.
- Please note the following points for operation in the negative pressure range:

Function (continued)

- The pressure transmitter must always be positioned below the lowest shank.
 - The operating range of some filling liquids may be extremely limited in terms of the permissible temperature of the medium.
 - A vacuum-resistant remote seal is required for continuous operation in the low-pressure range.
- You can find recommendations for the minimum measuring span in "Technical specifications".

Note

The remote seals listed here are merely a selection of the most common remote seals. As there is a wide range of process connections, this list may not include all remote seals available.

Other versions may include:

- Different process connections and standards
- Aseptic or sterile screw glands
- Different dimensions
- Different nominal pressures
- Special diaphragm materials and coatings
- Different sealing surfaces
- Different filling liquids
- Different capillary lengths
- Capillary sheathed in protective tubing
- Calibration at higher/lower temperatures, etc.

Please contact your local Siemens office for further information.

Negative pressure service

Filling liquids, such as silicone oils, inert or those suitable for food, are used in remote seal systems for transmission of the process pressure to the pressure transmitter.

In each liquid, particles have the tendency to leave the liquid compound with increasing temperature (transition from liquid to gaseous aggregate state). This means the vapor pressure increases with increasing temperature and is dependent on the substance or mixture present.

The higher the temperature and the lower the associated process pressure in the liquid, the more difficult it is to guarantee the desired transmission properties of the remote seal's filling liquid and therefore the measuring arrangement.

In addition, the sealing elements at the transmitter must be designed so that a diffusion of molecules from the atmosphere into the remote seal system is prevented due to the constantly occurring negative pressure.

In addition to the influencing variables process pressure and process temperature, the vapor pressure curve of the filling liquid at the remote seal end and the stiffness of the remote seal membrane impact the functionality of the remote seal in the negative pressure range.

This means you have to pay special attention to the physical properties of filling liquids with applications in the negative pressure range.

There are three stages for the negative pressure resistance:

- **Standard version** of the remote seal without additional protective measures, suitable for the overpressure range and low negative pressure range. This design is identified with (1) in the diagrams below.
- **Negative pressure service** with suitable seals and treated filling liquid, identified with (2) in the diagrams below. Here you select the order codes D81 or D83, depending on the mounting type.
- **Extended negative pressure service** with more extended treatment of the filling liquid and the remote seals, identified in the diagrams below with (3). Here you select the order codes D85 or D88, depending on the mounting type.

There are two more areas in the charts. The area (4) identifies an area that has to be clarified with Technical Support prior to placing the order. The area (5) describes the area in which the remote seal filling liquid is permanently destroyed and the entire remote seal is therefore without function.

Pressure measurement

Remote seals

for SITRANS P320/P420 pressure transmitters / Technical reference

Function (continued)

Technical specifications of the remote seal filling liquids

Filling liquid	Reference in the article no.	Density at 20 °C (68 °F) [kg/dm ³]	Viscosity at 20 °C [mm ² /s]	Suitable for negative pressure service	Suitable for extended negative pressure service
Silicone oil M5	A	0.914	4	x	-
Silicone oil M50	B	0.966	50	x	x
High-temperature oil	C	1.079	57	x	x
Halocarbon oil	D	1.968	14	x	-
Food oil (FDA-listed)	E	0.920	10	x	x
Neobee M20	R	0.921	10	x	x

The suitable negative pressure service is specified with the pressure/temperature curves of the respective liquids described below.

Note: For reasons of operational safety, the transmitter must not exceed the height of the remote seal - with differential pressure applications, the height of the bottom remote seal - for measurements in the negative pressure range. The associated mounting types B, C1, C2 or H are described at the end of this section under the topic "Measuring arrangements".

Selection of the required negative pressure service

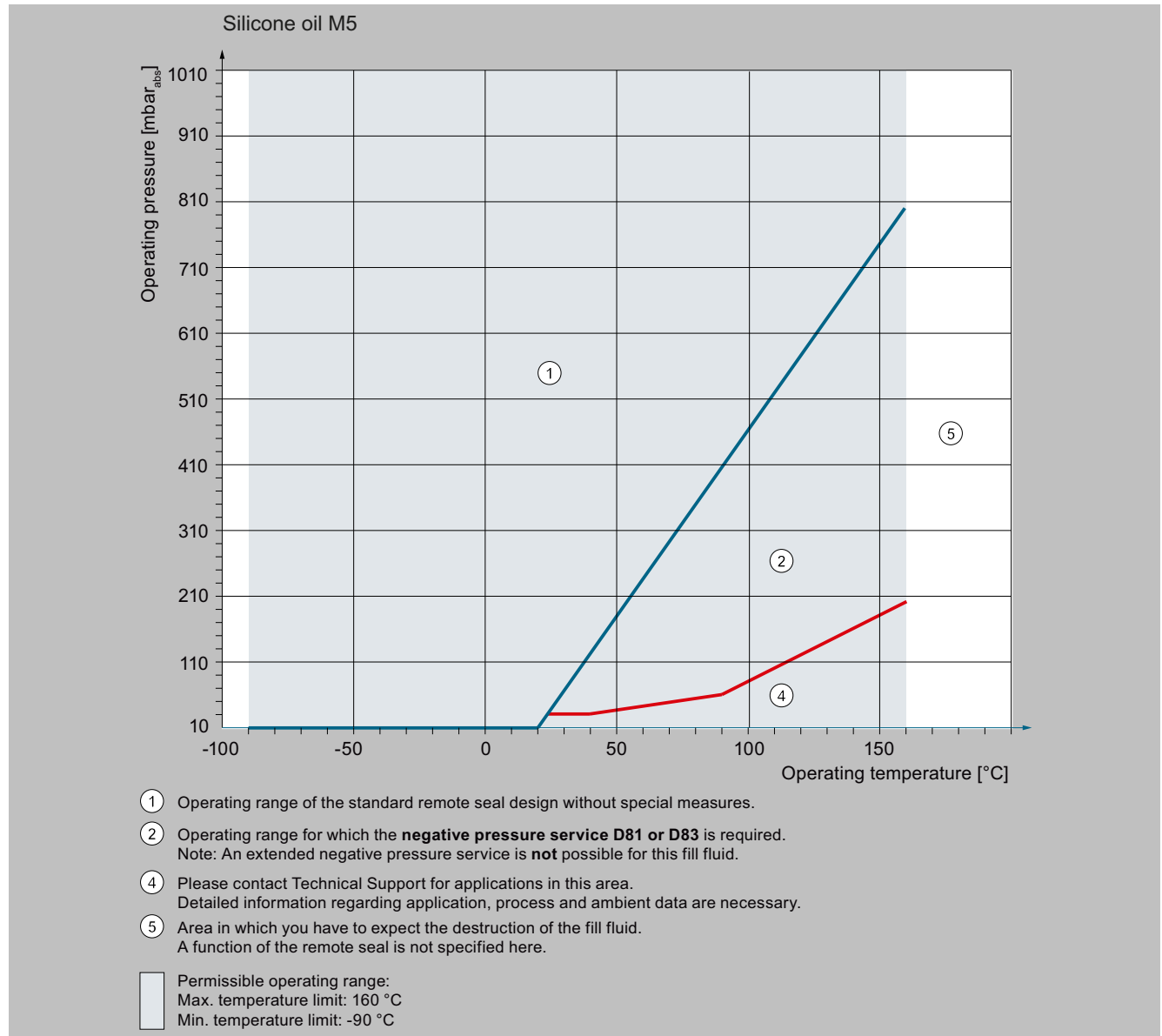
The procedure for determining the required negative pressure service is described below using the silicone oil M5 as filling liquid. The minimum existing process pressure of a fictitious process is 200 mbar_{abs} (2.9 psi) (at a maximum process temperature of 150 °C (302 °F)). This intersection is identified by an "X" in the chart below. This means the negative pressure service D81 or D83 (depending on the application) is sufficient in this example.

The suitable negative pressure resistance is determined this way for all other filling liquids also.

Note:

Note the response times according to the table "Response times" (see Technical specifications).

Function (continued)



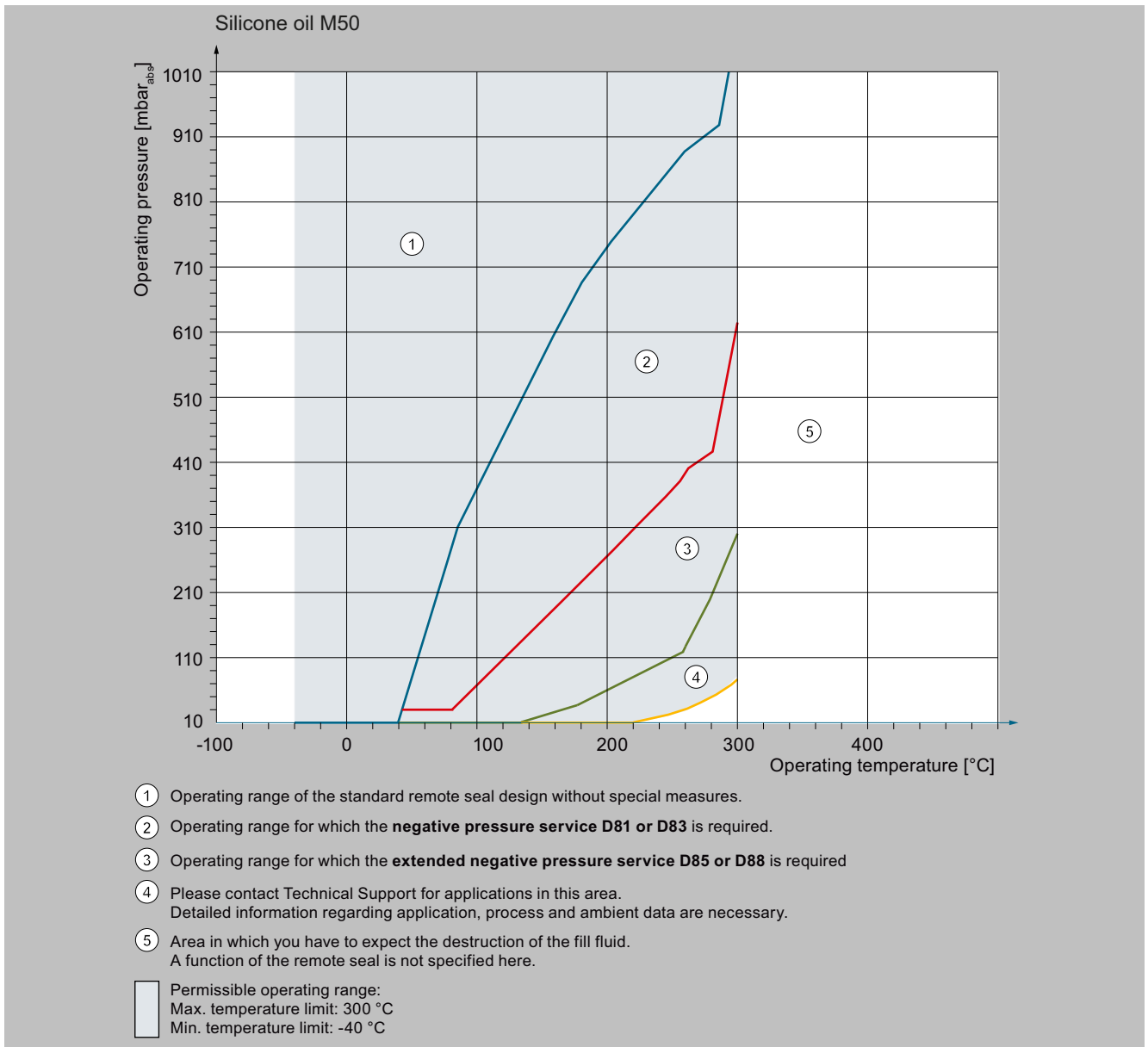
Negative pressure applications with silicone oil M5

Pressure measurement

Remote seals

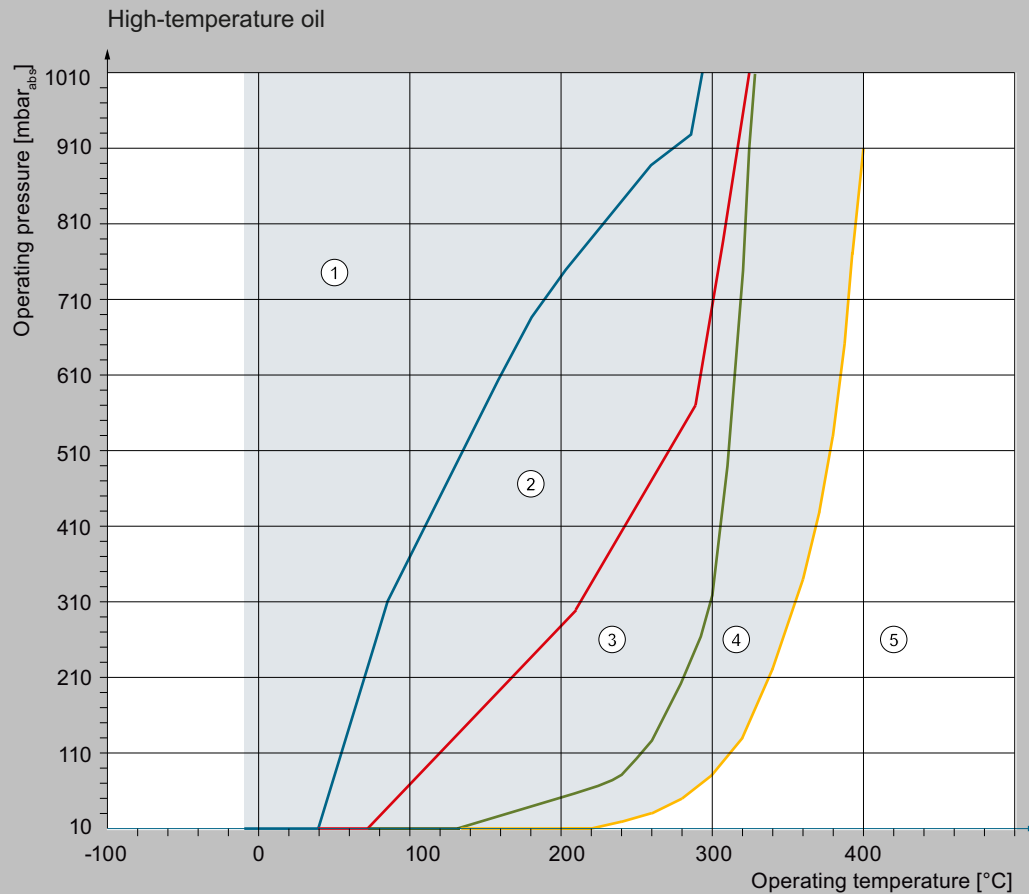
for SITRANS P320/P420 pressure transmitters / Technical reference

Function (continued)



Negative pressure applications with silicone oil M50

Function (continued)



- ① Operating range of the standard remote seal design without special measures.
- ② Operating range for which the **negative pressure service D81 or D83** is required.
- ③ Operating range for which the **extended negative pressure service D85 or D88** is required
- ④ Please contact Technical Support for applications in this area.
Detailed information regarding application, process and ambient data are necessary.
- ⑤ Area in which you have to expect the destruction of the fill fluid.
A function of the remote seal is not specified here.

▭ Permissible operating range:
Max. temperature limit: 400 °C
Min. temperature limit: -10 °C

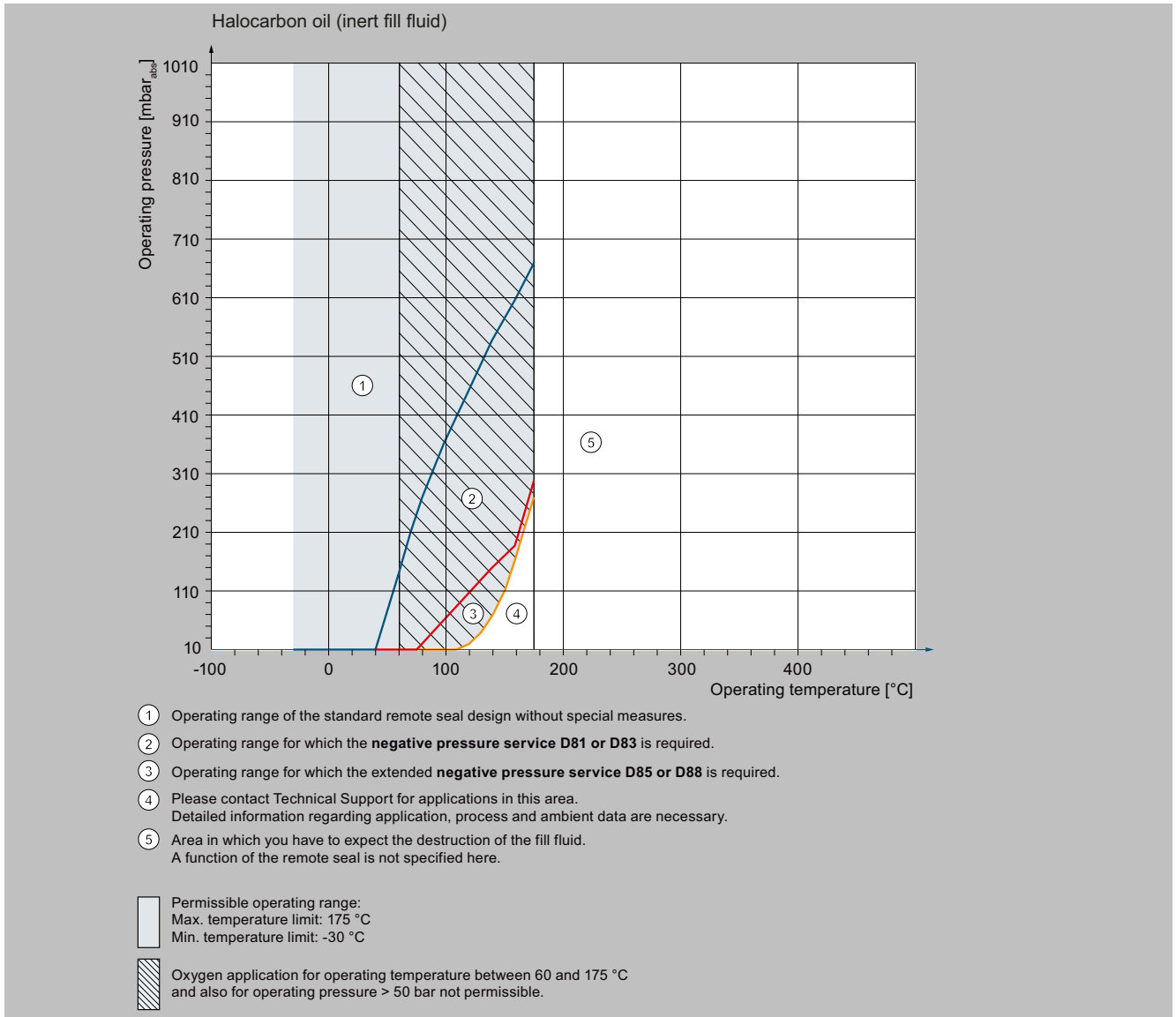
Negative pressure applications with high-temperature oil

Pressure measurement

Remote seals

for SITRANS P320/P420 pressure transmitters / Technical reference

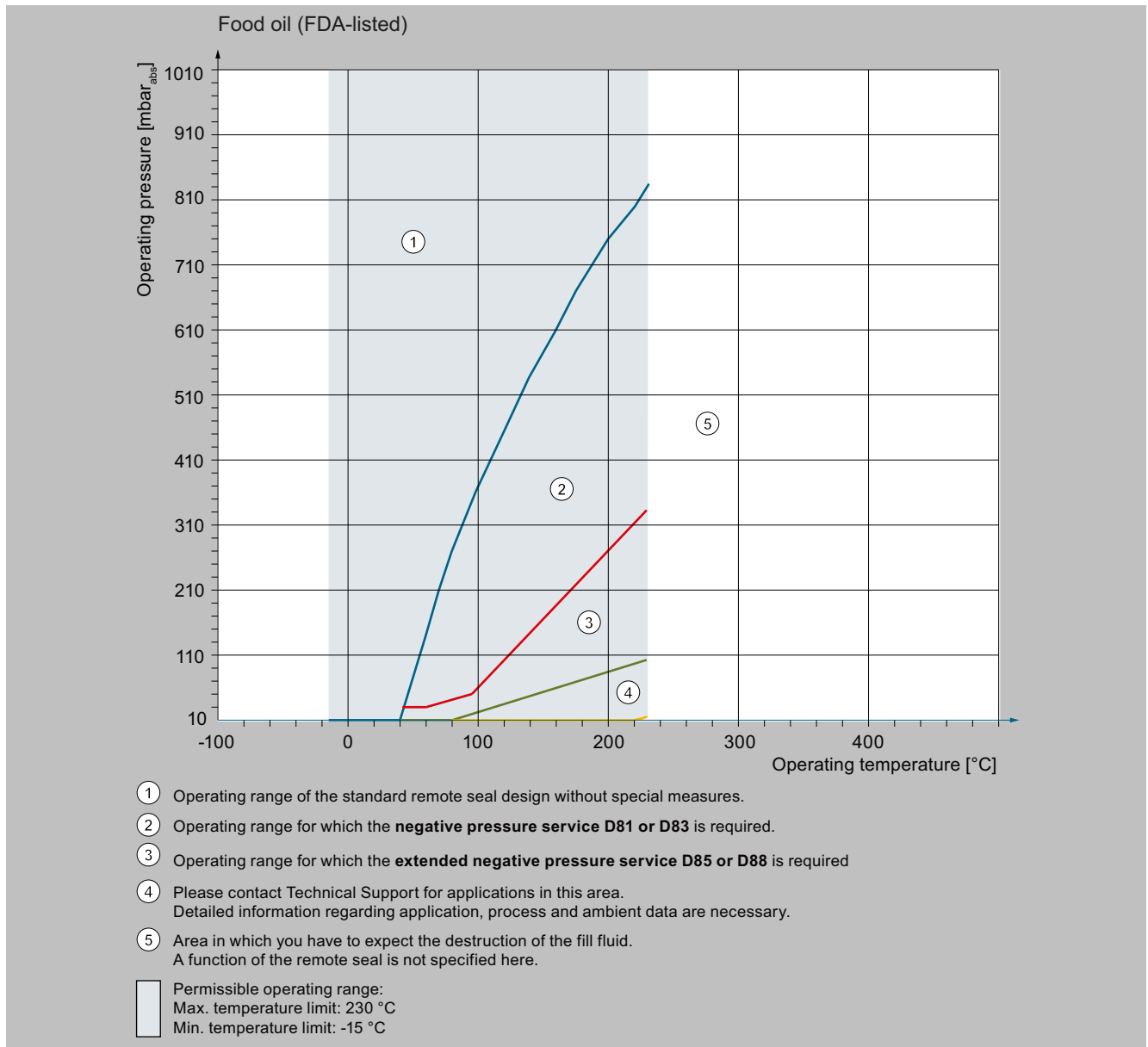
Function (continued)



Negative pressure applications with halocarbon oil (inert filling liquid)

A BAM approval for process temperatures up to 60 °C (140 °F) and system pressures up to 50 bar (725 psi) is available for the oxygen application.

Function (continued)



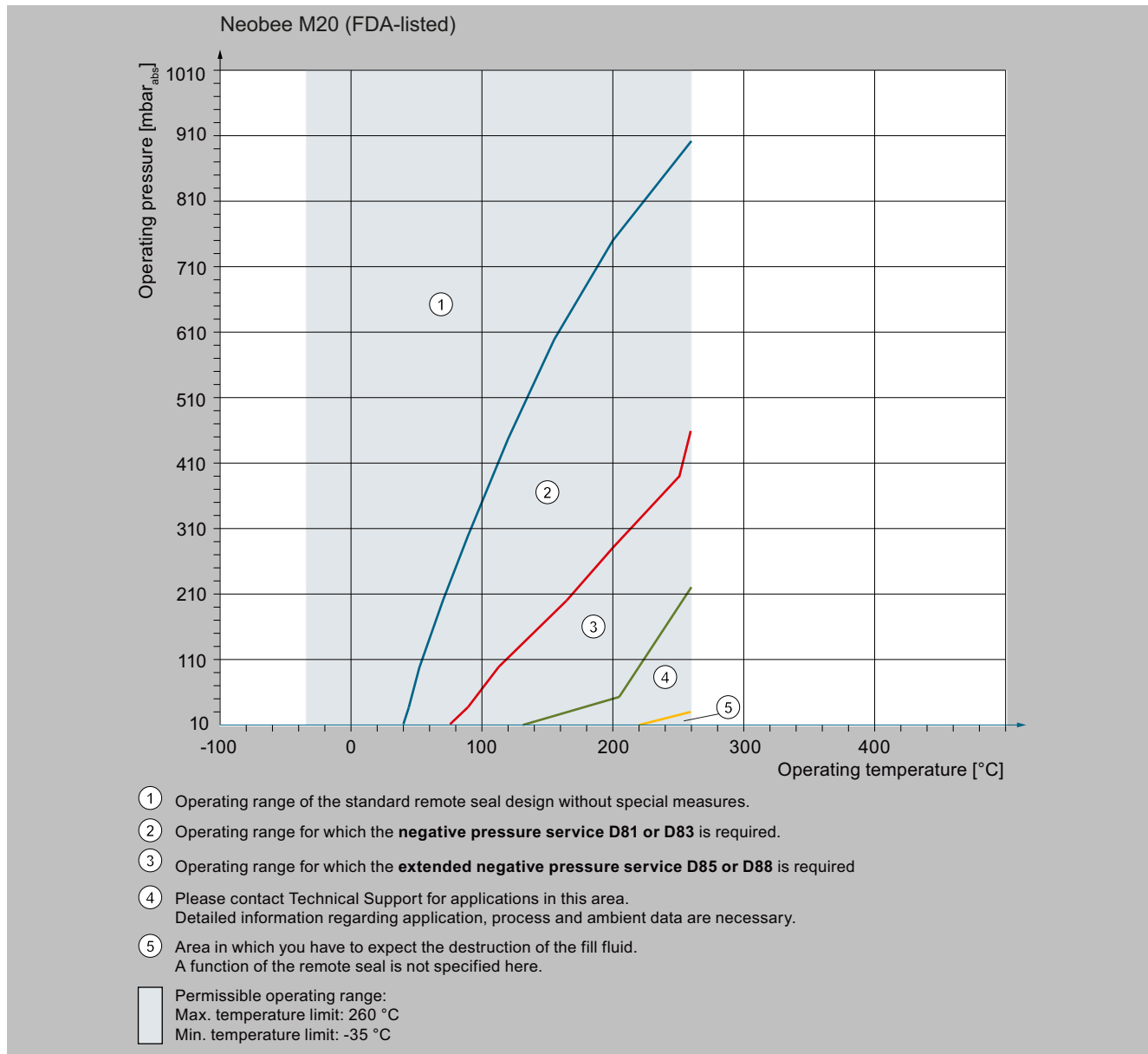
Negative pressure applications with food oil (FDA-listed)

Pressure measurement

Remote seals

for SITRANS P320/P420 pressure transmitters / Technical reference

Function (continued)



Negative pressure applications with Neobee M20 (FDA-listed)

Technical specifications

Diaphragm seal temperature error

Temperature errors of diaphragm seals when connected to pressure transmitters for gauge pressure, absolute pressure, differential pressure (single-sided) and level

Notes

Table values apply to:

- The filling liquids silicone oil M5, silicone oil M50, high-temperature oil, halocarbon oil and food oil (FDA listed), Neobee M20
- Diaphragm material stainless steel

With selected order code W01:

- The values listed in the table for "High-temperature oil" filling liquid and for the wetted parts made of stainless steel 316L, mat no. 1.4404/1.4435, apply.
- For the other filling liquids, the following supplements must be applied to the determined table values for the temperature errors¹⁾:
 - For "FDA oil": 5%
 - For "Silicone oil M5": 35%
 - For "Silicone oil M50": 35%
 - For "Halocarbon oil": 20%
 - For "Neobee M20": 20%

¹⁾ The specified surcharges for the various wetted parts are unaffected. They still need to be included in the calculation.

	Nominal diameter/design	Diaphragm diameter		Temperature error of remote seal f_{RS}		Temperature error of capillary f_{Cap}	
		mm	(inch)	mbar/10 K	(psi/10 K)	mbar/(10 K · m_{Cap})	(psi/(10 K · m_{Cap}))
Sandwich design or with flange according to EN 1092-1	DN 25 without tube	27	(1.06)	5	(0.073)	16	(0.232)
	DN 40 without tube	40	(1.57)	1.6	(0.023)	2.9	(0.042)
	DN 50 without tube	59	(2.32)	1.5	(0.022)	2	(0.029)
	DN 50 with tube	45	(1.89)	5	(0.073)	10	(0.145)
	DN 80 without tube	89	(3.50)	0.2	(0.003)	0.2	(0.003)
	DN 80 with tube	72	(2.83)	1	(0.015)	1	(1.015)
	DN 100 without tube	89	(3.50)	0.2	(0.003)	0.4	(0.006)
	DN 100 with tube	89	(3.50)	0.4	(0.006)	0.4	(0.006)
Sandwich design or with flange according to ASME B16.5	DN 125 without tube	124	(4.88)	0.2	(0.003)	0.1	(0.002)
	DN 125 with tube	124	(4.88)	0.2	(0.003)	0.1	(0.002)
	1 inch without tube	27	(1.06)	5	(0.073)	16	(0.232)
	1½ without tube	40	(1.57)	1.6	(0.023)	2.9	(0.042)
	2 inches without tube	59	(2.32)	1.5	(0.022)	2	(0.029)
	2 inches with tube	45	(1.89)	5	(0.073)	10	(0.145)
	3 inches without tube	89	(3.50)	0.2	(0.003)	0.2	(0.003)
	3 inches with tube	72	(2.83)	1	(0.015)	1	(1.015)
Remote seal with union nut according to DIN 11851	4 inches without tube	89	(3.50)	0.2	(0.003)	0.4	(0.006)
	4 inches with tube	89	(3.50)	0.4	(0.006)	0.4	(0.006)
	5 inches without tube	124	(4.88)	0.2	(0.003)	0.1	(0.002)
	5 inches with tube	124	(4.88)	0.2	(0.003)	0.1	(0.002)
	DN 25	25	(0.98)	20	(0.290)	60	(0.870)
	DN 32	32	(1.26)	8	(0.116)	25	(0.363)
	DN 40	40	(1.57)	4	(0.058)	10	(0.145)
	DN 50	52	(2.05)	4	(0.058)	5	(0.073)
Remote seal, screw gland design	DN 65	59	(2.32)	3	(0.044)	4	(0.058)
	DN 80	72	(2.83)	1	(0.015)	1	(0.015)
	DN 50	52	(2.05)	4	(0.058)	5	(0.073)
Remote seal with screwed connector according to DIN 11851	DN 50	52	(2.05)	4	(0.058)	5	(0.073)
	DN 25	25	(0.98)	20	(0.290)	60	(0.870)
	DN 32	32	(1.26)	8	(0.116)	25	(0.363)
	DN 40	40	(1.57)	4	(0.058)	10	(0.145)

Pressure measurement

Remote seals

for SITRANS P320/P420 pressure transmitters / Technical reference

Technical specifications (continued)

	Nominal diameter/design	Diaphragm diameter		Temperature error of remote seal f_{RS}		Temperature error of capillary f_{cap}	
		mm	(inch)	mbar/10 K	(psi/10 K)	mbar/(10 K · m_{cap})	(psi/(10 K · m_{cap}))
	DN 50	52	(2.05)	4	(0.058)	5	(0.073)
	DN 65	59	(2.32)	3	(0.044)	4	(0.058)
	DN 80	72	(2.83)	1	(0.015)	1	(0.015)
Clamp connection	1½ inches	32	(1.26)	8	(0.116)	25	(0.363)
	2 inches	40	(1.57)	4	(0.058)	10	(0.145)
	2½ inches	59	(2.32)	3	(0.044)	5	(0.073)
	3 inches	72	(2.83)	1	(0.015)	1	(0.015)
Miniature diaphragm seal	G1B	25	(0.98)	20	(0.290)	60	(0.870)
	G1½B	40	(1.57)	4	(0.058)	10	(0.145)
	G2B	52	(2.05)	4	(0.058)	5	(0.073)

	Nominal diameter/design	Diaphragm diameter		Temperature error of process flange/connection shank f_{PF}		Recommended min. measuring spans (guidance values, note temperature error)	
		mm	(inch)	mbar/10 K	(psi/10 K)	mbar	(psi)
Sandwich design or with flange according to EN 1092-1	DN 25 without tube	27	(1.06)	23.6	(0.342)	4000	(58)
	DN 40 without tube	40	(1.57)	4.3	(0.062)	1000	(14.5)
	DN 50 without tube	59	(2.32)	2	(0.029)	200	(2.90)
	DN 50 with tube	45	(1.89)	10	(0.145)	500	(7.25)
	DN 80 without tube	89	(3.50)	0.2	(0.003)	100	(1.45)
	DN 80 with tube	72	(2.83)	1	(1.015)	250	(3.63)
	DN 100 without tube	89	(3.50)	0.4	(0.006)	100	(1.45)
	DN 100 with tube	89	(3.50)	0.4	(0.006)	100	(1.45)
Sandwich design or with flange according to ASME B16.5	1 inch without tube	27	(1.06)	23.6	(0.342)	4000	(58)
	1½ without tube	40	(1.57)	4.3	(0.062)	1000	(14.5)
	2 inches without tube	59	(2.32)	2	(0.029)	200	(2.90)
	2 inches with tube	45	(1.89)	10	(0.145)	500	(7.25)
	3 inches without tube	89	(3.50)	0.2	(0.003)	100	(1.45)
	3 inches with tube	72	(2.83)	1	(1.015)	250	(3.63)
	4 inches without tube	89	(3.50)	0.4	(0.006)	100	(1.45)
	4 inches with tube	89	(3.50)	0.4	(0.006)	100	(1.45)
Remote seal with union nut according to DIN 11851	DN 25	25	(0.98)	60	(0.870)	6000	(87)
	DN 32	32	(1.26)	25	(0.363)	4000	(58)
	DN 40	40	(1.57)	10	(0.145)	2000	(29)
	DN 50	52	(2.05)	5	(0.073)	500	(7.25)
	DN 65	59	(2.32)	4	(0.058)	500	(7.25)
	DN 80	72	(2.83)	1	(0.015)	250	(3.63)
Remote seal, screw gland design	DN 50	52	(2.05)	5	(0.073)	500	(7.25)
Remote seal with screwed connector according to DIN 11851	DN 25	25	(0.98)	60	(0.870)	6000	(87)
	DN 32	32	(1.26)	25	(0.363)	4000	(58)
	DN 40	40	(1.57)	10	(0.145)	2000	(29)
	DN 50	52	(2.05)	5	(0.073)	500	(7.25)
	DN 65	59	(2.32)	4	(0.058)	500	(7.25)
Clamp connection	1½ inches	32	(1.26)	25	(0.363)	4000	(58)
	2 inches	40	(1.57)	10	(0.145)	2000	(29)
	2½ inches	59	(2.32)	5	(0.073)	500	(7.25)
	3 inches	72	(2.83)	1	(0.015)	250	(3.63)

Technical specifications (continued)

	Nominal diameter/design	Diaphragm diameter		Temperature error of process flange/connection shank f_{PF}		Recommended min. measuring spans (guidance values, note temperature error)	
		mm	(inch)	mbar/10 K	(psi/10 K)	mbar	(psi)
Miniature diaphragm seal	G1B	25	(0.98)	60	(0.870)	6000	(87)
	G1½B	40	(1.57)	10	(0.145)	2000	(29)
	G2B	52	(2.05)	5	(0.073)	500	(7.25)

Temperature errors of diaphragm seals with connection to differential pressure transmitters (double-sided)Notes

Table values apply to:

- The filling liquids silicone oil M5, silicone oil M50, high-temperature oil, halocarbon oil and food oil (FDA listed), Neobee M20
- Diaphragm material stainless steel

With selected order code W01:

- The values listed in the table for "High-temperature oil" filling liquid and for the wetted parts made of stainless steel 316L, mat no. 1.4404/1.4435, apply.
- For the other filling liquids, the following supplements must be applied to the determined table values for the temperature errors¹⁾:
 - For "FDA oil": 5%
 - For "Silicone oil M5": 35%
 - For "Silicone oil M50": 35%
 - For "Halocarbon oil": 20%
 - For "Neobee M20": 20%

¹⁾ The specified surcharges for the various wetted parts are unaffected. They still need to be included in the calculation.

	Nominal diameter/design	Diaphragm diameter		Temperature error of remote seal f_{RS}		Temperature error of capillary f_{CAP}	
		mm	(inch)	mbar/10 K	(psi/10 K)	mbar/ (10 K · m_{CAP})	(psi/(10 K · m_{CAP}))
Sandwich design or with flange according to EN 1092-1	DN 40 without tube	40	(1.57)	0.2	(0.003)	0.4	(0.006)
	DN 50 without tube	59	(2.32)	0.3	(0.0043)	0.3	(0.0045)
	DN 50 with tube	45	(1.89)	1.26	(0.018)	1.7	(0.025)
	DN 80 without tube	89	(3.50)	0.05	(0.001)	0.05	(0.001)
	DN 80 with tube	72	(2.83)	0.24	(0.004)	0.17	(0.003)
	DN 100 without tube	89	(3.50)	0.05	(0.001)	0.07	(0.001)
	DN 100 with tube	89	(3.50)	0.1	(0.002)	0.07	(0.001)
	DN 125 without tube	124	(4.88)	0.05	(0.001)	0.03	(0.0004)
Sandwich design with flange according to ASME B16.5	1½ without tube	40	(1.57)	0.2	(0.003)	0.4	(0.006)
	2 inches without tube	59	(2.32)	0.3	(0.0043)	0.3	(0.0043)
	2 inches with tube	45	(1.89)	1.26	(0.018)	1.7	(0.025)
	3 inches without tube	89	(3.50)	0.05	(0.001)	0.05	(0.0007)
	3 inches with tube	72	(2.83)	0.24	(0.004)	0.17	(0.003)
	4 inches without tube	89	(3.50)	0.05	(0.001)	0.07	(0.001)
	4 inches with tube	89	(3.50)	0.1	(0.002)	0.07	(0.001)
	5 inches without tube	124	(4.88)	0.05	(0.001)	0.03	(0.0004)
Remote seal, screw gland design	DN 50	52	(2.05)	1	(0.015)	0.83	(0.012)
	DN 65	59	(2.32)	0.7	(0.010)	0.67	(0.010)
Remote seal with union nut according to DIN 11851	DN 50	52	(2.05)	1	(0.015)	0.83	(0.012)
	DN 65	59	(2.32)	0.7	(0.010)	0.67	(0.010)
	DN 80	72	(2.83)	0.24	(0.004)	0.17	(0.003)
Remote seal with screwed connector according to DIN 11851	DN 50	52	(2.05)	1	(0.015)	0.83	(0.012)
	DN 65	59	(2.32)	0.7	(0.010)	0.67	(0.010)
	DN 80	72	(2.83)	0.24	(0.004)	0.17	(0.003)
Clamp connection	2 inches	40	(1.57)	1	(0.015)	2.5	(0.036)
	2½ inches	59	(2.32)	0.7	(0.010)	0.67	(0.010)
	3 inches	72	(2.83)	0.24	(0.004)	0.17	(0.003)

Pressure measurement

Remote seals

for SITRANS P320/P420 pressure transmitters / Technical reference

Technical specifications (continued)

	Nominal diameter/design	Diaphragm diameter		Temperature error of process flange/connection shank f_{PF}		Recommended min. measuring spans (guidance values, note temperature error)	
		mm	(inch)	mbar/10 K	(psi/10 K)	mbar	(psi)
Sandwich design or with flange according to EN 1092-1	DN 40 without tube	40	(1.57)	0.4	(0.006)	1600	(23.2)
	DN 50 without tube	59	(2.32)	0.3	(0.0045)	250	(3.626)
	DN 50 with tube	45	(1.89)	1.7	(0.025)	250	(3.626)
	DN 80 without tube	89	(3.50)	0.05	(0.0007)	50	(0.725)
	DN 80 with tube	72	(2.83)	0.17	(0.003)	100	(1.45)
	DN 100 without tube	89	(3.50)	0.07	(0.001)	50	(0.725)
	DN 100 with tube	89	(3.50)	0.07	(0.001)	50	(0.725)
	DN 125 without tube	124	(4.88)	0.03	(0.0004)	20	(0.29)
	DN 125 with tube	124	(4.88)	0.03	(0.0004)	20	(0.29)
Sandwich design with flange according to ASME B16.5	1½ without tube	40	(1.57)	0.4	(0.006)	1600	(23.2)
	2 inches without tube	59	(2.32)	0.3	(0.0045)	250	(3.626)
	2 inches with tube	45	(1.89)	1.7	(0.025)	250	(3.626)
	3 inches without tube	89	(3.50)	0.05	(0.0007)	50	(0.725)
	3 inches with tube	72	(2.83)	0.17	(0.003)	100	(1.45)
	4 inches without tube	89	(3.50)	0.07	(0.001)	50	(0.725)
	4 inches with tube	89	(3.50)	0.07	(0.001)	50	(0.725)
	5 inches without tube	124	(4.88)	0.03	(0.0004)	20	(0.29)
	5 inches with tube	124	(4.88)	0.03	(0.0004)	20	(0.29)
Remote seal, screw gland design	DN 50	52	(2.05)	0.83	(0.012)	250	(3.626)
Remote seal with union nut according to DIN 11851	DN 50	52	(2.05)	0.83	(0.012)	250	(3.626)
	DN 65	59	(2.32)	0.67	(0.010)	250	(3.626)
	DN 80	72	(2.83)	0.17	(0.003)	100	(1.450)
Remote seal with screwed connector according to DIN 11851	DN 50	52	(2.05)	0.83	(0.012)	250	(3.626)
	DN 65	59	(2.32)	0.67	(0.010)	250	(3.626)
	DN 80	72	(2.83)	0.17	(0.003)	100	(1.450)
Clamp connection	2 inches	40	(1.57)	2.5	(0.036)	2000	(29.01)
	2½ inches	59	(2.32)	0.67	(0.010)	250	(3.626)
	3 inches	72	(2.83)	0.17	(0.003)	100	(1.450)

Inline seal temperature errors

Notes

Table values apply to:

- The filling liquids silicone oil M5, silicone oil M50, high-temperature oil, halocarbon oil and food oil (FDA listed), Neobee M20
- Diaphragm material stainless steel
- Half the values apply to glycerin/water mixture as filling liquid

Diaphragm thickness:

- 0.05 mm (0.002 inches) for DN 25/DN 40/DN 50
- 0.1 mm (0.004 inches) for DN 80/DN 100

Temperature errors of inline seals for flange-mounting 7MF0900 for one-sided mounting

Nominal diameter/design	Process error		Transmitter error		Remote line error		Minimum measuring span	
	mbar/10 K	(psi/10 K)	mbar/10 K	(psi/10 K)	mbar/10 K	(psi/10 K)	mbar	(psi)
DN 25 (1 inch)	8.0	(0.116)	12.0	(0.174)	Not possible	Not possible	3000	(43.5)
DN 40 (1½ inches)	10.0	(0.145)	9.5	(0.138)	8.0	(0.116)	3000	(43.5)
DN 50 (2 inches)	12.0	(0.174)	9.0	(0.131)	19.0	(0.276)	3000	(43.5)
DN 80 (3 inches)	9.5	(0.138)	5.0	(0.073)	10.5	(0.152)	2000	(29)
DN 100 (4 inches)	16.0	(0.232)	7.0	(0.102)	16.0	(0.232)	3000	(43.5)

Technical specifications (continued)

Temperature errors of inline seals for flange-mounting 7MF0902 for two-sided mounting

Nominal diameter/design	Process error		Transmitter error		Remote line error		Minimum measuring span	
	mbar/10 K	(psi/10 K)	mbar/10 K	(psi/10 K)	mbar/10 K	(psi/10 K)	mbar	(psi)
DN 25 (1 inch)	Not possible	Not possible	Not possible	Not possible	Not possible	Not possible	Not possible	Not possible
DN 40 (1½ inches)	10.0	(0.145)	9.5	(0.138)	7.5	(0.109)	600	(8.7)
DN 50 (2 inches)	13.5	(0.196)	12.5	(0.181)	19.0	(0.276)	600	(8.7)
DN 80 (3 inches)	11.0	(0.160)	12.5	(0.181)	10.5	(0.152)	600	(8.7)
DN 100 (4 inches)	14.0	(0.203)	9.0	(0.131)	14.0	(0.203)	3000	(43.5)

Temperature errors of quick-release inline seals 7MF0930 for one-sided mounting

Nominal diameter/design	Process error		Transmitter error		Remote line error		Minimum measuring span	
	mbar/10 K	(psi/10 K)	mbar/10 K	(psi/10 K)	mbar/10 K	(psi/10 K)	mbar	(psi)
DN 25 (1 inch)	30.0	(0.435)	23.0	(0.334)	13.0	(0.189)	6000	(87)
DN 32 (1¼ inches)	9.0	(0.131)	5.0	(0.073)	16.5	(0.239)	3000	(43.5)
DN 40 (1½ inches)	3.0	(0.044)	1.5	(0.022)	4.0	(0.058)	2000	(29)
DN 50 (2 inches)	4.0	(0.058)	1.0	(0.015)	3.0	(0.044)	2000	(29)
DN 65 (2½ inches)	5.5	(0.080)	2.0	(0.029)	6.0	(0.087)	2000	(29)

Calculation of the temperature error

The following equation is used to calculate the temperature error:

$$dp = (\vartheta_{RS} - \vartheta_{Cal}) \cdot f_{RS} + (\vartheta_{Cap} - \vartheta_{Cal}) \cdot l_{Cap} \cdot f_{Cap} + (\vartheta_{MU} - \vartheta_{Cal}) \cdot f_{PF}$$

Legend:

dp	Additional temperature error (mbar)
ϑ_{RS}	Temperature on remote seal diaphragm (generally corresponds to temperature of medium)
ϑ_{Cal}	Calibration/reference temperature (20 °C (68 °F))
f_{DM}	Temperature error of remote seal
ϑ_{Cap}	Ambient temperature on the capillaries
l_{Cap}	Capillary length
f_{Cap}	Temperature error of capillaries
ϑ_{TR}	Ambient temperature on pressure transmitter
f_{PF}	Temperature error of the oil filling in the process flanges of the pressure transmitter

Example of temperature error calculation

What are you looking for?

We are looking for an additional temperature error of the remote seals (dp).

Prevailing values:

SITRANS P pressure transmitter for differential pressure, 250 mbar, set to 0 ... 100 mbar, with DN 100 diaphragm seals without tube, diaphragm made of stainless steel, mat. no. 1.4404/316L	$f_{DM} = 0.05 \text{ mbar}/10 \text{ K}$ (0.039 inH ₂ O/10 K)
Capillary length	$l_{Cap} = 6 \text{ m}$ (19.7 ft)
Capillaries fitted on both sides	$f_{Cap} = 0.07 \text{ mbar}/(10 \text{ K} \cdot \text{m}_{Cap})$ 0.028 inH ₂ O/(10 K · m _{Cap})
Filling liquid silicone oil M5	$f_{PF} = 0.07 \text{ mbar}/10 \text{ K}$ (0.028 inH ₂ O/10 K)
Medium temperature	$\vartheta_{DM} = 100 \text{ °C}$ (212 °F)
Temperature on the capillaries	$\vartheta_{Cap} = 50 \text{ °C}$ (122 °F)
Temperature on pressure transmitter	$\vartheta_{MU} = 50 \text{ °C}$ (122 °F)
Calibration temperature	$\vartheta_{Cal} = 20 \text{ °C}$ (68 °F)

Calculation in mbar:

$$dp = (100 \text{ °C} - 20 \text{ °C}) \cdot 0.05 \text{ mbar}/10 \text{ K} + (50 \text{ °C} - 20 \text{ °C}) \cdot 6 \text{ m} \cdot 0.07 \text{ mbar}/(10 \text{ K} \cdot \text{m}) + (50 \text{ °C} - 20 \text{ °C}) \cdot 0.07 \text{ mbar}/10 \text{ K}$$

Calculation in inH₂O:

$$dp = (212 \text{ °F} - 68 \text{ °F}) \cdot 0.039 \text{ inH}_2\text{O}/10 \text{ K} + (112 \text{ °F} - 68 \text{ °F}) \cdot 19.7 \text{ ft} \cdot 0.028 \text{ inH}_2\text{O}/(10 \text{ K} \cdot 3.28 \text{ ft}) + (112 \text{ °F} - 68 \text{ °F}) \cdot (0.028 \text{ inH}_2\text{O}/10 \text{ K})$$

$$dp = 0.16 \text{ inH}_2\text{O} + 0.51 \text{ inH}_2\text{O} + 0.08 \text{ inH}_2\text{O}$$

Pressure measurement

Remote seals

for SITRANS P320/P420 pressure transmitters / Technical reference

Technical specifications (continued)

Result:

$dp = 1.87 \text{ mbar (0.75 inH}_2\text{O)}$

(corresponds to 2.27% of set measuring span)

Note:

The determined temperature error only applies to the error resulting from connection of the remote seal.

The transmission response of the respective pressure transmitter is not taken into account here!

The transmission response must be calculated separately, and the resulting measuring error added to the temperature error determined above from connection of the remote seal.

Dependence of temperature error on diaphragm material

The temperature errors listed in the previous table are based on the use of stainless steel as the diaphragm material. If other diaphragm materials are used, the temperature errors change as follows:

Diaphragm material	Change in temperature error of remote seal
	<i>Increase in values by:</i>
Stainless steel, duplex, ...	See previous tables
Hastelloy C4, mat. no. 2.4610	50%
Hastelloy C276, mat. no. 2.4819	50%
Monel 400, mat. no. 2.4360	60%
Tantalum	50%
Titanium	50%
PTFE coating on stainless steel diaphragm	80%
ECTFE coating or PFA coating on stainless steel diaphragm	100%
Gold coating on stainless steel diaphragm	40%
Inconel	50%
Incoloy	50%

Maximum medium temperature

Note

When taking into account the maximum medium temperature, the application limits of the filling liquids and gaskets used as well as the pressure/temperature limits of the respective process connections must also be taken into consideration.

The following maximum medium temperatures apply depending on the material of wetted parts.

Material	Max. medium temperature	Min./max. Pressure
Stainless steel, mat. no. 1.4404/316L	400 °C (752 °F)	No restrictions
PTFE coating	200 °C (392 °F)	< 0 bar (0 psi); gauge pressure
	260 °C (500 °F)	0 bar (0 psi) ... 25 bar (363 psi); gauge pressure
	150 °C (302 °F)	25 bar (363 psi) ... 40 bar (580 psi); gauge pressure
	50 °C (302 °F)	40 bar (580 psi) ... 60 bar (870 psi); gauge pressure
ECTFE coating	150 °C (302 °F)	For pressures < 1 bar (14.5 psi) on request
PFA coating	200 °C (392 °F)	< 0 bar (0 psi); gauge pressure
	260 °C (500 °F)	0 bar (0 psi) ... 25 bar (363 psi); gauge pressure
	150 °C (302 °F)	25 bar (363 psi) ... 40 bar (580 psi); gauge pressure
	50 °C (302 °F)	40 bar (580 psi) ... 100 bar (1450 psi); gauge pressure
Hastelloy C4, mat. no. 2.4610	400 °C (752 °F)	No restrictions
Hastelloy C276, mat. no. 2.4819	400 °C (752 °F)	No restrictions
Hastelloy C22, mat. no. 2.4602	400 °C (752 °F)	No restrictions
Monel 400, mat. no. 2.4360	400 °C (752 °F)	No restrictions
Tantalum	300 °C (572 °F)	No restrictions
	150 °C (302 °F)	No restrictions
Duplex, mat. no. 1.4462	250 °C (482 °F)	No restrictions
Titanium	150 °C (302 °F)	No restrictions
Inconel	400 °C (752 °F)	No restrictions
Incoloy	400 °C (752 °F)	No restrictions
Gold coating	400 °C (752 °F)	No restrictions

Technical specifications (continued)

Maximum length of the capillary for diaphragm seals (guidance values)

Nominal diameter DN		Max. length of the capillary		Inline seal		7MF0902*		7MF0930*	
		Diaphragm seal		7MF0900*					
		m	(ft)	m	(ft)	m	(ft)	m	(ft)
DN 25	(1")	2.5	(8.2)	Only direct mounting possible	Only direct mounting possible	Not possible	Not possible	1	(3.2)
DN 32	(1¼")	2.5	(8.2)	-	-	-	-	6	(19.7)
DN 40	(1½")	4	(13.1)	1.66	(5.5)	1	(3.2)	6	(19.7)
DN 50	(2")	6	(19.7)	4	(13.1)	4	(13.1)	6	(19.7)
DN 65	(2½")	8	(26.2)	-	-	-	-	6	(19.7)
DN 80	(3")	15	(49.1)	4	(13.1)	6	(19.7)	-	-
DN 100	(4")	15	(49.1)	4	(13.1)	4	(13.1)	-	-
DN 125	(5")	15	(49.1)	-	-	-	-	-	-

Response times

The response times specified in the following table (in seconds per meter length of the capillary) apply to a change in pressure which corresponds to the set measuring span.

The listed values must be multiplied by the respective length of the capillary, or with pressure transmitters for differential pressure and flow by the total length of both capillaries.

The response times are independent of the set measuring span within the range of the respective pressure transmitter. The response times are of insignificant importance for measuring spans above 10 bar (145 psi). The response times of the pressure transmitters are not considered in the table.

Filling liquid	Density		Temperature on capillary		Response time in s/m (s/ft) with max. measuring span of pressure transmitter					
	kg/dm ³	(lb/in ³)	°C	(°F)	250 mbar (101 inH ₂ O)	600 mbar (241 inH ₂ O)	1600 mbar (643 inH ₂ O)	250 mbar (101 inH ₂ O)	600 mbar (241 inH ₂ O)	1600 mbar (643 inH ₂ O)
Silicone oil M5	0.914	(0.033)	+60	(140)	0.06	(0.018)	0.02	(0.006)	0.01	(0.003)
			+20	(68)	0.11	(0.034)	0.02	(0.006)	0.02	(0.006)
			-20	(-4)	0.3	(0.091)	0.12	(0.037)	0.05	(0.015)
Silicone oil M50	0.966	(0.035)	+60	(140)	0.6	(0.183)	0.25	(0.076)	0.09	(0.027)
			+20	(68)	0.61	(0.186)	0.26	(0.079)	0.1	(0.030)
			-20	(-4)	1.69	(0.515)	0.71	(0.216)	0.27	(0.082)
High-temperature oil	1.070	(0.039)	+60	(140)	0.14	(0.043)	0.06	(0.018)	0.02	(0.006)
			+20	(68)	0.65	(0.198)	0.27	(0.082)	0.1	(0.030)
			-10	(14)	3.96	(1.207)	1.65	(0.503)	0.62	(0.189)
Halocarbon oil	1.968	(0.071)	+60	(140)	0.07	(0.021)	0.03	(0.009)	0.01	(0.003)
			+20	(68)	0.29	(0.088)	0.12	(0.037)	0.05	(0.015)
			-20	(-4)	2.88	(0.878)	1.2	(0.366)	0.45	(0.137)
Food oil (FDA-listed)	0.920	(0.033)	+60	(140)	0.75	(0.229)	0.33	(0.101)	0.17	(0.052)
			+20	(68)	4	(1.220)	1.75	(0.534)	0.67	(0.204)
			-20	(-4)	20	(6.100)	8.5	(2.593)	3.25	(0.991)
Neebee M20	0.920	(0.033)	+60	(140)	0.69	(0.210)	0.29	(0.884)	0.11	(0.034)
			+20	(68)	1.81	(0.552)	0.76	(0.232)	0.29	(0.088)
			-20	(-4)	6.46	(1.969)	2.71	(0.826)	1.04	(0.317)

See charts under "Function" for permissible data of filling liquid for pressure and temperatures.

Pressure measurement

Remote seals

for SITRANS P320/P420 pressure transmitters / Technical reference

More information

Specification of process conditions for selection and ordering data

Ambient temperature range

The standard remote seal systems are optimized for an ambient temperature range of -10 to +50 °C (14 to +122 °F). Therefore, in the ordering options, the **order code "D66"** is preset.

If the range of the ambient temperature deviates from this, you have the possibility to choose other ambient temperature ranges:

- With the **order code D67**, a range from -40 to +50 °C (-40 to +122 °F)
- With the **order code D68**, a range from -10 to +85 °C (14 to +185 °F)

In the case of a **special design**, which you can select with the **order option Y99** in the device settings, it is possible to enter the ambient temperature as a numerical value.

Process temperature

The standard optimization for the process temperature depends on the filling liquid used:

Filling liquid	Code	Optimized temperature range as standard
Silicone M50	B	-10 ... +200 °C (14 ... +392 °F)
High-temperature oil	C	-10 ... +300 °C (14 ... +572 °F)
Silicone oil M5	A	-40 ... +140 °C (-40 ... +284 °F)
Food oil (FDA-listed)	E	-10 ... +140 °C (14 ... +284 °F)
Halocarbon oil	D	-20 ... +60 °C (-4 ... +140 °F)
Neobee M20 (FDA-listed)	R	-10 ... +140 °C (14 ... +284 °F)

- If the **process temperatures** deviate from the temperature ranges mentioned in the table above, we ask you to send the process temperature with the **order code Y50** along with the order.
- If the remote seal has a small diameter (< DN 50/2") or a long capillary (> 4 m), we also ask you to provide the process data with the **following order code** when ordering.

These entries are transmitted and ensure the correct functioning of the remote seal systems.

	Order code
Ambient temperature range	
• -10 ... +50 °C (14 ... +122 °F) preset	D66
• -40 ... +50 °C (-40 ... +122 °F)	D67
• -10 ... +85 °C (14 ... +185 °F)	D68
Process temperature min. ... °C/(°F)/max. ... °C/(°F)	Y50

Overview



Diaphragm seals in sandwich design

Pressure measurement

Remote seals

for SITRANS P320/P420 pressure transmitters / Diaphragm seals in sandwich design with flexible capillary

Selection and ordering data

	Article No.	Order code
Diaphragm seal		
In sandwich design, connected with flexible capillary tube to a transmitter		
SITRANS P320/P420 or SITRANS P300 for gauge and absolute pressure (only in conjunction with underpressure service)	7MF0800-	
7MF03../7MF04../7MF802. to be ordered separately; scope of delivery: 1 unit		
SITRANS P320/P420 for absolute pressure from differential pressure	7MF0801-	
7MF03../7MF04.. order separately, scope of delivery: 1 unit		
SITRANS P320/P420 transmitter for differential pressure and flow	7MF0802-	
7MF03../7MF04.. order separately, scope of delivery: 2 units		
	● ● ● ● ● - 0 ● ● ● ● ● ● ● ●	
Click the article number for online configuration in the PIA Life Cycle Portal.		
Nominal diameter	Nominal pressure	
<u>Process connection standard EN 1092-1</u>		
(DN 25, DN 40 and DN 50 only recommended for pressure transmitters for gauge pressure)		
DN 25	PN 16 ... 400	0 B Q
DN 40	PN 16 ... 400	0 D Q
DN 50	PN 16 ... 400	0 E Q
DN 65	PN 16 ... 400	0 F Q
DN 80	PN 16 ... 400	0 G Q
DN 100	PN 16 ... 400	0 H Q
DN 125	PN 16 ... 400	0 J Q
<u>Process connection standard ASME B16.5</u>		
(1 inch, 1½ inches and 2 inches only recommended for pressure transmitters for gauge pressure)		
1 inch	Class 150 ... 2500	1 K X
1½ inches	Class 150 ... 2500	1 L X
2 inches	Class 150 ... 2500	1 M X
2½ inches	Class 150 ... 2500	1 N X
3 inches	Class 150 ... 2500	1 P X
4 inches	Class 150 ... 2500	1 Q X
5 inches	Class 150 ... 2500	1 R X
<u>Process connection standard J.I.S.</u>		
(DN 25, DN 40 and DN 50 only recommended for pressure transmitters for gauge pressure)		
DN 25	10K ... 63K	2 B W
DN 40	10K ... 63K	2 D W
DN 50	10K ... 63K	2 E W
DN 65	10K ... 63K	2 F W
DN 80	10K ... 63K	2 G W
DN 100	10K ... 63K	2 H W
DN 125	10K ... 63K	2 J W
Other version, add order code and plain text		
	9 A A	H 1 Y
Capillary length		
1 m (38.37 inches)		1 0
1.6 m (63 inches)		1 1
2 m (78.7 inches)		1 2
2.5 m (98.4 inches)		1 3
3 m (118.1 inches)		1 4
4 m (157.5 inches)		1 5
5 m (196.9 inches)		1 6
6 m (236.2 inches)		1 7
7 m (275.6 inches)		1 8
8 m (315 inches)		2 0
9 m (354.3 inches)		2 1
10 m (393.7 inches)		2 2
11 m (433.1 inches); only for 7MF0802		2 3
12 m (472.4 inches); only for 7MF0802		2 4
13 m (511.811 inches); only for 7MF0802		2 5
14 m (551.2 inches); only for 7MF0802		2 6
15 m (590.6 inches); only for 7MF0802		2 7
Other version, add order code and plain text		
	9 8	L 1 Y
Filling liquid		
Silicone oil M50		B
High-temperature oil		C

for SITRANS P320/P420 pressure transmitters / Diaphragm seals in sandwich design with flexible capillary

Selection and ordering data (continued)

	Article No.	Order code
Diaphragm seal		
In sandwich design, connected with flexible capillary tube to a transmitter		
SITRANS P320/P420 or SITRANS P300 for gauge and absolute pressure (only in conjunction with underpressure service)	7MF0800-	
7MF03../7MF04../7MF802. to be ordered separately; scope of delivery: 1 unit		
SITRANS P320/P420 for absolute pressure from differential pressure	7MF0801-	
7MF03../7MF04.. order separately, scope of delivery: 1 unit		
SITRANS P320/P420 transmitter for differential pressure and flow	7MF0802-	
7MF03../7MF04.. order separately, scope of delivery: 2 units		
	● ● ● ● ● ● - 0 ● ● ● ● ● ● ● ● ● ●	
Silicone oil M5		A
Food oil (FDA-listed)		E
Halocarbon oil		D
Neobee M20 (FDA listed)		R
Other version, add order code and plain text		Z P 1 Y
Material of wetted parts		
Stainless steel 316L		
• Without coating		A
• With PFA coating		D
• With PTFE coating		E 0
• With ECTFE coating		F
Monel 400, 2.4360		G
Hastelloy C276, 2.4819		J
Tantalum		K
Titanium, 3.7035		L 0
Nickel 201		M 0
Diaphragm Duplex, 1.4462		Q
Diaphragm and flange Duplex, 1.4462		R
Stainless steel 316L, gold-plated		S 0
Hastelloy C4, 2.4610		U 0
Hastelloy C22, 2.4602		V 0
Other version, add order code and plain text		Z 8 Q 1 Y
Tube length		
None		0
50 mm (2 inches)		1
100 mm (4 inches)		2
150 mm (6 inches)		3
200 mm (8 inches)		4
250 mm (10 inches)		5
Other version, add order code and plain text		Z 8 Q 1 Y
Customer-specific tube length		
Wetted parts: Stainless steel without coating		
<u>Range</u>	<u>Standard length</u>	
20 ... 50 mm (0.79 ... 1.97 inches)	50 mm (1.97 inches)	A 1
51 ... 100 mm (2.01 ... 3.94 inches)	100 mm (3.94 inches)	A 2
101 ... 150 mm (3.98 ... 5.91 inches)	150 mm (5.91 inches)	A 3
151 ... 200 mm (5.94 ... 7.87 inches)	200 mm (7.87 inches)	A 4
201 ... 250 mm (7.91 ... 9.84 inches)	250 mm (9.84 inches)	A 5
Wetted parts: Stainless steel with ECTFE coating		
<u>Range</u>	<u>Standard length</u>	
20 ... 50 mm (0.79 ... 1.97 inches)	50 mm (1.97 inches)	F 1
51 ... 100 mm (2.01 ... 3.94 inches)	100 mm (3.94 inches)	F 2
101 ... 150 mm (3.98 ... 5.91 inches)	150 mm (5.91 inches)	F 3
151 ... 200 mm (5.94 ... 7.87 inches)	200 mm (7.87 inches)	F 4
201 ... 250 mm (7.91 ... 9.84 inches)	250 mm (9.84 inches)	F 5
Wetted parts: Stainless steel with PFA coating		
<u>Range</u>	<u>Standard length</u>	
20 ... 50 mm (0.79 ... 1.97 inches)	50 mm (1.97 inches)	D 1

Pressure measurement

Remote seals

for SITRANS P320/P420 pressure transmitters / Diaphragm seals in sandwich design with flexible capillary

Selection and ordering data (continued)

		Article No.	Order code
Diaphragm seal			
In sandwich design, connected with flexible capillary tube to a transmitter			
SITRANS P320/P420 or SITRANS P300 for gauge and absolute pressure (only in conjunction with underpressure service)		7MF0800-	
7MF03../7MF04../7MF802. to be ordered separately; scope of delivery: 1 unit			
SITRANS P320/P420 for absolute pressure from differential pressure		7MF0801-	
7MF03../7MF04.. order separately, scope of delivery: 1 unit			
SITRANS P320/P420 transmitter for differential pressure and flow		7MF0802-	
7MF03../7MF04.. order separately, scope of delivery: 2 units			
		● ● ● ● ● - 0 ● ● ● ● ● ● ● ●	
51 ... 100 mm (2.01 ... 3.94 inches)	100 mm (3.94 inches)		D 2
101 ... 150 mm (3.98 ... 5.91 inches)	150 mm (5.91 inches)		D 3
151 ... 200 mm (5.94 ... 7.87 inches)	200 mm (7.87 inches)		D 4
201 ... 250 mm (7.91 ... 9.84 inches)	250 mm (9.84 inches)		D 5
Wetted parts: Monel 400			
Range		Standard length	
20 ... 50 mm (0.79 ... 1.97 inches)	50 mm (1.97 inches)		G 1
51 ... 100 mm (2.01 ... 3.94 inches)	100 mm (3.94 inches)		G 2
101 ... 150 mm (3.98 ... 5.91 inches)	150 mm (5.91 inches)		G 3
151 ... 200 mm (5.94 ... 7.87 inches)	200 mm (7.87 inches)		G 4
Wetted parts: Hastelloy C276			
Range		Standard length	
20 ... 50 mm (0.79 ... 1.97 inches)	50 mm (1.97 inches)		J 1
51 ... 100 mm (2.01 ... 3.94 inches)	100 mm (3.94 inches)		J 2
101 ... 150 mm (3.98 ... 5.91 inches)	150 mm (5.91 inches)		J 3
151 ... 200 mm (5.94 ... 7.87 inches)	200 mm (7.87 inches)		J 4
Wetted parts: Tantalum			
Range		Standard length	
20 ... 50 mm (0.79 ... 1.97 inches)	50 mm (1.97 inches)		K 1
51 ... 100 mm (2.01 ... 3.94 inches)	100 mm (3.94 inches)		K 2
101 ... 150 mm (3.98 ... 5.91 inches)	150 mm (5.91 inches)		K 3
151 ... 200 mm (5.94 ... 7.87 inches)	200 mm (7.87 inches)		K 4

Options	Order code
Add "-Z" to article number and specify order code.	
Factory certificates	
Quality inspection certificate (5-point characteristic curve test) acc. to IEC 62828-2	C11
Inspection certificate to EN 10204-3.1 for material of body and diaphragm	C12
Manufacturer declaration acc. to NACE (MR 0103-2012 and MR 0175-2009) (only together with wetted parts made of stainless steel 316 L and Hastelloy)	C13
Inspection certificate according to EN 10204-3.1, PMI test of pressure containing and wetted parts	C15
Certificate of FDA-approved fill oil according to EN 10204-2.2	C17
Factory certificate functional safety (SIL2/3) Devices suitable for use according to IEC 61508 and IEC 61511 (includes SIL Declaration of Conformity)	C20
Accessories	
Remote seal nameplate Attached, made of stainless steel, contains Article No. and order number of the remote seal	D42
Volume deflagration flame arrester (VDEF)	
• For gauge pressure and absolute pressure transmitters	D61
• For differential pressure and level transmitters	D62

Selection and ordering data (continued)

Options	Order code
Add "-Z" to article number and specify order code.	
Negative pressure service	
Negative pressure service	
• For gauge pressure and absolute pressure transmitters	D81
• For differential pressure transmitters	D83
Extended negative pressure service	
• For gauge pressure and absolute pressure transmitters (only 7MF0800)	D85
• For differential pressure transmitters	D88
Marine approvals	
Note:	
If one of the order codes E50 to E60 is selected, the corresponding option must also be selected for the transmitter!	
DNV-GL (Det Norske Veritas/Germanischer Lloyd)	E50
LR (Lloyds Register)	E51
BV (Bureau Veritas)	E52
ABS (American Bureau of Shipping)	E53
RMR (Russian Maritime Register)	E55
KR (Korean Register of Shipping)	E56
RINA (Registro Italiano Navale)	E57
CCS (China Classification Society)	E58
Country-specific approval	
CRN approval Canada (Canadian Registration Number)	E60
General product approvals without explosion proof approvals	
Oil-free and grease-free cleaned version for oxygen application including certificate EN 10204-2.2 (only with filling liquid halocarbon oil max. temperature 60 °C and max. pressure 50 bar)	E80
Oil-free and grease-free cleaned version not for oxygen application, including certificate EN 10204-2.2	E87
Sealing surface	
Sealing surface smooth, form B2/EN 1092-1 resp. RFSF/ANSI 16.5 (for wetted parts made of stainless steel 316L only)	M50
Sealing surface groove according to EN 1092-1, form D (instead of sealing surface B1, only for wetted parts made of stainless steel 316L)	M54
Sealing surface RJF (groove) according to ASME B16.5 (instead of sealing surface RF 125 ... 250AO, only for wetted parts made of stainless steel 316L)	M64
Sealing surface with tongue to EN 1092-1, form C (for wetted parts made of stainless steel 316L only)	
• DN 25	M70
• DN 40	M71
• DN 50	M72
• DN 80	M73
• DN 100	M74
• DN 125	M75
Sealing surface with spigot according to EN 1092-1, form E (for wetted parts made of stainless steel 316L only)	
• DN 25	M76
• DN 40	M77
• DN 50	M78
• DN 80	M79
• DN 100	M80
• DN 125	M81

Pressure measurement

Remote seals

for SITRANS P320/P420 pressure transmitters / Diaphragm seals in sandwich design with flexible capillary

Selection and ordering data (continued)

Options	Order code
Add "-Z" to article number and specify order code.	
Sealing surface female face according to EN 1092-1, form F (only for wetted parts made of stainless steel 316L)	
• DN 25	M82
• DN 40	M83
• DN 50	M84
• DN 80	M85
• DN 100	M86
• DN 125	M87
Capillary connection (Only for 7MF0800)	
Single-side mounted at differential pressure transmitter at high side	S03
Single-side mounted at differential pressure transmitter at low side	S04
Capillary coating	
PE protective tube	
• 1 m (38.37 inches)	S10
• 1.6 m (63 inches)	S11
• 2 m (78.7 inches)	S12
• 2.5 m (98.4 inches)	S13
• 3 m (118.1 inches)	S14
• 4 m (157.5 inches)	S15
• 5 m (196.9 inches)	S16
• 6 m (236.2 inches)	S17
• 7 m (275.6 inches)	S18
• 8 m (315 inches)	S19
• 9 m (354.3 inches)	S20
• 10 m (393.7 inches)	S21
• 11 m (433.1 inches); only for 7MF0802	S22
• 12 m (472.4 inches); only for 7MF0802	S23
• 13 m (511.811 inches); only for 7MF0802	S24
• 14 m (551.2 inches); only for 7MF0802	S25
• 15 m (590.6 inches); only for 7MF0802	S26
PTFE protective tube	
• 1 m (38.37 inches)	S40
• 1.6 m (63 inches)	S41
• 2 m (78.7 inches)	S42
• 2.5 m (98.4 inches)	S43
• 3 m (118.1 inches)	S44
• 4 m (157.5 inches)	S45
• 5 m (196.9 inches)	S46
• 6 m (236.2 inches)	S47
• 7 m (275.6 inches)	S48
• 8 m (315 inches)	S49
• 9 m (354.3 inches)	S50
• 10 m (393.7 inches)	S51
• 11 m (433.1 inches); only for 7MF0802	S52

Selection and ordering data (continued)

Options	Order code
Add "-Z" to article number and specify order code.	
• 12 m (472.4 inches); only for 7MF0802	S53
• 13 m (511.811 inches); only for 7MF0802	S54
• 14 m (551.2 inches); only for 7MF0802	S55
• 15 m (590.6 inches); only for 7MF0802	S56
PVC protective tube	
• 1 m (38.37 inches)	S70
• 1.6 m (63 inches)	S71
• 2 m (78.7 inches)	S72
• 2.5 m (98.4 inches)	S73
• 3 m (118.1 inches)	S74
• 4 m (157.5 inches)	S75
• 5 m (196.9 inches)	S76
• 6 m (236.2 inches)	S77
• 7 m (275.6 inches)	S78
• 8 m (315 inches)	S79
• 9 m (354.3 inches)	S80
• 10 m (393.7 inches)	S81
• 11 m (433.1 inches); only for 7MF0802	S82
• 12 m (472.4 inches); only for 7MF0802	S83
• 13 m (511.811 inches); only for 7MF0802	S84
• 14 m (551.2 inches); only for 7MF0802	S85
• 15 m (590.6 inches); only for 7MF0802	S86
Desired remote seal supplier	
Note:	
If the remote seal is to be supplied only by one of the suppliers specified below, this option needs to be selected. For orders without this option, the remote seal supplier is selected through the dispatch center.	
Company WIKA, Klingenberg	W01
Company Labom, Hude	W02
Special design	
Welded filling hole	X01
Customer-specific tube length	
Customer-specific tube length (specify in plain text in mm)	Y44
Specification of process conditions¹⁾	
Ambient temperature range	
• +10 ... +50 °C (+50 ... +122 °F) preset	D66
• -40 ... +50 °C (-40 ... +122 °F)	D67
• -10 ... +85 °C (+14 ... +185 °F)	D68
Process temperature min. ... °C/(°F)/max. ... °C/(°F)	Y50

¹⁾ See also "Specification of process conditions for selection and ordering data" in the section "More information" under "Technical reference" for SITRANS P320/P420.

Pressure measurement

Remote seals

for SITRANS P320/P420 pressure transmitters / Diaphragm seals in sandwich design with flexible capillary

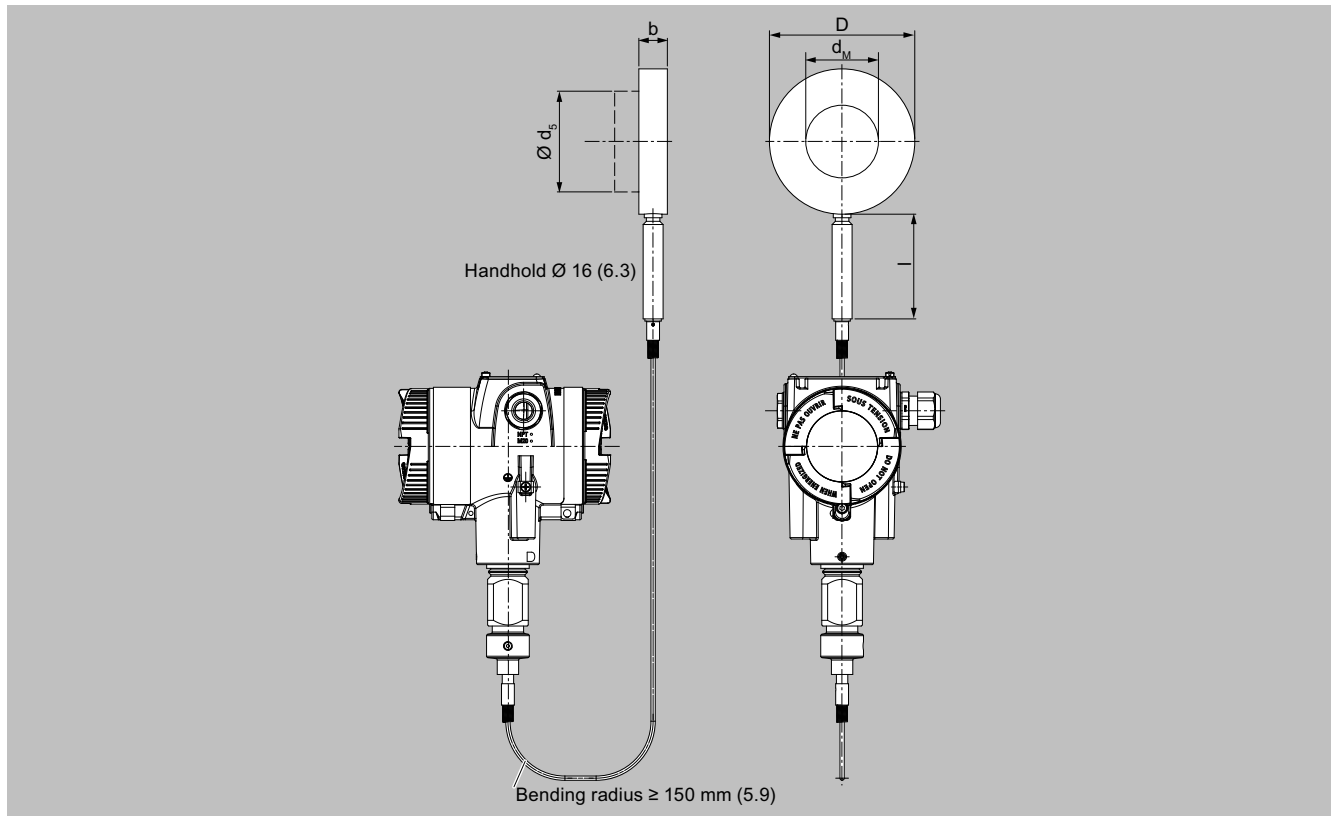
Technical specifications

SITRANS P320/P420 diaphragm seals in sandwich design with flexible capillary	
Nominal diameter Standard of process connection EN 1092-1 <ul style="list-style-type: none"> DN 25, DN 40, DN 50, DN 65, DN 80, DN 100, DN 125 Standard of process connection ASME B16.5 <ul style="list-style-type: none"> 1 inch, 1½ inch, 2 inch, 2½ inch, 3 inch, 4 inch, 5 inch Process connection standard J.I.S. <ul style="list-style-type: none"> DN 25, DN 40, DN 50, DN 65, DN 80, DN 100, DN 125 	Nominal pressure PN 16 ... PN 400 Class 150 ... Class 2500 10K ... 63K
Sealing surface <ul style="list-style-type: none"> For stainless steel mat. no. 1.4404/316L For the other materials 	According to EN 1092-1, form B1 or ASME B16.5 RF 125 ... 250 AA According to EN 1092-1, form B2 or ASME B16.5 RFSF
Materials <ul style="list-style-type: none"> Main body Wetted parts 	Stainless steel, mat. no. 1.4404/316L Stainless steel, mat. no. 1.4404/316L <ul style="list-style-type: none"> Without coating PTFE coating ECTFE coating (for negative pressure on request) PFA coating Monel 400, mat. no. 2.4360 Hastelloy C276, mat. no. 2.4819 Hastelloy C4, mat. no. 2.4610 Hastelloy C22, mat. no. 2.4602 Tantalum Titanium, mat. no. 3.7035 Nickel 201 Duplex 2205, mat. no. 1.4462 Stainless steel 316L, gold plated, layer thickness approx. 25 µm
<ul style="list-style-type: none"> Capillary Sheath 	Stainless steel, mat. no. 1.4571/316Ti (with options W01 and E50 ... E58) or mat. no. 1.4301/304 Flexible spiral coiled tube made of stainless steel, mat. no. 1.4404/316L
Gasket material in the process flanges <ul style="list-style-type: none"> For gauge pressure transmitters, absolute pressure transmitters and negative pressure applications For other applications 	Copper Viton
Permissible pressure load	See above and the technical specifications of the pressure transmitters
Tube length	Without tube as standard. A custom tube length can be selected as an order code.
Capillary <ul style="list-style-type: none"> Length Inside diameter Minimum bending radius 	≤ 10 m (32.8 ft), longer lengths on request ≤ 1.3 mm (0.051 inch) 150 mm (5.9 inches)
Filling liquid	<ul style="list-style-type: none"> Silicone oil M5 Silicone oil M50 High-temperature oil Halocarbon oil (for measuring O₂) Food oil (FDA-listed) Neobee M20 (FDA-listed)

Technical specifications (continued)

SITRANS P320/P420 diaphragm seals in sandwich design with flexible capillary	
Permissible ambient temperature	Dependent on the pressure transmitter and the filling liquid of the remote seal. More information In the technical specifications of the pressure transmitters and in the sections in the technical reference of the remote seals: <ul style="list-style-type: none"> "Function" - "Technical specifications of the remote seal filling liquids" "More information" - "Specification of process conditions for selection and ordering data"
Weight	Approx. 4 kg (8.82 lbs)
Certificates and approvals Classification according to pressure equipment directive (PED 2014/68/EU)	For gases of fluid group 1 and liquids of fluid group 1; complies with requirements of article 4, paragraph 3 (sound engineering practice)

Dimensional drawings



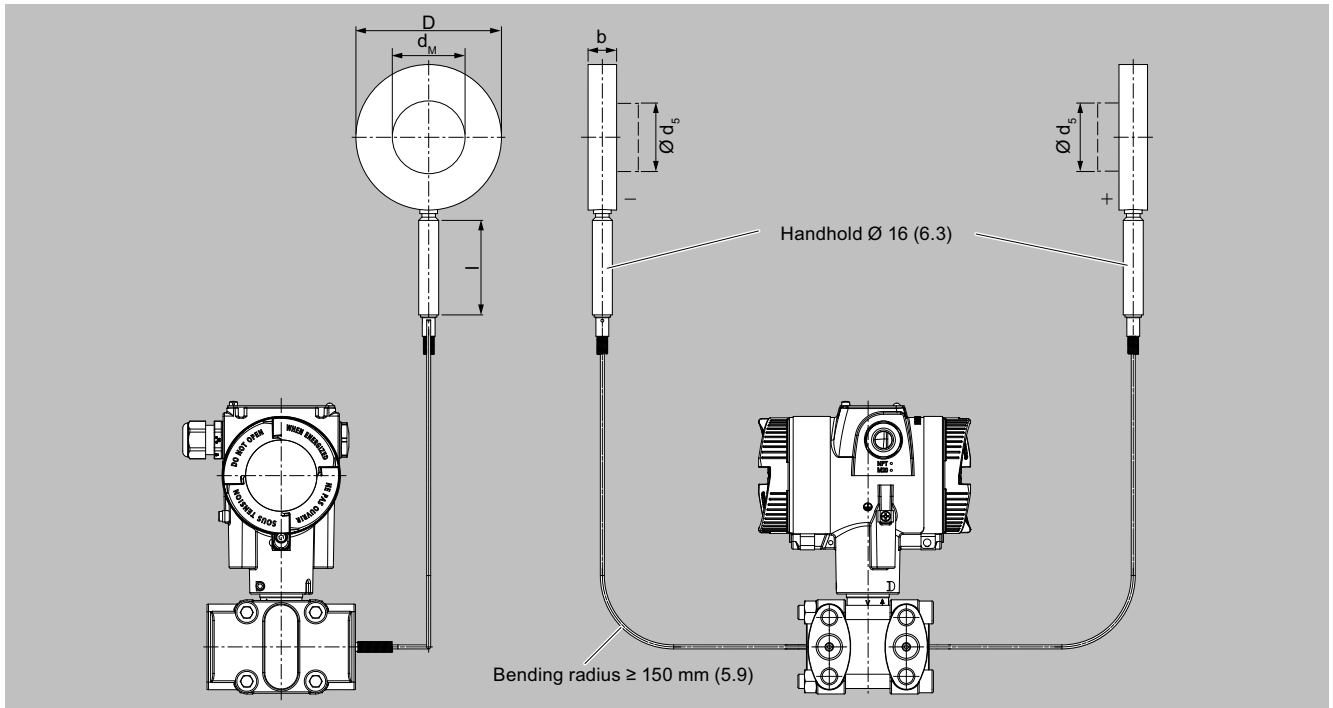
Diaphragm seals of sandwich design with flexible capillary for connection to SITRANS P320/420 pressure transmitters for gauge pressure, dimensions in mm (inch)

Pressure measurement

Remote seals

for SITRANS P320/P420 pressure transmitters / Diaphragm seals in sandwich design with flexible capillary

Dimensional drawings (continued)



Diaphragm seals of sandwich design (without flange) with flexible capillary for connection to SITRANS P320/420 pressure transmitters for absolute pressure or differential pressure and flow, dimensions in mm (inch)

Connection according to EN 1092-1

Nominal diameter	Nominal pressure	b	D	d ₅	d _M with tube	d _M without tube	l
		mm	mm	mm	mm	mm	mm
DN 25	PN 16 ... PN 400	20	68	24.5	22.6	27	100
DN 40		20	88	38	30	40	100
DN 50		20	102	48.3	40	51	100
DN 65		20	122	48.3	40	65	100
DN 80		20	138	76	65	85	100
DN 100		20	158	94	85	85	100
DN 125		22	188	125	16	116	100

d: Inside diameter of gasket according to EN 1092-1/ASME B16.5

d_M: Effective diaphragm diameter

Connection according to ASME B16.5

Nominal diameter	Nominal pressure lb/sq.in.	b	D	d ₅	d _M with tube	d _M without tube	l
		mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)
1"	150 ... 2500	20 (0.79)	51 (2.01)	24.5 (0.96)	22.6 (0.89)	30 (1.18)	100 (3.94)
1½"		20 (0.79)	73 (2.9)	38 (1.5)	30 (1.18)	40 (1.57)	100 (3.94)
2"		20 (0.79)	100 (3.94)	48.3 (1.9)	40 (1.57)	51 (2.01)	100 (3.94)
2½"		20 (0.79)	105 (4.13)	48.3 (1.9)	40 (1.57)	65 (2.56)	100 (3.94)
3"		20 (0.79)	134 (5.28)	72 (2.8)	65 (2.56)	85 (3.35)	100 (3.94)
4"		20 (0.79)	158 (6.22)	94 (3.69)	85 (3.35)	85 (3.35)	100 (3.94)
5"		22 (0.87)	186 (7.32)	125 (4.92)	116 (4.57)	116 (4.57)	100 (3.94)

d: Inside diameter of gasket according to EN 1092-1/ASME B16.5

d_M: Effective diaphragm diameter

Dimensional drawings (continued)

Connection according to J.I.S.

Nominal diameter	Nominal pressure	b mm (inch)	D 10K, 20K mm (inch)	D 30K ... 63K mm (inch)	d _s mm (inch)	d _M with tube mm (inch)	d _M without tube mm (inch)	l mm (inch)
DN 25	10K ... 63K	20 (0.79)	67 (2.64)	70 (2.76)	24.5 (0.96)	22.6 (0.89)	30 (1.18)	100 (3.94)
DN 40		20 (0.79)	81 (3.19)	90 (3.54)	38 (1.5)	30 (1.18)	36 (1.42)	100 (3.94)
DN 50		20 (0.79)	96 (3.78)	105 (4.13)	48.3 (1.9)	40 (1.57)	51 (2.01)	100 (3.94)
DN 65		20 (0.79)	116 (4.57)	130 (5.12)	48.3 (1.9)	40 (1.57)	65 (2.56)	100 (3.94)
DN 80		20 (0.79)	132 (5.2)	140 (5.51)	76 (2.99)	65 (2.56)	85 (3.35)	100 (3.94)
DN 100		20 (0.79)	160 (6.3)	160 (6.3)	94 (3.69)	85 (3.35)	85 (3.35)	100 (3.94)
DN 125		20 (0.79)	195 (7.68)	195 (7.68)	125 (4.92)	116 (4.57)	116 (4.57)	100 (3.94)

d: Inside diameter of gasket according to EN 1092-1/ASME B16.5

d_M: Effective diaphragm diameter

Pressure measurement

Remote seals

for SITRANS P320/P420 pressure transmitters / Diaphragm seals in flange design with flexible capillary

Overview



Diaphragm seals of flange design

Selection and ordering data

		Article No.	Order code
Diaphragm seal			
Flange type design, connected to a transmitter with flexible capillary			
SITRANS P320/P420 or SITRANS P300 for gauge and absolute pressure (only together with negative pressure service), 7MF03../7MF04../7MF802 is to be ordered separately, scope of delivery: 1 unit		7MF0810-	
SITRANS P320/P420 for absolute pressure from differential pressure 7MF03../7MF04.. order separately, scope of delivery: 1 unit		7MF0811-	
SITRANS P320/P420 transmitter for differential pressure and flow 7MF03../7MF04.. order separately, scope of delivery: 2 units		7MF0812-	
		● ● ● ● ● - 0 ● ● ● ● ● ● ● ●	
Click the article number for online configuration in the PIA Life Cycle Portal.			
Nominal diameter	Nominal pressure		
<u>Process connection standard EN 1092-1</u>			
(DN 25, DN 40 and DN 50 only recommended for pressure transmitters for gauge pressure)			
DN 25	PN 10/16/25/40	0 B D	
	PN 63/100	0 B F	
	PN 160	0 B G	
	PN 250	0 B H	
DN 40	PN 10/16/25/40	0 D D	
	PN 63/100	0 D F	
	PN 160	0 D G	
DN 50	PN 10/16/25/40	0 E D	
	PN 63	0 E E	
	PN 100	0 E F	
DN 80	PN 10/16/25/40	0 G D	
	PN 100	0 G F	
DN 100	PN 10/16	0 H B	
	PN 25/40	0 H D	
DN 125	PN 16	0 J B	
	PN 40	0 J D	
<u>Process connection standard ASME B16.5</u>			
(1 inch, 1½ inches and 2 inches only recommended for pressure transmitters for gauge pressure)			
1 inch	Class 150	1 K L	
	Class 300	1 K M	
	Class 600	1 K N	
	Class 1500	1 K P	
1½ inches	Class 150	1 L A	
	Class 300	1 L B	
	Class 400/600	1 L D	
	Class 900/1500	1 L F	
2 inches	Class 150	1 M A	
	Class 300	1 M B	
	Class 400/600	1 M D	
	Class 900/1500	1 M F	
3 inches	Class 150	1 P A	
	Class 300	1 P B	
	Class 600	1 P D	
	Class 1500	1 P F	
4 inches	Class 150	1 Q A	
	Class 300	1 Q B	
	Class 400	1 Q C	
	Class 1500	1 Q F	
5 inches	Class 150	1 R A	
	Class 300	1 R B	
	Class 400	1 R C	
<u>Process connection standard J.I.S.</u>			
(DN 50 only recommended for pressure transmitters for gauge pressure)			
DN 50	10 K	2 E S	
	20 K	2 E T	
	40 K	2 E U	
DN 80	10 K	2 G S	
	20 K	2 G T	

Pressure measurement

Remote seals

for SITRANS P320/P420 pressure transmitters / Diaphragm seals in flange design with flexible capillary

Selection and ordering data (continued)

	Article No.	Order code
Diaphragm seal		
Flange type design, connected to a transmitter with flexible capillary		
SITRANS P320/P420 or SITRANS P300 for gauge and absolute pressure (only together with negative pressure service), 7MF03../7MF04../7MF802 is to be ordered separately, scope of delivery: 1 unit	7MF0810-	
SITRANS P320/P420 for absolute pressure from differential pressure 7MF03../7MF04.. order separately, scope of delivery: 1 unit	7MF0811-	
SITRANS P320/P420 transmitter for differential pressure and flow 7MF03../7MF04.. order separately, scope of delivery: 2 units	7MF0812-	
	● ● ● ● ● ● - 0 ● ● ● ● ● ● ● ● ● ●	
DN 100	40 K 10 K 20 K 40 K	
	2 G U 2 H S 2 H T 2 H U	
Other version, add order code and plain text	9 A A	H 1 Y
Transmitter connection		
Connection via capillary		
Capillary length		
1 m (38.37 inches)	1 0	
1.6 m (63 inches)	1 1	
2 m (78.7 inches)	1 2	
2.5 m (98.4 inches)	1 3	
3 m (118.1 inches)	1 4	
4 m (157.5 inches)	1 5	
5 m (196.9 inches)	1 6	
6 m (236.2 inches)	1 7	
7 m (275.6 inches)	1 8	
8 m (315 inches)	2 0	
9 m (354.3 inches)	2 1	
10 m (393.7 inches)	2 2	
11 m (433.1 inches); only for 7MF0812	2 3	
12 m (472.4 inches); only for 7MF0812	2 4	
13 m (511.811 inches); only for 7MF0812	2 5	
14 m (551.2 inches); only for 7MF0812	2 6	
15 m (590.6 inches); only for 7MF0812	2 7	
Other version, add order code and plain text	9 8	L 1 Y
Filling liquid		
Silicone oil M50		B
High-temperature oil		C
Silicone oil M5		A
Food oil (FDA-listed)		E
Halocarbon oil		D
Neobee M20 (FDA listed)		R
Other version, add order code and plain text		Z P 1 Y
Material of wetted parts		
Stainless steel 316L		
• Without coating		A
• With PFA coating		D
• With PTFE coating		E 0
• With ECTFE coating		F
Monel 400, 2.4360		G
Hastelloy C276, 2.4819		J
Tantalum		K
Titanium, 3.7035		L 0
Nickel 201		M 0
Diaphragm Duplex, 1.4462		Q
Diaphragm and flange Duplex, 1.4462		R
Stainless steel 316L, gold-plated		S 0
Hastelloy C4, 2.4610		U 0
Hastelloy C22, 2.4602		V 0
Other version, add order code and plain text		Z 8 Q 1 Y

for SITRANS P320/P420 pressure transmitters / Diaphragm seals in flange design with flexible capillary

Selection and ordering data (continued)

	Article No.	Order code
Diaphragm seal		
Flange type design, connected to a transmitter with flexible capillary		
SITRANS P320/P420 or SITRANS P300 for gauge and absolute pressure (only together with negative pressure service), 7MF03../7MF04../7MF802 is to be ordered separately, scope of delivery: 1 unit	7MF0810-	
SITRANS P320/P420 for absolute pressure from differential pressure 7MF03../7MF04.. order separately, scope of delivery: 1 unit	7MF0811-	
SITRANS P320/P420 transmitter for differential pressure and flow 7MF03../7MF04.. order separately, scope of delivery: 2 units	7MF0812-	
	● ● ● ● ● - 0 ● ● ● ● ● ● ● ●	
Tube length		
Without tube		0
50 mm (2 inches)		1
100 mm (4 inches)		2
150 mm (6 inches)		3
200 mm (8 inches)		4
250 mm (10 inches)		5
Other version, add order code and plain text		Z 8 Q 1 Y
Customer-specific tube length		
Wetted parts: Stainless steel without coating		
Range	Standard length	
20 ... 50 mm (0.79 ... 1.97 inches)	50 mm (1.97 inches)	A 1
51 ... 100 mm (2.01 ... 3.94 inches)	100 mm (3.94 inches)	A 2
101 ... 150 mm (3.98 ... 5.91 inches)	150 mm (5.91 inches)	A 3
151 ... 200 mm (5.94 ... 7.87 inches)	200 mm (7.87 inches)	A 4
201 ... 250 mm (7.91 ... 9.84 inches)	250 mm (9.84 inches)	A 5
Wetted parts: Stainless steel with ECTFE coating		
Range	Standard length	
20 ... 50 mm (0.79 ... 1.97 inches)	50 mm (1.97 inches)	F 1
51 ... 100 mm (2.01 ... 3.94 inches)	100 mm (3.94 inches)	F 2
101 ... 150 mm (3.98 ... 5.91 inches)	150 mm (5.91 inches)	F 3
151 ... 200 mm (5.94 ... 7.87 inches)	200 mm (7.87 inches)	F 4
201 ... 250 mm (7.91 ... 9.84 inches)	250 mm (9.84 inches)	F 5
Wetted parts: Stainless steel with PFA coating		
Range	Standard length	
20 ... 50 mm (0.79 ... 1.97 inches)	50 mm (1.97 inches)	D 1
51 ... 100 mm (2.01 ... 3.94 inches)	100 mm (3.94 inches)	D 2
101 ... 150 mm (3.98 ... 5.91 inches)	150 mm (5.91 inches)	D 3
151 ... 200 mm (5.94 ... 7.87 inches)	200 mm (7.87 inches)	D 4
201 ... 250 mm (7.91 ... 9.84 inches)	250 mm (9.84 inches)	D 5
Wetted parts: Monel 400		
Range	Standard length	
20 ... 50 mm (0.79 ... 1.97 inches)	50 mm (1.97 inches)	G 1
51 ... 100 mm (2.01 ... 3.94 inches)	100 mm (3.94 inches)	G 2
101 ... 150 mm (3.98 ... 5.91 inches)	150 mm (5.91 inches)	G 3
151 ... 200 mm (5.94 ... 7.87 inches)	200 mm (7.87 inches)	G 4
Wetted parts: Hastelloy C276		
Range	Standard length	
20 ... 50 mm (0.79 ... 1.97 inches)	50 mm (1.97 inches)	J 1
51 ... 100 mm (2.01 ... 3.94 inches)	100 mm (3.94 inches)	J 2
101 ... 150 mm (3.98 ... 5.91 inches)	150 mm (5.91 inches)	J 3
151 ... 200 mm (5.94 ... 7.87 inches)	200 mm (7.87 inches)	J 4
Wetted parts: Tantalum		
Range	Standard length	
20 ... 50 mm (0.79 ... 1.97 inches)	50 mm (1.97 inches)	K 1
51 ... 100 mm (2.01 ... 3.94 inches)	100 mm (3.94 inches)	K 2
101 ... 150 mm (3.98 ... 5.91 inches)	150 mm (5.91 inches)	K 3

Pressure measurement

Remote seals

for SITRANS P320/P420 pressure transmitters / Diaphragm seals in flange design with flexible capillary

Selection and ordering data (continued)

	Article No.	Order code
Diaphragm seal		
Flange type design, connected to a transmitter with flexible capillary		
SITRANS P320/P420 or SITRANS P300 for gauge and absolute pressure (only together with negative pressure service), 7MF03../7MF04../7MF802 is to be ordered separately, scope of delivery: 1 unit	7MF0810-	
SITRANS P320/P420 for absolute pressure from differential pressure 7MF03../7MF04.. order separately, scope of delivery: 1 unit	7MF0811-	
SITRANS P320/P420 transmitter for differential pressure and flow 7MF03../7MF04.. order separately, scope of delivery: 2 units	7MF0812-	
	● ● ● ● ● - 0 ● ● ● ● ● ● ● ●	
151 ... 200 mm (5.94 ... 7.87 inches)	200 mm (7.87 inches)	K 4

Options	Order code
Add "-Z" to article number and specify order code.	
Factory certificates	
Quality inspection certificate (5-point characteristic curve test) acc. to IEC 62828-2	C11
Inspection certificate to EN 10204-3.1 for material of body and diaphragm	C12
Manufacturer declaration acc. to NACE (MR 0103-2012 and MR 0175-2009) (only together with wetted parts made of stainless steel 316 L and Hastelloy)	C13
Inspection certificate according to EN 10204-3.1, PMI test of pressure containing and wetted parts	C15
Certificate of FDA-approved fill oil according to EN 10204-2.2	C17
Factory certificate functional safety (SIL2/3) Devices suitable for use according to IEC 61508 and IEC 61511 (includes SIL Declaration of Conformity)	C20
Accessories	
Representation of the epoxy resin coating Color: Transparent coverage: Front and rear of the remote seal, connecting pipe, process connection of the transmitter. Maximum process medium temperature for epoxy lacquering: 140 °C	D15
Remote seal nameplate Attached, made of stainless steel, contains Article No. and order number of the remote seal	D42
Volume deflagration flame arrester (VDEF)	
• For gauge pressure and absolute pressure transmitters	D61
• For differential pressure and level transmitters	D62
Negative pressure service	
Negative pressure service	
• For gauge pressure and absolute pressure transmitters (only 7MF0810)	D81
• For differential pressure transmitters	D83
Extended negative pressure service	
• For gauge pressure and absolute pressure transmitters (only 7MF0810)	D85
• For differential pressure transmitters	D88
Marine approvals	
Note:	
If one of the order codes E50 to E60 is selected, the corresponding option must also be selected for the transmitter!	
DNV-GL (Det Norske Veritas/Germanischer Lloyd)	E50
LR (Lloyds Register)	E51
BV (Bureau Veritas)	E52
ABS (American Bureau of Shipping)	E53

Selection and ordering data (continued)

Options	Order code
Add "-Z" to article number and specify order code.	
RMR (Russian Maritime Register)	E55
KR (Korean Register of Shipping)	E56
RINA (Registro Italiano Navale)	E57
CCS (China Classification Society)	E58
Country-specific approval	
CRN approval Canada (Canadian Registration Number)	E60
General product approvals without explosion proof approvals	
Oil-free and grease-free cleaned version for oxygen application including certificate EN 10204-2.2 (only with filling liquid halocarbon oil max. temperature 60 °C and max. pressure 50 bar)	E80
Oil-free and grease-free cleaned version not for oxygen application, including certificate EN 10204-2.2	E87
Sealing surface	
Sealing surface smooth, form B2/EN 1092-1 or RFSF/ANSI 16.5 (only for wetted parts made of stainless steel 316L)	M50
Sealing surface groove according to EN 1092-1, form D (instead of sealing surface B1, only for wetted parts made of stainless steel 316L)	M54
Sealing surface RJF (groove) according to ASME B16.5 (instead of sealing surface RF 125 ... 250AO, only for wetted parts made of stainless steel 316L)	M64
Sealing surface with tongue to EN 1092-1, form C (for wetted parts made of stainless steel 316L only)	
• DN 25	M70
• DN 40	M71
• DN 50	M72
• DN 80	M73
• DN 100	M74
• DN 125	M75
Sealing surface with spigot according to EN 1092-1, form E (for wetted parts made of stainless steel 316L only)	
• DN 25	M76
• DN 40	M77
• DN 50	M78
• DN 80	M79
• DN 100	M80
• DN 125	M81
Sealing surface female face according to EN 1092-1, form F (only for wetted parts made of stainless steel 316L)	
• DN 25	M82
• DN 40	M83
• DN 50	M84
• DN 80	M85
• DN 100	M86
• DN 125	M87
Capillary connection	
For 7MF0810	
• Radial capillary outlet (for single-side mounting)	S01

Pressure measurement

Remote seals

for SITRANS P320/P420 pressure transmitters / Diaphragm seals in flange design with flexible capillary

Selection and ordering data (continued)

Options	Order code
Add "-Z" to article number and specify order code.	
• Single-side mounted at differential pressure transmitter at high side	S03
• Single-side mounted at differential pressure transmitter at low side	S04
For 7MF0811	
• Radial capillary outlet (for single-side mounting)	S01
For 7MF0812	
• Radial capillary pipe outlet (for double-side mounting)	S02
Capillary coating	
PE protective tube	
• 1 m (38.37 inches)	S10
• 1.6 m (63 inches)	S11
• 2 m (78.7 inches)	S12
• 2.5 m (98.4 inches)	S13
• 3 m (118.1 inches)	S14
• 4 m (157.5 inches)	S15
• 5 m (196.9 inches)	S16
• 6 m (236.2 inches)	S17
• 7 m (275.6 inches)	S18
• 8 m (315 inches)	S19
• 9 m (354.3 inches)	S20
• 10 m (393.7 inches)	S21
• 11 m (433.1 inches); only for 7MF0812	S22
• 12 m (472.4 inches); only for 7MF0812	S23
• 13 m (511.811 inches); only for 7MF0812	S24
• 14 m (551.2 inches); only for 7MF0812	S25
• 15 m (590.6 inches); only for 7MF0812	S26
PTFE protective tube	
• 1 m (38.37 inches)	S40
• 1.6 m (63 inches)	S41
• 2 m (78.7 inches)	S42
• 2.5 m (98.4 inches)	S43
• 3 m (118.1 inches)	S44
• 4 m (157.5 inches)	S45
• 5 m (196.9 inches)	S46
• 6 m (236.2 inches)	S47
• 7 m (275.6 inches)	S48
• 8 m (315 inches)	S49
• 9 m (354.3 inches)	S50
• 10 m (393.7 inches)	S51
• 11 m (433.1 inches); only for 7MF0812	S52
• 12 m (472.4 inches); only for 7MF0812	S53
• 13 m (511.811 inches); only for 7MF0812	S54
• 14 m (551.2 inches); only for 7MF0812	S55
• 15 m (590.6 inches); only for 7MF0812	S56
PVC protective tube	
• 1 m (38.37 inches)	S70

Selection and ordering data (continued)

Options	Order code
Add "-Z" to article number and specify order code.	
• 1.6 m (63 inches)	S71
• 2 m (78.7 inches)	S72
• 2.5 m (98.4 inches)	S73
• 3 m (118.1 inches)	S74
• 4 m (157.5 inches)	S75
• 5 m (196.9 inches)	S76
• 6 m (236.2 inches)	S77
• 7 m (275.6 inches)	S78
• 8 m (315 inches)	S79
• 9 m (354.3 inches)	S80
• 10 m (393.7 inches)	S81
• 11 m (433.1 inches); only for 7MF0812	S82
• 12 m (472.4 inches); only for 7MF0812	S83
• 13 m (511.811 inches); only for 7MF0812	S84
• 14 m (551.2 inches); only for 7MF0812	S85
• 15 m (590.6 inches); only for 7MF0812	S86
Desired remote seal supplier	
Note:	
If the remote seal is to be supplied only by one of the suppliers specified below, this option needs to be selected. For orders without this option, the remote seal supplier is selected through the dispatch center.	
Company WIKA, Klingenberg	W01
Company Labom, Hude	W02
Special design	
Welded filling hole	X01
Customer-specific tube length	
Customer-specific tube length (specify in plain text in mm)	Y44
Specification of process conditions¹⁾	
Ambient temperature range	
• +10 ... +50 °C (+50 ... +122 °F) preset	D66
• -40 ... +50 °C (-40 ... +122 °F)	D67
• -10 ... +85 °C (+14 ... +185 °F)	D68
Process temperature min. ... °C/(°F)/max. ... °C/(°F)	Y50

¹⁾ See also "Specification of process conditions for selection and ordering data" in the section "More information" under "Technical reference" for SITRANS P320/P420.

Pressure measurement

Remote seals

for SITRANS P320/P420 pressure transmitters / Diaphragm seals in flange design with flexible capillary

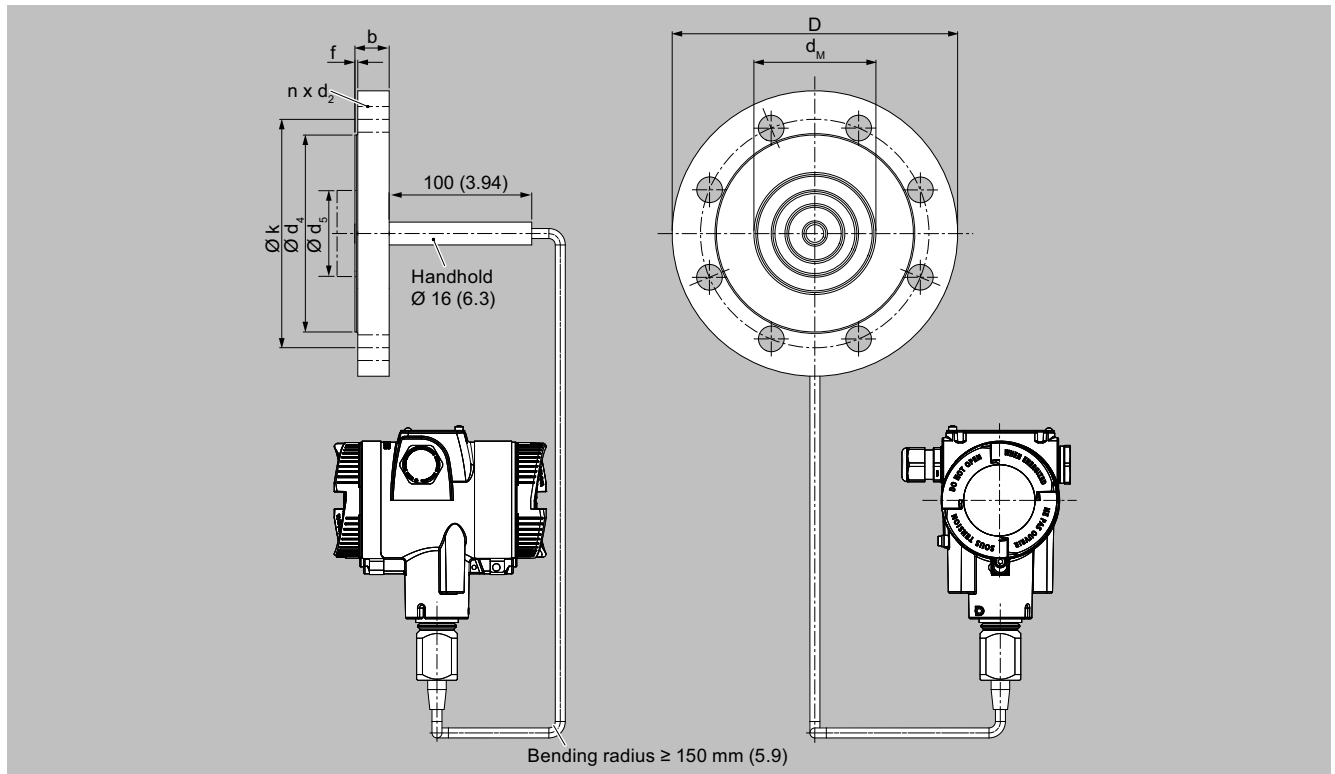
Technical specifications

SITRANS P320/P420 diaphragm seals in flange design with flexible capillary	
Nominal diameter	Nominal pressure
Standard of process connection EN 1092-1	
• DN 25	PN 10/16/25/40/63/100/160/250
• DN 40	PN 10/16/25/40/63/100/160
• DN 50	PN 10/16/25/40/63/100
• DN 80	PN 10/16/25/40/100
• DN 100	PN 10/16/25/40
• DN 125	PN 16/40
Process connection standard ASME B16.5	
• 1 inch	Class 150/300/600/1500
• 1½ inches	Class 150/300/400/600/900/1500
• 2 inches	Class 150/300/400/600/900/1500
• 3 inches	Class 150/300/600/1500
• 4 inches	Class 150/300/400/1500
• 5 inches	Class 150/300/400
Process connection standard J.I.S.	
• DN 50	10K
• DN 80	20K
• DN 100	40K
Sealing surface	
• For stainless steel mat. no. 1.4404/316L	According to EN 1092-1, form B1 or ASMR B16.5 RF 125 ... 250 AO
• For other materials	According to EN 1092-1, form B2 or ASME B16.5 RFSF
Materials	
• Main body	Stainless steel, mat. no. 1.4404/316L
• Wetted parts	Stainless steel, mat. no. 1.4404/316L
	<ul style="list-style-type: none"> Without coating PTFE coating ECTFE coating (for negative pressure on request) PFA coating
	Monel 400, mat. no. 2.4360
	Hastelloy C276, mat. no. 2.4819
	Hastelloy C4, mat. no. 2.4610
	Hastelloy C22, mat. no. 2.4602
	Tantalum
	Titanium, mat. no. 3.7035
	Nickel 201
	Duplex 2205, mat. no. 1.4462
	Stainless steel 316L, gold plated, layer thickness approx. 25 µm
• Capillary	Stainless steel, mat. no. 1.4571/316Ti (with options W01 and E50 to E58) or mat. no. 1.4301/304
• Sheath	Flexible spiral coiled tube made of stainless steel mat. no. 1.4404/316L
Gasket material in the process flanges	
• For pressure transmitters, absolute pressure transmitters and negative pressure applications	Copper
• For other applications	Viton
Permissible pressure load	See above and the technical specifications of the pressure transmitter
Tube length	Without tube as standard. A custom tube length can be selected as an order code.

Technical specifications (continued)

SITRANS P320/P420 diaphragm seals in flange design with flexible capillary	
Capillary	
• Length	≤ 10 m (32.8 ft), longer lengths on request
• Inside diameter	≤ 1.3 mm (0.051 inch)
• Minimum bending radius	150 mm (5.9 inches)
Filling liquid (for remote seals of sandwich and flange type)	<ul style="list-style-type: none"> Silicone oil M5 Silicone oil M50 High-temperature oil Halocarbon oil (for measuring O₂) Food oil (FDA-listed) Neobee M20 (FDA-listed)
Permissible ambient temperature	Dependent on the pressure transmitter and the filling liquid of the remote seal. More information In the technical specifications of the pressure transmitters and in the sections in the technical reference of the remote seals: <ul style="list-style-type: none"> "Function" - "Technical specifications of the remote seal filling liquids" "More information" - "Specification of process conditions for selection and ordering data"
Weight	Approx. 4 kg (8.82 lb)
Certificates and approvals	
Classification according to pressure equipment directive (PED 2014/68/EU)	For gases of fluid group 1 and liquids of fluid group 1; complies with requirements of article 4, paragraph 3 (sound engineering practice)

Dimensional drawings



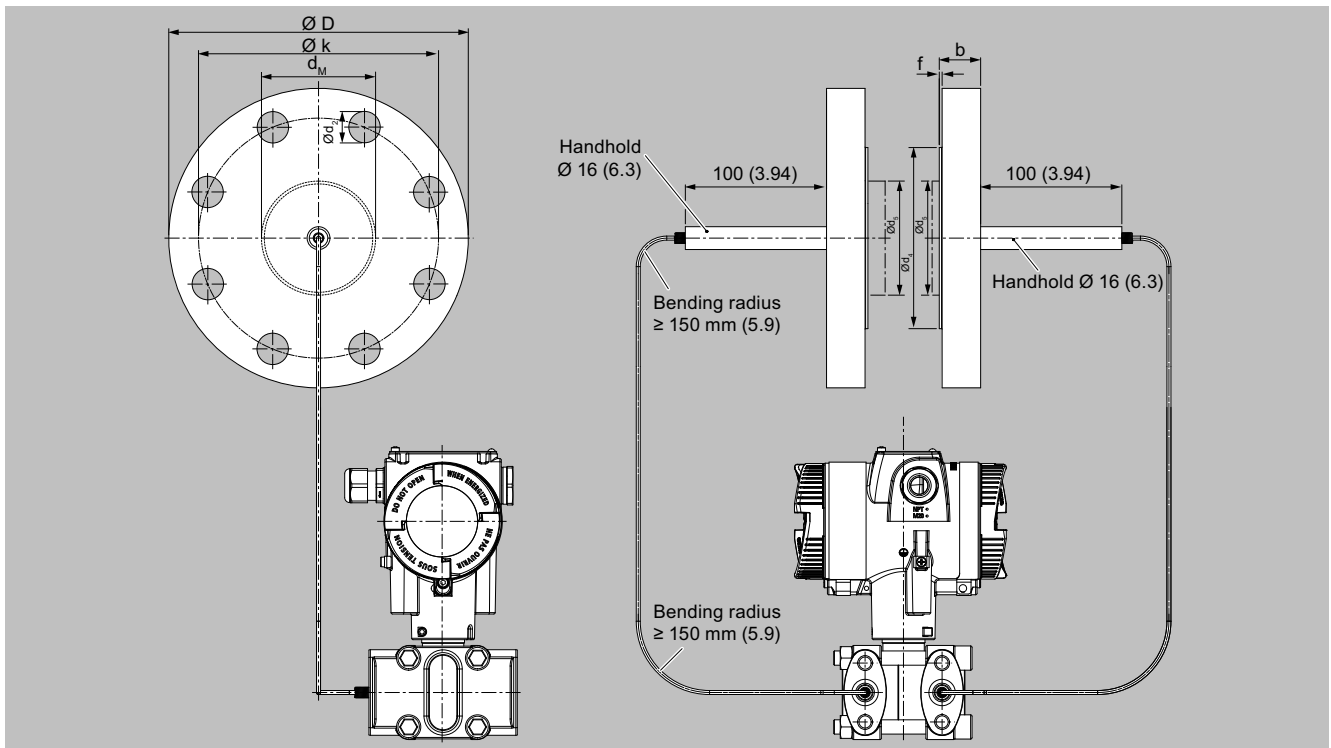
Diaphragm seals of flange design with flexible capillary for connection to SITRANS P320/420 pressure transmitters for gauge pressure, dimensions in mm (inch)

Pressure measurement

Remote seals

for SITRANS P320/P420 pressure transmitters / Diaphragm seals in flange design with flexible capillary

Dimensional drawings (continued)



Diaphragm seals of flange design with flexible capillary for connection to SITRANS P320/420 pressure transmitters for absolute pressure or for differential pressure and flow, dimensions in mm (inch)

Connection according to EN 1092-1

Nominal diameter	Nominal pressure	b	D	d ₂	d ₄	d ₅	d _M with tube	d _M without tube	f	k	n	L
		mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	
DN 25	PN 10/16/25/40	18	115	14	68	24.5	22.6	27	2	85	4	0, 50, 100, 150 or 200
	PN 63/100	24	140	18	68	24.5	22.6	27	2	100	4	
	PN 160	24	140	18	68	24.5	22.6	27	2	100	4	
	PN 250	28	150	22	68	24.5	22.6	27	2	105	4	
DN 40	PN 10/16/25/40	16	150	18	88	38	30	42	2	110	4	
	PN 63/100	24	170	22	88	38	30	42	2	125	4	
	PN 160	26	170	22	88	38	30	42	2	125	4	
DN 50	PN 10/16/25/40	18	165	18	102	48.3	40	51	2	125	4	
	PN 63/100	26	195	26	102	48.3	40	51	2	145	4	
	PN 160	28	195	26	102	48.3	40	51	2	145	4	
DN 80	PN 10/16/25/40	22	200	18	138	76	65	85	2	160	8	
	PN 100	30	230	26	138	76	65	85	2	180	8	
DN 100	PN 10/16	18	220	18	158	94	85	85	2	180	8	
	PN 25/40	22	235	22	162	94	85	85	2	190	8	
DN 125	PN 16	20	250	18	188	127	85	116	2	210	8	
	PN 40	24	270	26	188	127	85	116	2	220	8	

d: Inside diameter of gasket according to EN 1092-1/ASME B16.5

d_M: Effective diaphragm diameter

Dimensional drawings (continued)

Connection according to ASME B16.5

Nominal diameter	Nominal pressure lb/sq.in.	b	D	d ₂	d ₄	d ₅	d _M with tube	d _M without tube	f	k	n	L
		Inch (mm)	Inch (mm)	Inch (mm)	Inch (mm)	Inch (mm)	Inch (mm)	Inch (mm)	Inch (mm)	Inch (mm)	Inch (mm)	Inch (mm)
1"	150	0.71 (18)	4.33 (110)	0.61 (15.6)	2 (50.8)	0.96 (24.5)	0.89 (22.6)	1,18 (30)	0.08 (2)	3.13 (79.4)	4	0, 2, 3.94, 5.94 or 7.87 (0, 50, 100, 150 or 200)
	300	0.77 (19.5)	4.92 (125)	0.75 (19.1)	2 (50.8)	0.96 (24.5)	0.89 (22.6)	1,18 (30)	0.08 (2)	3.5 (88.9)	4	
	600	0.96 (24.5)	4.92 (125)	0.75 (19.1)	2 (50.8)	0.96 (24.5)	0.89 (22.6)	1,18 (30)	0.28 (7)	3.5 (88.9)	4	
	1500	1.4 (35.6)	5.91 (150)	1 (25.4)	2 (50.8)	0.96 (24.5)	0.89 (22.6)	1,18 (30)	0.28 (7)	4 (101.6)	4	
1½"	150	0.63 (15.9)	4.92 (125)	0.63 (15.9)	2.87 (73)	1.5 (38)	1,18 (30)	1.42 (36)	0.08 (2)	3.87 (98.4)	4	
	300	0.75 (19.1)	6.10 (155)	0.87 (22.2)	2.87 (73)	1.5 (38)	1,18 (30)	1.42 (36)	0.08 (2)	4.5 (114.3)	4	
	400/600	0.88 (22.3)	6.10 (155)	0.87 (22.2)	2.87 (73)	1.5 (38)	1,18 (30)	1.42 (36)	0.28 (7)	4.5 (114.3)	4	
	900/1500	1.25 (31.8)	7.09 (180)	1.13 (28.6)	2.87 (73)	1.5 (38)	1,18 (30)	1.42 (36)	0.28 (7)	4.87 (123.8)	4	
2"	150	0.69 (17.5)	5.91 (150)	0.75 (19.1)	3.63 (92.1)	1.9 (48.3)	1.57 (40)	2.01 (51)	0.08 (2)	4.75 (120.7)	4	
	300	0.81 (20.7)	6.5 (165)	0.75 (19.1)	3.63 (92.1)	1.9 (48.3)	1.57 (40)	2.01 (51)	0.08 (2)	5 (127)	8	
	400/600	1.00 (25.4)	6.5 (165)	0.75 (19.1)	3.63 (92.1)	1.9 (48.3)	1.57 (40)	2.01 (51)	0.28 (7)	5 (127)	8	
	900/1500	1.5 (38.1)	8.46 (215)	1.00 (25.4)	3.63 (92.1)	1.9 (48.3)	1.57 (40)	2.01 (51)	0.28 (7)	6.5 (165.1)	8	
3"	150	0.88 (22.3)	7.48 (190)	0.75 (19.1)	5 (127)	3 (76)	2.65 (65)	3.35 (85)	0.08 (2)	6 (152.4)	4	
	300	1.06 (27)	8.27 (210)	0.87 (22.2)	5 (127)	3 (76)	2.65 (65)	3.35 (85)	0.08 (2)	6.63 (168.3)	8	
	600	1.23 (31.8)	8.27 (210)	0.87 (22.2)	5 (127)	3 (76)	2.65 (65)	3.35 (85)	0.28 (7)	6.63 (168.3)	8	
	1500	1.88 (47.7)	10.43 (265)	1.25 (31.8)	5 (127)	3 (76)	2.65 (65)	3.35 (85)	0.28 (7)	8 (203.2)	8	
4"	150	0.88 (22.3)	9.06 (230)	0.75 (19.1)	6.19 (157.2)	3.69 (94)	3.35 (85)	3.35 (85)	0.08 (2)	7.5 (190.5)	8	
	300	1.19 (30.2)	10.04 (255)	0.87 (22.2)	6.19 (157.2)	3.69 (94)	3.35 (85)	3.35 (85)	0.08 (2)	7.87 (200)	8	
	400	1.38 (35)	10.04 (255)	0.87 (22.2)	6.19 (157.2)	3.69 (94)	3.35 (85)	3.35 (85)	0.28 (7)	7.87 (200)	8	
	1500	2.13 (54)	12.20 (310)	1.37 (34.9)	6.19 (157.2)	3.69 (94)	3.35 (85)	3.35 (85)	0.28 (7)	9.5 (241.3)	8	
5"	150	0.88 (22.3)	10.04 (255)	0.87 (22.2)	7.31 (185.7)	5 (127)	4.57 (116)	4.57 (116)	0.08 (2)	8.5 (215.9)	8	
	300	1.31 (33.4)	11.02 (280)	0.87 (22.2)	7.31 (185.7)	5 (127)	4.57 (116)	4.57 (116)	0.08 (2)	9.25 (235)	8	
	400	1.50 (38.1)	11.02 (280)	0.87 (22.2)	7.31 (185.7)	5 (127)	4.57 (116)	4.57 (116)	0.28 (7)	9.25 (235)	8	

d: Inside diameter of gasket according to EN 1092-1/ASME B16.5

d_M: Effective diaphragm diameter

Connection according to J.I.S.

Nominal diameter	Nominal pressure	b	D	d ₂	d ₄	d ₅	d _M with tube	d _M without tube	f	k	n	L
		mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)
DN 50	10K	14 (0.55)	155 (6.10)	19 (0.75)	96 (3.78)	48.3 (1.9)	40 (1.57)	51 (2.01)	2	120 (4.72)	4	0, 50, 100, 150 or 200 (0, 2, 3.94, 5.94 or 7.87)
	20K	16 (0.63)	165 (6.50)	19 (0.75)	96 (3.78)	48.3 (1.9)	40 (1.57)	51 (2.01)	2	120 (4.72)	8	
	40K	26 (1.02)	165 (6.50)	19 (0.75)	105 (4.13)	48.3 (1.9)	40 (1.57)	51 (2.01)	2	130 (5.12)	8	
DN 80	10K	16 (0.63)	185 (7.28)	19 (0.75)	126 (4.96)	76 (2.99)	65 (2.56)	85 (3.35)	2	150 (5.91)	8	
	20K	20 (0.79)	200 (7.87)	23 (0.91)	132 (5.20)	76 (2.99)	65 (2.56)	85 (3.35)	2	160 (6.30)	8	
	40K	32 (1.26)	210 (8.27)	23 (0.91)	140 (5.51)	76 (2.99)	65 (2.56)	85 (3.35)	2	170 (6.30)	8	
DN 100	10K	16 (0.63)	210 (8.27)	19 (0.75)	151 (5.94)	94 (3.7)	85 (3.35)	85 (3.35)	2	175 (6.89)	8	
	20K	22 (0.87)	225 (8.86)	23 (0.91)	160 (6.30)	94 (3.7)	85 (3.35)	85 (3.35)	2	185 (7.28)	8	
	40K	36 (1.42)	250 (9.84)	25 (0.98)	165 (6.50)	94 (3.7)	85 (3.35)	85 (3.35)	2	205 (8.07)	8	

d: Inside diameter of gasket according to EN 1092-1/ASME B16.5

d_M: Effective diaphragm diameter

Pressure measurement

Remote seals

for SITRANS P320/P420 pressure transmitters / Diaphragm seals in flange design, direct mount

Overview



Diaphragm seals of flange design, directly fitted on a pressure transmitter for gauge pressure

for SITRANS P320/P420 pressure transmitters / Diaphragm seals in flange design, direct mount

Selection and ordering data

		Article No.	Order code
Diaphragm seal Flange type design, mounted directly onto the transmitter SITRANS P320/P420 or SITRANS P300 for gauge and absolute pressure (only together with negative pressure service), 7MF03../7MF04../7MF802 is to be ordered separately, scope of delivery: 1 unit		7MF0810-	
		● ● ● ● ● - 0 ● ● ● ● ● ● ● ●	
Click the article number for online configuration in the PIA Life Cycle Portal.			
Nominal diameter	Nominal pressure		
<u>Process connection standard EN 1092-1</u>			
DN 25	PN 10/16/25/40	0 B D	
	PN 63/100	0 B F	
	PN 160	0 B G	
	PN 250	0 B H	
DN 40	PN 10/16/25/40	0 D D	
	PN 63/100	0 D F	
	PN 160	0 D G	
DN 50	PN 10/16/25/40	0 E D	
	PN 63	0 E E	
	PN 100	0 E F	
DN 80	PN 10/16/25/40	0 G D	
	PN 100	0 G F	
DN 100	PN 10/16	0 H B	
	PN 25/40	0 H D	
DN 125	PN 16	0 J B	
	PN 40	0 J D	
<u>Process connection standard ASME B16.5</u>			
1 inch	Class 150	1 K L	
	Class 300	1 K M	
	Class 600	1 K N	
	Class 1500	1 K P	
1½ inches	Class 150	1 L A	
	Class 300	1 L B	
	Class 400/600	1 L D	
	Class 900/1500	1 L F	
2 inches	Class 150	1 M A	
	Class 300	1 M B	
	Class 400/600	1 M D	
	Class 900/1500	1 M F	
3 inches	Class 150	1 P A	
	Class 300	1 P B	
	Class 600	1 P D	
	Class 1500	1 P F	
4 inches	Class 150	1 Q A	
	Class 300	1 Q B	
	Class 400	1 Q C	
	Class 1500	1 Q F	
5 inches	Class 150	1 R A	
	Class 300	1 R B	
	Class 400	1 R C	
<u>Process connection standard J.I.S.</u>			
DN 50	10 K	2 E S	
	20 K	2 E T	
	40 K	2 E U	
DN 80	10 K	2 G S	
	20 K	2 G T	
	40 K	2 G U	
DN 100	10 K	2 H S	
	20 K	2 H T	
	40 K	2 H U	
Other version, add order code and plain text		9 A A	H 1 Y

Pressure measurement

Remote seals

for SITRANS P320/P420 pressure transmitters / Diaphragm seals in flange design, direct mount

Selection and ordering data (continued)

	Article No.	Order code
Diaphragm seal		
Flange type design, mounted directly onto the transmitter		
SITRANS P320/P420 or SITRANS P300 for gauge and absolute pressure (only together with negative pressure service), 7MF03../7MF04../7MF802 is to be ordered separately, scope of delivery: 1 unit	7MF0810-	
	● ● ● ● ● - 0 ● ● ● ● ● ● ●	
Transmitter connection		
Without capillary pipe, direct mount, straight connection (for gauge pressure transmitters)	0 0	
Without capillary pipe, direct mount, connection with 90° elbow (for gauge pressure transmitters)	0 1	
Filling liquid		
Silicone oil M50		B
High-temperature oil		C
Silicone oil M5		A
Food oil (FDA-listed)		E
Halocarbon oil		D
Neobee M20 (FDA listed)		R
Other version, add order code and plain text		Z P 1 Y
Material of wetted parts		
Stainless steel 316L		
• Without coating		A
• With PFA coating		D
• With PTFE coating		E 0
• With ECTFE coating		F
Monel 400, 2.4360		G
Hastelloy C276, 2.4819		J
Tantalum		K
Titanium, 3.7035		L 0
Nickel 201		M 0
Diaphragm Duplex, 1.4462		Q
Diaphragm and flange Duplex, 1.4462		R
Stainless steel 316L, gold-plated		S 0
Hastelloy C4, 2.4610		U 0
Hastelloy C22, 2.4602		V 0
Other version, add order code and plain text		Z 8 Q 1 Y
Tube length		
Without tube		0
50 mm (2 inches)		1
100 mm (4 inches)		2
150 mm (6 inches)		3
200 mm (8 inches)		4
250 mm (10 inches)		5
Other version, add order code and plain text		Z 8 Q 1 Y
Customer-specific tube length		
Wetted parts: Stainless steel without coating		
Range	Standard length	
20 ... 50 mm (0.79 ... 1.97 inches)	50 mm (1.97 inches)	A 1
51 ... 100 mm (2.01 ... 3.94 inches)	100 mm (3.94 inches)	A 2
101 ... 150 mm (3.98 ... 5.91 inches)	150 mm (5.91 inches)	A 3
151 ... 200 mm (5.94 ... 7.87 inches)	200 mm (7.87 inches)	A 4
201 ... 250 mm (7.91 ... 9.84 inches)	250 mm (9.84 inches)	A 5
Wetted parts: Stainless steel with ECTFE coating		
Range	Standard length	
20 ... 50 mm (0.79 ... 1.97 inches)	50 mm (1.97 inches)	F 1
51 ... 100 mm (2.01 ... 3.94 inches)	100 mm (3.94 inches)	F 2
101 ... 150 mm (3.98 ... 5.91 inches)	150 mm (5.91 inches)	F 3
151 ... 200 mm (5.94 ... 7.87 inches)	200 mm (7.87 inches)	F 4
201 ... 250 mm (7.91 ... 9.84 inches)	250 mm (9.84 inches)	F 5

for SITRANS P320/P420 pressure transmitters / Diaphragm seals in flange design, direct mount

Selection and ordering data (continued)

		Article No.	Order code
Diaphragm seal			
Flange type design, mounted directly onto the transmitter			
SITRANS P320/P420 or SITRANS P300 for gauge and absolute pressure		7MF0810-	
(only together with negative pressure service), 7MF03../7MF04../7MF802 is to be ordered separately, scope of delivery: 1 unit			
		● ● ● ● ● - 0 ● ● ● ● ● ● ● ●	
<i>Wetted parts: Stainless steel with PFA coating</i>			
<u>Range</u>	<u>Standard length</u>		
20 ... 50 mm (0.79 ... 1.97 inches)	50 mm (1.97 inches)		D 1
51 ... 100 mm (2.01 ... 3.94 inches)	100 mm (3.94 inches)		D 2
101 ... 150 mm (3.98 ... 5.91 inches)	150 mm (5.91 inches)		D 3
151 ... 200 mm (5.94 ... 7.87 inches)	200 mm (7.87 inches)		D 4
201 ... 250 mm (7.91 ... 9.84 inches)	250 mm (9.84 inches)		D 5
<i>Wetted parts: Monel 400</i>			
<u>Range</u>	<u>Standard length</u>		
20 ... 50 mm (0.79 ... 1.97 inches)	50 mm (1.97 inches)		G 1
51 ... 100 mm (2.01 ... 3.94 inches)	100 mm (3.94 inches)		G 2
101 ... 150 mm (3.98 ... 5.91 inches)	150 mm (5.91 inches)		G 3
151 ... 200 mm (5.94 ... 7.87 inches)	200 mm (7.87 inches)		G 4
<i>Wetted parts: Hastelloy C276</i>			
<u>Range</u>	<u>Standard length</u>		
20 ... 50 mm (0.79 ... 1.97 inches)	50 mm (1.97 inches)		J 1
51 ... 100 mm (2.01 ... 3.94 inches)	100 mm (3.94 inches)		J 2
101 ... 150 mm (3.98 ... 5.91 inches)	150 mm (5.91 inches)		J 3
151 ... 200 mm (5.94 ... 7.87 inches)	200 mm (7.87 inches)		J 4
<i>Wetted parts: Tantalum</i>			
<u>Range</u>	<u>Standard length</u>		
20 ... 50 mm (0.79 ... 1.97 inches)	50 mm (1.97 inches)		K 1
51 ... 100 mm (2.01 ... 3.94 inches)	100 mm (3.94 inches)		K 2
101 ... 150 mm (3.98 ... 5.91 inches)	150 mm (5.91 inches)		K 3
151 ... 200 mm (5.94 ... 7.87 inches)	200 mm (7.87 inches)		K 4

Options	Order code
Add "-Z" to article number and specify order code.	
Factory certificates	
Quality inspection certificate (5-point characteristic curve test) acc. to IEC 62828-2	C11
Inspection certificate to EN 10204-3.1 for material of body and diaphragm	C12
Manufacturer declaration acc. to NACE (MR 0103-2012 and MR 0175-2009) (only together with wetted parts made of stainless steel 316 L and Hastelloy)	C13
Inspection certificate according to EN 10204-3.1, PMI test of pressure containing and wetted parts	C15
Certificate of FDA-approved fill oil according to EN 10204-2.2	C17
Factory certificate functional safety (SIL2/3) Devices suitable for use according to IEC 61508 and IEC 61511 (includes SIL Declaration of Conformity)	C20
Accessories	
Representation of the epoxy resin coating Color: Transparent coverage: Front and rear of the remote seal, connecting pipe, process connection of the transmitter. Maximum process medium temperature for epoxy lacquering: 140 °C	D15
Remote seal nameplate Attached, made of stainless steel, contains Article No. and order number of the remote seal	D42

Pressure measurement

Remote seals

for SITRANS P320/P420 pressure transmitters / Diaphragm seals in flange design, direct mount

Selection and ordering data (continued)

Options	Order code
Add "-Z" to article number and specify order code.	
Volume deflagration flame arrester (VDEF) for gauge pressure and absolute pressure transmitters	D61
Negative pressure service	
Negative pressure service for gauge pressure and absolute pressure transmitters	D81
Extended negative pressure service for gauge pressure and absolute pressure transmitters (only for 7MF0810)	D85
Country-specific approval	
CRN approval Canada (Canadian Registration Number)	E60
Note:	
If the order code E60 is selected, the option E60 must also be selected for the transmitter!	
General product approvals without explosion proof approvals	
Oil-free and grease-free cleaned version for oxygen application including certificate EN 10204-2.2 (only with filling liquid halocarbon oil max. temperature 60 °C and max. pressure 50 bar)	E80
Oil-free and grease-free cleaned version not for oxygen application, including certificate EN 10204-2.2	E87
Sealing surface	
Sealing surface smooth, form B2/EN 1092-1 or RFSF/ANSI 16.5 (only for wetted parts made of stainless steel 316L)	M50
Sealing surface groove according to EN 1092-1, form D (instead of sealing surface B1, only for wetted parts made of stainless steel 316L)	M54
Sealing surface RJF (groove) according to ASME B16.5 (instead of sealing surface RF 125 ... 250AO, only for wetted parts made of stainless steel 316L)	M64
Sealing surface with tongue to EN 1092-1, form C (for wetted parts made of stainless steel 316L only)	
• DN 25	M70
• DN 40	M71
• DN 50	M72
• DN 80	M73
• DN 100	M74
• DN 125	M75
Sealing surface with spigot according to EN 1092-1, form E (for wetted parts made of stainless steel 316L only)	
• DN 25	M76
• DN 40	M77
• DN 50	M78
• DN 80	M79
• DN 100	M80
• DN 125	M81
Sealing surface female face according to EN 1092-1, form F (only for wetted parts made of stainless steel 316L)	
• DN 25	M82
• DN 40	M83
• DN 50	M84
• DN 80	M85
• DN 100	M86
• DN 125	M87

Selection and ordering data (continued)

Options	Order code
Add "-Z" to article number and specify order code.	
Capillary connection	
Elongated pipe elbow, 150 mm instead of 100 mm, max. media temperature 250 °C (482 °F), observe the max. permissible media temperature of the filling liquid.	S05
Elongated pipe elbow, 200 mm instead of 100 mm, max. media temperature 300 °C (572 °F), observe the max. permissible media temperature of the filling liquid.	S06
Elongated pipe elbow, 200 mm instead of 130 mm, max. media temperature 300 °C (572 °F), observe the max. permissible media temperature of the filling liquid.	S07
Cooling element, max. medium temperature 300 °C (572 °F), observe the max. permissible media temperature of the filling liquid.	S08
Desired remote seal supplier	
Note:	
If the remote seal is to be supplied only by one of the suppliers specified below, this option needs to be selected. For orders without this option, the remote seal supplier is selected through the dispatch center.	
Company WIKA, Klingenberg	W01
Company Labom, Hude	W02
Special design	
Welded filling hole	X01
Customer-specific tube length	
Customer-specific tube length (specify in plain text in mm)	Y44
Specification of process conditions¹⁾	
Ambient temperature range	
• +10 ... +50 °C (+50 ... +122 °F) preset	D66
• -40 ... +50 °C (-40 ... +122 °F)	D67
• -10 ... +85 °C (+14 ... +185 °F)	D68
Process temperature min. ... °C/(°F)/max. ... °C/(°F)	Y50

¹⁾ See also "Specification of process conditions for selection and ordering data" in the section "More information" under "Technical reference" for SITRANS P320/P420.

Pressure measurement

Remote seals

for SITRANS P320/P420 pressure transmitters / Diaphragm seals in flange design, direct mount

Technical specifications

SITRANS P320/P420 diaphragm seals in flange design, mounted directly on the transmitter

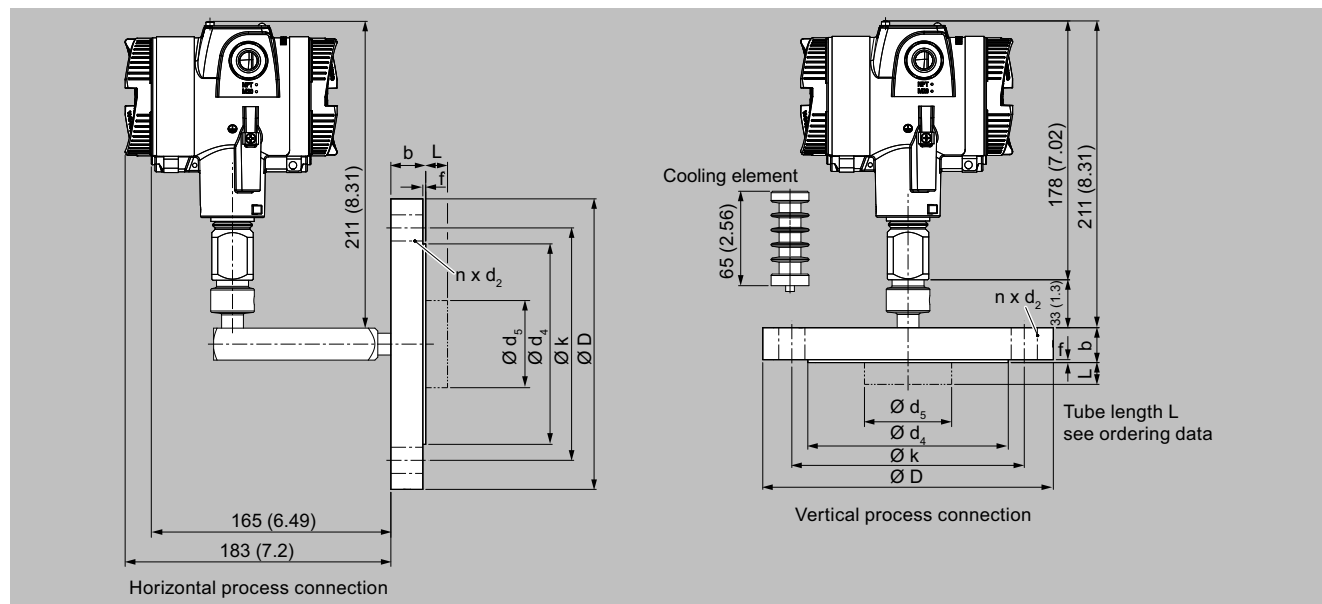
Nominal diameter	Nominal pressure
Standard of process connection EN 1092-1	
• DN 25	PN 10/16/25/40/63/100/160/250
• DN 40	PN 10/16/25/40/63/100/160
• DN 50	PN 10/16/25/40/63/100
• DN 80	PN 10/16/25/40/100
• DN 100	PN 10/16/25/40
• DN 125	PN 16/40
Process connection standard ASME B16.5	
• 1 inch	Class 150/300/600/1500
• 1½ inches	Class 150/300/400/600/900/1500
• 2 inches	Class 150/300/400/600/900/1500
• 3 inches	Class 150/300/600/1500
• 4 inches	Class 150/300/400/1500
• 5 inches	Class 150/300/400
Process connection standard J.I.S.	
• DN 50	10K
• DN 80	20K
• DN 100	40K
Sealing surface	
• For stainless steel mat. no. 1.4404/316L	According to EN 1092-1, form B1 or ASME B16.5 RF 125 ... 250 AA
• For the other materials	Smooth according to EN 1092-1, form B2 or ASME B16.5 RFSF
Materials	
• Main body	Stainless steel, mat. no. 1.4404/316L
• Wetted parts	Stainless steel, mat. no. 1.4404/316L
	<ul style="list-style-type: none"> • No coating • PTFE coating • ECTFE coating (for negative pressure on request) • PFA coating
	Monel 400, mat. no. 2.4360
	Hastelloy C276, mat. no. 2.4819
	Hastelloy C4, mat. no. 2.4610
	Hastelloy C22, mat. no. 2.4602
	Tantalum
	Titanium, mat. no. 3.7035
	Nickel 201
	Duplex 2205, mat. no. 1.4462
	Stainless steel 316L, gold plated, layer thickness approx. 25 µm
• Capillary	Stainless steel, mat. no. 1.4404/316L
• Gasket material at the transmitter connection	Copper
Permissible pressure load	See above and the technical specifications of the transmitter
Tube length	<ul style="list-style-type: none"> • Without tube • 50 mm (1.97 inches) • 100 mm (3.94 inches) • 150 mm (5.91 inches) • 200 mm (7.87 inches)
Capillary	
• Length	≤ 10 m (32.8 ft), longer lengths on request
• Inside diameter	≤ 1.3 mm (0.051 inch)

Technical specifications (continued)

SITRANS P320/P420 diaphragm seals in flange design, mounted directly on the transmitter

• Minimum bending radius	150 mm (5.9 inches)
Filling liquid	<ul style="list-style-type: none"> • Silicone oil M5 • Silicone oil M50 • High-temperature oil • Halocarbon oil (for measuring O₂) • Food oil (FDA-listed) • Neobee M20 (FDA-listed)
Max. recommended medium temperature	170 °C (338 °F)
Permissible ambient temperature	Dependent on the pressure transmitter and the filling liquid of the remote seal. More information In the technical specifications of the pressure transmitters and in the sections in the technical reference of the remote seals: <ul style="list-style-type: none"> • "Function" - "Technical specifications of the remote seal filling liquids" • "More information" - "Specification of process conditions for selection and ordering data"
Weight	Approx. 4 kg (8.82 lbs)
Certificates and approvals	
Classification according to pressure equipment directive (PED 2014/68/EU)	For gases of fluid group 1 and liquids of fluid group 1; complies with requirements of article 4, paragraph 3 (sound engineering practice)

Dimensional drawings



Diaphragm seals of flange design, direct connection to a SITRANS P320/420 pressure transmitter (process connection vertical (top) and horizontal (bottom)), dimensions in mm (inch)

Connection according to EN 1092-1

Nominal diameter	Nominal pressure	b	D	d ₂	d ₄	d ₅	d _M with tube	d _M without tube	f	k	n	L
		mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
DN 25	PN 10/16/25/40	18	115	14	68	24.5	22.6	27	2	85	4	0, 50, 100, 150 or 200
	PN 63/100	24	140	18	68	24.5	22.6	27	2	100	4	
	PN 160	24	140	18	68	24.5	22.6	27	2	100	4	
	PN 250	28	150	22	68	24.5	22.6	27	2	105	4	
DN 40	PN 10/16/25/40	16	150	18	88	38	30	42	2	110	4	
	PN 63/100	24	170	22	88	38	30	42	2	125	4	
	PN 160	26	170	22	88	38	30	42	2	125	4	
DN 50	PN 10/16/25/40	18	165	18	102	48.3	40	51	2	125	4	
	PN 63/100	26	195	26	102	48.3	40	51	2	145	4	
	PN 160	28	195	26	102	48.3	40	51	2	145	4	
DN 80	PN 10/16/25/40	22	200	18	138	76	65	85	2	160	8	
	PN 100	30	230	26	138	76	65	85	2	180	8	
DN 100	PN 10/16	18	220	18	158	94	85	85	2	180	8	
	PN 25/40	22	235	22	162	94	85	85	2	190	8	
DN 125	PN 16	20	250	18	188	127	85	116	2	210	8	
	PN 40	24	270	26	188	127	85	116	2	220	8	

d: Inside diameter of gasket according to EN 1092-1/ASME B16.5

d_M: Effective diaphragm diameter

Connection according to ASME B16.5

Nominal diameter	Nominal pressure	b	D	d ₂	d ₄	d ₅	d _M with tube	d _M without tube	f	k	n	L
		lb/sq. in.	Inch (mm)	Inch (mm)	Inch (mm)	Inch (mm)	Inch (mm)	Inch (mm)	Inch (mm)	Inch (mm)	Inch (mm)	Inch (mm)
1"	150	0.71 (18)	4.33 (110)	0.61 (15.6)	2 (50.8)	0.96 (24.5)	0.89 (22.6)	1,18 (30)	0.08 (2)	3.13 (79.4)	4	0, 2, 3.94, 5.94 or 7.87 (0, 50, 100, 150 or 200)
	300	0.77 (19.5)	4.92 (125)	0.75 (19.1)	2 (50.8)	0.96 (24.5)	0.89 (22.6)	1,18 (30)	0.08 (2)	3.5 (88.9)	4	
	600	0.96 (24.5)	4.92 (125)	0.75 (19.1)	2 (50.8)	0.96 (24.5)	0.89 (22.6)	1,18 (30)	0.28 (7)	3.5 (88.9)	4	
	1500	1.4 (35.6)	5.91 (150)	1 (25.4)	2 (50.8)	0.96 (24.5)	0.89 (22.6)	1,18 (30)	0.28 (7)	4 (101.6)	4	

Pressure measurement

Remote seals

for SITRANS P320/P420 pressure transmitters / Diaphragm seals in flange design, direct mount

Dimensional drawings (continued)

Nominal diameter	Nominal pressure lb/sq.in.	b	D	d ₂	d ₄	d ₅	d _M with tube	d _M without tube	f	k	n	L
		Inch (mm)	Inch (mm)	Inch (mm)	Inch (mm)	Inch (mm)	Inch (mm)	Inch (mm)	Inch (mm)	Inch (mm)	Inch (mm)	Inch (mm)
1½"	150	0.63 (15.9)	4.92 (125)	0.63 (15.9)	2.87 (73)	1.5 (38)	1,18 (30)	1.42 (36)	0.08 (2)	3.87 (98.4)	4	0, 2, 3.94, 5.94 or 7.87 (0, 50, 100, 150 or 200)
	300	0.75 (19.1)	6.10 (155)	0.87 (22.2)	2.87 (73)	1.5 (38)	1,18 (30)	1.42 (36)	0.08 (2)	4.5 (114.3)	4	
	400/600	0.88 (22.3)	6.10 (155)	0.87 (22.2)	2.87 (73)	1.5 (38)	1,18 (30)	1.42 (36)	0.28 (7)	4.5 (114.3)	4	
	900/1500	1.25 (31.8)	7.09 (180)	1.13 (28.6)	2.87 (73)	1.5 (38)	1,18 (30)	1.42 (36)	0.28 (7)	4.87 (123.8)	4	
2"	150	0.69 (17.5)	5.91 (150)	0.75 (19.1)	3.63 (92.1)	1.9 (48.3)	1.57 (40)	2.01 (51)	0.08 (2)	4.75 (120.7)	4	
	300	0.81 (20.7)	6.5 (165)	0.75 (19.1)	3.63 (92.1)	1.9 (48.3)	1.57 (40)	2.01 (51)	0.08 (2)	5 (127)	8	
	400/600	1.00 (25.4)	6.5 (165)	0.75 (19.1)	3.63 (92.1)	1.9 (48.3)	1.57 (40)	2.01 (51)	0.28 (7)	5 (127)	8	
	900/1500	1.5 (38.1)	8.46 (215)	1.00 (25.4)	3.63 (92.1)	1.9 (48.3)	1.57 (40)	2.01 (51)	0.28 (7)	6.5 (165.1)	8	
3"	150	0.88 (22.3)	7.48 (190)	0.75 (19.1)	5 (127)	3 (76)	2.65 (65)	3.35 (85)	0.08 (2)	6 (152.4)	4	
	300	1.06 (27)	8.27 (210)	0.87 (22.2)	5 (127)	3 (76)	2.65 (65)	3.35 (85)	0.08 (2)	6.63 (168.3)	8	
	600	1.23 (31.8)	8.27 (210)	0.87 (22.2)	5 (127)	3 (76)	2.65 (65)	3.35 (85)	0.28 (7)	6.63 (168.3)	8	
	1500	1.88 (47.7)	10.43 (265)	1.25 (31.8)	5 (127)	3 (76)	2.65 (65)	3.35 (85)	0.28 (7)	8 (203.2)	8	
4"	150	0.88 (22.3)	9.06 (230)	0.75 (19.1)	6.19 (157.2)	3.69 (94)	3.35 (85)	3.35 (85)	0.08 (2)	7.5 (190.5)	8	
	300	1.19 (30.2)	10.04 (255)	0.87 (22.2)	6.19 (157.2)	3.69 (94)	3.35 (85)	3.35 (85)	0.08 (2)	7.87 (200)	8	
	400	1.38 (35)	10.04 (255)	0.87 (22.2)	6.19 (157.2)	3.69 (94)	3.35 (85)	3.35 (85)	0.28 (7)	7.87 (200)	8	
	1500	2.13 (54)	12.20 (310)	1.37 (34.9)	6.19 (157.2)	3.69 (94)	3.35 (85)	3.35 (85)	0.28 (7)	9.5 (241.3)	8	
5"	150	0.88 (22.3)	10.04 (255)	0.87 (22.2)	7.31 (185.7)	5 (127)	4.57 (116)	4.57 (116)	0.08 (2)	8.5 (215.9)	8	
	300	1.31 (33.4)	11.02 (280)	0.87 (22.2)	7.31 (185.7)	5 (127)	4.57 (116)	4.57 (116)	0.08 (2)	9.25 (235)	8	
	400	1.50 (38.1)	11.02 (280)	0.87 (22.2)	7.31 (185.7)	5 (127)	4.57 (116)	4.57 (116)	0.28 (7)	9.25 (235)	8	

d: Inside diameter of gasket according to EN 1092-1/ASME B16.5

d_M: Effective diaphragm diameter

Connection according to J.I.S.

Nominal diameter	Nominal pressure	b	D	d ₂	d ₄	d ₅	d _M with tube	d _M without tube	f	k	n	L
		mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	Inch (mm)
DN 50	10K	14 (0.55)	155 (6.10)	19 (0.75)	96 (3.78)	48.3 (1.9)	40 (1.57)	51 (2.01)	2	120 (4.72)	4	0, 50, 100, 150 or 200 (0, 2, 3.94, 5.94 or 7.87)
	20K	16 (0.63)	165 (6.50)	19 (0.75)	96 (3.78)	48.3 (1.9)	40 (1.57)	51 (2.01)	2	120 (4.72)	8	
	40K	26 (1.02)	165 (6.50)	19 (0.75)	105 (4.13)	48.3 (1.9)	40 (1.57)	51 (2.01)	2	130 (5.12)	8	
DN 80	10K	16 (0.63)	185 (7.28)	19 (0.75)	126 (4.96)	76 (2.99)	65 (2.56)	85 (3.35)	2	150 (5.91)	8	
	20K	20 (0.79)	200 (7.87)	23 (0.91)	132 (5.20)	76 (2.99)	65 (2.56)	85 (3.35)	2	160 (6.30)	8	
	40K	32 (1.26)	210 (8.27)	23 (0.91)	140 (5.51)	76 (2.99)	65 (2.56)	85 (3.35)	2	170 (6.30)	8	
DN 100	10K	16 (0.63)	210 (8.27)	19 (0.75)	151 (5.94)	94 (3.7)	85 (3.35)	85 (3.35)	2	175 (6.89)	8	
	20K	22 (0.87)	225 (8.86)	23 (0.91)	160 (6.30)	94 (3.7)	85 (3.35)	85 (3.35)	2	185 (7.28)	8	
	40K	36 (1.42)	250 (9.84)	25 (0.98)	165 (6.50)	94 (3.7)	85 (3.35)	85 (3.35)	2	205 (8.07)	8	

d: Inside diameter of gasket according to EN 1092-1/ASME B16.5

d_M: Effective diaphragm diameter

Overview



Diaphragm seal of flange design for pressure transmitters for differential pressure, fixed connection and with flexible capillary

Pressure measurement

Remote seals

for SITRANS P320/P420 pressure transmitters / Diaphragm seals in flange design, direct mount, with capillary

Selection and ordering data

		Article No.	Order code
Diaphragm seal Flange design, mounted directly and with capillary Mounting flange (optionally with tube) for direct mounting on high side and flange remote seal without tube, mounted via capillary on low side of SITRANS P for differential pressure; SITRANS P320/420 SITRANS P320/P420 transmitter for differential pressure and flow 7MF03../7MF04.. order separately, scope of delivery: 2 units		7MF0813-	
Click the article number for online configuration in the PIA Life Cycle Portal.		● ● ● ● ● - 0 ● ● ● ● ● ● ● ●	
Nominal diameter	Nominal pressure		
<u>Process connection standard EN 1092-1</u>			
DN 40	PN 10/16/25/40	0 D D	
	PN 63/100	0 D F	
	PN 160	0 D G	
DN 50	PN 10/16/25/40	0 E D	
	PN 63	0 E E	
	PN 100	0 E F	
DN 80	PN 10/16/25/40	0 G D	
	PN 100	0 G F	
DN 100	PN 10/16	0 H B	
	PN 25/40	0 H D	
DN 125	PN 16	0 J B	
	PN 40	0 J D	
<u>Process connection standard ASME B16.5</u>			
1½ inches	Class 150	1 L A	
	Class 300	1 L B	
	Class 400/600	1 L D	
	Class 900/1500	1 L F	
2 inches	Class 150	1 M A	
	Class 300	1 M B	
	Class 400/600	1 M D	
	Class 900/1500	1 M F	
3 inches	Class 150	1 P A	
	Class 300	1 P B	
	Class 600	1 P D	
	Class 1500	1 P F	
4 inches	Class 150	1 Q A	
	Class 300	1 Q B	
	Class 400	1 Q C	
	Class 1500	1 Q F	
5 inches	Class 150	1 R A	
	Class 300	1 R B	
	Class 400	1 R C	
<u>Process connection standard J.I.S.</u>			
DN 50	10K	2 E S	
	20K	2 E T	
	40K	2 E U	
DN 80	10K	2 G S	
	20K	2 G T	
	40K	2 G U	
DN 100	10K	2 H S	
	20K	2 H T	
	40K	2 H U	
Other version, add order code and plain text		9 A A	H 1 Y
Capillary length at low side			
1 m (38.37 inches)		1 0	
1.6 m (63 inches)		1 1	
2 m (78.7 inches)		1 2	
2.5 m (98.4 inches)		1 3	
3 m (118.1 inches)		1 4	

for SITRANS P320/P420 pressure transmitters / Diaphragm seals in flange design, direct mount, with capillary

Selection and ordering data (continued)

	Article No.	Order code
Diaphragm seal Flange design, mounted directly and with capillary Mounting flange (optionally with tube) for direct mounting on high side and flange remote seal without tube, mounted via capillary on low side of SITRANS P for differential pressure; SITRANS P320/420 SITRANS P320/P420 transmitter for differential pressure and flow 7MF03../7MF04.. order separately, scope of delivery: 2 units	7MF0813-	
	● ● ● ● ● - 0 ● ● ● ● ● ● ● ●	
4 m (157.5 inches)	1 5	
5 m (196.9 inches)	1 6	
6 m (236.2 inches)	1 7	
7 m (275.6 inches)	1 8	
8 m (315 inches)	2 0	
9 m (354.3 inches)	2 1	
10 m (393.7 inches)	2 2	
Other version, add order code and plain text	9 8	L 1 Y
Filling liquid		
Silicone oil M50		B
High-temperature oil		C
Silicone oil M5		A
Food oil (FDA-listed)		E
Halocarbon oil		D
Neobee M20 (FDA listed)		R
Other version, add order code and plain text		Z P 1 Y
Material of wetted parts		
Stainless steel 316L		
• Without coating		A
• With PFA coating		D
• With PTFE coating		E 0
• With ECTFE coating		F
Monel 400, 2.4360		G
Hastelloy C276, 2.4819		J
Tantalum		K
Titanium, 3.7035		L 0
Nickel 201		M 0
Diaphragm Duplex, 1.4462		Q
Diaphragm and flange Duplex, 1.4462		R
Stainless steel 316L, gold-plated		S 0
Hastelloy C4, 2.4610		U 0
Hastelloy C22, 2.4602		V 0
Other version, add order code and plain text		Z 8 Q 1 Y
Tube length		
Note: If a tube is ordered, only the directly mounted remote seal is equipped with a tube.		
None		0
50 mm (2 inches)		1
100 mm (4 inches)		2
150 mm (6 inches)		3
200 mm (8 inches)		4
250 mm (10 inches)		5
Other version, add order code and plain text		Z 8 Q 1 Y
Customer-specific tube length		
Wetted parts: Stainless steel without coating		
Range	Standard length	
20 ... 50 mm (0.79 ... 1.97 inches)	50 mm (1.97 inches)	A 1
51 ... 100 mm (2.01 ... 3.94 inches)	100 mm (3.94 inches)	A 2
101 ... 150 mm (3.98 ... 5.91 inches)	150 mm (5.91 inches)	A 3
151 ... 200 mm (5.94 ... 7.87 inches)	200 mm (7.87 inches)	A 4
201 ... 250 mm (7.91 ... 9.84 inches)	250 mm (9.84 inches)	A 5
Wetted parts: Stainless steel with ECTFE coating		

Pressure measurement

Remote seals

for SITRANS P320/P420 pressure transmitters / Diaphragm seals in flange design, direct mount, with capillary

Selection and ordering data (continued)

		Article No.	Order code
Diaphragm seal			
Flange design, mounted directly and with capillary			
Mounting flange (optionally with tube) for direct mounting on high side and flange remote seal without tube, mounted via capillary on low side of SITRANS P for differential pressure; SITRANS P320/420			
SITRANS P320/P420 transmitter for differential pressure and flow		7MF0813-	
7MF03../7MF04.. order separately, scope of delivery: 2 units		● ● ● ● ● - 0 ● ● ● ● ● ● ● ●	
<u>Range</u>	<u>Standard length</u>		
20 ... 50 mm (0.79 ... 1.97 inches)	50 mm (1.97 inches)		F 1
51 ... 100 mm (2.01 ... 3.94 inches)	100 mm (3.94 inches)		F 2
101 ... 150 mm (3.98 ... 5.91 inches)	150 mm (5.91 inches)		F 3
151 ... 200 mm (5.94 ... 7.87 inches)	200 mm (7.87 inches)		F 4
201 ... 250 mm (7.91 ... 9.84 inches)	250 mm (9.84 inches)		F 5
Wetted parts: Stainless steel with PFA coating			
<u>Range</u>	<u>Standard length</u>		
20 ... 50 mm (0.79 ... 1.97 inches)	50 mm (1.97 inches)		D 1
51 ... 100 mm (2.01 ... 3.94 inches)	100 mm (3.94 inches)		D 2
101 ... 150 mm (3.98 ... 5.91 inches)	150 mm (5.91 inches)		D 3
151 ... 200 mm (5.94 ... 7.87 inches)	200 mm (7.87 inches)		D 4
201 ... 250 mm (7.91 ... 9.84 inches)	250 mm (9.84 inches)		D 5
Wetted parts: Monel 400			
<u>Range</u>	<u>Standard length</u>		
20 ... 50 mm (0.79 ... 1.97 inches)	50 mm (1.97 inches)		G 1
51 ... 100 mm (2.01 ... 3.94 inches)	100 mm (3.94 inches)		G 2
101 ... 150 mm (3.98 ... 5.91 inches)	150 mm (5.91 inches)		G 3
151 ... 200 mm (5.94 ... 7.87 inches)	200 mm (7.87 inches)		G 4
Wetted parts: Hastelloy C276			
<u>Range</u>	<u>Standard length</u>		
20 ... 50 mm (0.79 ... 1.97 inches)	50 mm (1.97 inches)		J 1
51 ... 100 mm (2.01 ... 3.94 inches)	100 mm (3.94 inches)		J 2
101 ... 150 mm (3.98 ... 5.91 inches)	150 mm (5.91 inches)		J 3
151 ... 200 mm (5.94 ... 7.87 inches)	200 mm (7.87 inches)		J 4
Wetted parts: Tantalum			
<u>Range</u>	<u>Standard length</u>		
20 ... 50 mm (0.79 ... 1.97 inches)	50 mm (1.97 inches)		K 1
51 ... 100 mm (2.01 ... 3.94 inches)	100 mm (3.94 inches)		K 2
101 ... 150 mm (3.98 ... 5.91 inches)	150 mm (5.91 inches)		K 3
151 ... 200 mm (5.94 ... 7.87 inches)	200 mm (7.87 inches)		K 4

Options	Order code
Add "-Z" to article number and specify order code.	
Factory certificates	
Quality inspection certificate (5-point characteristic curve test) acc. to IEC 62828-2	C11
Inspection certificate to EN 10204-3.1 for material of body and diaphragm	C12
Manufacturer declaration acc. to NACE (MR 0103-2012 and MR 0175-2009) (only together with wetted parts made of stainless steel 316 L and Hastelloy)	C13
Inspection certificate according to EN 10204-3.1, PMI test of pressure containing and wetted parts	C15
Certificate of FDA-approved fill oil according to EN 10204-2.2	C17
Factory certificate functional safety (SIL2/3) Devices suitable for use according to IEC 61508 and IEC 61511 (includes SIL Declaration of Conformity)	C20

Selection and ordering data (continued)

Options	Order code
Add "-Z" to article number and specify order code.	
Accessories	
Representation of the epoxy resin coating Color: Transparent coverage: Front and rear of the remote seal, connecting pipe, process connection of the transmitter. Maximum process medium temperature for epoxy lacquering: 140 °C	D15
Remote seal nameplate Attached, made of stainless steel, contains Article No. and order number of the remote seal	D42
Volume deflagration flame arrester (VDEF) for differential pressure and level transmitters	D62
Negative pressure service	
Negative pressure service for differential pressure transmitters	D83
Extended negative pressure service for differential pressure transmitters	D88
Country-specific approval	
CRN approval Canada (Canadian Registration Number)	E60
Note:	
If the order code E60 is selected, the option E60 must also be selected for the transmitter!	
General product approvals without explosion proof approvals	
Oil-free and grease-free cleaned version for oxygen application including certificate EN 10204-2.2 (only with filling liquid halocarbon oil max. temperature 60 °C and max. pressure 50 bar)	E80
Oil-free and grease-free cleaned version not for oxygen application, including certificate EN 10204-2.2	E87
Sealing surface	
Sealing surface smooth, form B2/EN 1092-1 or RFSF/ANSI 16.5 (only for wetted parts made of stainless steel 316L)	M50
Sealing surface groove according to EN 1092-1, form D (instead of sealing surface B1, only for wetted parts made of stainless steel 316L)	M54
Sealing surface RJF (groove) according to ASME B16.5 (instead of sealing surface RF 125 ... 250AO, only for wetted parts made of stainless steel 316L)	M64
Sealing surface with tongue to EN 1092-1, form C (for wetted parts made of stainless steel 316L only)	
• DN 25	M70
• DN 40	M71
• DN 50	M72
• DN 80	M73
• DN 100	M74
• DN 125	M75
Sealing surface with spigot according to EN 1092-1, form E (for wetted parts made of stainless steel 316L only)	
• DN 25	M76
• DN 40	M77
• DN 50	M78
• DN 80	M79
• DN 100	M80
• DN 125	M81

Pressure measurement

Remote seals

for SITRANS P320/P420 pressure transmitters / Diaphragm seals in flange design, direct mount, with capillary

Selection and ordering data (continued)

Options	Order code
Add "-Z" to article number and specify order code.	
Sealing surface female face according to EN 1092-1, form F (only for wetted parts made of stainless steel 316L)	
• DN 25	M82
• DN 40	M83
• DN 50	M84
• DN 80	M85
• DN 100	M86
• DN 125	M87
Capillary coating	
PE protective tube	
• 1 m (38.37 inches)	S10
• 1.6 m (63 inches)	S11
• 2 m (78.7 inches)	S12
• 2.5 m (98.4 inches)	S13
• 3 m (118.1 inches)	S14
• 4 m (157.5 inches)	S15
• 5 m (196.9 inches)	S16
• 6 m (236.2 inches)	S17
• 7 m (275.6 inches)	S18
• 8 m (315 inches)	S19
• 9 m (354.3 inches)	S20
• 10 m (393.7 inches)	S21
PTFE protective tube	
• 1 m (38.37 inches)	S40
• 1.6 m (63 inches)	S41
• 2 m (78.7 inches)	S42
• 2.5 m (98.4 inches)	S43
• 3 m (118.1 inches)	S44
• 4 m (157.5 inches)	S45
• 5 m (196.9 inches)	S46
• 6 m (236.2 inches)	S47
• 7 m (275.6 inches)	S48
• 8 m (315 inches)	S49
• 9 m (354.3 inches)	S50
• 10 m (393.7 inches)	S51
PVC protective tube	
• 1 m (38.37 inches)	S70
• 1.6 m (63 inches)	S71
• 2 m (78.7 inches)	S72
• 2.5 m (98.4 inches)	S73
• 3 m (118.1 inches)	S74
• 4 m (157.5 inches)	S75
• 5 m (196.9 inches)	S76
• 6 m (236.2 inches)	S77
• 7 m (275.6 inches)	S78
• 8 m (315 inches)	S79
• 9 m (354.3 inches)	S80
• 10 m (393.7 inches)	S81

Selection and ordering data (continued)

Options	Order code
Add "-Z" to article number and specify order code.	
Desired remote seal supplier	
Note: If the remote seal is to be supplied only by one of the suppliers specified below, this option needs to be selected. For orders without this option, the remote seal supplier is selected through the dispatch center.	
Company WIKA, Klingenberg	W01
Company Labom, Hude	W02
Special design	
Welded filling hole	X01
Customer-specific tube length	
Customer-specific tube length (specify in plain text in mm)	Y44
Specification of process conditions¹⁾	
Ambient temperature range	
• +10 ... +50 °C (+50 ... +122 °F) preset	D66
• -40 ... +50 °C (-40 ... +122 °F)	D67
• -10 ... +85 °C (+14 ... +185 °F)	D68
Process temperature min. ... °C/(°F)/max. ... °C/(°F)	Y50

¹⁾ See also "Specification of process conditions for selection and ordering data" in the section "More information" under "Technical reference" for SITRANS P320/P420.

Pressure measurement

Remote seals

for SITRANS P320/P420 pressure transmitters / Diaphragm seals in flange design, direct mount, with capillary

Technical specifications

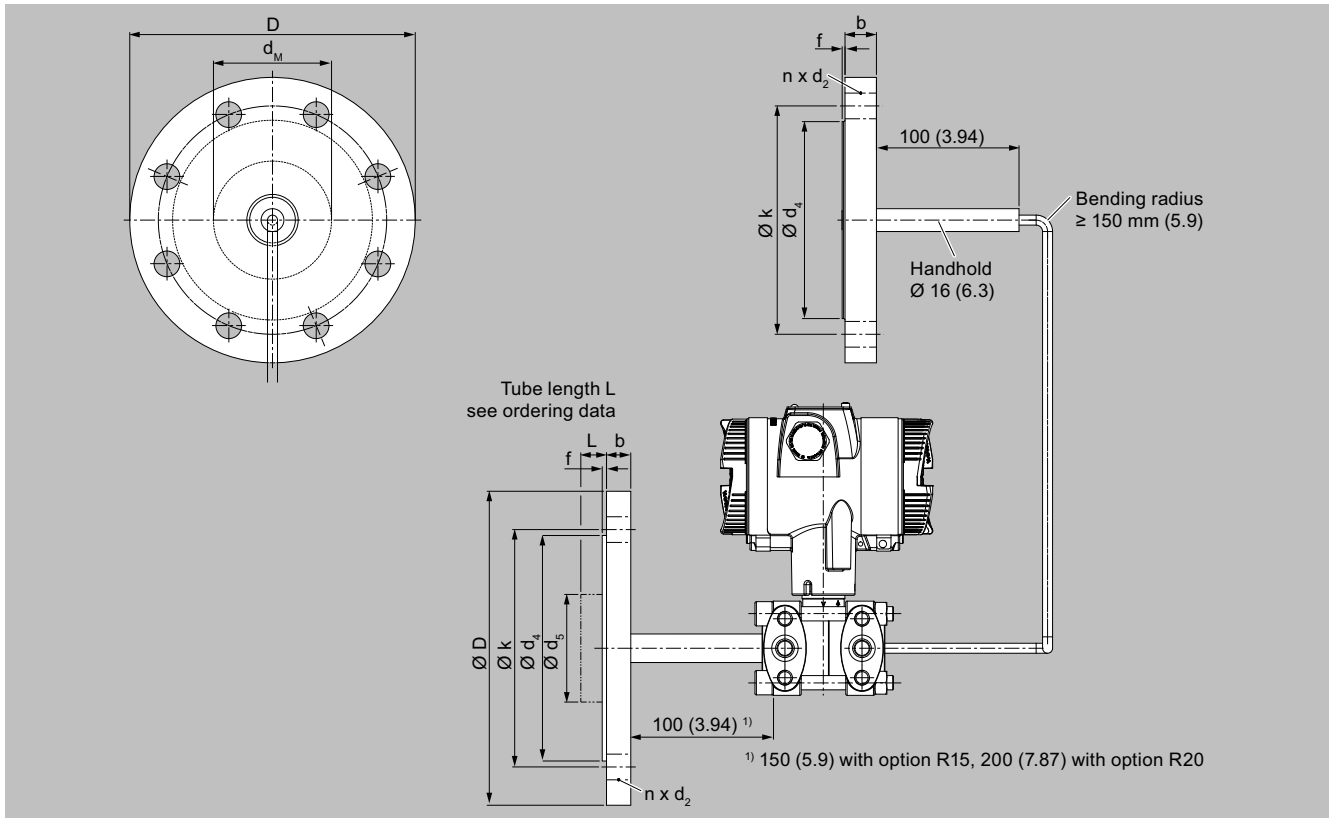
SITRANS P320/P420 diaphragm seals in flange design, mounted directly and with capillary	
Nominal diameter	Nominal pressure
Standard of process connection EN 1092-1	
• DN 40	PN 10/16/25/40/63/100/160
• DN 50	PN 10/16/25/40/63/100
• DN 80	PN 10/16/25/40/100
• DN 100	PN 10/16/25/40
• DN 125	PN 16/40
Process connection standard ASME B16.5	
• 1½ inches	Class 150/300/400/600/900/1500
• 2 inches	Class 150/300/400/600/900/1500
• 3 inches	Class 150/300/600/1500
• 4 inches	Class 150/300/400/1500
• 5 inches	Class 150/300/400
Process connection standard J.I.S.	
• DN 50	10K
• DN 80	20K
• DN 100	40K
Sealing surface	
• For stainless steel mat. no. 1.4404/316L	According to EN 1092-1, form B1 or ASME B16.5 RF 125 ... 250 AO
• For the other materials	According to EN 1092-1, form B2 or ASME B16.5 RFSF
Materials	
• Main body	Stainless steel, mat. no. 1.4404/316L
• Wetted parts	Stainless steel, mat. no. 1.4404/316L
	<ul style="list-style-type: none"> Without coating PTFE coating ECTFE coating (for negative pressure on request) PFA coating
	Monel 400, mat. no. 2.4360
	Hastelloy C276, mat. no. 2.4819
	Hastelloy C4, mat. no. 2.4610
	Hastelloy C22, mat. no. 2.4602
	Tantalum
	Titanium, mat. no. 3.7035
	Nickel 201
	Duplex 2205, mat. no. 1.4462
	Stainless steel 316L, gold plated, layer thickness approx. 25 µm
• Capillary	Stainless steel, mat. no. 1.4571/316Ti (with option W01) or mat. no. 1.4301/304
• Sheath	Flexible spiral coiled tube made of stainless steel, mat. no. 1.4404/316L
Gasket material in the process flanges	
• For gauge pressure transmitters, absolute pressure transmitters and negative pressure applications	Copper
• For other applications	Viton

Technical specifications (continued)

SITRANS P320/P420 diaphragm seals in flange design, mounted directly and with capillary	
Permissible pressure load	See above and the technical specifications of the pressure transmitter
Tube length	<ul style="list-style-type: none"> Without tube 50 mm (1.97 inch) 100 mm (3.94 inches) 150 mm (5.91 inches) 200 mm (7.87 inches) <p>Note: If a tube is ordered, only the directly mounted remote seal is equipped with a tube.</p>
Capillary	
• Length	≤ 10 m (32.8 ft), longer lengths on request
• Inside diameter	≤ 1.3 mm (0.051 inch)
• Minimum bending radius	150 mm (5.9 inches)
Filling liquid	<ul style="list-style-type: none"> Silicone oil M5 Silicone oil M50 High-temperature oil Halocarbon oil (for measuring O₂) Food oil (FDA-listed) Neobee M20 (FDA-listed)
Max. recommended medium temperature	170 °C (338 °F)
Permissible ambient temperature	<p>Dependent on the pressure transmitter and the filling liquid of the remote seal.</p> <p>More information In the technical specifications of the pressure transmitters and in the sections in the technical reference of the remote seals:</p> <ul style="list-style-type: none"> "Function" - "Technical specifications of the remote seal filling liquids" "More information" - "Specification of process conditions for selection and ordering data"
Weight	Approx. 4 kg (8.82 lb)
Certificates and approvals	
Classification according to pressure equipment directive (PED 2014/68/EU)	For gases of fluid group 1 and liquids of fluid group 1; complies with requirements of article 4, paragraph 3 (sound engineering practice)

for SITRANS P320/P420 pressure transmitters / Diaphragm seals in flange design, direct mount, with capillary

Dimensional drawings



Diaphragm seals of flange design with flexible capillary, rigid mounting, for connection to a SITRANS P320/420 pressure transmitter for differential pressure, dimensions in mm (inch)

Connection according to EN 1092-1

Nominal diameter	Nominal pressure	b	D	d ₂	d ₄	d ₅	d _M with tube	d _M without tube	f	k	n	L
		mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
DN 40	PN 10/16/25/40	16	150	18	88	38	30	42	2	110	4	0, 50, 100, 150 or 200
	PN 63/100	24	170	22	88	38	30	42	2	125	4	
	PN 160	26	170	22	88	38	30	42	2	125	4	
DN 50	PN 10/16/25/40	18	165	18	102	48.3	40	51	2	125	4	
	PN 63/100	26	195	26	102	48.3	40	51	2	145	4	
	PN 160	28	195	26	102	48.3	40	51	2	145	4	
DN 80	PN 10/16/25/40	22	200	18	138	76	65	85	2	160	8	
	PN 100	30	230	26	138	76	65	85	2	180	8	
DN 100	PN 10/16	18	220	18	158	94	85	85	2	180	8	
	PN 25/40	22	235	22	162	94	85	85	2	190	8	
DN 125	PN 16	20	250	18	188	127	85	116	2	210	8	
	PN 40	24	270	26	188	127	85	116	2	220	8	

d: Inside diameter of gasket according to EN 1092-1/ASME B16.5

d_M: Effective diaphragm diameter

Pressure measurement

Remote seals

for SITRANS P320/P420 pressure transmitters / Diaphragm seals in flange design, direct mount, with capillary

Dimensional drawings (continued)

Connection according to ASME B16.5

Nominal diameter	Nominal pressure lb/sq.in.	b	D	d ₂	d ₄	d ₅	d _M with tube	d _M without tube	f	k	n	L
		Inch (mm)	Inch (mm)	Inch (mm)	Inch (mm)	Inch (mm)	Inch (mm)	Inch (mm)	Inch (mm)	Inch (mm)	Inch (mm)	Inch (mm)
1½"	150	0.63 (15.9)	4.92 (125)	0.63 (15.9)	2.87 (73)	1.5 (38)	1.18 (30)	1.42 (36)	0.08 (2)	3.87 (98.4)	4	0, 2, 3.94, 5.94 or 7.87 (0, 50, 100, 150 or 200)
	300	0.75 (19.1)	6.10 (155)	0.87 (22.2)	2.87 (73)	1.5 (38)	1.18 (30)	1.42 (36)	0.08 (2)	4.5 (114.3)	4	
	400/600	0.88 (22.3)	6.10 (155)	0.87 (22.2)	2.87 (73)	1.5 (38)	1.18 (30)	1.42 (36)	0.28 (7)	4.5 (114.3)	4	
	900/1500	1.25 (31.8)	7.09 (180)	1.13 (28.6)	2.87 (73)	1.5 (38)	1.18 (30)	1.42 (36)	0.28 (7)	4.87 (123.8)	4	
2"	150	0.69 (17.5)	5.91 (150)	0.75 (19.1)	3.63 (92.1)	1.9 (48.3)	1.57 (40)	2.01 (51)	0.08 (2)	4.75 (120.7)	4	
	300	0.81 (20.7)	6.5 (165)	0.75 (19.1)	3.63 (92.1)	1.9 (48.3)	1.57 (40)	2.01 (51)	0.08 (2)	5 (127)	8	
	400/600	1.00 (25.4)	6.5 (165)	0.75 (19.1)	3.63 (92.1)	1.9 (48.3)	1.57 (40)	2.01 (51)	0.28 (7)	5 (127)	8	
	900/1500	1.5 (38.1)	8.46 (215)	1.00 (25.4)	3.63 (92.1)	1.9 (48.3)	1.57 (40)	2.01 (51)	0.28 (7)	6.5 (165.1)	8	
3"	150	0.88 (22.3)	7.48 (190)	0.75 (19.1)	5 (127)	3 (76)	2.65 (65)	3.35 (85)	0.08 (2)	6 (152.4)	4	
	300	1.06 (27)	8.27 (210)	0.87 (22.2)	5 (127)	3 (76)	2.65 (65)	3.35 (85)	0.08 (2)	6.63 (168.3)	8	
	600	1.23 (31.8)	8.27 (210)	0.87 (22.2)	5 (127)	3 (76)	2.65 (65)	3.35 (85)	0.28 (7)	6.63 (168.3)	8	
	1500	1.88 (47.7)	10.43 (265)	1.25 (31.8)	5 (127)	3 (76)	2.65 (65)	3.35 (85)	0.28 (7)	8 (203.2)	8	
4"	150	0.88 (22.3)	9.06 (230)	0.75 (19.1)	6.19 (157.2)	3.69 (94)	3.35 (85)	3.35 (85)	0.08 (2)	7.5 (190.5)	8	
	300	1.19 (30.2)	10.04 (255)	0.87 (22.2)	6.19 (157.2)	3.69 (94)	3.35 (85)	3.35 (85)	0.08 (2)	7.87 (200)	8	
	400	1.38 (35)	10.04 (255)	0.87 (22.2)	6.19 (157.2)	3.69 (94)	3.35 (85)	3.35 (85)	0.28 (7)	7.87 (200)	8	
	1500	2.13 (54)	12.20 (310)	1.37 (34.9)	6.19 (157.2)	3.69 (94)	3.35 (85)	3.35 (85)	0.28 (7)	9.5 (241.3)	8	
5"	150	0.88 (22.3)	10.04 (255)	0.87 (22.2)	7.31 (185.7)	5 (127)	4.57 (116)	4.57 (116)	0.08 (2)	8.5 (215.9)	8	
	300	1.31 (33.4)	11.02 (280)	0.87 (22.2)	7.31 (185.7)	5 (127)	4.57 (116)	4.57 (116)	0.08 (2)	9.25 (235)	8	
	400	1.50 (38.1)	11.02 (280)	0.87 (22.2)	7.31 (185.7)	5 (127)	4.57 (116)	4.57 (116)	0.28 (7)	9.25 (235)	8	

d: Inside diameter of gasket according to EN 1092-1/ASME B16.5

d_M: Effective diaphragm diameter

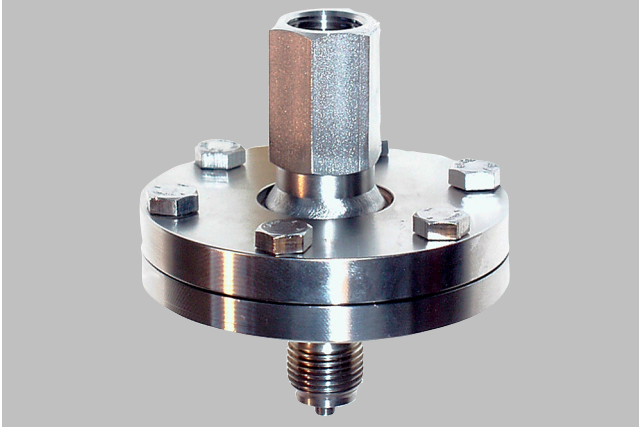
Connection according to J.I.S.

Nominal diameter	Nominal pressure	b	D	d ₂	d ₄	d ₅	d _M with tube	d _M without tube	f	k	n	L
		mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)
DN 50	10K	14 (0.55)	155 (6.10)	19 (0.75)	96 (3.78)	48.3 (1.9)	40 (1.57)	51 (2.01)	2	120 (4.72)	4	0, 50, 100, 150 or 200 (0, 2, 3.94, 5.94 or 7.87)
	20K	16 (0.63)	165 (6.50)	19 (0.75)	96 (3.78)	48.3 (1.9)	40 (1.57)	51 (2.01)	2	120 (4.72)	8	
	40K	26 (1.02)	165 (6.50)	19 (0.75)	105 (4.13)	48.3 (1.9)	40 (1.57)	51 (2.01)	2	130 (5.12)	8	
DN 80	10K	16 (0.63)	185 (7.28)	19 (0.75)	126 (4.96)	76 (2.99)	65 (2.56)	85 (3.35)	2	150 (5.91)	8	
	20K	20 (0.79)	200 (7.87)	23 (0.91)	132 (5.20)	76 (2.99)	65 (2.56)	85 (3.35)	2	160 (6.30)	8	
	40K	32 (1.26)	210 (8.27)	23 (0.91)	140 (5.51)	76 (2.99)	65 (2.56)	85 (3.35)	2	170 (6.30)	8	
DN 100	10K	16 (0.63)	210 (8.27)	19 (0.75)	151 (5.94)	94 (3.7)	85 (3.35)	85 (3.35)	2	175 (6.89)	8	
	20K	22 (0.87)	225 (8.86)	23 (0.91)	160 (6.30)	94 (3.7)	85 (3.35)	85 (3.35)	2	185 (7.28)	8	
	40K	36 (1.42)	250 (9.84)	25 (0.98)	165 (6.50)	94 (3.7)	85 (3.35)	85 (3.35)	2	205 (8.07)	8	

d: Inside diameter of gasket according to EN 1092-1/ASME B16.5

d_M: Effective diaphragm diameter

Overview



Diaphragm seal, screwed design with inside diaphragm for gauge, absolute and differential pressure for direct mounting



Process connection: open measurement flange

Pressure measurement

Remote seals

for SITRANS P320/P420 pressure transmitters / Diaphragm seal in screwed design

Selection and ordering data

		Article No.	Order code
Diaphragm seals, screwed			
With inside diaphragm, direct mounting or connected via flexible capillary pipe to a transmitter			
SITRANS P320/P420 or SITRANS P300 for gauge and absolute pressure (only in conjunction with underpressure service)		7MF0840-	
7MF03../7MF04../7MF802. to be ordered separately; scope of delivery: 1 unit			
SITRANS P320/P420 for differential pressure and flow		7MF0842-	
7MF03../7MF04.. to be ordered separately; scope of delivery: 2 units			
		● ● ● ● ● - 0 ● ● 0 ● ● ●	
Click the article number for online configuration in the PIA Life Cycle Portal.			
Nominal diameter	Nominal pressure		
<u>Open flange, process connection standard EN 1092-1</u>			
DN 15	PN 10/16/25/40	0 A D	
	PN 63/100	0 A F	
	PN 160	0 A G	
	PN 250	0 A H	
DN 20	PN 10/16/25/40	0 A M	
DN 25	PN 10/16/25/40	0 B D	
	PN 63/100	0 B F	
	PN 160	0 B G	
	PN 250	0 B H	
<u>Open flange, process connection standard ASME B16.5</u>			
½ inch	Class 150	1 K A	
	Class 300	1 K B	
	Class 600	1 K C	
	Class 1500	1 K D	
¾ inch	Class 150	1 K F	
	Class 300	1 K G	
	Class 600	1 K H	
	Class 1500	1 K J	
1 inch	Class 150	1 K L	
	Class 300	1 K M	
	Class 600	1 K N	
	Class 1500	1 K P	
<u>Process connection: Thread according to EN 837-1</u>			
G¼"B	PN 100	3 S B	
G¼"B	PN 250	3 S C	
G½"B	PN 100	3 S F	
G½"B	PN 250	3 S G	
G¾"B	PN 100	3 S K	
G¾"B	PN 250	3 S L	
G1"B	PN 100	3 S P	
G1"B	PN 250	3 S Q	
<u>Process connection: thread according to ASME B1.20.1</u>			
¼" NPTM	Class 1500	5 T A	
¼" NPTM	Class 3675	5 T B	
¼" NPTF	Class 1500	5 T C	
¼" NPTF	Class 3675	5 T D	
½" NPTM	Class 1500	5 T E	
½" NPTM	Class 3675	5 T F	
½" NPTF	Class 1500	5 T G	
½" NPTF	Class 3675	5 T H	
¾" NPTM	Class 1500	5 T J	
¾" NPTM	Class 3675	5 T K	
¾" NPTF	Class 1500	5 T L	
¾" NPTF	Class 3675	5 T M	
1" NPTM	Class 1500	5 T N	
1" NPTM	Class 3675	5 T P	

Selection and ordering data (continued)

		Article No.	Order code
Diaphragm seals, screwed			
With inside diaphragm, direct mounting or connected via flexible capillary pipe to a transmitter			
SITRANS P320/P420 or SITRANS P300 for gauge and absolute pressure (only in conjunction with underpressure service)		7MF0840-	
7MF03../7MF04../7MF802. to be ordered separately; scope of delivery: 1 unit			
SITRANS P320/P420 for differential pressure and flow		7MF0842-	
7MF03../7MF04.. to be ordered separately; scope of delivery: 2 units			
		● ● ● ● ● - 0 ● ● 0 ● ● ●	
1" NPTF	Class 1500	5 T Q	
1" NPTF	Class 3675	5 T R	
Other version, add order code and plain text		9 A A	H 1 Y
Transmitter connection			
Without capillary pipe, direct mount, straight connection (for gauge pressure transmitters)		0 0	
Other version, add order code and plain text			
1 m (38.37 inches)		1 0	
1.6 m (63 inches)		1 1	
2 m (78.7 inches)		1 2	
2.5 m (98.4 inches)		1 3	
3 m (118.1 inches)		1 4	
4 m (157.5 inches)		1 5	
5 m (196.9 inches)		1 6	
6 m (236.2 inches)		1 7	
7 m (275.6 inches)		1 8	
8 m (315 inches)		2 0	
9 m (354.3 inches)		2 1	
10 m (393.7 inches)		2 2	
Other version, add order code and plain text		9 8	L 1 Y
Filling liquid			
Silicone oil M50			B
High-temperature oil			C
Silicone oil M5			A
Food oil (FDA-listed)			E
Neobee M20 (FDA-listed)			R
Halocarbon oil			D
Other version, add order code and plain text			Z P 1 Y
Material of wetted parts			
Stainless steel 316L without coating			A
Stainless steel 316L with PTFE coating			E
Monel 400, 2.4360			G
Hastelloy C276, 2.4819			J
Tantalum			K
Stainless steel 316L, gold-plated			S
Neobee M20 (FDA listed)			R
Hastelloy C4, 2.4610			U
Other version, add order code and plain text			Z Q 1 Y

Options	Order code
Add "-Z" to article number and specify order code.	
Factory certificates	
Quality inspection certificate (5-point characteristic curve test) acc. to IEC 62828-2	C11
Inspection certificate to EN 10204-3.1 for material of body and diaphragm	C12
Manufacturer's declaration acc. to NACE (MR 0103-2012 and MR 0175-2009) (only together with wetted parts made of stainless steel 316 L and Hastelloy)	C13
Inspection certificate according to EN 10204-3.1, PMI test of pressure containing and wetted parts	C15
Certificate of FDA-approved fill oil according to EN 10204-2.2	C17

Pressure measurement

Remote seals

for SITRANS P320/P420 pressure transmitters / Diaphragm seal in screwed design

Selection and ordering data (continued)

Options	Order code
Add "-Z" to article number and specify order code.	
Factory certificate functional safety (SIL2/3) Devices suitable for use according to IEC 61508 and IEC 61511 (includes SIL Declaration of Conformity)	C20
Accessories	
Representation of the epoxy resin coating Color: Transparent coverage: Front and rear of the remote seal, connecting pipe, process connection of the transmitter. Maximum process medium temperature for epoxy lacquering: 140 °C	D15
Flushing port ¼" 18 NPT unsealed	D70
Flushing port ¼" 18 NPT sealed with stainless steel plug	D71
Gasket material between upper and lower enclosure PTFE (instead of FKM viton)	D75
Gasket material between upper and lower enclosure metal C spring lock washer (instead of FKM viton)	D76
PTFE coating of lower section (only for G½B PN 100, DN 25 PN 10 ... 40, 1 inch Class 150/300)	D77
Country-specific approval	
CRN approval Canada (Canadian Registration Number)	E60
Note:	
If the order code E60 is selected, the option E60 must also be selected for the transmitter!	
Negative pressure service	
Negative pressure service (for gauge pressure and absolute pressure transmitters)	D81
Negative pressure service (for differential pressure transmitters)	D83
Extended negative pressure service (for gauge pressure and absolute pressure transmitters) (only 7MF0800)	D85
Extended negative pressure service (for differential pressure transmitters)	D88
General product approvals without explosion proof approvals	
Oil-free and grease-free cleaned version for oxygen application including certificate EN 10204-2.2 (only with filling liquid halocarbon oil max. temperature 60 °C and max. pressure 50 bar)	E80
Oil-free and grease-free cleaned version not for oxygen application, including certificate EN 10204-2.2	E87
Capillary connection (Only for 7MF0840)	
Single-side mounted at differential pressure transmitter at high side	S03
Single-side mounted at differential pressure transmitter at low side	S04
Cooling element	S08
Capillary coating	
PE protective tube	
• 1 m (38.37 inches)	S10
• 1.6 m (63 inches)	S11
• 2 m (78.7 inches)	S12
• 2.5 m (98.4 inches)	S13
• 3 m (118.1 inches)	S14
• 4 m (157.5 inches)	S15
• 5 m (196.9 inches)	S16
• 6 m (236.2 inches)	S17
• 7 m (275.6 inches)	S18
• 8 m (315 inches)	S19

Selection and ordering data (continued)

Options	Order code
Add "-Z" to article number and specify order code.	
• 9 m (354.3 inches)	S20
• 10 m (393.7 inches)	S21
PTFE protective tube	
• 1 m (38.37 inches)	S40
• 1.6 m (63 inches)	S41
• 2 m (78.7 inches)	S42
• 2.5 m (98.4 inches)	S43
• 3 m (118.1 inches)	S44
• 4 m (157.5 inches)	S45
• 5 m (196.9 inches)	S46
• 6 m (236.2 inches)	S47
• 7 m (275.6 inches)	S48
• 8 m (315 inches)	S49
• 9 m (354.3 inches)	S50
• 10 m (393.7 inches)	S51
PVC protective tube	
• 1 m (38.37 inches)	S70
• 1.6 m (63 inches)	S71
• 2 m (78.7 inches)	S72
• 2.5 m (98.4 inches)	S73
• 3 m (118.1 inches)	S74
• 4 m (157.5 inches)	S75
• 5 m (196.9 inches)	S76
• 6 m (236.2 inches)	S77
• 7 m (275.6 inches)	S78
• 8 m (315 inches)	S79
• 9 m (354.3 inches)	S80
• 10 m (393.7 inches)	S81
Desired remote seal supplier	
Note:	
If the remote seal is to be supplied only by one of the suppliers specified below, this option needs to be selected. For orders without this option, the remote seal supplier is selected through the dispatch center.	
Company WIKA, Klingenberg	W01
Company Labom, Hude	W02
Special design	
Welded filling holes	X01
Customer-specific tube length	
Customer-specific tube length (specify in plain text)	Y44
Specification of process conditions¹⁾	
Ambient temperature range	
• +10 ... +50 °C (+50 ... +122 °F) preset	D66
• -40 ... +50 °C (-40 ... +122 °F)	D67
• -10 ... +85 °C (+14 ... +185 °F)	D68
Process temperature min. ... °C/(°F)/max. ... °C/(°F)	Y50

¹⁾ See also "Specification of process conditions for selection and ordering data" in the section "More information" under "Technical reference" for SITRANS P320/P420.

Pressure measurement

Remote seals

for SITRANS P320/P420 pressure transmitters / Diaphragm seal in screwed design

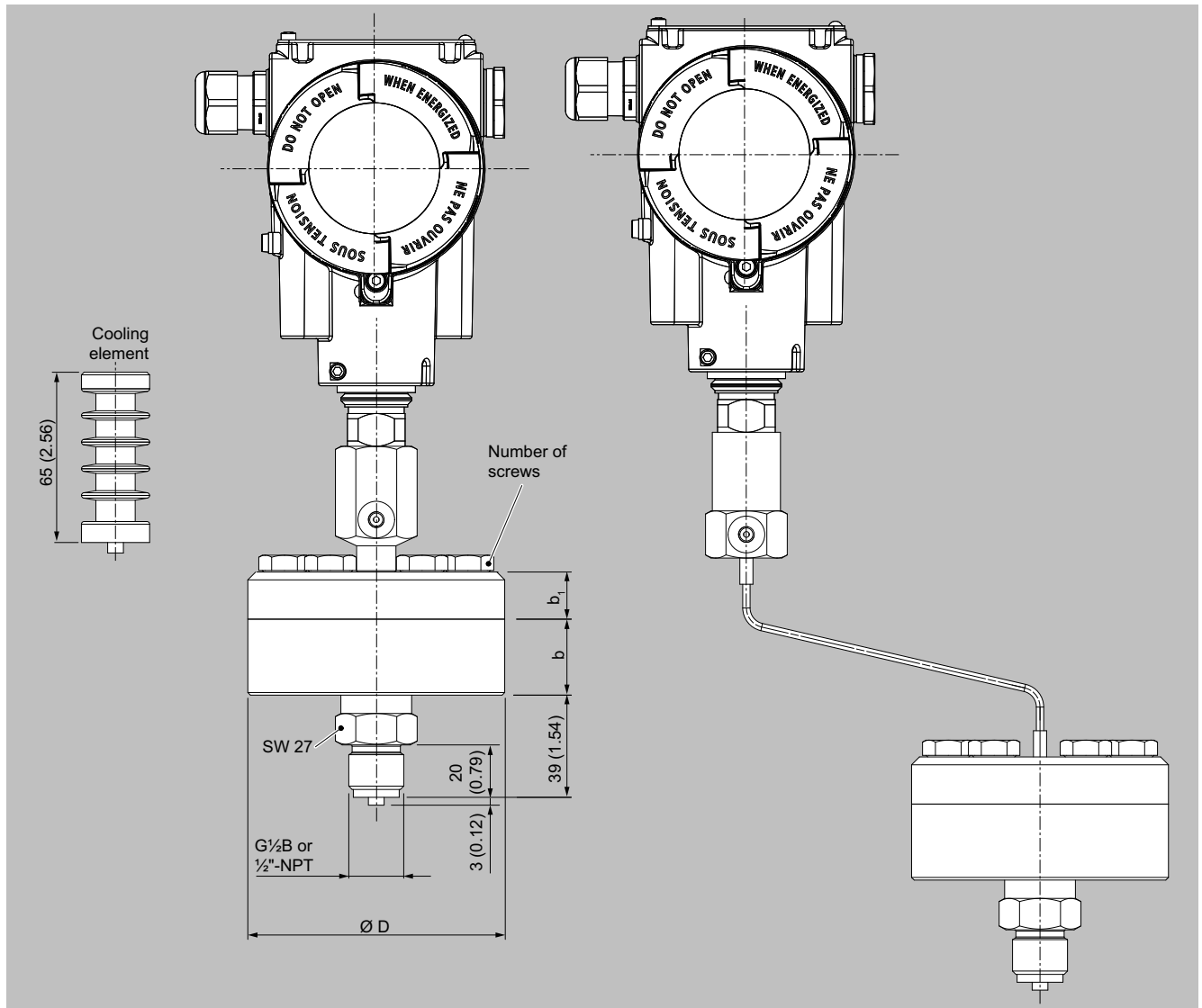
Technical specifications

SITRANS P320/P420 diaphragm seals, screwed design	
Process connection - Open flange EN 1092-1	Nominal pressure
• DN 15	PN 10/16/25/40/63/100/160/250
• DN 20	PN 10/16/25/40
• DN 25	PN 10/16/25/40/63/100/160/250
Open flange ASME B16.5	
• ½ inch, ¾ inch, 1 inch	Class 150/300/600/1500
Thread EN 837-1	
• G¼"B, G½"B, G¾"B, G1"B	PN 100/250
Thread ASME B1.20.1	
• ¼" NPT-M, ¼" NPT-F	Class 1500/3675
• ½" NPT-M, ½" NPT-F	Class 1500/3675
• ¾" NPT-M, ¾" NPT-F	Class 1500/3675
• 1" NPT-M, 1" NPT-F	Class 1500/3675
Sealing surface for open measurement flange	
• For stainless steel mat. no. 1.4404/316L	According to EN 1092-1, form B1 or ASMR B16.5 RF 125 ... 250 AA
Materials	
• Lower section (in the case of process connection thread)	Stainless steel, mat. no. 1.4404/316L
• Diaphragm	Stainless steel, mat. no. 1.4404/316L • Without coating • With PTFE coating Monel 400, mat. no. 2.4360 Hastelloy C276, mat. no. 2.4819 Hastelloy C4, mat. no. 2.4610 Hastelloy C22, mat. no. 2.4602 Tantalum Titanium, mat. no. 3.7035 Nickel 201 Stainless steel 316L, gold plated, layer thickness approx. 25 µm
• Top section (process connection in the case of an open measurement flange)	Stainless steel, mat. no. 1.4404/316L
• Capillary	Stainless steel, mat. no. 1.4571/316Ti (with option W01) or mat. no. 1.4301/304
• Gasket material on the process connection	Viton or copper (in the case of vacuum-free version)
• Gasket material between top and bottom section	Viton (FKM) (standard:) Teflon (PTFE) metal spring ring (silver-coated)
Capillary	
• Length	≤ 10 m (32.8 ft)
• Inside diameter	≤ 1.3 mm (0.051 inch)
• Minimum bending radius	150 mm (5.9 inches)
• Sheath	Flexible spiral coiled tube made of stainless steel, mat. no. 14301/304
Filling liquid (for remote seals of sandwich and flange type)	<ul style="list-style-type: none"> • Silicone oil M5 • Silicone oil M50 • High-temperature oil • Halocarbon oil (for measuring O₂) • Food oil (FDA-listed) • Neobee M20 (FDA-listed)
Max. recommended medium temperature	170 °C (338 °F)

Technical specifications (continued)

SITRANS P320/P420 diaphragm seals, screwed design	
Permissible ambient temperature	Dependent on the pressure transmitter and the filling liquid of the remote seal. More information In the technical specifications of the pressure transmitters and in the sections in the technical reference of the remote seals: • "Function" - "Technical specifications of the remote seal filling liquids" • "More information" - "Specification of process conditions for selection and ordering data"
Weight	Approx. 1.5 kg (3.3 lbs)
Certificates and approvals	
Classification according to pressure equipment directive (PED 2014/68/EU)	For gases of fluid group 1 and liquids of fluid group 1; complies with requirements of article 4, paragraph 3 (sound engineering practice)

Dimensional drawings



Diaphragm seal, screwed design with interior diaphragm, for gauge and absolute pressure, attached to the transmitter directly and with capillaries, dimensions in mm (inch)

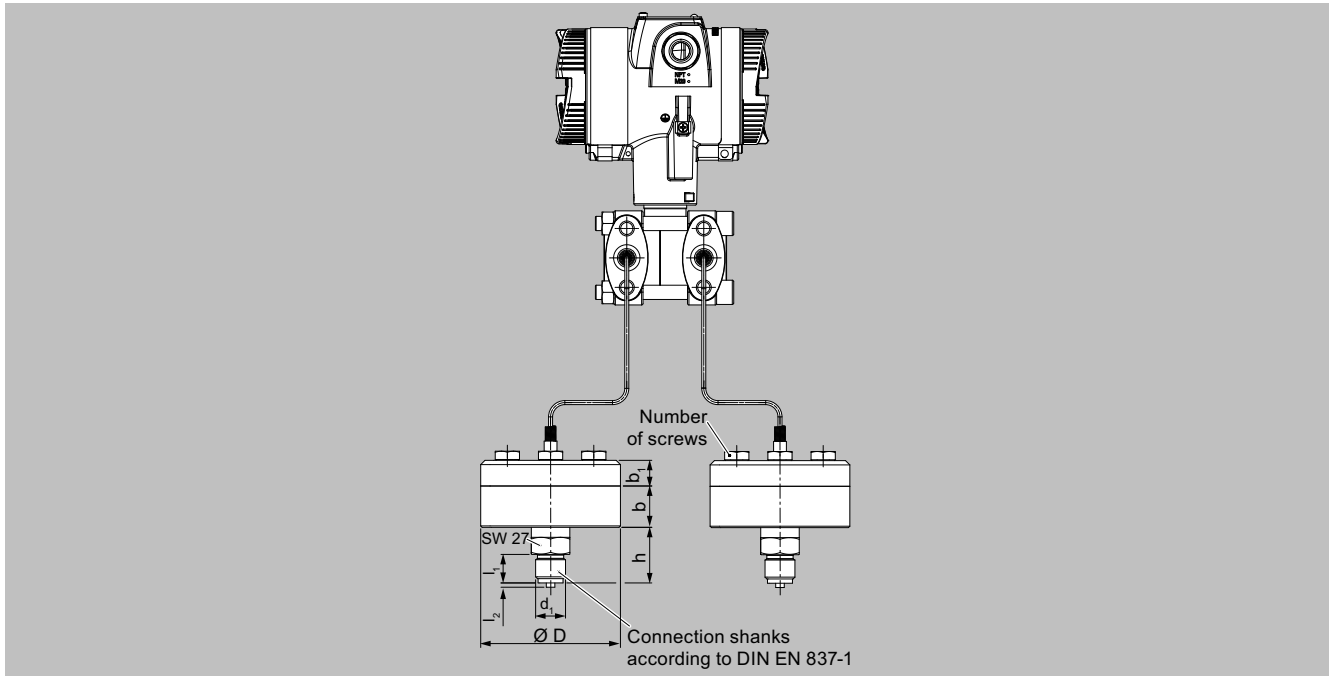
Range	D mm (inch)	b mm (inch)	b ₁ mm (inch)	Number of screws
Up to 100 bar	98 (3.86)	14 (0.55)	16 (0.63)	6
Up to 250 bar	98 (3.86)	14 (0.55)	20 (0.79)	12

Pressure measurement

Remote seals

for SITRANS P320/P420 pressure transmitters / Diaphragm seal in screwed design

Dimensional drawings (continued)



Diaphragm seal, screwed design with interior diaphragm, for differential pressure, attached to the transmitter directly and with capillaries, dimensions in mm (inch)

Nominal diameter	Nominal pressure	D mm (inch)	d4	k	M	Number of holes	b mm (inch)	b1	f
DN 25	PN 10/16/25/40	115 (4.53)	68 (2.68)	85 (3.35)	M12	4	26 (1.02)	12 (0.47)	21 (0.83)
1"	150 lb/sq.in	110 (4.33)	50.8 (2)	79.4 (3.13)	M12	4	32 (1.26)	12 (0.47)	1.6 (0.063)
1"	300 lb/sq.in	125 (4.92)	50.8 (2)	88.9 (3.5)	M16	4	32 (1.26)	12 (0.47)	1.6 (0.063)

Overview

Quick-release diaphragm seals, acc. to DIN 11851 with slotted union nut



Quick-release diaphragm seals, with clamp connection

Quick-release diaphragm seals can be supplied for the pressure transmitters of the SITRANS P320/420 series.

The quick-release remote seals are common designs in the food industry. Their design means that the medium cannot accumulate in dead volumes. The remote seal's quick release mechanism enables fast disassembly for cleaning.

Pressure measurement

Remote seals

for SITRANS P320/P420 pressure transmitters / Diaphragm seals with quick-release

Selection and ordering data

		Article No.	Order code
Diaphragm seal with quick-release			
Flange type design, with flexible capillary pipe or direct mounting on pressure transmitter			
SITRANS P320/P420 or SITRANS P300 for gauge and absolute pressure (only in conjunction with underpressure service)		7MF0830-	
7MF03../7MF04../7MF802. to be ordered separately; scope of delivery: 1 unit			
SITRANS P320/P420 for absolute pressure from differential pressure		7MF0832-	
7MF03../7MF04.. order separately, scope of delivery: 2 units			
		● ● ● ● ● - 0 ● A 0 ● ● ●	
Click the article number for online configuration in the PIA Life Cycle Portal.			
Nominal diameter	Nominal pressure		
<u>Process connection standard DIN 11851 with groove nut</u>			
DN 25	PN 40	0 B M	
DN 32	PN 40	0 C D	
DN 40	PN 40	0 D M	
DN 50	PN 25	0 E K	
DN 65	PN 25	0 F L	
DN 80	PN 25	0 G K	
<u>Process connection standard DIN 11851 with thread</u>			
DN 25	PN 40	1 B M	
DN 32	PN 40	1 C D	
DN 40	PN 40	1 D M	
DN 50	PN 25	1 E K	
DN 65	PN 25	1 F L	
DN 80	PN 25	1 G K	
<u>Process connection standard clamp ISO 2852</u>			
DN 25	PN 16	2 B K	
DN 38	PN 16	2 C Q	
DN 51	PN 16	2 F H	
DN 63.5	PN 10	2 F J	
DN 76.1	PN 10	2 G J	
<u>Process connection standard clamp DIN 32676, schedule C</u>			
DN 1 inch	PN 25	3 K V	
DN 1½ inch	PN 25	3 L V	
DN 2 inch	PN 16	3 M V	
DN 2½ inch	PN 16	3 N V	
DN 3 inch	PN 10	3 P V	
<u>Process connection standard clamp DIN 32676, schedule A metric</u>			
DN 25	PN 25	4 B L	
DN 32	PN 25	4 C C	
DN 40	PN 25	4 D L	
DN 50	PN 16	4 E J	
DN 65	PN 10	4 F K	
<u>Varivent</u>			
DN 25/32	PN 25	5 C L	
DN 40/50	PN 25	5 D K	
<u>DRD flange</u>			
DN 50	PN 40	6 E M	
Other version, add order code and plain text		9 A A	H 1 Y
Transmitter connection			
Without capillary pipe, direct mount, straight connection (for gauge pressure transmitters)		0 0	
Connection via capillary			
Capillary length:			
1 m (38.37 inches)		1 0	
1.6 m (63 inches)		1 1	
2 m (78.7 inches)		1 2	
2.5 m (98.4 inches)		1 3	
3 m (118.1 inches)		1 4	
4 m (157.5 inches)		1 5	

Selection and ordering data (continued)

	Article No.	Order code
Diaphragm seal with quick-release		
Flange type design, with flexible capillary pipe or direct mounting on pressure transmitter		
SITRANS P320/P420 or SITRANS P300 for gauge and absolute pressure (only in conjunction with underpressure service)	7MF0830-	
7MF03../7MF04../7MF802. to be ordered separately; scope of delivery: 1 unit		
SITRANS P320/P420 for absolute pressure from differential pressure	7MF0832-	
7MF03../7MF04.. order separately, scope of delivery: 2 units		
	● ● ● ● ● - 0 ● A 0 ● ● ●	
5 m (196.9 inches)	1 6	
6 m (236.2 inches)	1 7	
7 m (275.6 inches)	1 8	
8 m (315 inches)	2 0	
9 m (354.3 inches)	2 1	
10 m (393.7 inches)	2 2	
Other version, add order code and plain text	9 8	L 1 Y
Filling liquid		
Food oil (FDA-listed)		E
Neobee M20 (FDA listed)		R
Other version, add order code and plain text		Z P 1 Y

Options	Order code
Add "-Z" to article number and specify order code.	
Factory certificates	
Quality inspection certificate (5-point characteristic curve test) acc. to IEC 62828-2	C11
Inspection certificate to EN 10204-3.1 for material of body and diaphragm	C12
Inspection certificate according to EN 10204-3.1, PMI test of pressure containing and wetted parts	C15
Certificate of FDA-approved fill oil according to EN 10204-2.2	C17
Factory certificate functional safety (SIL2/3) Devices suitable for use according to IEC 61508 and IEC 61511 (includes SIL Declaration of Conformity)	C20
Accessories	
Remote seal nameplate Attached, made of stainless steel, contains Article No. and order number of the remote seal	D42
Negative pressure service	
Negative pressure service	
• For gauge pressure and absolute pressure transmitters	D81
• For differential pressure transmitters	D83
Extended negative pressure service	
• For gauge pressure and absolute pressure transmitters	D85
• For differential pressure transmitters	D88
Country-specific approval	
CRN approval Canada (Canadian Registration Number)	E60
Note: If the order code E60 is selected, the option E60 must also be selected for the transmitter!	
Capillary connection (Only for 7MF0830)	
Single-side mounted at differential pressure transmitter at high side	S03
Single-side mounted at differential pressure transmitter at low side	S04
Cooling element	S08
Capillary coating	
PE protective tube	
• 1 m (38.37 inches)	S10

Pressure measurement

Remote seals

for SITRANS P320/P420 pressure transmitters / Diaphragm seals with quick-release

Selection and ordering data (continued)

Options	Order code
Add "-Z" to article number and specify order code.	
• 1.6 m (63 inches)	S11
• 2 m (78.7 inches)	S12
• 2.5 m (98.4 inches)	S13
• 3 m (118.1 inches)	S14
• 4 m (157.5 inches)	S15
• 5 m (196.9 inches)	S16
• 6 m (236.2 inches)	S17
• 7 m (275.6 inches)	S18
• 8 m (315 inches)	S19
• 9 m (354.3 inches)	S20
• 10 m (393.7 inches)	S21
PTFE protective tube	
• 1 m (38.37 inches)	S40
• 1.6 m (63 inches)	S41
• 2 m (78.7 inches)	S42
• 2.5 m (98.4 inches)	S43
• 3 m (118.1 inches)	S44
• 4 m (157.5 inches)	S45
• 5 m (196.9 inches)	S46
• 6 m (236.2 inches)	S47
• 7 m (275.6 inches)	S48
• 8 m (315 inches)	S49
• 9 m (354.3 inches)	S50
• 10 m (393.7 inches)	S51
PVC protective tube	
• 1 m (38.37 inches)	S70
• 1.6 m (63 inches)	S71
• 2 m (78.7 inches)	S72
• 2.5 m (98.4 inches)	S73
• 3 m (118.1 inches)	S74
• 4 m (157.5 inches)	S75
• 5 m (196.9 inches)	S76
• 6 m (236.2 inches)	S77
• 7 m (275.6 inches)	S78
• 8 m (315 inches)	S79
• 9 m (354.3 inches)	S80
• 10 m (393.7 inches)	S81
Desired remote seal supplier	
Note:	
If the remote seal is to be supplied only by one of the suppliers specified below, this option needs to be selected. For orders without this option, the remote seal supplier is selected through the dispatch center.	
Company WIKA, Klingenberg	W01
Company Labom, Hude	W02
Special design	
Welded filling holes	X01
Customer-specific tube length	
Customer-specific tube length (specify in plain text in mm)	Y44

Selection and ordering data (continued)

Options	Order code
Add "-Z" to article number and specify order code.	
Specification of process conditions¹⁾	
Ambient temperature range	
• +10 ... +50 °C (+50 ... +122 °F) preset	D66
• -40 ... +50 °C (-40 ... +122 °F)	D67
• -10 ... +85 °C (+14 ... +185 °F)	D68
Process temperature min. ... °C/(°F)/max. ... °C/(°F)	Y50

¹⁾ See also "Specification of process conditions for selection and ordering data" in the section "More information" under "Technical reference" for SITRANS P320/P420.

Pressure measurement

Remote seals

for SITRANS P320/P420 pressure transmitters / Diaphragm seals with quick-release

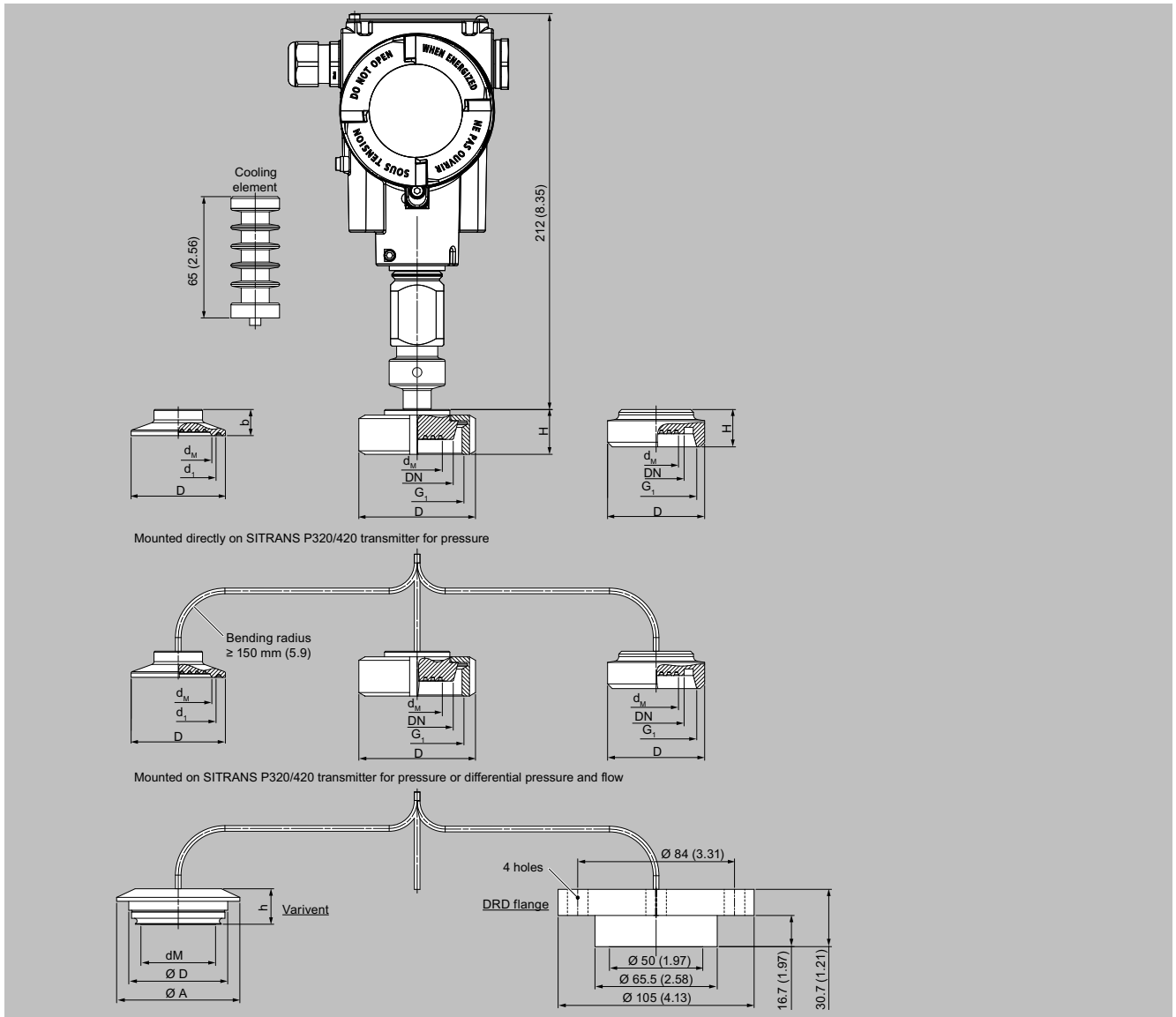
Technical specifications

SITRANS P320/P420 quick-release diaphragm seals	
Connection, nominal diameter	Nominal pressure
Process connection standard DIN 11851 with groove nut	
• DN 25/32/40	PN 40
• DN 50/65/80	PN 25
Process connection standard DIN 11851 with thread	
• DN 25/32/40	PN 40
• DN 50/65/80	PN 25
Standard of process connection clamp ISO 2852	
• DN 25/38/51	PN 16
• DN 63.5/76.1	PN 10
Standard of process connection clamp DIN 32676, schedule C Tri-Clamp	
• 1 inch, 1½ inches	PN 25
• 2 inches, 2½ inch	PN 16
• 3 inches	PN 10
Standard of process connection clamp DIN 32676, schedule A metric	
• DN 25/32/40	PN 25
• DN 50	PN 16
• DN 65	PN 10
Varivent	
• DN 25/32/40/50	PN 25
DRD flange	
• DN 50	PN 40
Materials	
• Main body	Stainless steel, mat. no. 1.4404/316L
• Wetted parts	Stainless steel, mat. no. 1.4404/316L
• Capillary	Stainless steel, mat. no. 1.4571/316Ti (with option W01) or mat. no. 1.4301/304
• Sheath	Spiral coiled tube made of stainless steel, mat. no. 1.4404/316L
Permissible pressure load	See above and the technical specifications of the pressure transmitter
Tube length	Without tube
Capillary	
• Length	≤ 10 m (32.8 ft), longer lengths on request
• Inside diameter	≤ 1.3 mm (0.051 inch)
• Minimum bending radius	150 mm (5.9 inches)
• Sheath	Flexible spiral coiled tube made of stainless steel mat. no. 1.4404/316L
Filling liquid	<ul style="list-style-type: none"> • Food oil (FDA-listed) • Neobee M20 (FDA-listed)
Permissible ambient temperature	Dependent on the pressure transmitter and the filling liquid of the remote seal. More information In the technical specifications of the pressure transmitters and in the sections in the technical reference of the remote seals: <ul style="list-style-type: none"> • "Function" - "Technical specifications of the remote seal filling liquids" • "More information" - "Specification of process conditions for selection and ordering data"
Weight	Approx. 4 kg (8.82 lbs)

Technical specifications (continued)

SITRANS P320/P420 quick-release diaphragm seals	
Certificates and approvals	
Classification according to pressure equipment directive (PED 2014/68/EU)	For gases of fluid group 1 and liquids of fluid group 1; complies with requirements of article 4, paragraph 3 (sound engineering practice)
EHEDG	Complies with EHEDG recommendations

Dimensional drawings



Quick-release diaphragm seals

Connection according to DIN 11851 with groove nut

Nominal diameter	$\varnothing d_M$ mm	$\varnothing D$ mm	H mm	G_1 mm
DN 25	25	63	36	Radius 52x1/6
DN 32	32	70	36	Radius 52x1/6
DN 40	40	78	36	Radius 65x1/6
DN 50	52	112	36	Radius 78x1/6
DN 65	65	112	36	Radius 95x1/6
DN 80	72	127	36	Radius 110x1/6

 d_M effective diaphragm diameter

Pressure measurement

Remote seals

for SITRANS P320/P420 pressure transmitters / Diaphragm seals with quick-release

Dimensional drawings (continued)

Connection according to DIN 11851 with thread

Nominal diameter	Ø d _M mm	H mm	G ₁ mm
DN 25	25	36	Radius 52x1/6
DN 32	32	36	Radius 52x1/6
DN 40	40	36	Radius 65x1/6
DN 50	52	36	Radius 78x1/6
DN 65	65	36	Radius 95x1/6
DN 80	72	36	Radius 110x1/6

d_M effective diaphragm diameter

Clamp connection according to ISO 2852 for pipes according to ISO 2037

Nominal diameter	Nominal pressure	d _M mm	d ₁ mm	b mm	D mm
DN 25	PN 16	22.6	43.5	14	50.5
DN 38	PN 16	34	43.5	12	50.5
DN 51	PN 16	46	56.5	14	64
DN 63.5	PN 10	51	70.5	14	77.5
DN 76.1	PN 10	65	83.5	14	91

d_M effective diaphragm diameter

Clamp connection according to DIN 32676 row C for pipes according to ASME BPE

Nominal diameter	Nominal pressure	d _M mm (inch)	d ₁ mm (inch)	b mm (inch)	D mm (inch)
1"	PN 25	22.6 (0.89)	43.5 (1.71)	14 (0.55)	50.5 (1.99)
1½"	PN 25	34 (1.34)	43.5 (1.71)	12 (0.47)	50.5 (1.99)
2"	PN 16	46 (1.81)	56.5 (2.22)	14 (0.55)	64 (2.52)
2½"	PN 16	51 (2.01)	70.5 (2.78)	14 (0.55)	77.5 (3.05)
3"	PN 16	65 (2.56)	83.5 (3.29)	14 (0.55)	91 (3.58)

d_M effective diaphragm diameter

Clamp connection according to DIN 32676 row A (metric) for pipes according to EN 10357 (DIN 11850)

Nominal diameter	Nominal pressure	Ø d _M mm	d ₁ mm	b mm	D mm
DN 25	PN 25	22.6	43.5	14	50.5
DN 32	PN 25	27	43.5	12	50.5
DN 40	PN 25	34	43.5	12	50.5
DN 50	PN 16	46	56.5	14	64
DN 65	PN 16	65	83.5	14	91

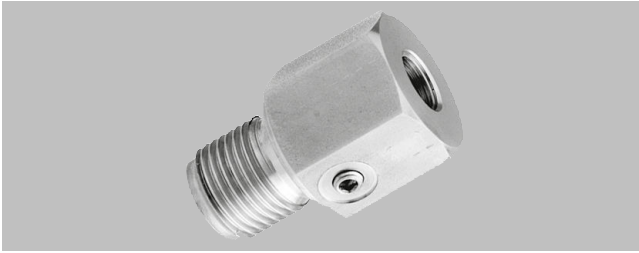
d_M effective diaphragm diameter

Varivent

Nominal diameter	d _M mm (inch)	A mm (inch)	D mm (inch)	h mm (inch)
DN 25, DN 32, 1", 1¼"	40 (1.57)	66 (2.6)	50 (1.97)	19 (0.75)
DN 40 ... 125, 1½" ... 6"	58 (2.28)	84 (3.3)	68 (2.68)	19 (0.75)

d_M effective diaphragm diameter

Overview



The miniature diaphragm seals are available for the pressure transmitters of the SITRANS P320/420 series.

For high pressures, contaminated, fibrous and viscous media in the chemical, paper, food and drink industries.

Design

The miniature diaphragm seals consist of a flush diaphragm, a fixed threaded pin and are free of dead space.

Pressure measurement

Remote seals

for SITRANS P320/P420 pressure transmitters / Diaphragm seals, miniature type

Selection and ordering data

	Article No.	Order code
Diaphragm seals, miniature type Installed directly on pressure transmitter SITRANS P320/P420 or SITRANS P300 for gauge and absolute pressure (only together with negative pressure service), 7MF03../7MF04../7MF802 is to be ordered separately, scope of delivery: 1 unit	7MF0850-	
	● ● ● 0 0 - 0 ● ● 0 ● ● ●	
Click the article number for online configuration in the PIA Life Cycle Portal.		
Process connection		
<u>Process connection standard DIN 3852-2 form A</u>		
G 1"	PN 400	4 S V
G 1½"	PN 250	4 S W
G 2"	PN 250	4 S X
<u>Process connection standard ASME B1.20.1</u>		
1" NPTM	PN 250	5 T U
1½" NPT-M	PN 100	5 T V
2" NPTM	PN 100	5 T W
Other version, add order code and plain text	9 A A	H 1 Y
Filling liquid		
Silicone oil M5		A
Food oil (FDA-listed)		E
Neobee M20 (FDA listed)		R
Other version, add order code and plain text		Z P 1 Y
Material of wetted parts		
Stainless steel 316L without coating		A
Hastelloy C276, 2.4819		J

Options	Order code
Add "-Z" to article number and specify order code.	
Factory certificates	
Quality inspection certificate (5-point characteristic curve test) acc. to IEC 62828-2	C11
Inspection certificate to EN 10204-3.1 for material of body and diaphragm	C12
Manufacturer's declaration acc. to NACE (MR 0103-2012 and MR 0175-2009) (only together with wetted parts made of stainless steel 316 L and Hastelloy)	C13
Inspection certificate according to EN 10204-3.1, PMI test of pressure containing and wetted parts	C15
Certificate of FDA-approved fill oil according to EN 10204-2.2	C17
Factory certificate functional safety (SIL2/3) Devices suitable for use according to IEC 61508 and IEC 61511 (includes SIL Declaration of Conformity)	C20
Accessories	
Remote seal nameplate Attached, made of stainless steel, contains Article No. and order number of the remote seal	D42
Negative pressure service	
Negative pressure service for gauge pressure and absolute pressure transmitters	D81
Extended negative pressure service for gauge pressure and absolute pressure transmitters	D85
Country-specific approval	
CRN approval Canada (Canadian Registration Number)	E60
Note: If the order code E60 is selected, the option E60 must also be selected for the transmitter!	
Capillary connection	
Cooling element between transmitter and remote seal	S08

Selection and ordering data (continued)

Options	Order code
Add "-Z" to article number and specify order code.	
Desired remote seal supplier	
Note:	
If the remote seal is to be supplied only by one of the suppliers specified below, this option needs to be selected. For orders without this option, the remote seal supplier is selected through the dispatch center.	
Company WIKA, Klingenberg	W01
Company Labom, Hude	W02
Special design	
Welded filling hole	X01
Customer-specific tube length	
Customer-specific tube length (specify in plain text in mm)	Y44
Specification of process conditions¹⁾	
Ambient temperature range	
• +10 ... +50 °C (+50 ... +122 °F) preset	D66
• -40 ... +50 °C (-40 ... +122 °F)	D67
• -10 ... +85 °C (+14 ... +185 °F)	D68
Process temperature min. ... °C/(°F)/max. ... °C/(°F)	Y50

¹⁾ See also "Specification of process conditions for selection and ordering data" in the section "More information" under "Technical reference" for SITRANS P320/P420.

Technical specifications

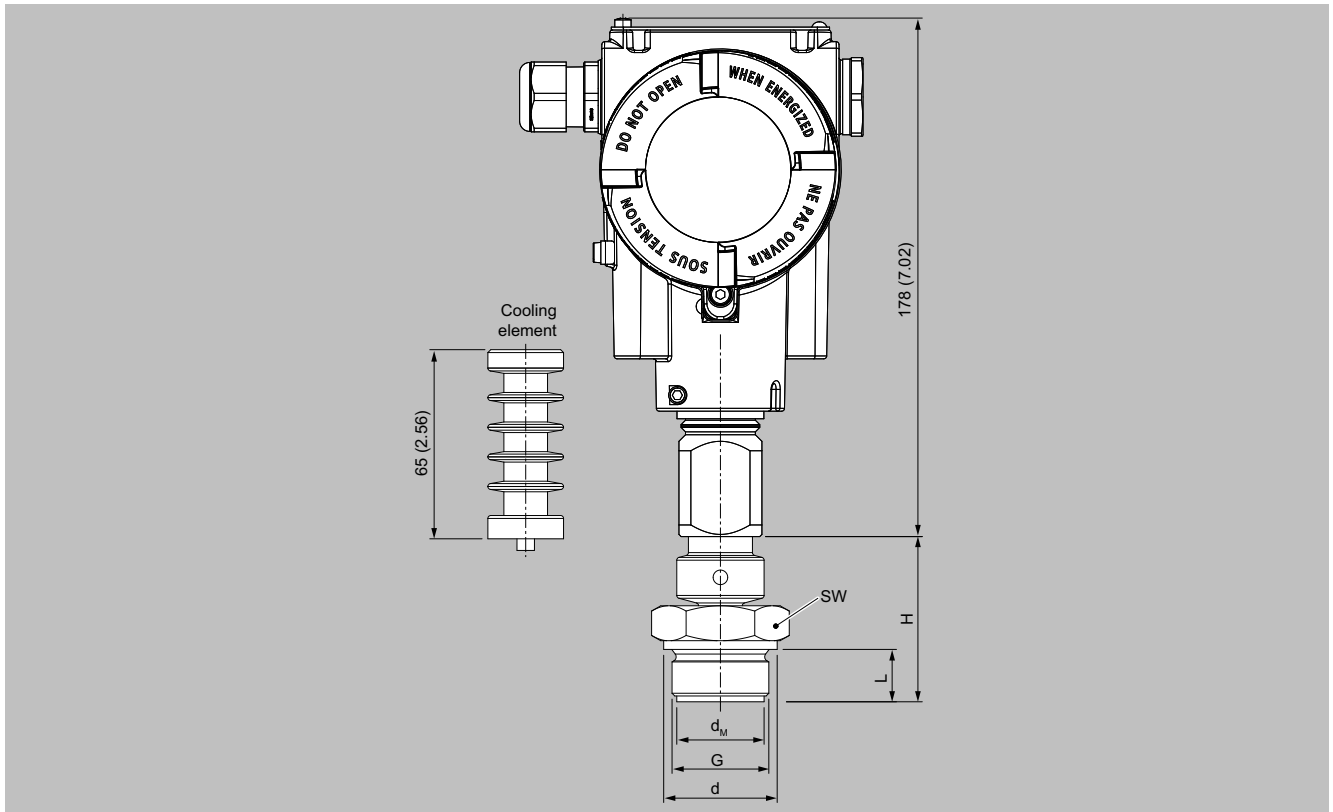
SITRANS P320/P420 miniature diaphragm seals	
Measuring span when	
• G1B and 1" NPT	> 6 bar (> 87 psi)
• G1½B and 1½" NPT	> 2 bar (> 29 psi)
• G2B and 2" NPT	> 600 mbar (> 8.7 psi)
Filling liquid	<ul style="list-style-type: none"> • Silicone oil M5 • Food oil (FDA-listed) • Neobee M20 (FDA-listed)
Material	
• Main body	Stainless steel, mat. no. 1.4404/316L or Hastelloy C276, mat. no. 2.4819
• Diaphragm	Stainless steel, mat. no. 1.4404/316L or Hastelloy C276, mat. no. 2.4819
Maximum pressure	100% of the nominal pressure of the pressure transmitter, but a maximum of PN 400 (5802 psi) (depending on the seal used)
Temperature of use	As for pressure transmitter
Medium temperature range	As for pressure transmitter
Max. recommended medium temperature	150 °C (302 °F)
Weight	
• G1B and 1" NPT	Approx. 0.3 kg (approx. 0.66 lb)
• G1½B and 1½" NPT	Approx. 0.5 kg (approx. 1.10 lb)
• G2B and 2" NPT	Approx. 0.8 kg (approx. 1.76 lb)
Certificates and approvals	
Classification according to pressure equipment directive (PED 2014/68/EU)	For gases of fluid group 1 and liquids of fluid group 1; complies with requirements of article 4, paragraph 3 (sound engineering practice)

Pressure measurement

Remote seals

for SITRANS P320/P420 pressure transmitters / Diaphragm seals, miniature type

Dimensional drawings



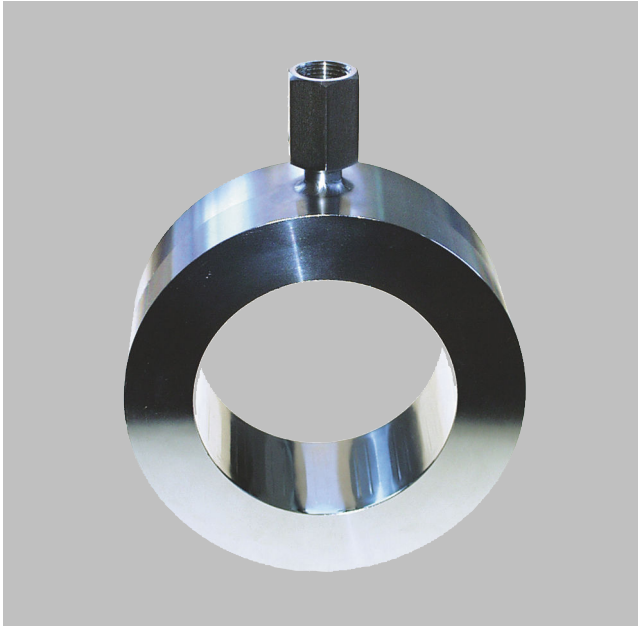
Diaphragm seal, miniature type, dimensions in mm (inch)

G	Ø d _M mm (inch)	Width across flats mm (inch)	Ø d mm (inch)	L mm (inch)	H mm (inch)
G1B	25 (0.98)	41 (1.61)	39 (1.53)	28 (1.1)	56 (2.21)
G1½B	40 (1.57)	55 (2.17)	60 (2.36)	30 (1.18)	50 (1.97)
G2B	50 (1.97)	60 (2.36)	70 (2.76)	30 (1.18)	63 (2.48)

G	Ø d _M mm (inch)	Width across flats mm (inch)	L mm (inch)	H mm (inch)
1" NPT	27 (1.06)	41 (1.61)	25 (0.98)	40 (1.57)
1½" NPT	34 (1.34)	55 (2.17)	26 (1.02)	45 (1.77)
2" NPT	46 (1.81)	60 (2.56)	26 (1.02)	45 (1.77)

d_M: Effective diaphragm diameter

Overview



Inline seals for flange-mounting

The inline seal is fully integrated into the process control. It is especially suitable for flowing and high-viscosity media.

The inline seal consists of a cylindrical jacket into which a thin-walled tube is welded. It is clamped directly between two flanges in the pipeline.

Design

- Inline seals for flange-mounting (flange design) according to EN/ASME for SITRANS P320/420 pressure transmitters
 - For gauge and absolute pressure (only in connection with negative pressure service)
 - For differential pressure and flow
- Sealing surface according to EN 1092-1 or ASME B16.5
- Connection to the pressure transmitter directly or by means of a flexible capillary (max. 10 m long)
- See Technical specifications for details of materials used for the wetted parts
- Material used for the capillary, the protective jacket, the remote seal's main body and the measuring cell: Stainless steel, mat. no. 1.4571
- Filling liquid: Silicone oil, high-temperature oil, halocarbon oil, food oil (FDA-listed) vegetable oil or glycerin/water (not suitable for applications in negative pressure range).

Function

The measured pressure is transferred to the filling liquid by the diaphragm and enters the sample chamber of the pressure transmitter either directly or through the capillary. The filling fluid completely fills the inside of the diaphragm seal, the capillary and the sample chamber of the pressure transmitter so that it is free of gas.

Note:

A vacuum-resistant remote seal is recommended for low-pressure operation, including during commissioning (see ordering data).

Pressure measurement

Remote seals

for SITRANS P320/P420 pressure transmitters / Inline seals in sandwich design

Selection and ordering data

		Article No.	Order code
Inline seals in sandwich design, direct mounting or with a flexible capillary connected with pressure transmitter SITRANS P320/P420 or SITRANS P300 for gauge and absolute pressure (only together with negative pressure service), 7MF03../7MF04../7MF802 is to be ordered separately, scope of delivery: 1 unit SITRANS P320/P420 for differential pressure and flow 7FM03../7MF04.. to be ordered separately, scope of delivery: 2 units		7MF0900-	
		7MF0902-	
		● ● ● ● ● - 0 ● ● 0 ● ● ●	
Click the article number for online configuration in the PIA Life Cycle Portal.			
Nominal diameter	Nominal pressure		
Process connection standard EN 1092-1			
DN 25	PN 6 ... 100	0 B P	
DN 40	PN 6 ... 100	0 D P	
DN 50	PN 6 ... 100	0 E P	
DN 65	PN 6 ... 100	0 F P	
DN 80	PN 6 ... 100	0 G P	
DN 100	PN 6 ... 100	0 H P	
DN 125	PN 6 ... 100	0 J P	
Process connection standard ASME B16.5			
1 inch	Class 150 ... 2500	1 K X	
1½ inches	Class 150 ... 2500	1 L X	
2 inches	Class 150 ... 2500	1 M X	
2½ inches	Class 150 ... 2500	1 N X	
3 inches	Class 150 ... 2500	1 P X	
4 inches	Class 150 ... 2500	1 Q X	
5 inches	Class 150 ... 2500	1 R X	
Different version, add order code and plain text.		9 A A	H 1 Y
Transmitter connection			
Without capillary pipe, direct mount, straight connection (for gauge pressure transmitters)		0 0	
Without capillary pipe, direct mount, connection with 90° elbow (for gauge pressure transmitters)		0 1	
Connection via capillary			
Capillary length:			
1 m (38.37 inches)		1 0	
1.6 m (63 inches)		1 1	
2 m (78.7 inches)		1 2	
2.5 m (98.4 inches)		1 3	
3 m (118.1 inches)		1 4	
4 m (157.5 inches)		1 5	
5 m (196.9 inches)		1 6	
6 m (236.2 inches)		1 7	
7 m (275.6 inches)		1 8	
8 m (315 inches)		2 0	
9 m (354.3 inches)		2 1	
10 m (393.7 inches)		2 2	
11 m (433.1 inches); only for 7MF0902		2 3	
12 m (472.4 inches); only for 7MF0902		2 4	
13 m (511.811 inches); only for 7MF0902		2 5	
14 m (551.2 inches); only for 7MF0902		2 6	
15 m (590.6 inches); only for 7MF0902		2 7	
Other version, add order code and plain text		9 8	L 1 Y
Filling liquid			
Silicone oil M50			B
High-temperature oil			C
Silicone oil M5			A
Food oil (FDA-listed)			E
Halocarbon oil			D
Neobee M20 (FDA listed)			R
Other version, add order code and plain text			Z P 1 Y
Material of wetted parts			
Stainless steel 316L			A
Other version, add order code and plain text			Z Q 1 Y

Selection and ordering data (continued)

Options	Order code
Add "-Z" to article number and specify order code.	
Factory certificates	
Quality inspection certificate (5-point characteristic curve test) acc. to IEC 62828-2	C11
Inspection certificate to EN 10204-3.1 for material of body and diaphragm	C12
Manufacturer's declaration acc. to NACE (MR 0103-2012 and MR 0175-2009) (only together with wetted parts made of stainless steel 316 L and Hastelloy)	C13
Inspection certificate according to EN 10204-3.1, PMI test of pressure containing and wetted parts	C15
Certificate of FDA-approved fill oil according to EN 10204-2.2	C17
Factory certificate functional safety (SIL2/3) Devices suitable for use according to IEC 61508 and IEC 61511 (includes SIL Declaration of Conformity)	C20
Accessories	
Remote seal nameplate Attached, made of stainless steel, contains Article No. and order number of the remote seal	D42
Volume deflagration flame arrester (VDEF)	
• For gauge pressure and absolute pressure transmitters	D61
• For differential pressure and level transmitters	D62
Negative pressure service	
Negative pressure service	
• For gauge pressure and absolute pressure transmitters	D81
• For differential pressure transmitters	D83
Extended negative pressure service	
• For gauge pressure and absolute pressure transmitters	D85
• For differential pressure transmitters	D88
Country-specific approval	
CRN approval Canada (Canadian Registration Number)	E60
Note:	
If the order code E60 is selected, the option E60 must also be selected for the transmitter!	
General product approvals without explosion proof approvals	
Oil-free and grease-free cleaned version for oxygen application including certificate EN 10204-2.2 (only with filling liquid halocarbon oil max. temperature 60 °C and max. pressure 50 bar)	E80
Oil-free and grease-free cleaned version not for oxygen application, including certificate EN 10204-2.2	E87
Sealing surface	
Sealing surface smooth, form B2/EN 1092-1 or RFSF/ANSI 16.5 (only for wetted parts made of stainless steel 316L)	M50
Sealing surface groove according to EN 1092-1, form D (instead of sealing surface B1, only for wetted parts made of stainless steel 316L)	M54
Sealing surface RJF (groove) according to ASME B16.5 (instead of sealing surface RF 125 ... 250AO, only for wetted parts made of stainless steel 316L)	M64
Sealing surface with tongue to EN 1092-1, form C (for wetted parts made of stainless steel 316L only)	
• DN 25	M70
• DN 40	M71
• DN 50	M72
• DN 80	M73

Pressure measurement

Remote seals

for SITRANS P320/P420 pressure transmitters / Inline seals in sandwich design

Selection and ordering data (continued)

Options	Order code
Add "-Z" to article number and specify order code.	
• DN 100	M74
• DN 125	M75
Sealing surface with spigot according to EN 1092-1, form E (for wetted parts made of stainless steel 316L only)	
• DN 25	M76
• DN 40	M77
• DN 50	M78
• DN 80	M79
• DN 100	M80
• DN 125	M81
Sealing surface female face according to EN 1092-1, form F (only for wetted parts made of stainless steel 316L)	
• DN 25	M82
• DN 40	M83
• DN 50	M84
• DN 80	M85
• DN 100	M86
• DN 125	M87
Capillary connection	
For 7MF0900	
• Single-side mounted at differential pressure transmitter at high side	S03
• Single-side mounted at differential pressure transmitter at low side	S04
• Cooling element	S08
Capillary coating	
PE protective tube	
• 1 m (38.37 inches)	S10
• 1.6 m (63 inches)	S11
• 2 m (78.7 inches)	S12
• 2.5 m (98.4 inches)	S13
• 3 m (118.1 inches)	S14
• 4 m (157.5 inches)	S15
• 5 m (196.9 inches)	S16
• 6 m (236.2 inches)	S17
• 7 m (275.6 inches)	S18
• 8 m (315 inches)	S19
• 9 m (354.3 inches)	S20
• 10 m (393.7 inches)	S21
• 11 m (433.1 inches); only for 7MF0902	S22
• 12 m (472.4 inches); only for 7MF0902	S23
• 13 m (511.811 inches); only for 7MF0902	S24
• 14 m (551.2 inches); only for 7MF0902	S25
• 15 m (590.6 inches); only for 7MF0902	S26
PTFE protective tube	
• 1 m (38.37 inches)	S40
• 1.6 m (63 inches)	S41
• 2 m (78.7 inches)	S42
• 2.5 m (98.4 inches)	S43

Selection and ordering data (continued)

Options	Order code
Add "-Z" to article number and specify order code.	
• 3 m (118.1 inches)	S44
• 4 m (157.5 inches)	S45
• 5 m (196.9 inches)	S46
• 6 m (236.2 inches)	S47
• 7 m (275.6 inches)	S48
• 8 m (315 inches)	S49
• 9 m (354.3 inches)	S50
• 10 m (393.7 inches)	S51
• 11 m (433.1 inches); only for 7MF0902	S52
• 12 m (472.4 inches); only for 7MF0902	S53
• 13 m (511.811 inches); only for 7MF0902	S54
• 14 m (551.2 inches); only for 7MF0902	S55
• 15 m (590.6 inches); only for 7MF0902	S56
PVC protective tube	
• 1 m (38.37 inches)	S70
• 1.6 m (63 inches)	S71
• 2 m (78.7 inches)	S72
• 2.5 m (98.4 inches)	S73
• 3 m (118.1 inches)	S74
• 4 m (157.5 inches)	S75
• 5 m (196.9 inches)	S76
• 6 m (236.2 inches)	S77
• 7 m (275.6 inches)	S78
• 8 m (315 inches)	S79
• 9 m (354.3 inches)	S80
• 10 m (393.7 inches)	S81
• 11 m (433.1 inches); only for 7MF0902	S82
• 12 m (472.4 inches); only for 7MF0902	S83
• 13 m (511.811 inches); only for 7MF0902	S84
• 14 m (551.2 inches); only for 7MF0902	S85
• 15 m (590.6 inches); only for 7MF0902	S86
Desired remote seal supplier	
Note:	
If the remote seal is to be supplied only by one of the suppliers specified below, this option needs to be selected. For orders without this option, the remote seal supplier is selected through the dispatch center.	
Company WIKA, Klingenberg	W01
Company Labom, Hude	W02
Special design	
Welded filling holes	X01
Customer-specific tube length	
Customer-specific tube length (specify in plain text in mm)	Y44
Specification of process conditions¹⁾	
Ambient temperature range	
• +10 ... +50 °C (+50 ... +122 °F) preset	D66
• -40 ... +50 °C (-40 ... +122 °F)	D67
• -10 ... +85 °C (+14 ... +185 °F)	D68
Process temperature min. ... °C/(°F)/max. ... °C/(°F)	Y50

Pressure measurement

Remote seals

for SITRANS P320/P420 pressure transmitters / Inline seals in sandwich design

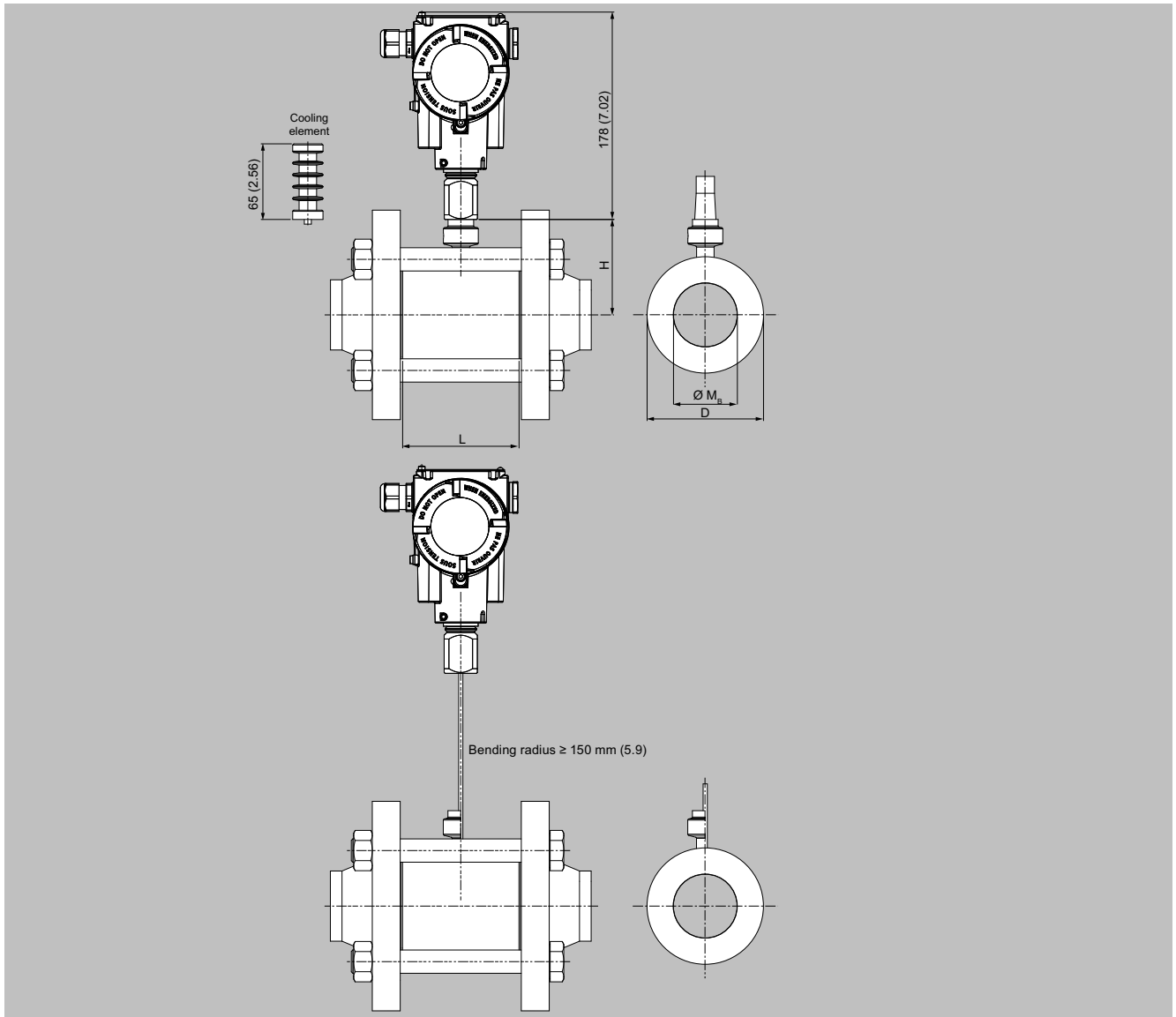
Selection and ordering data (continued)

¹⁾ See also "Specification of process conditions for selection and ordering data" in the section "More information" under "Technical reference" for SITRANS P320/P420.

Technical specifications

SITRANS P320/P420 inline seals in sandwich design	
Nominal diameter	Nominal pressure
Standard of process connection EN 1092-1 • DN 25/40/50/65/80/100/125	PN 6 ... PN 100
Standard of process connection ASME B16.5 • 1, 1½, 2, 2½, 3, 4, 5 inch	Class 150 ... Class 2500
Process connection	Flange according to EN 1092-1 or ASME B 16.5
Sealing surface	<ul style="list-style-type: none"> For stainless steel mat. no. 1.4404/316L according to EN 1092-1, form B1 or ASME B16.5 RF 125 ... 250 AA For the other materials according to EN 1092-1, form B2 or ASME B16.5 RFSF
Materials	
• Main body	Stainless steel, mat. no. 1.4404/316L
• Diaphragm	Stainless steel, mat. no. 1.4404/316L
• Wetted parts	Stainless steel, mat. no. 1.4404/316L
• Capillary	Stainless steel, mat. no. 1.4571/316Ti (with option W01) or mat. no. 1.4301/304
• Sheath	Flexible spiral coiled tube made of stainless steel, mat. no. 1.4404/316L
Capillary	
• Length	≤ 10 m (32.8 ft)
• Inside diameter	≤ 1.3 mm (0.051 inch)
• Minimum bending radius	150 mm (5.9 inches)
Filling liquid	<ul style="list-style-type: none"> Silicone oil M5 Silicone oil M50 High-temperature oil Halocarbon oil Food oil (FDA-listed) Neobee M20 (FDA-listed)
Permissible ambient temperature	<p>Dependent on the pressure transmitter and the filling liquid of the remote seal.</p> <p>More information In the technical specifications of the pressure transmitters and in the sections in the technical reference of the remote seals:</p> <ul style="list-style-type: none"> "Function" - "Technical specifications of the remote seal filling liquids" "More information" - "Specification of process conditions for selection and ordering data"
Weight	Approx. 4 kg (8.82 lbs)
Certificates and approvals	
Classification according to pressure equipment directive (PED 2014/68/EU)	For gases of fluid group 1 and liquids of fluid group 1; complies with the requirements of Article 4, Paragraph 1 (annex 1); assigned to category III, conformity evaluation module H by the TÜV Nord

Dimensional drawings



Inline seal for flange-mounting, installed on SITRANS P320/420 pressure transmitter, dimensions in mm (inch)

Connection according to EN 1092-1

Nominal diameter	PN bar	D mm	Mb mm	L mm	H mm
DN 25	6 ... 100	68	28.5	60	81
DN 40		88	43.1	60	91
DN 50		100	54.5	60	93
DN 65		120	70.3	60	107
DN 80		138	82.5	60	116
DN 100		160	107.1	60	127
DN 125	188	127	127	60	141

Pressure measurement

Remote seals

for SITRANS P320/P420 pressure transmitters / Inline seals in sandwich design

Dimensional drawings (continued)

Connection according to ASME B16.5

Nominal diameter	Class	D mm (inch)	Mb mm (inch)	L mm (inch)	H mm (inch)
1"	150 ... 2500	50 (1.97)	28.5 (1.12)	60 (2.36)	72 (2.83)
1½"		73.5 (2.89)	43.1 (1.70)	60 (2.36)	84 (3.31)
2"		91.9 (3.62)	54.5 (2.15)	60 (2.36)	93 (3.66)
2½"		104.6 (4.12)	70.3 (2.77)	60 (2.36)	99 (3.9)
3"		127 (5)	82.5 (3.25)	60 (2.36)	110 (4.33)
4"		157.2 (6.19)	107.1 (4.22)	60 (2.36)	125 (4.92)
5"		188 (7.4)	127 (5)	60 (2.36)	141 (5.55)

Overview



Quick-release inline seal, according to DIN 11851 with screwed connection



Quick-release inline seal, with clamp connection

Quick-release inline seals are available for pressure transmitters of the SITRANS P320/420 series.

Application

The quick-release inline seal is a special design for flowing and high-viscosity media. Because it is completely integrated in the process line, there are no turbulences, dead spaces or other obstacles in the flow direction. The medium flows almost unhindered through the inline seal and causes self-cleaning of the sample chamber. The inline seal is also piggingable.

Design

The quick-release lock is available in two versions:

- DIN 11851 with threaded socket
- Clamp connection

The inline seal is connected to the pressure transmitter either directly or via a capillary tube.

Function

The measured pressure is transferred to the filling liquid by the measuring diaphragm located around the circumference inside the inline seal and enters the sample chamber of the pressure transmitter through the capillary. The filling fluid completely fills the inside of the inline seal, the capillary and the sample chamber of the pressure transmitter so that it is free of gas.

Note:

A vacuum-resistant remote seal is recommended for low-pressure operation, including during commissioning (see ordering data).

Pressure measurement

Remote seals

for SITRANS P320/P420 pressure transmitters / Inline seals with quick-release

Selection and ordering data

		Article No.	Order code
Inline seal with quick-release Flange type design, with flexible capillary pipe or direct mounting on pressure transmitter SITRANS P320/P420 or SITRANS P300 for gauge and absolute pressure (only together with negative pressure service), 7MF03../7MF04../7MF802 is to be ordered separately, scope of delivery: 1 unit		7MF0930-	
		● ● ● ● ● - 0 ● A 0 ● ● ●	
Click the article number for online configuration in the PIA Life Cycle Portal.			
Nominal diameter	Nominal pressure		
<u>Process connection standard</u> <u>DIN 11851 with thread</u>			
DN 25	PN 40	1 B M	
DN 32	PN 40	1 C D	
DN 40	PN 40	1 D M	
DN 50	PN 25	1 E K	
DN 65	PN 25	1 F L	
DN 80	PN 25	1 G K	
<u>Process connection standard</u> <u>Clamp ISO 2852</u>			
DN 25	PN 16	2 B K	
DN 38	PN 16	2 C Q	
DN 51	PN 16	2 F H	
DN 63.5	PN 10	2 F J	
DN 76.1	PN 10	2 G J	
<u>Process connection standard</u> <u>Clamp DIN 32676, schedule C</u>			
DN 1 inch	PN 25	3 K V	
DN 1½ inch	PN 25	3 L V	
DN 2 inch	PN 16	3 M V	
DN 2½ inch	PN 16	3 N V	
DN 3 inch	PN 10	3 P V	
<u>Process connection standard</u> <u>Clamp DIN 32676, schedule A metric</u>			
DN 25	PN 25	4 B L	
DN 32	PN 25	4 C C	
DN 40	PN 25	4 D L	
DN 50	PN 16	4 E J	
DN 65	PN 10	4 F K	
Other version Add order code and plain text.		9 A A	H 1 Y
Transmitter connection			
Without capillary pipe, direct mount, straight connection (for gauge pressure transmitters)		0 0	
Connection via capillary Capillary length:			
1 m (38.37 inches)		1 0	
1.6 m (63 inches)		1 1	
2 m (78.7 inches)		1 2	
2.5 m (98.4 inches)		1 3	
3 m (118.1 inches)		1 4	
4 m (157.5 inches)		1 5	
5 m (196.9 inches)		1 6	
6 m (236.2 inches)		1 7	
7 m (275.6 inches)		1 8	
8 m (315 inches)		2 0	
9 m (354.3 inches)		2 1	
10 m (393.7 inches)		2 2	
Other version, add order code and plain text		9 8	L 1 Y
Filling liquid			
Food oil (FDA-listed)			E
Neobee M20 (FDA listed)			R
Other version, add order code and plain text			Z P 1 Y

Selection and ordering data (continued)

Options	Order code
Add "-Z" to article number and specify order code.	
Factory certificates	
Quality inspection certificate (5-point characteristic curve test) acc. to IEC 62828-2	C11
Inspection certificate to EN 10204-3.1 for material of body and diaphragm	C12
Inspection certificate according to EN 10204-3.1, PMI test of pressure containing and wetted parts	C15
Certificate of FDA-approved fill oil according to EN 10204-2.2	C17
Factory certificate functional safety (SIL2/3) Devices suitable for use according to IEC 61508 and IEC 61511 (includes SIL Declaration of Conformity)	C20
Accessories	
Remote seal nameplate Attached, made of stainless steel, contains Article No. and order number of the remote seal	D42
Negative pressure service	
Negative pressure service for gauge pressure and absolute pressure transmitters	D81
Extended negative pressure service for gauge pressure and absolute pressure transmitters	D85
Country-specific approval	
CRN approval Canada (Canadian Registration Number)	E60
Note:	
If the order code E60 is selected, the option E60 must also be selected for the transmitter!	
Capillary connection	
Single-side mounted at differential pressure transmitter at high side	S03
Single-side mounted at differential pressure transmitter at low side	S04
Cooling element	S08
Capillary coating	
PE protective tube	
• 1 m (38.37 inches)	S10
• 1.6 m (63 inches)	S11
• 2 m (78.7 inches)	S12
• 2.5 m (98.4 inches)	S13
• 3 m (118.1 inches)	S14
• 4 m (157.5 inches)	S15
• 5 m (196.9 inches)	S16
• 6 m (236.2 inches)	S17
• 7 m (275.6 inches)	S18
• 8 m (315 inches)	S19
• 9 m (354.3 inches)	S20
• 10 m (393.7 inches)	S21
PTFE protective tube	
• 1 m (38.37 inches)	S40
• 1.6 m (63 inches)	S41
• 2 m (78.7 inches)	S42
• 2.5 m (98.4 inches)	S43
• 3 m (118.1 inches)	S44
• 4 m (157.5 inches)	S45

Pressure measurement

Remote seals

for SITRANS P320/P420 pressure transmitters / Inline seals with quick-release

Selection and ordering data (continued)

Options	Order code
Add "-Z" to article number and specify order code.	
• 5 m (196.9 inches)	S46
• 6 m (236.2 inches)	S47
• 7 m (275.6 inches)	S48
• 8 m (315 inches)	S49
• 9 m (354.3 inches)	S50
• 10 m (393.7 inches)	S51
PVC protective tube	
• 1 m (38.37 inches)	S70
• 1.6 m (63 inches)	S71
• 2 m (78.7 inches)	S72
• 2.5 m (98.4 inches)	S73
• 3 m (118.1 inches)	S74
• 4 m (157.5 inches)	S75
• 5 m (196.9 inches)	S76
• 6 m (236.2 inches)	S77
• 7 m (275.6 inches)	S78
• 8 m (315 inches)	S79
• 9 m (354.3 inches)	S80
• 10 m (393.7 inches)	S81
Desired remote seal supplier	
Note:	
If the remote seal is to be supplied only by one of the suppliers specified below, this option needs to be selected. For orders without this option, the remote seal supplier is selected through the dispatch center.	
Company WIKA, Klingenberg	W01
Company Labom, Hude	W02
Special design	
Welded filling holes	X01
Customer-specific tube length	
Customer-specific tube length (specify in plain text in mm)	Y44
Specification of process conditions¹⁾	
Ambient temperature range	
+10 ... +50 °C (+50 ... +122 °F) preset	D66
-40 ... +50 °C (-40 ... +122 °F)	D67
-10 ... +85 °C (+14 ... +185 °F)	D68
Process temperature min. ... °C/(°F)/max. ... °C/(°F)	Y50

¹⁾ See also "Specification of process conditions for selection and ordering data" in the section "More information" under "Technical reference" for SITRANS P320/P420.

Technical specifications

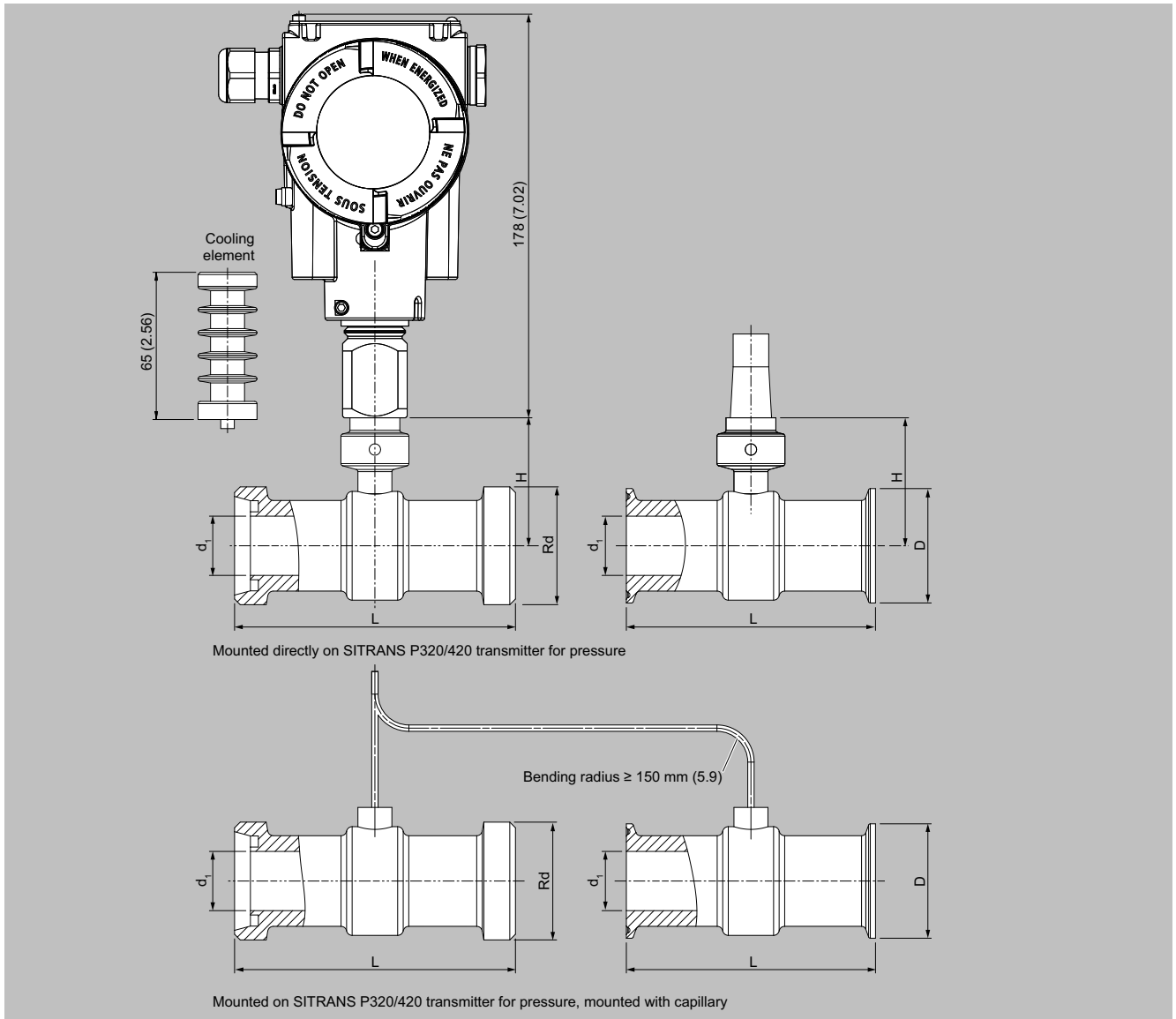
SITRANS P320/P420 quick-release inline seals		
Connection	Nominal diameter	Nominal pressure
<ul style="list-style-type: none"> Process connection standard DIN 11851 with thread 	DN 25/32/40	PN 40
	DN 50/65/80	PN 25
<ul style="list-style-type: none"> Standard of process connection clamp ISO 2852 	DN 25/38/51	PN 16
	DN 63.5/76.1	PN 10
<ul style="list-style-type: none"> Standard of process connection clamp DIN 32676, schedule C Tri-Clamp 	1, 1½ inch	PN 25
	2, 2½ inch	PN 16
	3 inches	PN 10
<ul style="list-style-type: none"> Process connection standard clamp DIN 32676, schedule A metric 	DN 25/32/40	PN 25
	DN 50	PN 16
	DN 65	PN 10
Material		
<ul style="list-style-type: none"> Main body 	Stainless steel, mat. no. 1.4404/316L	
<ul style="list-style-type: none"> Capillary 	Stainless steel, mat. no. 1.4571/316Ti (with option W01) or mat. no. 1.4301/304	
<ul style="list-style-type: none"> Diaphragm 	Stainless steel, mat. no. 1.4404/316L	
Capillary		
<ul style="list-style-type: none"> Length 	≤ 10 m (32.8 ft)	
<ul style="list-style-type: none"> Inside diameter 	≤ 1.3 mm (0.051 inch)	
<ul style="list-style-type: none"> Minimum bending radius 	150 mm (5.9 inches)	
<ul style="list-style-type: none"> Sheath 	Flexible spiral coiled tube made of stainless steel, mat. no. 1.4404/316L	
Filling liquid		
	<ul style="list-style-type: none"> Food oil (FDA-listed) Neobee M20 (FDA-listed) 	
Permissible ambient temperature		
	Dependent on the pressure transmitter and the filling liquid of the remote seal. More information In the technical specifications of the pressure transmitters and in the sections in the technical reference of the remote seals: <ul style="list-style-type: none"> "Function" - "Technical specifications of the remote seal filling liquids" "More information" - "Specification of process conditions for selection and ordering data" 	
Weight		
	Approx. 4 kg (approx. 8.82 lbs)	
Certificates and approvals		
Classification according to pressure equipment directive (PED 2014/68/EU)	For gases of fluid group 1 and liquids of fluid group 1; complies with the requirements of Article 4, Paragraph 1 (annex 1); assigned to category III, conformity evaluation module H by the TÜV Nord	
EHEDG	Complies with EHEDG recommendations	

Pressure measurement

Remote seals

for SITRANS P320/P420 pressure transmitters / Inline seals with quick-release

Dimensional drawings



Quick-release inline seal, dimensions in mm (inch)

Dimensional drawings (continued)

Inline seals for pipes according to EN 10357 (DIN 11851)

Nominal diameter	Length		Inside diameter	Connection height	Food connections DIN 11851		DIN 32676 Nominal pressure	Clamp connection according to DIN 32676
	L [mm]	di (mm)			Nominal pressure	Round thread connection according to DIN 11851 Thread radius		
DN 10	96	10		27.5	PN 40	28 × 1/8"	PN 16	34
DN 15	150	16		12	PN 40	34 × 1/8"	PN 16	34
DN 25	110	26		21	PN 40	52 × 1/6"	PN 16	50.5
DN 32	110	32		26	PN 40	58 × 1/6"	PN 16	50.5
DN 40	110	38		28.5	PN 40	65 × 1/6"	PN 16	50.5
DN 50	110	50		34	PN 25	78 × 1/6"	PN 16	64
DN 65	110	66		42	PN 25	95 × 1/6"	PN 10	91
DN 80	60	81		47.5	PN 25	110 × 1/4"	PN 10	106
DN 100	60	100		60	PN 25	130 × 1/4"	PN 10	119

Inline seals for pipes according to BS 4825 Part 3 and pipe outer diameter (suitable for pipes according to ASME-BPE)

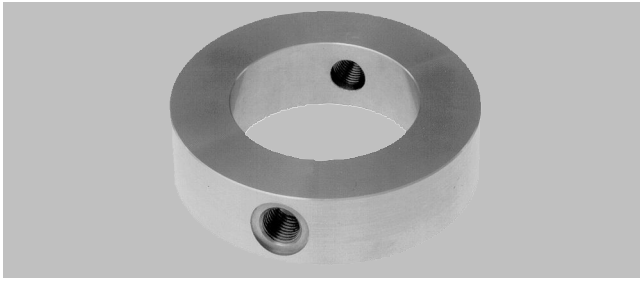
Nominal diameter			Length	Inside diameter	Connection height	Food connections IDF according to ISO 2853		Clamp connection according to ISO 2852	
Inch	mm	L [mm]				Nominal pressure	IDF thread according to ISO 2853	Nominal pressure	Clamp connection according to ISO 2852
				di (mm)	h (mm)		IDF thread (Tr)		D (mm)
1	25.4	110		22.2	21	PN 40	37 × 3.175	PN 16	50.5
1½	38	110		34.8	28.5	PN 40	50 × 3.175	PN 16	50.5
2	51	110		47.8	34	PN 25	64 × 3.175	PN 16	64
1½	63.5	110		60.3	38	PN 25	77.5 × 3.175	PN 16	77.5
3	76.1	60		72.9	44.5	PN 25	91 × 3.175	PN 10	91
4	101.6	60		97.6	59.5	PN 25	118 × 3.175	PN 10	119

Pressure measurement

Remote seals

for SITRANS P320/P420 pressure transmitters / Flushing ring for diaphragm seals

Overview



Flushing rings are required for remote seals in flange and sandwich design (article numbers 7MF0800 ... 7MF0814) when the medium has a tendency to form deposits or blockages due to the process conditions and the geometry of the connection.

The ferrule is clamped in between the process flange and the remote seal.

Due to the lateral flushing holes, particles accumulated in front of the membrane can be washed away and the pressure space can be vented. Different nominal diameters and forms enable adaption to the relevant process flange.

Process connection

For flanges according to EN and ASME:

DN 50, 80, 100, 125; PN 16 ... 100 or

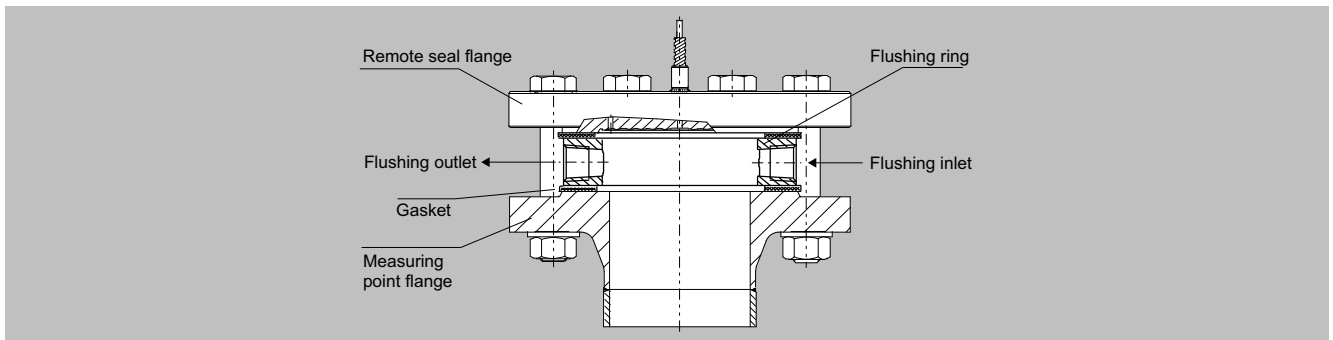
DN 2 inch, 3 inch, 4 inch, 5 inch; Class 150 ... 600

Standard version

Material: CrNi steel, mat. no. 1.4404/316L

Sealing surfaces and flushing holes: See ordering data

Design



Example of installation

Selection and ordering data

		Article No.	Order code			
Flushing ring		7MF4925-				
For remote seals 7MF0800 to 7MF0814		1	•	•	•	•
Click the article number for online configuration in the PIA Life Cycle Portal.						
Nominal diameter	Nominal pressure					
DN 50	PN 16 ... PN 100	A				
DN 80	PN 16 ... PN 100	B				
DN 100	PN 16 ... PN 100	C				
DN 125	PN 16 ... PN 100	D				
2 inches	Class 150 ... 600	G				
3 inches	Class 150 ... 600	H				
4 inches	Class 150 ... 600	J				
5 inches	Class 150 ... 600	K				
Only for RJF ring groove, 7MF4925-1*R....:						
2 inches	Class 150	N	R			
3 inches	Class 150	P	R			
4 inches	Class 150	Q	R			
5 inches	Class 150	R	R			
2 inches	Class 300 ... 600	U	R			
3 inches	Class 300 ... 600	V	R			
4 inches	Class 300 ... 600	W	R			
5 inches	Class 300 ... 600	X	R			
Other version, add Order Code and plain text: Nominal diameter ...; Nominal pressure ...		Z			J	1 Y
Sealing surface						
EN 1092-1						
• Form B1						
• Form B2						
• Form C / Form C						
• Form D / Form C						
• Form D / Form D						
• Form E						
• Form F						
ASME B16.5						
• RF 125 ... 250 AA						
• RFSF						
• RJF ring groove						
Other version, add Order Code and plain text: Sealing surface ...		Z			K	1 Y
Flushing holes (2 units)						
Female thread G $\frac{1}{4}$						
Female thread G $\frac{1}{2}$						
Female thread $\frac{1}{4}$ -18 NPT						
Female thread $\frac{1}{2}$ -14 NPT						
Material						
Stainless steel mat. no. 1.4404/316L						
Other version, add Order Code and plain text: Material ...					0	
					9	M 1 Y

Options	Order code
Add "-Z" to article number and specify order code.	
Inspection certificate according to EN 10204-3.1	C12

Pressure measurement

Remote seals

for SITRANS P320/P420 pressure transmitters / Flushing ring for diaphragm seals

Technical specifications

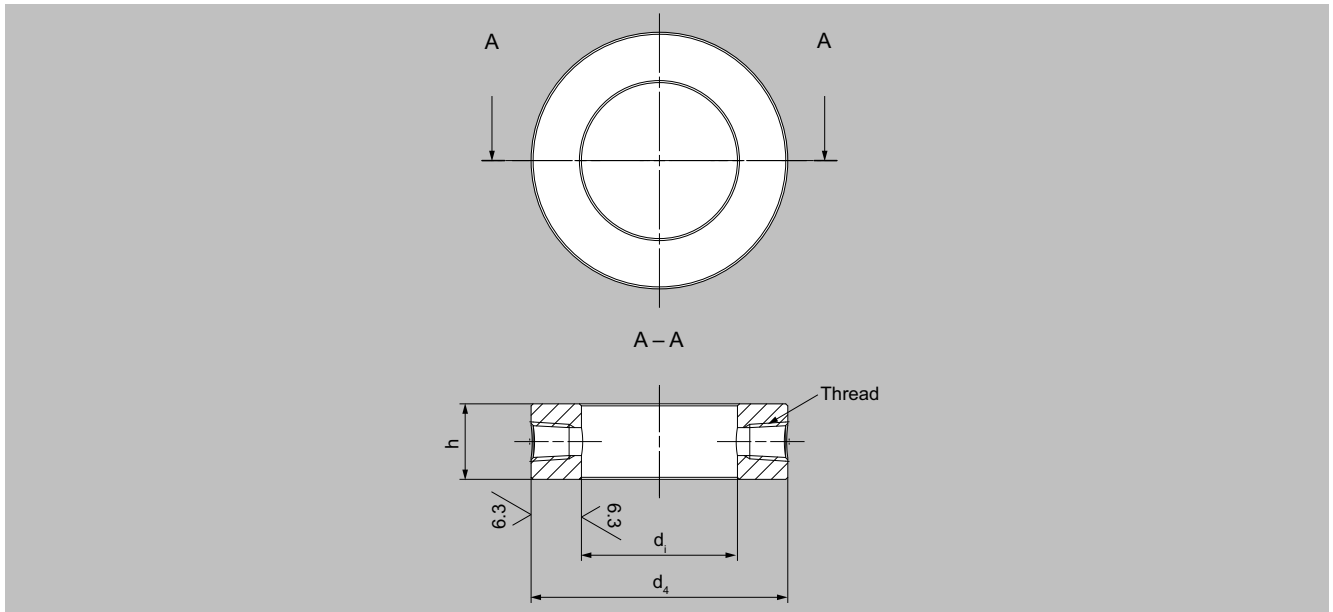
SITRANS P320/P420 flushing ring for diaphragm seals

Nominal diameter	Nominal pressure
• DN 50	PN 16 ... PN 100
• DN 80	PN 16 ... PN 100
• DN 100	PN 16 ... PN 100
• DN 125	PN 16 ... PN 100
• 2 inches	Class 150 ... Class 600
• 3 inches	Class 150 ... Class 600
• 4 inches	Class 150 ... Class 600
• 5 inches	Class 150 ... Class 600
Sealing surface	
• According to EN 1092-1	<ul style="list-style-type: none"> • Form B1 • Form B2 • Form D/Form D • Form C/Form C • Form D/Form C • Form E • Form F
• According to ASME B16.5	<ul style="list-style-type: none"> • RF 125 ... 250 AA • RFSF • RJF ring groove
Flushing holes (2 units), female thread:	<ul style="list-style-type: none"> • G¼ • G½ • ¼-18 NPT • ½-14 NPT
Material	Stainless steel 1.4404/316L

Dimensional drawings

Connection according to EN 1092-1

Form B1 and form B2



Flushing ring; sealing surface (EN 1092-1), form B1 and form B2

Nominal diameter	PN bar	Thread	d ₄ Ø in mm (inch)	d _i Ø in mm (inch)	h Ø in mm (inch)	Weight kg (lb)
DN 50	16 ... 100	¼ NPT	102 (4.02)	62 (2.44)	30 (1.18)	1.24 (2.73)
DN 80	16 ... 100	¼ NPT	138 (5.43)	92 (3.62)	30 (1.18)	1.99 (4.39)
DN 100	16 ... 100	¼ NPT	162 (6.38)	92 (3.62)	30 (1.18)	3.35 (7.39)
DN 125	16 ... 100	¼ NPT	188 (7.40)	132 (5.2)	30 (1.18)	3.38 (7.45)
DN 50	16 ... 100	½ NPT	102 (4.02)	62 (2.44)	30 (1.18)	1.24 (2.73)
DN 80	16 ... 100	½ NPT	138 (5.43)	92 (3.62)	30 (1.18)	1.99 (4.39)
DN 100	16 ... 100	½ NPT	162 (6.38)	92 (3.62)	30 (1.18)	3.35 (7.39)
DN 125	16 ... 100	½ NPT	188 (7.40)	132 (5.2)	30 (1.18)	3.38 (7.45)

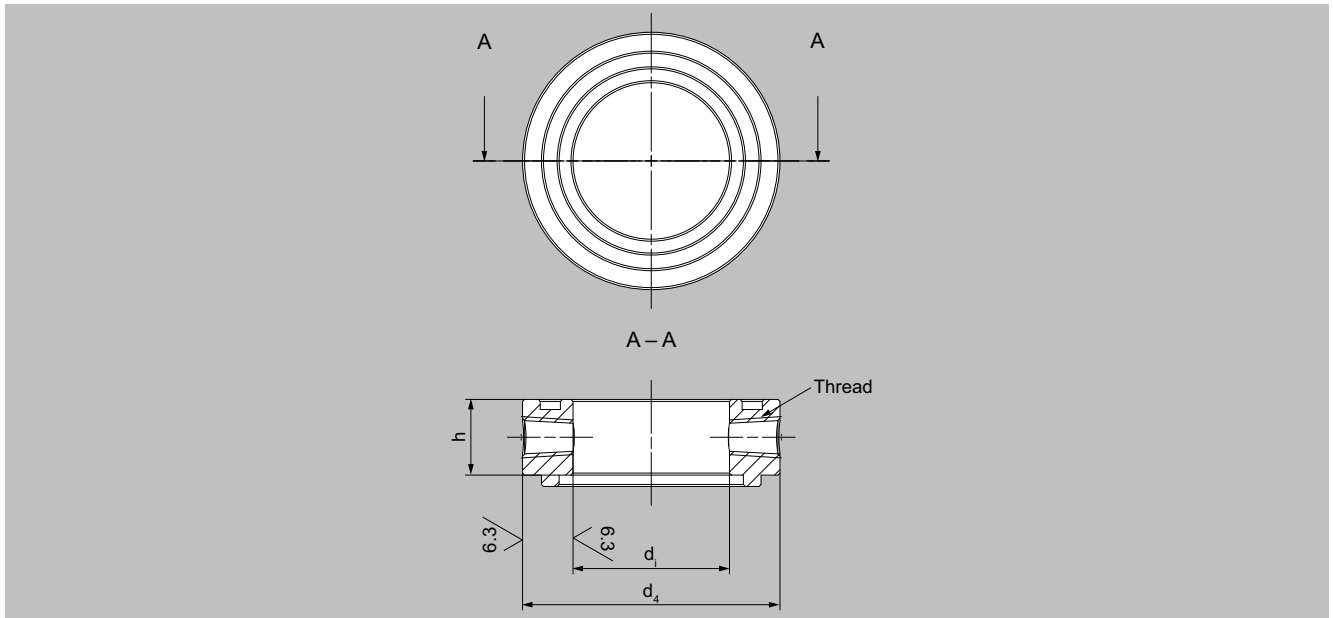
Pressure measurement

Remote seals

for SITRANS P320/P420 pressure transmitters / Flushing ring for diaphragm seals

Dimensional drawings (continued)

Form D / Form C

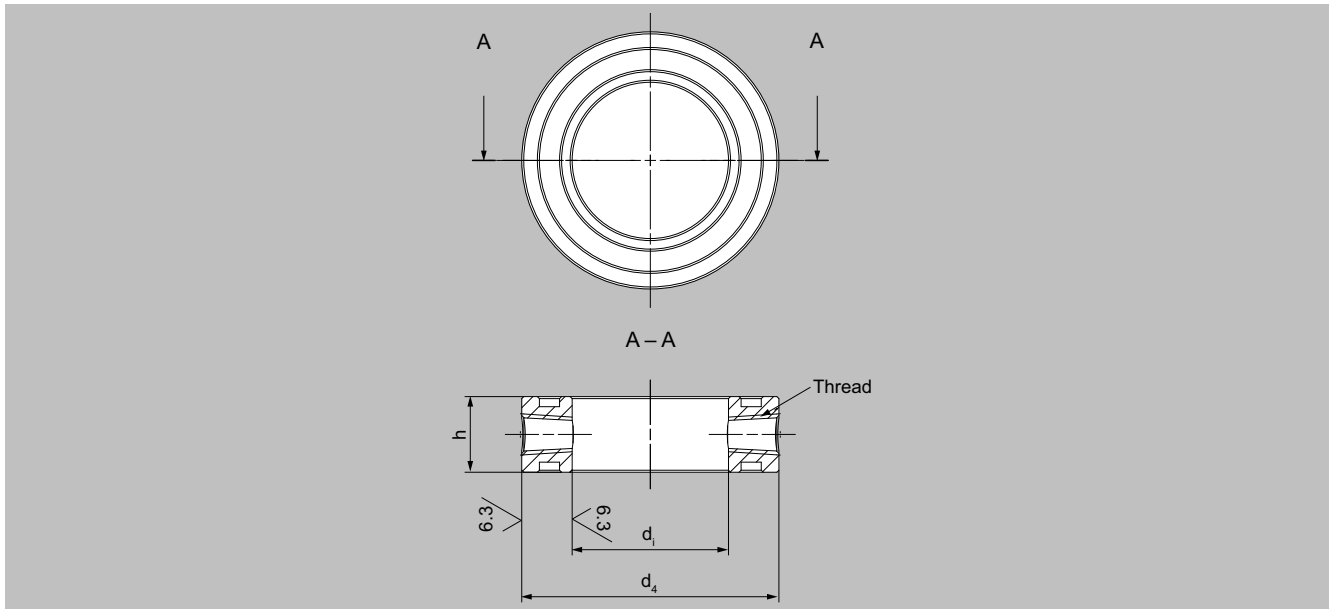


Flushing ring; sealing surface (EN 1092-1), form D / form C

Nominal diameter	PN bar	Thread	d_4 Ø in mm (inch)	d_i Ø in mm (inch)	h Ø in mm (inch)	Weight kg (lb)
DN 50	16 ... 100	¼ NPT	102 (4.02)	62 (2.44)	35.5 (1.40)	1.46 (3.22)
DN 80	16 ... 100	¼ NPT	138 (5.43)	92 (3.62)	35.5 (1.40)	2.36 (5.2)
DN 100	16 ... 100	¼ NPT	162 (6.38)	92 (3.62)	35.5 (1.40)	3.96 (8.73)
DN 125	16 ... 100	¼ NPT	188 (7.40)	132 (5.2)	35.5 (1.40)	4.00 (8.82)
DN 50	16 ... 100	½ NPT	102 (4.02)	62 (2.44)	40.5 (1.595)	1.67 (3.68)
DN 80	16 ... 100	½ NPT	138 (5.43)	92 (3.62)	40.5 (1.595)	2.69 (5.93)
DN 100	16 ... 100	½ NPT	162 (6.38)	92 (3.62)	40.5 (1.595)	4.52 (9.97)
DN 125	16 ... 100	½ NPT	188 (7.40)	132 (5.2)	40.5 (1.595)	4.56 (10.05)

Dimensional drawings (continued)

Form D / Form D



Flushing ring; sealing surface (EN 1092-1), form D/form D

Nominal diameter	PN bar	Thread	d_4 Ø in mm (inch)	d_i Ø in mm (inch)	h Ø in mm (inch)	Weight kg (lb)
DN 50	16 ... 100	¼ NPT	102 (4.02)	62 (2.44)	40 (1.58)	1.65 (3.64)
DN 80	16 ... 100	¼ NPT	138 (5.43)	92 (3.62)	40 (1.58)	2.66 (5.86)
DN 100	16 ... 100	¼ NPT	162 (6.38)	92 (3.62)	40 (1.58)	4.47 (9.86)
DN 125	16 ... 100	¼ NPT	188 (7.40)	132 (5.2)	40 (1.58)	4.50 (9.92)
DN 50	16 ... 100	½ NPT	102 (4.02)	62 (2.44)	40 (1.58)	1.65 (3.64)
DN 80	16 ... 100	½ NPT	138 (5.43)	92 (3.62)	40 (1.58)	2.66 (5.86)
DN 100	16 ... 100	½ NPT	162 (6.38)	92 (3.62)	40 (1.58)	4.47 (9.86)
DN 125	16 ... 100	½ NPT	188 (7.40)	132 (5.2)	40 (1.58)	4.50 (9.92)

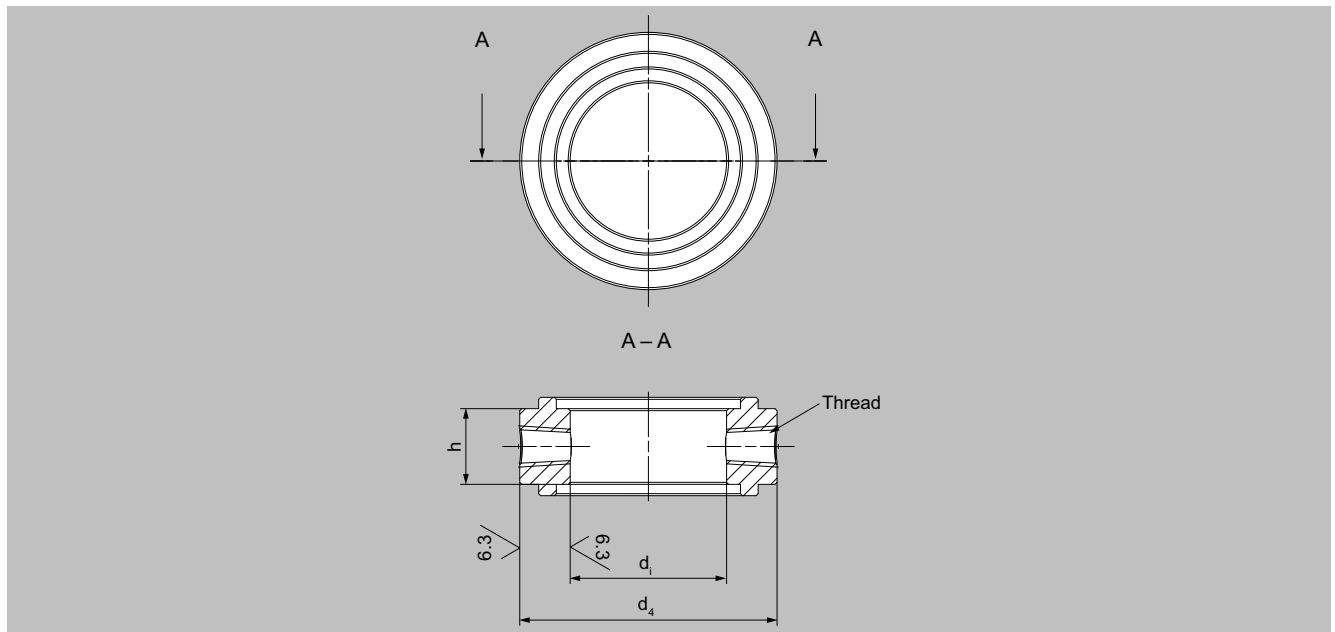
Pressure measurement

Remote seals

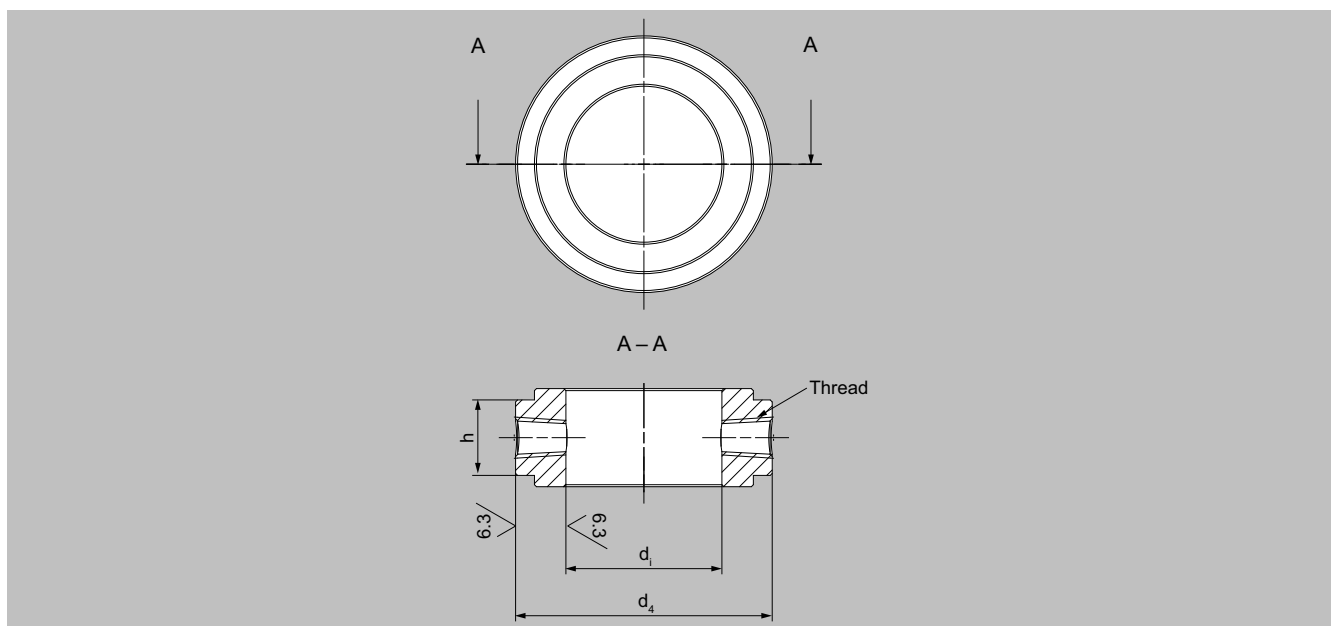
for SITRANS P320/P420 pressure transmitters / Flushing ring for diaphragm seals

Dimensional drawings (continued)

Form C / form C and form E



Flushing ring; sealing surface (EN 1092-1), form C / form C

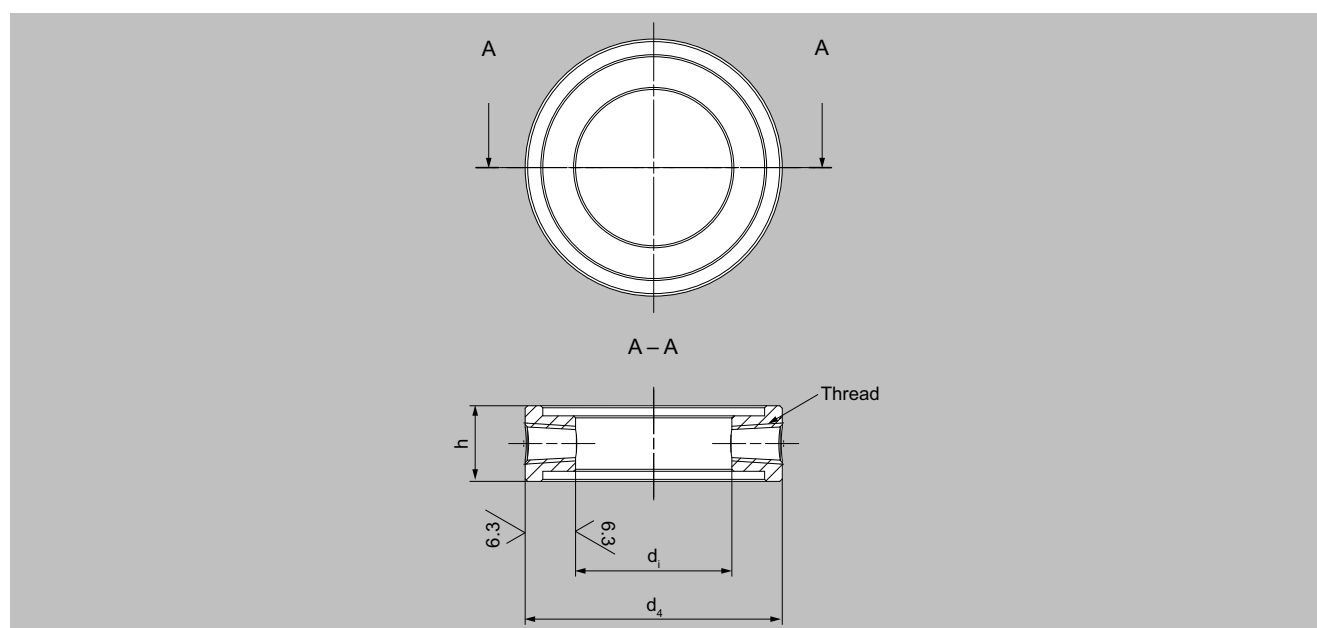


Flushing ring; sealing surface (EN 1092-1), form E

Dimensional drawings (continued)

Nominal diameter	PN bar	Thread	d ₄ Ø in mm (inch)	d _i Ø in mm (inch)	h Ø in mm (inch)	x Ø in mm (inch)	f3 Ø in mm (inch)	Weight kg (lb)
DN 50	16 ... 100	¼ NPT	102 (4.02)	62 (2.44)	31 (1.22)	87 (3.43)	4.5 (0.18)	1.49 (3.28)
DN 80	16 ... 100	¼ NPT	138 (5.43)	92 (3.62)	31 (1.22)	120 (4.72)	4.5 (0.18)	2.40 (5.29)
DN 100	16 ... 100	¼ NPT	162 (6.38)	92 (3.62)	30 (1.18)	149 (5.87)	5 (0.2)	4.21 (9.28)
DN 125	16 ... 100	¼ NPT	188 (7.40)	132 (5.2)	30 (1.18)	175 (6.89)	5 (0.2)	4.21 (9.28)
DN 50	16 ... 100	½ NPT	102 (4.02)	62 (2.44)	31 (1.22)	87 (3.43)	4.5 (0.18)	1.49 (3.28)
DN 80	16 ... 100	½ NPT	138 (5.43)	92 (3.62)	31 (1.22)	120 (4.72)	4.5 (0.18)	2.40 (5.29)
DN 100	16 ... 100	½ NPT	162 (6.38)	92 (3.62)	30 (1.18)	149 (5.87)	5 (0.2)	4.21 (9.28)
DN 125	16 ... 100	½ NPT	188 (7.40)	132 (5.2)	30 (1.18)	175 (6.89)	5 (0.2)	3.38 (7.45)

Form F



Flushing ring; sealing surface (EN 1092-1), form F

Nominal diameter	PN bar	Thread	d ₄ Ø in mm (inch)	d _i Ø in mm (inch)	h Ø in mm (inch)	x Ø in mm (inch)	f3 Ø in mm (inch)	Weight kg (lb)
DN 50	16 ... 100	¼ NPT	102 (4.02)	62 (2.44)	35 (1.38)	88 (3.46)	4 (0.16)	1.25 (2.76)
DN 80	16 ... 100	¼ NPT	138 (5.43)	92 (3.62)	35 (1.38)	121 (4.76)	4 (0.16)	2.02 (4.45)
DN 100	16 ... 100	¼ NPT	162 (6.38)	92 (3.62)	35 (1.38)	150 (5.91)	4.5 (0.18)	3.11 (6.86)
DN 125	16 ... 100	¼ NPT	188 (7.40)	132 (5.2)	35 (1.38)	175 (6.89)	4.5 (0.18)	3.19 (7.03)
DN 50	16 ... 100	½ NPT	102 (4.02)	62 (2.44)	40 (1.58)	88 (3.46)	4 (0.16)	1.45 (3.2)
DN 80	16 ... 100	½ NPT	138 (5.43)	92 (3.62)	40 (1.58)	121 (4.76)	4 (0.16)	2.35 (5.18)
DN 100	16 ... 100	½ NPT	162 (6.38)	92 (3.62)	40 (1.58)	150 (5.91)	4.5 (0.18)	3.67 (8.09)
DN 125	16 ... 100	½ NPT	188 (7.40)	132 (5.2)	40 (1.58)	175 (6.89)	4.5 (0.18)	3.76 (8.29)

Pressure measurement

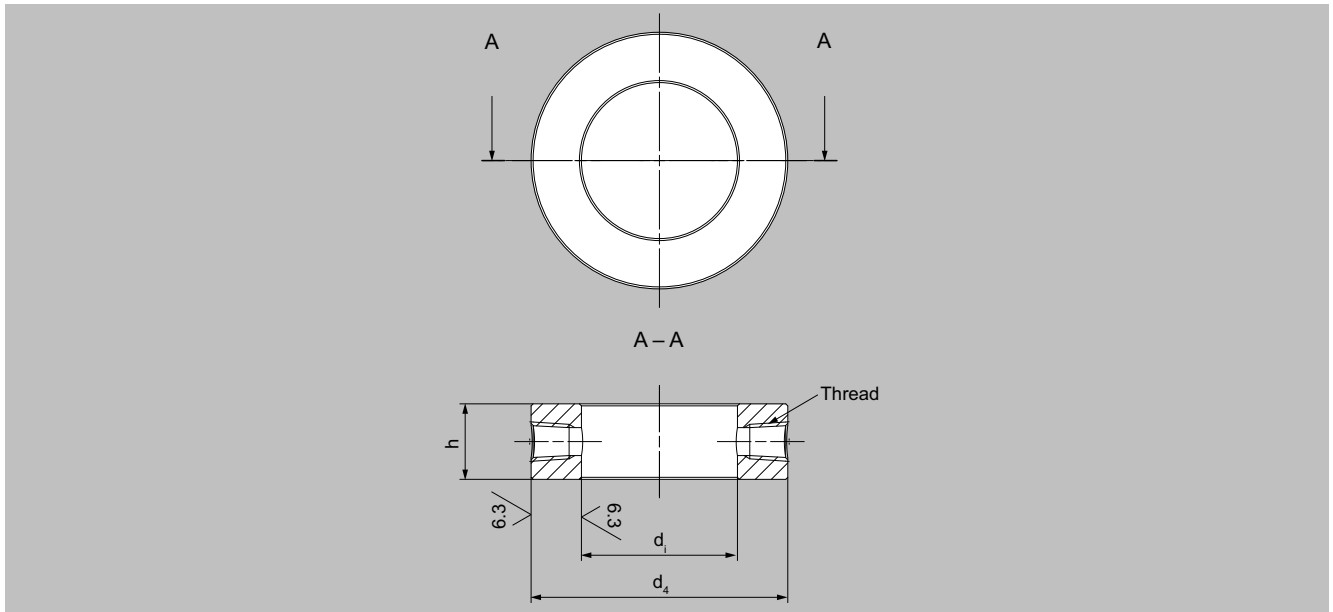
Remote seals

for SITRANS P320/P420 pressure transmitters / Flushing ring for diaphragm seals

Dimensional drawings (continued)

Connection according to ASME B 16.5

RFSF and RF 125 ... 250 AO

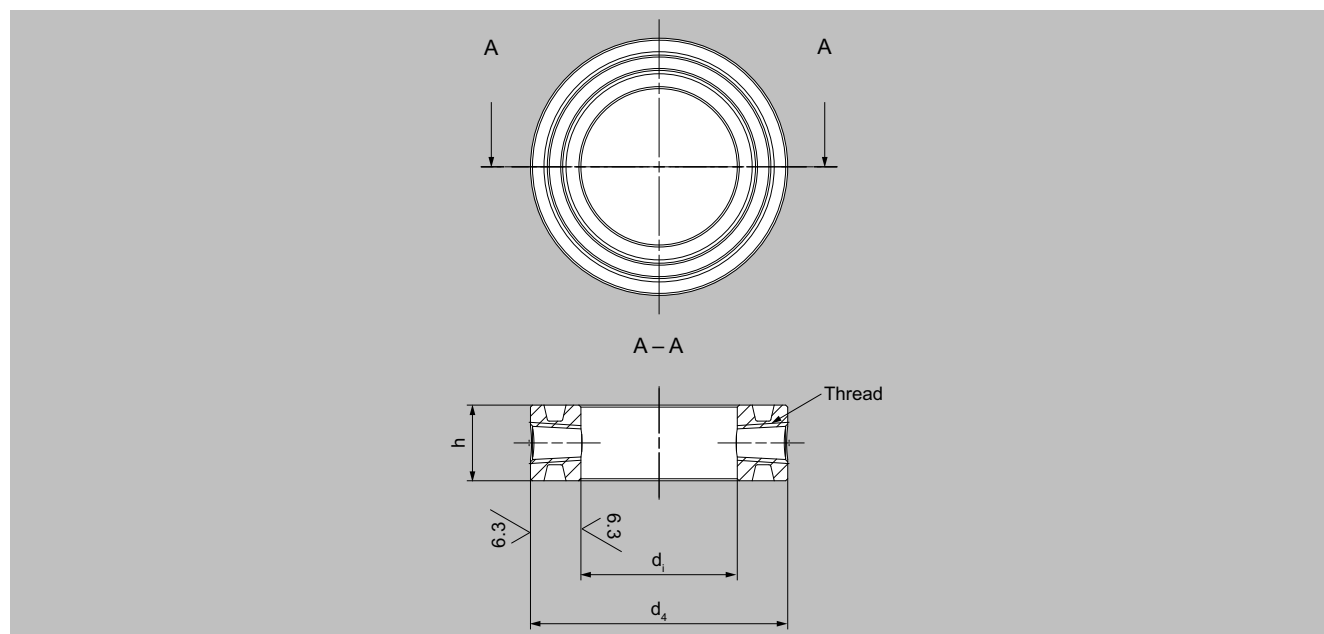


Flushing ring; sealing surface (ASME B 16.5), RFSF and RF 125 to 250 AO

Nominal diameter	Class	Thread	d ₄ Ø in mm (inch)	d _i Ø in mm (inch)	h Ø in mm (inch)	Weight kg (lb)
2"	150 ... 600	¼ NPT	92 (3.62)	62 (2.44)	30 (1.18)	0.87 (1.92)
3"	150 ... 600	¼ NPT	127 (5)	92 (3.62)	30 (1.18)	1.44 (3.17)
4"	150 ... 600	¼ NPT	157 (6.18)	92 (3.62)	30 (1.18)	3.05 (6.72)
5"	150 ... 600	¼ NPT	186 (7.32)	141 (5.55)	30 (1.18)	2.77 (6.11)
2"	150 ... 600	½ NPT	92 (3.62)	62 (2.44)	30 (1.18)	0.87 (1.92)
3"	150 ... 600	½ NPT	127 (5)	92 (3.62)	30 (1.18)	1.44 (3.17)
4"	150 ... 600	½ NPT	157 (6.18)	92 (3.62)	30 (1.18)	3.05 (6.72)
5"	150 ... 600	½ NPT	186 (7.32)	141 (5.55)	30 (1.18)	2.77 (6.11)

Dimensional drawings (continued)

RJF ring groove



Flushing ring; sealing surface (ASME B 16.5), RJF ring groove

Nominal diameter	Class	Thread	d_4 Ø in mm (inch)	d_i Ø in mm (inch)	h Ø in mm (inch)	Weight kg (lb)
2"	150	¼ NPT	102 (4.02)	62 (2.44)	40 (1.58)	1.65 (3.64)
3"	150	¼ NPT	133 (5.24)	92 (3.62)	40 (1.58)	2.32 (5.12)
4"	150	¼ NPT	171 (6.73)	92 (3.62)	40 (1.58)	5.22 (11.51)
5"	150	¼ NPT	194 (7.64)	141 (5.55)	40 (1.58)	4.46 (9.83)
2"	150	½ NPT	102 (4.02)	62 (2.44)	46 (1.81)	1.90 (4.19)
3"	150	½ NPT	133 (5.24)	92 (3.62)	46 (1.81)	2.66 (5.86)
4"	150	½ NPT	171 (6.73)	92 (3.62)	46 (1.81)	6.00 (13.23)
5"	150	½ NPT	194 (7.64)	141 (5.55)	46 (1.81)	5.13 (11.31)
2"	300 ... 600	¼ NPT	108 (4.25)	62 (2.44)	40 (1.58)	1.96 (4.32)
3"	300 ... 600	¼ NPT	146 (5.75)	92 (3.62)	40 (1.58)	3.23 (7.12)
4"	300 ... 600	¼ NPT	175 (6.89)	92 (3.62)	40 (1.58)	5.57 (12.28)
5"	300 ... 600	¼ NPT	210 (8.27)	141 (5.55)	40 (1.58)	6.08 (13.4)
2"	300 ... 600	½ NPT	108 (4.25)	62 (2.44)	46 (1.81)	2.26 (4.98)
3"	300 ... 600	½ NPT	146 (5.75)	92 (3.62)	46 (1.81)	3.71 (8.18)
4"	300 ... 600	½ NPT	175 (6.89)	92 (3.62)	46 (1.81)	6.4 (14.11)
5"	300 ... 600	½ NPT	210 (8.27)	141 (5.55)	46 (1.81)	7 (15.43)

Pressure measurement

Remote seals

for SITRANS P320/P420 pressure transmitters / Measuring setups

Overview

Examples of typical measuring arrangements for using the SITRANS P320/420 pressure transmitter with and without remote seal are illustrated in this section.

Formulas for calculating lower range value and upper range value are listed for each example.

Mounting

Remote seals in sandwich design are mounted between the connecting flange of the measuring point and a blank flange. Remote seals in flange design are mounted directly to the connecting flange of the measuring point. The respective pressure rating of the blank flange or of the remote seal, flange type must be taken into consideration.

The pressure transmitter should be mounted below the connecting flange; pressure transmitters for differential pressure should be mounted below the bottom connecting flange. This arrangement must be selected in the negative pressure range.

For measurements in the overpressure range, the pressure transmitter can also be mounted above the connecting flange.

For a good transmission characteristic, the capillaries between remote seal and pressure transmitter should be kept as short as possible.

Shifting the measuring range

If the two connecting flanges are installed at different heights for measurements with two remote seals, additional differential pressure is generated due to the oil filling of the remote seal capillaries. This additional pressure causes a shift of the measuring range that has to be taken into consideration when setting the pressure transmitter.

A shift of the measuring range will also occur when you combine a remote seal with a pressure transmitter and when the remote seal is not installed at the height of the pressure transmitter.

Pressure transmitter output

When level, interface or density increase in closed vessels, the differential pressure and therefore the output signal of the pressure transmitter increases as well.

For a reverse relationship between differential pressure and output signal, the lower range value and upper range value must be reversed with SITRANS P320/420.

For open vessels, increasing pressure is usually assigned to an increase in level, interface or density.

Effect of ambient temperature

Try to avoid temperature differences between the individual capillaries and the individual remote seals.

Temperature fluctuations in the area of the measuring unit cause a change in the volume of the filling liquid and therefore measuring errors.

Notes

- For interface measurements, the interface must be located between the two nozzles. In addition, the fill level of the vessel must always be above the top nozzle.
- A constant level of the process medium is required for density measurement. The level should be above the top nozzle.

Overview (continued)

Possible combinations of pressure transmitters and remote seals

Mounting type	Pressure transmitter	Remote seal
A/B	7MF030-... 7MF031-... 7MF040-... 7MF041-...	7MF0800-... 7MF0810-...
C ₁ and C ₂	7MF032-... 7MF042-... 7MF033-... 7MF043-...	7MF0800-... 7MF0810-... (negative pressure service in all cases) 7MF0801-... 7MF0811-...
D	7MF034-... 7MF035-... 7MF044-... 7MF045-...	7MF0802-... 7MF0812-...
E	7MF034-... 7MF035-... 7MF044-... 7MF045-...	7MF0813-...
G, H and J	7MF034-... 7MF035-... 7MF044-... 7MF045-...	7MF0802-... 7MF0812-...

Dimensional drawings

Mounting types for gauge pressure and level measurements (open vessels)

Installation type A

Pressure transmitter above the measuring point

Installation type B

Pressure transmitter below the measuring point

$H_1 \leq 7 \text{ m (23 ft)}$, with halocarbon oil as filling liquid only $H_1 \leq 4 \text{ m (13.1 ft)}$

Installation type A

Lower range value: $p_{MA} = \rho_{FL} \cdot g \cdot H_U - \rho_{OIL} \cdot g \cdot H_1$

Upper range value: $p_{ME} = \rho_{FL} \cdot g \cdot H_O - \rho_{OIL} \cdot g \cdot H_1$

Installation type B

Lower range value: $p_{MA} = \rho_{FL} \cdot g \cdot H_U + \rho_{OIL} \cdot g \cdot H_1$

Upper range value: $p_{ME} = \rho_{FL} \cdot g \cdot H_O + \rho_{OIL} \cdot g \cdot H_1$

Legend

p_{MA}	Lower range value to be set
p_{ME}	Upper range value to be set
ρ_{FL}	Density of medium in vessel
ρ_{OIL}	Density of filling oil in the capillary to the remote seal
g	Local acceleration due to gravity
H_U	Lower range value
H_O	Upper range value
H_1	Distance between vessel flange and pressure trans.

Mounting type for absolute pressure measurements (closed vessels)

Installation type C₁

Installation type C₂

Pressure transmitter for absolute pressure always below the measuring point: $H_1 \geq 200 \text{ mm (7.9 inch)}$

Installation type C₁ and C₂

Lower range value: $p_{MA} = p_{START} + \rho_{OIL} \cdot g \cdot H_1$

Upper range value: $p_{ME} = p_{END} + \rho_{OIL} \cdot g \cdot H_1$

Legend

p_{MA}	Lower range value to be set
p_{ME}	Upper range value to be set
p_{START}	Lower range value
p_{END}	Upper range value
ρ_{OIL}	Density of filling oil in the capillary to the remote seal
g	Local acceleration due to gravity
H_1	Distance between vessel flange and pressure trans.

Pressure measurement

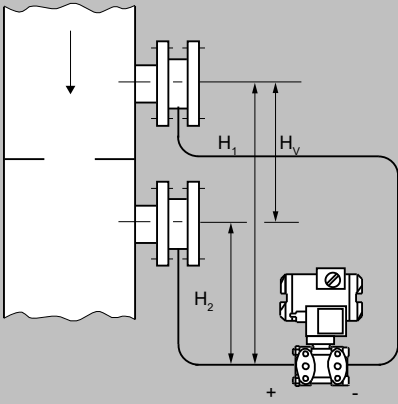
Remote seals

for SITRANS P320/P420 pressure transmitters / Measuring setups with remote seal

Dimensional drawings (continued)

Mounting types for differential pressure and flow measurements

Installation type D Filter monitoring



Installation type D

Lower range value: $p_{MA} = p_{START} - \rho_{OIL} \cdot g \cdot H_V$

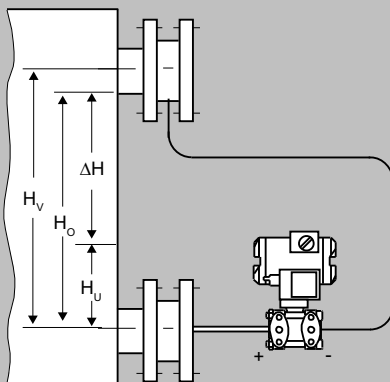
Upper range value: $p_{ME} = p_{END} - \rho_{OIL} \cdot g \cdot H_V$

Legend

p_{MA}	Lower range value to be set
p_{ME}	Upper range value to be set
p_{START}	Lower range value
p_{END}	Upper range value
ρ_{OIL}	Density of filling oil in the capillary to the remote seal
g	Local acceleration due to gravity
H_V	Distance between the measuring points (spigots)

Mounting type for level measurements (closed vessels)

Installation type E



Installation type E

Lower range value: $p_{MA} = \rho_{FL} \cdot g \cdot H_U - \rho_{OIL} \cdot g \cdot H_V$

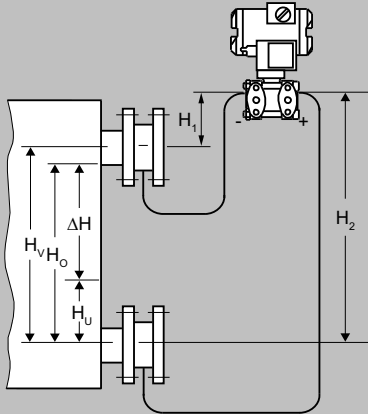
Upper range value: $p_{ME} = \rho_{FL} \cdot g \cdot H_O - \rho_{OIL} \cdot g \cdot H_V$

Legend

p_{MA}	Lower range value to be set
p_{ME}	Upper range value to be set
ρ_{FL}	Density of medium in vessel
ρ_{OIL}	Density of filling oil in the capillary to the remote seal
g	Local acceleration due to gravity
H_U	Lower range value
H_O	Upper range value
H_V	Distance between the measuring points (spigots)

Dimensional drawings (continued)

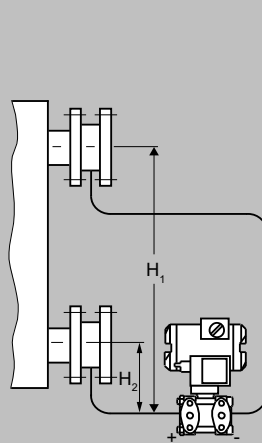
Installation type G



Pressure transmitter for differential pressure above the upper measuring point, no vacuum

$H_2 \leq 7 \text{ m (23 ft)}$, with halocarbon oil as filling liquid only $H_1 \leq 4 \text{ m (13.1 ft)}$

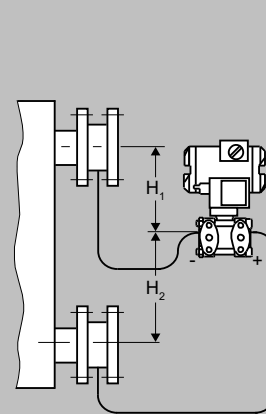
Installation type H



below the lower measuring point

Installation type for vacuum applications

Installation type J



between the measuring points, no vacuum

$H_2 \leq 7 \text{ m (23 ft)}$, with halocarbon oil as filling liquid only $H_2 \leq 4 \text{ m (13.1 ft)}$

Installation type G, H and J

Lower range value:

$$P_{MA} = \rho_{FL} \cdot g \cdot H_U - \rho_{OIL} \cdot g \cdot H_V$$

Upper range value:

$$P_{ME} = \rho_{FL} \cdot g \cdot H_O - \rho_{OIL} \cdot g \cdot H_V$$

Legend

P_{MA}

Lower range value to be set

P_{ME}

Upper range value to be set

ρ_{FL}

Density of medium in vessel

ρ_{OIL}

Density of filling oil in the capillary to the remote seal

g

Local acceleration due to gravity

H_U

Lower range value

H_O

Upper range value

H_V

Distance between the measuring points (spigots)

Pressure measurement

Remote seals

for SITRANS P320/P420 pressure transmitters / Measuring setups without remote seal

Overview

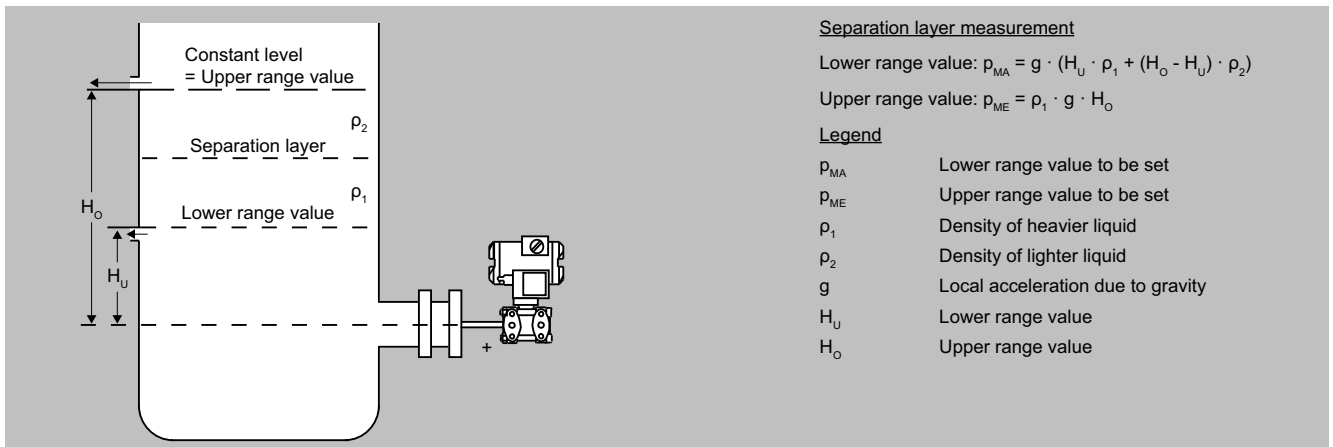
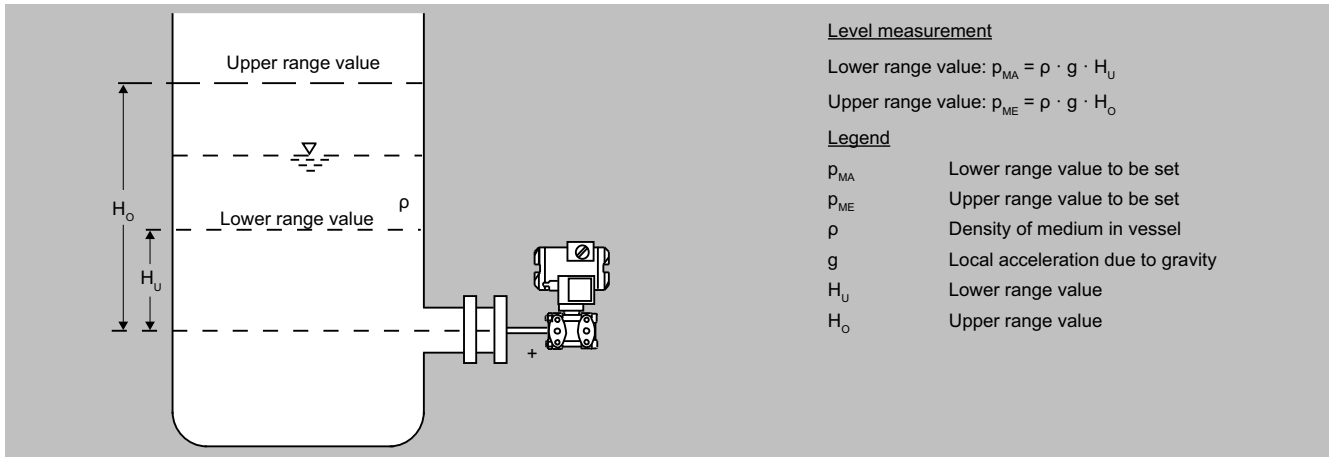
Notes

- For interface measurements, the interface must be located between the two nozzles. In addition, the fill level of the container must always be above the top nozzle.
- A constant level of the process medium is required for density measurement. The level should be above the top nozzle.

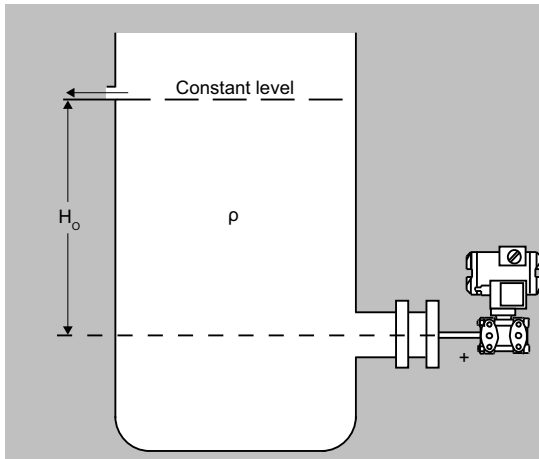
Dimensional drawings

Pressure transmitters for differential pressure for flanging

Measuring arrangements for open containers



Dimensional drawings (continued)

Density measurement

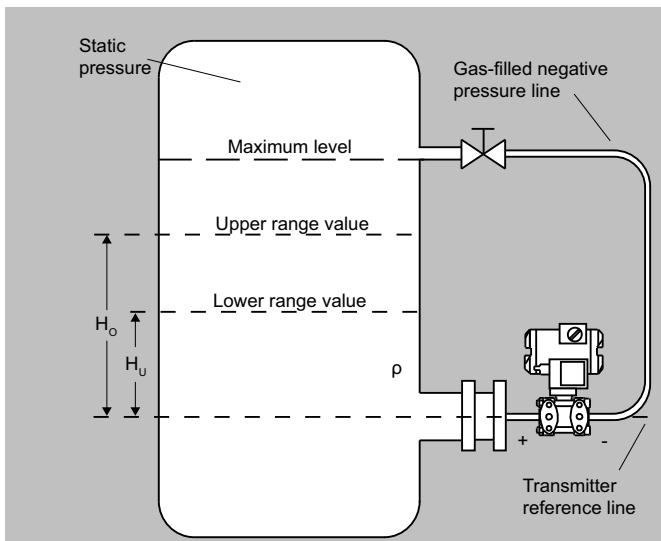
Lower range value: $p_{MA} = \rho_{MIN} \cdot g \cdot H_o$

Upper range value: $p_{ME} = \rho_{MAX} \cdot g \cdot H_o$

Legend

p_{MA}	Lower range value to be set
p_{ME}	Upper range value to be set
ρ_{MIN}	Minimum density of medium in vessel
ρ_{MAX}	Maximum density of medium in vessel
g	Local acceleration due to gravity
H_o	Upper range value in m

Measuring arrangements for closed containers

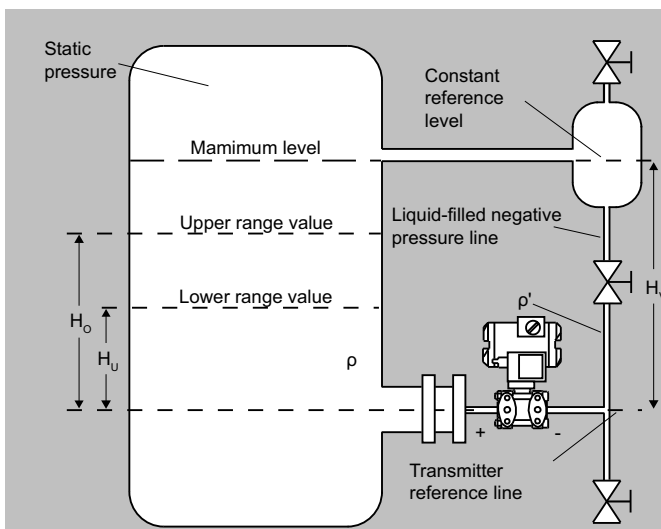
Level measurement, Version 1

Lower range value: $\Delta p_{MA} = \rho \cdot g \cdot H_U$

Upper range value: $\Delta p_{ME} = \rho \cdot g \cdot H_o$

Legend

Δp_{MA}	Lower range value to be set
Δp_{ME}	Upper range value to be set
ρ	Density of medium in vessel
g	Local acceleration due to gravity
H_U	Lower range value
H_o	Upper range value

Level measurement, Version 2

Lower range value: $\Delta p_{MA} = g \cdot (H_U \cdot \rho - H_v \cdot \rho')$

Upper range value: $\Delta p_{ME} = g \cdot (H_o \cdot \rho - H_v \cdot \rho')$

Legend

Δp_{MA}	Lower range value to be set
Δp_{ME}	Upper range value to be set
ρ	Density of medium in vessel
ρ'	Density of liquid in the negative pressure line (corresponding to the temperature existing there)
g	Local acceleration due to gravity
H_U	Lower range value
H_o	Upper range value
H_v	Distance between the measuring points (spigots)

Pressure measurement

Remote seals

for SITRANS P320/P420 pressure transmitters / Measuring setups without remote seal

Dimensional drawings (continued)

Level measurement, Version 3

Lower range value: $\Delta p_{MA} = \underbrace{P_{Stat} + \rho \cdot g \cdot H_U}_{\text{Transmitter 1}} - \underbrace{P_{Stat}}_{\text{Transmitter 2}}$

Upper range value: $\Delta p_{ME} = \underbrace{P_{Stat} + \rho \cdot g \cdot H_O}_{\text{Transmitter 1}} - \underbrace{P_{Stat}}_{\text{Transmitter 2}}$

Legend

- Δp_{MA} Lower range value to be set
- Δp_{ME} Upper range value to be set
- ρ Density of medium in vessel
- g Local acceleration due to gravity
- H_U Lower range value
- H_O Upper range value
- H_V Distance between the measuring points (spigots)

The pressure measuring range (\pm level) will be calculated by subtraction of measuring range of transmitter 1 minus measuring range of transmitter 2 in the process control system.

Pressure transmitters for differential pressure for flanging, measuring arrangement for closed containers, level measurement

Separation layer measurement

Lower range value: $\Delta p_{MA} = g \cdot (H_U \cdot \rho_1 + (H_O - H_U) \cdot \rho_2 - H_V \cdot \rho'_2)$

Upper range value: $\Delta p_{ME} = g \cdot (H_O \cdot \rho_1 - H_V \cdot \rho'_2)$

Legend

- Δp_{MA} Lower range value to be set
- Δp_{ME} Upper range value to be set
- ρ_1 Density of heavier liquid with separation layer in vessel
- ρ_2 Density of lighter liquid with separation layer
- ρ'_2 Density of liquid in the negative pressure line (corresponding to the temperature existing there)
- g Local acceleration due to gravity
- H_U Lower range value
- H_O Upper range value
- H_V Distance between the measuring points (spigots)

Overview

All shut-off fittings can be secured onto walls, racks (72 mm grid size) and vertical and horizontal pipes.

This offers the advantage when assembling a plant that the shut-off fittings can be secured first and the lines for the medium and differential pressure lines connected to them. It is then possible to check all connections for leaks and to blow out or flush the pipes in order to remove dirt (welding residues, shavings etc.).

Finally, when all piping is completed, the measuring instruments are screwed onto the shut-off fittings.

If a measuring instrument has to be removed for maintenance, the fittings and pipes remain intact. Only the valves have to be closed. The measuring instrument can then be detached and re-installed after maintenance.

Classification according to pressure equipment directive (PED 2014/68/EU):

For gasses of fluid group 1 and liquids of fluid group 1; compliance with requirements of article 4, paragraph 3 (sound engineering practice).

Norm IEC 61518/EN 61518

The flange connection between pressure transmitter and valve manifold was modified in the standard IEC 61518/EN 61518. The only connection thread approved for use in the process flanges of the pressure transmitter is $7/16-20$ UNF.

The valve manifolds for M12 screws, including the accessory sets, have therefore been deleted.

Material inspection certificate to EN 10204-3.1

If a material inspection certificate according to EN 10204-3.1 is required for ordering valve manifolds or shut-off fittings, be aware that one certificate is sufficient for each valve type ordered. This means that you will only be charged for one certificate in the cost calculations.

Minimum/maximum operating temperatures

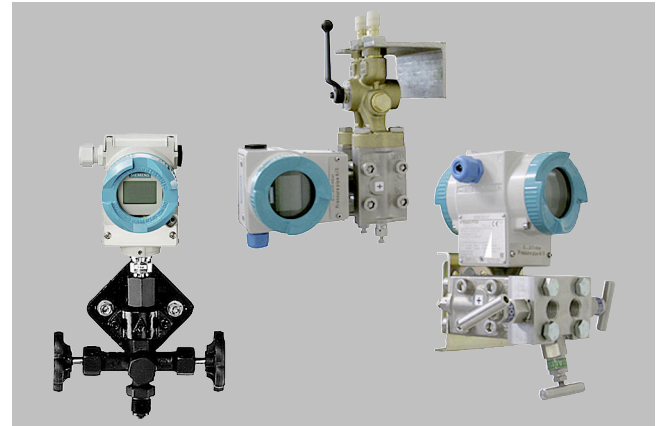
The maximum operating temperatures are given for each valve or valve manifold.

The minimum operating temperatures depend on the material used for the valves or valve manifold. They are:

Material	Minimum operating temperature
Brass	-10 °C (+14 °F) according to EN 12516-4
Steel	-10 °C (+14 °F) according to AD200-W10
Stainless steel	-40 °C (-40 °F)

Overview (continued)

Pressure transmitters with shut-off fittings – mounting examples



SITRANS P transmitter for gauge pressure with double shut-off valve, SITRANS P differential pressure transmitter with multiway cock or 3-spindle valve manifold



SITRANS P transmitter for differential pressure with 3-way valve manifold, 3-spindle valve manifold or valve manifold combination DN 5/DN 8



SITRANS P pressure transmitter for differential pressure, mounted in protective box (available on request)

Pressure measurement

Fittings

Introduction

Overview (continued)



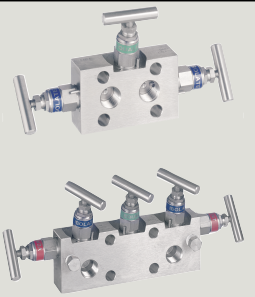


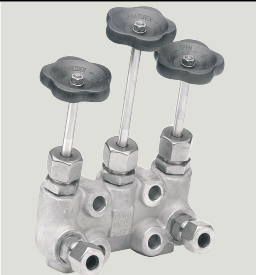
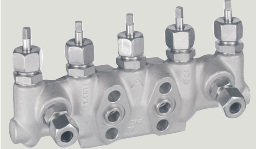
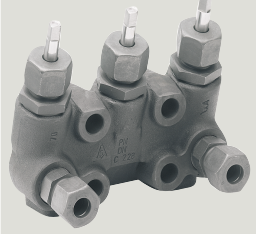
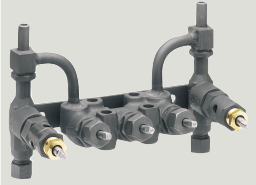

SITRANS P pressure transmitter mounted on "Monoflange" valve combination for direct connection to flanges (available on request)

Pressure measurement


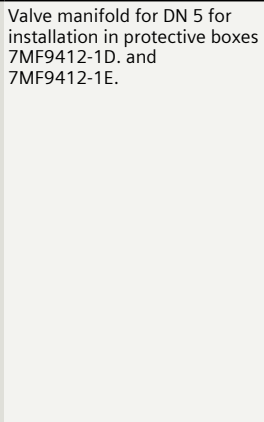

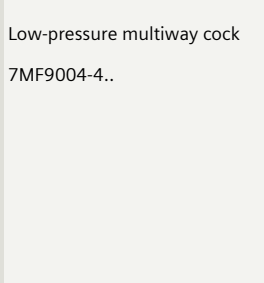
Fittings

Introduction

Configuration (continued)

Transmitters	Shut-off valves for general applications	Shut-off valves for special applications
<p>Differential pressure transmitter with process connection according to IEC 61518/EN 61518 e.g.</p> <ul style="list-style-type: none"> SITRANS P 320/420 7MF034-..... 7MF044-..... 	<p>3/5-spindle valve manifold DN 5 7MF9411-5B. and 7MF9411-5C.</p>  <p>PN 100 multiway cock 7MF9004-...</p>  	<p>3-way valve manifold DN 5 forged version 7MF9410-1..</p>  <p>5-way valve manifold DN 5 forged version 7MF9410-3..</p>  <p>3-way valve manifold DN 8 forged version 7MF9416-1.. and 7MF9416-2..</p>  <p>Valve manifold combination DN 5/DN 8 for vapor measure- ment 7MF9416-6..</p>  <p>Valve manifold combination DN 8 for vapor measurement 7MF9416-4..</p> 

Configuration (continued)

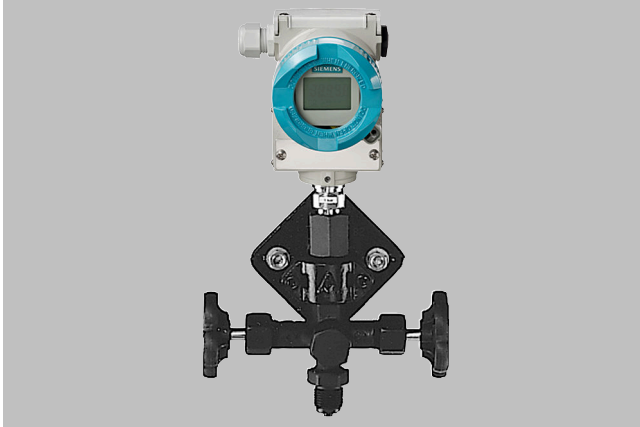
Transmitters	Shut-off valves for general applications	Shut-off valves for special applications
<p>Differential pressure transmitter with process connection according to IEC 61518/EN 61518 e.g.</p> <ul style="list-style-type: none"> SITRANS P 320/420 7MF034-..... 7MF044-..... 	<p>PN 100 multiway cock 7MF9004-...</p> 	<p>Valve manifold for DN 5 for installation in protective boxes 7MF9412-1D. and 7MF9412-1E.</p>  <p>Valve manifold for vertical differential pressure line 7MF9413-1..</p>  <p>Low-pressure multiway cock 7MF9004-4..</p> 

Pressure measurement

Fittings

Shut-off valves for gauge and absolute pressure / Shut-off valves acc. to DIN 16270, DIN 16271 and DIN 16272

Overview



Pressure transmitters with double shut-off valve 7MF9401-...

The shut-off valves for pressure gauges are used to shut off the measured medium line for corrosive and non-corrosive gases, vapors and liquids.

Design

A siphon is installed in front of the shutoff valve for measured materials with temperatures above 120 °C. The form B shut-off valves have a shaft with which a measuring instrument holder can be attached. No adapter is therefore required for fastening these valves. With double shut-off valves DN 5, the air-release/test connection can be shut off. This enables a zero point check on the pressure gauge. In addition, a characteristic curve test can be conducted on the pressure gauge using an external pressure sensor. The valve packing material is PTFE.

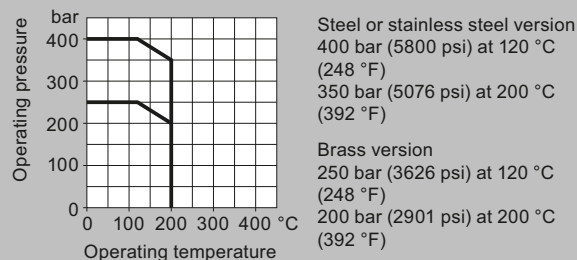
Shut-off valves for gauge and absolute pressure / Shut-off valves acc. to DIN 16270, DIN 16271 and DIN 16272

Selection and ordering data

		Article No.
Shut-off valves, form B, DIN 16270		
Without test collar, connection shank, without certificate		
Material valve enclosure	Max. permissible operating overpressure	
CW614N (CuZn39Pb3) (mat. no. 2.0402)	250 bar (3626 psi)	7MF9401-7AA
P250GH (mat. no. 1.0460)	400 bar (5800 psi)	7MF9401-7AB
X 6 CrNiMoTi 17 12 2 (mat. no. 1.4571/316Ti)	400 bar (5800 psi)	7MF9401-7AC
Shut-off valves, form B, DIN 16271		
With test collar, connection shank, without certificate		
Material valve enclosure	Max. permissible operating overpressure	
CW614N (CuZn39Pb3) (mat. no. 2.0402)	250 bar (3626 psi)	7MF9401-7BA
P250GH (mat. no. 1.0460)	400 bar (5800 psi)	7MF9401-7BB
X 6 CrNiMoTi 17 12 2 (mat. no. 1.4571/316Ti)	400 bar (5800 psi)	7MF9401-7BC
Shut-off valves, form B, DIN 16270		
Without test collar, cutting ring 12 S EN ISO 8434-1, without certificate		
Material valve enclosure	Max. permissible operating overpressure	
P250GH (mat. no. 1.0460)	400 bar (5800 psi)	7MF9401-8AB
X 6 CrNiMoTi 17 12 2 (mat. no. 1.4571/316Ti)	400 bar (5800 psi)	7MF9401-8AC
Shut-off valves, form B, DIN 16271		
With test collar, cutting ring 12 S EN ISO 8434-1, without certificate		
Material valve enclosure	Max. permissible operating overpressure	
P250GH (mat. no. 1.0460)	400 bar (5800 psi)	7MF9401-8BB
X 6 CrNiMoTi 17 12 2 (mat. no. 1.4571/316Ti)	400 bar (5800 psi)	7MF9401-8BC
Double shut-off valves, form B, DIN 16272		
With test collar, connection shank, without certificate		
Material valve enclosure	Max. permissible operating overpressure	
CW614N (CuZn39Pb3) (mat. no. 2.0402)	250 bar (3626 psi)	7MF9401-7DA
P250GH (mat. no. 1.0460)	400 bar (5800 psi)	7MF9401-7DB
X 6 CrNiMoTi 17 12 2 (mat. no. 1.4571/316Ti)	400 bar (5800 psi)	7MF9401-7DC
Double shut-off valves, form B, DIN 16272		
With test collar, cutting ring 12 S EN ISO 8434-1, without certificate		
Material valve enclosure	Max. permissible operating overpressure	
P250GH (mat. no. 1.0460)	400 bar (5800 psi)	7MF9401-8DB
X 6 CrNiMoTi 17 12 2 (mat. no. 1.4571/316Ti)	400 bar (5800 psi)	7MF9401-8DC
Accessories		
Factory certificate according to EN 10204-2.2		7MF9000-8AB
Material inspection certificate to EN 10204-3.1		7MF9000-8AD

Measuring instrument holders, see under "Accessories for shut-off valves and double shut-off valves".

Characteristic curves



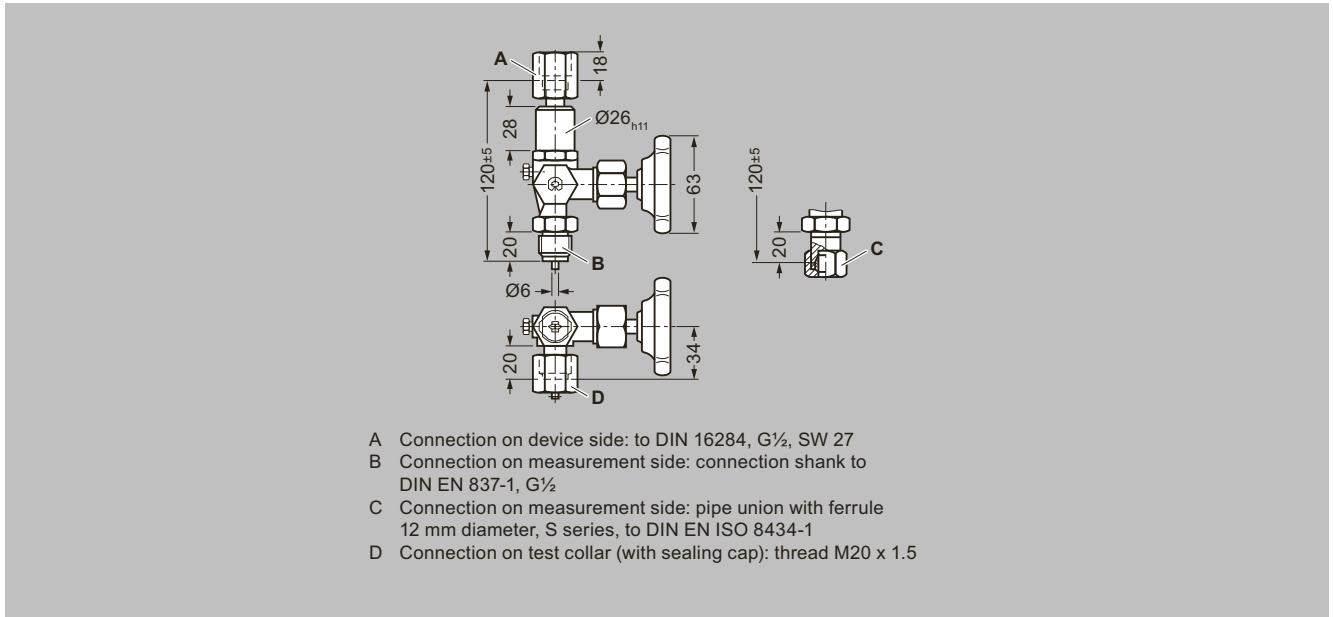
Permissible operating overpressure depends on the permissible operating temperature

Pressure measurement

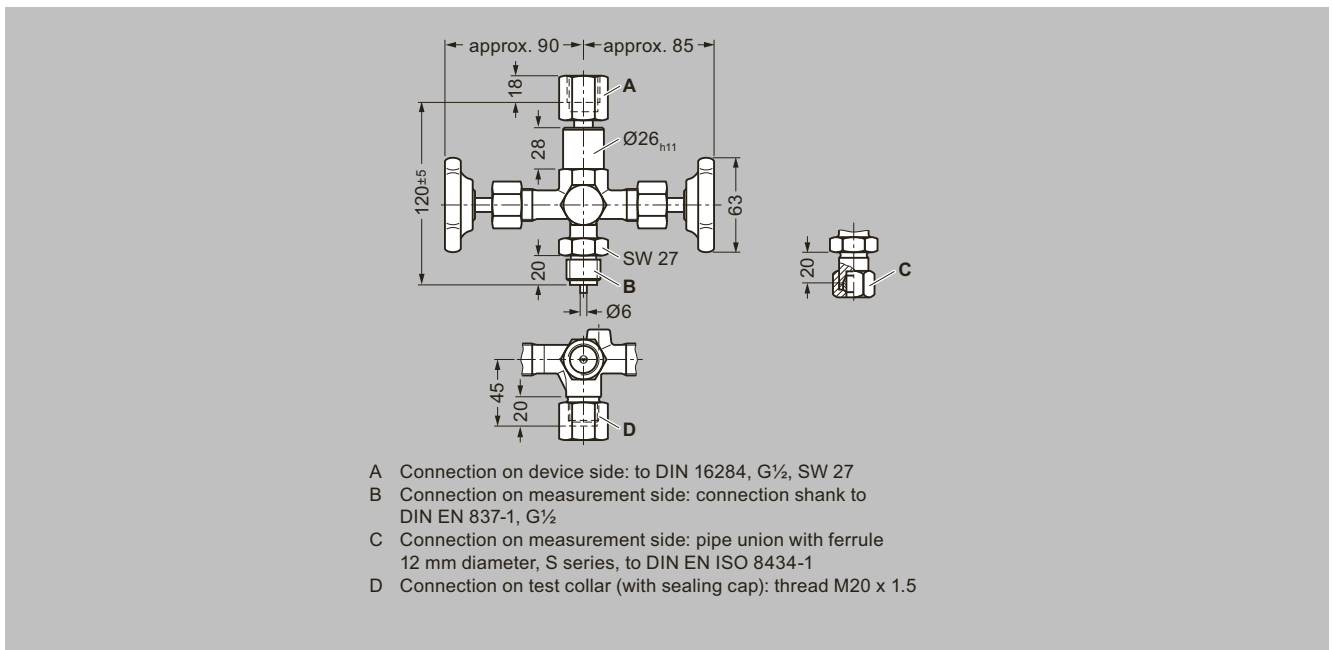
Fittings

Shut-off valves for gauge and absolute pressure / Shut-off valves acc. to DIN 16270, DIN 16271 and DIN 16272

Dimensional drawings



Shut-off valve, Form B, dimension drawing, dimensions in mm



Double shut-off valve, Form B, dimension drawing, dimensions in mm

Overview



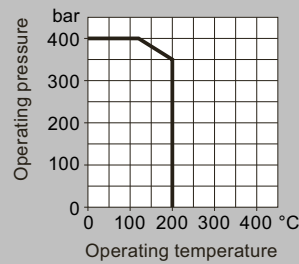
P300 pressure transmitters with shut-off valve and angled adapter

The angled adapter serves to allow transmitters with display on top to be read from the front.

Selection and ordering data

	Article No.
Angled adapter	7MF9401-7WA
Material: X 12 CrNiMoTi 17 12 2 (mat. no. 1.45714/316Ti), max. permissible operating overpressure 400 bar (5800 psi)	
Accessories	
Factory certificate according to EN 10204-2.2	7MF9000-8AB
Material inspection certificate to EN 10204-3.1	7MF9000-8AD

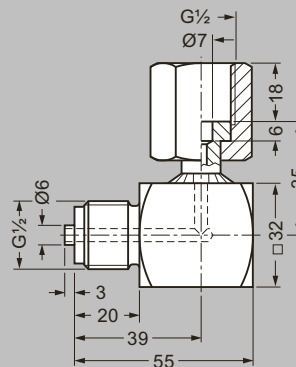
Characteristic curves



Stainless steel version
 400 bar (5800 psi) at 120 °C
 (248 °F)
 350 bar (5076 psi) at 200 °C
 (392 °F)

Permissible operating overpressure depends on the permissible operating temperature

Dimensional drawings



Angled adapter, dimensions in mm

Pressure measurement

Fittings

Shut-off valves for gauge and absolute pressure / Shut-off valves

Overview

The double shut-off valves DN 5 are suitable for pressure measuring devices and pressure transmitters and available in 5 versions:

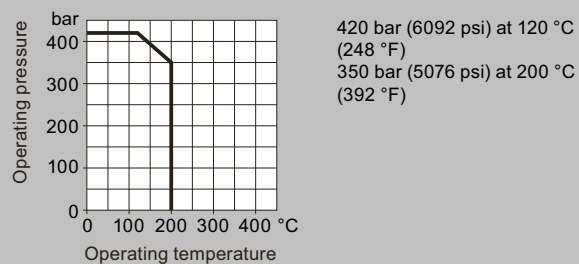
- Sleeve-nipple
- Sleeve-sleeve
- Sleeve-collar
- Collar-collar
- Collar-sleeve

The valve packing material is PTFE.

Selection and ordering data

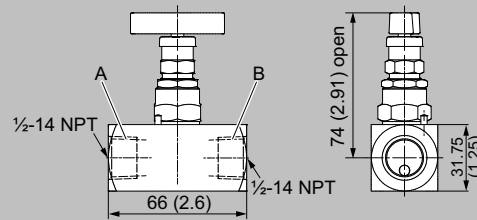
Shut-off valves DN 5	Article No.
Material: X 6 CrNiMoTi 17 13 2 (mat. no. 1.4404/316L), max. permissible operating overpressure 420 bar (6092 psi) • Sleeve-sleeve	7MF9011-3HA
Double shut-off valves DN 5 Material: X 6 CrNiMoTi 17 13 2 (mat. no. 1.4404/316L), max. permissible operating overpressure 420 bar (6092 psi) • Sleeve-nipple • Sleeve-sleeve • Sleeve-collar • Collar-collar • Collar-sleeve	7MF9011-4EA 7MF9011-4HA 7MF9011-4FA 7MF9011-4GA 7MF9011-4KA
Accessories Factory certificate according to EN 10204-2.2 Material inspection certificate to EN 10204-3.1	7MF9000-8AB 7MF9000-8AD
Options Add "-Z" to article number and specify order code. Oil-free and grease-free cleaned version for oxygen applications, max. pressure PN 100 (1450 psi) and max. temperature 60 °C (140 °F) Suitable for hydrogen applications in ventilated environment	Order code S12 S22
Certification according to NACE MR-0175 Including inspection certificate 3.1 according to EN 10204	D07

Characteristic curves



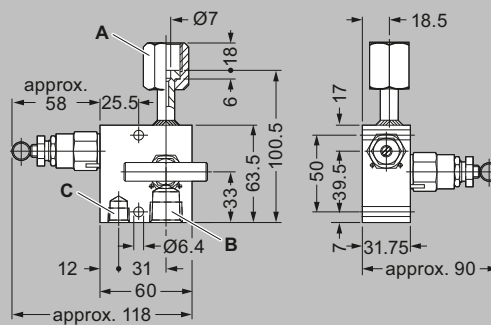
Permissible operating overpressure depends on the permissible operating temperature

Dimensional drawings



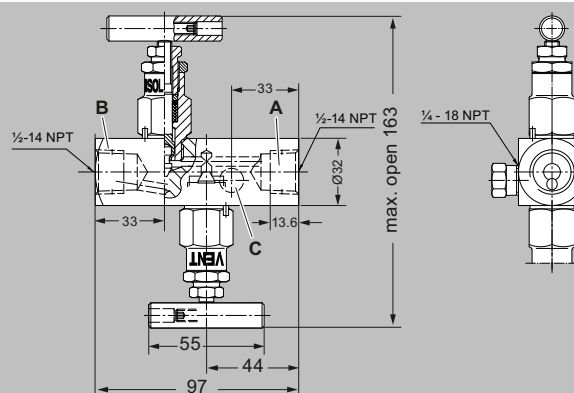
- A Connection on device side: 1/2-14 NPT
 B Connection on measurement side: 1/2-14 NPT

Shut-off valve DN 5 (sleeve-sleeve) 7MF9011-3HA, dimensions in mm (inch)



- A Connection on device side: nipple to DIN 16284, G1/2, SW 27
 B Connection on measurement side: 1/2-14 NPT
 C Vent and test connection: 1/4-18 NPT

Double shut-off valve DN 5 (sleeve-nipple connection) 7MF9011-4EA, dimensions in mm (inch)



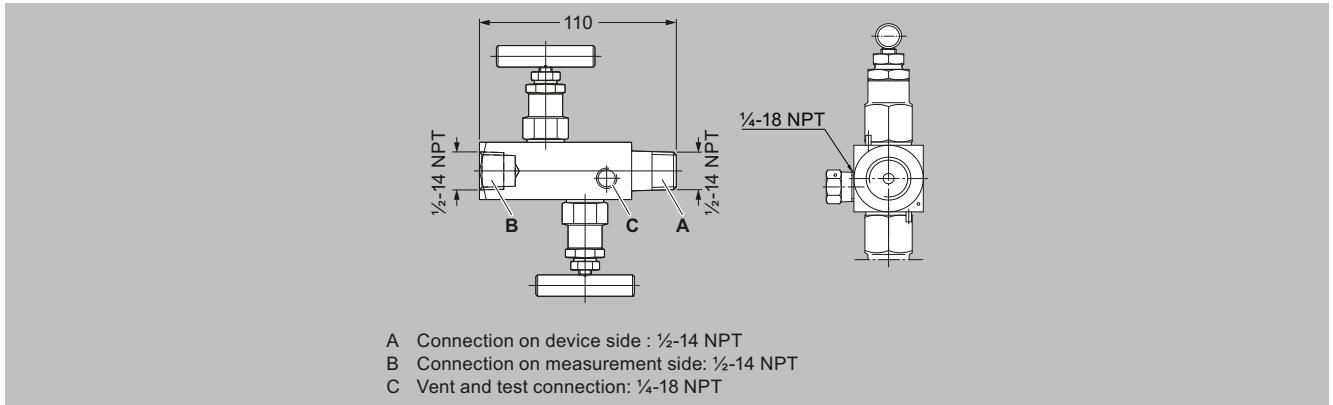
Double shut-off valve DN 5 (sleeve-sleeve) 7MF9011-4HA, dimensions in mm (inch)

Pressure measurement

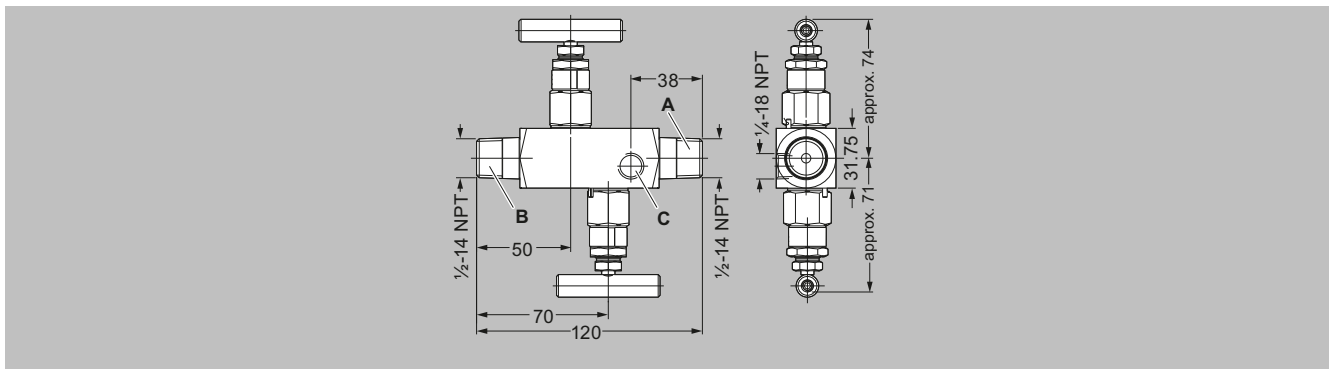
Fittings

Shut-off valves for gauge and absolute pressure / Shut-off valves

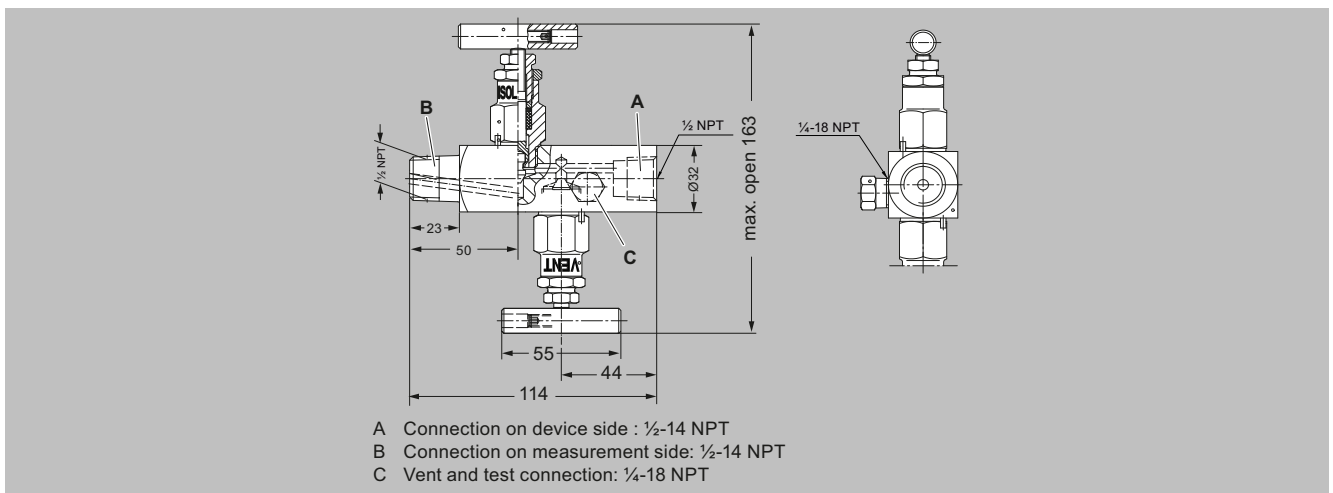
Dimensional drawings (continued)



Double shut-off valve DN 5 (sleeve-collar) 7MF9011-4FA, dimensions in mm (inch)



Double shut-off valve DN 5 (collar-collar) 7MF9011-4GA, dimensions in mm (inch)



Double shut-off valve DN 5 (collar-sleeve) 7MF9011-4KA, dimensions in mm (inch)

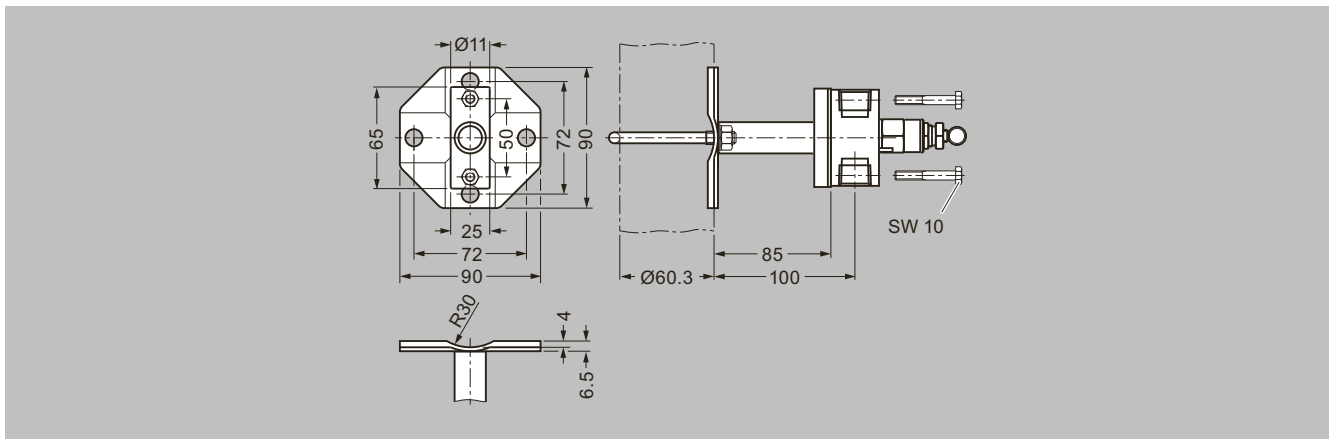
Overview

The mounting kit is suitable for the double shut-off valves 7MF9011-4.A and for wall, rack and tube mounting.

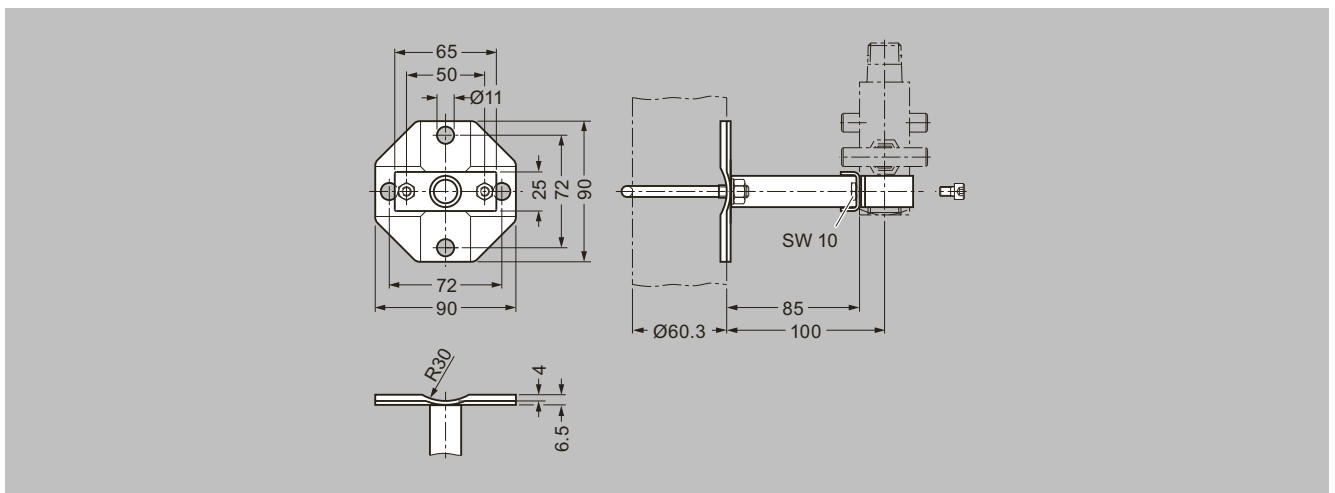
Selection and ordering data

Mounting set for shut-off valves	Article No.
7MF9011-4DA and -4EA Made of stainless steel, scope of delivery: 1 × mounting brackets 2 × hexagon head screws M6x40 1 × mounting bracket 2 × washers 8.4 according to DIN 125 2 × hexagon nut M8 according to EN 24032	7MF9011-8AB
7MF9011-4FA, -4GA, 4HA, -4KA and -3HA Made of stainless steel, scope of delivery: 1 × mounting brackets 2 × hexagon head screws M6x10 1 × mounting bracket 2 × washers 8.4 according to DIN 125 2 × hexagon nut M8 according to EN 24032	7MF9011-8AC

Dimensional drawings



Mounting bracket (7MF9011-8AB) for shut-off valves 7MF9011-4DA and 7MF9011-4EA for wall, rack or pipe mounting, dimensions in mm



Mounting bracket (7MF9011-8AC) for shut-off valves 7MF9011-4FA and 7MF9011-4GA for wall, rack or pipe mounting, dimensions in mm

Pressure measurement

Fittings

Shut-off valves for gauge and absolute pressure / Accessories for shut-off valves / Measuring instrument holder

Overview

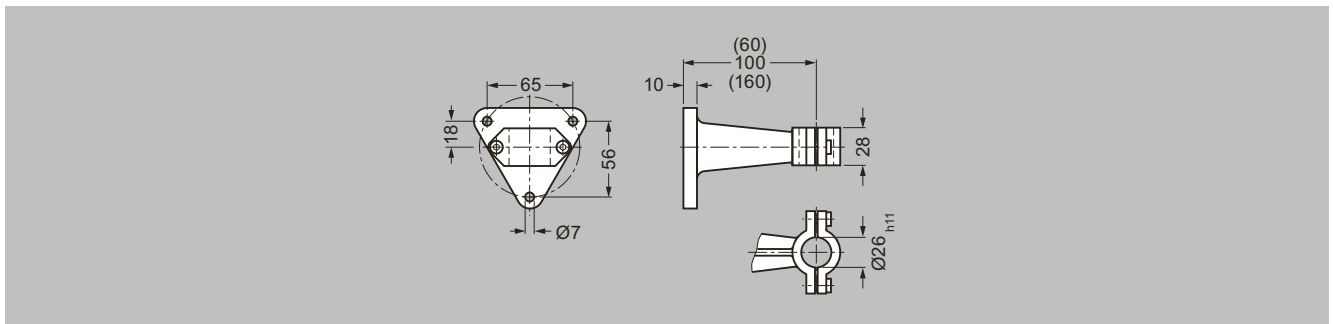
The measuring instrument holders are required to mount the following devices:

- Pressure gauges with threaded connection underneath
- Shut-off valves according to DIN 16270, DIN 16271 and DIN 16272 (7MF9401-7.. and 7MF9401-8..)

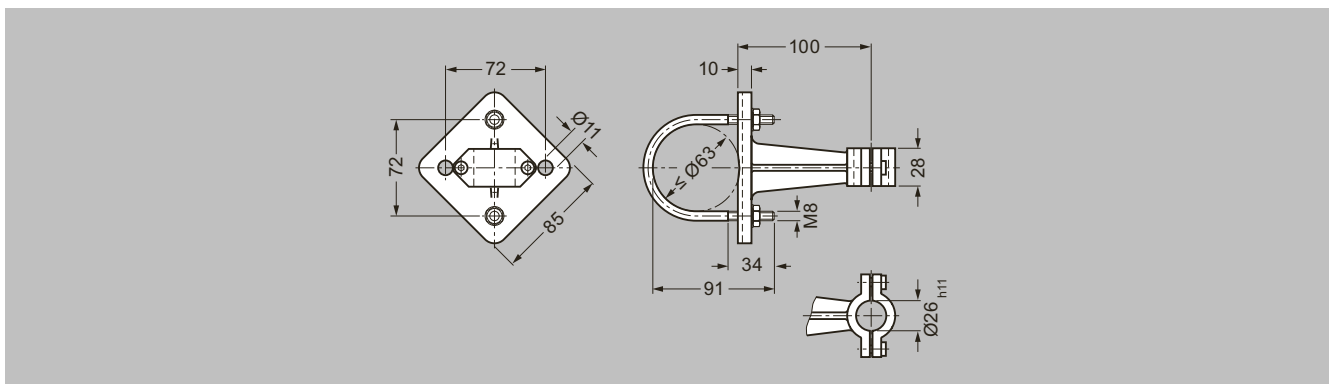
Selection and ordering data

	Article No.
Measuring instrument holder, form H, DIN 16281 (E.g. for pressure gauge) Out of aluminum alloy, painted black, for wall mounting , removable holder lid	
• Projection length 60 mm	M56340-A0046
• Projection length 100 mm	M56340-A0047
Measuring instrument holder, form A, DIN 16281 (E.g. for integrator) Out of malleable cast iron, zinc-plated and primed; for wall mounting , fastened to a rack or mounting rail (horizontal/vertical); removable holder lid	M56340-A0053
Measuring instrument holder, form A, DIN 16281 (E.g. for transmitter) Out of malleable cast iron, zinc-plated and primed; with pipe collar for wall and pipe mounting (horizontal/vertical); removable holder lid	M56340-A0079

Dimensional drawings



Measuring instrument holder form H for wall mounting M56340-A0046/-A0047, dimensions in mm



Measuring instrument holder form A for wall and pipe mounting M56340-A0053/-A0079, dimensions in mm

Shut-off valves for differential pressure / DN 5 2-, 3- and 5-spindle valve manifold

Overview



The 2-spindle, 3-spindle and 5-spindle valve manifolds 7MF9411-5.. are for pressure transmitters for absolute pressure or gauge pressure.

The valve manifolds are used to shut off the differential pressure lines and to check the transmitter zero point.

The 2-spindle and the 5-spindle valve manifolds also enable venting on the transmitter side and checking of the pressure transmitter characteristic.

Benefits

- Max. operating overpressure 420 bar (6092 psi)
- Each available in version for oxygen

Application

The spindle valve manifolds DN 5 are designed for liquids and gases.

A version for oxygen is also available on request.

Design

All versions of the valve manifolds have a process connection $\frac{1}{2}$ -14 NPT. The connection for the pressure transmitter is always designed as a flange connection according to IEC 61518/EN 61518, Form A. The 2-spindle and the 5-spindle valve manifold have a vent and test connection $\frac{1}{4}$ -18 NPT in addition.

The valves have an external spindle thread.

Materials used

Component	Material	Mat. no.
Enclosure	X 2 CrNiMo 17 13 2	1.4404/316L
Cones	X 6 CrNiMoTi 17 12 2	1.4571/316Ti
Spindles	X 2 CrNiMo 18 10	1.4404/316L
Head parts	X 5 CrNiMo 18 10	1.4401/316
Packings	PTFE	-

Function

Functions of all valve manifolds:

- Shutting off the differential pressure lines
- Monitoring of pressure transmitter zero point

Additional functions of the 2-spindle or 5-spindle valve manifolds via the venting and test connection:

- Venting on transmitter side
- Monitoring of the pressure transmitter characteristic

Pressure measurement

Fittings

Shut-off valves for differential pressure / DN 5 2-, 3- and 5-spindle valve manifold

Selection and ordering data

Valve manifolds DN 5	Article No.	●	●	A
<p>Click the article number for online configuration in the PIA Life Cycle Portal.</p> <p>For liquids and gases, for flanging to pressure transmitter for absolute and differential pressure, max. operating overpressure 420 bar, (order accessory kit using order code), without certificate</p> <ul style="list-style-type: none"> • 2-spindle valve manifold • 3-spindle valve manifold • 5-spindle valve manifold 	7MF9411-			
			5	A
			5	B
			5	C

Accessories

Factory certificate EN 10204-2.2	7MF9000-8AB
Material inspection certificate to EN 10204-3.1	7MF9000-8AD

Options ¹⁾	Order code	Article No.
Add "Z" to article number and specify order code.		
Accessory kit according to EN (Connection valve manifold – pressure transmitter)		
<u>For valve manifold 7MF9411-5A.</u>		
2 × screws $\frac{7}{16}$ -20 UNF × 1¼ inches according to ASME B18.2.1; chromated steel	K35	7MF9411-7DB
1 × flat sealing made of PTFE, max. permissible 420 bar (6092 psi), 80 °C (176 °F)		
2 × screws $\frac{7}{16}$ -20 UNF × 1¼ inches according to ASME B18.2.1; stainless steel	K45	7MF9411-7DC
1 × flat sealing made of PTFE, max. permissible 420 bar (6092 psi), 80 °C (176 °F)		
<u>For valve manifold 7MF9411-5B. and -5C.</u>		
4 × screws $\frac{7}{16}$ -20 UNF × 1¼ inches according to ASME B18.2.1; chromated steel	K36	7MF9411-5DB
2 × flat sealings made of PTFE, max. permissible 420 bar (6092 psi), 80 °C (176 °F)		
4 × screws $\frac{7}{16}$ -20 UNF × 1¼ inches according to ASME B18.2.1; stainless steel	K46	7MF9411-5DC
2 × flat sealings made of PTFE, max. permissible 420 bar (6092 psi), 80 °C (176 °F)		
Accessory kit according to DIN²⁾ (Connection valve manifold – pressure transmitter)		
<u>For valve manifold 7MF9411-5A.</u>		
2 × screws M10×45 according to EN 24014; chromated steel	K15	7MF9411-7BB
2 × washers Ø 10.5 mm according to DIN 125;		
1 × flat sealing made of PTFE, max. permissible 420 bar (6092 psi), 80 °C (176 °F)		
2 × screws M10×45 according to EN 24014; stainless steel	K25	7MF9411-7BC
2 × washers Ø 10.5 mm according to DIN 125, stainless steel;		
1 × flat sealing made of PTFE, max. permissible 420 bar (6092 psi), 80 °C (176 °F)		
<u>For valve manifold 7MF9411-5B. and -5C.</u>		
4 × screws M10×45 according to EN 24014; chromated steel	K16	7MF9411-6BB
4 × washers Ø 10.5 mm according to DIN 125;		
2 × flat sealings made of PTFE, max. permissible 420 bar (6092 psi), 80 °C (176 °F); flange connection with screws M10 only permissible up to PN 160.		
4 × screws M10×45 according to EN 24014; stainless steel	K26	7MF9411-6BC
4 × washers Ø 10.5 mm according to DIN 125, stainless steel;		
2 × flat sealings made of PTFE, max. permissible 420 bar (6092 psi), 80 °C (176 °F); flange connection with screws M10 only permissible up to PN 160		

Shut-off valves for differential pressure / DN 5 2-, 3- and 5-spindle valve manifold

Selection and ordering data (continued)

Options ¹⁾	Order code	Article No.
Mounting plate		
<ul style="list-style-type: none"> For valve manifold, made of electrogalvanized sheet steel 		
<ul style="list-style-type: none"> For wall mounting or fastening on rack (72 mm grid), weight 0.5 kg Scope of delivery: 1 × mounting plate with fixing screws for mounting on valve manifold 	M11	7MF9006-6EA
<ul style="list-style-type: none"> For pipe mounting, weight 0.7 kg Scope of delivery: 1 × mounting plate M11, 2 × pipe collar with nuts and washers (for pipe with max. Ø 60.3 mm) and fixing screws for mounting on valve manifold 	M12	7MF9006-6GA
<ul style="list-style-type: none"> For valve manifold, made of stainless steel 316L 		
<ul style="list-style-type: none"> For wall mounting or fastening on rack (72 mm grid), weight 0.5 kg Scope of delivery: 1 × mounting plate with fixing screws for mounting on valve manifold 	M21	7MF9006-6EC
<ul style="list-style-type: none"> For pipe mounting, weight 0.7 kg Scope of delivery: 1 × mounting plate M21, 2 × pipe collar with nuts and washers (for pipe with max. Ø 60.3 mm) 	M22	7MF9006-6GC
Valve manifold 100 bar		
Oil-free and grease-free cleaned version for oxygen applications, max. pressure PN 100 (1450 psi) and max. temperature 60 °C (140 °F)		
<ul style="list-style-type: none"> For 7MF9411-5A. 	S12	
<ul style="list-style-type: none"> For 7MF9411-5B. 	S13	
<ul style="list-style-type: none"> For 7MF9411-5C. 	S14	
Suitable for hydrogen applications in ventilated environment	S22	
Certification according to NACE MR-0175	D07	
Including inspection certificate 3.1 according to EN 10204		

¹⁾ If accessory kit or mounting brackets are ordered together with the valve manifolds, please use order code; otherwise, use the article number.

²⁾ Flange connections according to DIN 19213 only permissible up to PN 160 (2321 psi).

Pressure measurement

Fittings

Shut-off valves for differential pressure / DN 5 2-, 3- and 5-spindle valve manifold

Accessories

Accessory set for 2-, 3- and 5-spindle valve manifolds

2-spindle valve manifold DN 5

- K35: 2 screws $\frac{7}{16}$ -20 UNF x 1 $\frac{3}{4}$ inch to ASME B18.2.1, 1 flat gasket
- K15: 2 screws M10x45 according to EN 24 014, 2 washers, 1 flat gasket

3-spindle and 5-way valve manifold DN 5

- K36: 4 screws $\frac{7}{16}$ -20 UNF x 1 $\frac{3}{4}$ inch to ASME B18.2.1, 2 flat gaskets
- K16: 4 screws M10x45 according to EN 24 014, 4 washers, 2 flat gaskets

Washers \varnothing 10.5 according to DIN 125

Flat gaskets made of PTFE, max. permissible 420 bar (6092 psi), 80 °C (176 °F)

Note: Flange connection with M10 screws only permissible up to PN 160!

Mounting plate

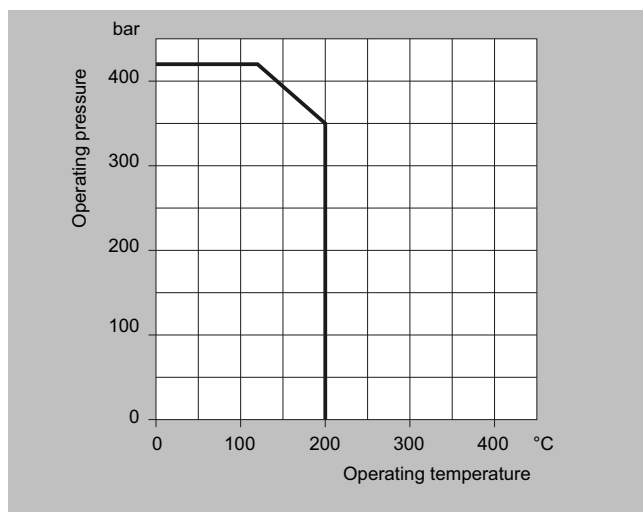
Made of electrogalvanized sheet-steel

- M11: For wall mounting or for securing on rack (72 mm grid)
Scope of delivery:
 - 1 mounting plate with bolts for mounting on valve manifold
- M12: For pipe mounting
Scope of delivery:
 - 1 mounting plate M11
 - 2 pipe brackets with nuts and washers for pipes with max. \varnothing 60.3 mm

Valve manifold 100 bar, suitable for oxygen

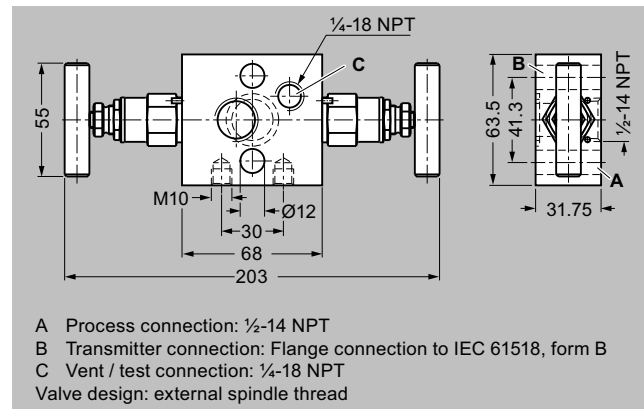
- S12: For 2-way valve manifold
- S13: For 3-way valve manifold
- S14: For 5-way valve manifold

Characteristic curves

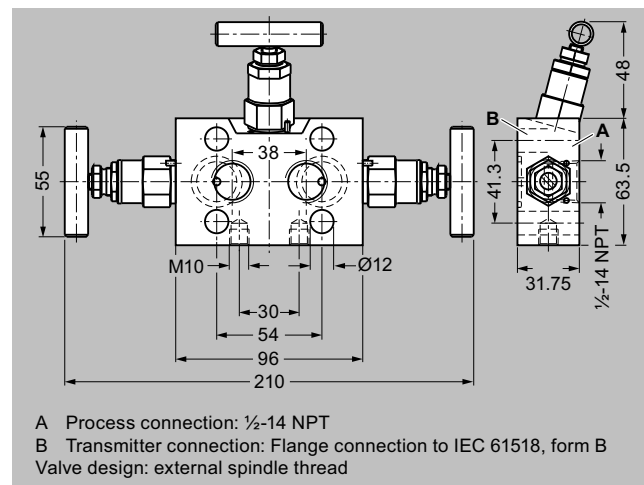


Valve manifolds DN 5 (7MF9411-5..), permissible operating overpressure depends on the permissible operating temperature

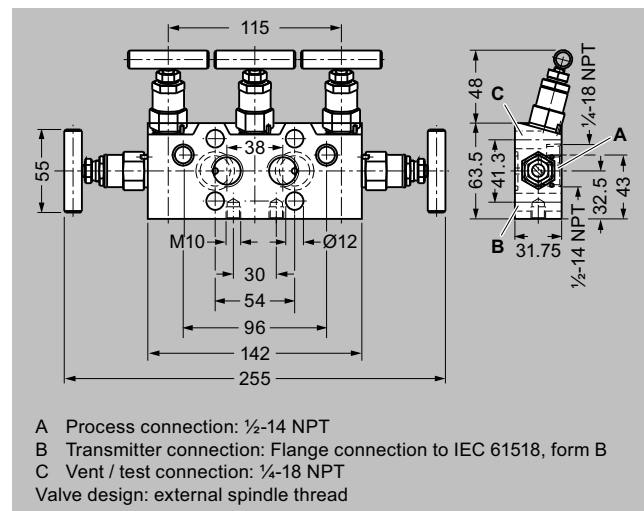
Dimensional drawings



2-spindle valve manifold DN 5 (7MF9411-5A.), dimensions in mm

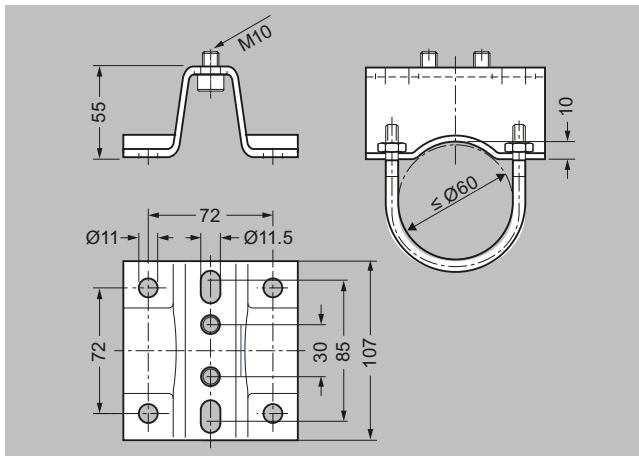


3-spindle valve manifold DN 5 (7MF9411-5B.), dimensions in mm



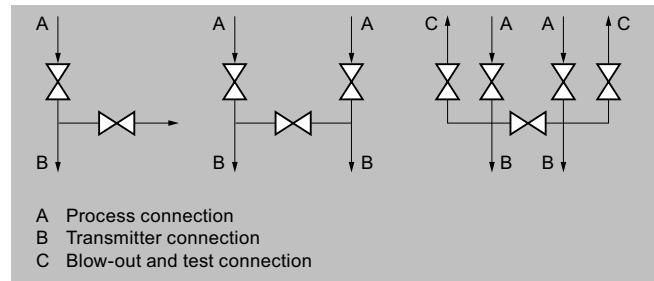
5-spindle valve manifold DN 5 (7MF9411-5C.), dimensions in mm

Dimensional drawings (continued)



Mounting plate 7MF9006-6.. (M11, M12) for valve manifold, dimensions in mm

Circuit diagrams



2-spindle, 3-spindle and 5-spindle valve manifold DN 5, connections

Pressure measurement

Fittings

Shut-off valves for differential pressure / PN 100 multiway cock

Overview



The multiway cock PN 100 (1450 psi) can be flanged to pressure transmitters for differential pressure.

Benefits

- Version for corrosive liquids, gases and vapors available
- Robust design
- Oil- and grease-free variant possible
- One-hand operation

Application

The PN 100 (1450 psi) multiway cock is available in versions for corrosive and non-corrosive liquids, gases and vapors.

Design

The multiway cock can be flanged with four screws to pressure transmitters for differential pressure.

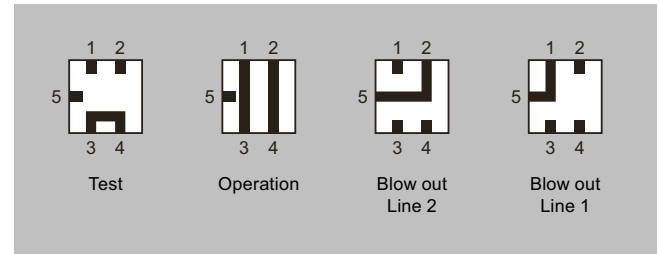
The PN 100 (1450 psi) has 2 process connections and one blow-out connection. A steel version of the multiway cock is available for non-corrosive media, and a stainless steel version for corrosive media. The enclosure is forged in one piece. The switching lever is removable.

Sealing can be improved during operation.

Note: An accessory set is always required for flanging of the multiway cock to a differential pressure transmitter:

Function

- Shutting off the differential pressure lines
- Blowing out differential pressure lines
- Checking the zero point of the pressure transmitter.



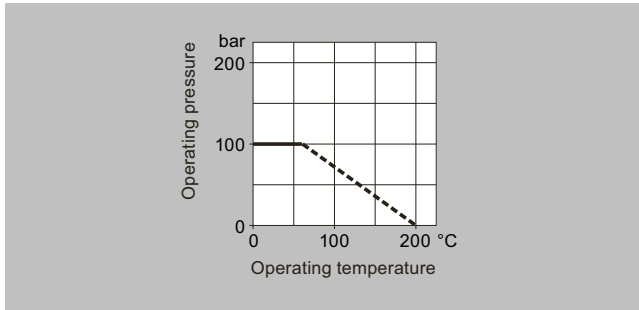
Cock settings, the symbols are on the cock

Pressure measurement

Fittings

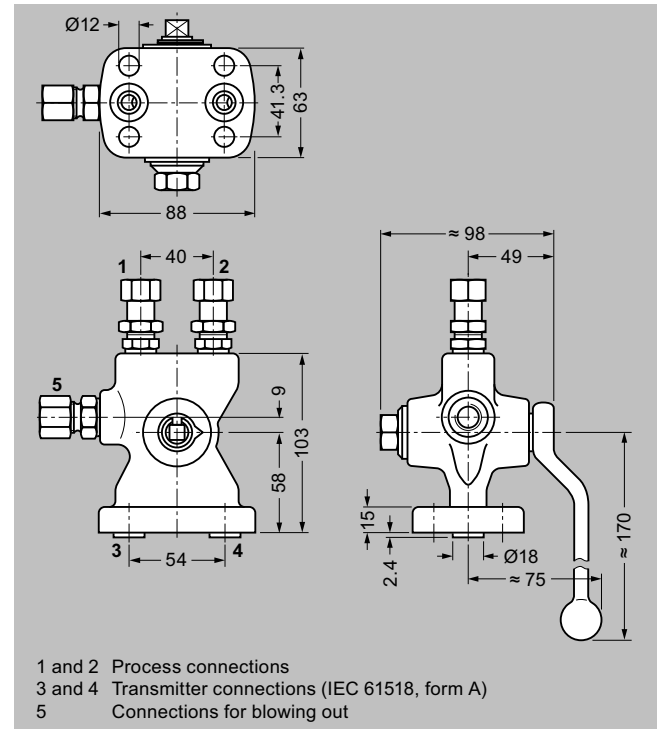
Shut-off valves for differential pressure / PN 100 multiway cock

Characteristic curves

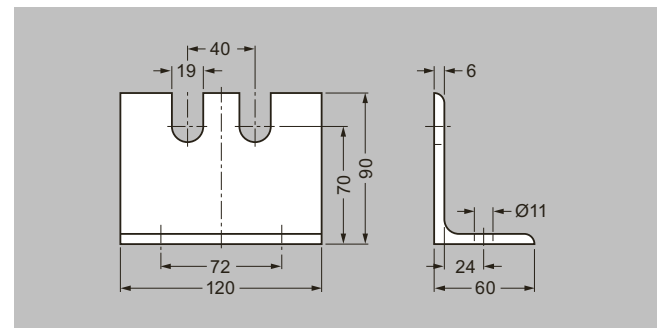


Multiway cock PN 100 (1450 psi), permissible operating pressure as a function of the permissible operating temperature

Dimensional drawings



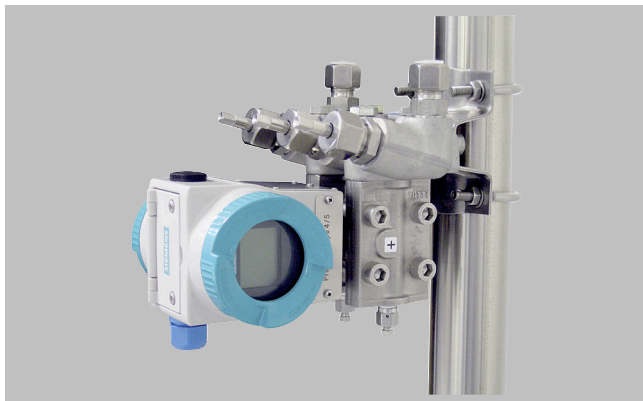
Multiway cock 7MF9004-1P. for flanging to pressure transmitter for differential pressure, dimensions in mm



Mounting bracket 7MF9004-6AA (M13), dimensions in mm

Shut-off valves for differential pressure / DN 5 3-way and 5-way valve manifold

Overview



The 3-way and 5-way valve manifolds DN 5 (7MF9410-1../-3..) are used to shut off the differential pressure lines and to check the transmitter zero point.

The 5-way valve manifold also enables blowing out of differential pressure lines.

Benefits

- Available for corrosive and non-corrosive liquids and gases
- Max. working pressure 420 bar (6092 psi), with version for oxygen max. 100 bar (1450 psi)

Application

The 3-way and 5-way valve manifolds are available in versions for corrosive and non-corrosive liquids and gases.

Wall mounting, securing on rack and tube mounting are possible with the appropriate mounting plate.

Design

The process connection of the 3-way and 5-way valve manifolds is a pipe union with cutting ring.

Both valve manifolds have 2 flange connections for connecting a pressure transmitter.

The 5-way valve manifold also has 2 blowout connections.

Depending on the version, the valve manifold has 3 or 5 valves, each with an internal spindle thread.

Materials used

Component	For non-corrosive liquids and gases		For corrosive liquids and gases	
	Material	Mat. no.	Material	Mat. no.
Enclosure	P250GH	1.0460	X 6 CrNiMoTi 17 12 2	1.4571/316Ti
Head parts	C 35	1.0501		
Spindles	X 12 CrMoS 17	1.4104		
Cones	X 35 CrMo 17 hardened and tempered	1.4122		
Valve seats	X 6 CrNiMoTi 17 12 2	1.4571/316Ti		
Packings	PTFE	-	PTFE	-

Function

- Shutting off the differential pressure lines
- Monitoring of transmitter zero point
- The 5-way valve manifold also enables blowing out of differential pressure lines.

Pressure measurement

Fittings

Shut-off valves for differential pressure / DN 5 3-way and 5-way valve manifold

Selection and ordering data

	Article No.		
DN 5 3-way valve manifold	7MF9410-	●	● A
Click the article number for online configuration in the PIA Life Cycle Portal.			
For flanging to pressure transmitter for differential pressure, process connection: Pipe union with cutting ring, max. operating overpressure 420 bar (6092 psi), weight 2.9 kg (order accessory kit and mounting plate using order code)			
<ul style="list-style-type: none"> For non-corrosive liquids and gases 		1	E
<ul style="list-style-type: none"> For corrosive liquids and gases 		1	F
DN 5 5-way valve manifold			
Click the article number for online configuration in the PIA Life Cycle Portal.			
For flanging to pressure transmitter for differential pressure, process connection: Pipe union with cutting ring, max. operating overpressure 420 bar (6092 psi), weight 4.4 kg (order accessory kit and mounting plate using order code)			
<ul style="list-style-type: none"> For non-corrosive liquids and gases 		3	E
<ul style="list-style-type: none"> For corrosive liquids and gases 		3	F

Accessories

Factory certificate EN 10204-2.2	7MF9000-8AB
Material inspection certificate to EN 10204-3.1	7MF9000-8AD

Options ¹⁾	Order code	Article No.
Add "Z" to article number and specify order code.		
Accessory kit according to EN		
(Required for flanging, weight 0.2 kg)		
4 x screws $7/16$ -20 UNF x $2\frac{1}{8}$ inches according to ASME B18.2.1; chromated steel	B31	7MF9010-5CC
2 x flat gaskets made of PTFE, max. permissible 420 bar (6092 psi), 80 °C (176 °F)		
4 x screws $7/16$ -20 UNF x $2\frac{1}{8}$ inches according to ASME B18.2.1; chromated steel	B34	7MF9410-5CA
2 x O-rings according to DIN 3771, 20 x 2.65 - S - FPM90, max. permissible 420 bar (6092 psi), 120 °C (248 °F)		
Accessory kit according to DIN²⁾		
(Required for flanging, weight 0.2 kg)		
4 x screws M10x55 according to EN 24014; chromated steel		
4 x washers Ø 10.5 mm according to DIN 125;		
2 x flat gaskets made of PTFE, max. permissible 420 bar (6092 psi), 80 °C (176 °F)		
<ul style="list-style-type: none"> Standard design 	B11	7MF9010-6AD
<ul style="list-style-type: none"> Version for oxygen 	B15	7MF9010-6AE
4 x screws M10x55 according to EN 24014; chromated steel	B16	7MF9010-6CC
4 x washers Ø 10.5 mm according to DIN 125;		
2 x O-rings according to DIN 3771, 20 x 2.65 - S - FPM90, max. permissible 420 bar (6092 psi), 120 °C (248 °F)		
Mounting plate		
For valve manifold, made of electrogalvanized sheet steel		
For wall mounting or for fastening on rack (72 mm grid), weight 0.5 kg	M11	7MF9006-6EA
Scope of delivery: 1 x mounting plate with bolts for mounting on valve manifold		
For pipe mounting , weight 0.7 kg	M12	7MF9006-6GA
Scope of delivery: 1 x mounting plate M11, 2 x pipe collars with nuts and washers (for pipes with max. Ø 60.3 mm)		
Valve manifold 100 bar		
Oil-free and grease-free cleaned version for oxygen applications, max. pressure PN 100 (1450 psi) and max. temperature 60 °C (140 °F)		
For 7MF9410-1F.	S13	
For 7MF9410-3F.	S14	
Certification according to NACE MR-0175	D07	
Including inspection certificate 3.1 according to EN 10204 (only for version 7MF9410-1FA and -3FA)		

¹⁾ If accessory kit or mounting brackets are ordered together with the valve manifolds, please use order code; otherwise, use the article number.

²⁾ Flange connections according to DIN 9213 only permissible up to PN 160 (2321 psi)!

Accessories

Accessory set for 3-way and 5-way valve manifold DN 5 for flanging

- B31: 4 screws $\frac{7}{16}$ -20 UNF x $2\frac{1}{8}$ inches to ASME B 18.2.1, 2 flat gaskets
- B34: 4 screws $\frac{7}{16}$ -20 UNF x $2\frac{1}{8}$ inches to ASME B 18.2.1, 2 O-rings (FPM 90)
- B11: 4 screws M10x55 according to EN 24014, 4 washers, 2 flat gaskets
- B15 (suitable for oxygen): 4 screws M10x55 according to EN 24014, 4 washers, 2 flat gaskets
- B16: 4 screws M10x55 according to EN 24014, 4 washers, 2 O-rings (FPM 90)

Washers \varnothing 10.5 according to DIN 125

Flat gaskets made of PTFE, max. permissible 420 bar (6092 psi), 80 °C (176 °F)

O-ring acc. to DIN 3771, 20 x 2.65 – S – FPM90, max. permissible 420 bar (6092 psi), 120 °C (176 °F)

Note: M10 screws only permissible up to PN 160 (2320 psi)!

Mounting plate

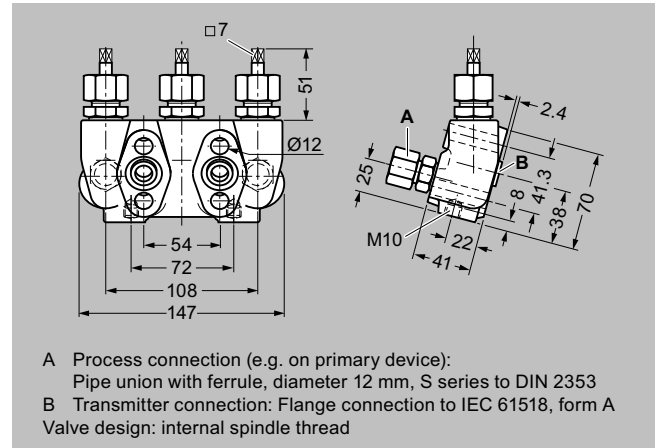
Made of electrogalvanized sheet-steel

- M11: For wall mounting or for securing on rack (72 mm grid)
Scope of delivery:
 - 1 mounting plate 7MF9006-6EA with bolts for mounting on valve manifold
- M12: For pipe mounting
scope of delivery:
 - 1 mounting plate M11
 - 2 pipe brackets with nuts and washers for pipes with max. \varnothing 60.3 mm

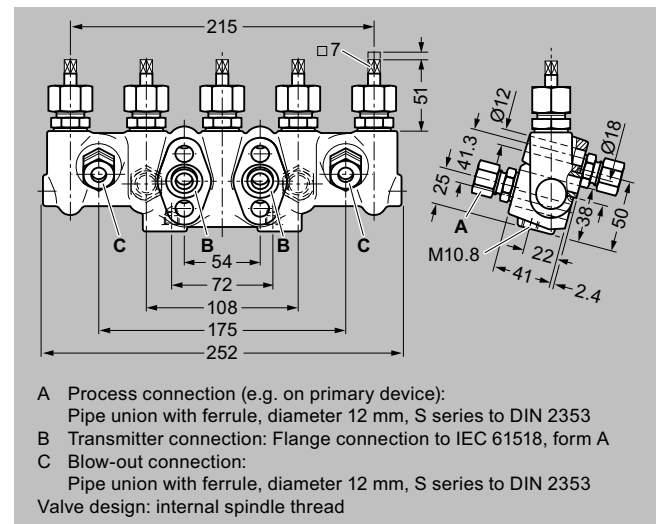
Valve manifold 100 bar, suitable for oxygen

S12: Only in combination with versions for corrosive liquids and gases

Dimensional drawings

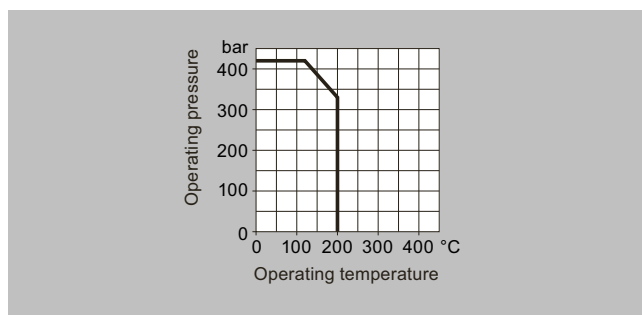


3-way valve manifold DN 5 (7MF9410-1..), dimensions in mm

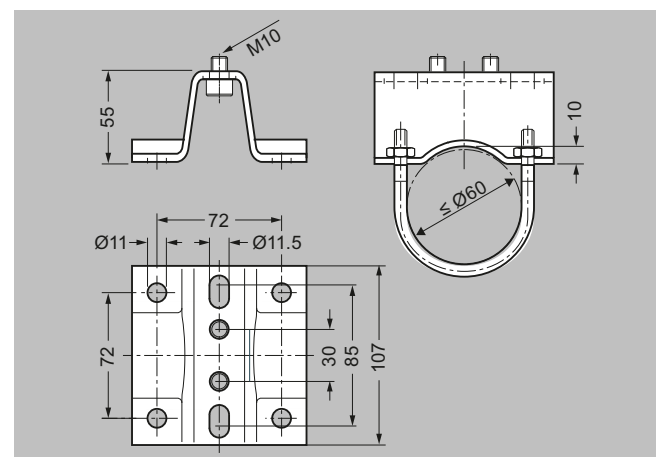


5-way valve manifold DN 5 (7MF9410-3..), dimensions in mm

Characteristic curves



Permissible operating overpressure depends on the permissible operating temperature



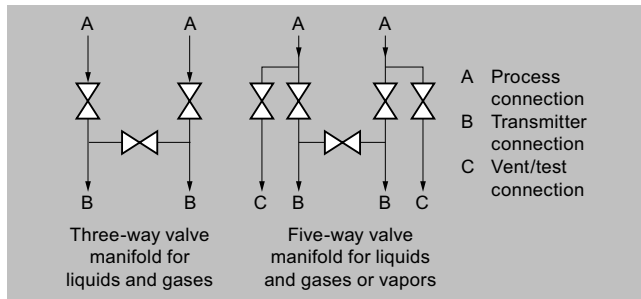
Mounting plate 7MF9006-6.. (M11, M12) for valve manifold, dimensions in mm

Pressure measurement

Fittings

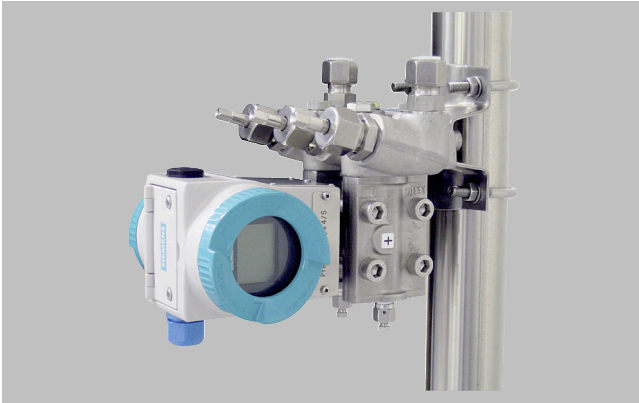
Shut-off valves for differential pressure / DN 5 3-way and 5-way valve manifold

Circuit diagrams



3-way and 5-way valve manifolds, schematic diagram

Overview



The 3-way valve manifold DN 8 (7MF9416-1../-2..) is for pressure transmitters for differential pressure. It is used to shut off the differential pressure lines and to check the transmitter zero point.

In the versions with test connection, a test device can be connected to check the characteristic of the pressure transmitter.

Benefits

- For corrosive and non-corrosive liquids and gases
- The maximum working pressure is 420 bar (6092 psi).

Application

The 3-way valve manifold is available in versions for corrosive and non-corrosive liquids and gases.

Wall mounting, securing on rack and tube mounting are possible with the appropriate mounting plate.

Design

In the version for non-corrosive measured mediums, you can choose between a pipe union with cutting ring and welding pins for the process connection.

The version for corrosive measuring media always has a pipe union with cutting ring.

The two versions are optionally available with a test connection M20x1.5.

The valves have an internal spindle thread.

Materials used

Component	For non-corrosive liquids and gases		For corrosive liquids and gases	
	Material	Mat. no.	Material	Mat. no.
Enclosure	P250GH	1.0460	X 6 CrNiMoTi 17 12 2	1.4571/316Ti
Head parts	C 35	1.0501		
Spindles	X 12 CrMoS 17	1.4104		
Cones	X 35 CrMo 17 hardened and tempered	1.4122		
Valve seats	X 6 CrNiMoTi 17 12 2	1.4571/316Ti		
Packings	PTFE	-	PTFE	-

Function

The 3-way valve manifold DN 8 fulfills two functions as standard:

- Shutting off the differential pressure lines
- Monitoring of pressure transmitter zero point

All versions are also available with test connection to which the test device can be connected to check the characteristic of the transmitter.

Pressure measurement

Fittings

Shut-off valves for differential pressure / DN 8 3-way valve manifold

Selection and ordering data

DN 8 3-way valve manifold	Article No. 7MF9416-	● ● A
Click the article number for online configuration in the PIA Life Cycle Portal.		
For flanging to the pressure transmitter for differential pressure, max. operating overpressure 420 bar (6092 psi), (order accessory kit and mounting plate using order code), without certificate		
For non-corrosive liquids and gases, process connection: Pipe union with cutting ring \varnothing 12 mm		
• Without test connection		1 B
• With test connection		1 C
For non-corrosive liquids and gases, process connection: Welding pins \varnothing 14 x 2.5		
• Without test connection		2 C
• With test connection		2 D
For corrosive liquids and gases, process connection: Pipe union with cutting ring \varnothing 12 mm		
• Without test connection		1 D
• With test connection		1 E

Accessories

Factory certificate EN 10204-2.2	7MF9000-8AB
Material inspection certificate to EN 10204-3.1	7MF9000-8AD

Options ¹⁾	Order code	Article No.
Add "-Z" to article number and specify order code.		
Accessory kit according to EN		
(Required for flanging, weight 0.2 kg)		
4 x screws $7/16$ -20 UNF x $2 1/8$ inches according to ASME B18.2.1; chromated steel 2 x flat gaskets made of PTFE, max. permissible 420 bar (6092 psi), 80 °C (176 °F)	B31	7MF9010-5CC
4 x screws $7/16$ -20 UNF x $2 1/8$ inches according to ASME B18.2.1; chromated steel 2 x O-rings according to DIN 3771, 20 x 2.65 - S - FPM90, max. permissible 420 bar (6092 psi), 120 °C (248 °F)	B34	7MF9410-5CA
Accessory kit according to DIN²⁾		
(Required for flanging, weight 0.2 kg)		
4 x screws M10x55 according to EN 24014; chromated steel 4 x washers \varnothing 10.5 mm according to DIN 125; 2 x flat gaskets made of PTFE, max. permissible 420 bar (6092 psi), 80 °C (176 °F)	B11	7MF9010-6AD
4 x screws M10x55 according to EN 24014; chromated steel 4 x washers \varnothing 10.5 mm according to DIN 125; 2 x O-rings according to DIN 3771, 20 x 2.65 - S - FPM90, max. permissible 420 bar (6092 psi), 120 °C (248 °F)	B16	7MF9010-6CC
Mounting plate		
For valve manifold, made of electrogalvanized sheet steel		
Forwall mounting or for fastening on rack (72 mm grid), weight 0.5 kg Scope of delivery: 1 x mounting plate with bolts for mounting on valve manifold	M11	7MF9006-6EA
For pipe mounting, weight 0.7 kg Scope of delivery: 1 x mounting plate M11, 2 x pipe collars with nuts and washers (for pipes with max. \varnothing 60.3 mm)	M12	7MF9006-6GA
Certification according to NACE MR-0175		
Including inspection certificate 3.1 according to EN 10204 (only for version 7MF9416-1DA and -1EA)	D07	

¹⁾ If accessory kit or mounting brackets are ordered together with the valve manifold, please use order code; otherwise, use the article number.
²⁾ Flange connections according to DIN 19213 only permissible up to PN 160 (2321 psi).

Accessories

Accessory set for 3-way valve manifold DN 8 for flanging

- B31: 4 screws $\frac{7}{16}$ -20 UNF x $2\frac{1}{8}$ inches to ASME B 18.2.1, 2 flat gaskets
- B34: 4 screws $\frac{7}{16}$ -20 UNF x $2\frac{1}{8}$ inches to ASME B 18.2.1, 2 O-rings (FPM 90)
- B11: 4 screws M10x55 according to EN 24014, 4 washers, 2 flat gaskets
- B16: 4 screws M10x55 according to EN 24014, 4 washers, 2 O-rings (FPM 90)

Washers \varnothing 10.5 according to DIN 125

Flat gaskets made of PTFE, max. permissible 420 bar (6092 psi), 80 °C (176 °F)

O-ring acc. to DIN 3771, 20 x 2.65 – S – FPM90, max. permissible 420 bar (6092 psi), 120 °C (248 °F)

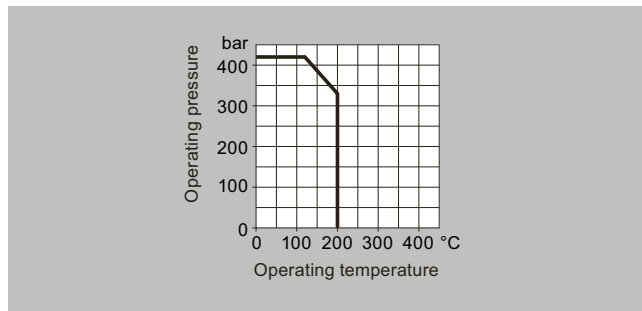
Note: M10 screws only permissible up to PN 160 (2320 psi)!

Mounting plate

Made of electrogalvanized sheet-steel

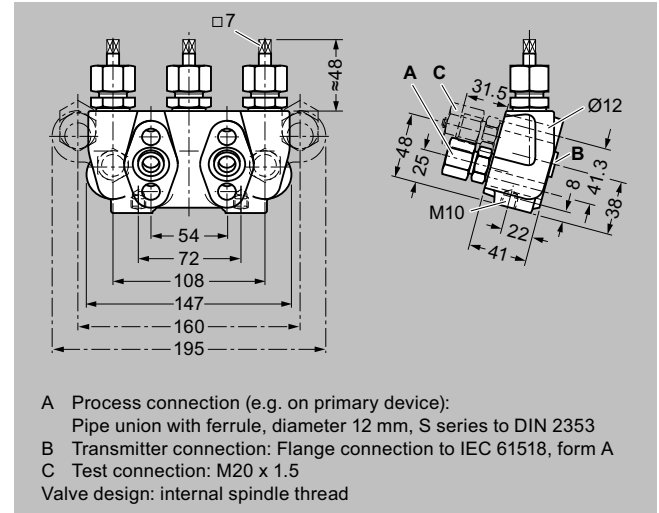
- M11: For wall mounting or for securing on rack (72 mm grid)
Scope of delivery:
 - 1 mounting plate with bolts for mounting on valve manifold
- M12: For pipe mounting
scope of delivery:
 - 1 mounting plate M11
 - 2 pipe brackets with nuts and washers for pipes with max. \varnothing 60.3 mm

Characteristic curves

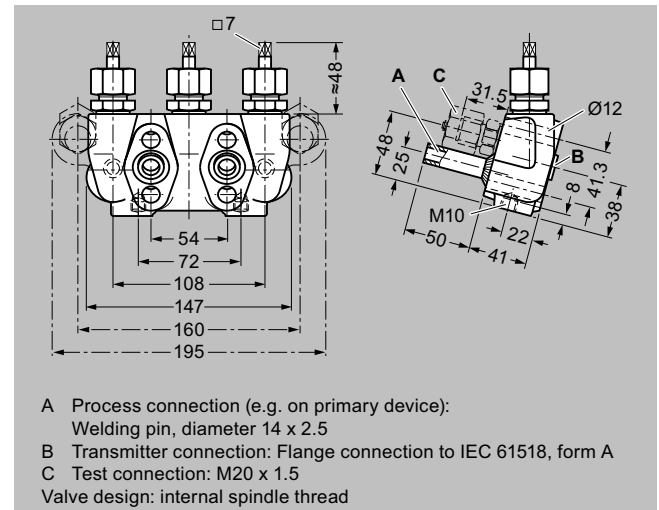


3-way valve manifold DN 8, permissible operating overpressure depends on the permitted operating temperature

Dimensional drawings



3-way valve manifold DN 8 (7MF9416-1..) with pipe union, dimensions in mm



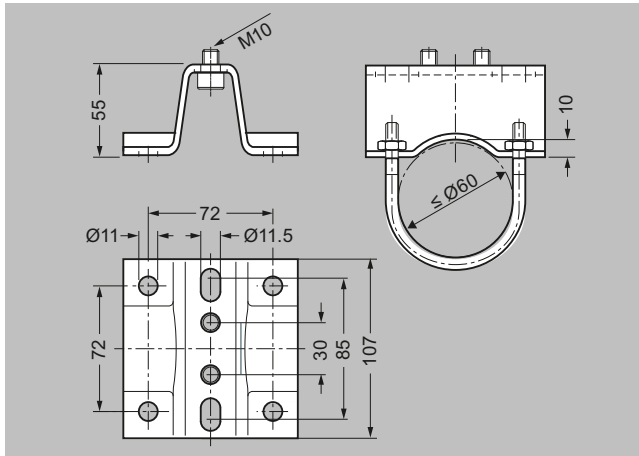
3-way valve manifold DN 8 (7MF9416-2..) with welding pins, dimensions in mm

Pressure measurement

Fittings

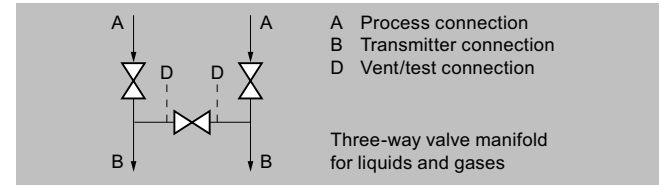
Shut-off valves for differential pressure / DN 8 3-way valve manifold

Dimensional drawings (continued)



Mounting plate 7MF9006-6.. (M11, M12) for valve manifold, dimensions in mm

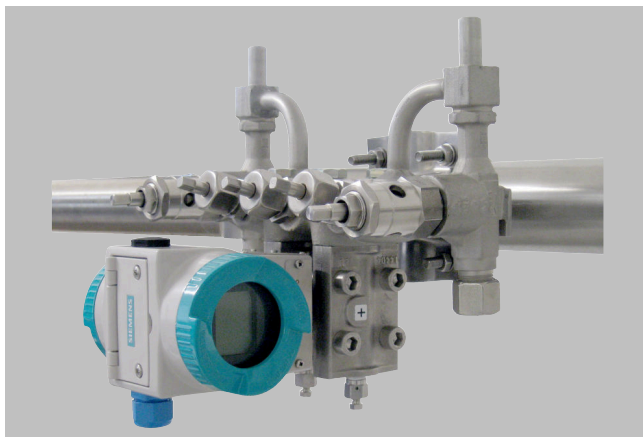
Circuit diagrams



3-way valve manifold DN 8, schematic diagram

Shut-off valves for differential pressure / DN 5/DN 8 valve manifold combination

Overview



The valve manifold combination DN 5/DN 8 (7MF9416-6..) is for pressure transmitters for differential pressure.

The combination is used to shut off and blow out the differential pressure lines and to check the transmitter zero point.

In the versions with test connection, a test device can be connected to check the characteristic of the pressure transmitter.

Benefits

Max. operating overpressure 420 bar (6092 psi)

Application

The valve manifold combination DN 5/DN 8 is designed for vapors.

Design

The valve manifold combination DN 5/DN 8 has a process connection with welding pins.

The connection for the pressure transmitter is designed as a flange connection, the blowout connection as a pipe union with cutting ring.

The block valves have an internal spindle thread, the blowout valves have an external spindle thread.

The optional test connections are M20x1.5.

Materials used

	Valve manifold DN 5		Blowout valves DN 8	
Component	Material	Mat. No.	Material	Mat. No.
Enclosure	P250GH	1.0460	16 Mo 3	1.5415
Head parts	C 35	1.0501	21 CrMo V 57	1.7709
Spindles	X 12 CrMoS 17	1.4104	X 20 Cr 13	1.4021
Cones	X 35 CrMo 17	1.4122	X 35 CrMo 17 hardened and tempered	1.4122
Valve seats	X 6 CrNiMoTi	1.4571/316Ti	X 20 Cr 13	1.4021
Packings	PTFE	-	Pure graphite	-
Welding pins	-	-	16 Mo 3	1.5415

Function

- Shutting off the differential pressure lines
- Blowing out differential pressure lines
- Monitoring of pressure transmitter zero point

A version with test connection to which a test device to check the characteristic of the pressure transmitter can be connected can be ordered optionally.

Pressure measurement

Fittings

Shut-off valves for differential pressure / DN 5/DN 8 valve manifold combination

Selection and ordering data

DN 5/DN 8 valve manifold combination for vapors	Article No.	6	●	A
Click the article number for online configuration in the PIA Life Cycle Portal. For flanging to the pressure transmitter for differential pressure, max. operating overpressure 420 bar (6092 psi), available in stainless steel on request (order accessory kit using order code), without certificate	7MF9416-			
<ul style="list-style-type: none"> Without test connection With test connection M20 × 1.5 				C D

Accessories

Factory certificate EN 10204-2.2	7MF9000-8AB
Material inspection certificate to EN 10204-3.1	7MF9000-8AD

Options ¹⁾	Order code	Article No.
Add "-Z" to article number and specify order code.		
Accessory kit according to EN (Required for flanging, weight 0.2 kg) 4 × screws $7/16$ -20 UNF × 2 $1/8$ inches according to ASME B18.2.1; chromated steel 2 × O-rings according to DIN 3771, 20 × 2.65 - S - FPM90, max. permissible 420 bar (6092 psi), 120 °C (248 °F)	B34	7MF9410-5CA
Accessory kit according to DIN²⁾ (Required for flanging, weight 0.2 kg) 4 × screws M10×55 according to DIN EN 24014; chromated steel 4 × washers Ø 10.5 mm according to DIN 125; 2 × O-rings according to DIN 3771, 20 × 2.65 - S - FPM90, max. permissible 420 bar (6092 psi), 120 °C (248 °F)	B16	7MF9010-6CC

1) If accessory kit is ordered together with the valve manifold combination, please use order code; otherwise, use the article number.

2) Flange connections according to DIN 19213 only permissible up to PN 160 (2321 psi).

Accessories

Accessory set for valve manifold combination DN 5/DN 8 for flanging

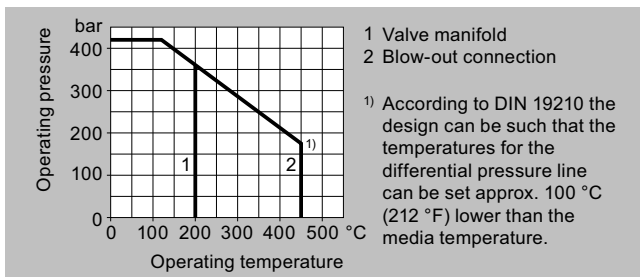
- B34: 4 screws $7/16$ -20 UNF × 2 $1/8$ inches to ASME B 18.2.1, 2 O-rings (FPM 90)
- B16: 4 screws M10x55 according to EN 24014, 4 washers, 2 O-rings (FPM 90)

Washers Ø 10.5 according to DIN 125

O-ring acc. to DIN 3771, 20 × 2.65 – S – FPM90, max. permissible 420 bar (6092 psi), 120 °C (248 °F)

Note: M10 screws only permissible up to PN 160 (2321 psi)!

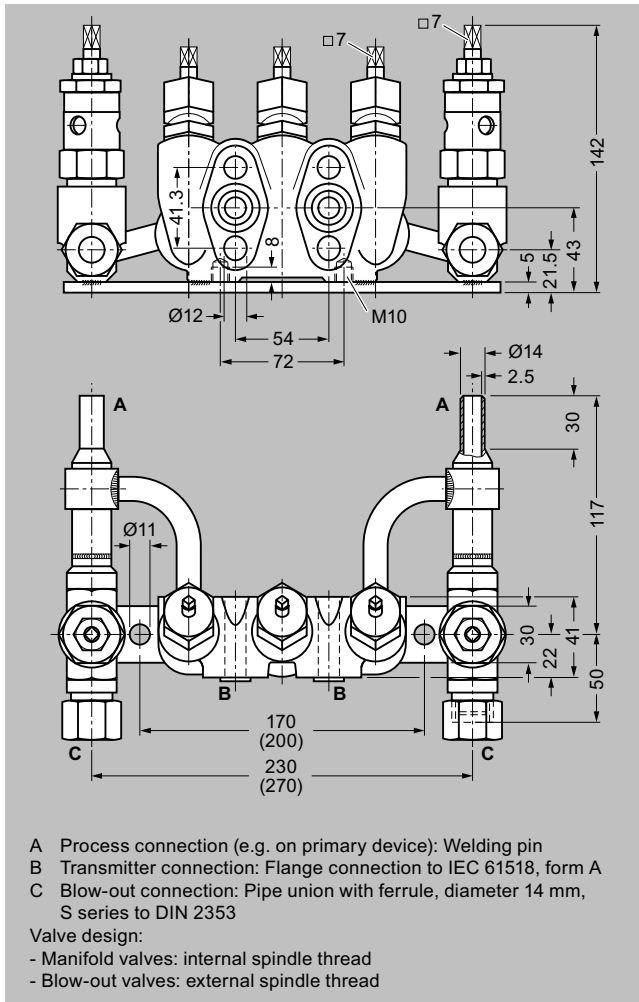
Characteristic curves



Permissible operating overpressure depends on the permissible operating temperature

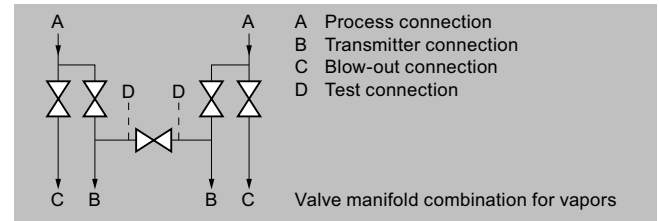
Shut-off valves for differential pressure / DN 5/DN 8 valve manifold combination

Dimensional drawings



Valve manifold combination DN 5/DN 8 (7MF9416-6C.), dimensions in mm (deviating dimensions for 7MF9416-6D. in brackets)

Circuit diagrams



DN 5/DN 8 valve manifold combination, connections

Pressure measurement

Fittings

Shut-off valves for differential pressure / DN 8 valve manifold combination

Overview



The valve manifold combination DN 8 (7MF9416-4..) is for pressure transmitters for differential pressure.

They are used to shut off and blow out the differential pressure lines and to check the transmitter zero point.

In the versions with test connection, a test device can be connected to check the characteristic of the pressure transmitter.

Benefits

Max. operating overpressure 420 bar (6092 psi)

Application

The valve manifold combination DN 8 is designed for vapors.

Design

The valve manifold combination DN 8 has a process connection with welding pins.

The connection for the pressure transmitter is designed as a flange connection, the blowout connection as a pipe union with cutting ring.

The block valves have an internal spindle thread, the blowout valves have an external spindle thread.

The optional test connection is M20x1.5.

The valve manifold combination DN 8 is supplied with a mounting plate.

Materials used

Component	Valve manifold		Blowout valves	
	Material	Mat. No.	Material	Mat. No.
Enclosure	P250GH	1.0460	16 Mo 3	1.5415
Head parts	C 35	1.0501	21 CrMo V 57	1.7709
Spindles	X 12 CrMoS 17	1.4104	X 20 Cr 13	1.4021
Cones	X 35 CrMo 17	1.4122	X 35 CrMo 17 hardened and tempered	1.4122
Valve seats	X 6 CrNiMoTi	1.4571/316Ti	X 20 Cr 13	1.4021
Packings	PTFE	-	Pure graphite	-
Welding pins	-	-	16 Mo 3	1.5415

Shut-off valves for differential pressure / DN 8 valve manifold combination

Function

- Shutting off the differential pressure lines
- Blowing out differential pressure lines
- Monitoring of pressure transmitter zero point

A version with test connection to which a test device to check the characteristic of the pressure transmitter can be connected can be ordered optionally.

Selection and ordering data

DN 8 valve manifold combination for vapors	Article No. 7MF9416-	• • A
Click the article number for online configuration in the PIA Life Cycle Portal.		
For flanging to the pressure transmitter for differential pressure, with mounting plate, max. operating overpressure 420 bar (6092 psi), available in stainless steel on request (order accessory kit using order code), without certificate		
• Without test connection		4 C
• With test connection M20 × 1.5		4 D

Accessories

Factory certificate EN 10204-2.2	7MF9000-8AB
Material inspection certificate to EN 10204-3.1	7MF9000-8AD

Options ¹⁾	Order code	Article No.
Add "-Z" to article number and specify order code.		
Accessory kit according to EN (Required for flanging, weight 0.2 kg) 4 × screws $7/16$ -20 UNF × $2\frac{1}{8}$ inches according to ASME B18.2.1; chromated steel 2 × O-rings according to DIN 3771, 20 × 2.65 - S - FPM90, max. permissible 420 bar, 120 °C (248 °F)	B34	7MF9410-5CA
Accessory kit according to DIN²⁾ (Required for flanging, weight 0.2 kg) 4 × screws M10×55 according to EN 24014; chromated steel 4 × washers Ø 10.5 mm according to DIN 125; 2 × O-rings according to DIN 3771, 20 × 2.65 - S - FPM90, max. permissible 420 bar, 120 °C (248 °F)	B16	7MF9010-6CC

¹⁾ If accessory kit is ordered together with the valve manifold combination, please use order code; otherwise, use the article number.

²⁾ Flange connections according to DIN 19213 only permissible up to PN 160 (2321 psi).

Accessories

Accessory set for valve manifold combination DN 8 for flanging

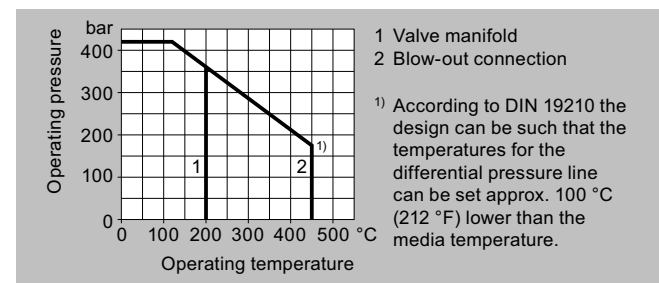
- B34: 4 screws $7/16$ -20 UNF × $2\frac{1}{8}$ inches to ASME B 18.2.1, 2 O-rings (FPM 90)
- B16: 4 screws M10x55 according to EN 24 014, 4 washers, 2 O-rings (FPM 90)

Washers Ø 10.5 according to DIN 125

O-ring acc. to DIN 3771, 20 × 2.65 – S – FPM90, max. permissible 420 bar (6092 psi), 120 °C (248 °F)

Note: M10 screws only permissible up to PN 160 (2321 psi)!

Characteristic curves



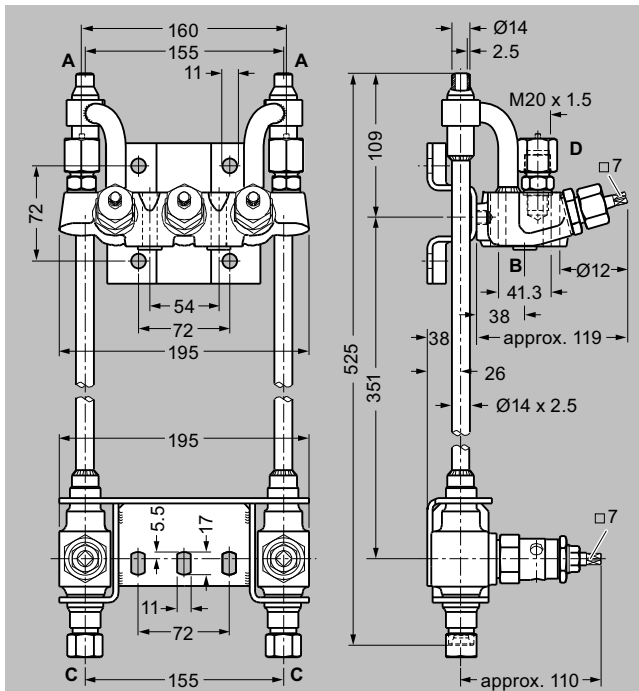
Permissible operating overpressure depends on the permissible operating temperature

Pressure measurement

Fittings

Shut-off valves for differential pressure / DN 8 valve manifold combination

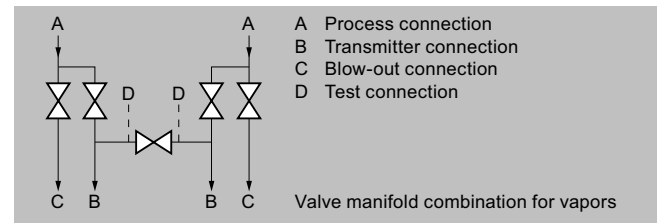
Dimensional drawings



- A Process connection (e.g. on primary device): Welding pin
 B Transmitter connection: Flange connection to IEC 61518, form A
 C Blow-out connection:
 Pipe union with ferrule, diameter 14 mm, S series to DIN 2353
 D Test connection (only with Article No. 7MF9416-4D.): M20 x 1.5
 Valve design:
 - Manifold valves: internal spindle thread
 - Blow-out valves: external spindle thread

Valve manifold combination DN 8 (7MF9416-4..), dimensions in mm

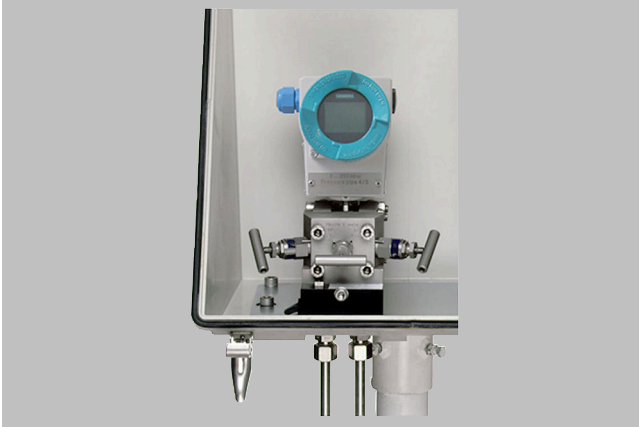
Circuit diagrams



DN 8 valve manifold combination, connections

Shut-off valves for differential pressure / 2-, 3- and 5-spindle valve manifold for protective casing

Overview



The 2-spindle, 3-spindle and 5-spindle valve manifolds (7MF9412-1..) are used to shut off the differential pressure lines and to check the pressure transmitter zero point.

The 2-spindle and the 5-spindle valve manifolds also enable venting on the transmitter side and checking of the pressure transmitter characteristic.

These valve manifolds are designed for installation in protective boxes. However, using a mounting bracket, they can also be used for wall, frame or pipe mounting.

Application

The DN 5 valve manifolds are designed for liquids and gases and for installation in protective boxes.

A version for oxygen is also available on request.

Design

All versions of the spindle valve manifolds have a process connection $\frac{1}{2}$ -14 NPT.

The connection for the pressure transmitter is always designed as a flange connection according to IEC 61518/EN 61518, Form A.

The 2-spindle and the 5-spindle valve manifold have a vent and test connection $\frac{1}{4}$ -18 NPT in addition.

The valves have an external spindle thread.

Materials used:

Component	Material	Mat. no.
Enclosure	X 2 CrNiMo 17 13 2	1.4404/316L
Cones	X 6 CrNiMoTi 17 12 2	1.4571/316Ti
Spindles	X 2 CrNiMo 18 10	1.4404/316L
Head parts	X 5 CrNiMo 18 10	1.4401/316
Packings	PTFE	-

Function

Functions of all valve manifolds:

- Shutting off the differential pressure lines
- Monitoring of pressure transmitter zero point

Additional functions of the 2-spindle or 5-spindle valve manifolds via the venting and test connection:

- Venting on transmitter side
- Monitoring of the pressure transmitter characteristic

Shut-off valves for differential pressure / 2-, 3- and 5-spindle valve manifold for protective casing

Selection and ordering data (continued)

Options ¹⁾	Order code	Article No.
• For valve manifold 7MF9412-1D.	M17	7MF9006-6NA
• For valve manifold 7MF9412-1E.	M18	7MF9006-6PA
Mounting bracket		
2 units, for fastening the mounting bracket to the pipe	M16	7MF9006-6KA
Valve manifold 100 bar		
Oil-free and grease-free cleaned version for oxygen applications, max. pressure PN 100 (1450 psi) and max. temperature 60 °C (140 °F)		
• For valve manifold 7MF9412-1B. and -1C.	S12	
• For valve manifold 7MF9412-1D.	S13	
• For valve manifold 7MF9412-1E.	S14	
Suitable for hydrogen applications in ventilated environment	S22	
Certification according to NACE MR-0175	D07	
Including inspection certificate 3.1 according to EN 10204		

¹⁾ If accessory kit or mounting brackets are ordered together with the valve manifolds, please use order code; otherwise, use the article number.

²⁾ Flange connections with screws M10 only permissible up to PN 160 (2321 psi)!

Pressure measurement

Fittings

Shut-off valves for differential pressure / 2-, 3- and 5-spindle valve manifold for protective casing

Accessories

Accessory set for 2, 3 and 5-spindle valve manifolds (connection: valve manifold-pressure transmitter)

For 2-spindle valve manifold DN 5 with flange connection

- F32: 2 screws $7/16$ -20 UNF x 2 inches to ASME B 18.2.1, 1 O-ring (FPM 90)
- F35: 2 screws $7/16$ -20 UNF x 2 inches to ASME B 18.2.1, 1 flat gasket
- F12: 2 screws M10x50 according to EN 24 014, 2 washers, 1 O-ring (FPM90)
- F15: 2 screws M10x50 according to EN 24 014, 2 washers, 1 flat gasket

For 3-spindle and 5-spindle valve manifold DN 5

- F34: 4 screws $7/16$ -20 UNF x 2 inches to ASME B 18.2.1, 2 O-rings (FPM90)
- F36: 4 screws $7/16$ -20 UNF x 2 inches to ASME B 18.2.1, 2 flat gaskets
- F14: 4 screws M10x50 according to EN 24 014, 4 washers, 2 O-rings (FPM 90)
- F16: 4 screws M10x50 according to EN 24 014, 4 washers, 2 flat-gaskets

Washers \varnothing 10.5 according to DIN 125

Flat gaskets made of PTFE, max. permissible 420 bar (6092 psi), 80 °C (176 °F)

O-ring acc. to DIN 3771, 20 x 2.65 – S – FPM90, max. permissible 420 bar (6092 psi), 120 °C (248 °F)

Note: Flange connection with M10 screws only permissible up to PN 160 (2321 psi)!

Mounting bracket for wall mounting or for securing to mounting rack

With bolts for mounting on valve manifold

- M14: For 2-spindle valve manifold DN 5
- M17: For 3-spindle valve manifold DN 5
- M18: For 5-spindle valve manifold DN 5

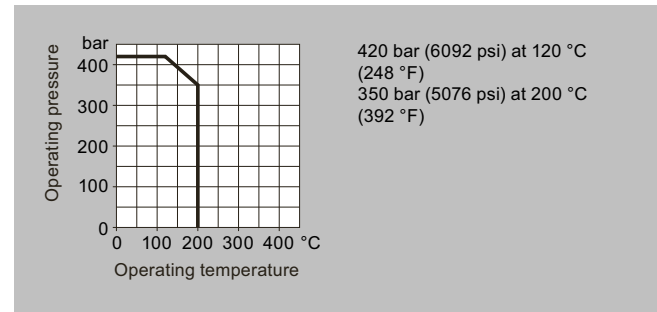
Mounting clip (2 units)

- M16: For securing the mounting brackets M14, M17 and M18 to pipe

Valve manifold 100 bar, suitable for oxygen

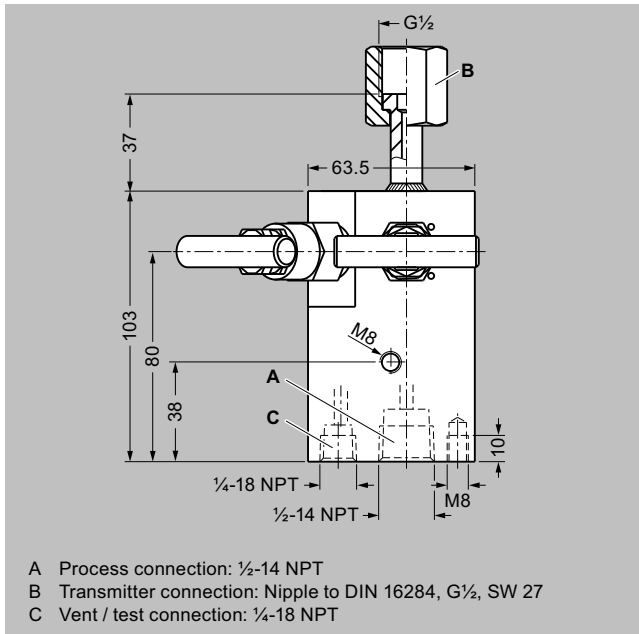
- S12: For 2-spindle valve manifold DN 5
- S13: For 3-spindle valve manifold DN 5
- S14: For 5-spindle valve manifold DN 5

Characteristic curves

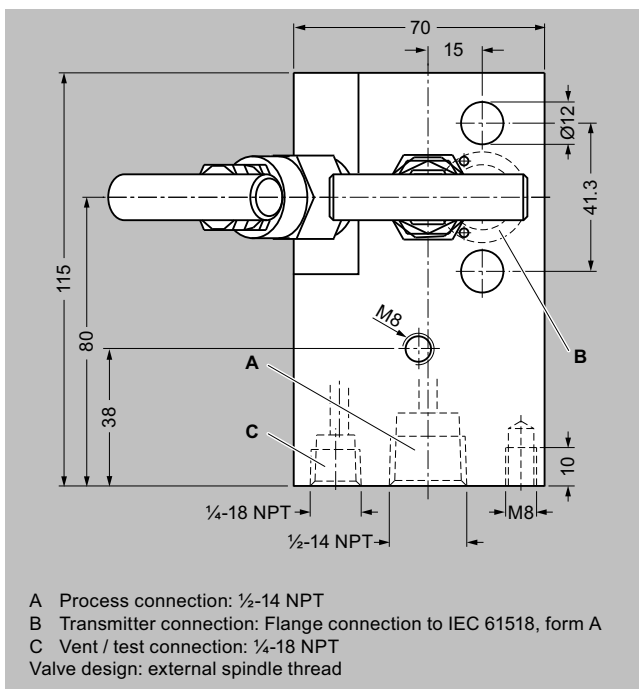


Permissible operating overpressure depends on the permissible operating temperature

Dimensional drawings

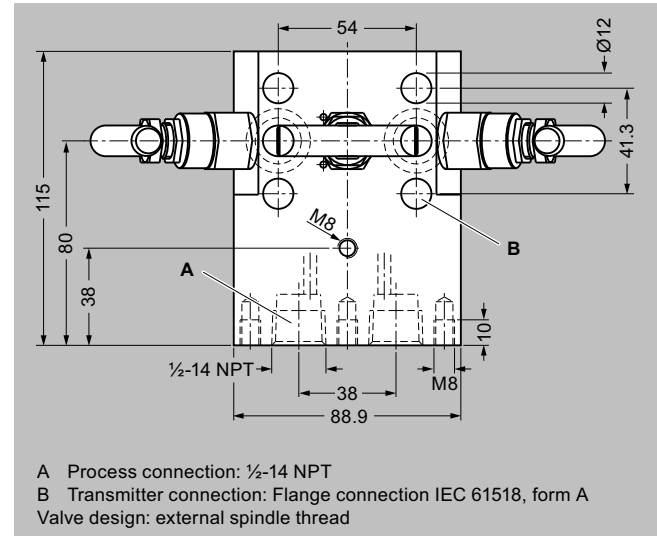


2-spindle valve manifold DN 5 (7MF9412-1B..) with rotatable sleeve, dimensions in mm

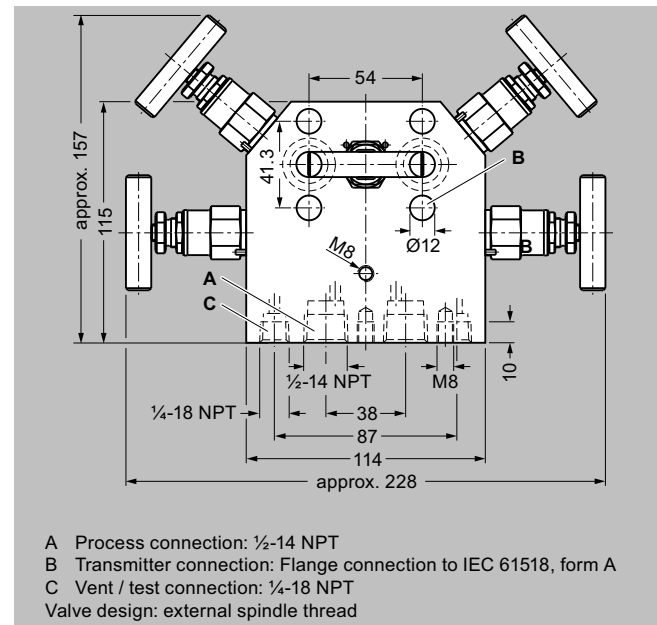


2-spindle valve manifold DN 5 (7MF9412-1C..), dimensions in mm

Dimensional drawings (continued)



3-spindle valve manifold DN 5 (7MF9412-1D..), dimensions in mm



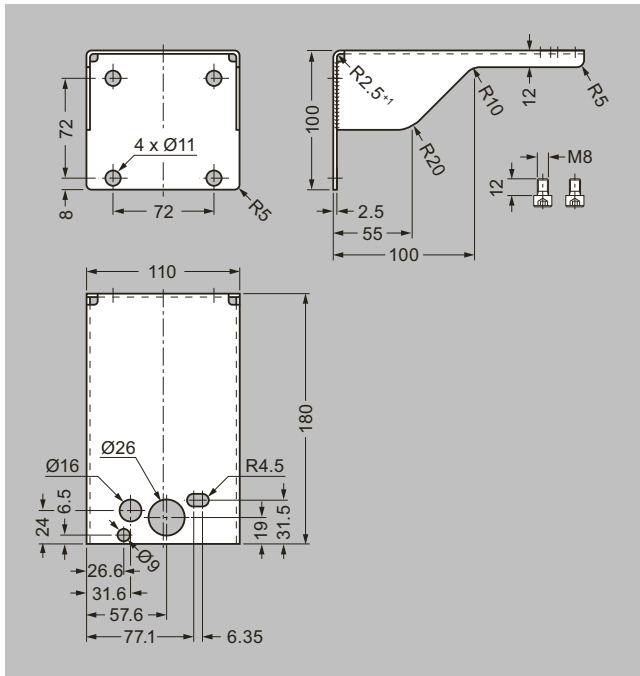
5-spindle valve manifold DN 5 (7MF9412-1E..), dimensions in mm

Pressure measurement

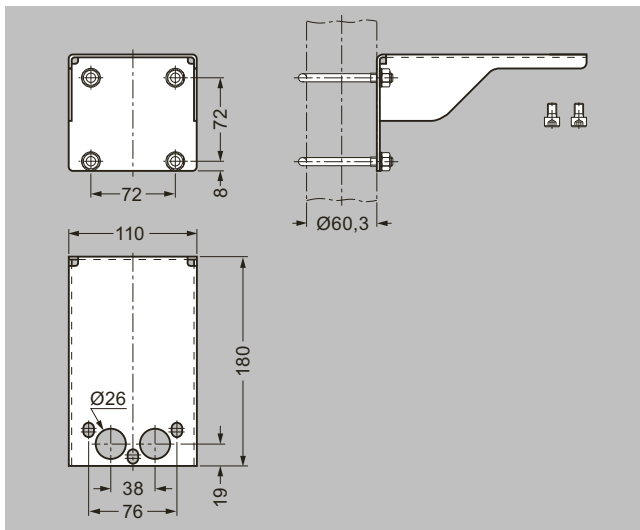
Fittings

Shut-off valves for differential pressure / 2-, 3- and 5-spindle valve manifold for protective casing

Dimensional drawings (continued)

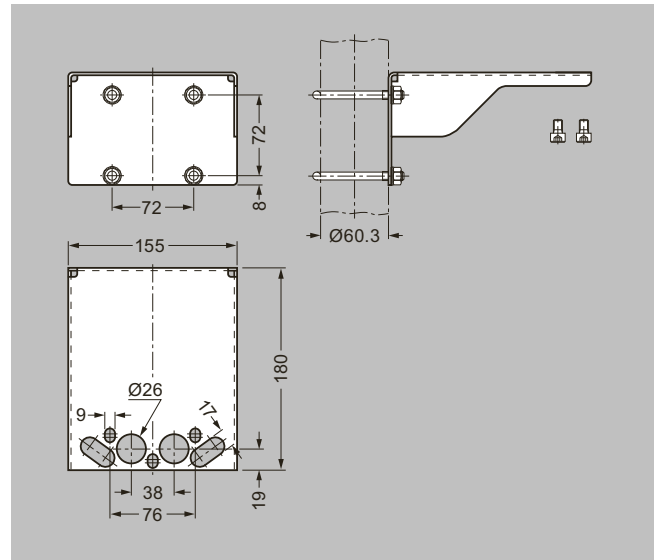


Mounting bracket (7MF9006-6LA)/(M14) for 2-spindle valve manifold, dimensions in mm



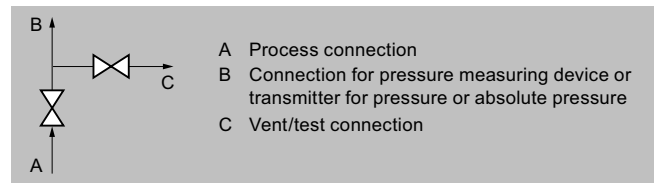
Mounting bracket (7MF9006-6NA)/(M17) for 3-spindle valve manifold, dimensions in mm

Dimensional drawings (continued)

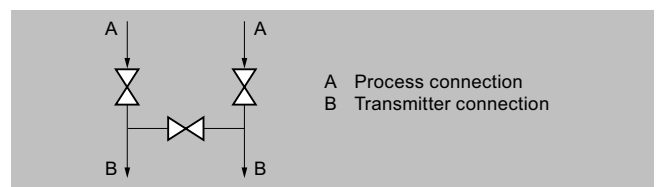


Mounting bracket (7MF9006-6PA)/(M18) for 5-spindle valve manifold, dimensions in mm

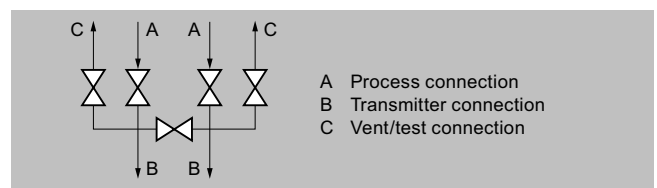
Circuit diagrams



2-spindle valve manifold DN 5 (with rotating sleeve G $\frac{1}{2}$ or flange connection), connections



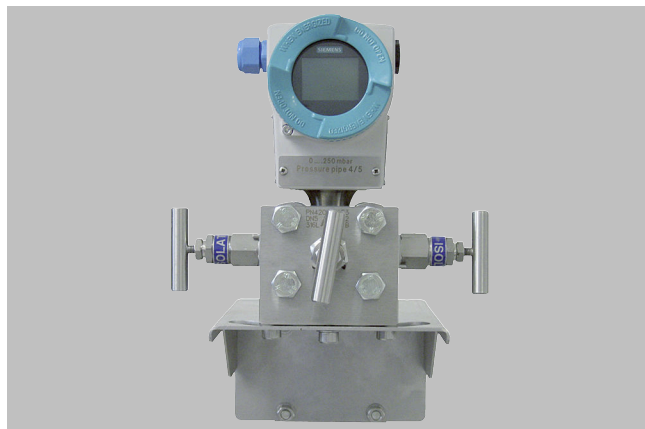
3-spindle valve manifold DN 5, connections



5-spindle valve manifold DN 5, connections

Shut-off valves for differential pressure / 3- and 5-spindle valve manifold for vertical differential pressure lines

Overview



These 3-spindle and 5-spindle valve manifolds 7MF9413-1.. were developed specifically for vertical differential pressure lines.

The valve manifolds are used to shut off the differential pressure lines and to check the transmitter zero point.

The 5-spindle valve manifold also enables venting on the transmitter side and checking of the pressure transmitter characteristic.

Benefits

- For vertical differential pressure lines
- Max. operating overpressure 420 bar (6092 psi)

Application

The 3-spindle and 5-spindle valve manifolds for vertical differential pressure lines are for liquids and gases. The valve manifolds are flanged to the pressure transmitter.

Design

All versions of the spindle valve manifolds have a process connection $\frac{1}{2}$ -14 NPT.

The connection for the pressure transmitter is always designed as a flange connection according to IEC 61518/EN 61518, Form A.

The 2-spindle and the 5-spindle valve manifold have a vent and test connection $\frac{1}{4}$ -18 NPT in addition.

Materials used:

Component	Material	Mat. no.
Enclosure	X 2 CrNiMo 17 13 2	1.4404/316L
Cones	X 6 CrNiMoTi 17 12 2	1.4571/316Ti
Spindles	X 2 CrNiMo 18 10	1.4404/316L
Head parts	X 5 CrNiMo 18 10	1.4401/316
Packings	PTFE	-

Function

Functions of all valve manifolds:

- Shutting off the differential pressure lines
- Monitoring of pressure transmitter zero point

Additional functions of the 2-spindle or 5-spindle valve manifolds via the venting and test connection:

- Venting on transmitter side
- Monitoring of the pressure transmitter characteristic

Pressure measurement

Fittings

Shut-off valves for differential pressure / 3- and 5-spindle valve manifold for vertical differential pressure lines

Selection and ordering data

Valve manifolds for vertically arranged differential pressure lines	Article No. 7MF9413-	● ● A
Click the article number for online configuration in the PIA Life Cycle Portal.		
For liquids and gases, for flanging to pressure transmitter for absolute and differential pressure; material: Stainless steel, mat. no.: 1.4404/316L; max. operating overpressure 420 bar (6092 psi) (order accessory kit using order code), without certificate		
<ul style="list-style-type: none"> 3-spindle valve manifold 		1 D
<ul style="list-style-type: none"> 5-spindle valve manifold 		1 E

Accessories

Factory certificate EN 10204-2.2	7MF9000-8AB
Material inspection certificate to EN 10204-3.1	7MF9000-8AD

Options ¹⁾	Order code	Article No.
Add "Z" to article number and specify order code.		
Accessory kit according to EN (Connection valve manifold – pressure transmitter) 4 × screws ⁷ / ₁₆ -20 UNF × 1 3/4 inches according to ASME B18.2.1; chromated steel, 2 × flat sealings made of PTFE, max. permissible 420 bar (6092 psi), 80 °C (176 °F)	K36	7MF9411-5DB
Accessory kit according to DIN²⁾ (Connection valve manifold – pressure transmitter) 4 × screws M10×45 according to EN 24014; chromated steel 4 × washers Ø 10.5 mm according to DIN 125; 2 × flat sealings made of PTFE, max. permissible 420 bar (6092 psi), 80 °C (176 °F); flange connection with screws M10 only permissible up to PN 160 (2321 psi).	K16	7MF9411-6BB
Mounting bracket Required for wall mounting for fastening to rack, with fixing screws for mounting on valve manifold		
<ul style="list-style-type: none"> For valve manifold 7MF9413-1D. 	M17	7MF9006-6NA
<ul style="list-style-type: none"> For valve manifold 7MF9413-1E. 	M18	7MF9006-6PA
Required for mounting on 2" standpipe , with fixing screws for mounting on valve manifold		
<ul style="list-style-type: none"> For valve manifold 7MF9413-1D. 	M19	7MF9006-6QA
Mounting bracket 2 units, for fastening the mounting bracket to the pipe	M16	7MF9006-6KA
Valve manifold 100 bar (1450 psi) Oil-free and grease-free cleaned version for oxygen applications, max. pressure PN 100 (1450 psi) and max. temperature 60 °C (140 °F)		
<ul style="list-style-type: none"> For valve manifold 7MF9413-1D. 	S13	
<ul style="list-style-type: none"> For valve manifold 7MF9413-1E. 	S14	
Suitable for hydrogen applications in ventilated environment	S22	
Certification according to NACE MR-0175 Including inspection certificate 3.1 according to EN 10204	D07	

¹⁾ If accessory kit or mounting brackets are ordered together with the multiway cock, please use order code; otherwise, use the article number.

²⁾ Flange connections according to DIN 19213 only permissible up to PN 160 (2321 psi).

Shut-off valves for differential pressure / 3- and 5-spindle valve manifold for vertical differential pressure lines

Accessories

Accessory set (connection between valve manifold and pressure transmitter)

- K36: 4 screws $\frac{7}{16}$ -20 UNF x 1 $\frac{3}{4}$ inches to ASME B 18.2.1, 2 flat gaskets
- K16: 4 screws M10x45 according to EN 24 014, 4 washers, 2 flat gaskets

Washers \varnothing 10.5 according to DIN 125

Flat gaskets made of PTFE, max. permissible 420 bar (6092 psi), 80 °C (176 °F)

Note: Flange connection with M10 screws only permissible up to PN 160 (2321 psi)!

Mounting bracket for wall mounting or for securing to mounting rack

With bolts for mounting on valve manifold

- M17: For 3-spindle valve manifold
- M18: For 5-spindle valve manifold

Mounting bracket for mounting on 2" standpipe

With bolts for mounting on valve manifold

- M19: For 3-spindle valve manifold

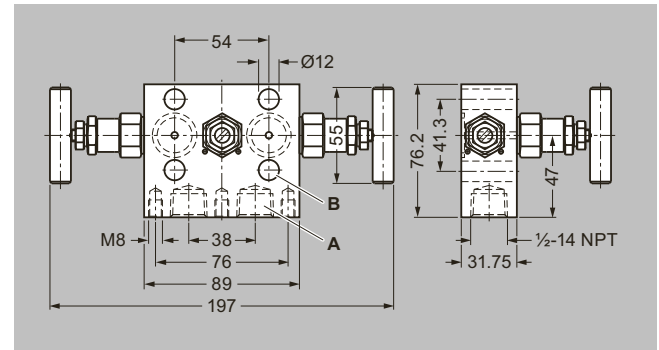
Mounting clip (2 units)

For securing the mounting brackets M17, M18 and M19 to pipe

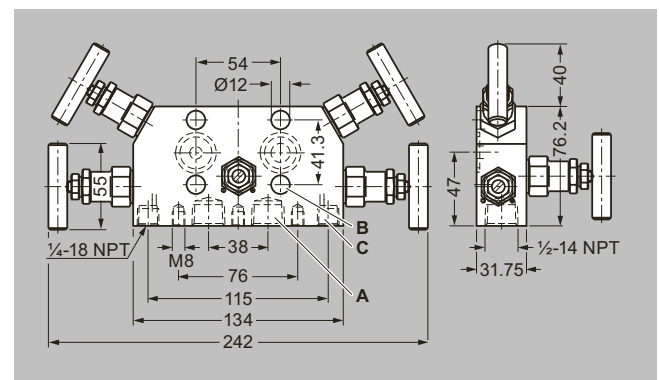
Valve manifold 100 bar, suitable for oxygen

- For 3-spindle valve manifold
- For 5-spindle valve manifold

Dimensional drawings

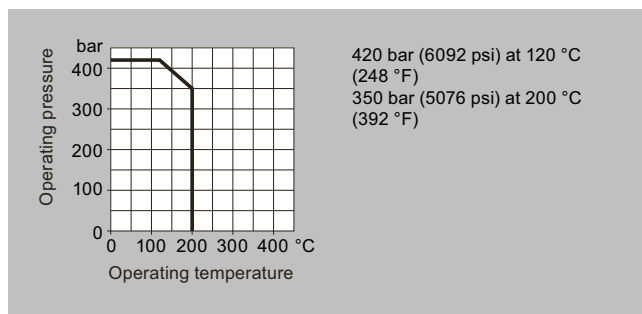


3-spindle valve manifold 7MF9413-1D. for vertical differential pressure lines, dimensions in mm

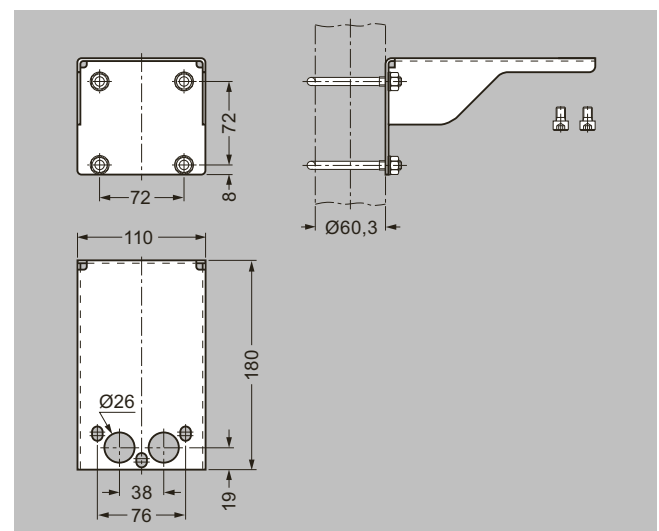


5-spindle valve manifold 7MF9413-1E. for vertical differential pressure lines, dimensions in mm

Characteristic curves



Permissible operating overpressure depends on the permissible operating temperature



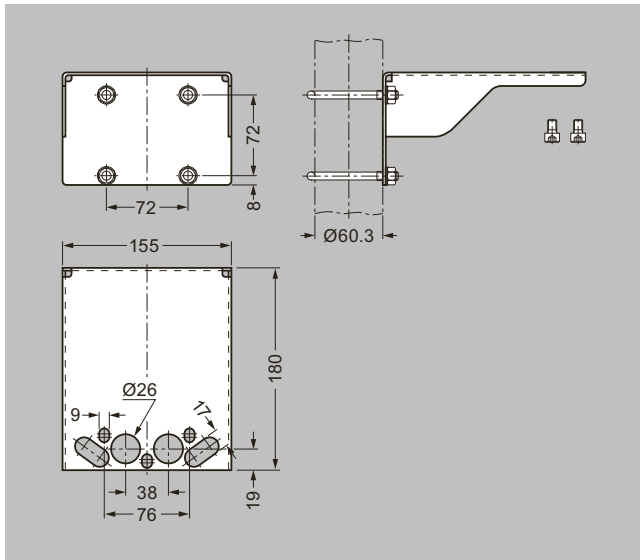
Mounting bracket (7MF9006-6NA)/(M17) for 3-spindle valve manifold, dimensions in mm

Pressure measurement

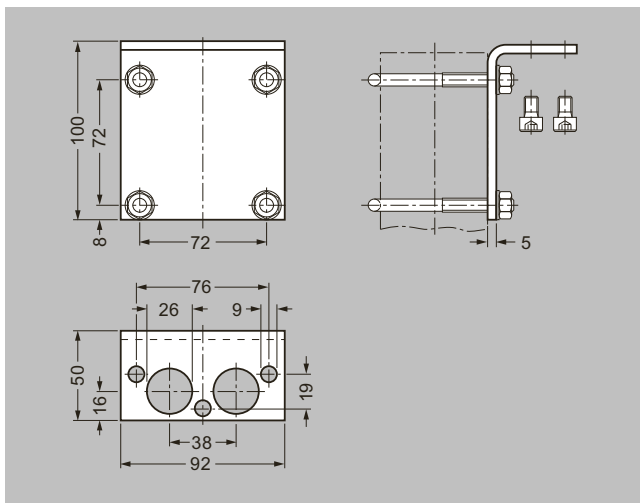
Fittings

Shut-off valves for differential pressure / 3- and 5-spindle valve manifold for vertical differential pressure lines

Dimensional drawings (continued)

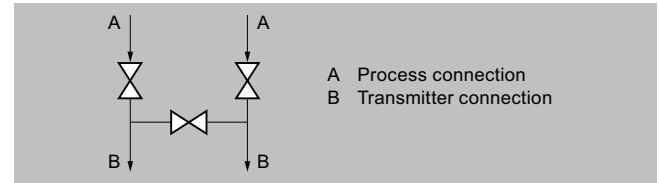


Mounting bracket (7MF9006-6PA)/(M18) for 5-spindle valve manifold, dimensions in mm

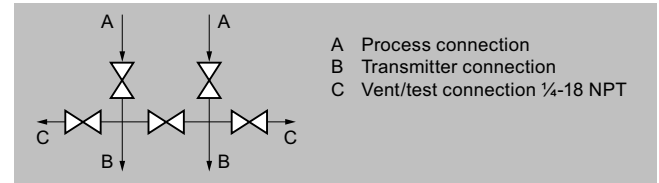


Mounting bracket (7MF9006-6QA)/(M19) for 3-spindle valve manifold, dimensions in mm

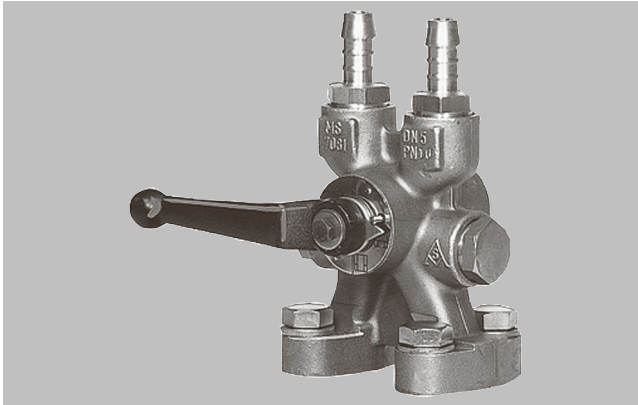
Circuit diagrams



3-spindle valve manifold for vertical differential pressure lines, connections



5-spindle valve manifold for vertical differential pressure lines, connections

Overview

The low-pressure multiway cock can be flanged to pressure transmitters for differential pressure.

Benefits

- Robust design
- For liquids and gases
- One-hand operation

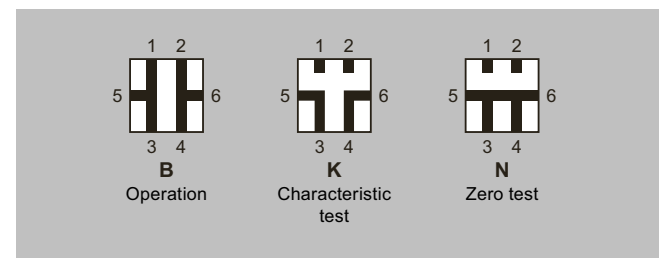
Design

The multiway cock has two process connections and two test connections which are available in two versions ($G^{3/8}$ sealing screws or quick-release couplings). The enclosure is made of pressed brass CuZn39Pb3, CW 614N. Test connections with screw plugs or with self-sealing quick-release couplings.

Note: An accessory set is always required for flanging of the multiway cock to a differential pressure transmitter.

Function

- Shutting off the differential pressure lines
- Checking the zero point of the pressure transmitter.
- Checking the characteristic of the pressure transmitter.



Cock settings, the symbols are on the cock

Pressure measurement

Fittings

Shut-off valves for differential pressure / Low-pressure multiway cock

Selection and ordering data

	Article No.
Low-pressure multiway cock	
For liquids and gases, for flanging to pressure transmitter, max. operating overpressure 25 bar (363 psi), max. operating temperature 60 °C (140 °F) (briefly up to 80 °C (176 °F)), weight 1.75 kg (without accessory kit)	
Test connections	
• 2 × screw plugs G ³ / ₈	7MF9004-4CA
• 2 × quick-action couplings	7MF9004-4DA

Accessories	
Factory certificate EN 10204-2.2	7MF9000-8AB
Material inspection certificate to EN 10204-3.1	7MF9000-8AD

Options ¹⁾	Order code	Article No.
Add "-Z" to article number and specify order code.		
Accessory kit according to EN (Required for flanging, weight 0.2 kg) 4 × screws ⁷ / ₁₆ -20 UNF × 1 inch according to ASME B18.2.1; chromated steel 2 × flat gaskets made of PTFE, max. permissible 80 °C (176 °F)	L31	7MF9004-5CC
Accessory kit according to DIN (Required for flanging, weight 0.2 kg) 4 × screws M10x25 according to EN 24017; chromated steel 4 × washers Ø 10.5 mm according to DIN 125, 2 × flat sealings made of PTFE, max. permissible 80 °C (176 °F)	L11	7MF9004-6AD
• Standard design	L15	7MF9004-6AE
• Version for oxygen		
Multiway cock in oil-free and grease-free design BAM-tested lubricant, sealing socket suitable for oxygen	S11	
Mounting brackets Required for wall mounting or for fastening on rack (72 mm grid); made of electrogalvanized sheet steel, weight 0.85 kg	M13	7MF9004-6AA

¹⁾ If accessory kit or mounting brackets are ordered together with the multiway cock, please use order code; otherwise, use the article number.

Accessories

Accessory set for low-pressure multiway cock

- L31: 4 screws ⁷/₁₆-20 UNF × 1 inch, 2 flat gaskets
- L11: 4 screws M10x25 according to EN 24017, 4 washers, 2 flat gaskets
- L15 (suitable for oxygen): 4 screws M10x25 according to EN 24017, 4 washers, 2 flat gaskets

Washers Ø 10.5 according to DIN 125

Flat gaskets made of PTFE, max. permissible temperature 80 °C (176 °F)

Multiway cock in oil-free and grease-free design

- S11: BAM-tested lubricant, sealing socket suitable for oxygen

Mounting brackets

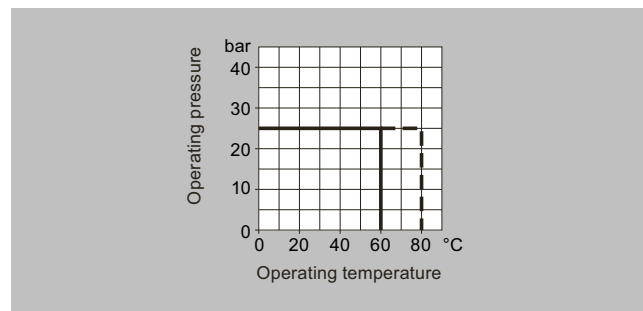
- M13: Required for wall mounting or for securing on rack (72 mm grid); made of electrogalvanized sheet-steel

Options

Test connections

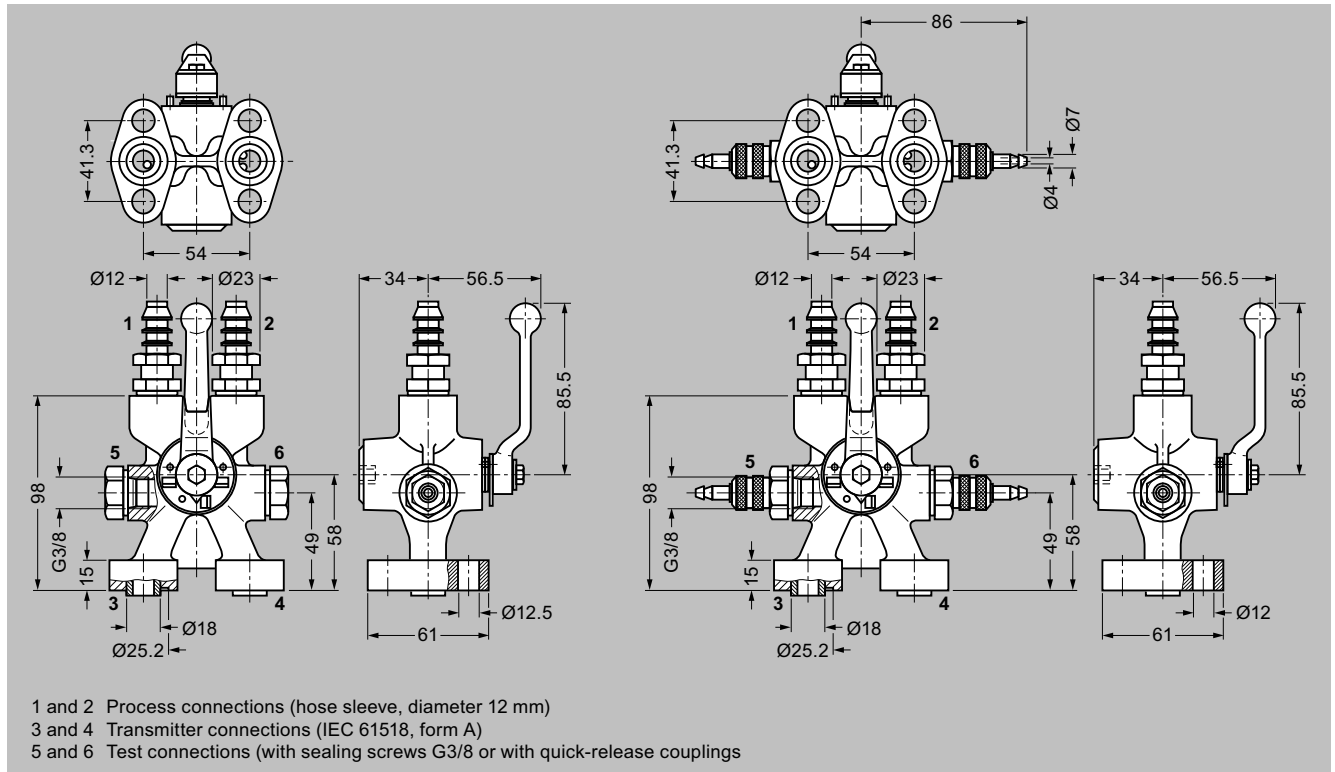
- 2 screw plugs G³/₈
- 2 quick-action couplings

Characteristic curves

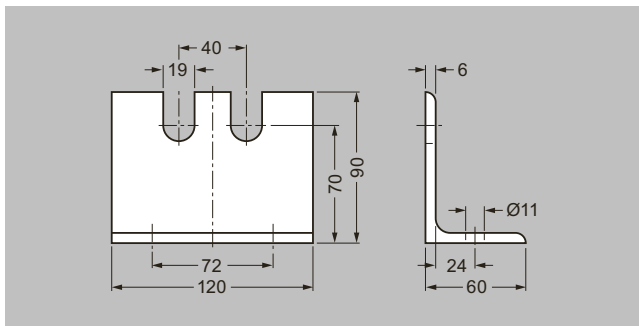


Low-pressure multiway cock, permissible operating overpressure depends on the permissible operating temperature

Dimensional drawings



Low-pressure multiway cock 7MF9004-4CA/-4DA for direct flanging to pressure transmitter for differential pressure, dimensions in mm



Mounting bracket 7MF9004-6AA (M13), dimensions in mm

Pressure measurement

Fittings

Accessories / Oval flange

Overview



The 7MF9408-2C oval flange for pressure transmitters for absolute pressure and differential pressure has a 1/2-14 NPT internal thread and is designed for a max. operating pressure of 420 bar (6092 psi).

Selection and ordering data

	Article No.
Oval flange With internal thread 1/2-14 NPT, max. operating overpressure 420 bar (6092 psi), flange connection according to IEC 61518/EN 61518, form A	
Material P250GH, mat. no. 1.0460 X 2 CrNiMo 17 13 2, mat. no. 1.4404/316L	7MF9408-2CE 7MF9408-2CL

Options ¹⁾	Order code	Article No.
Add "-Z" to article number and specify order code.		
Accessory kit according to EN 2 x screws 7/16-20 UNF x 1 1/2 inches according to ASME B 18.2.3; chromated steel 1 x flat gasket made of PTFE, max. permissible 420 bar (6092 psi), 80 °C (176 °F)	E36	7MF9408-5DA
2 x screws 7/16-20 UNF x 1 1/2 inches according to ASME B 18.2.3; chromated steel 1 x O-ring according to DIN 3771, 20 x 2.65 - S - FPM90, max. permissible 420 bar (6092 psi), 120 °C (248 °F)	E34	7MF9408-5CA
Accessory kit according to DIN 2 x screws M10x40 according to EN 4762; chromated steel 2 x washers Ø 10,5 mm according to DIN 125; 1 x O-ring according to DIN 3771, 20 x 2.65 - S - FPM90, max. permissible 160 bar (2321 psi), 120 °C (248 °F)	E13	7MF9408-6AA
2 x screws M10x40 according to EN 4762; chromated steel 2 x washers Ø 10,5 mm according to DIN 125; 1 x flat gasket made of PTFE, max. permissible 160 bar (2321 psi), 80 °C (176 °F) ²⁾	E16	7MF9408-6BA
Certification according to NACE MR-0175 Including inspection certificate 3.1 according to EN 10204	D07	

¹⁾ If accessory kit is ordered together with the oval flange, please use order code; otherwise, use the article number.

²⁾ Flange connections with screws M10 only permissible up to PN 160 (2321 psi).

Accessories

- E36: 2 screws $7/16$ -20 UNF \times 1 1/2 inch according to ASME B18.2.1, 1 flat gasket
- E34: 2 screws $7/16$ -20 UNF \times 1 1/2 inch according to ASME B18.3, 1 O-ring (FPM 90)
- E13: 2 screws M10x40 according to EN 4762, 2 washers, 1 O-ring (FPM 90)
- E16: 2 screws M10x40 according to EN ISO 4762, 2 washers, 1 flat gasket

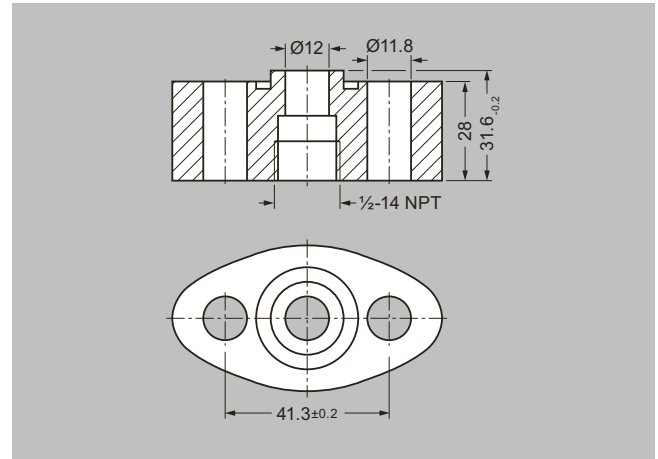
Washers \varnothing 10.5 according to DIN 125

Flat gaskets made of PTFE, max. permissible 420 bar (6092 psi), 80 °C (176 °F)

O-ring acc. to DIN 3771, 20 \times 2.65 – S – FPM90, max. permissible 420 bar (6092 psi), 120 °C (248 °F)

Note: M10 screws only permissible up to PN 160 (2321 psi)!

Dimensional drawings



Oval flange 7MF9408-2C., dimensions in mm

Pressure measurement

Fittings

Accessories / Connection pieces

Overview

Adapters enable, for example, a transition from measured medium connections with NPT thread to shut-off valves according to DIN 16270 ... 16272 or to tubes in connection with a connection gland (e.g. 7MF9008).

Design

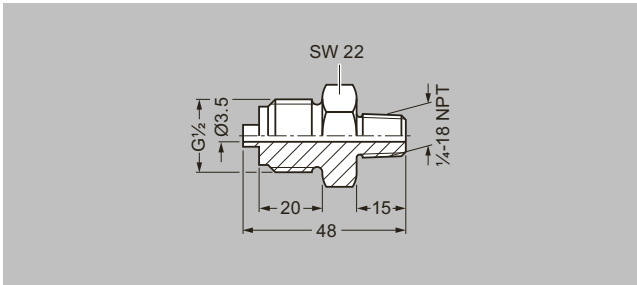
The adapters are made of X 6 CrNiMoTi 17 12 2, mat. no. 1.4571 and are available in 3 versions:

- Thread ¼-18 NPT and connection shank G½ according to EN 837-1
- Thread ½-14 NPT and connection shank G½ according to EN 837-1
- Thread ½-14 NPT and thread ½-14 NPT

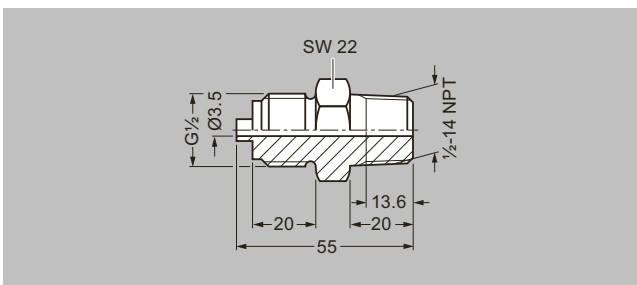
Selection and ordering data

	Article No.
Connection piece	
Max. operating pressure: 689 bar (10 000 psi), weight: 0.2 kg	
With thread ¼-18 NPT – G½	7MF9001-1AA
With thread ½-14 NPT – G½	7MF9001-1CA
With thread ½-14 NPT – ½-14 NPT	7MF9001-1DA
With thread ½-14 NPT – M20 × 1.5	7MF9001-1EA
With cutting ring 12 S, max. operating pressure 630 bar (9 100 psi), Ø 12 mm – ½-14 NPT	
• 9 SMnPb 28, mat. No. .0718	7MF9008-1CA
• X 6 CrNiMoTi 17 122, mat. No. 1.4571	7MF9008-1CB
With cutting ring 14 S, max. operating pressure 630 bar (9 100 psi), Ø 14 mm – ½-14 NPT	
• 9 SMnPb 28, mat. No. 1.0718	7MF9008-1CC
• X 6 CrNiMoTi 17 122, mat. No. 1.4571	7MF9008-1CD

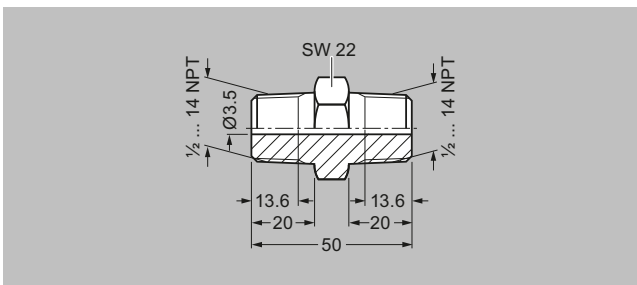
Dimensional drawings



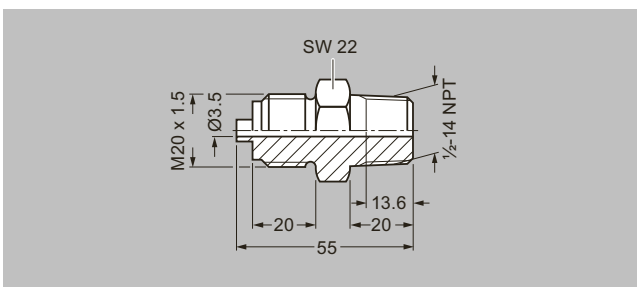
Mounting collar with thread 1/4-18 NPT and connection shank G $\frac{1}{2}$ (7MF9001-1AA), dimensions in mm



Mounting collar with thread 1/2-14 NPT and connection shank G $\frac{1}{2}$ (7MF9001-1CA), dimensions in mm

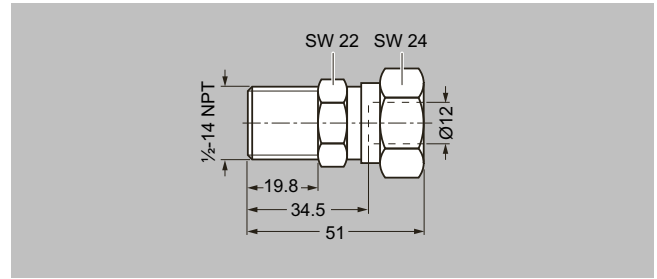


Mounting collar with 1/2-14 NPT thread and 1/2-14 NPT thread (7MF9001-1DA), dimensions in mm

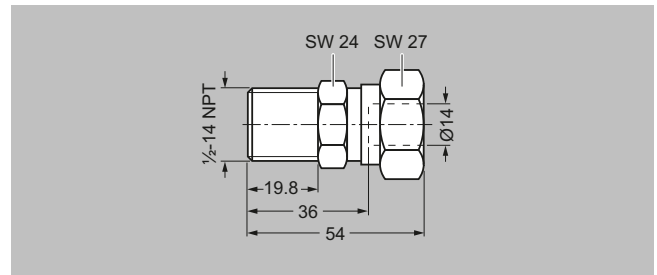


Mounting collar with thread 1/2-14 NPT and connection shank M20 x 1.5 (7MF9001-1EA), dimensions in mm

Dimensional drawings (continued)



Mounting collar with cutting ring fitting 12 S, Ø12 mm and thread 1/2-14 NPT (7MF9008-1CA and -1CB), dimensions in mm



Mounting collar with cutting ring fitting 14 S, Ø14 mm and thread 1/2-14 NPT (7MF9008-1CC and -1CD), dimensions in mm

Pressure measurement

Fittings

Accessories / Connection glands

Overview

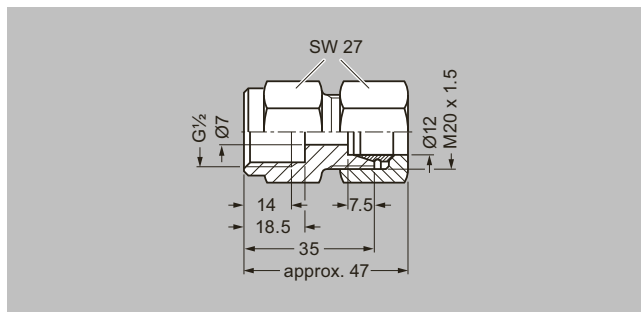
Connection glands for connecting measured-medium or differential pressure lines to connection shank G $\frac{1}{2}$ according to EN 837-1

- For rated pressures up to PN 630 (9137 psi)
- For oxygen only up to PN 250 (3626 psi)

Selection and ordering data

		Article No.
Connection glands for pipes (weight 0.2 kg)		
Material	Version	
115Mn30 (mat. No. 1.0715)	Normal	7MF9008-1GA
X 6 CrNiMoTi 17 12 2 (mat. No. 1.4571/316Ti)	Normal	7MF9008-1GB
X 6 CrNiMoTi 17 12 2 (mat. No. 1.4571/316Ti)	Grease-free	7MF9008-1GC

Dimensional drawings



Connection gland 7MF9008-1G., dimensions in mm

Overview

Connection parts G $\frac{1}{2}$ for pressure gauges and shut-off valves are available in 3 versions:

- Nipple connection
- Clamping sleeve
- Shank mounting collar

Selection and ordering data

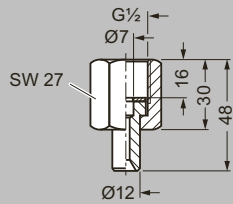
Connection parts G $\frac{1}{2}$		Article No.
For pressure measuring devices and shut-off valves		
Nipple connection		
G $\frac{1}{2}$ according to DIN 16284 (union nut with nipple and gasket); Max. Operating overpressure 400 bar (5802 psi); weight 0.1 kg; Connection: G $\frac{1}{2}$ according to EN 837-1; female thread G $\frac{1}{2}$		
Material	Mat. no.	
CuZn39Pb3	CW 614N	M56340-A0001
Union nut: 9 SMn 28 k	1.0715	M56340-A0002
Nipple: RSt 37-2	1.0037	
Union nut: X 8 CrNiS 18 9	1.4305	M56340-A0003
Nipple: X 6 CrNiMoTi 17 12 2	1.4571/316Ti	
Nipple connection		
M20 x 1.5 according to DIN 16284 (union nut with nipple and gasket); Max. Operating overpressure 400 bar (5802 psi); weight 0.1 kg; Connection: M20 x 1.5 according to EN 837-1; female thread M20 x 1.5		
Material	Mat. no.	
Union nut: X 8 CrNiS 18 9	1.4305	M56340-A0008
Nipple: X 6 CrNiMoTi 17 12 2	1.4571/316Ti	
Clamping sleeve		
G $\frac{1}{2}$ according to DIN 16283; max. operating overpressure 400 bar (5802 psi); weight 0.1 kg; Connections: G $\frac{1}{2}$ according to EN 837-1; Female thread: G $\frac{1}{2}$ right, G $\frac{1}{2}$ left		
Material	Mat. no.	
CuZn39Pb3	CW614N	M56340-A0004
9 SMn 28 k	1.0715	M56340-A0005
Collar connection piece		
Max. operating pressure; weight 0.1 kg; Connections: G $\frac{1}{2}$ according to EN 837-1; Male thread: G $\frac{1}{2}$, G $\frac{1}{2}$		
Material	Mat. no.	
CuZn39Pb3	CW614N	M56340-A0006
9 SMn 28 k	1.0715	M56340-A0007

Pressure measurement

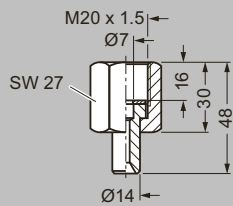
Fittings

Accessories / Connection parts G 1/2

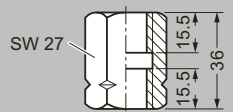
Dimensional drawings



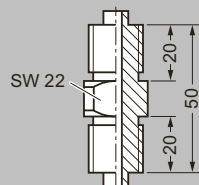
G 1/2 (M56340-A0001 to -A0003) nipple connection, dimensions in mm



M20 x 1.5 nipple connection (M56340-A0008), dimensions in mm



Clamping sleeve (M56340-A0004/-A0005), dimensions in mm



Collar connection piece (M56340-A0006/-A0007), dimensions in mm

Overview

Water traps protect pressure measuring devices and shut-off fittings from heating up (e.g. by steam) by the water column produced by the water trap.

The max. operating temperature is 120 °C (248 °F) at 100 bar (1450 psi), 300 °C (572 °F) at 80 bar (1160 psi), 400 °C (752 °F) at 63 bar (914 psi). If the temperature of the measured medium is higher, a sufficiently long line has to be connected upstream of the trap to enable heat dissipation.

Design

The water traps are available in U form (type B) or in circular form (type D) according to DIN 16282. On the measuring cell side, they consist of a weld-in end \varnothing 20 mm \times 2.6 mm. The connection on the device side is a clamping sleeve $G\frac{1}{2}$ to DIN 16283.

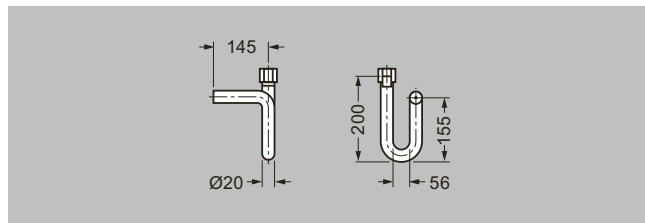
The water traps are made of steel (P250GH) or stainless steel (X 6 CrNiMoTi 17 12 2)

Water traps are designed as standard for max. operating temperature 120 °C (248 °F) at a max. operating pressure of 100 bar (1450 psi) (300 °C (572 °F) at 80 bar (1160 psi), 400 °C (752 °F) at 63 bar (914 psi)). Water traps for higher operating pressures and temperatures are available on request.

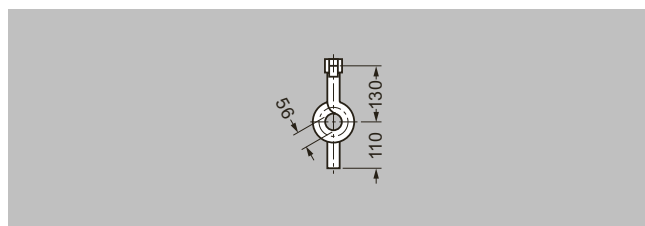
Selection and ordering data

		Article No.
Water traps		
For pressure measuring devices and pressure transmitters; max. operating temperature 120 °C (248 °F), max. operating pressure 100 bar (1450 psi) (or 300 °C (572 °F) at 80 bar (1160 psi), or 400 °C (752 °F) at 63 bar (914 psi)), weight 0.7 kg		
Water trap B according to DIN 16282		
Material	Mat. no.	
P235GH	1.0345	M56340-A0043
X 6 CrNiMoTi 17 12 2	1.4571/316Ti	M56340-A0061
Water trap D according to DIN 16282		
Material	Mat. no.	
P235GH	1.0345	M56340-A0045
X 6 CrNiMoTi 17 12 2	1.4571/316Ti	M56340-A0063

Dimensional drawings



Water traps, type B, M56340-A0043/-A0061, measurements in mm



Water traps, type D, M56340-A0045/-A0063, measurements in mm

Pressure measurement

Fittings

Accessories / Sealing rings acc. to EN 837-1

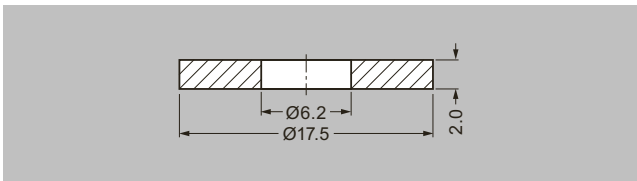
Overview

The sealing rings according to EN 837-1 are required to seal the pressure measuring devices with process connection G½B.

Selection and ordering data

	Article No.
Sealing ring according to EN 837-1 for G½ thread (Packing unit 100 units)	
<ul style="list-style-type: none"> made of copper 	7MF9007-7AA
<ul style="list-style-type: none"> made of soft iron 	7MF9007-7AB
<ul style="list-style-type: none"> made of stainless steel, mat. no. 1.4571 	7MF9007-7AC
<ul style="list-style-type: none"> made of PTFE 	7MF9007-7AD

Dimensional drawings



Sealing ring 7MF9007-7A according to EN 837-1, measurements in mm

Overview

The pressure surge reducer protects the pressure gauge from damage, premature wear-and-tear, and an imprecise or vibrating display.

Application

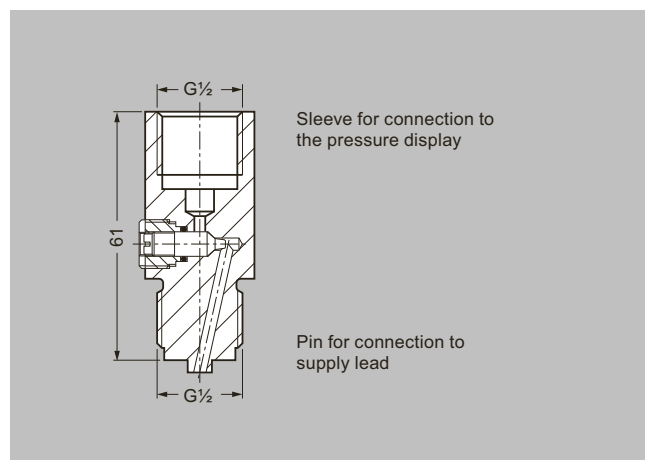
The pressure reducer is used when pulsations of the measured medium occur (e.g. in slow-running steam engines, piston pumps and compressors) or when sudden pressure increases and drops of the measured medium can be expected (e.g. in hydraulic presses and tensile testing machines).

Design

- Brass or stainless steel enclosure (mat. no. 1.4571)
- Adjustable nozzle
- Sleeve for connection to the pressure gauge
- Shank for connection to the supply line

Selection and ordering data

			Article No.
Pressure surge reducers			
Weight approx. 0.21 kg			
Material	Full-scale value	Weight approx. in kg	
Brass	250 bar (3626 psi)	0.21	M56340-A0054
Stainless steel	600 bar (8702 psi)	0.21	M56340-A0059

Dimensional drawings

Pressure surge reducer, dimensions in mm

Pressure measurement

Fittings

Accessories / Primary shut-off valves

Overview

The primary shut-off valves are available in the following versions:

- For non-corrosive liquids, gases and vapors
- For corrosive liquids and gases
- Grease-free for oxygen

The shut-off valves are available in different materials and with different connections (see ordering data).

Selection and ordering data

Primary shut-off valves							Article No.		
Without certificate							7MF9017- ● ● A		
Click the article number for online configuration in the PIA Life Cycle Portal.									
Max. operating overpressure	Characteristic curve ¹⁾	Material	Mat. no.	Spindle thread	Connections	Weight in kg			
Shut-off valve for non-corrosive liquids, gases and vapors									
160 bar (2321 psi)	A	P250GH	1.0460	Female	Screwed connectors G½, form R, DIN 19207	0.8			1 A
160 bar (2321 psi)	A	P250GH	1.0460	Female	Screwed connectors G½ form R, DIN 19207 and pipe union with cutting ring for pipe Ø 12 mm, schedule S	0.8			1 B
400 bar (5800 psi)	C	P250GH	1.0460	Female	Pipe union with cutting ring for pipe Ø 12 mm, schedule S	1			1 C
400 bar (5800 psi)	C	P250GH	1.0460	Female	Pipe union with cutting ring for pipe Ø 14 mm, schedule S	1			1 D
500 bar (7252 psi)	D	16 Mo 3	1.5415	Male	Welding sleeve Ø 14 mm × 2.5 mm	1.6			1 F
500 bar (7252 psi)	E	11 CrMo 9 10	1.7383	Male	Welding sleeve Ø 14 mm × 2.5 mm	1.6			1 G
500 bar (7252 psi)	D	16 Mo 3	1.5415	Male	Welding sleeve Ø 21.3 mm × 6.3 mm and Ø 14 mm × 2.5 mm	1.6			1 H
500 bar (7252 psi)	D	16 Mo 3	1.5415	Male	Welding sleeve Ø 24 mm × 7.1 mm and Ø 14 mm × 2.5 mm	1.6			1 J
500 bar (7252 psi)	E	11 CrMo 9 10	1.7383	Male	Welding sleeve Ø 24 mm × 7.1 mm and Ø 14 mm × 2.5 mm	1.6			1 K
Shut-off valve for corrosive liquids and gases									
160 bar (2321 psi)	F	X 6 CrNiMoTi 17 12 2	1.4571/316Ti	Female	Screwed connectors G½ form R, DIN 19207 and pipe union with cutting ring for pipe Ø 12 mm, schedule S	0.8			2 B
400 bar (5800 psi)	G	X 6 CrNiMoTi 17 12 2	1.4571/316Ti	Female	Pipe union with cutting ring for pipe Ø 12 mm, schedule S	1			2 C
400 bar (5800 psi)	H	X 6 CrNiMoTi 17 12 2	1.4571/316Ti	Male	Welding sleeve Ø 21.3 mm × 6.3 mm and Ø 14 mm × 2.5 mm	1.6			2 H
400 bar (5800 psi)	H	X 6 CrNiMoTi 17 12 2	1.4571/316Ti	Male	Welding sleeve Ø 24 mm × 7.1 mm and Ø 14 mm × 2.5 mm	1.6			2 J

Accessories

Factory certificate EN 10204-2.2

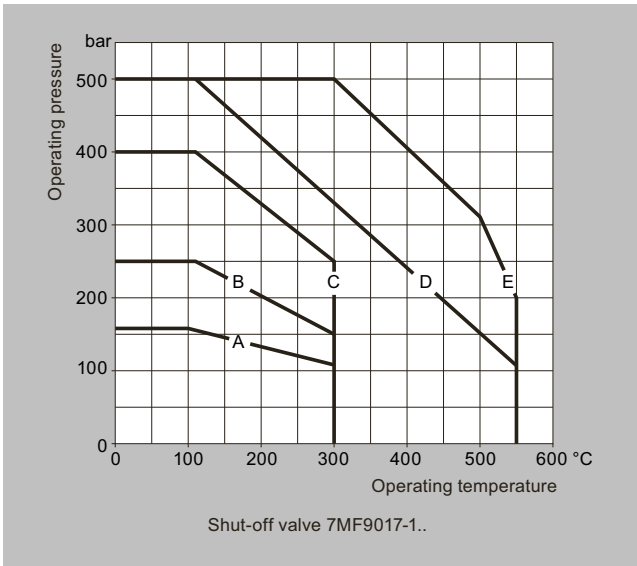
7MF9000-8AB

Material inspection certificate to EN 10204-3.1

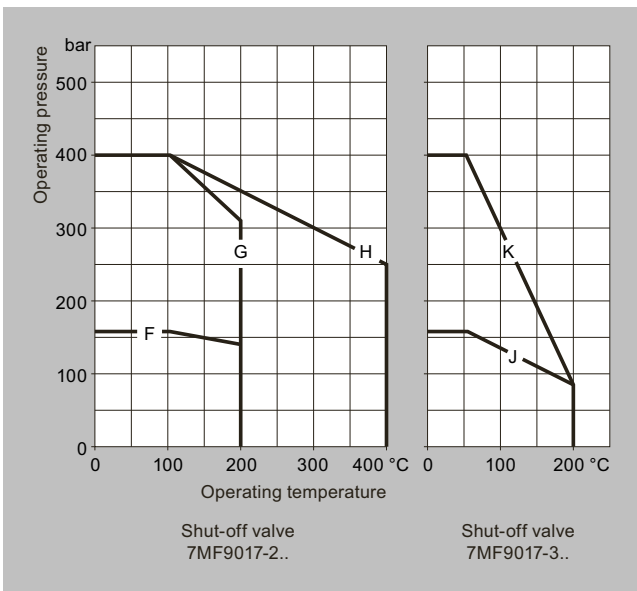
7MF9000-8AD

¹⁾ See characteristic curve "Permissible operating overpressure depends on the permissible operating temperature"

Characteristic curves

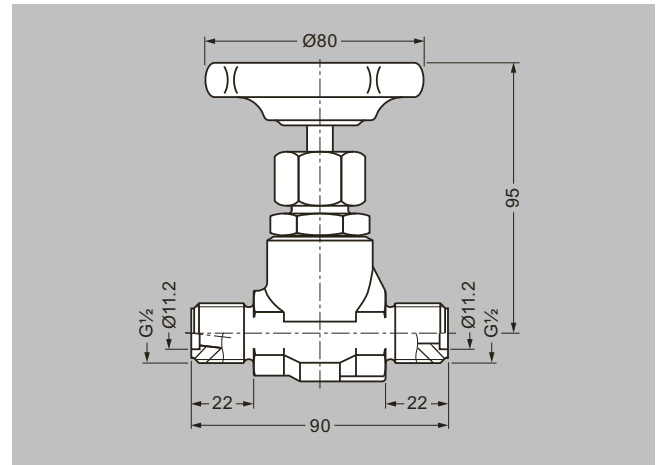


Shut-off valve 7MF9017-1.., permissible operating overpressure depends on permissible operating temperature

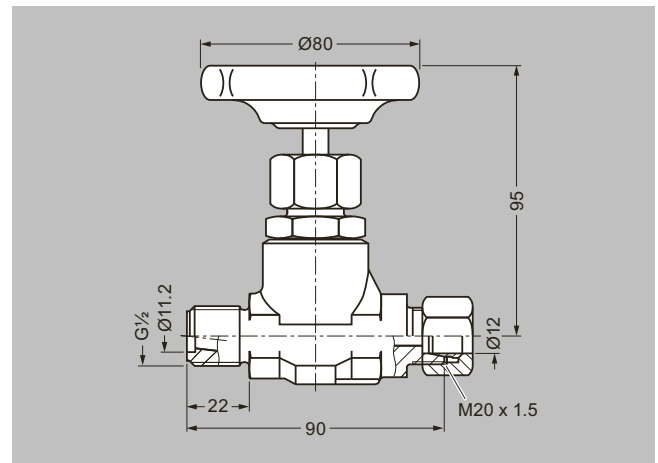


Shut-off valves 7MF9017-2.. and -3.., permissible operating overpressure depends on permissible operating temperature

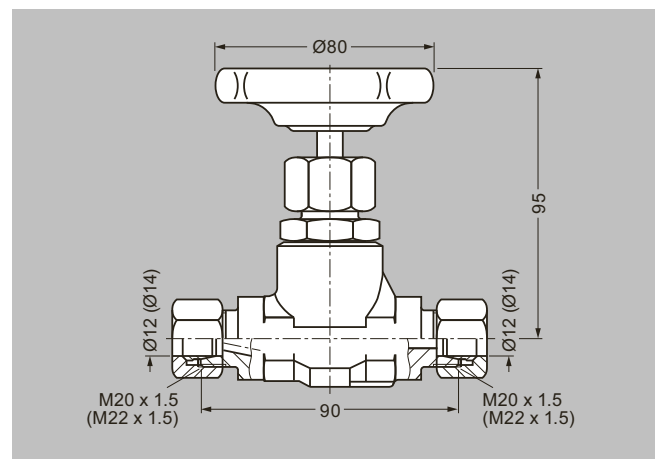
Dimensional drawings



Shut-off valves 7MF9017-1A., dimensions in mm



Shut-off valves 7MF9017-1B. and -2B., dimensions in mm



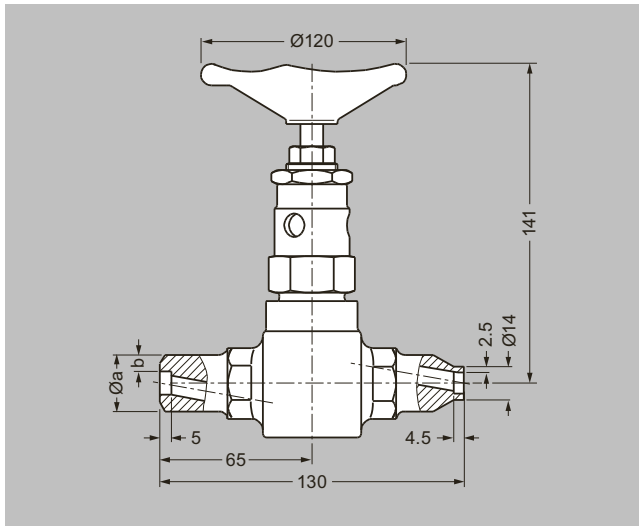
Shut-off valves 7MF9017-1C., -1D. and -2C., dimensions in mm

Pressure measurement

Fittings

Accessories / Primary shut-off valves

Dimensional drawings (continued)



Shut-off valves 7MF9017-..., dimensions in mm

$\varnothing A \times b$	7MF9017-
14 mm x 2.5 mm	1F. and 1G.
21.3 mm x 6.3 mm	1H. and 2H.
24 mm x 7.1 mm	1J., 1K. and 2J.

Overview

The compensation vessels prevent the level difference in the differential pressure lines on a change in pressure, which corrupts the measurement result.

According to DIN 19211, for calculating the wall thickness, the prevailing temperature in the compensation vessel should be assumed to be 50 K lower than the steam temperature in the pipeline. The reason is that the temperature in the condensate vessels during operation can rise no higher than the saturated steam temperature.

There is a material inspection certificate A according to EN 10204-3.1 for materials from which the compensation vessels are manufactured.

Selection and ordering data

Condensate vessel								Article No.	
Without certificate								7MF9015- ● ● A	
Click the article number for online configuration in the PIA Life Cycle Portal.									
Max. operating overpressure	Characteristic curve ¹⁾	Material	Mat. no.	Connections:		Content approx. cm ³	Weight approx. kg		
				Input	Output				
160 bar (2321 psi)	A	16 Mo 3	1.5415	Screwed connectors G½, form R, DIN 19207	Screwed connectors G½, form V, DIN 19207	250	0.8		1 A
250 bar (3626 psi)	B	16 Mo 3	1.5415	Welding sleeve Ø 21.3 mm × 6.3-mm	Welding sleeve Ø 21.3 mm × 6.3-mm	250	0.8		1 B
250 bar (3626 psi)	B	16 Mo 3	1.5415	Welding sleeve Ø 24 mm × 7.1 - mm	Welding sleeve Ø 24 mm × 7.1 - mm	250	1		1 C
500 bar (7252 psi)	E	11 CrMo 9 10	1.7383	Welding sleeve Ø 24 mm × 7.1 - mm	Welding sleeve Ø 24 mm × 7.1 - mm	170	1		1 D
250 bar (3626 psi)	B	16 Mo 3	1.5415	Welding sleeve Ø 33.7 mm × 4.5-mm	Welding sleeve Ø 24 mm × 7.1 - mm	700	0.7		1 E
160 bar (2321 psi)	A	16 Mo 3	1.5415	Screwed connectors G½, form R, DIN 19207	Screwed connectors G½, form V, DIN 19207	20	1.6		5 A
500 bar (7252 psi)	D	16 Mo 3	1.5415	Welding sleeve Ø 21.3 mm × 6.3-mm	Welding sleeve Ø 21.3 mm × 6.3-mm	20	1.6		5 B
500 bar (7252 psi)	D	16 Mo 3	1.5415	Welding sleeve Ø 24 mm × 7.1 - mm	Welding sleeve Ø 24 mm × 7.1 - mm	20	1.6		5 C
500 bar (7252 psi)	E	11 CrMo 9 10	1.7383	Welding sleeve Ø 24 mm × 7.1 - mm	Welding sleeve Ø 24 mm × 7.1 - mm	20	1.6		5 D

Accessories

Factory certificate EN 10204-2.2	7MF9000-8AB
Material inspection certificate to EN 10204-3.1	7MF9000-8AD

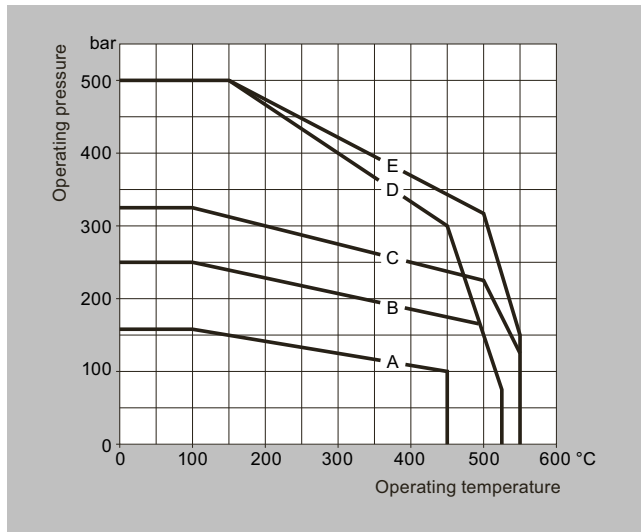
¹⁾ See characteristic curve "Permissible operating overpressure depends on the permissible operating temperature"

Pressure measurement

Fittings

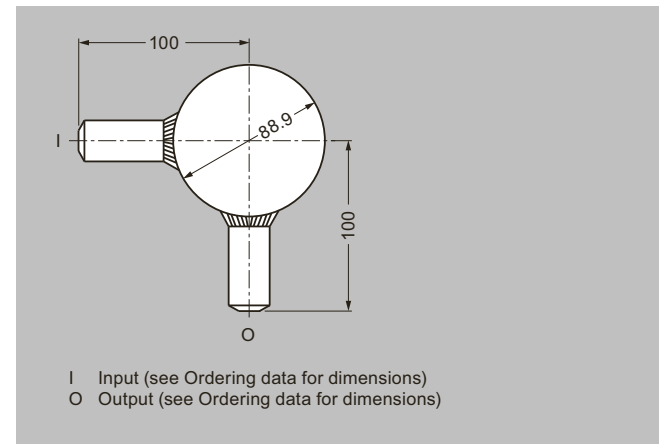
Accessories / Compensation vessels

Characteristic curves

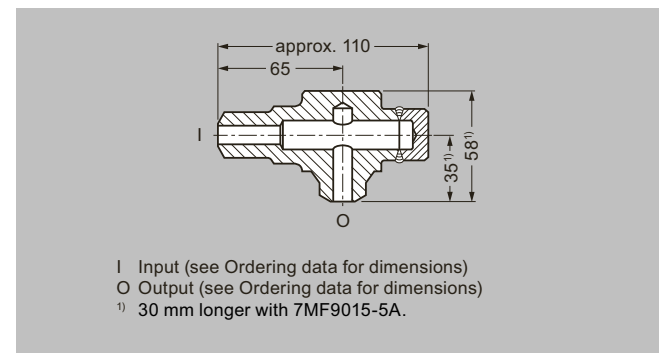


Permissible operating overpressure depends on the permissible operating temperature

Dimensional drawings



Compensation vessel 7MF9015-1..., dimensions in mm



Compensation vessel 7MF9015-5..., dimensions in mm

Overview

Connection parts are available in the following versions:

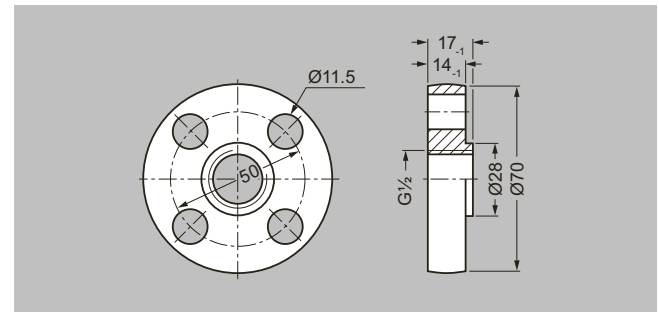
- G $\frac{1}{2}$ threaded flange pair with stainless steel gasket
- G $\frac{1}{2}$ nipple connection, form V to DIN 19207
- G $\frac{1}{2}$ C 35 union nut to DIN 16284
- B $\frac{1}{2}$ sealing ring (grooved) to DIN 19207

All connection parts are also available grease-free for oxygen.

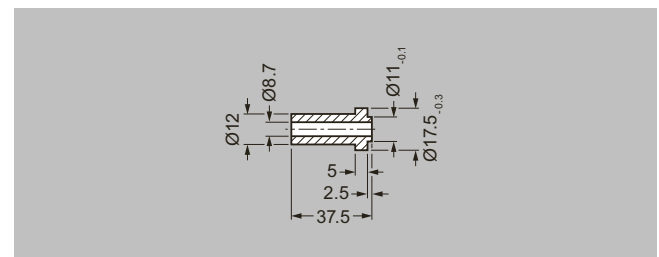
Selection and ordering data

	Article No.
Threaded flange pair G$\frac{1}{2}$ • With stainless steel gasket • Grease-free for oxygen, with stainless steel gasket Scope of delivery: 2 × threaded flange G $\frac{1}{2}$ according to DIN 19207; material: P250GH (mat. no. 1.0460) 4 × hexagonal screws M10×45 According to EN 24014; material: C35E (mat. no. 1.1181) 4 × hexagon nut M10 according to EN 24032 1 × sealing ring G $\frac{1}{2}$ (7MF9007-6BA) grooved, according to DIN 19207; material: X 6 CrNiMoTi 17 12 2 (mat. no. 1.4571/316Ti); only for 7MF9007-4CA! 1 × sealing ring G $\frac{1}{2}$ (7MF9007-6CA), grease-free for oxygen, grooved, according to DIN 19207; material: X 6 CrNiMoTi 17 12 2 (mat. no. 1.4571/316Ti); only for 7MF9007-4DA!	7MF9007-4CA 7MF9007-4DA
Nipple G$\frac{1}{2}$ According to DIN 19207 • Material: 16 Mo 3 (mat. no. 1.5415) • Grease-free for oxygen; material: X 6 CrNiMoTi 17 12 2 (mat. no. 1.4571/316Ti)	7MF9007-4KA 7MF9007-4LA
Union nut G$\frac{1}{2}$ According to DIN 16284 • Material: C35E (mat. no. 1.1181) • Grease-free for oxygen; material: X 6 CrNiMoTi 17 12 2 (mat. no. 1.4571/316Ti)	7MF9007-4MA 7MF9007-4NA
Sealing ring G$\frac{1}{2}$ According to DIN 19207, grooved • Material: X 6 CrNiMoTi 17 12 2 (mat. no. 1.4571/316Ti) • Grease-free for oxygen; material: X 6 CrNiMoTi 17 12 2 (mat. no. 1.4571/316Ti)	7MF9007-6BA 7MF9007-6CA

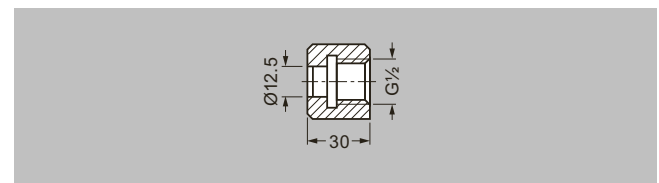
Dimensional drawings



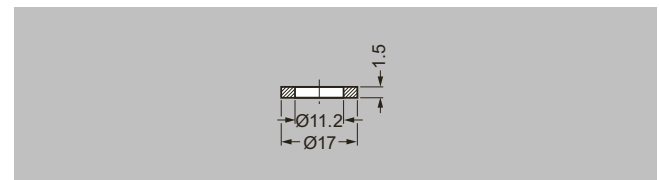
Threaded flange 7MF9007-4CA/-4DA, dimensions in mm



G $\frac{1}{2}$ nipple connection, 7MF9007-4KA/-4LA, dimensions in mm



G $\frac{1}{2}$ union nut 7MF9007-4MA/-4N, dimensions in mm



Sealing ring 7MF9007-6BA/-6CA, dimensions in mm

Temperature Measurement


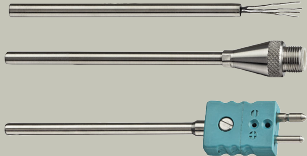


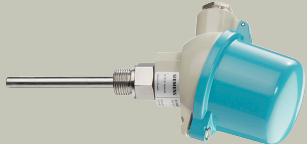





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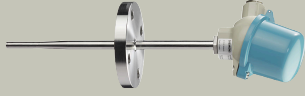



Overview


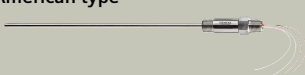
SITRANS TS temperature sensors		
Type	Description	Software for parameterization
TS100 	<ul style="list-style-type: none"> • Cable version • Universal use • For cramped spaces • Mineral-insulated 	-
TS200 	<ul style="list-style-type: none"> • Compact version • Universal use • For cramped spaces • Mineral-insulated 	-
TS300 	<p>Resistance thermometer for food, pharmaceuticals and biotechnology</p> <ul style="list-style-type: none"> • Modular design, for installation in pipes and vessels • Clamp-on design, for mounting on pipe mainly for sterilization processes 	-
TS500, Type 2 	<ul style="list-style-type: none"> • For the process industry (pipes and vessels) • Tubular thermowell for low to medium stress • Thermowell according to DIN 43772, type 2, without process connection • Without extension X, plug-in or use with moveable compression fitting 	-
TS500, Type 2N 	<ul style="list-style-type: none"> • For the process industry (pipes and vessels) • Tubular thermowell for low to medium stress • Thermowell type 2N similar to DIN 43772, screwed design • Without extension X, connection head non-adjustable 	-
TS500, Type 2G 	<ul style="list-style-type: none"> • For the process industry (pipes and vessels) • Tubular thermowell for low to medium stress • Thermowell according to DIN 43772, type 2G, screwed design • With extension X 	-
TS500, Type 2F 	<ul style="list-style-type: none"> • For the process industry (pipes and vessels) • Tubular thermowell for low to medium stress • Thermowell according to DIN 43772, type 2F with flange • With extension X 	-
TS500, Type 3 	<ul style="list-style-type: none"> • For the process industry (pipes and vessels) • Tubular thermowell for low to medium stress • Thermowell according to DIN 43772, type 3 without process connection, improved response time • Without extension X, plug-in or use with moveable compression fitting 	-



Temperature Measurement

Product overview

Overview (continued)

SITRANS TS temperature sensors		
TS500, Type 3G 	<ul style="list-style-type: none"> • For the process industry (pipes and vessels) • Tubular thermowell for low to medium stress • Thermowell according to DIN 43772, type 3G, screwed design, improved response time • With extension X 	-
TS500, Type 3F 	<ul style="list-style-type: none"> • For the process industry (pipes and vessels) • Tubular thermowell for low to medium stress • Thermowell according to DIN 43772, type 3F with flange, improved response time • With extension X 	-
TS500, Type 4 	<ul style="list-style-type: none"> • For the process industry (pipes and vessels) • Barstock thermowell for medium to extreme stress • Thermowell according to DIN 43772 • Type 4 for welding • Type 4F with flange 	-
TS500, Type 4F 	<ul style="list-style-type: none"> • For the process industry (pipes and vessels) • Barstock thermowell for medium to extreme stress • Thermowell according to DIN 43772 • Type 4 for welding • Type 4F with flange 	-
TS500, installation 	<ul style="list-style-type: none"> • For the process industry (pipes and vessels) • For installation in existing thermowells • Suitable for thermowells according to DIN 43772 as well as ASME B40.92001 • With extension X, European type or American type 	-

SITRANS TSinsert - measuring inserts for temperature sensors		
Type	Description	Software for parameterization
European type 	<ul style="list-style-type: none"> • Replaceable • Mineral-insulated 	-
American type 	<ul style="list-style-type: none"> • Replaceable • Mineral-insulated 	-

SITRANS TSthermowell - thermowells for temperature sensors		
Type	Description	Software for parameterization
Screw-in connection 	<ul style="list-style-type: none"> • Straight • Staggered • Tapered 	-
Weld-in connection 	<ul style="list-style-type: none"> • Straight • Staggered • Tapered 	-

Overview (continued)



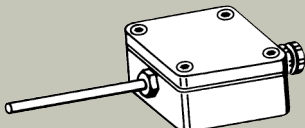
SITRANS TSthermowell - thermowells for temperature sensors

Flange connection





- Straight
- Staggered
- Tapered

Thermocouples/resistance thermometers - Temperature sensors for combustion processes and damp rooms

Type	Description	Software for parameterization
Straight thermocouples 	Largest measuring range: 0 ... 1250 °C (32 ... 2282 °F)	-
Flue gas resistance thermometer 	Largest measuring range: -50 ... +600 °C (-58 ... +1112 °F)	-
Resistance thermometer for damp rooms 	Largest measuring range: -30 ... +80 °C (-22 ... +140 °F)	-

Compact and head transmitters

Type	Description	Mounting of transmitter with Ex protection		Software for parameterization
		Transmitters	Sensor	
SITRANS TH100 Slim 	For temperature measurement in combination with Pt100 compact resistance thermometers	-	-	SIPROM T
SITRANS TH100 	<ul style="list-style-type: none"> • 4 to 20 mA • Transmitters for Pt100 	<ul style="list-style-type: none"> • Zone 2 • Zone 1 • Zone 0 • Zone 21 • Zone 20 • DIV 1 • DIV 2 	<ul style="list-style-type: none"> • Zone 2 • Zone 1 • Zone 0 • Zone 21 • Zone 20 • DIV 1 • DIV 2 	SIPROM T





Temperature Measurement

Product overview

Overview (continued)

Compact and head transmitters				
<p>SITRANS TH200</p>  <p>A compact, teal-colored transmitter with a circular top surface featuring several screw terminals. The label on the top includes the model name 'SITRANS TH200', a serial number, and other technical details.</p>	<p>Transmitters for connection to resistance thermometers, resistance-based sensors, thermocouples and DC voltages up to 1.1 V</p> <ul style="list-style-type: none"> • 4 to 20 mA • Universal 	<ul style="list-style-type: none"> • Zone 2 • Zone 1 • Zone 0 • Zone 21 • Zone 20 • DIV 1 • DIV 2 	<ul style="list-style-type: none"> • Zone 2 • Zone 1 • Zone 0 • Zone 21 • Zone 20 • DIV 1 • DIV 2 	SIPROM T
<p>SITRANS TH300</p>  <p>A compact, teal-colored transmitter with a circular top surface and screw terminals. The label includes 'SITRANS TH300' and other technical specifications.</p>	<p>Transmitters for connection to resistance thermometers, resistance-based sensors, thermocouples and DC voltages up to 1.1 V</p> <ul style="list-style-type: none"> • 4 to 20 mA • HART • Universal 	<ul style="list-style-type: none"> • Zone 2 • Zone 1 • Zone 0 • Zone 21 • Zone 20 • DIV 1 • DIV 2 	<ul style="list-style-type: none"> • Zone 2 • Zone 1 • Zone 0 • Zone 21 • Zone 20 • DIV 1 • DIV 2 	SIMATIC PDM
<p>SITRANS TH320</p>  <p>A teal-colored transmitter with a more complex top surface featuring multiple screw terminals and a central circular opening. The label includes 'SITRANS TH320' and other technical details.</p>	<p>2-wire head transmitter with and without HART communication interface. With 1 input for connection to resistance thermometers, linear resistors, potentiometers, thermocouples, and DC voltages up to 1.7 V</p> <ul style="list-style-type: none"> • 4 to 20 mA • HART 7 • Universal • SIL2/3 according to IEC 61508 	<ul style="list-style-type: none"> • Zone 2 • Zone 1 • Zone 0 • Zone 21 • Zone 20 • M1 • DIV 1 • DIV 2 	<ul style="list-style-type: none"> • Zone 2 • Zone 1 • Zone 0 • Zone 21 • Zone 20 • M1 • DIV 1 • DIV 2 	SIMATIC PDM or SIPROM T (depending on SITRANS TH320 type used)
<p>SITRANS TH420</p>  <p>A teal-colored transmitter with a top surface similar to the TH320, featuring multiple screw terminals and a central opening. The label includes 'SITRANS TH420' and other technical details.</p>	<p>Transmitters with 2 inputs for connection to resistance thermometers, linear resistors, potentiometers, thermocouples, and DC voltages up to 1.7 V</p> <ul style="list-style-type: none"> • Drift detection function • HART 7 • Universal • SIL2/3 according to IEC 61508 • High input availability 	<ul style="list-style-type: none"> • Zone 2 • Zone 1 • Zone 0 • Zone 21 • Zone 20 • M1 • DIV 1 • DIV 2 	<ul style="list-style-type: none"> • Zone 2 • Zone 1 • Zone 0 • Zone 21 • Zone 20 • M1 • DIV 1 • DIV 2 	SIMATIC PDM




Overview (continued)

Rail transmitter				
Type	Description	Mounting of transmitter with Ex protection		Software for parameterization
		Transmitters	Sensor	
SITRANS TR200 	<ul style="list-style-type: none"> • 4 to 20 mA • Universal 	<ul style="list-style-type: none"> • Zone 2 • Zone 1 • Zone 0 • Zone 21 	<ul style="list-style-type: none"> • Zone 2 • Zone 1 • Zone 0 • Zone 21 • Zone 20 	SIPROM T
SITRANS TR300 	<ul style="list-style-type: none"> • 4 to 20 mA • HART • Universal 	<ul style="list-style-type: none"> • Zone 2 • Zone 1 • Zone 0 • Zone 21 	<ul style="list-style-type: none"> • Zone 2 • Zone 1 • Zone 0 • Zone 21 • Zone 20 	SIMATIC PDM
SITRANS TR320 	<p>2-wire rail transmitter with and without HART communication interface</p> <p>With 1 input for connection to resistance thermometers, linear resistors, potentiometers, thermocouples, and DC voltages up to 1.7 V</p> <ul style="list-style-type: none"> • 4 to 20 mA • HART 7 • Universal • SIL2/3 according to IEC 61508 	<ul style="list-style-type: none"> • Zone 2 • Zone 1 • Zone 0 • Zone 21 • Zone 20 • M1 • DIV 1 • DIV 2 	<ul style="list-style-type: none"> • Zone 2 • Zone 1 • Zone 0 • Zone 21 • Zone 20 • M1 • DIV 1 • DIV 2 	SIMATIC PDM (depending on SITRANS TR320 type used)
SITRANS TR420 	<p>Transmitters with 2 inputs for connection to resistance thermometers, linear resistors, potentiometers, thermocouples, and DC voltages up to 1.7 V</p> <ul style="list-style-type: none"> • Drift detection function • HART 7 • Universal • SIL2/3 according to IEC 61508 • High input availability 	<ul style="list-style-type: none"> • Zone 2 • Zone 1 • Zone 0 • Zone 21 • Zone 20 • M1 • DIV 1 • DIV 2 	<ul style="list-style-type: none"> • Zone 2 • Zone 1 • Zone 0 • Zone 21 • Zone 20 • M1 • DIV 1 • DIV 2 	SIMATIC PDM

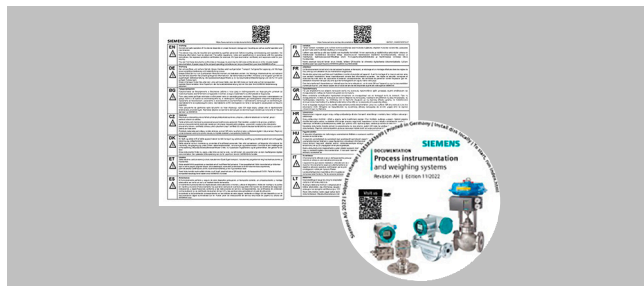
Temperature Measurement

Product overview

Overview (continued)

Field transmitter				
Type	Description	Mounting of transmitter with Ex protection		Software for parameterization
		Transmitters	Sensor	
 <p>SITRANS TF</p>	<p>Transmitters for connection to resistance thermometers, resistance-based sensors, thermocouples and DC voltages up to 1.1 V</p> <ul style="list-style-type: none"> In field enclosure for heavy industrial use 4 to 20 mA HART 5 Universal 	<ul style="list-style-type: none"> Zone 2 Zone 1 Zone 21 DIV 1 DIV 2 	<ul style="list-style-type: none"> Zone 2 Zone 1 Zone 0 Zone 21 Zone 20 	Depending on the installed SITRANS TH200/TH300 transmitter
 <p>SITRANS TF320</p>	<p>Transmitters for connection to resistance thermometers, resistance-based sensors, thermocouples and DC voltages up to 1.7 V</p> <ul style="list-style-type: none"> In field enclosure for heavy industrial use 4 to 20 mA HART 7 Universal SIL2/3 according to IEC 61508 	<ul style="list-style-type: none"> Zone 2 Zone 1 Zone 21 Zone 22 DIV 1 DIV 2 	<ul style="list-style-type: none"> Zone 2 Zone 1 Zone 0 Zone 20 Zone 21 Zone 22 DIV 1 DIV 2 	Local operation with buttons. SIMATIC PDM local with HART modem or SIPROM T (depending on SITRANS TH320 type used)
 <p>SITRANS TF420</p>	<p>Transmitters for connection to resistance thermometers, resistance-based sensors, thermocouples and DC voltages up to 1.7 V</p> <ul style="list-style-type: none"> In field enclosure for heavy industrial use HART 7 Universal SIL2/3 according to IEC 61508 High input availability 	<ul style="list-style-type: none"> Zone 2 Zone 1 Zone 21 Zone 22 DIV 1 DIV 2 	<ul style="list-style-type: none"> Zone 2 Zone 1 Zone 0 Zone 20 Zone 21 Zone 22 DIV 1 DIV 2 	Local operation with buttons. SIMATIC PDM locally with HART modem.

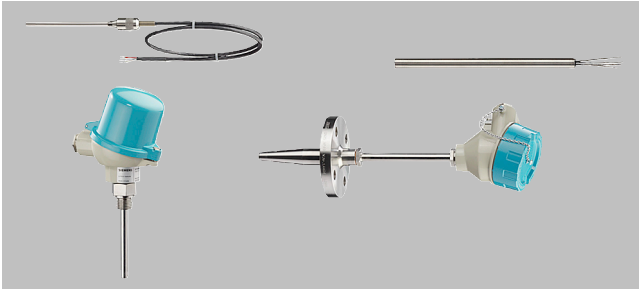
Supplied product documentation on DVD and safety notes



The scope of delivery of the Siemens products for process instrumentation includes a multilingual instruction sheet with **safety notes** as well as a uniform **mini DVD – Process Instrumentation and Weighing Systems**.

This DVD contains the most important manuals and certificates for the Siemens process instrumentation and weighing technology portfolio. The delivery may also contain product-specific or order-specific printed materials. For more information, refer to section 10 "Appendix".

Overview



The temperature sensors of the SITRANS TS product family are used for measuring temperatures in industrial plants.

Siemens offers the following temperature sensors:

- SITRANS TS100
 - General use
 - Compact design with connection cable
- SITRANS TS200
 - General use
 - Compact design with plug/wire ends
- SITRANS TS300
 - Use in food, pharmaceuticals and biotechnology
 - Modular or clamp-on design
- SITRANS TS500
 - General use
 - Modular design with connection head and thermowell

Benefits

The modular design makes it possible to customize the temperature sensor for most applications, while still being able to use many standardized individual components.

Application

Depending on the specification, sensors can be combined with different connection heads, extensions (neck pipe) and process connections. As a result, the sensors can be used in a large number of technical applications, e.g. in the following industries:

- Chemical industry
- Petrochemical industry
- Power engineering
- Basic material industry
- Pharmaceutical industry
- Biotechnology
- Food manufacturing

SITRANS TS100 and SITRANS TS200

Temperature sensors of the SITRANS TS100 series are cable thermometers with different electrical connection options (e.g. plug, soldered connection, connection cable). The SITRANS TS200 series of compact thermometers is characterized by a compact design. Both temperature sensor series are suitable for:

- Measurements of temperatures of solids, where additional thermowells are not required for replacements done during ongoing operations, e.g. bearing bracket temperature.
- Measurements which are particularly critical with regard to response times. The advantages offered by an additional thermowell are intentionally omitted.
- Measuring points which must be easy to convert or relocate.
- Surface temperature measurements: The temperature sensor is used in conjunction with a surface connection piece.
- Cost-effective transport: The mineral-insulated design of the sensors allows for economical transport even over large lengths. As of a length of 0.8 m, the sensors can be delivered rolled or bent.

SITRANS TS300 temperature sensors for food, pharmaceuticals and biotechnology

The temperature sensors of the SITRANS TS300 series are thermometers especially designed for measurements with high hygienic demands, such as in the food, pharmaceutical and biotechnology industries. The basic versions are:

- Thermometers in modular design with replaceable measuring insert and process connections usual in the industry
- Clamp-on thermometers for measurement of the pipe surface temperature without interrupting the process

SITRANS TS500 temperature sensors as a module system

Due to their modular design, temperature sensors of the SITRANS TS500 series are well suited to a large number of applications. The replaceable measuring insert makes it possible to conduct maintenance work even during ongoing operations. These devices are used particularly frequently in pipes and vessels in the following industries:

- Power stations
- Chemical industry
- Petrochemical industry
- General process engineering
- Water, waste water

Temperature Measurement

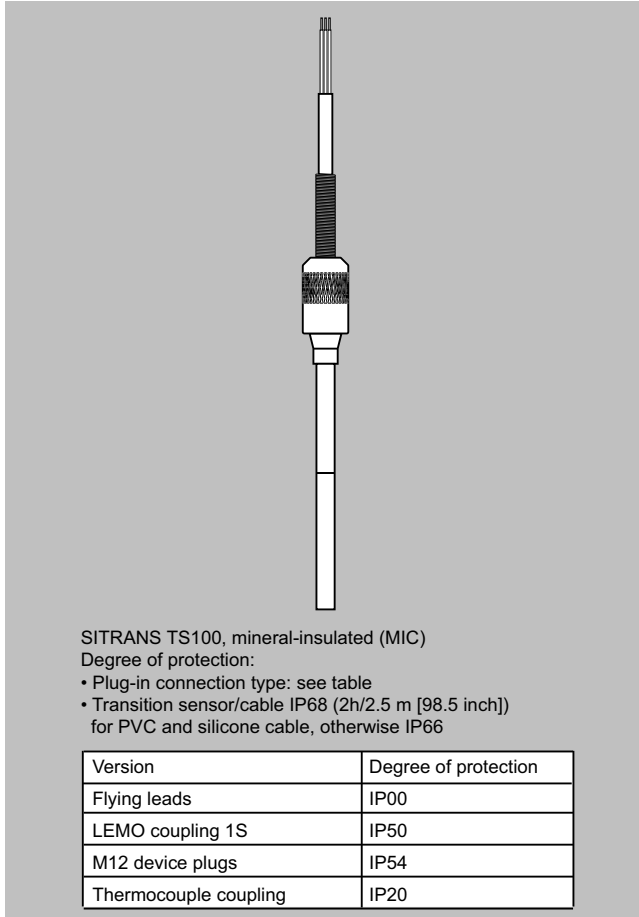
Temperature sensors

Technical reference

Design

SITRANS TS100 7MC71xx

The following figure shows the available versions of SITRANS TS100 temperature sensors.



SITRANS TS100

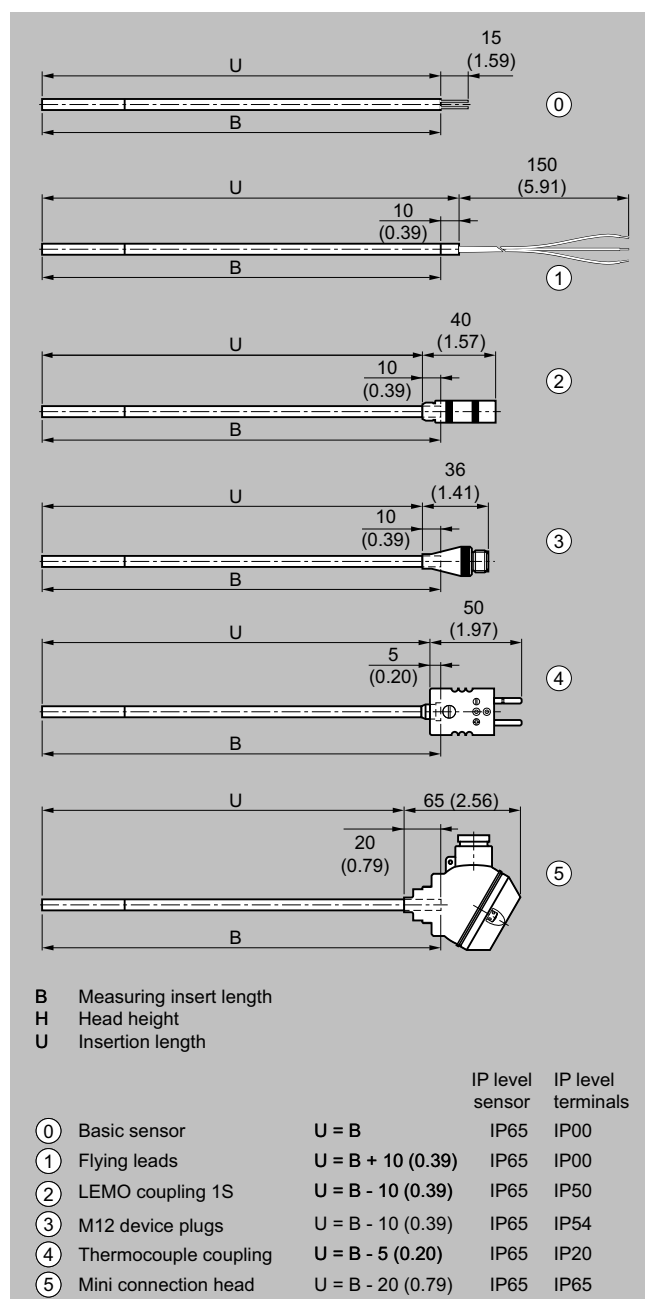
The following types of process connections can be implemented:

- Compression fitting
- Spring-loaded compression fitting
- Soldering nipple
- Direct soldering/welding in

SITRANS TS200 7MC72xx

The following figure shows the available versions of SITRANS TS200 temperature sensors.

Design (continued)



SITRANS TS200, dimensions in mm (inch)

The following types of process connections can be implemented:

- Compression fitting
- Spring-loaded compression fitting
- Soldering nipple
- Direct soldering/welding in

SITRANS TS300

SITRANS TS300 modular design

The resistance thermometer is intended for installation in vessels and pipes for hygienic requirements.

- Modular design consisting of thermowell, measuring insert, connection head and optional transmitter for replacement during operation.

Temperature Measurement

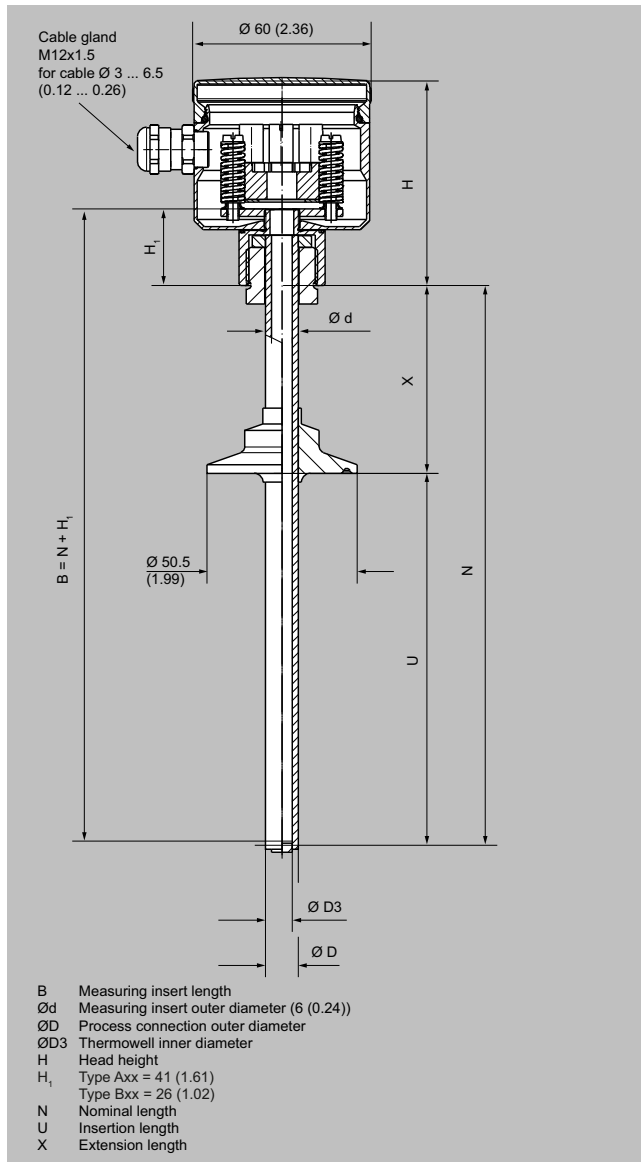
Temperature sensors

Technical reference

Design (continued)

- Hygiene version, design according to recommendations of the EHEDG
- Transmitter can be integrated (4 to 20 mA, PROFIBUS PA or FOUNDATION Fieldbus)

The following figure shows the available versions and components of SITRANS TS300 temperature sensors in modular design.



SITRANS TS, temperature sensors, TS300 modular design, dimensions in mm (inch)

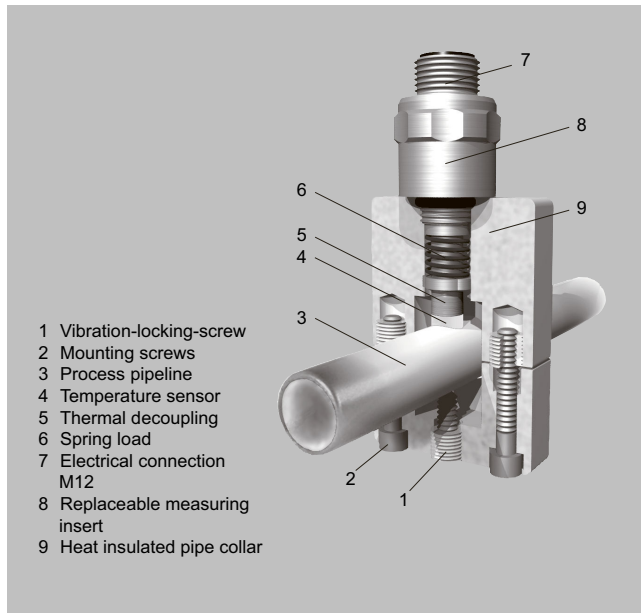
SITRANS TS300 Clamp-on

The temperature is recorded via a modified, fast response Pt100 measuring element that is positioned and insulated by a pipe collar made of temperature-resistant plastic.

The measuring insert contains a special temperature sensor made of silver that is constantly pressed onto the pipe by a spring.

A positively driven operation of the replaceable measuring insert ensures a constant fit on the pipe and thus provides for a reproducible measuring result.

Design (continued)

**Structural design**

Measuring insert	<ul style="list-style-type: none"> • Special measuring insert made of stainless steel; hygienic design • Measuring element made of silver; thermal decoupling by plastic insert Measuring insert screwed into collar with spring tension. Use thermo-lubricant (see accessories) prior to mounting the device.
Pipe collar	<ul style="list-style-type: none"> • Collar made from temperature-resistant, high-performance plastic with integrated insulation system in hygienic design • Ambient temperature influence: Approx. 0.2%/10 K

The diameter of the measuring pipe is required for correct device selection. For special sizes, you start by selecting the appropriate collar size and entering the desired size in plain text. Space-saving designs (clamping bracket version) are available optionally for installation in restricted spaces (e.g., pipe bundles).

For correct assignment after recalibration, the collar as well as the measuring insert are marked with the serial number and pipe diameter. This information can also be engraved.

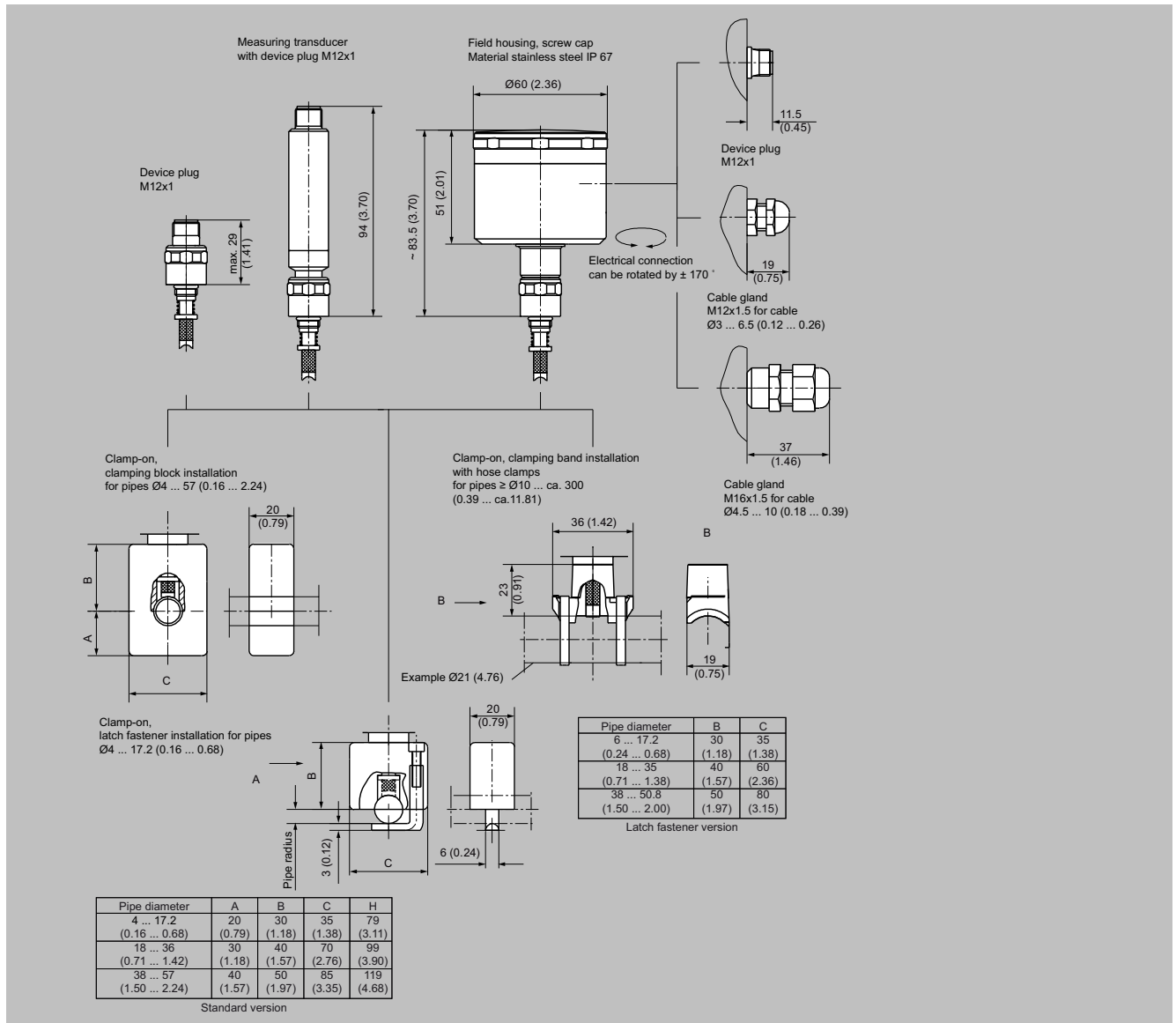
The following figure shows the available versions and components of SITRANS TS300 temperature sensors in clamp-on design:

Temperature Measurement

Temperature sensors

Technical reference

Design (continued)

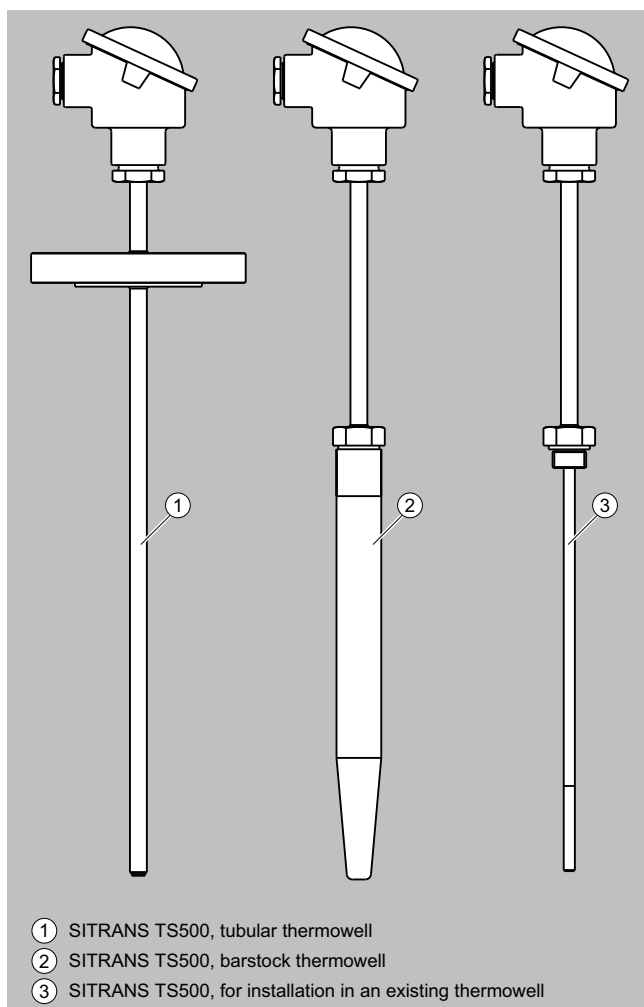


SITRANS TS300 clamp-on design, device plug, field enclosure, cable gland, versions, dimensions in mm (inch)

SITRANS TS500 7MC75xx

The following figure illustrates the available designs and components for SITRANS TS500 temperature sensors:

Design (continued)



SITRANS TS500 temperature sensors; the IP degree of protection depends on the connection head

The temperature sensors of the SITRANS TS500 series are available in three different versions:

Version	Description	Area of application	Process connection
1	<ul style="list-style-type: none"> Tubular thermowell Thermowell and extension made from a pipe; closed at tip with welded-in base plug 	Minimal to medium process requirements	<ul style="list-style-type: none"> Connection with thread or flange Thread is welded on, or compression fitting
2	<ul style="list-style-type: none"> Barstock thermowell Barstock thermowell, tubular extension; extension screwed into thermowell 	Medium to extreme process requirements	<ul style="list-style-type: none"> Directly welded into pipe With welded-on flange With external thread
3	<ul style="list-style-type: none"> For installation in existing thermowell Tubular extension 	Process requirements depending on the thermowell design	Screwed into an existing thermowell

Temperature Measurement

Temperature sensors

Technical reference

Function

A complete measuring point consists of a measuring insert which contains the sensor elements, the protective fitting and an optional measured value processor (transmitter).

Basic sensors

The sensor elements are:

- Resistance thermometers:
Temperature measurement is based on the temperature dependency of the installed measuring resistor.
- Thermocouples:
Temperature measurement is based on the Seebeck effect. A thermocouple which subjected to a temperature drop produces thermoelectric voltage that can be measured.

Transmitter

The optional Siemens transmitters assume the following functions:

- Optimum measurement processing
- Strengthening of weak sensor signals directly on site
- Transmit standardized signals
- Protect against electromagnetic interspersions
- Option to conduct measuring point diagnostics

Configuration

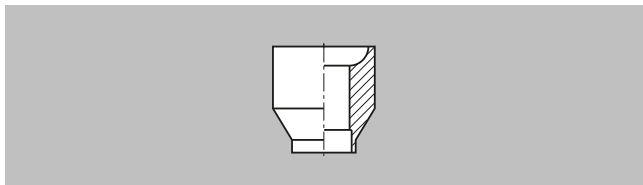
Components: Process connections

This catalog is limited to the standard versions. Special designs are available on request. The technical specifications are provided to assist the user. It is the responsibility of the ordering party to make the correct selection of suitable devices.

Welding in

The welding in of the thermowell provides a permanent, secure and highly resilient process connection, assuming a respective welding quality.

It is not possible to accidentally open the process connection. Additional gaskets are not required. If the pipe is not thick enough to ensure a secure welded joint, appropriate weld-in sockets are used. With weld-in sockets in suitable length, it is also possible to standardize a plant's measuring points to a large extent. Stocks of spare parts can therefore be reduced to a minimum.

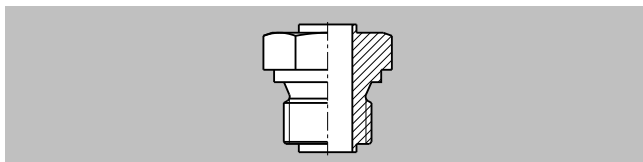


Weld-in sockets

Thread

Mounting type: Screw-in thread

Screw-in threads of different thread types and sizes are firmly welded to the thermowell.



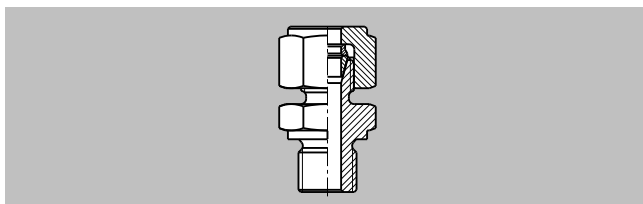
Screw-in thread

Mounting type: Compression fittings

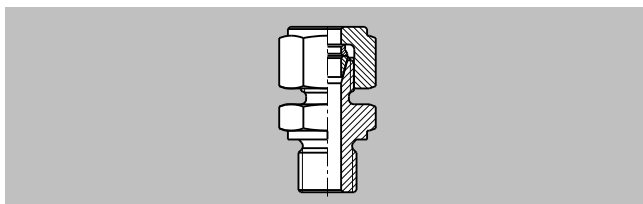
Compression fittings are available as accessories. They fit the diameter of the thermowell and provide for flexible installation. The installation length can be selected on site. When installed correctly, compression fittings are well suited for low and medium pressure.

The difference between the standard and spring-loaded version is as follows:

In the case of the spring-loaded compression fitting, the sensor is pressed against the measured object or the base of the thermowell, thus achieving particularly good heat contact.



Compression fitting



Spring-loaded compression fitting

Temperature Measurement

Temperature sensors

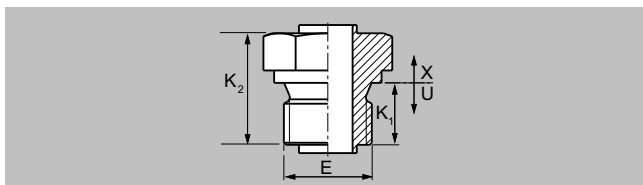
Technical reference

Configuration (continued)

Thread form:

Cylindrical thread

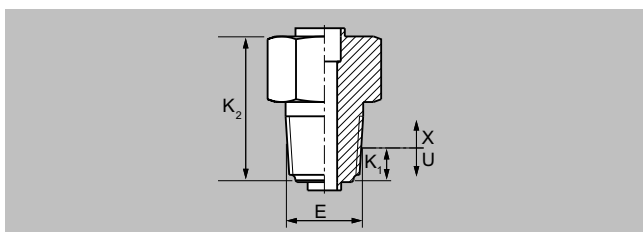
Cylindrical threads do not seal in the thread but due to an additional sealing surface or seal. For example, threads with the short form "G" (as per ISO 228) feature a thread form with a defined screw gauge.



Cylindrical thread

Tapered thread

By contrast, tapered threads, such as the American "NPT" thread, seal metallic in the thread. The relevant length information in the catalog refers to the "fully-tightened point (hand-tight)" of the thread, which cannot be defined exactly due to standard-related tolerances. However, the spring-load of the measuring insert compensates for the differences in length.



NPT thread

	Thread form:	E / E ₁	K ₁	K ₂
Thermowells Form 2G + 3G	Cylindrical	G ½"	15	27
		G ¾"	16	34
		G1	30	46
		M20 x 1.5	12	26
		M27 x 2	16	34
		M33 x 2	18	36
		Tapered	NPT ½"	9
NPT ¾"	9		32.5	
NPT 1"	10		40	
Extensions 7MC7500	Cylindrical	G ½"	12	27
		M14 x 1.5	12	23
		M18 x 1.5	12	25
		M20 x 1.5	12	25
	Tapered	NPT ½"	9	33

X = extension length

U = installation length

E₁ = Neck pipe/process connection

K₁ = Screw-in depth

K₂ = Length of the process connection

Flanges

The different properties of the flanges are as follows:

- Standard series EN 1092, ASME 16.5,...
- Nominal pressure
- Nominal diameter
- Sealing surface

Configuration (continued)

This information is also stamped into the flange, along with the material code and batch number for "3.1 Material". For flange thermowells made of expensive materials, wetted parts of the thermowell and the so-called flanged wheel are designed with the required material. The flanged wheel is welded in front of the flange sealing surface in this case. Non-wetted parts are listed in 316L.

Industry-specific process connections

Special process connections have become popular in different industries. For example, hygiene technology: clamp-on connections, dairy connections and others.

Components: Thermowell

Tubular or barstock thermowells fulfill two basic functions:

- They protect the measuring insert from corrosive media
- They make it possible to replace units during ongoing operation

This catalog is limited to the standard versions. Special designs are available on request. The large number of available types can be classified as follows.

Tubular thermowells

Thermowells made of pipe material are also described as "welded" or "multi-part" thermowells (not to be confused with "multi-part protective fittings"). They are suitable for low to medium process loads and can be manufactured on a cost-effective basis.

Versions:

- Form 2N similar to DIN 43772
with straight tip and shortest possible extension length
non-adjustable connection head
- Form 2 as per DIN 43772
with straight tip and extension
adjustable connection head
Form 2: without process connection
Form 2G: Threaded connection
Form 2F: Flange connection
- Form 3 according to DIN 43772
Version with tapered tip and extension
Adjustable connection head
For these thermowells, the thermowell tip is tapered by rotary swaging. This results in an excellent fit with the measuring insert and very good response times.
Like with form 2, versions 3G/3F are also available for form 3

Barstock thermowells acc. to DIN 43772

Where process loads are too great, or where a thermowell cannot have a welded seam, deep-hole drilled barstock thermowells are used. Thermowells of form 4 according to DIN 43772 are widely used. Forms D1-D5 of the previous standard DIN 43763 have been integrated into form 4 of DIN 43772:

Design DIN 43763 invalid	Design 4 DIN 43772 current	
	L in mm	U in mm
D1	140	65
D2	200	125
D4	200	65
D5	260	125

Tubular thermowells and barstock: Dimensions

The following table shows the dimensions of the different thermowells.

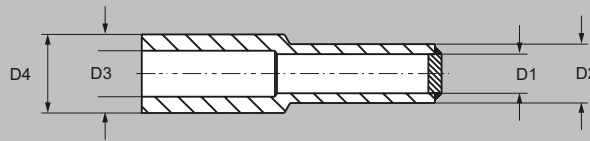
Thermowell type, design	Tip	Outer diameter [mm (inch)] D ₂	Process connection	
	Inner diameter [mm (inch)] D ₁		Inner diameter [mm (inch)] D ₃	Outer diameter [mm (inch)] D ₄
2N/2/2G/2F, pipe	7 (0.28)	9 (0.35)	7 (0.28)	9 (0.35)
2/2G/2F, pipe	7 (0.28)	12 (0.47)	7 (0.28)	12 (0.47)
3/3G/3F, pipe	6 (0.24) Tolerances acc. to DIN 43772	9 (0.35)	7 (0.28)	12 (0.47)
4/4F, barstock	7 (0.28)	12.5 (0.49)	7 (0.28)	24 (0.94)
4/4F, fast response, barstock	3.5 (0.14)	9 (0.35)	3.5 (0.14)	18 (0.71)

Temperature Measurement

Temperature sensors

Technical reference

Configuration (continued)



Dimensions of thermowells

Barstock thermowells according to ASME B40.9

Thermowells according to ASME are distinguished by their form: straight, reduced (staggered) or tapered along the entire installation length. Coarse subdivisions can also be made in the type of process connection: Screwed design, for welding in, with flange, or with the so-called Van Stone connection.

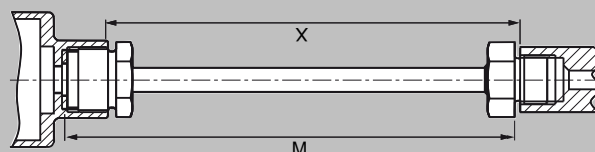
For the Van Stone connection, a small flange sealing surface exists directly at the barstock thermowell. This prevents any welding seams in the area touching the media. The thermowell is fixed by a collar flange that presses the sealing surface against the plant-side flange. Another advantage of this design is the optimized spare parts inventory. A thermowell fits onto multiple connecting flanges; the only difference is in the collar flanges.

Components: Extension (neck pipe)

The extension is the section from the lower edge of the connection head to the fixed point of the process connection or thermowell. There are a variety of terms for this component, e.g. neck pipe. For this reason the term extension has been selected as a standardized term for the different designs. Function is the deciding factor:

- Thermal decoupling of connection head from process temperature
- Installation of connection head over existing insulation
- Simple standardization of measuring inserts: In general, the length of the extension may be freely selected. However, when using standardized installation lengths, the option "Extension as per DIN 43772" is recommended. This ensures that measuring inserts which are quickly available can be used. In the case of special installation lengths, it is possible to standardize the measuring insert length through a clever combination with the respective special extension length. This allows customers to optimize their costs in purchasing and logistics.
- For American-type sensors, the extension also undertakes the spring load of the measuring insert.
- Depending on the version, the extension can also enable the adjustment of the connection head
- The form of the extension depends on the form of the thermowell:
 - Tubular thermowell
The extension and thermowell usually consist of one continuous pipe. The process connection is welded on (= one-piece protective fitting).
 - Barstock thermowells
Extension and the thermowell consist of two components which are screwed together. The process connection is attached to the thermowell (= multi-piece protective fitting).

Thermowell type	X [mm (inch)]	M [mm (inch)]	Divisible
2G	129 (5.08)	145 (5.71)	No
2F	64 (2.52)	80 (3.15)	No
3G	131 (5.19)	147 (5.79)	No
3F	66 (2.60)	82 (3.23)	No
4 (only L=110)	139 (5.47)	155 (6.10)	Yes
4 (others)	149 (5.87)	165 (6.50)	Yes



Extensions as per DIN 43772

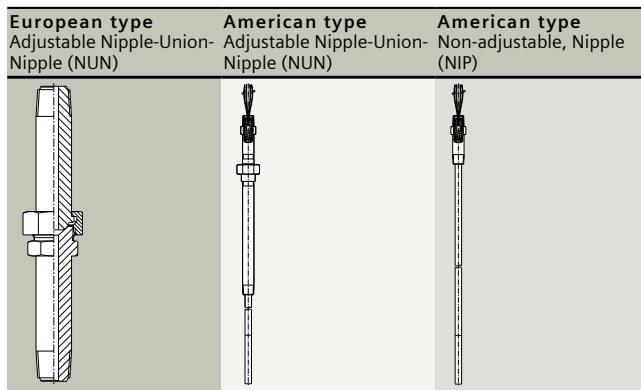
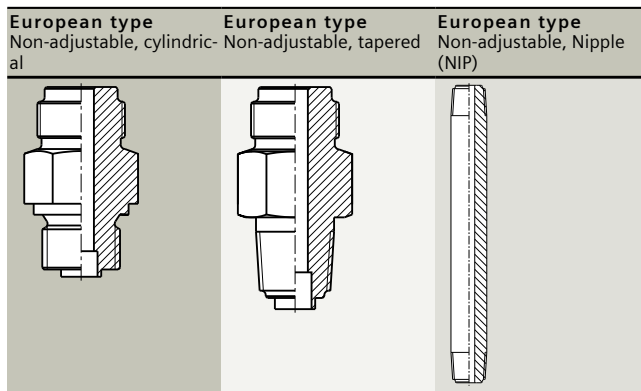
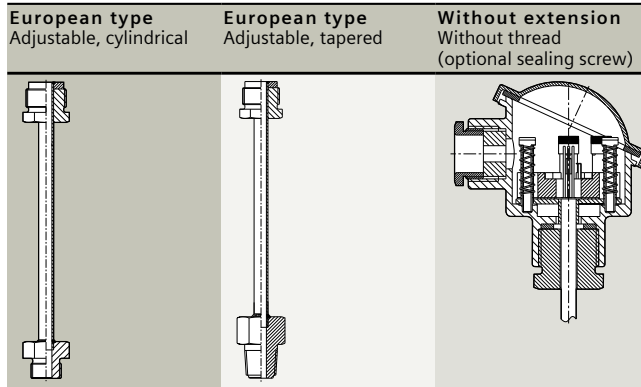
Versions

With regard to their function, extensions can be classified into two types:

- Adjustable /non-adjustable:
Function of the extension to align the connection head to the desired direction

Configuration (continued)• **Integrated measuring insert spring load:**

In the case of American-type sensors, the spring load of the measuring insert is integrated into the extension. Measuring insert and extension form one unit.



Versions; in the case of heavy stainless steel connection heads in conjunction with vibrations, a short extension length should be chosen or external support should be provided.

Components: Connection headConnection head

the connection head protects the terminal compartment. The connection head features sufficient room for mounting a clamping base or transmitter.

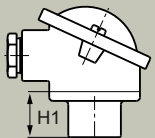
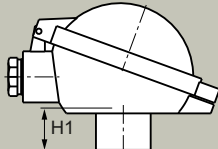
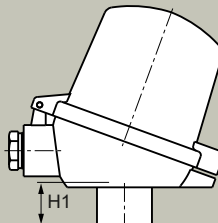
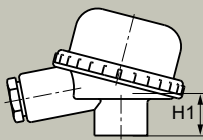
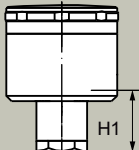
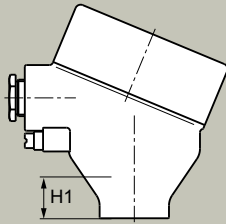
Different connection heads are used depending on the application and preference. Where cable glands and thread adapters are included in the scope of the order, they will be supplied with the device.

Temperature Measurement

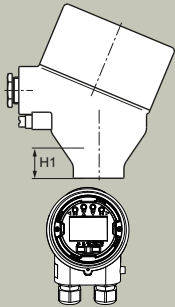
Temperature sensors

Technical reference

Configuration (continued)

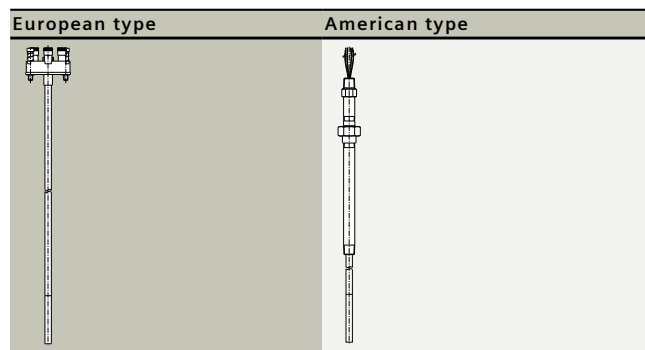
Connection head label	Type Material	Cable gland	Degree of protection [corrosion protection corresponding to ISO 12944-2]	Transmitter installation	Connection height H1 [mm (inch)]	Explosion protection optional
Flange cover 	BA0 aluminum	M20 × 1.5 Not Ex: Plastic Ex i/Ex n: Brass	IP65 [C2, durability H; C3, durability M]	Measuring insert	26 (1.02)	Ex i
Spring flap low 	B80 aluminum	M20 × 1.5 Not Ex: Plastic Ex i/Ex n: Brass	IP65 [C2, durability H; C3, durability M]	Measuring insert	26 (1.02)	Ex i
Spring flap high 	BC0 aluminum BC0 plastic	M20 × 1.5 Not Ex: Plastic Ex i/Ex n: Brass	IP65 [For aluminum: C2, durability H; C3, durability M] [For plastic: not applicable]	Measuring insert and/or spring flap	26 (1.02)	Ex i
Screw cover made of plastic 	BMO plastic	M20 × 1.5 Not Ex: Plastic Ex i/Ex n: Brass	IP54 [For plastic: not applicable]	Measuring insert	26 (1.02)	Ex i
Screw cover made of stainless steel 	B50 stainless steel	M12 × 1.5 polyamide	IP67 [For stainless steel: not applicable]	Measuring insert	26 (1.02)	Ex i
Screw cover, heavy-duty 	AG0 aluminum AU0 stainless steel AISI 316 (1.4401)	M20 × 1.5 Not Ex: Plastic Ex i/Ex n: Brass Ex d: without cable gland	IP66/68 (IP68: 1.5 m; 2 h) NEMA 4X [For aluminum: C2, C3, C4, for stainless steel: not applic- able]	Measuring insert	41 (1.61)	Ex i, Ex d

Configuration (continued)

Connection head label	Type Material	Cable gland	Degree of protection [corrosion protection corresponding to ISO 12944-2]	Transmitter installation	Connection height H1 [mm (inch)]	Explosion protection optional
Screw cover, window, heavy duty, with 4 ... 20 mA local display 	AH0 aluminum AV0 stainless steel AISI 316 (1.4401)	M20 × 1.5 not Ex: plastic Ex i/Ex n: brass Ex d: without cable gland	IP66/68 (IP68: 1.5 m; 2 h) NEMA 4X [For aluminum: C2, C3, C4, for stainless steel: not applic- able]	Measuring insert	41 (1.61)	Ex i, Ex d

Components: Measuring insertMeasuring insert

The measuring insert of the temperature sensor is built into the protective fitting (thermowell, extension and connection head). The sensor element is located in the measuring insert, where it is protected. The spring load of the measuring inserts provide good thermal contact with the tip of the thermowell, and vibration resistance is significantly increased. Only highly resistant mineral-insulated cables (so-called MIC or plastic-sheathed) are used for the electrical connection between the sensor element and connection head. The highly compacted insulation of magnesium oxide achieves excellent levels of vibration resistance. The following measuring insert designs are the most widely used on the world market:

European type

European type measuring inserts can be replaced without having to dismantle the connection head. The springs are located either on the transmitter or the terminal block. This makes it possible to achieve an 8 to 10 mm (0.315 to 0.394 inches) spring range. If a transmitter is not attached, a ceramic base is located at this position. Order option G01 can be used to select a version with flying leads instead of the ceramic base for mounting of head transmitters.

American type

American-type measuring inserts feature a large spring range. These measuring inserts are ideal for use with NPT threads that feature high tolerances. In this configuration, the extension function is partially or fully integrated (nipple-union-nipple). Moreover, it is also possible to directly mount field devices, e.g. SITRANS TF.

Components: Transmitters

SITRANS TH head transmitters process weak, non-linear sensor signals and transmit a stable and temperature-linear standard signal, thereby minimizing sensor signal disruptions.

The transmitters permanently monitor the temperature sensors and transmit diagnostics data to higher-level systems.

Because of the low energy feed of the SITRANS TH head transmitters, self-heating of the temperature sensors is at a minimal level.

The galvanic isolation and integrated reference junction ensure that temperature sensors with thermocouples provide reliable measurements at a low cost.

Temperature Measurement

Temperature sensors

Technical reference

Configuration (continued)

SITRANS TH product family

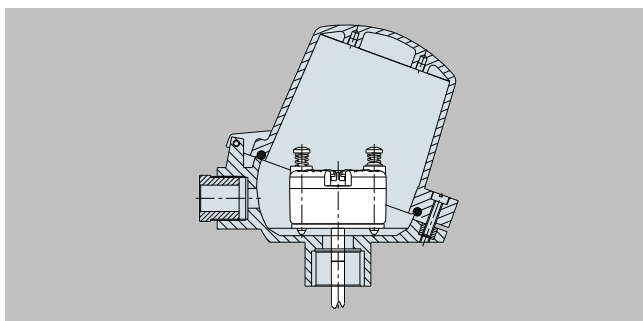
Refer to this catalog for detailed technical specifications on the SITRANS TH transmitters.

- TH100 - the basic device
 - Output: 4 ... 20 mA
 - 1 x input Pt100
 - Can be configured using simple software
- TH320 - the universal device
 - Output 4 ... 20 mA or:
 - Output 4 ... 20 mA/HART
 - 1 x input resistance thermometer, thermocouples
 - Can be configured using simple software
- TH420 – Twice as safe
 - Output 4 ... 20 mA/HART
 - 2 x input resistance thermometer, thermocouples, hot backup, drift detection, etc. can be achieved as a result
 - Extended diagnostics functions

Installation types

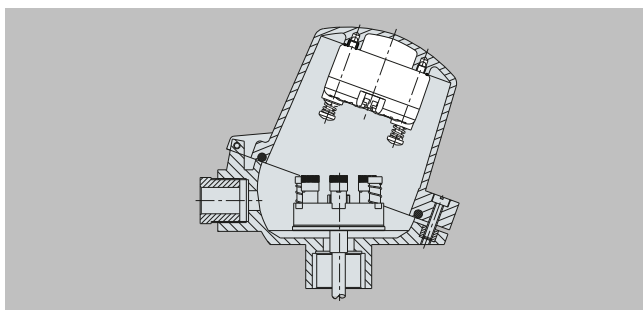
All SITRANS TH transmitters can be installed in type B connection heads. The following installation forms are used:

- Measuring insert installation
 - Our standard version offers the following advantages
 - Small vibrating masses and compact design
 - Measuring insert-transmitter unit can be replaced quickly



Installation of measuring insert

- Spring flap installation
 - Standard for head type BCO and BPO
 - Advantage: Measuring insert and transmitter can be repaired/maintained separately (recalibration).



Spring flap installation

Measuring technology: Basic sensors

The diverse application spectrum for industrial temperature measuring technology requires different sensor technologies.

Resistance thermometer

Basic sensors made of other basic materials, with different basic values or different underlying standards, are available on request. Resistance thermometers can be classified as follows:

Configuration (continued)

- **Basic design:**
The sensor element is built with thin layer technology. The resistance material is applied in the form of a thin layer on a ceramic carrier material.
- **Versions with increased vibration resistance:**
In addition to the basic design: Measures to improve vibration resistance.
- **Versions with expanded measuring range:**
Elements in wire-wound design. The wire winding is embedded in a ceramic body.

Thermocouples

Thermocouples based on other thermocouples or underlying standards are available upon request.

The most common base-metal thermocouples are:

- Type N (NiCrSi-NiSi) high degree of stability even in the upper temperature range
- Type K (NiCr-Ni) more stable than type J, but drifts in upper range
- Type J (Fe-CuNi) narrow application band

Measuring technology: Measuring range

The measuring range describes the temperature limits within which the thermometer can be used in a way that is meaningful for measurement purposes. Depending on the loads present, the thermowell materials and the desired accuracy levels, among other things, the actual application range for the thermometer may be smaller.

Resistance thermometer [°C (°F)]	
Basic version and increased vibration resistance	-50 ... +400 (-58 ... +752)
Expanded measuring range	-196 ... +600 (-320.8 ... +1112)

Thermocouple [°C (°F)]	
Type N	-270 ... +1 100 (-167 ... +2 012)
Type K	-270 ... +1 100 (-167 ... +2 012)
Type J	-210* ... +750 (-134* ... +1 382)

* According to IEC 60 584: recommended 0 ... +750 °C

Measuring technology: Measuring accuracy**Resistance thermometer**

The tolerance classes of the resistance thermometers correspond to IEC 751/EN 60751:

Tolerance	Δt
Basic accuracy, Class B	$\pm (0.30 \text{ °C} + 0.0050 t [\text{°C}])$ $0.54 \text{ °F} + 0.0050x t [\text{°F}] - 32]$
Increased accuracy, Class A	$\pm (0.15 \text{ °C} + 0.0020 t [\text{°C}])$ $0.27 \text{ °F} + 0.0020x t [\text{°F}] - 32]$
High accuracy, Class AO (1/3 B)	$\pm (0.10 \text{ °C} + 0.0017 t [\text{°C}])$ $\pm 0.18 \text{ °F} + 0.0017x t [\text{°F}] - 32]$

The following tables provide an overview of the scope of these tolerances. If the specified limits are exceeded with a resistance thermometer, the values of the next lower accuracy class permanently apply:

Resistance thermometer, Basic version [°C (°F)]	
Tolerance	Range
Basic accuracy, Class B	-50 ... +400 (-58 ... +752) ¹⁾
Increased accuracy, Class A	-30 ... +300 (-22 ... +572)
High accuracy, Class AO (1/3 B)	0 ... 150 (32 ... 302)

Resistance thermometer, Increased vibration resistance [°C (°F)]	
Tolerance	Range
Basic accuracy, Class B	-50 ... +400 (-58 ... +752) ¹⁾
Increased accuracy, Class A	-30 ... +300 (-22 ... +572)
High accuracy, Class AO (1/3 B)	0 ... 150 (32 ... 302)

Temperature Measurement

Temperature sensors

Technical reference

Configuration (continued)

Resistance thermometer, Expanded measuring range [°C (°F)]	
Tolerance	Range
Basic accuracy, Class B	-196 ... +600 (-321 ... +1 112)
Increased accuracy, Class A	-100 ... +450 (-148 ... +842)
High accuracy, Class A0	-50 ... +250 (-58 ... +482)

¹⁾ The requirements of IEC 60751 are observed. In the event of high requirements regarding long-term stability, Pt100 sensors "expanded measuring range" should be used for temperatures above 350 °C (662 °F).

Thermocouples

The tolerance classes of the thermocouples correspond with IEC 584/EN 60584:

Catalog versions

Type	Basic accuracy, Class 2	Increased accuracy, Class 1
N	-40 °C ... +333 °C ±2.5 °C (-40 °F ... +631 °F ±4.5 °F) 333 °C ... 1100 °C ±0.0075x t[°C] (631 °F ... 2012 °F ±0.0075x t[°F]-32)	-40 °C ... +375 °C ±1.5 °C (-40 °F ... +707 °F ±2.7 °F) 375 °C ... 1000 °C ±0.004x t[°C] (707 °F ... 1832 °F ±0.004x t[°F]-32)
K	-40 °C ... +333 °C ±2.5 °C (-40 °F ... +631 °F ±4.5 °F) 333 °C ... 1000 °C ±0.0075x t[°C] (631 °F ... 1832 °F ±0.0075x t[°F]-32)	-40 °C ... +375 °C ±1.5 °C (-40 °F ... +707 °F ±2.7 °F) 375 °C ... 1000 °C ±0.004x t[°C] (707 °F ... 1832 °F ±0.004x t[°F]-32)
J	-40 °C ... +333 °C ±2.5 °C (-40 °F ... +631 °F ±4.5 °F) 333 °C ... 750 °C ±0.0075x t[°C] (631 °F ... 1382 °F ±0.0075x t[°F]-32)	-40 °C ... +375 °C ±1.5 °C (-40 °F ... +707 °F ±2.7 °F) 375 °C ... 750 °C ±0.004x t[°C] (707 °F ... 1382 °F ±0.004x t[°F]-32)

Other thermocouples, ignoble

Type	Basic accuracy, Class 2	Increased accuracy, Class 1
T	-40 °C ... 133 °C ±1 °C (-40 °F ... +271 °F ±1.8 °F) 133 °C ... 350 °C ±0.0075x t[°C] (271 °F ... 662 °F ±0.0075x t[°F]-32)	-40 °C ... +125 °C ±0.5 °C (-40 °F ... +257 °F ±0.9 °F) 125 °C ... 350 °C ±0.004x t[°C] (257 °F ... 662 °F ±0.004x t[°F]-32)
E	-40 °C ... +333 °C ±2.5 °C (-40 °F ... +631 °F ±4.5 °F) 333 °C ... 900 °C ±0.0075x t[°C] (631 °F ... 1652 °F ±0.0075x t[°F]-32)	-40 °C ... +375 °C ±1.5 °C (-40 °F ... +707 °F ±2.7 °F) 375 °C ... 800 °C ±0.004x t[°C] (707 °F ... 1472 °F ±0.004x t[°F]-32)

Other thermocouples, noble

Type	Basic accuracy, Class 2	Increased accuracy, Class 1
R and S	0 °C ... 600 °C ±1.5 °C (32 °F ... 1112 °F ±2.7 °F) 600 °C ... 1600 °C ±0.0025x t[°C] (1112 °F ... 2912 °F ±0.0025x t[°F]-32)	0 °C ... 1100 °C ±1 °C (32 °F ... 2012 °F ±1.8 °F) 1100 °C ... 1600 °C ± [1 + 0.003 x (t - 1100)] °C (2012 °F ... 2912 °F ±1.8 + 0.003x(t[°F]-2012))
B	600 °C ... 1 700 °C ±0.0025x t[°C] (1 112 °F ... 3 092 °F ±0.0025x t[°F]-32)	

SITRANS TS300 Clamp-on

Measuring accuracy	
Reference conditions	
• Pipe	Pipe 13 × 1.5 mm (0.51 × 0.06 inches) made of stainless steel using thermal paste
• Ambient temperature	20 °C (68 °F)
• Medium	Water 120 °C (248 °F)
• Flow velocity	3 m/s (9.84 ft/s)
Measuring accuracy when using thermal paste	Process-optimized for steam sterilization
The accuracy depends on the geometry of the pipe, the medium and the ambient conditions T_M = Medium temperature; T_A = Ambient temperature	
• Class A according to IEC 60751	-40 ... +150 °C (-40 ... 302 °F) ($T_A - T_M$) × 0.02

Measuring technology: Response times

Response time describes the speed of the measurement system in the case of a temperature change, and is typically indicated as T0.5 or T0.9. The values indicate the time in which a measured value has increased to 50% or 90% of the actual temperature increase.

Configuration (continued)

The main variables which affect response time are as follows:

- Thermowell geometry, ideal are:
 - Very little material at the tip
 - use of conductive material
- Thermal connection of measuring insert to the thermowell:
 - Because of design changes implemented for the measuring insert (small gap width, spring system), Siemens measuring inserts feature very good response behavior. Because of the good fit, additional contact materials are not usually required except in certain applications, e.g. attachment of a surface sensor.
- Size of temperature increase
- Medium and flow velocity

Resistance thermometer

Typical values as per EN 60751 in water at 0.4 m/s can be found in the following table.

Thermowell form	Diameter [mm (inch)]	T0.5	T0.9
None	6 (0.24)	6	15
Straight (2)	9 (0.35)	34	90
	12 (0.47)	45	143
Tapered (3)	12 (0.47)	15	31
Barstock (4), U/C = 65	24 (0.95)	40	100
Barstock (4), U/C = 125	24 (0.95)	40	110

Thermocouples

Typical values as per EN 60751 in water at 0.4 m/s can be found in the following table.

Thermowell form	Diameter [mm (inch)]	T0.5	T0.9
None	6 (0.24)	2	4
Straight (2)	9 (0.35)	20	63
	12 (0.47)	19	66
Tapered (3)	12 (0.47)	7	22
Barstock (4), U/C = 65	24 (0.95)	22	73
Barstock (4), U/C = 125	24 (0.95)	20	53

Measuring technology: Mounting depthMeasuring insert

Type	Temperature-sensitive length (TSL) [mm (inch)]	Non-bendable length [mm (inch)]
Basic	20 (0.79)	30 (1.82)
Increased vibration resistance	20 (0.79)	30 (1.82)
Expanded measuring range	50 (1.97)	60 (2.36)
Thermocouple	20 (0.79)	5 (0.20)

Immersion depth/contact with medium

The "heat transfer error" arises depending on the ambient conditions (temperature/weather/insulation) and the size of the thermowell, process connection and pipe.

To prevent such an error, the immersion depth and diameter of the thermowell are defined. The temperature-sensitive length (TSL) of the thermowell must also be taken into account. The following rule of thumb can be used:

- Water
 - Immersion depth \geq TSL + 5 x thermowell diameter
- Air
 - Immersion depth \geq TSL + 10 ... 15 x thermowell diameter
- Recommendations
 - Select largest possible immersion depth
 - Select measuring location with higher flow velocity
 - Insulate outer components of thermometer

Temperature Measurement

Temperature sensors

Technical reference

Configuration (continued)

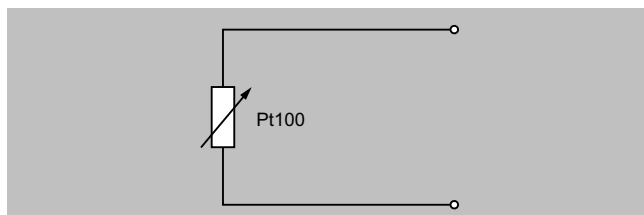
- Smallest possible surface for outer components
- Insertion in pipe bends
- Direct measurement without additional thermowell if no suitable solution can be found using other measures

Measuring technology: Connection types

For resistance thermometers, the type of sensor connection directly affects the level of accuracy:

2-wire connection

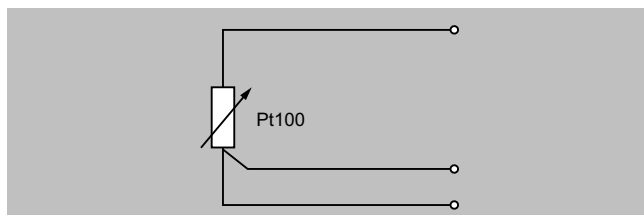
The resistance of sensor lines is included in the measurement result as an error. Adjustments are recommended in this case.



Pt100 2-wire connection

3-wire connection

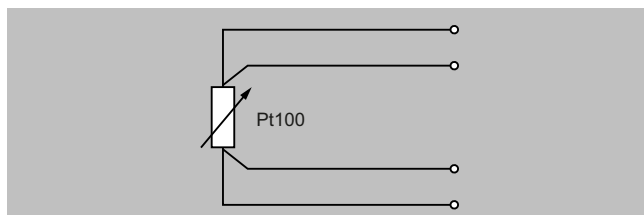
Line resistance is not included in the measurement result. Requirement: All terminal and wire resistances (corrosion) are at the same level, and terminals are at the same temperature level. Unfortunately, this is often not the case in practice.



Pt100 3-wire connection

4-wire connection

Line resistance is not included in the measurement result. This type of connection is the most secure and most accurate.



Pt100 4-wire connection

Siemens measuring inserts can be used to implement all types of connections for Pt100 devices. In the standard version, these are always supplied as 1 × 4-wire or 2 × 3-wire.

Even 2 × 4-wire are available using order option "G30". Our SITRANS TH420 transmitters offer the unique possibility to connect 2 × 4-wire resistance thermometers. The user therefore no longer has to live with the disadvantages of the 3-wire circuit when redundant sensor designs are required at the same time for safety reasons. If a complete second measuring point had to be instrumented in these cases, this work is now eliminated.

Temperature influence

At connection head TS500 ¹⁾

	Without transmitter [°C (°F)]	With suitable transmitter [°C (°F)]
A heads AG0/AH0/AU0/AV0 non-SIL ²⁾	-50 ... +100 (-58 ... +212)	-50 ... +80 (-58 ... +176)
Aluminum or stainless steel	-40 ... +100 (-40 ... +212)	-40 ... +80 (-40 ... +176)
Plastic	-40 ... +85 (-40 ... +185)	-40 ... +80 (-40 ... +176)

Configuration (continued)

- 1) In the case of applications in hazardous areas, observe information in manual.
- 2) Check cable gland and transmitter (e.g. not for Han 7 device plugs, M12).

Special climatic conditions

SITRANS TS100, TS200, TS500 and TSinsert achieve the following classes of application according to IEC 60654-1 for use in tropical climates:

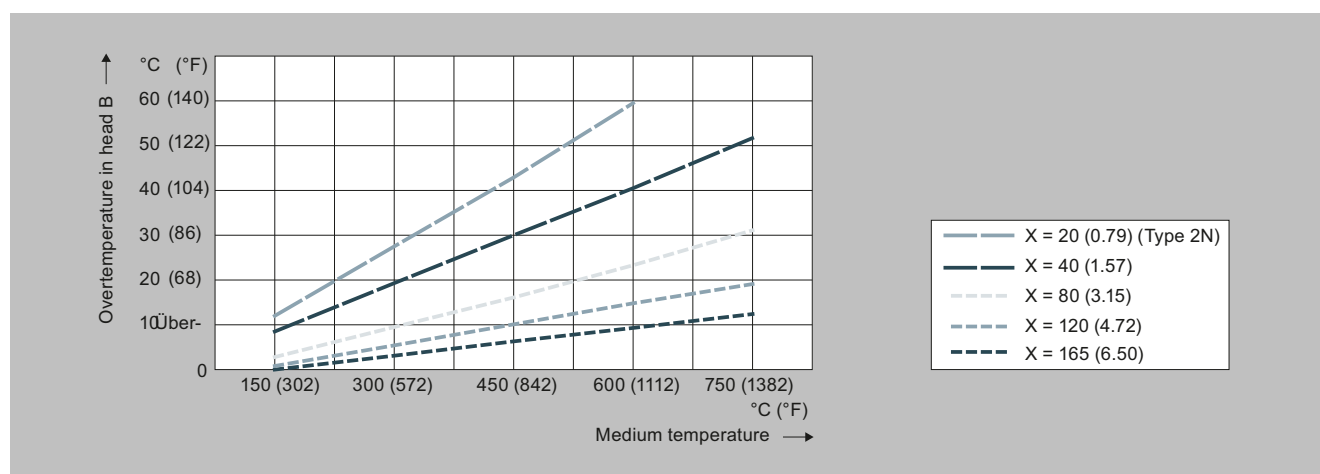
- C3 for sheltered locations
- D2 for outdoor locations

At connection site cable/plug-in connection TS100/200

The specified measuring range applies to the hot side of the sensor. The maximum permissible temperature at the cold end depends on the cables and plugs used. < 80 °C (176 °F) is considered non-critical here.

Influence of extension

The illustration below assists you in selecting the right length for the neck pipe. In this case, the following applies: Connection head temperature = Ambient temperature + Overtemperature. The temperature in the connection head can thus be assessed as follows:



Extension length X, influence on temperature, dimensions in mm (inch)

Note that guidance values may change due to local conditions. Consider these potential changes particularly with respect to explosion protection.

Also note that the accuracy of the transmitter also depends on the temperature in the connection head.

SITRANS TS300 Clamp-on

Structural design	
Measuring insert	<ul style="list-style-type: none"> • Special measuring insert made of stainless steel; hygienic design • Measuring element made of silver; thermal decoupling by plastic insert Measuring insert screwed into collar with spring tension. Use thermo-lubricant (see accessories) prior to mounting the device.
Pipe collar	
Material	Temperature-resistant, high-performance plastic with integrated insulation system in hygienic design
Ambient temperature influence	Approx. 0.2%/10 K

Process connection/thermowell

Process parameters may only allow one specific technology for the selection of process connections. You also have to observe regional, standard-based and customer-specific requirements. The range of products therefore includes a broad selection of standard connections. In the case of redesigned or newly designed facilities, it is possible to achieve cost savings by implementing various measures:

- Use of standard lengths through clever selection of screw-in, weld-in or flange sockets
- Moveable compression fittings

The thermal stability of a material for process connection and thermowell also limits the application area of the temperature sensor. The temperature range specified on the type plate always refers to the measuring insert, not the material which comes into contact with media. Two aspects must be considered when assessing temperature stability:

- What maximum temperature may the material reach without a load?

Temperature Measurement

Temperature sensors

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Configuration (continued)

- What is the behavior under load?

Pressure Equipment Directive

This device does not fall under the Pressure Equipment Directive; classification according to Pressure Equipment Directive (PED 2014/68/EU), Guideline 1/40; Article 1, Paragraph 2.5

Oxygen applications

Our solutions with austenitic materials (especially 316L/1.4404 in this case) are suitable for measuring temperatures in hydrogen. In principle, all productive tube and process connection types can be used for this purpose. Due to the large material thicknesses, H₂ diffusion is small and usually does not pose a problem. For particularly requirements for high diffusion tightness, full-penetration-welded flange connections or the weld-free Vanstone designs are available.

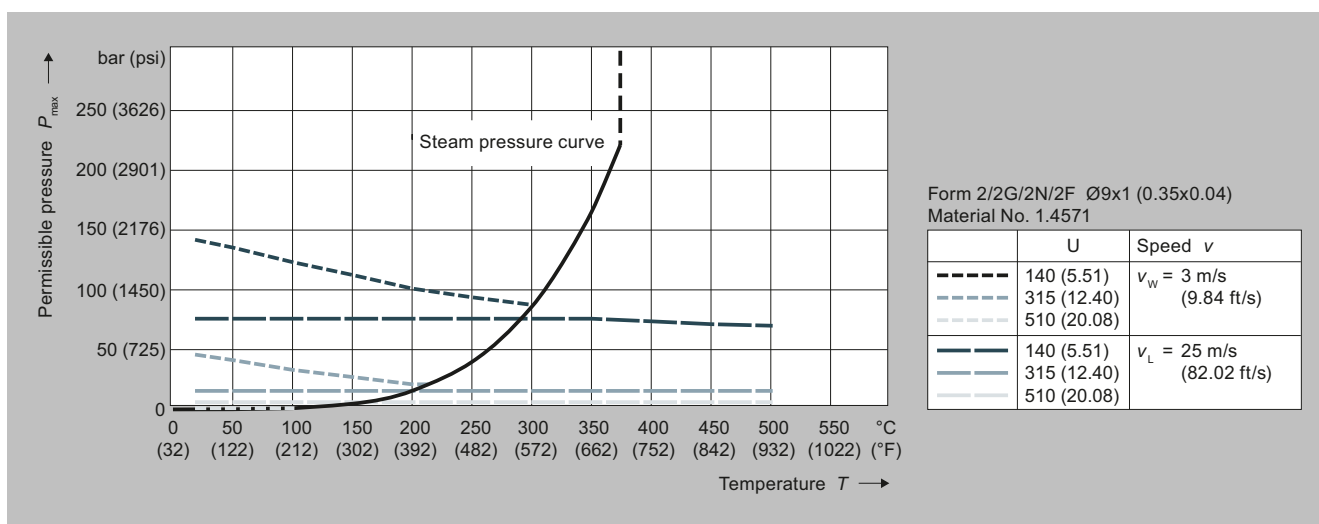
Process load

Because of the large variety of possible applications and variables, it is not possible to make general binding statements regarding the resilience of components which comes into contact with media. The load diagrams below can be used for common applications. However, where operating conditions vary significantly, contact our technical support team.

Load on the thermowell and remedies:

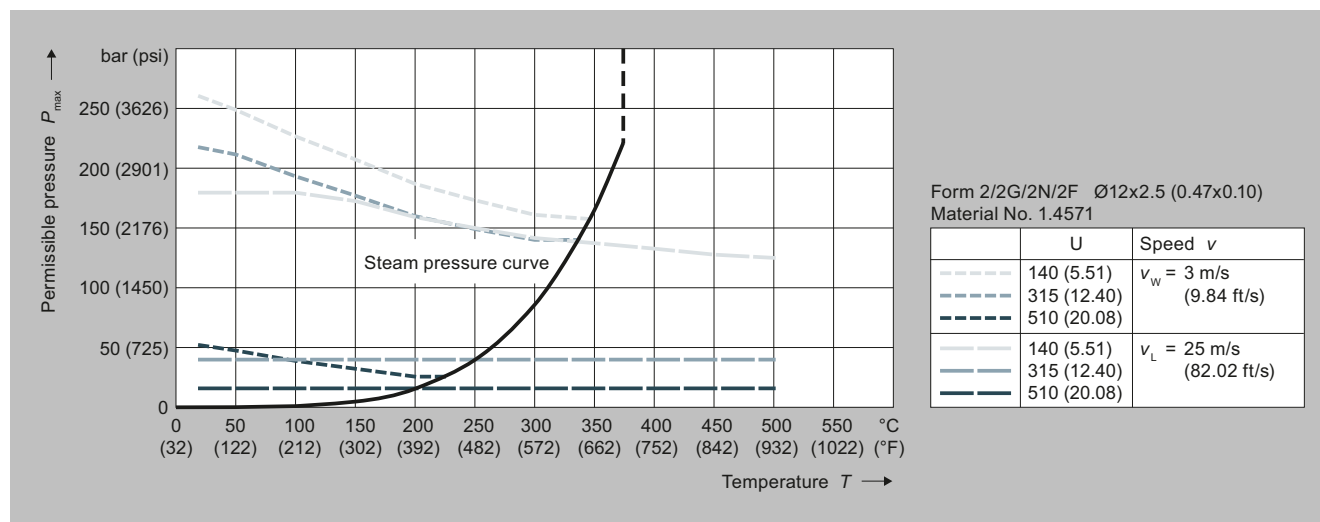
The process itself	Correction options
Temperature	Material selection
Pressure	Thermowell design
Flow velocity	Installation length, thermowell form
Viscosity	Installation length, thermowell form
Vibration	Support against vibration
Corrosiveness	Material selection, coating, covering
Abrasion (e.g. carbon dust)	Sensing rod, coating

Load diagrams

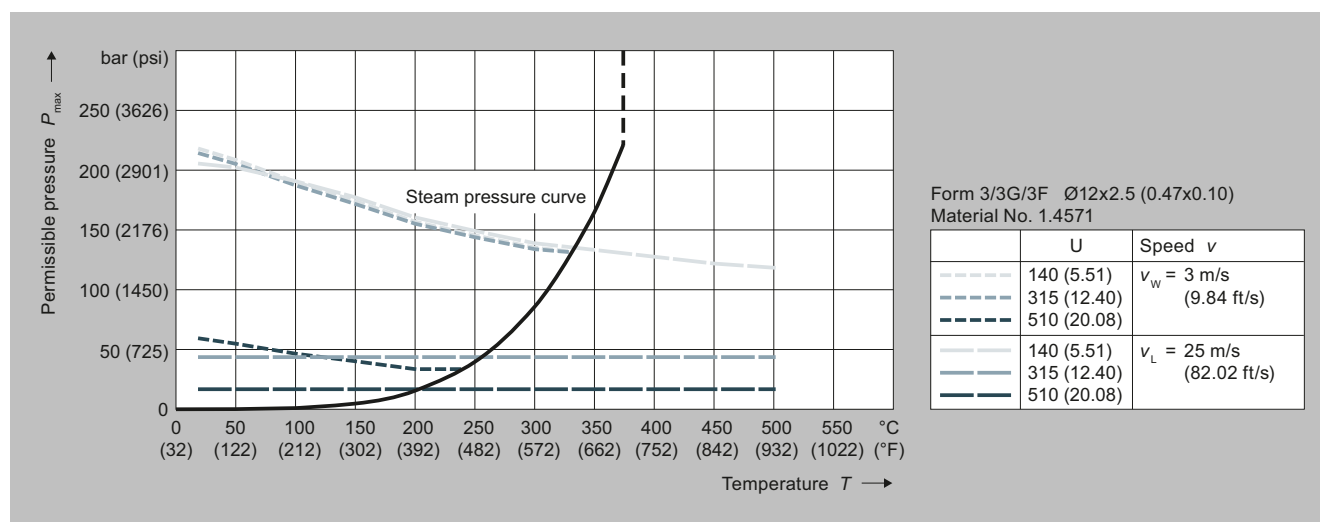


Thermowells with diameter 9 x 1 mm (0.35 x 0.04), dimensions in mm (inch)

Configuration (continued)



Thermowells with diameter 12 × 2.5 mm (0.47 × 0.10 inches), dimensions in mm (inch)



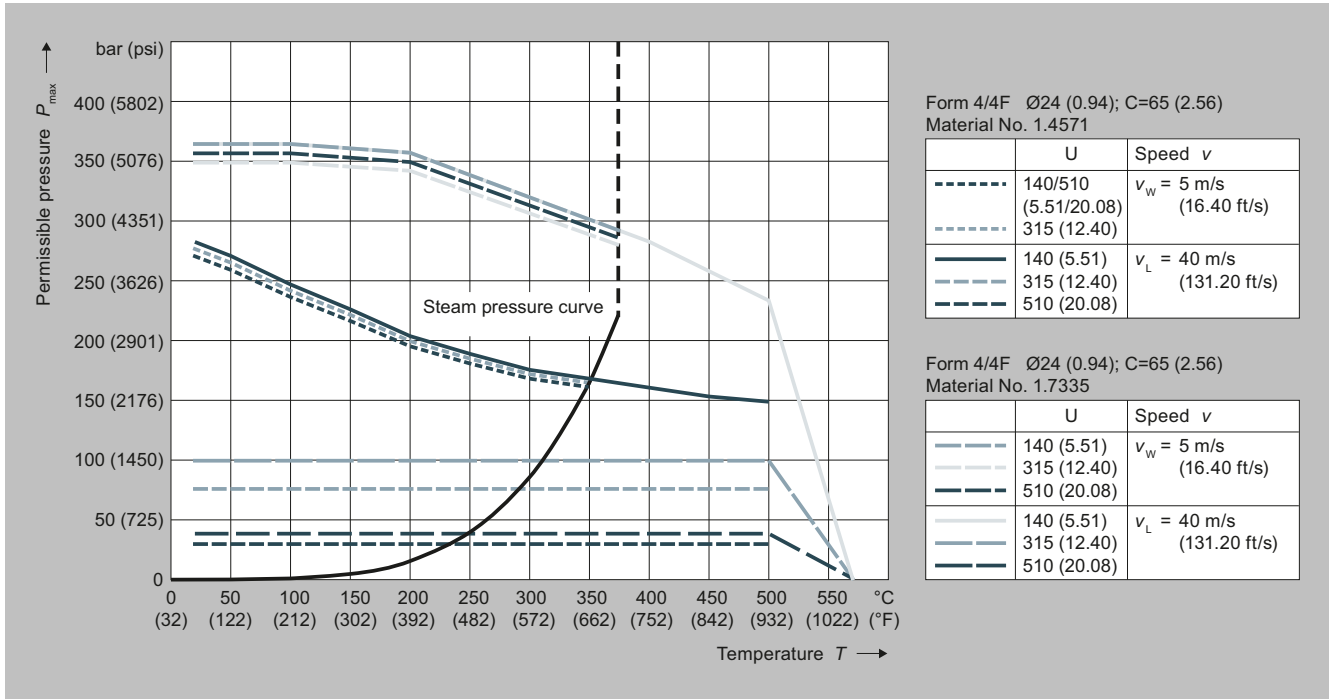
Thermowells with diameter 12 × 2.5 mm (0.47 × 0.10 inches) and 14 × 2.5 mm (0.55 × 0.10 inches), dimensions in mm (inch)

Temperature Measurement

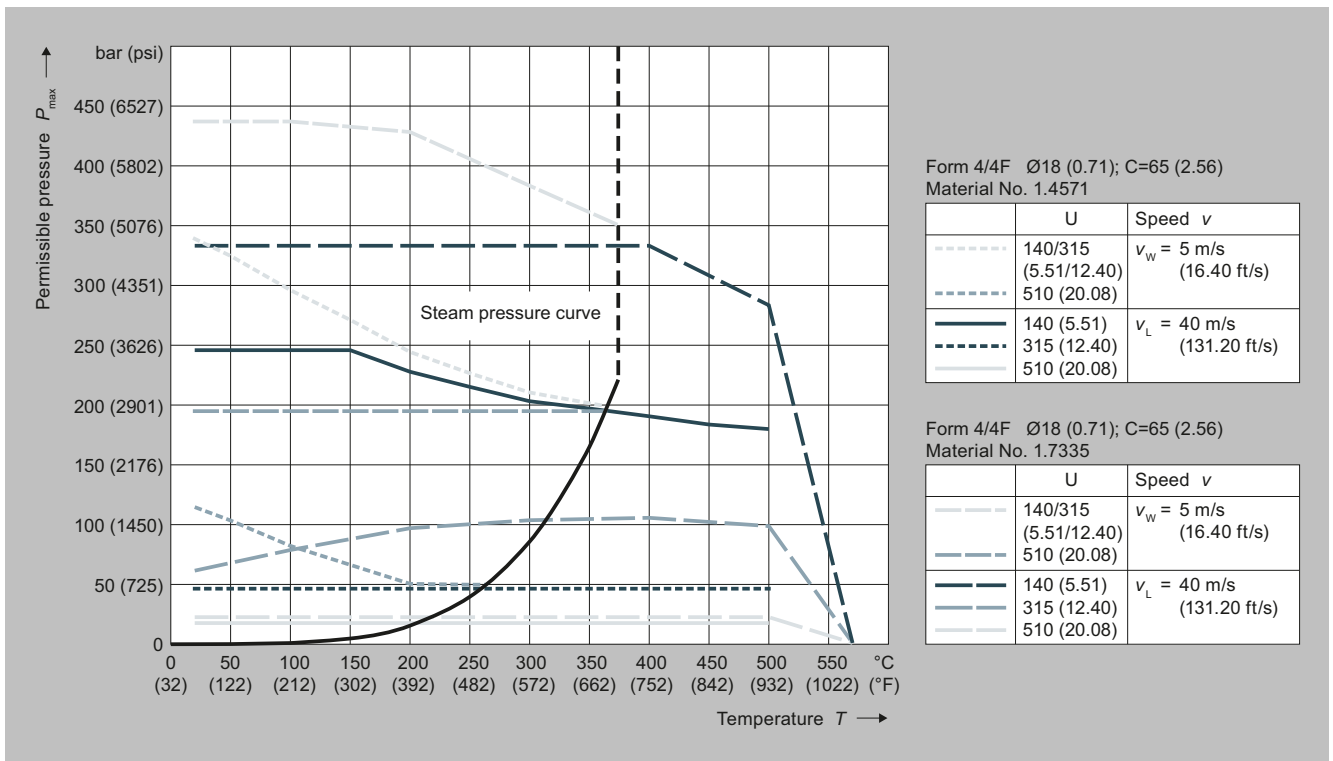
Temperature sensors

Technical reference

Configuration (continued)

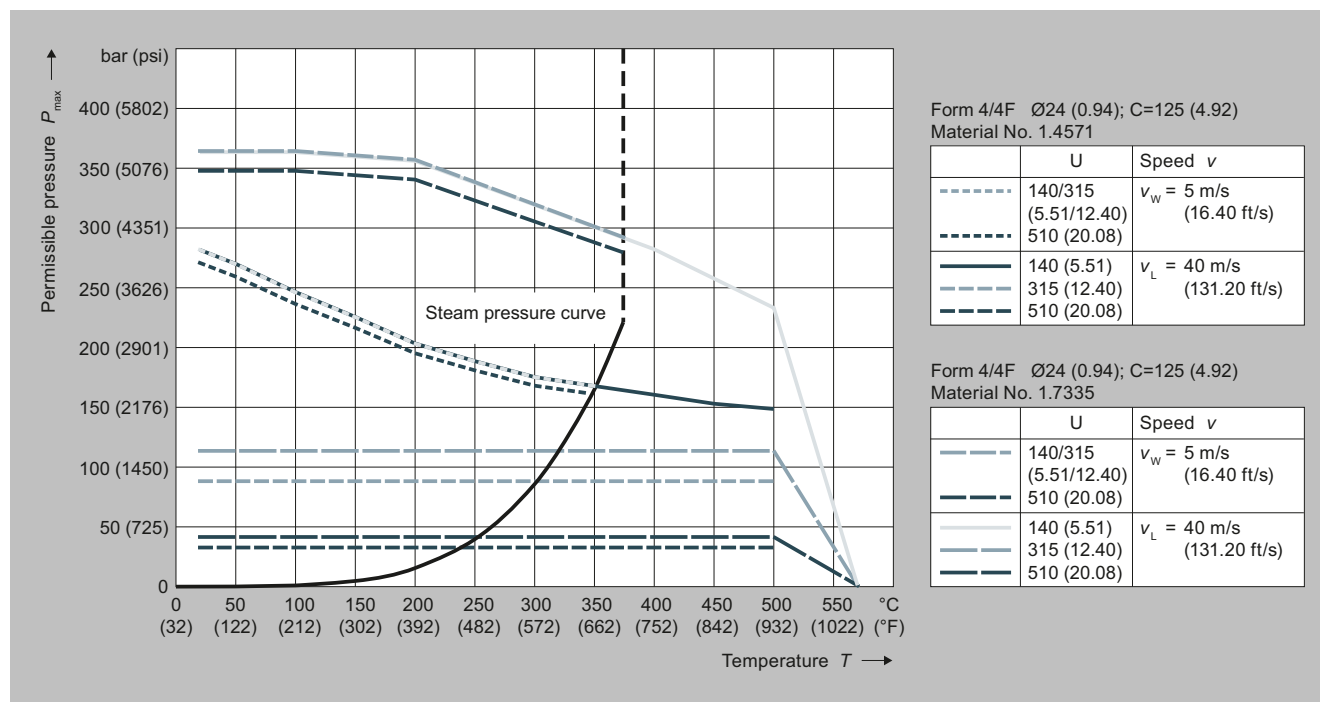


Thermowells with diameter 24 mm (0.95 inches), C = 65 mm (2.60 inches), dimensions in mm (inch)



Thermowells with diameter 18 mm (0.71 inches), C = 65 mm (2.60 inches), dimensions in mm (inch)

Configuration (continued)



Thermowells with diameter 24 mm (0.95 inches), C = 125 mm (4.92 inches), dimensions in mm (inch)

Thermowell calculation

Properly applied load diagrams will provide a sufficient degree of security for the thermowell dimensioning of most applications.

However, there are cases in which operating conditions deviate too greatly from standard parameters. In this case, a customized thermowell calculation can be displayed.

Another reason for doing this calculation is the fact that flowing media can create turbulence at the tip of the thermowell under certain conditions. The thermowell will then vibrate and may even be destroyed if not configured correctly. This is the most frequent cause of thermowell failure.

Siemens can offer thermowell calculations according to the two recognized procedures upon request.

- Dittrich/Klotter method

- ASME PTC19.3-TW2016 method

This method also takes into account turbulence formation on a mathematical level.

Both methods provide a high degree of security with regard to thermowell configuration; however, they do not provide a guarantee against failures. A recalculation may be necessary in case of changes to the process parameters.

Materials

Material descriptions/Standards comparison				Max. temperature [°C (°F)] (unloaded)	Properties	Applications
Material no.	AISI/Trade name:	EN 10028-2:	Description			
1.4404 or 1.4435	AISI 316 L	X2CrNiMo17-12-2	Austenitic stainless steel	550 (1 022)	Good acid resistance, resistant against grain boundary corrosion	Chemical industry, waste treatment, paper and cellulose industry, food industry
1.4571	AISI 316 Ti	X6CrNiMoTi17-12-2	Austenitic stainless steel	550 (1 022)	Good acid resistance, resistant against grain boundary corrosion (supported by Ti portion)	Chemical industry, textile industry, paper and cellulose industry, water supply, food and pharmaceuticals
1.5415	A 204 Gr.A	16Mo3	Carbon steel, high-alloy	500 (932)	Resistant at higher temperatures, well suited for welding	Steam turbines, steam lines, water pipes
1.7335	A 182 F11	13CrMo4-5	Carbon steel, high-alloy	540 (1 004)	Resistant at higher temperatures, well suited for welding	Steam turbines, steam lines, water pipes

Temperature Measurement

Temperature sensors

Technical reference

Configuration (continued)

Material descriptions/Standards comparison				Max. temperature [°C (°F)] (unloaded)	Properties	Applications
Material no.	AISI/Trade name:	EN 10028-2:	Description			
1.4841	SS 314	X15CrNiSi25-20	Austenitic heat-resistant stainless steel	1 150 (2 102)	Resistant at high temperatures, also resistant against low-oxygen gasses and gasses containing nitrogen.	Flue gasses, petrochemical industry, chemicals industry, power plants
1.4762	446	X10CrAl24	Ferritic heat-resistant steel	1 150 (2 102)	Resistant at high temperatures, in oxidizing and reducing sulfur-containing atmosphere	Chemical industry, power plants, steel industry, waste gas treatment
2.4819	Hastelloy C 276	NiMo16Cr15W	Nickel-Chrome-Molybdenum alloy	1 100 (2 012)	Resistant at high temperatures, in oxidizing and reducing atmosphere, resistant against pitting and crevice corrosion, good corrosion resistance after welding	Chemicals industry, paper and cellulose industry, waste treatment, waste incinerators, emissions controls, shipbuilding and offshore industry
2.4360	Monel 400	NiCu30Fe	Nickel-copper alloy	500 (932)	Excellent corrosion resistance, particularly against chloride-induced cold crack corrosion	Chemical industry, offshore industry, nuclear technology, petrochemical industry
Similar to 1.0305	A105		Carbon steel	400 (752)		Steam turbines, steam lines, water pipes
1.4410	Similar to A2507	X2CrNiMoN 22-7-4	Austenitic-ferritic super duplex steel	300 (572)	Excellent resistance especially to chloride-related gap and pitting corrosion	Chemical Industry and petroleum chemistry, seawater desalination plants, paper pulp industry
1.4462	Similar to AISI 318 LN	X2CrNiMoN22-5-3	Austenitic-ferritic duplex steel	250 (482)	Resistance especially to chloride-related gap and pitting corrosion	Chloride contaminated water, acidic gas conditions, petrochemicals, marine technology

Where cost-intensive materials are used with flange thermowells, cost savings can be achieved by using a so-called flanged wheel. A thin disk of the material which comes into contact with media is applied prior to the flange (ordinary stainless steel).

Materials of sensor pipe/measuring insert:

- SITRANS TSinsert, TS100, TS200
 - Resistance thermometer Cr-Ni-Mo
 - Thermocouple 2.4816/Inconel600

Vibration resistance of measuring insert, cable sensor

Similar to the thermowell, the equipment also creates inner (Karman vortices) and outer vibration inducements which act on the measuring insert. For this reason, a special assembly of measurement elements is required. Other than a few exceptions for cable and compact thermometers, Siemens only produces sensors with a mineral-insulated plastic-sheathed cable. Together with precautions taken when installing the measuring element, the Siemens basic version already exceeds EN 60751 by more than a factor of 3. Pursuant to the measurement methods of this standard, the following values are obtained (tip-tip):

- 10 g: Basic version and expanded measuring range
- 60 g: Increased vibration resistance and thermocouple

Bending ability of measuring insert/cable sensor

All Siemens SITRANS TSinsert measuring inserts are made with a mineral-insulated plastic-sheathed cable (MIC). The same applies to a portion of the cable and compact thermometer. In addition to the already described properties, another advantage of the plastic-sheathed cable is its bending ability. This makes it possible to install these thermometers even in mounting locations that are difficult to access. Ensure that the following minimum bending radius is observed:

MIC diameter [mm] (inch)	$R_{max} = 4 \times \text{MIC diameter [mm]}$ (inch)
3 (0.12)	12 (0.48)
6 (0.24)	24 (0.95)

Where a smaller bending radius is required due to installation conditions, subsequent testing of the insulation resistance is recommended. The bending ability of the mineral-insulated design allows for economical transport even of large lengths. As of a length of 0.8 m, the sensors can be delivered rolled or bent. If slight bends have arisen due to mechanical loads during transport or handling, the quality and function of the sensor are not impacted by this. The bends can easily be straightened.

Electrical stability

Insulation resistance

The insulation resistance between each measuring circuit and the fitting is tested at a voltage of 500 V DC at room temperature.

Configuration (continued)

$R_{iso} \geq 100 \text{ M}\Omega$

Due to the property of the mineral-insulated cable, the insulation resistance decreases as temperature increases. Because of the special production method, however, it is possible to achieve very good values even at high temperatures.

Wire resistance

For 2-wire connections, the wire resistance is considered in the measurement result. The following rule of thumb can be used:

- Measuring insert diameter 3 mm (0.12 inches) 5 Ω /m or 12.8 °C (55.04 °F)
- Measuring insert diameter 6 mm (0.24 inches) 2.8 Ω /m or 7.1 °C (44.78 °F)

Therefore, a 3 or 4-wire connection is urgently recommended.

Tests

In addition, statutory, standards-based or operating specifications also require additional testing. The results are attested in certificates according to EN 10204:

- According to EN 10204-2.1, order conformity (C35)
Certificate in which Siemens confirms that the delivered products correspond to the requirements of the order, without specification of test results. The testing does not have to be carried out on the delivered devices.
- According to EN 10204-3.1
Certificate in which Siemens confirms that the delivered products meet the requirements set out in the order, with indication of the specified values. Testing is carried out by an organization which is independent of production. The inspection certificate 3.1 replaces 3.1.B of the previous edition.
- Material certificate for parts which come into contact with media (C12)
This certificate confirms the properties of the material and guarantees traceability up to the melting batch.
- Pressure test (C31)
Hydrostatic pressure test on thermowell. Internal pressure for thread and weld-in, external pressure for flange forms.
- Helium leak test (C32)
This test can be used to detect even the smallest leaks in thermowells and weld seams.
- Dye-penetration test (C33)
The color penetration method can detect tears and other surface defects.
- Comparative test (calibration) (Y33)
The test object is measured in one temperature direction against a highly precise thermometer, and the measured values of test object and normal object are documented. However, calibration requires the measuring insert to be of a certain minimum length. Measuring inserts can be calibrated together with the associated transmitter. Calibration values can be stored in the transmitter in order to increase the measuring accuracy of the system.
- According to EN 10204-3.2
This type of acceptance certificate can be prepared on request, together with an acceptance representative of the ordering party or a representative indicated by official requirements (e.g. TÜV). It confirms that the delivered products meet the requirements set out in the order; it also contains the test results.
- Welding documentation
Documentation such as WPS and PQR is available on our website.

ApprovalsExplosion protection

Due to the variety of requirements, all flameproof versions, as well as those complying with CSA and FM, are supplied without cable glands. The Ex markings can be found in the current manual A5E03920348, section "Certificates and approvals".

Designator	Additional information	Region	Standard	Type of protection	For Zone	For Division
TSinsert TS100 TS200	E00	EU/AU/NZ	CE/RCM	Without Ex protection	0...2/20...22	-
	E17	US/CA	cCSAus			-
	E54	CN				-
	E80	EAC	TR	Intrinsic safety "I"/"IS"		-
	E01	EU/AU/NZ	ATEX, IECEx			-
	E18	US/CA	cCSAus			1/2
	E55	CN	NEPSI			-
	E81	EAC	EACEx			-
TS500	E00	EU/AU/NZ	CE/RCM	Without Ex protection	0...2/20...22	-
	E10	US/CA	cFMus			-
	E17	US/CA	cCSAus			-

Temperature Measurement

Temperature sensors

Technical reference

Configuration (continued)

Designator	Additional information	Region	Standard	Type of protection	For Zone	For Division
TS500	E54	CN		Without Ex protection		-
	E80	EAC	TR			-
	E01	EU/AU/NZ	ATEX, IECEx	Intrinsic safety "i"/"IS"	0*...2/20*...22	-
	E18	US/CA	cCSAus		0*...2/20*...22	1/2
	E55	CN	NEPSI		0*...2/20*...22	-
	E81	EAC	EACEx		0*...2/20*...22	-
	E03	EU/AU/NZ	ATEX, IECEx	Flameproof enclosure "d"/"XP"	0*...2/20*...22	-
	E13 (7MC750, NPT only)	US/CA	cFMus	dust protection through enclosure "t"/"DIP"	1/21	1/2 (aluminum head)
	E14 (metric)	US/CA	cFMus	only with connection heads code AGO, AHO, AUO, AVO	1/21	1/2 (aluminum head)
	E20 (NPT)	US/CA	cCSAus		0*...2/20*...22	1/2
	E21 (metric)	US	CSAus		0*...2/20*...22	-
	E56	CN	NEPSI		0*...2/20*...22	-
	E82	EAC	EACEx		0*...2/20*...22	-
	E04	EU/AU/NZ	ATEX, IECEx	Non-sparking "ec"	2	-
	E16	US/CA	cFMus	Non-sparking "nA"/"NI"	2	-
	E23	US/CA	cCSAus		2	2
	E57	CN	NEPSI		2	-
	E83	EAC	EACEx		2	-

AU = Australia; CA = Canada; CN = China; EAC = Eurasian Customs Union; EU = Europe; US = USA

* Zone 0 to process connection, outside Zone 1

Marine approvals

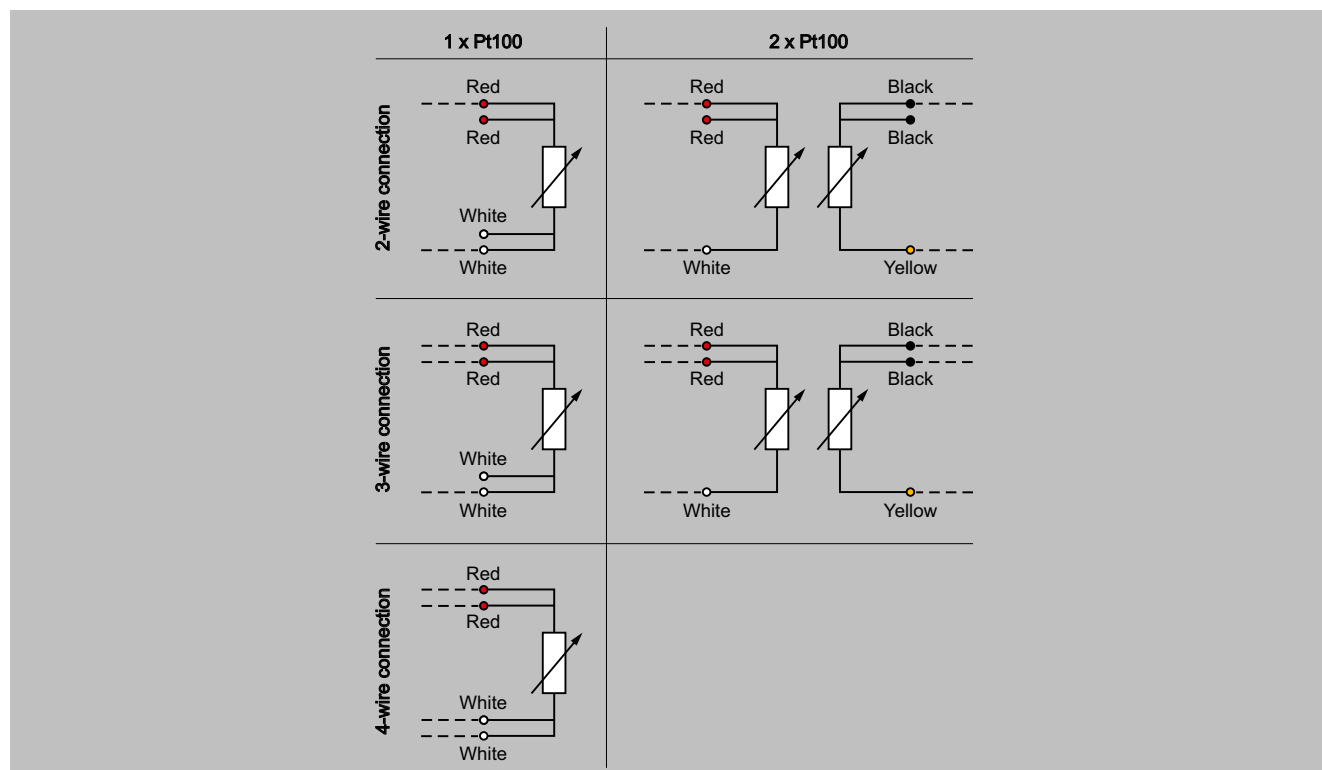
Designator	Additional information	Approval
TSinsert TS100 TS200 TS500	D01	Det Norske Veritas Germanischer Lloyd (DNV GL)

Circuit diagrams

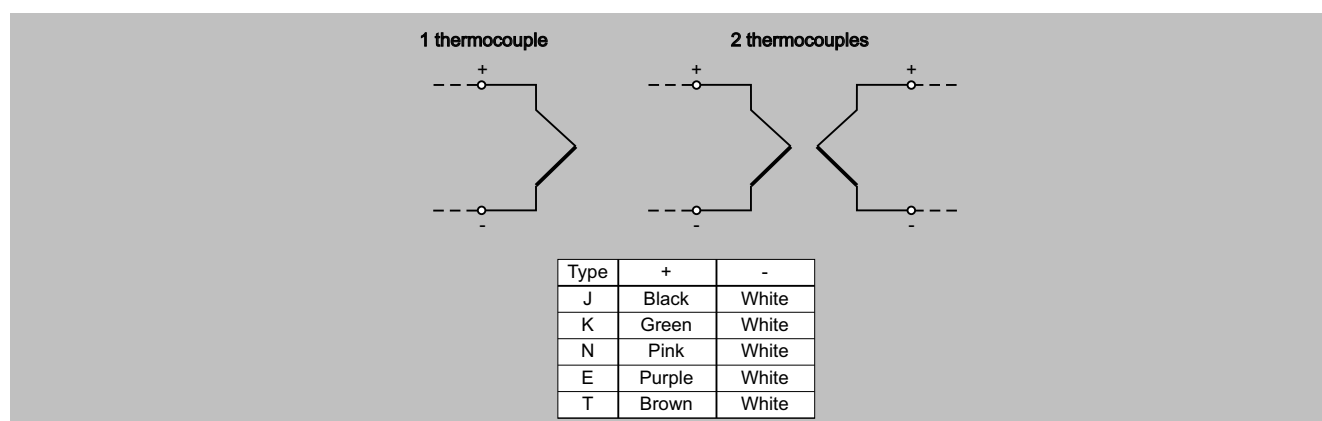
Resistance thermometer connection

SITRANS TSinsert measuring inserts are, unless otherwise mentioned, designed as single Pt100 measuring inserts with a 4-wire connection. This makes it possible to implement all of the aforementioned connection types.

Double Pt100 measuring inserts (only possible with 6 mm outer diameter) are designed as 3-wire connection.



Circuit diagrams 1 x Pt100-2W to 2 x Pt100-4W

Thermocouple connection

Circuit diagram for thermocouple

If thermocouples are used, the use of head transmitters offers particular advantages: The reference junction is already integrated in the universal transmitter. There is no need for expensive extension or compensating cables. This also removes a number of possible error sources. The weak millivolt signal of the thermocouple is already converted into a stable and temperature-linear DC or bus signal on site. This drastically reduces the effects of electromagnetic factors on the measurement result.

If a head transmitter is not installed, the sensor supply cable consists of the appropriate extension or compensating cable. The thermo line is made from the thermocouple material of the relevant thermocouple, while the compensating cable uses a cost-effective substitute material. The electrical behavior of the compensating cable is similar to that of the thermo line within a limited temperature range of up to 200 °C. A wide spectrum of color coding exists for thermocouples on an international level. This must be taken into account during the connecting process.

Temperature Measurement

Temperature sensors

Technical reference

Circuit diagrams (continued)

Country Standard	International/Germany Not intrinsically safe ¹⁾			North America Compensating cable ²⁾			UK/Czech Republic BS 1843		
	Jacket	+	-	Jacket	+	-	Jacket	+	-
N	PN	PN	WH	OG	OG	RD	OG	OG	BU
K	GN	GN	WH	YE	YE	RD	RD	BR	BU
J	BK	BK	WH	BK	WH	RD	BK	YE	BU
T	BR	BR	WH	BU	BU	RD	BU	WH	BU
E	VT	VT	WH	VT	VT	RD	BR	BR	BU
R+S	OG	OG	WH		BK	RD	GN	WH	BU
B	GY	GY	WH	GY	GY	RD	-	-	-

1) For intrinsically safe cable as per IEC 584-3, the jacket is always blue.

2) With thermo lines as per ANSI MC96, the jacket is always blue.

Country Standard	Netherlands DIN 43714			Japan ISC 1610-198			France NF C42-323		
	Jacket	+	-	Jacket	+	-	Jacket	+	-
N	-	-	-	-	-	-	-	-	-
K	GN	RD	GN	BU	RD	WH	VT	VT	YE
J	BU	RD	BU	YE	RD	WH	BK	BK	YE
T	BR	RD	BR	BR	RD	WH	BU	BU	YE
E	BK	RD	BK	VT	RD	WH	OG	OG	YE
R+S	WH	RD	WH	BK	RD	WH	GN	GN	YE
B	GY	RD	GY	GY	RD	WH	-	-	-

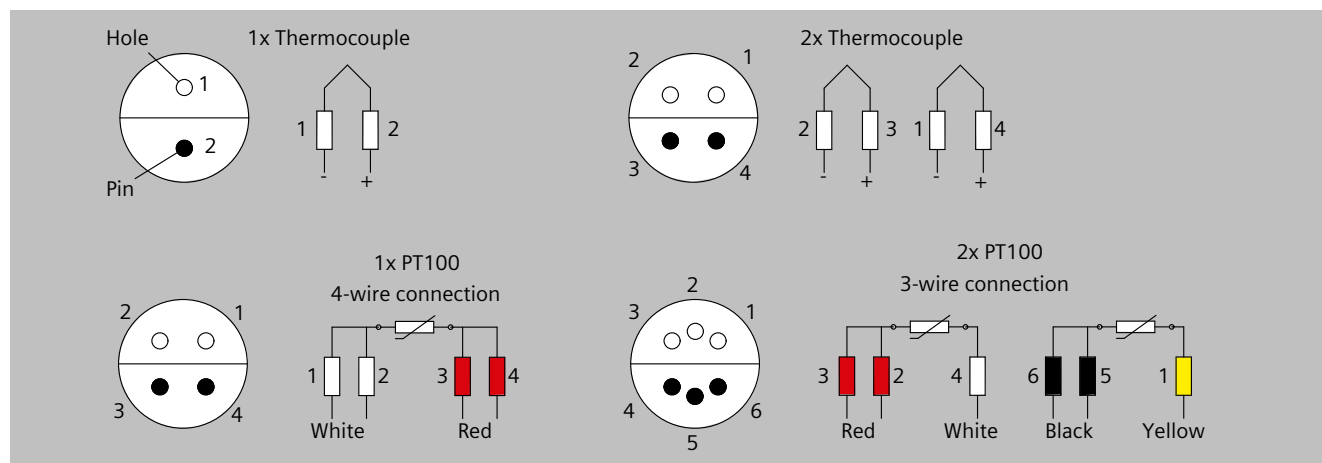
Abbreviation for colors

BK: black	BR: brown	BU: blue	GD: gold	GN: green
GY: gray	OG: Orange	PN: pink	RD: red	SR: silver
TQ: turquoise	VT: Violet	WH: white	YE: yellow	

Device plug

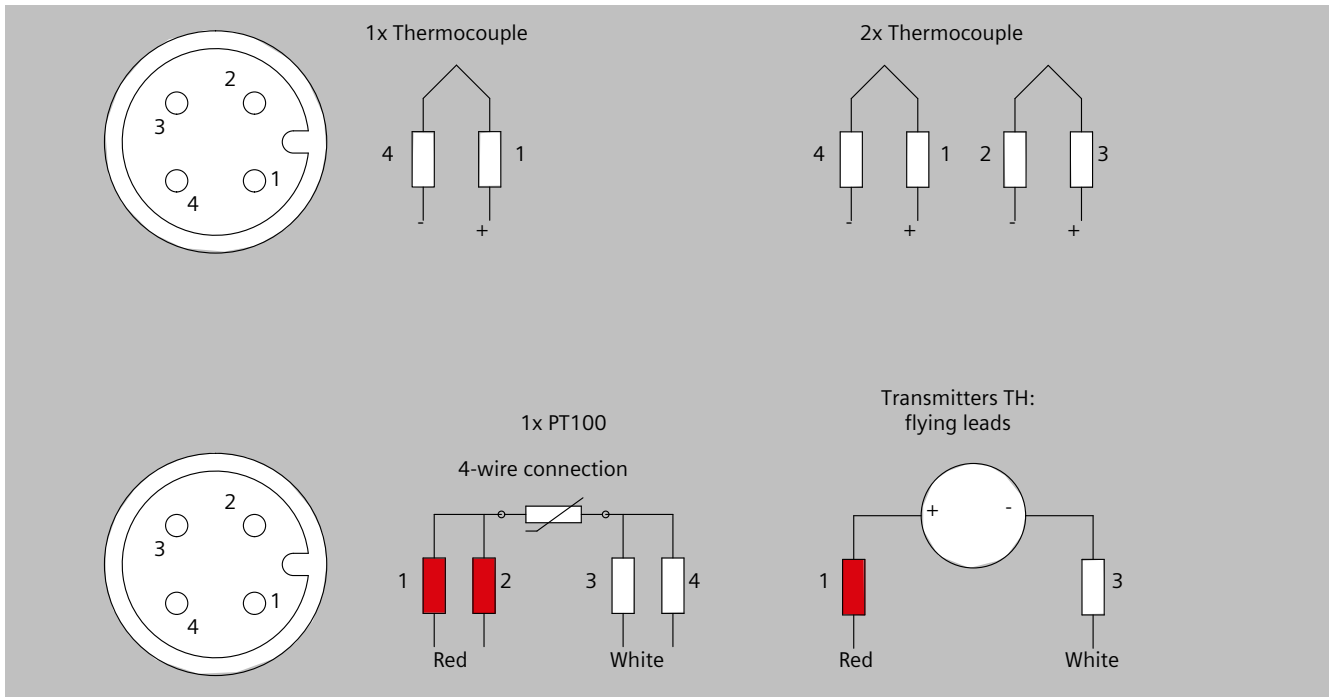
In some cases, sensors are not connected directly but using device plugs. The connection is made according to the figures below.

Lemo 1S coupling (SITRANS TS100/TS200)

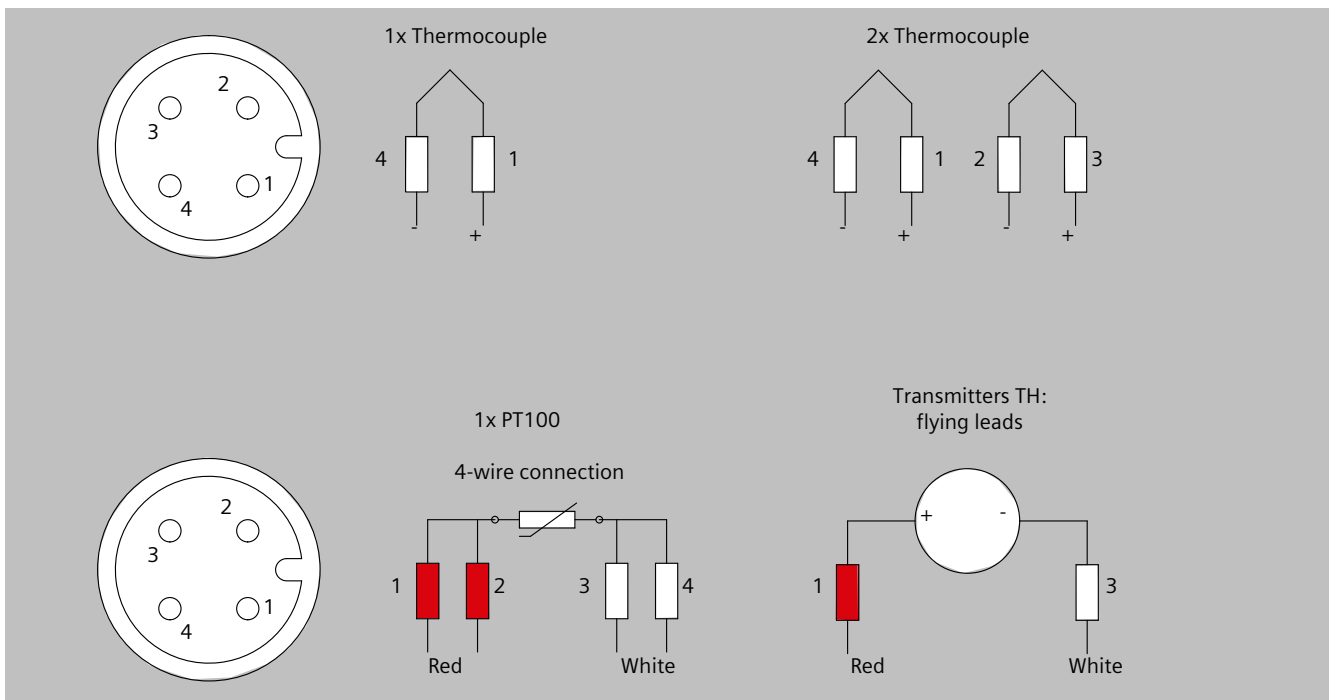


Circuit diagrams (continued)

M12 device plug for single sensors (SITRANS TS100/TS200/TS500)



M12 device plug for single sensors (SITRANS TS300)



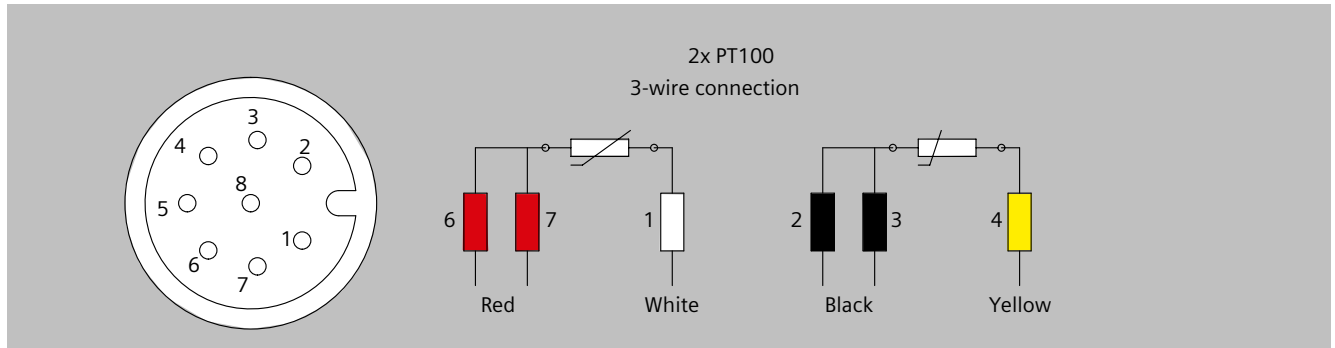
Temperature Measurement

Temperature sensors

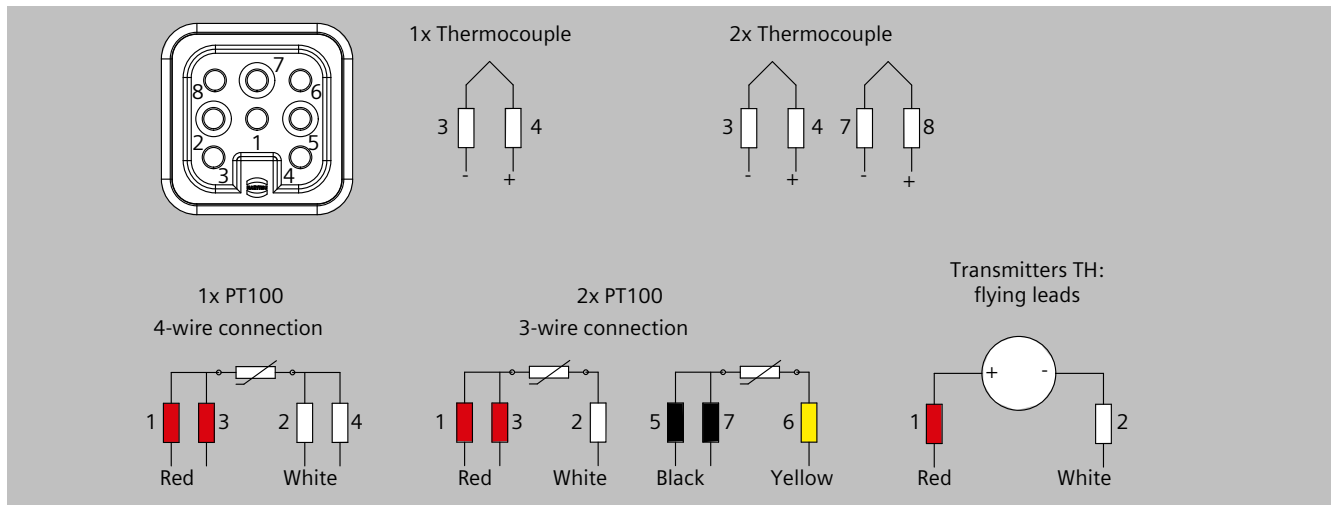
Technical reference

Circuit diagrams (continued)

M12 device plug for dual sensors (SITRANS TS100)



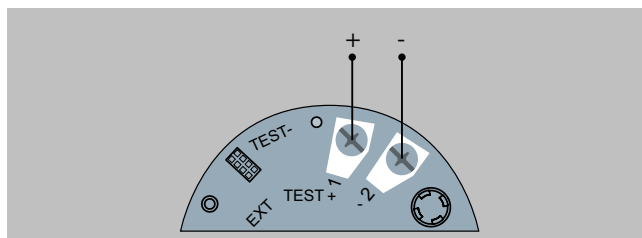
Han 7D device plug (SITRANS TS500)



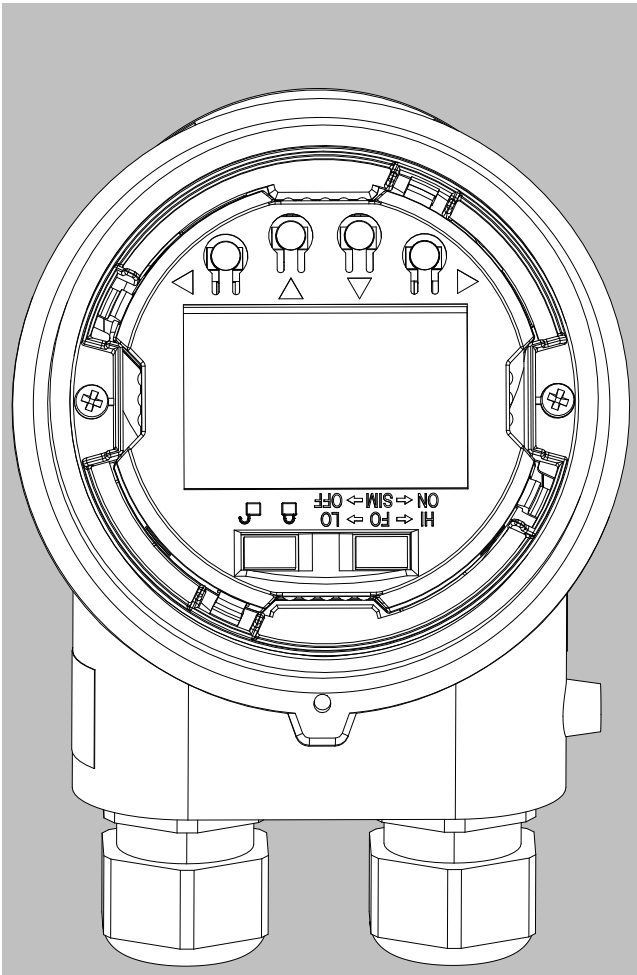
Transmitter connection

If SITRANS TH transmitters are used in the connection head of the temperature sensor, they are already wired on the sensor side. On the output side, the terminals for plus (1) and minus (2) are marked on the device.

Transmitter SITRANS TH



SITRANS TH100/320/420 connection diagram

Circuit diagrams (continued)Transmitter SITRANS TS500-TH

An optional local display is connected to the transmitter through a plug. It communicates process and diagnostic data directly from the transmitter. The display can be removed without tools for convenient wiring and can be rotated in 90° increments. 4 ... 20 mA and HART transmitters can also be conveniently configured with 4 operating keys.

In addition, our transmitters also allow for a large number of other possible connections (e.g. difference, mean value, 2 sensors). More information can be obtained at:




<http://www.siemens.com/temperature>

Temperature Measurement

Temperature sensors



Detailed product overview

Overview

Type	TSinsert	TS100	TS200
Description	Measuring inserts	Temperature sensors in cable version	Temperature sensors in compact version
Area of application	Replaceable	Universal use	Universal use
Version	Mineral-insulated version	Mineral-insulated version	Mineral-insulated version
Type	As European or American type	For cramped spaces	For cramped spaces
Figure			
Article No.	7MC70*	7MC711*	7MC72*
Wetted material	Cr-Ni-Mo (RTD); 2.4816 (TC) (Cr-Ni-Mo; Inconel600)	Cr-Ni-Mo (RTD); 2.4816 (TC) (Cr-Ni-Mo; Inconel600)	Cr-Ni-Mo (RTD); 2.4816 (TC) (Cr-Ni-Mo; Inconel600)
Thermowell forms	Order separately	Without/with separate thermowell	Without/with separate thermowell
Process connections	-	<ul style="list-style-type: none"> • Compression fittings • Soldering nipple: <ul style="list-style-type: none"> - G ¼, G ½ - ½ NPT - M8 × 1, M18 × 1.5 • Surface connection piece for installation on flat surfaces/pipes 	<ul style="list-style-type: none"> • Compression fittings • Soldering nipple: <ul style="list-style-type: none"> - G ¼, G ½ - ½ NPT - M8 × 1, M18 × 1.5 • Surface connection piece for installation on flat surfaces/pipes
Sensor elements	Pt100 + thermocouples	Pt100 + thermocouples	Pt100 + thermocouples
Sensor connection	<ul style="list-style-type: none"> • 1 × 4-wire • 2 × 3-wire • 2 × 4-wire 	<ul style="list-style-type: none"> • 1 × 4-wire • 2 × 3-wire 	<ul style="list-style-type: none"> • 1 × 4-wire • 2 × 3-wire
Sensor accuracy	<ul style="list-style-type: none"> • Class AA • Class A • Class B • Class 1 • Class 2 	<ul style="list-style-type: none"> • Class AA • Class A • Class B • Class 1 • Class 2 	<ul style="list-style-type: none"> • Class AA • Class A • Class B • Class 1 • Class 2
Connection heads	Type B (Type A flameproof)	• Cable, optional with misc. plugs	<ul style="list-style-type: none"> • Flying leads • Miscellaneous plugs
Explosion protection (EU, CN, EAC, AU, NZ, US, CA)	Intrinsic safety "i"/"IS"	Intrinsic safety "i"/"IS"	Intrinsic safety "i"/"IS"
Output signal	Sensor signal: <ul style="list-style-type: none"> • 4 ... 20 mA (TH100/TH200) • HART (TH300) • PA (TH400) • FF (TH400) 	Sensor signal	Sensor signal
Application	Spare parts	<ul style="list-style-type: none"> • Mechanical engineering • Storage temperature • Surfaces 	<ul style="list-style-type: none"> • Mechanical engineering • Storage temperature • Surfaces
Limit temperatures ¹⁾ [°C (°F)]	<ul style="list-style-type: none"> • Pt100 basic: -50 ... +400 °C (-58 ... +752 °F) • Pt100 expanded measuring range: -196 ... +600 °C (-321 ... +1112 °F) • Thermocouple: -40 ... +1 100 °C (-40 ... +2012 °F) (type dependent) 	<ul style="list-style-type: none"> • Pt100 basic: -50 ... +400 °C (-58 ... +752 °F) • Pt100 expanded measuring range: -196 ... +600 °C (-321 ... +1112 °F) • Thermocouple: -40 ... +1 100 °C (-40 ... +2012 °F) (type dependent) 	<ul style="list-style-type: none"> • Pt100 basic: -50 ... +400 °C (-58 ... +752 °F) • Pt100 expanded measuring range: -196 ... +600 °C (-321 ... +1112 °F) • Thermocouple: -40 ... +1 100 °C (-40 ... +2012 °F) (type dependent)
Max. nominal pressure ¹⁾ (static pressure at 20 °C)	-	Compression fitting max. 5 bar (73 psi) Compression fitting: PTFE gasket, temperature min./max. -20 ... +150 °C (-4 ... +302 °F)	Compression fitting max. 5 bar (73 psi) Compression fitting: PTFE gasket, temperature min./max. -20 ... +150 °C (-4 ... +302 °F)
Min. response time t _{0,5}	2 ... 6 s	2 ... 6 s	2 ... 6 s
Degree of protection	IP54	See drawing in "Temperature sensors" - "Structure"	See drawing in "Temperature sensors" - "Structure"

¹⁾ Load combinations (temperature, flow, vibration, pressure) can at times significantly restrict these values. Additional temperature limits result, for example, from thermowell materials with lower limits [e.g. 1.4571 pressure resilient, 450 ... 550 °C (842 ... 1022 °F), limit temperature 800 °C (1472 °F)].

Overview (continued)

Type	TS300 Modular	TS300 Clamp-on
Description	Temperature sensors for food, pharmaceuticals and biotechnology	Temperature sensors for food, pharmaceuticals and biotechnology
Area of application	Measurements immersed in medium (pipes and vessels)	Clamp-on measurement of pipe surface temperature
Version	Thermowell similar to DIN 43772, type 2F and tapered design	Thermowell similar to DIN 43772, type 2F and tapered design
Type		
Figure		
Article No.	7MC8005*	7MC8016
Wetted material	1.4404 or 1.4435 (316L)	1.4404 or 1.4435 (316L)
Thermowell forms	Similar to 2F	Similar to 2F
Process connections	DIN 11851, clamp-on connection (Tri-Clamp/ISO 2852/DIN 32676), Varivent, Ingold socket (Fermenter connection), Neumo Biocontrol, spherical weld-in sleeve Seals are not included in the scope of delivery	Clamp-on connections suitable for the following pipe diameters: <ul style="list-style-type: none"> • Collar 4 ... 57 mm (0.16 ... 2.24 inches) • Tensioning hook 6 ... 50.8 mm (0.24 ... 2.00 inches) • Clamping band 50 ... 200 mm (1.97 ... 7.87 inches)
Sensor elements	Pt100	Pt100
Sensor connection	<ul style="list-style-type: none"> • 1 × 4-wire • 2 × 3-wire 	<ul style="list-style-type: none"> • 1 × 3-wire
Sensor accuracy	<ul style="list-style-type: none"> • Class A 	<ul style="list-style-type: none"> • Class A • Process-optimized design
Connection heads	Type B	Type B
Explosion protection (EU, CN, EAC, AU, NZ, US, CA)	-	-
Output signal	Sensor signal: <ul style="list-style-type: none"> • 4 ... 20 mA (TH100/TH200) • HART (TH300) • PA (TH400) • FF (TH400) 	Sensor signal: <ul style="list-style-type: none"> • 4 ... 20 mA SITRANS TH100 Slim • HART (TH300) • PA (TH400) • FF (TH400)
Application	Surface roughness: Standard applications Ra < 1.5 µm (5.9 10 ⁻⁵ inches)	Surface roughness: Standard applications Ra < 1.5 µm (5.9 10 ⁻⁵ inches)
Limit temperatures ¹⁾ [°C (°F)]	-20 ... +400 °C (-4 ... +752 °F)	-40 ... +150 °C (-40 ... +302 °F)
Max. nominal pressure ¹⁾ (static pressure at 20 °C) Dimensions in mm (inch)	0 ... 150 (0 ... 5.91), at 50 bar 150 ... 300 (5.91 ... 11.81), at 40 bar	No pressure load due to clamp-on design
Min. response time t _{0,5}	20 ... 34 s	4 s (see "Reference conditions SITRANS TS300 Clamp-on")
Degree of protection	IP54 ... IP68 depending on connection head	IP65 for pipe collar, IP67 for electrical connection

¹⁾ Load combinations (temperature, flow, vibration, pressure) can at times significantly restrict these values. Additional temperature limits result, for example, from thermowell materials with lower limits (e.g. 1.4571 pressure resilient, 450 ... 550 °C (842 ... 1022 °F), limit temperature 800 °C (1472 °F)).



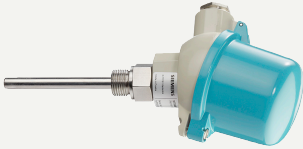
Type	TS500 for installation	TS500 Type 2	TS500 Type 2N
Description	Temperature sensors for the process industry (pipes and vessels)	Temperature sensors for the process industry (pipes and vessels)	Temperature sensors for the process industry (pipes and vessels)
Area of application	Temperature sensors for installation in existing thermowells	Tubular thermowell for low to medium stress	Tubular thermowell for low to medium stress
Version	Suitable for thermowells according to DIN 43772 as well as ASME B40.9-2001	Thermowell according to DIN 43772, type 2, without process connection	Thermowell type 2N similar to DIN 43772, screwed design

Temperature Measurement

Temperature sensors

Detailed product overview




Overview (continued)

Type	TS500 for installation	TS500 Type 2	TS500 Type 2N
Type	With extension <ul style="list-style-type: none"> European type American type 	<ul style="list-style-type: none"> Without extension, plug-in Use with moveable compression fittings 	Without extension
Figure			
Article No.	No. 7MC750*	7MC751*-0*(A/B)**-0***	7MC751*-1****-0***
Wetted material	None: Measuring insert made of 1.4571, 1.4404 or 1.4435 (RTD); 2.4816 (TC) (316L; Inconel600)	1.4404 or 1.4435; 1.4571 (316L; 316TI)	1.4404 or 1.4435; 1.4571 (316L; 316TI)
Thermowell forms	Order separately	Form 2	Form 2N (similar to Form 2)
Process connections	Connection to the thermowell: <ul style="list-style-type: none"> M14 × 1.5 M18 × 1.5 G ½ ½ NPT 	Compression fittings <ul style="list-style-type: none"> G ½ ½ NPT For welding	<ul style="list-style-type: none"> G ½ ½ NPT
Installation length	<ul style="list-style-type: none"> 110 mm (4.33 inches) 140 mm (5.51 inches) 200 mm (7.87 inches) 260 mm (10.24 inches) 410 mm (16.14 inches) 	Variable	<ul style="list-style-type: none"> 100 mm (3.94 inches) 160 mm (6.30 inches) 230 mm (9.06 inches) 360 mm (14.17 inches) 510 mm (20.08 inches)
Neck pipe length	According to DIN 43772	According to DIN 43772	Non-adjustable X=20 mm (0.79 inches)
Sensor elements	Pt100 + thermocouples	Pt100 + thermocouples	Pt100 + thermocouples
Sensor connection	<ul style="list-style-type: none"> 1 × 4-wire 2 × 3-wire 2 × 4-wire 	<ul style="list-style-type: none"> 1 × 4-wire 2 × 3-wire 2 × 4-wire 	<ul style="list-style-type: none"> 1 × 4-wire 2 × 3-wire 2 × 4-wire
Sensor accuracy	<ul style="list-style-type: none"> Class AA Class A Class B Class 1 Class 2 	<ul style="list-style-type: none"> Class AA Class A Class B Class 1 Class 2 	<ul style="list-style-type: none"> Class AA Class A Class B Class 1 Class 2
Connection heads	Type B (Type A flameproof)	Type B (Type A flameproof)	Type B (Type A flameproof)
Explosion protection (EU, CN, EAC, AU, NZ, US, CA)	<ul style="list-style-type: none"> Intrinsic safety "i"/"IS" Flameproof enclosure "d"/"XP" Non-sparking "ec"/"nA"/"NI" 	<ul style="list-style-type: none"> Intrinsic safety "i"/"IS" Flameproof enclosure "d"/"XP" Non-sparking "ec"/"nA"/"NI" 	<ul style="list-style-type: none"> Intrinsic safety "i"/"IS" Flameproof enclosure "d"/"XP" Non-sparking "ec"/"nA"/"NI"
Output signal	Sensor signal: <ul style="list-style-type: none"> 4 ... 20 mA (TH100/TH200) HART (TH300) PA (TH400) FF (TH400) 	Sensor signal: <ul style="list-style-type: none"> 4 ... 20 mA (TH100/TH200) HART (TH300) PA (TH400) FF (TH400) 	Sensor signal: <ul style="list-style-type: none"> 4 ... 20 mA (TH100/TH200) HART (TH300) PA (TH400) FF (TH400)
Application	Pipes and vessels	Pipes and vessels	Pipes and vessels
Limit temperatures ¹⁾ [°C (°F)]	<ul style="list-style-type: none"> Pt100 basic: -50 ... +400 °C (-58 ... +752 °F) Pt100 expanded measuring range: -196 ... +600 °C (-321 ... +1112 °F) Thermocouple: -40 ... +1 100 °C (-40 ... +2 012 °F) (type dependent) 	<ul style="list-style-type: none"> Pt100 basic: -50 ... +400 °C (-58 ... +752 °F) Pt100 expanded measuring range: -196 ... +600 °C (-321 ... +1112 °F) Thermocouple: -40 ... +1 100 °C (-40 ... +2012 °F) (type dependent) 	<ul style="list-style-type: none"> Pt100 basic: -50 ... +400 °C (-58 ... +752 °F) Pt100 expanded measuring range: -196 ... +600 °C (-321 ... +1112 °F) Thermocouple: -40 ... +1 100 °C (-40 ... +2012 °F) (type dependent)

Overview (continued)

Type	TS500 for installation	TS500 Type 2	TS500 Type 2N
Max. nominal pressure ¹⁾ (static pressure at 20 °C) Dimensions in mm (inch)	See thermowell	Pipe diameter 9 (0.35): • 0 ... 150 (0 ... 5.91), at 50 bar • 150 ... 300 (5.91 ... 11.81), at 40 bar • Compression fitting, at 5 bar Pipe diameter 12 mm (0.47 inches): • 0 ... 150 (0 ... 5.91), at 75 bar • 150 ... 300 (5.91 ... 11.81), at 60 bar • Compression fitting, at 5 bar: PTFE gasket, temperature min./max. -20 ... +150 °C (-4 ... +302 °F)	Pipe diameter 9 (0.35): • 0 ... 150 (0 ... 5.91), at 50 bar • 150 ... 300 (5.91 ... 11.81), at 40 bar
Min. response time $t_{0,5}$	See thermowell	20 ... 45 s	20 ... 34 s
Degree of protection	IP54 ... IP68 depending on connection head	IP54 ... IP68 depending on connection head	IP54 ... IP68 depending on connection head

¹⁾ Load combinations (temperature, flow, vibration, pressure) can at times significantly restrict these values. Additional temperature limits result, for example, from thermowell materials with lower limits (e.g. 1.4571 pressure resilient, 450 ... 550 °C (842 ... 1022 °F), limit temperature 800 °C (1472 °F)).

Type	TS500 Type 2G	TS500 Type 2F	TS500 Type 3
Description	Temperature sensors for the process industry (pipes and vessels)	Temperature sensors for the process industry (pipes and vessels)	Temperature sensors for the process industry (pipes and vessels) Faster response than Form 2
Area of application	Tubular thermowell for low to medium stress	Tubular thermowell for low to medium stress	Tubular thermowell for low to medium stress
Version	Thermowell according to DIN 43772, type 2G, screwed design	Thermowell according to DIN 43772, type 2F with flange	Thermowell according to DIN 43772, type 3 without process connection, improved response time
Type	With extension	With extension	• Without extension, plug-in • Use with moveable compression fittings
Figure			
Article No.	7MC751*-1*(A/B)**-1***	7MC751*-2*(A/B)**-1***	7MC751*-0*K**-0***
Wetted material	1.4404 or 1.4435; 1.4571 (316L; 316TI)	1.4404 or 1.4435; 1.4571 (316L; 316TI)	1.4404 or 1.4435; 1.4571 (316L; 316TI)
Thermowell forms	Form 2G	Form 2F	Form 3
Process connections	Screw-in thread welded on: • G 1 • G ½ • ½ NPT	Welded flange • DN 25, PN10 ... 40 • 1RF150 • 1.5RF150 • 1.5RF300	Compression fittings • G ½ • ½ NPT For welding
Installation length	• 160 mm (6.30 inches) • 250 mm (9.84 inches) • 400 mm (15.75 inches)	• 225 mm (8.86 inches) • 315 mm (12.40 inches) • 465 mm (18.31 inches)	• 225 mm (8.86 inches) • 315 mm (12.40 inches) • 465 mm (18.31 inches)
Neck pipe length	According to DIN 43772	According to DIN 43772	According to DIN 43772
Sensor elements	Pt100 + thermocouples	Pt100 + thermocouples	Pt100 + thermocouples
Sensor connection	• 1 x 4-wire • 2 x 3-wire • 2 x 4-wire	• 1 x 4-wire • 2 x 3-wire • 2 x 4-wire	• 1 x 4-wire • 2 x 3-wire • 2 x 4-wire
Sensor accuracy	• Class AA • Class A • Class B • Class 1 • Class 2	• Class AA • Class A • Class B • Class 1 • Class 2	• Class AA • Class A • Class B • Class 1 • Class 2
Connection heads	Type B (Type A flameproof)	Type B (Type A flameproof)	Type B (Type A flameproof)
Explosion protection (EU, CN, EAC, AU, NZ, US, CA)	• Intrinsic safety "i"/"IS" • Flameproof enclosure "d"/"XP" • Non-sparking "ec"/"nA"/"NI"	• Intrinsic safety "i"/"IS" • Flameproof enclosure "d"/"XP" • Non-sparking "ec"/"nA"/"NI"	• Intrinsic safety "i"/"IS" • Flameproof enclosure "d"/"XP" • Non-sparking "ec"/"nA"/"NI"

Temperature Measurement



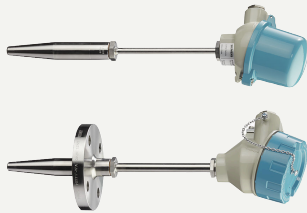
Temperature sensors

Detailed product overview

Overview (continued)

Type	TS500 Type 2G	TS500 Type 2F	TS500 Type 3
Output signal	Sensor signal: <ul style="list-style-type: none"> 4 ... 20 mA (TH100/TH200) HART (TH300) PA (TH400) FF (TH400) 	Sensor signal: <ul style="list-style-type: none"> 4 ... 20 mA (TH100/TH200) HART (TH300) PA (TH400) FF (TH400) 	Sensor signal: <ul style="list-style-type: none"> 4 ... 20 mA (TH100/TH200) HART (TH300) PA (TH400) FF (TH400)
Application	Pipes and vessels	Pipes and vessels	Pipes and vessels
Limit temperatures¹⁾ [°C (°F)]	<ul style="list-style-type: none"> Pt100 basic: -50 ... +400 °C (-58 ... +752 °F) Pt100 expanded measuring range: -196 ... +600 °C (-321 ... +1112 °F) Thermocouple: -40 ... +1 100 °C (-40 ... +2012 °F) (type dependent) 	<ul style="list-style-type: none"> Pt100 basic: -50 ... +400 °C (-58 ... +752 °F) Pt100 expanded measuring range: -196 ... +600 °C (-321 ... +1112 °F) Thermocouple: -40 ... +1 100 °C (-40 ... +2012 °F) (type dependent) 	<ul style="list-style-type: none"> Pt100 basic: -50 ... +400 °C (-58 ... +752 °F) Pt100 expanded measuring range: -196 ... +600 °C (-321 ... +1112 °F) Thermocouple: -40 ... +1 100 °C (-40 ... +2 012 °F) (type dependent)
Max. nominal pressure¹⁾ (static pressure at 20 °C) Dimensions in mm (inch)	Pipe diameter 9 (0.35): <ul style="list-style-type: none"> 0 ... 150 (0 ... 5.91), at 50 bar 150 ... 300 (5.91 ... 11.81), at 40 bar Compression fitting, at 5 bar Pipe diameter 12 (0.47): <ul style="list-style-type: none"> 0 ... 150 (0 ... 5.9), at 75 bar 150 ... 300 (5.91 ... 11.81), at 60 bar 	Pipe diameter 9 (0.35): <ul style="list-style-type: none"> 0 ... 150 (0 ... 5.91), at 50 bar 150 ... 300 (5.91 ... 11.81), at 40 bar Pipe diameter 12 (0.47): <ul style="list-style-type: none"> 0 ... 150 (0 ... 5.91), at 75 bar 150 ... 300 (5.91 ... 11.81), at 60 bar Note restriction imposed by PN of the flange	Pipe diameter 12 (0.47): <ul style="list-style-type: none"> 0 ... 200 (0 ... 7.87), at 75 bar 200 ... 300 (7.87 ... 11.81), at 60 bar Compression fitting, at 5 bar: PTFE gasket, temperature min./max. -20 ... +150 °C (-4 ... +302 °F)
Min. response time $t_{0,5}$	20 ... 34 s	20 ... 34 s	7 ... 15 s
Degree of protection	IP54 ... IP68 depending on connection head	IP54 ... IP68 depending on connection head	IP54 ... IP68 depending on connection head

¹⁾ Load combinations (temperature, flow, vibration, pressure) can at times significantly restrict these values. Additional temperature limits result, for example, from thermowell materials with lower limits (e.g. 1.4571 pressure resilient, 450 ... 550 °C (842 ... 1022 °F), limit temperature 800 °C (1472 °F)).

Type	TS500 Type 3G	TS500 Type 3F	TS500 Type 4/4F
Description	Temperature sensors for the process industry (pipes and vessels) Faster response than Form 2	Temperature sensors for the process industry (pipes and vessels) Faster response than Form 2	Temperature sensors for the process industry (pipes and vessels) Fast response version available
Area of application	Tubular thermowell for low to medium stress	Tubular thermowell for low to medium stress	Barstock thermowell for medium to extreme stress
Version	Thermowell according to DIN 43772, type 3G, screwed design	Thermowell according to DIN 43772, type 3F with flange	Thermowell according to DIN 43772: <ul style="list-style-type: none"> Type 4 for welding Type 4F with flange
Type	With extension	With extension	With extension
Figure			
Article No.	7MC751*-1*K**-1***	7MC751*-2*K**-1***	7MC752*
Wetted material	1.4404 or 1.4435; 1.4571 (316L; 316TI)	1.4404 or 1.4435; 1.4571 (316L; 316TI)	Form 4F: 1.4404 or 1.4435; 1.4571 (316L; 316TI) Form 4 additionally: 1.7335; 1.5415 (A 182 F11; A 204 Size A)
Thermowell forms	Form 3G	Form 3F	<ul style="list-style-type: none"> Form 4 Form 4F
Process connections	Screw-in thread welded on: <ul style="list-style-type: none"> G 1 G ½ ½ NPT 	Welded flange <ul style="list-style-type: none"> DN 25, PN10 ... 40 1RF150 1.5RF150 1.5RF300 	Form 4 for welding, Form 4F with flange: <ul style="list-style-type: none"> DN 25, PN10 ... 40 1RF150 1RF300 1.5RF150 1.5RF300

Overview (continued)

Type	TS500 Type 3G	TS500 Type 3F	TS500 Type 4/4F
Installation length	<ul style="list-style-type: none"> • 160 mm (6.30 inches) • 220 mm (8.66 inches) • 280 mm (11.02 inches) 	<ul style="list-style-type: none"> • 225 mm (8.86 inches) • 285 mm (11.22 inches) • 345 mm (13.58 inches) 	Form 4F: as per customer specification Form 4: <ul style="list-style-type: none"> • 110 mm (4.33 inches) fast • 140 mm (5.51 inches) fast/normal • 200 mm (7.87 inches) fast/normal • 260 mm (10.23 inches) normal
Neck pipe length	According to DIN 43772	According to DIN 43772	According to DIN 43772
Sensor elements	Pt100 + thermocouples	Pt100 + thermocouples	Pt100 + thermocouples
Sensor connection	<ul style="list-style-type: none"> • 1 × 4-wire • 2 × 3-wire • 2 × 4-wire 	<ul style="list-style-type: none"> • 1 × 4-wire • 2 × 3-wire • 2 × 4-wire 	<ul style="list-style-type: none"> • 1 × 4-wire • 2 × 3-wire • 2 × 4-wire
Sensor accuracy	<ul style="list-style-type: none"> • Class AA • Class A • Class B • Class 1 • Class 2 	<ul style="list-style-type: none"> • Class AA • Class A • Class B • Class 1 • Class 2 	<ul style="list-style-type: none"> • Class AA • Class A • Class B • Class 1 • Class 2
Connection heads	Type B (Type A flameproof)	Type B (Type A flameproof)	Type B (Type A flameproof)
Explosion protection (EU, CN, EAC, AU, NZ, US, CA)	<ul style="list-style-type: none"> • Intrinsic safety "i"/"IS" • Flameproof enclosure "d"/"XP" • Dust protection by enclosure "t"/"DIP" • Non-sparking "ec"/"nA"/"NI" 	<ul style="list-style-type: none"> • Intrinsic safety "i"/"IS" • Flameproof enclosure "d"/"XP" • Non-sparking "ec"/"nA"/"NI" 	<ul style="list-style-type: none"> • Intrinsic safety "i"/"IS" • Flameproof enclosure "d"/"XP" • Non-sparking "ec"/"nA"/"NI"
Output signal	Sensor signal: <ul style="list-style-type: none"> • 4 ... 20 mA (TH100/TH200) • HART (TH300) • PA (TH400) • FF (TH400) 	Sensor signal: <ul style="list-style-type: none"> • 4 ... 20 mA (TH100/TH200) • HART (TH300) • PA (TH400) • FF (TH400) 	Sensor signal: <ul style="list-style-type: none"> • 4 ... 20 mA (TH100/TH200) • HART (TH300) • PA (TH400) • FF (TH400)
Application	Pipes and vessels	Pipes and vessels	Pipes and vessels
Limit temperatures ¹⁾ [°C (°F)]	<ul style="list-style-type: none"> • Pt100 basic: -50 ... +400 °C (-58 ... +752 °F) • Pt100 expanded measuring range: -196 ... +600 °C (-321 ... +1112 °F) • Thermocouple: -40 ... +1 100 °C (-40 ... +2012 °F) (type dependent) 	<ul style="list-style-type: none"> • Pt100 basic: -50 ... +400 °C (-58 ... +752 °F) • Pt100 expanded measuring range: -196 ... +600 °C (-321 ... +1112 °F) • Thermocouple: -40 ... +1 100 °C (-40 ... +2012 °F) (type dependent) 	<ul style="list-style-type: none"> • Pt100 basic: -50 ... +400 °C (-58 ... +752 °F) • Pt100 expanded measuring range: -196 ... +600 °C (-321 ... +1112 °F) • Thermocouple: -40 ... +1 100 °C (-40 ... +2012 °F) (type dependent)
Max. nominal pressure ¹⁾ (static pressure at 20 °C) Dimensions in mm (inch)	Pipe diameter 12 (0.47): <ul style="list-style-type: none"> • 0 ... 200 (0 ... 7.87), at 75 bar • 200 ... 300 (7.87 ... 11.81), at 60 bar 	Pipe diameter 12 (0.47): <ul style="list-style-type: none"> • 0 ... 200 (0 ... 7.87), at 75 bar • 200 ... 300 (7.87 ... 11.81), at 60 bar Note restriction imposed by PN of the flange	Mat. (1.4404; 1.4571): <ul style="list-style-type: none"> • 65 (2.56), at 450 bar • 125 (4.92), at 350 bar Mat. (1.7335; 1.5415): <ul style="list-style-type: none"> • 65 (2.56), at 500 bar • 125 (4.92), at 400 bar form 4F: Note restriction imposed by PN of the flange
Min. response time $t_{0,5}$	7 ... 15 s	7 ... 15 s	Diameter 24 mm (0.95 inches): 20 ... 45 s
Degree of protection	IP54 ... IP68 depending on connection head	IP54 ... IP68 depending on connection head	IP54 ... IP68 depending on connection head

¹⁾ Load combinations (temperature, flow, vibration, pressure) can at times significantly restrict these values. Additional temperature limits result, for example, from thermowell materials with lower limits (e.g. 1.4571 pressure resilient, 450 ... 550 °C (842 ... 1022 °F), limit temperature 800 °C (1472 °F)).

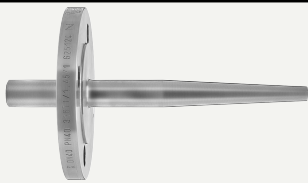


Type	SITRANS TSthermowell 7MT14..	SITRANS TSthermowell 7MT2..	SITRANS TSthermowell 7MT3..
Description	Thermowells for the process industry	Thermowells for the process industry	Thermowells for the process industry
Area of application	Barstock thermowell for medium to extreme stress	Barstock thermowell for medium to extreme stress	Barstock thermowell for medium to extreme stress
Version	Thermowell according to DIN 43772	Thermowell according to ASME B40.9	Thermowell according to ASME B40.9
Type	With flange connection or for welding in	Screwed design	For welding

Temperature Measurement

Temperature sensors



Detailed product overview

Overview (continued)

Type	SITRANS TSthermowell 7MT14..	SITRANS TSthermowell 7MT2..	SITRANS TSthermowell 7MT3..
Figure			
Article No.	7MT14..	7MT21.. (straight) 7MT22.. (reduced) 7MT23.. (tapered)	7MT31.. (straight) 7MT32.. (reduced) 7MT33.. (tapered)
Wetted material	<ul style="list-style-type: none"> • 316Ti/1.4571 • 316L/1.4404 • Hastelloy C276/2.4819 • 1.5415 Heat-resistant • 1.7335 Heat-resistant • PFA coating (thermowell made of 316/Ti/L) • ECTFE (HALAR) (thermowell made of 316/Ti/L) • Stellite coating (thermowell made of 316/Ti/L) 	<ul style="list-style-type: none"> • 316L/1.4404 • Carbon steel • 304L/1.4306 • 321/1.4541 	<ul style="list-style-type: none"> • 316L/1.4404 • Carbon steel • 304L/1.4306 • 321/1.4541
Thermowell forms	<ul style="list-style-type: none"> • Straight/tapered 	<ul style="list-style-type: none"> • Straight • Reduced (staggered) • Tapered 	<ul style="list-style-type: none"> • Straight • Reduced (staggered) • Tapered
Process connections	<ul style="list-style-type: none"> • Without (for direct welding) • Flange connection • EN 1092-1: DN 40, 50/PN 10-16, 25-40 • ASME B16.5: 1.5" 2"/Class 150, 300, 600 	<ul style="list-style-type: none"> • M20 × 1.5 • M27 × 2.0 • M33 × 2.0 • ½-14 NPT • ¾ NPT • 1 NPT • G½ • G¾ • G1 • R½ • R¾ • R1 	<ul style="list-style-type: none"> • 26.7 mm • 33.4 mm • 48.3 mm
Installation length	Standard lengths and free configuration		
Extension length	Standard lengths and free configuration		
Explosion protection	Not Ex-relevant, but offers zone separation when wall thickness of 1 mm for anti-corrosive materials, or otherwise 3 mm, is observed. Not for coated versions.		
Application	Pipes and vessels		
Limit temperatures	Material-dependent		
Max. static pressure	Material-dependent		
Min. response time	20 s ... several minutes		
Degree of protection	When installed correctly, IP68 is achieved between extension and thermowell		

Type	SITRANS TSthermowell 7MT4..	SITRANS TSthermowell 7MT5..
Description	Thermowells for the process industry	Thermowells for the process industry
Area of application	Barstock thermowell for medium to extreme stress	Barstock thermowell for medium to extreme stress
Version	Thermowell according to ASME B40.9	Thermowell according to ASME B40.9
Type	With flange connection	Van Stone version

Overview (continued)

Type	SITRANS TSthermowell 7MT4..	SITRANS TSthermowell 7MT5..
Figure		
Article No.	7MT41.. (straight) 7MT42.. (reduced) 7MT43.. (tapered)	7MT51.. (straight) 7MT52.. (reduced) 7MT53.. (tapered)
Wetted material	<ul style="list-style-type: none"> • 316L/1.4404 • Carbon steel • Hastelloy C276/2.4819 • Hastelloy C22/2.4602 • 304L/1.4306 • 321/1.4541 • Monel alloy 400/2.4360 • Tantalum (barrel, thermowell made of 316/Ti/L) • Duplex/1.4462 • Super duplex • PFA coating (thermowell made of 316/Ti/L) • ECTFE (HALAR) (thermowell made of 316/Ti/L) • Stellite coating (thermowell made of 316/Ti/L) 	<ul style="list-style-type: none"> • 316L/1.4404 • Hastelloy C276/2.4819 • Hastelloy C22/2.4602 • 304L/1.4306 • 321/1.4541 • Monel alloy 400/2.4360 • Duplex/1.4462 • Super duplex • Tantalum coating on 316 • PFA coating (thermowell made of 316/Ti/L) • ECTFE (HALAR) (thermowell made of 316/Ti/L) • Stellite coating (thermowell made of 316/Ti/L)
Thermowell forms	<ul style="list-style-type: none"> • Straight • Reduced (staggered) • Tapered 	<ul style="list-style-type: none"> • Straight • Reduced (staggered) • Tapered
Process connections	<ul style="list-style-type: none"> • EN 1092-1: nom. diam. 25, 40, 50/ PN 10-16, 25-40 • ASME B16.5: 1", 1.5", 2", 3", 4" Class 150, 300, 600 	<ul style="list-style-type: none"> • 33.4 mm/51 mm • 48.3 mm/73 mm • 60.3 mm/92 mm + collar flanges • ASME B16.5: 1", 1.5", 2" Class 150, 300, 600
Installation length	Standard lengths and free configuration	
Extension length	Standard lengths and free configuration	
Explosion protection	Not Ex-relevant, but offers zone separation when wall thickness of 1 mm for anti-corrosive materials, or otherwise 3 mm, is observed. Not for coated versions.	
Application	Pipes and vessels	
Limit temperatures	Material-dependent	
Max. static pressure	Material-dependent	
Min. response time	20 s ... several minutes	
Degree of protection	When installed correctly, IP68 is achieved between extension and thermowell	

Temperature Measurement

Temperature sensors

Ordering examples

More information

Ordering examples for SITRANS TS100/200

Required properties	Ordering data
SITRANS TS100	7MC7111
Sensor diameter	6
Standard length 200 mm (sensor length range 101 ... 250 mm)	C
Sensor	A1
Flying leads	1
Enclosed clamp connection	A41
PVC cable, 10 m	J10
TAG plate	Y15: TTSA5458
Non-Ex requirements	-Z E00

Complete article number

7MC7111-6CA11-Z A41+J10+Y15
Y15: TTSA5458

Required properties	Ordering data
SITRANS TS100	7MC7111
Sensor diameter	6
Standard length 200 mm (sensor length range 101 ... 250 mm)	C
Sensor	A1
Flying leads	1
Enclosed clamp connection	A41
PVC cable, 10 m	J10
TAG plate	Y15: TTSA5458
Customer-specific length 211 mm	Y44: 211 mm
Non-Ex requirements	-Z E00

Complete article number

7MC7111-6CA11-Z A41+J10+Y15+Y44
Y15: TTSA5458
Y44: 211 mm

Ordering examples for SITRANS TS500

Required properties	Ordering data
SITRANS TS500	7MC751
Material	1
Process connection	1E
Thermowell form	A
Installation length U standard 250 mm (installation length customer specific 220 mm)	12
Extension X customer-specific	9
Header	C
Sensor	A
Number/precision of sensors	1
Extension X customer-specific	N2D
Installation length U customer-specific	Y44: 220 mm
Extension length X customer-specific	Y45: 200 mm
3-point factory calibration	Y33: 0° C Y33: 50 °C Y33: 150 °C
Non-Ex requirements	-Z E00

More information (continued)

Complete article number

7MC7511-1EA12-9CA1-Z N2D+Y44+Y45 +Y33+Y33+Y33
Y44: 220 mm
Y45: 200 mm
Y33: 0 °C
Y33: 50 °C
Y33: 150 °C

Selection and ordering data

SITRANS TS100	Article No.				
Temperature sensors in cable version, for universal use, mineral-insulated version, for unfavorable space conditions	7MC7111-	•	•	•	•
Click the article number for online configuration in the PIA Life Cycle Portal.					
Sensor diameter					
6 mm (0.24 inches)		6			
Length of the basic sensor B					
Effective length U = B-10, see "Dimensional drawings"					
200 mm (7.87 inches)			C		
500 mm (19.68 inches)			D		
750 mm (29.53 inches)			E		
Customer-specific length of the basic sensor B					
Effective length U = B-10, see section "Dimensional drawings"					
Specify customer-specific length with Y44, see order codes					
70 ... 100 mm (2.76 ... 3.94 inches)				B	
Initial: 100 mm (3.94 inches)					
101 ... 250 mm (3.98 ... 9.84 inches)				C	
Initial: 200 mm (7.87 inches)					
251 ... 500 mm (9.88 ... 19.68 inches)				D	
Initial: 500 mm (19.68 inches)					
501 ... 750 mm (19.72 ... 29.53 inches)				E	
Initial: 750 mm (29.53 inches)					
751 ... 1 000 mm (19.72 ... 39.37 inches)				F	
Initial: 1 000 mm (39.37 inches)					
1 001 ... 1 500 mm (39.4 ... 59.00 inches)				G	
Initial: 1 500 mm (59.00 inches)					
Special length: < 70 mm (2.76 inches) or > 1 500 mm (59.00 inches)				X	
Sensor¹⁾					
Note: The accuracy class range can be lower than the measuring range. For more detailed information, see "Configuration"/"Measuring technology: Measuring accuracy"					
Pt100, Basic, -50 ... +400 °C (-58 ... +752 °F)				A	
Pt100, vibration-resistant, -50 ... +400 °C (-58 ... +752 °F)				B	
Pt100, extended range, -196 ... +600 °C (-320.8 ... +1 112 °F)				C	
Type K thermocouple, -270 ... +1 100 °C (-167 ... +2 012 °F)				K	
Thermocouple type J, -40 ... +750 °C (-40 ... +1 382 °F)				J	
Number/precision of sensors					
Pt100 connection: 1 × 4-wire connection or 2 × 3-wire connection see "Configuration"/"Measuring technology: Connection types"					
Single, basic accuracy (Class 2/Class B)					1
Single, increased accuracy (Class 1/Class A)					2
Single, maximum accuracy (Class AA)					3
Double, basic accuracy (Class 2/Class B)					4
Double, increased accuracy (Class 1/Class A)					5
Double, maximum accuracy (Class AA)					6
Type of connection end					
Flying leads					1
Coupling LEMO 1S					2
M12 device plug, not for double Pt100					3
Thermocouple coupling, made of thermal material (2 × TC on request)					4

¹⁾ Pt1000 versions are also available.

To find these, switch to Online Configuration in the PIA Life Cycle Portal: www.siemens.com/pia-portal

Options	Order code
Add "-Z" to article number and specify options; separate multiple expansions with "+"	
Process connection	
Soldering nipple enclosed	
• G¼"	A20
• G½"	A21
• NPT½"	A22
• M18x1.5	A23
Compression fitting enclosed	
• G¼"	A30
• G½"	A31

Temperature Measurement

Temperature sensors

SITRANS TS100 cable version

Selection and ordering data (continued)

Options	Order code
• NPT $\frac{1}{2}$ "	A32
• NEW: Spring-loaded G $\frac{1}{2}$ "	A41
• NEW: Spring-loaded NPT $\frac{1}{2}$ "	A42
Surface connection piece	
• Aluminum, enclosed (non-Ex)	A50
Certificates and approvals	
DELETE: Inspection certificate EN 10204-3.1: Wetted material	C12
NEW: Callendar Van Dusen coefficients calibrated at 0/+50/+100 °C	C25
NEW: Callendar Van Dusen coefficients calibrated at 0/+100/+150 °C	C26
NEW: Callendar Van Dusen coefficients calibrated at 0/+100/+200 °C	C27
Inspection certificate EN 10204-3.1: Visual, dimensional and function check	C34
Inspection certificate EN 10204-2.1: Declaration of compliance with the order	C35
ISO 9001 grease-free (cleaned for oxygen applications, for example)	C51
Marine approvals	
Det Norske Veritas Germanischer Lloyd (DNV GL)	D01
Type of protection (Ex)	
Without explosion protection requirements (Europe, Australia, New Zealand)	E00
Intrinsic safety "i"/"IS" ¹⁾ according to ATEX and IECEx (Europe, Australia, New Zealand)	E01
Without explosion protection requirements (USA, Canada), Basis CSA	E17
Intrinsic safety "i"/"IS" ¹⁾ according to cCSAus (USA, Canada)	E18
Without explosion protection requirements (China)	E54
Intrinsic safety "i"/"IS" ¹⁾ according to NEPSI (China)	E55
NEW: Intrinsic safety ia,"ic" according to KCC/KCS (Korea)	E70
Without explosion protection requirements (EAC)	E80
Intrinsic safety "i"/"IS" ¹⁾ according to EACEx (EAC)	E81
Connecting cable, type and length	
• Cable type = 1st letter,	
• Length 1 ... 99 m (3.28 ... 324.80 ft) = 2nd+3rd place For example: 34 m (111.55 ft) connecting cable PVC (PVC has the order code J34)	
With X meter connecting cable (JJ) PVC/PVC, operating temperature: -10 ... +105 °C (14 ... 221 °F)	J01 - J99
With X meter connecting cable (SLFP) silicone/fluoropolymer, operating temperature: -50 ... +180 °C (-58 ... 356 °F)	S01 - S99
With X meter connecting cable (TGLV) PTFE/glass silk/stainless steel reinforced), operating temperature: -100 ... +205 °C (-148 ... +401 °F)	L01 - L99
Device settings	
Tag plate made of stainless steel, specify label in plain text	Y15
Perform factory calibration at one point, specify desired temperature in plain text. Notice: For devices with built-in head transmitter, select test points within the set measuring range.	Y33
Special length of the basic sensor B Effective length U = B-10, see "Dimensional drawings" Select range, plain text specification of desired length (no specification = standard length)	Y44
Customer-specific plain text	
Handling number of the special design	Y99

¹⁾ Select Ex i version of the optional transmitter.

Selection and ordering data (continued)

For ordering examples, see "Temperature sensors"/"Ordering examples".

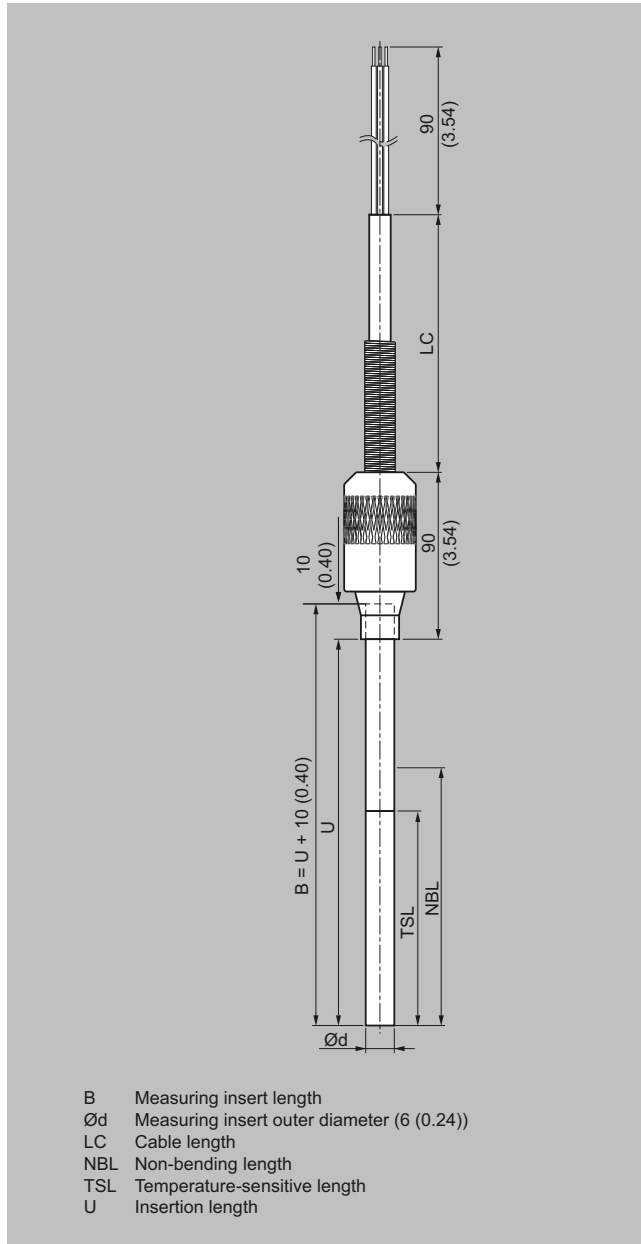
For accessories, see "Accessories"/"Additional accessories for assembly, connection and transmitter configuration".

Temperature Measurement

Temperature sensors

SITRANS TS100 cable version

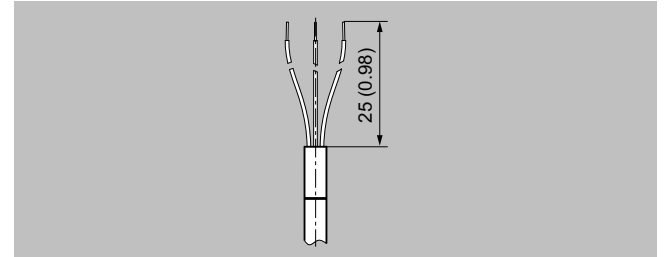
Dimensional drawings



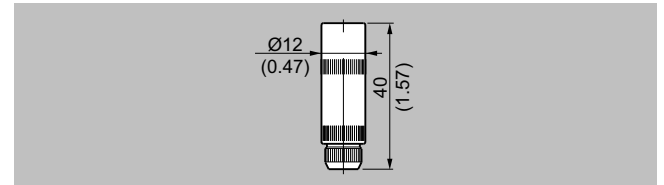
SITRANS TS100, temperature sensors in cable version, for universal use, mineral-insulated version, for unfavorable space conditions, IP54 at sensor/cable transition, dimensions in mm (inch)

Dimensional drawings (continued)

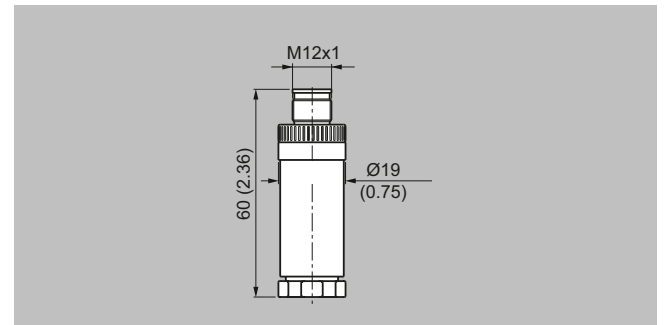
Types of connection end



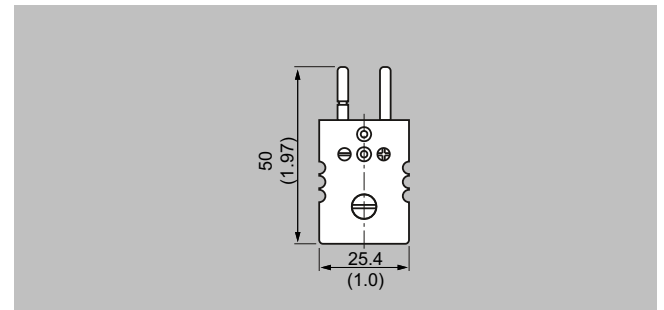
Flying leads, IP00, dimensions in mm (inch)



LEMO 1S coupling, IP50, dimensions in mm (inch)



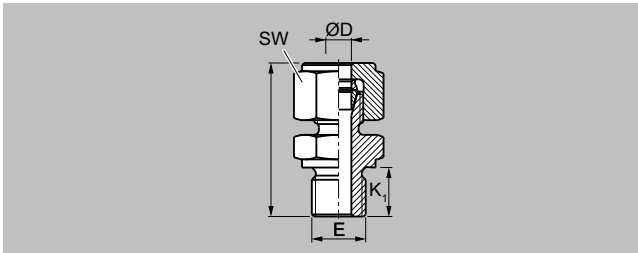
M12 device plug, IP54, dimensions in mm (inch)



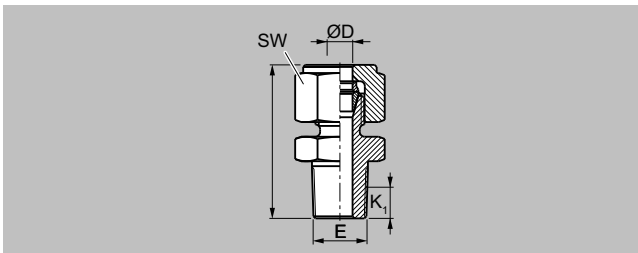
Thermocouple plug, IP20, dimensions in mm (inch)

Dimensional drawings (continued)

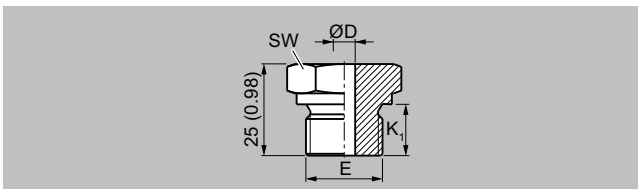
Process connection



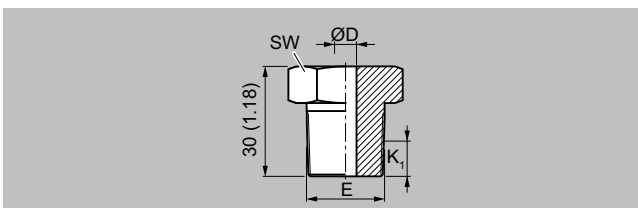
Compression fitting, metric (A30, A31), dimensions in mm (inch)



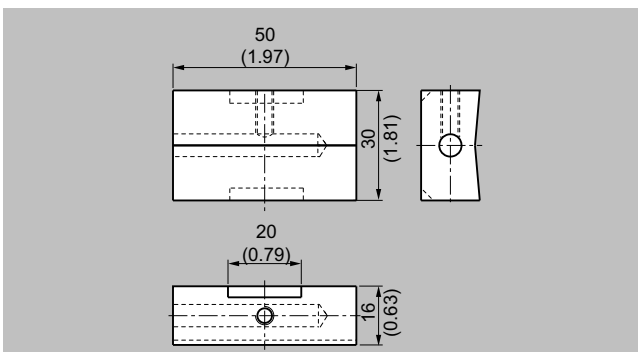
Compression fitting, NPT (A32), dimensions in mm (inch)



Soldering nipple, metric (A20, A21, A23), dimensions in mm (inch)



Soldering nipple NPT (A22), dimensions in mm (inch)



Surface connection piece (A50), dimensions in mm (inch)

Temperature Measurement

Temperature sensors

SITRANS TS200 compact version

Selection and ordering data

SITRANS TS200	Article No.				
Temperature sensors in compact version, for universal use, mineral-insulated version, for unfavorable space conditions	7MC7212-	●	●	●	●
Click the article number for online configuration in the PIA Life Cycle Portal.					
Sensor diameter					
6 mm (0.24 inches)		6			
Length of the basic sensor B					
Effective length U = B-10, see "Dimensional drawings"					
200 mm (7.87 inches)			C		
500 mm (19.68 inches)			D		
750 mm (29.53 inches)			E		
Customer-specific length of the basic sensor B					
Effective length U = B-10, see "Dimensional drawings"					
Specify customer-specific length with Y44, see order codes					
70 ... 100 mm (2.76 ... 3.94 inches)			B		
Initial: 100 mm (3.94 inches)					
101 ... 250 mm (3.98 ... 9.84 inches)			C		
Initial: 200 mm (7.87 inches)					
251 ... 500 mm (9.88 ... 19.68 inches)			D		
Initial: 500 mm (19.68 inches)					
501 ... 750 mm (19.72 ... 29.53 inches)			E		
Initial: 750 mm (29.53 inches)					
751 ... 1 000 mm (19.72 ... 39.37 inches)			F		
Initial: 1 000 mm (39.37 inches)					
1 001 ... 1 500 mm (39.4 ... 59.00 inches)			G		
Initial: 1 500 mm (59.00 inches)					
Special length: < 70 mm (2.76 inches) or > 1 500 mm (59.00 inches)			X		
Sensor¹⁾					
Note: The accuracy class range can be lower than the measuring range. For more detailed information, see "Configuration"/"Measuring technology: Measuring accuracy"					
Pt100, Basic, -50 ... +400 °C (-58 ... +752 °F)				A	
Pt100, vibration-resistant, -50 ... +400 °C (-58 ... +752 °F)				B	
Pt100, extended range, -196 ... +600 °C (-320.8 ... +1 112 °F)				C	
Type K thermocouple, -270 ... +1 100 °C (-167 ... +2 012 °F)				K	
Type J thermocouple, -40 ... +750 °C -0 ... +750 °C (-18 ... +1 382 °F)				J	
Number/precision of sensors					
Pt100 connection: 1 × 4-wire connection or 2 × 3-wire connection, see "Configuration"/"Measuring technology: Connection types"					
Single, basic accuracy (Class 2/Class B)					1
Single, increased accuracy (Class 1/Class A)					2
Single, maximum accuracy (Class AA)					3
Double, basic accuracy (Class 2/Class B)					4
Double, increased accuracy (Class 1/Class A)					5
Double, maximum accuracy (Class AA)					6
Type of connection end					
Solid wire ends (basic sensor)					0
Flying leads					1
Coupling LEMO 1S					2
M12 device plug, not for double Pt100					3
Thermocouple coupling, made of thermal material (2 × TC on request)					4
Mini connection head aluminum, not for double Pt100					5

¹⁾ Pt1000 versions are also available.

To find these, switch to Online Configuration in the PIA Life Cycle Portal: www.siemens.com/pia-portal

Options	Order code
Add "-Z" to article number and specify options; separate multiple expansions with "+"	
Process connection	
Soldering nipple enclosed	
• G $\frac{1}{4}$ "	A20

Selection and ordering data (continued)

Options	Order code
• G½"	A21
• NPT½"	A22
• M18x1.5	A23
Compression fitting enclosed	
• G¼"	A30
• G½"	A31
• NPT½"	A32
Surface connection piece	
• Aluminum, enclosed (non-Ex)	A50
Certificates and approvals	
Inspection certificate EN 10204-3.1: Wetted material	C12
Inspection certificate EN 10204-3.1: Visual, dimensional and function check	C34
Inspection certificate EN 10204-2.1: Declaration of compliance with the order	C35
ISO 9001 grease-free (cleaned for oxygen applications, for example)	C51
Marine approvals	
Det Norske Veritas Germanischer Lloyd (DNV GL)	D01
Type of protection (Ex)	
Without explosion protection requirements (Europe, Australia, New Zealand)	E00
Intrinsic safety "i"/"IS" ¹⁾ according to ATEX and IECEx (Europe, Australia, New Zealand)	E01
Without explosion protection requirements (USA, Canada), Basis CSA	E17
Intrinsic safety "i"/"IS" ¹⁾ according to cCSAus (USA, Canada)	E18
Without explosion protection requirements (China)	E54
Intrinsic safety "i"/"IS" ¹⁾ according to NEPSI (China)	E55
NEW: Intrinsic safety ia,"ic" according to KCC/KCS (Korea)	E70
Without explosion protection requirements (EAC)	E80
Intrinsic safety "i"/"IS" ¹⁾ according to EACEx (EAC)	E81
Device settings	
Tag plate made of stainless steel, specify label in plain text	Y15
Perform factory calibration at one point, specify desired temperature in plain text. <u>Notice:</u> For devices with built-in head transmitter, select test points within the set measuring range.	Y33
Special length of the basic sensor B Effective length U = B-10, see "Dimensional drawings" Select range, plain text specification of desired length (no specification = standard length)	Y44
Customer-specific plain text	
Handling number of the special design	Y99

¹⁾ Please select Ex i version of the optional transmitter.

For ordering examples, see "Temperature sensors"/"Ordering examples".

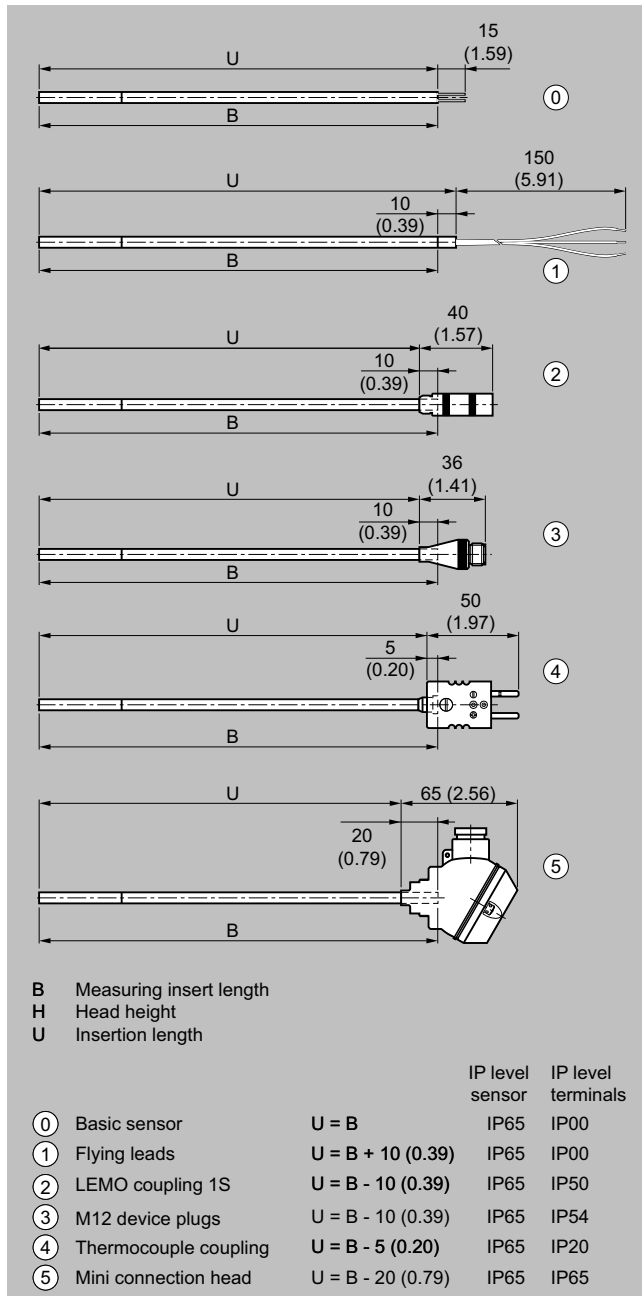
For accessories, see "Accessories"/"Additional accessories for assembly, connection and transmitter configuration".

Temperature Measurement

Temperature sensors

SITRANS TS200 compact version

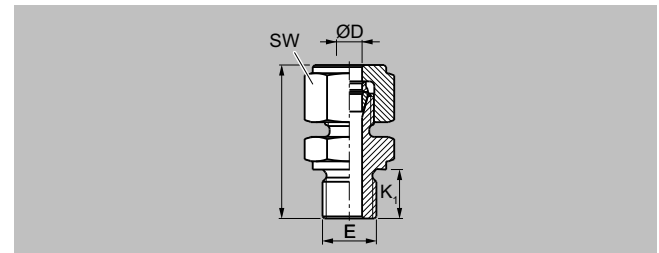
Dimensional drawings



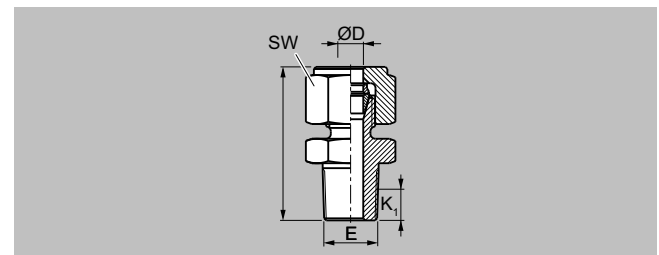
SITRANS TS200, temperature sensors in cable design, for universal use, mineral-insulated version, for unfavorable space conditions, dimensions in mm (inch)

Dimensional drawings (continued)

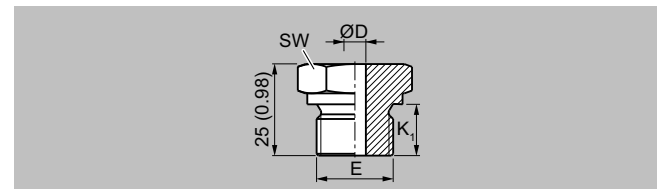
Process connection



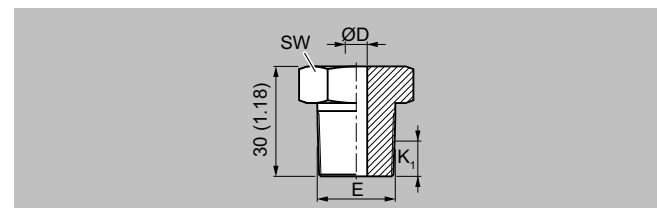
Compression fitting, metric (A30, A31), dimensions in mm (inch)



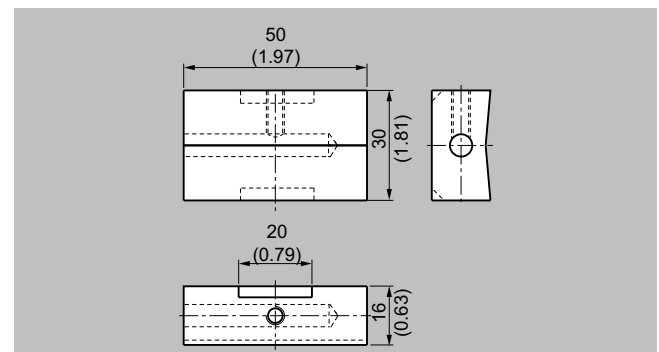
Compression fitting NPT (A32), dimensions in mm (inch)



Soldering nipple, metric (A20, A21, A23), dimensions in mm (inch)



Soldering nipple NPT (A22), dimensions in mm (inch)



Surface connection piece (A50), dimensions in mm (inch)

Selection and ordering data

				Article No.	Order code			
SITRANS TS300				7MC8005-	●	●	●	●
For food, pharmaceuticals and biotechnology					0	-	●	●
Modular design, for installation in pipelines and vessels					0		●	●
Click the article number for online configuration in the PIA Life Cycle Portal.								
Head								
Stainless steel head, B50, screw cover (standard version)				5				
Aluminum head, BAO, flange cap, standard				1				
Plastic head, BMO, screw cover				2				
Aluminum head, BBO, spring flap low, screw closure				3				
Aluminum head, BCO, spring flap high, screw closure				4				
Special design (specify order code and plain text)				9			H	1 Y
Process connection								
Material 1.4404 or 1.4435/316L								
Dairy connection acc. to DIN 11851								
with slotted union nut and nominal diameter/nominal pressure								
DN 25/PN 40				A	A			
DN 32/PN 40				A	B			
DN 40/PN 40				A	C			
DN 50/PN 25				A	D			
Clamp connection								
ISO 2852	DIN 32676	Tri-Clamp	Outer diameter D ₆					
-	-	½ inch/ ¾ inch	25.0 mm (0.98 inch)	C	A			
DN 25/ 33.7/38	DN 25/32/40	1 inch, 1½ inches	50.5 mm (1.99 inches)	C	B			
DN 40/51	DN 50	2 inches	64.0 mm (2.52 inches)	C	C			
DN 63.5	-	2½ inches	77.5 mm (3.05 inches)	C	D			
DN 88.9	DN 80	-	106.0 mm (4.17 inches)	C	E			
Varivent connection (Tuchenhagen Co.)								
Ø D ₆ = 50 mm (1.97 inches), for Varivent enclosure DN 25 and DN 1"				K	U			
Ø D ₆ = 68 mm (2.68 inches), for Varivent enclosure DN 40 ... DN 125 and 1½ ... 6 inches				K	V			
NEUMO/BioControl with O-ring								
Size 25				B	A			
Size 50				B	B			
Size 65				B	C			
Ingold socket								
DN 25 with hexagonal union nut G 1¼", installation length 40 mm (1.57 inches), diameter 24.8 mm (0.98 inches), incl. O-ring				J	A			
Weld-in piece [spherical diameter 30 × 40 mm (1.2 × 1.6 inches) long]				L	A			
Special design: Type of gland and nominal diameter (add order code and plain text)				Z	A		J	1 Y
Thermowell								
Ø D = 6 mm (0.24 inch)						1		
Ø D = 9 mm (0.35 inch)						2		
Ø D = 9 mm (0.35 inch)						3		
Ø D = 9 mm (0.35 inch) tapered tip, D ₂ = 5 Ø × 20 mm (0.2 × 0.79 inch)						4		
Special design (specify order code and plain text)						9		L 1 Y
Measuring insert								
Ø 3/3.2 mm, (0.12/0.13 inch) mineral-insulated								
Ø 6 mm (0.24 inch)								
Ø 6 mm (0.24 inch) mineral-insulated								
Ø 3/3.2 mm, (0.12/0.12 inch,) mineral-insulated								
Extension tube length X								
65 mm (2.56 inches) [M = 80 mm (3.15 inches)]						1		
130 mm (5.12 inches) [M = 145 mm (5.71 inches)]						2		
Special design (add order code and plain text)						9		N 1 Y
Installation length "U"								
Specify customer-specific length with Y44, see order codes								
15 mm (0.59 inches)							B	
16 ... 35 mm (0.63 ... 1.38 inches)							C	
Initial: 35 mm (1.38 inches)								

Temperature Measurement

Temperature sensors

SITRANS TS300 food and pharmaceuticals / Modular design

Selection and ordering data (continued)

	Article No.	Order code
SITRANS TS300	7MC8005-	
For food, pharmaceuticals and biotechnology Modular design, for installation in pipelines and vessels	● ● ● ● 0 - ● ● ● 0 ● ● ●	
36 ... 50 mm (1.42 ... 1.97 inches) Initial: 50 mm (1.97 inches)		D
51 ... 100 mm (2.01 ... 3.94 inches) Initial: 100 mm (3.94 inches)		E
101 ... 160 mm (3.98 ... 6.30 inches) Initial: 160 mm (6.30 inches)		F
161 ... 250 mm (6.34 ... 9.84 inches) Initial: 250 mm (9.84 inches)		G
251 ... 400 mm (9.88 ... 15.75 inches) Initial: 400 mm (15.75 inches)		H
1 ... 4 inches, initial: 4 inches		J
4 ... 6 inches, initial: 6 inches		K
6 ... 9 inches, initial: 9 inches		L
Special design (add order code and plain text)		Z P 1 Y
Sensor		
Thin layer technology: Range of use -50 ... +400 °C (-58 ... +752 °F)		
1 × Pt100, Class A, 3-wire		F
2 × Pt100, Class A, 3-wire		G
1 × Pt100, Class A, 4-wire		H
Special design (specify order code and plain text)		Z Q 1 Y

Options	Order code
Add "-Z" to article number and specify an order code.	
Certificates and approvals	
Transmitter test report (5 points)	C11
Inspection certificate EN 10204-3.1: Wetted material	C12
Roughness depth measurement R_a certified with a factory certificate according to EN 10204-3.1	C18
Certificates for functional safety	
SITRANS TH320/420 transmitter with SIL2/3 certificate	C20
Type of protection (Ex)	
Manufacturer declaration for intrinsically safe circuits	E01
Special design	
Flying lead connection type (for direct transmitter mounting, delivery without screws or springs)	G01
Cable input for connection head	
M12 device plug (in combination with transmitter, non-Ex and intrinsically safe, max. IP65/67)	G12
Hygiene version	
$R_a < 0.8 \mu\text{m}$ (3.1×10^{-5} inches)	H01
Process connection	
Process connection: Completely extrapolated	P01
Built-in head transmitter	
Measuring range to be set must be specified with plain text data "Y01".	
SITRANS TH100, input 1 × Pt100, 4 ... 20 mA	T12
SITRANS TH320, input 1 × universal, 4 ... 20 mA	T24
SITRANS TH320, input 1 × universal, HART	T34
SITRANS TH420, input 2 × universal, HART	T35
Device settings (head transmitter options)	
Specify measuring range in plain text (Y11: +/-NNNN ... +/-NNNN C,F)	Y11
Tag plate made of stainless steel, specify label/tag no. in plain text	Y15

Selection and ordering data (continued)

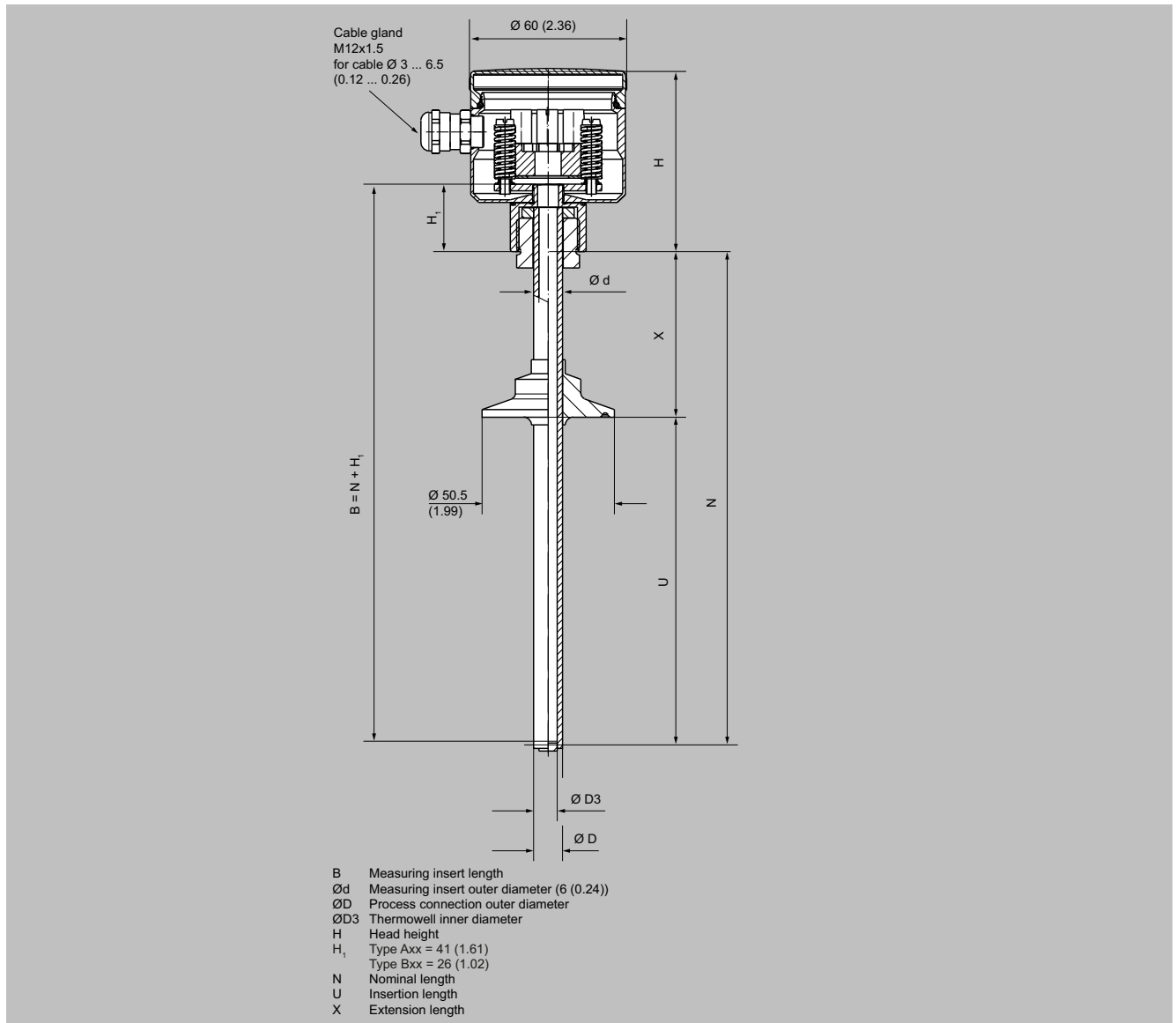
Options	Order code
Specify measuring point description in plain text (max. 16 characters)	Y23
Specify measuring point message in plain text (max. 32 characters)	Y24
Specify bus address in plain text	Y25
Test report (at 0, 50 and 100%); Specify measuring range in plain text. Note If optional head transmitters are installed, all calibration points must be in the set measuring range. If the points are outside the standard measuring range, a Y01 suffix is always required.	Y33
Installation length "U" customer-specific, select range, plain text specification of desired length (no specification = standard length)	Y44
Customer-specific plain text	
Specify special design in plain text	Y98
Handling number of the special design	Y99

Temperature Measurement

Temperature sensors

SITRANS TS300 food and pharmaceuticals / Modular design

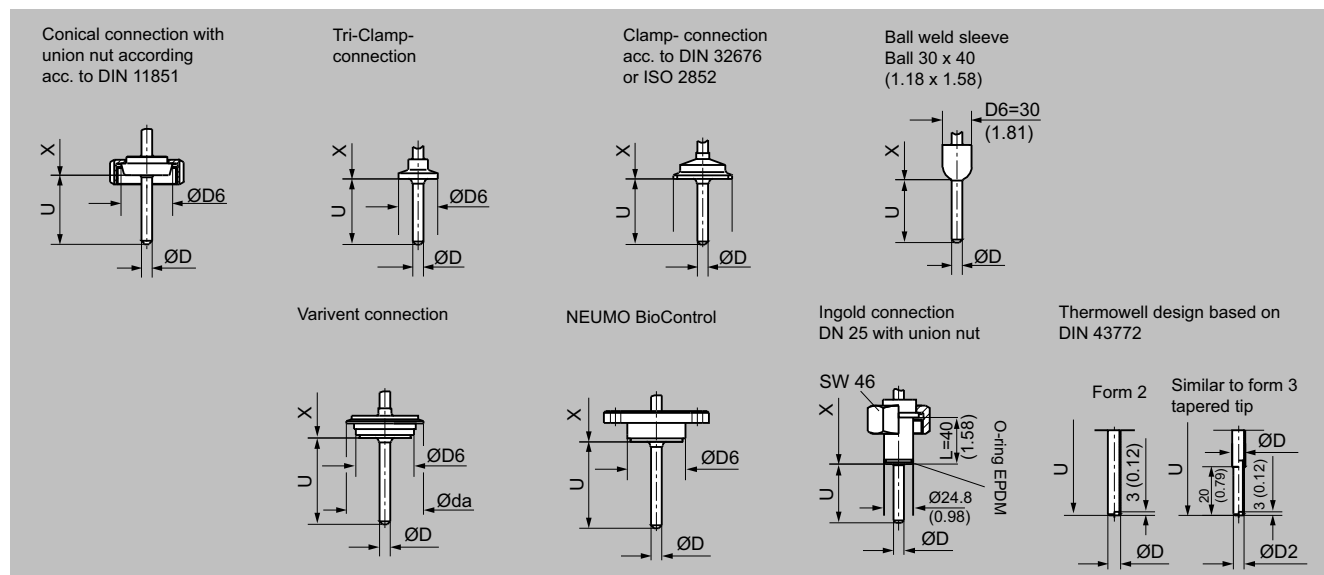
Dimensional drawings



SITRANS TS300, modular design, dimensions in mm (inch)

Dimensional drawings (continued)

Process connection



SITRANS TS300 modular design, process connections, dimensions in mm (inch)

Temperature Measurement

Temperature sensors

SITRANS TS300 food and pharmaceuticals / Clamp-on design

Selection and ordering data

	Article No.	Order code
SITRANS TS300 for food, pharmaceuticals and biotechnology Clamp-on design for measuring the pipe surface temperature	7MC8016-	
	● ● ● ● 0	● ● ●
Click the article number for online configuration in the PIA Life Cycle Portal.		
Type According to IEC 60751, Class A [-40 ... +150 °C (-40 ... +302 °F)]	1	
Connection type Device plug M12 × 1 Connection head form B, stainless steel 4 ... 20 mA compact transmitter SITRANS TH100 Slim (standard measuring range 0 ... 100 °C (32 ... 212 °F))	A B C	
Pipe collar mounting type		
Outer pipe diameter mm (inch)	Collar size mm (inch)	
4 (0.16)	50 × 35 × 20 (1.97 × 1.38 × 0.79)	A 1
6 (0.24)		B 1
6.35 (0.25)		C 1
8 (0.31)		D 1
9.35 (0.37)		E 1
10 (0.39)		F 1
10.2 (0.40)		G 1
10.3 (0.41)		H 1
12 (0.47)		J 1
12.7 (0.50)		K 1
13 (0.51)		L 1
13.5 (0.53)		M 1
13.7 (0.54)		N 1
14 (0.55)		P 1
15.88 (0.62)		Q 1
16 (0.63)		R 1
17.2 (0.68)		S 1
18.0 (0.71)	70 × 70 × 20 (2.76 × 2.76 × 0.79)	A 2
19.0 (0.74)		B 2
19.05 (0.75)		C 2
20.0 (0.79)		D 2
21.3 (0.84)		E 2
22.0 (0.87)		F 2
23.0 (0.90)		G 2
24.0 (0.94)		H 2
25.0 (0.98)		J 2
25.4 (1.00)		K 2
26.7 (1.05)		L 2
26.9 (1.06)		M 2
28.0 (1.10)		N 2
29.0 (1.14)		P 2
30.0 (1.18)		Q 2
31.8 (1.25)		R 2
32.0 (1.26)		S 2
33.4 (1.31)		T 2
33.7 (1.33)		U 2
34.0 (1.34)		V 2
35.0 (1.38)		W 2
36.0 (1.42)		X 2
38.0 (1.49)	90 × 85 × 20 (3.54 × 3.35 × 0.79)	Y 2
38.1 (1.50)		A 3
41.0 (1.61)		B 3
42.4 (1.67)		C 3
44.5 (1.75)		D 3
48.3 (1.90)		E 3
50.8 (2.00)		F 3
53.0 (2.09)		G 3
54.0 (2.13)		H 3

Selection and ordering data (continued)

		Article No.	Order code
SITRANS TS300 for food, pharmaceuticals and biotechnology		7MC8016-	
Clamp-on design for measuring the pipe surface temperature		● ● ● ● 0	● ● ●
57.0 (2.24)	90 × 85 × 20 (3.54 × 3.35 × 0.79)	J 3	K 1 Y
Always indicate outer pipe diameter for ¹⁾ :		Z 0	
<ul style="list-style-type: none"> • Installation with pipe collar and deviating outer pipe diameter (S11-S19) • Securing with clamping bracket (S21-S23) • Clamping band installation (S31-S35) 			

- ¹⁾ Special sizes for outer pipe diameters:
 To process special sizes "Z0", two additional specifications are essential:
 - Plain text specification of the desired diameter under "K1Y"
 - Choice of corresponding pipe collar, clamping band or clamping bracket size (order codes "S11" to "S35")

Recommendation

Recommended for all versions: Thermo-lubricant enclosed, silicon-free, injection 3 g, option L15 (see "Options" table)

Options	Order code
Add "-Z" to article number and specify order code.	
Certificates and approvals	
Transmitter test report (5 points)	C11
Certificates for functional safety	
SITRANS TH320/420 transmitter with SIL2/3 certificate	C20
Type of protection (Ex)	
Manufacturer declaration for intrinsically safe circuits	E01
Other cable gland (only for connection head)	
Polyamide for cable diameter 4.5 ... 10 mm (0.18 ... 0.39 inches)	K02
Stainless steel for cable diameter 3 ... 6.5 mm (0.12 ... 0.25 inches)	K03
Device plug M12 × 1	K11
Additional options	
Assignment marking, engraving instead of adhesive label (serial number and pipe diameter on plug and plastic block)	L11
2 mm drain hole	L12
Sensor 4-wire connection	L14
Thermo-lubricant enclosed, silicon-free, injection 3 g (0.0066 lb)	L15
Pipe diameter deviating / Collar size; mm (inch)	
4 ... 17.9 (0.16 ... 0.71) / 50 × 35 (1.97 × 1.38)	S11
18 ... 37.50 (0.71 ... 1.48) / 70 × 70 (2.76 × 2.76)	S12
37.51 ... 57 (1.5 ... 2.24) / 90 × 85 (3.54 × 3.35)	S13
Larger nominal diameters on request	S19
Space-saving mounting (securing with clamping bracket)	
For outer pipe diameter; mm (inch):	
• 6 ... 17.2 (0.24 ... +0.68)	S21
• 18 ... 35 (0.71 ... 1.38) Clamping band version recommended, see "Clamping band installation"	S22
• 38 ... 50.8 (1.45 ... 2.00) Clamping band version recommended, see "Clamping band installation"	S23
Clamping band installation	
For outer pipe diameter; mm (inch):	
• 10 ... 57 (0.39 ... 2.24)	S31
• 58 ... 220 (2.28 ... 8.66)	S32
• Without clamping band installation	S35

Temperature Measurement

Temperature sensors

SITRANS TS300 food and pharmaceuticals / Clamp-on design

Selection and ordering data (continued)

Options	Order code
Built-in head transmitter	
Measuring range to be set must be specified with plain text data "Y01".	
SITRANS TH100, input 1 × Pt100, 4 ... 20 mA	T12
SITRANS TH320, input 1 × universal, 4 ... 20 mA	T24
SITRANS TH320, input 1 × universal, HART	T34
SITRANS TH420, input 2 × universal, HART	T35
Device settings (including head transmitter options)	
Specify measuring range in plain text (Y11: +/-NNNN ... +/-NNNN C,F)	Y11
Tag plate made of stainless steel, specify label/tag no. in plain text	Y15
Specify measuring point description in plain text (max. 16 characters)	Y23
Specify measuring point message in plain text (max. 32 characters)	Y24
Specify bus address in plain text	Y25
Test report (at 0, 50 and 100%)	Y33
Specify measuring range in plain text. Note If optional head transmitters are installed, all calibration points must be in the set measuring range. If the points are outside the standard measuring range, a Y01 suffix is always required.	
Customer-specific plain text	
Specify special design in plain text	Y98
Handling number of the special design	Y99

Ordering examples

Other pipe diameter 28.5 mm:

7MC8016-1AZ00-Z K1Y + S12 {K1Y: 28.5 mm}

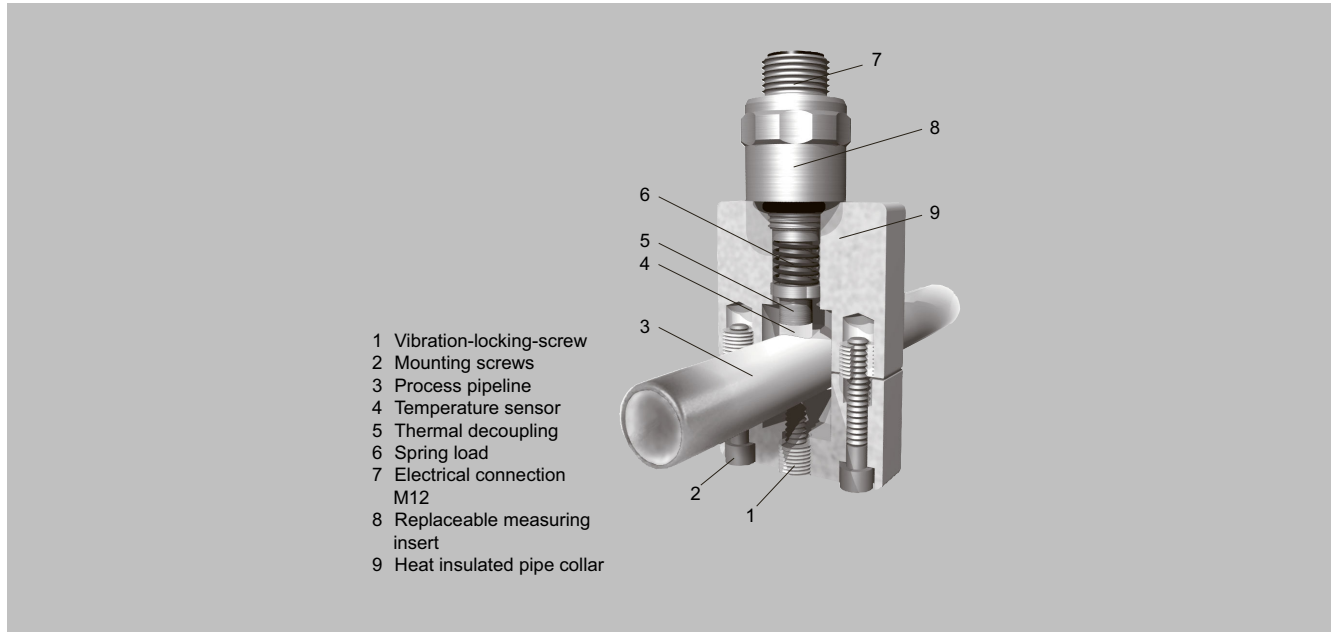
Space-saving mounting, pipe diameter 38 mm:

7MC8016-1AZ00-Z K1Y + S23 {K1Y: 38 mm}; as of diameter ≥ 18 mm, we recommend using the clamping band installation.

Clamping band installation, pipe diameter 111 mm:

7MC8016-1AZ00-Z K1Y + S32 {K1Y: 111 mm}

Dimensional drawings



Resistance thermometer with thermowell in clamp-on technology, dimensions in mm (inch)

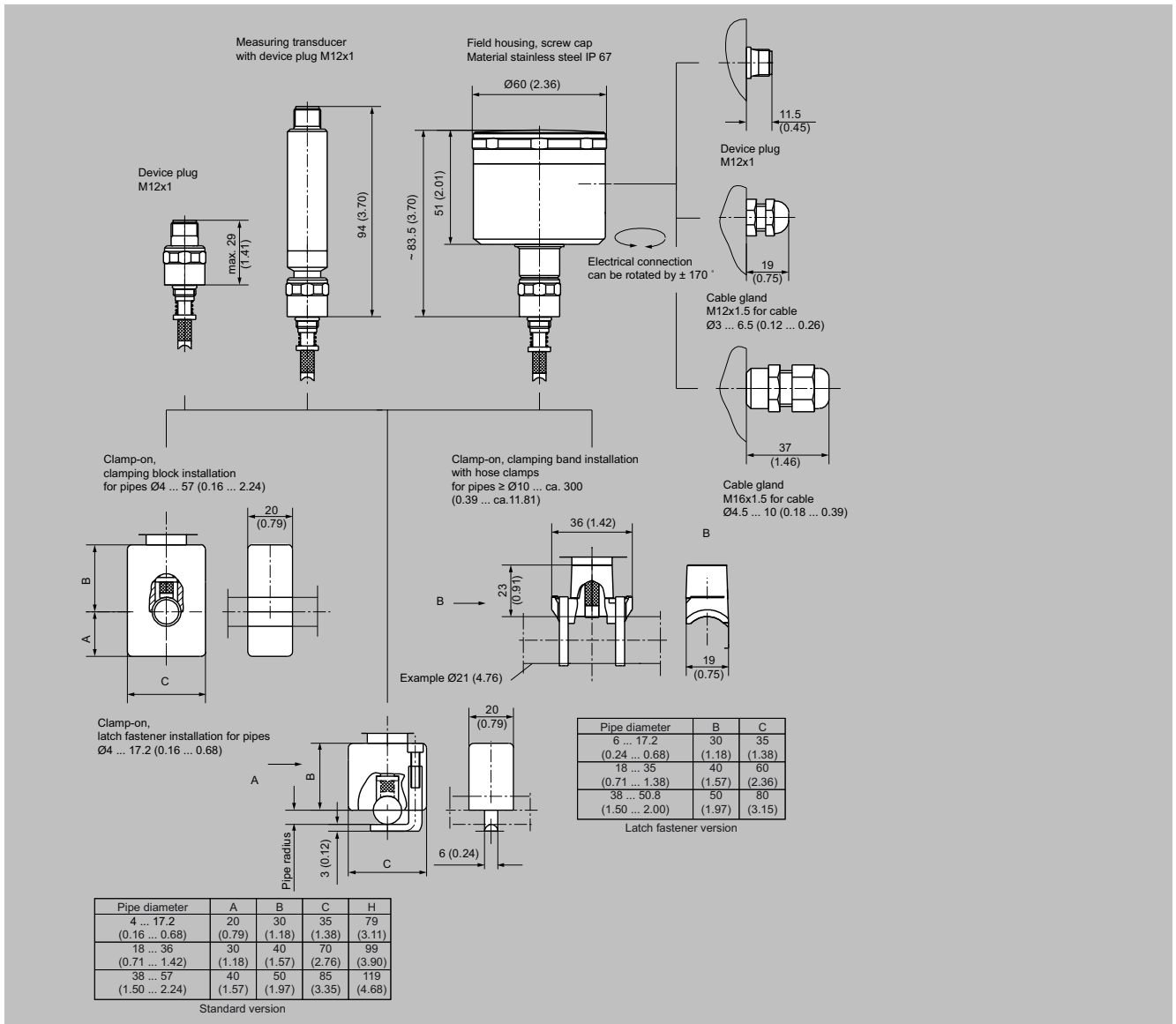
Temperature Measurement

Temperature sensors

SITRANS TS300 food and pharmaceuticals / Clamp-on design

Dimensional drawings (continued)

Clamp-on design, device plug, field enclosure, cable gland, versions



SITRANS TS300 in clamp-on design, device plug, field enclosure, cable gland, versions, dimensions in mm (inch)

Selection and ordering data

SITRANS TS500	Article No.
Tubular thermowell for low to medium stress, according to DIN 43772, Type 2, without process connection, without extension, plug-in or for use with sliding compression fittings	7MC751 ● - ● ● ● ● ● - ● ● ● ●
Click the article number for online configuration in the PIA Life Cycle Portal.	
Wetted material	
316Ti (1.4571)	1
316L (1.4404 or 1.4435)	2
Process connection	
Without process connection (for compression fittings) N=U	0 N
Thermowell form	
2; 9 mm (0.35 inches)	A
2; 12 mm (0.47 inches)	B
Installation length "U" (= N), standard	
160 mm (6.3 inches)	0 4
250 mm (9.84 inches)	1 2
400 mm (15.75 inches)	2 2
Installation length "U" (= N), customer-specific	
Specify customer-specific length with Y44, see order codes	
80 ... 100 mm (3.15 ... 3.94 inches) Initial: 100 mm (3.94 inches)	0 1
101 ... 120 mm (3.98 ... 4.72 inches) Initial: 120 mm (4.72 inches)	0 2
121 ... 140 mm (4.76 ... 5.51 inches) Initial: 140 mm (5.51 inches)	0 3
141 ... 160 mm (5.55 ... 6.30 inches) Initial: 160 mm (6.3 inches)	0 4
161 ... 180 mm (6.34 ... 7.09 inches) Initial: 180 mm (7.09 inches)	0 5
181 ... 200 mm (7.13 ... 7.87 inches) Initial: 200 mm (7.87 inches)	0 6
201 ... 220 mm (7.91 ... 8.66 inches) Initial: 220 mm (8.66 inches)	0 7
221 ... 240 mm (8.7 ... 9.45 inches) Initial: 225 mm (8.86 inches)	1 1
241 ... 260 mm (9.49 ... 10.24 inches) Initial: 250 mm (9.84 inches)	1 2
261 ... 280 mm (10.28 ... 11.02 inches) Initial: 280 mm (11.02 inches)	1 3
281 ... 300 mm (11.06 ... 11.81 inches) Initial: 285 mm (11.22 inches)	1 4
301 ... 320 mm (11.85 ... 12.6 inches) Initial: 315 mm (12.4 inches)	1 5
321 ... 340 mm (12.64 ... 13.39 inches) Initial: 340 mm (13.39 inches)	1 6
341 ... 360 mm (13.43 ... 14.17 inches) Initial: 360 mm (14.17 inches)	2 0
361 ... 380 mm (14.21 ... 14.96 inches) Initial: 380 mm (14.96 inches)	2 1
381 ... 400 mm (15 ... 15.75 inches) Initial: 400 mm (15.75 inches)	2 2
401 ... 420 mm (15.79 ... 16.54 inches) Initial: 420 mm (16.54 inches)	2 3
421 ... 440 mm (16.57 ... 17.32 inches) Initial: 440 mm (17.32 inches)	2 4
441 ... 460 mm (17.36 ... 18.11 inches) Initial: 460 mm (18.11 inches)	2 5
461 ... 480 mm (18.15 ... 18.90 inches) Initial: 465 mm (18.30 inches)	2 6
481 ... 500 mm (18.94 ... 19.69 inches) Initial: 500 mm (19.69 inches)	2 7
501 ... 550 mm (19.72 ... 21.65 inches) Initial: 510 mm (20.08 inches)	3 1
551 ... 600 mm (21.69 ... 23.62 inches) Initial: 600 mm (23.62 inches)	3 2
601 ... 650 mm (23.66 ... 25.59 inches) Initial: 650 mm (25.59 inches)	3 3
651 ... 700 mm (25.63 ... 27.56 inches) Initial: 700 mm (27.56 inches)	3 4
701 ... 750 mm (27.6 ... 29.53 inches) Initial: 750 mm (29.53 inches)	3 5

Temperature Measurement

Temperature sensors

SITRANS TS500 / Tubular thermowells / Type 2, without process connection

Selection and ordering data (continued)

SITRANS TS500	Article No.
Tubular thermowell for low to medium stress, according to DIN 43772, Type 2, without process connection, without extension, plug-in or for use with sliding compression fittings	7MC751 ● - ● ● ● ● - ● ● ● ●
751 ... 800 mm (29.57 ... 31.50 inches) Initial: 800 mm (31.50 inches)	3 6
801 ... 850 mm (31.5 ... 33.47 inches) Initial: 850 mm (33.47 inches)	3 7
851 ... 900 mm (33.5 ... 35.43 inches) Initial: 900 mm (35.43 inches)	4 1
901 ... 950 mm (35.47 ... 37.4 inches) Initial: 950 mm (37.4 inches)	4 2
951 ... 1 000 mm (37.44 ... 39.37 inches) Initial: 1 000 mm (39.37 inches)	4 3
1 001 ... 1 100 mm (39.4 ... 43.30 inches) Initial: 1 100 mm (43.30 inches)	4 4
1 101 ... 1 200 mm (43.35 ... 47.24 inches) Initial: 1 200 mm (47.24 inches)	4 5
1 201 ... 1 300 mm (47.28 ... 51.18 inches) Initial: 1 300 mm (51.18 inches)	4 6
1 301 ... 1 400 mm (51.22 ... 55.11 inches) Initial: 1 400 mm (55.11 inches)	4 7
1 401 ... 1 500 mm (55.15 ... 59.05 inches) Initial: 1 500 mm (59.05 inches)	5 1
Extension "X"	
Standard length for Type 2 according to DIN 43772 (without extension N=U)	0
Head	
Aluminum head, BAO, flange cap, standard	A
Aluminum head, BBO, spring flap low, screw closure	B
Aluminum head, BCO, spring flap high, screw closure	C
Aluminum head, AGO, screw cover, Ex d suitable ¹⁾	G
Aluminum head, AHO, screw cover, Ex d suitable, display ¹⁾	H
Plastic head, BMO, screw cover	M
Plastic head, BPO, spring flap high, screw closure	P
Stainless steel head, AUO, screw cover, Ex d suitable ¹⁾	U
Stainless steel head, AVO, screw cover, Ex d suitable, display ¹⁾	V
Sensor²⁾	
Note: The accuracy class range can be lower than the measuring range. For more detailed information, see "Configuration"/"Measuring technology: Measuring accuracy"	
Pt100, basic version, -50 ... +400 °C (-58 ... +752 °F)	A
Pt100, vibration-resistant, -50 ... +400 °C (-58 ... +752 °F)	B
Pt100, extended measuring range, -196 ... +600 °C (-320.8 ... +1 112 °F)	C
Type K thermocouple, -270 ... +1 100 °C (-167 ... +2 012 °F)	K
Type J thermocouple, -0 ... +750 °C (-18 ... +1 382 °F)	J
Type N thermocouple, -270 ... +1 100 °C (-167 ... +2 012 °F)	N
Number/precision of sensors	
Pt100 connection: 1 × 4-wire connection or 2 × 3-wire connection, see "Configuration"/"Measuring technology: Connection types"	
Single, basic accuracy (Class 2/Class B)	1
Single, increased accuracy (Class 1/Class A)	2
Single, maximum accuracy (Class AA)	3
Double, basic accuracy (Class 2/Class B)	5
Double, increased accuracy (Class 1/Class A)	6
Double, maximum accuracy (Class AA)	7

¹⁾ Ex d in connection with order option E03

²⁾ Pt1000 versions are also available.

To find these, switch to Online Configuration in the PIA Life Cycle Portal: www.siemens.com/pia-portal

Options	Order code
Add "Z" to article number and specify order code	
Accessories	
With external grounding screw for connection heads AGO, AHO, AUO and AVO	A02
With external grounding screw for connection heads BCO, AGO, AHO, AUO and AVO	A03

Selection and ordering data (continued)

Options	Order code
Add "-Z" to article number and specify order code	
Compression fitting enclosed	
G½"	A31
NPT½"	A32
Certificates and approvals	
Transmitter test report (5 points)	C11
EN 10204-3.1 Inspection certificate Wetted material	C12
EN 10204-3.1 Inspection certificate Hydrostatic pressure test	C31
EN 10204-3.1 Inspection certificate Helium leak test	C32
EN 10204-3.1 Inspection certificate Surface tear test	C33
EN 10204-3.1 Factory certificate Visual, dimensional and function check	C34
EN 10204-2.1: Declaration of compliance with the order	C35
ISO 9001 grease-free (cleaned for oxygen applications, for example)	C51
EN 10204-3.1 Inspection certificate "Positive Materials Identification" (PMI)	On request
Certificates for functional safety	
SITRANS TH320/420 transmitter with SIL2/3 certificate	C20
Marine approvals	
Det Norske Veritas Germanischer Lloyd (DNV GL)	D01
Type of protection (Ex)	
Without explosion protection requirements (Europe, Australia, New Zealand)	E00
Intrinsic safety "i"/"IS ¹)" according to ATEX and IECEx (Europe, Australia, New Zealand)	E01
Flameproof enclosure "d"/"XP"; dust protection through enclosure "t"/"DIP ²)" according to ATEX and IECEx (Europe, Australia, New Zealand)	E03
Non-sparking "ec" according to ATEX and IECEx (Europe, Australia, New Zealand)	E04
Without explosion protection requirements (USA, Canada) Basis FM	E10
Flameproof enclosure "d"/"XP"; dust protection through enclosure "t"/"DIP ²)" according to cFMus (USA, Canada); other connections (M,G,R)	E14
Non-sparking "nA"/"NI" according to cFMus (USA, Canada)	E16
Without explosion protection requirements (USA, Canada), Basis CSA	E17
Intrinsic safety "i"/"IS ¹)" according to cCSAus (USA, Canada)	E18
Flameproof enclosure "d"/"XP"; dust protection through enclosure "t"/"DIP ²)" according to CSAus (USA); other connections (M, G, R)	E21
Non-sparking "nA"/"NI" according to cCSAus (USA, Canada)	E23
Without explosion protection requirements (China)	E54
Intrinsic safety "i"/"IS ¹)" according to NEPSI (China)	E55
Flameproof enclosure "d"; dust protection through enclosure "t ²)" according to NEPSI (China)	E56
Non-sparking "nA"/"NI" according to NEPSI (China)	E57
Without explosion protection requirements (EAC)	E80
Intrinsic safety "i"/"IS ¹)" according to EACEx (EAC)	E81
Flameproof enclosure "d"/"XP"; dust protection through enclosure "t"/"DIP ²)" according to EACEx (EAC)	E82
Non-sparking "nA"/"NI" according to EACEx (EAC)	E83
Special design	
Flying lead connection type (for direct transmitter mounting, delivery without screws or springs)	G01

Temperature Measurement

Temperature sensors

SITRANS TS500 / Tubular thermowells / Type 2, without process connection

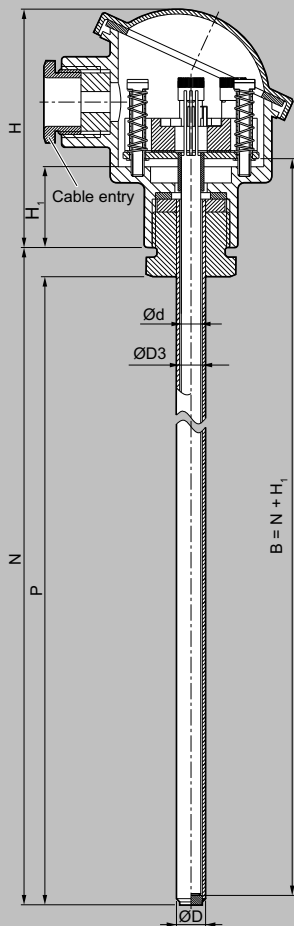
Selection and ordering data (continued)

Options	Order code
Add "-Z" to article number and specify order code	
Cable input for connection head	
M12 device plug (in combination with transmitter, non-Ex and intrinsically safe, max. IP65/67)	G12
Han 7 D device plug (non-Ex and intrinsically safe, without mating connector max. IP65/67)	G13
Connection head with ½"-NPT thread without cable gland, for AU0 and AHO only IP66	G20
SafeGuard 2 × Pt100 4-wire	G30
Built-in head transmitter	
Measuring range to be set must be specified with plain text data "Y01".	
SITRANS TH100, input 1 × Pt100, 4 ... 20 mA	T12
SITRANS TH320, input 1 × universal, 4 ... 20 mA	T24
SITRANS TH320, input 1 × universal, HART	T34
SITRANS TH420, input 2 × universal, HART	T35
Device settings (including head transmitter options)	
Tag plate made of stainless steel, specify label in plain text	Y15
Factory calibration per 1 point, specify temperature in plain text	Y33
Specify measuring range in plain text (Y01: +/-NNNN ... +/-NNNN C,F), marking on the device when option "Y15" is selected in addition	Y01
Specify measuring point description in plain text (max. 16 characters)	Y23
Specify measuring point message in plain text (max. 32 characters)	Y24
Specify bus address in plain text	Y25
Installation length U customer-specific Select range, plain text specification of desired length (no specification = standard length)	Y44
Customer-specific plain text	
Handling number of the special design	Y99

¹⁾ Select Ex i version of the optional transmitter.

²⁾ Only with connection heads code AG0, AHO, AU0, AV0, without cable gland (select non-Ex version of the optional transmitter).

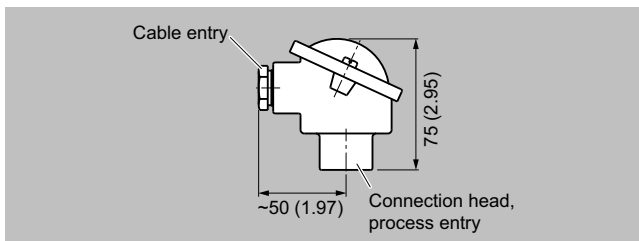
Dimensional drawings



- B Measuring insert length
- Ød Measuring insert outer diameter (6 (0.24))
- ØD Process connection outer diameter
- ØD3 Thermowell internal diameter
- H Head height
- H₁ Type Axx = 41 (1.61)
Type Bxx = 26 (1.02)
- N Nominal length
- P Space for process connection P ~ N - 9 (0.35), floor strength 3 mm

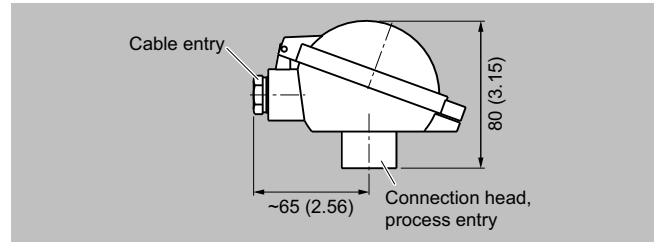
SITRANS TS500, temperature sensors for vessels and pipes, tubular thermowell for low to medium stress, without process connection, without extension, plug-in or for use with sliding compression fittings, dimensions in mm (inch)

Connection heads

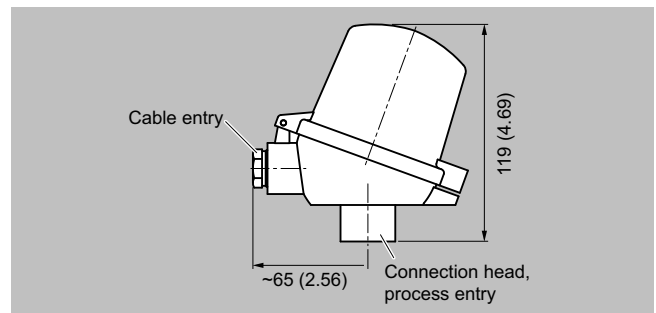


Connection head, aluminum, type BA0, dimensions in mm (inch)

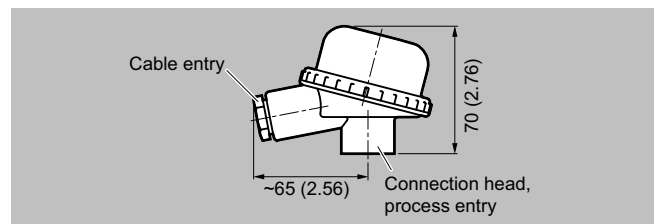
Dimensional drawings (continued)



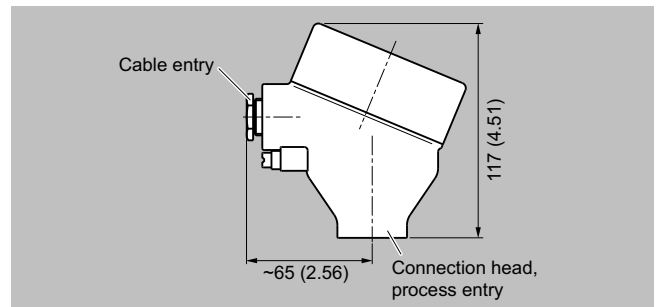
Connection head, aluminum, type BB0, dimensions in mm (inch)



Connection head, aluminum, type BC0, plastic, type BP0, dimensions in mm (inch)



Connection head, plastic, type BM0, dimensions in mm (inch)



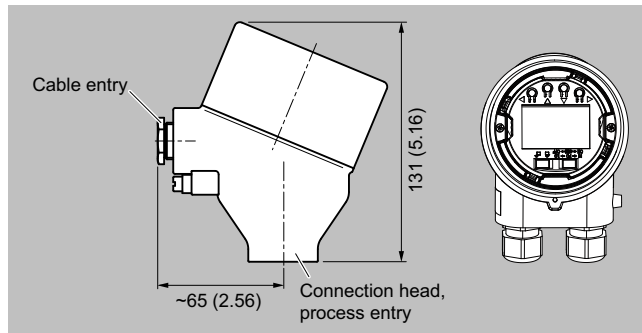
Connection head, aluminum, type AG0, stainless steel, type AU0, dimensions in mm (inch)

Temperature Measurement

Temperature sensors

SITRANS TS500 / Tubular thermowells / Type 2, without process connection

Dimensional drawings (continued)



Connection head with 4-20 mA display, aluminum, type AH0, stainless steel, type AV0, dimensions in mm (inch)

Selection and ordering data

SITRANS TS500	Article No.	
Tubular thermowell for low to medium stress, Type 2N similar to DIN 43772, screwed design, without extension	7MC751	● - ● ● ● ● ● - ● ● ● ●
Click the article number for online configuration in the PIA Life Cycle Portal.		
Wetted material		
316Ti (1.4571)	1	
316L (1.4404 or 1.4435)	2	
Process connection		
G ½" (½"BSPP)		1 C
½" NPT		1 J
Thermowell form		
2N, 9 mm (0.35 inches)		A
Standard installation length "U"		
100 mm (3.97 inches)		0 1
160 mm (6.30 inches)		0 4
230 mm (9.06 inches)		1 0
360 mm (14.17 inches)		2 0
510 mm (20.08 inches)		3 1
Installation length "U" customer-specific		
Specify customer-specific length with Y44, see order codes		
80 ... 100 mm (3.15 ... 3.94 inches) Initial: 100 mm (3.94 inches)		0 1
101 ... 120 mm (3.98 ... 4.72 inches) Initial: 120 mm (4.72 inches)		0 2
121 ... 140 mm (4.76 ... 5.51 inches) Initial: 140 mm (5.51 inches)		0 3
141 ... 160 mm (5.55 ... 6.30 inches) Initial: 160 mm (6.3 inches)		0 4
161 ... 180 mm (6.34 ... 7.09 inches) Initial: 180 mm (7.09 inches)		0 5
181 ... 200 mm (7.13 ... 7.87 inches) Initial: 200 mm (7.87 inches)		0 6
201 ... 220 mm (7.91 ... 8.66 inches) Initial: 220 mm (8.66 inches)		0 7
221 ... 240 mm (8.70 ... 9.45 inches) Initial: 230 mm (9.06 inches)		1 0
241 ... 260 mm (9.49 ... 10.24 inches) Initial: 250 mm (9.84 inches)		1 2
261 ... 280 mm (10.28 ... 11.02 inches) Initial: 280 mm (11.02 inches)		1 3
281 ... 300 mm (11.06 ... 11.81 inches) Initial: 285 mm (11.22 inches)		1 4
301 ... 320 mm (11.85 ... 12.6 inches) Initial: 315 mm (12.4 inches)		1 5
321 ... 340 mm (12.64 ... 13.39 inches) Initial: 340 mm (13.39 inches)		1 6
341 ... 360 mm (13.43 ... 14.17 inches) Initial: 360 mm (14.17 inches)		2 0
361 ... 380 mm (14.21 ... 14.96 inches) Initial: 380 mm (14.96 inches)		2 1
381 ... 400 mm (15 ... 15.75 inches) Initial: 400 mm (15.75 inches)		2 2
401 ... 420 mm (15.79 ... 16.54 inches) Initial: 420 mm (16.54 inches)		2 3
421 ... 440 mm (16.57 ... 17.32 inches) Initial: 440 mm (17.32 inches)		2 4
441 ... 460 mm (17.36 ... 18.11 inches) Initial: 460 mm (18.11 inches)		2 5
461 ... 480 mm (18.15 ... 18.90 inches) Initial: 465 mm (18.30 inches)		2 6
481 ... 500 mm (18.94 ... 19.69 inches) Initial: 500 mm (19.69 inches)		2 7
501 ... 550 mm (19.72 ... 21.65 inches) Initial: 510 mm (20.08 inches)		3 1
551 ... 600 mm (21.69 ... 23.62 inches) Initial: 600 mm (23.62 inches)		3 2

Temperature Measurement

Temperature sensors

SITRANS TS500 / Tubular thermowells / Type 2N, screwed design, without extension

Selection and ordering data (continued)

SITRANS TS500	Article No.
Tubular thermowell for low to medium stress, Type 2N similar to DIN 43772, screwed design, without extension	7MC751 ● - ● ● ● ● ● - ● ● ● ●
601 ... 650 mm (23.66 ... 25.59 inches) Initial: 650 mm (25.59 inches)	3 3
651 ... 700 mm (25.63 ... 27.56 inches) Initial: 700 mm (27.56 inches)	3 4
701 ... 750 mm (27.6 ... 29.53 inches) Initial: 750 mm (29.53 inches)	3 5
751 ... 800 mm (29.57 ... 31.50 inches) Initial: 800 mm (31.50 inches)	3 6
801 ... 850 mm (31.5 ... 33.47 inches) Initial: 850 mm (33.47 inches)	3 7
851 ... 900 mm (33.5 ... 35.43 inches) Initial: 900 mm (35.43 inches)	4 1
901 ... 950 mm (35.47 ... 37.4 inches) Initial: 950 mm (37.4 inches)	4 2
951 ... 1 000 mm (37.44 ... 39.37 inches) Initial: 1 000 mm (39.37 inches)	4 3
1 001 ... 1 100 mm (39.4 ... 43.30 inches) Initial: 1 100 mm (43.30 inches)	4 4
1 101 ... 1 200 mm (43.35 ... 47.24 inches) Initial: 1 200 mm (47.24 inches)	4 5
1 201 ... 1 300 mm (47.28 ... 51.18 inches) Initial: 1 300 mm (51.18 inches)	4 6
1 301 ... 1 400 mm (51.22 ... 55.11 inches) Initial: 1 400 mm (55.11 inches)	4 7
1 401 ... 1 500 mm (55.15 ... 59.05 inches) Initial: 1 500 mm (59.05 inches)	5 1
Extension "X"	
Without extension (non-adjustable)	0
Head	
Aluminum head, BAO, flange cap, standard	A
Aluminum head, BBO, spring flap low, screw closure	B
Aluminum head, BCO, spring flap high, screw closure	C
Aluminum head, AGO, screw cover, Ex d suitable ¹⁾	G
Aluminum head, AHO, screw cover, Ex d suitable, display ¹⁾	H
Plastic head, BMO, screw cover	M
Plastic head, BPO, spring flap high, screw closure	P
Stainless steel head, AUO, screw cover, Ex d suitable ¹⁾	U
Stainless steel head, AVO, screw cover, Ex d suitable, display ¹⁾	V
Sensor²⁾	
Note: The accuracy class range can be lower than the measuring range. For more detailed information, see "Configuration"/"Measuring technology: Measuring accuracy"	
Pt100, basic version, -50 ... +400 °C (-58 ... +752 °F)	A
Pt100, vibration-resistant, -50 ... +400 °C (-58 ... +752 °F)	B
Pt100, extended measuring range, -196 ... +600 °C (-320.8 ... +1 112 °F)	C
Type K thermocouple, -270 ... +1 100 °C (-167 ... +2 012 °F)	K
Type J thermocouple, -0 ... +750 °C (-18 ... +1 382 °F)	J
Type N thermocouple, -270 ... +1 100 °C (-167 ... +2 012 °F)	N
Number/precision of sensors	
Pt100 connection: 1 × 4-wire connection or 2 × 3-wire connection, see "Configuration"/"Measuring technology: Connection types"	
Single, basic accuracy (Class 2/Class B)	1
Single, increased accuracy (Class 1/Class A)	2
Single, maximum accuracy (Class AA)	3
Double, basic accuracy (Class 2/Class B)	5
Double, increased accuracy (Class 1/Class A)	6
Double, maximum accuracy (Class AA)	7

¹⁾ Ex d in connection with order option E03

²⁾ Pt1000 versions are also available.

To find these, switch to Online Configuration in the PIA Life Cycle Portal: www.siemens.com/pia-portal

Selection and ordering data (continued)

Options	Order code
Add "-Z" to article number and specify order code	
Accessories	
With external grounding screw for connection heads AG0, AH0, AU0 and AV0	A02
With external grounding screw for connection heads BC0, AG0, AH0, AU0 and AV0	A03
Certificates and approvals	
Transmitter test report (5 points)	C11
EN 10204-3.1 Inspection certificate Wetted material	C12
EN 10204-3.1 Inspection certificate Hydrostatic pressure test	C31
EN 10204-3.1 Inspection certificate Helium leak test	C32
EN 10204-3.1 Inspection certificate Surface tear test	C33
EN 10204-3.1 Factory certificate Visual, dimensional and function check	C34
EN 10204-2.1: Declaration of compliance with the order	C35
ISO 9001 grease-free (cleaned for oxygen applications, for example)	C51
EN 10204-3.1 Inspection certificate "Positive Materials Identification" (PMI)	On request
Certificates for functional safety	
SITRANS TH320/420 transmitter with SIL2/3 certificate	C20
Marine approvals	
Det Norske Veritas Germanischer Lloyd (DNV GL)	D01
Type of protection (Ex)	
Without explosion protection requirements (Europe, Australia, New Zealand)	E00
Intrinsic safety "i"/"IS ¹ " according to ATEX and IECEx (Europe, Australia, New Zealand)	E01
Flameproof enclosure "d"/"XP"; dust protection through enclosure "t"/"DIP ² " according to ATEX and IECEx (Europe, Australia, New Zealand)	E03
Non-sparking "ec" according to ATEX and IECEx (Europe, Australia, New Zealand)	E04
Without explosion protection requirements (USA, Canada) Basis FM	E10
Flameproof enclosure "d"/"XP"; dust protection through enclosure "t"/"DIP ² " according to cFMus (USA, Canada); other connections (M,G,R)	E14
Non-sparking "nA"/"NI" according to cFMus (USA, Canada)	E16
Without explosion protection requirements (USA, Canada), Basis CSA	E17
Intrinsic safety "i"/"IS ¹ " according to cCSAus (USA, Canada)	E18
Flameproof enclosure "d"/"XP"; dust protection through enclosure "t"/"DIP ² " according to CSAus (USA); other connections (M, G, R)	E21
Non-sparking "nA"/"NI" according to cCSAus (USA, Canada)	E23
Without explosion protection requirements (China)	E54
Intrinsic safety "i"/"IS ¹ " according to NEPSI (China)	E55
Flameproof enclosure "d"; dust protection through enclosure "t ² " according to NEPSI (China)	E56
Non-sparking "nA"/"NI" according to NEPSI (China)	E57
Without explosion protection requirements (EAC)	E80
Intrinsic safety "i"/"IS ¹ " according to EACEx (EAC)	E81
Flameproof enclosure "d"/"XP"; dust protection through enclosure "t"/"DIP ² " according to EACEx (EAC)	E82
Non-sparking "nA"/"NI" according to EACEx (EAC)	E83
Special design	
Flying lead connection type (for direct transmitter mounting, delivery without screws or springs)	G01

Temperature Measurement

Temperature sensors

SITRANS TS500 / Tubular thermowells / Type 2N, screwed design, without extension

Selection and ordering data (continued)

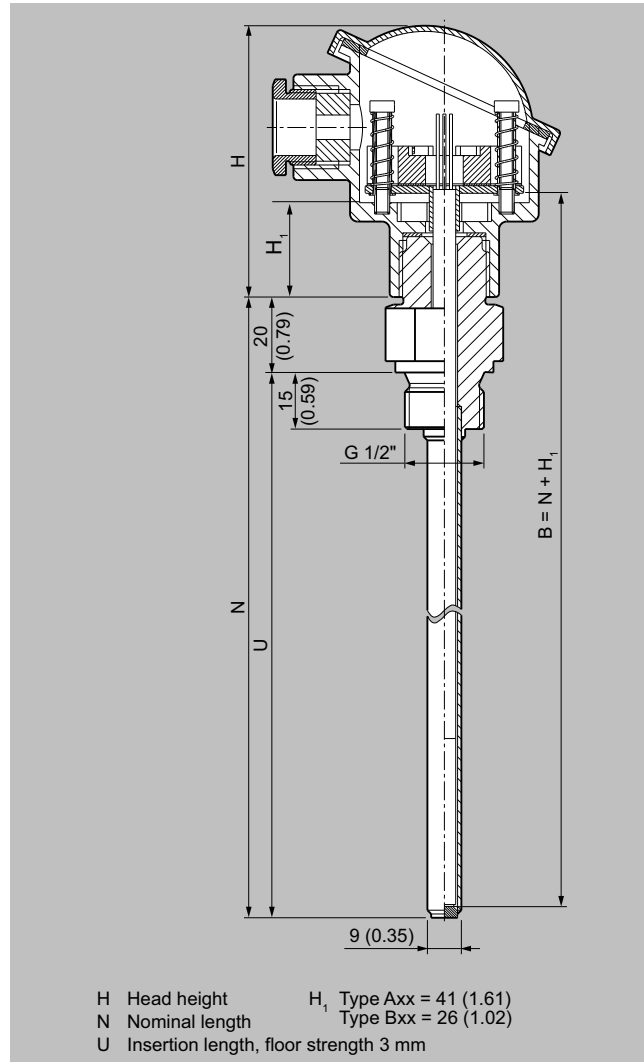
Options	Order code
Add "-Z" to article number and specify order code	
Cable input for connection head	
M12 device plug (in combination with transmitter, non-Ex and intrinsically safe, max. IP65/67)	G12
Han 7 D device plug (non-Ex and intrinsically safe, without mating connector max. IP65/67)	G13
Connection head with ½"-NPT thread without cable gland, for AU0 and AH0 only IP66	G20
SafeGuard 2 × Pt100 4-wire	G30
Built-in head transmitter	
Measuring range to be set must be specified with plain text data "Y01".	
SITRANS TH100, input 1 × Pt100, 4 ... 20 mA	T12
SITRANS TH320, input 1 × universal, 4 ... 20 mA	T24
SITRANS TH320, input 1 × universal, HART	T34
SITRANS TH420, input 2 × universal, HART	T35
Device settings (including head transmitter options)	
Tag plate made of stainless steel, specify label in plain text	Y15
Factory calibration per 1 point, specify temperature in plain text	Y33
Specify measuring range in plain text (Y01: +/-NNNN ... +/-NNNN C,F), marking on the device when option "Y15" is selected in addition	Y01
Specify measuring point description in plain text (max. 16 characters)	Y23
Specify measuring point message in plain text (max. 32 characters)	Y24
Specify bus address in plain text	Y25
Installation length U customer-specific Select range, plain text specification of desired length (no specification = standard length)	Y44
Extension length X customer-specific Select range, plain text specification of desired length (no specification = standard length)	Y45
Customer-specific plain text	
Handling number of the special design	Y99

1) Select Ex i version of the optional transmitter.

2) Only with connection heads code AG0, AH0, AU0, AV0, without cable gland (select non-Ex version of the optional transmitter).

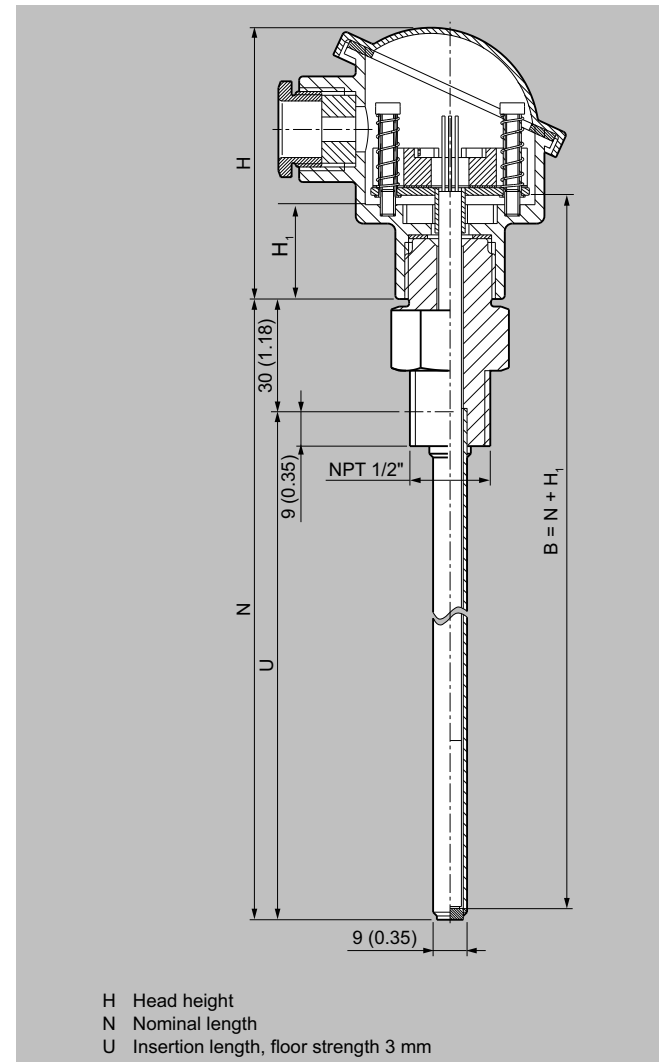
Dimensional drawings

SITRANS TS500, temperature sensors for vessels and pipes, tubular thermowell for low to medium stress, type 2N similar to DIN 43772, screwed design, without extension, non-adjustable connection head. For Ex-versions the maximum process temperature is 100 °C.



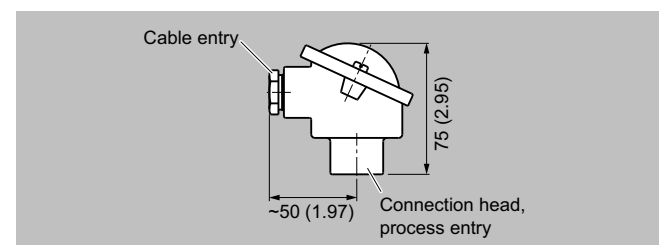
Connection type "G", dimensions in mm (inch)

Dimensional drawings (continued)



Connection type "NPT", dimensions in mm (inch)

Connection heads



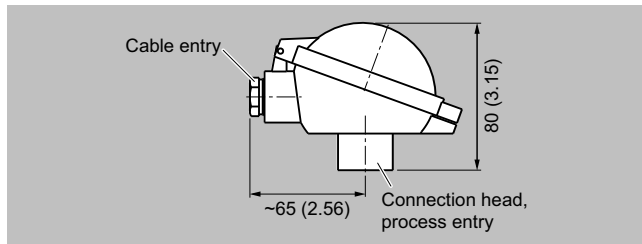
Connection head, aluminum, type BA0, dimensions in mm (inch)

Temperature Measurement

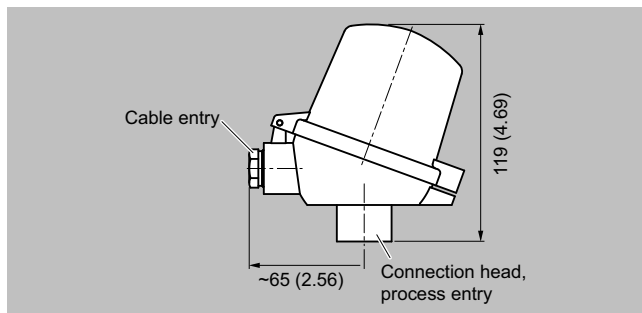
Temperature sensors

SITRANS TS500 / Tubular thermowells / Type 2N, screwed design, without extension

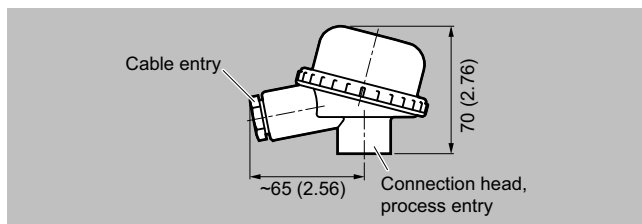
Dimensional drawings (continued)



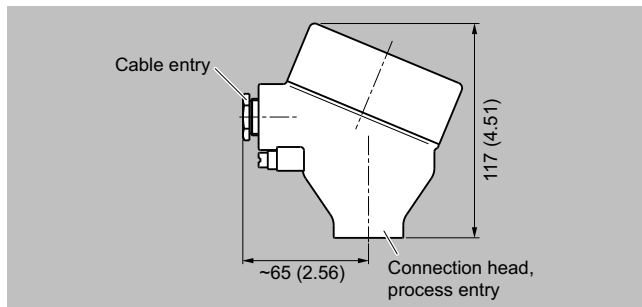
Connection head, aluminum, type BB0, dimensions in mm (inch)



Connection head, aluminum, type BC0, plastic, type BP0, dimensions in mm (inch)

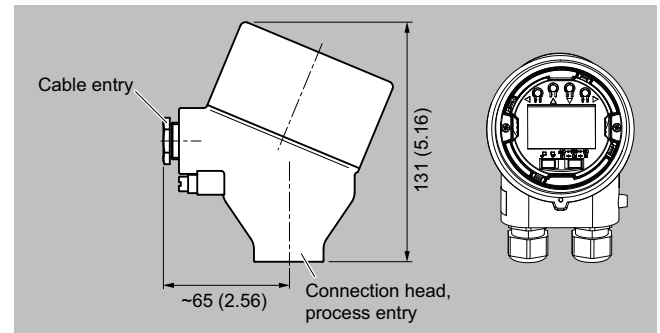


Connection head, plastic, type BM0, dimensions in mm (inch)



Connection head, aluminum, type AG0, stainless steel, type AU0, dimensions in mm (inch)

Dimensional drawings (continued)



Connection head with 4-20 mA display, aluminum, type AHO, stainless steel, type AV0, dimensions in mm (inch)

Selection and ordering data

Selection and ordering data	Article No.	Order code
SITRANS TS500	7MC751	
Tubular thermowell for low to medium stress, according to DIN 43772, Type 2G, screwed design, with extension	● - ● ● ● ● ● - ● ● ● ● ● ● ● ●	
Click the article number for online configuration in the PIA Life Cycle Portal.		
Wetted material		
316Ti (1.4571)	1	
316L (1.4404 or 1.4435)	2	
Process connection		
Cylindrical: G½" (½" BSPP)	1	C
Cylindrical: G¾" (¾" BSPP)	1	D
Tapered: NPT½"	1	J
Tapered: NPT¾"	1	K
Tapered: NPT1"	1	L
Cylindrical: M20 × 1.5	1	V
Cylindrical: M27 × 2.0	1	W
Cylindrical: M33 × 2.0	1	Y
Thermowell form		
2G, 9 mm (0.35 inches)		A
2G, 12 mm (0.47 inches)		B
Standard installation length "U"		
160 mm (6.30 inches)		0 4
250 mm (9.84 inches)		1 2
400 mm (15.75 inches)		2 2
Installation length "U" customer-specific		
Specify customer-specific length with Y44, see order codes		
80 ... 100 mm (3.15 ... 3.94 inches) Initial: 100 mm (3.94 inches)		0 1
101 ... 120 mm (3.98 ... 4.72 inches) Initial: 120 mm (4.72 inches)		0 2
121 ... 140 mm (4.76 ... 5.51 inches) Initial: 140 mm (5.51 inches)		0 3
141 ... 160 mm (5.55 ... 6.30 inches) Initial: 160 mm (6.3 inches)		0 4
161 ... 180 mm (6.34 ... 7.09 inches) Initial: 180 mm (7.09 inches)		0 5
181 ... 200 mm (7.13 ... 7.87 inches) Initial: 200 mm (7.87 inches)		0 6
201 ... 220 mm (7.91 ... 8.66 inches) Initial: 220 mm (8.66 inches)		0 7
221 ... 240 mm (8.70 ... 9.45 inches) Initial: 225 mm (8.86 inches)		1 1
241 ... 260 mm (9.49 ... 10.24 inches) Initial: 250 mm (9.84 inches)		1 2
261 ... 280 mm (10.28 ... 11.02 inches) Initial: 280 mm (11.02 inches)		1 3
281 ... 300 mm (11.06 ... 11.81 inches) Initial: 285 mm (11.22 inches)		1 4
301 ... 320 mm (11.85 ... 12.6 inches) Initial: 315 mm (12.4 inches)		1 5
321 ... 340 mm (12.64 ... 13.39 inches) Initial: 340 mm (13.39 inches)		1 6
341 ... 360 mm (13.43 ... 14.17 inches) Initial: 360 mm (14.17 inches)		2 0
361 ... 380 mm (14.21 ... 14.96 inches) Initial: 380 mm (14.96 inches)		2 1
381 ... 400 mm (15 ... 15.75 inches) Initial: 400 mm (15.75 inches)		2 2
401 ... 420 mm (15.79 ... 16.54 inches) Initial: 420 mm (16.54 inches)		2 3
421 ... 440 mm (16.57 ... 17.32 inches) Initial: 440 mm (17.32 inches)		2 4
441 ... 460 mm (17.36 ... 18.11 inches) Initial: 460 mm (18.11 inches)		2 5
461 ... 480 mm (18.15 ... 18.90 inches) Initial: 465 mm (18.30 inches)		2 6

Temperature Measurement

Temperature sensors

SITRANS TS500 / Tubular thermowells / Type 2G, screwed design

Selection and ordering data (continued)

Selection and ordering data	Article No.	Order code
SITRANS TS500	7MC751	
Tubular thermowell for low to medium stress, according to DIN 43772, Type 2G, screwed design, with extension	● - ● ● ● ● ● - ● ● ● ● ● ● ● ●	
481 ... 500 mm (18.94 ... 19.69 inches) Initial: 500 mm (19.69 inches)		2 7
501 ... 550 mm (19.72 ... 21.65 inches) Initial: 510 mm (20.08 inches)		3 1
551 ... 600 mm (21.69 ... 23.62 inches) Initial: 600 mm (23.62 inches)		3 2
601 ... 650 mm (23.66 ... 25.59 inches) Initial: 650 mm (25.59 inches)		3 3
651 ... 700 mm (25.63 ... 27.56 inches) Initial: 700 mm (27.56 inches)		3 4
701 ... 750 mm (27.6 ... 29.53 inches) Initial: 750 mm (29.53 inches)		3 5
751 ... 800 mm (29.57 ... 31.50 inches) Initial: 800 mm (31.50 inches)		3 6
801 ... 850 mm (31.5 ... 33.47 inches) Initial: 850 mm (33.47 inches)		3 7
851 ... 900 mm (33.5 ... 35.43 inches) Initial: 900 mm (35.43 inches)		4 1
901 ... 950 mm (35.47 ... 37.4 inches) Initial: 950 mm (37.4 inches)		4 2
951 ... 1 000 mm (37.44 ... 39.37 inches) Initial: 1 000 mm (39.37 inches)		4 3
1 001 ... 1 100 mm (39.4 ... 43.30 inches) Initial: 1 100 mm (43.30 inches)		4 4
1 101 ... 1 200 mm (43.35 ... 47.24 inches) Initial: 1 200 mm (47.24 inches)		4 5
1 201 ... 1 300 mm (47.28 ... 51.18 inches) Initial: 1 300 mm (51.18 inches)		4 6
1 301 ... 1 400 mm (51.22 ... 55.11 inches) Initial: 1 400 mm (55.11 inches)		4 7
1 401 ... 1 500 mm (55.15 ... 59.05 inches) Initial: 1 500 mm (59.05 inches)		5 1
Extension "X"		
Standard length for type 2G DIN 43772 (X=129 mm (5.08 inches))		1
Extension length "X" customer-specific Specify customer-specific length with Y45, see page 2/68 order codes		
75 ... 150 mm (2.95 ... 5.91 inches) Initial: 150 mm (5.91 inches)		9 N 1 D
151 ... 300 mm (5.95 ... 11.81 inches) Initial: 300 mm (11.81 inches)		9 N 2 D
301 ... 450 mm (11.85 ... 17.72 inches) Initial: 450 mm (17.72 inches)		9 N 3 D
Head		
Aluminum head, BAO, flange cap, standard		A
Aluminum head, BBO, spring flap low, screw closure		B
Aluminum head, BCO, spring flap high, screw closure		C
Aluminum head, AGO, screw cover, Ex d suitable ¹⁾		G
Aluminum head, AHO, screw cover, Ex d suitable, display ¹⁾		H
Plastic head, BMO, screw cover		M
Plastic head, BPO, spring flap high, screw closure		P
Stainless steel head, AUO, screw cover, Ex d suitable ¹⁾		U
Stainless steel head, AVO, screw cover, Ex d suitable, display ¹⁾		V
Sensor²⁾		
Note: The accuracy class range can be lower than the measuring range. For more detailed information, see "Configuration"/"Measuring technology: Measuring accuracy"		
Pt100, basic version, -50 ... +400 °C (-58 ... +752 °F)		A
Pt100, vibration-resistant, -50 ... +400 °C (-58 ... +752 °F)		B
Pt100, extended measuring range, -196 ... +600 °C (-320.8 ... +1 112 °F)		C
Type K thermocouple, -270 ... +1 100 °C (-167 ... +2 012 °F)		K
Type J thermocouple, -0 ... +750 °C (-18 ... +1 382 °F)		J
Type N thermocouple, -270 ... +1 100 °C (-167 ... +2 012 °F)		N
Number/precision of sensors		
Pt100 connection: 1 × 4-wire connection or 2 × 3-wire connection, see "Configuration"/"Measuring technology: Connection types"		
Single, basic accuracy (Class 2/Class B)		1
Single, increased accuracy (Class 1/Class A)		2

Temperature Measurement

Temperature sensors

SITRANS TS500 / Tubular thermowells / Type 2G, screwed design

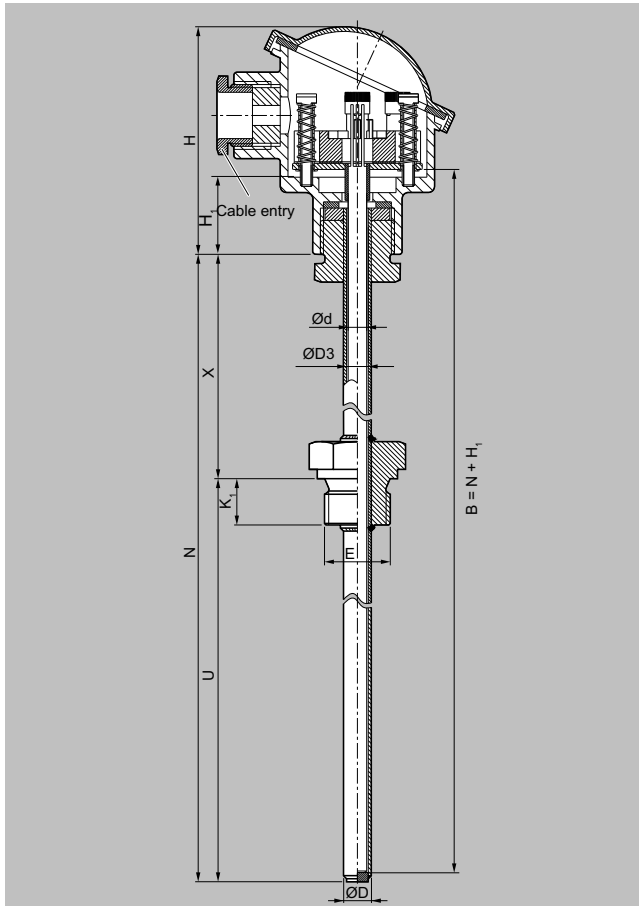
Selection and ordering data (continued)

Options	Order code
Add "-Z" to article number and specify order code	
Without explosion protection requirements (China)	E54
Intrinsic safety "i"/"IS" ¹⁾ according to NEPSI (China)	E55
Flameproof enclosure "d"; dust protection through enclosure "t" ²⁾ according to NEPSI (China)	E56
Non-sparking "nA"/"NI" according to NEPSI (China)	E57
Without explosion protection requirements (EAC)	E80
Intrinsic safety "i"/"IS" ¹⁾ according to EACEx (EAC)	E81
Flameproof enclosure "d"/"XP"; dust protection through enclosure "t"/"DIP" ²⁾ according to EACEx (EAC)	E82
Non-sparking "nA"/"NI" according to EACEx (EAC)	E83
Special design	
Flying lead connection type (for direct transmitter mounting, delivery without screws or springs)	G01
Cable input for connection head	
M12 device plug (in combination with transmitter, non-Ex and intrinsically safe, max. IP65/67)	G12
Han 7 D device plug (non-Ex and intrinsically safe, without mating connector max. IP65/67)	G13
Connection head with 1/2"-NPT thread without cable gland, for AU0 and AHO only IP66	G20
SafeGuard 2 × Pt100 4-wire	G30
Built-in head transmitter	
Measuring range to be set must be specified with plain text data "Y01".	
SITRANS TH100, input 1 × Pt100, 4 ... 20 mA	T12
SITRANS TH320, input 1 × universal, 4 ... 20 mA	T24
SITRANS TH320, input 1 × universal, HART	T34
SITRANS TH420, input 2 × universal, HART	T35
Device settings (including head transmitter options)	
Tag plate made of stainless steel, specify label in plain text	Y15
Factory calibration per 1 point, specify temperature in plain text	Y33
Specify measuring range in plain text (Y01: +/-NNNN ... +/-NNNN C,F), marking on the device when option "Y15" is selected in addition	Y01
Specify measuring point description in plain text (max. 16 characters)	Y23
Specify measuring point message in plain text (max. 32 characters)	Y24
Specify bus address in plain text	Y25
Installation length U customer-specific Select range, plain text specification of desired length (no specification = standard length)	Y44
Customer-specific plain text	
Handling number of the special design	Y99

¹⁾ Select Ex i version of the optional transmitter.

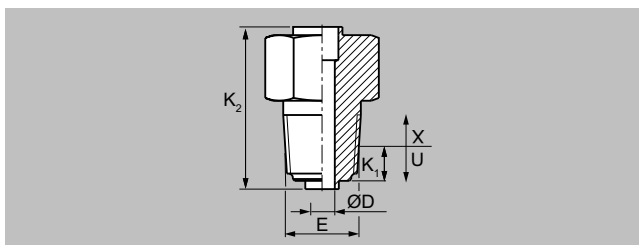
²⁾ Only with connection heads code AG0, AHO, AU0, AV0, without cable gland (select non-Ex version of the optional transmitter).

Dimensional drawings



- B Measuring insert length
- Ød Measuring insert outer, diameter (6 (0.24))
- ØD Process connection, outer diameter
- ØD3 Thermowell internal diameter
- E Process connection, thread size
- H Head height
- H₁ Type Axx = 41 (1.61)
Type Bxx = 26 (1.02)
- K₁ Screw depth
- N Nominal length
- U Insertion length
- X Extension length, floor strength 3 mm

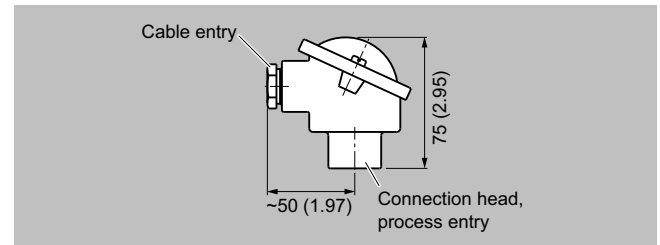
SITRANS TS500, temperature sensors for vessels and pipes, tubular thermowell for low to medium stress, according to DIN 43772, type 2G, screwed design, with extension, for screw-in depth dimensions, see "Technical reference", "Thread shapes" page, dimensions in mm (inch).



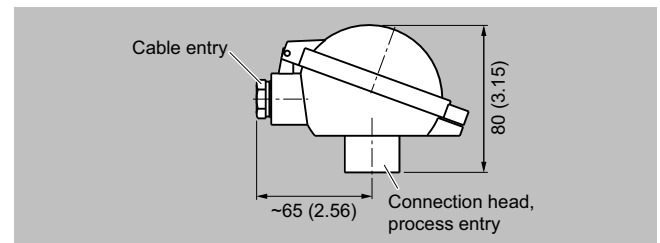
Process connection tapered, dimensions in mm (inch)

Dimensional drawings (continued)

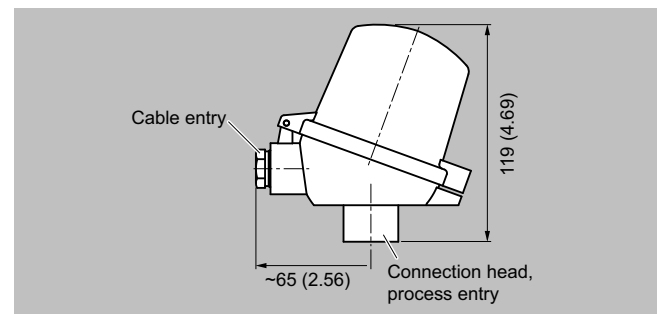
Connection heads



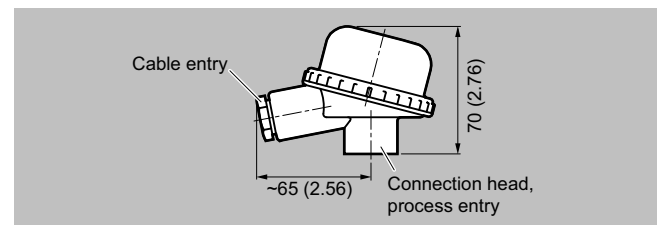
Connection head, aluminum, type BA0, dimensions in mm (inch)



Connection head, aluminum, type BB0, dimensions in mm (inch)



Connection head, aluminum, type BC0, plastic, type BP0, dimensions in mm (inch)



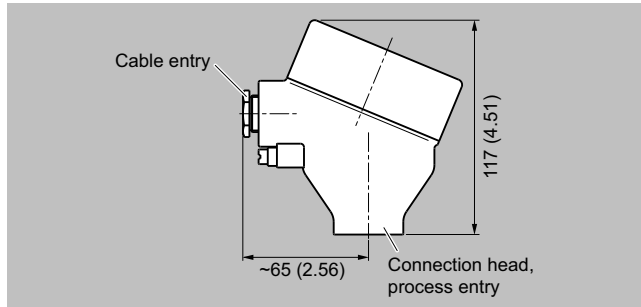
Connection head, plastic, type BM0, dimensions in mm (inch)

Temperature Measurement

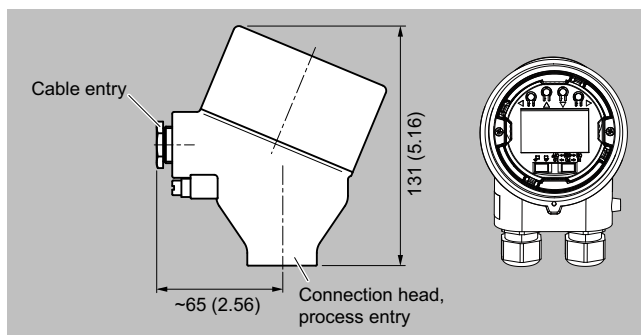
Temperature sensors

SITRANS TS500 / Tubular thermowells / Type 2G, screwed design

Dimensional drawings (continued)



Connection head, aluminum, type AG0, stainless steel, type AU0, dimensions in mm (inch)



Connection head with 4-20 mA display, aluminum, type AH0, stainless steel, type AVO, dimensions in mm (inch)

Selection and ordering data

	Article No. 7MC751	Order code
SITRANS TS500		
Tubular thermowell for low to medium stress, according to DIN 43772, Type 2F, with flange, with extension	● - ● ● ● ● ● - ● ● ● ● ● ● ● ●	
Click the article number for online configuration in the PIA Life Cycle Portal.		
Wetted material		
316Ti (1.4571)	1	
316L (1.4404 or 1.4435)	2	
Process connection		
Flange EN; DN 25 PN10 ... 40 B1	2	A
Flange EN; DN 40 PN 40 B1	2	B
Flange EN; DN 50 PN 40 B1	2	C
Flange ASME; 1.0" RF 150	2	E
Flange ASME; 1.0" RF 300	2	F
Flange ASME; 1.5" RF 150	2	G
Flange ASME; 1.5" RF 300	2	H
Flange ASME; 2.0" RF 150	2	J
Flange ASME; 2.0" RF 300	2	K
Flange ASME; 1.0" RF 600	2	L
Flange ASME; 1.5" RF 600	2	N
Flange ASME; 1.5" RF 900	2	R
Flange ASME; 2.0" RF 600	2	S
Flange ASME; 2.0" RF 900	2	T
Flange EN; DN 32 PN 40 B1	4	A
Flange EN; DN 40 PN 100 B1	4	B
Flange EN; DN 50 PN 16 B1	4	C
Flange EN; DN 80 PN 16 B1	4	D
Flange EN; DN 100 PN 16 B1	4	E
Thermowell form		
2G, 9 mm (0.35 inches)		A
2G, 12 mm (0.47 inches)		B
Standard installation length "U"		
225 mm (8.86 inches)		1 1
315 mm (12.40 inches)		1 5
465 mm (18.31 inches)		2 6
Installation length "U" customer-specific		
Specify customer-specific length with Y44, see order codes		
80 ... 100 mm (3.15 ... 3.94 inches) Initial: 100 mm (3.94 inches)		0 1
101 ... 120 mm (3.98 ... 4.72 inches) Initial: 120 mm (4.72 inches)		0 2
121 ... 140 mm (4.76 ... 5.51 inches) Initial: 140 mm (5.51 inches)		0 3
141 ... 160 mm (5.55 ... 6.30 inches) Initial: 160 mm (6.3 inches)		0 4
161 ... 180 mm (6.34 ... 7.09 inches) Initial: 180 mm (7.09 inches)		0 5
181 ... 200 mm (7.13 ... 7.87 inches) Initial: 200 mm (7.87 inches)		0 6
201 ... 220 mm (7.91 ... 8.66 inches) Initial: 220 mm (8.66 inches)		0 7
221 ... 240 mm (8.70 ... 9.45 inches) Initial: 225 mm (8.86 inches)		1 1
241 ... 260 mm (9.49 ... 10.24 inches) Initial: 250 mm (9.84 inches)		1 2
261 ... 280 mm (10.28 ... 11.02 inches) Initial: 280 mm (11.02 inches)		1 3
281 ... 300 mm (11.06 ... 11.81 inches) Initial: 285 mm (11.22 inches)		1 4
301 ... 320 mm (11.85 ... 12.6 inches) Initial: 315 mm (12.4 inches)		1 5
321 ... 340 mm (12.64 ... 13.39 inches) Initial: 340 mm (13.39 inches)		1 6
341 ... 360 mm (13.43 ... 14.17 inches) Initial: 360 mm (14.17 inches)		2 0

Temperature Measurement

Temperature sensors

SITRANS TS500 / Tubular thermowells / Type 2F, flange

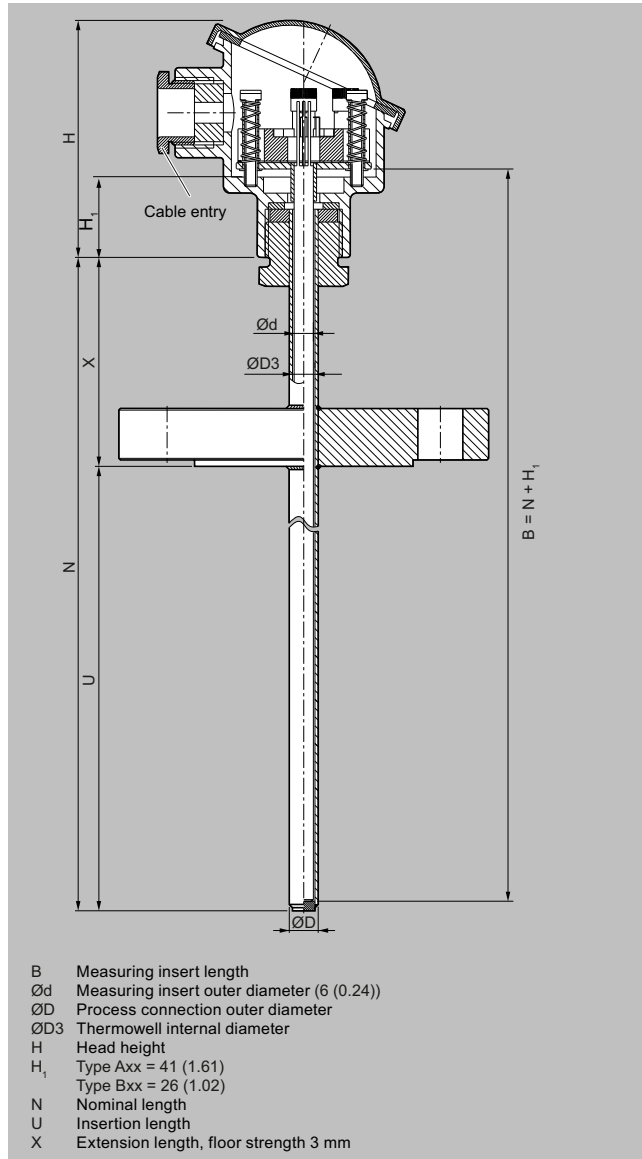
Selection and ordering data (continued)

Options	Order code
Add "-Z" to article number and specify order code.	
Flameproof enclosure "d"/"XP"; dust protection through enclosure "t"/"DIP ²) according to cFMus (USA, Canada); other connections (M,G,R)	E14
Non-sparking "nA"/"NI" according to cFMus (USA, Canada)	E16
Without explosion protection requirements (USA, Canada), Basis CSA	E17
Intrinsic safety "i"/"IS ¹) according to cCSAus (USA, Canada)	E18
Flameproof enclosure "d"/"XP"; dust protection through enclosure "t"/"DIP ²) according to CSAus (USA); other connections (M, G, R)	E21
Non-sparking "nA"/"NI" according to cCSAus (USA, Canada)	E23
Without explosion protection requirements (China)	E54
Intrinsic safety "i"/"IS ¹) according to NEPSI (China)	E55
Flameproof enclosure "d"; dust protection through enclosure "t ²) according to NEPSI (China)	E56
Non-sparking "nA"/"NI" according to NEPSI (China)	E57
Without explosion protection requirements (EAC)	E80
Intrinsic safety "i"/"IS ¹) according to EACEx (EAC)	E81
Flameproof enclosure "d"/"XP"; dust protection through enclosure "t"/"DIP ²) according to EACEx (EAC)	E82
Non-sparking "nA"/"NI" according to EACEx (EAC)	E83
Special design	
Flying lead connection type (for direct transmitter mounting, delivery without screws or springs)	G01
Cable input for connection head	
M12 device plug (in combination with transmitter, non-Ex and intrinsically safe, max. IP65/67)	G12
Han 7 D device plug (non-Ex and intrinsically safe, without mating connector max. IP65/67)	G13
Connection head with ½" NPT thread without cable gland, for AU0 and AHO only IP66	G20
SafeGuard 2 × Pt100 4-wire	G30
Built-in head transmitter	
Measuring range to be set must be specified with plain text data "Y01".	
SITRANS TH100, input 1 × Pt100, 4 ... 20 mA	T12
SITRANS TH320, input 1 × universal, 4 ... 20 mA	T24
SITRANS TH320, input 1 × universal, HART	T34
SITRANS TH420, input 2 × universal, HART	T35
Device settings (including head transmitter options)	
Tag plate made of stainless steel, specify label in plain text	Y15
Factory calibration per 1 point, specify temperature in plain text	Y33
Specify measuring range in plain text (Y01:+/-NNNN ... +/-NNNN C,F), marking on the device when option "Y15" is selected in addition	Y01
Specify measuring point description in plain text (max. 16 characters)	Y23
Specify measuring point message in plain text (max. 32 characters)	Y24
Specify bus address in plain text	Y25
Installation length U customer-specific	Y44
Select range, plain text specification of desired length (no specification = standard length)	
Extension length X customer-specific	Y45
Select range, plain text specification of desired length (no specification = standard length)	
Customer-specific plain text	
Handling number of the special design	Y99

Selection and ordering data (continued)

- 1) Select Ex i version of the optional transmitter.
- 2) Only with connection heads code AG0, AH0, AU0, AV0, without cable gland (select non-Ex version of the optional transmitter).

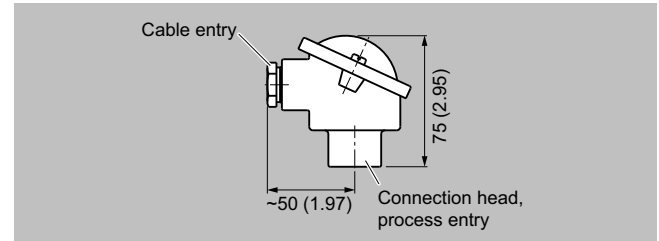
Dimensional drawings



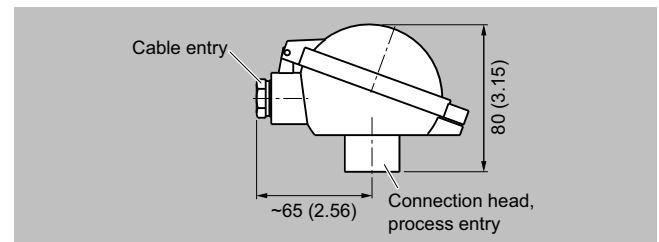
SITRANS TS500, temperature sensors for vessels and pipes, tubular thermowell for low to medium stress, according to DIN 43772, type 2F, with flange, with extension, dimensions in mm (inch)

Dimensional drawings (continued)

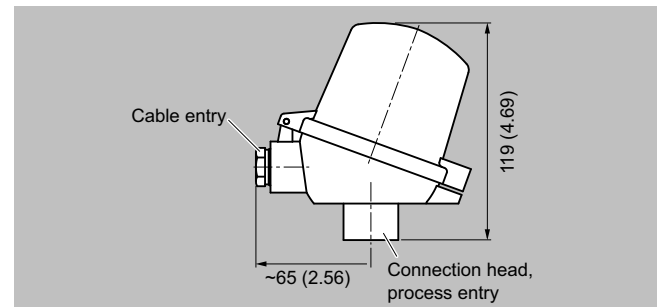
Connection heads



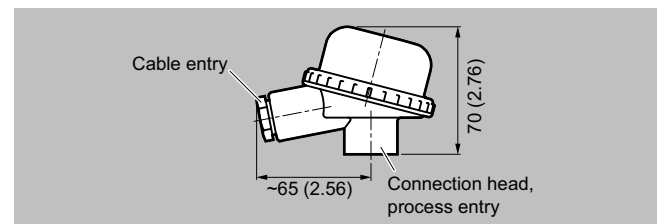
Connection head, aluminum, type BA0, dimensions in mm (inch)



Connection head, aluminum, type BB0, dimensions in mm (inch)



Connection head, aluminum, type BC0, plastic, type BP0, dimensions in mm (inch)



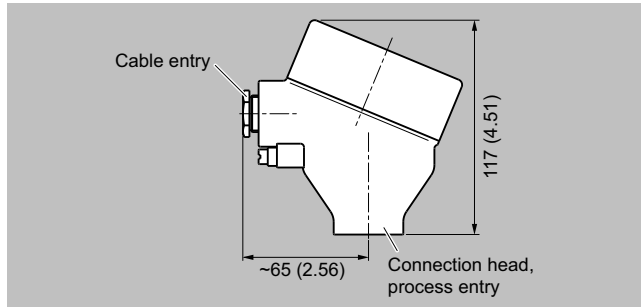
Connection head, plastic, type BM0, dimensions in mm (inch)

Temperature Measurement

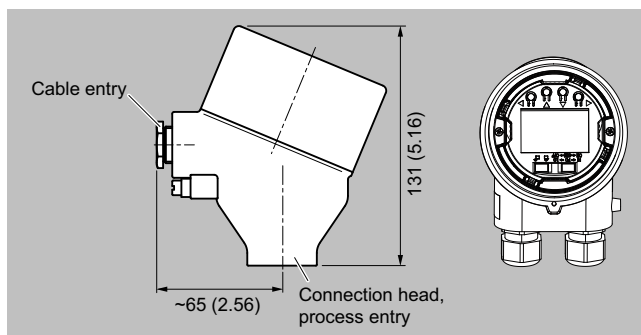
Temperature sensors

SITRANS TS500 / Tubular thermowells / Type 2F, flange

Dimensional drawings (continued)



Connection head, aluminum, type AG0, stainless steel, type AU0, dimensions in mm (inch)



Connection head with 4-20 mA display, aluminum, type AH0, stainless steel, type AV0, dimensions in mm (inch)

Selection and ordering data

SITRANS TS500	Article No.
Tubular thermowell for low to medium stress, according to DIN 43772, Type 3, without process connection, improved response time, plug-in or for use with sliding compression fittings	7MC751 ● - ● ● ● ● ● - ● ● ● ●
Click the article number for online configuration in the PIA Life Cycle Portal.	
Wetted material	
316Ti (1.4571)	1
316L (1.4404 or 1.4435)	2
Process connection	
Without process connection (for compression fittings) U = N	0 N
Thermowell form	
3. 12/9 mm (0.47/0.35 inches)	K
Installation length "U" (= N), standard	
160 mm (6.3 inches)	0 4
220 mm (8.66 inches)	0 7
280 mm (11.02 inches)	1 3
Installation length "U" customer-specific	
Specify customer-specific length with Y44, see order codes	
121 ... 140 mm (4.76 ... 5.51 inches) Initial: 140 mm (5.51 inches)	0 3
141 ... 160 mm (5.55 ... 6.30 inches) Initial: 160 mm (6.3 inches)	0 4
161 ... 180 mm (6.34 ... 7.09 inches) Initial: 180 mm (7.09 inches)	0 5
181 ... 200 mm (7.13 ... 7.87 inches) Initial: 200 mm (7.87 inches)	0 6
201 ... 220 mm (7.91 ... 8.66 inches) Initial: 220 mm (8.66 inches)	0 7
221 ... 240 mm (8.70 ... 9.45 inches) Initial: 225 mm (8.86 inches)	1 1
241 ... 260 mm (9.49 ... 10.24 inches) Initial: 250 mm (9.84 inches)	1 2
261 ... 280 mm (10.28 ... 11.02 inches) Initial: 280 mm (11.02 inches)	1 3
281 ... 300 mm (11.06 ... 11.81 inches) Initial: 285 mm (11.22 inches)	1 4
301 ... 320 mm (11.85 ... 12.6 inches) Initial: 315 mm (12.4 inches)	1 5
321 ... 340 mm (12.64 ... 13.39 inches) Initial: 340 mm (13.39 inches)	1 6
341 ... 360 mm (13.43 ... 14.17 inches) Initial: 360 mm (14.17 inches)	2 0
361 ... 380 mm (14.21 ... 14.96 inches) Initial: 380 mm (14.96 inches)	2 1
381 ... 400 mm (15 ... 15.75 inches) Initial: 400 mm (15.75 inches)	2 2
401 ... 420 mm (15.79 ... 16.54 inches) Initial: 420 mm (16.54 inches)	2 3
421 ... 440 mm (16.57 ... 17.32 inches) Initial: 440 mm (17.32 inches)	2 4
441 ... 460 mm (17.36 ... 18.11 inches) Initial: 460 mm (18.11 inches)	2 5
461 ... 480 mm (18.15 ... 18.90 inches) Initial: 465 mm (18.30 inches)	2 6
481 ... 500 mm (18.94 ... 19.69 inches) Initial: 500 mm (19.69 inches)	2 7
501 ... 550 mm (19.72 ... 21.65 inches) Initial: 510 mm (20.08 inches)	3 1
551 ... 600 mm (21.69 ... 23.62 inches) Initial: 600 mm (23.62 inches)	3 2
601 ... 650 mm (23.66 ... 25.59 inches) Initial: 650 mm (25.59 inches)	3 3
651 ... 700 mm (25.63 ... 27.56 inches) Initial: 700 mm (27.56 inches)	3 4
701 ... 750 mm (27.6 ... 29.53 inches) Initial: 750 mm (29.53 inches)	3 5
751 ... 800 mm (29.57 ... 31.50 inches) Initial: 800 mm (31.50 inches)	3 6
801 ... 850 mm (31.5 ... 33.47 inches) Initial: 850 mm (33.47 inches)	3 7

Temperature Measurement

Temperature sensors

SITRANS TS500 / Tubular thermowells / Type 3, without process connection

Selection and ordering data (continued)

SITRANS TS500	Article No.
Tubular thermowell for low to medium stress, according to DIN 43772, Type 3, without process connection, improved response time, plug-in or for use with sliding compression fittings	7MC751 ● - ● ● ● ● - ● ● ● ●
851 ... 900 mm (33.5 ... 35.43 inches) Initial: 900 mm (35.43 inches)	4 1
901 ... 950 mm (35.47 ... 37.4 inches) Initial: 950 mm (37.4 inches)	4 2
951 ... 1 000 mm (37.44 ... 39.37 inches) Initial: 1 000 mm (39.37 inches)	4 3
1 001 ... 1 100 mm (39.4 ... 43.30 inches) Initial: 1 100 mm (43.30 inches)	4 4
Extension Standard length for type 2 according to DIN 43772 (without extension N = U)	0
Head Aluminum head, BAO, flange cap, standard	A
Aluminum head, BBO, spring flap low, screw closure	B
Aluminum head, BCO, spring flap high, screw closure	C
Aluminum head, AGO, screw cover, Ex d suitable ¹⁾	G
Aluminum head, AHO, screw cover, Ex d suitable, display ¹⁾	H
Plastic head, BMO, screw cover	M
Plastic head, BPO, spring flap high, screw closure	P
Stainless steel head, AUO, screw cover, Ex d suitable ¹⁾	U
Stainless steel head, AVO, screw cover, Ex d suitable, display ¹⁾	V
Sensor²⁾ Note: The accuracy class range can be lower than the measuring range. For more detailed information, see "Configuration"/"Measuring technology: Measuring accuracy"	
Pt100, basic version, -50 ... +400 °C (-58 ... +752 °F)	A
Pt100, vibration-resistant, -50 ... +400 °C (-58 ... +752 °F)	B
Pt100, extended measuring range, -196 ... +600 °C (-320.8 ... +1 112 °F)	C
Type K thermocouple, -270 ... +1 100 °C (-167 ... +2 012 °F)	K
Type J thermocouple, -0 ... +750 °C (-18 ... +1 382 °F)	J
Type N thermocouple, -270 ... +1 100 °C (-167 ... +2 012 °F)	N
Number/precision of sensors Pt100 connection: 1 × 4-wire connection or 2 × 3-wire connection, see "Configuration"/"Measuring technology: Connection types"	
Single, basic accuracy (Class 2/Class B)	1
Single, increased accuracy (Class 1/Class A)	2
Single, maximum accuracy (Class AA)	3
Double, basic accuracy (Class 2/Class B)	5
Double, increased accuracy (Class 1/Class A)	6
Double, maximum accuracy (Class AA)	7

¹⁾ Ex d in connection with order option E03

²⁾ Pt1000 versions are also available.

To find these, switch to Online Configuration in the PIA Life Cycle Portal: www.siemens.com/pia-portal

Options	Order code
Add "-Z" to article number and specify order code	
Accessories	
With external grounding screw for connection heads AGO, AHO, AUO and AVO	A02
With external grounding screw for connection heads BCO, AGO, AHO, AUO and AVO	A03
Compression fitting enclosed	
G½"	A31
NPT½"	A32
Certificates and approvals	
Transmitter test report (5 points)	C11
EN 10204-3.1 Inspection certificate Wetted material	C12
EN 10204-3.1 Inspection certificate Hydrostatic pressure test	C31
EN 10204-3.1 Inspection certificate Helium leak test	C32
EN 10204-3.1 Inspection certificate Surface tear test	C33

Selection and ordering data (continued)

Options	Order code
Add "-Z" to article number and specify order code	
EN 10204-3.1 Factory certificate Visual, dimensional and function check	C34
EN 10204-2.1: Declaration of compliance with the order	C35
ISO 9001 grease-free (cleaned for oxygen applications, for example)	C51
EN 10204-3.1 Inspection certificate "Positive Materials Identification" (PMI)	On request
Certificates for functional safety	
SITRANS TH320/420 transmitter with SIL2/3 certificate	C20
Marine approvals	
Det Norske Veritas Germanischer Lloyd (DNV GL)	D01
Type of protection (Ex)	
Without explosion protection requirements (Europe, Australia, New Zealand)	E00
Intrinsic safety "i"/"IS ¹ " according to ATEX and IECEx (Europe, Australia, New Zealand)	E01
Flameproof enclosure "d"/"XP"; dust protection through enclosure "t"/"DIP ² " according to ATEX and IECEx (Europe, Australia, New Zealand)	E03
Non-sparking "ec" according to ATEX and IECEx (Europe, Australia, New Zealand)	E04
Without explosion protection requirements (USA, Canada) Basis FM	E10
Flameproof enclosure "d"/"XP"; dust protection through enclosure "t"/"DIP ² " according to cFMus (USA, Canada); other connections (M,G,R)	E14
Non-sparking "nA"/"NI" according to cFMus (USA, Canada)	E16
Without explosion protection requirements (USA, Canada), Basis CSA	E17
Intrinsic safety "i"/"IS ¹ " according to cCSAus (USA, Canada)	E18
Flameproof enclosure "d"/"XP"; dust protection through enclosure "t"/"DIP ² " according to CSAus (USA); other connections (M, G, R)	E21
Non-sparking "nA"/"NI" according to cCSAus (USA, Canada)	E23
Without explosion protection requirements (China)	E54
Intrinsic safety "i"/"IS ¹ " according to NEPSI (China)	E55
Flameproof enclosure "d"; dust protection through enclosure "t ² " according to NEPSI (China)	E56
Non-sparking "nA"/"NI" according to NEPSI (China)	E57
Without explosion protection requirements (EAC)	E80
Intrinsic safety "i"/"IS ¹ " according to EACEx (EAC)	E81
Flameproof enclosure "d"/"XP"; dust protection through enclosure "t"/"DIP ² " according to EACEx (EAC)	E82
Non-sparking "nA"/"NI" according to EACEx (EAC)	E83
Special design	
Flying lead connection type (for direct transmitter mounting, delivery without screws or springs)	G01
Cable input for connection head	
M12 device plug (in combination with transmitter, non-Ex and intrinsically safe, max. IP65/67)	G12
Han 7 D device plug (non-Ex and intrinsically safe, without mating connector max. IP65/67)	G13
Connection head with 1/2"-NPT thread without cable gland, for AU0 and AHO only IP66	G20
SafeGuard 2 × Pt100 4-wire	G30
Built-in head transmitter	
Measuring range to be set must be specified with plain text data "Y01".	
SITRANS TH100, input 1 × Pt100, 4 ... 20 mA	T12

Temperature Measurement

Temperature sensors

SITRANS TS500 / Tubular thermowells / Type 3, without process connection

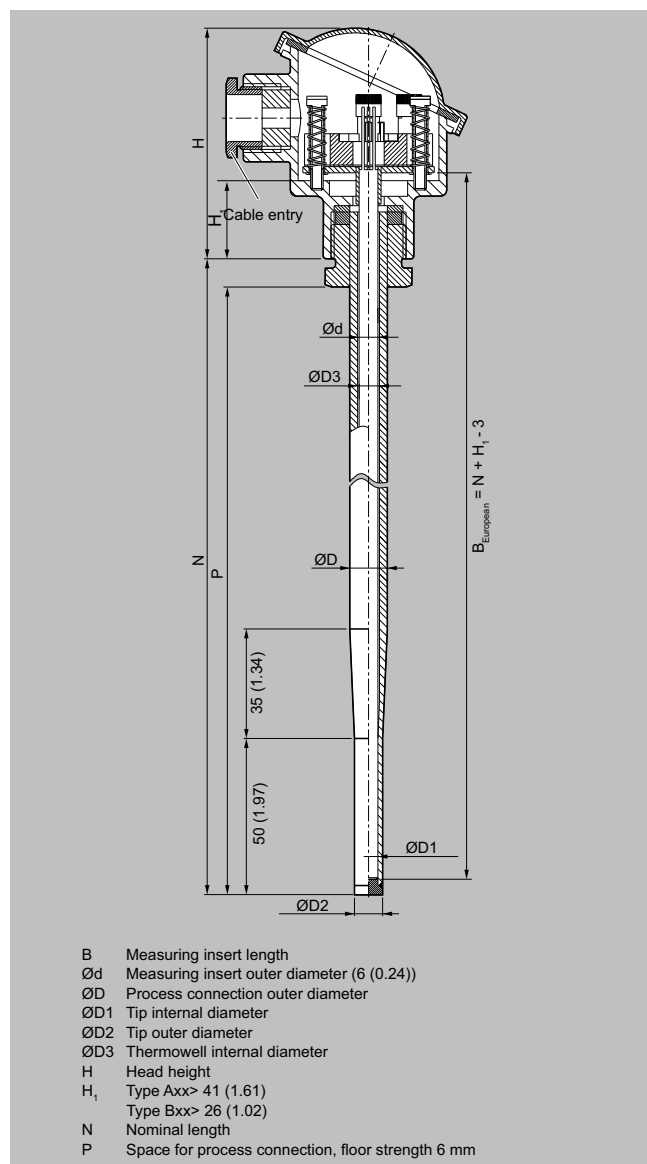
Selection and ordering data (continued)

Options	Order code
Add "-Z" to article number and specify order code	
SITRANS TH320, input 1 × universal, 4 ... 20 mA	T24
SITRANS TH320, input 1 × universal, HART	T34
SITRANS TH420, input 2 × universal, HART	T35
Device settings (including head transmitter options)	
Tag plate made of stainless steel, specify label in plain text	Y15
Factory calibration per 1 point, specify temperature in plain text	Y33
Specify measuring range in plain text (Y01:+/-NNNN ... +/-NNNN C,F), marking on the device when option "Y15" is selected in addition	Y01
Specify measuring point description in plain text (max. 16 characters)	Y23
Specify measuring point message in plain text (max. 32 characters)	Y24
Specify bus address in plain text	Y25
Installation length U customer-specific Select range, plain text specification of desired length (no specification = standard length)	Y44
Customer-specific plain text	
Handling number of the special design	Y99

1) Select Ex i version of the optional transmitter.

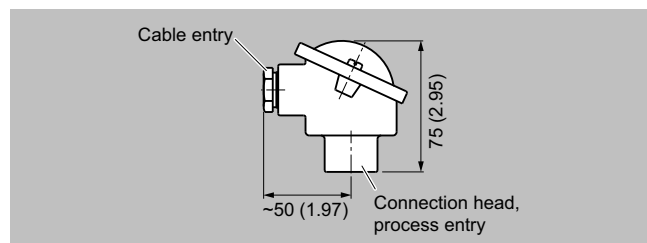
2) Only with connection heads code AG0, AH0, AU0, AV0, without cable gland (select non-Ex version of the optional transmitter).

Dimensional drawings



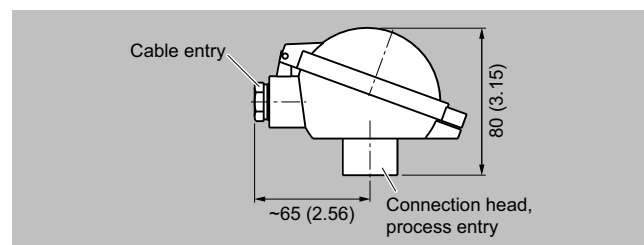
SITRANS TS500, temperature sensors for vessels and pipes, tubular thermowell for low to medium stress, without process connection, without extension, plug-in or for use with sliding compression fittings, dimensions in mm (inch)

Connection heads

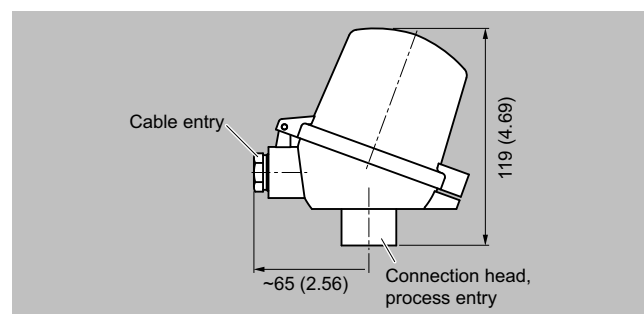


Connection head, aluminum, type BA0, dimensions in mm (inch)

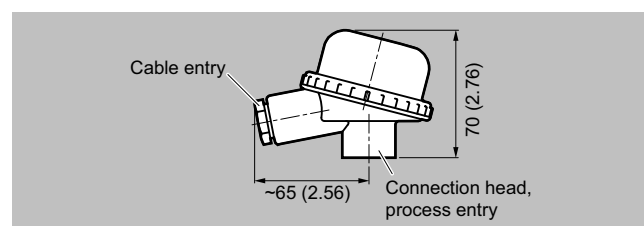
Dimensional drawings (continued)



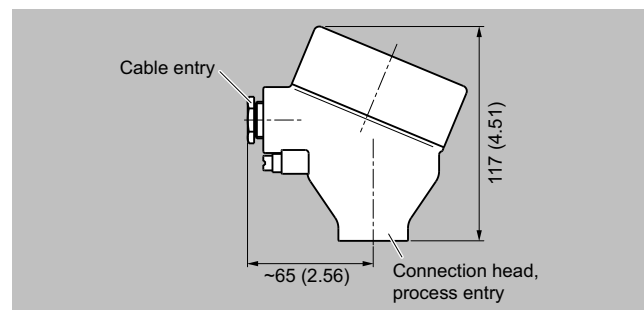
Connection head, aluminum, type BB0, dimensions in mm (inch)



Connection head, aluminum, type BC0, plastic, type BP0, dimensions in mm (inch)



Connection head, plastic, type BM0, dimensions in mm (inch)



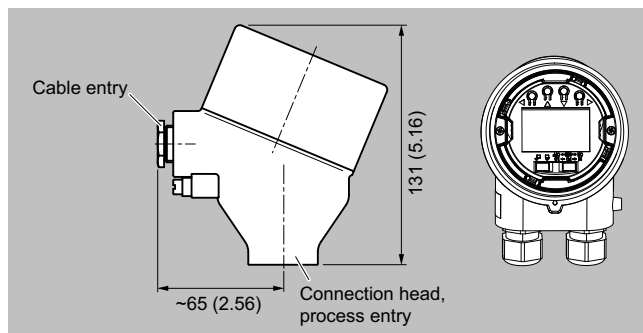
Connection head, aluminum, type AG0, stainless steel, type AU0, dimensions in mm (inch)

Temperature Measurement

Temperature sensors

SITRANS TS500 / Tubular thermowells / Type 3, without process connection

Dimensional drawings (continued)



Connection head with 4-20 mA display, aluminum, type AH0, stainless steel, type AV0, dimensions in mm (inch)

Selection and ordering data

	Article No. 7MC751	Order code
SITRANS TS500		
Tubular thermowell made of pipe material for low to medium stress, according to DIN 43772, Type 3G, screwed design, with extension	● - ● ● ● ● ● - ● ● ● ● ● ● ● ●	
Click the article number for online configuration in the PIA Life Cycle Portal.		
Wetted material		
316Ti (1.4571)	1	
316L (1.4404 or 1.4435)	2	
Process connection		
Cylindrical: G½" (½" BSPP)	1	C
Cylindrical: G¾" (¾" BSPP)	1	D
Tapered: NPT½"	1	J
Tapered: NPT¾"	1	K
Tapered: NPT1"	1	L
Cylindrical: M20 × 1.5	1	V
Cylindrical: M27 × 2.0	1	W
Cylindrical: M33 × 2.0	1	Y
Thermowell form		
3G, 12/9 mm (0.47/0.35 inches)		K
Standard installation length "U"		
160 mm (6.30 inches)		0 4
220 mm (8.66 inches)		0 7
280 mm (11.02 inches)		1 3
Installation length "U" customer-specific		
Specify customer-specific length with Y44, see page 2/83 order codes		
121 ... 140 mm (4.76 ... 5.51 inches) Initial: 140 mm (5.51 inches)		0 3
141 ... 160 mm (5.55 ... 6.30 inches) Initial: 160 mm (6.3 inches)		0 4
161 ... 180 mm (6.34 ... 7.09 inches) Initial: 180 mm (7.09 inches)		0 5
181 ... 200 mm (7.13 ... 7.87 inches) Initial: 200 mm (7.87 inches)		0 6
201 ... 220 mm (7.91 ... 8.66 inches) Initial: 220 mm (8.66 inches)		0 7
221 ... 240 mm (8.70 ... 9.45 inches) Initial: 225 mm (8.86 inches)		1 1
241 ... 260 mm (9.49 ... 10.24 inches) Initial: 250 mm (9.84 inches)		1 2
261 ... 280 mm (10.28 ... 11.02 inches) Initial: 280 mm (11.02 inches)		1 3
281 ... 300 mm (11.06 ... 11.81 inches) Initial: 285 mm (11.22 inches)		1 4
301 ... 320 mm (11.85 ... 12.6 inches) Initial: 315 mm (12.4 inches)		1 5
321 ... 340 mm (12.64 ... 13.39 inches) Initial: 340 mm (13.39 inches)		1 6
341 ... 360 mm (13.43 ... 14.17 inches) Initial: 360 mm (14.17 inches)		2 0
361 ... 380 mm (14.21 ... 14.96 inches) Initial: 380 mm (14.96 inches)		2 1
381 ... 400 mm (15 ... 15.75 inches) Initial: 400 mm (15.75 inches)		2 2
401 ... 420 mm (15.79 ... 16.54 inches) Initial: 420 mm (16.54 inches)		2 3
421 ... 440 mm (16.57 ... 17.32 inches) Initial: 440 mm (17.32 inches)		2 4
441 ... 460 mm (17.36 ... 18.11 inches) Initial: 460 mm (18.11 inches)		2 5
461 ... 480 mm (18.15 ... 18.90 inches) Initial: 465 mm (18.30 inches)		2 6
481 ... 500 mm (18.94 ... 19.69 inches) Initial: 500 mm (19.69 inches)		2 7
501 ... 550 mm (19.72 ... 21.65 inches) Initial: 510 mm (20.08 inches)		3 1

Selection and ordering data (continued)

Options	Order code
Add "-Z" to article number and specify order code	
Accessories	
With external grounding screw for connection heads AG0, AH0, AU0 and AV0	A02
With external grounding screw for connection heads BC0, AG0, AH0, AU0 and AV0	A03
Certificates and approvals	
Transmitter test report (5 points)	C11
EN 10204-3.1 Inspection certificate Wetted material	C12
EN 10204-3.1 Inspection certificate Hydrostatic pressure test	C31
EN 10204-3.1 Inspection certificate Helium leak test	C32
EN 10204-3.1 Inspection certificate Surface tear test	C33
EN 10204-3.1 Factory certificate Visual, dimensional and function check	C34
EN 10204-2.1: Declaration of compliance with the order	C35
ISO 9001 grease-free (cleaned for oxygen applications, for example)	C51
EN 10204-3.1 Inspection certificate "Positive Materials Identification" (PMI)	On request
Certificates for functional safety	
SITRANS TH320/420 transmitter with SIL2/3 certificate	C20
Marine approvals	
Det Norske Veritas Germanischer Lloyd (DNV GL)	D01
Type of protection (Ex)	
Without explosion protection requirements (Europe, Australia, New Zealand)	E00
Intrinsic safety "i"/"IS ¹ " according to ATEX and IECEx (Europe, Australia, New Zealand)	E01
Flameproof enclosure "d"/"XP"; dust protection through enclosure "t"/"DIP ² " according to ATEX and IECEx (Europe, Australia, New Zealand)	E03
Non-sparking "ec" according to ATEX and IECEx (Europe, Australia, New Zealand)	E04
Without explosion protection requirements (USA, Canada) Basis FM	E10
Flameproof enclosure "d"/"XP"; dust protection through enclosure "t"/"DIP ² " according to cFMus (USA, Canada); other connections (M,G,R)	E14
Non-sparking "nA"/"NI" according to cFMus (USA, Canada)	E16
Without explosion protection requirements (USA, Canada), Basis CSA	E17
Intrinsic safety "i"/"IS ¹ " according to cCSAus (USA, Canada)	E18
Flameproof enclosure "d"/"XP"; dust protection through enclosure "t"/"DIP ² " according to CSAus (USA); other connections (M, G, R)	E21
Non-sparking "nA"/"NI" according to cCSAus (USA, Canada)	E23
Without explosion protection requirements (China)	E54
Intrinsic safety "i"/"IS ¹ " according to NEPSI (China)	E55
Flameproof enclosure "d"; dust protection through enclosure "t ² " according to NEPSI (China)	E56
Non-sparking "nA"/"NI" according to NEPSI (China)	E57
Without explosion protection requirements (EAC)	E80
Intrinsic safety "i"/"IS ¹ " according to EACEx (EAC)	E81
Flameproof enclosure "d"/"XP"; dust protection through enclosure "t"/"DIP ² " according to EACEx (EAC)	E82
Non-sparking "nA"/"NI" according to EACEx (EAC)	E83
Special design	
Flying lead connection type (for direct transmitter mounting, delivery without screws or springs)	G01

Temperature Measurement

Temperature sensors

SITRANS TS500 / Tubular thermowells / Type 3G, screwed design

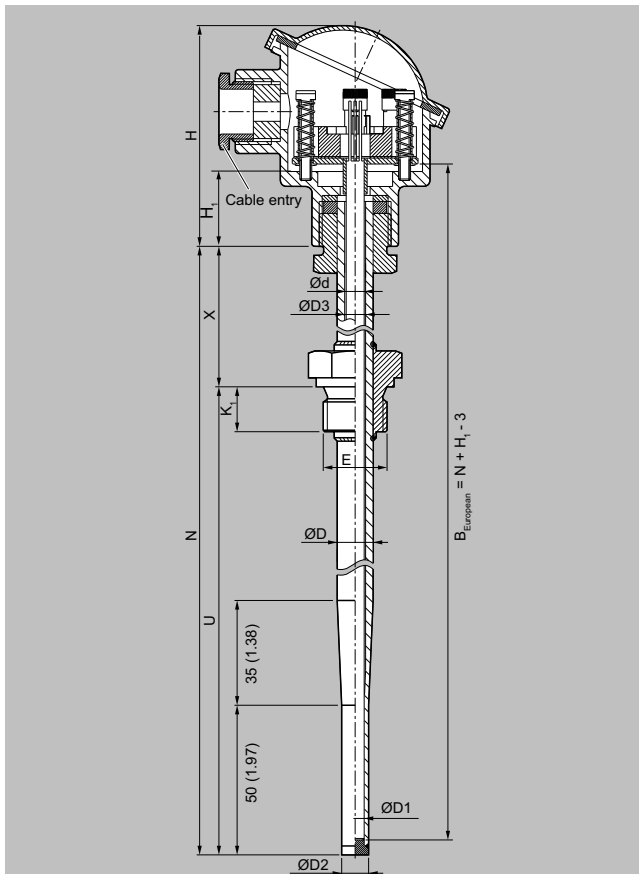
Selection and ordering data (continued)

Options	Order code
Add "-Z" to article number and specify order code	
Cable input for connection head	
M12 device plug (in combination with transmitter, non-Ex and intrinsically safe, max. IP65/67)	G12
Han 7 D device plug (non-Ex and intrinsically safe, without mating connector max. IP65/67)	G13
Connection head with ½"-NPT thread without cable gland, for AU0 and AH0 only IP66	G20
SafeGuard 2 × Pt100 4-wire	G30
Built-in head transmitter	
Measuring range to be set must be specified with plain text data "Y01".	
SITRANS TH100, input 1 × Pt100, 4 ... 20 mA	T12
SITRANS TH320, input 1 × universal, 4 ... 20 mA	T24
SITRANS TH320, input 1 × universal, HART	T34
SITRANS TH420, input 2 × universal, HART	T35
Device settings (including head transmitter options)	
Tag plate made of stainless steel, specify label in plain text	Y15
Factory calibration per 1 point, specify temperature in plain text	Y33
Specify measuring range in plain text (Y01: +/-NNNN ... +/-NNNN C,F), marking on the device when option "Y15" is selected in addition	Y01
Specify measuring point description in plain text (max. 16 characters)	Y23
Specify measuring point message in plain text (max. 32 characters)	Y24
Specify bus address in plain text	Y25
Installation length U customer-specific Select range, plain text specification of desired length (no specification = standard length)	Y44
Extension length X customer-specific Select range, plain text specification of desired length (no specification = standard length)	Y45
Customer-specific plain text	
Handling number of the special design	Y99

¹⁾ Select Ex i version of the optional transmitter.

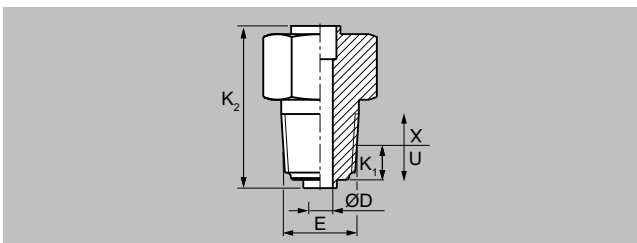
²⁾ Only with connection heads code AG0, AH0, AU0, AV0, without cable gland (select non-Ex version of the optional transmitter).

Dimensional drawings



- B Measuring insert length
- Ød Measuring insert outer diameter (6 (0.24))
- ØD Process connection outer diameter
- ØD1 Tip internal diameter
- ØD2 Tip outer diameter
- ØD3 Thermowell internal diameter
- E Process connection, thread size
- H Head height
- H₁ Type Axx = 41 (1.61)
Type Bxx = 26 (1.02)
- K₁ Screw depth
- N Nominal length
- U Insertion length
- X Extension length, floor strength 6 mm

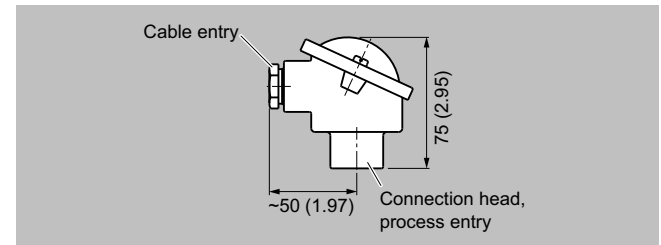
SITRANS TS500, temperature sensors for vessels and pipes, tubular thermowell for low to medium stress, according to DIN 43772, type 3G, screwed design, without process connection, with extension, for screw-in depth dimensions, see "Technical reference", "Thread shapes" page, dimensions in mm (inch).



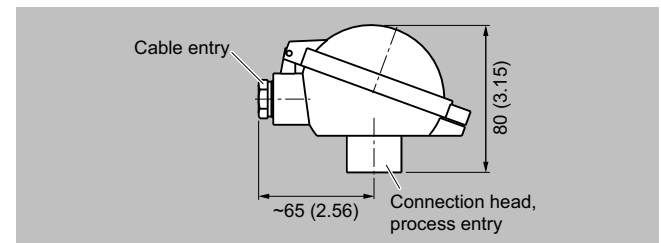
Process connection tapered, dimensions in mm (inch)

Dimensional drawings (continued)

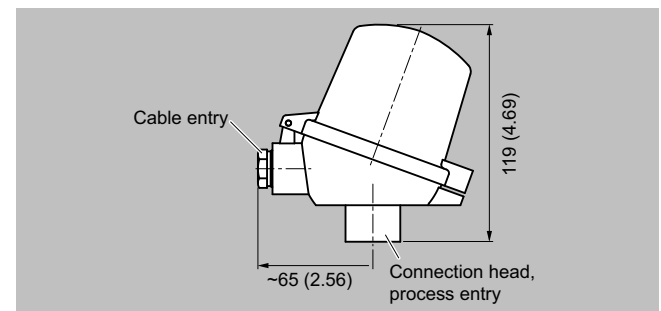
Connection heads



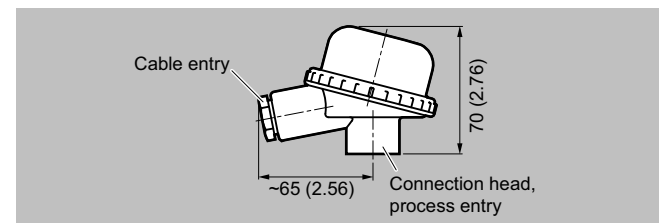
Connection head, aluminum, type BA0, dimensions in mm (inch)



Connection head, aluminum, type BB0, dimensions in mm (inch)



Connection head, aluminum, type BC0, plastic, type BP0, dimensions in mm (inch)



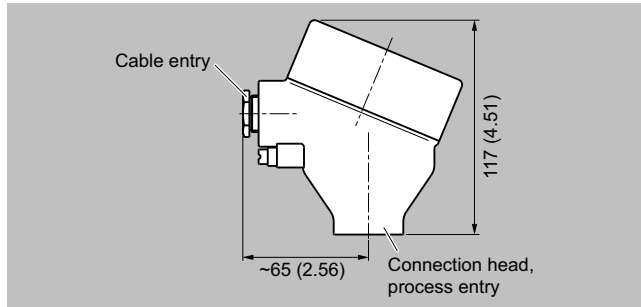
Connection head, plastic, type BM0, dimensions in mm (inch)

Temperature Measurement

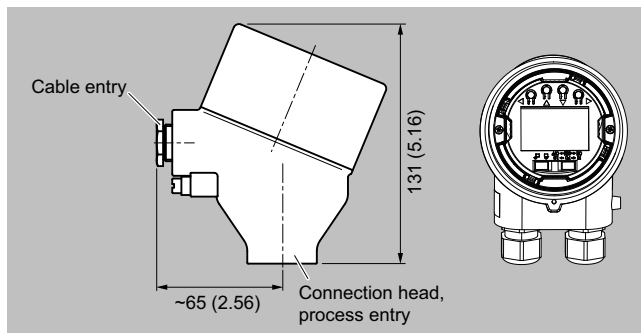
Temperature sensors

SITRANS TS500 / Tubular thermowells / Type 3G, screwed design

Dimensional drawings (continued)



Connection head, aluminum, type AG0, stainless steel, type AU0, dimensions in mm (inch)



Connection head with 4-20 mA display, aluminum, type AH0, stainless steel, type AVO, dimensions in mm (inch)

Selection and ordering data

	Article No. 7MC751	Order code
SITRANS TS500 Tubular thermowell for low to medium stress, according to DIN 43772, Type 3F, with flange, with extension	● - ● ● ● ● ● - ● ● ● ● ● ● ● ●	
Click the article number for online configuration in the PIA Life Cycle Portal.		
Wetted material		
316Ti (1.4571)	1	
316L (1.4404 or 1.4435)	2	
Process connection		
Flange EN; DN 25 PN10 ... 40 B1	2	A
Flange EN; DN 40 PN 40 B1	2	B
Flange EN; DN 50 PN 40 B1	2	C
Flange ASME; 1.0" RF 150	2	E
Flange ASME; 1.0" RF 300	2	F
Flange ASME; 1.5" RF 150	2	G
Flange ASME; 1.5" RF 300	2	H
Flange ASME; 2.0" RF 150	2	J
Flange ASME; 2.0" RF 300	2	K
Flange ASME; 1.0" RF 600	2	L
Flange ASME; 1.5" RF 600	2	N
Flange ASME; 1.5" RF 900	2	R
Flange ASME; 2.0" RF 600	2	S
Flange ASME; 2.0" RF 900	2	T
Flange EN; DN 32 PN 40 B1	4	A
Flange EN; DN 40 PN 100 B1	4	B
Flange EN; DN 50 PN 16 B1	4	C
Flange EN; DN 80 PN 16 B1	4	D
Flange EN; DN 100 PN 16 B1	4	E
Thermowell form		
3F; 12/9 mm (0.47/0.35 inches)		K
Standard installation length "U"		
225 mm (8.86 inches)		1 1
285 mm (11.22 inches)		1 4
345 mm (13.58 inches)		1 7
Installation length "U" customer-specific Specify customer-specific length with Y44, see order codes		
121 ... 140 mm (4.76 ... 5.51 inches) Initial: 140 mm (5.51 inches)		0 3
141 ... 160 mm (5.55 ... 6.30 inches) Initial: 160 mm (6.3 inches)		0 4
161 ... 180 mm (6.34 ... 7.09 inches) Initial: 180 mm (7.09 inches)		0 5
181 ... 200 mm (7.13 ... 7.87 inches) Initial: 200 mm (7.87 inches)		0 6
201 ... 220 mm (7.91 ... 8.66 inches) Initial: 220 mm (8.66 inches)		0 7
221 ... 240 mm (8.70 ... 9.45 inches) Initial: 225 mm (8.86 inches)		1 1
241 ... 260 mm (9.49 ... 10.24 inches) Initial: 250 mm (9.84 inches)		1 2
261 ... 280 mm (10.28 ... 11.02 inches) Initial: 280 mm (11.02 inches)		1 3
281 ... 300 mm (11.06 ... 11.81 inches) Initial: 285 mm (11.22 inches)		1 4
301 ... 320 mm (11.85 ... 12.6 inches) Initial: 315 mm (12.4 inches)		1 5
321 ... 340 mm (12.64 ... 13.39 inches) Initial: 340 mm (13.39 inches)		1 6
341 ... 360 mm (13.43 ... 14.17 inches) Initial: 345 mm (13.58 inches)		1 7
361 ... 380 mm (14.21 ... 14.96 inches) Initial: 380 mm (14.96 inches)		2 1
381 ... 400 mm (15 ... 15.75 inches) Initial: 400 mm (15.75 inches)		2 2

Selection and ordering data (continued)

	Article No. 7MC751	Order code
SITRANS TS500 Tubular thermowell for low to medium stress, according to DIN 43772, Type 3F, with flange, with extension	● - ● ● ● ● ● - ● ● ● ● ● ● ● ●	
Single, maximum accuracy (Class AA)		3
Double, basic accuracy (Class 2/Class B)		5
Double, increased accuracy (Class 1/Class A)		6
Double, maximum accuracy (Class AA)		7

1) Ex d in connection with order option E03

2) Pt1000 versions are also available.

To find these, switch to Online Configuration in the PIA Life Cycle Portal: www.siemens.com/pia-portal

Options	Order code
Add "-Z" to article number and specify order code	
Accessories	
With external grounding screw for connection heads AG0, AHO, AU0 and AV0	A02
With external grounding screw for connection heads BC0, AG0, AHO, AU0 and AV0	A03
Certificates and approvals	
Transmitter test report (5 points)	C11
EN 10204-3.1 Inspection certificate Wetted material	C12
EN 10204-3.1 Inspection certificate Hydrostatic pressure test	C31
EN 10204-3.1 Inspection certificate Helium leak test	C32
EN 10204-3.1 Inspection certificate Surface tear test	C33
EN 10204-3.1 Factory certificate Visual, dimensional and function check	C34
EN 10204-2.1: Declaration of compliance with the order	C35
ISO 9001 grease-free (cleaned for oxygen applications, for example)	C51
EN 10204-3.1 Inspection certificate "Positive Materials Identification" (PMI)	On request
Certificates for functional safety	
SITRANS TH320/420 transmitter with SIL2/3 certificate	C20
Marine approvals	
Det Norske Veritas Germanischer Lloyd (DNV GL)	D01
Type of protection (Ex)	
Without explosion protection requirements (Europe, Australia, New Zealand)	E00
Intrinsic safety "i"/"IS ¹⁾ " according to ATEX and IECEx (Europe, Australia, New Zealand)	E01
Flameproof enclosure "d"/"XP"; dust protection through enclosure "t"/"DIP ²⁾ " according to ATEX and IECEx (Europe, Australia, New Zealand)	E03
Non-sparking "ec" according to ATEX and IECEx (Europe, Australia, New Zealand)	E04
Without explosion protection requirements (USA, Canada) Basis FM	E10
Flameproof enclosure "d"/"XP"; dust protection through enclosure "t"/"DIP ²⁾ " according to cFMus (USA, Canada); other connections (M,G,R)	E14
Non-sparking "nA"/"NI" according to cFMus (USA, Canada)	E16
Without explosion protection requirements (USA, Canada), Basis CSA	E17
Intrinsic safety "i"/"IS ¹⁾ " according to cCSAus (USA, Canada)	E18
Flameproof enclosure "d"/"XP"; dust protection through enclosure "t"/"DIP ²⁾ " according to CSAus (USA); other connections (M, G, R)	E21
Non-sparking "nA"/"NI" according to cCSAus (USA, Canada)	E23

Temperature Measurement

Temperature sensors

SITRANS TS500 / Tubular thermowells / Type 3F, flange

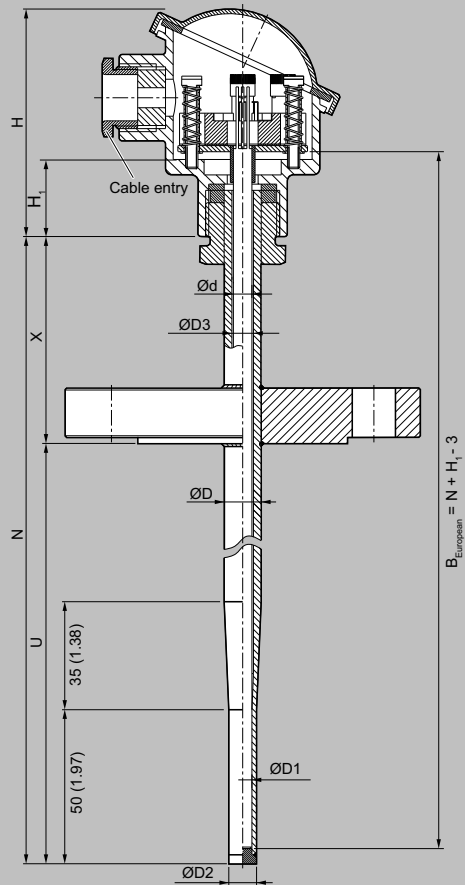
Selection and ordering data (continued)

Options	Order code
Add "-Z" to article number and specify order code	
Without explosion protection requirements (China)	E54
Intrinsic safety "i"/"IS" ¹⁾ according to NEPSI (China)	E55
Flameproof enclosure "d"; dust protection through enclosure "t" ²⁾ according to NEPSI (China)	E56
Non-sparking "nA"/"NI" according to NEPSI (China)	E57
Without explosion protection requirements (EAC)	E80
Intrinsic safety "i"/"IS" ¹⁾ according to EACEx (EAC)	E81
Flameproof enclosure "d"/"XP"; dust protection through enclosure "t"/"DIP" ²⁾ according to EACEx (EAC)	E82
Non-sparking "nA"/"NI" according to EACEx (EAC)	E83
Special design	
Flying lead connection type (for direct transmitter mounting, delivery without screws or springs)	G01
Cable input for connection head	
M12 device plug (in combination with transmitter, non-Ex and intrinsically safe, max. IP65/67)	G12
Han 7 D device plug (non-Ex and intrinsically safe, without mating connector max. IP65/67)	G13
Connection head with ½"-NPT thread without cable gland, for AU0 and AHO only IP66	G20
SafeGuard 2 × Pt100 4-wire	G30
Built-in head transmitter	
Measuring range to be set must be specified with plain text data "Y01".	
SITRANS TH100, input 1 × Pt100, 4 ... 20 mA	T12
SITRANS TH320, input 1 × universal, 4 ... 20 mA	T24
SITRANS TH320, input 1 × universal, HART	T34
SITRANS TH420, input 2 × universal, HART	T35
Device settings (including head transmitter options)	
Tag plate made of stainless steel, specify label in plain text	Y15
Factory calibration per 1 point, specify temperature in plain text	Y33
Specify measuring range in plain text (Y01: +/-NNNN ... +/-NNNN C,F), marking on the device when option "Y15" is selected in addition	Y01
Specify measuring point description in plain text (max. 16 characters)	Y23
Specify measuring point message in plain text (max. 32 characters)	Y24
Specify bus address in plain text	Y25
Installation length U customer-specific Select range, plain text specification of desired length (no specification = standard length)	Y44
Extension length X customer-specific Select range, plain text specification of desired length (no specification = standard length)	Y45
Customer-specific plain text	
Handling number of the special design	Y99

¹⁾ Select Ex i version of the optional transmitter.

²⁾ Only with connection heads code AG0, AHO, AU0, AV0, without cable gland (select non-Ex version of the optional transmitter).

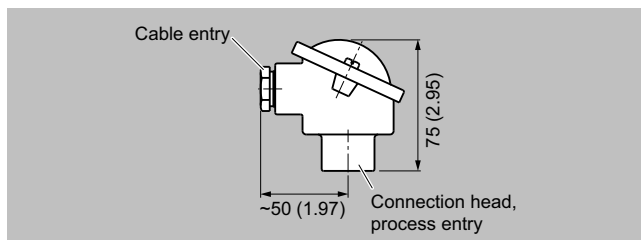
Dimensional drawings



- B Measuring insert length
- Ød Measuring insert outer diameter (6 (0.24))
- ØD Process connection outer diameter
- ØD1 Tip internal diameter
- ØD2 Tip outer diameter
- ØD3 Thermowell internal diameter
- H Head height
- H₁ Type Axx = 41 (1.61)
Type Bxx = 26 (1.02)
- N Nominal length
- U Insertion length
- X Extension length, floor strength 6 mm

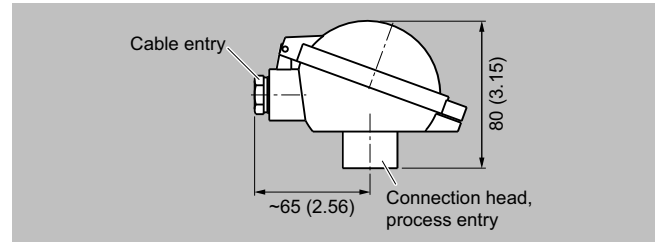
SITRANS TS500, temperature sensors for vessels and pipes, tubular thermowell for low to medium stress, according to DIN 43772, type 3F, with flange, with extension, dimensions in mm (inch)

Connection heads

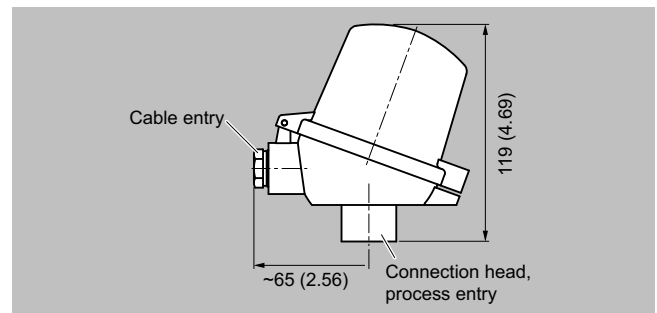


Connection head, aluminum, type BA0, dimensions in mm (inch)

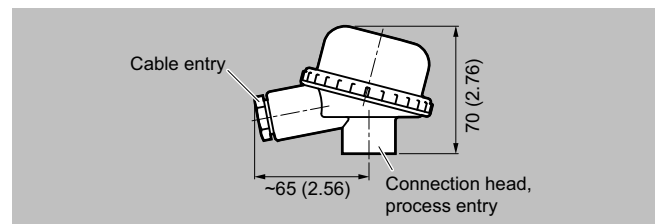
Dimensional drawings (continued)



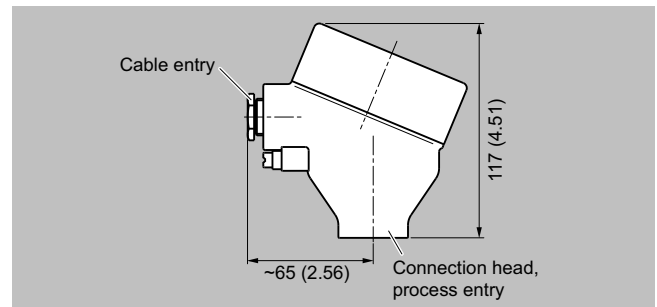
Connection head, aluminum, type BB0, dimensions in mm (inch)



Connection head, aluminum, type BC0, plastic, type BP0, dimensions in mm (inch)



Connection head, plastic, type BM0, dimensions in mm (inch)



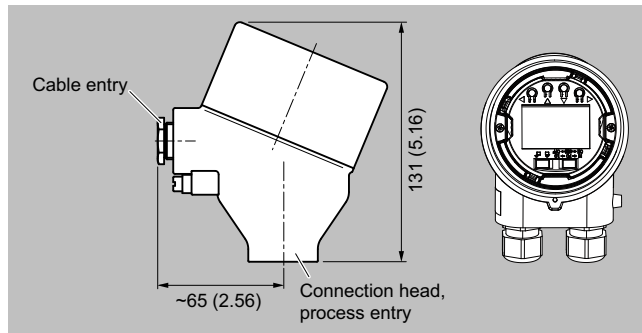
Connection head, aluminum, type AG0, stainless steel, type AU0, dimensions in mm (inch)

Temperature Measurement

Temperature sensors

SITRANS TS500 / Tubular thermowells / Type 3F, flange

Dimensional drawings (continued)



Connection head with 4-20 mA display, aluminum, type AH0, stainless steel, type AV0, dimensions in mm (inch)

Selection and ordering data

SITRANS TS500	Article No.	Order code
Barstock thermowell for connection head, with display and medium to high stress, according to DIN 43772. Type 4, for welding, Type 4F with flange, with extension	7MC752	● - ● ● ● ● ● - ● ● ● ● ● ● ● ●
Click the article number for online configuration in the PIA Life Cycle Portal.		
Wetted material		
316Ti (1.4571)	1	
316L (1.4404 or 1.4435)	2	
1.7335 Heat-resistant, only for versions without flange	3	
1.5415 Heat-resistant, only for versions without flange	4	
Process connection		
None (for welding)	0 N	
Flange DN25 PN10 ... 40 B1	2 A	
Flange 1"RF150	2 E	
Flange 1"RF300	2 F	
Flange 1.5"RF150	2 G	
Flange 1.5"RF300	2 H	
Thermowell form		
Version with flange:		
Deviating from standard [U = L-70 mm (2.76 inches)] installation length "U"; specify in plain text with Y44. [Min: U = C; Max: U = L-50 mm (1.97 inches)]		
Type 4/4F L = 140 mm (5.51 inches), C = 65 mm (3.74 inches), ØD = 24 mm (0.95 inches), Ød = 6 mm (0.24 inches)		A 0 0
Type 4/4F L = 200 mm (7.87 inches), C = 65 mm (3.74 inches), ØD = 24 mm (0.95 inches), Ød = 6 mm (0.24 inches)		B 0 0
Type 4/4F L = 200 mm (7.87 inches), C = 125 mm (4.92 inches), ØD = 24 mm (0.95 inches), Ød = 6 mm (0.24 inches)		D 0 0
Type 4/4F L = 260 mm (10.24 inches), C = 125 mm (4.92 inches), ØD = 24 mm (0.95 inches), Ød = 6 mm (0.24 inches)		E 0 0
Extension "X"		
According to DIN 43772, (X=149 mm (5.87 inches))		1
Extension length "X" customer-specific		
Specify customer-specific length with Y45, see page 2/93 order codes		
75 ... 150 mm (2.95 ... 5.91 inches) Initial: 150 mm (5.91 inches)	9	N 1 D
151 ... 300 mm (5.95 ... 11.81 inches) Initial: 300 mm (11.81 inches)	9	N 2 D
301 ... 450 mm (11.85 ... 17.72 inches) Initial: 450 mm (17.72 inches)	9	N 3 D
451 ... 600 mm (17.86 ... 23.62 inches) Initial: 600 mm (23.62 inches)	9	N 4 D
601 ... 750 mm (23.66 ... 29.53 inches) Initial: 750 mm (29.53 inches)	9	N 5 D
751 ... 900 mm (29.57 ... 45.43 inches) Initial: 900 mm (45.43 inches)	9	N 6 D
901 ... 1 050 mm (45.47 ... 41.34 inches) Initial: 1 050 mm (41.34 inches)	9	N 7 D
Head		
Aluminum head, BAO, flange cap, standard		A
Aluminum head, BB0, spring flap low, screw closure		B
Aluminum head, BC0, spring flap high, screw closure		C
Aluminum head, AG0, screw cover, Ex d suitable ¹⁾		G
Aluminum head, AH0, screw cover, Ex d suitable, display ¹⁾		H
Plastic head, BM0, screw cover		M
Plastic head, BP0, spring flap high, screw closure		P
Stainless steel head, AU0, screw cover, Ex d suitable ¹⁾		U
Stainless steel head, AV0, screw cover, Ex d suitable, display ¹⁾		V
Sensor²⁾		
Note: The accuracy class range can be lower than the measuring range. For more detailed information, see "Configuration"/"Measuring technology: Measuring accuracy"		
Pt100, basic version, -50 ... +400 °C (-58 ... +752 °F)		A
Pt100, vibration-resistant, -50 ... +400 °C (-58 ... +752 °F)		B
Pt100, extended measuring range, -196 ... +600 °C (-320.8 ... +1 112 °F)		C
Type K thermocouple, -270 ... +1 100 °C (-167 ... +2 012 °F)		K
Type J thermocouple, -0 ... +750 °C (-18 ... +1 382 °F)		J
Type N thermocouple, -270 ... +1 100 °C (-167 ... +2 012 °F)		N

Selection and ordering data (continued)

Options	Order code
Add "-Z" to article number and specify order code	
Intrinsic safety "i"/"IS" ¹⁾ according to cCSAus (USA, Canada)	E18
Flameproof enclosure "d"/"XP"; dust protection through enclosure "t"/"DIP" ²⁾ according to CSAus (USA); other connections (M, G, R)	E21
Non-sparking "nA"/"NI" according to cCSAus (USA, Canada)	E23
Without explosion protection requirements (China)	E54
Intrinsic safety "i"/"IS" ¹⁾ according to NEPSI (China)	E55
Flameproof enclosure "d"; dust protection through enclosure "t" ²⁾ according to NEPSI (China)	E56
Non-sparking "nA"/"NI" according to NEPSI (China)	E57
Without explosion protection requirements (EAC)	E80
Intrinsic safety "i"/"IS" ¹⁾ according to EACEx (EAC)	E81
Flameproof enclosure "d"/"XP"; dust protection through enclosure "t"/"DIP" ²⁾ according to EACEx (EAC)	E82
Non-sparking "nA"/"NI" according to EACEx (EAC)	E83
Special design	
Flying lead connection type (for direct transmitter mounting, delivery without screws or springs)	G01
Full penetration process connection for 316L/316Ti	G02
Cable input for connection head	
M12 device plug (in combination with transmitter, non-Ex and intrinsically safe, max. IP65/67)	G12
Han 7 D device plug (non-Ex and intrinsically safe, without mating connector max. IP65/67)	G13
Connection head with ½"-NPT thread without cable gland, for AU0 and AH0 only IP66	G20
SafeGuard 2 × Pt100 4-wire	G30
Built-in head transmitter	
Measuring range to be set must be specified with plain text data "Y01".	
SITRANS TH100, input 1 × Pt100, 4 ... 20 mA	T12
SITRANS TH320, input 1 × universal, 4 ... 20 mA	T24
SITRANS TH320, input 1 × universal, HART	T34
SITRANS TH420, input 2 × universal, HART	T35
Tag plate made of stainless steel, specify label in plain text	Y15
Factory calibration per 1 point, specify temperature in plain text	Y33
Specify measuring range in plain text (Y01: +/-NNNN ... +/-NNNN C,F), marking on the device when option "Y15" is selected in addition	Y01
Specify measuring point description in plain text (max. 16 characters)	Y23
Specify measuring point message in plain text (max. 32 characters)	Y24
Specify bus address in plain text	Y25
Installation length U customer-specific Select range, plain text specification of desired length (no specification = standard length)	Y44
Extension length X customer-specific Select range, plain text specification of desired length (no specification = standard length)	Y45
Customer-specific plain text	
Handling number of the special design	Y99

¹⁾ Select Ex i version of the optional transmitter.

²⁾ Only with connection heads code AG0, AH0, AU0, AV0, without cable gland (select non-Ex version of the optional transmitter).

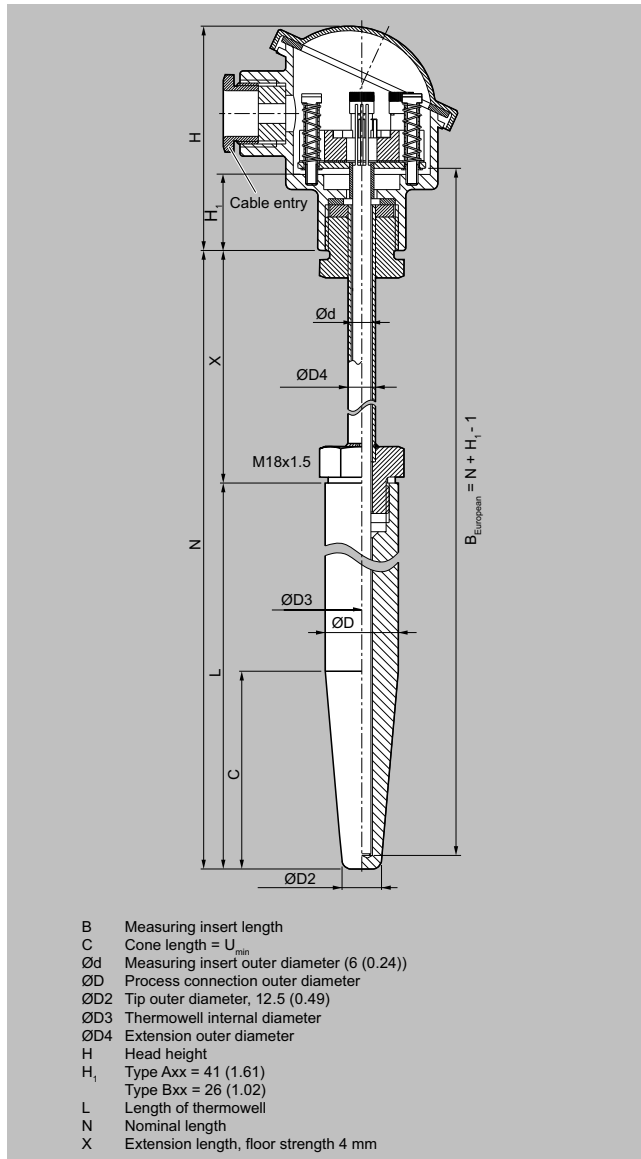
Temperature Measurement

Temperature sensors

SITRANS TS500 / Barstock thermowells / Type 4+4F

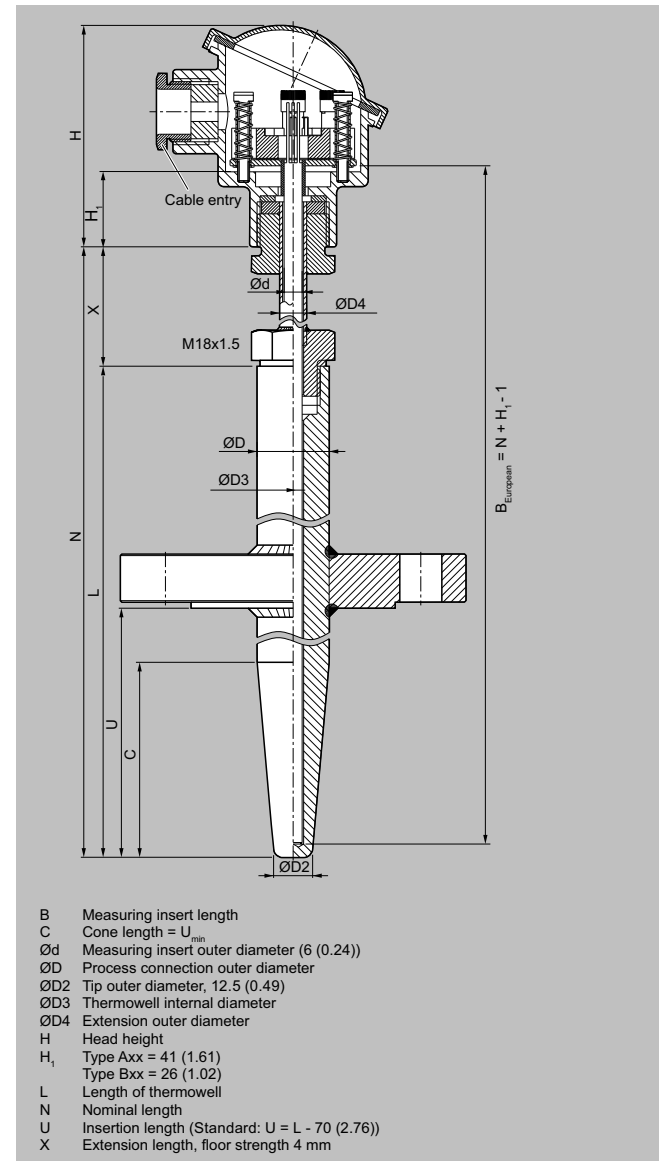
Dimensional drawings

SITRANS TS500, temperature sensors for vessels and pipes, barstock thermowell for medium to extreme stress, according to DIN 43772.



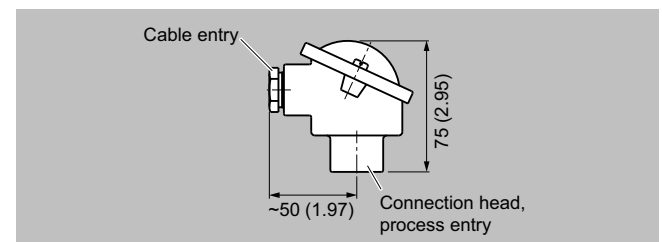
Thermowell type 4, for welding in, with extension, dimensions in mm (inch)

Dimensional drawings (continued)



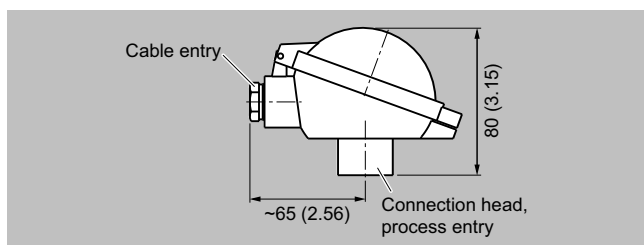
Thermowell type 4F, with flange, with extension, dimensions in mm (inch)

Connection heads

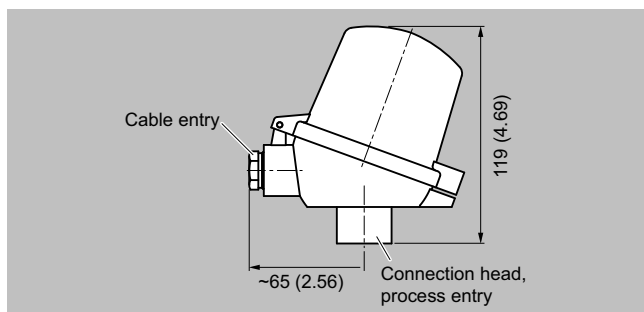


Connection head, aluminum, type BA0, dimensions in mm (inch)

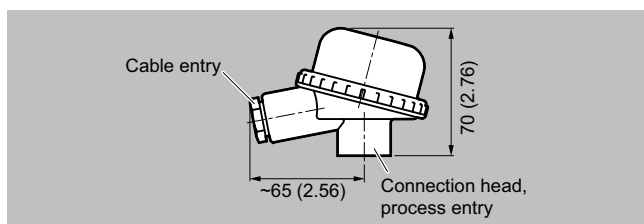
Dimensional drawings (continued)



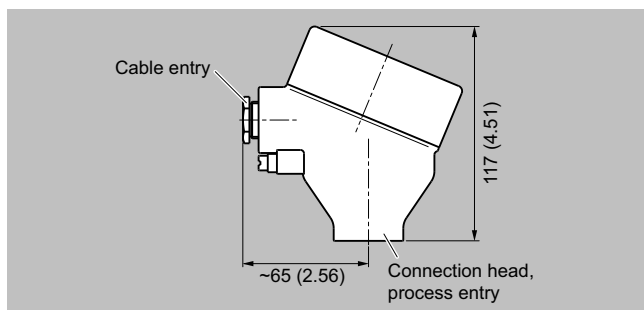
Connection head, aluminum, type BB0, dimensions in mm (inch)



Connection head, aluminum, type BC0, plastic, type BP0, dimensions in mm (inch)

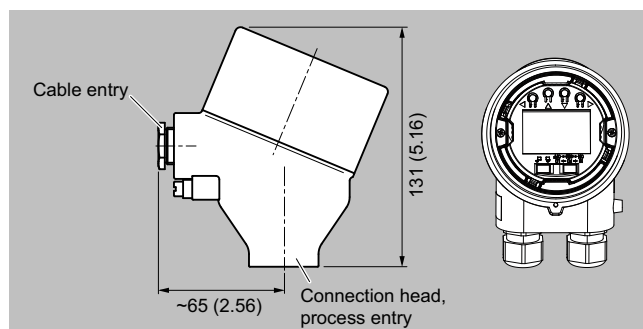


Connection head, plastic, type BM0, dimensions in mm (inch)



Connection head, aluminum, type AG0, stainless steel, type AU0, dimensions in mm (inch)

Dimensional drawings (continued)



Connection head with 4-20 mA display, aluminum, type AH0, stainless steel, type AV0, dimensions in mm (inch)

Temperature Measurement

Temperature sensors

SITRANS TS500 / for installation in existing thermowells

Selection and ordering data (continued)

Options	Order code
Add "-Z" to article number and specify order code	
Flameproof enclosure "d"/"XP"; dust protection through enclosure "t"/"DIP ²) according to ATEX and IECEx (Europe, Australia, New Zealand)	E03
Non-sparking "ec" according to ATEX and IECEx (Europe, Australia, New Zealand)	E04
Without explosion protection requirements (USA, Canada) Basis FM	E10
Flameproof enclosure "d"/"XP"; dust protection through enclosure "t"/"DIP ²) according to cFMus (USA); NPT connections at the enclosure are mandatory	E13
Flameproof enclosure "d"/"XP"; dust protection through enclosure "t"/"DIP ²) according to cFMus (USA, Canada); other connections (M,G,R)	E14
Non-sparking "nA"/"NI" according to cFMus (USA, Canada)	E16
Without explosion protection requirements (USA, Canada), Basis CSA	E17
Intrinsic safety "i"/"IS ¹) according to cCSAus (USA, Canada)	E18
Flameproof enclosure "d"/"XP"; dust protection through enclosure "t"/"DIP ²) according to cCSAus (USA, Canada); NPT connections on the enclosure are mandatory	E20
Flameproof enclosure "d"/"XP"; dust protection through enclosure "t"/"DIP ²) according to CSAus (USA); other connections (M, G, R)	E21
Non-sparking "nA"/"NI" according to cCSAus (USA, Canada)	E23
Without explosion protection requirements (China)	E54
Intrinsic safety "i"/"IS ¹) according to NEPSI (China)	E55
Flameproof enclosure "d"; dust protection through enclosure "t ²) according to NEPSI (China)	E56
Non-sparking "nA"/"NI" according to NEPSI (China)	E57
Without explosion protection requirements (EAC)	E80
Intrinsic safety "i"/"IS ¹) according to EACEx (EAC)	E81
Flameproof enclosure "d"/"XP"; dust protection through enclosure "t"/"DIP ²) according to EACEx (EAC)	E82
Non-sparking "nA"/"NI" according to EACEx (EAC)	E83
Special design	
Flying lead connection type (for direct transmitter mounting, delivery without screws or springs)	G01
Full penetration process connection for 316L/316TI	G02
Cable input for connection head	
M12 device plug (in combination with transmitter, non-Ex and intrinsically safe, max. IP65/67)	G12
Han 7 D device plug (non-Ex and intrinsically safe, without mating connector max. IP65/67)	G13
Connection head with 1/2"-NPT thread without cable gland, for AU0 and AHO only IP66	G20
SafeGuard 2 × Pt100 4-wire	G30
Input of the connection head	
Input of the connection head: M24×1.5, with sealing screw, Umin = 50 mm	G50
Input of the connection head: NPT 1/2", with sealing screw, Umin = 50 mm	G51
Input of the connection head: M24×1.5, open, Umin = 50 mm	G52
Input of the connection head: NPT 1/2", open, Umin = 50 mm	G53
Built-in head transmitter	
Measuring range to be set must be specified with plain text data "Y01".	
SITRANS TH100, input 1 × Pt100, 4 ... 20 mA	T12
SITRANS TH320, input 1 × universal, 4 ... 20 mA	T24
SITRANS TH320, input 1 × universal, HART	T34
SITRANS TH420, input 2 × universal, HART	T35

Selection and ordering data (continued)

Options	Order code
Add "-Z" to article number and specify order code	
Device settings (including head transmitter options)	
Tag plate made of stainless steel, specify label in plain text	Y15
Factory calibration per 1 point, specify temperature in plain text	Y33
Specify measuring range in plain text (Y01: +/-NNNN ... +/-NNNN C,F), marking on the device when option "Y15" is selected in addition	Y01
Specify measuring point description in plain text (max. 16 characters)	Y23
Specify measuring point message in plain text (max. 32 characters)	Y24
Specify bus address in plain text	Y25
Installation length U customer-specific Select range, plain text specification of desired length (no specification = standard length)	Y44
Extension length X customer-specific Select range, plain text specification of desired length (no specification = standard length)	Y45
Customer-specific plain text	
Handling number of the special design	Y99

¹⁾ Select Ex i version of the optional transmitter.

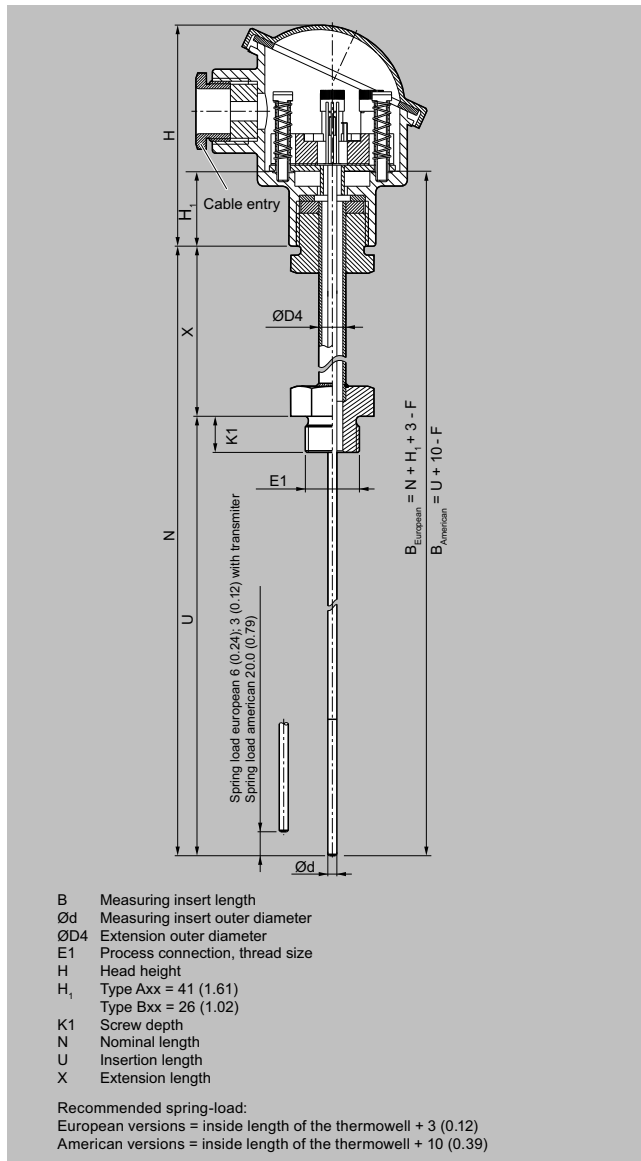
²⁾ Only with connection heads code AG0, AH0, AU0, AV0, without cable gland (select non-Ex version of the optional transmitter).

Temperature Measurement

Temperature sensors

SITRANS TS500 / for installation in existing thermowells

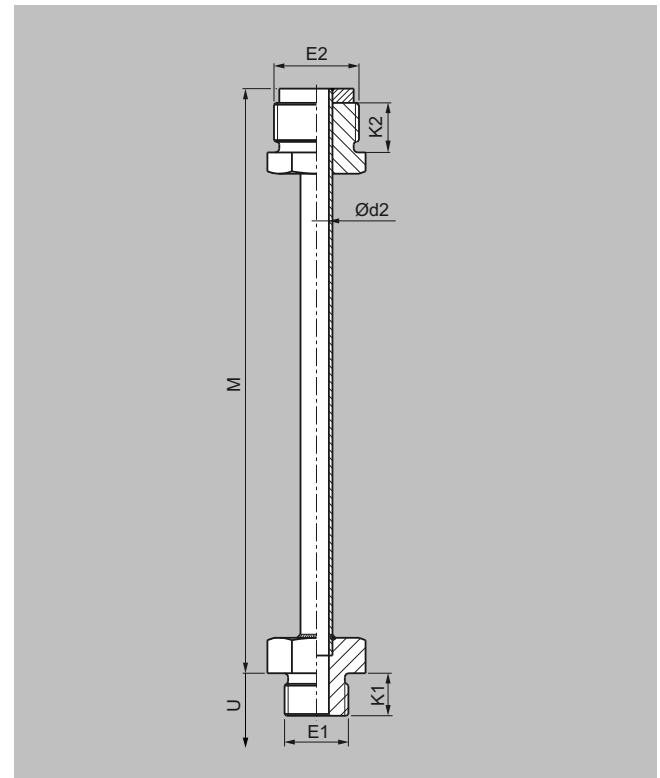
Dimensional drawings



SITRANS TS500, temperature sensors for vessels and pipes. Temperature sensors for installation in existing thermowells, suitable for thermowells in accordance with DIN 43772 and ASME B40.9-2001, with extension of European or American type, dimensions in mm (inch)

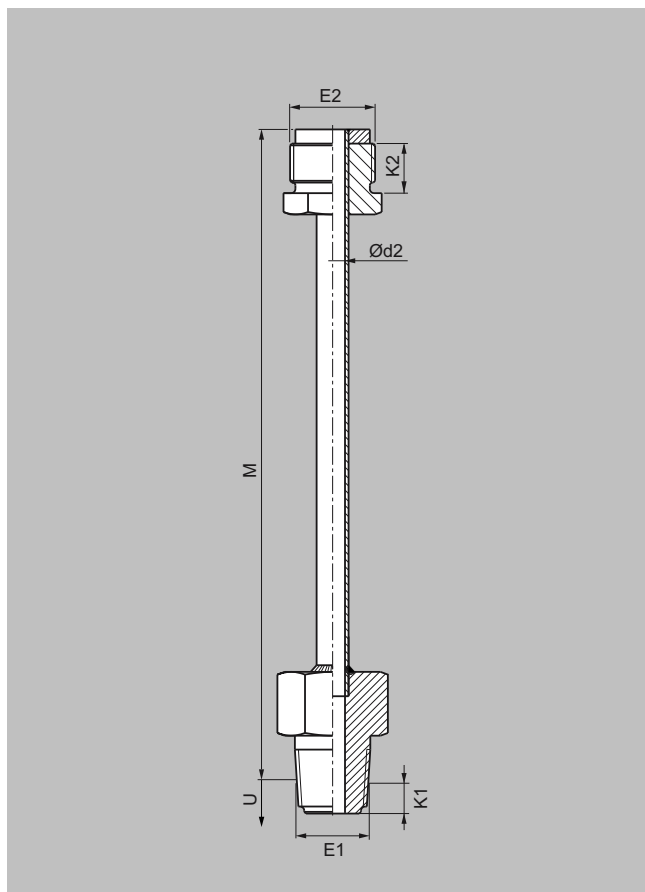
Dimensional drawings (continued)

Extensions



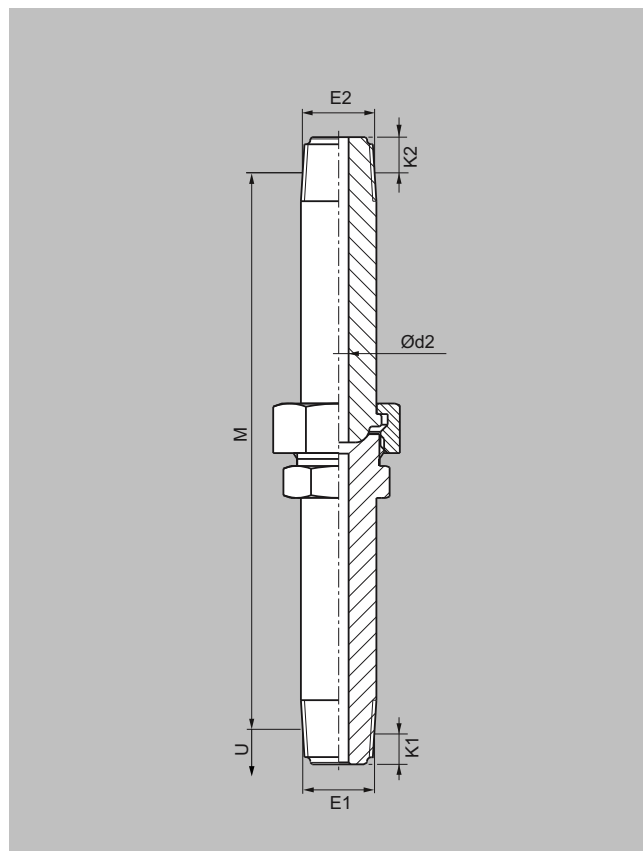
Extension (1, 2, 3)¹⁾, adjustable, European, cylindrical

Dimensional drawings (continued)



Extension (1, 2, 3)¹⁾, adjustable, European, tapered

Dimensional drawings (continued)



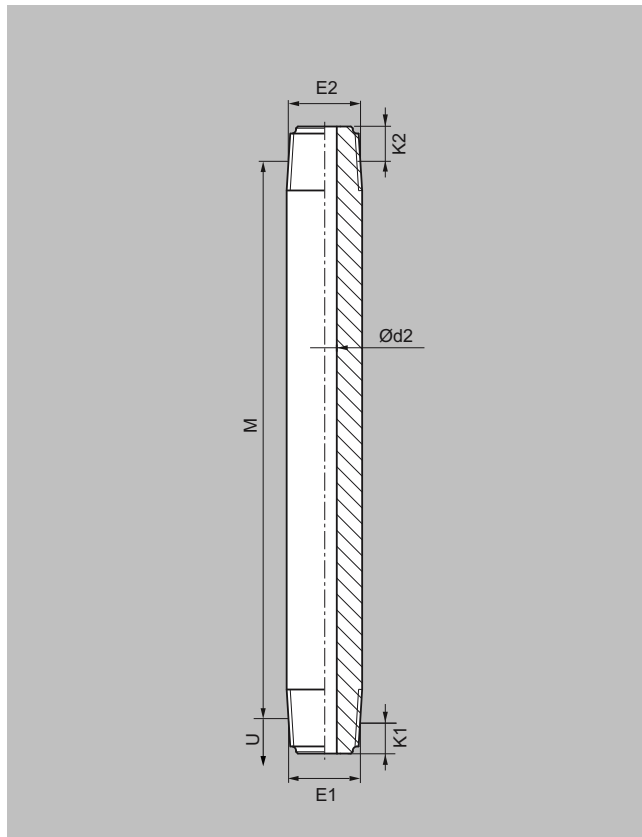
Extension NUN, adjustable, tapered, American (8)¹⁾

Temperature Measurement

Temperature sensors

SITRANS TS500 / for installation in existing thermowells

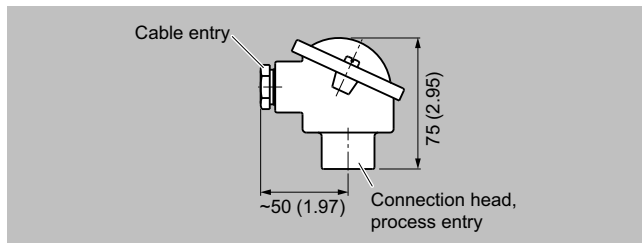
Dimensional drawings (continued)



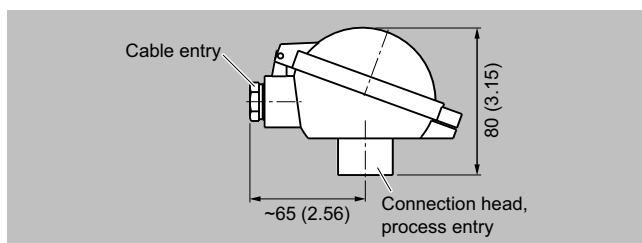
Extension NIP, non-adjustable, tapered, American (6)¹⁾

¹⁾ Numbers 1 ... 8: See selection and ordering data "Extension" option

Connection heads

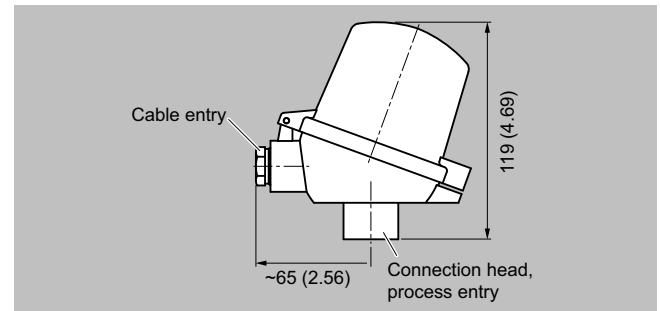


Connection head, aluminum, type BA0, dimensions in mm (inch)

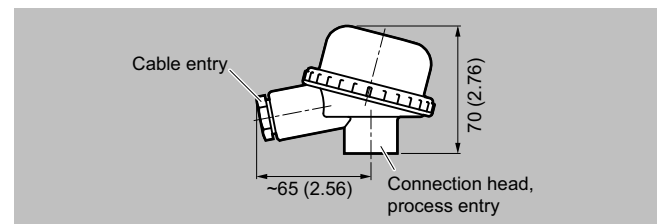


Connection head, aluminum, type BB0, dimensions in mm (inch)

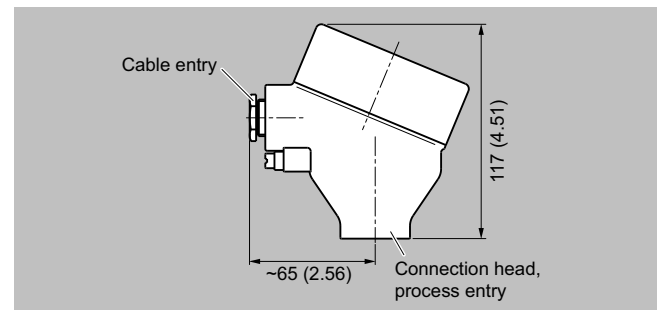
Dimensional drawings (continued)



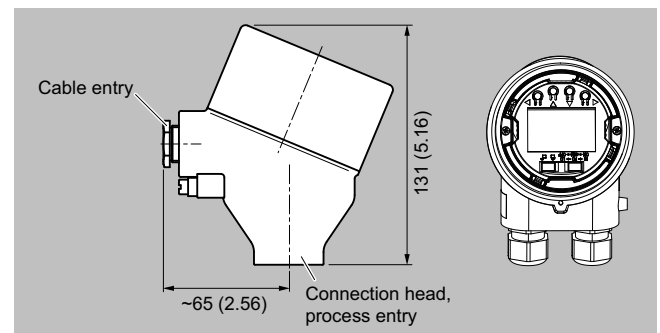
Connection head, aluminum, type BC0, plastic, type BPO, dimensions in mm (inch)



Connection head, plastic, type BM0, dimensions in mm (inch)



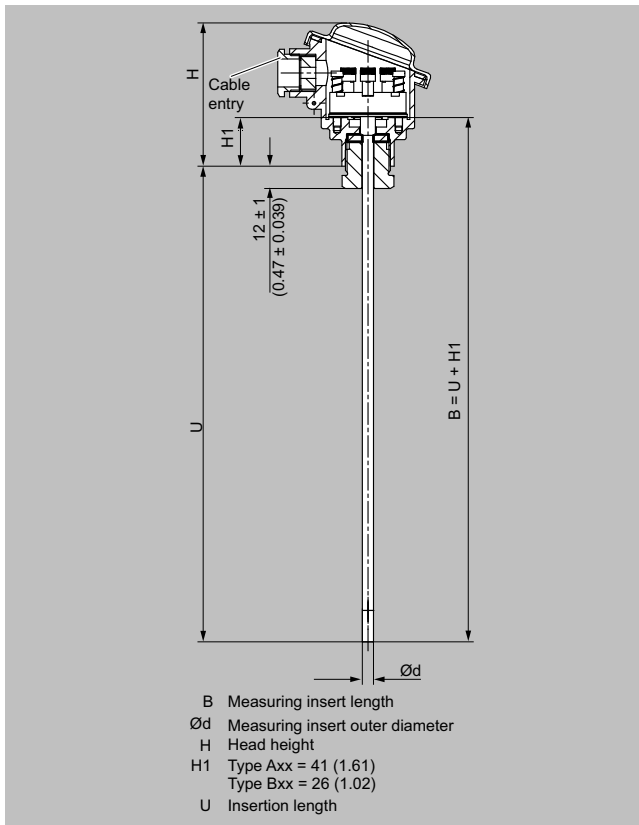
Connection head, aluminum, type AG0, stainless steel, type AU0, dimensions in mm (inch)



Connection head with 4-20 mA display, aluminum, type AH0, stainless steel, type AV0, dimensions in mm (inch)

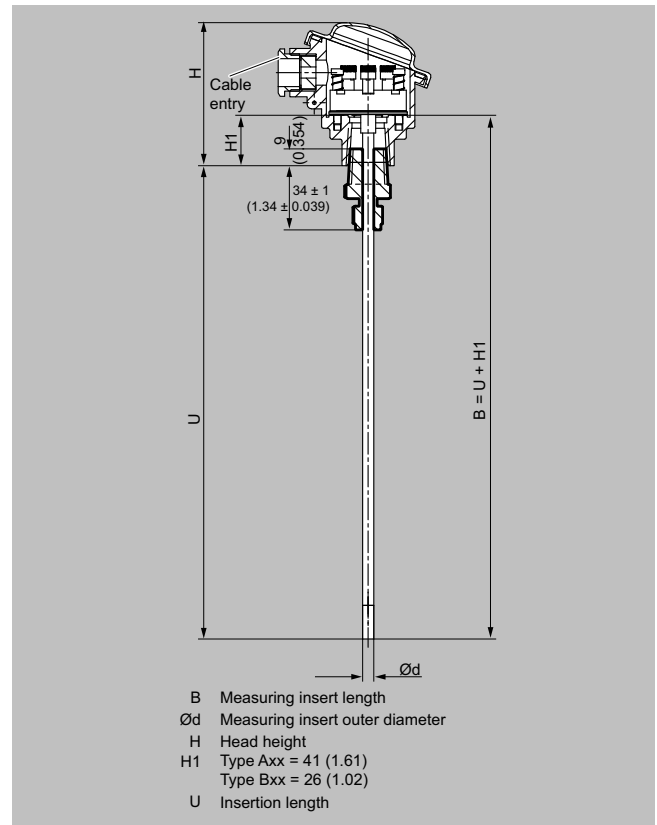
Dimensional drawings (continued)

Option G50: M24×1.5, with gasket



Dimensional drawings (continued)

Option G51: ½" NPT, with seal



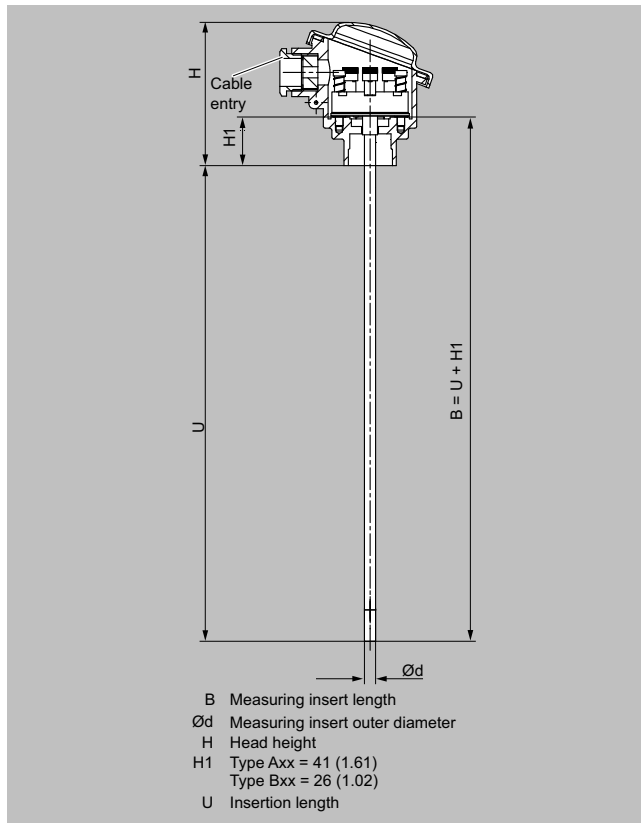
Temperature Measurement

Temperature sensors

SITRANS TS500 / for installation in existing thermowells

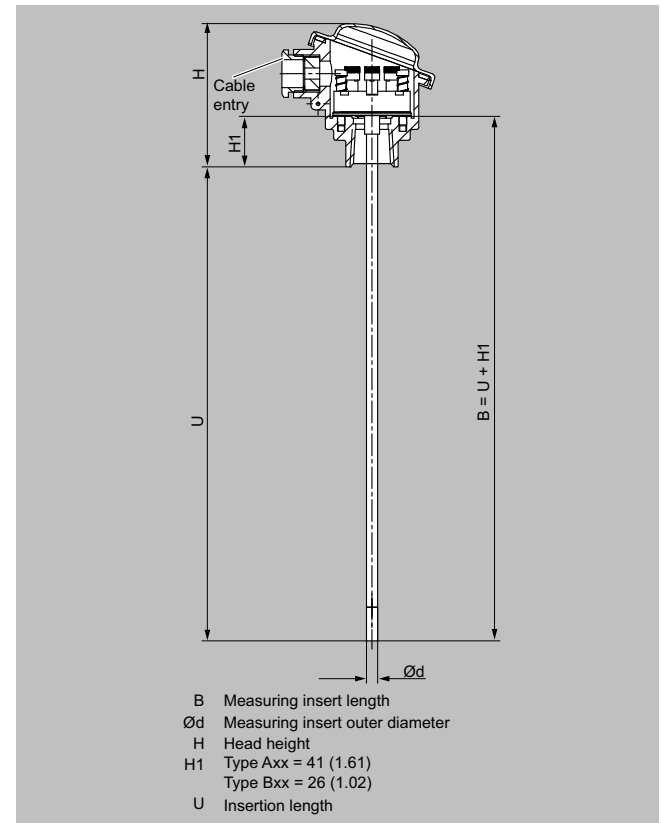
Dimensional drawings (continued)

Option G52: M24×1.5, open



Dimensional drawings (continued)

Option G53: ½" NPT, open



Input of the connection head: $U_{min} = 50 \text{ mm}$ (1.97 inches), dimensions in mm (inch)

SITRANS TSinsert / Measuring inserts for retrofitting and upgrading, European and American type

Selection and ordering data

SITRANS TSinsert		Article No.	
Measuring inserts for temperature sensors, exchangeable, mineral-insulated version, as European or American type		7MC701 ● - ● ● ● ● ●	
Click the article number for online configuration in the PIA Life Cycle Portal.			
Diameter measuring tip "d"			
6 mm (0.24 inches)		6	
8 mm (0.31 inches); with thermowell		8	
10 mm (0.39 inches); with thermowell		0	
Type			
European type - DIN ceramic base		1	
European type - DIN flying leads, mandatory with mounted transmitter		2	
American type - ANSI (nipple spring)		5	
Sensor²⁾			
Note: The accuracy class range can be lower than the measuring range. For more detailed information, see "Configuration"/"Measuring technology: Measuring accuracy"			
Pt100, basic version, -50 ... +400 °C (-58 ... +752 °F)			A
Pt100, vibration-resistant, -50 ... +400 °C (-58 ... +752 °F)			B
Pt100, extended measuring range, -196 ... +600 °C (-320.8 ... +1 112 °F)			C
Type J thermocouple, -0 ... +750 °C (-18 ... +1 382 °F)			J
Type K thermocouple, -270 ... +1 100 °C (-167 ... +2 012 °F)			K
Type N thermocouple, -270 ... +1 100 °C (-167 ... +2 012 °F)			N
Number/precision of sensors			
Pt100 connection: 1 × 4-wire connection or 2 × 3-wire connection, see "Configuration"/"Measuring technology: Connection types"			
Single, basic accuracy (Class 2/Class B)			A
Single, increased accuracy (Class 1/Class A)			B
Single, maximum accuracy (Class AA)			C
Double, basic accuracy (Class 2/Class B)			D
Double, increased accuracy (Class 1/Class A)			E
Double, maximum accuracy (Class AA)			F
Length of measuring insert "B", standard			
145 mm (6.89 inches)			1 3
205 mm (8.07 inches)			1 7
275 mm (10.83 inches)			2 1
315 mm (12.40 inches)			2 3
345 mm (13.58 inches)			2 4
375 mm (14.76 inches)			2 5
405 mm (15.94 inches)			2 7
435 mm (17.13 inches)			2 0
555 mm (21.85 inches)			3 5
585 mm (23.03 inches)			3 6
Length of measuring insert "B", customer-specific			
Specify customer-specific length with Y44, see page 2/103 order codes			
85 ... 100 mm (3.37 ... 3.94 inches)			1 1
Initial: 100 mm (3.94 inches)			
101 ... 150 mm (3.98 ... 5.91 inches)			1 3
Initial: 145 mm (5.71 inches)			
151 ... 200 mm (5.95 ... 7.87 inches)			1 5
Initial: 200 mm (7.87 inches)			
201 ... 250 mm (7.91 ... 9.84 inches)			1 7
Initial: 205 mm (8.07 inches)			
251 ... 300 mm (9.88 ... 11.81 inches)			2 1
Initial: 275 mm (10.83 inches)			
301 ... 350 mm (11.85 ... 13.78 inches)			2 3
Initial: 315 mm (12.40 inches)			
351 ... 400 mm (13.82 ... 15.75 inches)			2 5
Initial: 375 mm (14.76 inches)			
401 ... 450 mm (15.79 ... 17.72 inches)			2 7
Initial: 405 mm (15.94 inches)			
451 ... 500 mm (17.76 ... 19.69 inches)			3 1
Initial: 500 mm (19.69 inches)			
501 ... 550 mm (19.72 ... 21.65 inches)			3 3
Initial: 525 mm (20.67 inches)			
551 ... 600 mm (21.69 ... 23.92 inches)			3 5
Initial: 555 mm (21.85 inches)			

Temperature Measurement

Temperature sensors

SITRANS TSinsert / Measuring inserts for retrofitting and upgrading, European and American type

Selection and ordering data (continued)

SITRANS TSinsert Measuring inserts for temperature sensors, exchangeable, mineral-insulated version, as European or American type	Article No. 7MC701	● - ● ● ● ● ● ●
601 ... 700 mm (23.66 ... 27.56 inches) Initial: 655 mm (25.79 inches)		3 7
701 ... 800 mm (27.60 ... 31.50 inches) Initial: 735 mm (28.94 inches)		4 1
801 ... 900 mm (31.54 ... 35.43 inches) Initial: 825 mm (32.48 inches)		4 3
901 ... 1 000 mm (35.47 ... 39.37 inches) Initial: 950 mm (37.40 inches)		4 5
1 001 ... 1 500 mm (39.41 ... 59.05 inches) Initial: 1 250 mm (49.21 inches)		4 7
1 501 ... 2 000 mm (59.09 ... 78.74 inches) Initial: 1 700 mm (66.93 inches)		4 8

1) Pt1000 versions are also available.

To find these, switch to Online Configuration in the PIA Life Cycle Portal: www.siemens.com/pia-portal

Options	Order code
Add "Z" to article number and specify order code	
Certificates for functional safety	
SITRANS TH320/420 transmitter with SIL2/3 certificate	C20
Marine approvals	
Det Norske Veritas Germanischer Lloyd (DNV GL)	D01
Type of protection (Ex)	
Without explosion protection requirements (Europe, Australia, New Zealand)	E00
Intrinsic safety "i"/"IS" ¹⁾ according to ATEX and IECEx (Europe, Australia, New Zealand)	E01
For flameproof enclosure "d"/"XP"; dust protection through enclosure "t"/"DIP" ²⁾ according to ATEX and IECEx (Europe, Australia, New Zealand)	E03
For non-sparking "ec" according to ATEX and IECEx (Europe, Australia, New Zealand)	E04
Without explosion protection requirements (USA, Canada) Basis FM	E10
For flameproof enclosure "d"/"XP"; dust protection through enclosure "t"/"DIP" ²⁾ according to cFMus (USA); NPT connections on the enclosure are mandatory	E13
For flameproof enclosure "d"/"XP"; dust protection through enclosure "t"/"DIP" ²⁾ according to cFMus (USA, Canada); other connections (M,G,R)	E14
For non-sparking "nA"/"NI" according to cFMus (USA, Canada)	E16
Without explosion protection requirements (USA, Canada), Basis CSA	E17
Intrinsic safety "i"/"IS" ¹⁾ according to cCSAus (USA, Canada)	E18
For flameproof enclosure "d"/"XP"; dust protection through enclosure "t"/"DIP" ²⁾ according to cCSAus (USA, Canada); NPT connections on the enclosure are mandatory	E20
For flameproof enclosure "d"/"XP"; dust protection through enclosure "t"/"DIP" ²⁾ according to CSAus (USA); other connections (M, G, R)	E21
For non-sparking "nA"/"NI" according to cCSAus (USA, Canada)	E23
Without explosion protection requirements (China)	E54
Intrinsic safety "i"/"IS" ¹⁾ according to NEPSI (China)	E55
For flameproof enclosure "d"; dust protection through enclosure "t" ²⁾ according to NEPSI (China)	E56
For non-sparking "nA"/"NI" according to NEPSI (China)	E57
Without explosion protection requirements (EAC)	E80
Intrinsic safety "i"/"IS" ¹⁾ according to EACEx (EAC)	E81
For flameproof enclosure "d"/"XP"; dust protection through enclosure "t"/"DIP" ²⁾ according to EACEx (EAC)	E82
For non-sparking "nA"/"NI" according to EACEx (EAC)	E83

SITRANS TSinsert / Measuring inserts for retrofitting and upgrading, European and American type

Selection and ordering data (continued)

Options	Order code
Add "-Z" to article number and specify order code	
Special design	
SafeGuard 2 × Pt100 4-wire	G30
Built-in head transmitter	
Measuring range to be set must be specified with plain text data "Y01".	
SITRANS TH100, input 1 × Pt100, 4 ... 20 mA	T12
SITRANS TH320, input 1 × universal, 4 ... 20 mA	T24
SITRANS TH320, input 1 × universal, HART	T34
SITRANS TH420, input 2 × universal, HART	T35
Device settings (including head transmitter options)	
Tag plate made of stainless steel, specify label in plain text	Y15
Factory calibration per 1 point, specify temperature in plain text	Y33
Specify measuring range in plain text (Y01: +/-NNNN ... +/-NNNN C,F), marking on the device when option "Y15" is selected in addition	Y01
Specify measuring point description in plain text (max. 16 characters)	Y23
Specify measuring point message in plain text (max. 32 characters)	Y24
Specify bus address in plain text	Y25
Customer-specific plain text	
Handling number of the special design	Y99

¹⁾ Select Ex i version of the optional transmitter.

²⁾ Only with connection heads code AG0, AH0, AU0, AV0, without cable gland (select non-Ex version of the optional transmitter).

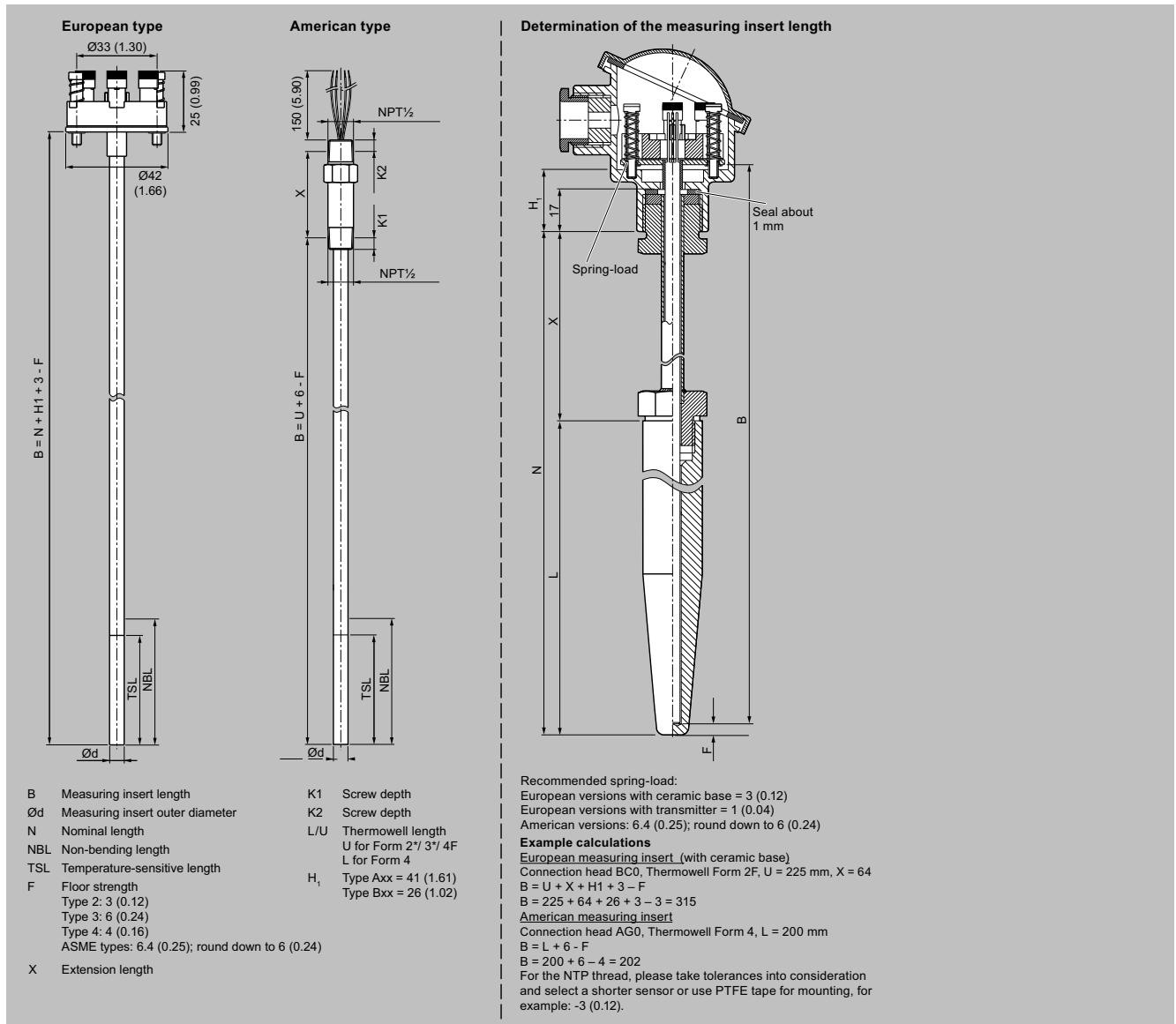
Temperature Measurement

Temperature sensors

SITRANS TSinsert / Measuring inserts for retrofitting and upgrading, European and American type

Dimensional drawings

Measuring inserts for temperature sensors

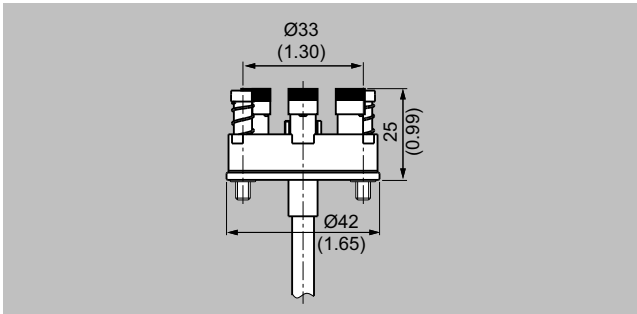


SITRANS TSinsert - measuring inserts for temperature sensors, replaceable, mineral-insulated version

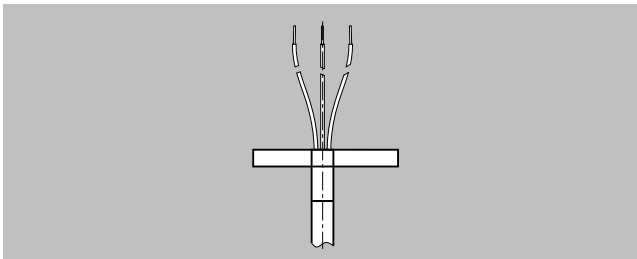
European type (DIN ceramic base): Suspension approx. 6 mm (0.24 inches)/3 mm (0.12 inches) with transmitter

American type: Suspension approx. 21 mm (0.83 inches)

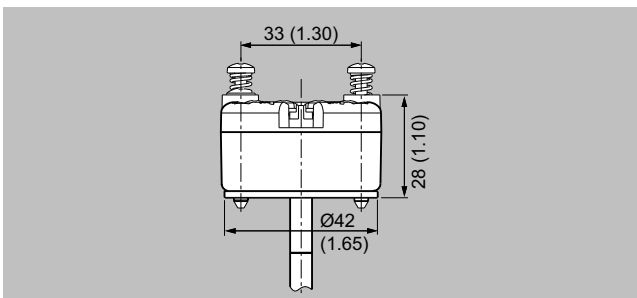
Determination of the measuring insert length, dimensions in mm

Dimensional drawings (continued)Cold end versions

Cold end versions, ceramic base, dimensions in mm (inch)



Cold end versions, flying lead



European type: Cold end versions, installed transmitter, dimensions in mm (inch)

Temperature Measurement

Temperature sensors

SITRANS TSthermowells / Thermowells according to DIN 43772

Selection and ordering data

Barstock thermowells according to DIN 43772 - Form 4			Article No.										Order code					
			7MT ● ● ● ● - ● ● ● ● ● - ● ● ● ● ● ● ● ●															
Click the article number for online configuration and buildability check in the PIA Life Cycle Portal.																		
Basic model																		
<u>Standard</u>	<u>Process connection</u>	<u>Form</u>																
DIN	Weld-in/flange connection	Form 4/4F	1 4															
Outer diameter of root D	Outer diameter of tip D2	Bore hole D3																
24 mm (0.94 inches)	12.5 mm (0.49 inches)	7 mm (0.28 inches)	1															
26 mm (1.02 inches)	12.5 mm (0.49 inches)	7 mm (0.28 inches)	2															
32 mm (1.26 inches)	17 mm (0.67 inches)	11 mm (0.43 inches)	3															
Thermowell length L																		
110 mm (4.3 inches)													0 1					
140 mm (5.5 inches)													0 2					
170 mm (6.7 inches)													0 3					
200 mm (7.9 inches)													0 4					
260 mm (10.2 inches)													0 5					
410 mm (16.1 inches)													0 6					
Thermowell material																		
316Ti / 1.4571													A					
316L / 1.4404													B					
Hastelloy C276 / 2.4819 (flange with flanged wheel)													E					
1.7335 Heat-resistant													S					
1.5415 Heat-resistant													T					
PFA coating (thermowell made of 316/Ti/L)													U					
ECTFE (HALAR) (thermowell made of 316/Ti/L)													V					
Stellite coating (thermowell made of 316/Ti/L)													W					
Customer-specific thermowell													9 8 8 N			Y 9 9		
																+		
																Y 4 6		
Process connection material																		
Without (form 4 for welding)													N					
316Ti/1.4571													A					
316L/1.4404													B					
Hastelloy C276/2.4819													E					
1.7335 Heat-resistant													S					
1.5415 Heat-resistant													T					
PFA coating (thermowell made of 316/Ti/L)													U					
ECTFE (HALAR) (thermowell made of 316/Ti/L)													V					
Stellite coating (thermowell made of 316/Ti/L)													W					
Process connection																		
Without (form 4 for welding)													0 0					
Flange according to EN 1092-1 sealing surface Initial B1 for uncoated variants																		
• DN 40, PN 10 ... 16													3 2					
• DN 40, PN 25 ... 40													3 3					
• DN 50, PN 10 ... 16													3 4					
• DN 50, PN 25 ... 40													3 5					
Flange according to ASME B16.5 sealing surface Initial RF for uncoated variants																		
• 1.50 inches; Class 150													6 0					
• 1.50 inches; Class 300													6 1					
• 1.50 inches; Class 600													6 2					
• 2.00 inches; Class 150													6 6					
• 2.00 inches; Class 300													6 7					
• 2.00 inches; Class 600													6 8					
Customer-specific process connection													Z 8 8			K 1 Y		
Installation length U																		
For welding (no process connection)													0 N					
130 mm (5.1 inches)													0 A					

Temperature Measurement

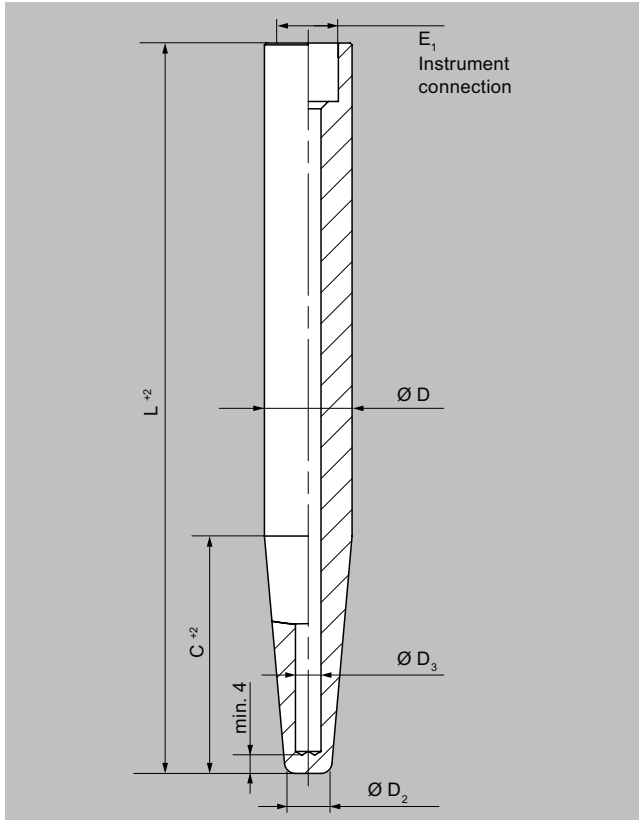
Temperature sensors

SITRANS TSthermowells / Thermowells according to DIN 43772

Dimensional drawings

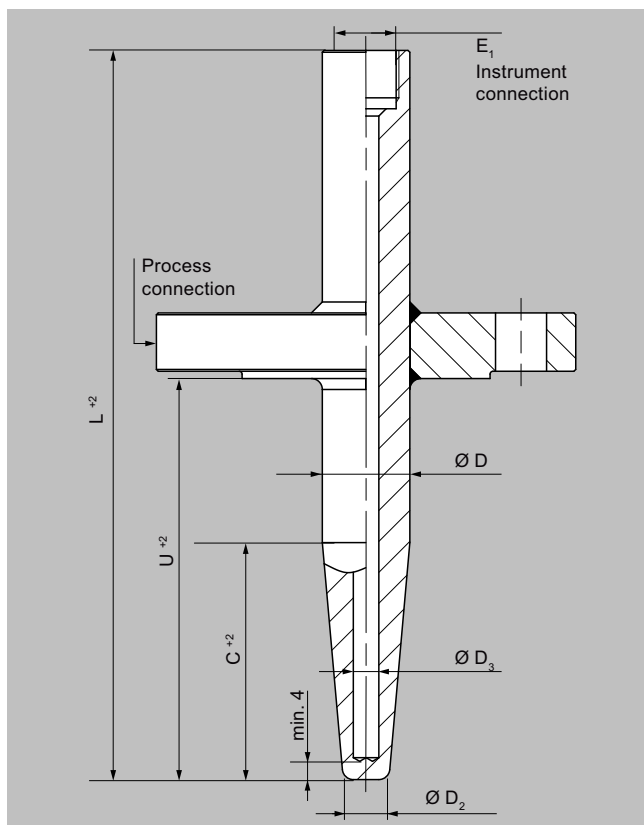
Thermowells according to DIN 43772 - Form 4

7MT14, welded



Dimensional drawings (continued)

7MT14, flange connection



The label of the D sleeves is from the previous standard but still used today. The table below shows the order information for the corresponding successor products from DIN 43772.

Design	L [mm]	C [mm]	Ordering data
D1	140	65	7MC1410-2*N00-0NQ2
D2	200	125	7MC1410-4*N00-0NQ4
D4	200	65	7MC1410-4*N00-0NQ2
D5	260	125	7MC1410-5*N00-0NQ4
			Material:
			* = A: 1.4571
			* = B: 1.4404
			* = S: 1.7335
			* = T: 1.5415

Temperature Measurement

Temperature sensors

SITRANS TSthermowells / Thermowells according to ASME B40.9

Selection and ordering data

Barstock thermowells according to ASME B40.9				Article No.										Order code		
Click the article number for online configuration and buildability check in the PIA Life Cycle Portal.				7MT ● ● ● ● - ● ● ● ● - ● ● ● ● ● ● ● ●												
Basic model																
Standard	Process connection	Form														
ASME	Screwed design	Straight												2 1		
ASME	For welding	Straight												3 1		
ASME	Flange connection	Straight												4 1		
ASME	Van Stone type	Straight												5 1		
ASME	Screwed design	Reduced form												2 2		
ASME	For welding	Reduced form												3 2		
ASME	Flange connection	Reduced form												4 2		
ASME	Van Stone type	Reduced form												5 2		
ASME	Screwed design	Tapered												2 3		
ASME	For welding	Tapered												3 3		
ASME	Flange connection	Tapered												4 3		
ASME	Van Stone type	Tapered												5 3		
Connection to thermometer E1																
M18×1.5														1		
M20×1.5														2		
½-14 NPT														5		
G½														7		
Special design														9		
Head diameter of the thermowell																
Screwed design - width across flats	For welding	Flange connection	Van Stone head / process connection													
	26.7 mm (1.05 inches)													0		
H27	33.4 mm (1.32 inches)	28.6 mm (1.13 inches)	33.4 mm/51 mm (1.32 inches/2.01 inches)											1		
	48.3 mm (1.9 inches)	30 mm (1.18 inches)	48.3 mm/73 mm (1.9 inches/2.87 inches)											2		
H32		32 mm (1.26 inches)	60.3 mm/92 mm (2.37 inches/3.62 inches)											3		
H36		34 mm (1.39 inches)												4		
H42		38 mm (1.5 inches)												5		
Head length X1				Screw-in	Weld-in	Flange	Van Stone									
25 ... 50 mm (0.99 ... 1.97 inches): Initial 38 mm (1.5 inches) (7MT2), 45 mm (1.77 inches) (7MT3/4)				✓	✓	✓								0		
51 ... 75 mm (2 ... 2.95 inches): Initial 64 mm (2.5 inches)				✓	✓	✓	✓							1		
76 ... 101 mm (3 ... 3.98 inches): Initial 89 mm (3.5 inches)				✓	✓	✓	✓							2		
102 ... 126 mm (4 ... 4.96 inches): Initial 114 mm (4.5 inches)				✓	✓	✓	✓							3		
127 ... 151 mm (5 ... 5.95 inches): Initial 140 mm (5.5 inches)				✓	✓	✓	✓							4		
152 ... 177 mm (... 6.97 inches): Initial 165 mm (6.5 inches)				✓	✓	✓	✓							5		
178 ... 202 mm (7 ... 7.95 inches): Initial 191 mm (7.5 inches)				✓	✓	✓								6		
Installation length U																
25 ... 126 mm (1 ... 4.99 inches): Initial 25 mm (0.99 inches)														A		
127 ... 253 mm (5 ... 9.99 inches): Initial 127 mm (5 inches)														B		
254 ... 380 mm (10 ... 14.99 inches): Initial 254 mm (10 inches)														C		
381 ... 507 mm (15 ... 19.99 inches): Initial 381 mm (15 inches)														D		
508 ... 634 mm (20 ... 24.99 inches): Initial 508 mm (20 inches)														E		

Selection and ordering data (continued)

Barstock thermowells according to ASME B40.9					Article No.										Order code		
635 ... 761 mm (25 ... 29.99 inches): Initial 635 mm (25 inches)					7MT ● ● ● ● - ● ● ● ● - ● ● ● ● ● ● ● ●										F		
762 ... 888 mm (30 ... 34.99 inches): Initial 762 mm (30 inches)															G		
Thermowell material	Screw-in	Weld-in	Flange	Van Stone													
316L / 1.4404	✓	✓	✓	✓											B		
Carbon steel / A105	✓	✓	✓												C		
Hastelloy C276 / 2.4819 (flange with flanged wheel)			✓	✓											E		
Hastelloy C22 / 2.4602 (flange with flanged wheel)			✓	✓											F		
304L / 1.4306	✓	✓	✓	✓											H		
321 / 1.4541	✓	✓	✓	✓											K		
Monel alloy 400 / 2.4360 (flange with flanged wheel)			✓	✓											L		
Tantalum (barrel, thermowell made of 316/Ti/L)			✓												Q		
Duplex / 1.4462			✓	✓											P		
Superduplex / 1.4410			✓	✓											R		
PFA coating (thermowell made of 316/Ti/L)			✓	✓											U		
ECTFE (HALAR) (thermowell made of 316/Ti/L)			✓	✓											V		
Stellite coating (thermowell made of 316/Ti/L)			✓	✓											W		
Customer-specific thermowell (head diameter/X1/U/material)	✓		✓	✓	9 8 N N										G 1 Y		
Outer diameter of root D/tip D2																	
Straight thermowell form	Reduced thermowell form		Tapered thermowell form														
D	D	D2 (L6 = 60.3 - mm)	D	D2													
0.50 inches (12.7 mm)															0 0		
0.625 inches (15.9 mm)	0.625 inches (15.9 mm)	0.50 inches (12.7 mm)	0.625 inches (15.9 mm)	0.50 inches (12.7 mm)											0 1		
0.75 inches (19.1 mm)	0.75 inches (19.1 mm)	0.50 inches (12.7 mm)	0.75 inches (19.1 mm)	0.50 inches (12.7 mm)											0 2		
1.00 inch (25.4 mm)	1.00 inch (25.4 mm)	0.50 inches (12.7 mm)													0 3		
1.25 inches (31.8 mm)	1.25 inches (31.8 mm)	0.50 inches (12.7 mm)	1.00 inch (25.4 mm)	0.50 inches (12.7 mm)											0 4		
1.50 inches (38.1 mm)	1.50 inches (38.1 mm)	0.50 inches (12.7 mm)	1.00 inch (25.4 mm)	0.75 inches (19.1 mm)											0 5		
			1.25 inches (31.8 mm)	0.50 inches (12.7 mm)											0 7		
			1.25 inches (31.8 mm)	0.75 inches (19.1 mm)											0 8		
D = 12 mm (0.47 inches)			1.25 inches (31.8 mm)	1.00 inch (25.4 mm)											1 0		
D = 14 mm (0.55 inches)															1 1		
D = 16 mm (0.63 inches)			1.50 inches (38.1 mm)	0.50 inches (12.7 mm)											1 2		
D = 19 mm (0.75 inches)			1.50 inches (38.1 mm)	0.75 inches (19.1 mm)											1 3		
D = 22 mm (0.87 inches)			1.50 inches (38.1 mm)	1.00 inch (25.4 mm)											1 4		
D = 25 mm (0.98 inches)			1.50 inches (38.1 mm)	1.25 inches (31.8 mm)											1 5		
D = 27 mm (1.06 inches)															1 6		
			12 mm (0.47 inches)	9 mm (0.35 inches)											3 1		
			14 mm (0.55 inches)	9 mm (0.35 inches)											3 3		

Temperature Measurement

Temperature sensors

SITRANS TSthermowells / Thermowells according to ASME B40.9

Selection and ordering data (continued)

Barstock thermowells according to ASME B40.9		Article No.	Order code
		7MT	
16 mm (0.63 inches)	9 mm (0.35 inches)	3 6	
16 mm (0.63 inches)	13 mm (0.51 inches)	3 7	
16 mm (0.63 inches)	14 mm (0.55 inches)	3 8	
19 mm (0.75 inches)	9 mm (0.35 inches)	4 1	
19 mm (0.75 inches)	13 mm (0.51 inches)	4 2	
19 mm (0.75 inches)	14 mm (0.55 inches)	4 3	
22 mm (0.87 inches)	9 mm (0.35 inches)	4 6	
22 mm (0.87 inches)	13 mm (0.51 inches)	4 7	
22 mm (0.87 inches)	14 mm (0.55 inches)	4 8	
22 mm (0.87 inches)	16 mm (0.63 inches)	5 0	
25 mm (0.98 inches)	9 mm (0.35 inches)	5 3	
25 mm (0.98 inches)	13 mm (0.51 inches)	5 4	
25 mm (0.98 inches)	14 mm (0.55 inches)	5 5	
25 mm (0.98 inches)	16 mm (0.63 inches)	5 6	
25 mm (0.98 inches)	19 mm (0.75 inches)	5 7	
27 mm (1.06 inches)	9 mm (0.35 inches)	6 1	
27 mm (1.06 inches)	13 mm (0.51 inches)	6 2	
27 mm (1.06 inches)	14 mm (0.55 inches)	6 3	
27 mm (1.06 inches)	16 mm (0.63 inches)	6 4	
27 mm (1.06 inches)	19 mm (0.75 inches)	6 5	
27 mm (1.06 inches)	22 mm (0.87 inches)	6 6	
32 mm (1.26 inches)	9 mm (0.35 inches)	7 0	
32 mm (1.26 inches)	13 mm (0.51 inches)	7 1	
32 mm (1.26 inches)	14 mm (0.55 inches)	7 2	
32 mm (1.26 inches)	16 mm (0.63 inches)	7 3	
32 mm (1.26 inches)	19 mm (0.75 inches)	7 4	
32 mm (1.26 inches)	22 mm (0.87 inches)	7 5	
32 mm (1.26 inches)	25 mm (0.98 inches)	7 6	
34 mm (1.34 inches)	9 mm (0.35 inches)	8 0	
34 mm (1.34 inches)	13 mm (0.51 inches)	8 1	
34 mm (1.34 inches)	14 mm (0.55 inches)	8 2	
34 mm (1.34 inches)	16 mm (0.63 inches)	8 3	
34 mm (1.34 inches)	19 mm (0.75 inches)	8 4	
34 mm (1.34 inches)	22 mm (0.87 inches)	8 5	
34 mm (1.34 inches)	25 mm (0.98 inches)	8 6	
Customer-specific	Customer-specific	9 0	L 1 Y
Process connection			
Thread for 7MT2... (screw-in thermowells)			
• G½"			1 A
• G¾"			1 B
• G1"			1 C
• R½"			1 D
• R¾"			1 E
• R1"			1 F
• ½" NPT			1 G
• ¾" NPT			1 H
• 1" NPT			1 J
• M20 × 1.5			1 L
• M27 × 2			1 M
• M33 × 2			1 N
Flange according to EN 1092-1 for 7MT4... (Flange thermowell), Sealing surface initial: B1 for uncoated variants, as of Class 900 RTJ			
• DN25, PN10 - 40			2 D
• DN40, PN10 - 40			2 F
• DN50, PN10 - 16			2 H

Selection and ordering data (continued)

Barstock thermowells according to ASME B40.9					Article No.	Order code													
					7MT	●	●	●	●	-	●	●	●	●	●	●	●	●	
• DN50, PN25 - 40															2	J			
Flange according to ASME B16.5 for 7MT4... (Flange thermowell), Sealing surface initial: RF for uncoated variants																			
• 1.00 inch; Class 150															3	E			
• 1.00 inch; Class 300															3	F			
• 1.00 inch; Class 600															3	G			
• 1.00 inch; Class 900/1500															3	H			
• 1.50 inches; Class 150															3	K			
• 1.50 inches; Class 300															3	L			
• 1.50 inches; Class 600															3	M			
• 1.50 inches; Class 900/1500															3	N			
• 2.00 inches; Class 150															3	R			
• 2.00 inches; Class 300															3	S			
• 2.00 inches; Class 600															3	T			
• 2.00 inches; Class 900/1500															3	U			
• 3.00 inches; Class 150															4	C			
• 3.00 inches; Class 300															4	D			
• 3.00 inches; Class 600															4	E			
• 3.00 inches; Class 900															4	F			
• 3.00 inches; Class 1500															4	L			
• 4.00 inches; Class 150															4	G			
• 4.00 inches; Class 300															4	H			
• 4.00 inches; Class 600															4	J			
• 4.00 inches; Class 900															4	K			
• 4.00 inches; Class 1500															4	M			
For 7MT3... and 7MT5... (weld-in and Van Stone thermowells)																			
• None (for optional collar flanges for Van Stone, see "Options")															0	N			
Process connection material (identical to thermowell)																			
		Screw-in	Weld-in	Flange	Van Stone														
316L / 1.4404		✓		✓	✓														B
Carbon steel / A105		✓		✓															C
Hastelloy C276 / 2.4819 (flange with flanged wheel)				✓															E
Hastelloy C22 / 2.4602				✓															F
304L / 1.4306		✓		✓															H
321 / 1.4541		✓		✓															K
Monel alloy 400 / 2.4360 (flange with flanged wheel)				✓															L
Tantalum (barrel, thermowell made of 316/Ti/L)				✓															Q
Duplex / 1.4462				✓															P
Super duplex				✓															R
PFA coating (thermowell made of 316/Ti/L)				✓															U
ECTFE (HALAR) (thermowell made of 316/Ti/L)				✓															V
Stellite coating (thermowell made of 316/Ti/L)				✓															W
Customer-specific		✓		✓	✓										9	N	N		N 1 Y
Bore hole D3																			
D3 = 6.6 mm (0.260 inches)																			2
Customer-specific																			9 R 1 Y

Temperature Measurement

Temperature sensors

SITRANS TSthermowells / Thermowells according to ASME B40.9

Selection and ordering data (continued)

Options	Order code
Add "-Z" to article number and specify options; separate multiple expansions with "+".	
Inspection certificate according to EN 10204-3.1	
Material certificate, material in contact with media	C12
PMI (positive material ident.), in contact with media	C15
Pressure test	C31
Helium leak test	C32
Dye-penetration test	C33
Compliance with order	C35
X-ray test for welding seams	C41
Ultrasound test for welding seams	C44
X-ray test concentricity of bore hole	C47
Ultrasound test concentricity of bore hole	C48
MR-01-75 compliance	C50
MR-01-03 compliance	C53
Grease-free (cleaned for oxygen applications, for example)	C51
CRN marking	C60
Additional options	
Thread protection stainless steel plug and chain	A55
Forged flange	A76
Sealing surface with concentric lines	A77
Marking of the installation length (7MT4 flange versions only)	A78
TAG marking	Y15
Full penetration options	
Process connection welded	G02
Surface treatment, options on request	
Parts in contact with media stained, neutralized and passivated	W01
Parts in contact with media electropolished	W02
Additional flange sealing surfaces	
FF-Flat Face according to ASME B16.5	A70
RTJ ring type joint according to ASME B16.5	A71
Type B2 according to EN1092-1	A72
Type C according to EN1092-1	A73
Type D according to EN1092-1	A74
Additional designs	
Add "-Z" to article number and specify plain text.	
Additional information	
Additional information in plain text: Thermowell (head diameter/X1/U/material)	G1Y
Additional information in plain text: AD root D [tip D2]	L1Y
Additional information in plain text: Process connection (material/type)	N1Y
Additional information in plain text: Bore hole D3:	R1Y
Customer single job production	
Length options U: Specify special installation length (in spec. area)	Y44
Length options X1: Specify special length extension (in spec. area)	Y45
Processing number of special design: Specify in plain text	Y99
Optional collar flanges 316L (Van Stone only)	
1.00 inch; Class 150 sealing surface Initial: RF	B24
1.00 inch; Class 300 sealing surface Initial: RF	B25

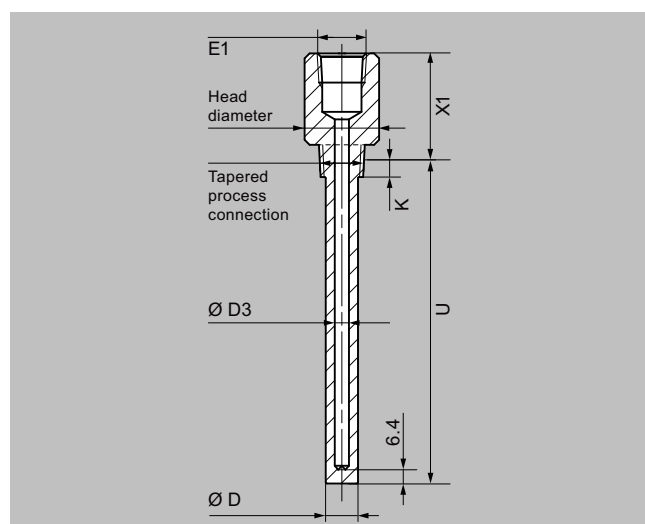
Selection and ordering data (continued)

Options	Order code
Add "-Z" to article number and specify options; separate multiple expansions with "+".	
1.00 inch; Class 600 sealing surface Initial: RF	B26
1.50 inches; Class 150 sealing surface Initial: RF	B29
1.50 inches; Class 300 sealing surface Initial: RF	B30
1.50 inches; Class 600 sealing surface Initial: RF	B31
2.00 inches; Class 150 sealing surface Initial: RF	B35
2.00 inches; Class 300 sealing surface Initial: RF	B36
2.00 inches; Class 600 sealing surface Initial: RF	B37

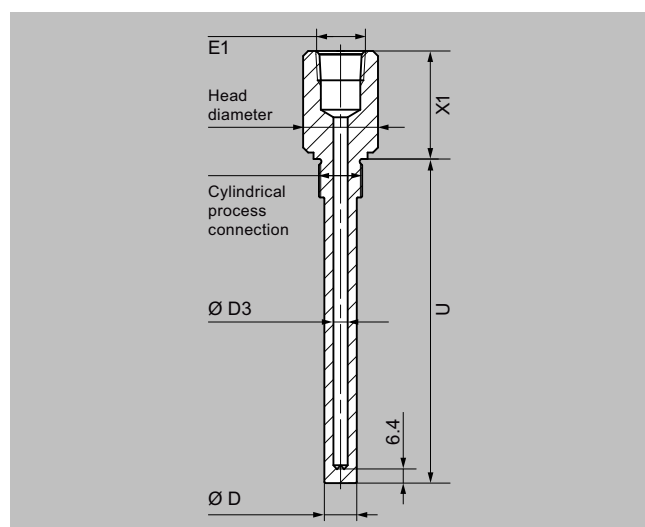
Dimensional drawings

Thermowells according to ASME B40.9

7MT21, screwed design, straight, tapered process connection

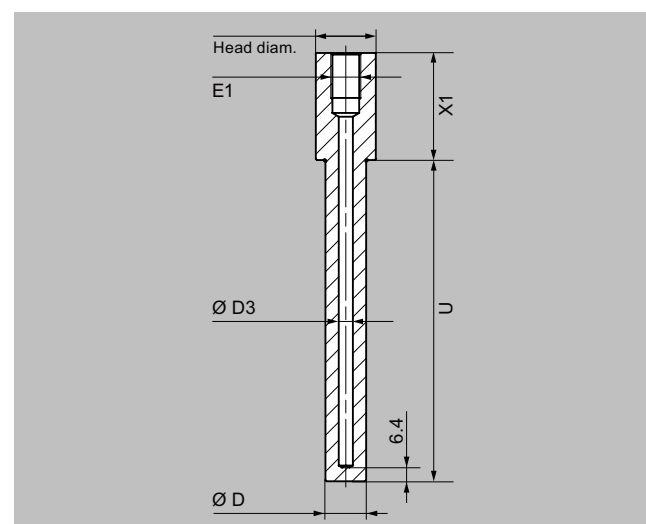


7MT21, screwed design, straight, cylindrical process connection

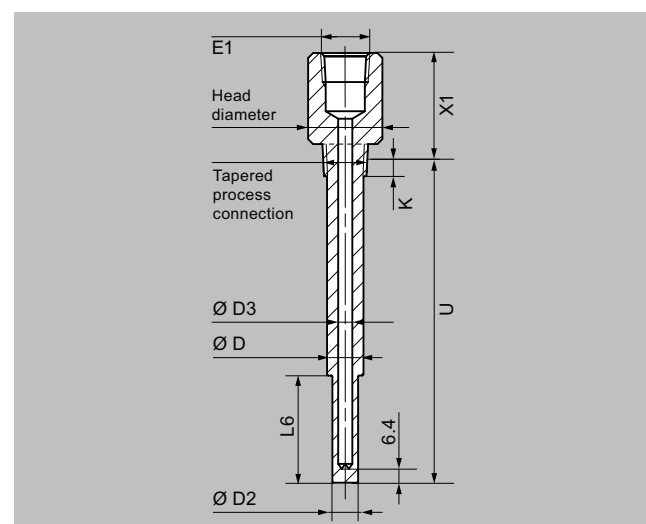


Dimensional drawings (continued)

7MT31, for welding, straight



7MT22, screwed design, reduced, tapered process connection



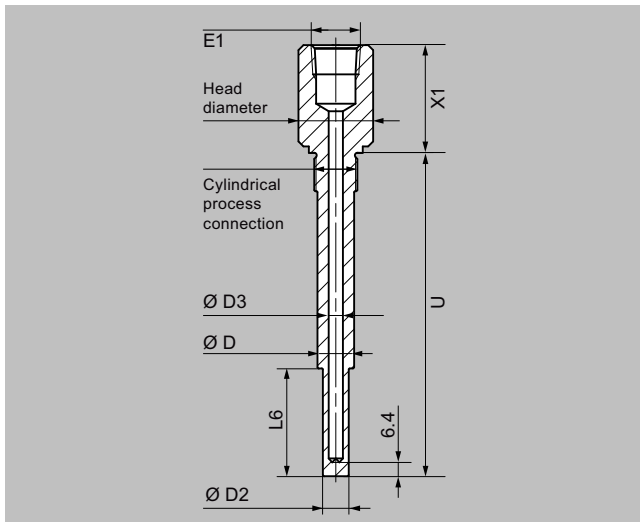
Temperature Measurement

Temperature sensors

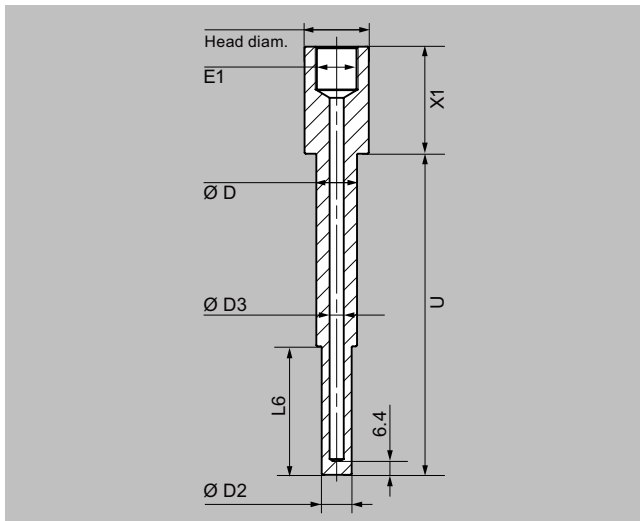
SITRANS TSthermowells / Thermowells according to ASME B40.9

Dimensional drawings (continued)

7MT22, screwed design, reduced, cylindrical process connection

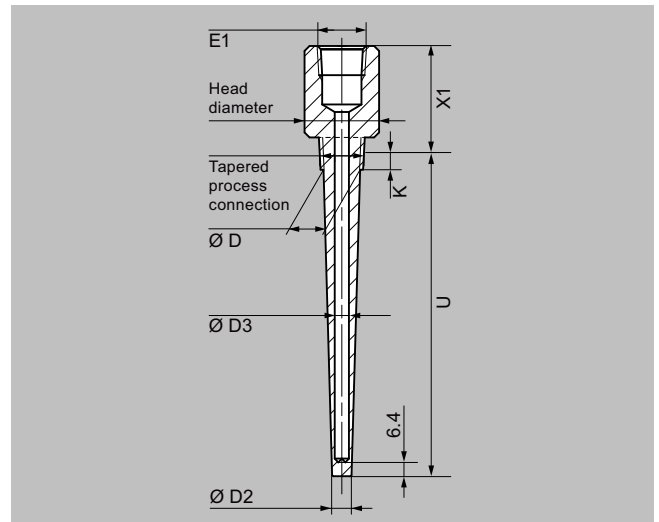


7MT32, for welding, reduced

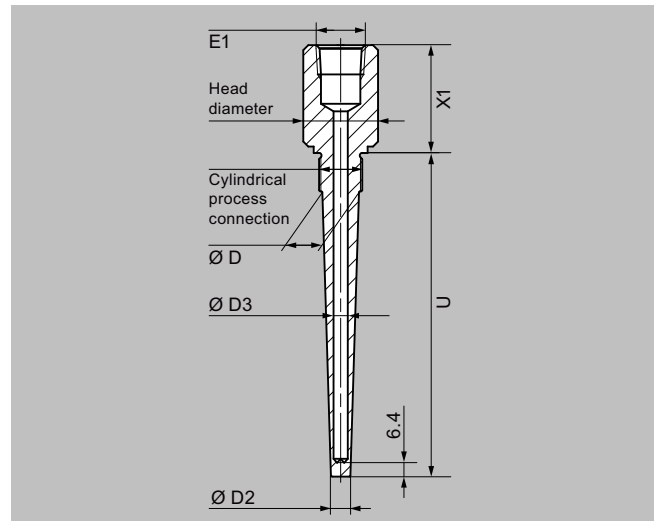


Dimensional drawings (continued)

7MT23, screwed design, tapered, tapered process connection

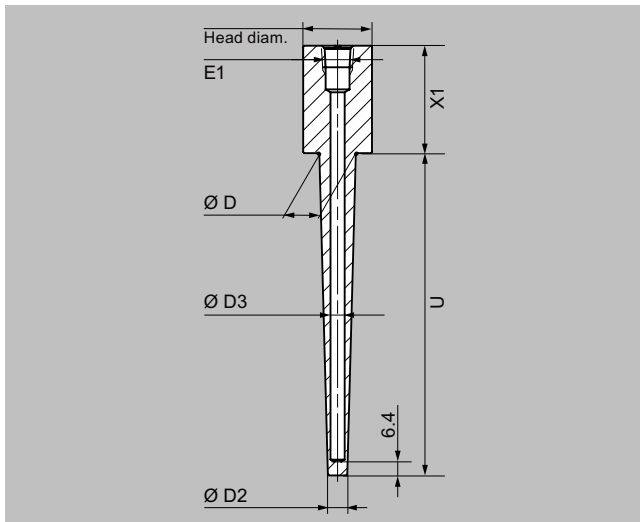


7MT23, screwed design, tapered, cylindrical process connection



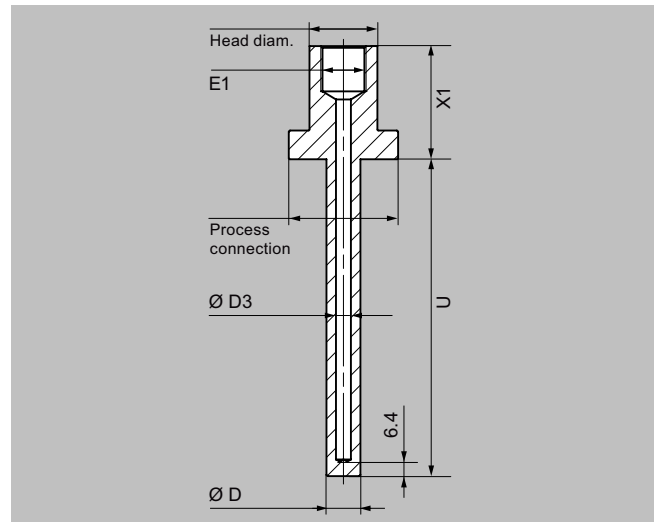
Dimensional drawings (continued)

7MT33, for welding, tapered

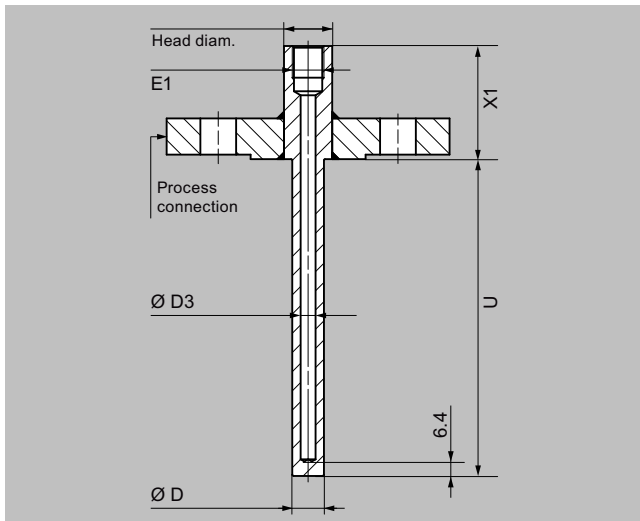


Dimensional drawings (continued)

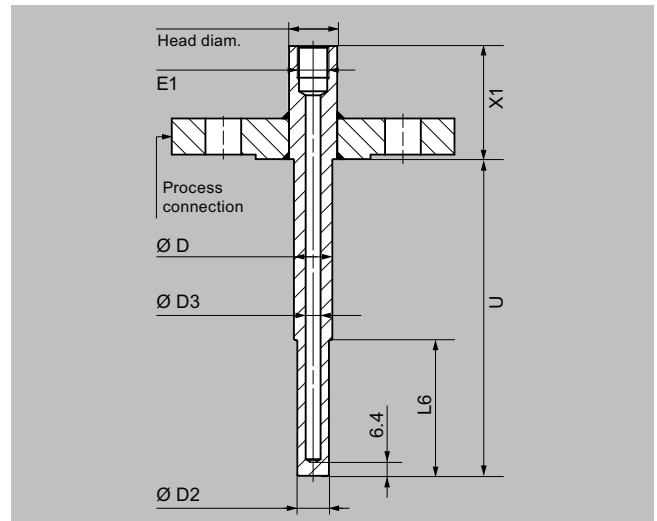
7MT51, Van Stone type, straight



7MT41, flange connection, straight



7MT42, flange connection, reduced



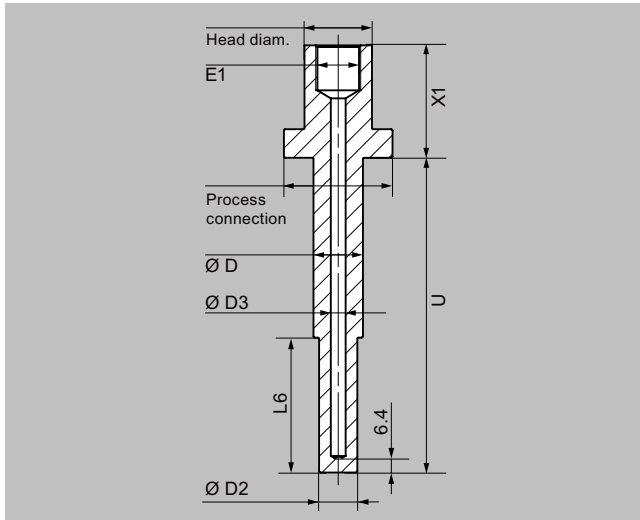
Temperature Measurement

Temperature sensors

SITRANS TSthermowells / Thermowells according to ASME B40.9

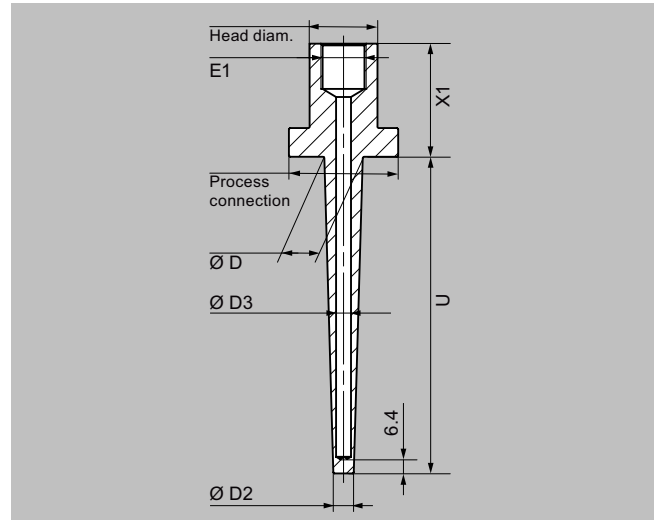
Dimensional drawings (continued)

7MT52, Van Stone type, reduced

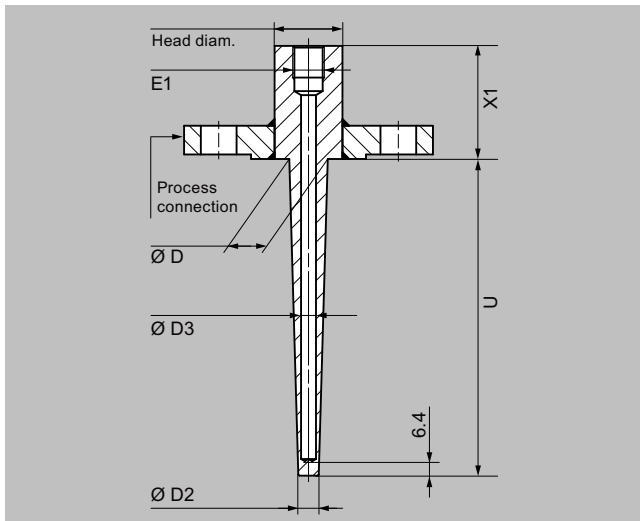


Dimensional drawings (continued)

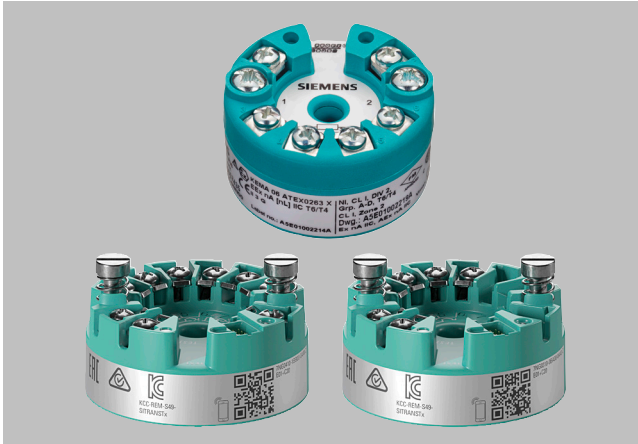
7MT53 Van Stone type, tapered



7MT43, flange connection, tapered



Overview



The following temperature transmitters are available for installation in the connection head:

SITRANS TH320

Programmable 2-wire temperature transmitter as a 4 to 20 mA version or with HART communication (4 to 20 mA), galvanic isolation. 1 sensor input for resistance thermometer and thermocouples.

SITRANS TH420

Programmable 2-wire temperature transmitter with HART communication (4 to 20 mA), galvanic isolation. 2 sensor inputs for resistance thermometers and thermocouples; therefore expanded functions such as hot backup (redundancy) and drift detection are possible.

Note:

- SITRANS TH320/TH420 can be installed in place of the connection socket or in the high spring flap. Retrofitting possible only in the high spring flap.
- If using intrinsically-safe temperature sensors any installed temperature transmitters must also be intrinsically-safe.

Selection and ordering data

You can find detailed information on the transmitters for the respective products under "Compact and head transmitters".

Transmitter to be fitted	Order code
SITRANS TH320, input 1 × universal, 4 ... 20 mA	T24
SITRANS TH320, input 1 × universal, HART	T34
SITRANS TH420, input 2 × universal, HART	T35
Customer-specific setting of the built-in transmitter (specify settings in plain text)	Y11

Temperature Measurement

Temperature sensors

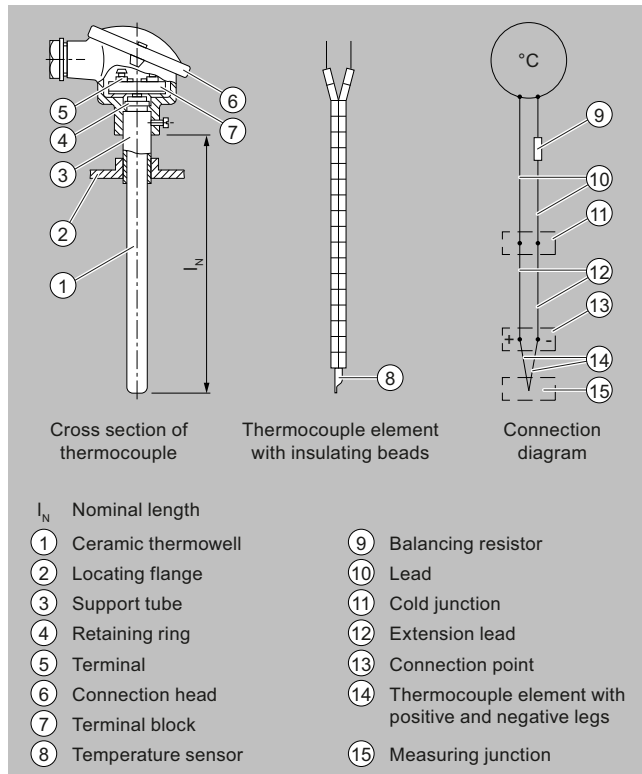
Thermocouples / Technical reference

Design

A thermocouple consists of

- the thermocouple (sensor)
- the mounting and terminal elements required.

The thermocouple consists of two wire elements made of different metals or metal alloys which are joined at one end, the measuring point, by soldering or welding:



Function

Measuring principle of the thermocouple element

If the measuring junction is exposed to a temperature different from that at the free ends of the thermocouple, a voltage (the thermoelectric voltage, Seebeck effect) is produced at these free ends. The magnitude of the thermoelectric voltage depends on the difference in temperature between the measuring junction and the free ends, and on the combination of materials in the thermocouple. Thermocouples always record a temperature difference. It is therefore essential to hold the free ends of a reference junction at a constant and known temperature in order to be able to determine the temperature at the measuring junction.

Calibration data for thermoelectric voltages and permissible deviations

The basic values of the thermoelectric voltages and the permissible deviations are specified for the commonly used material pairs in DIN IEC 584.

The thermocouples Cu-CuNi and Fe-CuNi to DIN 43710 are used for replacement purposes. Thermocouples of class 2 are supplied as standard. For more accurate measurements, thermocouples of Class 1 are available with half the DIN tolerance or with a test certificate. The tolerances only apply to the condition upon delivery. During operation at high temperatures, the tolerances of the thermocouples may change due to absorption of foreign matter, oxidation or evaporation of alloy components.

Mode of operation

The thermocouples are extended from their connecting point by means of compensating cables to a point with a temperature which remains constant as far as possible (reference junction). The compensating cables have the same color code as the associated thermocouple elements; the positive pole is marked in red. Correct polarity must be ensured since otherwise large errors will occur. Up to 200 °C, the same calibration data and tolerances apply to the compensating cables as to the corresponding thermocouples.

Protective fittings/thermowells

The thermocouple can be protected against mechanical stress and chemical attack by a ceramic or metal thermowell, which may be mounted using flanges, screwed glands or by welding into the pipe or vessel. The thermocouple element terminates in the connection head.

Installation examples with specification of the recommended thermocouples and thermowell materials can be found under "Integration" in the "Installation examples" table.

Owing to the different operating conditions, no guarantee can be given for protective fittings. The manufacturer is responsible for damages and measuring errors caused by wrong installation in compliance with the General Terms of Delivery if the instruments have been installed by the manufacturer and if the specifications for the operating conditions furnished by the customer were correct and sufficiently detailed.

Thermocouple elements are very compatible since it is almost always possible to adapt them in shape and size to the particular problem. The temperature-responsive part is almost point-shaped. Thermocouple elements are therefore particularly suitable for measuring rapidly changing temperatures.

Measuring insert and transport

The thermocouple wires are guided in a ceramic insulating pipe. With long lengths, this can also be in several parts in order to avoid or reduce breakage of the insulating pipe during transport. Normal transport conditions can be handled in this way. Small breaks in the measuring insert do not impair the function.

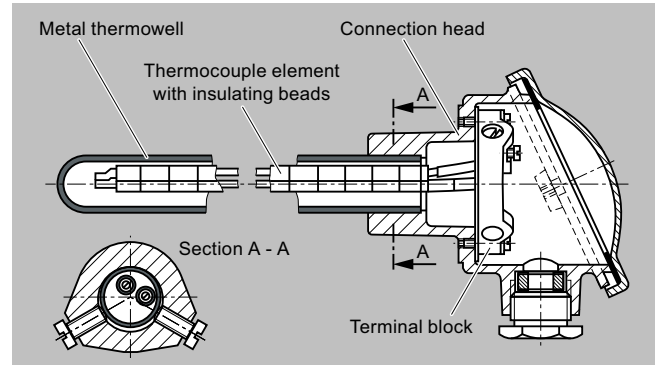
A sheathed thermocouple design or the use of special packaging can be clarified in advance for extreme transport conditions.

Overview



The straight thermocouple is suitable for temperatures from 0 to 1250 °C (32 to 2282 °F) with metal thermowell and is available with built-in temperature transmitter.

Design



Straight thermocouple with base-metal thermocouple elements Ni Cr/Ni with metal thermowell

Temperature Measurement

Temperature sensors

Thermocouples / Straight thermocouples acc. to EN 50446, with connection head

Selection and ordering data

Notes

- The installation of a transmitter is only possible in the versions with high spring flap (7MC2000-....6).
- To order a temperature transmitter installed in the connection head, see "Temperature transmitters for installation in the connection head".

Straight thermocouple with thermocouples Ni Cr/Ni (type K) with metal thermowell	Article No. 7MC2000-	● ● ● 0 ●
Click the article number for online configuration in the PIA Life Cycle Portal.		
Nominal length Specify customer-specific length with Y44, see order codes		
300 ... 500 mm (11.81 ... 19.68 inches) Initial: 500 mm (19.68 inches)		1
501 ... 710 mm (19.72 ... 27.95 inches) Initial: 710 mm (27.95 inches)		2
711 ... 1 000 mm (27.11 ... 39.37 inches) Initial: 1 000 mm (39.37 inches)		3
Thermowell		
≤ 1 000 °C (1 832 °F) X 10 CrAl 24, material no. 1.4762 Diameter: 22 mm × 2 mm (0.87 inches × 0.079 inches) Leg diameter: 2 mm (0.08 inches)		D
≤ 1 100 °C (2 012 °F) X 18 CrNi28, material no. 1.4749 Diameter: 26 mm × 4 mm (1.02 × 0.16 inches) Leg diameter: 3 mm (0.12 inches)		E
≤ 1 200 °C (2 192 °F) X 15 CrNi Si 24 19, material no. 1.4841 Diameter: 22 mm × 1.3 mm (0.87 inches × 0.051 inches) Leg diameter: 2 mm (0.08 inches)		F
≤ 1 250 °C (2 282 °F) CrAl 205 (Kantal AF), material no. 1.4767 Diameter: 22 mm × 1.3 mm (0.87 inches × 0.051 inches) Leg diameter: 3 mm (0.12 inches)		H
Number of thermocouples		
1 × thermocouple		C
2 × thermocouples		D
Connection head, form A		
Made of cast light metal with 1 cable entry and:		
• Screw cover		1
• High spring flap		6

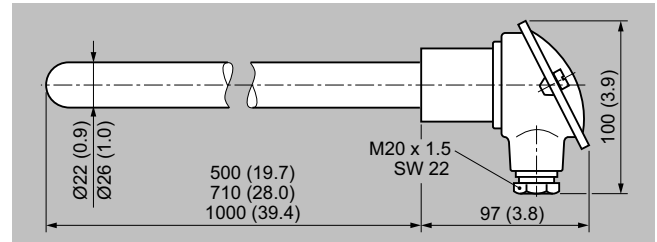
Options	Order code
Add "-Z" to article number and specify order code and plain text if needed.	
Tag plate made of stainless steel, specify label/tag no. in plain text	Y15
Perform factory calibration at 1 point, specify desired temperature in plain text.	Y33
Note	
If there are multiple calibration points, order as many as necessary.	
Installation length "U" customer-specific Select range, plain text specification of desired length (no specification = standard length)	Y44
Specify special design in plain text	Y98
Handling number of the special design	Y99

Technical specifications

Straight thermocouple

Thermocouples	Ni Cr/Ni Type K
• Quantity	1 or 2
• Leg diameter	2 to 3 mm (0.08 to 0.12 inch)
• Insulation of the legs	Insulating pipe
Thermowell	Metals
Connection head	Form A, from light metal casting, with a cable entry

Dimensional drawings



Straight thermocouple, dimensions in mm (inch)

Temperature Measurement

Temperature sensors

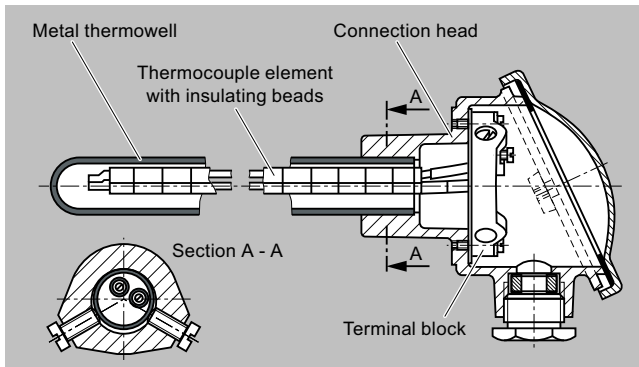
Thermocouples / Individual parts and accessories for straight thermocouples / Metal thermowells

Selection and ordering data

Metal thermowells for straight thermocouples according to EN 50446

	Article No.
X 10 CrAl 24, material no. 1.4762 Ø 22 × 2 mm (Ø 0.87 × 0.08 inch), 0.55 ... 1.10 kg (1.21 ... 2.42 lbs), dished Nominal length/thermowell length in mm (inch): <ul style="list-style-type: none"> • 500 (19.7)/520 (20.5) • 710 (28.0)/730 (28.7) • 1 000 (39.4)/1 020 (40.2) 	7MC2900-1DA 7MC2900-2DA 7MC2900-3DA
X 18 CrN28, material no. 1.4749 Ø 26 × 4 mm (Ø 1.02 × 0.16 inches), 1.25 ... 2.20 kg (2.76 ... 4.85 lbs), dished Nominal length/thermowell length in mm (inch): <ul style="list-style-type: none"> • 500 (19.7)/520 (20.5) • 710 (28.0)/730 (28.7) • 1 000 (39.4)/1 020 (40.2) 	7MC2900-1EC 7MC2900-2EC 7MC2900-3EC
X 15 CrNiSi 25 20, material no. 1.4841 Ø 22 × 2 mm (Ø 0.87 × 0.08 inch), 1.05 kg (2.31 lbs), dished Nominal length/thermowell length in mm (inch): <ul style="list-style-type: none"> • 1 000 (39.4)/1 020 (40.2) 	7MC2900-3FA
CrAl 205 (Kantal AF), material no. 1.4767 Ø 22 × 2 mm (Ø 0.87 × 0.05 inch), 0.55 ... 1.10 kg (1.21 ... 2.42 lbs) Nominal length/thermowell length in mm (inch): <ul style="list-style-type: none"> • 500 (19.7)/520 (20.5) • 710 (28.0)/730 (28.7) • 1 000 (39.4)/1 020 (40.2) 	7MC2900-1HA 7MC2900-2HA 7MC2900-3HA

Design



Straight thermocouple with base-metal thermocouple elements Ni Cr/Ni with metal thermowell

Selection and ordering data

Thermocouples for straight thermocouples according to DIN 43733

	Article No.
Base thermocouple with isolating pipe Wire diameter 3 mm (0.12 inch) Ni Cr/Ni, up to 1 000 °C (max. 1 300 °C), (up to 1 832 °F (max. 2 372 °F)) 0.55 ... 2.10 kg (1.21 ... 4.63 lbs) Nominal length L1/Thermowell length L2 in mm (inch):	
• 500 (19.7)/540 (21.3)	7MC2903-1CA
• 1 000 (39.4)/1 040 (40.9)	7MC2903-3CA

Temperature Measurement

Temperature sensors

Thermocouples / Individual parts and accessories for straight thermocouples / Connection heads

Overview

Connection head, type A (without terminal base and connection terminals) for thermowell diameter (drill hole = thermowell diameter + 0.5 mm) (0.02 inch)

Selection and ordering data

Connection heads for straight thermocouples

	Article No.
Connection head, type A (without terminal base and terminals), 1 cable entry, degree of protection IP53, 0.35 kg (0.77 lb)	
Light metal, screw-on cover, for thermowell diameter in mm (inch) (hole = thermowell diameter +0.5 mm) (0.02 inch)	
• 22 (0.87)	7MC2905-1AA
• 26 (1.02)	7MC2905-1BA
Light metal, high spring flap, for thermowell diameter in mm (inch) (hole = thermowell diameter +0.5 mm) (0.02 inch)	
• 22 (0.87)	7MC2905-4AA
• 26 (1.02)	7MC2905-4BA

Overview

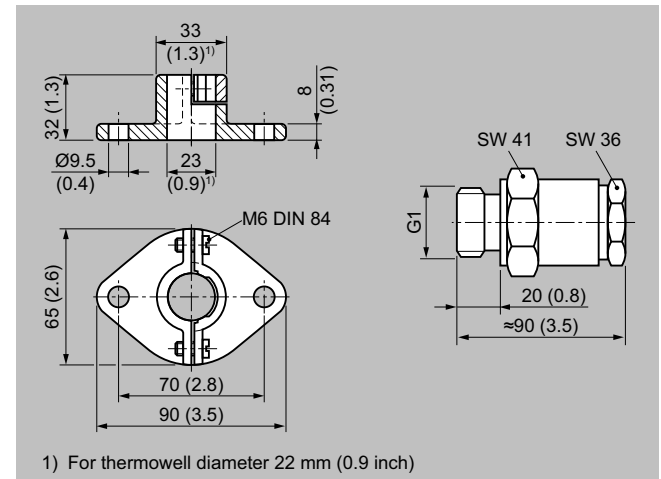
- Mounting base
- Terminal
- Gaskets
- Washers
- Stop flange
- Thread sleeve

Selection and ordering data

Installation accessories for connection heads for straight thermocouples

	Article No.
Terminal base without terminals for base thermocouples; 0.06 kg (0.13 lb)	7MC2998-1AA
Terminal for base thermocouples; 0.01 kg (0.02 lb)	7MC2998-1BA
Set of sealing rings (100 units) for the lid of the connection head; 0.01 kg (0.02 lb)	7MC2998-1CA
Set of washers (100 units) for the terminal base; 0.01 kg (0.02 lb)	7MC2998-1CB
Stop flange, adjustable, from GTW	
• For thermowell outer diameter 22 mm (0.87 inch); 0.35 kg (0.77 lb)	7MC2998-2CB
• For thermowell outer diameter 26 mm (1.02 inches); 0.32 kg (0.71 lb)	7MC2998-2CC
Threaded sleeve, gas-tight up to 1 bar (14.5 psi), adjustable, material no. 1.0718, with seal; 0.40 kg (0.88 lb)	
• For thermowell outer diameter 22 mm (0.87 inch), G1	7MC2998-2DB
• For thermowell outer diameter 26 mm (1.02 inches), G1	7MC2998-2DC

Dimensional drawings



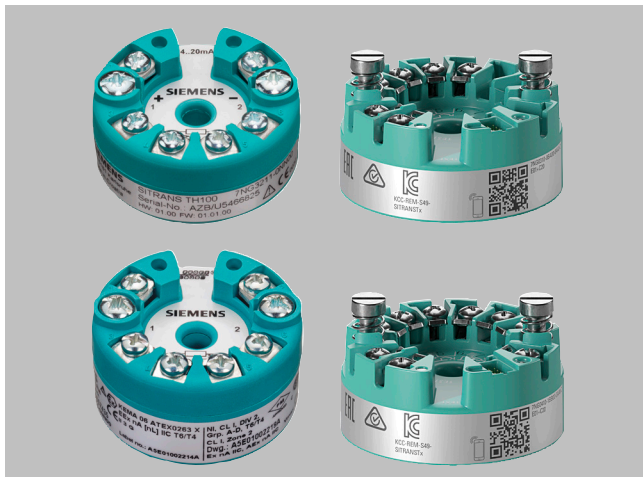
Stop flange according to DIN 43734 (left) and thread sleeve (right) for installing straight thermocouples, dimensions in mm (inch)

Temperature Measurement

Temperature sensors

Resistance thermometers / Temperature transmitters for mounting in the connection head

Overview



The following temperature transmitters are available for installation in the connection head:

SITRANS TH100

Programmable 2-wire temperature transmitter (4 to 20 mA), without galvanic isolation, only for Pt100 resistance thermometers.

SITRANS TH320

Programmable 2-wire temperature transmitter as a 4 to 20 mA version or with HART communication (4 to 20 mA), galvanic isolation. 1 sensor input for resistance thermometer and thermocouples.

SITRANS TH420

Programmable 2-wire temperature transmitter with HART communication (4 to 20 mA), galvanic isolation. 2 sensor inputs for resistance thermometers and thermocouples; therefore expanded functions such as hot backup (redundancy) and drift detection are possible.

SITRANS TH400

Temperature transmitter with PROFIBUS PA or FOUNDATION Fieldbus connection, galvanic isolation for resistance thermometers and thermocouple elements.

Note:

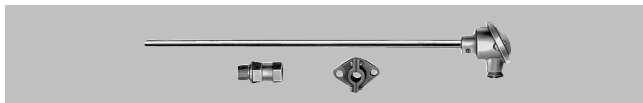
- SITRANS TH100/TH320/TH420/TH400 can be fitted in the high hinged cover or instead of the terminal base. Retrofitting possible only in the high hinged cover.
- If using intrinsically-safe temperature sensors any installed temperature transmitters must also be intrinsically-safe.

Selection and ordering data

You can find detailed information on the transmitters for the respective products under "Compact and head transmitters".

Transmitter to be fitted	Order code
To order the sensor with a built-in temperature transmitter, add "-Z" to the article number of the sensor, and supplement with the following order code:	
SITRANS TH100, input 1 × Pt100, 4 ... 20 mA	T12
SITRANS TH320, input 1 × universal, 4 ... 20 mA	T24
SITRANS TH320, input 1 × universal, HART	T34
SITRANS TH420, input 2 × universal, HART	T35
Customer-specific setting of the built-in transmitter (specify settings in plain text)	Y11

Overview



The flue gas resistance thermometer with connection head is suitable for the temperature range of -50 to +600 °C (-58 to +1112 °F) and is also available with built-in temperature transmitter. Please order stop flange or thread sleeve separately.

Selection and ordering data

Notes

- To order a temperature transmitter installed in the connection head, see "Temperature transmitters for installation in the connection head".
- Individual parts: Measuring inserts, see "Accessories".

Flue gas resistance thermometer	Article No.
Measurement resistance: (measurement winding) embedded in ceramic 1 Pt100 measurement resistance, 3-wire connection	
Installation length/mm (inch)	
300 ... 500 mm: (11.8 ... 19.69 inches): Initial 500 mm (19.7 inches)	7MC1000-1BA2 ●
501 ... 710 mm: (19.72 ... 27.95 inches): Initial 710 mm (27.95 inches)	7MC1000-2BA2 ●
711 ... 1 000 mm: (28 ... 39.37 inches): Initial 1 000 mm (39.37 inches)	7MC1000-3BA2 ●
1 001 ... 1 400 mm: (39.41 ... 55.12 inches): Initial 1 400 mm (19.7 inches)	7MC1000-4BA2 ●
1 401 ... 2 000 mm: (55.16 ... 78.7 inches): Initial 2 000 mm (78.7 inches)	7MC1000-5BA2 ●
Connection head, form B	
Made of cast light metal with 1 cable entry and	
• Screw cover	1
• Standard spring flap	4
• High spring flap	6

Options	Order code
Add "-Z" to article number and specify order code and plain text if needed.	
Tag plate made of stainless steel, specify label/tag no. in plain text	Y15
Perform factory calibration at 1 point, specify desired temperature in plain text	Y33
Note If there are multiple calibration points, order as many as necessary.	
Specify special design in plain text	Y98
Handling number special design	Y99

Temperature Measurement

Temperature sensors

Resistance thermometers / Flue gas resistance thermometers with connection head

Selection and ordering data (continued)

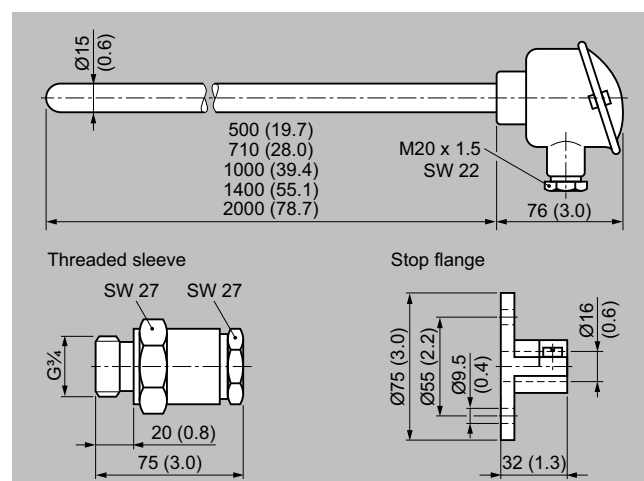
Accessories

	Article No.
Stop flange Adjustable, acc. to DIN 43734; Material: GTW 35, material no. 0.8035, for thermowell diameter: 15 mm (0.59 inches), 0.3 kg (0.66 lb)	7MC2998-5CA
Gas-tight threaded sleeve Material: 9 SMnPb 28, material no. 1.0718, for thermowell outer diameter 15 mm (0.59 inches), 0.4 kg (0.88 lb)	
Screw-in thread G $\frac{3}{4}$ with seal	7MC2998-5DA
Screw-in thread G $\frac{1}{2}$ with seal	7MC2998-5DC

Technical specifications

Flue gas resistance thermometer with connection head	
Design	According to DIN 43764: Thermometer without mounting
Thermowell	
• Form	1, DIN 43772; cylindrical, \varnothing 15 mm (0.59 inches), wall thickness 3 mm (0.12 inches), seamless
• Material	St 35.8, Material No. 1.0305, enameled
• Load rating	1 bar (14.5 psi) overpressure, according to DIN 43772
Measuring insert	Exchangeable, with measuring insert pipe (\varnothing 8 mm (0.31 inches)) made of stainless steel; terminal block with pressure springs

Dimensional drawings



Flue gas resistance thermometer with connection head, dimensions in mm (inch)

Overview

The resistance thermometer for damp areas is suitable for the temperature range of -30 to +60 °C (-22 to +140 °F).

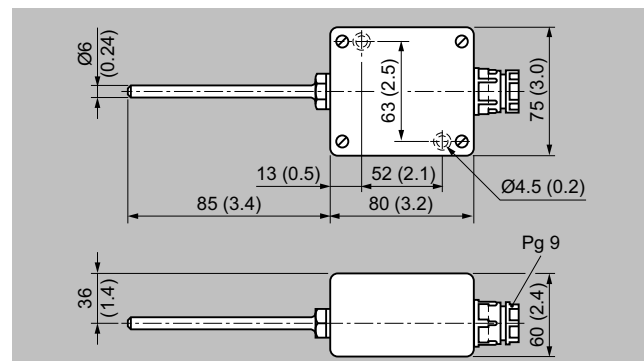
Selection and ordering data**Notes**

- To order a temperature transmitter installed in the connection head, see "Temperature transmitters for installation in the connection head".
- Subsequent installation of SITRANS TH series head transmitters possible at any time.

Resistance thermometer for damp rooms	Article No.
Thermowell out of stainless steel	
• With 1 Pt100 measurement resistance 0.1 kg (0.22 lb)	7MC1027-1AA
• With 2 Pt100 measuring resistor 0.1 kg (0.22 lb)	7MC1027-1AB
Options	
Add "-Z" to article number and specify order code and plain text if needed.	Order code
Tag plate made of stainless steel, specify label/tag no. in plain text	Y15
Perform factory calibration at 1 point, specify desired temperature in plain text	Y33
Note If there are multiple calibration points, order as many as necessary.	
Specify special design in plain text	Y98
Handling number special design	Y99

Technical specifications

Resistance thermometer for damp rooms	
Thermowell	Made of stainless steel
Connection head	From light metal casting, with cable entry; made of plastic on request
Measuring insert	1 or 2 Pt measurement resistors according to EN 60751, 2 or 3-wire connection, Class B
Degree of protection	IP65 according to EN 60529

Dimensional drawings

Resistance thermometer for damp rooms, dimensions in mm (inch)

Temperature Measurement

Temperature sensors

Resistance thermometers / Accessories - Connection heads

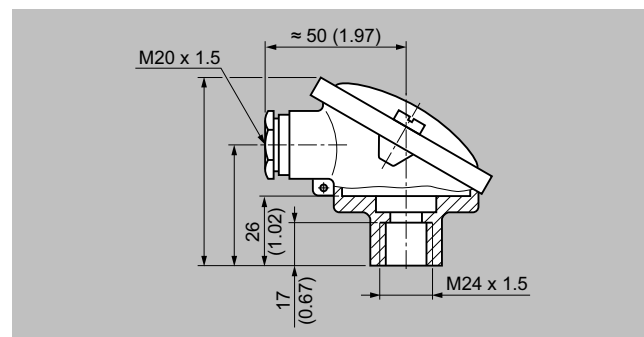
Selection and ordering data

Connection heads type B for SITRANS TS500

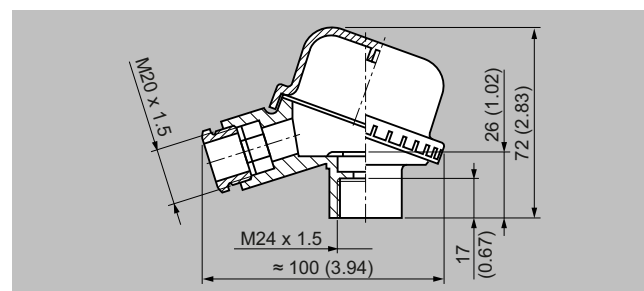
	Article No.
IP54 degree of protection	
Connection head type: similar to BAO; aluminum; flange cover	7MC1907-1BA
Connection head type: similar to BMO; plastic; screw cover	7MC1907-1BK
IP65 degree of protection	
Connection head type: similar to BB0; aluminum; small spring flap	7MC1907-1BF
Connection head type: similar to BC0; aluminum; high spring flap	7MC1907-1BL
Connection head type: B-VA, stainless steel	7MC1907-1BV
Quick-release lock for connection heads BB0, BC0, degree of protection of connection head reduced to IP20, weight: 0.02 kg (0.04 lb)	7MC1907-1BS

Dimensional drawings

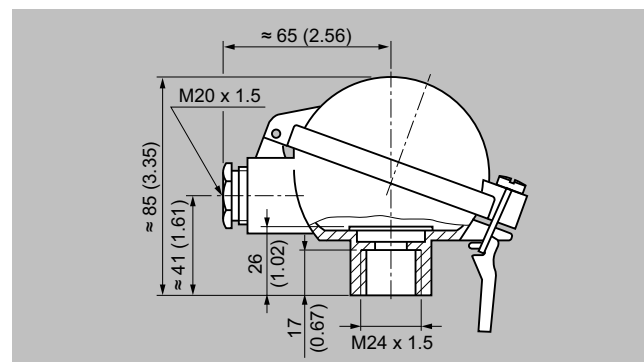
Connection heads type B for SITRANS TS500



Connection head, Type B, IP 54 degree of protection, made of aluminum, with screw cover, dimensions in mm (inch)

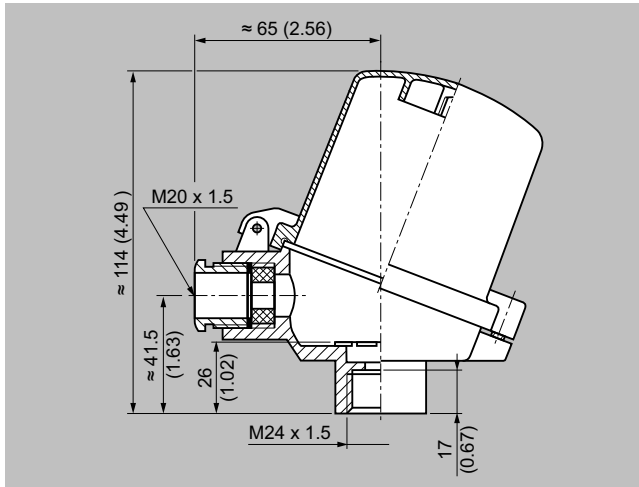


Connection head, Type B, IP 54 degree of protection, made of plastic, with screw cover, dimensions in mm (inch)

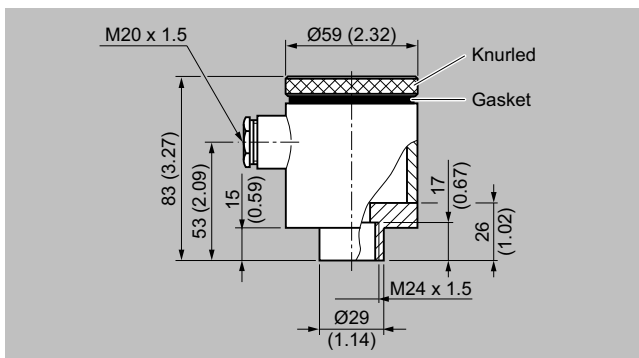


Connection head, Type B, IP65 degree of protection, made of aluminum, with standard spring flap, dimensions in mm (inch)

Dimensional drawings (continued)



Connection head, Type B, IP65 degree of protection, made of aluminum, with high spring flap, dimensions in mm (inch)



Connection head, Type B-VA, IP65 degree of protection, made of stainless steel, with screw cover, dimensions in mm (inch)

Temperature Measurement

Temperature transmitters

Compact and head transmitters / SITRANS TH100 Slim (Pt100)

Overview



SITRANS TH100 Slim is particularly suited for the production of compact thermometers with integrated transmitter. Its cylindrical stainless steel enclosure is simply welded to the basic body of the compact thermometer. Its compact design makes the SITRANS TH100 Slim the ideal solution for manufacturers from a wide variety of industries. For the parameterization, the SIPROM T software is used in combination with the modem for SITRANS TH100/TH200.

Benefits

- Transmitter in 2-wire system with M12 device plug for mounting on compact thermometer.
- Solution for easy and space-saving temperature measurements in a variety of industries.
- Programmable; as a result, the sensor connection, measuring range and much more are programmable.

Application

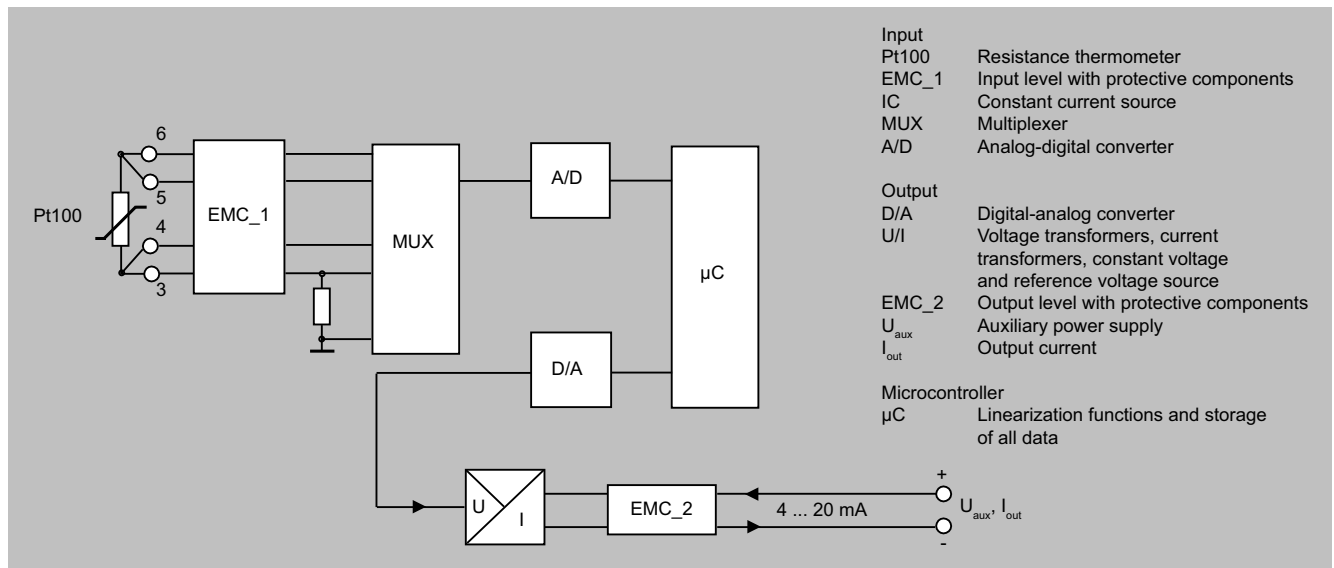
The SITRANS TH100 Slim transmitter can be used in combination with Pt100 compact resistance thermometers for temperature measurement in all industries. Thanks to its compact design, it can be mounted to all kinds of designs. The output signal is a load-independent direct current of 4 to 20 mA which is proportional to the temperature. Parameterization is implemented over the PC using the parameterization software SIPROM T and the modem for SITRANS TH100/TH200. If you already have a "Modem for SITRANS TK" (article number 7NG3190-6KB), you can continue to use this for parameterization of the SITRANS TH100.

Function

Mode of operation

The measured signal supplied by a Pt100 resistance thermometer (2, 3 or 4-wire connection) is amplified in the input stage. The voltage, which is proportional to the input variable, is then converted into digital signals by a multiplexer in an analog-to-digital converter. They are converted in the microcontroller in accordance with the sensor characteristic and additional parameters (measuring range, damping, ambient temperature, etc.).

The signal prepared in this way is converted in an analog-to-digital converter into a load-independent direct current of 4 to 20 mA. An EMC filter protects the input and output circuits against electromagnetic interferences.



SITRANS TH100 Slim, function block diagram

Temperature Measurement

Temperature transmitters

Compact and head transmitters / SITRANS TH100 Slim (Pt100)

Selection and ordering data

SITRANS TH100 Slim temperature transmitters for Pt100	Article No.
For welding to compact thermometers 2-wire system, 4 ... 20 mA, programmable, without galvanic isolation	7NG3150-0NN00
• Without explosion protection	
Accessories	
Modem	
Modem with USB interface and SIPROM T software	7NG3092-8KN

Technical specifications

SITRANS TH100 Slim (Pt100)	
Input	
<u>Resistance thermometer</u>	
Measured variable	Temperature
Input type	Pt100 according to IEC 60751
Characteristic curve	Temperature-linear
Connection type	2, 3, 4-wire connection
Resolution	14 bit
Measuring accuracy	< 0.25 °C (0.45 °F)
Repeatability	< 0.1 °C (0.18 °F)
Measuring current	Approx. 0.4 mA
Measuring cycle	< 0.7 s
Measuring range	-60 ... +160 °C (-76 ... +320 °F)
Measuring span	25 ... 220 °C (45 ... 396 °F)
Unit	°C or °F
Offset	Programmable: -100 ... +100 °C (-180 ... +180 °F)
Wire resistance	Max. 20 Ω (total from feeder and return conductor)
Noise suppression	50 and 60 Hz
Output	
Output signal	4 ... 20 mA, 2-wire
Auxiliary power	8.5 ... 36 V DC (30 V for Ex)
Max. load	($U_{aux} - 8.5 V$)/0.023 A
Overrange	3.6 ... 23 mA, continuously adjustable (factory setting: 3.84 ... 20.5 mA)
Error signal (in the event of sensor breakage)	3.6 ... 23 mA, continuously adjustable (factory setting: 3.6 mA or 22.8 mA)
Damping time	0 ... 30 s
Protection	Against reverse polarity
Resolution	12 bit
Accuracy at 23 °C (73.4 °F)	< 0.1% of measuring span
Temperature influence	< 0.13%/10 °C (0.13%/18 °F)
Effect of auxiliary power	< 0.02% of measuring span/V
Effect of load impedance	< 0.055% of max. measuring span/100 Ω
Long-term drift	<ul style="list-style-type: none"> < 0.025% of the max. measuring span in the first month < 0.035% of the max. measuring span after one year < 0.05% of the max. measuring span after 5 years
Ambient conditions	
Ambient temperature range	-40 ... +85 °C (-40 ... +185 °F)
Storage temperature range	-40 ... +85 °C (-40 ... +185 °F)
Relative humidity	98%, with condensation
Electromagnetic compatibility	According to EN 61326 and NAMUR NE21
Structural design	
Weight	42 g (0.093 lbs)
Dimensions	See dimensional drawing

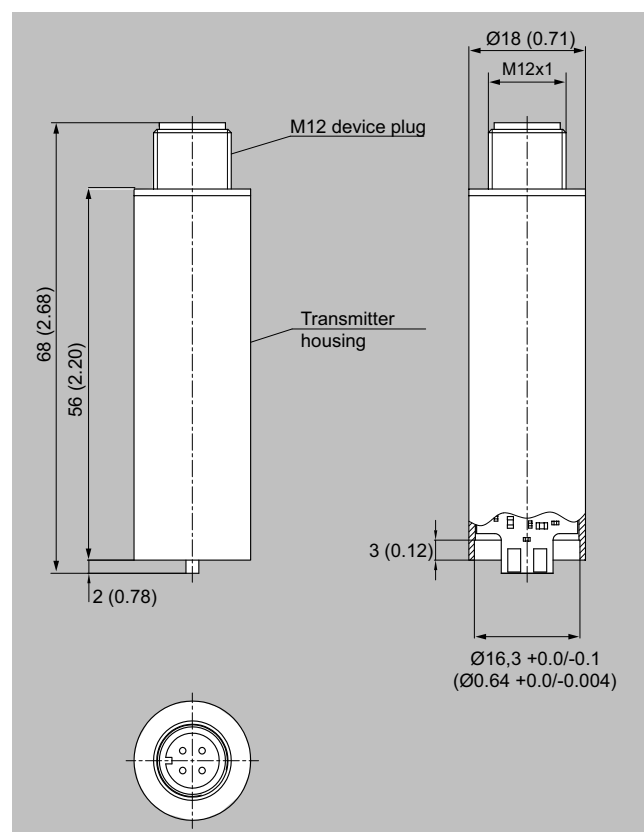
Technical specifications (continued)

SITRANS TH100 Slim (Pt100)	
Material	316L stainless steel
Degree of protection according to IEC 60529	IP67
• Enclosure	
Software requirements for SIPROM T	
PC operating system	Windows 10, 7, ME, 2000 and XP; also Windows 95, 98 and 98SE, but only in connection with RS 232 modem

Factory setting:

- Pt100 (IEC 751) in the 3-wire connection
- Measuring range: 0 ... 100 °C (32 ... 212 °F)
- Fault current in the event of sensor breakage: 22.8 mA
- Sensor offset: 0 °C (0 °F)
- Damping 0.0 s

Dimensional drawings



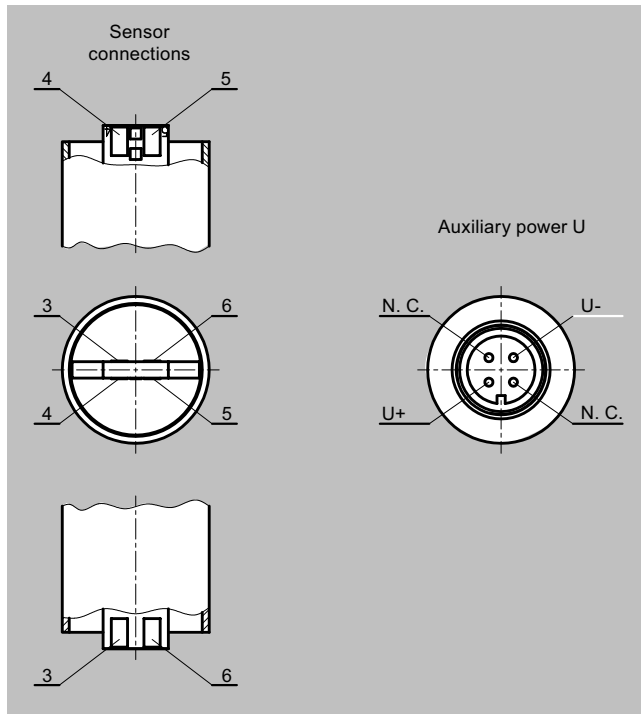
SITRANS TH100 Slim, dimensions in mm (inch)

Temperature Measurement

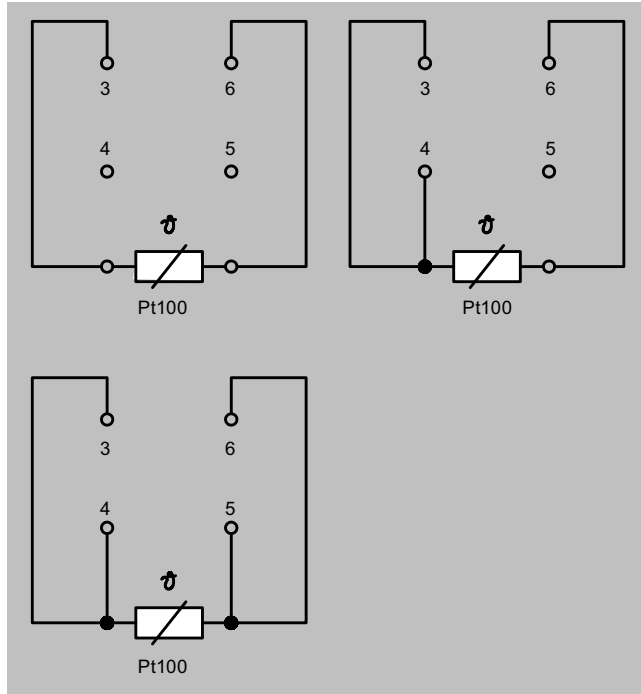
Temperature transmitters

Compact and head transmitters / SITRANS TH100 Slim (Pt100)

Circuit diagrams



SITRANS TH100 Slim, auxiliary power and sensor connection



SITRANS TH100 Slim, sensor connection assignment

Overview



The SITRANS TH100, which represents an economical alternative by dispensing with galvanic isolation and universal sensor connection, is ideally suited for Pt100 measurements.

For the parameterization, the SIPROM T software is used in combination with the modem for SITRANS TH100/TH200.

Its compact design makes the SITRANS TH100 suitable for retrofitting measuring points or replacing analog transmitters.

The transmitter is available in a non-Ex version and in a version suitable for use in hazardous areas.

Benefits

- Transmitter with 2-wire system
- Mounting in connection head, type B or larger or on DIN rail
- Programmable; as a result, the sensor connection, measuring range and much more are programmable
- Intrinsically safe version for use in hazardous areas

Application

The SITRANS TH100 transmitter can be used for temperature measurement with Pt100 resistance thermometers in all industries. Its compact size means that it can be installed in connection heads of type B or larger.

The output signal is a load-independent direct current of 4 to 20 mA which is proportional to the temperature.

Parameterization is implemented over the PC using the parameterization software SIPROM T and the modem for SITRANS TH100/TH200. If you already have a "Modem for SITRANS TK" (article number 7NG3190-6KB), you can continue to use this for parameterization of the SITRANS TH100.

Transmitters of the "intrinsically safe" type of protection can be installed within potentially explosive atmospheres. The devices meet the directive 2014/34/EU (ATEX) as well as the FM and CSA requirements.

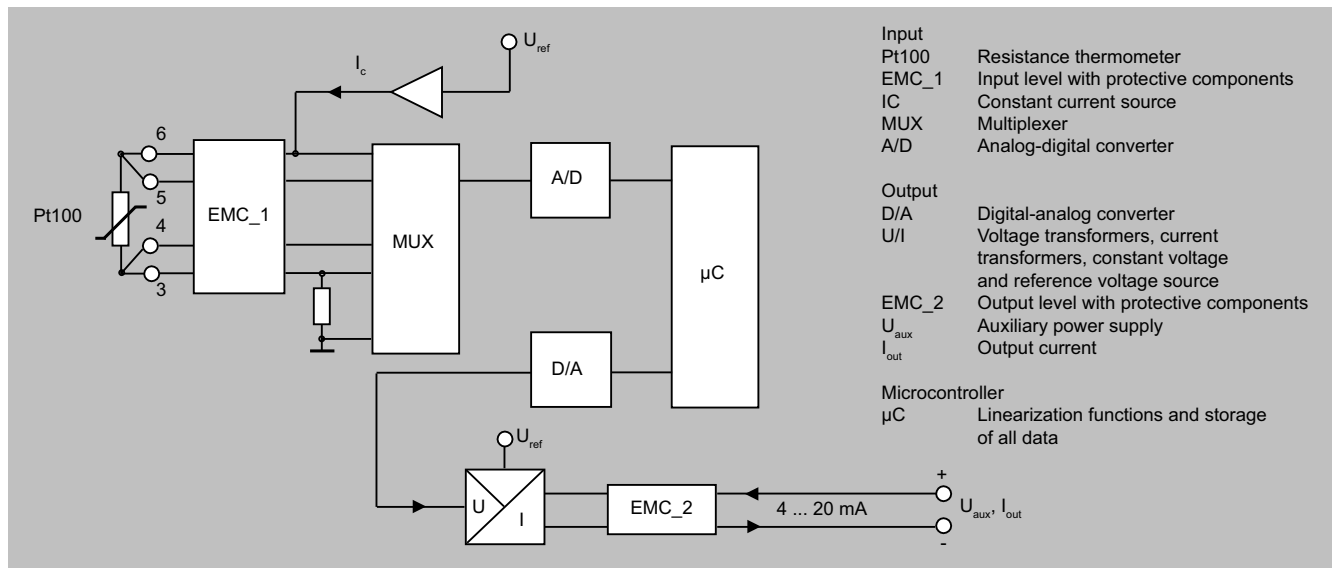
Function

Mode of operation

The measured signal supplied by a Pt100 resistance thermometer (2, 3 or 4-wire connection) is amplified in the input stage. The voltage, which is proportional to the input variable, is then converted into digital signals by a multiplexer in an analog-to-digital converter. They are converted in the microcontroller in accordance with the sensor characteristic and further parameters (measuring range, damping, ambient temperature, etc.).

The signal prepared in this way is converted in an analog-to-digital converter into a load-independent direct current of 4 to 20 mA.

An EMC filter protects the input and output circuits against electromagnetic interferences.



SITRANS TH100, function block diagram

Temperature Measurement

Temperature transmitters

Compact and head transmitters / SITRANS TH100 (4 to 20 mA, Pt100)

Selection and ordering data

	Article No.
SITRANS TH100 head transmitter for Pt100 For installation in connection head type B, 2-wire system 4 ... 20 mA, programmable, without galvanic isolation	
Without explosion protection	7NG3211-0NN00
With explosion protection "Intrinsic safety" type of protection and for zone 2	
• According to ATEX	7NG3211-0AN00
• According to FM (cFM _{US})	7NG3211-0BN00

Options	Order code
Add "-Z" to article number, specify order code and, if applicable, plain text	
Test report (5 measuring points)	C11
Customer-specific programming	
Specify measuring range to be set in plain text (max. 5 digits): Y01: ... to ... °C, °F	Y01 ¹⁾
Measuring point number (TAG) max. 8 characters	Y17 ²⁾
Measuring point description, max. 16 characters	Y23 ²⁾
Pt100 (IEC) 2-wire, R _L = 0 Ω	U02 ³⁾
Pt100 (IEC) 3-wire	U03 ³⁾
Pt100 (IEC) 4-wire	U04 ³⁾
Enter special deviating customer-specific setting in plain text	Y09 ⁴⁾
Fault current 3.6 mA (instead of 22.8 mA)	U36 ²⁾

- 1) For customer-specific programming for RTD and TC, the start value and the end value of the required measuring span must be specified here.
- 2) For this selection, Y01 or Y09 must also be selected.
- 3) For this selection, Y01 must also be selected.
- 4) For customer-specific programming for mV and ohm, the start value and the end value of the required measuring span and the unit must be entered here.

Accessories

	Article No.
Other accessories for assembly, connection and transmitter configuration, see page 2/198.	
Modem	
Modem with USB interface and SIPROM T software	7NG3092-8KN
Mounting rail adapter for head transmitter (Quantity delivered: 5 units)	7NG3092-8KA
Connecting cable 4-wire, 200 mm (7.87 inches), for sensor connections when using head transmitters in the high spring flap (set with 5 units)	7NG3092-8KC

For supply units, see Catalog FI01 section "Supplementary components"

Ordering example:

7NG3211-0NN00-Z Y01+Y23+U03

Y01: -10 ... +100 °C

Y23: TICA1234HEAT

Factory setting:

- Pt100 (IEC 751) in the 3-wire connection
- Measuring range: 0 ... 100 °C (32 ... 212 °C)
- Fault current in the event of sensor breakage: 22.8 mA

Selection and ordering data (continued)

- Sensor offset: 0 °C (0 °F)
- Damping 0.0 s

Technical specifications

SITRANS TH100 (4 ... 20 mA, Pt100)	
Input	
Resistance thermometer	
Measured variable	Temperature
Input type	Pt100 according to IEC 60751
Characteristic curve	Temperature-linear
Connection type	2, 3, 4-wire connection
Resolution	14 bit
Measuring accuracy	
• Measuring span <250 °C (450 °F)	< 0.25 °C (0.45 °F)
• Measuring span >250 °C (450 °F)	< 0.1% of measuring span
Repeatability	< 0.1 °C (0.18 °F)
Measuring current	Approx. 0.4 mA
Measuring cycle	< 0.7 s
Measuring range	-200 ... +850 °C (-328 ... +1562 °F)
Measuring span	25 ... 1050 °C (77 ... 1922 °F)
Unit	°C or °F
Offset	Programmable: -100 ... +100 °C (-180 ... +180 °F)
Wire resistance	Max. 20 Ω (total from feeder and return conductor)
Noise suppression	50 and 60 Hz
Output	
Output signal	4 ... 20 mA, 2-wire
Auxiliary power	8.5 ... 36 V DC (30 V with Ex ia and ib; 32 V with Ex nL/iC; 35 V with Ex nA)
Max. load	(U _{aux} - 8.5 V)/0.023 A
Overrange	3.6 ... 23 mA, continuously adjustable (default range: 3.84 ... 20.5 mA)
Error signal (following sensor breakage) (conforming to NE43)	3.6 ... 23 mA, continuously adjustable (default range: 3.6 mA or 22.8 mA)
Damping time	0...30 s (default value: 0 s)
Protection	Against reverse polarity
Resolution	12 bit
Accuracy at 23 °C (73.4 °F)	< 0.1% of measuring span
Temperature influence	< 0.1%/10 °C (0.1%/18 °F)
Effect of auxiliary power	< 0.01% of measuring span/V
Effect of load impedance	< 0.025% of the max. measuring span/100 Ω
Long-term drift	• < 0.025% of the max. measuring span in the first month • < 0.035% of the max. measuring span after one year • < 0.05% of the max. measuring span according to 5 years
Ambient conditions	
Ambient temperature	-40 ... +85 °C (-40 ... +185 °F)
Storage temperature	-40 ... +85 °C (-40 ... +185 °F)
Relative humidity	< 98%, with condensation
Electromagnetic compatibility	According to EN 61326 and NAMUR NE21
Structural design	
Weight	50 g (0.11 lb)
Dimensions	See dimensional drawing
Material	Molded plastic
Cross-section of cables	Max. 2.5 mm ² (AWG 13)
Degree of protection according to IEC 60529	
• Enclosure	IP40
• Terminals	IP00

Temperature Measurement

Temperature transmitters

Compact and head transmitters / SITRANS TH100 (4 to 20 mA, Pt100)

Technical specifications (continued)

SITRANS TH100 (4 ... 20 mA, Pt100)

Certificates and approvals

ATEX explosion protection

EC type-examination certificate

• "Intrinsic gas safety" type of protection

• "Increased safety" type of protection

• "Intrinsic dust safety" type of protection

Explosion protection: FM for USA

• FM approval

• Degrees of protection

Explosion protection to FM for Canada (FMU_s)

• FM approval

• Degrees of protection

Other certificates

Software requirements for SIPROM T

PC operating system

DEKRA 21ATEX0033X /
DEKRA 21ATEX0034X

- II 1 G Ex ia IIC T6...T4
- II 2 (1) G Ex ib [ia Ga] IIC T6...T4 Gb
- II 3 (1) G Ex ic [ia Ga] IIC T6...T4 Gc
- II 3 G Ex ic IIC T6...T4 Gc

• II 3 G Ex ec IIC T6...T4 Gc

• II 3 G Ex ec [ic] IIC T6...T4 Gc

II 2 D Ex ia IIIC Db

FM 3024169

- IS / CI I, II, III / Div 1 / GP ABCDEFG T6, T5, T4
- CI I / ZN 0 / AEx ia IIC T6, T5, T4
- NI / CI I / Div 2 / GP ABCDEFG T6, T5, T4
- NI / CI I / ZN 2 / IIC T6, T5, T4

FM 3024169C

- IS / CI I, II, III / Div 1 / GP ABCDEFG T6, T5, T4
- NI / CI I / DIV 2 / GP ABCD T6, T5, T4
- NIFW / CI I, II, III / DIV 2 / GP ABCDEFG T6, T5, T4
- DIP / CI II, III / Div 2 / GP FG T6, T5, T4
- CI I / ZN 0 / Ex ia IIC T6, T5, T4
- CI I / ZN 2 / Ex nA nL IIC T6, T5, T4

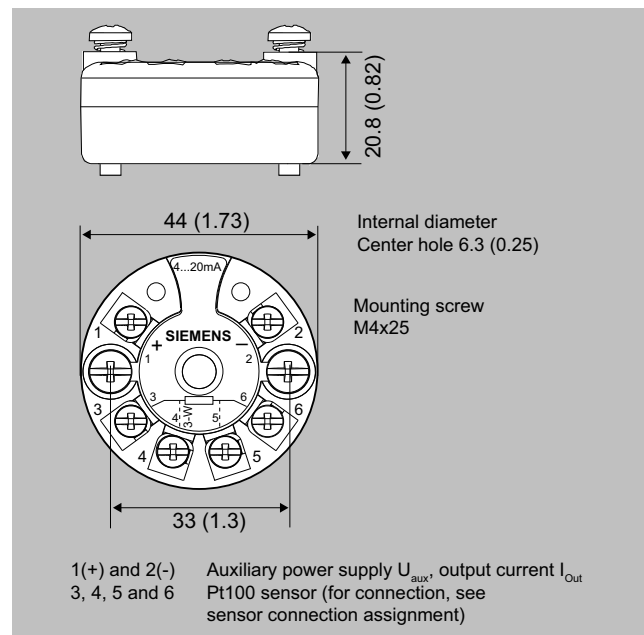
EAC Ex, NEPSI

Windows ME, 2000, XP, Win 7, 8 and 10; in connection with RS 232 modem, also Windows 95, 98 and 98 SE

Factory setting:

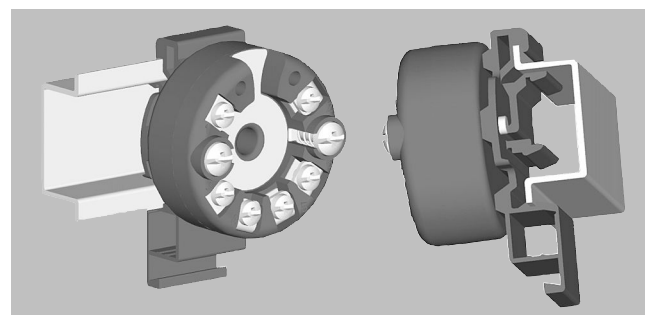
- Pt100 (IEC 751) in the 3-wire connection
- Measuring range: 0 ... 100 °C (32 ... 212 °F)
- Fault current in the event of sensor breakage: 22.8 mA
- Sensor offset: 0 °C (32 °F)
- Damping 0.0 s

Dimensional drawings

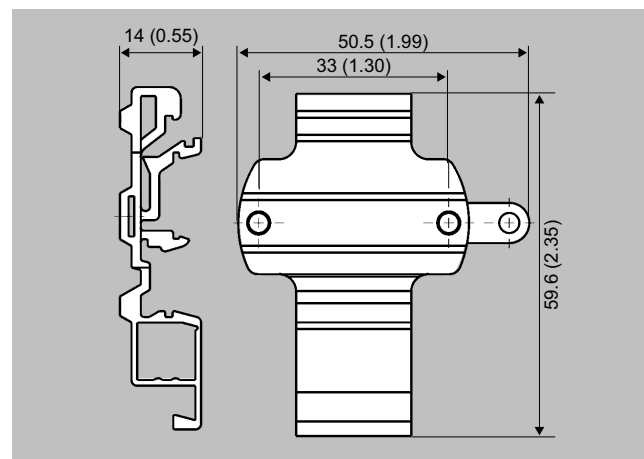


SITRANS TH100, dimensions in mm (inch)

Mounting on DIN rail



SITRANS TH100, mounting of transmitter on DIN rail



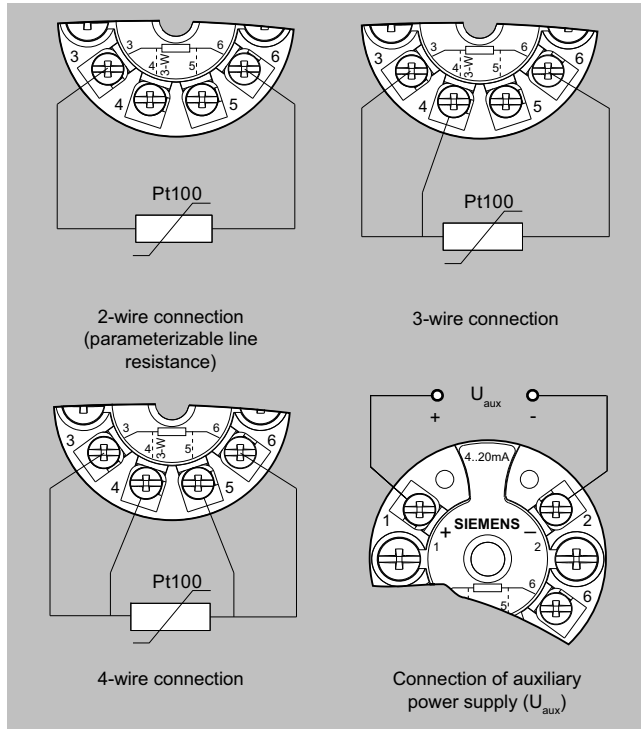
Mounting rail adapter, dimensions in mm (inch)

Temperature Measurement

Temperature transmitters

Compact and head transmitters / SITRANS TH100 (4 to 20 mA, Pt100)

Circuit diagrams



SITRANS TH100, sensor connection assignment

Temperature Measurement

Temperature transmitters

Compact and head transmitters / SITRANS TH200 (4 to 20 mA, universal)

Overview



Ultra flexible - with the universal SITRANS TH200 transmitter

- 2-wire device for 4 to 20 mA
- Mounting in the connection head of the temperature sensor
- Universal input for virtually any type of temperature sensor
- Configurable over PC

Benefits

- Compact design
- Flexible mounting and center hole allow you to select your preferred mounting type
- Galvanic isolation
- Test sockets for multimeters
- Diagnostics LED (green/red)
- Sensor monitoring open circuits and short-circuits
- Self-monitoring
- Configuration status stored in EEPROM
- SIL2 (with order note C20), SIL2/3 (with C23)
- Expanded diagnostic functions, such as slave pointer, operating hours counter, etc.
- Special characteristic
- Electromagnetic compatibility to EN 61326 and NE21

Application

SITRANS TH200 transmitters can be used in all industrial sectors. Its compact size means that it can be installed in connection heads of type B or larger. The following sensors/signal sources can be connected over their universal input module:

- Resistance thermometer (2, 3, 4-wire connection)
- Thermocouples
- Resistance-based sensors and DC voltage sources

The output signal is a direct current from 4 to 20 mA in accordance with the sensor characteristic.

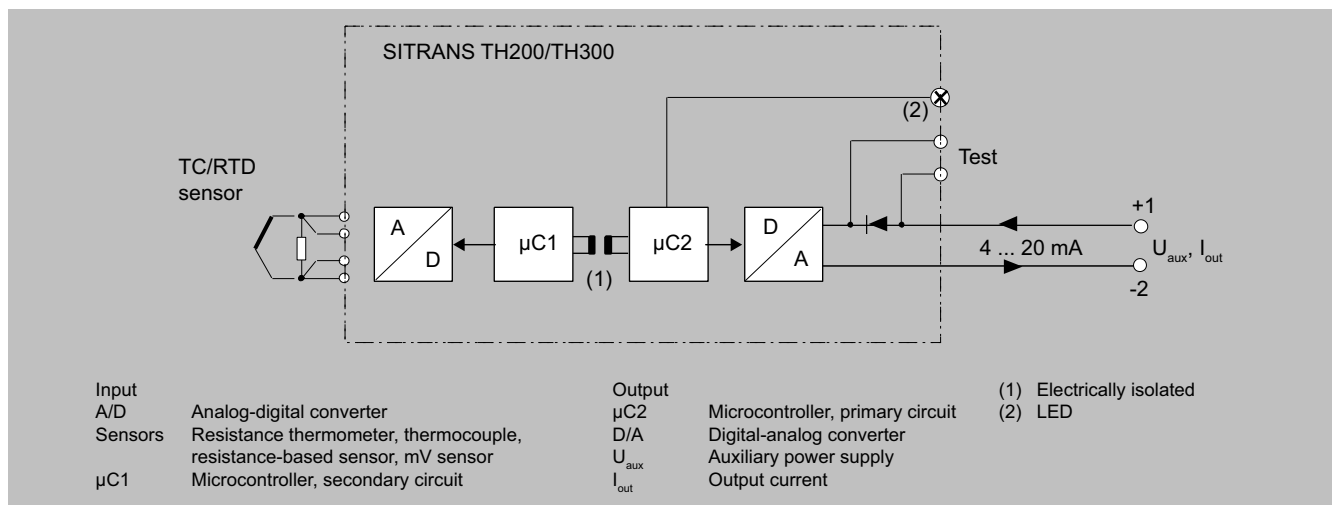
Transmitters of the "intrinsically safe" type of protection can be installed within potentially explosive atmospheres. The devices meet the directive 2014/34/EU (ATEX) as well as the FM and CSA requirements.

Function

The SITRANS TH200 is configured over a PC. A USB or RS 232 modem is linked to the output terminals for this purpose. The configuration data can now be edited using the SIPROM T software tool. The configuration data are then permanently stored in the non-volatile memory (EEPROM).

Once the sensors and power supply have been correctly connected, the transmitter outputs a temperature-linear output signal and the diagnostics LED displays a green light. In the case of a sensor break, the LED flashes red, an internal device fault is indicated by a steady red light.

The test socket can be used to connect an ammeter at any time for monitoring purposes and plausibility checks. The output current can be read without any interruption, or even without opening the current loop.



SITRANS TH200 function diagram

Temperature Measurement

Temperature transmitters

Compact and head transmitters / SITRANS TH200 (4 to 20 mA, universal)

Selection and ordering data

	Article No.
SITRANS TH200 head transmitter For installation in connection head type B, 2-wire system 4 ... 20 mA, programmable, with galvanic isolation	
Without explosion protection	7NG3211-1NN00
With explosion protection	
• According to ATEX	7NG3211-1AN00
• According to FM (cFM _{US})	7NG3211-1BN00

Options	Order code
Add "-Z" to article number, specify order code and, if applicable, plain text	
Test report (5 measuring points)	C11
Functional safety SIL2	C20
Functional safety SIL2/3	C23
Customer-specific programming	
Measuring range to be set Specify in plain text (max. 5 digits): Y01: ... to ... °C, °F	Y01 ¹⁾
Measuring point number (TAG) max. 8 characters	Y17 ²⁾
Measuring point description, max. 16 characters	Y23 ²⁾
Measuring point message, max. 32 characters	Y24 ²⁾
Pt100 (IEC) 2-wire, R _L = 0 Ω	U02 ³⁾
Pt100 (IEC) 3-wire	U03 ³⁾
Pt100 (IEC) 4-wire	U04 ³⁾
Type B thermocouple	U20 ³⁾⁴⁾
Type C thermocouple (W5)	U21 ³⁾⁴⁾
Type D thermocouple (W3)	U22 ³⁾⁴⁾
Type E thermocouple	U23 ³⁾⁴⁾
Type J thermocouple	U24 ³⁾⁴⁾
Type K thermocouple	U25 ³⁾⁴⁾
Type L thermocouple	U26 ³⁾⁴⁾
Type N thermocouple	U27 ³⁾⁴⁾
Type R thermocouple	U28 ³⁾⁴⁾
Type S thermocouple	U29 ³⁾⁴⁾
Type T thermocouple	U30 ³⁾⁴⁾
Type U thermocouple	U31 ³⁾⁴⁾
For TC: Cold junction compensation: external (Pt100, 3-wire)	U41
For TC: Cold junction compensation: external with fixed value: Specify in plain text	Y50
Enter special deviating customer-specific setting in plain text	Y09 ⁵⁾
Fault current 3.6 mA (instead of 22.8 mA)	U36 ²⁾
Cable extension Transmitter with installed cable extension 200 mm (7.87 inches), for Pt100 in 4-wire connection	W01

- 1) For customer-specific programming for RTD and TC, the start value and the end value of the required measuring span must be specified here.
- 2) For this selection, Y01 or Y09 must also be selected.
- 3) For this selection, Y01 must also be selected.
- 4) Internal cold junction compensation is selected as the default for TC.
- 5) For customer-specific programming for mV and ohm, the start value and the end value of the required measuring span and the unit must be entered here.

Selection and ordering data (continued)

Accessories

	Article No.
Other accessories for assembly, connection and transmitter configuration, see page 2/198.	
Modem	
Modem with USB interface and SIPROM T software	7NG3092-8KN
Mounting rail adapter for head transmitter (Quantity delivered: 5 units)	7NG3092-8KA
Connecting cable 4-wire, 200 mm (7.87 inches), for sensor connections when using head transmitters in the high spring flap (set with 5 units)	7NG3092-8KC

For supply units, see Catalog FI01 section "Supplementary components"

Ordering example 1:

7NG3211-1NN00-Z Y01+Y17+U03

Y01: -10 ... +100 °C

Y17: TICA123

Ordering example 2:

7NG3211-1NN00-Z Y01+Y23+U25

Y01: -10 ... +100 °C

Y23: TICA1234HEAT

Factory setting:

- Pt100 (IEC 751); 3-wire connection
- Measuring range: 0 ... 100 °C (32 ... 212 °F)
- Fault current: 22.8 mA
- Sensor offset: 0 °C (0 °F)
- Damping 0.0 s

Technical specifications

SITRANS TH200 (4 ... 20 mA, universal)

Input	
<u>Resistance thermometer</u>	
Measured variable	Temperature
Sensor type	
• According to IEC 60751	Pt25 ... Pt1000
• According to JIS C 1604; $\alpha = 0.00392 \text{ K}^{-1}$	Pt25 ... Pt1000
• According to IEC 60751	Ni25 ... Ni1000
• Special type	Via special characteristic curve (max. 30 points)
Sensor factor	0.25 ... 10 (adaptation of the basic type, e.g. Pt100 to version Pt25 ... 1000)
Units	°C or °F
Connection	
• Standard connection	1 resistance thermometer (RTD) in 2-wire, 3-wire or 4-wire connection
• Averaging	2 identical resistance thermometers in 2-wire connection for generation of average temperature
• Differentiation	2 identical resistance thermometers (RTD) in 2-wire connection (RTD 1 – RTD 2 or RTD 2 – RTD 1)
Connection	
• 2-wire connection	Wire resistance can be configured $\leq 100 \Omega$ (loop resistance)
• 3-wire connection	No trim necessary
• 4-wire connection	No trim necessary
Sensor current	$\leq 0.45 \text{ mA}$
Response time	$\leq 250 \text{ ms}$ for 1 sensor with break monitoring
Break monitoring	Always active (cannot be switched off)
Short-circuit monitoring	Can be switched on/off (default value: ON)
Measuring range	Assignable (see "Digital measuring error" table)
Min. measuring span	10 °C (18 °F)
Characteristic curve	Temperature-linear or special characteristic curve
<u>Resistance-based sensor</u>	
Measured variable	Ohmic resistance
Sensor type	Resistance-based, potentiometers
Units	Ω
Connection	
• Standard connection	1 resistance-based sensor (R) in 2-wire, 3-wire or 4-wire connection
• Averaging	2 resistance-based sensors in 2-wire connection for averaging
• Differentiation	2 resistance thermometers in 2-wire connection (R1 – R2 or R2 – R1)
Connection	
• 2-wire connection	Wire resistance can be configured $\leq 100 \Omega$ (loop resistance)
• 3-wire connection	No trim necessary
• 4-wire connection	No trim necessary
Sensor current	$\leq 0.45 \text{ mA}$
Response time	$\leq 250 \text{ ms}$ for 1 sensor with break monitoring
Break monitoring	Always active (cannot be switched off)
Short-circuit monitoring	Can be switched on/off (default value: OFF)
Measuring range	Assignable max. 0 ... 2200 Ω (see "Digital measuring error" table)
Min. measuring span	5 Ω ... 25 Ω (see "Digital measuring error" table)
Characteristic curve	Resistance-linear or special characteristic curve
<u>Thermocouples</u>	

Temperature Measurement

Temperature transmitters

Compact and head transmitters / SITRANS TH200 (4 to 20 mA, universal)

Technical specifications (continued)

SITRANS TH200 (4 ... 20 mA, universal)	
Measured variable	Temperature
Sensor type (thermocouples)	
• Type B	Pt30Rh-Pt6Rh acc. to IEC 584
• Type C	W5%-Re acc. to ASTM 988
• Type D	W3%-Re acc. to ASTM 988
• Type E	NiCr-CuNi acc. to IEC 584
• Type J	Fe-CuNi acc. to IEC 584
• Type K	NiCr-Ni acc. to IEC 584
• Type L	Fe-CuNi acc. to DIN 43710
• Type N	NiCrSi-NiSi acc. to IEC 584
• Type R	Pt13Rh-Pt acc. to IEC 584
• Type S	Pt10Rh-Pt acc. to IEC 584
• Type T	Cu-CuNi acc. to IEC 584
• Type U	Cu-CuNi acc. to DIN 43710
Units	°C or °F
Connection	
• Standard connection	1 thermocouple (TC)
• Averaging	2 thermocouples (TC)
• Differentiation	2 thermocouples (TC) (TC1 – TC2 or TC2 – TC1)
Response time	≤ 250 ms for 1 sensor with break monitoring
Break monitoring	Can be switched off
Cold junction compensation	
• Internal	With integrated Pt100 resistance thermometer
• External	With external Pt100 IEC 60751 (2-wire or 3-wire connection)
• External fixed	Reference junction temperature can be set as fixed value
Measuring range	Assignable (see "Digital measuring error" table)
Min. measuring span	Min. 40 ... 100 °C (72 ... 180 °F) (see "Digital measuring error" table)
Characteristic curve	Temperature-linear or special characteristic curve
mV sensor	
Measured variable	DC voltage
Sensor type	DC voltage source (DC voltage source possible over externally connected resistance)
Units	mV
Response time	≤ 250 ms for 1 sensor with break monitoring
Break monitoring	Can be switched off
Measuring range	<ul style="list-style-type: none"> • -10 ... +70 mV • -100 ... +1100 mV
Min. measuring span	2 mV or 20 mV
Overload capability of the input	-1.5 ... +3.5 V DC
Input resistance	≥ 1 MΩ
Characteristic curve	Voltage-linear or special characteristic curve
Output	
Output signal	4 ... 20 mA, 2-wire
Auxiliary power	11 ... 35 V DC (to 30 V with Ex ia and ib; to 32 V with Ex nA/nL/ic)
Max. load	(U _{aux} – 11 V)/0.023 A
Overrange	3.6 ... 23 mA, continuously adjustable (default range: 3.80 mA ... 20.5 mA)
Error signal (e.g. in case of sensor breakage) (conforming to NE43)	3.6 ... 23 mA, continuously adjustable (default value: 22.8 mA)

Technical specifications (continued)

SITRANS TH200 (4 ... 20 mA, universal)	
Sample cycle	0.25 s nominal
Damping	Software filter 1st order 0 ... 30 s (parameterizable)
Protection	Against reverse polarity
Galvanic isolation	Input against output 2.12 kV DC (1.5 kV _{rms} AC)
Measuring accuracy	
Digital measuring error	See "Digital measuring error" table
Reference conditions	
• Auxiliary power	24 V ± 1%
• Load	500 Ω
• Ambient temperature	23 °C
• Warming-up time	> 5 min
Error in the analog output (digital/analog converter)	< 0.025% of measuring span
Error due to internal reference junction	< 0.5 °C (0.9 °F)
Effect of ambient temperature	
• Analog measuring error	0.02% of measuring span/10 °C (18 °F)
• Digital measuring error	
- With resistance thermometers	0.06 °C (0.11 °F)/10 °C (18 °F)
- With thermocouples	0.6 °C (1.1 °F)/10 °C (18 °F)
Auxiliary power effect	< 0.001% of meas. span/V
Effect of load impedance	< 0.002% of meas. span/100 Ω
Long-term drift	
• In the first month	• < 0.02% of measuring span
• After one year	• < 0.2% of measuring span
• After 5 years	• < 0.3% of measuring span
Operating conditions	
Ambient conditions	
Ambient temperature	-40 ... +85 °C (-40 ... +185 °F)
Storage temperature	-40 ... +85 °C (-40 ... +185 °F)
Relative humidity	< 98%, with condensation
Electromagnetic compatibility	According to EN 61326 and NE21
Structural design	
Material	Molded plastic
Weight	50 g (0.11 lb)
Dimensions	See "Dimensional drawings"
Cross-section of cables	Max. 2.5 mm ²² (AWG 13)
Degree of protection according to IEC 60529	
• Enclosure	IP40
• Terminals	IPO0
Certificates and approvals	
ATEX explosion protection	
EC type-examination certificate	PTB 05 ATEX 2040X
• "Intrinsic safety" type of protection	<ul style="list-style-type: none"> • II 1 G Ex ia IIC T6...T4 Ga • II 2 (1) G Ex [ia Ga] ib IIC T6...T4 Gb • II 3 (1) G Ex [ia Ga] ic IIC T6...T4 Gc • II 3 G Ex ic IIC T6...T4 Gc • II 2 D Ex ia Db
• "Increased safety" type of protection	II 3 G Ex ec IIC T6...T4 Gc
Explosion protection: FM for USA	

Temperature Measurement

Temperature transmitters

Compact and head transmitters / SITRANS TH200 (4 to 20 mA, universal)

Technical specifications (continued)

SITRANS TH200 (4 ... 20 mA, universal)	
• FM approval	FM 3024169
• Degrees of protection	<ul style="list-style-type: none"> • IS / CI I, II, III / Div 1 / GP ABCDEFG T6, T5, T4 • CI I / ZN 0 / AEx ia IIC T6, T5, T4 • NI / CI I / Div 2 / GP ABCDEFG T6, T5, T4 • NI / CI I / ZN 2 / IIC T6, T5, T4
Explosion protection to FM for Canada („FMUs")	
• FM approval	FM 3024169C
• Degrees of protection	<ul style="list-style-type: none"> • IS / CI I, II, III / Div 1 / GP ABCDEFG T6, T5, T4 • NI / CI I / DIV 2 / GP ABCD T6, T5, T4 • NIFW / CI I, II, III / DIV 2 / GP ABCDEFG T6, T5, T4 • DIP / CI II, III / Div 2 / GP FG T6, T5, T4 • CI I / ZN 0 / Ex ia IIC T6, T5, T4 • CI I / ZN 2 / Ex nA nL IIC T6, T5, T4
Other certificates	NEPSI
Software requirements for SIPROM T	
PC operating system	Windows ME, 2000, XP, Win 7, 8 and 10; in connection with RS 232 modem, also Windows 95, 98 and 98 SE

Factory setting:

- Pt100 (IEC 751) in the 3-wire connection
- Measuring range: 0 ... 100 °C (32 ... 212 °F)
- Fault current: 22.8 mA
- Sensor offset: 0 °C (0 °F)
- Damping 0.0 s

Digital measuring error

Resistance thermometer

Input	Measuring range °C (°F)	Minimum measuring span		Digital accuracy	
		°C	(°F)	°C	(°F)
According to IEC 60751					
Pt25	-200 ... +850 (-328 ... +1562)	10	(18)	0.3	(0.54)
Pt50	-200 ... +850 (-328 ... +1562)	10	(18)	0.15	(0.27)
Pt100 ... Pt200	-200 ... +850 (-328 ... +1562)	10	(18)	0.1	(0.18)
Pt500	-200 ... +850 (-328 ... +1562)	10	(18)	0.15	(0.27)
Pt1000	-200 ... +350 (-328 ... +662)	10	(18)	0.15	(0.27)
According to JIS C1604-81					
Pt25	-200 ... +649 (-328 ... +1200)	10	(18)	0.3	(0.54)
Pt50	-200 ... +649 (-328 ... +1200)	10	(18)	0.15	(0.27)
Pt100 ... Pt200	-200 ... +649 (-328 ... +1200)	10	(18)	0.1	(0.18)
Pt500	-200 ... +649 (-328 ... +1200)	10	(18)	0.15	(0.27)
Pt1000	-200 ... +350 (-328 ... +662)	10	(18)	0.15	(0.27)
Ni 25 ... Ni1000	-60 ... +250 (-76 ... +482)	10	(18)	0.1	(0.18)

Technical specifications (continued)

Resistance-based sensor

Input	Measuring range	Minimum measuring span	Digital accuracy	
	Ω		Ω	Ω
Resistance	0 ... 390	5	0.05	
Resistance	0 ... 2200	25	0.25	

Thermocouples

Input	Measuring range	Minimum measuring span		Digital accuracy	
	$^{\circ}\text{C}$ ($^{\circ}\text{F}$)	$^{\circ}\text{C}$	($^{\circ}\text{F}$)	$^{\circ}\text{C}$	($^{\circ}\text{F}$)
Type B	100 ... 1820 (212 ... 3308)	100	(180)	2 ¹⁾	(3.60) ¹⁾
Type C (W5)	0 ... 2300 (32 ... 4172)	100	(180)	2	(3.60)
Type D (W3)	0 ... 2300 (32 ... 4172)	100	(180)	1 ²⁾	(1.80) ²⁾
Type E	-200 ... +1000 (-328 ... +1832)	50	(90)	1	(1.80)
Type J	-200 ... +1200 (-328 ... +2192)	50	(90)	1	(1.80)
Type K	-200 ... +1370 (-328 ... +2498)	50	(90)	1	(1.80)
Type L	-200 ... +900 (-328 ... +1652)	50	(90)	1	(1.80)
Type N	-200 ... +1300 (-328 ... +2372)	50	(90)	1	(1.80)
Type R	-50 ... +1760 (-58 ... +3200)	100	(180)	2	(3.60)
Type S	-50 ... +1760 (-58 ... +3200)	100	(180)	2	(3.60)
Type T	-200 ... +400 (-328 ... +752)	40	(72)	1	(1.80)
Type U	-200 ... +600 (-328 ... +1112)	50	(90)	2	(3.60)

¹⁾ The digital accuracy in the range 100 to 300 °C (212 to 572 °F) is 3 °C (5.4 °F).

²⁾ The digital accuracy in the range 1750 to 2300 °C (3182 to 4172 °F) is 2 °C (3.6 °F).

mV sensor

Input	Measuring range	Minimum measuring span	Digital accuracy	
	mV		mV	μV
mV sensor	-10 ... +70	2	40	
mV sensor	-100 ... +1100	20	400	

The digital accuracy is the accuracy after the analog/digital conversion including linearization and calculation of the measured value. An additional error is generated in the output current 4 to 20 mA as a result of the digital/analog conversion of 0.025% of the set measuring span (digital-analog error).

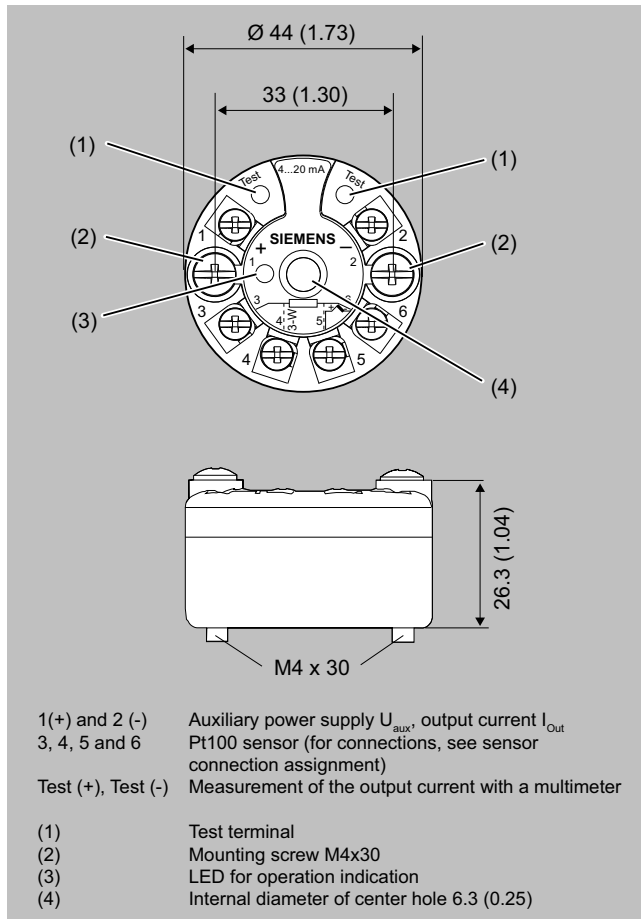
The total error under reference conditions at the analog output is the sum from the digital error and the digital-analog error (poss. with the addition of reference junction errors in the case of thermocouple measurements).

Temperature Measurement

Temperature transmitters

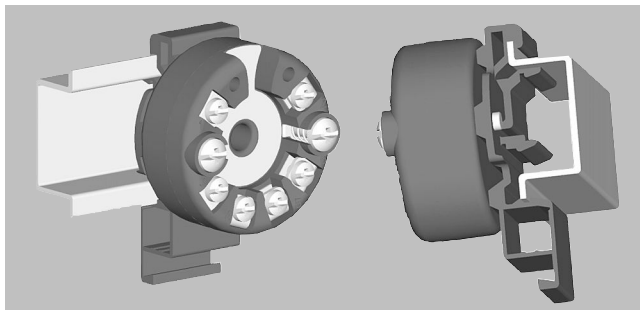
Compact and head transmitters / SITRANS TH200 (4 to 20 mA, universal)

Dimensional drawings



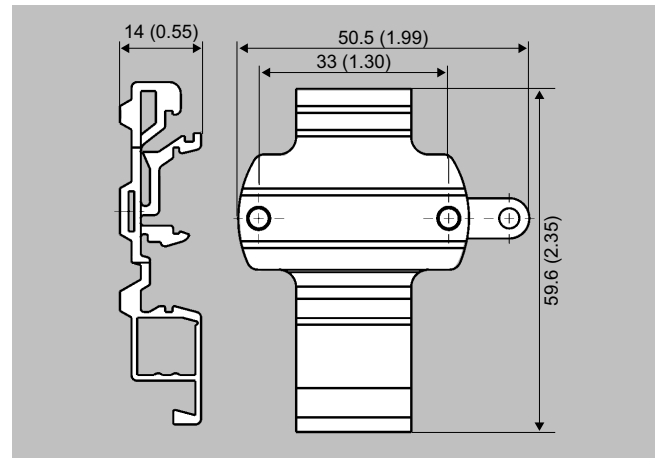
SITRANS TH200, dimensions and pin assignment, dimensions in mm (inch)

Mounting on DIN rail



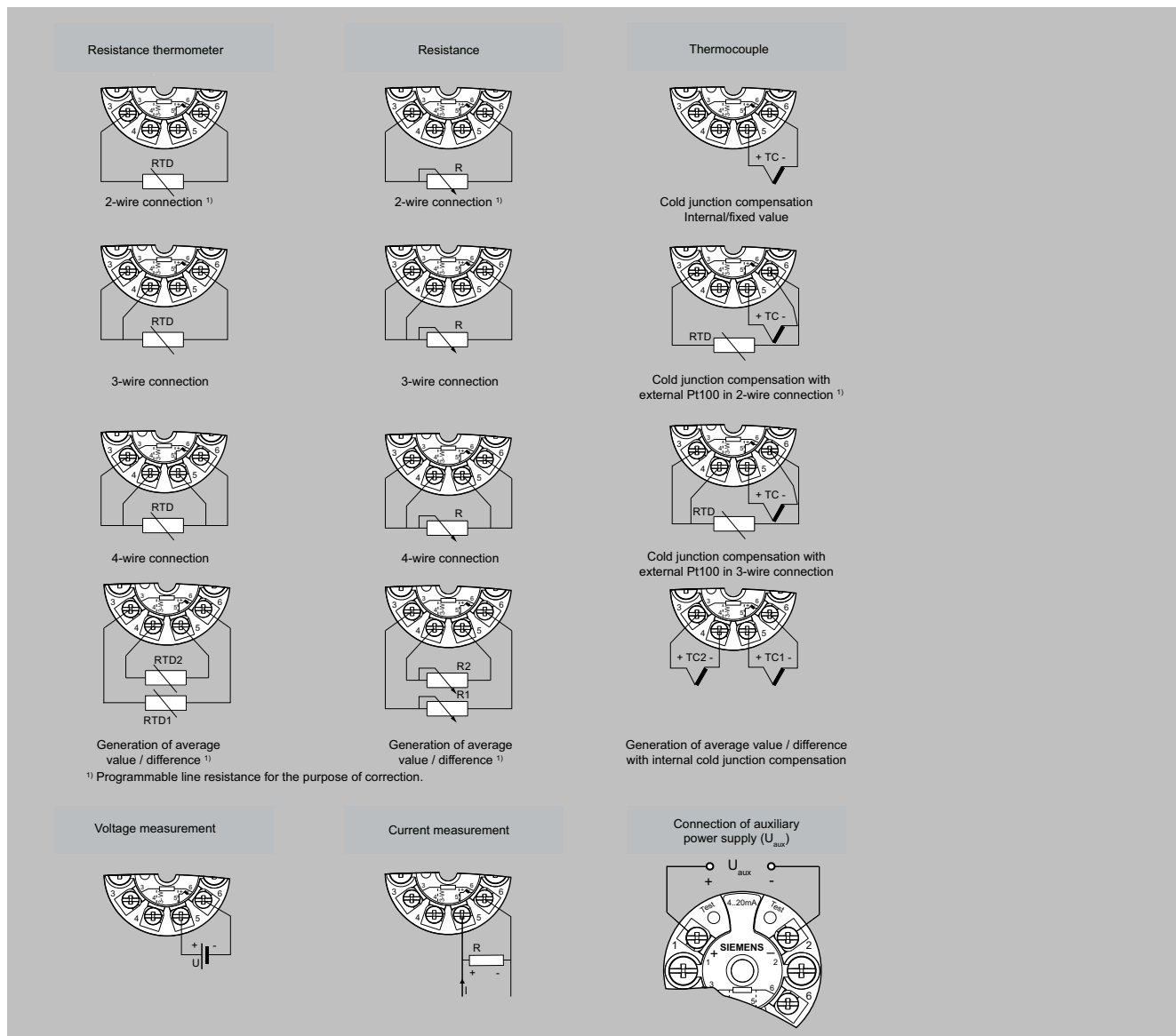
SITRANS TH200, mounting of transmitter on DIN rail

Dimensional drawings (continued)



Mounting rail adapter, dimensions in mm (inch)

Circuit diagrams



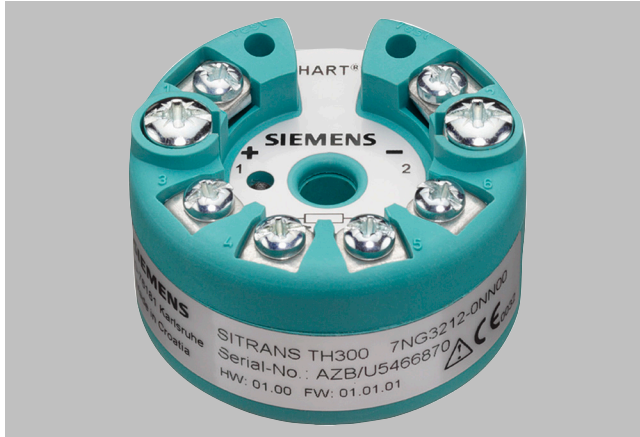
SITRANS TH200, sensor connection assignment

Temperature Measurement

Temperature transmitters

Compact and head transmitters / SITRANS TH300 (4 to 20 mA, HART, universal)

Overview



Robust and durable HART - the universal SITRANS TH300 transmitter

- 2-wire device for 4 to 20 mA, HART 5
- Mounting in the connection head of the temperature sensor
- Universal input for virtually any type of temperature sensor
- Configurable over HART

Benefits

- Compact design
- Flexible mounting and center hole allow you to select your preferred mounting type
- Galvanic isolation
- Test sockets for multimeters
- Diagnostics LED (green/red)
- Sensor monitoring open circuits and short-circuits
- Self-monitoring
- Configuration status stored in EEPROM
- SIL2 (with order note C20), SIL2/3 (with C23)
- Expanded diagnostic functions, such as slave pointer, operating hours counter, etc.
- Special characteristic
- Electromagnetic compatibility to EN 61326 and NE21

Application

SITRANS TH300 transmitters can be used in all industrial sectors. Its compact size means that it can be installed in connection heads of type B or larger. The following sensors/signal sources can be connected over their universal input module:

- Resistance thermometer (2, 3, 4-wire connection)
- Thermocouples
- Resistance-based sensors and DC voltage sources

The output signal is a load-independent direct current of 4 to 20 mA corresponding to the sensor characteristic overlaid by the digital HART signal.

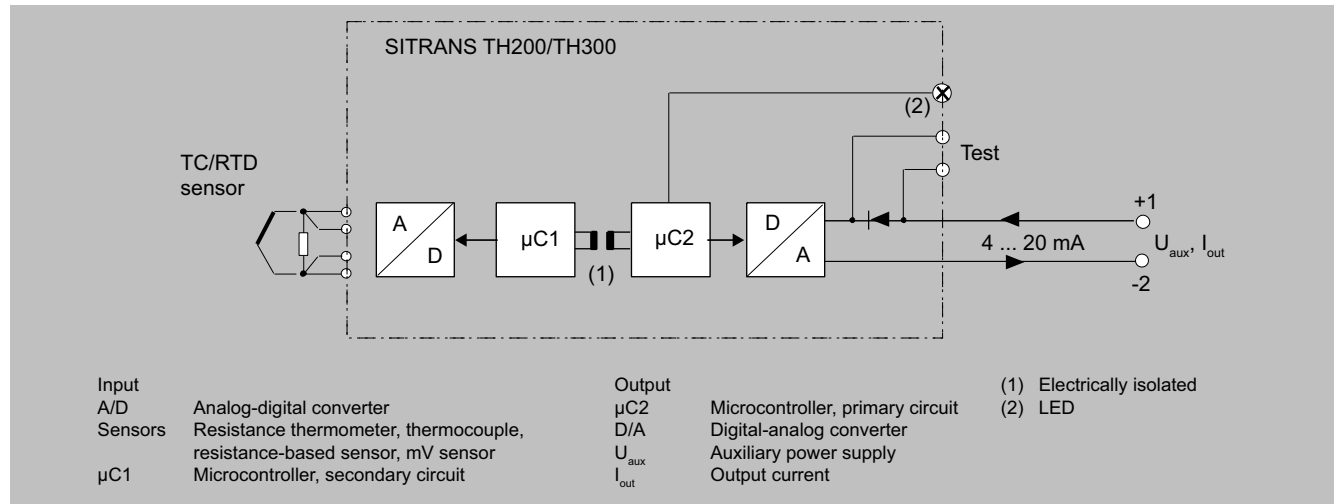
Transmitters of the "intrinsically safe" type of protection can be installed within potentially explosive atmospheres. The devices meet the directive 2014/34/EU (ATEX) as well as the FM and CSA requirements.

Function

The SITRANS TH300 is configured over HART. This can be done using a handheld communicator or even more conveniently with a HART modem and the SIMATIC PDM parameterization software. The configuration data are then permanently stored in the non-volatile memory (EEPROM).

Once the sensors and power supply have been correctly connected, the transmitter outputs a temperature-linear output signal and the diagnostics LED displays a green light. In the case of a sensor break, the LED flashes red, an internal device fault is indicated by a steady red light.

The test socket can be used to connect an ammeter at any time for monitoring purposes and plausibility checks. The output current can be read without any interruption, or even without opening the current loop.



SITRANS TH 300 function diagram

Temperature Measurement

Temperature transmitters

Compact and head transmitters / SITRANS TH300 (4 to 20 mA, HART, universal)

Selection and ordering data

	Article No.
SITRANS TH300 head transmitter For installation in connection head type B, 2-wire system 4 ... 20 mA, communication-capable according to HART, with galvanic isolation	
Without explosion protection	7NG3212-0NN00
With explosion protection	
• According to ATEX	7NG3212-0AN00
• According to FM (cFM _{US})	7NG3212-0BN00

Options	Order code
Add "-Z" to article number, specify order code and, if applicable, plain text	
Test report (5 measuring points)	C11
Functional safety SIL2	C20
Functional safety SIL2/3	C23
Customer-specific programming	
Measuring range to be set Specify in plain text (max. 5 digits): Y01: ... to ... °C, °F	Y01 ¹⁾
Measuring point number (TAG) max. 8 characters	Y17 ²⁾
Measuring point description, max. 16 characters	Y23 ²⁾
Measuring point message, max. 32 characters	Y24 ²⁾
Pt100 (IEC) 2-wire, R _L = 0 Ω	U02 ³⁾
Pt100 (IEC) 3-wire	U03 ³⁾
Pt100 (IEC) 4-wire	U04 ³⁾
Type B thermocouple	U20 ³⁾⁴⁾
Type C thermocouple (W5)	U21 ³⁾⁴⁾
Type D thermocouple (W3)	U22 ³⁾⁴⁾
Type E thermocouple	U23 ³⁾⁴⁾
Type J thermocouple	U24 ³⁾⁴⁾
Type K thermocouple	U25 ³⁾⁴⁾
Type L thermocouple	U26 ³⁾⁴⁾
Type N thermocouple	U27 ³⁾⁴⁾
Type R thermocouple	U28 ³⁾⁴⁾
Type S thermocouple	U29 ³⁾⁴⁾
Type T thermocouple	U30 ³⁾⁴⁾
Type U thermocouple	U31 ³⁾⁴⁾
For TC: Cold junction compensation: external (Pt100, 3-wire)	U41
For TC: Cold junction compensation: external with fixed value: Specify in plain text	Y50
Enter special deviating customer-specific setting in plain text	Y09 ⁵⁾
Fault current 3.6 mA (instead of 22.8 mA)	U36 ²⁾
Cable extension Transmitter with installed cable extension 200 mm (7.87 inches), for Pt100 in 4-wire connection	W01

- 1) For customer-specific programming for RTD and TC, the start value and the end value of the required measuring span must be specified here.
- 2) For this selection, Y01 or Y09 must also be selected.
- 3) For this selection, Y01 must also be selected.
- 4) Internal cold junction compensation is selected as the default for TC.
- 5) For customer-specific programming for mV and ohm, the start value and the end value of the required measuring span and the unit must be entered here.

Selection and ordering data (continued)

Accessories

	Article No.
Other accessories for assembly, connection and transmitter configuration, see page 2/198.	
HART modem	
With USB interface	7MF4997-1DB
SIMATIC PDM operating software	See Catalog FI 01 section 8
Mounting rail adapter for head transmitter (Quantity delivered: 5 units)	7NG3092-8KA
Connecting cable 4-wire, 200 mm (7.87 inches), for sensor connections when using head transmitters in the high spring flap (set with 5 units)	7NG3092-8KC

For supply units, see Catalog FI01 section "Supplementary components"

Ordering example 1:

7NG3212-0NN00-Z Y01+Y17+U03

Y01: -10 ... +100 °C

Y17: TICA123

Ordering example 2:

7NG3212-0NN00-Z Y01+Y23+U25

Y01: -10 ... +100 °C

Y23: TICA1234HEAT

Factory setting:

- Pt100 (IEC 751); 3-wire connection
- Measuring range: 0 ... 100 °C (32 ... 212 °F)
- Fault current: 22.8 mA
- Sensor offset: 0 °C (0 °F)
- Damping 0.0 s

Technical specifications

SITRANS TH300 (4 ... 20 mA, HART, universal)

Input	
<u>Resistance thermometer</u>	
Measured variable	Temperature
Sensor type	
• According to IEC 60751	Pt25 ... Pt1000
• According to JIS C 1604; $\alpha = 0.00392 \text{ K}^{-1}$	Pt25 ... Pt1000
• According to IEC 60751	Ni25 ... Ni1000
• Special type	Via special characteristic curve (max. 30 points)
Sensor factor	0.25 ... 10 (adaptation of the basic type, e.g. Pt100 to version Pt25 ... 1000)
Units	°C or °F
Connection	
• Standard connection	1 resistance thermometer (RTD) in 2-wire, 3-wire or 4-wire connection
• Averaging	2 identical resistance thermometers in 2-wire connection for generation of average temperature
• Differentiation	2 identical resistance thermometers (RTD) in 2-wire connection (RTD 1 – RTD 2 or RTD 2 – RTD 1)
Connection	
• 2-wire connection	Wire resistance can be configured $\leq 100 \Omega$ (loop resistance)
• 3-wire connection	No trim necessary
• 4-wire connection	No trim necessary
Sensor current	$\leq 0.45 \text{ mA}$
Response time	$\leq 250 \text{ ms}$ for 1 sensor with break monitoring
Break monitoring	Always active (cannot be switched off)
Short-circuit monitoring	Can be switched on/off (default value: ON)
Measuring range	Assignable (see "Digital measuring error" table)
Min. measuring span	10 °C (18 °F)
Characteristic curve	Temperature-linear or special characteristic curve
<u>Resistance-based sensor</u>	
Measured variable	Ohmic resistance
Sensor type	Resistance-based, potentiometers
Units	Ω
Connection	
• Standard connection	1 resistance-based sensor (R) in 2-wire, 3-wire or 4-wire connection
• Averaging	2 resistance-based sensors in 2-wire connection for averaging
• Differentiation	2 resistance thermometers in 2-wire connection (R1 – R2 or R2 – R1)
Connection	
• 2-wire connection	Wire resistance can be configured $\leq 100 \Omega$ (loop resistance)
• 3-wire connection	No trim necessary
• 4-wire connection	No trim necessary
Sensor current	$\leq 0.45 \text{ mA}$
Response time	$\leq 250 \text{ ms}$ for 1 sensor with break monitoring
Break monitoring	Always active (cannot be switched off)
Short-circuit monitoring	Can be switched on/off (default value: OFF)
Measuring range	Assignable max. 0 ... 2200 Ω (see "Digital measuring error" table)
Min. measuring span	5 ... 25 Ω (see "Digital measuring error" table)
Characteristic curve	Resistance-linear or special characteristic curve
<u>Thermocouples</u>	

Temperature Measurement

Temperature transmitters

Compact and head transmitters / SITRANS TH300 (4 to 20 mA, HART, universal)

Technical specifications (continued)

SITRANS TH300 (4 ... 20 mA, HART, universal)	
Measured variable	Temperature
Sensor type (thermocouples)	
• Type B	Pt30Rh-Pt6Rh acc. to IEC 584
• Type C	W5%-Re acc. to ASTM 988
• Type D	W3%-Re acc. to ASTM 988
• Type E	NiCr-CuNi acc. to IEC 584
• Type J	Fe-CuNi acc. to IEC 584
• Type K	NiCr-Ni acc. to IEC 584
• Type L	Fe-CuNi acc. to DIN 43710
• Type N	NiCrSi-NiSi acc. to IEC 584
• Type R	Pt13Rh-Pt acc. to IEC 584
• Type S	Pt10Rh-Pt acc. to IEC 584
• Type T	Cu-CuNi acc. to IEC 584
• Type U	Cu-CuNi acc. to DIN 43710
Units	°C or °F
Connection	
• Standard connection	1 thermocouple (TC)
• Averaging	2 thermocouples (TC)
• Differentiation	2 thermocouples (TC) (TC1 – TC2 or TC2 – TC1)
Response time	≤ 250 ms for 1 sensor with break monitoring
Break monitoring	Can be switched off
Cold junction compensation	
• Internal	With integrated Pt100 resistance thermometer
• External	With external Pt100 IEC 60751 (2-wire or 3-wire connection)
• External fixed	Reference junction temperature can be set as fixed value
Measuring range	Assignable (see "Digital measuring error" table)
Min. measuring span	Min. 40 ... 100 °C (72 ... 180 °F) (see "Digital measuring error" table)
Characteristic curve	Temperature-linear or special characteristic curve
mV sensor	
Measured variable	DC voltage
Sensor type	DC voltage source (DC voltage source possible over externally connected resistance)
Units	mV
Response time	≤ 250 ms for 1 sensor with break monitoring
Break monitoring	Can be switched off
Measuring range	<ul style="list-style-type: none"> • -10 ... +70 mV • -100 ... +1100 mV
Min. measuring span	2 mV or 20 mV
Overload capability of the input	-1.5 ... +3.5 V DC
Input resistance	≥ 1 MΩ
Characteristic curve	Voltage-linear or special characteristic curve
Output	
Output signal	4 ... 20 mA, 2-wire with communication acc. to HART Rev. 5.9
Auxiliary power	11 ... 35 V DC (to 30 V with Ex ia and ib; to 32 V with Ex nA/nL/ic)
Max. load	$(U_{aux} - 11 V)/0.023 A$
Overrange	3.6 ... 23 mA, continuously adjustable (default range: 3.80 mA ... 20.5 mA)
Error signal (e.g. in case of sensor breakage) (conforming to NE43)	3.6 ... 23 mA, continuously adjustable (default value: 22.8 mA)

Technical specifications (continued)

SITRANS TH300 (4 ... 20 mA, HART, universal)	
Sample cycle	0.25 s nominal
Damping	Software filter 1st order 0 ... 30 s (parameterizable)
Protection	Against reverse polarity
Galvanic isolation	Input against output 2.12 kV DC (1.5 kV _{rms} AC)
Measuring accuracy	
Digital measuring error	See "Digital measuring error" table
Reference conditions	
• Auxiliary power	24 V ± 1%
• Load	500 Ω
• Ambient temperature	23 °C
• Warming-up time	> 5 min
Error in the analog output (digital/analog converter)	< 0.025% of measuring span
Error due to internal reference junction	< 0.5 °C (0.9 °F)
Effect of ambient temperature	
• Analog measuring error	0.02% of measuring span/10 °C (18 °F)
• Digital measuring error	
- With resistance thermometers	0.06 °C (0.11 °F)/10 °C (18 °F)
- With thermocouples	0.6 °C (1.1 °F)/10 °C (18 °F)
Auxiliary power effect	< 0.001% of meas. span/V
Effect of load impedance	< 0.002% of meas. span/100 Ω
Long-term drift	
• In the first month	< 0.02% of measuring span
• After one year	< 0.2% of measuring span
• After 5 years	< 0.3% of measuring span
Operating conditions	
Ambient conditions	
Ambient temperature	-40 ... +85 °C (-40 ... +185 °F)
Storage temperature	-40 ... +85 °C (-40 ... +185 °F)
Relative humidity	< 98%, with condensation
Electromagnetic compatibility	According to EN 61326 and NE21
Structural design	
Material	Molded plastic
Weight	50 g (0.11 lb)
Dimensions	See "Dimensional drawings"
Cross-section of cables	Max. 2.5 mm ² (AWG 13)
Degree of protection according to IEC 60529	
• Enclosure	IP40
• Terminals	IP00
Certificates and approvals	
ATEX explosion protection	
EC type-examination certificate	PTB 05 ATEX 2040X
• "Intrinsic safety" type of protection	<ul style="list-style-type: none"> • II 1 G Ex ia IIC T6...T4 Ga • II 2 (1) G Ex [ia Ga] ib IIC T6...T4 Gb • II 3 (1) G Ex [ia Ga] ic IIC T6...T4 Gc • II 3 G Ex ic IIC T6...T4 Gc • II 2 D Ex ia Db
• "Increased safety" type of protection	II 3 G Ex ec IIC T6...T4 Gc
Explosion protection: FM for USA	

Temperature Measurement

Temperature transmitters

Compact and head transmitters / SITRANS TH300 (4 to 20 mA, HART, universal)

Technical specifications (continued)

SITRANS TH300 (4 ... 20 mA, HART, universal)	
• FM approval	FM 3024169
• Degrees of protection	<ul style="list-style-type: none"> • IS / CI I, II, III / Div 1 / GP ABCDEFG T6, T5, T4 • CI I / ZN 0 / AEx ia IIC T6, T5, T4 • NI / CI I / Div 2 / GP ABCDEFG T6, T5, T4 • NI / CI I / ZN 2 / IIC T6, T5, T4
Explosion protection to FM for Canada („FMUs")	
• FM approval	FM 3024169C
• Degrees of protection	<ul style="list-style-type: none"> • IS / CI I, II, III / Div 1 / GP ABCDEFG T6, T5, T4 • NI / CI I / DIV 2 / GP ABCD T6, T5, T4 • NIFW / CI I, II, III / DIV 2 / GP ABCDEFG T6, T5, T4 • DIP / CI II, III / Div 2 / GP FG T6, T5, T4 • CI I / ZN 0 / Ex ia IIC T6, T5, T4 • CI I / ZN 2 / Ex nA nL IIC T6, T5, T4
Other certificates	NEPSI

Factory setting:

- Pt100 (IEC 751) in the 3-wire connection
- Measuring range: 0 ... 100 °C (32 ... 212 °F)
- Fault current: 22.8 mA
- Sensor offset: 0 °C (0 °F)
- Damping 0.0 s

Digital measuring error

Resistance thermometer

Input	Measuring range °C (°F)	Minimum measuring span		Digital accuracy	
		°C	(°F)	°C	(°F)
According to IEC 60751					
Pt25	-200 ... +850 (-328 ... +1562)	10	(18)	0.3	(0.54)
Pt50	-200 ... +850 (-328 ... +1562)	10	(18)	0.15	(0.27)
Pt100 ... Pt200	-200 ... +850 (-328 ... +1562)	10	(18)	0.1	(0.18)
Pt500	-200 ... +850 (-328 ... +1562)	10	(18)	0.15	(0.27)
Pt1000	-200 ... +350 (-328 ... +662)	10	(18)	0.15	(0.27)
According to JIS C1604-81					
Pt25	-200 ... +649 (-328 ... +1200)	10	(18)	0.3	(0.54)
Pt50	-200 ... +649 (-328 ... +1200)	10	(18)	0.15	(0.27)
Pt100 ... Pt200	-200 ... +649 (-328 ... +1200)	10	(18)	0.1	(0.18)
Pt500	-200 ... +649 (-328 ... +1200)	10	(18)	0.15	(0.27)
Pt1000	-200 ... +350 (-328 ... +662)	10	(18)	0.15	(0.27)
Ni 25 ... Ni1000	-60 ... +250 (-76 ... +482)	10	(18)	0.1	(0.18)

Resistance-based sensor

Input	Measuring range Ω	Minimum measuring span Ω	Digital accuracy
			Ω
Resistance	0 ... 390	5	0.05
Resistance	0 ... 2200	25	0.25

Technical specifications (continued)

Thermocouples

Input	Measuring range °C (°F)	Minimum measuring span		Digital accuracy	
		°C	(°F)	°C	(°F)
Type B	100 ... 1820 (212 ... 3308)	100	(180)	2 ¹⁾	(3.60) ¹⁾
Type C (W5)	0 ... 2300 (32 ... 4172)	100	(180)	2	(3.60)
Type D (W3)	0 ... 2300 (32 ... 4172)	100	(180)	1 ²⁾	(1.80) ²⁾
Type E	-200 ... +1000 (-328 ... +1832)	50	(90)	1	(1.80)
Type J	-200 ... +1200 (-328 ... +2192)	50	(90)	1	(1.80)
Type K	-200 ... +1370 (-328 ... +2498)	50	(90)	1	(1.80)
Type L	-200 ... +900 (-328 ... +1652)	50	(90)	1	(1.80)
Type N	-200 ... +1300 (-328 ... +2372)	50	(90)	1	(1.80)
Type R	-50 ... +1760 (-58 ... +3200)	100	(180)	2	(3.60)
Type S	-50 ... +1760 (-58 ... +3200)	100	(180)	2	(3.60)
Type T	-200 ... +400 (-328 ... +752)	40	(72)	1	(1.80)
Type U	-200 ... +600 (-328 ... +1112)	50	(90)	2	(3.60)

¹⁾ The digital accuracy in the range 100 to 300 °C (212 to 572 °F) is 3 °C (5.4 °F).

²⁾ The digital accuracy in the range 1750 to 2300 °C (3182 to 4172 °F) is 2 °C (3.6 °F).

mV sensor

Input	Measuring range mV	Minimum measuring span mV	Digital accuracy
			µV
mV sensor	-10 ... +70	2	40
mV sensor	-100 ... +1100	20	400

The digital accuracy is the accuracy after the analog/digital conversion including linearization and calculation of the measured value.

An additional error is generated in the output current 4 to 20 mA as a result of the digital/analog conversion of 0.025% of the set measuring span (digital-analog error).

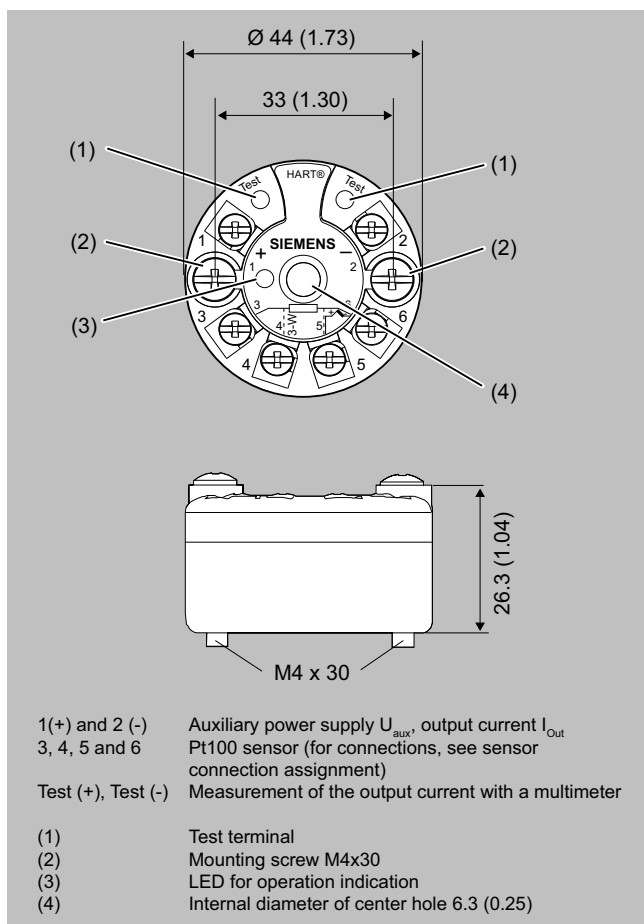
The total error under reference conditions at the analog output is the sum from the digital error and the digital-analog error (poss. with the addition of reference junction errors in the case of thermocouple measurements).

Temperature Measurement

Temperature transmitters

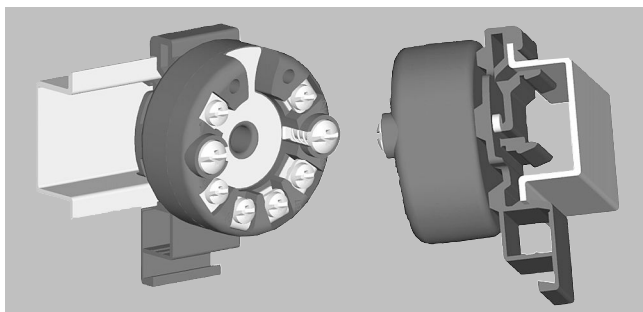
Compact and head transmitters / SITRANS TH300 (4 to 20 mA, HART, universal)

Dimensional drawings



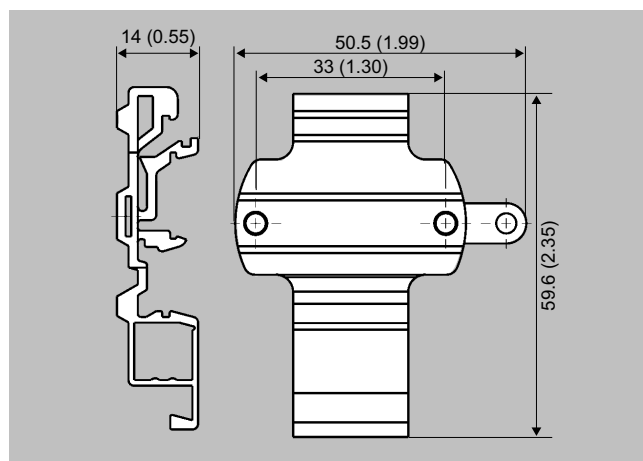
SITRANS TH300, dimensions and pin assignment, dimensions in mm (inch)

Mounting on DIN rail



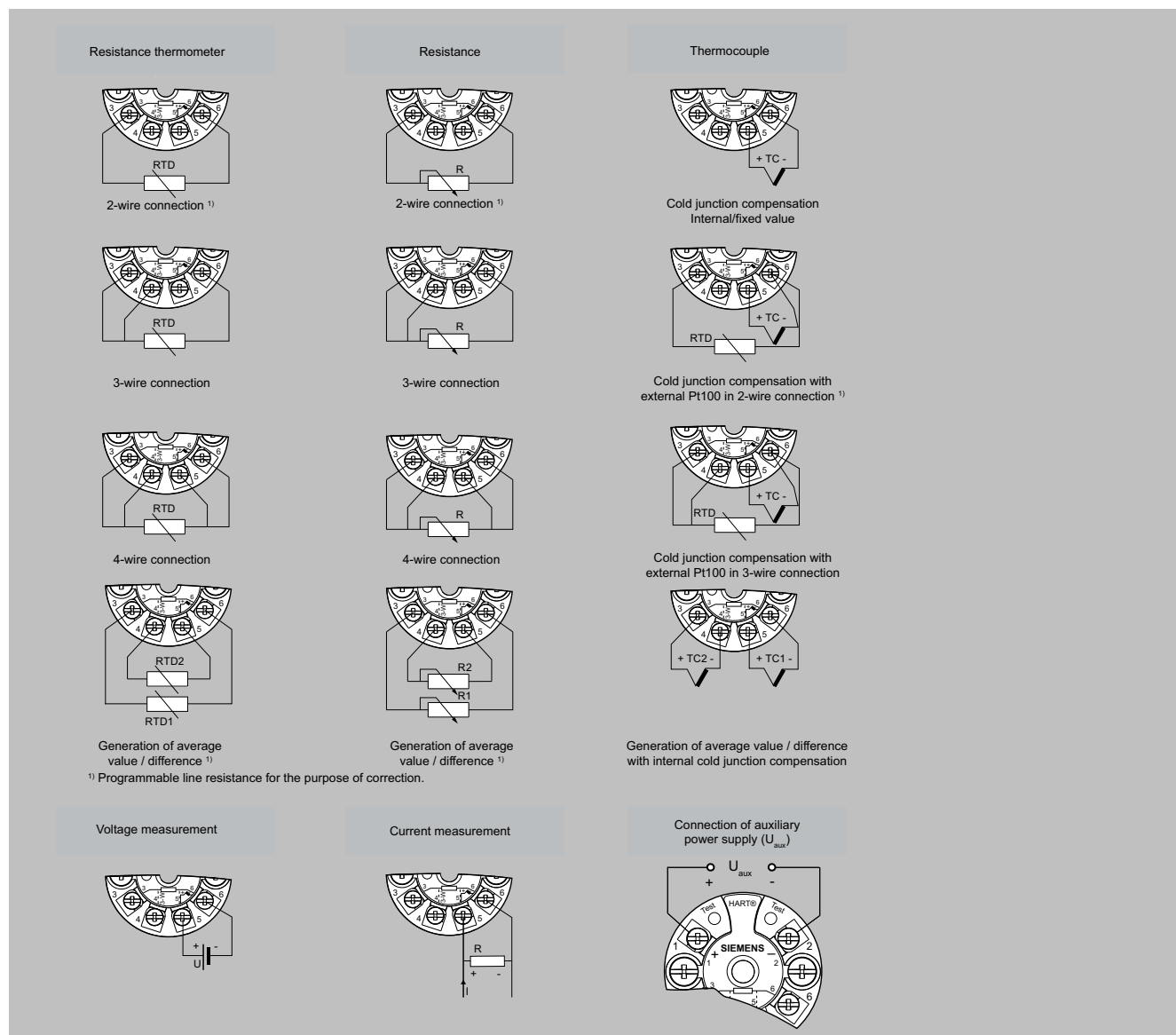
SITRANS TH300, mounting of transmitter on DIN rail

Dimensional drawings (continued)



Mounting rail adapter, dimensions in mm (inch)

Circuit diagrams



SITRANS TH300, sensor connection assignment

Temperature Measurement

Temperature transmitters

Compact and head transmitters / SITRANS TH320 (HART, universal)

Overview



- 2-wire head transmitter with and without HART communications interface
- Mounting in the connection head of the temperature sensor
- Universal input for virtually any type of temperature sensor
- Can be configured via PC, HART 7 or optional local operation

Benefits

- Compact design
- Flexible mounting and center hole allow you to select your preferred mounting type
- Galvanic isolation

Function

Without HART communications interface

For the SITRANS TH320 without HART functionality, parameters are assigned with the PC. A special modem and the software tool SIPROM T are available for this purpose.

With HART communications interface:

The SITRANS TH320 is configured via HART. The configuration can be carried out using a handheld communicator or, more conveniently, with a HART modem and the SIMATIC PDM parameterization software. The configuration data is then permanently stored in the non-volatile memory (EEPROM).

After correct connection of input and supply voltage, the transmitter outputs a temperature-linear output signal and the diagnostics LED is green. In case of external errors, e.g. sensor short circuit or interruption, the LED flashes red; an internal device error is indicated by a permanent red light.

An ammeter can be connected at any time for checking and plausibility via the test terminals. The output current can be read without any interruption, or even without opening the current loop.

Benefits

- Test terminals for ammeter
- Diagnostics LED (green/red)
- Input monitoring wire break and short-circuit
- Self-monitoring
- Configuration status stored in EEPROM
- SIL2/3 (with order note C20)
- Expanded diagnostic functions, such as slave pointer, operating hours counter, etc.
- Special characteristic
- Electromagnetic compatibility according to EN 61326 and NE21

Application

SITRANS TH320 transmitters can be used in all sectors. Its compact size means that it can be installed in connection heads of type B or larger. The following sensors/signal sources can be connected over their universal input module:

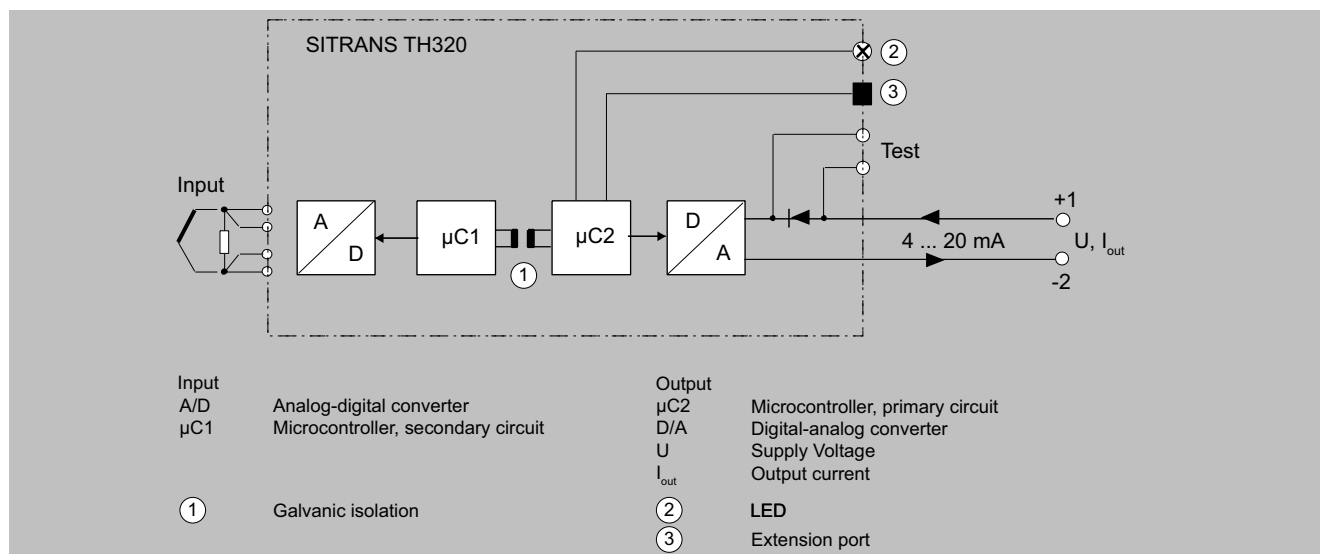
- Resistance thermometer (2-wire, 3-wire, 4-wire connection)
- Thermocouples

- Linear resistance, potentiometer and DC voltage sources

With HART communications interface:

- The output signal is a load-independent direct current from 4 to 20 mA in accordance with the input characteristic, superimposed by the digital HART signal.

Transmitters of the "intrinsically safe or Zone 2 increased safety" type of protection can be installed in hazardous areas. The device meets the requirements of the EU Directive 2014/34/EU (ATEX), the FM and CSA regulations as well as other national approvals.



SITRANS TH320 function block diagram

Temperature Measurement

Temperature transmitters

Compact and head transmitters / SITRANS TH320 (HART, universal)

Selection and ordering data

SITRANS TH320 head transmitter with 1 input	Article No. 7NG031										
	●	-	●	●	●	●	●	-	0	●	●
Click the article number for online configuration in the PIA Life Cycle Portal.											
Communication											
With HART		0									
2-wire, 4 ... 20 mA		7									
Primary value output											
Input 1			0								
Input 1, type											
RTD											
• Pt100 (IEC), 3-wire									B		
• Pt100 (IEC), 4-wire									C		
• Pt1000 (IEC), 3-wire									D		
• Pt1000 (IEC), 4-wire									E		
TC											
• Type B									F		
• Type E									G		
• Type J									H		
• Type K									J		
• Type L									K		
• Type N									L		
• Type R									N		
• Type S									P		
• Type T									Q		
Potentiometer, 4-wire									R		
Input 1, type customer-specific											
Define customer-specific input configurations in V options									Y		
Input 2, type											
Without input 2									A		
CJC configuration for TC											
Without CJC										0	
Internal CJC										1	
External CJC Pt100 (IEC), 3-wire										3	
External CJC Ni100 (DIN), 3-wire										6	
Define fixed CJC value with option Y60										8	
Materials not in contact with media											
None										0	
Type of protection											
General safety (non-Ex); CE, RCM, FM, KCC, EAC, CSA, UK											A
Intrinsic safety (Ex i) / non-incendive field wiring (NIFW) / increased safety zone 2 (Ex ec) / non-incendive (NI) (ATEX, IECEx, EACEx, CSA, FM, NEPSI, Inmetro, UKEx)											N
Electrical connection/cable entries											
None											A
Local HMI											
Without display											0

Options	Order code
Add "-Z" to article number, specify order code and, if applicable, free text	
Manufacturer's declarations	
Inspection certificate EN 10204-3.1: Manufacturer test certificate for transmitters (5 measured values)	C11
Certificates for functional safety	
Functional safety SIL2/3 (IEC 61508)	C20

Temperature Measurement

Temperature transmitters

Compact and head transmitters / SITRANS TH320 (HART, universal)

Selection and ordering data (continued)

Options	Order code
Add "-Z" to article number, specify order code and, if applicable, free text	
Device options	
PDF file with device settings	D10
Without labeling of the measuring range on the TAG plate	D41
Input 1: Cable extension 200 mm fixed, for RTD Pt100 (0 ... 100 °C) 4-wire	D73
Jumper plug set on device for write protection	D81
Jumper plug set on device set for fault current > 21 mA (instead of < 3.6 mA) (only non-SIL)	D82
Noise damping	
Noise damping 60 Hz instead of 50 Hz	P10
Input 1: TC	
Type C W5	V01
Type D W3	V02
Type U	V03
Type Lr	V04
Input 1: Callendar-Van Dusen	
2-wire (define wire resistance value in option Y51 and Callendar-Van Dusen parameter in option Y35)	V50
3-wire (define Callendar-Van Dusen parameter in option Y35)	V51
4-wire (define Callendar-Van Dusen parameter in option Y35)	V52
Input 1: RTD	
Pt × (IEC 60751), 2-wire (define wire resistance value in option Y51 and RTD factor × in option Y21)	V60
Pt × (IEC 60721), 3-wire, define RTD factor × in option Y21	V61
Pt × (IEC 60721), 4-wire, define RTD factor × in option Y21	V62
Pt × (JIS C1604), 2-wire (define wire resistance value in option Y51 and RTD factor × in option Y21)	V63
Pt × (JIS C1604-81), 3-wire, define RTD factor × in option Y21	V64
Pt × (JIS C1604-81), 4-wire, define RTD factor × in option Y21	V65
Pt × (GOST 6651-2009), 2-wire (define wire resistance value in option Y51 and RTD factor × in option Y21)	V66
Pt × (GOST 6651-2009), 3-wire, define RTD factor × in option Y21	V67
Pt × (GOST 6651-2009), 4-wire, define RTD factor × in option Y21	V68
Ni × (DIN 43760-87), 2-wire (define wire resistance value in option Y51 and RTD factor × in option Y21)	V69
Ni × (DIN 43760-87), 3-wire, define RTD factor × in option Y21	V70
Ni × (DIN 43760-87), 4-wire, define RTD factor × in option Y21	V71
Ni × (GOST 6651-2009), 2-wire (define wire resistance value in option Y51 and RTD factor × in option Y21)	V72
Ni × (GOST 6651-2009), 3-wire, define RTD factor × in option Y21	V73
Ni × (GOST 6651-2009), 4-wire, define RTD factor × in option Y21	V74
Cu × (ECW-15), 2-wire (define wire resistance value in option Y51 and RTD factor × in option Y21)	V75
Cu × (ECW-15), 3-wire, define RTD factor × in option Y21	V76
Cu × (ECW-15), 4-wire, define RTD factor × in option Y21	V77
Cu × (GOST 6651-94), 2-wire (define wire resistance value in option Y51 and RTD factor × in option Y21)	V78
Cu × (GOST 6651-94), define 3-wire, define RTD factor × in option Y21	V79

Selection and ordering data (continued)

Options	Order code
Add "-Z" to article number, specify order code and, if applicable, free text	
Cu × (GOST 6651-94), define 4-wire, define RTD factor × in option Y21	V80
Cu × (GOST 6651-2009), 2-wire (define wire resistance value in option Y51 and RTD factor × in option Y21)	V81
Cu × (GOST 6651-2009), define 3-wire, define RTD factor × in option Y21	V82
Cu × (GOST 6651-2009), define 4-wire, define RTD factor × in option Y21	V83
Device settings	
Measuring range setting temperature input: Lower range value (max. 5 characters), upper range value (max. 5 characters), unit (°C, °F, °Ra, K)	Y01
Customer-specific programming in plain text (n-lines)	Y09
Tag (device parameters, max. 32 characters), adhesive label	Y15
Measuring point description (device parameters, max. 32 characters), adhesive label	Y16
Tag (device parameters, max. 8 characters), adhesive label	Y17
Descriptor (device parameters, max. 16 characters), adhesive label	Y18
Input 1: RTD factor; e.g. factor "200" = Pt200, adhesive label	Y21
Fault current for input circuit short-circuit & interruption instead of 22.4 mA (short-circuit) and 22.8 mA (interruption) e.g. 3.6 mA and 22.4 mA [3.6 - 3.6; 3.6 - 22.8; 22.4 - 3.6]	Y31
CvD Sensor matching factors input 1 R0, A, B, C, Beta, Delta Selection: CVDR - R0 (format for example 100.0), CVDA - A (format for example 0.003908), CVDB - B (format for example -5.775E-07), CVDC - C (format for example -4.183E-12)	Y35
Wire resistance value input 1 in ohms (0 ... 100 ohms)	Y51
Input 1: CJC sensor, fixed value (see measuring range for unit)	Y60
ID number of special design	Y99

Accessories

	Article No.
Other accessories for assembly, connection and transmitter configuration, see page 2/198.	
Modems	
HART modem with USB interface	7MF4997-1DB
Modem with USB interface and SIPROM T software	7NG3092-8KN
SIMATIC PDM parameterization software	See Catalog FI 01 section 8
Mounting rail adapter for head transmitter (Quantity delivered: 5 units)	7NG3092-8KA
Connecting cable 4-wire, 200 mm (7.97 inches), for input connections when using head transmitters in the high spring flap (set with 5 units)	7NG3092-8KC

Ordering example

7NG0310-OBA00-OAA0-Z Y01
Y01: -10 ... +100 °C

Temperature Measurement

Temperature transmitters

Compact and head transmitters / SITRANS TH320 (HART, universal)

Selection and ordering data (continued)

Factory setting

- Pt100 (IEC 60751); 3-wire connection
- Measuring range: 0 ... 100 °C (32 ... 212 °F)
- Fault current
 - Device fault: < 3.6 mA
 - Input circuit wire break: 22.8 mA
 - Input circuit short-circuit: 22.4 mA
 - Input monitoring wire break and short-circuit
- No trimming of input and output (offset)
- Damping 0.0 s

Technical specifications

SITRANS TH320 (HART, universal)	
General	
Supply voltage ^{1) 2)}	
• Without explosion protection (non-Ex)	7.5 ... 48 V DC
• With explosion protection (Ex i)	7.5 ... 30 V DC
Additional minimum supply voltage when using test terminals	0.8 V
Maximum power loss	≤ 850 mW
Minimum load resistance at supply voltage > 37 V	$(V_{\text{supply}} - 37 \text{ V})/23 \text{ mA}$
Insulation voltage, test/operation	
• Without explosion protection (non-Ex)	2.5 kV AC/55 V AC
• With explosion protection (Ex i)	2.5 kV AC/42 V AC
Polarity protection	All inputs and outputs
Write protection	Wire jumpers or software
Warm-up time	< 5 min
Starting time	< 2.75 s
Programming	HART
Signal-to-noise ratio	> 60 dB
Long-term stability	Better than: <ul style="list-style-type: none"> • ± 0.05% of measuring span/year • ± 0.18% of measuring span/5 years
Response time	4 ... 20 mA: ≤ 55 ms HART: ≤ 75 ms (typically 70 ms)
Programmable damping	0 ... 60 s
Signal dynamic	
• Input	24 bit
• Output	18 bit
Influence of change in supply voltage	< 0.005% of measuring span/V DC
Input	
<u>Resistance thermometer (RTD)</u>	
Input type	
• Pt10 ... 10000	<ul style="list-style-type: none"> • IEC 60751 • JIS C 1604-8 • GOST 6651_2009 • Callendar-Van Dusen
• Ni10 ... 10000	<ul style="list-style-type: none"> • DIN 43760-1987 • GOST 6651-2009/OIML R84:2003
• Cu5 ... 1000	<ul style="list-style-type: none"> • Edison Copper Winding No. 15 • GOST 6651-2009/OIML R84:2003
Connection type	2-wire, 3-wire or 4-wire
Wire resistance per wire	Max. 50 Ω
Input current	< 0.15 mA
Effect of the wire resistance (with 3-wire and 4-wire connections)	< 0.002 Ω/Ω
Cable, wire-wire capacity	
• Pt1000, Pt10000 (IEC 60751 and JIS C 1604-8)	Max. 30 nF
• All other input types	Max. 50 nF
Fault detection, programmable	None, short-circuited, defective, short-circuited or defective Note When the low limit for the configured input type is below the constant detection limit for short-circuited inputs, the detection of short circuits is disabled regardless of the configuration of the fault detection.
Detection limit for short-circuited input	15 Ω
Fault detection time (RTD)	≤ 75 ms (typically 70 ms)
Fault detection time (for 3-wire and 4-wire)	≤ 2 000 ms
<u>Thermocouples (TC)</u>	

Temperature Measurement

Temperature transmitters

Compact and head transmitters / SITRANS TH320 (HART, universal)

Technical specifications (continued)

SITRANS TH320 (HART, universal)	
Input type	
• B	IEC 60584-1
• E	IEC 60584-1
• J	IEC 60584-1
• K	IEC 60584-1
• L	DIN 43710
• Lr	GOST 3044-84
• N	IEC 60584-1
• R	IEC 60584-1
• S	IEC 60584-1
• T	IEC 60584-1
• U	DIN 43710
• W3	ASTM E988-96
• W5	ASTM E988-96
• LR	GOST 3044-84
Cold Junction Compensation (CJC)	Constant, internal or external over Pt100 or Ni100 RTD
• Temperature range internal CJC	-50 ... +100 °C (-58 ... +212 °F)
• Connection external CJC	2-wire or 3-wire
• External CJC, wire resistance per wire (for 3-wire and 4-wire connections)	50 Ω
• Effect of the wire resistance (with 3-wire and 4-wire connections)	< 0.002 Ω/Ω
• Input current external CJC	< 0.15 mA
• Temperature range external CJC	-50 ... +135 °C (-58 ... +275 °F)
• Cable, wire-wire capacity	Max. 50 nF
• Total wire resistance	Max. 10 kΩ
• Fault detection, programmable	None, short-circuited, defective, short-circuited or defective Note The short-circuited fault detection only applies to the CJC input.
• Fault detection time (TC)	≤ 75 ms (typically 70 ms)
• Fault detection time, external CJC (for 3-wire and 4-wire)	≤ 2 000 ms
<u>Linear resistance</u>	
Input range	0 ... 100 kΩ
Minimum measuring span	25 Ω
Connection type	2-wire, 3-wire or 4-wire
Wire resistance per wire	Max. 50 Ω
Input current	< 0.15 mA
Effect of the wire resistance (with 3-wire and 4-wire connections)	< 0.002 Ω/Ω
Cable, wire-wire capacity	
• R > 400 Ω	Max. 30 nF
• R ≤ 400 Ω	Max. 50 nF
Fault detection, programmable	None, defective
<u>Potentiometers</u>	
Input range	10 ... 100 kΩ
Minimum measuring span	25 Ω
Connection type	3-wire or 4-wire
Wire resistance per wire	Max. 50 Ω
Input current	< 0.15 mA
Effect of the wire resistance (with 4-wire and 5-wire connections)	< 0.002 Ω/Ω
Cable, wire-wire capacity	
• R > 400 Ω	Max. 30 nF
• R ≤ 400 Ω	Max. 50 nF

Technical specifications (continued)

SITRANS TH320 (HART, universal)	
Fault detection, programmable	None, short-circuited, defective, short-circuited or defective Note When the configured potentiometer size is below the constant detection limit for short-circuited inputs, the detection of short circuits is disabled regardless of the configuration of the fault detection.
Detection limit for short-circuited input	15 Ω
Fault detection time, wiper arm (no short-circuit detection)	≤ 75 ms (typically 70 ms)
Fault detection time, element	≤ 2 000 ms
Fault detection time (for 4-wire and 5-wire)	≤ 2 000 ms
<u>Voltage input</u>	
Measuring range	
• Unipolar	-100 ... 1700 mV
• Bipolar	-800 ... +800 mV
Minimum measuring span	2.5 mV
Input resistance	10 MΩ
Cable, wire-wire capacity	
• Input range: -100 ... 1700 mV	Max. 30 nF
• Input range: -20 ... 100 mV	Max. 50 nF
Fault detection, programmable	None, defective
Fault detection time	≤ 75 ms (typically 70 ms)
Output and HART communication	
Normal range, programmable	3.8 ... 20.5 mA/20.5 ... 3.8 mA
Extended range (output limits), programmable	3.5 ... 23 mA/23 ... 3.5 mA
Programmable input/output limits	
• Fault current	Enable/disable
• Fault current setting	3.5 ... 23 mA
Update time	10 ms
Load (with current output)	≤ (V _{Supply} - 7.5)/0.023 Ω
Load stability	< 0.01% of measuring span/100 Ω (measuring span = currently selected range)
Input fault detection, programmable (detection of input short-circuits is ignored with TC and voltage inputs)	3.5 ... 23 mA
NAMUR NE43 Upscale	> 21 mA
NAMUR NE43 Downscale	< 3.6 mA
HART protocol versions	HART 7
Measuring accuracy	
Input accuracy	See "Input accuracy" table
Output accuracy	See "Output accuracy" table
Operating conditions	
Ambient temperature	-50 ... +85 °C (-58 ... +185 °F)
Ambient temperature for devices with functional safety	-40 ... +80 °C (-40 ... +176 °F)
Storage temperature	-50 ... +85 °C (-58 ... +185 °F)
Reference temperature for sensor calibration	24 °C ±1.0 °C (75.2 °F ±1.8 °F)
Relative humidity	< 99% (no condensation)
Degree of protection	
• Transmitter enclosure	IP68
• Terminals	IP00
Structural design	
Weight	50 g (0.11 lb)
Maximum core cross-section	1 × 1.5 mm ² (stranded wire)
Tightening torque for clamping screws	0.4 Nm
Vibrations	
• 2 ... 25 Hz	± 1.6 mm (0.07 inches)
• 25 ... 100 Hz	± 4 g

Temperature Measurement

Temperature transmitters

Compact and head transmitters / SITRANS TH320 (HART, universal)

Technical specifications (continued)

SITRANS TH320 (HART, universal)	
Certificates and approvals	
<u>Explosion protection ATEX/IECEX and others</u>	
Certificates ³⁾	<ul style="list-style-type: none"> • DEKRA 17ATEX0116 X • IECEx DEK 17.0054X • A5E43700604A-2018X
"Intrinsic safety ia/ib" type of protection	For use in Zone 0, 1, 2, 20, 21, 22
<ul style="list-style-type: none"> • ATEX 	<ul style="list-style-type: none"> • II 1 G Ex ia IIC T6 ... T4 Ga • II 2(1) G Ex ib [ia Ga] IIC T6 ... T4 Gb • II 2 D Ex ia IIIC Db • I M1 Ex ia I Ma
<ul style="list-style-type: none"> • IECEx and others 	<ul style="list-style-type: none"> • Ex ia IIC T6 ... T4 Ga • Ex ib [ia Ga] IIC T6 ... T4 Gb • Ex ia IIIC Db • Ex ia I Ma
"Intrinsic safety ic" type of protection	For use in Zones 2 and 22
<ul style="list-style-type: none"> • ATEX 	<ul style="list-style-type: none"> • II 3 G Ex ic IIC T6...T4 Gc • II 3 D Ex ic IIIC Dc
<ul style="list-style-type: none"> • IECEx and others 	<ul style="list-style-type: none"> • Ex ic IIC T6 ... T4 Gc • Ex ic IIIC Dc
"Non-sparking/increased safety nA/lec" type of protection	For use in Zones 2 and 22
<ul style="list-style-type: none"> • ATEX 	<ul style="list-style-type: none"> • II 3 G Ex nA IIC T6...T4 Gc • II 3 G Ex ec IIC T6...T4 Gc
<ul style="list-style-type: none"> • IECEx and others 	<ul style="list-style-type: none"> • Ex nA IIC T6 ... T4 Gc • Ex ec IIC T6 ... T4 Gc
<u>Explosion protection CSA/FM for Canada and USA</u>	
Certificates	<ul style="list-style-type: none"> • CSA 1861385 • FM18CA0024 • FM18US0046
"Intrinsic safety ia" type of protection	<ul style="list-style-type: none"> • IS, CL I, Div 1, GP ABCD, T6 ... T4 • Ex ia IIC T6 ... T4 Ga, AEx ia IIC T6 ... T4 Ga or Ex ib [ia Ga] IIC T6...T4 Gb, AEx ib [ia Ga] IIC T6...T4 Gb
"Non incandive field wiring NIFW" type of protection	NIFW, CL I, Div 2, GP ABCD T6 ... T4
"Non incandive NI" type of protection	<ul style="list-style-type: none"> • NI, CL I, Div 2, GP ABCD T6...T4 • Ex nA IIC T6 ... T4 Gc • AEx nA IIC T6 ... T4 Gc

¹⁾ Note that the minimum supply voltage must correspond to the value measured at the terminals of the SITRANS TH320. All external voltage drops must be taken into account.

²⁾ Protect the device from overvoltage with the help of a suitable power supply or suitable overvoltage protection equipment.

³⁾ Additional available certificates are listed on the internet at <http://www.siemens.com/processinstrumentation/certificates>

Technical specifications (continued)

Measuring ranges/Minimum measuring span

RTD

Input type	Standard	Measuring range in °C (°F)	α_0 in °C ⁻¹ (°F ⁻¹)	Minimum measuring span in °C (°F)
Pt10 ... 10000	IEC 60751	-200 ... +850 (-328 ... +1 562)	0.003851 (0.002139)	10 (50)
	JIS C 1604-8	-200 ... +649 (-328 ... +1 200)	0.003916 (0.002176)	10 (50)
	GOST 6651_2009	-200 ... +850 (-328 ... +1 562)	0.003910 (0.002172)	10 (50)
	Callendar-Van Dusen	-200 ... +850 (-328 ... +1 562)	-	10 (50)
Ni10 ... 10000	DIN 43760-1987	-60 ... +250 (-76 ... +482)	0.006180 (0.003433)	10 (50)
	GOST 6651-2009/OIML R84:2003	-60 ... +180 (-76 ... +356)	0.006170 (0.003428)	10 (50)
Cu5 ... 1000	Edison Copper Winding No. 15	-200 ... +260 (-328 ... +500)	0.004270 (0.002372)	100 (212)
	GOST 6651-2009/OIML R84:2-003	-180 ... +200 (-292 ... +392)	0.004280 (0.002378)	100 (212)
	GOST 6651-94	-50 ... +200 (-58 ... +392)	0.004260 (0.002367)	100 (212)

TC

Input type	Standard	Measuring range in °C (°F)	Minimum measuring span in °C (°F)
B	IEC 60584-1	0 (85) ... 1 820 (32 (185) ... 3 308)	100 (212)
E	IEC 60584-1	-200 ... +1 000 (-392 ... +1 832)	50 (122)
J	IEC 60584-1	-100 ... +1 200 (-212 ... +2 192)	50 (122)
K	IEC 60584-1	-180 ... +1 372 (-356 ... +2 502)	50 (122)
L	DIN 43710	-200 ... +900 (-392 ... +1 652)	50 (122)
Lr	GOST 3044-84	-200 ... +800 (-392 ... +1 472)	50 (122)
N	IEC 60584-1	-180 ... +1 300 (-356 ... +2 372)	50 (122)
R	IEC 60584-1	-50 ... +1 760 (-122 ... +3 200)	100 (212)
S	IEC 60584-1	-50 ... +1 760 (-122 ... +3 200)	100 (212)
T	IEC 60584-1	-200 ... +400 (-392 ... +752)	50 (122)
U	DIN 43710	-200 ... +600 (-392 ... +1 112)	50 (122)
W3	ASTM E988-96	0 ... 2 300 (32 ... 4 172)	100 (212)
W5	ASTM E988-96	0 ... 2 300 (32 ... 4 172)	100 (212)
LR	GOST 3044-84	-200 ... +800 (-392 ... +1472)	50 (122)

Input accuracy

Basic values

Input type	Basic accuracy	Temperature coefficient ¹⁾
RTD		
Pt10	$\leq \pm 0.8$ °C (1.44 °F)	$\leq \pm 0.020$ °C/°C (°F/°F)
Pt20	$\leq \pm 0.4$ °C (0.72 °F)	$\leq \pm 0.010$ °C/°C (°F/°F)
Pt50	$\leq \pm 0.16$ °C (0.288 °F)	$\leq \pm 0.004$ °C/°C (°F/°F)
Pt100	$\leq \pm 0.04$ °C (0.072 °F)	$\leq \pm 0.002$ °C/°C (°F/°F)
Pt200	$\leq \pm 0.08$ °C (0.144 °F)	$\leq \pm 0.002$ °C/°C (°F/°F)
Pt500	$T_{\max.} < 180$ °C (356 °F) = $\leq \pm 0.08$ °C (0.144 °F) $T_{\max.} > 180$ °C (356 °F) = $\leq \pm 0.16$ °C (0.288 °F)	$\leq \pm 0.002$ °C/°C (°F/°F)
Pt1000	$\leq \pm 0.08$ °C (0.144 °F)	$\leq \pm 0.002$ °C/°C (°F/°F)
Pt2000	$T_{\max.} < 300$ °C (572 °F) = $\leq \pm 0.08$ °C (0.144 °F) $T_{\max.} > 300$ °C (572 °F) = $\leq \pm 0.4$ °C (0.72 °F)	$\leq \pm 0.002$ °C/°C (°F/°F)
Pt10000	$\leq \pm 0.16$ °C (0.288 °F)	$\leq \pm 0.002$ °C/°C (°F/°F)
Pt x	Largest tolerance of neighboring points	Largest temperature coefficient of neighboring points
Ni10	$\leq \pm 1.6$ °C (2.88 °F)	$\leq \pm 0.020$ °C/°C (°F/°F)

Temperature Measurement

Temperature transmitters

Compact and head transmitters / SITRANS TH320 (HART, universal)

Technical specifications (continued)

Input type	Basic accuracy	Temperature coefficient ¹⁾
Ni20	≤ ±0.8 °C (1.44 °F)	≤ ±0.010 °C/°C (°F/°F)
Ni50	≤ ±0.32 °C (0.576 °F)	≤ ±0.004 °C/°C (°F/°F)
Ni100	≤ ±0.16 °C (0.288 °F)	≤ ±0.002 °C/°C (°F/°F)
Ni120	≤ ±0.16 °C (0.288 °F)	≤ ±0.002 °C/°C (°F/°F)
Ni200	≤ ±0.16 °C (0.288 °F)	≤ ±0.002 °C/°C (°F/°F)
Ni500	≤ ±0.16 °C (0.288 °F)	≤ ±0.002 °C/°C (°F/°F)
Ni1000	≤ ±0.16 °C (0.288 °F)	≤ ±0.002 °C/°C (°F/°F)
Ni2000	≤ ±0.16 °C (0.288 °F)	≤ ±0.002 °C/°C (°F/°F)
Ni10000	≤ ±0.32 °C (0.576 °F)	≤ ±0.002 °C/°C (°F/°F)
Ni x	Largest tolerance of neighboring points	Largest temperature coefficient of neighboring points
Cu5	≤ ±1.6 °C (2.88 °F)	≤ ±0.040 °C/°C (°F/°F)
Cu10	≤ ±0.8 °C (1.44 °F)	≤ ±0.020 °C/°C (°F/°F)
Cu20	≤ ±0.4 °C (0.72 °F)	≤ ±0.010 °C/°C (°F/°F)
Cu50	≤ ±0.16 °C (0.288 °F)	≤ ±0.004 °C/°C (°F/°F)
Cu100	≤ ±0.08 °C (0.144 °F)	≤ ±0.002 °C/°C (°F/°F)
Cu200	≤ ±0.08 °C (0.144 °F)	≤ ±0.002 °C/°C (°F/°F)
Cu500	≤ ±0.16 °C (0.288 °F)	≤ ±0.002 °C/°C (°F/°F)
Cu1000	≤ ±0.08 °C (0.144 °F)	≤ ±0.002 °C/°C (°F/°F)
Cu x	Largest tolerance of neighboring points	Largest temperature coefficient of neighboring points
Linear resistance		
0 ... 400 Ω	≤ ±40 mΩ	≤ ±2 mΩ/°C (1.11 mΩ/°F)
0 ... 100 kΩ	≤ ±4 Ω	≤ ±0.2 Ω/°C (0.11 Ω/°F)
Potentiometers		
0 ... 100%	< 0.05%	< ± 0.005%
Voltage input		
mV: -20 ... 100 mV	≤ ±5 μV	≤ ±0.2 μV/°C (0.11 μV/°F)
mV: -100 ... 1700 mV	≤ ±0.1 mV	≤ ±36 μV/°C (20 μV/°F)
mV: ± 800 mV	≤ ±0.1 mV	≤ ±32 μV/°C (17.8 μV/°F)
TC		
E	≤ ±0.2 °C (0.36 °F)	≤ ±0.025 °C/°C (°F/°F)
J	≤ ±0.25 °C (0.45 °F)	≤ ±0.025 °C/°C (°F/°F)
K	≤ ±0.25 °C (0.45 °F)	≤ ±0.025 °C/°C (°F/°F)
L	≤ ±0.35 °C (0.63 °F)	≤ ±0.025 °C/°C (°F/°F)
N	≤ ±0.4 °C (0.72 °F)	≤ ±0.025 °C/°C (°F/°F)
T	≤ ±0.25 °C (0.45 °F)	≤ ±0.025 °C/°C (°F/°F)
U	< 0 °C (32 °F) ≤ ±0.8 °C (1.44 °F) ≥ 0 °C (32 °F) ≤ ±0.4 °C (0.72 °F)	≤ ±0.025 °C/°C (°F/°F)
Lr	≤ ±0.2 °C (0.36 °F)	≤ ±0.1 °C/°C (°F/°F)
R	< 200 °C (392 °F) ≤ ±0.5 °C (0.9 °F) ≥ 200 °C (392 °F) ≤ ±1 °C (1.8 °F)	≤ ±0.1 °C/°C (°F/°F)
S	< 200 °C (392 °F) ≤ ±0.5 °C (0.9 °F) ≥ 200 °C (392 °F) ≤ ±1 °C (1.8 °F)	≤ ±0.1 °C/°C (°F/°F)
W3	≤ ±0.6 °C (1.08 °F)	≤ ±0.1 °C/°C (°F/°F)
W5	≤ ±0.4 °C (0.72 °F)	≤ ±0.1 °C/°C (°F/°F)
B ²⁾	≤ ±1 °C (1.8 °F)	≤ ±0.1 °C/°C (°F/°F)
B ³⁾	≤ ±3 °C (5.4 °F)	≤ ±0.1 °C/°C (°F/°F)
B ⁴⁾	≤ ±8 °C (14.4 °F)	≤ ±0.8 °C/°C (°F/°F)
B ⁵⁾	Not specified	Not specified
CJC (internal)	< ±0.5 °C (0.9 °F)	Included in basic accuracy
CJC (external)	≤ ±0.08 °C (0.144 °F)	≤ ±0.002 °C/°C (°F/°F)

¹⁾ Temperature coefficients correspond to the specified values or 0.002% of the input span, depending on which value is greater.

²⁾ Accuracy of the specification range > 400 °C (752 °F)

³⁾ Accuracy of the specification range > 160 °C (320 °F) < 400 °C (752 °F)

⁴⁾ Accuracy of the specification range > 85 °C (185 °F) < 160 °C (320 °F)

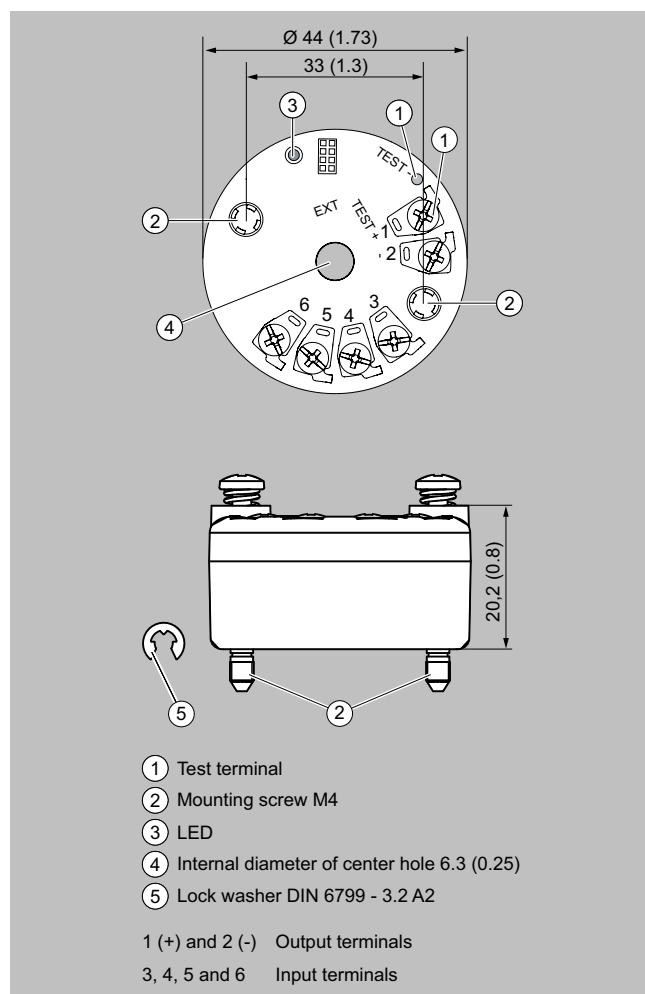
⁵⁾ Accuracy of the specification range < 85 °C (185 °F)

Technical specifications (continued)

Output accuracy

Output type	Basic accuracy	Temperature coefficient
Analog output	$\leq \pm 1.6 \mu\text{A}$ (0.01% of the full output span)	$\leq \pm 0.48 \mu\text{A/K}$ ($\leq \pm 0.003\%$ of the full output span/K)

Dimensional drawings



SITRANS TH320, dimensions and pin assignment, dimensions in mm (inch)

Temperature Measurement

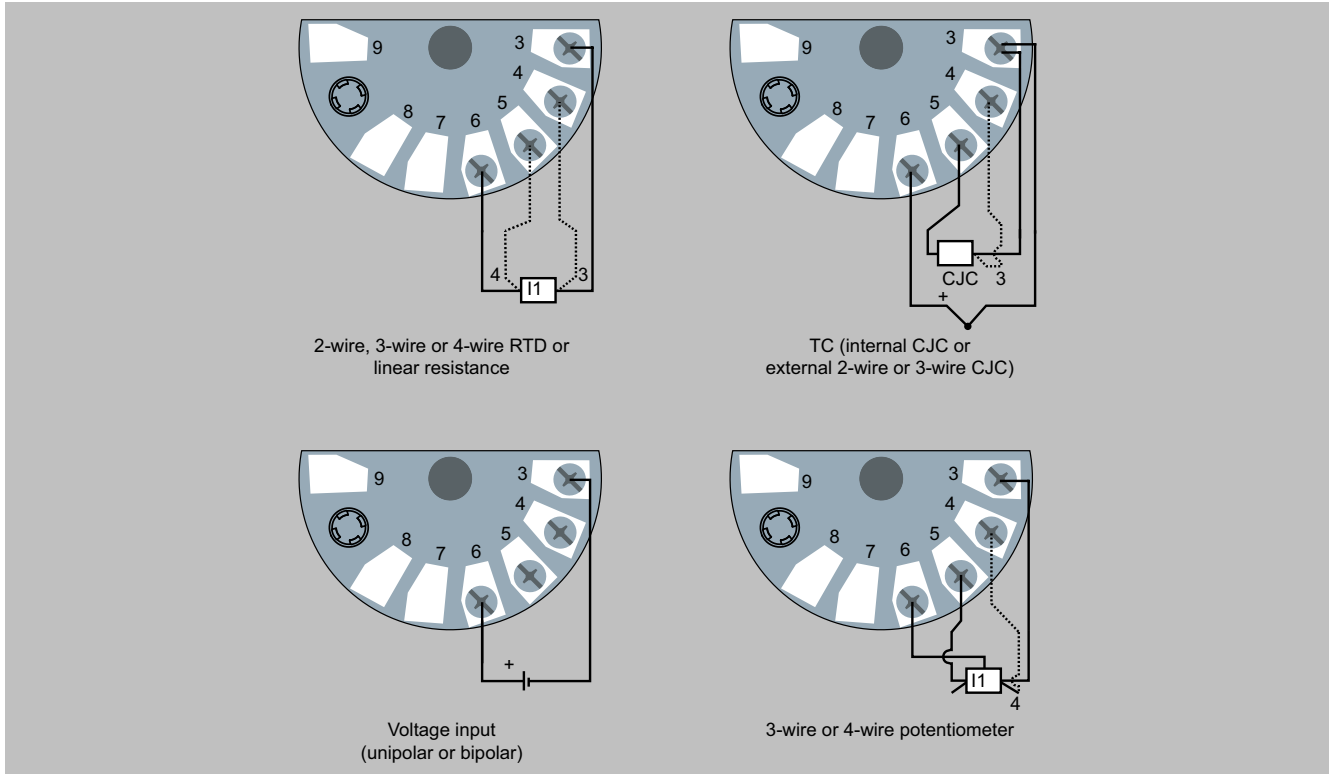
Temperature transmitters

Compact and head transmitters / SITRANS TH320 (HART, universal)

Circuit diagrams

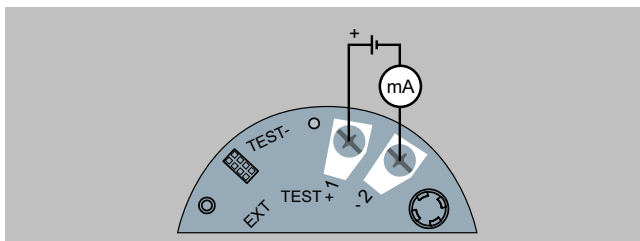
Connections

Input connection



SITRANS TH320, input connection assignment

Output connection



SITRANS TH320, output connection assignment

Overview



- 2-wire head transmitter with HART communications interface
- Mounting in the connection head of the temperature sensor
- Universal input for virtually any type of temperature sensor
- Connection of two independent input circuits for redundant operation (high input availability)
- Input drift detection
- Configurable via HART 7

Benefits

- Compact design
- Connection of two independent input circuits for redundant operation (high input availability)
- Flexible mounting and center hole allow you to select your preferred mounting type
- Galvanic isolation
- Test terminals for ammeter
- Diagnostics LED (green/red)
- Input monitoring wire break, short-circuit and drift
- Self-monitoring
- Configuration status stored in EEPROM
- SIL2/3 (with order note C20)
- Expanded diagnostic functions, such as slave pointer, operating hours counter, etc.
- Special characteristic
- Electromagnetic compatibility according to EN 61326 and NE21

Application

The SITRANS TH420 transmitter with two inputs can be used in all sectors. Its compact size means that it can be installed in connection heads of type B or larger. Due to its universal input module, the following sensors and signal sources can be connected in redundant operation (high input availability):

- 2 resistance thermometers (2-wire, 3-wire, 4-wire connection)
- 2 thermocouples
- 2 linear resistors, potentiometer and DC voltage sources

The output signal is a load-independent direct current from 4 to 20 mA in accordance with the input characteristic, superimposed by the digital HART signal.

The dual input mode also supports drift detection of the inputs, whereby maintenance intervals can be more easily planned. Transmitters of the "intrinsically safe or Zone 2 increased safety" type of protection can be installed in hazardous areas. The device meets the requirements of the EU Directive 2014/34/EU (ATEX), the FM and CSA regulations as well as other national approvals.

Temperature Measurement

Temperature transmitters

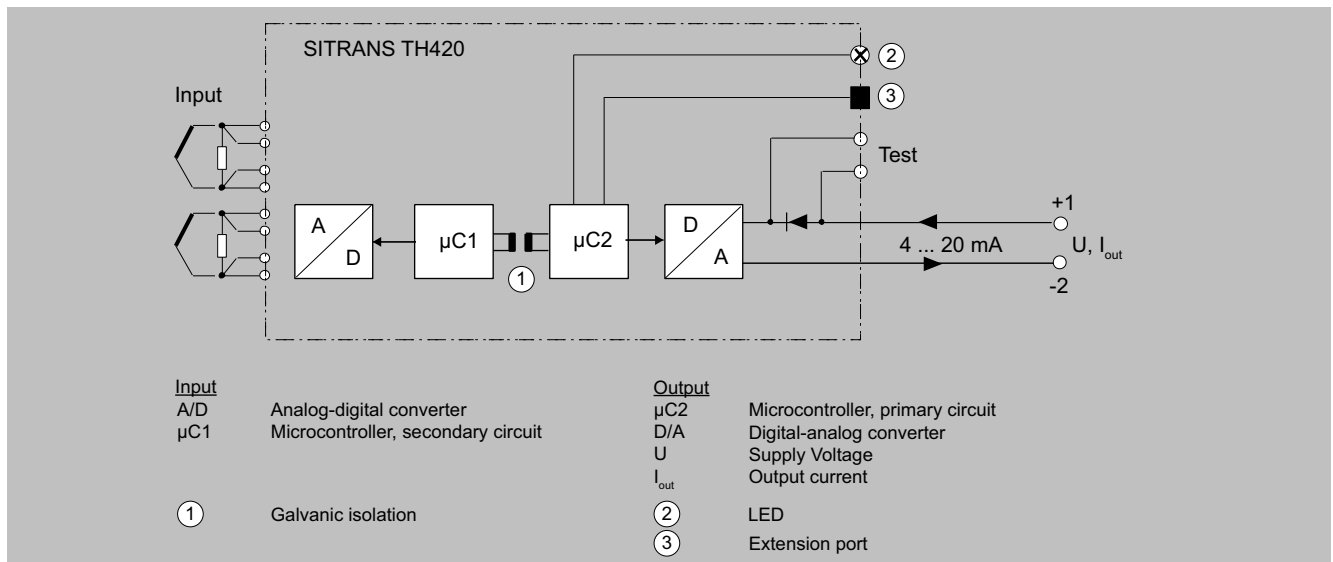
Compact and head transmitters / SITRANS TH420 (HART, universal)

Function

The SITRANS TH420 is configured via HART. The configuration can be carried out using a handheld communicator or, more conveniently, with a HART modem and the SIMATIC PDM configuration software. The configuration data are then permanently stored in the non-volatile memory (EEPROM).

After correct connection of input and supply voltage, the transmitter outputs a temperature-linear output signal and the diagnostics LED is green. In case of external errors, e.g. sensor short circuit or interruption, the LED flashes red; an internal error is indicated by a permanent red light.

An ammeter can be connected at any time for checking and plausibility via the test terminals. The output current can be read without any interruption, or even without opening the current loop.



SITRANS TH420, function block diagram

Temperature Measurement

Temperature transmitters

Compact and head transmitters / SITRANS TH420 (HART, universal)

Selection and ordering data

SITRANS TH420 head transmitter with 2 inputs	Article No. 7NG041	Order code
Click the article number for online configuration in the PIA Life Cycle Portal.	● - ● ● ● ● ● - 0 ● ● ● ● ● ● ●	
Communication		
With HART	0	
Primary value output		
Input 1	0	
Input 1, input 2 as redundancy	1	
Input 2, input 1 as redundancy	2	
Mean value input 1 and input 2, both as redundancy	3	
Minimum input 1 and input 2, both as redundancy	4	
Maximum input 1 and input 2, both as redundancy	5	
Difference input 1 - input 2	6	
Difference input 2 - input 1	7	
Absolute difference	8	
Primary value output, customer-specific		
Minimum input 1 and input 2, without redundancy	9	H 1 A
Maximum input 1 and input 2, without redundancy	9	H 1 B
Mean value input 1 and input 2, without redundancy	9	H 1 C
Input 2	9	H 1 D
Input 1, type		
RTD		
• Pt100 (IEC), 3-wire	B	
• Pt100 (IEC), 4-wire	C	
• Pt1000 (IEC), 3-wire	D	
• Pt1000 (IEC), 4-wire	E	
TC		
• Type B	F	
• Type E	G	
• Type J	H	
• Type K	J	
• Type L	K	
• Type N	L	
• Type R	N	
• Type S	P	
• Type T	Q	
Potentiometer, 4-wire	R	
Input 1, type customer-specific		
Define customer-specific input configurations in V options	Y	
Input 2, type		
Without input 2	A	
RTD		
• Pt100 (IEC), 3-wire	B	
• Pt100 (IEC), 4-wire	C	
• Pt1000 (IEC), 3-wire	D	
• Pt1000 (IEC), 4-wire	E	
TC		
• Type B	F	
• Type E	G	
• Type J	H	
• Type K	J	
• Type L	K	
• Type N	L	
• Type R	N	

Temperature Measurement

Temperature transmitters

Compact and head transmitters / SITRANS TH420 (HART, universal)

Selection and ordering data (continued)

SITRANS TH420 head transmitter with 2 inputs	Article No. 7NG041	Order code
• Type S	P	
• Type T	Q	
Potentiometer, 4-wire	R	
Input 2, type customer-specific Define customer-specific input configurations in W options	Y	
CJC configuration for TC Input 1: no CJC; input 2: No CJC	0	
Input 1: internal CJC; input 2: internal CJC	1	
Input 1: external CJC; input 2: external CJC; define type in option Jxx	2	
Input 1: external CJC; define type in option Jxx; input 2: internal CJC	3	
Input 1: internal CJC; input 2: external CJC; define type in option Jxx	4	
Input 1: Internal CJC; Input 2: No CJC	5	
Input 1: External CJC (define type in option Jxx); input 2: No CJC	6	
Materials not in contact with media None	0	
Type of protection General safety (non-Ex); CE, RCM, FM, KCC, EAC, CSA, UK		A
Intrinsic safety (Ex i) / non-incendive field wiring (NIFW) / increased safety zone 2 (Ex ec) / non-incendive (NI) (ATEX, IECEx, EACEx, CSA, FM, NEPSI, Inmetro, UKEx)		N
Electrical connection/cable entries None		A
Local HMI Without display		0

Options Add "-Z" to article number, specify order code and, if applicable, free text	Order code
Manufacturer's declarations Inspection certificate EN 10204-3.1: Manufacturer test certificate for transmitters (5 measured values)	C11
Certificates for functional safety Functional safety SIL2/3 (IEC 61508)	C20
Device options PDF file with device settings	D10
Without labeling of the measuring range on the TAG plate	D41
Input 1: Cable extension 200 mm fixed, for RTD Pt100 (0 ... 100 °C) 4-wire	D73
Input 2: Cable extension 200 mm fixed, for RTD Pt100 (0 ... 100 °C) 4-wire	D74
Jumper plug set on device for write protection	D81
Jumper plug set on device set for fault current > 21 mA (instead of < 3.6 mA) (only non-SIL)	D82
External CJC types Pt100, IEC 60751, 3-wire	J02
Pt100, IEC 60751, 4-wire	J03
Ni100, DIN 43760-87, 3-wire	J05
Ni100, DIN 43760-87, 4-wire	J06
Noise damping Noise damping 60 Hz instead of 50 Hz	P10
Input 1: TC Type C W5	V01
Type D W3	V02
Type U	V03
Type Lr	V04

Selection and ordering data (continued)

Options	Order code
Add "-Z" to article number, specify order code and, if applicable, free text	
Input 1: Callendar-Van Dusen	
2-wire (define wire resistance value in option Y51 and Callendar-Van Dusen parameter in option Y35)	V50
3-wire (define Callendar-Van Dusen parameter in option Y35)	V51
4-wire (define Callendar-Van Dusen parameter in option Y35)	V52
Input 1: RTD	
Pt × (IEC 60751), 2-wire (define wire resistance value in option Y51 and RTD factor × in option Y21)	V60
Pt × (IEC 60751), 3-wire, define RTD factor × in option Y21	V61
Pt × (IEC 60751), 4-wire, define RTD factor × in option Y21	V62
Pt × (JIS C1604), 2-wire (define wire resistance value in option Y51 and RTD factor × in option Y21)	V63
Pt × (JIS C1604-81), 3-wire, define RTD factor × in option Y21	V64
Pt × (JIS C1604-81), 4-wire, define RTD factor × in option Y21	V65
Pt × (GOST 6651-2009), 2-wire (define wire resistance value in option Y51 and RTD factor × in option Y21)	V66
Pt × (GOST 6651-2009), 3-wire, define RTD factor × in option Y21	V67
Pt × (GOST 6651-2009), 4-wire, define RTD factor × in option Y21	V68
Ni × (DIN 43760-87), 2-wire (define wire resistance value in option Y51 and RTD factor × in option Y21)	V69
Ni × (DIN 43760-87), 3-wire, define RTD factor × in option Y21	V70
Ni × (DIN 43760-87), 4-wire, define RTD factor × in option Y21	V71
Ni × (GOST 6651-2009), 2-wire (define wire resistance value in option Y51 and RTD factor × in option Y21)	V72
Ni × (GOST 6651-2009), 3-wire, define RTD factor × in option Y21	V73
Ni × (GOST 6651-2009), 4-wire, define RTD factor × in option Y21	V74
Cu × (ECW-15), 2-wire (define wire resistance value in option Y51 and RTD factor × in option Y21)	V75
Cu × (ECW-15), 3-wire, define RTD factor × in option Y21	V76
Cu × (ECW-15), 4-wire, define RTD factor × in option Y21	V77
Cu × (GOST 6651-94), 2-wire (define wire resistance value in option Y51 and RTD factor × in option Y21)	V78
Cu × (GOST 6651-94), define 3-wire, define RTD factor × in option Y21	V79
Cu × (GOST 6651-94), define 4-wire, define RTD factor × in option Y21	V80
Cu × (GOST 6651-2009), 2-wire (define wire resistance value in option Y51 and RTD factor × in option Y21)	V81
Cu × (GOST 6651-2009), define 3-wire, define RTD factor × in option Y21	V82
Cu × (GOST 6651-2009), define 4-wire, define RTD factor × in option Y21	V83
Input 2: TC	
Type C W5	W01
Type D W3	W02
Type U	W03
Type Lr	W04

Temperature Measurement

Temperature transmitters

Compact and head transmitters / SITRANS TH420 (HART, universal)

Selection and ordering data (continued)

Options	Order code
Add "-Z" to article number, specify order code and, if applicable, free text	
Input 2: Callendar-Van Dusen	
2-wire (define wire resistance value in option Y52 and Callendar-Van Dusen parameter in option Y36)	W50
3-wire (define Callendar-Van Dusen parameter in option Y36)	W51
4-wire (define Callendar-Van Dusen parameter in option Y36)	W52
Input 2: RTD	
Pt × (IEC 60751), 2-wire (define wire resistance value in option Y52 and RTD factor × in option Y22)	W60
Pt × (IEC 60721), 3-wire, define RTD factor × in option Y22	W61
Pt × (IEC 60721), 4-wire, define RTD factor × in option Y22	W62
Pt × (JIS C1604), 2-wire (define wire resistance value in option Y52 and RTD factor × in option Y22)	W63
Pt × (JIS C1604-81), 3-wire, define RTD factor × in option Y22	W64
Pt × (JIS C1604-81), 4-wire, define RTD factor × in option Y22	W65
Pt × (GOST 6651-2009), 2-wire (define wire resistance value in option Y52 and RTD factor × in option Y22)	W66
Pt × (GOST 6651-2009), 3-wire, define RTD factor × in option Y22	W67
Pt × (GOST 6651-2009), 4-wire, define RTD factor × in option Y22	W68
Ni × (DIN 43760-87), 2-wire (define wire resistance value in option Y52 and RTD factor × in option Y22)	W69
Ni × (DIN 43760-87), 3-wire, define RTD factor × in option Y22	W70
Ni × (DIN 43760-87), 4-wire, define RTD factor × in option Y22	W71
Ni × (GOST 6651-2009), 2-wire (define wire resistance value in option Y52 and RTD factor × in option Y22)	W72
Ni × (GOST 6651-2009), 3-wire, define RTD factor × in option Y22	W73
Ni × (GOST 6651-2009), 4-wire, define RTD factor × in option Y22	W74
Cu × (ECW-15), 2-wire (define wire resistance value in option Y52 and RTD factor × in option Y22)	W75
Cu × (ECW-15), 3-wire, define RTD factor × in option Y22	W76
Cu × (ECW-15), 4-wire, define RTD factor × in option Y22	W77
Cu × (GOST 6651-94), 2-wire (define wire resistance value in option Y52 and RTD factor × in option Y22)	W78
Cu × (GOST 6651-94), 3-wire, define RTD factor × in option Y22	W79
Cu × (GOST 6651-94), 4-wire, define RTD factor × in option Y22	W80
Cu × (GOST 6651-2009), 2-wire (define wire resistance value in option Y52 and RTD factor × in option Y22)	W81
Cu × (GOST 6651-2009), 3-wire, define RTD factor × in option Y22	W82
Cu × (GOST 6651-2009), 4-wire, define RTD factor × in option Y22	W83
Device settings	
Measuring range setting temperature input: Lower range value (max. 5 characters), upper range value (max. 5 characters), unit (°C, °F, °Ra, K)	Y01
Customer-specific programming in plain text (n-lines)	Y09

Selection and ordering data (continued)

Options	Order code
Add "-Z" to article number, specify order code and, if applicable, free text	
Tag (device parameters, max. 32 characters), adhesive label	Y15
Measuring point description (device parameters, max. 32 characters), adhesive label	Y16
Tag (device parameters, max. 8 characters), adhesive label	Y17
Descriptor (device parameters, max. 16 characters), adhesive label	Y18
Input 1: RTD factor; e.g. factor "200" = Pt200, adhesive label	Y21
Input 2: RTD factor (e.g. factor "200" => RTD Pt200), adhesive label	Y22
Fault current for input circuit short-circuit & interruption instead of 22.4 mA (short-circuit) and 22.8 mA (interruption) e.g. 3.6 mA and 22.4 mA [3.6 - 3.6; 3.6 - 22.8; 22.4 - 3.6]	Y31
CvD Sensor matching factors input 1 R0, A, B, C, Beta, Delta Selection: CVDR - R0 (format for example 100.0), CVDA - A (format for example 0.003908), CVDB - B (format for example -5.775E-07), CVDC - C (format for example -4.183E-12)	Y35
CvD Sensor matching factors input 2 R0, A, B, C, Beta, Delta Selection: CVDR - R0 (format for example 100.0), CVDA - A (format for example 0.003908), CVDB - B (format for example -5.775E-07), CVDC - C (format for example -4.183E-12)	Y36
Wire resistance value input 1 in ohms (0 ... 100 ohms)	Y51
Wire resistance value input 2 in ohms (0 ... 100 ohms)	Y52
Input 1: CJC sensor, fixed value (see measuring range for unit)	Y60
Input 2: CJC sensor, fixed value (see measuring range for unit)	Y61

Accessories

Article No.	
Other accessories for assembly, connection and transmitter configuration, see page 2/198.	
Modems	
HART modem with USB interface	7MF4997-1DB
SIMATIC PDM parameterization software	See Catalog FI 01 section 8
Mounting rail adapter for head transmitter (Quantity delivered: 5 units)	7NG3092-8KA
Connecting cable 4-wire, 200 mm (7.87 inches), for input connections when using head transmitters in the high spring flap (set with 5 units)	7NG3092-8KC

Ordering example

7NG0410-0BA00-0AA0-Z Y01
Y01: -10 ... +100 °C

Factory setting

- Input 1: Pt100 (IEC 751); 3-wire connection
- Input 2: not configured (inactive)
- Measuring range: 0 ... 100 °C (32 ... 212 °F)

Temperature Measurement

Temperature transmitters

Compact and head transmitters / SITRANS TH420 (HART, universal)

Selection and ordering data (continued)

- Fault current
 - Device fault: < 3.6 mA
 - Input circuit wire break: 22.8 mA
 - Input circuit short-circuit: 22.4 mA
 - Input circuit drift: 22 mA (active when input 2 is active)
 - Input monitoring wire break and short-circuit
- No trimming of input and output (offset)
- Damping 0.0 s

Technical specifications

SITRANS TH420 (HART, universal)	
General	
Supply voltage ^{1) 2)}	
• Without explosion protection (non-Ex)	7.5 ... 48 V DC
• With explosion protection (Ex i)	7.5 ... 30 V DC
Additional minimum supply voltage when using test terminals	0.8 V
Maximum power loss	≤ 850 mW
Minimum load resistance at supply voltage > 37 V	$(V_{\text{supply}} - 37 \text{ V})/23 \text{ mA}$
Insulation voltage, test/operation	
• Without explosion protection (non-Ex)	2.5 kV AC/55 V AC
• With explosion protection (Ex i)	2.5 kV AC/42 V AC
Polarity protection	All inputs and outputs
Write protection	Wire jumpers or software
Warm-up time	< 5 min
Starting time	< 2.75 s
Programming	HART
Signal-to-noise ratio	> 60 dB
Long-term stability	Better than: <ul style="list-style-type: none"> • ± 0.05% of measuring span/year • ± 0.18% of measuring span/5 years
Response time	≤ 75 ms (typically 70 ms)
Programmable damping	0 ... 60 s
Signal dynamic	
• Input	24 bit
• Output	18 bit
Influence of change in supply voltage	< 0.005% of measuring span/V DC
Input	
Resistance thermometer (RTD)	
Input type	
• Pt10 ... 10000	<ul style="list-style-type: none"> • IEC 60751 • JIS C 1604-8 • GOST 6651_2009 • Callendar-Van Dusen
• Ni10 ... 10000	<ul style="list-style-type: none"> • DIN 43760-1987 • GOST 6651-2009/OIML R84:2003
• Cu5 ... 1000	<ul style="list-style-type: none"> • Edison Copper Winding No. 15 • GOST 6651-2009/OIML R84:2003
Connection type	2-wire, 3-wire or 4-wire
Wire resistance per wire	Max. 50 Ω
Input current	< 0.15 mA
Effect of the wire resistance (with 3-wire and 4-wire connections)	< 0.002 Ω/Ω
Cable, wire-wire capacity	
• Pt1000, Pt10000 (IEC 60751 and JIS C 1604-8)	Max. 30 nF

Technical specifications (continued)

SITRANS TH420 (HART, universal)	
• All other input types	Max. 50 nF
Fault detection, programmable	None, short-circuited, defective, short-circuited or defective Note When the low limit for the configured input type is below the constant detection limit for short-circuited inputs, the detection of short circuits is disabled regardless of the configuration of the fault detection.
Detection limit for short-circuited input	15 Ω
Fault detection time (RTD)	≤ 75 ms (typically 70 ms)
Fault detection time (for 3-wire and 4-wire)	$\leq 2\,000$ ms
Thermocouples (TC)	
Input type	
• B	IEC 60584-1
• E	IEC 60584-1
• J	IEC 60584-1
• K	IEC 60584-1
• L	DIN 43710
• Lr	GOST 3044-84
• N	IEC 60584-1
• R	IEC 60584-1
• S	IEC 60584-1
• T	IEC 60584-1
• U	DIN 43710
• W3	ASTM E988-96
• W5	ASTM E988-96
• LR	GOST 3044-84
Cold Junction Compensation (CJC)	Constant, internal or external over Pt100 or Ni100 RTD
• Temperature range internal CJC	-50 ... +100 °C (-58 ... +212 °F)
• Connection external CJC	2-wire, 3-wire or 4-wire
• External CJC, wire resistance per wire (for 3-wire and 4-wire connections)	50 Ω
• Effect of the wire resistance (with 3-wire and 4-wire connections)	< 0.002 Ω/Ω
• Input current external CJC	< 0.15 mA
• Temperature range external CJC	-50 ... +135 °C (-58 ... +275 °F)
• Cable, wire-wire capacity	Max. 50 nF
• Total wire resistance	Max. 10 k Ω
• Fault detection, programmable	None, short-circuited, defective, short-circuited or defective Note The short-circuited fault detection only applies to the CJC input.
• Fault detection time (TC)	≤ 75 ms (typically 70 ms)
• Fault detection time, external CJC (for 3-wire and 4-wire)	$\leq 2\,000$ ms
Linear resistance	
Input range	0 ... 100 k Ω
Minimum measuring span	25 Ω
Connection type	2-wire, 3-wire or 4-wire
Wire resistance per wire	Max. 50 Ω
Input current	< 0.15 mA
Effect of the wire resistance (with 3-wire and 4-wire connections)	< 0.002 Ω/Ω
Cable, wire-wire capacity	
• R > 400 Ω	Max. 30 nF

Temperature Measurement

Temperature transmitters

Compact and head transmitters / SITRANS TH420 (HART, universal)

Technical specifications (continued)

SITRANS TH420 (HART, universal)	
• $R \leq 400 \Omega$	Max. 50 nF
Fault detection, programmable	None, defective
Potentiometers	
Input range	10 ... 100 k Ω
Minimum measuring span	25 Ω
Connection type	3-wire, 4-wire or 5-wire
Wire resistance per wire	Max. 50 Ω
Input current	< 0.15 mA
Effect of the wire resistance (with 4-wire and 5-wire connections)	< 0.002 Ω/Ω
Cable, wire-wire capacity	
• $R > 400 \Omega$	Max. 30 nF
• $R \leq 400 \Omega$	Max. 50 nF
Fault detection, programmable	None, short-circuited, defective, short-circuited or defective
	Note When the configured potentiometer size is below the constant detection limit for short-circuited inputs, the detection of short circuits is disabled regardless of the configuration of the fault detection.
Detection limit for short-circuited input	15 Ω
Fault detection time, wiper arm (no short-circuit detection)	≤ 75 ms (typically 70 ms)
Fault detection time, element	$\leq 2\,000$ ms
Fault detection time (for 4-wire and 5-wire)	$\leq 2\,000$ ms
Voltage input	
Measuring range	
• Unipolar	-100 ... 1700 mV
• Bipolar	-800 ... +800 mV
Minimum measuring span	2.5 mV
Input resistance	10 M Ω
Cable, wire-wire capacity	
• Input range: -100 ... 1700 mV	Max. 30 nF
• Input range: -20 ... 100 mV	Max. 50 nF
Fault detection, programmable	None, defective
Fault detection time	≤ 75 ms (typically 70 ms)
Output and HART communication	
Normal range, programmable	3.8 ... 20.5 mA/20.5 ... 3.8 mA
Extended range (output limits), programmable	3.5 ... 23 mA/23 ... 3.5 mA
Programmable input/output limits	
• Fault current	Enable/disable
• Fault current setting	3.5 ... 23 mA
Update time	10 ms
Load (with current output)	$\leq (V_{\text{Supply}} - 7.5)/0.023 \Omega$
Load stability	< 0.01% of measuring span/100 Ω (measuring span = currently selected range)
Input fault detection, programmable (detection of input short-circuits is ignored with TC and voltage inputs)	3.5 ... 23 mA
NAMUR NE43 Upscale	> 21 mA
NAMUR NE43 Downscale	< 3.6 mA
HART protocol versions	HART 7
Measuring accuracy	
Input accuracy	See "Input accuracy" table
Output accuracy	See "Output accuracy" table
Operating conditions	
Ambient temperature	-50 ... +85 $^{\circ}\text{C}$ (-58 ... +185 $^{\circ}\text{F}$)
Ambient temperature for devices with functional safety	-40 ... +80 $^{\circ}\text{C}$ (-40 ... +176 $^{\circ}\text{F}$)

Technical specifications (continued)

SITRANS TH420 (HART, universal)	
Storage temperature	-50 ... +85 °C (-58 ... +185 °F)
Reference temperature for sensor calibration	24 °C ±1.0 °C (75.2 °F ±1.8 °F)
Relative humidity	< 99% (no condensation)
Degree of protection	
• Transmitter enclosure	IP68
• Terminals	IP00
Structural design	
Weight	50 g (0.11 lb)
Maximum core cross-section	1 × 1.5 mm ² (stranded wire)
Tightening torque for clamping screws	0.4 Nm
Vibrations	IEC 60068-2-6
• 2 ... 25 Hz	± 1.6 mm (0.07 inches)
• 25 ... 100 Hz	± 4 g
Certificates and approvals	
<u>Explosion protection ATEX/IECEx and others</u>	
Certificates ³⁾	<ul style="list-style-type: none"> • DEKRA 17ATEX0116 X • IECEx DEK 17.0054X • A5E43700604A-2018X
"Intrinsic safety ia/ib" type of protection	For use in Zone 0, 1, 2, 20, 21, 22
• ATEX	<ul style="list-style-type: none"> • II 1 G Ex ia IIC T6 ... T4 Ga • II 2(1) G Ex ib [ia Ga] IIC T6 ... T4 Gb • II 2 D Ex ia IIIC Db • I M1 Ex ia I Ma
• IECEx and others	<ul style="list-style-type: none"> • Ex ia IIC T6 ... T4 Ga • Ex ib [ia Ga] IIC T6 ... T4 Gb • Ex ia IIIC Db • Ex ia I Ma
"Intrinsic safety ic" type of protection	For use in Zones 2 and 22
• ATEX	<ul style="list-style-type: none"> • II 3 G Ex ic IIC T6...T4 Gc • II 3 D Ex ic IIIC Dc
• IECEx and others	<ul style="list-style-type: none"> • Ex ic IIC T6 ... T4 Gc • Ex ic IIIC Dc
"Non-sparking/increased safety nA/ec" type of protection	For use in Zones 2 and 22
• ATEX	<ul style="list-style-type: none"> • II 3 G Ex nA IIC T6...T4 Gc • II 3 G Ex ec IIC T6...T4 Gc
• IECEx and others	<ul style="list-style-type: none"> • Ex nA IIC T6 ... T4 Gc • Ex ec IIC T6 ... T4 Gc
<u>Explosion protection CSA/FM for Canada and USA</u>	
Certificates	<ul style="list-style-type: none"> • CSA 1861385 • FM18CA0024 • FM18US0046
"Intrinsic safety ia" type of protection	<ul style="list-style-type: none"> • IS, CL I, Div 1, GP ABCD, T6 ... T4 • Ex ia IIC T6 ... T4 Ga, AEx ia IIC T6 ... T4 Ga or • Ex ib [ia Ga] IIC T6...T4 Gb, AEx ib [ia Ga] IIC T6...T4 Gb
"Non incensive field wiring NIFW" type of protection	NIFW, CL I, Div 2, GP ABCD T6 ... T4
"Non incensive NI" type of protection	<ul style="list-style-type: none"> • NI, CL I, Div 2, GP ABCD T6...T4 • Ex nA IIC T6 ... T4 Gc • AEx nA IIC T6 ... T4 Gc

¹⁾ Note that the minimum supply voltage must correspond to the value measured at the terminals of the SITRANS TH420. All external voltage drops must be taken into account.

²⁾ Protect the device from overvoltage with the help of a suitable power supply or suitable overvoltage protection equipment.

³⁾ Additional available certificates are listed on the internet at <http://www.siemens.com/processinstrumentation/certificates>

Temperature Measurement

Temperature transmitters

Compact and head transmitters / SITRANS TH420 (HART, universal)

Technical specifications (continued)

Measuring ranges/Minimum measuring span

RTD

Input type	Standard	Measuring range in °C (°F)	α_0 in °C ⁻¹ (°F ⁻¹)	Minimum measuring span in °C (°F)
Pt10 ... 10000	IEC 60751	-200 ... +850 (-328 ... +1 562)	0.003851 (0.002139)	10 (50)
	JIS C 1604-8	-200 ... +649 (-328 ... +1 200)	0.003916 (0.002176)	10 (50)
	GOST 6651_2009	-200 ... +850 (-328 ... +1 562)	0.003910 (0.002172)	10 (50)
	Callendar-Van Dusen	-200 ... +850 (-328 ... +1 562)	-	10 (50)
Ni10 ... 10000	DIN 43760-1987	-60 ... +250 (-76 ... +482)	0.006180 (0.003433)	10 (50)
	GOST 6651-2009/OIML R84:2-003	-60 ... +180 (-76 ... +356)	0.006170 (0.003428)	10 (50)
Cu5 ... 1000	Edison Copper Winding No. 15	-200 ... +260 (-328 ... +500)	0.004270 (0.002372)	100 (212)
	GOST 6651-2009/OIML - R84:2003	-180 ... +200 (-292 ... +392)	0.004280 (0.002378)	100 (212)
	GOST 6651-94	-50 ... +200 (-58 ... +392)	0.004260 (0.002367)	100 (212)

TC

Input type	Standard	Measuring range in °C (°F)	Minimum measuring span in °C (°F)
B	IEC 60584-1	0 (85) ... 1 820 (32 (185) ... 3 308)	100 (212)
E	IEC 60584-1	-200 ... +1 000 (-392 ... +1 832)	50 (122)
J	IEC 60584-1	-100 ... +1 200 (-212 ... +2 192)	50 (122)
K	IEC 60584-1	-180 ... +1 372 (-356 ... +2 502)	50 (122)
L	DIN 43710	-200 ... +900 (-392 ... +1 652)	50 (122)
Lr	GOST 3044-84	-200 ... +800 (-392 ... +1 472)	50 (122)
N	IEC 60584-1	-180 ... +1 300 (-356 ... +2 372)	50 (122)
R	IEC 60584-1	-50 ... +1 760 (-122 ... +3 200)	100 (212)
S	IEC 60584-1	-50 ... +1 760 (-122 ... +3 200)	100 (212)
T	IEC 60584-1	-200 ... +400 (-392 ... +752)	50 (122)
U	DIN 43710	-200 ... +600 (-392 ... +1 112)	50 (122)
W3	ASTM E988-96	0 ... 2 300 (32 ... 4 172)	100 (212)
W5	ASTM E988-96	0 ... 2 300 (32 ... 4 172)	100 (212)
LR	GOST 3044-84	-200 ... +800 (-392 ... +1472)	50 (122)

Input accuracy

Basic values

Input type	Basic accuracy	Temperature coefficient ¹⁾
RTD		
Pt10	$\leq \pm 0.8$ °C (1.44 °F)	$\leq \pm 0.020$ °C/°C (°F/°F)
Pt20	$\leq \pm 0.4$ °C (0.72 °F)	$\leq \pm 0.010$ °C/°C (°F/°F)
Pt50	$\leq \pm 0.16$ °C (0.288 °F)	$\leq \pm 0.004$ °C/°C (°F/°F)
Pt100	$\leq \pm 0.04$ °C (0.072 °F)	$\leq \pm 0.002$ °C/°C (°F/°F)
Pt200	$\leq \pm 0.08$ °C (0.144 °F)	$\leq \pm 0.002$ °C/°C (°F/°F)
Pt500	$T_{\max.} < 180$ °C (356 °F) $\leq \pm 0.08$ °C (0.144 °F) $T_{\max.} > 180$ °C (356 °F) $\leq \pm 0.16$ °C (0.288 °F)	$\leq \pm 0.002$ °C/°C (°F/°F)
Pt1000	$\leq \pm 0.08$ °C (0.144 °F)	$\leq \pm 0.002$ °C/°C (°F/°F)
Pt2000	$T_{\max.} < 300$ °C (572 °F) $\leq \pm 0.08$ °C (0.144 °F) $T_{\max.} > 300$ °C (572 °F) $\leq \pm 0.4$ °C (0.72 °F)	$\leq \pm 0.002$ °C/°C (°F/°F)
Pt10000	$\leq \pm 0.16$ °C (0.288 °F)	$\leq \pm 0.002$ °C/°C (°F/°F)
Pt x	Largest tolerance of neighboring points	Largest temperature coefficient of neighboring points
Ni10	$\leq \pm 1.6$ °C (2.88 °F)	$\leq \pm 0.020$ °C/°C (°F/°F)

Technical specifications (continued)

Input type	Basic accuracy	Temperature coefficient ¹⁾
Ni20	≤ ±0.8 °C (1.44 °F)	≤ ±0.010 °C/°C (°F/°F)
Ni50	≤ ±0.32 °C (0.576 °F)	≤ ±0.004 °C/°C (°F/°F)
Ni100	≤ ±0.16 °C (0.288 °F)	≤ ±0.002 °C/°C (°F/°F)
Ni120	≤ ±0.16 °C (0.288 °F)	≤ ±0.002 °C/°C (°F/°F)
Ni200	≤ ±0.16 °C (0.288 °F)	≤ ±0.002 °C/°C (°F/°F)
Ni500	≤ ±0.16 °C (0.288 °F)	≤ ±0.002 °C/°C (°F/°F)
Ni1000	≤ ±0.16 °C (0.288 °F)	≤ ±0.002 °C/°C (°F/°F)
Ni2000	≤ ±0.16 °C (0.288 °F)	≤ ±0.002 °C/°C (°F/°F)
Ni10000	≤ ±0.32 °C (0.576 °F)	≤ ±0.002 °C/°C (°F/°F)
Ni x	Largest tolerance of neighboring points	Largest temperature coefficient of neighboring points
Cu5	≤ ±1.6 °C (2.88 °F)	≤ ±0.040 °C/°C (°F/°F)
Cu10	≤ ±0.8 °C (1.44 °F)	≤ ±0.020 °C/°C (°F/°F)
Cu20	≤ ±0.4 °C (0.72 °F)	≤ ±0.010 °C/°C (°F/°F)
Cu50	≤ ±0.16 °C (0.288 °F)	≤ ±0.004 °C/°C (°F/°F)
Cu100	≤ ±0.08 °C (0.144 °F)	≤ ±0.002 °C/°C (°F/°F)
Cu200	≤ ±0.08 °C (0.144 °F)	≤ ±0.002 °C/°C (°F/°F)
Cu500	≤ ±0.16 °C (0.288 °F)	≤ ±0.002 °C/°C (°F/°F)
Cu1000	≤ ±0.08 °C (0.144 °F)	≤ ±0.002 °C/°C (°F/°F)
Cu x	Largest tolerance of neighboring points	Largest temperature coefficient of neighboring points
Linear resistance		
0 ... 400 Ω	≤ ±40 mΩ	≤ ±2 mΩ/°C (1.11 mΩ/°F)
0 ... 100 kΩ	≤ ±4 Ω	≤ ±0.2 Ω/°C (0.11 Ω/°F)
Potentiometers		
0 ... 100%	< 0.05%	< ± 0.005%
Voltage input		
mV: -20 ... 100 mV	≤ ±5 μV	≤ ±0.2 μV/°C (0.11 μV/°F)
mV: -100 ... 1700 mV	≤ ±0.1 mV	≤ ±36 μV/°C (20 μV/°F)
mV: ± 800 mV	≤ ±0.1 mV	≤ ±32 μV/°C (17.8 μV/°F)
TC		
E	≤ ±0.2 °C (0.36 °F)	≤ ±0.025 °C/°C (°F/°F)
J	≤ ±0.25 °C (0.45 °F)	≤ ±0.025 °C/°C (°F/°F)
K	≤ ±0.25 °C (0.45 °F)	≤ ±0.025 °C/°C (°F/°F)
L	≤ ±0.35 °C (0.63 °F)	≤ ±0.025 °C/°C (°F/°F)
N	≤ ±0.4 °C (0.72 °F)	≤ ±0.025 °C/°C (°F/°F)
T	≤ ±0.25 °C (0.45 °F)	≤ ±0.025 °C/°C (°F/°F)
U	< 0 °C (32 °F) ≤ ±0.8 °C (1.44 °F) ≥ 0 °C (32 °F) ≤ ±0.4 °C (0.72 °F)	≤ ±0.025 °C/°C (°F/°F)
Lr	≤ ±0.2 °C (0.36 °F)	≤ ±0.1 °C/°C (°F/°F)
R	< 200 °C (392 °F) ≤ ±0.5 °C (0.9 °F) ≥ 200 °C (392 °F) ≤ ±1 °C (1.8 °F)	≤ ±0.1 °C/°C (°F/°F)
S	< 200 °C (392 °F) ≤ ±0.5 °C (0.9 °F) ≥ 200 °C (392 °F) ≤ ±1 °C (1.8 °F)	≤ ±0.1 °C/°C (°F/°F)
W3	≤ ±0.6 °C (1.08 °F)	≤ ±0.1 °C/°C (°F/°F)
W5	≤ ±0.4 °C (0.72 °F)	≤ ±0.1 °C/°C (°F/°F)
B ²⁾	≤ ±1 °C (1.8 °F)	≤ ±0.1 °C/°C (°F/°F)
B ³⁾	≤ ±3 °C (5.4 °F)	≤ ±0.1 °C/°C (°F/°F)
B ⁴⁾	≤ ±8 °C (14.4 °F)	≤ ±0.8 °C/°C (°F/°F)
B ⁵⁾	Not specified	Not specified
CJC (internal)	< ±0.5 °C (0.9 °F)	Included in basic accuracy
CJC (external)	≤ ±0.08 °C (0.144 °F)	≤ ±0.002 °C/°C (°F/°F)

1) Temperature coefficients correspond to the specified values or 0.002% of the input span, depending on which value is greater.

2) Accuracy of the specification range > 400 °C (752 °F)

3) Accuracy of the specification range > 160 °C (320 °F) < 400 °C (752 °F)

4) Accuracy of the specification range > 85 °C (185 °F) < 160 °C (320 °F)

5) Accuracy of the specification range < 85 °C (185 °F)

Temperature Measurement

Temperature transmitters

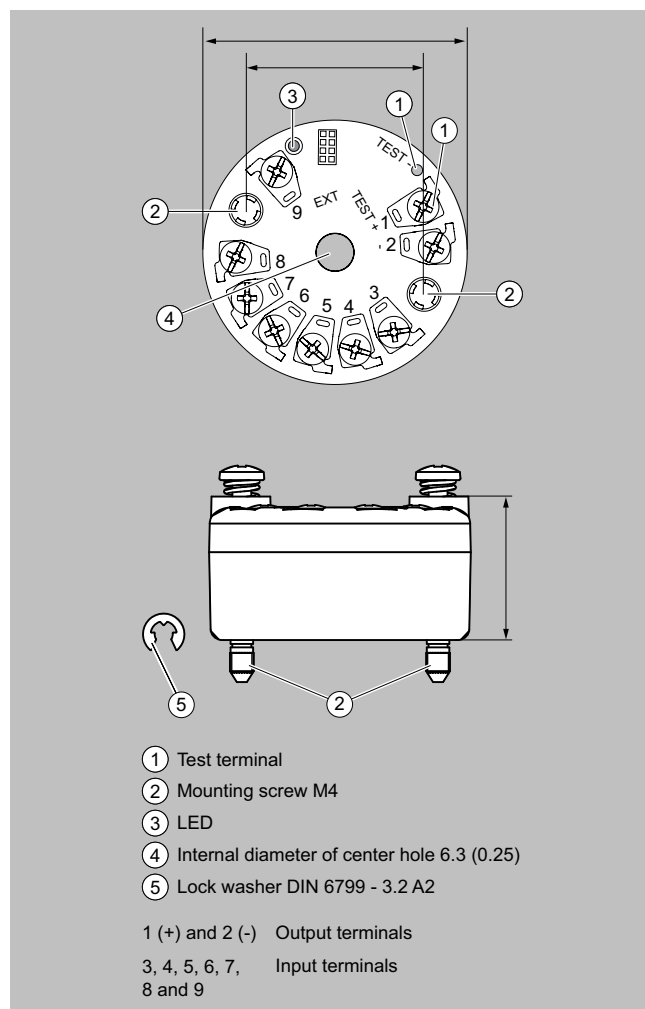
Compact and head transmitters / SITRANS TH420 (HART, universal)

Technical specifications (continued)

Output accuracy

Output type	Basic accuracy	Temperature coefficient
Average value measurement	Average of accuracy of input 1 and input 2	Average of temperature coefficient of input 1 and input 2
Differential measurement	Sum of accuracy of input 1 and input 2	Sum of temperature coefficient of input 1 and input 2
Analog output	$\leq \pm 1.6 \mu\text{A}$ (0.01% of the full output span)	$\leq \pm 0.48 \mu\text{A/K}$ ($\leq \pm 0.003\%$ of the full output span/K)

Dimensional drawings

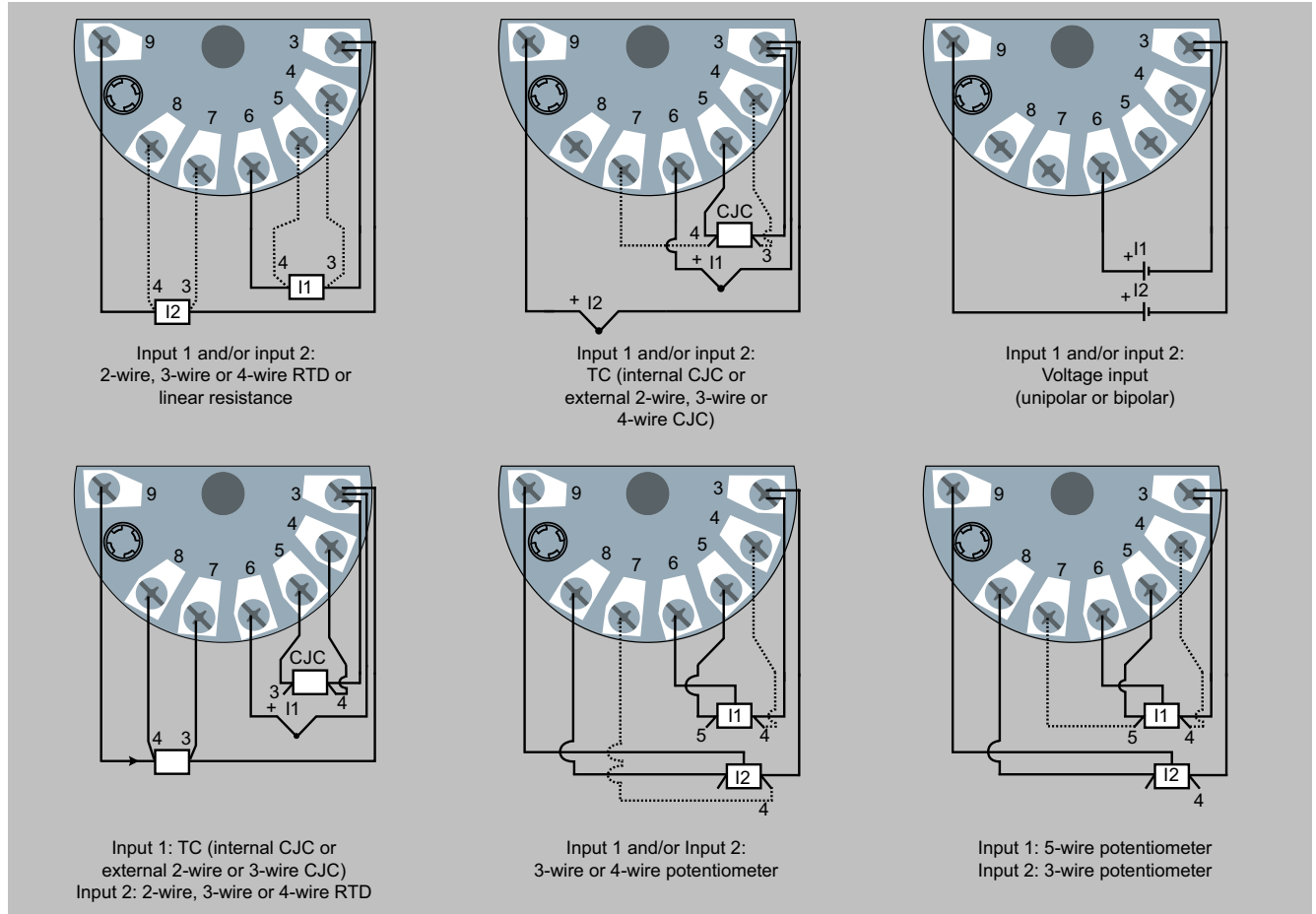


SITRANS TH420, dimensions and pin assignment, dimensions in mm (inch)

Circuit diagrams

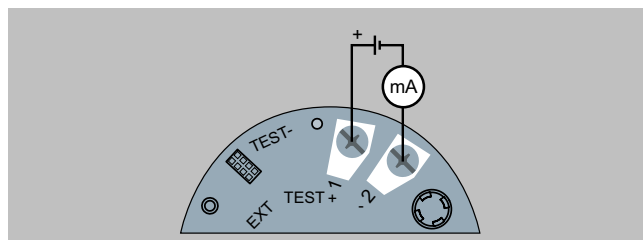
Connections

Input connection



SITRANS TH420, input connection assignment

Output connection



SITRANS TH420, output connection assignment

Temperature Measurement

Temperature transmitters

Rail transmitters / SITRANS TR200 (4 to 20 mA, universal)

Overview



Keep flexible - with the universal SITRANS TR200 transmitter

- 2-wire device for 4 to 20 mA
- Enclosure for rail mounting
- Universal input for virtually any type of temperature sensor
- Configurable over PC

Benefits

- Compact design
- Galvanic isolation
- Test sockets for multimeters
- Diagnostics LED (green/red)
- Sensor monitoring open circuits and short-circuits
- Self-monitoring
- Configuration status stored in EEPROM
- Expanded diagnostic functions, such as slave pointer, operating hours counter, etc.
- Special characteristic
- Electromagnetic compatibility to EN 61326 and NE21
- SIL2 (with order note C20), SIL2/3 (with C23)

Application

SITRANS TR200 transmitters can be used in all industrial sectors. Their compact design enables simple mounting on standard DIN rails on-site in protective boxes or in control cabinets. The following sensors/signal sources can be connected over their universal input module:

- Resistance thermometer (2, 3, 4-wire connection)
- Thermocouples
- Resistance-based sensors and DC voltage sources

The output signal is a direct current from 4 to 20 mA in accordance with the sensor characteristic.

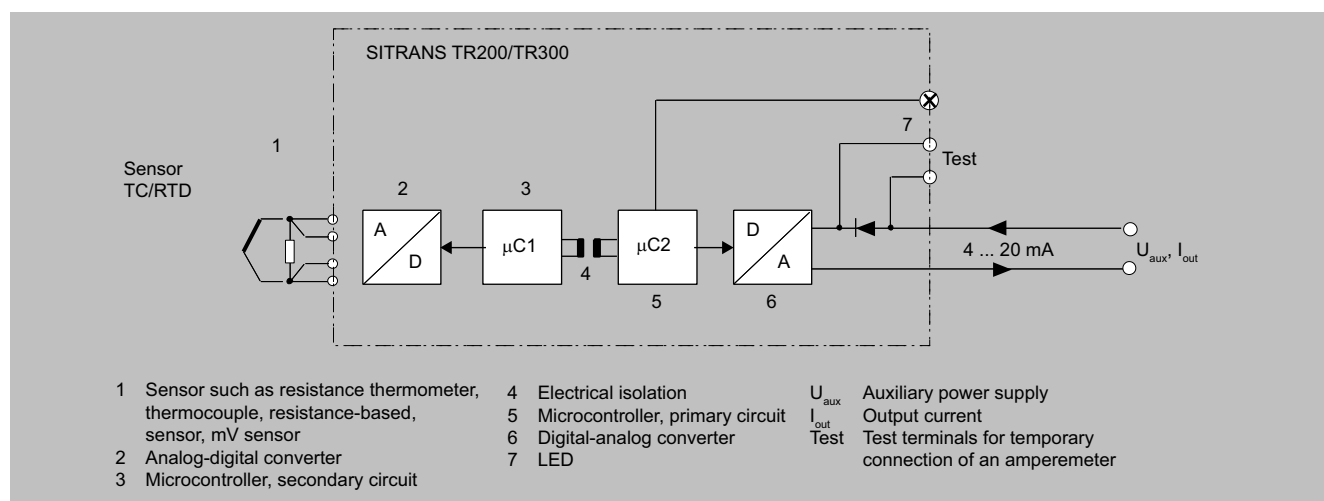
Transmitters of the "intrinsically safe" type of protection can be installed within hazardous areas. The devices meet the directive 2014/34/EU (ATEX).

Function

The SITRANS TR200 is configured over a PC. For this purpose, the USB or RS 232 modem is connected to the output terminals. The configuration data can now be edited using the SIPROM T software tool. The configuration data are then permanently stored in the non-volatile memory (EEPROM).

Once the sensors and power supply have been correctly connected, the transmitter outputs a temperature-linear output signal and the diagnostics LED displays a green light. In the case of a sensor break, the LED flashes red, an internal device fault is indicated by a steady red light.

The test socket can be used to connect an ammeter at any time for monitoring purposes and plausibility checks. The output current can be read without any interruption, or even without opening the current loop.



SITRANS TR200 function diagram

Selection and ordering data

	Article No.
SITRANS TR200 rail transmitter Installation on DIN rail 2-wire system, 4 to 20 mA, programmable, with galvanic isolation	
• Without explosion protection	7NG3032-0JN00
• With explosion protection according to ATEX	7NG3032-1JN00

Options	Order code
Add "-Z" to article number, specify order code and, if applicable, plain text	
With test report (5 measuring points)	C11
Functional safety SIL2	C20
Functional safety SIL2/3	C23
Customer-specific programming	
Measuring range to be set Specify in plain text (max. 5 digits): Y01: ... to ... °C, °F	Y01 ¹⁾
Measuring point number (TAG) max. 8 characters	Y17 ²⁾
Measuring point description, max. 16 characters	Y23 ²⁾
Measuring point message, max. 32 characters	Y24 ²⁾
Text on front plate, max. 16 characters	Y29 ²⁾³⁾
Pt100 (IEC) 2-wire, R _L = 0 W	U02 ⁴⁾
Pt100 (IEC) 3-wire	U03 ⁴⁾
Pt100 (IEC) 4-wire	U04 ⁴⁾
Type B thermocouple	U20 ⁴⁾⁵⁾
Type C thermocouple (W5)	U21 ⁴⁾⁵⁾
Type D thermocouple (W3)	U22 ⁴⁾⁵⁾
Type E thermocouple	U23 ⁴⁾⁵⁾
Type J thermocouple	U24 ⁴⁾⁵⁾
Type K thermocouple	U25 ⁴⁾⁵⁾
Type L thermocouple	U26 ⁴⁾⁵⁾
Type N thermocouple	U27 ⁴⁾⁵⁾
Type R thermocouple	U28 ¹⁾⁴⁾⁵⁾
Type S thermocouple	U29 ⁴⁾⁵⁾
Type T thermocouple	U30 ⁴⁾⁵⁾
Type U thermocouple	U31 ⁴⁾⁵⁾
For TC: Cold junction compensation: external (Pt100, 3-wire)	U41
For TC: Cold junction compensation: external with fixed value: Specify in plain text	Y50
Enter special deviating customer-specific setting in plain text	Y09 ⁶⁾
Fault current 3.6 mA (instead of 22.8 mA)	U36 ²⁾

¹⁾ For customer-specific programming for RTD and TC, the start value and the end value of the required measuring span must be specified here.

²⁾ For this selection, Y01 or Y09 must also be selected.

³⁾ Text on front plate is not saved in the device.

⁴⁾ For this selection, Y01 must also be selected.

⁵⁾ Internal cold junction compensation is selected as the default for TC.

⁶⁾ For customer-specific programming for mV and ohm, the start value and the end value of the required measuring span and the unit must be entered here.

Selection and ordering data (continued)

Accessories

	Article No.
Other accessories for assembly, connection and transmitter configuration, see page 2/198.	
Modem	
Modem with USB interface and SIPROM T software	7NG3092-8KN

For supply units, see Catalog FI01 section "Supplementary components"

Ordering example 1:

7NG3032-0JN00-Z Y01+Y17+Y29+U03

Y01: -10 ... +100 °C

Y17: TICA123

Y29: TICA123

Ordering example 2:

7NG3032-0JN00-Z Y01+Y17+Y23+Y29+U25

Y01: -10 ... +100 °C

Y17: TICA123

Y23: TICA123HEAT

Y29: TICA123HEAT

Factory setting:

- Pt100 (IEC 751); 3-wire connection
- Measuring range: 0 ... 100 °C (32 ... 212 °F)
- Fault current: 22.8 mA
- Sensor offset: 0 °C (0 °F)
- Damping 0.0 s

Temperature Measurement

Temperature transmitters

Rail transmitters / SITRANS TR200 (4 to 20 mA, universal)

Technical specifications

SITRANS TR200 (4 ... 20 mA, universal)

Input	
<u>Resistance thermometer</u>	
Measured variable	Temperature
Sensor type	
• According to IEC 60751	Pt25 ... Pt1000
• According to JIS C 1604; $\alpha=0.00392 \text{ K}^{-1}$	Pt25 ... Pt1000
• According to IEC 60751	Ni25 ... Ni1000
• Special type	Via special characteristic curve (max. 30 points)
Sensor factor	0.25 ... 10 (adaptation of the basic type, e.g. Pt100 to version Pt25 ... 1000)
Units	°C or °F
Connection	
• Standard connection	1 resistance thermometer (RTD) in 2-wire, 3-wire or 4-wire connection
• Averaging	2 resistance thermometers in 2-wire connection for generation of average temperature
• Differentiation	2 resistance thermometers (RTD) in 2-wire connection (RTD 1 – RTD 2 or RTD 2 – RTD 1)
Connection	
• 2-wire connection	Wire resistance can be configured $\leq 100 \Omega$ (loop resistance)
• 3-wire connection	No trim necessary
• 4-wire connection	No trim necessary
Sensor current	$\leq 0.45 \text{ mA}$
Response time T_{63}	$\leq 250 \text{ ms}$ for 1 sensor with break monitoring
Break monitoring	Always active (cannot be switched off)
Short-circuit monitoring	Can be switched on/off (default value: ON)
Measuring range	Assignable (see "Digital measuring error" table)
Min. measuring span	10 °C (18 °F)
Characteristic curve	Temperature-linear or special characteristic curve
<u>Resistance-based sensor</u>	
Measured variable	Ohmic resistance
Sensor type	Resistance-based, potentiometers
Units	Ω
Connection	
• Standard connection	1 resistance-based sensor (R) in 2-wire, 3-wire or 4-wire connection
• Averaging	2 resistance-based sensors in 2-wire connection for averaging
• Differentiation	2 resistance thermometers in 2-wire connection (R1 – R2 or R2 – R1)
Connection	
• 2-wire connection	Wire resistance can be configured $\leq 100 \Omega$ (loop resistance)
• 3-wire connection	No trim necessary
• 4-wire connection	No trim necessary
Sensor current	$\leq 0.45 \text{ mA}$
Response time T_{63}	$\leq 250 \text{ ms}$ for 1 sensor with break monitoring
Break monitoring	Always active (cannot be switched off)
Short-circuit monitoring	Can be switched on/off (default value: OFF)
Measuring range	Assignable max. 0 ... 2200 Ω (see "Digital measuring error" table)
Min. measuring span	5 ... 25 Ω (see "Digital measuring error" table)
Characteristic curve	Resistance-linear or special characteristic curve
<u>Thermocouples</u>	

Technical specifications (continued)

SITRANS TR200 (4 ... 20 mA, universal)	
Measured variable	Temperature
Sensor type (thermocouples)	
• Type B	Pt30Rh-Pt6Rh acc. to IEC 584
• Type C	W5%-Re acc. to ASTM 988
• Type D	W3%-Re acc. to ASTM 988
• Type E	NiCr-CuNi acc. to IEC 584
• Type J	Fe-CuNi acc. to IEC 584
• Type K	NiCr-Ni acc. to IEC 584
• Type L	Fe-CuNi acc. to DIN 43710
• Type N	NiCrSi-NiSi acc. to IEC 584
• Type R	Pt13Rh-Pt acc. to IEC 584
• Type S	Pt10Rh-Pt acc. to IEC 584
• Type T	Cu-CuNi acc. to IEC 584
• Type U	Cu-CuNi acc. to DIN 43710
Units	°C or °F
Connection	
• Standard connection	1 thermocouple (TC)
• Averaging	2 thermocouples (TC)
• Differentiation	2 thermocouples (TC) (TC1 – TC2 or TC2 – TC1)
Response time T_{63}	≤ 250 ms for 1 sensor with break monitoring
Break monitoring	Can be switched off
Cold junction compensation	
• Internal	With integrated Pt100 resistance thermometer
• External	With external Pt100 IEC 60751 (2-wire or 3-wire connection)
• External fixed	Reference junction temperature can be set as fixed value
Measuring range	Assignable (see "Digital measuring error" table)
Min. measuring span	Min. 40 ... 100 °C (72 ... 180 °F) (see "Digital measuring error" table)
Characteristic curve	Temperature-linear or special characteristic curve
<u>mV sensor</u>	
Measured variable	DC voltage
Sensor type	DC voltage source (DC voltage source possible over externally connected resistance)
Units	mV
Response time T_{63}	≤ 250 ms for 1 sensor with break monitoring
Break monitoring	Can be switched off
Measuring range	Assignable max. -100 ... 1100 mV
Min. measuring span	2 mV or 20 mV
Overload capability of the input	-1.5 ... +3.5 V DC
Input resistance	≥ 1 MΩ
Characteristic curve	Voltage-linear or special characteristic curve
Output	
Output signal	4 ... 20 mA, 2-wire
Auxiliary power	11 ... 35 V DC (to 30 V with Ex i/lc; to 32 V with Ex nA)
Max. load	$(U_{aux} - 11 V)/0.023 A$
Overrange	3.6 ... 23 mA, continuously adjustable (default range: 3.84 mA ... 20.5 mA)
Error signal (e.g. in case of sensor breakage) (conforming to NE43)	3.6 ... 23 mA, continuously adjustable (default value: 22.8 mA)
Sample cycle	0.25 s nominal
Damping	Software filter 1st order 0 ... 30 s (parameterizable)
Protection	Against reverse polarity

Temperature Measurement

Temperature transmitters

Rail transmitters / SITRANS TR200 (4 to 20 mA, universal)

Technical specifications (continued)

SITRANS TR200 (4 ... 20 mA, universal)	
Galvanic isolation	Input against output 2.12 kV DC (1.5 kV _{rms} AC)
Measuring accuracy	
Digital measuring error	See "Digital measuring error" table
Reference conditions	
• Auxiliary power	24 V ± 1%
• Load	500 Ω
• Ambient temperature	23 °C
• Warming-up time	> 5 min
Error in the analog output (digital/analog converter)	< 0.025% of measuring span
Error due to internal reference junction	< 0.5 °C (0.9 °F)
Effect of ambient temperature	
• Analog measuring error	0.02% of measuring span/10 °C (18 °F)
• Digital measuring error	
- With resistance thermometer	0.06 °C (0.11 °F)/10 °C (18 °F)
- With thermocouples	0.6 °C (1.1 °F)/10 °C (18 °F)
Auxiliary power effect	< 0.001% of meas. span/V
Effect of load impedance	< 0.002% of meas. span/100 Ω
Long-term drift	
• In the first month	< 0.02% of measuring span
• After one year	< 0.2% of measuring span
• After 5 years	< 0.3% of measuring span
Operating conditions	
Ambient conditions	
Ambient temperature	-40 ... +85 °C (-40 ... +185 °F)
Storage temperature	-40 ... +85 °C (-40 ... +185 °F)
Relative humidity	< 98%, with condensation
Electromagnetic compatibility	According to EN 61326 and NE21
Structural design	
Material	Plastic, electronic module potted
Weight	122 g
Dimensions	See "Dimensional drawings"
Cross-section of cables	Max. 2.5 mm ² (AWG 13)
Degree of protection according to IEC 60529	
• Enclosure	IP20
Certificates and approvals	
ATEX explosion protection	
EC type-examination certificate	PTB 07 ATEX 2032X
• "Intrinsic safety" type of protection	<ul style="list-style-type: none"> • II 2(1) G Ex ia/ib IIC T6/T4 • II 3(1) G Ex ia/ib IIC T6/T4 • II 3 G Ex ic IIC T6/T4 • II 2(1) D Ex iaD/ibD 20/21 T115 °C
• "Non-sparking equipment" type of protection	II 3 G Ex nA IIC T6/T4
Other certificates	NEPSI
Software requirements for SIPROM T	
PC operating system	Windows ME, 2000, XP, Win 7, 8 and 10; in connection with RS 232 modem, also Windows 95, 98 and 98 SE

Factory setting:

- Pt100 (IEC 751); 3-wire connection
- Measuring range: 0 ... 100 °C (32 ... 212 °F)
- Fault current: 22.8 mA
- Sensor offset: 0 °C (0 °F)
- Damping 0.0 s

Technical specifications (continued)

Digital measuring error

Resistance thermometer

Input	Measuring range °C (°F)	Minimum measuring span		Digital accuracy	
		°C	(°F)	°C	(°F)
According to IEC 60751					
Pt25	-200 ... +850 (-328 ... +1562)	10	(18)	0.3	(0.54)
Pt50	-200 ... +850 (-328 ... +1562)	10	(18)	0.15	(0.27)
Pt100 ... Pt200	-200 ... +850 (-328 ... +1562)	10	(18)	0.1	(0.18)
Pt500	-200 ... +850 (-328 ... +1562)	10	(18)	0.15	(0.27)
Pt1000	-200 ... +350 (-328 ... +662)	10	(18)	0.15	(0.27)
According to JIS C1604-81					
Pt25	-200 ... +649 (-328 ... +1200)	10	(18)	0.3	(0.54)
Pt50	-200 ... +649 (-328 ... +1200)	10	(18)	0.15	(0.27)
Pt100 ... Pt200	-200 ... +649 (-328 ... +1200)	10	(18)	0.1	(0.18)
Pt500	-200 ... +649 (-328 ... +1200)	10	(18)	0.15	(0.27)
Pt1000	-200 ... +350 (-328 ... +662)	10	(18)	0.15	(0.27)
Ni 25 ... Ni1000	-60 ... +250 (-76 ... +482)	10	(18)	0.1	(0.18)

Resistance-based sensor

Input	Measuring range Ω	Minimum measuring span		Digital accuracy	
		Ω	Ω	Ω	Ω
Resistance	0 ... 390	5		0.05	
Resistance	0 ... 2200	25		0.25	

Thermocouples

Input	Measuring range °C (°F)	Minimum measuring span		Digital accuracy	
		°C	(°F)	°C	(°F)
Type B	100 ... 1820 (212 ... 3308)	100	(180)	2 ¹⁾	(3.6) ¹⁾
Type C (W5)	0 ... 2300 (32 ... 4172)	100	(180)	2	(3.6)
Type D (W3)	0 ... 2300 (32 ... 4172)	100	(180)	1 ²⁾	(1.8) ²⁾
Type E	-200 ... +1000 (-328 ... +1832)	50	(90)	1	(1.8)
Type J	-200 ... +1200 (-328 ... +2192)	50	(90)	1	(1.8)
Type K	-200 ... +1370 (-328 ... +2498)	50	(90)	1	(1.8)
Type L	-200 ... +900 (-328 ... +1652)	50	(90)	1	(1.8)
Type N	-200 ... +1300 (-328 ... +2372)	50	(90)	1	(1.8)
Type R	-50 ... +1760 (-58 ... +3200)	100	(180)	2	(3.6)
Type S	-50 ... +1760 (-58 ... +3200)	100	(180)	2	(3.6)
Type T	-200 ... +400 (-328 ... +752)	40	(72)	1	(1.8)
Type U	-200 ... +600 (-328 ... +1112)	50	(90)	2	(3.6)

¹⁾ The digital accuracy in the range 100 to 300 °C (212 to 572 °F) is 3 °C (5.4 °F).

²⁾ The digital accuracy in the range 1750 to 2300 °C (3182 to 4172 °F) is 2 °C (3.6 °F).

mV sensor

Input	Measuring range mV	Minimum measuring span		Digital accuracy	
		mV	mV	μV	μV
mV sensor	-10 ... +70	2		40	
mV sensor	-100 ... +1100	20		400	

The digital accuracy is the accuracy after the analog/digital conversion including linearization and calculation of the measured value.

Temperature Measurement

Temperature transmitters

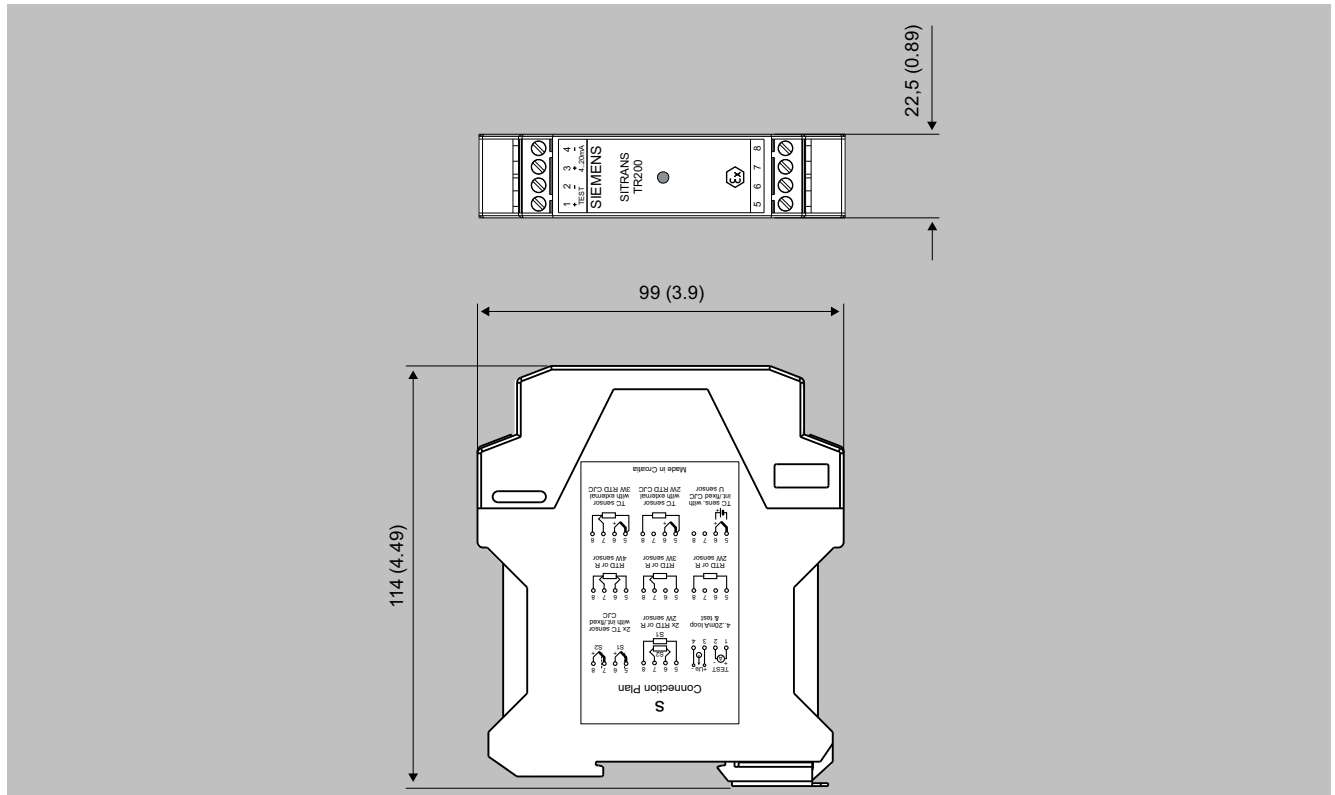
Rail transmitters / SITRANS TR200 (4 to 20 mA, universal)

Technical specifications (continued)

An additional error is generated in the output current 4 to 20 mA as a result of the digital/analog conversion of 0.025% of the set measuring span (digital-analog error).

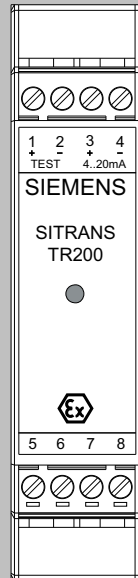
The total error under reference conditions at the analog output is the sum from the digital error and the digital-analog error (poss. with the addition of reference junction errors in the case of thermocouple measurements).

Dimensional drawings



SITRANS TR200, dimensions in mm (inch)

Circuit diagrams



Connections

1 (+) and 2 (-)	Test terminals (test) for measurement of the output current with a multimeter
3 (+) and 4 (-)	Power supply U_{aux} , output current I_{out}
5, 6, 7 and 8	Sensor connection, see schematics

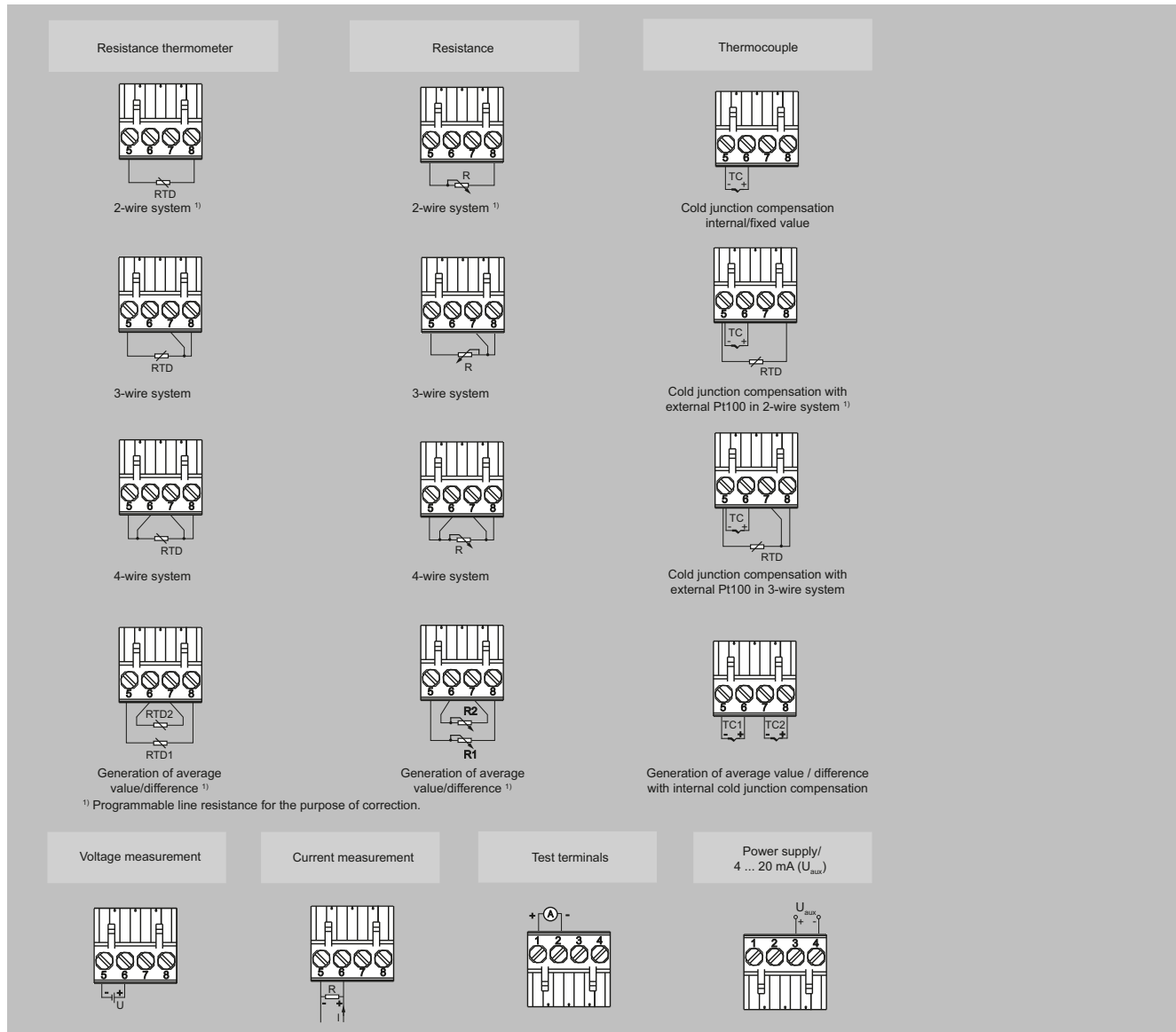
SITRANS TR200, connector assignment

Temperature Measurement

Temperature transmitters

Rail transmitters / SITRANS TR200 (4 to 20 mA, universal)

Circuit diagrams (continued)



SITRANS TR200, sensor connection assignment

Overview

**Robust and durable HART - the universal SITRANS TR300 transmitter**

- 2-wire device for 4 to 20 mA, HART
- Device for rail mounting
- Universal input for virtually any type of temperature sensor
- Configurable over HART

Benefits

- Compact design
- Galvanic isolation
- Test sockets for multimeters
- Diagnostics LED (green/red)
- Sensor monitoring open circuits and short-circuits
- Self-monitoring
- Configuration status stored in EEPROM
- Expanded diagnostic functions, such as slave pointer, operating hours counter, etc.
- Special characteristic
- Electromagnetic compatibility to EN 61326 and NE21
- SIL2 (with order note C20), SIL2/3 (with C23)

Application

SITRANS TR300 transmitters can be used in all industrial sectors. Their compact design enables simple mounting on standard DIN rails on-site in protective boxes or in control cabinets. The following sensors/signal sources can be connected over their universal input module:

- Resistance thermometer (2, 3, 4-wire connection)
- Thermocouples
- Resistance-based sensors and DC voltage sources

The output signal is a direct current from 4 to 20 mA in accordance with the sensor characteristic, superimposed by the digital HART signal.

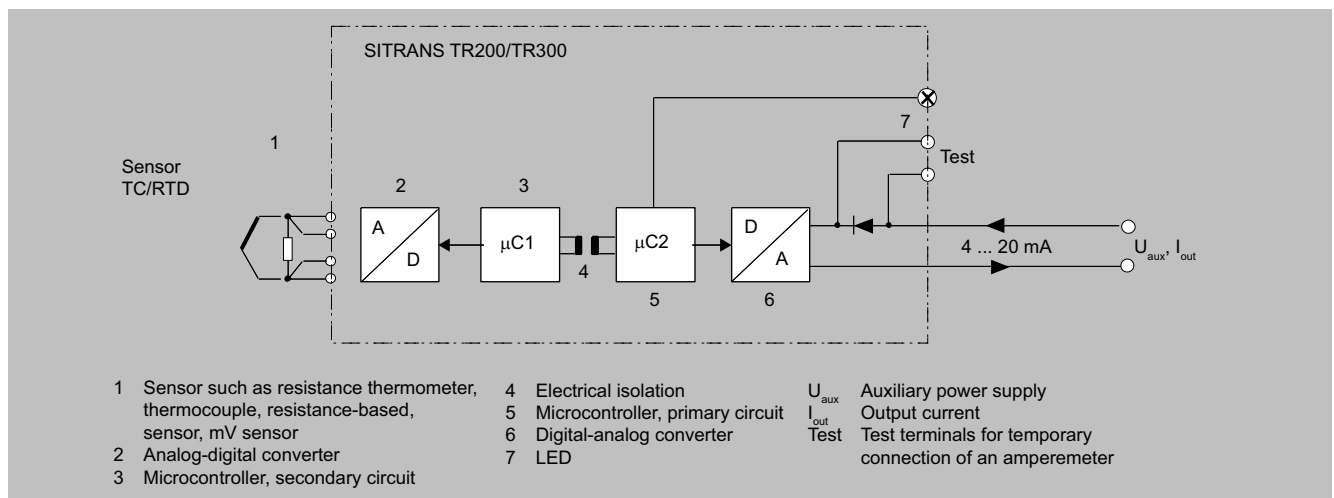
Transmitters of the "intrinsically safe" type of protection can be installed within potentially explosive atmospheres. The devices meet the directive 2014/34/EU (ATEX).

Function

The SITRANS TR300 is configured over HART. This can be done using a handheld communicator or even more conveniently with a HART modem and the SIMATIC PDM parameterization software. The configuration data are then permanently stored in the non-volatile memory (EEPROM).

Once the sensors and power supply have been correctly connected, the transmitter outputs a temperature-linear output signal and the diagnostics LED displays a green light. In the case of a sensor break, the LED flashes red, an internal device fault is indicated by a steady red light.

The test socket can be used to connect an ammeter at any time for monitoring purposes and plausibility checks. The output current can be read without any interruption, or even without opening the current loop.



SITRANS TR300 function diagram

Temperature Measurement

Temperature transmitters

Rail transmitters / SITRANS TR300 (4 to 20 mA, HART, universal)

Selection and ordering data

	Article No.
SITRANS TR300 rail transmitter Installation on DIN rail 2-wire system, 4 ... 20 mA, HART, with galvanic isolation	
• Without explosion protection	7NG3033-0JN00
• With explosion protection according to ATEX	7NG3033-1JN00

Options	Order code
Add "-Z" to article number, specify order code and, if applicable, plain text	
With test report (5 measuring points)	C11
Functional safety SIL2	C20
Functional safety SIL2/3	C23
Customer-specific programming	
Measuring range to be set Specify in plain text (max. 5 digits): Y01: ... to ... °C, °F	Y01 ¹⁾
Measuring point number (TAG) max. 8 characters	Y17 ²⁾
Measuring point description, max. 16 characters	Y23 ²⁾
Measuring point message, max. 32 characters	Y24 ²⁾
Text on front plate, max. 16 characters	Y29 ²⁾³⁾
Pt100 (IEC) 2-wire, R _L = 0 Ω	U02 ⁴⁾
Pt100 (IEC) 3-wire	U03 ⁴⁾
Pt100 (IEC) 4-wire	U04 ⁴⁾
Type B thermocouple	U20 ⁴⁾⁵⁾
Type C thermocouple (W5)	U21 ⁴⁾⁵⁾
Type D thermocouple (W3)	U22 ⁴⁾⁵⁾
Type E thermocouple	U23 ⁴⁾⁵⁾
Type J thermocouple	U24 ⁴⁾⁵⁾
Type K thermocouple	U25 ⁴⁾⁵⁾
Type L thermocouple	U26 ⁴⁾⁵⁾
Type N thermocouple	U27 ⁴⁾⁵⁾
Type R thermocouple	U28 ⁴⁾⁵⁾
Type S thermocouple	U29 ⁴⁾⁵⁾
Type T thermocouple	U30 ⁴⁾⁵⁾
Type U thermocouple	U31 ⁴⁾⁵⁾
For TC: Cold junction compensation: external (Pt100, 3-wire)	U41
For TC: Cold junction compensation: external with fixed value: Specify in plain text	Y50
Enter special deviating customer-specific setting in plain text	Y09 ⁶⁾
Fault current 3.6 mA (instead of 22.8 mA)	U36 ²⁾

¹⁾ For customer-specific programming for RTD and TC, the start value and the end value of the required measuring span must be specified here.

²⁾ For this selection, Y01 or Y09 must also be selected.

³⁾ Text on front plate is not saved in the device.

⁴⁾ For this selection, Y01 must also be selected.

⁵⁾ Internal cold junction compensation is selected as the default for TC.

⁶⁾ For customer-specific programming for mV and ohm, the start value and the end value of the required measuring span and the unit must be entered here.

Selection and ordering data (continued)

Accessories

	Article No.
Other accessories for assembly, connection and transmitter configuration, see page 2/198.	
Modem	
HART modem with USB interface	7MF4997-1DB
SIMATIC PDM operating software	See section 8

For supply units, see Catalog FI01 section "Supplementary components"

Ordering example 1:

7NG3033-0JN00-Z Y01+Y17+Y29+U03
Y01: -10 ... +100 °C
Y17: TICA123
Y29: TICA123

Ordering example 2:

7NG3033-0JN00-Z Y01+Y17+Y23+Y29+U25
Y01: -10 ... +100 °C
Y17: TICA123
Y23: TICA123HEAT
Y29: TICA123HEAT

Factory setting:

- Pt100 (IEC 751); 3-wire connection
- Measuring range: 0 ... 100 °C (32 ... 212 °F)
- Fault current in the event of sensor breakage: 22.8 mA
- Sensor offset: 0 °C (0 °F)
- Damping 0.0 s

Technical specifications

SITRANS TR300 (4 ... 20 mA, HART, universal)	
Input	
<u>Resistance thermometer</u>	
Measured variable	Temperature
Sensor type	
• According to IEC 60751	Pt25 ... Pt1000
• According to JIS C 1604; $\alpha=0.00392 \text{ K}^{-1}$	Pt25 ... Pt1000
• According to IEC 60751	Ni25 ... Ni1000
• Special type	Via special characteristic curve (max. 30 points)
Sensor factor	0.25 ... 10 (adaptation of the basic type, e.g. Pt100 to version Pt25 ... 1000)
Units	°C or °F
Connection	
• Standard connection	1 resistance thermometer (RTD) in 2-wire, 3-wire or 4-wire connection
• Averaging	2 identical resistance thermometers in 2-wire connection for generation of average temperature
• Differentiation	2 identical resistance thermometers (RTD) in 2-wire connection (RTD 1 – RTD 2 or RTD 2 – RTD 1)
Connection	
• 2-wire connection	Wire resistance can be configured $\leq 100 \Omega$ (loop resistance)
• 3-wire connection	No trim necessary
• 4-wire connection	No trim necessary
Sensor current	$\leq 0.45 \text{ mA}$
Response time T_{63}	$\leq 250 \text{ ms}$ for 1 sensor with break monitoring
Break monitoring	Always active (cannot be switched off)
Short-circuit monitoring	Can be switched on/off (default value: ON)
Measuring range	Assignable (see "Digital measuring error" table)
Min. measuring span	10 °C (18 °F)
Characteristic curve	Temperature-linear or special characteristic curve
<u>Resistance-based sensor</u>	
Measured variable	Ohmic resistance
Sensor type	Resistance-based, potentiometers
Units	Ω
Connection	
• Standard connection	1 resistance-based sensor (R) in 2-wire, 3-wire or 4-wire connection
• Averaging	2 resistance-based sensors in 2-wire connection for averaging
• Differentiation	2 resistance thermometers in 2-wire connection (R1 – R2 or R2 – R1)
Connection	
• 2-wire connection	Wire resistance can be configured $\leq 100 \Omega$ (loop resistance)
• 3-wire connection	No trim necessary
• 4-wire connection	No trim necessary
Sensor current	$\leq 0.45 \text{ mA}$
Response time T_{63}	$\leq 250 \text{ ms}$ for 1 sensor with break monitoring
Break monitoring	Always active (cannot be switched off)
Short-circuit monitoring	Can be switched on/off (default value: OFF)
Measuring range	Assignable max. 0 ... 2200 Ω (see "Digital measuring error" table)
Min. measuring span	5 ... 25 Ω (see "Digital measuring error" table)
Characteristic curve	Resistance-linear or special characteristic curve
<u>Thermocouples</u>	

Temperature Measurement

Temperature transmitters

Rail transmitters / SITRANS TR300 (4 to 20 mA, HART, universal)

Technical specifications (continued)

SITRANS TR300 (4 ... 20 mA, HART, universal)	
Measured variable	Temperature
Sensor type (thermocouples)	
• Type B	Pt30Rh-Pt6Rh acc. to IEC 584
• Type C	W5%-Re acc. to ASTM 988
• Type D	W3%-Re acc. to ASTM 988
• Type E	NiCr-CuNi acc. to IEC 584
• Type J	Fe-CuNi acc. to IEC 584
• Type K	NiCr-Ni acc. to IEC 584
• Type L	Fe-CuNi acc. to DIN 43710
• Type N	NiCrSi-NiSi acc. to IEC 584
• Type R	Pt13Rh-Pt acc. to IEC 584
• Type S	Pt10Rh-Pt acc. to IEC 584
• Type T	Cu-CuNi acc. to IEC 584
• Type U	Cu-CuNi acc. to DIN 43710
Units	°C or °F
Connection	
• Standard connection	1 thermocouple (TC)
• Averaging	2 thermocouples (TC)
• Differentiation	2 thermocouples (TC) (TC1 – TC2 or TC2 – TC1)
Response time T_{63}	≤ 250 ms for 1 sensor with break monitoring
Break monitoring	Can be switched off
Cold junction compensation	
• Internal	With integrated Pt100 resistance thermometer
• External	With external Pt100 IEC 60751 (2-wire or 3-wire connection)
• External fixed	Reference junction temperature can be set as fixed value
Measuring range	Assignable (see "Digital measuring error" table)
Min. measuring span	Min. 40 ... 100 °C (72 ... 180 °F) (see "Digital measuring error" table)
Characteristic curve	Temperature-linear or special characteristic curve
<u>mV sensor</u>	
Measured variable	DC voltage
Sensor type	DC voltage source (DC voltage source possible over externally connected resistance)
Units	mV
Response time T_{63}	≤ 250 ms for 1 sensor with break monitoring
Break monitoring	Can be switched off
Measuring range	Assignable max. -100 ... 1 100 mV
Min. measuring span	2 mV or 20 mV
Overload capability of the input	-1.5 ... +3.5 V DC
Input resistance	≥ 1 MΩ
Characteristic curve	Voltage-linear or special characteristic curve
Output	
Output signal	4 ... 20 mA, 2-wire with communication acc. to HART Rev. 5.9
Auxiliary power	11 ... 35 V DC (to 30 V with Ex <i>i</i> /iC; to 32 V with Ex <i>n</i> A)
Max. load	$(U_{\text{aux}} - 11 \text{ V})/0.023 \text{ A}$
Overrange	3.6 ... 23 mA, continuously adjustable (default range: 3.84 mA ... 20.5 mA)
Error signal (e.g. in case of sensor breakage) (conforming to NE43)	3.6 ... 23 mA, continuously adjustable (default value: 22.8 mA)
Sample cycle	0.25 s nominal
Damping	Software filter 1st order 0 ... 30 s (parameterizable)
Protection	Against reverse polarity

Technical specifications (continued)

SITRANS TR300 (4 ... 20 mA, HART, universal)	
Galvanic isolation	Input against output 2.12 kV DC (1.5 kV _{rms} AC)
Measuring accuracy	
Digital measuring error	See "Digital measuring error" table
Reference conditions	
• Auxiliary power	24 V ± 1%
• Load	500 Ω
• Ambient temperature	23 °C
• Warming-up time	> 5 min
Error in the analog output (digital/analog converter)	< 0.025% of measuring span
Error due to internal reference junction	< 0.5 °C (0.9 °F)
Effect of ambient temperature	
• Analog measuring error of measuring span	< 0.02% of max. meas. span/10 °C (18 °F)
• Digital measuring error	0.06 °C (0.11 °F)/10 °C (18 °F)
- With resistance thermometers	0.6 °C (1.1 °F)/10 °C (18 °F)
- With thermocouples	
Auxiliary power effect	< 0.001% of meas. span/V
Effect of load impedance	< 0.002% of meas. span/100 Ω
Long-term drift	
• In the first month	< 0.02% of measuring span
• After one year	< 0.2% of measuring span
• After 5 years	< 0.3% of measuring span
Operating conditions	
Ambient conditions	
Ambient temperature	-40 ... +85 °C (-40 ... +185 °F)
Storage temperature	-40 ... +85 °C (-40 ... +185 °F)
Relative humidity	< 98%, with condensation
Electromagnetic compatibility	According to EN 61326 and NE21
Structural design	
Material	Plastic, electronic module potted
Weight	122 g
Dimensions	See "Dimensional drawings"
Cross-section of cables	Max. 2.5 mm ² (AWG 13)
Degree of protection according to IEC 60529	
• Enclosure	IP20
Certificates and approvals	
ATEX explosion protection	
EC type-examination certificate	PTB 07 ATEX 2032X
• "Intrinsic safety" type of protection	<ul style="list-style-type: none"> • II 2(1) G Ex ia/ib IIC T6/T4 • II 3(1) G Ex ia/ia IIC T6/T4 • II 3 G Ex ic IIC T6/T4 • II 2(1) D Ex iaD/ibD 20/21 T115 °C
• "Non-sparking equipment" type of protection	II 3 G Ex nA IIC T6/T4
Other certificates	NEPSI

Factory setting:

- Pt100 (IEC 751); 3-wire connection
- Measuring range: 0 ... 100 °C (32 ... 212 °F)
- Fault current: 22.8 mA
- Sensor offset: 0 °C (0 °F)
- Damping 0.0 s

Temperature Measurement

Temperature transmitters

Rail transmitters / SITRANS TR300 (4 to 20 mA, HART, universal)

Technical specifications (continued)

Digital measuring error

Resistance thermometer

Input	Measuring range °C (°F)	Minimum measuring span		Digital accuracy	
		°C	(°F)	°C	(°F)
According to IEC 60751					
Pt25	-200 ... +850 (-328 ... +1562)	10	(18)	0.3	(0.54)
Pt50	-200 ... +850 (-328 ... +1562)	10	(18)	0.15	(0.27)
Pt100 ... Pt200	-200 ... +850 (-328 ... +1562)	10	(18)	0.1	(0.18)
Pt500	-200 ... +850 (-328 ... +1562)	10	(18)	0.15	(0.27)
Pt1000	-200 ... +350 (-328 ... +662)	10	(18)	0.15	(0.27)
According to JIS C1604-81					
Pt25	-200 ... +649 (-328 ... +1200)	10	(18)	0.3	(0.54)
Pt50	-200 ... +649 (-328 ... +1200)	10	(18)	0.15	(0.27)
Pt100 ... Pt200	-200 ... +649 (-328 ... +1200)	10	(18)	0.1	(0.18)
Pt500	-200 ... +649 (-328 ... +1200)	10	(18)	0.15	(0.27)
Pt1000	-200 ... +350 (-328 ... +662)	10	(18)	0.15	(0.27)
Ni 25 ... Ni1000	-60 ... +250 (-76 ... +482)	10	(18)	0.1	(0.18)

Resistance-based sensor

Input	Measuring range Ω	Minimum measuring span Ω	Digital accuracy Ω
Resistance	0 ... 2200	25	0.25

Thermocouples

Input	Measuring range °C (°F)	Minimum measuring span		Digital accuracy	
		°C	(°F)	°C	(°F)
Type B	100 ... 1820 (212 ... 3308)	100	(180)	2 ¹⁾	(3.6) ¹⁾
Type C (W5)	0 ... 2300 (32 ... 4172)	100	(180)	2	(3.6)
Type D (W3)	0 ... 2300 (32 ... 4172)	100	(180)	1 ²⁾	(1.8) ²⁾
Type E	-200 ... +1000 (-328 ... +1832)	50	(90)	1	(1.8)
Type J	-200 ... +1200 (-328 ... +2192)	50	(90)	1	(1.8)
Type K	-200 ... +1370 (-328 ... +2498)	50	(90)	1	(1.8)
Type L	-200 ... +900 (-328 ... +1652)	50	(90)	1	(1.8)
Type N	-200 ... +1300 (-328 ... +2372)	50	(90)	1	(1.8)
Type R	-50 ... +1760 (-58 ... +3200)	100	(180)	2	(3.6)
Type S	-50 ... +1760 (-58 ... +3200)	100	(180)	2	(3.6)
Type T	-200 ... +400 (-328 ... +752)	40	(72)	1	(1.8)
Type U	-200 ... +600 (-328 ... +1112)	50	(90)	2	(3.6)

¹⁾ The digital accuracy in the range 100 to 300 °C (212 to 572 °F) is 3 °C (5.4 °F).

²⁾ The digital accuracy in the range 1750 to 2300 °C (3182 to 4172 °F) is 2 °C (3.6 °F).

mV sensor

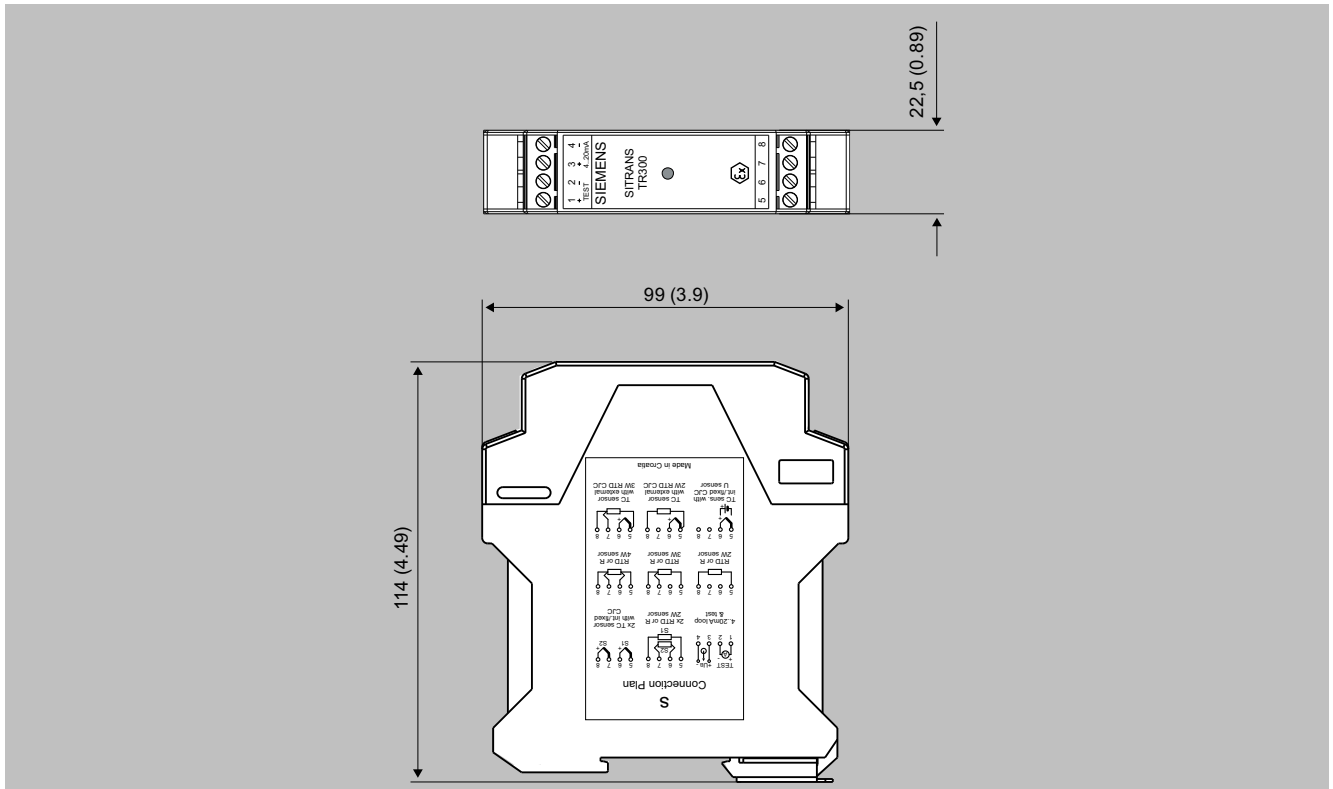
Input	Measuring range mV	Minimum measuring span mV	Digital accuracy μV
mV sensor	-100 ... +1100	20	400

The digital accuracy is the accuracy after the analog/digital conversion including linearization and calculation of the measured value.

Technical specifications (continued)

An additional error is generated in the output current 4 to 20 mA as a result of the digital/analog conversion of 0.025% of the set measuring span (digital-analog error).
 The total error under reference conditions at the analog output is the sum from the digital error and the digital-analog error (poss. with the addition of reference junction errors in the case of thermocouple measurements).

Dimensional drawings



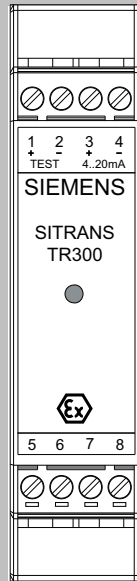
SITRANS TR300, dimensions in mm (inch)

Temperature Measurement

Temperature transmitters

Rail transmitters / SITRANS TR300 (4 to 20 mA, HART, universal)

Circuit diagrams

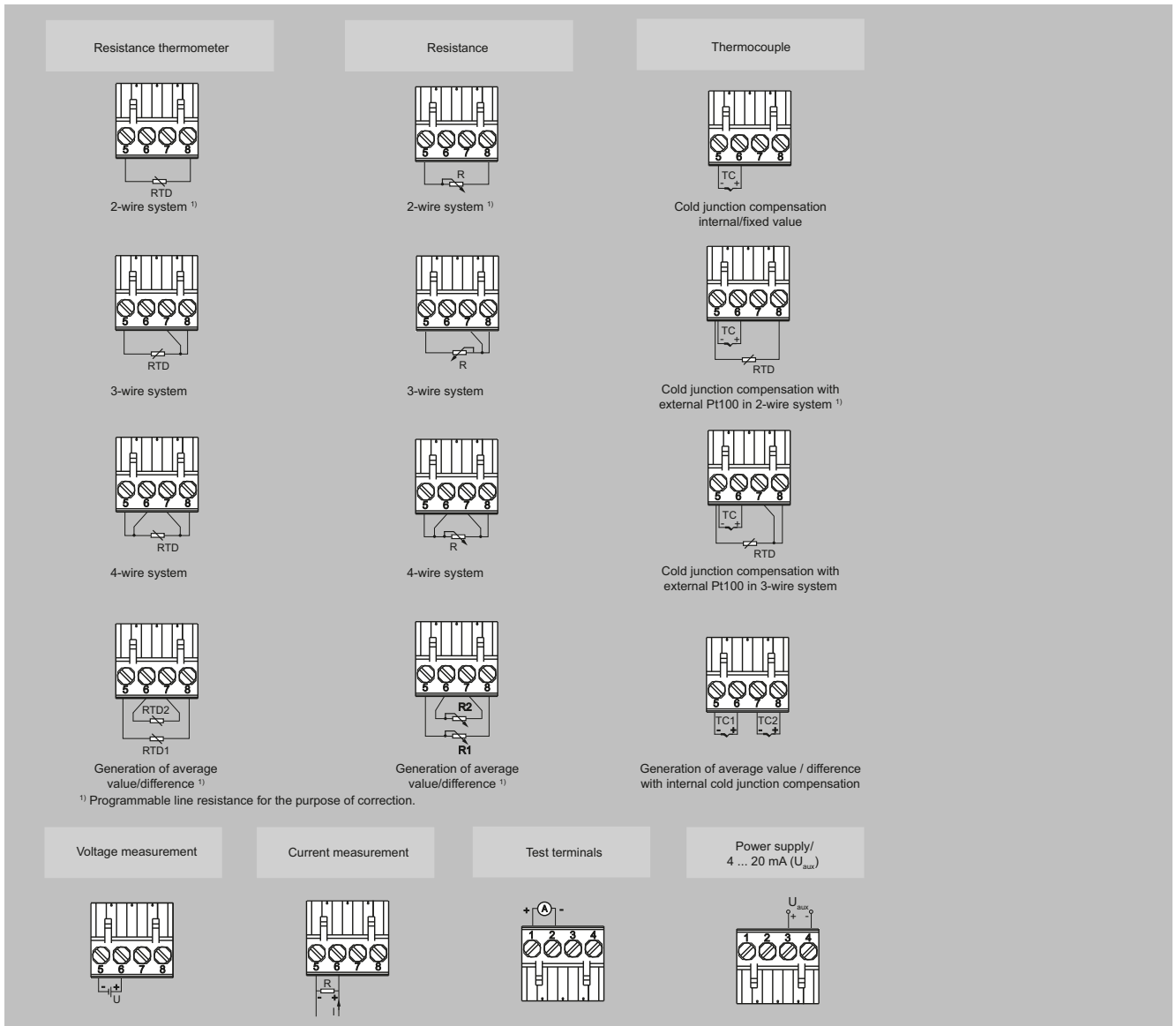


Connections

1 (+) and 2 (-)	Test terminals (Test) for measurement of the output current with a multimeter
3 (+) and 4 (-)	Power supply U_{aux} , Output current I_{out}
5, 6, 7 and 8	Sensor connection, see schematics

SITRANS TR300, connector assignment

Circuit diagrams (continued)



SITRANS TR300, sensor connection assignment

Temperature Measurement

Temperature transmitters

Rail transmitters / SITRANS TR320 (HART, universal)

Overview



- 2-wire rail transmitter with and without HART communications interface
- Enclosure for DIN rail mounting
- Universal input for virtually any type of temperature sensor
- Can be configured via PC, HART 7

Benefits

- Compact design
- Galvanic isolation
- Test terminals for ammeter
- Diagnostics LED (green/red)
- Input monitoring wire break and short-circuit
- Self-monitoring
- Configuration status stored in EEPROM
- Expanded diagnostic functions, such as slave pointer, operating hours counter, etc.
- Special characteristic
- Electromagnetic compatibility according to EN 61326 and NE21
- SIL2/3 (with order note C20)

Application

SITRANS TR320 transmitters can be used in all sectors. Their compact design enables simple mounting on standard DIN rails on-site in protective boxes or in control cabinets. The following sensors/signal sources can be connected over their universal input module:

- Resistance thermometer (2-wire, 3-wire, 4-wire connection)
- Thermocouples
- Linear resistance, potentiometer and DC voltage sources

With HART communication interface:

- The output signal is a load-independent direct current from 4 to 20 mA in accordance with the input characteristic, superimposed by the digital HART signal.

Transmitters of the "intrinsically safe or Zone 2 increased safety" type of protection can be installed in hazardous areas. The device meets the requirements of the EU Directive 2014/34/EU (ATEX), the FM and CSA regulations as well as other national approvals.

Function

Without HART communications interface

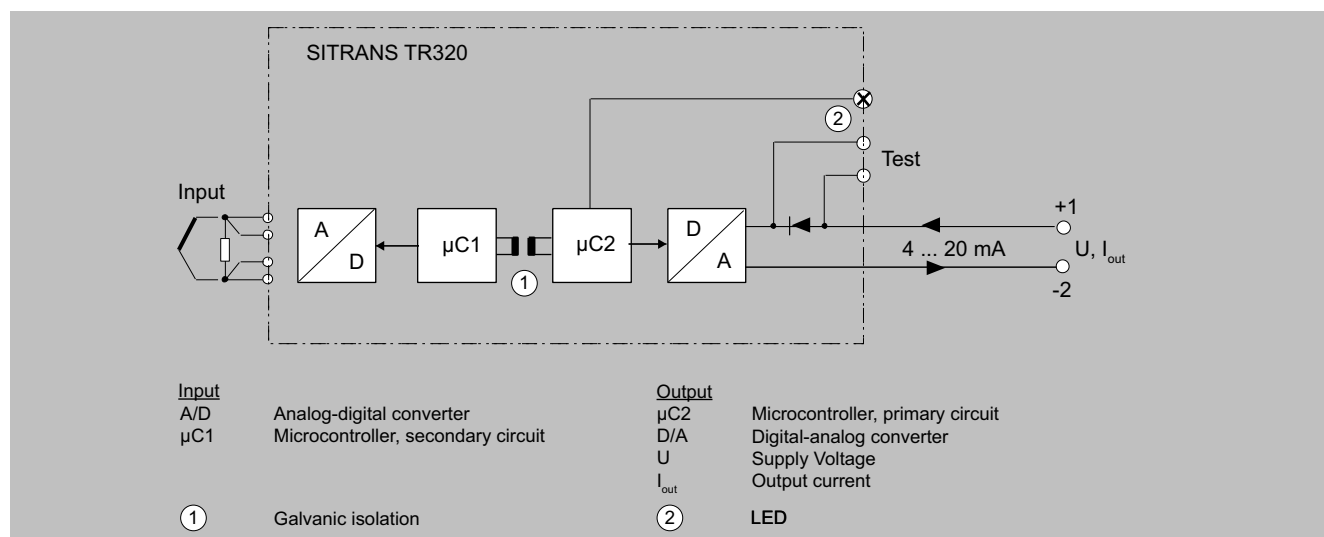
For the SITRANS TR320 without HART functionality, parameters are assigned with the PC. Available for this purpose are a special modem and the software tool SIPROM T.

With HART communications interface:

- The SITRANS TR320 is configured via HART. The configuration can be carried out using a handheld communicator or, more conveniently, with a HART modem and the SIMATIC PDM configuration software. The configuration data are then permanently stored in the non-volatile memory (EEPROM).

After correct connection of input and supply voltage, the transmitter outputs a temperature-linear output signal and the diagnostics LED is green. In case of external errors, e.g. sensor short circuit or interruption, the LED flashes red; an internal error is indicated by a permanent red light.

An ammeter can be connected at any time for checking and plausibility via the test terminals. The output current can be read without any interruption, or even without opening the current loop.



SITRANS TR320 function block diagram

Temperature Measurement

Temperature transmitters

Rail transmitters / SITRANS TR320 (HART, universal)

Selection and ordering data

SITRANS TR320 DIN rail transmitter with 1 input	Article No. 7NG032			
	●	-	●	●
Click the article number for online configuration in the PIA Life Cycle Portal.				
Communication				
With HART	0			
2-wire, 4 ... 20 mA	7			
Primary value output				
Input 1		0		
Input 1, type				
RTD				
• Pt100 (IEC), 3-wire			B	
• Pt100 (IEC), 4-wire			C	
• Pt1000 (IEC), 3-wire			D	
• Pt1000 (IEC), 4-wire			E	
TC				
• Type B			F	
• Type E			G	
• Type J			H	
• Type K			J	
• Type L			K	
• Type N			L	
• Type R			N	
• Type S			P	
• Type T			Q	
Potentiometer, 4-wire			R	
Input 1, type customer-specific				
Define customer-specific input configurations with V options			Y	
Input 2, type				
Without input 2			A	
CJC configuration for TC				
Without CJC			0	
Internal CJC			1	
External CJC Pt100 (IEC), 3-wire			3	
External CJC Ni100 (DIN), 3-wire			6	
Define fixed CJC value with option Y60			8	
Materials not in contact with media				
None			0	
Type of protection				
General safety (non-Ex); CE, RCM, FM, KCC, EAC, CSA, UK				A
Intrinsic safety (Ex i) / non-incendive field wiring (NIFW) / increased safety zone 2 (Ex ec) / non-incendive (NI) (ATEX, IECEx, EACEx, CSA, FM, NEPSI, Inmetro, UKEx)				N
Electrical connection/cable entries				
None				A
Local HMI				
Without display				0

Options	Order code
Add "-Z" to article number, specify order code and, if applicable, free text	
Manufacturer's declarations	
Inspection certificate EN 10204-3.1: Manufacturer test certificate for transmitters (5 measured values)	C11
Certificates for functional safety	
Functional safety SIL2/3 (IEC 61508)	C20
Device options	
PDF file with device settings	D10
Without labeling of the measuring range on the TAG plate	D41

Selection and ordering data (continued)

Options	Order code
Add "-Z" to article number, specify order code and, if applicable, free text	
Jumper plug set on device for write protection	D81
Jumper plug set on device set for fault current > 21 mA (instead of < 3.6 mA) (only non-SIL)	D82
Noise damping	
Noise damping 60 Hz instead of 50 Hz	P10
Input 1: TC	
Type C W5	V01
Type D W3	V02
Type U	V03
Type Lr	V04
Input 1: Callendar-Van Dusen	
2-wire (define wire resistance value in option Y51 and Callendar-Van Dusen parameter in option Y35)	V50
3-wire (define Callendar-Van Dusen parameter in option Y35)	V51
4-wire (define Callendar-Van Dusen parameter in option Y35)	V52
Input 1: RTD	
Pt × (IEC 60751), 2-wire (define wire resistance value in option Y51 and RTD factor × in option Y21)	V60
Pt × (IEC 60751), 3-wire, define RTD factor × in option Y21	V61
Pt × (IEC), 4-wire, define RTD factor × in option Y21	V62
Pt × (JIS C1604), 2-wire (define wire resistance value in option Y51 and RTD factor × in option Y21)	V63
Pt × (JIS C1604-81), 3-wire, define RTD factor × in option Y21	V64
Pt × (JIS C1604-81), 4-wire, define RTD factor × in option Y21	V65
Pt × (GOST 6651-2009), 2-wire (define wire resistance value in option Y51 and RTD factor × in option Y21)	V66
Pt × (GOST 6651-2009), 3-wire, define RTD factor × in option Y21	V67
Pt × (GOST 6651-2009), 4-wire, define RTD factor × in option Y21	V68
Ni × (DIN 43760-87), 2-wire (define wire resistance value in option Y51 and RTD factor × in option Y21)	V69
Ni × (DIN 43760-87), 3-wire, define RTD factor × in option Y21	V70
Ni × (DIN 43760-87), 4-wire, define RTD factor × in option Y21	V71
Ni × (GOST 6651-2009), 2-wire (define wire resistance value in option Y51 and RTD factor × in option Y21)	V72
Ni × (GOST 6651-2009), 3-wire, define RTD factor × in option Y21	V73
Ni × (GOST 6651-2009), 4-wire, define RTD factor × in option Y21	V74
Cu × (ECW-15), 2-wire (define wire resistance value in option Y51 and RTD factor × in option Y21)	V75
Cu × (ECW-15), 3-wire, define RTD factor × in option Y21	V76
Cu × (ECW-15), 4-wire, define RTD factor × in option Y21	V77
Cu × (GOST 6651-94), 2-wire (define wire resistance value in option Y51 and RTD factor × in option Y21)	V78
Cu × (GOST 6651-94), define 3-wire, define RTD factor × in option Y21	V79
Cu × (GOST 6651-94), define 4-wire, define RTD factor × in option Y21	V80
Cu × (GOST 6651-2009), 2-wire (define wire resistance value in option Y51 and RTD factor × in option Y21)	V81
Cu × (GOST 6651-2009), define 3-wire, define RTD factor × in option Y21	V82

Temperature Measurement

Temperature transmitters

Rail transmitters / SITRANS TR320 (HART, universal)

Selection and ordering data (continued)

Options Add "-Z" to article number, specify order code and, if applicable, free text	Order code
Cu × (GOST 6651-2009), define 4-wire, define RTD factor × in option Y21	V83
Device settings	
Measuring range setting temperature input: Lower range value (max. 5 characters), upper range value (max. 5 characters), unit (°C, °F, °Ra, K)	Y01
Customer-specific programming in plain text (n-lines)	Y09
Tag (device parameters, max. 32 characters), adhesive label	Y15
Measuring point description (device parameters, max. 32 characters), adhesive label	Y16
Descriptor (device parameters, max. 16 characters), adhesive label	Y18
Tag (device parameters, max. 16 characters), adhesive label on front	Y19
Input 1: RTD factor; e.g. factor "200" = Pt200, adhesive label	Y21
Fault current for input circuit short-circuit & interruption instead of 22.4 mA (short-circuit) and 22.8 mA (interruption) e.g. 3.6 mA and 22.4 mA [3.6 - 3.6; 3.6 - 22.8; 22.4 - 3.6]	Y31
CvD Sensor matching factors input 1 R0, A, B, C, Beta, Delta Selection: CVDR - R0 (format for example 100.0), CVDA - A (format for example 0.003908), CVDB - B (format for example -5.775E-07), CVDC - C (format for example -4.183E-12)	Y35
Wire resistance value input 1 in ohms (0 ... 100 ohms)	Y51
Input 1: CJC sensor, fixed value (see measuring range for unit)	Y60
ID number of special design	Y99

Accessories

	Article No.
Other accessories for assembly, connection and transmitter configuration, see page 2/198.	
Modems	
HART modem with USB interface	7MF4997-1DB
Modem with USB interface and SIPROM T software	7NG3092-8KN
SIMATIC PDM parameterization software	See Catalog FI 01 section 8

Ordering example

7NG0320-0BA00-OAA0-Z Y01
Y01: -10 ... +100 °C

Factory setting

- Pt100 (IEC 751); 3-wire connection
- Measuring range: 0 ... 100 °C (32 ... 212 °F)
- Fault current
 - Device fault: < 3.6 mA
 - Input circuit wire break: 22.8 mA
 - Input circuit short-circuit: 22.4 mA
 - Input monitoring wire break and short-circuit
- No trimming of input and output (offset)
- Damping 0.0 s

Technical specifications

SITRANS TR320 (HART, universal)

General	
Supply voltage ^{1) 2)}	
• Without explosion protection (non-Ex)	7.5 ... 48 V DC
• With explosion protection (Ex i)	7.5 ... 30 V DC
Additional minimum supply voltage when using test terminals	0.8 V
Maximum power loss	≤ 850 mW
Minimum load resistance at supply voltage > 37 V	$(V_{\text{supply}} - 37 \text{ V})/23 \text{ mA}$
Insulation voltage, test/operation	
• Without explosion protection (non-Ex)	2.5 kV AC/55 V AC
• With explosion protection (Ex i)	2.5 kV AC/42 V AC
Polarity protection	All inputs and outputs
Write protection	Wire jumpers or software
Warm-up time	< 5 min
Starting time	< 2.75 s
Programming	HART
Signal-to-noise ratio	> 60 dB
Long-term stability	Better than: <ul style="list-style-type: none"> • ± 0.05% of measuring span/year • ± 0.18% of measuring span/5 years
Response time	4 ... 20 mA: ≤ 55 ms HART: ≤ 75 ms (typically 70 ms)
Programmable damping	0 ... 60 s
Signal dynamic	
• Input	24 bit
• Output	18 bit
Influence of change in supply voltage	< 0.005% of measuring span/V DC
Input	
<u>Resistance thermometer (RTD)</u>	
Input type	
• Pt10 ... 10000	<ul style="list-style-type: none"> • IEC 60751 • JIS C 1604-8 • GOST 6651_2009 • Callendar-Van Dusen
• Ni10 ... 10000	<ul style="list-style-type: none"> • DIN 43760-1987 • GOST 6651-2009/OIML R84:2003
• Cu5 ... 1000	<ul style="list-style-type: none"> • Edison Copper Winding No. 15 • GOST 6651-2009/OIML R84:2003
Connection type	2-wire, 3-wire or 4-wire
Wire resistance per wire	Max. 50 Ω
Input current	< 0.15 mA
Effect of the wire resistance (with 3-wire and 4-wire connections)	< 0.002 Ω/Ω
Cable, wire-wire capacity	
• Pt1000, Pt10000 (IEC 60751 and JIS C 1604-8)	Max. 30 nF
• All other input types	Max. 50 nF
Fault detection, programmable	None, short-circuited, defective, short-circuited or defective Note When the low limit for the configured input type is below the constant detection limit for short-circuited inputs, the detection of short circuits is disabled regardless of the configuration of the fault detection.
Detection limit for short-circuited input	15 Ω
Fault detection time (RTD)	≤ 75 ms (typically 70 ms)
Fault detection time (for 3-wire and 4-wire)	≤ 2 000 ms
<u>Thermocouples (TC)</u>	

Temperature Measurement

Temperature transmitters

Rail transmitters / SITRANS TR320 (HART, universal)

Technical specifications (continued)

SITRANS TR320 (HART, universal)	
Input type	
• B	IEC 60584-1
• E	IEC 60584-1
• J	IEC 60584-1
• K	IEC 60584-1
• L	DIN 43710
• Lr	GOST 3044-84
• N	IEC 60584-1
• R	IEC 60584-1
• S	IEC 60584-1
• T	IEC 60584-1
• U	DIN 43710
• W3	ASTM E988-96
• W5	ASTM E988-96
• LR	GOST 3044-84
Cold Junction Compensation (CJC)	Constant, internal or external over Pt100 or Ni100 RTD
• Temperature range internal CJC	-50 ... +100 °C (-58 ... +212 °F)
• Connection external CJC	2-wire or 3-wire
• External CJC, wire resistance per wire (for 3-wire and 4-wire connections)	50 Ω
• Effect of the wire resistance (with 3-wire and 4-wire connections)	< 0.002 Ω/Ω
• Input current external CJC	< 0.15 mA
• Temperature range external CJC	-50 ... +135 °C (-58 ... +275 °F)
• Cable, wire-wire capacity	Max. 50 nF
• Total wire resistance	Max. 10 kΩ
• Fault detection, programmable	None, short-circuited, defective, short-circuited or defective Note The short-circuited fault detection only applies to the CJC input.
• Fault detection time (TC)	≤ 75 ms (typically 70 ms)
• Fault detection time, external CJC (for 3-wire and 4-wire)	≤ 2 000 ms
<u>Linear resistance</u>	
Input range	0 ... 100 kΩ
Minimum measuring span	25 Ω
Connection type	2-wire, 3-wire or 4-wire
Wire resistance per wire	Max. 50 Ω
Input current	< 0.15 mA
Effect of the wire resistance (with 3-wire and 4-wire connections)	< 0.002 Ω/Ω
Cable, wire-wire capacity	
• R > 400 Ω	Max. 30 nF
• R ≤ 400 Ω	Max. 50 nF
Fault detection, programmable	None, defective
<u>Potentiometers</u>	
Input range	10 ... 100 kΩ
Minimum measuring span	25 Ω
Connection type	3-wire or 4-wire
Wire resistance per wire	Max. 50 Ω
Input current	< 0.15 mA
Effect of the wire resistance (with 4-wire and 5-wire connections)	< 0.002 Ω/Ω
Cable, wire-wire capacity	
• R > 400 Ω	Max. 30 nF
• R ≤ 400 Ω	Max. 50 nF

Technical specifications (continued)

SITRANS TR320 (HART, universal)	
Fault detection, programmable	None, short-circuited, defective, short-circuited or defective Note When the configured potentiometer size is below the constant detection limit for short-circuited inputs, the detection of short circuits is disabled regardless of the configuration of the fault detection.
Detection limit for short-circuited input	15 Ω
Fault detection time, wiper arm (no short-circuit detection)	≤ 75 ms (typically 70 ms)
Fault detection time, element	≤ 2 000 ms
Fault detection time (for 4-wire and 5-wire)	≤ 2 000 ms
<u>Voltage input</u>	
Measuring range	
• Unipolar	-100 ... 1700 mV
• Bipolar	-800 ... +800 mV
Minimum measuring span	2.5 mV
Input resistance	10 MΩ
Cable, wire-wire capacity	
• Input range: -100 ... 1700 mV	Max. 30 nF
• Input range: -20 ... 100 mV	Max. 50 nF
Fault detection, programmable	None, defective
Fault detection time	≤ 75 ms (typically 70 ms)
Output and HART communication	
Normal range, programmable	3.8 ... 20.5 mA/20.5 ... 3.8 mA
Extended range (output limits), programmable	3.5 ... 23 mA/23 ... 3.5 mA
Programmable input/output limits	
• Fault current	Enable/disable
• Fault current setting	3.5 ... 23 mA
Update time	10 ms
Load (with current output)	≤ (V _{Supply} - 7.5)/0.023 Ω
Load stability	< 0.01% of measuring span/100 Ω (measuring span = currently selected range)
Input fault detection, programmable (detection of input short-circuits is ignored with TC and voltage inputs)	3.5 ... 23 mA
NAMUR NE43 Upscale	> 21 mA
NAMUR NE43 Downscale	< 3.6 mA
HART protocol versions	HART 7
Measuring accuracy	
Input accuracy	See "Input accuracy" table
Output accuracy	See "Output accuracy" table
Operating conditions	
Ambient temperature	-50 ... +85 °C (-58 ... +185 °F)
Ambient temperature for devices with functional safety	-40 ... +80 °C (-40 ... +176 °F)
Storage temperature	-50 ... +85 °C (-58 ... +185 °F)
Reference temperature for sensor calibration	24 °C ±1.0 °C (75.2 °F ±1.8 °F)
Relative humidity	< 99% (no condensation)
Degree of protection	
• Transmitter enclosure	IP20
• Terminals	IP20
Structural design	
Weight	122 g (0.27 lb)
Maximum core cross-section	2.5 mm ² (AWG 13)
Tightening torque for clamping screws	0.5 ... 0.6 Nm
Vibrations	IEC 60068-2-6
• 2 ... 25 Hz	± 1.6 mm (0.07 inches)
• 25 ... 100 Hz	± 4 g

Temperature Measurement

Temperature transmitters

Rail transmitters / SITRANS TR320 (HART, universal)

Technical specifications (continued)

SITRANS TR320 (HART, universal)	
Certificates and approvals	
<u>Explosion protection ATEX/IECEX and others</u>	
Certificates ³⁾	<ul style="list-style-type: none"> • DEKRA 17ATEX0116 X • IECEx DEK 17.0054X • A5E43700604A-2018X
"Intrinsic safety ia/ib" type of protection	For use in Zone 0, 1, 2, 20, 21, 22
<ul style="list-style-type: none"> • ATEX 	<ul style="list-style-type: none"> • II 1 G Ex ia IIC T6 ... T4 Ga • II 2(1) G Ex ib [ia Ga] IIC T6 ... T4 Gb • II 2 D Ex ia IIIC Db • I M1 Ex ia I Ma
<ul style="list-style-type: none"> • IECEx and others 	<ul style="list-style-type: none"> • Ex ia IIC T6 ... T4 Ga • Ex ib [ia Ga] IIC T6 ... T4 Gb • Ex ia IIIC Db • Ex ia I Ma
"Intrinsic safety ic" type of protection	For use in Zones 2 and 22
<ul style="list-style-type: none"> • ATEX 	<ul style="list-style-type: none"> • II 3 G Ex ic IIC T6...T4 Gc • II 3 D Ex ic IIIC Dc
<ul style="list-style-type: none"> • IECEx and others 	<ul style="list-style-type: none"> • Ex ic IIC T6 ... T4 Gc • Ex ic IIIC Dc
"Non-sparking/increased safety nA/lec" type of protection	For use in Zones 2 and 22
<ul style="list-style-type: none"> • ATEX 	<ul style="list-style-type: none"> • II 3 G Ex nA IIC T6...T4 Gc • II 3 G Ex ec IIC T6...T4 Gc
<ul style="list-style-type: none"> • IECEx and others 	<ul style="list-style-type: none"> • Ex nA IIC T6 ... T4 Gc • Ex ec IIC T6 ... T4 Gc
<u>Explosion protection CSA/FM for Canada and USA</u>	
Certificates	<ul style="list-style-type: none"> • CSA 1861385 • FM18CA0024 • FM18US0046
"Intrinsic safety ia" type of protection	<ul style="list-style-type: none"> • IS, CL I, Div 1, GP ABCD, T6 ... T4 • Ex ia IIC T6 ... T4 Ga, AEx ia IIC T6 ... T4 Ga or Ex ib [ia Ga] IIC T6...T4 Gb, AEx ib [ia Ga] IIC T6...T4 Gb
"Non incandive field wiring NIFW" type of protection	NIFW, CL I, Div 2, GP ABCD T6 ... T4
"Non incandive NI" type of protection	<ul style="list-style-type: none"> • NI, CL I, Div 2, GP ABCD T6...T4 • Ex nA IIC T6 ... T4 Gc • AEx nA IIC T6 ... T4 Gc

¹⁾ Note that the minimum supply voltage must correspond to the value measured at the terminals of the SITRANS TR320. All external voltage drops must be taken into account.

²⁾ Protect the device from overvoltage with the help of a suitable power supply or suitable overvoltage protection equipment.

³⁾ Additional available certificates are listed on the internet at <http://www.siemens.com/processinstrumentation/certificates>

Technical specifications (continued)

Measuring ranges/Minimum measuring span

RTD

Input type	Standard	Measuring range in °C (°F)	α_0 in °C ⁻¹ (°F ⁻¹)	Minimum measuring span in °C (°F)
Pt10 ... 10000	IEC 60751	-200 ... +850 (-328 ... +1 562)	0.003851 (0.002139)	10 (50)
	JIS C 1604-8	-200 ... +649 (-328 ... +1 200)	0.003916 (0.002176)	10 (50)
	GOST 6651_2009	-200 ... +850 (-328 ... +1 562)	0.003910 (0.002172)	10 (50)
	Callendar-Van Dusen	-200 ... +850 (-328 ... +1 562)	-	10 (50)
Ni10 ... 10000	DIN 43760-1987	-60 ... +250 (-76 ... +482)	0.006180 (0.003433)	10 (50)
	GOST 6651-2009/OIML R84:2003	-60 ... +180 (-76 ... +356)	0.006170 (0.003428)	10 (50)
Cu5 ... 1000	Edison Copper Winding No. 15	-200 ... +260 (-328 ... +500)	0.004270 (0.002372)	100 (212)
	GOST 6651-2009/OIML R84:20-03	-180 ... +200 (-292 ... +392)	0.004280 (0.002378)	100 (212)
	GOST 6651-94	-50 ... +200 (-58 ... +392)	0.004260 (0.002367)	100 (212)

TC

Input type	Standard	Measuring range in °C (°F)	Minimum measuring span in °C (°F)
B	IEC 60584-1	0 (85) ... 1 820 (32 (185) ... 3 308)	100 (212)
E	IEC 60584-1	-200 ... +1 000 (-392 ... +1 832)	50 (122)
J	IEC 60584-1	-100 ... +1 200 (-212 ... +2 192)	50 (122)
K	IEC 60584-1	-180 ... +1 372 (-356 ... +2 502)	50 (122)
L	DIN 43710	-200 ... +900 (-392 ... +1 652)	50 (122)
Lr	GOST 3044-84	-200 ... +800 (-392 ... +1 472)	50 (122)
N	IEC 60584-1	-180 ... +1 300 (-356 ... +2 372)	50 (122)
R	IEC 60584-1	-50 ... +1 760 (-122 ... +3 200)	100 (212)
S	IEC 60584-1	-50 ... +1 760 (-122 ... +3 200)	100 (212)
T	IEC 60584-1	-200 ... +400 (-392 ... +752)	50 (122)
U	DIN 43710	-200 ... +600 (-392 ... +1 112)	50 (122)
W3	ASTM E988-96	0 ... 2 300 (32 ... 4 172)	100 (212)
W5	ASTM E988-96	0 ... 2 300 (32 ... 4 172)	100 (212)
LR	GOST 3044-84	-200 ... +800 (-392 ... +1472)	50 (122)

Input accuracy

Basic values

Input type	Basic accuracy	Temperature coefficient ¹⁾
RTD		
Pt10	$\leq \pm 0.8$ °C (1.44 °F)	$\leq \pm 0.020$ °C/°C (°F/°F)
Pt20	$\leq \pm 0.4$ °C (0.72 °F)	$\leq \pm 0.010$ °C/°C (°F/°F)
Pt50	$\leq \pm 0.16$ °C (0.288 °F)	$\leq \pm 0.004$ °C/°C (°F/°F)
Pt100	$\leq \pm 0.04$ °C (0.072 °F)	$\leq \pm 0.002$ °C/°C (°F/°F)
Pt200	$\leq \pm 0.08$ °C (0.144 °F)	$\leq \pm 0.002$ °C/°C (°F/°F)
Pt500	$T_{\max.} < 180$ °C (356 °F) = $\leq \pm 0.08$ °C (0.144 °F) $T_{\max.} > 180$ °C (356 °F) = $\leq \pm 0.16$ °C (0.288 °F)	$\leq \pm 0.002$ °C/°C (°F/°F)
Pt1000	$\leq \pm 0.08$ °C (0.144 °F)	$\leq \pm 0.002$ °C/°C (°F/°F)
Pt2000	$T_{\max.} < 300$ °C (572 °F) = $\leq \pm 0.08$ °C (0.144 °F) $T_{\max.} > 300$ °C (572 °F) = $\leq \pm 0.4$ °C (0.72 °F)	$\leq \pm 0.002$ °C/°C (°F/°F)
Pt10000	$\leq \pm 0.16$ °C (0.288 °F)	$\leq \pm 0.002$ °C/°C (°F/°F)
Pt x	Largest tolerance of neighboring points	Largest temperature coefficient of neighboring points
Ni10	$\leq \pm 1.6$ °C (2.88 °F)	$\leq \pm 0.020$ °C/°C (°F/°F)

Temperature Measurement

Temperature transmitters

Rail transmitters / SITRANS TR320 (HART, universal)

Technical specifications (continued)

Input type	Basic accuracy	Temperature coefficient ¹⁾
Ni20	≤ ±0.8 °C (1.44 °F)	≤ ±0.010 °C/°C (°F/°F)
Ni50	≤ ±0.32 °C (0.576 °F)	≤ ±0.004 °C/°C (°F/°F)
Ni100	≤ ±0.16 °C (0.288 °F)	≤ ±0.002 °C/°C (°F/°F)
Ni120	≤ ±0.16 °C (0.288 °F)	≤ ±0.002 °C/°C (°F/°F)
Ni200	≤ ±0.16 °C (0.288 °F)	≤ ±0.002 °C/°C (°F/°F)
Ni500	≤ ±0.16 °C (0.288 °F)	≤ ±0.002 °C/°C (°F/°F)
Ni1000	≤ ±0.16 °C (0.288 °F)	≤ ±0.002 °C/°C (°F/°F)
Ni2000	≤ ±0.16 °C (0.288 °F)	≤ ±0.002 °C/°C (°F/°F)
Ni10000	≤ ±0.32 °C (0.576 °F)	≤ ±0.002 °C/°C (°F/°F)
Ni x	Largest tolerance of neighboring points	Largest temperature coefficient of neighboring points
Cu5	≤ ±1.6 °C (2.88 °F)	≤ ±0.040 °C/°C (°F/°F)
Cu10	≤ ±0.8 °C (1.44 °F)	≤ ±0.020 °C/°C (°F/°F)
Cu20	≤ ±0.4 °C (0.72 °F)	≤ ±0.010 °C/°C (°F/°F)
Cu50	≤ ±0.16 °C (0.288 °F)	≤ ±0.004 °C/°C (°F/°F)
Cu100	≤ ±0.08 °C (0.144 °F)	≤ ±0.002 °C/°C (°F/°F)
Cu200	≤ ±0.08 °C (0.144 °F)	≤ ±0.002 °C/°C (°F/°F)
Cu500	≤ ±0.16 °C (0.288 °F)	≤ ±0.002 °C/°C (°F/°F)
Cu1000	≤ ±0.08 °C (0.144 °F)	≤ ±0.002 °C/°C (°F/°F)
Cu x	Largest tolerance of neighboring points	Largest temperature coefficient of neighboring points
Linear resistance		
0 ... 400 Ω	≤ ±40 mΩ	≤ ±2 mΩ/°C (1.11 mΩ/°F)
0 ... 100 kΩ	≤ ±4 Ω	≤ ±0.2 Ω/°C (0.11 Ω/°F)
Potentiometers		
0 ... 100%	< 0.05%	< ± 0.005%
Voltage input		
mV: -20 ... 100 mV	≤ ±5 μV	≤ ±0.2 μV/°C (0.11 μV/°F)
mV: -100 ... 1700 mV	≤ ±0.1 mV	≤ ±36 μV/°C (20 μV/°F)
mV: ± 800 mV	≤ ±0.1 mV	≤ ±32 μV/°C (17.8 μV/°F)
TC		
E	≤ ±0.2 °C (0.36 °F)	≤ ±0.025 °C/°C (°F/°F)
J	≤ ±0.25 °C (0.45 °F)	≤ ±0.025 °C/°C (°F/°F)
K	≤ ±0.25 °C (0.45 °F)	≤ ±0.025 °C/°C (°F/°F)
L	≤ ±0.35 °C (0.63 °F)	≤ ±0.025 °C/°C (°F/°F)
N	≤ ±0.4 °C (0.72 °F)	≤ ±0.025 °C/°C (°F/°F)
T	≤ ±0.25 °C (0.45 °F)	≤ ±0.025 °C/°C (°F/°F)
U	< 0 °C (32 °F) ≤ ±0.8 °C (1.44 °F) ≥ 0 °C (32 °F) ≤ ±0.4 °C (0.72 °F)	≤ ±0.025 °C/°C (°F/°F)
Lr	≤ ±0.2 °C (0.36 °F)	≤ ±0.1 °C/°C (°F/°F)
R	< 200 °C (392 °F) ≤ ±0.5 °C (0.9 °F) ≥ 200 °C (392 °F) ≤ ±1 °C (1.8 °F)	≤ ±0.1 °C/°C (°F/°F)
S	< 200 °C (392 °F) ≤ ±0.5 °C (0.9 °F) ≥ 200 °C (392 °F) ≤ ±1 °C (1.8 °F)	≤ ±0.1 °C/°C (°F/°F)
W3	≤ ±0.6 °C (1.08 °F)	≤ ±0.1 °C/°C (°F/°F)
W5	≤ ±0.4 °C (0.72 °F)	≤ ±0.1 °C/°C (°F/°F)
B ²⁾	≤ ±1 °C (1.8 °F)	≤ ±0.1 °C/°C (°F/°F)
B ³⁾	≤ ±3 °C (5.4 °F)	≤ ±0.1 °C/°C (°F/°F)
B ⁴⁾	≤ ±8 °C (14.4 °F)	≤ ±0.8 °C/°C (°F/°F)
B ⁵⁾	Not specified	Not specified
CJC (internal)	< ±0.5 °C (0.9 °F)	Included in basic accuracy
CJC (external)	≤ ±0.08 °C (0.144 °F)	≤ ±0.002 °C/°C (°F/°F)

1) Temperature coefficients correspond to the specified values or 0.002% of the input span, depending on which value is greater.

2) Accuracy of the specification range > 400 °C (752 °F)

3) Accuracy of the specification range > 160 °C (320 °F) < 400 °C (752 °F)

4) Accuracy of the specification range > 85 °C (185 °F) < 160 °C (320 °F)

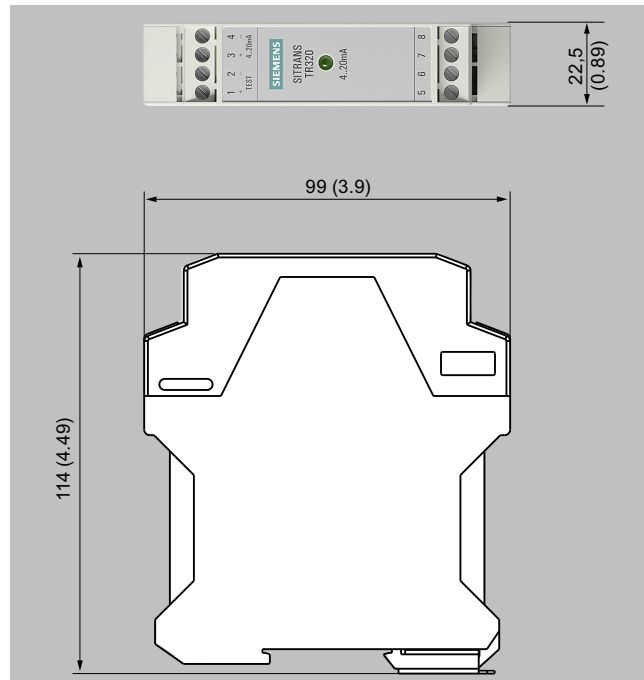
5) Accuracy of the specification range < 85 °C (185 °F)

Technical specifications (continued)

Output accuracy

Output type	Basic accuracy	Temperature coefficient
Analog output	$\leq \pm 1.6 \mu\text{A}$ (0.01% of the full output span)	$\leq \pm 0.48 \mu\text{A/K}$ ($\leq \pm 0.003\%$ of the full output span/K)

Dimensional drawings



SITRANS TR320, dimensions in mm (inch)

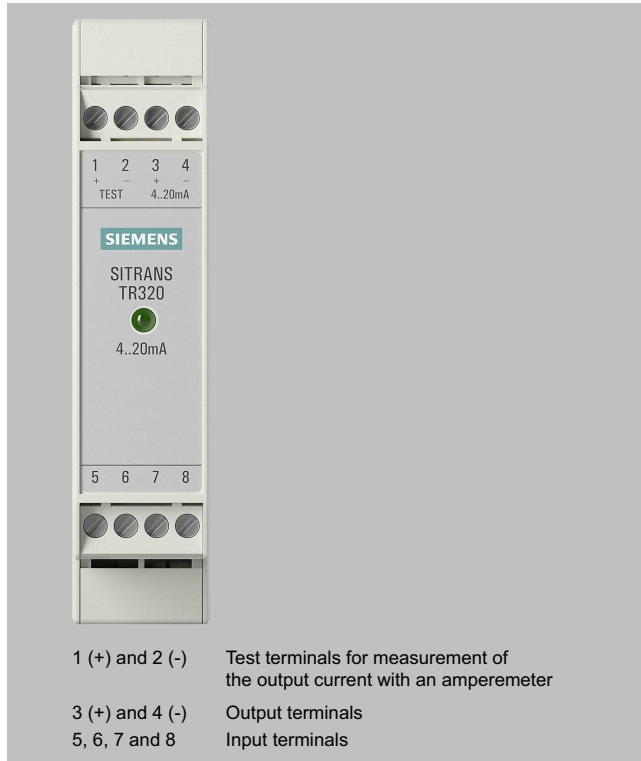
Temperature Measurement

Temperature transmitters

Rail transmitters / SITRANS TR320 (HART, universal)

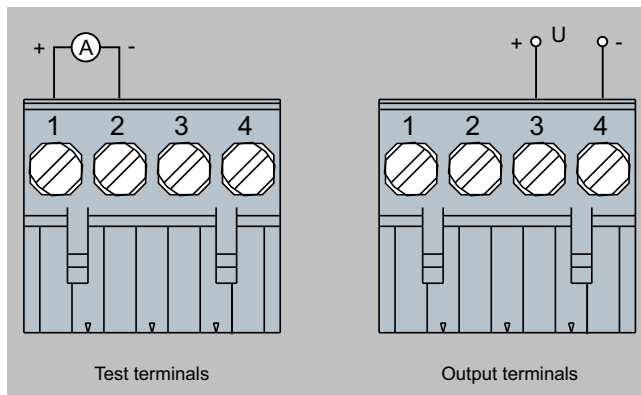
Circuit diagrams

Connections



SITRANS TR320, connector assignment

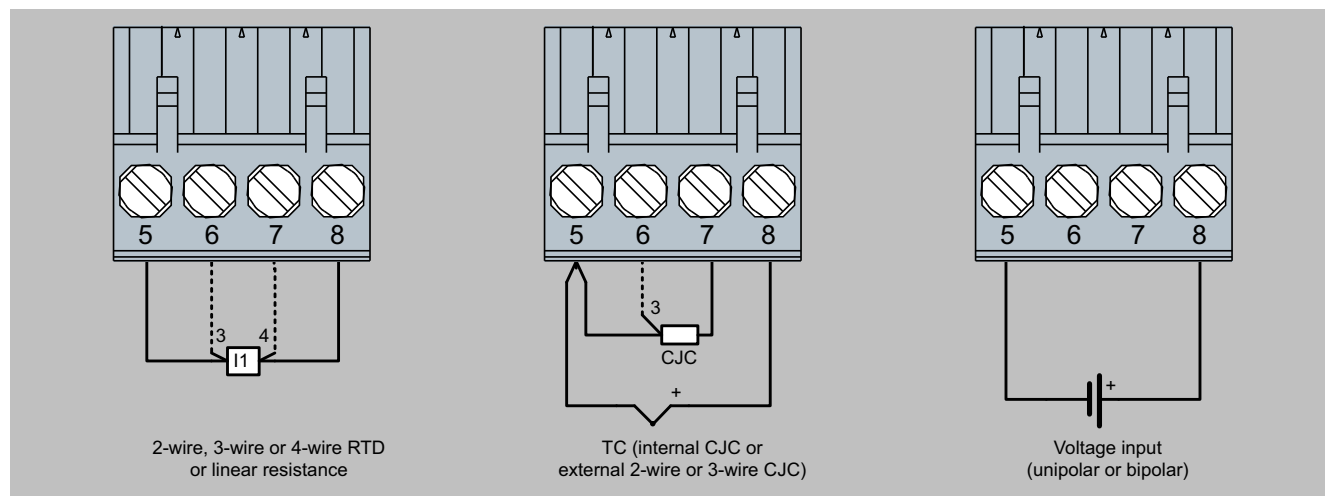
Output and test connection



SITRANS TR320, output connection assignment

Circuit diagrams (continued)

Input connection



SITRANS TR320, input connection assignment

Temperature Measurement

Temperature transmitters

Rail transmitters / SITRANS TR420 (HART, universal)

Overview



- 2-wire rail transmitter with HART communications interface
- Device for rail mounting
- Universal input for virtually any type of temperature sensor
- Connection of two independent input circuits for redundant operation (high input availability)
- Input drift detection
- Configurable via HART 7

Benefits

- Compact design
- Connection of two independent input circuits for redundant operation (high input availability)
- Galvanic isolation
- Test terminals for ammeter
- Diagnostics LED (green/red)
- Input monitoring wire break and short-circuit
- Self-monitoring
- Configuration status stored in EEPROM
- Expanded diagnostic functions, such as slave pointer, operating hours counter, etc.
- Special characteristic
- Electromagnetic compatibility according to EN 61326 and NE21
- SIL2/3 (with order note C20)

Application

SITRANS TR420 transmitters with two inputs can be used in all sectors. Their compact design enables simple mounting on standard DIN rails on-site in protective boxes or in control cabinets. The following sensors/signal sources can be connected over their universal input module:

- 2 resistance thermometers (2-wire, 3-wire, 4-wire connection)
- 2 thermocouples
- 2 linear resistors, potentiometer and DC voltage sources

The output signal is a load-independent direct current from 4 to 20 mA in accordance with the input characteristic, superimposed by the digital HART signal.

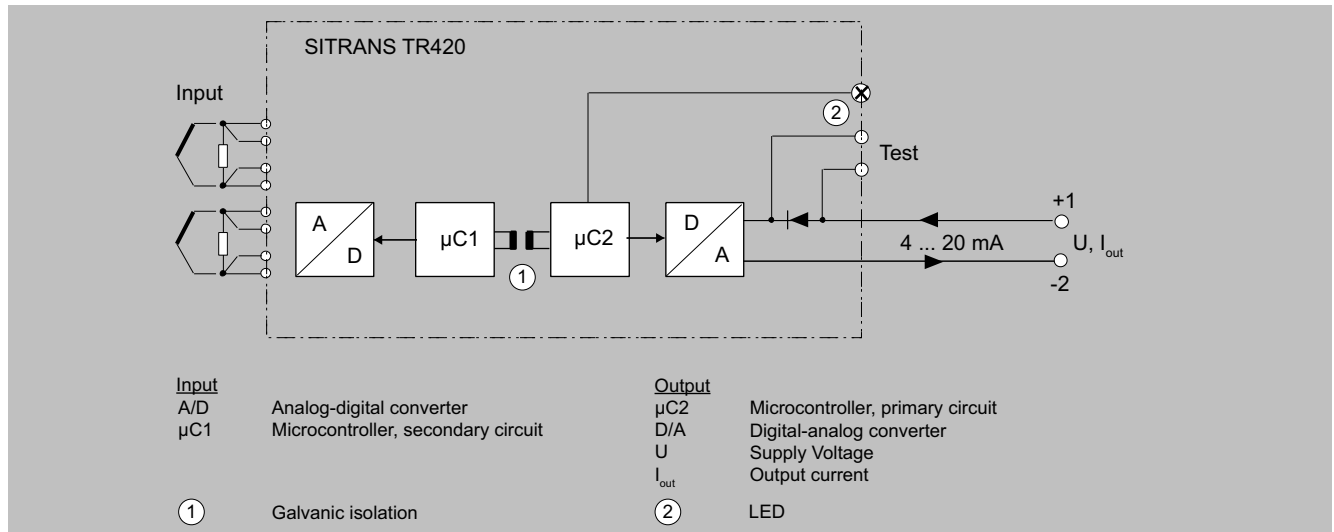
The dual input mode also supports drift detection of the inputs, whereby maintenance intervals can be more easily planned. Transmitters of the "intrinsically safe or Zone 2 increased safety" type of protection can be installed in hazardous areas. The device meets the requirements of the EU Directive 2014/34/EU (ATEX), the FM and CSA regulations as well as other national approvals.

Function

The SITRANS TR420 is configured via HART. The configuration can be carried out using a handheld communicator or, more conveniently, with a HART modem and the SIMATIC PDM configuration software. The configuration data are then permanently stored in the non-volatile memory (EEPROM).

After correct connection of input and supply voltage, the transmitter outputs a temperature-linear output signal and the diagnostics LED is green. In case of external errors, e.g. sensor short circuit or interruption, the LED flashes red; an internal error is indicated by a permanent red light.

An ammeter can be connected at any time for checking and plausibility via the test terminals. The output current can be read without any interruption, or even without opening the current loop.



SITRANS TR420, function block diagram

Temperature Measurement

Temperature transmitters

Rail transmitters / SITRANS TR420 (HART, universal)

Selection and ordering data

SITRANS TR420 DIN rail transmitter with 2 inputs	Article No. 7NG042	Order code
Click the article number for online configuration in the PIA Life Cycle Portal.	● - ● ● ● ● ● - 0 ● ● ● ● ● ●	
Communication		
With HART	0	
Primary value output		
Input 1	0	
Input 1, input 2 as redundancy	1	
Input 2, input 1 as redundancy	2	
Mean value input 1 and input 2, both as redundancy	3	
Minimum input 1 and input 2, both as redundancy	4	
Maximum input 1 and input 2, both as redundancy	5	
Difference input 1 - input 2	6	
Difference input 2 - input 1	7	
Absolute difference	8	
Primary value output, customer-specific		
Minimum input 1 and input 2, without redundancy	9	H 1 A
Maximum input 1 and input 2, without redundancy	9	H 1 B
Mean value input 1 and input 2, without redundancy	9	H 1 C
Input 2	9	H 1 D
Input 1, type		
RTD		
• Pt100 (IEC), 3-wire		B
• Pt100 (IEC), 4-wire		C
• Pt1000 (IEC), 3-wire		D
• Pt1000 (IEC), 4-wire		E
TC		
• Type B		F
• Type E		G
• Type J		H
• Type K		J
• Type L		K
• Type N		L
• Type R		N
• Type S		P
• Type T		Q
Potentiometer, 4-wire		R
Input 1, type customer-specific		
Define customer-specific input configurations in V options		Y
Input 2, type		
Without input 2		A
RTD		
• Pt100 (IEC), 3-wire		B
• Pt100 (IEC), 4-wire		C
• Pt1000 (IEC), 3-wire		D
• Pt1000 (IEC), 4-wire		E
TC		
• Type B		F
• Type E		G
• Type J		H
• Type K		J
• Type L		K
• Type N		L
• Type R		N

Temperature Measurement

Temperature transmitters

Rail transmitters / SITRANS TR420 (HART, universal)

Selection and ordering data (continued)

SITRANS TR420 DIN rail transmitter with 2 inputs	Article No. 7NG042	Order code
• Type S	P	
• Type T	Q	
Potentiometer, 4-wire	R	
Input 2, type customer-specific Define customer-specific input configurations in W options	Y	
CJC configuration for TC Input 1: no CJC; input 2: No CJC	0	
Input 1: internal CJC; input 2: internal CJC	1	
Input 1: external CJC; input 2: external CJC; define type in option Jxx	2	
Input 1: external CJC; define type in option Jxx; input 2: internal CJC	3	
Input 1: internal CJC; input 2: external CJC; define type in option Jxx	4	
Input 1: Internal CJC; Input 2: No CJC	5	
Input 1: External CJC (define type in option Jxx); input 2: No CJC	6	
CJC configuration for TC, customer-specific Input 1: Fixed CJC value (define value in option Y60); Input 2: Fixed CJC value (define value in option Y61)	9	L 1 A
Input 1: External CJC (define type in option Jxx); Input 2: Define fixed CJC value with option Y61	9	L 1 B
Input 1: Define fixed CJC value with option Y60; Input 2: External CJC (define type in option Jxx)	9	L 1 C
Input 1: Define fixed CJC value with option Y60; Input 2: Internal CJC	9	L 1 D
Input 1: Internal CJC; Input 2: Define fixed CJC value with option Y61	9	L 1 E
Materials not in contact with media None	0	
Type of protection General safety (non-Ex); CE, RCM, FM, KCC, EAC, CSA, UK		A
Intrinsic safety (Ex i) / non-incendive field wiring (NIFW) / increased safety zone 2 (Ex ec) / non-incendive (NI) (ATEX, IECEx, EACEx, CSA, FM, NEPSI, Inmetro, UKEx)		N
Electrical connection/cable entries None		A
Local HMI Without display		0

Options	Order code
Add "-Z" to article number, specify order code and, if applicable, free text	
Manufacturer's declarations Inspection certificate EN 10204-3.1: Manufacturer test certificate for transmitters (5 measured values)	C11
Certificates for functional safety Functional safety SIL2/3 (IEC 61508)	C20
Device options PDF file with device settings	D10
Without labeling of the measuring range on the TAG plate	D41
Jumper plug set on device for write protection	D81
Jumper plug set on device set for fault current > 21 mA (instead of < 3.6 mA) (only non-SIL)	D82
External CJC types Pt100, IEC 60751, 3-wire	J02
Pt100, IEC 60751, 4-wire	J03
Ni100, DIN 43760-87, 3-wire	J05
Ni100, DIN 43760-87, 4-wire	J06
Noise damping Noise damping 60 Hz instead of 50 Hz	P10
Input 1: TC Type C W5	V01
Type D W3	V02
Type U	V03
Type Lr	V04

Temperature Measurement

Temperature transmitters

Rail transmitters / SITRANS TR420 (HART, universal)

Selection and ordering data (continued)

Options Add "-Z" to article number, specify order code and, if applicable, free text	Order code
Input 1: Callendar-Van Dusen	
2-wire (define wire resistance value in option Y51 and Callendar-Van Dusen parameter in option Y35)	V50
3-wire (define Callendar-Van Dusen parameter in option Y35)	V51
4-wire (define Callendar-Van Dusen parameter in option Y35)	V52
Input 1: RTD	
Pt × (IEC 60751), 2-wire (define wire resistance value in option Y51 and RTD factor × in option Y21)	V60
Pt × (IEC 60751), 3-wire, define RTD factor × in option Y21	V61
Pt × (IEC 60751), 4-wire, define RTD factor × in option Y21	V62
Pt × (JIS C1604), 2-wire (define wire resistance value in option Y51 and RTD factor × in option Y21)	V63
Pt × (JIS C1604-81), 3-wire, define RTD factor × in option Y21	V64
Pt × (JIS C1604-81), 4-wire, define RTD factor × in option Y21	V65
Pt × (GOST 6651-2009), 2-wire (define wire resistance value in option Y51 and RTD factor × in option Y21)	V66
Pt × (GOST 6651-2009), 3-wire, define RTD factor × in option Y21	V67
Pt × (GOST 6651-2009), 4-wire, define RTD factor × in option Y21	V68
Ni × (DIN 43760-87), 2-wire (define wire resistance value in option Y51 and RTD factor × in option Y21)	V69
Ni × (DIN 43760-87), 3-wire, define RTD factor × in option Y21	V70
Ni × (DIN 43760-87), 4-wire, define RTD factor × in option Y21	V71
Ni × (GOST 6651-2009), 2-wire (define wire resistance value in option Y51 and RTD factor × in option Y21)	V72
Ni × (GOST 6651-2009), 3-wire, define RTD factor × in option Y21	V73
Ni × (GOST 6651-2009), 4-wire, define RTD factor × in option Y21	V74
Cu × (ECW-15), 2-wire (define wire resistance value in option Y51 and RTD factor × in option Y21)	V75
Cu × (ECW-15), 3-wire, define RTD factor × in option Y21	V76
Cu × (ECW-15), 4-wire, define RTD factor × in option Y21	V77
Cu × (GOST 6651-94), 2-wire (define wire resistance value in option Y51 and RTD factor × in option Y21)	V78
Cu × (GOST 6651-94), define 3-wire, define RTD factor × in option Y21	V79
Cu × (GOST 6651-94), define 4-wire, define RTD factor × in option Y21	V80
Cu × (GOST 6651-2009), 2-wire (define wire resistance value in option Y51 and RTD factor × in option Y21)	V81
Cu × (GOST 6651-2009), define 3-wire, define RTD factor × in option Y21	V82
Cu × (GOST 6651-2009), define 4-wire, define RTD factor × in option Y21	V83
Input 2: TC	
Type C W5	W01
Type D W3	W02
Type U	W03
Type Lr	W04

Selection and ordering data (continued)

Options	Order code
Add "-Z" to article number, specify order code and, if applicable, free text	
Input 2: Callendar-Van Dusen	
2-wire (define wire resistance value in option Y52 and Callendar-Van Dusen parameter in option Y36)	W50
3-wire (define Callendar-Van Dusen parameter in option Y36)	W51
4-wire (define Callendar-Van Dusen parameter in option Y36)	W52
Input 2: RTD	
Pt × (IEC 60751), 2-wire (define wire resistance value in option Y52 and RTD factor × in option Y22)	W60
Pt × (IEC 60721), 3-wire, define RTD factor × in option Y22	W61
Pt × (IEC 60721), 4-wire, define RTD factor × in option Y22	W62
Pt × (JIS C1604), 2-wire (define wire resistance value in option Y52 and RTD factor × in option Y22)	W63
Pt × (JIS C1604-81), 3-wire, define RTD factor × in option Y22	W64
Pt × (JIS C1604-81), 4-wire, define RTD factor × in option Y22	W65
Pt × (GOST 6651-2009), 2-wire (define wire resistance value in option Y52 and RTD factor × in option Y22)	W66
Pt × (GOST 6651-2009), 3-wire, define RTD factor × in option Y22	W67
Pt × (GOST 6651-2009), 4-wire, define RTD factor × in option Y22	W68
Ni × (DIN 43760-87), 2-wire (define wire resistance value in option Y52 and RTD factor × in option Y22)	W69
Ni × (DIN 43760-87), 3-wire, define RTD factor × in option Y22	W70
Ni × (DIN 43760-87), 4-wire, define RTD factor × in option Y22	W71
Ni × (GOST 6651-2009), 2-wire (define wire resistance value in option Y52 and RTD factor × in option Y22)	W72
Ni × (GOST 6651-2009), 3-wire, define RTD factor × in option Y22	W73
Ni × (GOST 6651-2009), 4-wire, define RTD factor × in option Y22	W74
Cu × (ECW-15), 2-wire (define wire resistance value in option Y52 and RTD factor × in option Y22)	W75
Cu × (ECW-15), 3-wire, define RTD factor × in option Y22	W76
Cu × (ECW-15), 4-wire, define RTD factor × in option Y22	W77
Cu × (GOST 6651-94), 2-wire (define wire resistance value in option Y52 and RTD factor × in option Y22)	W78
Cu × (GOST 6651-94), 3-wire, define RTD factor × in option Y22	W79
Cu × (GOST 6651-94), 4-wire, define RTD factor × in option Y22	W80
Cu × (GOST 6651-2009), 2-wire (define wire resistance value in option Y52 and RTD factor × in option Y22)	W81
Cu × (GOST 6651-2009), 3-wire, define RTD factor × in option Y22	W82
Cu × (GOST 6651-2009), 4-wire, define RTD factor × in option Y22	W83
Device settings	
Measuring range setting temperature input: Lower range value (max. 5 characters), upper range value (max. 5 characters), unit (°C, °F, °Ra, K)	Y01
Customer-specific programming in plain text (n-lines)	Y09

Temperature Measurement

Temperature transmitters

Rail transmitters / SITRANS TR420 (HART, universal)

Selection and ordering data (continued)

Options	Order code
Add "-Z" to article number, specify order code and, if applicable, free text	
Tag (device parameters, max. 32 characters), adhesive label	Y15
Measuring point description (device parameters, max. 32 characters), adhesive label	Y16
Descriptor (device parameters, max. 16 characters), adhesive label	Y18
Input 1: RTD factor; e.g. factor "200" = Pt200, adhesive label	Y21
Input 2: RTD factor (e.g. factor "200" - RTD Pt200), adhesive label	Y22
Fault current for input circuit short-circuit & interruption instead of 22.4 mA (short-circuit) and 22.8 mA (interruption) e.g. 3.6 mA and 22.4 mA [3.6 - 3.6; 3.6 - 22.8; 22.4 - 3.6]	Y31
CvD Sensor matching factors input 1 R0, A, B, C, Beta, Delta Selection: CVDR - R0 (format for example 100.0), CVDA - A (format for example 0.003908), CVDB - B (format for example -5.775E-07), CVDC - C (format for example -4.183E-12)	Y35
CvD Sensor matching factors input 2 R0, A, B, C, Beta, Delta Selection: CVDR - R0 (format for example 100.0), CVDA - A (format for example 0.003908), CVDB - B (format for example -5.775E-07), CVDC - C (format for example -4.183E-12)	Y36
Wire resistance value input 1 in ohms (0 ... 100 ohms)	Y51
Wire resistance value input 2 in ohms (0 ... 100 ohms)	Y52
Input 1: CJC sensor, fixed value (see measuring range for unit)	Y60
Input 2: CJC sensor, fixed value (see measuring range for unit)	Y61
ID number of special design	Y99

Accessories

Article No.	
Other accessories for assembly, connection and transmitter configuration, see page 2/198.	
Modem	
HART modem with USB interface	7MF4997-1DB
SIMATIC PDM parameterization software	See Catalog FI 01 section 8

Ordering example

7NG0420-0BA00-0AA0-Z Y01
Y01: -10 ... +100 °C

Factory setting

- Input 1: Pt100 (IEC 751; 3-wire connection)
- Input 2: not configured (inactive)
- Measuring range: 0 ... 100 °C (32 ... 212 °F)
- Fault current
 - Device fault: < 3.6 mA
 - Input circuit wire break: 22.8 mA
 - Input circuit short-circuit: 22.4 mA
 - Input circuit drift: 22 mA (active when input 2 is active)
 - Input monitoring wire break and short-circuit
- No trimming of input and output (offset)
- Damping 0.0 s

Technical specifications

SITRANS TR420 (HART, universal)

General	
Supply voltage ^{1) 2)}	
• Without explosion protection (non-Ex)	7.5 ... 48 V DC
• With explosion protection (Ex i)	7.5 ... 30 V DC
Additional minimum supply voltage when using test terminals	0.8 V
Maximum power loss	≤ 850 mW
Minimum load resistance at supply voltage > 37 V	$(V_{\text{supply}} - 37 \text{ V})/23 \text{ mA}$
Insulation voltage, test/operation	
• Without explosion protection (non-Ex)	2.5 kV AC/55 V AC
• With explosion protection (Ex i)	2.5 kV AC/42 V AC
Polarity protection	All inputs and outputs
Write protection	Wire jumpers or software
Warm-up time	< 5 min
Starting time	< 2.75 s
Programming	SIPROM T and HART
Signal-to-noise ratio	> 60 dB
Long-term stability	Better than: <ul style="list-style-type: none"> • ± 0.05% of measuring span/year • ± 0.18% of measuring span/5 years
Response time	≤ 75 ms (typically 70 ms)
Programmable damping	0 ... 60 s
Signal dynamic	
• Input	24 bit
• Output	18 bit
Influence of change in supply voltage	< 0.005% of measuring span/V DC
Input	
<u>Resistance thermometer (RTD)</u>	
Input type	
• Pt10 ... 10000	<ul style="list-style-type: none"> • IEC 60751 • JIS C 1604-8 • GOST 6651_2009 • Callendar-Van Dusen
• Ni10 ... 10000	<ul style="list-style-type: none"> • DIN 43760-1987 • GOST 6651-2009/OIML R84:2003
• Cu5 ... 1000	<ul style="list-style-type: none"> • Edison Copper Winding No. 15 • GOST 6651-2009/OIML R84:2003
Connection type	2-wire, 3-wire or 4-wire
Wire resistance per wire	Max. 50 Ω
Input current	< 0.15 mA
Effect of the wire resistance (with 3-wire and 4-wire connections)	< 0.002 Ω/Ω
Cable, wire-wire capacity	
• Pt1000, Pt10000 (IEC 60751 and JIS C 1604-8)	Max. 30 nF
• All other input types	Max. 50 nF
Fault detection, programmable	None, short-circuited, defective, short-circuited or defective Note When the low limit for the configured input type is below the constant detection limit for short-circuited inputs, the detection of short circuits is disabled regardless of the configuration of the fault detection.
Detection limit for short-circuited input	15 Ω
Fault detection time (RTD)	≤ 75 ms (typically 70 ms)
Fault detection time (for 3-wire and 4-wire)	≤ 2 000 ms
<u>Thermocouples (TC)</u>	

Temperature Measurement

Temperature transmitters

Rail transmitters / SITRANS TR420 (HART, universal)

Technical specifications (continued)

SITRANS TR420 (HART, universal)	
Input type	
• B	IEC 60584-1
• E	IEC 60584-1
• J	IEC 60584-1
• K	IEC 60584-1
• L	DIN 43710
• Lr	GOST 3044-84
• N	IEC 60584-1
• R	IEC 60584-1
• S	IEC 60584-1
• T	IEC 60584-1
• U	DIN 43710
• W3	ASTM E988-96
• W5	ASTM E988-96
• LR	GOST 3044-84
Cold Junction Compensation (CJC)	Constant, internal or external over Pt100 or Ni100 RTD
• Temperature range internal CJC	-50 ... +100 °C (-58 ... +212 °F)
• Connection external CJC	2-wire, 3-wire or 4-wire
• External CJC, wire resistance per wire (for 3-wire and 4-wire connections)	50 Ω
• Effect of the wire resistance (with 3-wire and 4-wire connections)	< 0.002 Ω/Ω
• Input current external CJC	< 0.15 mA
• Temperature range external CJC	-50 ... +135 °C (-58 ... +275 °F)
• Cable, wire-wire capacity	Max. 50 nF
• Total wire resistance	Max. 10 kΩ
• Fault detection, programmable	None, short-circuited, defective, short-circuited or defective Note The short-circuited fault detection only applies to the CJC input.
• Fault detection time (TC)	≤ 75 ms (typically 70 ms)
• Fault detection time, external CJC (for 3-wire and 4-wire)	≤ 2 000 ms
Linear resistance	
Input range	0 ... 100 kΩ
Minimum measuring span	25 Ω
Connection type	2-wire, 3-wire or 4-wire
Wire resistance per wire	Max. 50 Ω
Input current	< 0.15 mA
Effect of the wire resistance (with 3-wire and 4-wire connections)	< 0.002 Ω/Ω
Cable, wire-wire capacity	
• R > 400 Ω	Max. 30 nF
• R ≤ 400 Ω	Max. 50 nF
Fault detection, programmable	None, defective
Potentiometers	
Input range	10 ... 100 kΩ
Minimum measuring span	25 Ω
Connection type	3-wire, 4-wire or 5-wire
Wire resistance per wire	Max. 50 Ω
Input current	< 0.15 mA
Effect of the wire resistance (with 4-wire and 5-wire connections)	< 0.002 Ω/Ω
Cable, wire-wire capacity	
• R > 400 Ω	Max. 30 nF
• R ≤ 400 Ω	Max. 50 nF

Technical specifications (continued)

SITRANS TR420 (HART, universal)	
Fault detection, programmable	None, short-circuited, defective, short-circuited or defective Note When the configured potentiometer size is below the constant detection limit for short-circuited inputs, the detection of short circuits is disabled regardless of the configuration of the fault detection.
Detection limit for short-circuited input	15 Ω
Fault detection time, wiper arm (no short-circuit detection)	≤ 75 ms (typically 70 ms)
Fault detection time, element	≤ 2 000 ms
Fault detection time (for 4-wire and 5-wire)	≤ 2 000 ms
<u>Voltage input</u>	
Measuring range	
• Unipolar	-100 ... 1700 mV
• Bipolar	-800 ... +800 mV
Minimum measuring span	2.5 mV
Input resistance	10 MΩ
Cable, wire-wire capacity	
• Input range: -100 ... 1700 mV	Max. 30 nF
• Input range: -20 ... 100 mV	Max. 50 nF
Fault detection, programmable	None, defective
Fault detection time	≤ 75 ms (typically 70 ms)
Output and HART communication	
Normal range, programmable	3.8 ... 20.5 mA/20.5 ... 3.8 mA
Extended range (output limits), programmable	3.5 ... 23 mA/23 ... 3.5 mA
Programmable input/output limits	
• Fault current	Enable/disable
• Fault current setting	3.5 ... 23 mA
Update time	10 ms
Load (with current output)	≤ (V _{Supply} - 7.5)/0.023 Ω
Load stability	< 0.01% of measuring span/100 Ω (measuring span = currently selected range)
Input fault detection, programmable (detection of input short-circuits is ignored with TC and voltage inputs)	3.5 ... 23 mA
NAMUR NE43 Upscale	> 21 mA
NAMUR NE43 Downscale	< 3.6 mA
HART protocol versions	HART 7
Measuring accuracy	
Input accuracy	See "Input accuracy" table
Output accuracy	See "Output accuracy" table
Operating conditions	
Ambient temperature	-50 ... +85 °C (-58 ... +185 °F)
Ambient temperature for devices with functional safety	-40 ... +80 °C (-40 ... +176 °F)
Storage temperature	-50 ... +85 °C (-58 ... +185 °F)
Reference temperature for sensor calibration	24 °C ±1.0 °C (75.2 °F ±1.8 °F)
Relative humidity	< 99% (no condensation)
Degree of protection	
• Transmitter enclosure	IP20
• Terminals	IP20
Structural design	
Weight	122 g (0.27 lb)
Maximum core cross-section	2.5 mm ² (AWG 13)
Tightening torque for clamping screws	0.5 ... 0.6 Nm
Vibrations	
• 2 ... 25 Hz	± 1.6 mm (0.07 inches)
• 25 ... 100 Hz	± 4 g

Temperature Measurement

Temperature transmitters

Rail transmitters / SITRANS TR420 (HART, universal)

Technical specifications (continued)

SITRANS TR420 (HART, universal)	
Certificates and approvals	
<u>Explosion protection ATEX/IECEX and others</u>	
Certificates ³⁾	<ul style="list-style-type: none"> • DEKRA 17ATEX0116 X • IECEx DEK 17.0054X • A5E43700604A-2018X
"Intrinsic safety ia/ib" type of protection	For use in Zone 0, 1, 2, 20, 21, 22
• ATEX	<ul style="list-style-type: none"> • II 1 G Ex ia IIC T6 ... T4 Ga • II 2(1) G Ex ib [ia Ga] IIC T6 ... T4 Gb • II 2 D Ex ia IIIC Db • I M1 Ex ia I Ma
• IECEx and others	<ul style="list-style-type: none"> • Ex ia IIC T6 ... T4 Ga • Ex ib [ia Ga] IIC T6 ... T4 Gb • Ex ia IIIC Db • Ex ia I Ma
"Intrinsic safety ic" type of protection	For use in Zones 2 and 22
• ATEX	<ul style="list-style-type: none"> • II 3 G Ex ic IIC T6...T4 Gc • II 3 D Ex ic IIIC Dc
• IECEx and others	<ul style="list-style-type: none"> • Ex ic IIC T6 ... T4 Gc • Ex ic IIIC Dc
"Non-sparking/increased safety nA/lec" type of protection	For use in Zones 2 and 22
• ATEX	<ul style="list-style-type: none"> • II 3 G Ex nA IIC T6...T4 Gc • II 3 G Ex ec IIC T6...T4 Gc
• IECEx and others	<ul style="list-style-type: none"> • Ex nA IIC T6 ... T4 Gc • Ex ec IIC T6 ... T4 Gc
<u>Explosion protection CSA/FM for Canada and USA</u>	
Certificates	<ul style="list-style-type: none"> • CSA 1861385 • FM18CA0024 • FM18US0046
"Intrinsic safety ia" type of protection	<ul style="list-style-type: none"> • IS, CL I, Div 1, GP ABCD, T6 ... T4 • Ex ia IIC T6 ... T4 Ga, AEx ia IIC T6 ... T4 Ga or Ex ib [ia Ga] IIC T6...T4 Gb, AEx ib [ia Ga] IIC T6...T4 Gb
"Non incandive field wiring NIFW" type of protection	NIFW, CL I, Div 2, GP ABCD T6 ... T4
"Non incandive NI" type of protection	<ul style="list-style-type: none"> • NI, CL I, Div 2, GP ABCD T6...T4 • Ex nA IIC T6 ... T4 Gc • AEx nA IIC T6 ... T4 Gc

1) Note that the minimum supply voltage must correspond to the value measured at the terminals of the SITRANS TR420. All external voltage drops must be taken into account.

2) Protect the device from overvoltage with the help of a suitable power supply or suitable overvoltage protection equipment.

3) Additional available certificates are listed on the internet at <http://www.siemens.com/processinstrumentation/certificates>

Technical specifications (continued)

Measuring ranges/Minimum measuring span

RTD

Input type	Standard	Measuring range in °C (°F)	α_0 in °C ⁻¹ (°F ⁻¹)	Minimum measuring span in °C (°F)
Pt10 ... 10000	IEC 60751	-200 ... +850 (-328 ... +1 562)	0.003851 (0.002139)	10 (50)
	JIS C 1604-8	-200 ... +649 (-328 ... +1 200)	0.003916 (0.002176)	10 (50)
	GOST 6651_2009	-200 ... +850 (-328 ... +1 562)	0.003910 (0.002172)	10 (50)
	Callendar-Van Dusen	-200 ... +850 (-328 ... +1 562)	-	10 (50)
Ni10 ... 10000	DIN 43760-1987	-60 ... +250 (-76 ... +482)	0.006180 (0.003433)	10 (50)
	GOST 6651-2009/OIML R84:2-003	-60 ... +180 (-76 ... +356)	0.006170 (0.003428)	10 (50)
Cu5 ... 1000	Edison Copper Winding No. 15	-200 ... +260 (-328 ... +500)	0.004270 (0.002372)	100 (212)
	GOST 6651-2009/OIML - R84:2003	-180 ... +200 (-292 ... +392)	0.004280 (0.002378)	100 (212)
	GOST 6651-94	-50 ... +200 (-58 ... +392)	0.004260 (0.002367)	100 (212)

TC

Input type	Standard	Measuring range in °C (°F)	Minimum measuring span in °C (°F)
B	IEC 60584-1	0 (85) ... 1 820 (32 (185) ... 3 308)	100 (212)
E	IEC 60584-1	-200 ... +1 000 (-392 ... +1 832)	50 (122)
J	IEC 60584-1	-100 ... +1 200 (-212 ... +2 192)	50 (122)
K	IEC 60584-1	-180 ... +1 372 (-356 ... +2 502)	50 (122)
L	DIN 43710	-200 ... +900 (-392 ... +1 652)	50 (122)
Lr	GOST 3044-84	-200 ... +800 (-392 ... +1 472)	50 (122)
N	IEC 60584-1	-180 ... +1 300 (-356 ... +2 372)	50 (122)
R	IEC 60584-1	-50 ... +1 760 (-122 ... +3 200)	100 (212)
S	IEC 60584-1	-50 ... +1 760 (-122 ... +3 200)	100 (212)
T	IEC 60584-1	-200 ... +400 (-392 ... +752)	50 (122)
U	DIN 43710	-200 ... +600 (-392 ... +1 112)	50 (122)
W3	ASTM E988-96	0 ... 2 300 (32 ... 4 172)	100 (212)
W5	ASTM E988-96	0 ... 2 300 (32 ... 4 172)	100 (212)
LR	GOST 3044-84	-200 ... +800 (-392 ... +1472)	50 (122)

Input accuracy

Basic values

Input type	Basic accuracy	Temperature coefficient ¹⁾
RTD		
Pt10	≤ ±0.8 °C (1.44 °F)	≤ ±0.020 °C/°C (°F/°F)
Pt20	≤ ±0.4 °C (0.72 °F)	≤ ±0.010 °C/°C (°F/°F)
Pt50	≤ ±0.16 °C (0.288 °F)	≤ ±0.004 °C/°C (°F/°F)
Pt100	≤ ±0.04 °C (0.072 °F)	≤ ±0.002 °C/°C (°F/°F)
Pt200	≤ ±0.08 °C (0.144 °F)	≤ ±0.002 °C/°C (°F/°F)
Pt500	$T_{max.} < 180 \text{ °C (356 °F)} = \leq \pm 0.08 \text{ °C (0.144 °F)}$ $T_{max.} > 180 \text{ °C (356 °F)} = \leq \pm 0.16 \text{ °C (0.288 °F)}$	≤ ±0.002 °C/°C (°F/°F)
Pt1000	≤ ±0.08 °C (0.144 °F)	≤ ±0.002 °C/°C (°F/°F)
Pt2000	$T_{max.} < 300 \text{ °C (572 °F)} = \leq \pm 0.08 \text{ °C (0.144 °F)}$ $T_{max.} > 300 \text{ °C (572 °F)} = \leq \pm 0.4 \text{ °C (0.72 °F)}$	≤ ±0.002 °C/°C (°F/°F)
Pt10000	≤ ±0.16 °C (0.288 °F)	≤ ±0.002 °C/°C (°F/°F)
Pt x	Largest tolerance of neighboring points	Largest temperature coefficient of neighboring points
Ni10	≤ ±1.6 °C (2.88 °F)	≤ ±0.020 °C/°C (°F/°F)

Temperature Measurement

Temperature transmitters

Rail transmitters / SITRANS TR420 (HART, universal)

Technical specifications (continued)

Input type	Basic accuracy	Temperature coefficient ¹⁾
Ni20	≤ ±0.8 °C (1.44 °F)	≤ ±0.010 °C/°C (°F/°F)
Ni50	≤ ±0.32 °C (0.576 °F)	≤ ±0.004 °C/°C (°F/°F)
Ni100	≤ ±0.16 °C (0.288 °F)	≤ ±0.002 °C/°C (°F/°F)
Ni120	≤ ±0.16 °C (0.288 °F)	≤ ±0.002 °C/°C (°F/°F)
Ni200	≤ ±0.16 °C (0.288 °F)	≤ ±0.002 °C/°C (°F/°F)
Ni500	≤ ±0.16 °C (0.288 °F)	≤ ±0.002 °C/°C (°F/°F)
Ni1000	≤ ±0.16 °C (0.288 °F)	≤ ±0.002 °C/°C (°F/°F)
Ni2000	≤ ±0.16 °C (0.288 °F)	≤ ±0.002 °C/°C (°F/°F)
Ni10000	≤ ±0.32 °C (0.576 °F)	≤ ±0.002 °C/°C (°F/°F)
Ni x	Largest tolerance of neighboring points	Largest temperature coefficient of neighboring points
Cu5	≤ ±1.6 °C (2.88 °F)	≤ ±0.040 °C/°C (°F/°F)
Cu10	≤ ±0.8 °C (1.44 °F)	≤ ±0.020 °C/°C (°F/°F)
Cu20	≤ ±0.4 °C (0.72 °F)	≤ ±0.010 °C/°C (°F/°F)
Cu50	≤ ±0.16 °C (0.288 °F)	≤ ±0.004 °C/°C (°F/°F)
Cu100	≤ ±0.08 °C (0.144 °F)	≤ ±0.002 °C/°C (°F/°F)
Cu200	≤ ±0.08 °C (0.144 °F)	≤ ±0.002 °C/°C (°F/°F)
Cu500	≤ ±0.16 °C (0.288 °F)	≤ ±0.002 °C/°C (°F/°F)
Cu1000	≤ ±0.08 °C (0.144 °F)	≤ ±0.002 °C/°C (°F/°F)
Cu x	Largest tolerance of neighboring points	Largest temperature coefficient of neighboring points
Linear resistance		
0 ... 400 Ω	≤ ±40 mΩ	≤ ±2 mΩ/°C (1.11 mΩ/°F)
0 ... 100 kΩ	≤ ±4 Ω	≤ ±0.2 Ω/°C (0.11 Ω/°F)
Potentiometers		
0 ... 100%	< 0.05%	< ± 0.005%
Voltage input		
mV: -20 ... 100 mV	≤ ±5 μV	≤ ±0.2 μV/°C (0.11 μV/°F)
mV: -100 ... 1700 mV	≤ ±0.1 mV	≤ ±36 μV/°C (20 μV/°F)
mV: ± 800 mV	≤ ±0.1 mV	≤ ±32 μV/°C (17.8 μV/°F)
TC		
E	≤ ±0.2 °C (0.36 °F)	≤ ±0.025 °C/°C (°F/°F)
J	≤ ±0.25 °C (0.45 °F)	≤ ±0.025 °C/°C (°F/°F)
K	≤ ±0.25 °C (0.45 °F)	≤ ±0.025 °C/°C (°F/°F)
L	≤ ±0.35 °C (0.63 °F)	≤ ±0.025 °C/°C (°F/°F)
N	≤ ±0.4 °C (0.72 °F)	≤ ±0.025 °C/°C (°F/°F)
T	≤ ±0.25 °C (0.45 °F)	≤ ±0.025 °C/°C (°F/°F)
U	< 0 °C (32 °F) ≤ ±0.8 °C (1.44 °F) ≥ 0 °C (32 °F) ≤ ±0.4 °C (0.72 °F)	≤ ±0.025 °C/°C (°F/°F)
Lr	≤ ±0.2 °C (0.36 °F)	≤ ±0.1 °C/°C (°F/°F)
R	< 200 °C (392 °F) ≤ ±0.5 °C (0.9 °F) ≥ 200 °C (392 °F) ≤ ±1 °C (1.8 °F)	≤ ±0.1 °C/°C (°F/°F)
S	< 200 °C (392 °F) ≤ ±0.5 °C (0.9 °F) ≥ 200 °C (392 °F) ≤ ±1 °C (1.8 °F)	≤ ±0.1 °C/°C (°F/°F)
W3	≤ ±0.6 °C (1.08 °F)	≤ ±0.1 °C/°C (°F/°F)
W5	≤ ±0.4 °C (0.72 °F)	≤ ±0.1 °C/°C (°F/°F)
B ²⁾	≤ ±1 °C (1.8 °F)	≤ ±0.1 °C/°C (°F/°F)
B ³⁾	≤ ±3 °C (5.4 °F)	≤ ±0.1 °C/°C (°F/°F)
B ⁴⁾	≤ ±8 °C (14.4 °F)	≤ ±0.8 °C/°C (°F/°F)
B ⁵⁾	Not specified	Not specified
CJC (internal)	< ±0.5 °C (0.9 °F)	Included in basic accuracy
CJC (external)	≤ ±0.08 °C (0.144 °F)	≤ ±0.002 °C/°C (°F/°F)

1) Temperature coefficients correspond to the specified values or 0.002% of the input span, depending on which value is greater.

2) Accuracy of the specification range > 400 °C (752 °F)

3) Accuracy of the specification range > 160 °C (320 °F) < 400 °C (752 °F)

4) Accuracy of the specification range > 85 °C (185 °F) < 160 °C (320 °F)

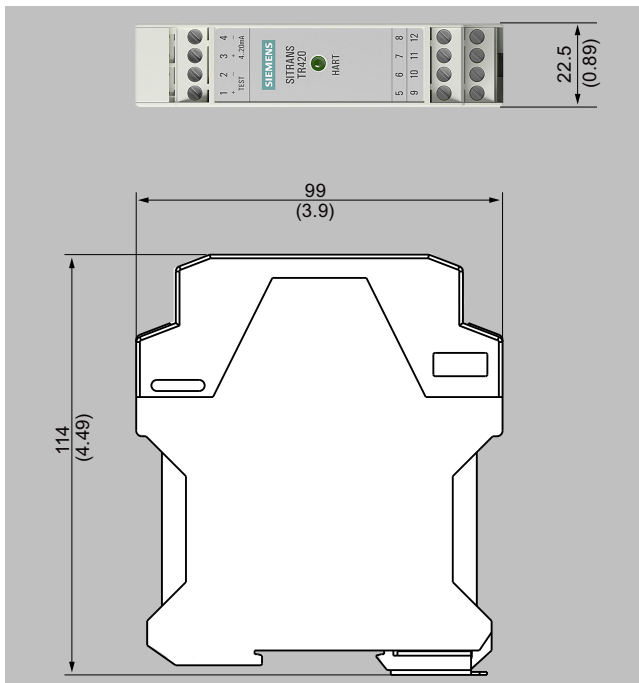
5) Accuracy of the specification range < 85 °C (185 °F)

Technical specifications (continued)

Output accuracy

Output type	Basic accuracy	Temperature coefficient
Average value measurement	Average of accuracy of input 1 and input 2	Average of temperature coefficient of input 1 and input 2
Differential measurement	Sum of accuracy of input 1 and input 2	Sum of temperature coefficient of input 1 and input 2
Analog output	$\leq \pm 1.6 \mu\text{A}$ (0.01% of the full output span)	$\leq \pm 0.48 \mu\text{A/K}$ ($\leq \pm 0.003\%$ of the full output span/K)

Dimensional drawings



SITRANS TR420, dimensions in mm (inch)

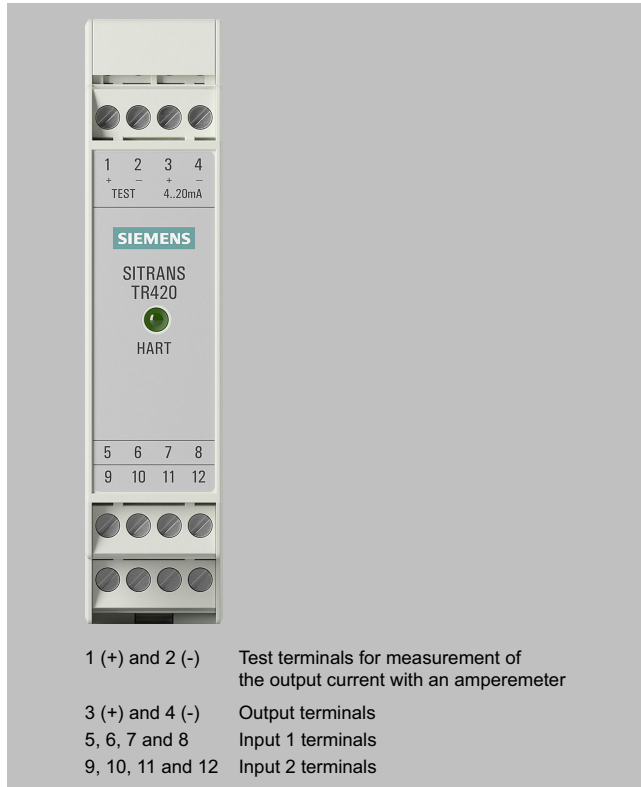
Temperature Measurement

Temperature transmitters

Rail transmitters / SITRANS TR420 (HART, universal)

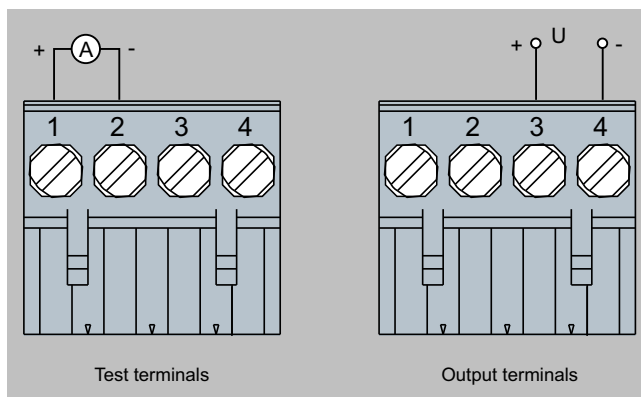
Circuit diagrams

Connections



SITRANS TR420, connector assignment

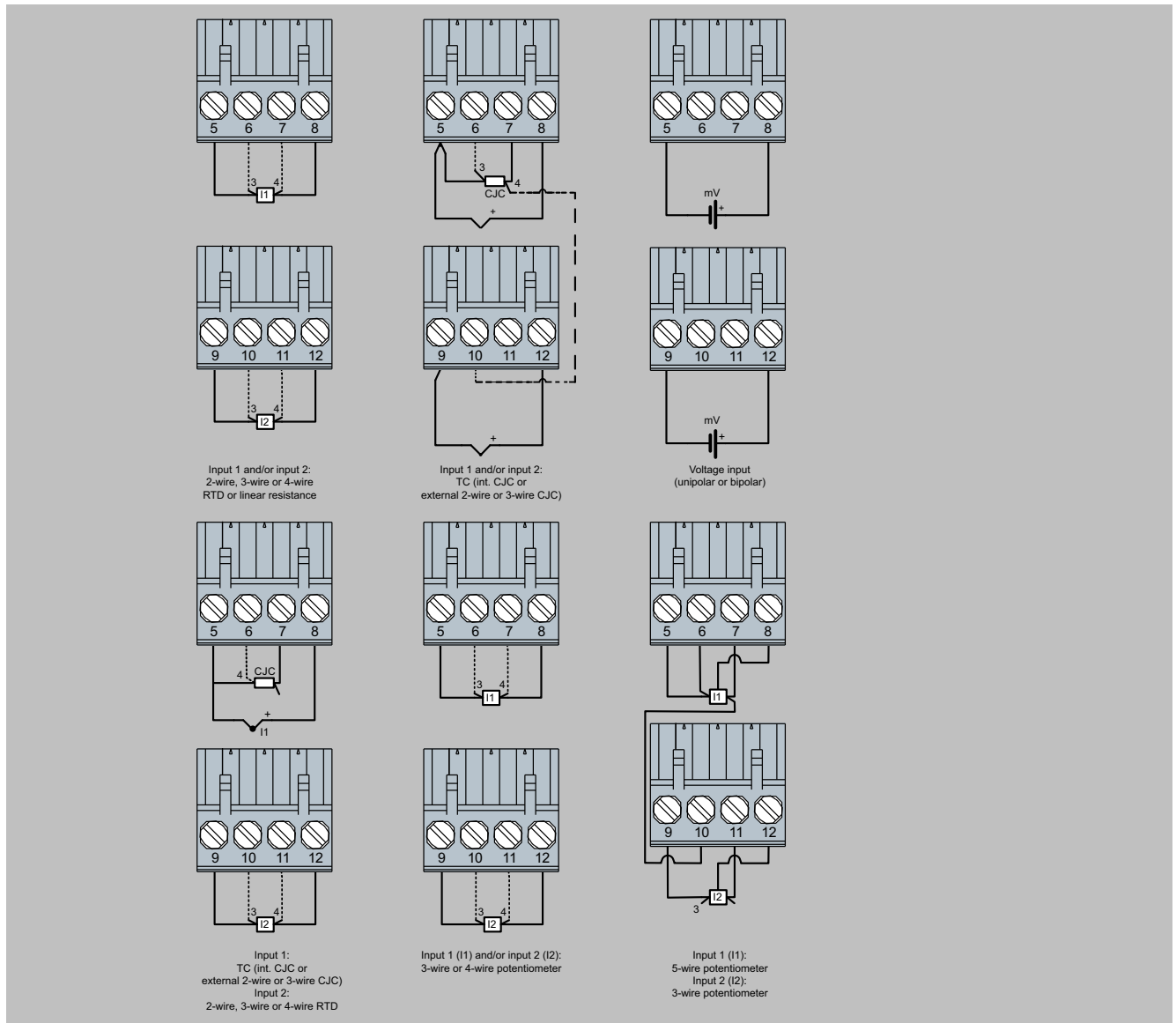
Output and test connection



SITRANS TR420, output connection assignment

Circuit diagrams (continued)

Input connection



SITRANS TR420, input connection assignment

Temperature Measurement

Temperature transmitters

Field transmitters/field indicator / SITRANS TF field transmitter

Overview



Our field devices for heavy industrial use

- HART, Universal
- 4 to 20 mA, universal

The temperature transmitter SITRANS TF works where others feel uncomfortable.

Benefits

- Universal use
 - as transmitter for resistance thermometer, thermocouple element, Ω or mV signal
 - as field indicator for any 4 to 20 mA signals
- Local sensing of measured values over digital display
- Rugged two-chamber enclosure in die-cast aluminum or stainless steel
- IP66/67/68 degree of protection
- Test terminals for direct read-out of the output signal without breaking the current loop
- Can be mounted elsewhere if the measuring point
 - is difficult to access
 - has high temperatures
 - experiences vibrations due to the process cell
 - is to avoid long neck pipes and thermowells
- Can be mounted directly on American-design sensors
- Wide range of approvals for use in potentially explosive atmospheres. Types of protection "Intrinsically safe, non-sparking and flameproof", for Europe and the USA.
- SIL2 (with order note C20), SIL2/3 (with C23)

Application

SITRANS TF can be used everywhere where temperatures need to be measured under particularly adverse conditions, or where a convenient local display is ideal. Which is why users from all industries have opted for this field device. The rugged enclosure protects the electronics. The stainless steel model is almost completely resistant to sea water and other aggressive substances. The inner workings offer high measuring accuracy, universal input and a wide range of diagnostic options.

Function

Configuration

The communication capability over the HART protocol V 5.9 of the SITRANS TF with an integrated SITRANS TH300 permits parameterization using a PC or HART communicator (hand-held communicator). The SIMATIC PDM makes it easy.

For the SITRANS TF with integrated programmable SITRANS TH200, parameters are assigned with the PC. Available for this purpose are a special modem and the software tool SIPROM T.

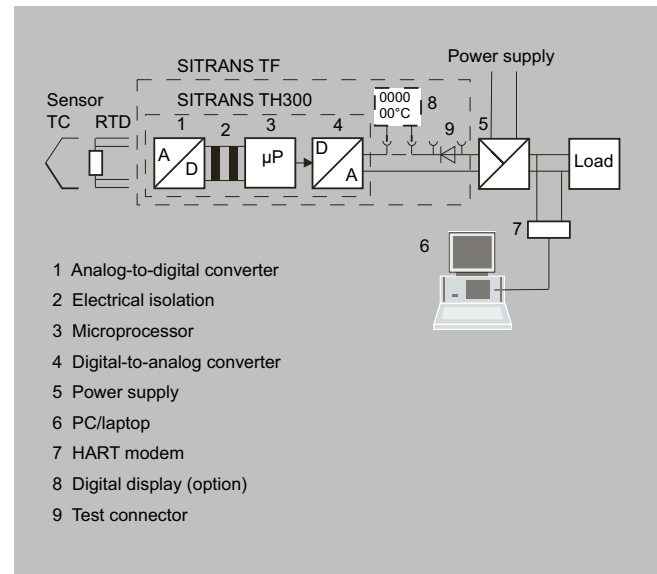
Mode of operation

Mode of operation of SITRANS TF as temperature transmitter

The sensor signal, whether resistance thermometer, thermocouple element or Ω or mV signal, is amplified and linearized. Sensor and output side are electrically isolated. An internal cold junction is integrated for measurements with thermocouples.

The device outputs a temperature-linear direct current from 4 to 20 mA. As well as the analog transmission of measured values from 4 to 20 mA, the HART version also supports digital communication for online diagnostics, measured value transmission and configuration.

SITRANS TF automatically detects when a sensor should be interrupted or is indicating a short-circuit. The practical test terminals allow direct measurement of 4 to 20 mA signals over an ammeter without interrupting the output current loop.



Mode of operation of SITRANS TF with integrated SITRANS TH300 and digital display

Temperature Measurement

Temperature transmitters

Field transmitters/field indicator / SITRANS TF field transmitter

Selection and ordering data

Temperature transmitter in field enclosure 2-wire system 4 ... 20 mA, with galvanic isolation		Article No. 7NG313				
Click the article number for online configuration in the PIA Life Cycle Portal.						
Built-in transmitter						
SITRANS TH200, programmable						
• Without Ex protection				5	0	
• With Ex ia (ATEX)				5	1	
• With Ex nAL for Zone 2 (ATEX)				5	2	
• Total device SITRANS TF Ex d (ATEX) ¹⁾				5	4	
• Total device SITRANS TF acc. to FM (XP, DIP, NI, S) ¹⁾				5	5	
SITRANS TH300, communication-capable according to HART V 5.9						
• Without Ex protection				6	0	
• With Ex ia (ATEX)				6	1	
• With Ex nAL for Zone 2 (ATEX)				6	2	
• Total device SITRANS TF Ex d (ATEX) ¹⁾				6	4	
• Total device SITRANS TF acc. to FM (XP, DIP, NI, S) ¹⁾				6	5	
Enclosure						
Die-cast aluminum						
Stainless steel precision casting						
Connections/cable entry						
Screw glands M20×1.5						
Screw glands ½-14 NPT						
Digital indicator						
None						
With						
Mounting bracket and fastening parts						
None						
Made of steel						
Made of stainless steel						

¹⁾ Without cable gland.

Options	Order code
Add "-Z" to article number, specify order code and, if applicable, plain text	
Test report (5 measuring points)	C11
Functional safety SIL2	C20
Functional safety SIL2/3	C23
Explosion protection	
• Explosion protection Ex i according to NEPSI (China) (only for 7NG313.-1...)	E55 ¹⁾
• Explosion protection Ex d according to NEPSI (China) (only for 7NG313.-4...)	E56 ¹⁾
• Explosion protection Ex nA according to NEPSI (China) (only for 7NG313.-2...)	E57 ¹⁾
• Explosion protection Ex d according to KOSHA (Korea) (only for 7NG313.-4...)	E70 ¹⁾
Marine approvals	
• Det Norske Veritas Germanischer Lloyd (DNV GL)	D01
Two-layer coating of enclosure and lid (PU on epoxy)	G10
Transient protection	J01
Cable gland CAPRI ½ NPT ADE 4F, nickel-plated brass (CAPRI 848694 and 810634) included	D57
Cable gland ½ NPT ADE 1F, cable diameter 6 ... 12 (CAPRI 818694 and 810534) flexible	D58
Cable gland ½ NPT ADE 4F, stainless steel (CAPRI 848699 and 810634) included	D59

Temperature Measurement

Temperature transmitters

Field transmitters/field indicator / SITRANS TF field transmitter

Selection and ordering data (continued)

Options Add "-Z" to article number, specify order code and, if applicable, plain text	Order code
Cable gland ½ NPT ADE 1F, cable diameter 4 ... 8.5 (CAPRI 818674 and 810534) flexible	D60
Customer-specific programming	
Measuring range to be set Specify in plain text (max. 5 digits): Y01: ... to ... °C, °F	Y01 ²⁾
Measuring point number (TAG) max. 8 characters	Y17 ³⁾
Measuring point description, max. 16 characters	Y23 ⁴⁾
Measuring point description, max. 32 characters	Y24 ⁴⁾
Labeling of measuring point plate only, specify in plain text: Measuring range	Y22 ⁴⁾
Pt100 (IEC) 2-wire, R _L = 0 Ω	U02 ⁵⁾
Pt100 (IEC) 3-wire	U03 ⁵⁾
Pt100 (IEC) 4-wire	U04 ⁵⁾
Type B thermocouple	U20 ⁵⁾⁶⁾
Type C thermocouple (W5)	U21 ⁵⁾⁶⁾
Type D thermocouple (W3) ⁵⁾⁶⁾	U22 ⁵⁾⁶⁾
Type E thermocouple	U23 ⁵⁾⁶⁾
Type J thermocouple	U24 ⁵⁾⁶⁾
Type K thermocouple	U25 ⁵⁾⁶⁾
Type L thermocouple	U26 ⁵⁾⁶⁾
Type N thermocouple	U27 ⁵⁾⁶⁾
Type R thermocouple	U28 ⁵⁾⁶⁾
Type S thermocouple	U29 ⁵⁾⁶⁾
Type T thermocouple	U30 ⁵⁾⁶⁾
Type U thermocouple	U31 ⁵⁾⁶⁾
For TC: Cold junction compensation: external (Pt100, 3-wire)	U41
For TC: Cold junction compensation: external with fixed value: Specify in plain text	Y50
Enter special deviating customer-specific setting in plain text	Y09 ⁷⁾
Fault current 3.6 mA (instead of 22.8 mA)	U36 ³⁾

1) Option does not include ATEX/IECEx approval, only country-specific approval.

2) For customer-specific programming for RTD and TC, the start value and the end value of the required measuring span must be specified here. For specification on TAG plate, please select Y22.

3) For this selection, Y01 or Y09 must also be selected. For specification on TAG plate, please select Y23.

4) If only Y22, Y23 or Y24 is ordered and if the labeling is only noted on the measuring point plate, do not specify Y01.

5) For this selection, Y01 must also be selected.

6) Internal cold junction compensation is selected as the default for TC.

7) For customer-specific programming, for example mV and ohm, the start value and the end value of the required measuring span and the unit must be entered here.

Accessories

	Article No.
See section "Other accessories for assembly, connection and transmitter configuration"	
Modems	
HART modem with USB interface	7MF4997-1DB
Modem with USB interface and SIPROM T software	7NG3092-8KN
SIMATIC PDM parameterization software Also for SITRANS TH300	See section 8
Mounting bracket and fastening parts	
Made of steel for 7NG313.-.B..	7MF4997-1AC
Made of steel for 7NG313.-.C..	7MF4997-1AB

Selection and ordering data (continued)

	Article No.
Made of stainless steel for 7NG313-...B..	7MF4997-1AJ
Made of stainless steel for 7NG313-...C..	7MF4997-1AH
Made of stainless steel 316L for 7NG313-...B..	7MF4997-1AQ
Made of stainless steel 316L for 7NG313-...C..	7MF4997-1AP
Digital display¹⁾	7MF4997-1BS
Connection board	A5E02226423
For supply units, see Catalog FI 01 section "Supplementary components".	

¹⁾ Retrofitting not possible with Ex devices.

Ordering example 1

7NG3135-0AB11-Z Y01+Y23+U03
 Y01: -10 ... +100 °C
 Y23: TICA1234HEAT

Ordering example 2

7NG3136-0AC11-Z Y01+Y23+Y24+U25
 Y01: -10 ... +100 °C
 Y23: TICA 1234 ABC
 Y24: Heating Boiler 56789

Factory setting of the transmitter

- Pt100 (IEC 751); 3-wire connection
- Measuring range: 0 ... 100 °C (32 ... 212 °F)
- Fault current 22.8 mA
- Sensor offset: 0 °C (0 °F)
- Damping 0.0 s

Temperature Measurement

Temperature transmitters

Field transmitters/field indicator / SITRANS TF field transmitter

Technical specifications

SITRANS TF, field transmitter	
Input	
<u>Resistance thermometer</u>	
Measured variable	Temperature
Input type	
• According to IEC 60751	Pt25 ... Pt1000
• According to JIS C 1604; $\alpha=0.00392$ K-1	Pt25 ... Pt1000
• According to IEC 60751	Ni25 ... Ni1000
Units	°C and °F
Connection	
• Standard connection	1 resistance thermometer (RTD) in 2-wire, 3-wire or 4-wire connection
• Averaging	Series or parallel connection of several resistance thermometers in the 2-wire connection for the generation of average temperatures or for adaptation to other device types
• Differentiation	2 resistance thermometers (RTD) in 2-wire connection (RTD 1 – RTD 2 or RTD 2 – RTD 1)
Connection	
• 2-wire connection	Wire resistance can be configured $\leq 100 \Omega$ (loop resistance)
• 3-wire connection	No trim necessary
• 4-wire connection	No trim necessary
Sensor current	≤ 0.45 mA
Response time	≤ 250 ms for 1 sensor with break monitoring
Break monitoring	Always active (cannot be switched off)
Short-circuit monitoring	Can be switched on/off (default value: ON)
Measuring range	Assignable (see "Digital measuring error" table)
Min. measuring span	10 °C (18 °F)
Characteristic curve	Temperature-linear or special characteristic curve
<u>Resistance-based sensor</u>	
Measured variable	Ohmic resistance
Sensor type	Resistance-based, potentiometers
Units	Ω
Connection	
• Standard connection	1 resistance-based sensor (R) in 2-wire, 3-wire or 4-wire connection
• Averaging	2 resistance-based sensors in 2-wire connection for averaging
• Differentiation	2 resistance-based sensors in 2-wire connection (R 1 – R 2 or R 2 – R 1)
Connection	
• 2-wire connection	Wire resistance can be configured $\leq 100 \Omega$ (loop resistance)
• 3-wire connection	No trim necessary
• 4-wire connection	No trim necessary
Sensor current	≤ 0.45 mA
Response time	≤ 250 ms for 1 sensor with break monitoring
Break monitoring	Can be switched off
Short-circuit monitoring	Can be switched off (value is adjustable)
Measuring range	Assignable max. 0 ... 2200 Ω (see "Digital measuring error" table)
Min. measuring span	5 ... 25 Ω (see "Digital measuring error" table)
Characteristic curve	Resistance-linear or special characteristic curve
<u>Thermocouples</u>	
Measured variable	Temperature
Sensor type (thermocouples)	

Technical specifications (continued)

SITRANS TF, field transmitter	
• Type B	Pt30Rh-Pt6Rh acc. to IEC 584
• Type C	W5%-Re acc. to ASTM 988
• Type D	W3%-Re acc. to ASTM 988
• Type E	NiCr-CuNi acc. to IEC 584
• Type J	Fe-CuNi acc. to IEC 584
• Type K	NiCr-Ni acc. to IEC 584
• Type L	Fe-CuNi acc. to DIN 43710
• Type N	NiCrSi-NiSi acc. to IEC 584
• Type R	Pt13Rh-Pt acc. to IEC 584
• Type S	Pt10Rh-Pt acc. to IEC 584
• Type T	Cu-CuNi acc. to IEC 584
• Type U	Cu-CuNi acc. to DIN 43710
Units	°C or °F
Connection	
• Standard connection	1 thermocouple (TC)
• Averaging	2 thermocouples (TC)
• Differentiation	2 thermocouples (TC) (TC 1 – TC 2 or TC 2 – TC 1)
Response time	≤ 250 ms for 1 sensor with break monitoring
Break monitoring	Can be switched off
Cold junction compensation	
• Internal	With integrated Pt100 resistance thermometer
• External	With external Pt100 IEC 60751 (2-wire or 3-wire connection)
• External fixed	Reference junction temperature can be set as fixed value
Measuring range	Assignable (see "Digital measuring error" table)
Min. measuring span	Min. 40 ... 100 °C (72 ... 180 °F) (see "Digital measuring error" table)
Characteristic curve	Temperature-linear or special characteristic curve
<u>mV sensor</u>	
Measured variable	DC voltage
Sensor type	DC voltage source (DC voltage source possible over externally connected resistance)
Units	mV
Response time	≤ 250 ms for 1 sensor with break monitoring
Break monitoring	Can be switched off
Measuring range	<ul style="list-style-type: none"> • -10 ... +70 mV • -100 ... +1100 mV
Min. measuring span	2 mV or 20 mV
Overload capability of the input	-1.5 ... +3.5 V DC
Input resistance	≥ 1 MΩ
Characteristic curve	Voltage-linear or special characteristic curve
Output	
Output signal	4 ... 20 mA, 2-wire
Communication with SITRANS TH300	According to HART Rev. 5.9
Digital display	
Digital indicator (optional)	In current loop
Display	Max. 5 digits
Digit height	9 mm (0.35")
Display range	-99 999 ... +99 999
Units	Any (max. 5 char.)
Setting:	Using 3 buttons
Zero point, full-scale value and unit	
Load voltage	2.1 V

Temperature Measurement

Temperature transmitters

Field transmitters/field indicator / SITRANS TF field transmitter

Technical specifications (continued)

SITRANS TF, field transmitter	
Measuring accuracy	
Digital measuring error	See "Digital measuring error" table
Reference conditions	
• Auxiliary power	24 V ± 1%
• Load	500 Ω
• Ambient temperature	23 °C (73.4 °F)
• Warming-up time	> 5 min
Error in the analog output (digital/analog converter)	< 0.025% of measuring span
Error due to internal reference junction	< 0.5 °C (0.9 °F)
Effect of ambient temperature	
• Analog measuring error	0.02% of measuring span/10 °C (18 °F)
• Digital measuring error	
• With resistance thermometers	0.06 °C (0.11 °F)/10 °C (18 °F)
• With thermocouples	0.6 °C (1.1 °F)/10 °C (18 °F)
Auxiliary power effect	< 0.001% of measuring span/V
Effect of load impedance	< 0.002% of meas. span/100 Ω
Long-term drift	
• In the first month	< 0.02% of measuring span
• After one year	< 0.2% of measuring span
• After 5 years	< 0.3% of measuring span
Rated conditions	
Ambient conditions	
Ambient temperature	-40 ... +85 °C (-40 ... +185 °F)
Condensation	Permissible
Electromagnetic compatibility	According to EN 61326 and NAMUR NE21
Degree of protection acc. to EN 60529	IP66/67/68
Structural design	
Weight	Approx. 1.5 kg (3.3 lb) without options
Dimensions	See "Dimensional drawings"
Enclosure material	Die-cast aluminum, low in copper, GD-AISI 12 or stainless steel, polyester-based lacquer, stainless steel nameplate
Electrical connection, sensor connection	Screw terminals, cable entry via M20 x 1.5 or ½-14 NPT screw gland
Mounting bracket (optional)	Steel, zinc-plated and chrome-plated or stainless steel
Auxiliary power	
Without digital indicator	11 ... 35 V DC (30 V with Ex ib; 32 V with Ex ic and Ex nA)
With digital indicator	13.1 ... 35 V DC (30 V with Ex ib; 32 V with Ex ic and Ex nA)
Galvanic isolation	Between input and output
• Test voltage	$U_{rms} = 1 \text{ kV}$, 50 Hz, 1 min
Certificates and approvals	
ATEX explosion protection	
• "Intrinsic safety" type of protection	With digital indicator: <ul style="list-style-type: none"> • II 2 (1) G Ex ib [ia Ga] IIC T4 Gb • II 2 G Ex ib IIC T4 Gb • II 2 D Ex ia IIIC T100°C Db Without digital indicator: <ul style="list-style-type: none"> • II 2 (1) G Ex ib [ia Ga] IIC T6 Gb • II 2 G Ex ib IIC T6 Gb • II 2 D Ex ia IIIC T100°C Db
• EC type-examination certificate	ZELM 11 ATEX 0471 X
• "Non-sparking and energy-limited equipment for Zone 2" type of protection	<ul style="list-style-type: none"> • II 3 G Ex ic IIC T6/T4 Gc • II 3 G Ex nA IIC T6/T4 Gc • II 3 G Ex nA [ic] IIC T6/T4 Gc
• EC type-examination certificate	ZELM 11 ATEX 0471 X

Technical specifications (continued)

SITRANS TF, field transmitter	
<ul style="list-style-type: none"> • "Flameproof enclosure" type of protection • EC type-examination certificate Explosion protection acc. to FM • Identification (XP, DIP, NI, S) 	<ul style="list-style-type: none"> • II 2 G Ex d IIC T6/T5 Gb • II 2 D Ex tb IIIC T100 °C Db ZELM 11 ATEX 0472 X Certificate of Compliance 3017742 <ul style="list-style-type: none"> • XP/II/1/BCD/T5 Ta = 85 °C (185 °F), T6 Ta = 60 °C (140 °F), Type 4X • DIP/II, III/1/EFG/T5 Ta = 85 °C (185 °F), T6 Ta = 60 °C (140 °F), Type 4X • NI/II/2/ABCD/T5 Ta = 85 °C (185 °F), T6 Ta = 60 °C (140 °F), Type 4X • S/II, III/2/FG/T5 Ta = 85 °C (185 °F), T6 Ta = 60 °C (140 °F), Type 4X
Other certificates	EAC Ex, NEPSI, KOSHA
Hardware and software requirements	
<ul style="list-style-type: none"> • For the SIPROM T parameterization software for SITRANS TF with TH200 • Personal computer • PC operating system • For the SIMATIC PDM parameterization software for SITRANS TH300 	PC with CD-ROM drive and USB interface Windows 98, NT, 2000, XP, Win 7, 8 and 10 See "Digitalization and Communication" - "SIMATIC PDM"
Communication	
Load for HART connection	230 ... 1100 Ω
• Two-core shielded	≤ 3.0 km (1.86 miles)
• Multi-core shielded	≤ 1.5 km (0.93 mile)
Protocol	HART protocol, version 5.9

Factory setting of the transmitter:

- Pt100 (IEC 751); 3-wire connection
- Measuring range: 0 ... 100 °C (32 ... 212 °F)
- Fault current: 22.8 mA
- Sensor offset: 0 °C (0 °F)
- Damping 0.0 s

Digital measuring error

Resistance thermometer

Input	Measuring range		Minimum measuring span		Digital accuracy	
	°C	(°F)	°C	(°F)	°C	(°F)
According to IEC 60751						
Pt25	-200 ... +850	(-328 ... +1562)	10	(18)	0.3	(0.54)
Pt50	-200 ... +850	(-328 ... +1562)	10	(18)	0.15	(0.27)
Pt100 ... Pt200	-200 ... +850	(-328 ... +1562)	10	(18)	0.1	(0.18)
Pt500	-200 ... +850	(-328 ... +1562)	10	(18)	0.15	(0.27)
Pt1000	-200 ... +350	(-328 ... +662)	10	(18)	0.15	(0.27)
According to JIS C1604-81						
Pt25	-200 ... +649	(-328 ... +1200)	10	(18)	0.3	(0.54)
Pt50	-200 ... +649	(-328 ... +1200)	10	(18)	0.15	(0.27)
Pt100 ... Pt200	-200 ... +649	(-328 ... +1200)	10	(18)	0.1	(0.18)
Pt500	-200 ... +649	(-328 ... +1200)	10	(18)	0.15	(0.27)
Pt1000	-200 ... +350	(-328 ... +662)	10	(18)	0.15	(0.27)
Ni 25 ... Ni1000	-60 ... +250	(-76 ... +482)	10	(18)	0.1	(0.18)

Temperature Measurement

Temperature transmitters

Field transmitters/field indicator / SITRANS TF field transmitter

Technical specifications (continued)

Resistance-based sensor

Input	Measuring range Ω	Minimum measuring span Ω	Digital accuracy Ω
Resistance	0 ... 390	5	0.05
Resistance	0 ... 2200	25	0.25

Thermocouples

Input	Measuring range		Minimum measuring span		Digital accuracy	
	$^{\circ}\text{C}$	$^{\circ}\text{C}$ ($^{\circ}\text{F}$)	$^{\circ}\text{C}$	($^{\circ}\text{F}$)	$^{\circ}\text{C}$	($^{\circ}\text{F}$)
Type B	100 ... 1820	(212 ... 3308)	100	(180)	2 ¹⁾	(3.6) ¹⁾
Type C (W5)	0 ... 2300	(32 ... 4172)	100	(180)	2	3.6
Type D (W3)	0 ... 2300	(32 ... 4172)	100	(180)	1 ²⁾	(1.8) ²⁾
Type E	-200 ... +1000	(-328 ... +1832)	50	(90)	1	(1.8)
Type J	-200 ... +1200	(-328 ... +2192)	50	(90)	1	(1.8)
Type K	-200 ... +1370	(-328 ... +2498)	50	(90)	1	(1.8)
Type L	-200 ... +900	(-328 ... +1652)	50	(90)	1	(1.8)
Type N	-200 ... +1300	(-328 ... +2372)	50	(90)	1	(1.8)
Type R	-50 ... +1760	(-58 ... +3200)	100	(180)	2	(3.6)
Type S	-50 ... +1760	(-58 ... +3200)	100	(180)	2	(3.6)
Type T	-20 ... +400	(-328 ... +752)	40	(72)	1	(1.8)
Type U	-200 ... +600	(-328 ... +1112)	50	(90)	2	(3.6)

¹⁾ The digital accuracy in the range 100 to 300 $^{\circ}\text{C}$ (212 to 572 $^{\circ}\text{F}$) is 3 $^{\circ}\text{C}$ (5.4 $^{\circ}\text{F}$).

²⁾ The digital accuracy in the range 1750 to 2300 $^{\circ}\text{C}$ (3182 to 4172 $^{\circ}\text{F}$) is 2 $^{\circ}\text{C}$ (3.6 $^{\circ}\text{F}$).

mV sensor

Input	Measuring span mV	Minimum measuring span mV	Digital accuracy μV
mV sensor	-10 ... +70	2	40
mV sensor	-100 ... +1100	20	400

The digital accuracy is the accuracy after the analog/digital conversion including linearization and calculation of the measured value. An additional error is generated in the output current 4 to 20 mA as a result of the digital/analog conversion of 0.025% of the set measuring span (digital-analog error).

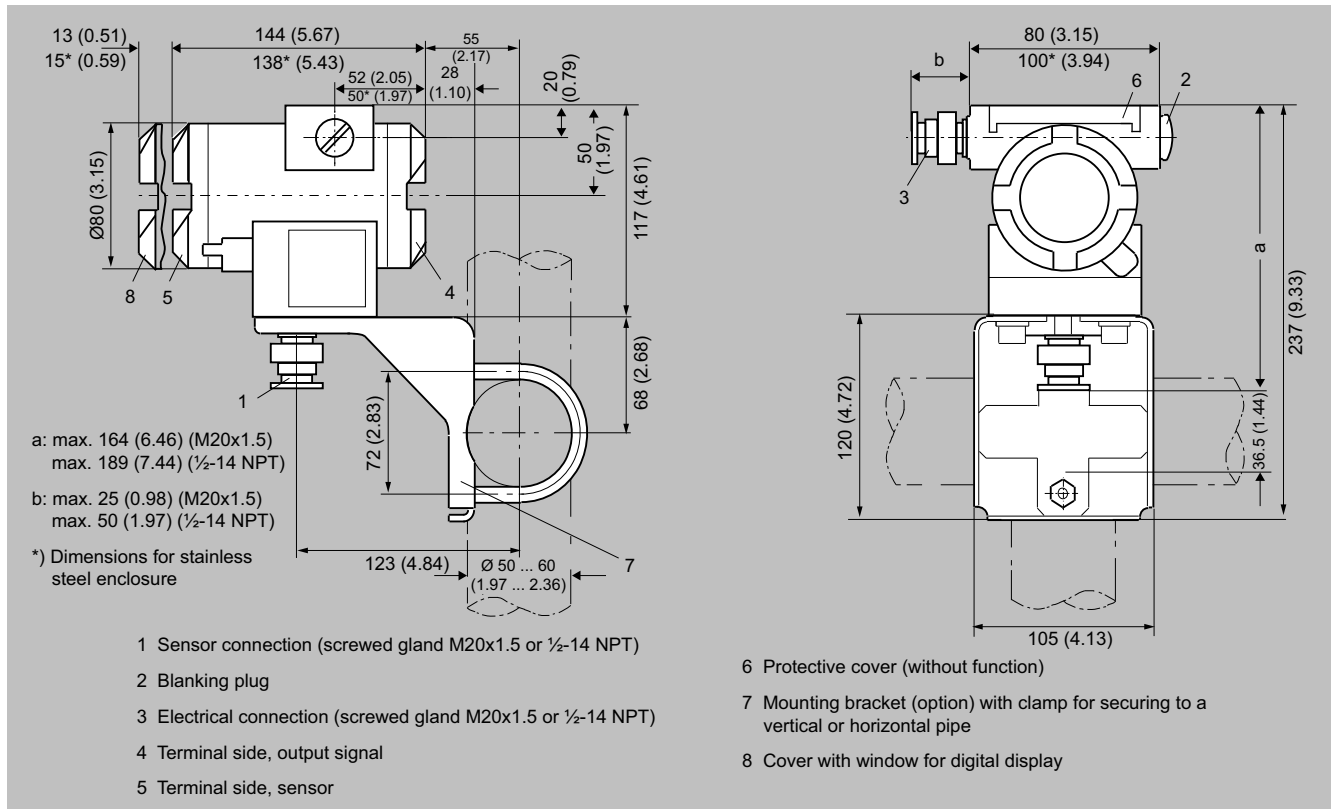
The total error under reference conditions at the analog output is the sum from the digital error and the digital-analog error (poss. with the addition of reference junction errors in the case of thermocouple measurements).

Temperature Measurement

Temperature transmitters

Field transmitters/field indicator / SITRANS TF field transmitter

Dimensional drawings



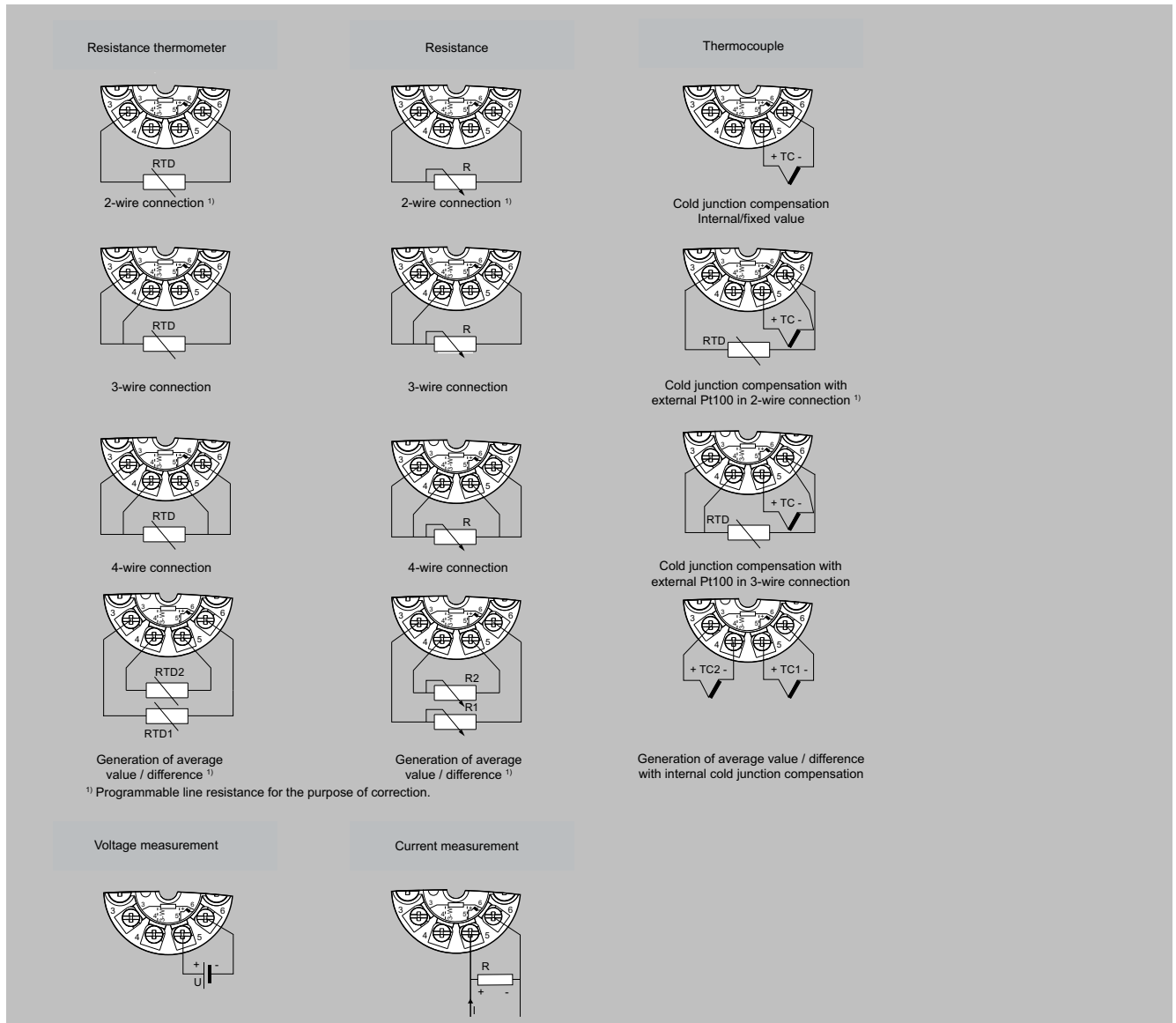
SITRANS TF, dimensions in mm (inch)

Temperature Measurement

Temperature transmitters

Field transmitters/field indicator / SITRANS TF field transmitter

Circuit diagrams



SITRANS TF, sensor connection assignment

Temperature Measurement

Temperature transmitters

Field transmitters/field indicator / SITRANS TF320 (HART, universal)

Overview



SITRANS TF320 in dual chamber enclosure

Overview (continued)



SITRANS TF320 in single chamber enclosure

- 2-wire temperature transmitter with and without HART communication interface
- Universal input for virtually any type of temperature sensor
- Can be configured via PC, HART 7 or optional local operation

Temperature Measurement

Temperature transmitters

Field transmitters/field indicator / SITRANS TF320 (HART, universal)

Benefits

- Universally applicable as a temperature transmitter with galvanic isolation for:
 - Resistance thermometer (2-wire, 3-wire, 4-wire connection)
 - Thermocouples
 - Linear resistances, potentiometer and DC voltage sources
- Local operation of the temperature transmitter via display (single chamber enclosure) or control keys accessible from outside (dual chamber enclosure)
- Rugged single or dual chamber enclosure made of die-cast aluminum or stainless steel 316/316L
- Electronic compartment isolated (watertight) from terminal compartment in dual chamber enclosure
- Degree of protection IP66/68 (1.5 m/2 h)
- Electromagnetic compatibility according to EN 61326 and NE21
- Test terminals for direct read-out of the output signal without breaking the current loop
- Remote installation option:
 - Measuring point is difficult to access
 - Measuring point is subjected to high temperatures
 - Measuring point is subjected to vibration through plant
 - Long neck pipes and thermowells must be avoided
- Temperature transmitters of the "intrinsically safe protection type, increased safety for zone 2, flameproof and dust-protected" type of protection can be installed in hazardous areas. The transmitter meets the requirements of the EU Directive 2014/34/EU (ATEX), the FM and CSA regulations as well as other national approvals, e.g. EACEx, NEPSI, KCs, Inmetro.
- SIL2/3 (with order note C20) according to IEC 61508 and Electrical Equipment For Furnaces And Ancillary Equipment (EN 50156-2)

Application

SITRANS TF320 can be used everywhere where temperatures need to be measured under particularly adverse conditions and where a user-friendly local display is ideal. Which is why users from all industries have opted for this field device. The rugged enclosure protects the electronics. The stainless steel model is almost completely resistant to sea water and other aggressive substances. The inner workings offer high measuring accuracy, universal input and a wide range of diagnostic options.

Function

Configuration

The communication capability over the HART protocol V 7 permits parameterization using a PC or HART communicator (hand-held communicator). The SIMATIC PDM makes it easy.

For the SITRANS TF320 without HART functionality, parameters are assigned with the PC. A special modem and the software tool SIPROM T are available for this purpose.

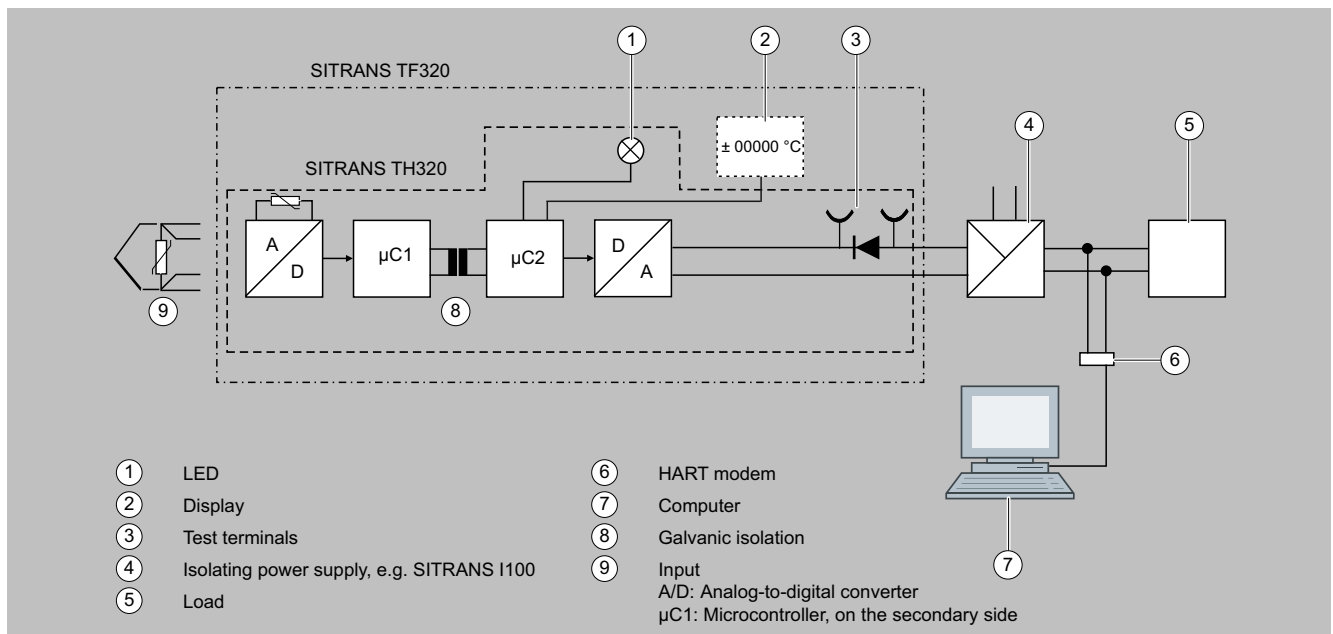
The optional local operation on the device gives you the possibility to configure the device's most important functions very quickly.

Principle of operation

SITRANS TF320 as temperature transmitter

The input signal, whether resistance thermometer (RTD), thermocouple (TC), Ω or mV signal, is amplified and linearized. Input and output side are galvanically isolated. An internal cold junction is integrated for measurements with thermocouples.

The device outputs a temperature-linear direct current from 4 to 20 mA. As well as the analog transmission of measured values from 4 to 20 mA, the HART version also supports digital communication for online diagnostics, measured value transmission, and configuration. SITRANS TF320 automatically detects when a sensor should be interrupted or is indicating a short-circuit. The practical test terminals allow direct measurement of 4 to 20 mA signals over an ammeter without interrupting the output current loop.



Function block diagram SITRANS TF320 with integrated SITRANS TH320

Temperature Measurement

Temperature transmitters

Field transmitters/field indicator / SITRANS TF320 (HART, universal)

Selection and ordering data

Single chamber enclosure

SITRANS TF320 temperature transmitter with single chamber enclosure for wall or pipe mounting, one configurable input and an electrically isolated 2-wire output.	Article No. 7NG034										
Click the article number for online configuration in the PIA Life Cycle Portal.	●	-	●	●	●	●	●	-	0	●	●
Communication											
With HART (4 ... 20 mA)									0		
Without HART (4 ... 20 mA)									7		
Primary value output											
Input 1									0		
Input 1, type											
RTD											
• Pt100 (IEC 60751), 3-wire											B
• Pt100 (IEC 60751), 4-wire											C
• Pt1000 (IEC 60751), 3-wire											D
• Pt1000 (IEC 60751), 4-wire											E
TC											
• Type B											F
• Type E											G
• Type J											H
• Type K											J
• Type L											K
• Type N											L
• Type R											N
• Type S											P
• Type T											Q
Potentiometer, 4-wire											R
More types in option Vxx											Y
Input 2, type											
Without input 2											A
CJC configuration for TC											
None CJC											0
Internal CJC											1
External CJC RTD Pt100 (IEC 60751), 3-wire											3
External CJC RTD Ni100 (DIN 43760-87), 3-wire											6
Define fixed CJC value with option Y60											8
Material of non-wetted parts											
Die-cast aluminum enclosure											1
Enclosure made of stainless steel precision casting 1.4401 (similar to 316)											3
Type of protection (Ex)											
General safety											A
Intrinsic safety (Ex i) / non-incendive field wiring (NIFW)											B
Flameproof enclosure (Ex d) / Explosion proof (XP)											C
Dust ignition protection by enclosure zone 21/22 (Ex t) / increased safety zone 2 (Ex ec) / dust ignition proof (DIP) / non-incendive (NI)											L
Flameproof enclosure (Ex d) / intrinsic safety (Ex i) / dust ignition protection by enclosure zone 21/22 (Ex t) / increased safety zone 2 (Ex ec)											S
Flameproof enclosure (Ex d) / explosion proof (XP) / intrinsic safety (Ex i) / non-incendive / non-incendive field wiring (NIFW) / dust ignition protection by enclosure zone 21/22 (Ex t) / increased safety zone 2 (Ex ec) / dust ignition proof (DIP) / non-incendive (NI)											T
Electrical connection/cable entries											
2 × M20 × 1.5											F
2 × ½" NPT											M
Local operation											
Without local operation											0
Local operation (closed lid)											1
Local operation (lid with glass window)											2

Selection and ordering data (continued)

Options	Order code
Add "-Z" to article number, specify order code and, if applicable, free text	
Cable gland included	
Plastic	A00
Metal	A01
Stainless steel	A02
Stainless steel 316L/1.4404	A03
CMP, for XP devices	A10
CAPRI ADE 4F, CuZn	A11
Cable inner diameter 7 ... 12 mm (0.28 ... 0.47 inches) Cable outer diameter 10 ... 16 mm (0.39 ... 0.63 inches)	
CAPRI ADE 4F, stainless steel	A12
Cable inner diameter 7 ... 12 mm (0.28 ... 0.47 inches) Cable outer diameter 10 ... 16 mm (0.39 ... 0.63 inches)	
Han plug	
Device plug Han 7D, mounted on left, metal, straight	A32
Cable socket included, metal, for device plug Han 7D/8D	A41
M12 plug	
Device plug M12, mounted on left, stainless steel, without cable socket	A62
Device plug M12, mounted on left, stainless steel, with cable socket	A63
Mounting cable glands/plugs	
Cable gland mounted	A97
Device plug for output, mounted right	A98
Manufacturer's declarations	
Inspection certificate EN 10204-3.1: Manufacturer test certificate for transmitters (5 measured values)	C11
Certificates for functional safety	
Functional safety (IEC 61508) - SIL2/3; Electrical equipment for furnaces and ancillary equipment (EN 50156-2)	C20
Device options	
PDF file with device settings	D10
IP66/IP68 degree of protection (not for device plug M12 and Han)	D30
Unlabeled TAG plate	D40
Without labeling of the measuring range on the TAG plate	D41
Nameplate and approval plate, stainless steel 1.4404/316L	D42
Overvoltage protection up to 20 kV (external)	D71
Jumper plug set on device for write protection	D81
Jumper plug set on device set for fault current >21 mA (instead of <3.6 mA) (only non-SIL)	D82
General approval without Ex approval	
Worldwide (CE, RCM) except EAC, FM, KCC	E00
Global	E01
EAC	E07
FM	E08
KCC	E09
Explosion protection certificates	
ATEX (Europe)	E20
FM (USA & Canada)	E22
IECEx (Worldwide)	E23
NEPSI (China)	E27
PESO (India)	E28
UKEX (United Kingdom)	E33
ATEX (Europe) and IECEx (Worldwide)	E47
ATEX, IECEx and FM	E49

Temperature Measurement

Temperature transmitters

Field transmitters/field indicator / SITRANS TF320 (HART, universal)

Selection and ordering data (continued)

Options Add "-Z" to article number, specify order code and, if applicable, free text	Order code
Factory	
Made in France	F00
Mounting clamps	
Pipe mounting kit for single chamber enclosure, stainless steel 316L	H06
Wall mounting kit for single chamber enclosure, stainless steel 316L	H07
Noise damping	
Noise damping 60 Hz instead of 50 Hz	P10
Input 1: TC	
Type C W5	V01
Type D W3	V02
Type U	V03
Type Lr	V04
Input 1: Callendar-Van Dusen	
2-wire (define wire resistance value in option Y51 and Callendar-Van Dusen parameter in option Y35)	V50
3-wire (define Callendar-Van Dusen parameter in option Y35)	V51
4-wire (define Callendar-Van Dusen parameter in option Y35)	V52
Input 1: RTD	
Pt × (IEC 60751), 2-wire (define wire resistance value in option Y51 and RTD factor × in option Y21)	V60
Pt × (IEC 60751), 3-wire, define RTD factor × in option Y21	V61
Pt × (IEC 60751), 4-wire, define RTD factor × in option Y21	V62
Pt × (JIS C1604), 2-wire (define wire resistance value in option Y51 and RTD factor × in option Y21)	V63
Pt × (JIS C1604-81), 3-wire, define RTD factor × in option Y21	V64
Pt × (JIS C1604-81), 4-wire, define RTD factor × in option Y21	V65
Pt × (GOST 6651-2009), 2-wire (define wire resistance value in option Y51 and RTD factor × in option Y21)	V66
Pt × (GOST 6651-2009), 3-wire, define RTD factor × in option Y21	V67
Pt × (GOST 6651-2009), 4-wire, define RTD factor × in option Y21	V68
Ni × (DIN 43760-87), 2-wire (define wire resistance value in option Y51 and RTD factor × in option Y21)	V69
Ni × (DIN 43760-87), 3-wire, define RTD factor × in option Y21	V70
Ni × (DIN 43760-87), 4-wire, define RTD factor × in option Y21	V71
Ni × (GOST 6651-2009), 2-wire (define wire resistance value in option Y51 and RTD factor × in option Y21)	V72
Ni × (GOST 6651-2009), 3-wire, define RTD factor × in option Y21	V73
Ni × (GOST 6651-2009), 4-wire, define RTD factor × in option Y21	V74
Cu × (ECW-15), 2-wire (define wire resistance value in option Y51 and RTD factor × in option Y21)	V75
Cu × (ECW-15), 3-wire, define RTD factor × in option Y21	V76
Cu × (ECW-15), 4-wire, define RTD factor × in option Y21	V77
Cu × (GOST 6651-94), 2-wire (define wire resistance value in option Y51 and RTD factor × in option Y21)	V78
Cu × (GOST 6651-94), define 3-wire, define RTD factor × in option Y21	V79

Selection and ordering data (continued)

Options	Order code
Add "-Z" to article number, specify order code and, if applicable, free text	
Cu × (GOST 6651-94), define 4-wire, define RTD factor × in option Y21	V80
Cu × (GOST 6651-2009), define 3-wire, define RTD factor × in option Y21	V82
Cu × (GOST 6651-2009), define 4-wire, define RTD factor × in option Y21	V83
Device settings	
Measuring range setting temperature input: Lower range value (max. 5 characters), upper range value (max. 5 characters), unit (°C, °F, °Ra, K)	Y01
Customer-specific programming in plain text (n-lines)	Y09
Tag (device parameters, max. 32 characters), adhesive label	Y15
Measuring point description (device parameters, max. 32 characters), adhesive label	Y16
Tag (device parameters, max. 8 characters), adhesive label	Y17
Descriptor (device parameters, max. 16 characters), adhesive label	Y18
Input 1: RTD factor; e.g. factor "200" = Pt200, adhesive label	Y21
Fault current for input circuit short-circuit & interruption instead of 22.4 mA (short-circuit) and 22.8 mA (interruption) e.g. 3.6 mA and 22.4 mA [3.6 - 3.6; 3.6 - 22.8; 22.4 - 3.6]	Y31
CvD Sensor matching factors input 1 R0, A, B, C, Beta, Delta Selection: CVDR - R0 (format for example 100.0), CVDA - A (format for example 0.003908), CVDB - B (format for example -5.775E-07), CVDC - C (format for example -4.183E-12)	Y35
Wire resistance value input 1 in ohms (0 ... 100 ohms)	Y51
Input 1: CJC sensor, fixed value (see measuring range for unit)	Y60
ID number of special design	Y99

Dual chamber enclosure

SITRANS TF320 temperature transmitter with dual chamber enclosure for wall or pipe mounting, one configurable input and an electrically isolated 2-wire output.	Article No.
	7NG035
Click the article number for online configuration in the PIA Life Cycle Portal.	● - ● ● ● ● ● ● - 0 ● ● ● ●
Communication	
With HART (4 ... 20 mA)	0
Without HART (4 ... 20 mA)	7
Primary value output	
Input 1	0
Input 1, type	
RTD	
• Pt100 (IEC 60751), 3-wire	B
• Pt100 (IEC 60751), 4-wire	C
• Pt1000 (IEC 60751), 3-wire	D
• Pt1000 (IEC 60751), 4-wire	E
TC	
• Type B	F
• Type E	G
• Type J	H
• Type K	J
• Type L	K

Temperature Measurement

Temperature transmitters

Field transmitters/field indicator / SITRANS TF320 (HART, universal)

Selection and ordering data (continued)

SITRANS TF320 temperature transmitter with dual chamber enclosure for wall or pipe mounting, one configurable input and an electrically isolated 2-wire output.	Article No. 7NG035										
	●	-	●	●	●	●	●	-	0	●	●
• Type N											L
• Type R											N
• Type S											P
• Type T											Q
Potentiometer, 4-wire											R
More types in option Vxx											Y
Input 2, type											A
Without input 2											
CJC configuration for TC											
Without CJC											0
Internal CJC											1
External CJC RTD Pt100 (IEC 60751), 3-wire											3
External CJC RTD Ni100 (DIN 43760-87), 3-wire											6
Define fixed CJC value with option Y60											8
Material of non-wetted parts											
Die-cast aluminum enclosure											1
Enclosure made of stainless steel precision casting CF3M/1.4409 (similar to 316L)											2
Type of protection (Ex)											
General safety											A
Intrinsic safety (Ex i) / non-incendive field wiring (NIFW)											B
Flameproof enclosure (Ex d) / Explosion proof (XP)											C
Dust ignition protection by enclosure zone 21/22 (Ex t) / increased safety zone 2 (Ex ec) / dust ignition proof (DIP) / non-incendive (NI)											L
Flameproof enclosure (Ex d) / intrinsic safety (Ex i) / dust ignition protection by enclosure zone 21/22 (Ex t) / increased safety zone 2 (Ex ec)											S
Flameproof enclosure (Ex d) / explosion proof (XP) / intrinsic safety (Ex i) / non-incendive / non-incendive field wiring (NIFW) / dust ignition protection by enclosure zone 21/22 (Ex t) / increased safety zone 2 (Ex ec) / dust ignition proof (DIP) / non-incendive (NI)											T
Electrical connection/cable entries											
2 × M20 × 1.5											F
2 × ½" NPT											M
Local operation											
Without local operation											0
Local operation (closed lid)											1
Local operation (lid with glass window)											2

Options	Order code
Add "-Z" to article number, specify order code and, if applicable, free text.	
Cable gland included	
Plastic	A00
Metal	A01
Stainless steel	A02
Stainless steel 316L/1.4404	A03
CMP, for XP devices	A10
CAPRI ADE 4F, CuZn	A11
Cable inner diameter 7 ... 12 mm (0.28 ... 0.47 inches)	
Cable outer diameter 10 ... 16 mm (0.39 ... 0.63 inches)	
CAPRI ADE 4F, stainless steel	A12
Cable inner diameter 7 ... 12 mm (0.28 ... 0.47 inches)	
Cable outer diameter 10 ... 16 mm (0.39 ... 0.63 inches)	
Device plug Han, mounted on left	
Device plug Han 7D (plastic, straight)	A30
Device plug Han 7D (plastic, angled)	A31
Device plug Han 7D (metal, straight)	A32
Device plug Han 7D (metal, angled)	A33
Device plug Han 8D (plastic, straight)	A34

Selection and ordering data (continued)

Options	Order code
Device plug Han 8D (plastic, angled)	A35
Device plug Han 8D (metal, straight)	A36
Device plug Han 8D (metal, angled)	A37
Cable socket included	
Plastic, for device plug Han 7D and Han 8D	A40
Metal, for device plug Han 7D and Han 8D	A41
Device plug M12, mounted on left	
Stainless steel, without cable socket	A62
Stainless steel, with cable socket	A63
Mounting cable glands/plugs	
Cable gland mounted	A97
Device plug for output, mounted right	A98
Manufacturer's declarations	
Inspection certificate EN 10204-3.1: Manufacturer test certificate for transmitters (5 measured values)	C11
Certificates for functional safety	
Functional safety (IEC 61508) - SIL2/3; Electrical equipment for furnaces and ancillary equipment (EN 50156-2)	C20
Device options	
PDF file with device settings	D10
Double layer coating (epoxy resin and polyurethane) 120 µm of enclosure and lid	D20
IP66/IP68 degree of protection (not for device plug M12 and Han)	D30
Unlabeled TAG plate	D40
Without labeling of the measuring range on the TAG plate	D41
Stainless steel Ex plate 1.4404/316L	D42
Overvoltage protection up to 20 kV (external)	D71
Jumper plug set on device for write protection	D81
Jumper plug set on device set for fault current >21 mA (instead of <3.6 mA) (only non-SIL)	D82
General approval without Ex approval	
Worldwide (CE, RCM) except EAC, FM, KCC	E00
Global	E01
EAC	E07
FM	E08
Explosion protection certificates	
ATEX (Europe)	E20
FM (USA & Canada)	E22
IECEX (Worldwide)	E23
NEPSI (China)	E27
PESO (India)	E28
ATEX (Europe) and IECEX (Worldwide)	E47
ATEX and IECEX and FM	E49
Factory	
Made in France	F00
Mounting brackets (only dual chamber enclosure)	
Wall/pipe mounting bracket for dual chamber enclosure, steel	H01
Wall/pipe mounting bracket for dual chamber enclosure, stainless steel 304	H02
Wall/pipe mounting bracket for dual chamber enclosure, stainless steel 316L	H03
Noise damping	
Noise damping 60 Hz instead of 50 Hz	P10

Temperature Measurement

Temperature transmitters

Field transmitters/field indicator / SITRANS TF320 (HART, universal)

Selection and ordering data (continued)

Options	Order code
Input 1: TC	
Type C W5	V01
Type D W3	V02
Type U	V03
Type Lr	V04
Input 1: Callendar-Van Dusen	
2-wire (define wire resistance value in option Y51 and Callendar-Van Dusen parameter in option Y35)	V50
3-wire (define Callendar-Van Dusen parameter in option Y35)	V51
4-wire (define Callendar-Van Dusen parameter in option Y35)	V52
Input 1: RTD	
Pt × (IEC 60751), 2-wire (define wire resistance value in option Y51 and RTD factor × in option Y21)	V60
Pt × (IEC 60751), 3-wire, define RTD factor × in option Y21	V61
Pt × (IEC 60751), 4-wire, define RTD factor × in option Y21	V62
Pt × (JIS C1604-81), 3-wire, define RTD factor × in option Y21	V64
Pt × (JIS C1604-81), 4-wire, define RTD factor × in option Y21	V65
Pt × (GOST 6651-2009), 2-wire (define wire resistance value in option Y51 and RTD factor × in option Y21)	V66
Pt × (GOST 6651-2009), 3-wire, define RTD factor × in option Y21	V67
Pt × (GOST 6651-2009), 4-wire, define RTD factor × in option Y21	V68
Ni × (DIN 43760-87), 2-wire (define wire resistance value in option Y51 and RTD factor × in option Y21)	V69
Ni × (DIN 43760-87), 3-wire, define RTD factor × in option Y21	V70
Ni × (DIN 43760-87), 4-wire, define RTD factor × in option Y21	V71
Ni × (GOST 6651-2009), 2-wire (define wire resistance value in option Y51 and RTD factor × in option Y21)	V72
Ni × (GOST 6651-2009), 3-wire, define RTD factor × in option Y21	V73
Ni × (GOST 6651-2009), 4-wire, define RTD factor × in option Y21	V74
Cu × (ECW-15), 2-wire (define wire resistance value in option Y51 and RTD factor × in option Y21)	V75
Cu × (ECW-15), 3-wire, define RTD factor × in option Y21	V76
Cu × (ECW-15), 4-wire, define RTD factor × in option Y21	V77
Cu × (GOST 6651-94), 2-wire (define wire resistance value in option Y51 and RTD factor × in option Y21)	V78
Cu × (GOST 6651-94), define 3-wire, define RTD factor × in option Y21	V79
Cu × (GOST 6651-94), define 4-wire, define RTD factor × in option Y21	V80
Cu × (GOST 6651-2009), 2-wire (define wire resistance value in option Y51 and RTD factor × in option Y21)	V81
Cu × (GOST 6651-2009), define 3-wire, define RTD factor × in option Y21	V82
Cu × (GOST 6651-2009), define 4-wire, define RTD factor × in option Y21	V83
Device settings	
Measuring range setting temperature input: Lower range value (max. 5 characters), upper range value (max. 5 characters), unit (°C, °F, °Ra, K)	Y01
Customer-specific programming in plain text (n-lines)	Y09

Selection and ordering data (continued)

Options	Order code
Tag (device parameters, max. 32 characters), plate, stainless steel 316L/1.4404	Y15
Measuring point description (device parameters, max. 32 characters), stainless steel 316L/1.4404	Y16
Tag (device parameters, max. 8 characters), stainless steel 316L/1.4404	Y17
Descriptor (device parameters, max. 16 characters), stainless steel 316L/1.4404	Y18
Input 1: RTD factor; e.g. factor "200" = Pt200, adhesive label	Y21
Fault current for input circuit short-circuit & interruption instead of 22.4 mA (short-circuit) and 22.8 mA (interruption) e.g. 3.6 mA and 22.4 mA [3.6 - 3.6; 3.6 - 22.8; 22.4 - 3.6]	Y31
CvD Sensor matching factors input 1 R0, A, B, C, Beta, Delta Selection: CVDR - R0 (format for example 100.0), CVDA - A (format for example 0.003908), CVDB - B (format for example -5.775E-07), CVDC - C (format for example -4.183E-12)	Y35
Wire resistance value input 1 in ohms (0 ... 100 ohms)	Y51
Input 1: CJC sensor, fixed value (see measuring range for unit)	Y60
ID number of special design	Y99

Accessories

	Article No.
See section "Other accessories for assembly, connection and transmitter configuration"	
Modems	
Modem with USB interface and SIPROM T software	7NG3092-8KN
HART modem with USB interface	7MF4997-1DB
Thread adapter	
Thread adapter M20×1.5 (external thread) to ½-14 NPT (feexternal thread)	7MP1990-0BA00
Thread adapter M20×1.5 (external thread) to G½ (feexternal thread)	7MP1990-0BB00
Local operation	
Local operation for temperature transmitter in dual chamber enclosure	7MF7902-1AD
Mounting system for local operation 7MF7902-1AD in single chamber enclosure	7MF7902-1AS
Mounting brackets (only dual chamber enclosure)	
Wall/pipe mounting bracket for dual chamber enclosure, steel, 5/16-24UNF	7MF7900-1AB
Wall/pipe mounting bracket for dual chamber enclosure, steel, M8	7MF7900-1AC
Wall/pipe mounting bracket for dual chamber enclosure, stainless steel 316L, 5/16-24UNF	7MF7900-1AH
Wall/pipe mounting bracket for dual chamber enclosure, stainless steel 316L, M8	7MF7900-1AJ
Mounting system (only single chamber enclosures)	
Pipe mounting kit for single chamber enclosure, stainless steel 316L	7MF7900-1AK
Wall mounting kit for single chamber enclosure, stainless steel 316L	7MF7900-1AL
Cable gland	
Cable gland, gray, non-Ex, M20	7MF7906-1AB
Cable gland, gray, non-Ex, NPT	7MF7906-1BB

Temperature Measurement

Temperature transmitters

Field transmitters/field indicator / SITRANS TF320 (HART, universal)

Selection and ordering data (continued)

	Article No.
Cable gland, metal, non-Ex, NPT	7MF7906-1BD
Cable gland, metal, non-Ex, M20	7MF7906-1AD
Cable gland, metal, Ex-d, NPT	7MF7906-1BE
Cable gland, metal, Ex-d, M20	7MF7906-1AE
Cable gland, 316L, non-Ex, NPT	7MF7906-1BH
Cable gland, 316L, non-Ex, M20	7MF7906-1AH
Cable gland, 316L, Ex-d, NPT	7MF7906-1BJ
Cable gland, 316L, Ex-d, M20	7MF7906-1AJ
Cable gland, E1FX Tri-Star ½-14 NPT, CMP	7MF7906-1NE
Cable gland, ½ NPT Capri ADE 4F cpl., CuZn	7MF7906-1PE
Cable gland, ½ NPT Capri ADE 4F cpl., stainless steel	7MF7906-1PJ
Plug and cable socket	
Plug Han 7D, plastic, straight	7MF7906-2AB
Plug Han 7D, plastic, angled	7MF7906-2AC
Plug Han 7D, metal, straight, blue	7MF7906-2AQ
Plug Han 7D, metal, straight, gray	7MF7906-2AN
Plug Han 7D, metal, angled, blue	7MF7906-2AR
Plug Han 7D, metal, angled, gray	7MF7906-2AP
Plug Han 8D, plastic, straight	7MF7906-2EB
Plug Han 8D, plastic, angled	7MF7906-2EC
Plug Han 8D, metal, straight, blue	7MF7906-2EQ
Plug Han 8D, metal, straight, gray	7MF7906-2EN
Plug Han 8D, metal, angled, blue	7MF7906-2ER
Plug Han 8D, metal, angled, gray	7MF7906-2EP
Cable socket, plastic, for plug Han 7D	7MF7906-2BB
Cable socket, plastic, for plug Han 8D	7MF7906-2FB
Cable socket, metal, for Han 7D blue	7MF7906-2BQ
Cable socket, metal, for Han 8D blue	7MF7906-2FQ
Cable socket, metal, for Han 7D gray	7MF7906-2BN
Cable socket, metal, for Han 8D gray	7MF7906-2FN
Plug M12 with cable socket, stainless steel	7MF7906-3AB
Overvoltage protection	
Overvoltage protection up to 20 kV, M20	7MF7906-3AC
Overvoltage protection up to 20 kV, NPT	7MF7906-3AD
Lid	
Closed lid aluminum, painted 2x, without glass window, with seal NBR	7MF7901-1BB
Closed lid aluminum, painted 2x, without glass window, with seal FVMQ	7MF7901-1BC
Lid aluminum 2x coated, with glass window, with seal NBR	7MF7901-1BG
Lid aluminum 2x coated, with glass window, with seal FVMQ	7MF7901-1BH
Closed lid stainless steel precision casting, without glass window, with seal NBR	7MF7901-2AB
Closed lid stainless steel precision casting, without glass window, with seal FVMQ	7MF7901-2AC
Lid stainless steel precision casting, with glass window, with seal NBR	7MF7901-2AG
Lid stainless steel precision casting, with glass window, with seal FVMQ	7MF7901-2AH

Ordering example

SITRANS TF320 (single chamber enclosure)

7NG0340-OBA01-OAF2-Z Y01+Y17+P10

Y01: -10 ... +100 °C

Y17: TICA123

Selection and ordering data (continued)

Factory setting

- Pt100 (IEC 60751) in 3-wire connection
- Measuring range: 0 ... 100 °C (32 ... 212 °F)
- Fault current
 - Input circuit wire break: 22.8 mA
 - Input circuit short-circuit: 22.4 mA
 - Input monitoring wire break and short-circuit
- No trimming of input and output (offset)
- Damping 0.0 s

Technical specifications

SITRANS TF320 (HART, universal)	
General	
Supply voltage ^{1) 2)}	
• Without explosion protection (non-Ex)	10.5 ... 48 V DC
• With explosion protection (Ex i)	10.5 ... 30 V DC
Additional minimum supply voltage when using test terminals	0.8 V
Maximum power loss	≤ 850 mW
Minimum load resistance at supply voltage > 37 V	$(V_{\text{supply}} - 37 \text{ V})/23 \text{ mA}$
Insulation voltage, test/operation	
• Without explosion protection (non-Ex)	2.5 kV AC/55 V AC
• With explosion protection (Ex i)	2.5 kV AC/42 V AC
Polarity protection	All inputs and outputs
Write protection	Wire jumper (transmitter), switch (on display) or software
Warm-up time	< 5 min
Starting time	< 2.75 s
Programming	SIPROM T and HART
Signal-to-noise ratio	> 60 dB
Long-term stability	Better than: <ul style="list-style-type: none"> • ± 0.05% of measuring span/year • ± 0.18% of measuring span/5 years
Response time	4 ... 20 mA: ≤ 55 ms HART: ≤ 75 ms (typically 70 ms)
Programmable damping	0 ... 60 s
Signal dynamic	
• Input	24 bit
• Output	18 bit
Influence of change in supply voltage	< 0.005% of measuring span/V DC
Input	
Resistance thermometer (RTD)	
Input type	
• Pt10 ... 10000	<ul style="list-style-type: none"> • IEC 60751 • JIS C 1604-8 • GOST 6651_2009 • Callendar-Van Dusen
• Ni10 ... 10000	<ul style="list-style-type: none"> • DIN 43760-1987 • GOST 6651-2009/OIML R84:2003
• Cu5 ... 1000	<ul style="list-style-type: none"> • Edison Copper Winding No. 15 • GOST 6651-2009/OIML R84:2003
Connection type	2-wire, 3-wire or 4-wire
Wire resistance per wire	Max. 50 Ω
Input current	< 0.15 mA

Temperature Measurement

Temperature transmitters

Field transmitters/field indicator / SITRANS TF320 (HART, universal)

Technical specifications (continued)

SITRANS TF320 (HART, universal)	
Effect of the wire resistance (with 3-wire and 4-wire connections)	< 0.002 Ω/Ω
Cable, wire-wire capacity	
• Pt1000, Pt10000 (IEC 60751 and JIS C 1604-8)	Max. 30 nF
• All other input types	Max. 50 nF
Fault detection, programmable	None, short-circuited, defective, short-circuited or defective Note When the low limit for the configured input type is below the constant detection limit for short-circuited inputs, the detection of short circuits is disabled regardless of the configuration of the fault detection.
Detection limit for short-circuited input	15 Ω
Fault detection time (RTD)	≤ 75 ms (typically 70 ms)
Fault detection time (for 3-wire and 4-wire)	≤ 2 000 ms
<u>Thermocouples (TC)</u>	
Input type	
• B	IEC 60584-1
• E	IEC 60584-1
• J	IEC 60584-1
• K	IEC 60584-1
• L	DIN 43710
• Lr	GOST 3044-84
• N	IEC 60584-1
• R	IEC 60584-1
• S	IEC 60584-1
• T	IEC 60584-1
• U	DIN 43710
• W3	ASTM E988-96
• W5	ASTM E988-96
• LR	GOST 3044-84
Cold Junction Compensation (CJC)	Constant, internal or external over Pt100 or Ni100 RTD
• Temperature range internal CJC	-50 ... +100 °C (-58 ... +212 °F)
• Connection external CJC	2-wire or 3-wire
• External CJC, wire resistance per wire (for 3-wire and 4-wire connections)	50 Ω
• Effect of the wire resistance (with 3-wire and 4-wire connections)	< 0.002 Ω/Ω
• Input current external CJC	< 0.15 mA
• Temperature range external CJC	50 ... +135 °C (-58 ... +275 °F)
• Cable, wire-wire capacity	Max. 50 nF
• Total wire resistance	Max. 10 kΩ
• Fault detection, programmable	None, short-circuited, defective, short-circuited or defective Note The short-circuited fault detection only applies to the CJC input.
• Fault detection time (TC)	≤ 75 ms (typically 70 ms)
• Fault detection time, external CJC (for 3-wire and 4-wire)	≤ 2 000 ms
<u>Linear resistance</u>	
Input range	0 ... 100 kΩ
Minimum measuring span	25 Ω
Connection type	2-wire, 3-wire or 4-wire
Wire resistance per wire	Max. 50 Ω
Input current	< 0.15 mA

Technical specifications (continued)

SITRANS TF320 (HART, universal)	
Effect of the wire resistance (with 3-wire and 4-wire connections)	< 0.002 Ω/Ω
Cable, wire-wire capacity	
• R > 400 Ω	Max. 30 nF
• R ≤ 400 Ω	Max. 50 nF
Fault detection, programmable	None, defective
Potentiometers	
Input range	10 Ω ... 100 kΩ
Minimum measuring span	25 Ω
Connection type	2-wire, 3-wire or 4-wire
Wire resistance per wire	Max. 50 Ω
Input current	< 0.15 mA
Effect of the wire resistance (with 4-wire and 5-wire connections)	< 0.002 Ω/Ω
Cable, wire-wire capacity	
• R > 400 Ω	Max. 30 nF
• R ≤ 400 Ω	Max. 50 nF
Fault detection, programmable	None, short-circuited, defective, short-circuited or defective
	Note When the configured potentiometer size is below the constant detection limit for short-circuited inputs, the detection of short circuits is disabled regardless of the configuration of the fault detection.
Detection limit for short-circuited input	15 Ω
Fault detection time, wiper arm (no short-circuit detection)	≤ 75 ms (typically 70 ms)
Fault detection time, element	≤ 2 000 ms
Fault detection time (for 4-wire and 5-wire)	≤ 2 000 ms
Supply voltage	
Measuring range	
• Unipolar	-100 ... 1700 mV
• Bipolar	-800 ... +800 mV
Minimum measuring span	2.5 mV
Input resistance	10 MΩ
Cable, wire-wire capacity	
• Input range: -100 ... 1700 mV	Max. 30 nF
• Input range: -20 ... 100 mV	Max. 50 nF
Fault detection, programmable	None, defective
Fault detection time	≤ 75 ms (typically 70 ms)
Output and HART communication	
Normal range, programmable	3.8 ... 20.5 mA/20.5 ... 3.8 mA
Extended range (output limits), programmable	3.5 ... 23 mA/23 ... 3.5 mA
Programmable input/output limits	
• Fault current	Enable/disable
• Fault current setting	3.5 ... 23 mA
Update time	10 ms
Load (with current output)	≤ (V _{Supply} - 10.5)/0.023 Ω
Load stability	< 0.01% of measuring span/100 Ω (measuring span = currently selected range)
Input fault detection, programmable (detection of input short-circuits is ignored with TC and voltage inputs)	3.5 ... 23 mA
NAMUR NE43 Upscale	> 21 mA
NAMUR NE43 Downscale	< 3.6 mA
HART protocol versions	HART 7
Measuring accuracy	
Input accuracy	See "Input accuracy" table
Output accuracy	See "Output accuracy" table

Temperature Measurement

Temperature transmitters

Field transmitters/field indicator / SITRANS TF320 (HART, universal)

Technical specifications (continued)

SITRANS TF320 (HART, universal)	
Operating conditions	
Ambient temperature	
• Without local operation in single chamber enclosure	50 ... +85 °C (-58 ... +185 °F)
• With local operation	40 ... +85 °C (-40 ... +185 °F)
• For transmitters with functional safety	40 ... +80 °C (-40 ... +176 °F)
Storage temperature	50 ... +85 °C (-58 ... +185 °F)
Reference temperature for sensor calibration	24 °C ±1.0 °C (75.2 °F ±1.8 °F)
Relative humidity	< 99% (no condensation)
Degree of protection	
• Temperature transmitter enclosure	IP66/IP68
• Terminals	IP00
Structural design	
Weight	
• Single chamber enclosure	<ul style="list-style-type: none"> Aluminum: 0.85 kg (1.87 lbs) Stainless steel: 1.69 kg (3.73 lbs)
• Dual chamber enclosure	<ul style="list-style-type: none"> Aluminum: 1.3 kg (2.87 lbs) Stainless steel: 3.3 kg (7.28 lbs)
Maximum core cross-section	
• Single chamber enclosure	1.5 mm ² (AWG 16)
• Dual chamber enclosure	2.5 mm ² (AWG 14)
Tightening torque for clamping screws	0.5 ... 0.6 Nm
Vibrations	
• 2 ... 25 Hz	± 1.6 mm (0.07 inches)
• 25 ... 100 Hz	± 4 g
Certificates and approvals	
Explosion protection ATEX/IECEx and others	
Certificates ³⁾	
	<ul style="list-style-type: none"> IECEx DEK 19.0069X IECEx DEK 19.0070X DEKRA 19ATEX0106 X (Category 1) DEKRA 19ATEX0108X (Category 2) DEKRA 19ATEX0107X (Category 3) A5E50642461A-2021X (Category 3)
"Intrinsic safety ia/ib" type of protection	
• ATEX	<ul style="list-style-type: none"> For use in Zone 0, 1, 2, 21 II 1 G Ex ia IIC T6 ... T4 Ga II 2 (1) G Ex ib [ia Ga] IIC T6 ... T4 Gb II 2 (1) D Ex ib [ia Da] IIIC T100 °C Db
• IECEx and others	<ul style="list-style-type: none"> Ex ia IIC T6 ... T4 Ga Ex ib [ia Ga] IIC T6 ... T4 Gb Ex ib [ia Da] IIIC T 100 °C Db
"Intrinsic safety ic" type of protection	
• ATEX	<ul style="list-style-type: none"> For use in Zone 2, 22 II 3 G Ex ic IIC T6...T4 Gc II 3 D Ex ic IIIC T100 °C Dc
• IECEx and others	<ul style="list-style-type: none"> Ex ic IIC T6 ... T4 Gc Ex ic IIIC T100 °C Dc
"Increased safety ec" type of protection	
• ATEX	<ul style="list-style-type: none"> For use in Zone 2 II 3 G Ex ec IIC T6...T4 Gc
• IECEx and others	<ul style="list-style-type: none"> Ex ec IIC T6 ... T4 Gc
"Flameproof enclosure db" type of protection	
• ATEX	<ul style="list-style-type: none"> For use in Zone 1 II 2 G Ex db IIC T6...T4 Gb
• IECEx and others	<ul style="list-style-type: none"> Ex db IIC T6 ... T4 Gb

Technical specifications (continued)

SITRANS TF320 (HART, universal)	
• "Protection by enclosure tb/tc" type of protection	For use in Zone 21, 22
• ATEX	<ul style="list-style-type: none"> • II 2 D Ex tb IIC T100 °C Db • II 3 D Ex tc IIIC T100 °C Dc
• IECEx and others	<ul style="list-style-type: none"> • Ex tb IIC T100 °C Db • Ex tc IIIC T100 °C Dc

- 1) Note that the minimum supply voltage must correspond to the value measured at the terminals of the SITRANS TF320. All external voltage drops must be taken into account.
- 2) Protect the device from overvoltage with the help of a suitable power supply or suitable overvoltage protection equipment.
- 3) Additional available certificates are listed on the internet at <http://www.siemens.com/processinstrumentation/certificates>

Measuring ranges/Minimum measuring span

RTD

Input type	Standard	Measuring range in °C (°F)	α_0 in °C ⁻¹ (°F ⁻¹)	Minimum measuring span in °C (°F)
Pt10 ... 10000	IEC 60751	-200 ... +850 (-328 ... +1 562)	0.003851 (0.002139)	10 (50)
	JIS C 1604-8	-200 ... +649 (-328 ... +1 200)	0.003916 (0.002176)	10 (50)
	GOST 6651_2009	-200 ... +850 (-328 ... +1 562)	0.003910 (0.002172)	10 (50)
	Callendar-Van Dusen	-200 ... +850 (-328 ... +1 562)	-	10 (50)
Ni10 ... 10000	DIN 43760-1987	-60 ... +250 (-76 ... +482)	0.006180 (0.003433)	10 (50)
	GOST 6651-2009/OIML R84:2003	-60 ... +180 (-76 ... +356)	0.006170 (0.003428)	10 (50)
Cu5 ... 1000	Edison Copper Winding No. 15	-200 ... +260 (-328 ... +500)	0.004270 (0.002372)	100 (212)
	GOST 6651-2009/OIML R84:20-03	-180 ... +200 (-292 ... +392)	0.004280 (0.002378)	100 (212)
	GOST 6651-94	-50 ... +200 (-58 ... +392)	0.004260 (0.002367)	100 (212)

TC

Input type	Standard	Measuring range in °C (°F)	Minimum measuring span in °C (°F)
B	IEC 60584-1	0 (85) ... 1 820 (32 (185) ... 3 308)	100 (212)
E	IEC 60584-1	-200 ... +1 000 (-392 ... +1 832)	50 (122)
J	IEC 60584-1	-100 ... +1 200 (-212 ... +2 192)	50 (122)
K	IEC 60584-1	-180 ... +1 372 (-356 ... +2 502)	50 (122)
L	DIN 43710	-200 ... +900 (-392 ... +1 652)	50 (122)
Lr	GOST 3044-84	-200 ... +800 (-392 ... +1 472)	50 (122)
N	IEC 60584-1	-180 ... +1 300 (-356 ... +2 372)	50 (122)
R	IEC 60584-1	-50 ... +1 760 (-122 ... +3 200)	100 (212)
S	IEC 60584-1	-50 ... +1 760 (-122 ... +3 200)	100 (212)
T	IEC 60584-1	-200 ... +400 (-392 ... +752)	50 (122)
U	DIN 43710	-200 ... +600 (-392 ... +1 112)	50 (122)
W3	ASTM E988-96	0 ... 2 300 (32 ... 4 172)	100 (212)
W5	ASTM E988-96	0 ... 2 300 (32 ... 4 172)	100 (212)
LR	GOST 3044-84	-200 ... +800 (-392 ... +1472)	50 (122)

Input accuracy

Basic values

Input type	Basic accuracy	Temperature coefficient ¹⁾
RTD		
Pt10	≤ ±0.8 °C (1.44 °F)	≤ ±0.020 °C/°C (°F/°F)
Pt20	≤ ±0.4 °C (0.72 °F)	≤ ±0.010 °C/°C (°F/°F)

Temperature Measurement

Temperature transmitters

Field transmitters/field indicator / SITRANS TF320 (HART, universal)

Technical specifications (continued)

Input type	Basic accuracy	Temperature coefficient ¹⁾
Pt50	$\leq \pm 0.16 \text{ °C (0.288 °F)}$	$\leq \pm 0.004 \text{ °C/°C (°F/°F)}$
Pt100	$\leq \pm 0.04 \text{ °C (0.072 °F)}$	$\leq \pm 0.002 \text{ °C/°C (°F/°F)}$
Pt200	$\leq \pm 0.08 \text{ °C (0.144 °F)}$	$\leq \pm 0.002 \text{ °C/°C (°F/°F)}$
Pt500	$T_{\text{max.}} < 180 \text{ °C (356 °F)} = \leq \pm 0.08 \text{ °C (0.144 °F)}$ $T_{\text{max.}} > 180 \text{ °C (356 °F)} = \leq \pm 0.16 \text{ °C (0.288 °F)}$	$\leq \pm 0.002 \text{ °C/°C (°F/°F)}$
Pt1000	$\leq \pm 0.08 \text{ °C (0.144 °F)}$	$\leq \pm 0.002 \text{ °C/°C (°F/°F)}$
Pt2000	$T_{\text{max.}} < 300 \text{ °C (572 °F)} = \leq \pm 0.08 \text{ °C (0.144 °F)}$ $T_{\text{max.}} > 300 \text{ °C (572 °F)} = \leq \pm 0.4 \text{ °C (0.72 °F)}$	$\leq \pm 0.002 \text{ °C/°C (°F/°F)}$
Pt10000	$\leq \pm 0.16 \text{ °C (0.288 °F)}$	$\leq \pm 0.002 \text{ °C/°C (°F/°F)}$
Pt x	Largest tolerance of neighboring points	Largest temperature coefficient of neighboring points
Ni10	$\leq \pm 1.6 \text{ °C (2.88 °F)}$	$\leq \pm 0.020 \text{ °C/°C (°F/°F)}$
Ni20	$\leq \pm 0.8 \text{ °C (1.44 °F)}$	$\leq \pm 0.010 \text{ °C/°C (°F/°F)}$
Ni50	$\leq \pm 0.32 \text{ °C (0.576 °F)}$	$\leq \pm 0.004 \text{ °C/°C (°F/°F)}$
Ni100	$\leq \pm 0.16 \text{ °C (0.288 °F)}$	$\leq \pm 0.002 \text{ °C/°C (°F/°F)}$
Ni120	$\leq \pm 0.16 \text{ °C (0.288 °F)}$	$\leq \pm 0.002 \text{ °C/°C (°F/°F)}$
Ni200	$\leq \pm 0.16 \text{ °C (0.288 °F)}$	$\leq \pm 0.002 \text{ °C/°C (°F/°F)}$
Ni500	$\leq \pm 0.16 \text{ °C (0.288 °F)}$	$\leq \pm 0.002 \text{ °C/°C (°F/°F)}$
Ni1000	$\leq \pm 0.16 \text{ °C (0.288 °F)}$	$\leq \pm 0.002 \text{ °C/°C (°F/°F)}$
Ni2000	$\leq \pm 0.16 \text{ °C (0.288 °F)}$	$\leq \pm 0.002 \text{ °C/°C (°F/°F)}$
Ni10000	$\leq \pm 0.32 \text{ °C (0.576 °F)}$	$\leq \pm 0.002 \text{ °C/°C (°F/°F)}$
Ni x	Largest tolerance of neighboring points	Largest temperature coefficient of neighboring points
Cu5	$\leq \pm 1.6 \text{ °C (2.88 °F)}$	$\leq \pm 0.040 \text{ °C/°C (°F/°F)}$
Cu10	$\leq \pm 0.8 \text{ °C (1.44 °F)}$	$\leq \pm 0.020 \text{ °C/°C (°F/°F)}$
Cu20	$\leq \pm 0.4 \text{ °C (0.72 °F)}$	$\leq \pm 0.010 \text{ °C/°C (°F/°F)}$
Cu50	$\leq \pm 0.16 \text{ °C (0.288 °F)}$	$\leq \pm 0.004 \text{ °C/°C (°F/°F)}$
Cu100	$\leq \pm 0.08 \text{ °C (0.144 °F)}$	$\leq \pm 0.002 \text{ °C/°C (°F/°F)}$
Cu200	$\leq \pm 0.08 \text{ °C (0.144 °F)}$	$\leq \pm 0.002 \text{ °C/°C (°F/°F)}$
Cu500	$\leq \pm 0.16 \text{ °C (0.288 °F)}$	$\leq \pm 0.002 \text{ °C/°C (°F/°F)}$
Cu1000	$\leq \pm 0.08 \text{ °C (0.144 °F)}$	$\leq \pm 0.002 \text{ °C/°C (°F/°F)}$
Cu x	Largest tolerance of neighboring points	Largest temperature coefficient of neighboring points
Linear resistance		
0 ... 400 Ω	$\leq \pm 40 \text{ mΩ}$	$\leq \pm 2 \text{ mΩ/°C (1.11 mΩ/°F)}$
0 ... 100 kΩ	$\leq \pm 4 \text{ Ω}$	$\leq \pm 0.2 \text{ Ω/°C (0.11 Ω/°F)}$
Potentiometers		
0 ... 100%	$< 0.05\%$	$< \pm 0.005\%$
Supply voltage		
mV: -20 ... 100 mV	$\leq \pm 5 \text{ μV}$	$\leq \pm 0.2 \text{ μV/°C (0.11 μV/°F)}$
mV: -100 ... 1700 mV	$\leq \pm 0.1 \text{ mV}$	$\leq \pm 36 \text{ μV/°C (20 μV/°F)}$
mV: ± 800 mV	$\leq \pm 0.1 \text{ mV}$	$\leq \pm 32 \text{ μV/°C (17.8 μV/°F)}$
TC		
E	$\leq \pm 0.2 \text{ °C (0.36 °F)}$	$\leq \pm 0.025 \text{ °C/°C (°F/°F)}$
J	$\leq \pm 0.25 \text{ °C (0.45 °F)}$	$\leq \pm 0.025 \text{ °C/°C (°F/°F)}$
K	$\leq \pm 0.25 \text{ °C (0.45 °F)}$	$\leq \pm 0.025 \text{ °C/°C (°F/°F)}$
L	$\leq \pm 0.35 \text{ °C (0.63 °F)}$	$\leq \pm 0.025 \text{ °C/°C (°F/°F)}$
N	$\leq \pm 0.4 \text{ °C (0.72 °F)}$	$\leq \pm 0.025 \text{ °C/°C (°F/°F)}$
T	$\leq \pm 0.25 \text{ °C (0.45 °F)}$	$\leq \pm 0.025 \text{ °C/°C (°F/°F)}$
U	$< 0 \text{ °C (32 °F)} \leq \pm 0.8 \text{ °C (1.44 °F)}$ $\geq 0 \text{ °C (32 °F)} \leq \pm 0.4 \text{ °C (0.72 °F)}$	$\leq \pm 0.025 \text{ °C/°C (°F/°F)}$
Lr	$\leq \pm 0.2 \text{ °C (0.36 °F)}$	$\leq \pm 0.1 \text{ °C/°C (°F/°F)}$
R	$< 200 \text{ °C (392 °F)} \leq \pm 0.5 \text{ °C (0.9 °F)}$ $\geq 200 \text{ °C (392 °F)} \leq \pm 1 \text{ °C (1.8 °F)}$	$\leq \pm 0.1 \text{ °C/°C (°F/°F)}$
S	$< 200 \text{ °C (392 °F)} \leq \pm 0.5 \text{ °C (0.9 °F)}$ $\geq 200 \text{ °C (392 °F)} \leq \pm 1 \text{ °C (1.8 °F)}$	$\leq \pm 0.1 \text{ °C/°C (°F/°F)}$
W3	$\leq \pm 0.6 \text{ °C (1.08 °F)}$	$\leq \pm 0.1 \text{ °C/°C (°F/°F)}$

Technical specifications (continued)

Input type	Basic accuracy	Temperature coefficient ¹⁾
W5	≤ ±0.4 °C (0.72 °F)	≤ ±0.1 °C/°C (°F/°F)
B ²⁾	≤ ±1 °C (1.8 °F)	≤ ±0.1 °C/°C (°F/°F)
B ³⁾	≤ ±3 °C (5.4 °F)	≤ ±0.1 °C/°C (°F/°F)
B ⁴⁾	≤ ±8 °C (14.4 °F)	≤ ±0.8 °C/°C (°F/°F)
B ⁵⁾	Not specified	Not specified
CJC (internal)	< ±0.5 °C (0.9 °F)	Included in basic accuracy
CJC (external)	≤ ±0.08 °C (0.144 °F)	≤ ±0.002 °C/°C (°F/°F)

1) Temperature coefficients correspond to the specified values or 0.002% of the input span, depending on which value is greater.

2) Accuracy of the specification range > 400 °C (752 °F)

3) Accuracy of the specification range > 160 °C (320 °F) < 400 °C (752 °F)

4) Accuracy of the specification range > 85 °C (185 °F) < 160 °C (320 °F)

5) Accuracy of the specification range < 85 °C (185 °F)

Output accuracy

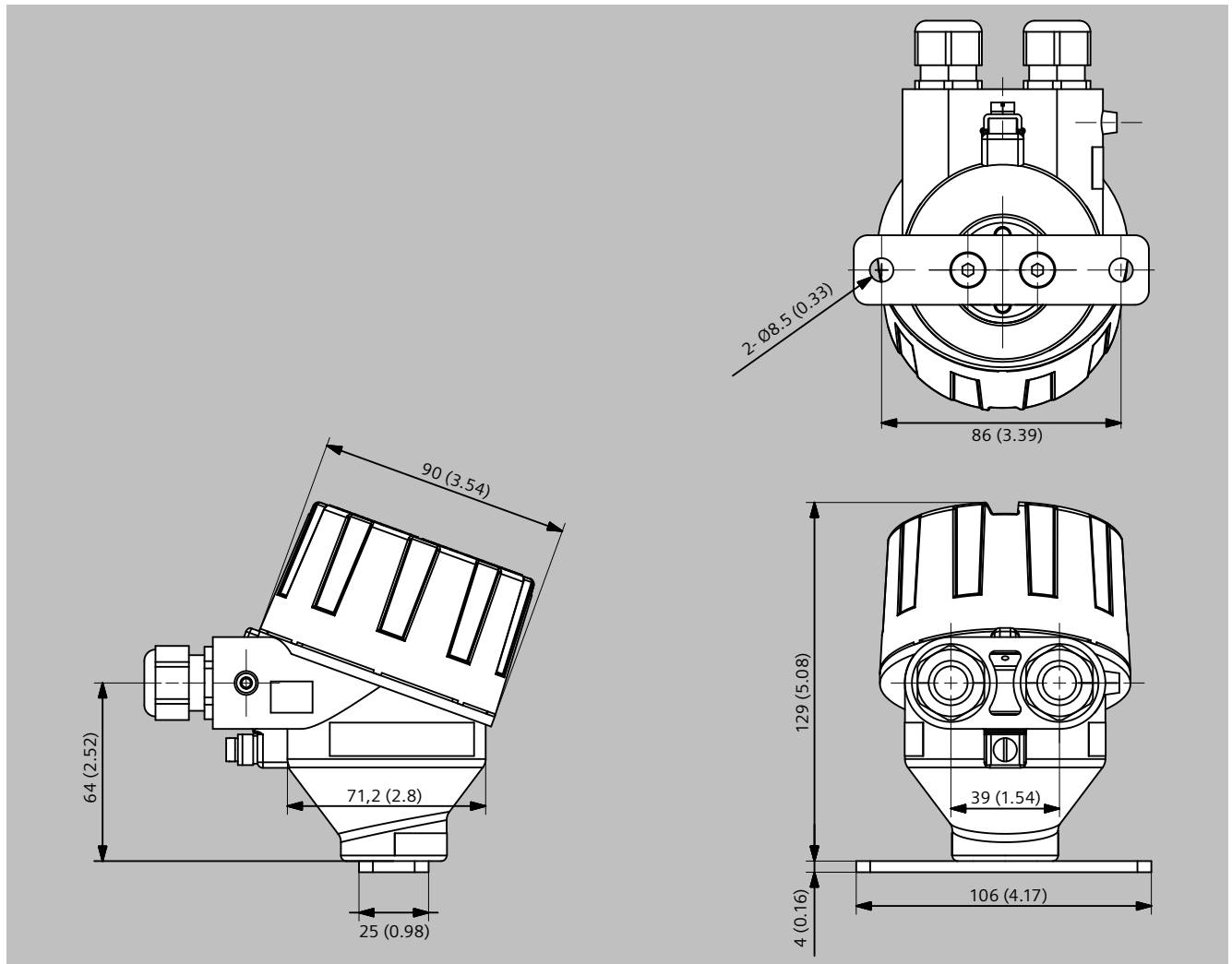
Output type	Basic accuracy	Temperature coefficient
Analog output	≤ ±1.6 µA (0.01% of the full output span)	≤ ±0.48 µA/K (≤ ±0.003% of the full output span/K)

Temperature Measurement

Temperature transmitters

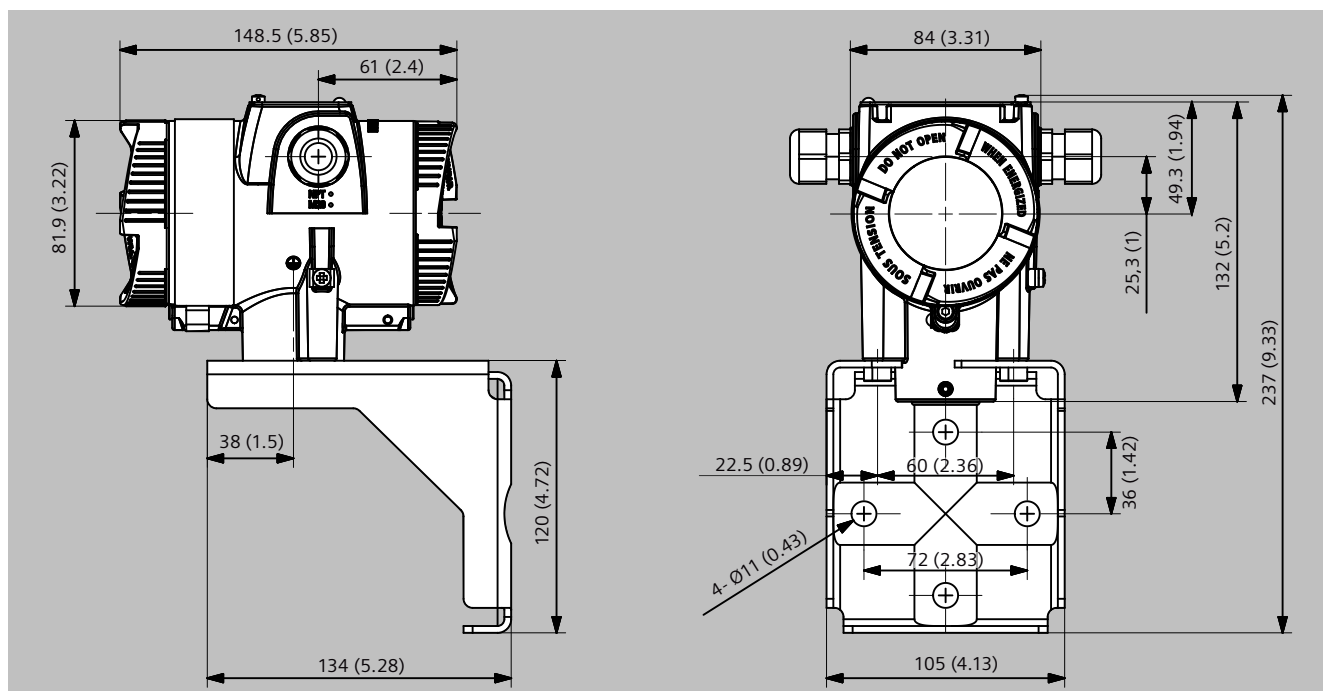
Field transmitters/field indicator / SITRANS TF320 (HART, universal)

Dimensional drawings



SITRANS TF320, single chamber enclosure, dimensions in mm (inch)

Dimensional drawings (continued)



SITRANS TF320, dual chamber enclosure, dimensions in mm (inch)

Temperature Measurement

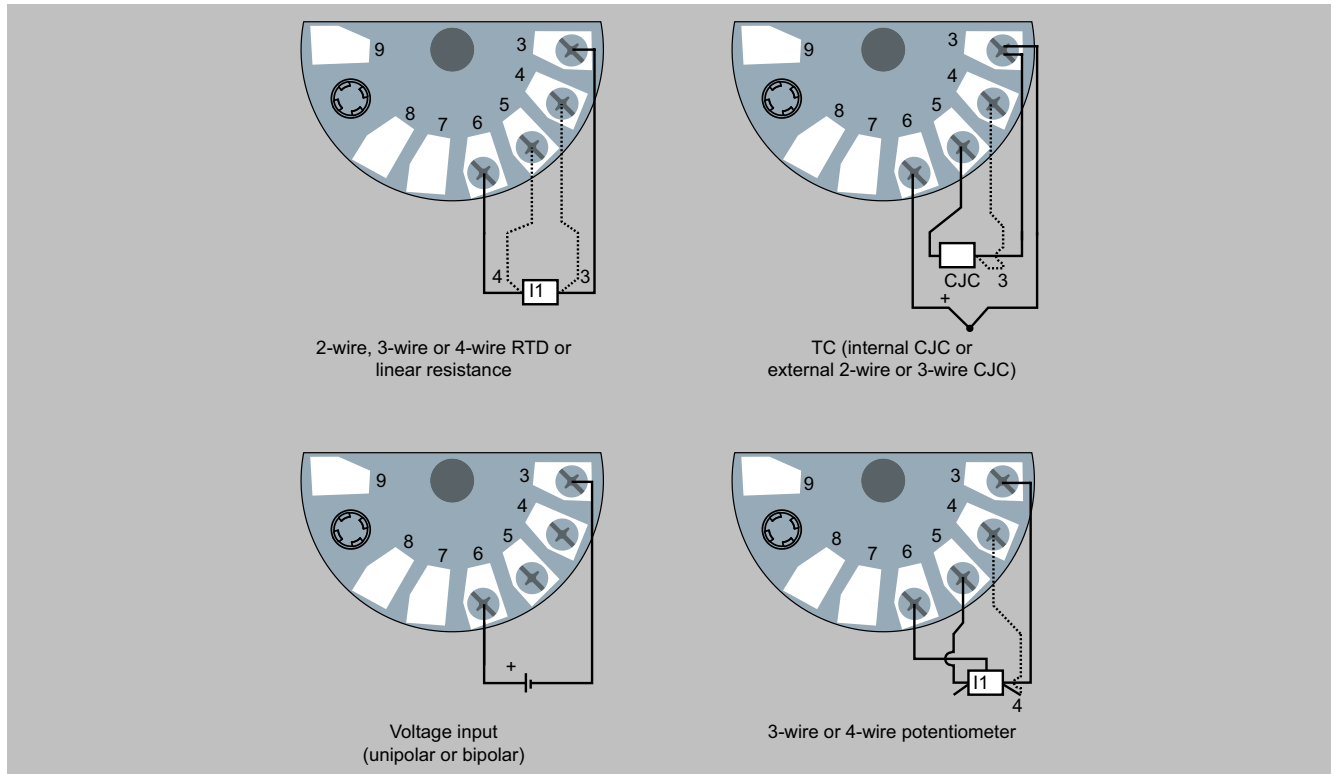
Temperature transmitters

Field transmitters/field indicator / SITRANS TF320 (HART, universal)

Circuit diagrams

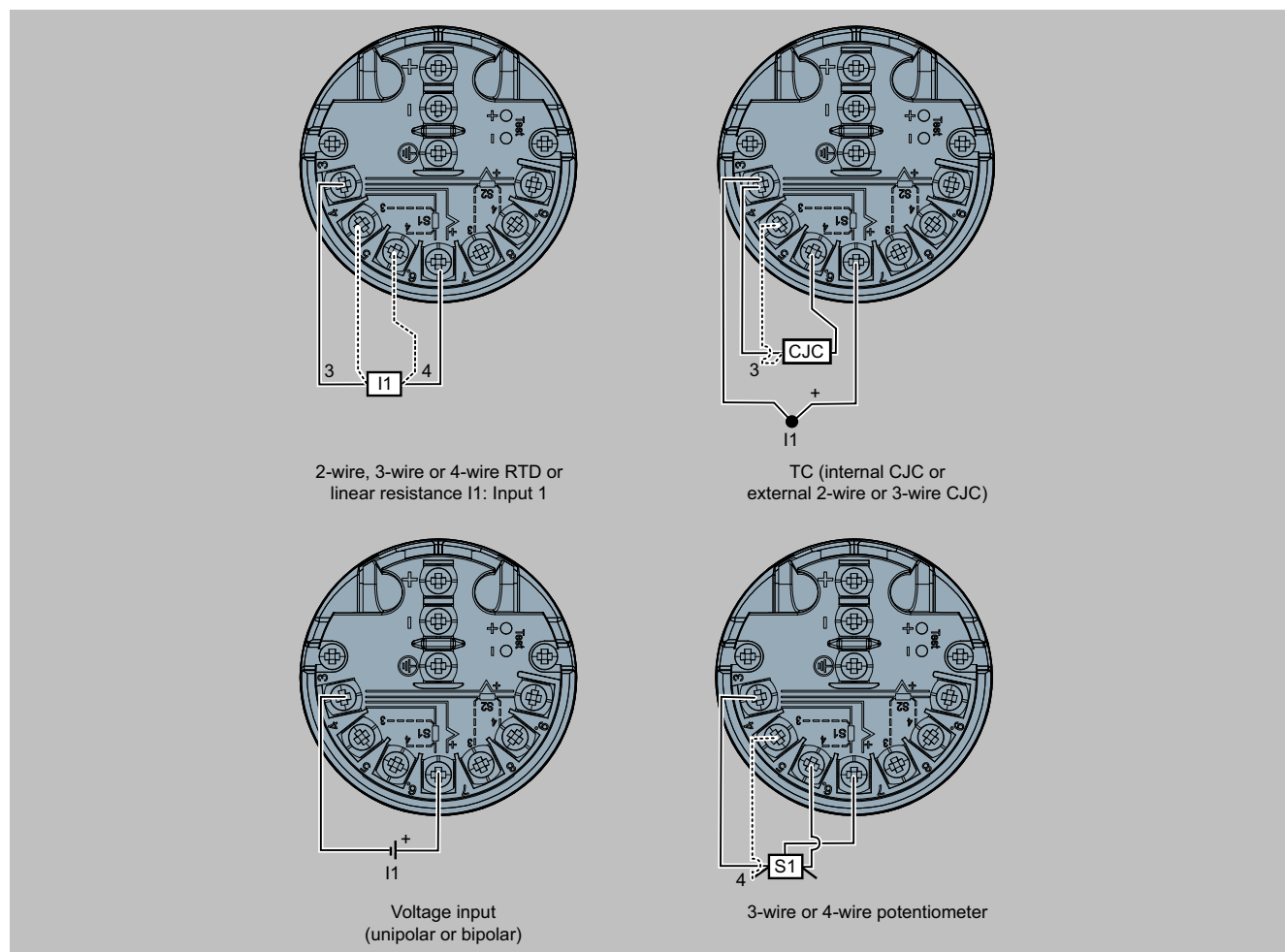
Connections

Input connection



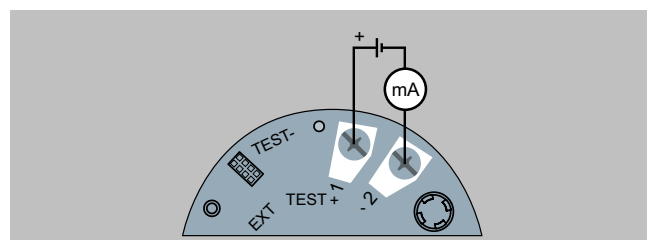
SITRANS TF320 in single chamber enclosure (7NG034*), input connection assignment

Circuit diagrams (continued)



SITRANS TF320 in dual chamber enclosure (7NG035*), input connection assignment

Output connection



SITRANS TF320 in single chamber enclosure (7NG034*), output connection assignment

Temperature Measurement

Temperature transmitters

Field transmitters/field indicator / SITRANS TF420 (HART, universal)

Overview



SITRANS TF420 in dual chamber enclosure

Overview (continued)



SITRANS TF420 in single chamber enclosure

- 2-wire temperature transmitter with HART communication interface
- Universal input for virtually any type of temperature sensor
- Connection of two independent input circuits for redundant operation (high input availability)
- Input drift detection
- Can be configured via PC, HART 7 or optional local operation

Benefits

- Universally applicable as a temperature transmitter with galvanic isolation for:
 - Resistance thermometer (2-wire, 3-wire, 4-wire connection)
 - Thermocouples
 - Linear resistances, potentiometer and DC voltage sources
- Local operation of the temperature transmitter via display (single chamber enclosure) or control keys accessible from outside (dual chamber enclosure)
- Rugged single or dual chamber enclosure made of die-cast aluminum or stainless steel 316/316L
- Electronic compartment isolated (watertight) from terminal compartment in dual chamber enclosure
- Degree of protection IP66/68 (1.5 m/2 h)
- Electromagnetic compatibility according to EN 61326 and NE21
- Test terminals for direct read-out of the output signal without breaking the current loop
- Remote installation option:
 - Measuring point is difficult to access
 - Measuring point is subjected to high temperatures
 - Measuring point is subjected to vibration through plant
 - Long neck pipes and thermowells must be avoided
- Temperature transmitters of the "intrinsically safe protection type, increased safety for zone 2, flameproof and dust-protected" type of protection can be installed in hazardous areas. The transmitter meets the requirements of the EU Directive 2014/34/EU (ATEX), the FM and CSA regulations as well as other national approvals, e.g. EACEx, NEPSI, KCs, Inmetro.
- SIL2/3 (with order note C20) according to IEC 61508 and Electrical Equipment For Furnaces And Ancillary Equipment (EN 50156-2)

Application

SITRANS TF420 with its two sensor inputs can be used everywhere where temperatures need to be measured without interruption under particularly adverse conditions and where a convenient local display is ideal. Which is why users from all industries have opted for this field device. The rugged enclosure protects the electronics. The stainless steel model is almost completely resistant to sea water and other aggressive substances. The inner workings offer high measuring accuracy, universal input and a wide range of diagnostic options.

Temperature Measurement

Temperature transmitters

Field transmitters/field indicator / SITRANS TF420 (HART, universal)

Function

Configuration

The communication capability over the HART protocol V 7 permits parameterization using a PC or HART communicator (hand-held communicator). The SIMATIC PDM makes it easy.

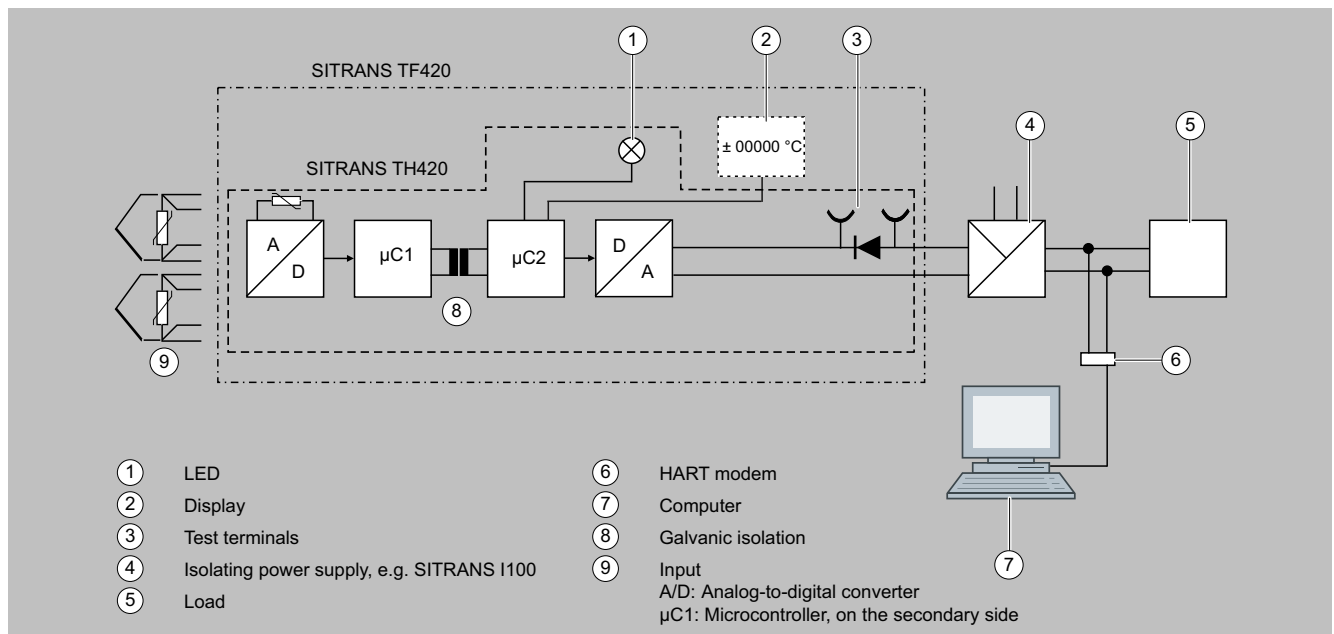
The optional local operation on the device gives you the possibility to configure the device's most important functions very quickly.

Principle of operation

SITRANS TF420 as temperature transmitter

Two sensor signals, whether resistance thermometers (RTD), thermocouples (TC), Ω or mV signals, are amplified and linearized. Input and output side are galvanically isolated. An internal cold junction is integrated for measurements with thermocouples.

The device outputs a temperature-linear direct current from 4 to 20 mA. As well as the analog transmission of measured values from 4 to 20 mA, the HART version also supports digital communication for online diagnostics, measured value transmission, and configuration. SITRANS TF420 automatically detects when a sensor should be interrupted or is indicating a short-circuit. If the back-up functionality has been selected in the primary value display, the SITRANS TF420 automatically switches to the 2nd input without interrupting the measured value; e.g. primary value input 1 with input 2 as backup. The practical test terminals allow direct measurement of 4 to 20 mA signals over an ammeter without interrupting the output current loop.



Selection and ordering data

Single chamber enclosure

SITRANS TF420 temperature transmitter with single chamber enclosure for wall or pipe mounting, two separately configurable inputs and an electrically isolated 2-wire output.	Article No. 7NG044	Order code
Click the article number for online configuration in the PIA Life Cycle Portal.	● - ● ● ● ● ● - 0 ● ● ● ● ● ● ●	
Communication		
With HART (4 ... 20 mA)	0	
Primary value output		
Input 1	0	
Input 1, input 2 as redundancy (hot backup)	1	
Input 2, input 1 as redundancy (hot backup)	2	
Mean value input 1 and input 2, both as redundancy (hot backup)	3	
Minimum input 1 and input 2, both as redundancy (hot backup)	4	
Maximum input 1 and input 2, both as redundancy (hot backup)	5	
Difference input 1 - input 2	6	
Difference input 2 - input 1	7	
Absolute difference	8	
Primary value output, customer-specific		
Minimum input 1 and input 2, without redundancy (hot backup)	9	H 1 A
Maximum input 1 and input 2, without redundancy (hot backup)	9	H 1 B
Mean value input 1 and input 2, without redundancy (hot backup)	9	H 1 C
Input 2	9	H 1 D
Input 1, type		
RTD		
• Pt100 (IEC 60751), 3-wire	B	
• Pt100 (IEC 60751), 4-wire	C	
• Pt1000 (IEC 60751), 3-wire	D	
• Pt1000 (IEC 60751), 4-wire	E	
TC		
• Type B	F	
• Type E	G	
• Type J	H	
• Type K	J	
• Type L	K	
• Type N	L	
• Type R	N	
• Type S	P	
• Type T	Q	
Potentiometer, 4-wire	R	
More types in option Vxx	Y	
Input 2, type		
No input	A	
RTD		
• Pt100 (IEC 60751), 3-wire	B	
• Pt100 (IEC 60751), 4-wire	C	
• Pt1000 (IEC 60751), 3-wire	D	
• Pt1000 (IEC 60751), 4-wire	E	
TC		
• Type B	F	
• Type E	G	
• Type J	H	
• Type K	J	
• Type L	K	
• Type N	L	
• Type R	N	

Temperature Measurement

Temperature transmitters

Field transmitters/field indicator / SITRANS TF420 (HART, universal)

Selection and ordering data (continued)

	Article No. 7NG044	Order code
SITRANS TF420 temperature transmitter with single chamber enclosure for wall or pipe mounting, two separately configurable inputs and an electrically isolated 2-wire output.	● - ● ● ● ● ● - 0 ● ● ● ● ● ● ● ●	
• Type S	P	
• Type T	Q	
Potentiometer, 4-wire	R	
More types in option Wxx	Y	
CJC configuration for TC		
Input 1: None CJC; Input 2: No CJC	0	
Input 1: Internal CJC; Input 2: Internal CJC	1	
Input 1: External CJC; input 2: External CJC; define type in option Jxx	2	
Input 1: External CJC; define type in option Jxx; input 2: Internal CJC	3	
Input 1: Internal CJC; Input 2: External CJC; define type in option Jxx	4	
Input 1: Internal CJC; Input 2: No CJC	5	
Input 1: External CJC (define type in option Jxx); input 2: No CJC	6	
Input 1: Define fixed CJC value with option Y60; Input 2: None CJC	7	
CJC configuration for TC, customer-specific		
Input 1: Fixed CJC value (define value in option Y60); Input 2: Fixed CJC value (define value in option Y61)	9	L 1 A
Input 1: External CJC (define type in option Jxx); Input 2: Define fixed CJC value with option Y61	9	L 1 B
Input 1: Define fixed CJC value with option Y60; Input 2: External CJC (define type in option Jxx)	9	L 1 C
Input 1: Define fixed CJC value with option Y60; Input 2: Internal CJC	9	L 1 D
Input 1: Internal CJC; Input 2: Define fixed CJC value with option Y61	9	L 1 E
Material of non-wetted parts		
Die-cast aluminum enclosure	1	
Enclosure made of stainless steel precision casting 1.4401 (similar to 316)	3	
Type of protection (Ex)		
General safety		A
Intrinsic safety (Ex i) / non-incendive field wiring (NIFW)		B
Flameproof enclosure (Ex d) / Explosion proof (XP)		C
Dust ignition protection by enclosure zone 21/22 (Ex t) / increased safety zone 2 (Ex ec) / dust ignition proof (DIP) / non-incendive (NI)		L
Flameproof enclosure (Ex d) / intrinsic safety (Ex i) / dust ignition protection by enclosure zone 21/22 (Ex t) / increased safety zone 2 (Ex ec)		S
Flameproof enclosure (Ex d) / explosion proof (XP) / intrinsic safety (Ex i) / non-incendive / non-incendive field wiring (NIFW) / dust explosion protection by enclosure zone 21/22 (Ex t) / increased safety zone 2 (Ex ec) / dust ignition proof (DIP) / non-incendive (NI)		T
Electrical connection/cable entries		
2 × M20 × 1.5		F
2 × ½" NPT		M
Local operation		
Without local operation		0
Local operation (closed lid)		1
Local operation (lid with glass window)		2

Options	Order code
Add "-Z" to article number, specify order code and, if applicable, free text	
Cable gland included	
Plastic	A00
Metal	A01
Stainless steel	A02
Stainless steel 316L/1.4404	A03
CMP, for XP devices	A10
CAPRI ADE 4F, CuZn	A11
Cable inner diameter 7 ... 12 mm (0.28 ... 0.47 inches) Cable outer diameter 10 ... 16 mm (0.39 ... 0.63 inches)	
CAPRI ADE 4F, stainless steel	A12
Cable inner diameter 7 ... 12 mm (0.28 ... 0.47 inches) Cable outer diameter 10 ... 16 mm (0.39 ... 0.63 inches)	
Cable entry accessories	
Sealing element for 2 cables included	A20

Selection and ordering data (continued)

Options	Order code
Add "-Z" to article number, specify order code and, if applicable, free text	
Device plug Han mounted left	
Device plug Han 7D (metal, straight)	A32
Cable socket included	
Metal, for device plug Han 7D and Han 8D	A41
Device plug M12 mounted left	
Stainless steel, without cable socket	A62
Stainless steel, with cable socket	A63
Mounting cable glands/plugs	
Cable gland mounted	A97
Device plug for output, mounted right	A98
Manufacturer's declarations	
Inspection certificate EN 10204-3.1: Manufacturer test certificate for transmitters (5 measured values)	C11
Certificates for functional safety	
Functional safety (IEC 61508) - SIL2/3; Electrical equipment for furnaces and ancillary equipment (EN 50156-2)	C20
Device options	
PDF file with device settings	D10
IP66/IP68 degree of protection (not for device plug M12 and Han)	D30
Unlabeled TAG plate	D40
Without labeling of the measuring range on the TAG plate	D41
Nameplate and approval plate, stainless steel 1.4404/316L	D42
Overvoltage protection up to 20 kV (external)	D71
Jumper plug set on device for write protection	D81
Jumper plug set on device set for fault current >21 mA (instead of <3.6 mA) (only non-SIL)	D82
General approval without Ex approval	
Worldwide (CE, RCM) except EAC, FM, KCC	E00
Global	E01
EAC	E07
FM	E08
KCC	E09
Explosion protection certificates	
ATEX (Europe)	E20
FM (USA and Canada)	E22
IECEX (Worldwide)	E23
NEPSI (China)	E27
PESO (India)	E28
UKEX (United Kingdom)	E33
ATEX (Europe) and IECEX (Worldwide)	E47
ATEX, IECEX and FM	E49
Factory	
Made in France	F00
Mounting system (only single chamber enclosures)	
Pipe mounting kit for single chamber enclosure, stainless steel 316L	H06
Wall mounting kit for single chamber enclosure, stainless steel 316L	H07
External CJC types	
Pt100, IEC 60751, 3-wire	J02
Pt100, IEC 60751, 4-wire	J03
Ni100, DIN 43760-87, 3-wire	J05
Ni100, DIN 43760-87, 4-wire	J06

Temperature Measurement

Temperature transmitters

Field transmitters/field indicator / SITRANS TF420 (HART, universal)

Selection and ordering data (continued)

Options Add "-Z" to article number, specify order code and, if applicable, free text	Order code
Noise damping	
Noise damping 60 Hz instead of 50 Hz	P10
Input 1: TC	
Type C W5	V01
Type D W3	V02
Type U	V03
Type Lr	V04
Input 1: Callendar-Van Dusen	
2-wire (define wire resistance value in option Y51 and Callendar-Van Dusen parameter in option Y35)	V50
3-wire (define Callendar-Van Dusen parameter in option Y35)	V51
4-wire (define Callendar-Van Dusen parameter in option Y35)	V52
Input 1: RTD	
Pt × (IEC 60751), 2-wire (define wire resistance value in option Y51 and RTD factor × in option Y21)	V60
Pt × (IEC 60751), 3-wire, define RTD factor × in option Y21	V61
Pt × (IEC 60751), 4-wire, define RTD factor × in option Y21	V62
Pt × (JIS C1604), 2-wire (define wire resistance value in option Y51 and RTD factor × in option Y21)	V63
Pt × (JIS C1604-81), 3-wire, define RTD factor × in option Y21	V64
Pt × (JIS C1604-81), 4-wire, define RTD factor × in option Y21	V65
Pt × (GOST 6651-2009), 2-wire (define wire resistance value in option Y51 and RTD factor × in option Y21)	V66
Pt × (GOST 6651-2009), 3-wire, define RTD factor × in option Y21	V67
Pt × (GOST 6651-2009), 4-wire, define RTD factor × in option Y21	V68
Ni × (DIN 43760-87), 2-wire (define wire resistance value in option Y51 and RTD factor × in option Y21)	V69
Ni × (DIN 43760-87), 3-wire, define RTD factor × in option Y21	V70
Ni × (DIN 43760-87), 4-wire, define RTD factor × in option Y21	V71
Ni × (GOST 6651-2009), 2-wire (define wire resistance value in option Y51 and RTD factor × in option Y21)	V72
Ni × (GOST 6651-2009), 3-wire, define RTD factor × in option Y21	V73
Ni × (GOST 6651-2009), 4-wire, define RTD factor × in option Y21	V74
Cu × (ECW-15), 2-wire (define wire resistance value in option Y51 and RTD factor × in option Y21)	V75
Cu × (ECW-15), 3-wire, define RTD factor × in option Y21	V76
Cu × (ECW-15), 4-wire, define RTD factor × in option Y21	V77
Cu × (GOST 6651-94), 2-wire (define wire resistance value in option Y51 and RTD factor × in option Y21)	V78
Cu × (GOST 6651-94), define 3-wire, define RTD factor × in option Y21	V79
Cu × (GOST 6651-94), define 4-wire, define RTD factor × in option Y21	V80
Cu × (GOST 6651-2009), define 3-wire, define RTD factor × in option Y21	V82
Cu × (GOST 6651-2009), define 4-wire, define RTD factor × in option Y21	V83

Selection and ordering data (continued)

Options Add "-Z" to article number, specify order code and, if applicable, free text	Order code
Input 2: TC	
TC type W5	W01
TC type W3	W02
TC type U	W03
TC type Lr	W04
Input 2: RTD	
Pt × (IEC 60751), 2-wire (define wire resistance value in option Y52 and RTD factor × in option Y22)	W60
Pt × (IEC 60721), 3-wire, define RTD factor × in option Y22	W61
Pt × (IEC 60721), 4-wire, define RTD factor × in option Y22	W62
Pt × (JIS C1604), 2-wire (define wire resistance value in option Y52 and RTD factor × in option Y22)	W63
Pt × (JIS C1604-81), 3-wire, define RTD factor × in option Y22	W64
Pt × (JIS C1604-81), 4-wire, define RTD factor × in option Y22	W65
Pt × (GOST 6651-2009), 2-wire (define wire resistance value in option Y52 and RTD factor × in option Y22)	W66
Pt × (GOST 6651-2009), 3-wire, define RTD factor × in option Y22	W67
Pt × (GOST 6651-2009), 4-wire, define RTD factor × in option Y22	W68
Ni × (DIN 43760-87), 2-wire (define wire resistance value in option Y52 and RTD factor × in option Y22)	W69
Ni × (DIN 43760-87), 3-wire, define RTD factor × in option Y22	W70
Ni × (DIN 43760-87), 4-wire, define RTD factor × in option Y22	W71
Ni × (GOST 6651-2009), 2-wire (define wire resistance value in option Y52 and RTD factor × in option Y22)	W72
Ni × (GOST 6651-2009), 3-wire, define RTD factor × in option Y22	W73
Ni × (GOST 6651-2009), 4-wire, define RTD factor × in option Y22	W74
Cu × (ECW-15), 2-wire (define wire resistance value in option Y52 and RTD factor × in option Y22)	W75
Cu × (ECW-15), 3-wire, define RTD factor × in option Y22	W76
Cu × (ECW-15), 4-wire, define RTD factor × in option Y22	W77
Cu × (GOST 6651-94), 2-wire (define wire resistance value in option Y52 and RTD factor × in option Y22)	W78
Cu × (GOST 6651-94), 3-wire, define RTD factor × in option Y22	W79
Cu × (GOST 6651-94), 4-wire, define RTD factor × in option Y22	W80
Cu × (GOST 6651-2009), 2-wire (define wire resistance value in option Y52 and RTD factor × in option Y22)	W81
Cu × (GOST 6651-2009), 3-wire, define RTD factor × in option Y22	W82
Cu × (GOST 6651-2009), 4-wire, define RTD factor × in option Y22	W83
Device settings	
Measuring range setting temperature input: Lower range value (max. 5 characters), upper range value (max. 5 characters), unit (°C, °F, °Ra, K)	Y01
Customer-specific programming in plain text (n-lines)	Y09
Tag (device parameters, max. 32 characters), adhesive label	Y15
Measuring point description (device parameters, max. 32 characters), adhesive label	Y16
Tag (device parameters, max. 8 characters), adhesive label	Y17

Temperature Measurement

Temperature transmitters

Field transmitters/field indicator / SITRANS TF420 (HART, universal)

Selection and ordering data (continued)

Options	Order code
Add "-Z" to article number, specify order code and, if applicable, free text	
Descriptor (device parameters, max. 16 characters), adhesive label	Y18
Input 1: RTD factor; e.g. factor "200" = Pt200, adhesive label	Y21
Input 2: RTD factor (e.g. factor = 200 => RTD Pt200), adhesive label	Y22
Fault current for input circuit short-circuit & interruption instead of 22.4 mA (short-circuit) and 22.8 mA (interruption) e.g. 3.6 mA and 22.4 mA [3.6 - 3.6; 3.6 - 22.8; 22.4 - 3.6]	Y31
CvD Sensor matching factors input 1 R0, A, B, C, Beta, Delta Selection: CVDR - R0 (format for example 100.0), CVDA - A (format for example 0.003908), CVDB - B (format for example -5.775E-07), CVDC - C (format for example -4.183E-12)	Y35
CvD Sensor matching factors input 2 R0, A, B, C, Beta, Delta Selection: CVDR - R0 (format for example 100.0), CVDA - A (format for example 0.003908), CVDB - B (format for example -5.775E-07), CVDC - C (format for example -4.183E-12)	Y36
Wire resistance value input 1 in ohms (0 ... 100 ohms)	Y51
Wire resistance value input 2 in ohms (0 ... 100 ohms)	Y52
Input 1: CJC sensor, fixed value (see measuring range for unit)	Y60
Input 2: CJC sensor, fixed value (see measuring range for unit)	Y61
ID number of special design	Y99

Dual chamber enclosure

	Article No.	Order code
SITRANS TF420 temperature transmitter with dual chamber enclosure for wall or pipe mounting, two separately configurable inputs and an electrically isolated 2-wire output.	7NG045	
Click the article number for online configuration in the PIA Life Cycle Portal.	● - ● ● ● ● ● ● - 0 ● ● ● ● ● ● ●	
Communication		
With HART (4 ... 20 mA)	0	
Primary value output		
Input 1	0	
Input 1, input 2 as redundancy (hot backup)	1	
Input 2, input 1 as redundancy (hot backup)	2	
Mean value input 1 and input 2, both as redundancy (hot backup)	3	
Minimum input 1 and input 2, both as redundancy (hot backup)	4	
Maximum input 1 and input 2, both as redundancy (hot backup)	5	
Difference input 1 - input 2	6	
Difference input 2 - input 1	7	
Absolute difference	8	
Primary value output, customer-specific		
Minimum input 1 and input 2, without redundancy (hot backup)	9	H 1 A
Maximum input 1 and input 2, without redundancy (hot backup)	9	H 1 B
Mean value input 1 and input 2, without redundancy (hot backup)	9	H 1 C
Input 2	9	H 1 D
Input 1, type		
RTD		
• Pt100 (IEC 60751), 3-wire	B	
• Pt100 (IEC 60751), 4-wire	C	
• Pt1000 (IEC 60751), 3-wire	D	
• Pt1000 (IEC 60751), 4-wire	E	

Temperature Measurement

Temperature transmitters

Field transmitters/field indicator / SITRANS TF420 (HART, universal)

Selection and ordering data (continued)

	Article No. 7NG045	Order code
SITRANS TF420 temperature transmitter with dual chamber enclosure for wall or pipe mounting, two separately configurable inputs and an electrically isolated 2-wire output.	● - ● ● ● ● ● - 0 ● ● ● ● ● ● ●	
TC		
• Type B	F	
• Type E	G	
• Type J	H	
• Type K	J	
• Type L	K	
• Type N	L	
• Type R	N	
• Type S	P	
• Type T	Q	
Potentiometer, 4-wire	R	
More types in option Vxx	Y	
Input 2, type		
Without input 2	A	
RTD		
• Pt100 (IEC 60751), 3-wire	B	
• Pt100 (IEC 60751), 4-wire	C	
• Pt1000 (IEC 60751), 3-wire	D	
• Pt1000 (IEC 60751), 4-wire	E	
TC		
• Type B	F	
• Type E	G	
• Type J	H	
• Type K	J	
• Type L	K	
• Type N	L	
• Type R	N	
• Type S	P	
• Type T	Q	
Potentiometer, 4-wire	R	
More types in option Wxx	Y	
CJC configuration for TC		
Input 1: None CJC; Input 2: No CJC	0	
Input 1: Internal CJC; Input 2: Internal CJC	1	
Input 1: External CJC; input 2: External CJC; define type in option Jxx	2	
Input 1: External CJC; define type in option Jxx; input 2: Internal CJC	3	
Input 1: Internal CJC; Input 2: External CJC; define type in option Jxx	4	
Input 1: Internal CJC; Input 2: No CJC	5	
Input 1: External CJC (define type in option Jxx); input 2: No CJC	6	
Material of non-wetted parts		
Die-cast aluminum enclosure	1	
Enclosure made of stainless steel precision casting CF3M/1.4409 (similar to 316L)	2	
Type of protection (Ex)		
General safety (non-Ex)		A
Intrinsic safety (Ex i) / non-incendive field wiring (NIFW)		B
Flameproof enclosure (Ex d) / Explosion proof (XP)		C
Dust ignition protection by enclosure zone 21/22 (Ex t) / increased safety zone 2 (Ex ec) / dust ignition proof (DIP) / non-incendive (NI)		L
Flameproof enclosure (Ex d) / intrinsic safety (Ex i) / dust ignition protection by enclosure zone 21/22 (Ex t) / increased safety zone 2 (Ex ec)		S
Flameproof enclosure (Ex d) / explosion proof (XP) / intrinsic safety (Ex i) / non-incendive / non-incendive field wiring (NIFW) / dust ignition protection by enclosure zone 21/22 (Ex t) / increased safety zone 2 (Ex ec) / dust ignition proof (DIP) / non-incendive (NI)		T

Temperature Measurement

Temperature transmitters

Field transmitters/field indicator / SITRANS TF420 (HART, universal)

Selection and ordering data (continued)

	Article No. 7NG045	Order code
SITRANS TF420 temperature transmitter with dual chamber enclosure for wall or pipe mounting, two separately configurable inputs and an electrically isolated 2-wire output.	● - ● ● ● ● ● - 0 ● ● ● ● ● ● ●	
Electrical connection/cable entries		
2 × M20 × 1.5		F
2 × ½" NPT		M
Local operation		
Without local operation		0
Local operation (closed lid)		1
Local operation (lid with glass window)		2

Options	Order code
Add "-Z" to article number, specify order code and, if applicable, free text	
Cable gland included	
Plastic	A00
Metal	A01
Stainless steel	A02
Stainless steel 316L/1.4404	A03
CMP, for XP devices	A10
CAPRI ADE 4F, CuZn, cable inner diameter 7 ... 12 mm (0.28 ... 0.47 inches), cable outer diameter 10 ... 16 mm (0.39 ... 0.63 inches)	A11
CAPRI ADE 4F, stainless steel, cable inner diameter 7 ... 12 mm (0.28 ... 0.47 inches), cable outer diameter 10 ... 16 mm (0.39 ... 0.63 inches)	A12
Cable entry accessories	
Sealing element for 2 cables included	A20
Device plug Han mounted left	
Device plug Han 7D (plastic, straight)	A30
Device plug Han 7D (plastic, angled)	A31
Device plug Han 7D (metal, straight)	A32
Device plug Han 7D (metal, angled)	A33
Device plug Han 8D (plastic, straight)	A34
Device plug Han 8D (plastic, angled)	A35
Device plug Han 8D (metal, straight)	A36
Device plug Han 8D (metal, angled)	A37
Cable socket included	
Plastic, for device plug Han 7D and Han 8D	A40
Metal, for device plug Han 7D and Han 8D	A41
Device plug M12 mounted left	
Stainless steel, without cable socket	A62
Stainless steel, with cable socket	A63
Mounting cable glands/plugs	
Cable gland mounted	A97
Device plug for output, mounted right	A98
Manufacturer's declarations	
Inspection certificate EN 10204-3.1: Manufacturer test certificate for transmitters (5 measured values)	C11
Certificates for functional safety	
Functional safety (IEC 61508) - SIL2/3; Electrical equipment for furnaces and ancillary equipment (EN 50156-2)	C20
Device options	
PDF file with device settings	D10
Double layer coating (epoxy resin and polyurethane) 120 µm of enclosure and lid	D20

Selection and ordering data (continued)

Options	Order code
Add "-Z" to article number, specify order code and, if applicable, free text	
IP66/IP68 degree of protection (not for device plug M12 and Han)	D30
Unlabeled TAG plate	D40
Without labeling of the measuring range on the TAG plate	D41
Stainless steel Ex plate 1.4404/316L	D42
Overvoltage protection up to 20 kV (external)	D71
Jumper plug set on device for write protection	D81
Jumper plug set on device set for fault current >21 mA (instead of <3.6 mA) (only non-SIL)	D82
General approval without Ex approval	
Worldwide (CE, RCM) except EAC, FM, KCC	E00
Global	E01
EAC	E07
FM	E08
KCC	E09
Explosion protection certificates	
ATEX (Europe)	E20
FM (USA and Canada)	E22
IECEX (Worldwide)	E23
NEPSI (China)	E27
PESO (India)	E28
ATEX (Europe) and IECEX (Worldwide)	E47
ATEX, IECEX and FM	E49
Mounting brackets (only dual chamber enclosure)	
Wall/pipe mounting bracket for dual chamber enclosure, steel	H01
Wall/pipe mounting bracket for dual chamber enclosure, stainless steel 304	H02
Wall/pipe mounting bracket for dual chamber enclosure, stainless steel 316L	H03
External CJC types	
Pt100, IEC 60751, 3-wire	J02
Pt100, IEC 60751, 4-wire	J03
Ni100, DIN 43760-87, 3-wire	J05
Ni100, DIN 43760-87, 4-wire	J06
Noise damping	
Noise damping 60 Hz instead of 50 Hz	P10
Input 1: TC	
Type C W5	V01
Type D W3	V02
Type U	V03
Type Lr	V04
Input 1: Callendar-Van Dusen	
2-wire (define wire resistance value in option Y51 and Callendar-Van Dusen parameter in option Y35)	V50
3-wire (define Callendar-Van Dusen parameter in option Y35)	V51
4-wire (define Callendar-Van Dusen parameter in option Y35)	V52
Input 1: RTD	
Pt × (IEC 60751), 2-wire (define wire resistance value in option Y51 and RTD factor × in option Y21)	V60
Pt × (IEC 60751), 3-wire, define RTD factor × in option Y21	V61

Temperature Measurement

Temperature transmitters

Field transmitters/field indicator / SITRANS TF420 (HART, universal)

Selection and ordering data (continued)

Options Add "-Z" to article number, specify order code and, if applicable, free text	Order code
Pt × (IEC 60751), 4-wire, define RTD factor × in option Y21	V62
Pt × (JIS C1604), 2-wire (define wire resistance value in option Y51 and RTD factor × in option Y21)	V63
Pt × (JIS C1604-81), 3-wire, define RTD factor × in option Y21	V64
Pt × (JIS C1604-81), 4-wire, define RTD factor × in option Y21	V65
Pt × (GOST 6651-2009), 2-wire (define wire resistance value in option Y51 and RTD factor × in option Y21)	V66
Pt × (GOST 6651-2009), 3-wire, define RTD factor × in option Y21	V67
Pt × (GOST 6651-2009), 4-wire, define RTD factor × in option Y21	V68
Ni × (DIN 43760-87), 2-wire (define wire resistance value in option Y51 and RTD factor × in option Y21)	V69
Ni × (DIN 43760-87), 3-wire, define RTD factor × in option Y21	V70
Ni × (DIN 43760-87), 4-wire, define RTD factor × in option Y21	V71
Ni × (GOST 6651-2009), 2-wire (define wire resistance value in option Y51 and RTD factor × in option Y21)	V72
Ni × (GOST 6651-2009), 3-wire, define RTD factor × in option Y21	V73
Ni × (GOST 6651-2009), 4-wire, define RTD factor × in option Y21	V74
Cu × (ECW-15), 2-wire (define wire resistance value in option Y51 and RTD factor × in option Y21)	V75
Cu × (ECW-15), 3-wire, define RTD factor × in option Y21	V76
Cu × (ECW-15), 4-wire, define RTD factor × in option Y21	V77
Cu × (GOST 6651-94), 2-wire (define wire resistance value in option Y51 and RTD factor × in option Y21)	V78
Cu × (GOST 6651-94), define 3-wire, define RTD factor × in option Y21	V79
Cu × (GOST 6651-94), define 4-wire, define RTD factor × in option Y21	V80
Cu × (GOST 6651-2009), define 3-wire, define RTD factor × in option Y21	V82
Cu × (GOST 6651-2009), define 4-wire, define RTD factor × in option Y21	V83
Input 2: TC	
TC type W5	W01
TC type W3	W02
TC type U	W03
TC type Lr	W04
Input 2: Callendar-Van Dusen	
2-wire (define wire resistance value in option Y52 and Callendar-Van Dusen parameter in option Y36)	W50
3-wire (define Callendar-Van Dusen parameter in option Y36)	W51
4-wire (define Callendar-Van Dusen parameter in option Y36)	W52
Input 2: RTD	
Pt × (IEC 60751), 2-wire (define wire resistance value in option Y52 and RTD factor × in option Y22)	W60
Pt × (IEC 60721), 3-wire, define RTD factor × in option Y22	W61
Pt × (IEC 60721), 4-wire, define RTD factor × in option Y22	W62
Pt × (JIS C1604), 2-wire (define wire resistance value in option Y52 and RTD factor × in option Y22)	W63
Pt × (JIS C1604-81), 3-wire, define RTD factor × in option Y22	W64

Selection and ordering data (continued)

Options	Order code
Add "-Z" to article number, specify order code and, if applicable, free text	
Pt × (JIS C1604-81), 4-wire, define RTD factor × in option Y22	W65
Pt × (GOST 6651-2009), 2-wire (define wire resistance value in option Y52 and RTD factor × in option Y22)	W66
Pt × (GOST 6651-2009), 3-wire, define RTD factor × in option Y22	W67
Pt × (GOST 6651-2009), 4-wire, define RTD factor × in option Y22	W68
Ni × (DIN 43760-87), 2-wire (define wire resistance value in option Y52 and RTD factor × in option Y22)	W69
Ni × (DIN 43760-87), 3-wire, define RTD factor × in option Y22	W70
Ni × (DIN 43760-87), 4-wire, define RTD factor × in option Y22	W71
Ni × (GOST 6651-2009), 2-wire (define wire resistance value in option Y52 and RTD factor × in option Y22)	W72
Ni × (GOST 6651-2009), 3-wire, define RTD factor × in option Y22	W73
Ni × (GOST 6651-2009), 4-wire, define RTD factor × in option Y22	W74
Cu × (ECW-15), 2-wire (define wire resistance value in option Y52 and RTD factor × in option Y22)	W75
Cu × (ECW-15), 3-wire, define RTD factor × in option Y22	W76
Cu × (ECW-15), 4-wire, define RTD factor × in option Y22	W77
Cu × (GOST 6651-94), 2-wire (define wire resistance value in option Y52 and RTD factor × in option Y22)	W78
Cu × (GOST 6651-94), 3-wire, define RTD factor × in option Y22	W79
Cu × (GOST 6651-94), 4-wire, define RTD factor × in option Y22	W80
Cu × (GOST 6651-2009), 2-wire (define wire resistance value in option Y52 and RTD factor × in option Y22)	W81
Cu × (GOST 6651-2009), 3-wire, define RTD factor × in option Y22	W82
Cu × (GOST 6651-2009), 4-wire, define RTD factor × in option Y22	W83
Device settings	
Measuring range setting temperature input: Lower range value (max. 5 characters), upper range value (max. 5 characters), unit (°C, °F, °Ra, K)	Y01
Customer-specific programming in plain text (n-lines)	Y09
Tag (device parameters, max. 32 characters), plate, stainless steel 316L/1.4404	Y15
Measuring point description (device parameter, max. 32 characters), stainless steel 316L/1.4404	Y16
Tag (device parameters, max. 8 characters), stainless steel 316L/1.4404	Y17
Descriptor (device parameters, max. 16 characters), stainless steel 316L/1.4404	Y18
Input 1: RTD factor; e.g. factor "200" = Pt200, adhesive label	Y21
Input 2: RTD factor (e.g. factor = 200 => RTD Pt200), adhesive label	Y22

Temperature Measurement

Temperature transmitters

Field transmitters/field indicator / SITRANS TF420 (HART, universal)

Selection and ordering data (continued)

Options	Order code
Add "-Z" to article number, specify order code and, if applicable, free text	
Fault current for input circuit short-circuit & interruption instead of 22.4 mA (short-circuit) and 22.8 mA (interruption) e.g. 3.6 mA and 22.4 mA [3.6 - 3.6; 3.6 - 22.8; 22.4 - 3.6]	Y31
CvD Sensor matching factors input 1 R0, A, B, C, Beta, Delta Selection: CVDR - R0 (format for example 100.0), CVDA - A (format for example 0.003908), CVDB - B (format for example -5.775E-07), CVDC - C (format for example -4.183E-12)	Y35
CvD Sensor matching factors input 2 R0, A, B, C, Beta, Delta Selection: CVDR - R0 (format for example 100.0), CVDA - A (format for example 0.003908), CVDB - B (format for example -5.775E-07), CVDC - C (format for example -4.183E-12)	Y36
Wire resistance value input 1 in ohms (0 ... 100 ohms)	Y51
Wire resistance value input 2 in ohms (0 ... 100 ohms)	Y52
Input 1: CJC sensor, fixed value (see measuring range for unit)	Y60
Input 2: CJC sensor, fixed value (see measuring range for unit)	Y61
ID number of special design	Y99

Accessories

	Article No.
See section "Other accessories for assembly, connection and transmitter configuration"	
Modems	
Modem with USB interface and SIPROM T software	7NG3092-8KN
HART modem with USB interface	7MF4997-1DB
Thread adapter	
Thread adapter M20×1.5 (external thread) to ½-14 NPT (feexternal thread)	7MP1990-0BA00
Thread adapter M20×1.5 (external thread) to G½ (feexternal thread)	7MP1990-0BB00
Local operation	
Local operation for temperature transmitter in dual chamber enclosure	7MF7902-1AD
Mounting system for local operation 7MF7902-1AD in single chamber enclosure	7MF7902-1AS
Mounting brackets (only dual chamber enclosure)	
Wall/pipe mounting bracket for dual chamber enclosure, steel, 5/16-24UNF	7MF7900-1AB
Wall/pipe mounting bracket for dual chamber enclosure, steel, M8	7MF7900-1AC
Wall/pipe mounting bracket for dual chamber enclosure, stainless steel 316L, 5/16-24UNF	7MF7900-1AH
Wall/pipe mounting bracket for dual chamber enclosure, stainless steel 316L, M8	7MF7900-1AJ
Mounting system (only single chamber enclosures)	
Pipe mounting kit for single chamber enclosure, stainless steel 316L	7MF7900-1AK
Wall mounting kit for single chamber enclosure, stainless steel 316L	7MF7900-1AL
Cable gland	
Cable gland, gray, non-Ex, M20	7MF7906-1AB
Cable gland, gray, non-Ex, NPT	7MF7906-1BB

Selection and ordering data (continued)

	Article No.
Cable gland, metal, non-Ex, NPT	7MF7906-1BD
Cable gland, metal, non-Ex, M20	7MF7906-1AD
Cable gland, metal, Ex-d, NPT	7MF7906-1BE
Cable gland, metal, Ex-d, M20	7MF7906-1AE
Cable gland, 316L, non-Ex, NPT	7MF7906-1BH
Cable gland, 316L, non-Ex, M20	7MF7906-1AH
Cable gland, 316L, Ex-d, NPT	7MF7906-1BJ
Cable gland, 316L, Ex-d, M20	7MF7906-1AJ
Cable gland, E1FX Tri-Star 1/2-14NPT, CMP	7MF7906-1NE
Cable gland, ½ NPT Capri ADE 4F cpl., CuZn	7MF7906-1PE
Cable gland, ½ NPT Capri ADE 4F cpl., stainless steel	7MF7906-1PJ
Sealing element for 2 cables in cable gland.	7MF7906-1WN
Plug and cable socket	
Plug Han 7D, plastic, straight	7MF7906-2AB
Plug Han 7D, plastic, angled	7MF7906-2AC
Plug Han 7D, metal, straight, blue	7MF7906-2AQ
Plug Han 7D, metal, straight, gray	7MF7906-2AN
Plug Han 7D, metal, angled, blue	7MF7906-2AR
Plug Han 7D, metal, angled, gray	7MF7906-2AP
Plug Han 8D, plastic, straight	7MF7906-2EB
Plug Han 8D, plastic, angled	7MF7906-2EC
Plug Han 8D, metal, straight, blue	7MF7906-2EQ
Plug Han 8D, metal, straight, gray	7MF7906-2EN
Plug Han 8D, metal, angled, blue	7MF7906-2ER
Plug Han 8D, metal, angled, gray	7MF7906-2EP
Cable socket, plastic, for plug Han 7D	7MF7906-2BB
Cable socket, plastic, for plug Han 8D	7MF7906-2FB
Cable socket, metal, for Han 7D blue	7MF7906-2BQ
Cable socket, metal, for Han 8D blue	7MF7906-2FQ
Cable socket, metal, for Han 7D gray	7MF7906-2BN
Cable socket, metal, for Han 8D gray	7MF7906-2FN
Plug M12 with cable socket, stainless steel	7MF7906-3AB
Overvoltage protection	
Overvoltage protection up to 20 kV, M20	7MF7906-3AC
Overvoltage protection up to 20 kV, NPT	7MF7906-3AD
Lid	
Closed lid aluminum, painted 2x, without glass window, with seal NBR	7MF7901-1BB
Closed lid aluminum, painted 2x, without glass window, with seal FVMQ	7MF7901-1BC
Lid aluminum 2x coated, with glass window, with seal NBR	7MF7901-1BG
Lid aluminum 2x coated, with glass window, with seal FVMQ	7MF7901-1BH
Closed lid stainless steel precision casting, without glass window, with seal NBR	7MF7901-2AB
Closed lid stainless steel precision casting, without glass window, with seal FVMQ	7MF7901-2AC
Lid stainless steel precision casting, with glass window, with seal NBR	7MF7901-2AG
Lid stainless steel precision casting, with glass window, with seal FVMQ	7MF7901-2AH

Ordering example

SITRANS TF420 (single chamber enclosure)

7NG0450-0BA02-0AF2-Z Y01+Y17+P10

Y01: -10 ... +100 °C (32 ... 212 °F)

Temperature Measurement

Temperature transmitters

Field transmitters/field indicator / SITRANS TF420 (HART, universal)

Selection and ordering data (continued)

Y17: TICA123

Factory setting

- Input 1: Pt100 (IEC 751); 3-wire connection
- Input 2: not configured (inactive)
- Measuring range: 0 ... 100 °C (32 ... 212 °F)
- Fault current
 - Input circuit wire break: 22.8 mA
 - Input circuit short-circuit: 22.4 mA
 - Input circuit drift: 22 mA (active when input 2 is active)
 - Input monitoring wire break and short-circuit
- No trimming of input and output (offset)
- Damping 0.0 s

Technical specifications

SITRANS TF420 (HART, universal)

General	
Supply voltage ^{1) 2)}	
• Without explosion protection (non-Ex)	10.5 ... 48 V DC
• With explosion protection (Ex i)	10.5 ... 30 V DC
Additional minimum supply voltage when using test terminals	0.8 V
Maximum power loss	≤ 850 mW
Minimum load resistance at supply voltage > 37 V	$(V_{\text{supply}} - 37 \text{ V})/23 \text{ mA}$
Insulation voltage, test/operation	
• Without explosion protection (non-Ex)	2.5 kV AC/55 V AC
• With explosion protection (Ex i)	2.5 kV AC/42 V AC
Polarity protection	All inputs and outputs
Write protection	Wire jumper (transmitter), switch (on display) or software
Warm-up time	< 5 min
Starting time	< 2.75 s
Programming	HART
Signal-to-noise ratio	> 60 dB
Long-term stability	Better than: <ul style="list-style-type: none"> • ± 0.05% of measuring span/year • ± 0.18% of measuring span/5 years
Response time	4 ... 20 mA: ≤ 55 ms HART: ≤ 75 ms (typically 70 ms)
Programmable damping	0 ... 60 s
Signal dynamic	
• Input	24 bit
• Output	18 bit
Influence of change in supply voltage	< 0.005% of measuring span/V DC
Input	
<u>Resistance thermometer (RTD)</u>	
Input type	
• Pt10 ... 10000	<ul style="list-style-type: none"> • IEC 60751 • JIS C 1604-8 • GOST 6651_2009 • Callendar-Van Dusen
• Ni10 ... 10000	<ul style="list-style-type: none"> • DIN 43760-1987 • GOST 6651-2009/OIML R84:2003
• Cu5 ... 1000	<ul style="list-style-type: none"> • Edison Copper Winding No. 15 • GOST 6651-2009/OIML R84:2003
Connection type	2-wire, 3-wire or 4-wire
Wire resistance per wire	Max. 50 Ω
Input current	< 0.15 mA
Effect of the wire resistance (with 3-wire and 4-wire connections)	< 0.002 Ω/Ω
Cable, wire-wire capacity	
• Pt1000, Pt10000 (IEC 60751 and JIS C 1604-8)	Max. 30 nF
• All other input types	Max. 50 nF
Fault detection, programmable	None, short-circuited, defective, short-circuited or defective Note When the low limit for the configured input type is below the constant detection limit for short-circuited inputs, the detection of short circuits is disabled regardless of the configuration of the fault detection.
Detection limit for short-circuited input	15 Ω
Fault detection time (RTD)	≤ 75 ms (typically 70 ms)
Fault detection time (for 3-wire and 4-wire)	≤ 2 000 ms
<u>Thermocouples (TC)</u>	

Temperature Measurement

Temperature transmitters

Field transmitters/field indicator / SITRANS TF420 (HART, universal)

Technical specifications (continued)

SITRANS TF420 (HART, universal)	
Input type	
• B	IEC 60584-1
• E	IEC 60584-1
• J	IEC 60584-1
• K	IEC 60584-1
• L	DIN 43710
• Lr	GOST 3044-84
• N	IEC 60584-1
• R	IEC 60584-1
• S	IEC 60584-1
• T	IEC 60584-1
• U	DIN 43710
• W3	ASTM E988-96
• W5	ASTM E988-96
• LR	GOST 3044-84
Cold Junction Compensation (CJC)	Constant, internal or external over Pt100 or Ni100 RTD
• Temperature range internal CJC	-50 ... +100 °C (-58 ... +212 °F)
• Connection external CJC	2-wire or 3-wire
• External CJC, wire resistance per wire (for 3-wire and 4-wire connections)	50 Ω
• Effect of the wire resistance (with 3-wire and 4-wire connections)	< 0.002 Ω/Ω
• Input current external CJC	< 0.15 mA
• Temperature range external CJC	-50 ... +135 °C (-58 ... +275 °F)
• Cable, wire-wire capacity	Max. 50 nF
• Total wire resistance	Max. 10 kΩ
• Fault detection, programmable	None, short-circuited, defective, short-circuited or defective Note The short-circuited fault detection only applies to the CJC input.
• Fault detection time (TC)	≤ 75 ms (typically 70 ms)
• Fault detection time, external CJC (for 3-wire and 4-wire)	≤ 2 000 ms
Linear resistance	
Input range	10 Ω ... 100 kΩ
Minimum measuring span	25 Ω
Connection type	2-wire, 3-wire or 4-wire
Wire resistance per wire	Max. 50 Ω
Input current	< 0.15 mA
Effect of the wire resistance (with 3-wire and 4-wire connections)	< 0.002 Ω/Ω
Cable, wire-wire capacity	
• R > 400 Ω	Max. 30 nF
• R ≤ 400 Ω	Max. 50 nF
Fault detection, programmable	None, defective
Potentiometers	
Input range	0 ... 100 kΩ
Minimum measuring span	25 Ω
Connection type	2-wire, 3-wire or 4-wire
Wire resistance per wire	Max. 50 Ω
Input current	< 0.15 mA
Effect of the wire resistance (with 4-wire and 5-wire connections)	< 0.002 Ω/Ω
Cable, wire-wire capacity	
• R > 400 Ω	Max. 30 nF
• R ≤ 400 Ω	Max. 50 nF

Technical specifications (continued)

SITRANS TF420 (HART, universal)	
Fault detection, programmable	None, short-circuited, defective, short-circuited or defective Note When the configured potentiometer size is below the constant detection limit for short-circuited inputs, the detection of short circuits is disabled regardless of the configuration of the fault detection.
Detection limit for short-circuited input	15 Ω
Fault detection time, wiper arm (no short-circuit detection)	≤ 75 ms (typically 70 ms)
Fault detection time, element	≤ 2 000 ms
Fault detection time (for 4-wire and 5-wire)	≤ 2 000 ms
Supply voltage	
Measuring range	
• Unipolar	-100 ... 1700 mV
• Bipolar	-800 ... +800 mV
Minimum measuring span	2.5 mV
Input resistance	10 MΩ
Cable, wire-wire capacity	
• Input range: -100 ... 1700 mV	Max. 30 nF
• Input range: -20 ... 100 mV	Max. 50 nF
Fault detection, programmable	None, defective
Fault detection time	≤ 75 ms (typically 70 ms)
Output and HART communication	
Normal range, programmable	3.8 ... 20.5 mA/20.5 ... 3.8 mA
Extended range (output limits), programmable	3.5 ... 23 mA/23 ... 3.5 mA
Programmable input/output limits	
• Fault current	Enable/disable
• Fault current setting	3.5 ... 23 mA
Update time	10 ms
Load (with current output)	≤ (V _{Supply} - 10.5)/0.023 Ω
Load stability	< 0.01% of measuring span/100 Ω (measuring span = currently selected range)
Input fault detection, programmable (detection of input short-circuits is ignored with TC and voltage inputs)	3.5 ... 23 mA
NAMUR NE43 Upscale	> 21 mA
NAMUR NE43 Downscale	< 3.6 mA
HART protocol versions	HART 7
Measuring accuracy	
Input accuracy	See "Input accuracy" table
Output accuracy	See "Output accuracy" table
Operating conditions	
Ambient temperature	
• Without local operation in single chamber enclosure	-50 ... +85 °C (-58 ... +185 °F)
• With local operation	-40 ... +85 °C (-40 ... +185 °F)
• For transmitters with functional safety	-40 ... +80 °C (-40 ... +176 °F)
Storage temperature	-50 ... +85 °C (-58 ... +185 °F)
Reference temperature for sensor calibration	24 °C ±1.0 °C (75.2 °F ±1.8 °F)
Relative humidity	< 99% (no condensation)
Degree of protection	
• Temperature transmitter enclosure	IP66/IP68
• Terminals	IP00
Structural design	
Weight	
• Single chamber enclosure	<ul style="list-style-type: none"> Aluminum: 0.85 kg (1.87 lbs) Stainless steel: 1.69 kg (3.73 lbs)

Temperature Measurement

Temperature transmitters

Field transmitters/field indicator / SITRANS TF420 (HART, universal)

Technical specifications (continued)

SITRANS TF420 (HART, universal)	
<ul style="list-style-type: none"> Dual chamber enclosure 	<ul style="list-style-type: none"> Aluminum: 1.3 kg (2.87 lbs) Stainless steel: 3.3 kg (7.28 lbs)
Maximum core cross-section	
<ul style="list-style-type: none"> Single chamber enclosure 	1.5 mm ² (AWG 16)
<ul style="list-style-type: none"> Dual chamber enclosure 	2.5 mm ² (AWG 14)
Tightening torque for clamping screws	0.5 ... 0.6 Nm
Vibrations	IEC 60068-2-6
<ul style="list-style-type: none"> 2 ... 25 Hz 	± 1.6 mm (0.07 inches)
<ul style="list-style-type: none"> 25 ... 100 Hz 	± 4 g
Certificates and approvals	
Explosion protection ATEX/IECEx and others	
Certificates ³⁾	<ul style="list-style-type: none"> IECEx DEK 19.0069X IECEx DEK 19.0070X DEKRA 19ATEX0106 X (Category 1) DEKRA 19ATEX0108X (Category 2) DEKRA 19ATEX0107X (Category 3) A5E50642461A-2021X (Category 3)
"Intrinsic safety ia/ib" type of protection	For use in Zone 0, 1, 2, 21
<ul style="list-style-type: none"> ATEX 	<ul style="list-style-type: none"> II 1 G Ex ia IIC T6 ... T4 Ga II 2 (1) G Ex ib [ia Ga] IIC T6 ... T4 Gb II 2 (1) D Ex ib [ia Da] IIIC T100 °C Db
<ul style="list-style-type: none"> IECEx and others 	<ul style="list-style-type: none"> Ex ia IIC T6 ... T4 Ga Ex ib [ia Ga] IIC T6 ... T4 Gb Ex ib [ia Da] IIIC T 100 °C Db
"Intrinsic safety ic" type of protection	For use in Zone 2, 22
<ul style="list-style-type: none"> ATEX 	<ul style="list-style-type: none"> II 3 G Ex ic IIC T6...T4 Gc II 3 D Ex ic IIIC T100 °C Dc
<ul style="list-style-type: none"> IECEx and others 	<ul style="list-style-type: none"> Ex ic IIC T6 ... T4 Gc Ex ic IIIC T100 °C Dc
"Increased safety ec" type of protection	For use in Zone 2
<ul style="list-style-type: none"> ATEX 	II 3 G Ex ec IIC T6...T4 Gc
<ul style="list-style-type: none"> IECEx and others 	Ex ec IIC T6 ... T4 Gc
"Flameproof enclosure db" type of protection	For use in Zone 1
<ul style="list-style-type: none"> ATEX 	II 2 G Ex db IIC T6...T4 Gb
<ul style="list-style-type: none"> IECEx and others 	Ex db IIC T6 ... T4 Gb
"Protection by enclosure tb/tc" type of protection	For use in Zone 21, 22
<ul style="list-style-type: none"> ATEX 	<ul style="list-style-type: none"> II 2 D Ex tb IIC T100 °C Db II 3 D Ex tc IIIC T100 °C Dc
<ul style="list-style-type: none"> IECEx and others 	<ul style="list-style-type: none"> Ex tb IIC T100 °C Db Ex tc IIIC T100 °C Dc

¹⁾ Note that the minimum supply voltage must correspond to the value measured at the terminals of the SITRANS TF420. All external voltage drops must be taken into account.

²⁾ Protect the device from overvoltage with the help of a suitable power supply or suitable overvoltage protection equipment.

³⁾ Additional available certificates are listed on the internet at <http://www.siemens.com/processinstrumentation/certificates>

Technical specifications (continued)

Measuring ranges/Minimum measuring span

RTD

Input type	Standard	Measuring range in °C (°F)	α_0 in °C ⁻¹ (°F ⁻¹)	Minimum measuring span in °C (°F)
Pt10 ... 10000	IEC 60751	-200 ... +850 (-328 ... +1 562)	0.003851 (0.002139)	10 (50)
	JIS C 1604-8	-200 ... +649 (-328 ... +1 200)	0.003916 (0.002176)	10 (50)
	GOST 6651_2009	-200 ... +850 (-328 ... +1 562)	0.003910 (0.002172)	10 (50)
	Callendar-Van Dusen	-200 ... +850 (-328 ... +1 562)	-	10 (50)
Ni10 ... 10000	DIN 43760-1987	-60 ... +250 (-76 ... +482)	0.006180 (0.003433)	10 (50)
	GOST 6651-2009/OIML R84:2003	-60 ... +180 (-76 ... +356)	0.006170 (0.003428)	10 (50)
Cu5 ... 1000	Edison Copper Winding No. 15	-200 ... +260 (-328 ... +500)	0.004270 (0.002372)	100 (212)
	GOST 6651-2009/OIML R84:2003	-180 ... +200 (-292 ... +392)	0.004280 (0.002378)	100 (212)
	GOST 6651-94	-50 ... +200 (-58 ... +392)	0.004260 (0.002367)	100 (212)

TC

Input type	Standard	Measuring range in °C (°F)	Minimum measuring span in °C (°F)
B	IEC 60584-1	0 (85) ... 1 820 (32 (185) ... 3 308)	100 (212)
E	IEC 60584-1	-200 ... +1 000 (-392 ... +1 832)	50 (122)
J	IEC 60584-1	-100 ... +1 200 (-212 ... +2 192)	50 (122)
K	IEC 60584-1	-180 ... +1 372 (-356 ... +2 502)	50 (122)
L	DIN 43710	-200 ... +900 (-392 ... +1 652)	50 (122)
Lr	GOST 3044-84	-200 ... +800 (-392 ... +1 472)	50 (122)
N	IEC 60584-1	-180 ... +1 300 (-356 ... +2 372)	50 (122)
R	IEC 60584-1	-50 ... +1 760 (-122 ... +3 200)	100 (212)
S	IEC 60584-1	-50 ... +1 760 (-122 ... +3 200)	100 (212)
T	IEC 60584-1	-200 ... +400 (-392 ... +752)	50 (122)
U	DIN 43710	-200 ... +600 (-392 ... +1 112)	50 (122)
W3	ASTM E988-96	0 ... 2 300 (32 ... 4 172)	100 (212)
W5	ASTM E988-96	0 ... 2 300 (32 ... 4 172)	100 (212)
LR	GOST 3044-84	-200 ... +800 (-392 ... +1472)	50 (122)

Input accuracy

Basic values

Input type	Basic accuracy	Temperature coefficient ¹⁾
RTD		
Pt10	$\leq \pm 0.8$ °C (1.44 °F)	$\leq \pm 0.020$ °C/°C (°F/°F)
Pt20	$\leq \pm 0.4$ °C (0.72 °F)	$\leq \pm 0.010$ °C/°C (°F/°F)
Pt50	$\leq \pm 0.16$ °C (0.288 °F)	$\leq \pm 0.004$ °C/°C (°F/°F)
Pt100	$\leq \pm 0.04$ °C (0.072 °F)	$\leq \pm 0.002$ °C/°C (°F/°F)
Pt200	$\leq \pm 0.08$ °C (0.144 °F)	$\leq \pm 0.002$ °C/°C (°F/°F)
Pt500	$T_{max.} < 180$ °C (356 °F) = $\leq \pm 0.08$ °C (0.144 °F) $T_{max.} > 180$ °C (356 °F) = $\leq \pm 0.16$ °C (0.288 °F)	$\leq \pm 0.002$ °C/°C (°F/°F)
Pt1000	$\leq \pm 0.08$ °C (0.144 °F)	$\leq \pm 0.002$ °C/°C (°F/°F)
Pt2000	$T_{max.} < 300$ °C (572 °F) = $\leq \pm 0.08$ °C (0.144 °F) $T_{max.} > 300$ °C (572 °F) = $\leq \pm 0.4$ °C (0.72 °F)	$\leq \pm 0.002$ °C/°C (°F/°F)
Pt10000	$\leq \pm 0.16$ °C (0.288 °F)	$\leq \pm 0.002$ °C/°C (°F/°F)
Pt x	Largest tolerance of neighboring points	Largest temperature coefficient of neighboring points
Ni10	$\leq \pm 1.6$ °C (2.88 °F)	$\leq \pm 0.020$ °C/°C (°F/°F)

Temperature Measurement

Temperature transmitters

Field transmitters/field indicator / SITRANS TF420 (HART, universal)

Technical specifications (continued)

Input type	Basic accuracy	Temperature coefficient ¹⁾
Ni20	≤ ±0.8 °C (1.44 °F)	≤ ±0.010 °C/°C (°F/°F)
Ni50	≤ ±0.32 °C (0.576 °F)	≤ ±0.004 °C/°C (°F/°F)
Ni100	≤ ±0.16 °C (0.288 °F)	≤ ±0.002 °C/°C (°F/°F)
Ni120	≤ ±0.16 °C (0.288 °F)	≤ ±0.002 °C/°C (°F/°F)
Ni200	≤ ±0.16 °C (0.288 °F)	≤ ±0.002 °C/°C (°F/°F)
Ni500	≤ ±0.16 °C (0.288 °F)	≤ ±0.002 °C/°C (°F/°F)
Ni1000	≤ ±0.16 °C (0.288 °F)	≤ ±0.002 °C/°C (°F/°F)
Ni2000	≤ ±0.16 °C (0.288 °F)	≤ ±0.002 °C/°C (°F/°F)
Ni10000	≤ ±0.32 °C (0.576 °F)	≤ ±0.002 °C/°C (°F/°F)
Ni x	Largest tolerance of neighboring points	Largest temperature coefficient of neighboring points
Cu5	≤ ±1.6 °C (2.88 °F)	≤ ±0.040 °C/°C (°F/°F)
Cu10	≤ ±0.8 °C (1.44 °F)	≤ ±0.020 °C/°C (°F/°F)
Cu20	≤ ±0.4 °C (0.72 °F)	≤ ±0.010 °C/°C (°F/°F)
Cu50	≤ ±0.16 °C (0.288 °F)	≤ ±0.004 °C/°C (°F/°F)
Cu100	≤ ±0.08 °C (0.144 °F)	≤ ±0.002 °C/°C (°F/°F)
Cu200	≤ ±0.08 °C (0.144 °F)	≤ ±0.002 °C/°C (°F/°F)
Cu500	≤ ±0.16 °C (0.288 °F)	≤ ±0.002 °C/°C (°F/°F)
Cu1000	≤ ±0.08 °C (0.144 °F)	≤ ±0.002 °C/°C (°F/°F)
Cu x	Largest tolerance of neighboring points	Largest temperature coefficient of neighboring points
Linear resistance		
0 ... 400 Ω	≤ ±40 mΩ	≤ ±2 mΩ/°C (1.11 mΩ/°F)
0 ... 100 kΩ	≤ ±4 Ω	≤ ±0.2 Ω/°C (0.11 Ω/°F)
Potentiometers		
0 ... 100%	< 0.05%	< ± 0.005%
Supply voltage		
mV: -20 ... 100 mV	≤ ±5 μV	≤ ±0.2 μV/°C (0.11 μV/°F)
mV: -100 ... 1700 mV	≤ ±0.1 mV	≤ ±36 μV/°C (20 μV/°F)
mV: ± 800 mV	≤ ±0.1 mV	≤ ±32 μV/°C (17.8 μV/°F)
TC		
E	≤ ±0.2 °C (0.36 °F)	≤ ±0.025 °C/°C (°F/°F)
J	≤ ±0.25 °C (0.45 °F)	≤ ±0.025 °C/°C (°F/°F)
K	≤ ±0.25 °C (0.45 °F)	≤ ±0.025 °C/°C (°F/°F)
L	≤ ±0.35 °C (0.63 °F)	≤ ±0.025 °C/°C (°F/°F)
N	≤ ±0.4 °C (0.72 °F)	≤ ±0.025 °C/°C (°F/°F)
T	≤ ±0.25 °C (0.45 °F)	≤ ±0.025 °C/°C (°F/°F)
U	< 0 °C (32 °F) ≤ ±0.8 °C (1.44 °F) ≥ 0 °C (32 °F) ≤ ±0.4 °C (0.72 °F)	≤ ±0.025 °C/°C (°F/°F)
Lr	≤ ±0.2 °C (0.36 °F)	≤ ±0.1 °C/°C (°F/°F)
R	< 200 °C (392 °F) ≤ ±0.5 °C (0.9 °F) ≥ 200 °C (392 °F) ≤ ±1 °C (1.8 °F)	≤ ±0.1 °C/°C (°F/°F)
S	< 200 °C (392 °F) ≤ ±0.5 °C (0.9 °F) ≥ 200 °C (392 °F) ≤ ±1 °C (1.8 °F)	≤ ±0.1 °C/°C (°F/°F)
W3	≤ ±0.6 °C (1.08 °F)	≤ ±0.1 °C/°C (°F/°F)
W5	≤ ±0.4 °C (0.72 °F)	≤ ±0.1 °C/°C (°F/°F)
B ²⁾	≤ ±1 °C (1.8 °F)	≤ ±0.1 °C/°C (°F/°F)
B ³⁾	≤ ±3 °C (5.4 °F)	≤ ±0.1 °C/°C (°F/°F)
B ⁴⁾	≤ ±8 °C (14.4 °F)	≤ ±0.8 °C/°C (°F/°F)
B ⁵⁾	Not specified	Not specified
CJC (internal)	< ±0.5 °C (0.9 °F)	Included in basic accuracy
CJC (external)	≤ ±0.08 °C (0.144 °F)	≤ ±0.002 °C/°C (°F/°F)

1) Temperature coefficients correspond to the specified values or 0.002% of the input span, depending on which value is greater.

2) Accuracy of the specification range > 400 °C (752 °F)

3) Accuracy of the specification range > 160 °C (320 °F) < 400 °C (752 °F)

4) Accuracy of the specification range > 85 °C (185 °F) < 160 °C (320 °F)

5) Accuracy of the specification range < 85 °C (185 °F)

Temperature Measurement

Temperature transmitters

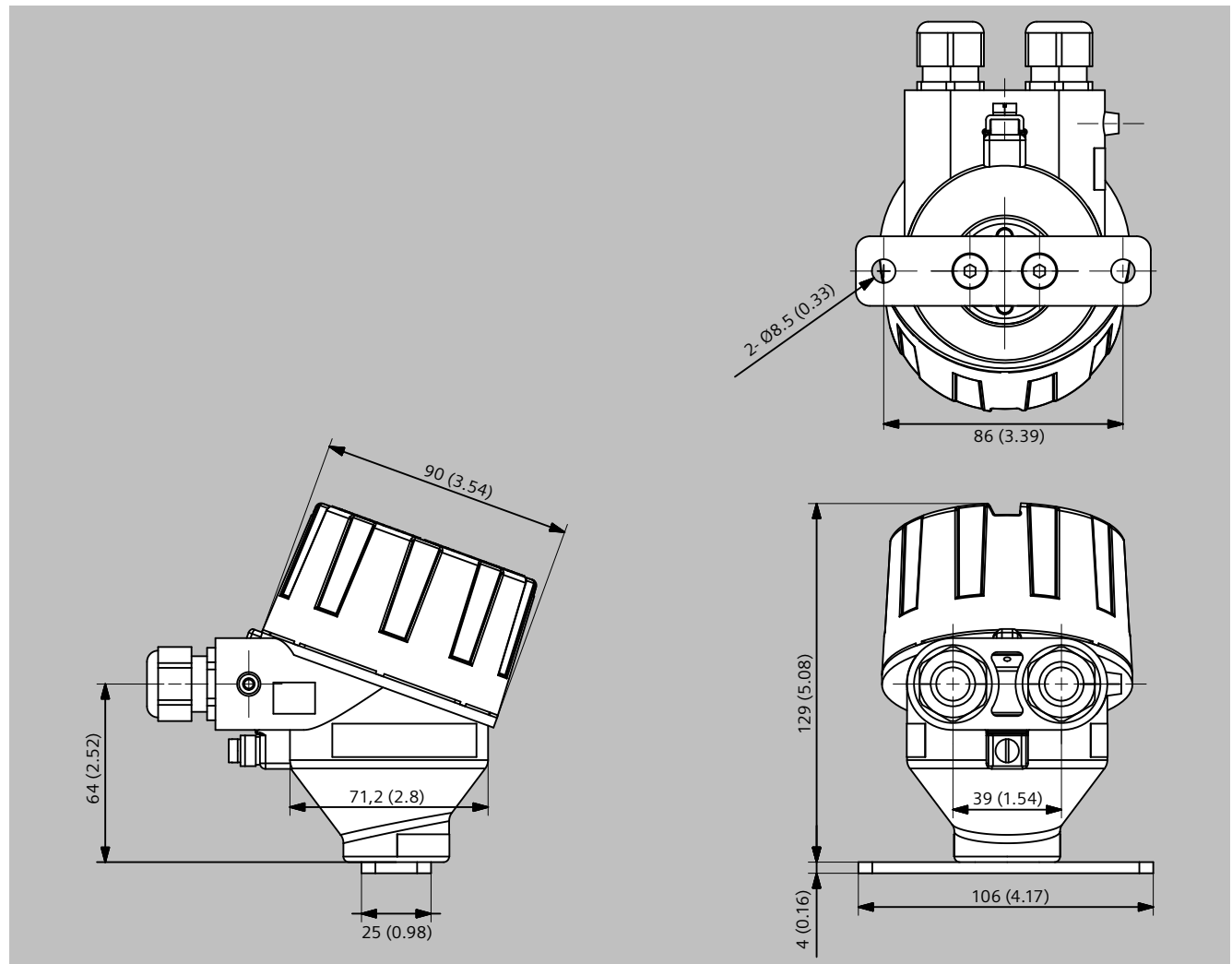
Field transmitters/field indicator / SITRANS TF420 (HART, universal)

Technical specifications (continued)

Output accuracy

Output type	Basic accuracy	Temperature coefficient
Average value measurement	Average of accuracy of input 1 and input 2	Average of temperature coefficient of input 1 and input 2
Differential measurement	Sum of accuracy of input 1 and input 2	Sum of temperature coefficient of input 1 and input 2
Analog output	$\leq \pm 1.6 \mu\text{A}$ (0.01% of the full output span)	$\leq \pm 0.48 \mu\text{A/K}$ ($\leq \pm 0.003\%$ of the full output span/K)

Dimensional drawings



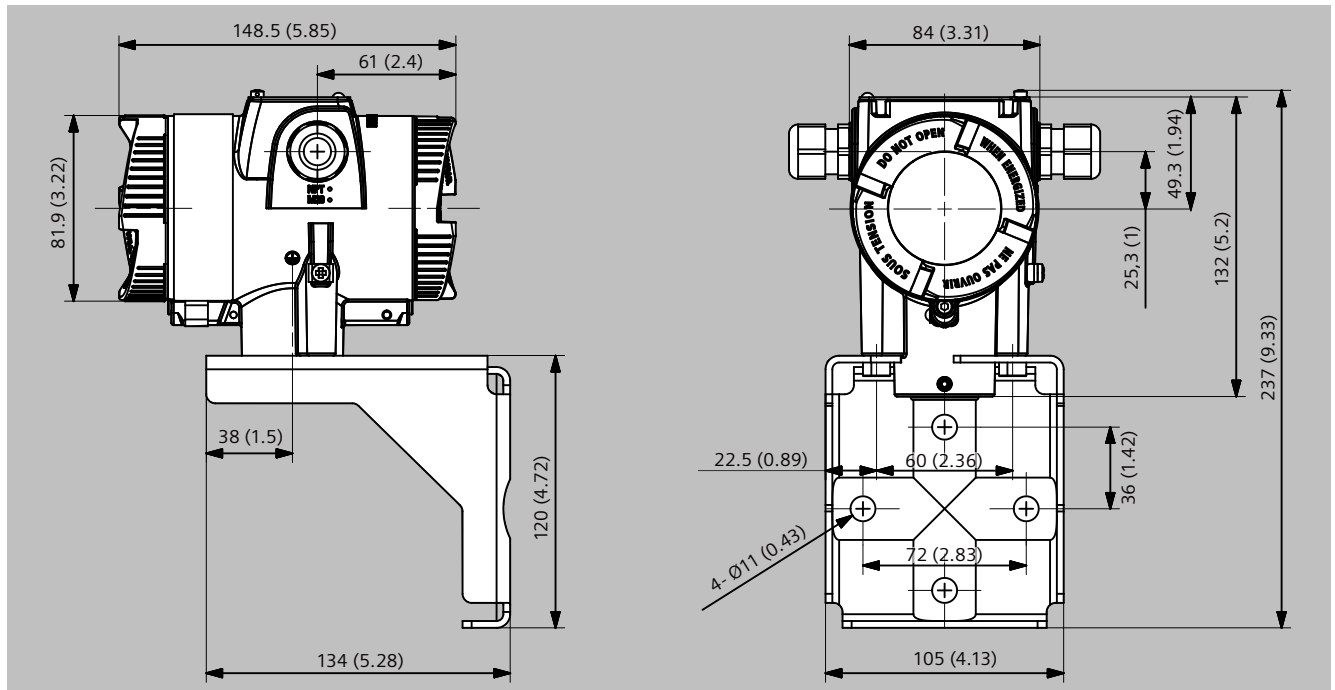
SITRANS TF420, single chamber enclosure, dimensions in mm (inch)

Temperature Measurement

Temperature transmitters

Field transmitters/field indicator / SITRANS TF420 (HART, universal)

Dimensional drawings (continued)

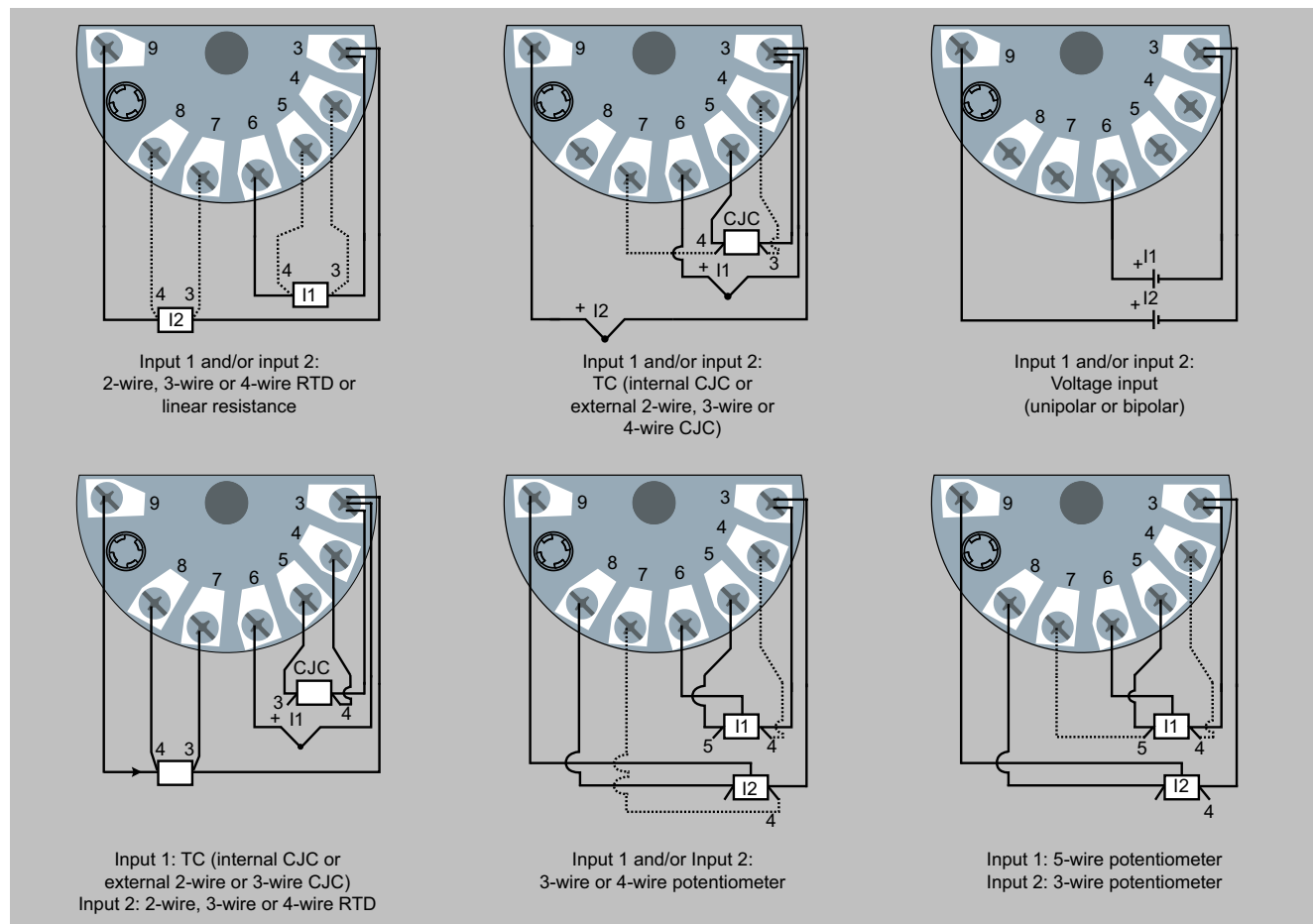


SITRANS TF420, dual chamber enclosure, dimensions in mm (inch)

Circuit diagrams

Connections

Input connection



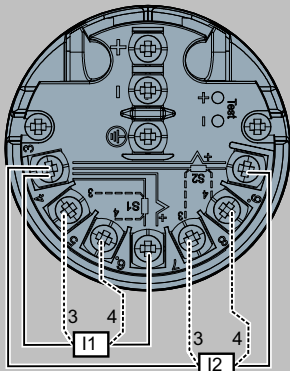
SITRANS TF420 in single chamber enclosure (7NG044*), input connection assignment

Temperature Measurement

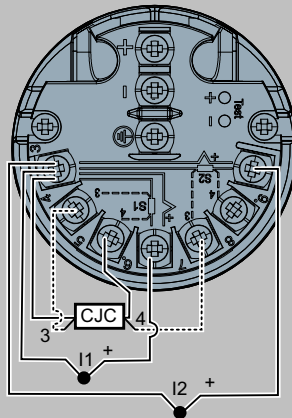
Temperature transmitters

Field transmitters/field indicator / SITRANS TF420 (HART, universal)

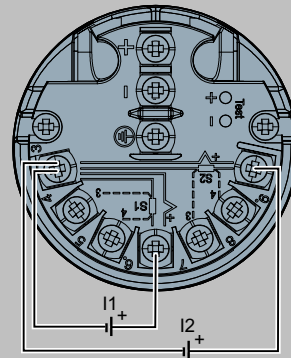
Circuit diagrams (continued)



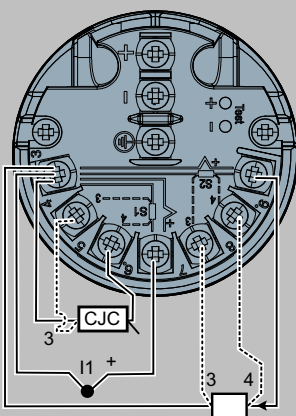
Input 1 (I1) and/or input 2 (I2):
2-wire, 3-wire or 4-wire RTD or
linear resistance



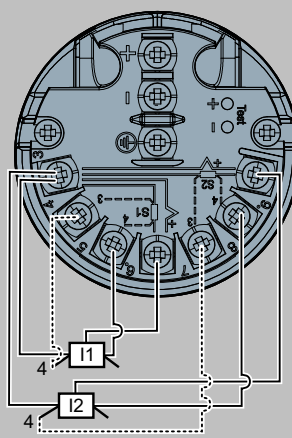
Input 1 (I1) and/or input 2 (I2):
TC (internal CJC or
external 2-wire, 3-wire or
4-wire CJC)



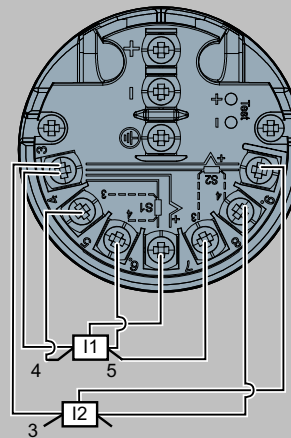
Input 1 (I1) and/or input 2 (I2):
Voltage input
(unipolar or bipolar)



Input 1: TC (internal CJC or
external 2-wire or 3-wire CJC)
Input 2: 2-wire, 3-wire or 4-wire RTD



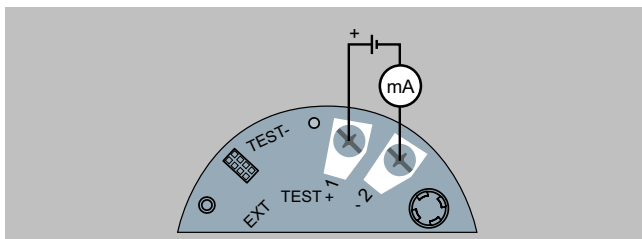
Input 1 (I1) and/or input 2 (I2):
3-wire or 4-wire potentiometer



Input 1 (I1): 5-wire potentiometer
Input 2 (I2): 3-wire potentiometer

SITRANS TF420 in dual chamber enclosure (7NG045*), input connection assignment

Output connection



SITRANS TF420 in single chamber enclosure (7NG044*), output connection assignment

Overview

Other accessories for assembly, connection and transmitter configuration

- Transmitter configuration for SITRANS TH / TR / TF and SITRANS TS
- Cable glands and adapters for SITRANS TF and SITRANS TS
- Lightning protection for SITRANS TF (SITRANS TS on request)
- Plugs for SITRANS TF and SITRANS TS
- Indicator for SITRANS TS500
- Connection and mounting accessories for SITRANS TH
- Connection and mounting accessories for field transmitter SITRANS TF
- Measuring inserts for SITRANS TS500 Measuring inserts: See SITRANS TSinsert
- Connection heads type B for SITRANS TS500 (accessory resistance thermometer)
- Enclosure gaskets for SITRANS TS500
- Connection heads type A and accessories for straight thermocouples
- Installation accessories for connection heads for straight thermocouples

Selection and ordering data

Transmitter configuration for SITRANS TH / TR / TF and SITRANS TS

	Article No.
Modems	
Modem with USB interface and SIPROM T software 4 ... 20 mA	7NG3092-8KN
• With USB connection	
• For SITRANS TH100, TH200, TH320, TR200, TR320, TF320, TF420 and TF, with TH200	
HART modem with USB interface for all HART devices	7MF4997-1DB
• With USB connection	
• For SITRANS TH300, TH320, TH420, TR300, TR320, TR420, TF320, TF420, TF in HART	
SIMATIC PDM parameterization software	See section 8 "Digitalization and communication"
• For SITRANS TH300, TR300, TH400, TF320, TF420, TF in HART / PROFIBUS PA / FOUNDATION Fieldbus	

Cable glands and adapters for SITRANS TF and SITRANS TS

	Article No.
M20 × 1.5 nickel-plated brass; with Ex-d approval	7MF4997-2FR
½-NPT nickel-plated brass; with Ex-d approval	7MF4997-2FU
CAPRI screw connection M20 × 1.5 nickel-plated brass; with Ex-d approval	7MF4997-2LA
CAPRI screw connection M20 × 1.5 stainless steel; with Ex-d approval	7MF4997-2LB
CAPRI screw connection ½-14 NPT nickel-plated brass; with Ex-d approval	7MF4997-2LC
CAPRI screw connection ½-14 NPT stainless steel; with Ex-d approval	7MF4997-2LD
Thread adapter M20 × 1.5 (external thread) to ½-14 NPT (internal thread)	7MP1990-0BA00
Thread adapter M20 × 1.5 (external thread) to G½ (internal thread)	7MP1990-0BB00

Lightning protection for SITRANS TF (SITRANS TS on request)

	Article No.
Transient protector M20 × 1.5 (lightning protection)	7MF4997-2DU
Transient protector ½-14 NPT (lightning protection)	7MF4997-2DV

Plugs for SITRANS TF and SITRANS TS

	Article No.
Han 7D plug made of plastic	7MF4997-2FB
Han 7D plug made of metal	7MF4997-2FC
M12 socket angled for cable diameter 4 ... 6 mm (0.158 ... 0.236 inches), -25 ... +85 °C (-13 ... 185 °F)	3RK1902-4CA00-4AA0

Indicator for SITRANS TS500

	Article No.
Local operation with temperature transmitters SITRANS TH320/TH420 4 ... 20 mA/HART	7MF7902-1AD
Mounting system for local operation in single chamber enclosure including fastening and connecting cable	7MF7902-1AS

Temperature Measurement

Accessories

Further accessories for assembly, connection and transmitter configuration

Selection and ordering data (continued)

Connection and mounting accessories for SITRANS TH

	Article No.
Mounting rail adapter for head transmitter (order quantity: 5 units)	7NG3092-8KA
Connecting cable 4-wire, 200 mm (7.87 inches), for input connections when using head transmitters in the high spring flap (set with 5 units)	7NG3092-8KC

Connection and mounting accessories for field transmitter SITRANS TF

	Article No.
Mounting bracket and fastening parts	
Made of steel for 7NG313. -..B.. and 7MP1110	7MF4997-1AC
Made of steel for 7NG313. -..C..	7MF4997-1AB
Made of stainless steel 304 for 7NG313. -..B.. and 7MP1110	7MF4997-1AJ
Made of stainless steel 304 for 7NG313. -..C..	7MF4997-1AH
Made of stainless steel 316L for 7NG313. -..B..	7MF4997-1AQ
Made of stainless steel 316L for 7NG313. -..C..	7MF4997-1AP
Digital indicator for SITRANS TF ¹⁾	7MF4997-1BS
Connection board for SITRANS TF	A5E02391790
Lid, die-cast aluminum, without inspection window	7MF4997-1BB
Lid, die-cast aluminum, with inspection window	7MF4997-1BE

¹⁾ Retrofitting not possible with Ex devices.

Measuring inserts for SITRANS TS500

Measuring inserts, see SITRANS TSinsert.

Connection heads type B for SITRANS TS500 (resistance thermometer accessories)

	Article No.
IP54 degree of protection	
Connection head type: similar to B00; aluminum; flange cover	7MC1907-1BA
Connection head type: similar to B00; plastic; screw cover	7MC1907-1BK
IP65 degree of protection	
Connection head type: similar to B00; aluminum; small spring flap	7MC1907-1BF
Connection head type: similar to B00; aluminum; high spring flap	7MC1907-1BL
Connection head type: B-VA, stainless steel	7MC1907-1BV
Quick-release lock for connection heads B00, B00, degree of protection of connection head reduced to IP20, weight: 0.02 kg (0.04 lb)	7MC1907-1BS

Spare parts/enclosure gaskets for SITRANS TF320/TF420 and SITRANS TS500

	Article No.
Lid gasket SITRANS TF320/TF420 single chamber enclosure as well as for SITRANS TS500 enclosure AGO, AVO, AUO, AVU	7MF7901-3AB

Selection and ordering data (continued)

Connection heads type A and accessories for straight thermocouples

Metal thermowells for straight thermocouples according to [EN 50446](#)

	Article No.
X 10 CrAl 24, material no. 1.4762 Ø 22 × 2 mm (Ø 0.87 × 0.08 inches), 0.55 ... 1.10 kg (1.21 ... 2.42 lb), dished Nominal length/thermowell length in mm (inch):	
• 500 (19.7)/520 (20.5)	7MC2900-1DA
• 710 (28.0)/730 (28.7)	7MC2900-2DA
• 1 000 (39.4)/1 020 (40.2)	7MC2900-3DA
X 18 CrNi28, material no. 1.4749 Ø 26 × 4 mm (Ø 1.02 × 0.16 inches), 1.25 ... 2.20 kg (2.76 ... 4.85 lb), dished Nominal length/thermowell length in mm (inch):	
• 500 (19.7)/520 (20.5)	7MC2900-1EC
• 710 (28.0)/730 (28.7)	7MC2900-2EC
• 1 000 (39.4)/1 020 (40.2)	7MC2900-3EC
X 15 CrNiSi 25 20, material no. 1.4841 Ø 22 × 2 mm (Ø 0.87 × 0.08 inches), 1.05 kg (2.31 lb), dished Nominal length/thermowell length in mm (inch):	
• 1 000 (39.4)/1 020 (40.2)	7MC2900-3FA
CrAl 205 (Kantal AF), material no. 1.4767 Ø 22 × 2 mm (Ø 0.87 × 0.05 inches), 0.55 ... 1.10 kg (1.21 ... 2.42 lb) Nominal length/thermowell length in mm (inch):	
• 500 (19.7)/520 (20.5)	7MC2900-1HA
• 710 (28.0)/730 (28.7)	7MC2900-2HA
• 1 000 (39.4)/1 020 (40.2)	7MC2900-3HA

Thermocouples for straight thermocouples according to EN 50446

	Article No.
Base thermocouple with isolating pipe Wire diameter 3 mm (0.12 inches) Ni Cr/Ni, up to 1 000 °C (max. 1 300 °C), (up to 1 832 °F (max. 2 372 °F)) 0.55 ... 2.10 kg (1.21 ... 4.63 lb) Nominal length L1/Thermowell length L2 in mm (inch):	
• 500 (19.7)/540 (21.3)	7MC2903-1CA
• 1 000 (39.4)/1 040 (40.9)	7MC2903-3CA

Connection heads for straight thermocouples

	Article No.
Connection head, type A (without terminal base and terminals), 1 cable entry, degree of protection IP53, 0.35 kg (0.77 lb) Light metal, screw-on cover, for thermowell diameter in mm (inch) (hole = thermowell diameter +0.5 mm) (0.02 inches)	
• 22 (0.87)	7MC2905-1AA

Selection and ordering data (continued)

	Article No.
<ul style="list-style-type: none"> • 26 (1.02) Light metal, high spring flap, for thermowell diameter in mm (inch) (hole = thermowell diameter +0.5 mm) (0.02 inches)	7MC2905-1BA
<ul style="list-style-type: none"> • 22 (0.87) 	7MC2905-4AA
<ul style="list-style-type: none"> • 26 (1.02) 	7MC2905-4BA

Installation accessories for connection heads for straight thermocouples

- Terminal base
- Terminal
- Sealing rings
- Washer
- Stop flange
- Threaded sleeve

	Article No.
Terminal base without terminals for base thermocouples; 0.06 kg (0.13 lb)	7MC2998-1AA
Terminal for base thermocouples; 0.01 kg (0.02 lb)	7MC2998-1BA
Set of sealing rings (100 units) for the lid of the connection head; 0.01 kg (0.02 lb)	7MC2998-1CA
Set of washers (100 units) for the terminal base; 0.01 kg (0.02 lb)	7MC2998-1CB
Stop flange, adjustable, from GTW	
<ul style="list-style-type: none"> • For thermowell outer diameter 22 mm (0.87 inches); 0.35 kg (0.77 lb) 	7MC2998-2CB
<ul style="list-style-type: none"> • For thermowell outer diameter 26 mm (1.02 inches); 0.32 kg (0.71 lb) 	7MC2998-2CC
Threaded sleeve, gas-tight up to 1 bar (14.5 psi), adjustable, material no. 1.0718, with seal; 0.40 kg (0.88 lb)	
<ul style="list-style-type: none"> • For thermowell outer diameter 22 mm (0.87 inches), G1 	7MC2998-2DB
<ul style="list-style-type: none"> • For thermowell outer diameter 26 mm (1.02 inches), G1 	7MC2998-2DC

Flow Measurement




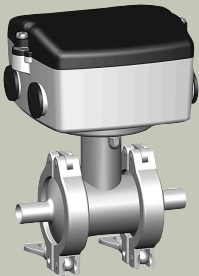


3/3	Product overview
3/12	Introduction
3/12	Criteria for selection of flowmeter
3/14	SITRANS FM (electromagnetic)
3/14	System information
3/40	<u>Flow sensors</u>
3/40	SITRANS FM MAG 1100 and 1100 HT
3/50	SITRANS FM MAG 1100 F
3/64	SITRANS FM MAG 3100 and 3100 HT
3/84	SITRANS FM MAG 3100 P
3/96	SITRANS FM MAG 5100 W
3/112	<u>Flow transmitters</u>
3/112	SITRANS FM MAG 5000 and 6000
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Overview

SITRANS FM electromagnetic flowmeters – Pulsed DC magnetic flowmeter			
	Application	Description	Software for parameterization
Transmitter MAG 5000/6000 	Designed in robust IP67 polyamide enclosures for compact or remote mounting. 19", back of panel and front of panel enclosure program.	<ul style="list-style-type: none"> • Superior signal resolution for optimum turn down ratio • Comprehensively self-diagnostic, for error indication and logging • Multi-lingual display and keypad interface • Communication modules: HART, Modbus, PROFIBUS, FOUNDATION Fieldbus, DeviceNet • Custody transfer approval: MI-001, PTB K7.2 	SIMATIC PDM
Transmitter MAG 6000 I/6000 I Ex 	Designed in robust die-cast aluminum enclosure for demanding applications and where explosion proof protection is necessary.	<ul style="list-style-type: none"> • Remote and compact mounting with all sensors • Communication modules: HART, Modbus, PROFIBUS, FOUNDATION Fieldbus, DeviceNet • Ex Approval: ATEX, IECEx, FM, CSA • Multi-lingual display and touchpad keypad • Comprehensive self-diagnostic 	SIMATIC PDM
Flow sensors MAG 1100 and MAG 1100 HT 	Designed for the general industry environment. The obstructionless performance of the MAG 1100 is unaffected by the suspended solids, viscosity and temperature challenges.	<ul style="list-style-type: none"> • Metering tube DN 2 ... 100 (1/12 ... 4") flangeless design. • Corrosion-resistant AISI 316 stainless steel housing. • Highly resistant liner (ceramic or PFA) and electrodes fitting most extreme process media. • Temperature rating up to 200 °C (390 °F) • Ex approval: ATEX, FM 	
Flow sensor MAG 1100 F 	Specially designed for the food & beverage and pharmaceutical industry.	<ul style="list-style-type: none"> • AISI 316 stainless steel enclosure • Hygienic seal, 3A • Easy to clean • Supplied with connections according to your specification • Ex approval: ATEX, FM 	





Flow Measurement

Product overview

Overview (continued)

SITRANS FM electromagnetic flowmeters – Pulsed DC magnetic flowmeter			
	Application	Description	Software for parameterization
Flow sensors MAG 3100 and MAG 3100 HT 	<p>The MAG 3100 series with its flexibility in the choice of liner, electrode and flange material allows the measurement of even the most extreme process media.</p>	<ul style="list-style-type: none"> • For a wide range of pipe dimensions: DN 15 ... 2200 (½" ... 88") • Wide range of liner and electrode materials • High-temperature version for application with temperatures up to 180 °C (355 °F) • High-pressure solutions 	
Flow sensor MAG 3100 P 	<p>The SITRANS FM MAG 3100 P sensor is designed to meet the most common specifications within the chemical and process industries.</p>	<ul style="list-style-type: none"> • For pipe dimensions DN 15 ... 300 (½" ... 12") • Fully welded construction that is extremely rugged and can withstand special process conditions using extreme measurement electrodes • Approvals for hazardous areas: ATEX, FM, CSA, IECEx • Comprehensive self-diagnostic for error indication and error logging • Temperature resistant up to 150 °C (302 °F) 	
Flow sensor MAG 5100 W 	<p>Designed for all water and wastewater applications in water plants and industrial applications.</p>	<ul style="list-style-type: none"> • Metering tube DN 15 ... 2000 (½" ... 80") • Hard Rubber or EPDM lining • Integral grounding electrodes as standard • Increased low flow accuracy for water leak detection • Drinking water approvals and custody transfer approvals, OIML R 49, MI-001 and PTB K7.2 	
Flowmeter FM100 	<p>The SITRANS FM100 is an electromagnetic flowmeter for measuring and monitoring small and medium flows.</p>	<ul style="list-style-type: none"> • Connection ½", ¾", 1", 2" • Flow- and temperature measurement • IO-Link communication • Dosing function with external control output • Flexible usage in different applications due to two individual configurable outputs • Bidirectional measurement • Robust stainless-steel design 	




Overview (continued)

SITRANS FM electromagnetic flowmeters – High-power AC magnetic flowmeter			
	Application	Description	Software for parameterization
Transmitter TRANSMAG 2 	Designed for heavy-duty applications like pulp & paper stock over 3%; heavy mining slurries and mining slurries with magnetic particles.	<ul style="list-style-type: none"> • Magnetic flowmeter with a very strong pulsed AC magnetic field • PROFIBUS PA or HART communication • Comprehensive self-test function 	SIMATIC PDM
Flow sensor MAG 911/E 	Designed for heavy-duty applications like pulp & paper stock over 3%; heavy mining slurries and mining slurries with magnetic particles.	<ul style="list-style-type: none"> • Metering tube: DN 15 ... 1000 (1/2" ... 40") • Metering tube liner: Hard Rubber, Linatex, Soft rubber, PTFE and Novolak • Integral smartPLUG for storing of calibration values • Multi-lingual display and touchpad keypad • Only remote version 	
SITRANS FM electromagnetic flowmeters – Battery-operated magnetic water meter			
	Application	Description	Software for parameterization
Water meter MAG 8000 	Battery-operated electromagnetic water meter for water applications within abstraction, distribution network and revenue metering.	<ul style="list-style-type: none"> • Battery- and/or mains power operated water meter • Metering tube DN 25 ... 1200 (1 ... 48") • Remote and compact installation IP68/NEMA 6P enclosure • Custody transfer approval: PTB K7.2, OIML R 49 and MI-001 • Drinking water approvals • Communication modules: GSM/GPRS, Modbus, Encoder 	SIMATIC PDM and Flow Tool
SITRANS FC mass flowmeters			
	Application	Description	Software for parameterization
Flowmeters FC330 (dual tube design) 	Designed for a variety of liquid and gas applications in the Process Industry. Measurement of mass flow, density, temperature and fraction.	<ul style="list-style-type: none"> • DN 15, DN 25, DN 50, DN 80, DN 100 and DN 150 • Flow from 70 ... 860 000 kg/h - water • Pipe material: AISI 316L or Nickel-Alloy C4 • Accuracy, typically: Flow: ≤ 0.1 % or 0.2 % version, Density: down to ≤ 0.002 g/cm³ • Liquid temperature/pressure: -50 ... +205 °C (-58 ... +400 °F)/up to 100 bar (1450 psi) • Approvals: ATEX, IECEx, cCSAus, CRN, PED (depending on configuration) 	

Flow Measurement

Product overview

Overview (continued)

SITRANS FC mass flowmeters			
	Application	Description	Software for parameterization
Flowmeters FC310 (dual tube design) 	Designed for a variety of liquid and gas applications Measurement of mass flow, density, temperature Modbus RS 485 RTU communication for direct integration into skids, OEM and pre-assembled plant packages	<ul style="list-style-type: none"> • DN 15, DN 25, DN 50, DN 80, DN 100 and DN 150 • Flow from 70 ... 860 000 kg/h • Pipe material: AISI 316L or Nickel-Alloy C4 • Accuracy, typically: Flow: $\leq 0.1\%$ or 0.2% version, Density: down to $\leq 0.002\text{ g/cm}^3$ • Liquid temperature/pressure: $-50 \dots +205\text{ }^\circ\text{C}$ ($-58 \dots +400\text{ }^\circ\text{F}$)/up to 100 bar (1450 psi) • Approvals: ATEX, IECEx, cCSAus, Germanischer Lloyd/det Norske Veritas, Bureau Veritas, Lloyds of London, American Bureau of Shipping (depending on configuration) 	
Flowmeters FC430 (dual tube design) 	Designed for a variety of liquid and gas applications Measurement of mass flow, density, temperature and fraction	<ul style="list-style-type: none"> • DN 15, DN 25, DN 50 • Flow from 20 ... 70 700 kg/h - water • Pipe material: AISI 316L • Accuracy, typically: Flow: $\leq 0.1\%$, Density: down to 0.005 g/cm^3 • Liquid temperature/pressure: $-50 \dots +200\text{ }^\circ\text{C}$ ($-58 \dots +392\text{ }^\circ\text{F}$)/up to 100 bar (1450 psi) • Approvals: ATEX, IECEx, EAC Ex, cCSAus, NEPSI, CRN, PED, Germanischer Lloyd/det Norske Veritas, Bureau Veritas, Lloyds of London, American Bureau of Shipping 	
Flowmeters FC410 (dual tube design) 	Designed for a variety of liquid and gas applications Measurement of mass flow, density, temperature Modbus RS 485 RTU communication for direct integration into skids, OEM and pre-assembled plant packages	<ul style="list-style-type: none"> • DN 15, DN 25, DN 50 • Flow from 20 ... 70 700 kg/h • Pipe material: AISI 316L • Accuracy, typically: Flow: $\pm 0.1\%$, Density: down to 0.005 g/cm^3 • Liquid temperature/pressure: $-50 \dots +200\text{ }^\circ\text{C}$ ($-58 \dots +392\text{ }^\circ\text{F}$)/up to 100 bar • Approvals: ATEX, IECEx, EAC Ex, cCSAus, NEPSI, Germanischer Lloyd/det Norske Veritas, Bureau Veritas, Lloyds of London, American Bureau of Shipping 	





Overview (continued)

SITRANS FC mass flowmeters			
	Application	Description	Software for parameterization
<p>Flowmeter MASS 2100 and FC300 with transmitter FCT010 or FCT030 (single tube design)</p> 	<p>Designed for low flow applications</p>	<ul style="list-style-type: none"> • MASS 2100: DI 1.5, DI 3, DI 6, DI 15 • FC300: DN 4 • Flow from 0.1 ... 5600 kg/h • Pipe material: Stainless steel AISI 316L/ 1.4435; Hastelloy C22/2.4602 • Accuracy, typically: <ul style="list-style-type: none"> - Flow: down to 0.1 % - Density: down to 0.0005 g/cm³ • Liquid temp./pressure: -50 ... +180 °C (-58 ... +356 °F); up to 410 bar (5946 psi) • Approvals: ed according to ATEX, IECEx, c-UL-us, CRN, PED 	
<p>Transmitter SITRANS FCT070</p> 	<p>SITRANS FCT070 can be connected to all Coriolis type Sensors FCS300, FCS400, MASS 2100 and FC300 DN. FCT070 can be used for machine builders and in the process industry plants. The meters are suitable for measuring on liquid and gas. With ET 200SP ST & HF the SITRANS FCT070 can be installed decentralized in small stations, with fast communication to the control room. The faceplates for TIA-Portal and PCS 7 offer the direct full remote access to the flowmeter.</p>	<ul style="list-style-type: none"> • Easy integration into automation process control as TIA Portal and PCS 7 • Cost effective integration of Coriolis flowmeters for PLC controlled machines • SITRANS FCT070 is a ET 200SP technology module and can combined with all other SIMATIC ET 200S SP ST & HF modules • Fast and trouble-free communication between the flowmeter and the PLC through digital data communication with up to 10 ms update rate • ATEX Zone 2 FM Class 1 Div 2 approvals • Included advanced batch functionality without additional modules 	
SITRANS FS in-line ultrasonic flowmeters			
	Application	Description	Software for parameterization
<p>SITRANS FST030 transmitter</p> 	<p>SITRANS FST030 Inline is designed for all ultrasonic flowmetering. The SITRANS FST030 can measure liquids or oil with the SONOKIT.</p>	<ul style="list-style-type: none"> • For SONOKIT up to DN 3000 and more • 1 or 2 path option • Single, dual or four path version • Hazardous area approvals for ATEX Zone 1,2, IECEx Zone 1,2 FMc Class I Div. 1,2 	<p>SIMATIC PDM</p>





Flow Measurement

Product overview

Overview (continued)

SITRANS FS in-line ultrasonic flowmeters			
	Application	Description	Software for parameterization
SITRANS FUS060 transmitter 	SITRANS FUS060 is a time-based transmitter designed for ultrasonic flowmetering in pipes for the F US inline industry series up to DN 500	<ul style="list-style-type: none"> • Die-cast aluminum enclosure • HART communication + 1 analog output, 1 digital output for frequency or pulse and 1 relay output for alarms and flow direction • PROFIBUS PA communication with 1 digital output for frequency or pulse 	SIMATIC PDM
SITRANS FUS080/FUE080 transmitter 	SITRANS FUS080 is a time-based transmitter designed for ultrasonic flowmetering in pipes for the SONOKIT, FUS380 and FUE380 series up to DN 1200	<ul style="list-style-type: none"> • Battery or mains-powered • Easy one-button operation • Bidirectional measuring • IrDA optical eye communication • Robust polyamide enclosure 	SIMATIC PDM
SONO 3300/FUS060 	The main application for SONO 3300 ultrasonic flowmeters is to measure the volume flow of: <ul style="list-style-type: none"> • Water and treated waste water • Hot water/cooling systems 	<ul style="list-style-type: none"> • DN 50 ... 300 (2" ... 12") steel pipes • PN 10 ... 40 or class 150 ... 300 pressure rates • Flow 0.3 ... 3 200 m³/h (1.3 ... 14 089 GPM) • No pressure drop • FUS060 transmitter for separate mounting • Signal cables from sensor to transducer are highly protected from aggressive environment by stainless steel pipes 	SIMATIC PDM
SONO 3100/FUS060 	The main application for SONO 3100 ultrasonic flowmeters is to measure the volume flow of: <ul style="list-style-type: none"> • Water and treated waste water • District heating systems 	<ul style="list-style-type: none"> • DN 100 ... DN 500 (4" ... 19") • Pipe in carbon steel • Transducers can be replaced under pressure • FUS060 transmitter for separate mounting • Measure of all liquids less than 350 Cst, conductive or non-conductive • No pressure drop • 1-track, 2-path 	SIMATIC PDM




Overview (continued)

SITRANS FS in-line ultrasonic flowmeters			
	Application	Description	Software for parameterization
SONOKIT 	Installation of one, two or four transducer sets in existing concrete or steel pipes. Typically installed in pipes with large diameters or in hot/cold water applications	<ul style="list-style-type: none"> • SITRANS FST030 transmitter for separate mounting • DN 100 ... 3000 (4" ... 120") • Control and display unit • Temperature of medium: -20 ... +200 °C (-4 ... +395 °F) • Installation on empty pipes or pipes under pressure (hot-tap installation) • Standard 1-, 2- or 4-path 	SIMATIC PDM
FUS380/FUE380 	Battery or mains-powered ultrasonic flowmeter for use within water-based district heating, cooling systems and utility. The FUS380 can also be used for water irrigation systems. SITRANS FUS380/FUE380 are designed to work with the SITRANS FUE950 energy calculator.	<ul style="list-style-type: none"> • FUS380/FUE380: DN 50 ... 1200 (2" ... 48") • FUE380: Approved for custody transfer according to MID MI004 (according to EN 1434 Class 2, OIML R 75) • FUS380/FUE380: Red brass or painted carbon steel flanges and metering tube. AISI transducers • Water temperatures 2 ... 200 °C (35.6 ... 392 °F) • Battery or mains-powered 	SIMATIC PDM
SITRANS FUE950 	Universal thermal energy calculator for district heating and cooling applications.	<ul style="list-style-type: none"> • Battery or mains-powered • 24 periods memory • 2 ports for plug-in modules as data output, extra input, M-Bus, RS 232/RS 485, current output • Complete set with temperature sensors and pockets • MID heating approval, PTB K7.2 cooling approval, MI004 type approval 	
SITRANS FS clamp-on ultrasonic flowmeters			
	Application	Description	Software for parameterization
SITRANS FS230 	SITRANS FS clamp-on ultrasonic flowmeters provide highly accurate measurement while minimizing installation time and maintenance expense. These dedicated flowmeters are suitable for a wide variety of liquid applications, including those in the: <ul style="list-style-type: none"> • Water Industry • Wastewater Industry • HVAC Industry • Power Industry • Processing Industry • Hydrocarbon Industry 	<ul style="list-style-type: none"> • Suitable for virtually any liquid, even those with high aeration or suspended solids • Hydrocarbon functions are ideal for applications carrying crude oil, refined petroleum or gas • Choice of single, dual or four path versions to suit your operating conditions and requirements • Easy installation; no need to cut pipe or stop flow • Minimal maintenance; external sensors do not require periodic cleaning • Easy to read display with intuitive menu system • Hazardous area approvals for ATEX Zone 1,2, IECEx Zone 1,2 FMc Class I Div. 1,2 	



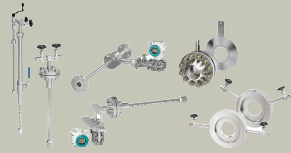
Flow Measurement

Product overview

Overview (continued)

SITRANS FS clamp-on ultrasonic flowmeters			
	Application	Description	Software for parameterization
SITRANS FS220 	<p>SITRANS FS220 basic is a fast-to-install clamp-on ultrasonic flowmeter for accurate measurements with minimal maintenance. Based on latest technology, this flowmeter is ideal suitable for applications like:</p> <ul style="list-style-type: none"> • Water Industry • Wastewater Industry • HVAC Industry • Power Industry • Process controls 	<ul style="list-style-type: none"> • Easy installation during process condition, no need to cut pipe or stop flow • Minimal maintenance; external sensors do not require periodic cleaning • No media-contacting parts, no wear, no pressure drop, no energy loss • Wide turn-down ratio, very sensitive in low flow condition • Optional WideBeam technology ensures high performance • Compatible with all previously fielded transit time sensors 	
SITRANS FS290 	<p>The portable clamp-on ultrasonic flow measurement system SITRANS FS290 is formed by the SITRANS FST090 portable clamp-on flowmeter with FSS200 sensors. This system represents the next generation of digital flow measurement which allows you to easily measure or check flows in pipes.</p>	<ul style="list-style-type: none"> • Easy installation: just clamp it on, with no need to cut pipe or stop flow • Minimal maintenance: sensors do not require upkeep or cleaning • No moving parts to foul or wear • No pressure drop or energy loss • Wide turn-down ratio • Precise single path measuring 	
SITRANS FST070 	<p>The technology module SITRANS FST070 is an ultrasonic clamp-on flowmeter transmitter for the SIMATIC ET200SP. The SITRANS FST070 can be used for machine builders, in the chemical industry or water treatments and is suitable for measuring on liquid, hydrocarbon and gas</p>	<ul style="list-style-type: none"> • Easy integration into automation process control as TIA Portal and PCS 7 (SIMATIC) • Easy selection and integration of flowmeters via TIA selector • Precast face plates for TIA Portal and PCS 7 • No additional transmitter between automation and clamp-on sensors required • Cost effective integration of clamp-on flowmeters for water treatments, control rooms with PCS 7 • SITRANS FST070 ET 200SP technology module can combined with all other SIMATIC ET200 modules • Fast and trouble-free communication between the flowmeter and the PLC through digital data communication with up to 10 ms update rate • ATEX Zone 2 Class 1 Div. 2. With the barrier SITRANS I300 the flowmeters sensor can be used in Ex Zone 1/0 Class 1 Div. 1 approval 	

Overview (continued)

SITRANS FX Vortex flowmeter			
	Application	Description	Software for parameterization
SITRANS FX330 	<p>Very versatile and flexible for use in many process applications. Flow sensors combines flow, pressure and temperature measurement into one user-friendly, two-wire device.</p> <ul style="list-style-type: none"> • Measurement of saturated steam and superheated steam • Heat metering of steam and hot water • Measurement of consumption in compressed air systems • Evaluation of Free Air Delivery (FAD) • SIP and CIP processes in the food, beverage and pharmaceutical industries • Measurement of conductive and non-conductive liquids • Safety-related measurement in SIL applications (SIL2). 	<ul style="list-style-type: none"> • Integrated pressure and temperature compensation • Temperature compensation for saturated steam included as standard • SIL2 certified according to IEC 61508 Edition 2 • Use in hazardous areas • Integrated reduction of nominal diameter for space-saving and economic installation • Exchange of electronics without loss of calibration and configuration data • Gross and net heat calculation to support energy management • Remote version with cable length up to 50 m (164 ft) 	
SITRANS FVA variable area meters			
	Application	Description	Software for parameterization
FVA250 	<p>Measurement of flow of liquids and gases, also highly suitable for corrosive media, high temperatures and high pressures.</p>	<ul style="list-style-type: none"> • All-metal variable area meter with various float materials • Connections: DN 15 ... 100 (1/2" ... 4") • Temperature of medium: -20 °C ... +300 °C (-4 ... +572 °F) • Optionally available with analog output or contacts 	
SITRANS FP differential pressure flow measurement			
	Application	Description	Software for parameterization
	<p>SITRANS FP product line is suitable for all kinds of applications – liquids, dry or humid gases and steam. Due to the robust though variable design it has been and still is one of the main technologies for flow measurement in various industries.</p> <p>A new digital sizing process ensures minimum effort during presales and full traceability in aftersales. The differential pressure portfolio consists of</p> <ul style="list-style-type: none"> • pitot tubes SITRANS FPS300 • primary elements according to ISO 5167 (orifices) SITRANS FPS200 	<ul style="list-style-type: none"> • Suitable for a vast range of different applications • Available as pre-mounted compact system as well as remote parts • Advanced intelligent sizing procedure • Web-based sizing and data storage enables full traceability and easy communication • All benefits of SITRANS P320 available 	

Flow Measurement

Introduction

Criteria for selection of flowmeter

Overview

Criteria for selection of flowmeter

Each method for measuring flow has specific properties, and each flow measuring point is characterized by specific requirements. The table shown below compares the properties of the various measuring instruments and thus provides assistance in selection of the optimum device.

This section of the field device catalog includes the following instruments for measuring flow:

- Electromagnetic
- Coriolis mass flow
- Ultrasonic
- Vortex volumetric- and mass flow
- Variable area meter
- Primary element

Measurement principle	Electromagnetic	Coriolis	Ultrasonic (inline)	Ultrasonic (clamp-on)	Vortex	Variable area meter	Primary element
Medium	Liquid (conductive)	Liquid or gas	Liquid	Liquid or gas	Steam/vapor, gases, liquid	Liquid or gas	Liquid, vapor, gas
Nominal size	DN 2 ... 2000 (0.08" ... 78")	1.5 ... 150 mm (0.06" ... 6")	DN 50 ... 1200 (2" ... 48")	6.4 mm ... 9.14 m (0.25" ... 360")	DN 15 ... 300 (½" ... 12")	DN 10 ... 100 (0.4" ... 4") G½" ... G3"	DN 10 ... 4000 (0.4" ... 160")
Temperature range [°C (°F)]	-40 ... +200 (-40 ... +392)	-50 ... +180 (-58 ... +356)	-20 ... +200 (-4 ... +392)	-40 ... +120 (-40 ... +248)	-40 ... +240 (-40 ... +464)	-20 ... +300 (-4 ... +572)	-100 ... +490 (-148 ... +914)
Max. pressure [bar (psi)]	160 (2 320), optional higher	Up to 410 (Up to 5 950)	40 (580)	Unlimited	100 (1 450)	100 (1 450)	315 (4 569)
Accuracy [%]	± 0.25 or ± 0.4	± 0.1 or ± 0.15	± 0.5 ... ± 2	0.5 ... 1.0 % of flow, for velocities greater than 0.3 m/s (1 ft/s)	± 0.75 ... ± 1	± 1.6 ... ± 2.0	± 0.5 ... ± 1.2
Repeatability [%]	0.1/0.2	0.05	0.25	0.15% of flow, for velocities greater than 0.3 m/s (1 ft/s)	0.1	0.5	0.1
Dynamic response range	1:100	1:100	1:400	1:100	1:25	1:10	1:6
Start-of-scale value [m/s (ft/s)]	0 (0)	0 (0)	0.1 (0.33)	0 (0)	0.4 (1.31) 2.0 (6.56)	0.2 (0.66)	Re > 500
Full-scale value				± 36/120 ± 12/40	10 (32.8)	3.5 (11.4)	Re < 10 ⁸ 3 (9.8)
• For liquids [m/s (ft/s)]	0.25 ... 10 (0.825 ... 32.8)	10 (32.8)	10 (32.8)		10 (32.8)	3.5 (11.4)	3 (9.8)
• For steam/vapor, gases [m/s (ft/s)]		Approx. 300 (1000)		± 12/40	80 (262.5)	60 (197)	50/25 (164/82)
Measured values							
Volume flow	•	•	•	•	•	•	•
Sound velocity			•	•			
Sound amplitude			•	•			
Density		•		•			
Mass flow		•	•	•	•		
Bidirectional measurement	•	•	•	•			•
Use							
• For custody transfer	•	•	•	•			
• As batching system	•	•		•			
• In viscosity range [mPa s (cp)]	0.1 ... 100 000 (0.1 ... 100 000)	0 ... 100 000 (0 ... 100 000)	0 ... 350 (0 ... 350)	0.5 ... 2800 (0.5 ... 2800)	0 ... 10 (0 ... 10)	0.5 ... 100 (0.5 ... 100)	0 ... 10 (0 ... 10)
Power supply	Mains or battery	Mains	Mains or battery	90 ... 240 V AC, 50 ... 60 Hz, 15 VA or 9 ... 36 V DC, 10 W	2-wire	non	2-wire

Communication solutions

Product	HART	PROFIBUS PA	PROFIBUS DP	FOUNDATION Fieldbus H1	DeviceNet	Modbus RTU	GSM/GPRS
SITRANS FM							
MAG 5000	• 1) 2) 4)						
MAG 6000	• 1) 2) 4) 5)	• 1) 5) 6) 7)	• 1) 5) 6) 7)	• 2) 4) 5)	• 5)	• 1) 5) 10)	
MAG 5000/6000 CT ⁸⁾							
MAG 6000 I	• 1) 2) 4) 5)	• 1) 5) 6) 7)	• 1) 5) 6) 7)	• 2) 4) 5)	• 5)	• 1) 5) 10)	
MAG 6000 I Ex	• 1) 2) 4) 5)	• 1) 5) 6) 7)		• 2) 4) 5)			

Overview (continued)

Product	HART	PROFIBUS PA	PROFIBUS DP	FOUNDATION Fieldbus H1	DeviceNet	Modbus RTU	GSM/GPRS
TRANSMAG 2	● 1) 4)	● 1) 6)					
MAG 8000						● 1) 3) 10) 11) 12)	● 14)
SITRANS FC							
FCT010						● 1) 10)	
FCT030	● 1) 2) 4) 8)	● 1) 2) 4) 8)	● 1) 2) 4) 8)			● 1) 2) 4) 8)	
MASS 6000	● 1) 2) 4) 5)	● 1) 5) 6) 7)	● 1) 5) 6) 7)	● 2) 4) 5)	● 5)	● 1) 10)	
MASS 6000 Ex d	● 1) 2) 4) 5)	● 1) 5) 6) 7)		● 2) 4) 5)	● 5)		
SIFLOW FC070			● 13)			● 1) 10) 11)	
SITRANS FS							
FUS060	● 1)	● 1) 6)					
FUS080		● 1) 8) 12)					
SITRANS FX							
SITRANS FX330	● 1)						

- 1) Supports SIMATIC PDM
- 2) Supports AMS
- 3) Supports Siemens Flow Tool
- 4) Supports HH275/375
- 5) Pluggable add-on module
- 6) Profile 2
- 7) Profile 3
- 8) CT versions are not approved with communication modules
- 9) All wall mount models
- 10) RS 485
- 11) RS 232
- 12) IrDA (Infrared)
- 13) Connected to ET200M PROFIBUS interface
- 14) Only with 7ME6810

Flow Measurement

SITRANS FM (electromagnetic)

System information

Overview

SITRANS FM electromagnetic flowmeters are designed for measuring the flow of electrically conductive liquids.

The full SITRANS FM program consists of three different types of flowmeters making Siemens unique in that it covers all possible applications where electromagnetic flowmeters are a suitable match:

Modular pulsed DC flowmeters cover all ordinary applications within all industries. The wide variety of combinations and versions from the modular system means that ideal adaptation is possible to each measuring task and application.



SITRANS FM products

Battery-operated water meters (fully electronic) are the perfect match for drinking water applications like network distribution, revenue metering and irrigation where mains power is not available. In addition, it complies with the MID (EU) and OIML R 49 water meter standards and has the MCERTS certificate.



SITRANS FM MAG 8000

AC powered alternating field flowmeters are used for difficult applications where other flowmeters cannot stand up to the task. This flowmeter can handle liquids and heavy slurries in industries such as mining, cement and pulp and paper.

Overview (continued)



SITRANS FM MAG 911/E

Benefits



Greater flexibility

- Wide product program
- Compact or remote installation using the same transmitter and sensor
- USM II communication platform for easy integration with all systems

Easier commissioning of MAG 5000, 6000, 6000 I

All SITRANS FM pulsed DC electromagnetic flowmeters feature a unique SENSORPROM memory unit which stores sensor calibration data and transmitter settings for the lifetime of the product.

At commissioning the flowmeter commences measurement without any initial programming.

The factory settings matching the sensor size are stored in the SENSORPROM unit. Also customer specified settings are downloaded to the unit. Should the transmitter be replaced, the new transmitter will upload all previous settings and resume measurement without any need for reprogramming.

Further, the "fingerprint" used in connection with the SITRANS FM Verificator is stored during the initial sensor calibration.

Easier service

Transmitter replacement requires no programming. SENSORPROM automatically updates all settings after initialization.

Room for growth

USM II the Universal Signal Module with "plug & play" simplicity, makes it easy to access and integrate the flow measurement with almost any system and bus-protocol and it ensures the flowmeter will be easy to upgrade to future communication/bus platforms.

Flow Measurement

SITRANS FM (electromagnetic)

System information

Benefits (continued)

SITRANS FM platform concept

Pulsed DC electromagnetic flowmeters



MAG 6000 I



MAG 5000



MAG 6000



Wall mounting unit

MAG 6000 I
(Ex de)MAG 6000
Ex safety barrierMAG 5000 / 6000 19"
Panel mountMAG 3100
MAG 3100 HT

MAG 3100 P



MAG 5100 W



MAG 1100 F

MAG 1100
MAG 1100 HT

Communication modules:

- HART
- Profibus PA
- Profibus DP
- Modbus RTU / RS485
- DeviceNet
- Foundation Fieldbus

Application


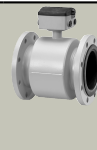


Electromagnetic flowmeters are suitable for measuring the flow of almost all electrically conductive liquids, pastes and slurries.

A prerequisite is that the medium must have a minimum conductivity. The temperature, pressure, density and viscosity have no influence on the result.

The main applications of the electromagnetic flowmeters can be found in the following sectors:

- Water and waste water
- Chemical industries
- Pharmaceutical industries
- Food and beverage industry
- Mining, aggregates and cements industries
- Pulp and paper industry
- Steel industry
- Power; utility and chilled water industry

The wide variety of combinations and versions from the modular system means that ideal adaptation is possible to each measuring task.

Please see Product selector on the Internet, because some constraints might be related to some of the features: www.pia-portal.automation.siemens.com											
PIA Life Cycle Portal The tool for Engineering, Ordering, Installation and Operation.		FM100 7ME6010	MAG 1100 7ME6110	MAG 1100 HT 7ME6120	MAG 1100 F 7ME6140	MAG 3100 7ME6310	MAG 3100 HT 7ME6320	MAG 3100 P 7ME6340	MAG 5100 W 7ME6520	MAG 911/E 7ME5610	MAG 8000 MAG 8000 CT 7ME6810 7ME6820
Industry											
Water/waste water			XX			XX		X	XXX	X	XXX ¹⁾
Chemical	•		XXX	XXX	XX	XXX	XXX	XXX	X		X
Pharmaceutical	•		XX	XX	XXX	XX	XX	XX	X		X
Food and beverage			XX		XXX	X	X	X	X		X
Mining, aggregates and cement			XX			XXX			X	XXX	X
HPI			XX	X		XX	X	XX	X		X
Other	•		XX	XX	XX	XX	XX	XX	XX	XXX	X
Design											
Compact	•		•		•	•	•	•	•		•
Remote	•		•	•	•	•	•	•	•	•	•
Constant field (DC)			•	•	•	•	•	•	•		•
Alternating field (AC)										•	
Battery-operated constant field (DC)											•
Size											
DN 2 (1/12")			•								
DN 3 (1/8")			•								
DN 6 (1/4")			•								
DN 10 (3/8")			•		•						
DN 15 (1/2")	•		•	•	•	•	•	•	•	•	
DN 25 (1")	•		•	•	•	•	•	•	•	•	•
DN 32 (1 1/4")					• ²⁾						
DN 40 (1 1/2")			•	•	•	•	•	•	•	•	•
DN 50 (2")	•		•	•	•	•	•	•	•	•	•
DN 65 (2 1/2")			•	•	•	•	•	•	•	•	•
DN 80 (3")			•	•	•	•	•	•	•	•	•
DN 100 (4")			•	•	•	•	•	•	•	•	•
DN 125 (5")					•	•	•	•	•	•	•
DN 150 (6")					•	•	•	•	•	•	•

Flow Measurement

SITRANS FM (electromagnetic)





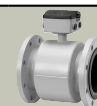





System information

Application (continued)

Please see Product selector on the Internet, because some constraints might be related to some of the features:

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	FM100	MAG 1100	MAG 1100 HT	MAG 1100 F	MAG 3100	MAG 3100 HT	MAG 3100 P	MAG 5100 W	MAG 911/E	MAG 8000 MAG 8000 CT
	7ME6010	7ME6110	7ME6120	7ME6140	7ME6310	7ME6320	7ME6340	7ME6520	7ME5610	7ME6810 7ME6820

DN 200 (8")					•	•	•	•	•	•
DN 250 (10")					•	•	•	•	•	•
DN 300 (12")					•	•	•	•	•	•
DN 350 (14")					•	•	•	•	•	•
DN 400 (16")					•	•	•	•	•	•
DN 450 (18")					•	•	•	•	•	•
DN 500 (20")					•	•	•	•	•	•
DN 600 (24")					•	•	•	•	•	•
DN 700 (28")					•	•	•	•	•	•
DN 750 (30")					•	•	•	•	•	•
DN 800 (32")					•	•	•	•	•	•
DN 900 (36")					•	•	•	•	•	•
DN 1000 (40")					•	•	•	•	•	•
DN 1050 (42")					•	•	•	•	•	•
DN 1100 (44")					•	•	•	•	•	•
DN 1200 (48")					•	•	•	•	•	•
DN 1400 (54")					•	•	•	•	•	•
DN 1500 (60")					•	•	•	•	•	•
DN 1600 (66")					•	•	•	•	•	•
DN 1800 (72")					•	•	•	•	•	•
DN 2000 (80")					•	•	•	•	•	•
Process connection										
Wafer design		•	•	•						
Sanitary process connections				•						
Flanges					•	•	•	•	•	•
Pressure ratings ³⁾										
EN 1092-1 PN 10					•	•	•	•	•	•
EN 1092-1 PN 16		•		•	•	•	•	•	•	•
EN 1092-1 PN 25					•	•	•	•	•	•
EN 1092-1 PN 40		•	•	•	•	•	•	•	•	•
EN 1092-1 PN 63					•	•	•	•	•	•
EN 1092-1 PN 100					•	•	•	•	•	•
ANSI B 16.5 class 150					•	•	•	•	•	•
ANSI B 16.5 class 300					•	•	•	•	•	•
ANSI B 16.5 class 600					•	•	•	•	•	•
AWWA class D					•	•	•	•	•	•
AS 2129 table E					•	•	•	•	•	•
AS 4087, PN 16					•	•	•	•	•	•
AS 4087, PN 21					•	•	•	•	•	•
AS 4087, PN 35					•	•	•	•	•	•
JIS B 2220:2004 10K					•	•	•	•	•	•
JIS B 2220:2004 20K					•	•	•	•	•	•
Accuracy										
Flow error ± 0.2 % of rate		•	•	•	•	•	•	•	•	•
Flow error ± 0.4 % of rate		•	•	•	•	•	•	•	•	•
Flow error ± 0.5 % of rate								•		

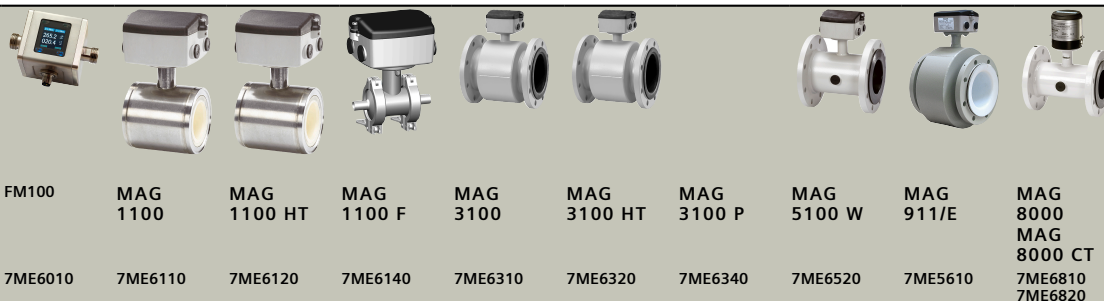
Application (continued)

Please see Product selector on the Internet, because some constraints might be related to some of the features:

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The tool for Engineering, Ordering, Installation and Operation



	FM100	MAG 1100	MAG 1100 HT	MAG 1100 F	MAG 3100	MAG 3100 HT	MAG 3100 P	MAG 5100 W	MAG 911/E	MAG 8000 MAG 8000 CT
Repeatability ⁴⁾										
0.1 %		•	•	•	•	•	•	•		
0.2 %	•								•	
Grounding electrodes										
Grounding electrodes, incl.					•		•	•	(•)	•
Materials/temperature										
Liner material/max. temperatures										
NBR: 70 °C (158 °F)								•		
EPDM: 70 °C (158 °F)					•			•		•
Soft rubber: 70 °C (158 °F)					•				•	
PTFE: 100 °C (212 °F)					•					
PTFE: 150 °C (302 °F)						•	•		•	
PTFE: 180 °C (356 °F)						•			•	
Ebonite: 95 °C (203 °F)					•				•	
Linatex: 70 °C (158 °F)					•				•	
Ceramic: 150 °C (302 °F)		•		•						
Ceramic: 200 °C (392 °F)			• ⁶⁾							
PFA: 100 °C (212 °F)					•					
PFA: 150 °C (302 °F)		•		•		•	•			
Novolak: 130 °C (266 °F)									•	
Electrodes										
Stainless steel	•				•	•			•	
Hastelloy C		•		•	•	•	•	•	•	•
Platinum		•	•	•	•	•	• ⁵⁾		•	
Titanium					•	•			•	
Tantalum					•	•	• ⁵⁾		•	
Ceramic coated stainless steel					•					
Ceramic coated Hastelloy C					•					
Flange/housing material										
Carbon steel					•	•	•	•	•	•
Stainless steel/carbon steel	•				•	•			•	
Polished stainless steel		•	•	•	•	•				
Approvals										
Custody transfer										
Cold Water – MI-001 (EU)								•		•
Cold water approval - OIML R 49/OIML R 49 MAA										• ⁷⁾
NMI 10(Australia)								• ⁷⁾		• ⁷⁾
Chilled water pattern approval - PTB K 7.2								• ⁷⁾		
OE 12/C 040 (Austria)								•		
Chilled water pattern approval										
KIWA water approval								•		•
Marine										

Flow Measurement

SITRANS FM (electromagnetic)

System information

Application (continued)

Please see Product selector on the Internet, because some constraints might be related to some of the features:

www.pia-portal.automation.siemens.com



	FM100	MAG 1100	MAG 1100 HT	MAG 1100 F	MAG 3100	MAG 3100 HT	MAG 3100 P	MAG 5100 W	MAG 911/E	MAG 8000 MAG 8000 CT
	7ME6010	7ME6110	7ME6120	7ME6140	7ME6310	7ME6320	7ME6340	7ME6520	7ME5610	7ME6810 7ME6820

DNV								●		
Hazardous areas										
ATEX – 2 GD (Zone 1/21)	●	●	●	●	●	●	●			
IECEX Zone 1/21					●	●	●			
FM Class I/II/III					● ¹³⁾	● ¹³⁾	● ¹³⁾			
FM Class I, Zone 1/21					●	●	●			
FM - Class I, Div 2	●	●	●	●	●	●	●	●		
FM - Class I, Zone 2	●	●	●	●	●	●	●	●		
CSA Class I, Zone 1/21					●	●	●			
CSA - Class I, Div 2					●	●	●	●		
NEPSI Zone 1					●	●	●			
EAC Ex	●	●	●	●	●	●	●			
Hygienic										
3A				●						
EC 1935:2004 European food contact material				●						
Drinking water										
WRAS (WR ₂)					●			● ⁹⁾		●
ANSI/NSF 61 (US)					●			● ⁹⁾		●
ACS (FR)					● ⁹⁾			● ⁹⁾		●
Belgaqua (B)					● ⁹⁾			● ⁹⁾		●
DVGW-W270 (D)					● ⁹⁾			● ⁹⁾		●
KIWA (NL)					● ⁹⁾			● ⁹⁾		●
AS/NZS 4020 (AU)					●			● ⁹⁾		●
GB/T5750 (China)					●					
Other										
CRN (Canada)	● ¹⁴⁾				●	●	●	●		●
FM Fire Service (class number 1044)								● ¹²⁾		● ¹²⁾
MCERTS (GB)					● ¹⁰⁾			● ⁹⁾		●
EAC (Russia, Belarus, and Kazakhstan)	●	●	●	●	●	●	●	●	●	●
CPA (China)	●	●	●	●	●	●	●	●	●	●
VdS								● ¹¹⁾		
Verificator										
Verificator compatible	● ⁸⁾	● ⁸⁾	● ⁸⁾	● ⁸⁾	● ⁸⁾	● ⁸⁾	● ⁸⁾	● ⁸⁾		

● = available

X = can be used

XX = often used

XXX = most often used

¹⁾

Not suitable for wastewater applications

²⁾ Only in combination with DN 32 adapter A5E02054637, A5E02218297, FDK:083G2120 and FDK:083G2160

³⁾ Pressure may be limited by the liner material chosen

⁴⁾ Of actual flow for $v \geq 0.5$ m/s (1.5 ft/s) and conductivity > 10 μ S/cm

⁵⁾ Only for PTFE

⁶⁾ Ex sensor: 180 °C (356 °F)

⁷⁾ For verification submit Product Variation Request (PVR)

⁸⁾ Only in combination with MAG 5000 and MAG 6000 transmitters


⁹⁾ EPDM liner

¹⁰⁾ EPDM or PTFE liner with AISI 316 or Hastelloy electrodes

Application (continued)

1¹⁾ Only valid for DN 50 to DN 300 (2" to 12")1²⁾ Sizes: DN 50, DN 80, DN 100, DN 150, DN 200, DN 250, and DN 300 (2", 3", 4", 6", 8", 10", and 12") with ANSI B16.5 Class 150 flanges1³⁾ Only DN 15 to DN 300 (½" to 12") with MAG 6000 I Ex, compact mounted1⁴⁾ Only PFA liner

Please see Product selector on the Internet, because some constraints might be related to some of the features:
www.pia-portal.automa-tion.siemens.com



	MAG 5000 7ME6910	MAG 6000 7ME6920	MAG 6000 I 7ME6930	MAG 6000 I Ex 7ME6930	MAG 6000 + Safety barrier 7ME6920	TRANSMAG 2 7ME5034	MAG 8000 MAG 8000 CT 7ME6810 7ME6820
Industry							
Water/waste water	XXX	XXX	XX	X		X	XXX
Chemical	X	XX	XX	XXX	X		X
Pharmaceutical	X	XXX	XX	XXX	X		X
Food and beverage	XX	XXX	XX				X
Mining, aggregates and cement	XX	X	XX	X		XXX	X
HPI	X	X	X	XX			X
Other	XX	XX	XX	XX		XX	X
Design							
Compact	•	•	•	•			•
Remote	•	•	•	•	•	•	•
Constant field (DC)	•	•	•	•	•		•
Alternating field (AC)						•	
Battery-operated constant field (DC)							•
Enclosure transmitter							
Polyamide, IP67	•	•		•		•	
Die-cast aluminum			•	•			
Stainless steel		•					• ¹⁾
19" rack	•	•			•		
Front panel mounting	•	•			•		
Panel mounting	•	•			•		
IP66 wall mounting	•	•	•	•	•		
Accuracy							
Flow error ± 0.2 % of rate		•	•	•	•		•
Flow error ± 0.4 % of rate	•						•
Flow error ± 0.5 % of rate						•	
Repeatability³⁾							
0.1 %	•	•	•	•	•		
0.2 %						•	
Communication							
HART	•	•	•	•	•	•	
PROFIBUS PA		•	•	•	•	•	
PROFIBUS DP		•	•	•	•		
FOUNDATION Fieldbus H1		•	•	•	•		
DeviceNet		•	•	•	•		
Modbus RTU/RS 485		•	•		•		• ²⁾
Encoder interface module (Sensus protocol for Itron 200WP radio)							•
GSM/GPRS module							•
Batching							
Batching		•	•	•	•		
Power supply							
24 V	• ⁴⁾	• ⁴⁾	•	•			• ^{4) 5)}
115 V - 230 V	•	•	•	•	•	•	• ⁵⁾

Flow Measurement

SITRANS FM (electromagnetic)

System information

Application (continued)

Please see Product selector on the internet, because some constraints might be related to some of the features:

www.pia-portal.automation.siemens.com



PIA Life Cycle Portal
The tool for Engineering, Ordering, Installation and Operation



MAG 5000

7ME6910



MAG 6000

7ME6920



MAG 6000 I

7ME6930



MAG 6000 I Ex

7ME6930



MAG 6000 + Safety barrier

7ME6920



TRANSMAG 2

7ME5034



MAG 8000
MAG 8000 CT

7ME6810
7ME6820

	MAG 5000	MAG 6000	MAG 6000 I	MAG 6000 I Ex	MAG 6000 + Safety barrier	TRANSMAG 2	MAG 8000 MAG 8000 CT
Battery							●
Approvals							
<u>Custody transfer</u>							
Cold water - MI-001 (EU)	●	●					●
Cold water approval - OIML R 49/OIML R 49 MAA							●
NMI 10 (Australia)		● ³⁾					● ⁸⁾
Chilled water pattern approval PTB K 7.2	● ⁸⁾	● ⁸⁾					● ⁸⁾
OE12/C 040 (Austria)	●	●					
Chilled water pattern approval							●
KIWA water approval		●					●
<u>Marine</u>							
ABS	●	●					
Bureau Veritas	●	●					
DNV-GL	●	●					
Lloyd's Register	●	●					
<u>Hazardous areas</u>							
ATEX - 2G GD (Zone 1/21)				●	(●) ⁶⁾		
IECEX Gb Zone 1/21				●			
FM Class I/II/III, Div 1				● ⁷⁾			
FM Class I, Zone 1/21				●			
FM Class I, Div 2	●	●	●				
FM Class I, Zone 2	●	●	●				
CSA Class I, Zone 1/21				●			
CSA Class I, Div 2	●	●	●				
UL/C-UL-general safety	●	●			●		
NEPSI Zone 1				●			
EAC Ex				●	●		
<u>Other</u>							
FM Fire Service (1044)	●	●					●
KCs (South Korea)	●	●	●	●	●		●
EAC (Russia, Belarus, Kazakhstan)	●	●	●	●	●	●	●
CPA (China)	●	●	●	●	●	●	●
VdS	●	●					
Other national approvals, see internet	●	●	●	●	●	●	●
<u>Verificator</u>							
Verificator compatible	●	●					

● = available

X = can be used

XX = often used

XXX = most often used

1) IP68 enclosure

2) Modbus RTU also as serial RS 232

3) Of actual flow for $v \geq 0.5$ m/s (1.5 ft/s) and conductivity $> 10 \mu\text{S/cm}$

4) 12/24 V AC/DC

5) Main power with battery backup

6) Only sensor in hazardous area

Application (continued)

- 7) Only with sensors sizes DN 15 to DN 300 (½" to 12") compact
- 8) For verification submit Product Variation Request (PVR)

For more national approvals please check our internet page
<http://support.automation.siemens.com/WW/view/en/10806954/134200>

SITRANS FM compact installation



MAG 6000 compact mounted on a MAG 3100 sensor

A compact installation is built by assembling of a MAG 6000 transmitter with a MAG 3100 sensor.

Example of a SITRANS FM compact installation	
Sensor	7ME6310-3TC11-1JA1
Pipe size	DN 100
Liner	Soft rubber
Electrodes	SS 316
Flanges	EN 1092-1, PN 16
Transmitter	MAG 6000, Polyamide, 115 ... 230 V AC
Accuracy	± 0.2 % ± 1 mm/s
Supply	230 V AC

Note:

MAG 5000/6000 transmitters, sensors and communication modules are packed in separate boxes, the final assembly takes place during installation at the customer's place.

SITRANS FM remote installation



Remote installation: MAG 600 with a wall bracket

Flow Measurement

SITRANS FM (electromagnetic)

System information

Application (continued)



Remote installation: MAG 3100 with coil and electrode cable

A remote installation is built by assembling of a MAG 6000 transmitter with a wall bracket and a MAG 3100 with two cables.

Example of a SITRANS FM remote installation

Sensor	7ME6310-3TC11-1AA1
Pipe size	DN 100
Liner	Soft rubber
Electrodes	SS 316
Flanges	EN 1092-1, PN 16
Transmitter	7ME6920-1AA10-0AA0
Accuracy	$\pm 0.2\% \pm 1 \text{ mm/s}$
Supply	230 V AC
Wall mounting kit	FDK:085U1018
Cable kit with coil cable and electrode cable	A5E01181647

Technical specifications

Flowmeter Calibration and traceability

To ensure continuous accurate measurement, flowmeters must be calibrated. The calibration is conducted at Siemens facilities with traceable instruments referring directly to the physical unit of measurement according to the International System of Units (SI).

Therefore, the calibration certificate ensures recognition of the test results worldwide, including the US (NIST traceability).

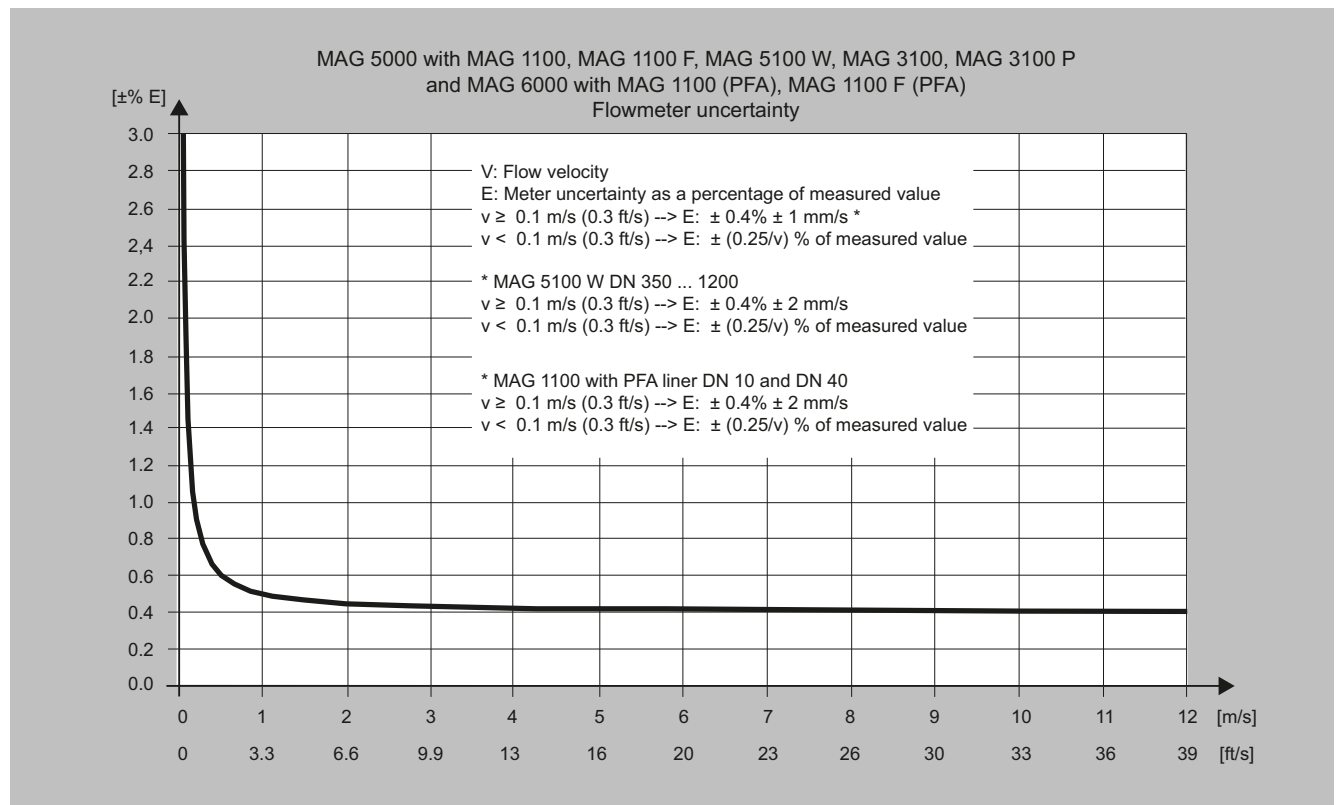
Siemens offers accredited calibrations assured to ISO 17025 in the flow range from 0.0001 m³/h to 10 000 m³/h.

The calibration follows the ISO 4185 performing calibrations under two methods: Static Weighing and Reference meter. Providing a measurement uncertainty of $\pm 0.1\%$.

Siemens accredited laboratories are recognized by ILAC MRA (International Laboratory Accreditation Corporation - Mutual Recognition Arrangement) ensuring international traceability and recognition of the test results worldwide.

A calibration certificate is shipped with every sensor and calibration data are stored in the SENSORPROM memory unit.

Flowmeter uncertainty

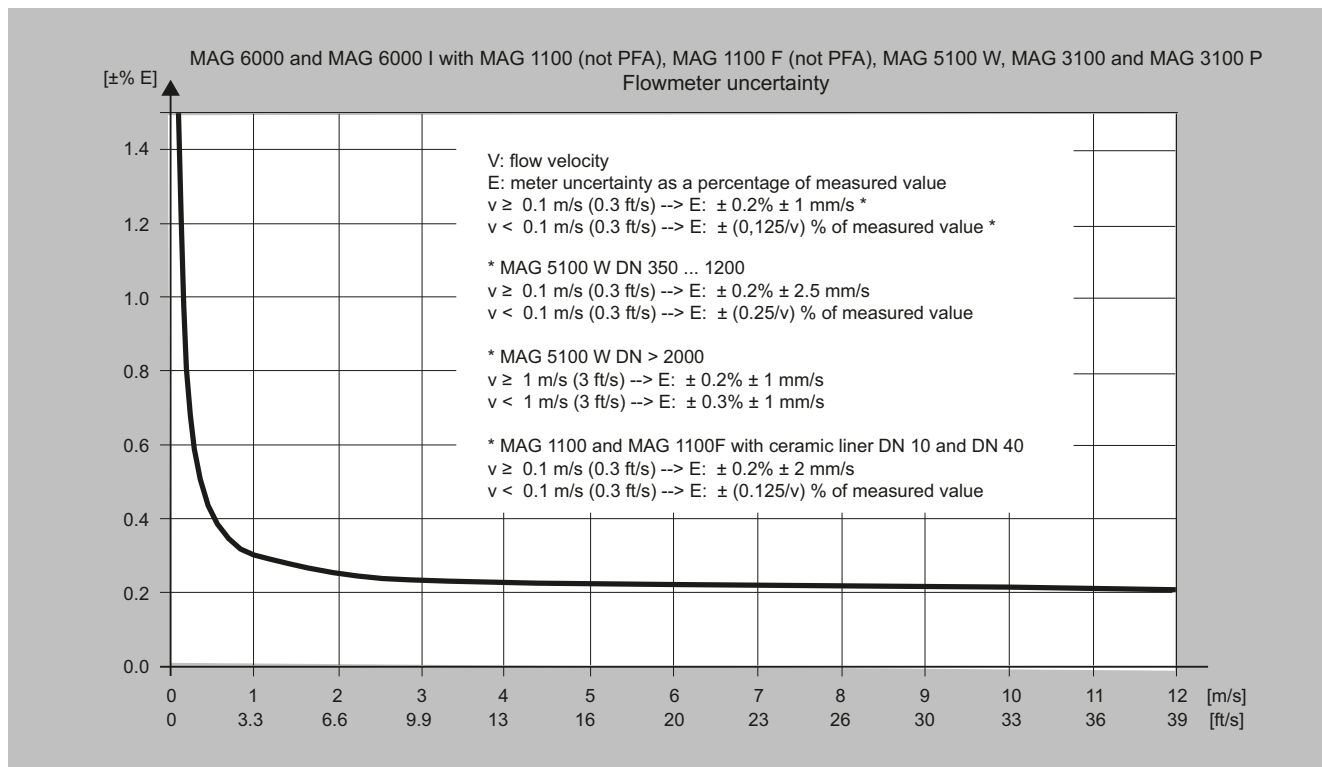


Flow Measurement

SITRANS FM (electromagnetic)

System information

Technical specifications (continued)



Calibration reference conditions

Calibration reference conditions	
Reference conditions (ISO 9104 and EN 29104)	
Temperature medium	20 °C ± 10 K (68 °F ± 18 °F)
Temperature ambient	25 °C ± 10 K (77 °F ± 18 °F)
Supply voltage	$U_n \pm 1 \%$
Warming-up time	30 minutes
Incorporation in conductive pipe section	
• Inlet section	10 × DN (DN ≤ 1200/48") 5 × DN (DN > 1200/48")
• Outlet section	5 × DN (DN ≤ 1200/48") 3 × DN (DN > 1200/48")
Flow conditions	Developed flow profile
Additions in the event of deviations from reference conditions	
Current output	As pulse output ($\pm 0,1 \%$ of actual flow +0,05 % FSO)
Effect of ambient temperature	
• Display frequency/pulse output	$< \pm 0.003 \%/K \text{ act.}$
• Current output	$< \pm 0.005 \%/K \text{ act.}$
Effect of supply voltage	$< 0.005 \%$ of measuring value on 1 % change
Repeatability	$\pm 0.1 \%$ of actual flow for $v \geq 0,5 \text{ m/s}$ (1.5 ft/s) and conductivity $> 10 \mu\text{S/cm}$
Certificates	
• EN 10204-2.1	Certificate of conformity, stating that the delivered parts are made of the material quality that was ordered. Available as Z option C15.
• EN 10204-2.2	Test report certificate, a non-batch specific material analysis of the ordered material. Available as Z-option C14.

Technical specifications (continued)

Calibration reference conditions

- EN 10204-3.1
Material analysis certificate, a batch specific analysis of the material issued by an independent inspector.
Certification covers all pressure containing and wetted parts. Available as Z option C12.

Calibration test point

Test points for default calibration at 25% and 90% of factory Q_{max} .

Calibration test point				
Size mm	Q_{max} m ³ /h	90% m ³ /h	25% m ³ /h	
2	0.055	0.0495	0.01375	
3	0.127	0.1143	0.01375	
6	0.5	0.45	0.125	
10	1.4	1.26	0.35	
15	3	2.7	0.75	
25	9	8.1	2.25	
40	23	20.7	5.75	
50	35	31.5	8.75	
65	60	54	15	
80	90	81	22.5	
100	140	126	35	
125	220	198	55	
150	320	288	80	
200	550	495	137.5	
250	900	810	225	
300	1300	1170	325	
350	1700	1530	425	
400	2250	2025	562.5	
450	2800	2520	700	
500	2800	2520	700	
600	2800	2520	700	
700	6000	5400	1500	
750	6000	5400	1500	
800	6000	5400	1500	
900	6000	5400	1500	
1000	6000	5400	1500	
1050	6000	5400	1500	
1100	6000	5400	1500	
1200	6000	5400	1500	
1400	7000	6300	1750	
1500	7000	6300	1750	
1600	7000	6300	1750	
1800	7000	6300	1750	
2000	7000	6300	1750	

Technical specifications PROFIBUS PA/DP

Technical specifications PROFIBUS PA/DP

General specifications	
PROFIBUS device profile	3.00 Class B
Certified	No
MS0 connections	1
MS1 connections	1
MS2 connections	2

Flow Measurement

SITRANS FM (electromagnetic)

System information

Technical specifications (continued)

Electrical specification DP

Electrical specification DP	
Physical layer specifications	
Applicable standard	IEC 61158/EN 50170
Physical Layer (Transmission technology)	RS 485
Transmission speed	≤ 1.5 Mbits/s
Number of stations	Up to 32 per line segment, (maximum total of 126)
Cable specification (Type A)	
Cable design	Two-wire twisted pair
Shielding	CU shielding braid or shielding braid and shielding foil
Impedance	35 up to 165 Ω at frequencies from 3 ... 20 MHz
Cable capacity	< 30 pF per meter
Core diameter	> 0,34 mm ² , corresponds to AWG 22
Resistance	< 110 Ω per km
Signal attenuation	Max. 9 dB over total length of line section
Max. bus length	200 m at 1500 kbit/s, up to 1.2 km at 93.75 kbit/s. Extendable by repeaters

Electrical specification PA

Electrical specification PA	
Physical layer specifications	
Applicable standard	IEC 61158/EN 50170
Physical Layer (Transmission technology)	IEC 61158-2
Transmission speed	31.25 Kbits/second
Number of stations	Up to 32 per line segment, (maximum total of 126)
Max. basic current [I _b]	14 mA
Fault current [I _{FDE}]	0 mA
Bus voltage	9 ... 32 V (non Ex)
Preferred cable specification (Type A)	
Cable design	Two wire twisted pair
Conductor area (nominal)	0.8 mm ² (AWG 18)
Loop resistance	44 Ω/km
Impedance	100 Ω ± 20 %
Wave attenuation at 39 kHz	3 dB/km
Capacitive asymmetry	2 nF/km
Bus termination	Passive line termination at both
Max. bus length	Up to 1.9 km. Extendable by repeaters
IS (Intrinsic Safety) data	
Required sensor electronics	Compact or remote mounted SITRANS F M MAG 6000 I Ex
FISCO	YES
Max. U _I	17,5 V
Max. I _I	380 mA
Max. P _I	5,32 V
Max. L _I	0 μH
Max. C _I	0 nF
FISCO cable requirements	
Loop resistance R _C	15 ... 150 Ω/km
Loop inductance L _C	0,4 ... 1 mH/km
Capacitance C _C	80 ... 200 nF/km
Max. Spur length in IIC and IIB	30 m
Max. Trunk length in IIC	1 km
Max. Trunk length in IIB	5 km

PROFIBUS parameter support

The following parameters are accessible using a MS0 relationship from a Class 1 Master. MS0 specifies cyclic Data Exchange between a Master and a Slave.

Technical specifications (continued)

Cyclic services		
Input (Master view)	Parameter	MAG 6000/MAG 6000 I
	Mass flow	
	Volume flow	✓
	Temperature	
	Density	
	Fraction A	
	Fraction B	
	Pct Fraction A	
	Totalizer 1	✓
	Totalizer 2 ¹⁾	✓
	Batch progress ¹⁾	✓
	Batch setpoint	✓
	Batch compensation	✓
	Batch status (running ...)	✓
Output (Master view)		
	Set Totalizer 1+2	✓
	Set Mode Totalizer 1+2	✓
	Batch control (start, stop ...)	✓
	Batch setpoint	✓
	Batch compensation	✓

¹⁾ Value returned is dependent on the BATCH function.

When ON, Batch progress is returned.

When OFF, TOTALIZER 2 is returned.

Flow Measurement

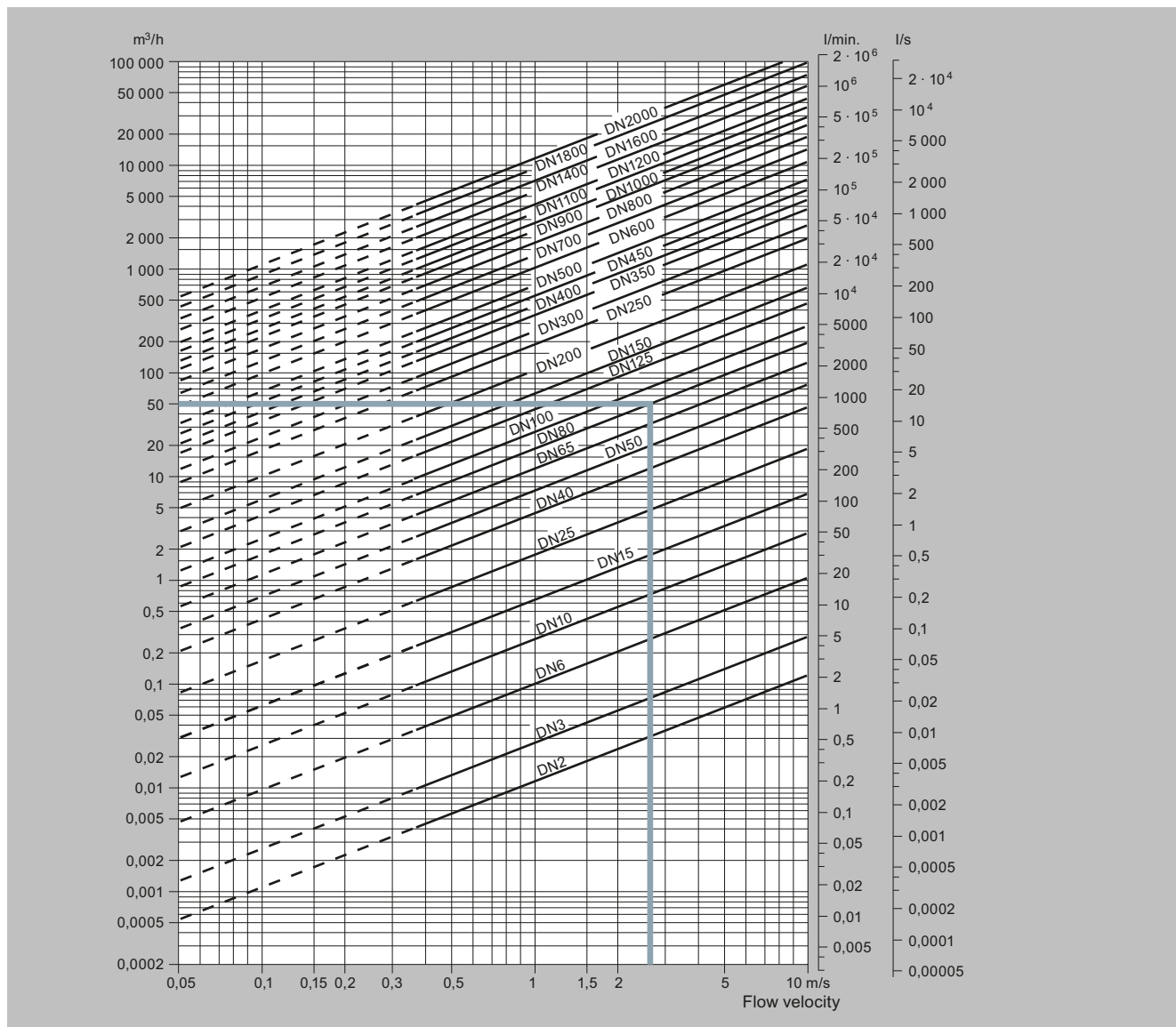
SITRANS FM (electromagnetic)

System information

Technical specifications (continued)

Flow and speed chart

Metric



Sizing table (DN 2 ... DN 2000)

The table shows the relationship between flow velocity v , flow quantity Q and sensor dimension DN.

Guidelines for selection of sensor

Min. measuring range: 0 ... 0.25 m/s

Max. measuring range: 0 ... 10 m/s

Normally the sensor size is selected so that nominal flow velocity v lies within the measuring range 1 to 3 m/s.

Example:

Flow quantity of 50 m³/h and a sensor dimension of DN 80 gives a flow velocity of 2.7 m/s, which is within the recommended measuring range of 1 to 3 m/s.

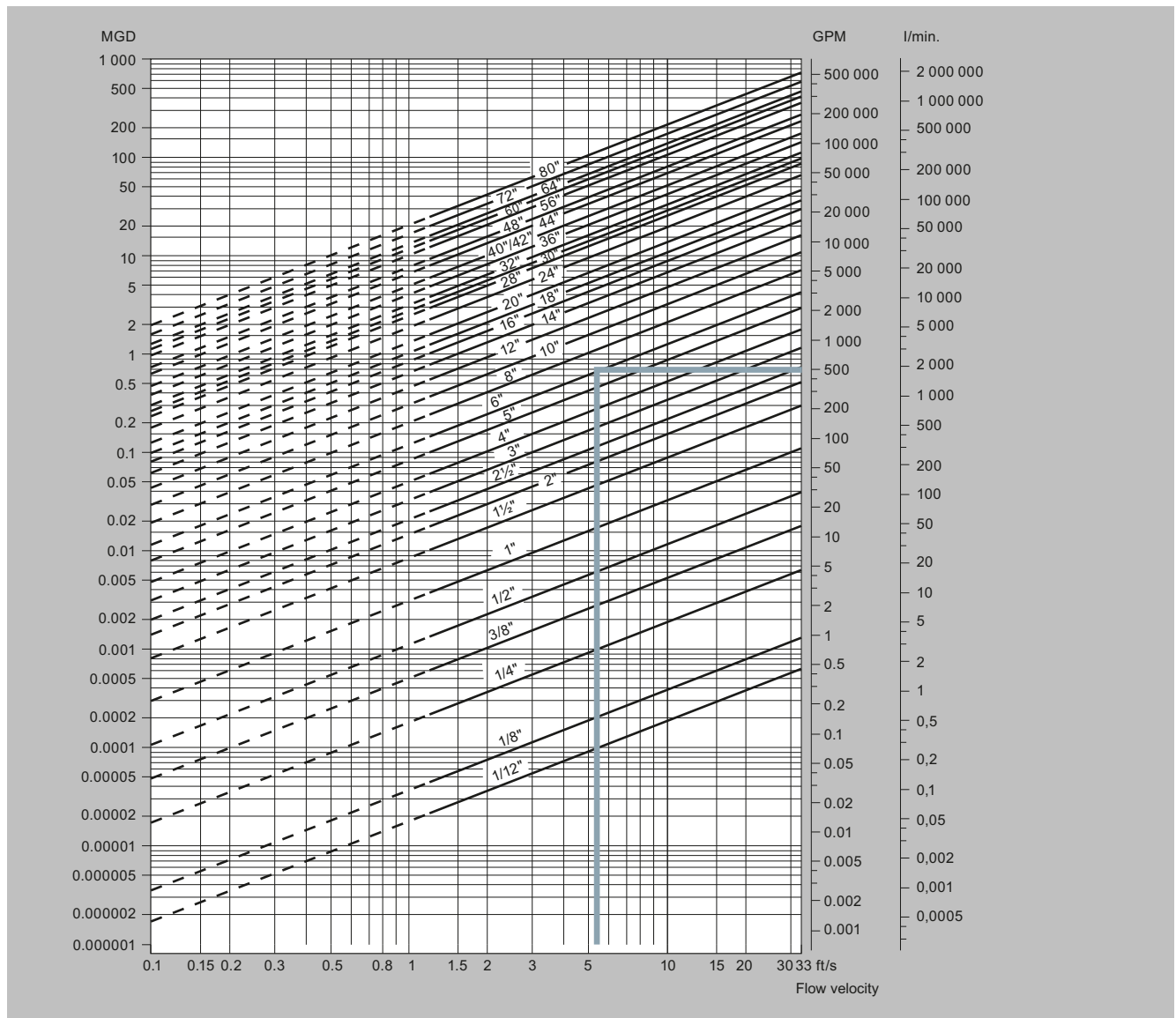
Technical specifications (continued)

Flow velocity calculation formula	Units
$v = 1273.24 \cdot Q/DN^2$ or	v : [m/s], Q : [l/s], DN : [mm]
$v = 353.68 \cdot Q/DN^2$	v : [m/s], Q : [m ³ /h], DN : [mm]

For more information visit:

<https://new.siemens.com/global/en/products/automation/process-instrumentation/flow-measurement/electromagnetic.html>

Imperial



Sizing table (1/12\" ... 78\")

The table shows the relationship between flow velocity v , flow quantity Q and sensor dimension size.

Guidelines for selection of sensor

Min. measuring range: 0 ... 0.8 ft/s

Max. measuring range: 0 ... 33 ft/s

Normally the sensor size is selected so that nominal flow velocity v lies within the measuring range 3 to 10 ft/s.

Flow Measurement

SITRANS FM (electromagnetic)

System information

Technical specifications (continued)

Example:

Flow quantity of 500 GPM and a sensor dimension of 6" gives a flow velocity of 5.6 ft/s, which is within the recommended measuring range of 3 to 10 ft/s.

Flow velocity calculation formula	Units
$v = 0.408 \cdot Q / (\text{Pipe I.D.})^2$ or	v: [ft/s], Q: [GPM], Pipe I.D.: [inch]
$v = 283.67 \cdot Q / (\text{Pipe I.D.})^2$	v: [ft/s], Q: [MGD], Pipe I.D.: [inch]

For more information visit:

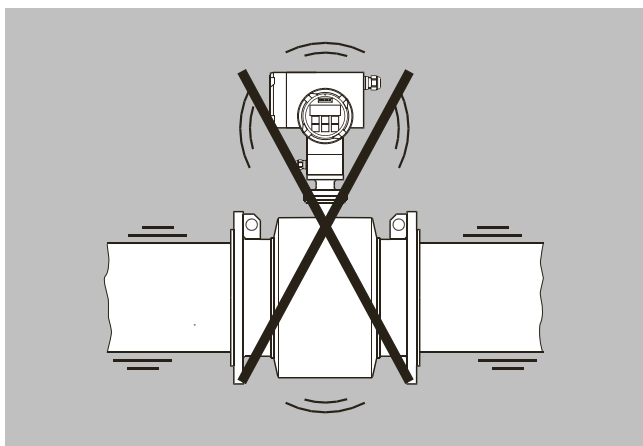
<https://new.siemens.com/global/en/products/automation/process-instrumentation/flow-measurement/electromagnetic.html>

Installation conditions

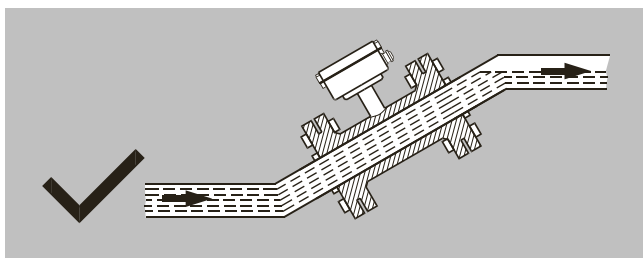
Vibrations

Strong vibrations should be avoided.

In applications with strong vibrations, remote mounting of the transmitter is recommended.



The sensor must always be completely filled with liquid.

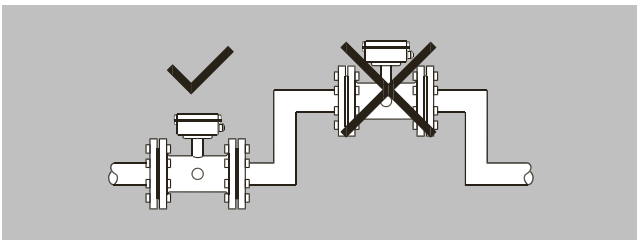
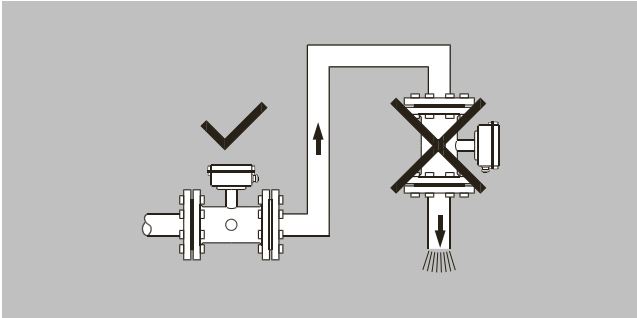


Install in pipelines which are always full

The sensor must always be completely filled with liquid. Therefore avoid:

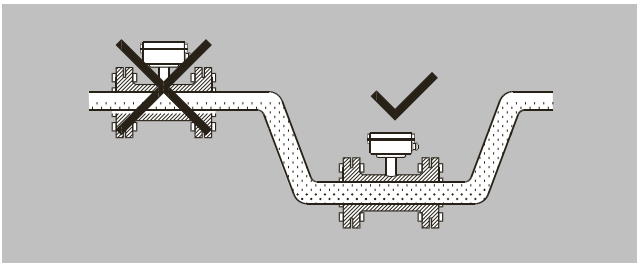
- Installation at the highest point in the pipe system
- Installation in vertical pipes with free outlet

Technical specifications (continued)



Do not install in pipelines which can run empty

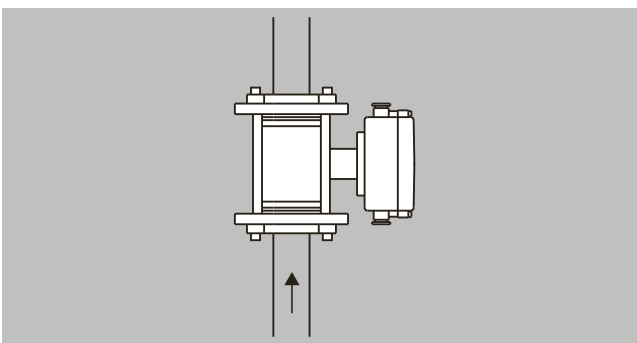
For partially filled pipes or pipes with downward flow and free outlet the flowmeter should be located in a U-Tube.



Install in U-tubes when pipe is partially filled

Installation in vertical pipes

Recommended flow direction: upwards. This minimizes the effect on the measurement of any gas/air bubbles in the liquid.



Install in vertical pipes with upward flow direction

Installation in horizontal pipes

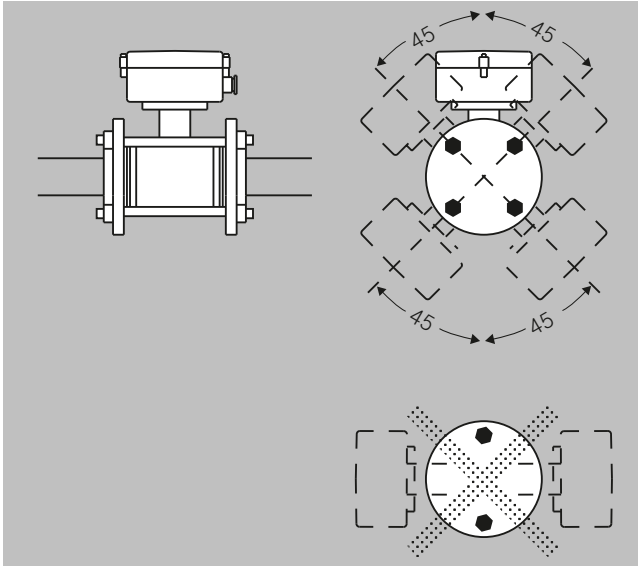
The sensor must be mounted as shown in the below figure. Do not mount the sensor as shown in the lower figure. This will position the electrodes at the top where there is possibility for air bubbles and at the bottom where there is possibility for mud, sludge, sand etc.

Flow Measurement

SITRANS FM (electromagnetic)

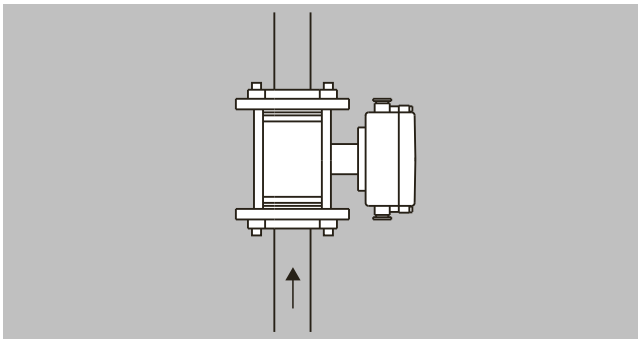
System information

Technical specifications (continued)



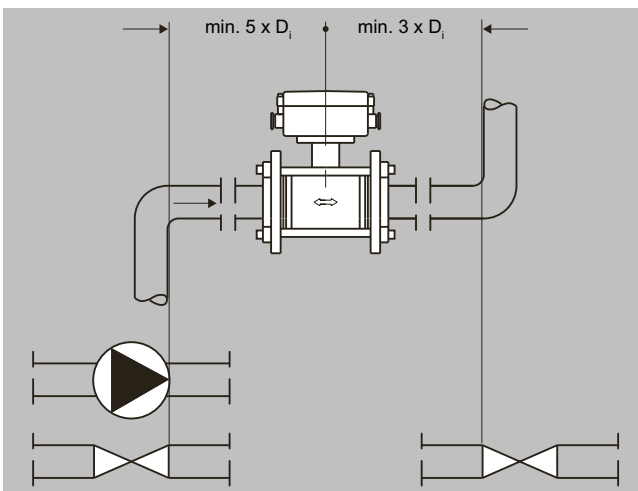
Measuring abrasive liquids and liquids containing particles

Recommended installation is in a vertical/inclined pipe to minimize the wear and deposits in the sensor.



Install in vertical pipelines with upward flow direction if measuring abrasive liquids

Inlet and outlet conditions



Recommended straight pipe lengths up and downstream for installations between elbows, pumps and valves

Technical specifications (continued)

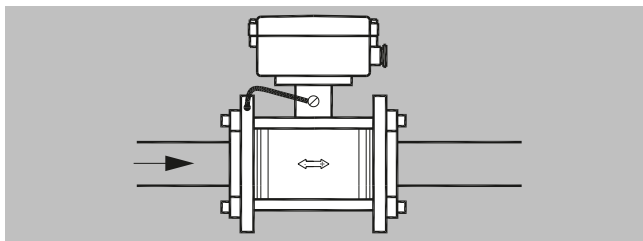
To achieve maximum accurate flow measurement it is essential to have straight pipe lengths up and downstream. For installations with non-optimal piping arrangements MAG 5100W and MAG 8000 still provide acceptable accuracy.

Tested in accordance with OIML R49 in various configurations that do not meet the suggested installation conditions MAG 5100W and MAG 8000 have received the qualification for mounting in zero diameter (OxDN) inlet/outlet installations.

Ambient temperature-Installation

Temperature changes can cause expansion or contraction in the pipe system. To avoid damage on the sensor use of proper gasket and torque should be ensured. For more information see sensor instruction.

Potential equalization

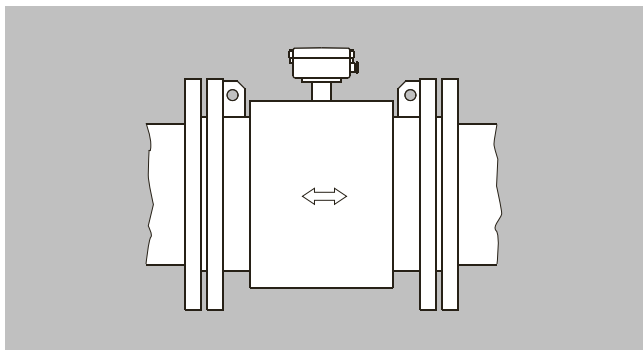


Potential equalization

The electrical potential of the liquid must always be equal to the electrical potential of the sensor. This can be achieved in different ways depending on the application:

- Wire jumper between sensor and adjacent flange (MAG 1100, MAG 3100)
- Direct metallic contact between sensor and fittings (MAG 1100 F)
- Built-in grounding electrodes (MAG 3100, MAG 5100 W)
- Optional grounding/protection flanges/rings (MAG 1100, MAG 3100, MAG 8000)
- Optional graphite gaskets on MAG 1100 (standard for MAG 1100 High Temperature)
- MAG 8000 installed in plastic or coated pipes: two grounding rings to be used.

Grounding



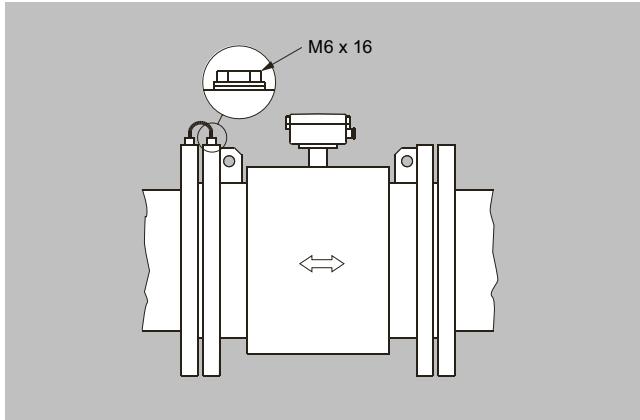
MAG 3100 and MAG 5100 W: with grounding electrodes in conductive and non-conductive pipes (no further action necessary)

Flow Measurement

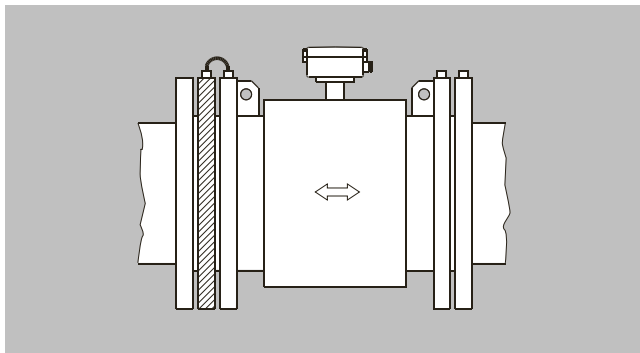
SITRANS FM (electromagnetic)

System information

Technical specifications (continued)



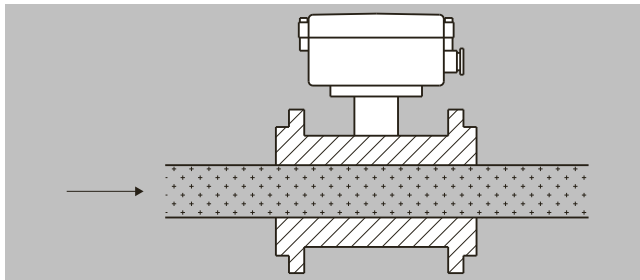
MAG 1100 and MAG 3100; without grounding electrodes in conductive pipes (MAG 1100 use graphite gasket)



Without grounding electrodes in non-conductive pipes use grounding ring (MAG 1100 use graphite gasket)

MAG 1100 F grounding via process connections. MAG 8000 grounding see the section about MAG 8000.

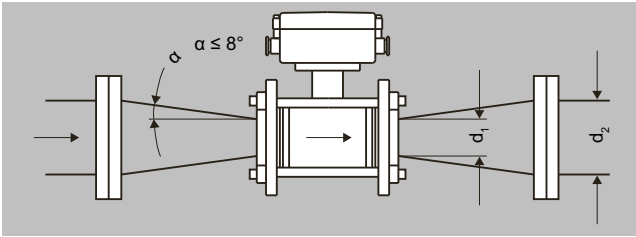
Vacuum



In order to prevent damages of liner when operating meters under vacuum please take note of the information "Operating pressure" given in section "Technical specification".

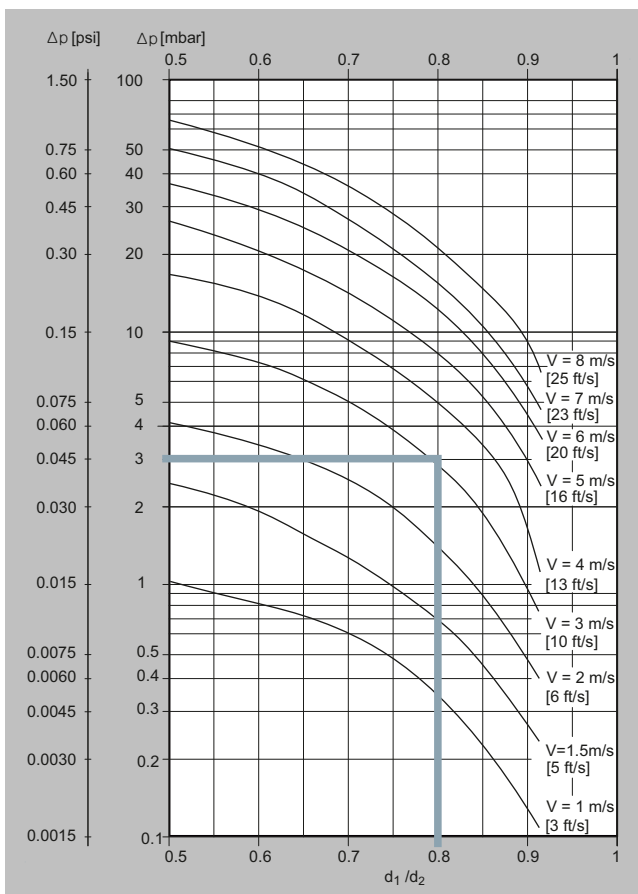
Technical specifications (continued)

Installation in large pipes



Reduction in nominal pipe diameter

The flowmeter can be installed between two reducers (e.g. DIN 28545). Assuming that at 8° the following pressure drop curve applies. The curves are applicable to water.



Pressure drop as function of diameter reduction between reducers

Example:

Flow velocity (v) of 3 m/s (10 ft/s) in a sensor with a diameter reduction DN 100 (4") to DN 80 (3") ($d_1/d_2 = 0.8$) gives a pressure drop of 2.9 mbar (0.04 psi).

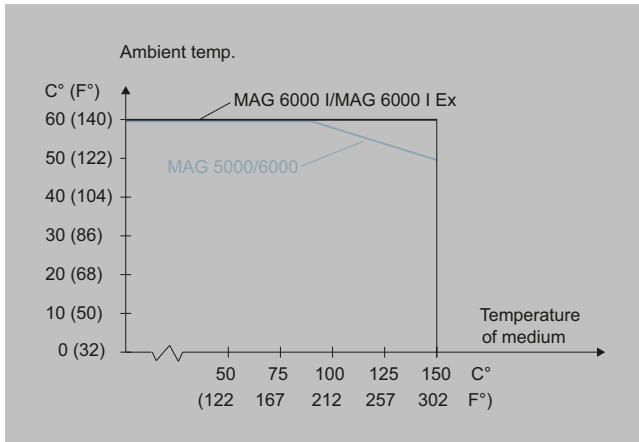
Flow Measurement

SITRANS FM (electromagnetic)

System information

Technical specifications (continued)

Ambient temperature



Max. ambient temperature as a function of temperature of medium

The transmitter can be installed either compact or remote.

With compact installation the temperature of medium must be according to the graph.

Sensor cables and conductivity of medium

Compact installation:

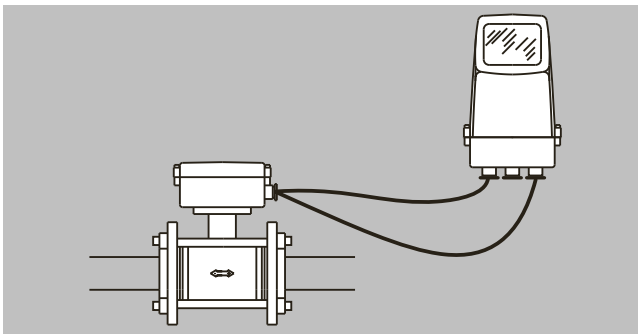
Liquids with an electrical conductivity $\geq 5 \mu\text{S/cm}$.

Note for MAG 1100 sizes DN2 and DN3:

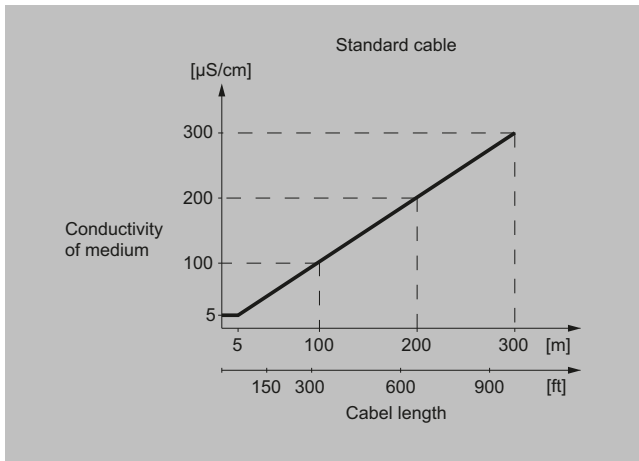
- The media conductivity must be $\geq 30 \mu\text{S/cm}$

Note for MAG 8000:

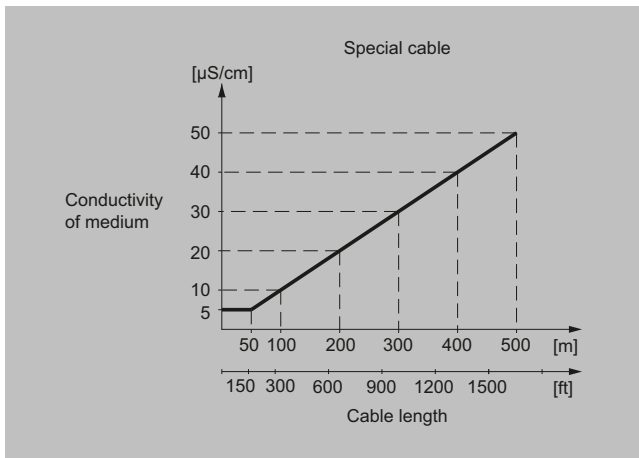
- The media conductivity must be $\geq 20 \mu\text{S/cm}$



Remote installation

Technical specifications (continued)

Minimum conductivity of medium (using standard electrode cable)



Minimum conductivity of medium (using special electrode cable)

Empty pipe detection

The installation has to fulfill the following limitations for usage of the empty pipe detection function:

- Media conductivity $\geq 20 \mu\text{S/cm}$
- Length of cable at remote installation $\leq 50 \text{ m}$ (150 ft)
- Special shield cable must be used

Note for MAG 1100 sizes DN 2 and DN 3:

- Empty pipe detection is not available

Note for MAG 5000/6000 CT:

- Empty pipe detection is not available

Flow Measurement

SITRANS FM (electromagnetic)

Flow sensors / SITRANS FM MAG 1100 and 1100 HT

Overview



The SITRANS FM MAG 1100 is an electromagnetic flow sensor in a compact wafer design designed for flow applications in the process industry.

Benefits

- Sensor sizes: DN 2 to DN 100 ($1/12$ " to 4")
- Compact wafer design meets EN 1092, DIN and ANSI flange standards
- Corrosion resistant AISI 316 stainless steel sensor housing
- Highly resistant liner and electrodes fitting most extreme process media
- Temperature rating up to 200 °C (392 °F)
- Hose proof IP67/NEMA 6 enclosure rating
- Designed that patented in-situ verification can be conducted. Using SENSORPROM fingerprints

Application

The main applications of the SITRANS FM electromagnetic flow sensors can be found in the following fields:

- Process industry
- Chemical industry
- Pharmaceutical industry
- Water treatment like e.g. chemical dosing

Design

- Compact or remote mounting possible
- Easy "plug & play" field changeability of transmitter
- Simple on-site upgrade to IP68/NEMA 6P terminal box
- ATEX 2G D version
- FM Class I Div 2

Mode of operation

The flow measuring principle is based on Faraday's law of electromagnetic induction according to which the sensor converts the flow into an electrical voltage proportional to the velocity of the flow.

Integration

The complete flowmeter consists of a flow sensor and an associated transmitter SITRANS FM MAG 5000, 6000 or 6000 I. The flexible communication concept USM II simplifies integration and update to a variety of fieldbus systems such as HART, FOUNDATION Fieldbus H1, DeviceNet, PROFIBUS DP and PA, Modbus RTU/RS 485.

Selection and ordering data

Sensor SITRANS FM MAG 1100 EPDM gaskets included		Article No. 7ME6110-	
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		● ● A ● 0 - ● ● ● ●	
Diameter			
DN 2 (1/12")	1 D		
DN 3 (1/8")	1 H		
DN 6 (1/4")	1 M		
DN 10 (3/8")	1 R		
DN 15 (1/2")	1 V		
DN 25 (1")	2 D		
DN 40 (1 1/2")	2 R		
DN 50 (2")	2 Y		
DN 65 (2 1/2")	3 F		
DN 80 (3")	3 M		
DN 100 (4")	3 T		
Liner material			
PFA - DN 10 ... 100 (3/8" ... 4")		1	
Ceramic		2	
Electrode material			
Hastelloy C (only with PFA liner)			1
Platinum (only with ceramic liner)			2
Transmitter			
Standard sensor for remote transmitter (order transmitter separately)			A
Ex sensor for remote transmitter (order transmitter separately)			B
MAG 6000 I, Aluminum 18 ... 90 V DC, 115 ... 230 V AC, FM / CSA Class I Div. 2			C
MAG 6000 I, Aluminum 18 ... 30 V DC, Ex			D
MAG 6000 I, Aluminum, 18 ... 90 V DC, 115 ... 230 V AC (non-Ex)			F
MAG 6000 I, Aluminum 115 ... 230 V AC, Ex			E
MAG 6000 Polyamide, 11 ... 30 V DC/11 ... 24 V AC			H
MAG 6000, Polyamide, 115 ... 230 V AC			J
MAG 5000, Polyamide, 11 ... 30 V DC/11 ... 24 V AC			K
MAG 5000, Polyamide, 115 ... 230 V AC			L
Communication			
No communication, add-on possible			A
HART			B
PROFIBUS PA Profile 3 (only MAG 6000/MAG 6000 I)			F
PROFIBUS DP Profile 3 (not for Ex) (only MAG 6000/MAG 6000 I)			G
Modbus RTU/RS 485 (not for Ex) (only MAG 6000/MAG 6000 I)			E
FOUNDATION Fieldbus H1 (only MAG 6000/MAG 6000 I)			J
Cable glands/terminal box			
Metric: Polyamide terminal box or MAG 6000 I compact			1
1/2" NPT: Polyamide terminal box or MAG 6000 I compact			2
Metric: Stainless steel terminal box			3
1/2" NPT: Stainless steel terminal box			4

1) Quick ship only in combination with Ceramic liner

Order code	
Additional information	
Please add "-Z" to Article No. and specify Order code(s) and plain text.	
Certificates	
Material certificate according to EN 10204-3.1	C12
Factory certificate according to EN 10204-2.2	C14
Factory certificate according to EN 10204-2.1	C15
Special calibration	
5-point calibration ¹⁾	D01
10-point calibration ²⁾	D06

Flow Measurement

SITRANS FM (electromagnetic)

Flow sensors / SITRANS FM MAG 1100 and 1100 HT

Selection and ordering data (continued)

	Order code
Default (2 × 25 % and 2 × 90 %) matched-pair calibration	D11
5-point, matched-pair calibration ¹⁾	D15
10-point, matched-pair calibration ²⁾	D18
Terminal blocks	
Factory mounted terminal blocks	N02
Country specific label	
CRN (Canadian Registration Number)	H25
Tag name plate	
Tag name plate transmitter, stainless steel (specify in plain text)	Y15
Tag name plate, stainless steel (specify in plain text)	Y17
Tag name plate, plastic (self-adhesive)	Y18
Device settings	
Customer-specific transmitter setting	Y20
Factory mounted sensor cables	
Sensor cables wired	Y40
Sensor cables wired and IP68 sealing	Y41
Additional calibrations	
Accredited matched-pair calibration acc. to ISO/IEC 17025: 2005	On request ³⁾
Customer-specified calibration up to 10 points	On request ³⁾
Customer-witnessed calibration (any of above calibration)	On request ³⁾

¹⁾ 20 %, 40 %, 60 %, 80 %, 100 % of factory Q_{max}

²⁾ Ascending and descending at 20 %, 40 %, 60 %, 80 %, 100 % of factory Q_{max}

³⁾ Product Variation Request (PVR)

Sensor SITRANS FM MAG 1100 HT High Temperature Ceramic liner, Platinum electrode, Graphite gaskets included	Article No. 7ME6120- ● ● A 2 0 - 2 ● A ●									
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.										
Diameter										
DN 15 (½")	1	V								
DN 25 (1")	2	D								
DN 40 (1½")	2	R								
DN 50 (2")	2	Y								
DN 80 (3")	3	M								
DN 100 (4")	3	T								
Transmitter										
Standard sensor for remote transmitter (order transmitter separately)									A	
Ex sensor for remote transmitter (order transmitter separately)									B	
Cable glands/terminal box										
Metric: Stainless steel terminal box										3
½" NPT: Stainless steel terminal box										4

	Order code
Additional information	
Please add "-Z" to Article No. and specify Order code(s) and plain text.	
Certificates	
Material certificate according to EN 10204-3.1	C12
Factory certificate according to EN 10204-2.2	C14
Factory certificate according to EN 10204-2.1	C15
Special calibration	
5-point calibration ¹⁾	D01
10-point calibration ²⁾	D06

Selection and ordering data (continued)

	Order code
Default (2 × 25 % and 2 × 90 %) matched-pair calibration	D11
5-point, matched-pair calibration ¹⁾	D15
10-point, matched-pair calibration ²⁾	D18
Terminal blocks	
Factory mounted terminal blocks	N02
Tag name plate	
Tag name plate, stainless steel (specify in plain text)	Y17
Tag name plate, plastic (self-adhesive)	Y18
Device settings	
Customer-specific transmitter setting	Y20
Factory mounted sensor cables	
Sensor cables wired	Y40
Sensor cables wired and IP68 sealing	Y41
Additional calibrations	
Accredited matched-pair calibration acc. to ISO/IEC 17025: 2005	On request ³⁾
Customer-specified calibration up to 10 points	On request ³⁾
Customer-witnessed calibration (any of above calibration)	On request ³⁾

¹⁾ 20 %, 40 %, 60 %, 80 %, 100 % of factory Q_{max}


²⁾ Ascending and descending at 20 %, 40 %, 60 %, 80 %, 100 % of factory Q_{max}

³⁾ Product Variation Request (PVR)

Description	Article No.
• English	A5E02435647

All literature is available to download for free, in a range of languages, at www.siemens.com/processinstrumentation/documentation

Accessories

Description	Article No.	
Potting kit for IP68/ NEMA 6P sealing of sensor junction box	FDK:085U0220	

Accessories for MAG 1100 sensor






Description	Article No.	
Pipe connection ½" external thread For DN 2 ... 10 (1/12" ... 3/8") sensor Material: Stainless steel AISI 316L 2 pcs. pipe connections, 2 pcs. EPDM gaskets, 12 pcs. M4x12 screws	FDK:083G0080	
• R½" ISO 7-1 tapered thread	FDK:083G4330	
• ½" NPT thread For DN 2 ... 10 (1/12" ... 3/8") sensor Material: Hastelloy C, 2 pcs. pipe connections, 2 pcs. PTFE gaskets, 12 pcs. M4x12 screws		

Flow Measurement



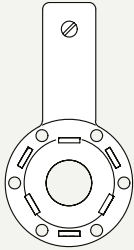


SITRANS FM (electromagnetic)

Flow sensors / SITRANS FM MAG 1100 and 1100 HT

Selection and ordering data (continued)

Description	Article No.	
<ul style="list-style-type: none"> • R$\frac{1}{2}$" ISO 7-1 tapered thread • $\frac{1}{2}$" NPT thread <p>For DN 2 ... 10 (1/12" ... 3/8") sensor Material PVDF (Kynar 1000) 2 pcs. pipe connections (Max. 70 °C, PN 8 bar/max 158 °F, 116 PSI), 1 pc. grounding ring ¹⁾, 1 pc. grounding wire, 3 pcs. PTFE gaskets, 2 pcs. space rings, 6 pcs. M4×12 and 6 pcs. M4×20 screws</p> <ul style="list-style-type: none"> • G$\frac{1}{2}$" ISO 7-1 tapered thread incl. grounding ring • $\frac{1}{2}$" NPT thread incl. grounding ring 	<p>FDK:083G4332</p> <p>FDK:083G4331</p> <p>A5E01018395</p> <p>A5E01018400</p>	
<p>EPDM gaskets Material: EPDM; each set includes: 2 pcs. EPDM gaskets, 1 pc. grounding wire, 1 pc. M6 screw, 1 pc. nut, 1 pc. washer, 1 pc. bolt grounding plate</p> <ul style="list-style-type: none"> • DN 2 ... 10 (1/12" ... 3/8") • DN 15 ($\frac{1}{2}$") • DN 25 (1") • DN 40 (1$\frac{1}{2}$") • DN 50 (2") • DN 65 (2$\frac{1}{2}$") • DN 80 (3") • DN 100 (4") 	<p>FDK:083G3116</p> <p>FDK:083G3117</p> <p>FDK:083G3119</p> <p>FDK:083G3121</p> <p>FDK:083G3122</p> <p>FDK:083G3123</p> <p>FDK:083G3124</p> <p>FDK:083G3125</p>	
<p>PTFE gaskets Material: PTFE; each set includes: 2 pcs. gaskets, 2 pcs. grounding wires, 3 pcs. M6 screws (DN 2 ... 10: 12 pcs. M4×14)</p> <ul style="list-style-type: none"> • DN 2 ... 10 (1/12" ... 3/8") • DN 15 ($\frac{1}{2}$") • DN 25 (1") • DN 40 (1$\frac{1}{2}$") • DN 50 (2") • DN 65 (2$\frac{1}{2}$") • DN 80 (3") • DN 100 (4") 	<p>FDK:083G0156</p> <p>FDK:083G0157</p> <p>FDK:083G0159</p> <p>FDK:083G0161</p> <p>FDK:083G0162</p> <p>FDK:083G0163</p> <p>FDK:083G0164</p> <p>FDK:083G0165</p>	
<p>Graphite gaskets Material: Graphite; conductive, each set includes: 2 pcs. gaskets (can also be used as grounding ring)</p> <ul style="list-style-type: none"> • DN 2 ... 10 (1/12" ... 3/8") • DN 15 ($\frac{1}{2}$") • DN 25 (1") • DN 40 (1$\frac{1}{2}$") • DN 50 (2") • DN 65 (2$\frac{1}{2}$") • DN 80 (3") • DN 100 (4") 	<p>FDK:083G0116</p> <p>FDK:083G0117</p> <p>FDK:083G0119</p> <p>FDK:083G0121</p> <p>FDK:083G0122</p> <p>FDK:083G0123</p> <p>FDK:083G0124</p> <p>FDK:083G0125</p>	
<p>Grounding ring (stainless steel) Material: AISI 316L/1.4404; each set includes: 1 pc. grounding ring¹⁾, 3 pcs. PTFE gaskets, 1 pc. earth wire, 1 pc. M6 screw</p> <ul style="list-style-type: none"> • DN 2 ... 10 (1/12" ... 3/8") • DN 15 ($\frac{1}{2}$") • DN 25 (1") • DN 40 (1$\frac{1}{2}$") • DN 50 (2") • DN 65 (2$\frac{1}{2}$") • DN 80 (3") 	<p>FDK:083G0686</p> <p>FDK:083G0687</p> <p>FDK:083G0689</p> <p>FDK:083G0691</p> <p>FDK:083G0692</p> <p>FDK:083G0693</p> <p>FDK:083G0694</p>	

Selection and ordering data (continued)

Description	Article No.	
<ul style="list-style-type: none"> • DN 100 (4") 	FDK:083G0695	
<p>Grounding ring (Hastelloy C) Material: Hastelloy C22/2.4602; each set includes: 1 pc. grounding ring¹⁾, 3 pcs. PTFE gaskets, 1 pc. earth wire, 1 pc. M6 screw</p> <ul style="list-style-type: none"> • DN 2 ... 10 (1/12" ... 3/8") • DN 15 (1/2") • DN 25 (1") • DN 40 (1 1/2") • DN 50 (2") • DN 65 (2 1/2") • DN 80 (3") • DN 100 (4") 	<p>FDK:083G3256</p> <p>FDK:083G3257</p> <p>FDK:083G3259</p> <p>FDK:083G3261</p> <p>FDK:083G3262</p> <p>FDK:083G3263</p> <p>FDK:083G3264</p> <p>FDK:083G3265</p>	
<p>Grounding ring (Tantalum) Material: Tantalum; each set includes: 1 pc. grounding ring¹⁾, 3 pcs. PTFE gaskets, 1 pc. earth wire, 1 pc. M6 screw</p> <ul style="list-style-type: none"> • DN 2 ... 10 (1/12" ... 3/8") • DN 15 (1/2") • DN 25 (1") • DN 40 (1 1/2") • DN 50 (2") • DN 65 (2 1/2") • DN 80 (3") • DN 100 (4") 	<p>A5E01181599</p> <p>A5E01181606</p> <p>A5E01181610</p> <p>A5E01181613</p> <p>A5E01181615</p> <p>A5E01181616</p> <p>A5E01181619</p> <p>A5E01181622</p>	 
<p>Studs and nuts For DN 100 PN 25/40, 8 pcs. M20 studs, 16 pcs. M20 nuts Material: AISI 304/1.4305</p> <ul style="list-style-type: none"> • DN 100 (4") 	FDK:083G0226	

¹⁾ Thickness of grounding ring is 2 mm (0.08 inch)

Flow Measurement

SITRANS FM (electromagnetic)

Flow sensors / SITRANS FM MAG 1100 and 1100 HT

Technical specifications

Version	MAG 1100	MAG 1100 HT (High Temperature)
Measuring principle	Electromagnetic induction	Electromagnetic induction
Excitation frequency (mains supply: 50 Hz/60 Hz)	DN 2 ... 65 (1/12" ... 2½"): 12.5 Hz/15 Hz DN 80, 100 (3", 4"): 6.25 Hz/7.5 Hz	DN 15 ... 50 (½" ... 2"): 12.5 Hz/15 Hz DN 80, 100 (3", 4"): 6.25 Hz/7.5 Hz
Process connection		
Nominal size		
• MAG 1100 (Ceramic)	DN 2 ... 100 (1/12" ... 4")	DN 15 ... 100 (½" ... 4")
• MAG 1100 (PFA)	DN 10 ... 100 (3/8" ... 4")	
Mating flanges	EN 1092-1 (DIN 2501), ANSI B 16.5 class 150 and 300 or equivalent Option: DN 2 ... 10 (1/12" ... 3/8"): G½"/1½" NPT pipe connection adapters	EN 1092-1 (DIN 2501), ANSI B 16.5 class 150 and 300 or equivalent
Rated operating conditions		
Ambient conditions		
Ambient temperature		
• Standard sensor	-40 ... +100 °C (-40 ... +212 °F)	-40 ... +100 °C (-40 ... +212 °F)
• Ex sensor	-20 ... +60 °C (-4 ... +140 °F)	-20 ... +60 °C (-4 ... +140 °F)
• Compact with transmitter MAG 5000/6000	-20 ... +60 °C (-4 ... +140 °F)	
• Compact with transmitter MAG 6000 I ¹⁾	-20 ... +60 °C (-4 ... +140 °F)	
• Compact with transmitter MAG 6000 I Ex ¹⁾	-20 ... +60 °C (-4 ... +140 °F)	
Temperature of medium		
• MAG 1100 (Ceramic)	-20 ... +150 °C (-4 ... +302 °F)	-20 ... +200 °C (-4 ... +392 °F)
• MAG 1100 Ex (Ceramic)	-20 ... +150 °C (-4 ... +302 °F)	-20 ... +180 °C (-4 ... +356 °F)
• MAG 1100 (PFA)	-30 ... +130 °C (-22 ... +266 °F) Suitable for steam sterilization at 150 °C (302 °F)	
Temperature shock		
• MAG 1100 (Ceramic)		
• Duration ≤ 1 min, followed by 10 min rest	• DN 2, 3 (1/12", 1/8") No limitations • DN 6, 10, 15, 25: Max. ΔT ≤ 80 °C/min (½", 3/8", ½", 1": Max. ΔT ≤ 144 °F/min) • DN 40, 50, 65: Max. ΔT ≤ 70 °C/min (1½", 2", 2½"): Max. ΔT ≤ 126 °F/min) • DN 80, 100: Max. ΔT ≤ 60 °C/min (3", 4"): Max. ΔT ≤ 108 °F/min)	• DN 15, 25: Max. ΔT ≤ 80 °C/min (½", 1": Max. ΔT ≤ 144 °F/min) • DN 40, 50: Max. ΔT ≤ 70 °C/min (1½", 2": Max. ΔT ≤ 126 °F/min) • DN 80, 100: Max. ΔT ≤ 60 °C/min (3", 4": Max. ΔT ≤ 108 °F/min)
• MAG 1100 (PFA)	Max. ± 100 °C (212 °F) momentarily	
Operating pressure		
• MAG 1100 (Ceramic)	• DN 2 ... 65: 40 bar (1/12" ... 2½": 580 psi) • DN 80: 37.5 bar (3": 540 psi) • DN 100: 30 bar (4": 435 psi) Vacuum: 1 x 10 ⁻⁶ bar _{abs} (1.5 - x 10 ⁻⁵ psi _{abs})	• DN 15 ... 50: 40 bar (½" ... 2": 580 psi) • DN 80: 37.5 bar (3": 540 psi) • DN 100: 30 bar (4": 435 psi) Vacuum: 1 x 10 ⁻⁶ bar _{abs} (1.5 - x 10 ⁻⁵ psi _{abs})

Technical specifications (continued)

Version	MAG 1100	MAG 1100 HT (High Temperature)
• MAG 1100 (PFA)	20 bar (290 psi) Vacuum: 0.02 bar _{abs} (0.3 psi _{abs}) DN 80 ... 100: CO ₂ pressure max. 7 bar (101.5 psi)	
Mechanical load (vibration)	• 18 ... 1000 Hz random in x, y, z, directions for 2 hours according to EN 60068-2-36 • Sensor: 3.17 g RMS • Sensor with compact MAG 5000/6000 mounted transmitter: 3.17 g RMS • Sensor with compact MAG 6000 I/6000 I Ex mounted transmitter: 1.14 g RMS • For compact installation with the MAG 6000 I, transmitter to be supported to avoid tension on sensor part.	• 18 ... 1000 Hz random in x, y, z, directions for 2 hours according to EN 60068-2-36 • Sensor: 3.17 g RMS
Enclosure rating (standard)	IP67 to EN 60529 (NEMA 6), 1 mH ₂ O for 30 min	IP67 to EN 60529 (NEMA 6), 1 mH ₂ O for 30 min
EMC	2014/30/EU	2014/30/EU
Design		
Weight	See Dimensional drawings	See Dimensional drawings
Material		
• Enclosure		
- MAG 1100	Stainless steel AISI 316L/1.4404	Stainless steel AISI 316L/1.4404
• Terminal box		
- Standard	Fibre glass reinforced polyamide (not for Ex)	Stainless steel AISI 316/1.4436
- Option	Stainless steel AISI 316/1.4436	
• Fixing studs	Stainless steel AISI 304/1.4301, Number and size to EN 1092-1:2001	Stainless steel AISI 304/1.4301, Number and size to EN 1092-1:2001
• Gaskets		
- Standard	EPDM (max. 150 °C, PN 40 (max. 302 °F, 600 psi))	Graphite (max. 200 °C, PN 40 (max. 392 °F, 600 psi))
- Option	• Graphite (max. 200 °C, PN 40 (max. 392 °F, 600 psi)) • PTFE (max. 130 °C, PN 25 (max. 266 °F, 300 psi))	
• Pipe connection adapters: DN 2, 3, 6 and 10 (1/12", 1/8", ¼" and 3/8")	• Stainless steel, AISI 316 /1.4436 • Hastelloy C22/2.4602 • PVDF	
Liner		
• MAG 1100 (Ceramic)	• DN 2, 3 (1/12", 1/8"): Zirconium oxide (ZrO ₂) (ceramic) • DN 6 ... 100 (¼" ... 4"): Aluminum oxide Al ₂ O ₃	DN 15 ... 100 (½", 4"): Aluminum oxide Al ₂ O ₃
• MAG 1100 (PFA)	Reinforced PFA (not for Ex)	
Electrodes		
• MAG 1100 (Ceramic)	• DN 10 ... 100 (3/8" ... 4"): Platinum with gold/Titanium brazing alloy • DN 2 ... 6 (1/12" ... ¼"): Platinum	Platinum with gold/Titanium brazing alloy

Technical specifications (continued)

Version	MAG 1100	MAG 1100 HT (High Temperature)
• MAG 1100 (PFA)	<ul style="list-style-type: none"> • DN 10 ... 15 (3/8" ... 1/2"): Hastelloy C276/2.4819 • DN 25 ... 100 (1" ... 4"): Hastelloy C22/2.4602 	
Cable entries	<ul style="list-style-type: none"> • Remote installation 2 x M20 or 2 x 1/2" NPT • Compact installation - MAG 5000/MAG 6000: 4 x M20 or 4 x 1/2" NPT - MAG 6000 I: 2 x M25 (for supply/output) - MAG 6000 I Ex: 2 x M25 (for supply/output) 	Remote installation 2 x M20 or 2 x 1/2" NPT
Certificates and approvals		
Calibration		
• Default calibration	Zero-point, 2 x 25 %, 2 x 90 %	Zero-point, 2 x 25 %, 2 x 90 %
• Special calibration	5-point calibration: 20 %, 40 %, 60 %, 80 %, 100 % of factory Q _{max} 10-point calibration: ascending and descending at 20 %, 40 %, 60 %, 80 %, 100 % of factory Q _{max} Matched-pair calibration: default, 5-point or 10-point	
Hazardous areas		
• MAG 1100 F (Ceramic)		
- Ex-sensor in compact or remote version with MAG 6000 I Ex	<ul style="list-style-type: none"> • ATEX, EAC Ex - Zone 1 Ex d e ia IIB T6 Gb • ATEX - Zone 21 Ex tD A21 IP67 	<ul style="list-style-type: none"> • ATEX, EAC Ex - Zone 1 Ex d e ia IIB T6 Gb • ATEX - Zone 21 Ex tD A21 IP67
- Standard sensor in compact or remote version with MAG 5000/6000/6000 I	<ul style="list-style-type: none"> • FM - NI Class I Div. 2 Groups A, B, C, D 	<ul style="list-style-type: none"> • FM - NI Class I Div. 2 Groups A, B, C, D
• MAG 1100 F (PFA)		
- Standard sensor in compact or remote version with MAG 5000/6000/6000 I	<ul style="list-style-type: none"> • FM - NI Class I Div. 2 Groups A, B, C, D 	
Pressure equipment	<ul style="list-style-type: none"> • PED – 2014/68/EU • CRN (only PFA) 	<ul style="list-style-type: none"> • PED – 2014/68/EU
Others	<ul style="list-style-type: none"> • EAC (Kazakhstan) 	<ul style="list-style-type: none"> • EAC (Kazakhstan)

1) With HART communication max. ambient temperature 50 °C (122 °F).

For technical specification for transmitter - please see section about transmitters.

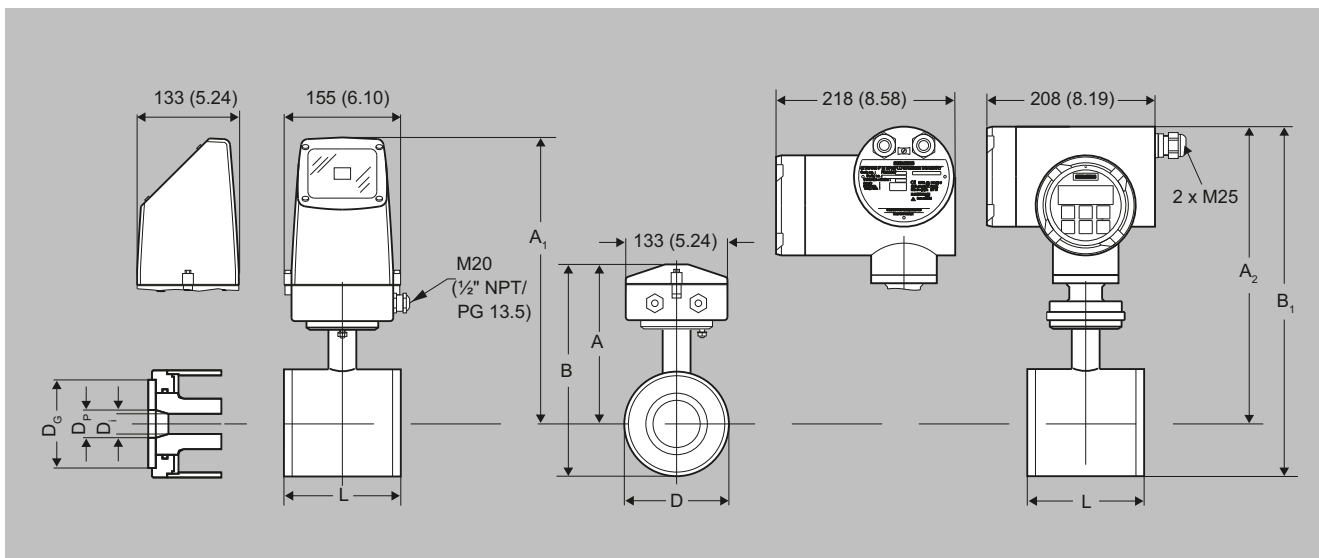
Flow Measurement

SITRANS FM (electromagnetic)

Flow sensors / SITRANS FM MAG 1100 and 1100 HT

Dimensional drawings

Sensor MAG 1100, compact/remote



Dimensions in mm (inch)

Important note: For compact installation with MAG 6000 I/Ex - transmitter to be supported to avoid tension on the sensor part

Size DN	A ¹⁾ [mm]	B ¹⁾ [mm]	A ₁ /A ₂ ³⁾ [mm]	B ₁ [mm]	D [mm]	D _i [mm]	D _i (PFA) [mm]	D _p [mm]	D _G [mm]	Weight ²⁾ [kg]
2	161	186	315	340	48.7	2		17.3	34	2.2
3	161	186	315	340	48.7	3		17.3	34	2.2
6	161	186	315	340	48.7	6		17.3	34	2.2
10	161	186	315	340	48.7	10	10	13.6	34	2.2
15	161	186	315	340	48.7	15	16	17.3	40	2.2
25	169	201	323	354	63.5	25	26	28.5	56	2.7
40	179	221	333	375	84.0	40	38	43.4	75	3.4
50	188	239	342	393	101.6	50	50	54.5	90	4.2
65	198	258	351	412	120.9	65	66	68.0	112	5.5
80	204	270	357	424	133.0	80	81	82.5	124	7.0
100	217	296	370	450	159.0	100	100	107.1	150	10.0

Size [inch]	A ¹⁾ [inch]	B ¹⁾ [inch]	A ₁ /A ₂ ³⁾ [inch]	B ₁ [inch]	D [inch]	D _i [inch]	D _i (PFA) [inch]	D _p [inch]	D _G [inch]	Weight ²⁾ [lbs]
1/12	6.34	7.33	12.40	13.39	1.92	0.08		0.68	1.34	4.8
1/8	6.34	7.33	12.40	13.39	1.92	0.12		0.68	1.34	4.8
1/4	6.34	7.33	12.40	13.39	1.92	0.24		0.68	1.34	4.8
3/8	6.34	7.33	12.40	13.39	1.92	0.39	0.39	0.53	1.34	4.8
1/2	6.34	7.33	12.40	13.39	1.92	0.59	0.63	0.68	1.57	4.8
1	6.66	7.92	12.72	13.94	2.50	0.98	1.02	1.12	2.20	5.9
1 1/2	7.05	8.70	13.11	14.76	3.31	1.57	1.50	1.71	2.95	7.5
2	7.40	9.41	13.47	15.47	4.00	1.97	1.97	2.15	3.54	9.2
2 1/2	7.80	10.16	13.82	16.22	4.76	2.56	2.60	2.68	4.41	12
3	8.03	10.63	14.06	16.70	5.24	3.15	3.19	3.25	4.88	15
4	8.54	11.65	14.57	17.72	6.26	3.94	3.94	4.22	5.91	22

¹⁾ 14.5 mm (0.571") shorter when the stainless steel terminal box is used (Ex or high temperature 200 °C (392 °F) version).

²⁾ With transmitter MAG 5000 or MAG 6000 installed, weight is increased by approximately 0.8 kg (1.8 lb). With MAG 6000 I weight is increased with 5.5 kg (12.1 lbs).

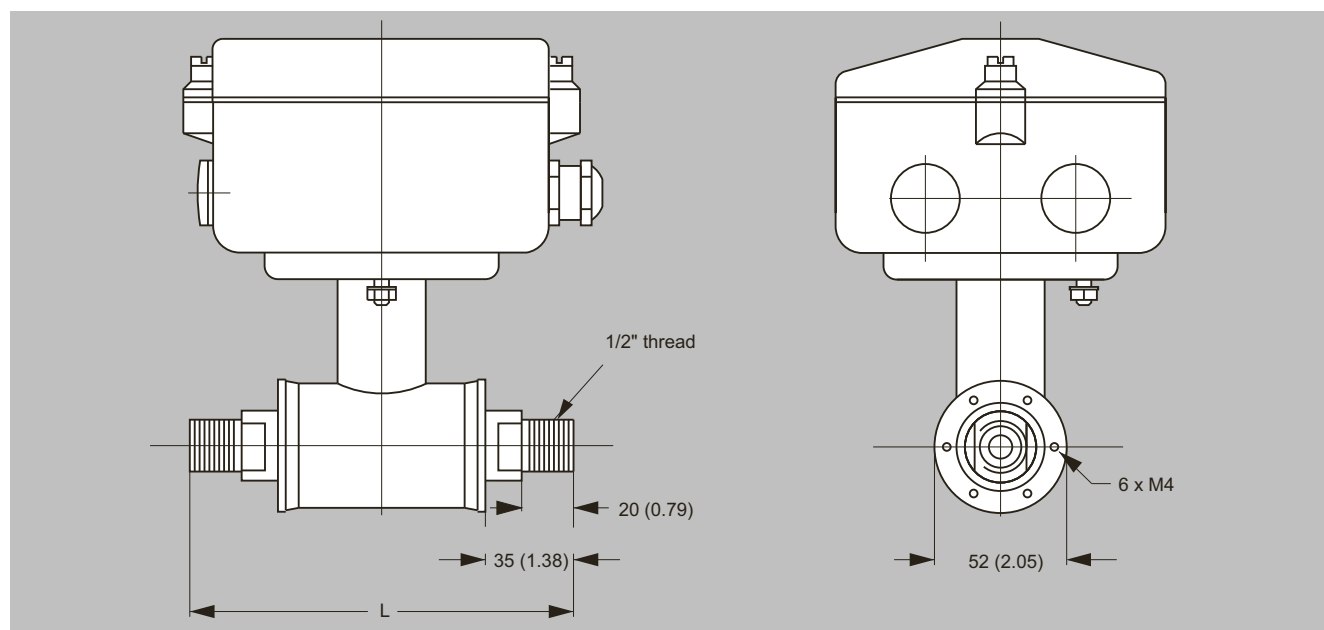
³⁾ A₂ is 3 mm (0.12") shorter than A₁

The total built-in length "L" [mm]/[inch] before assembling depends on the gasket selected.

Dimensional drawings (continued)

Size	EPDM		Graphite		PTFE (Teflon)		Without gasket		Grounding ring		
	Inch	[mm]	[inch]	[mm]	[inch]	[mm]	[inch]	[mm]	[inch]	[mm]	[inch]
2 ... 10 ¹⁾	$\frac{1}{12}$... $\frac{3}{8}$	64	2.52	66	2.60	70	2.75	64	2.52	77	3.03
15	$\frac{1}{2}$	65	2.56	66	2.60	70	2.75	64	2.52	77	3.03
25	1	80	3.15	81	3.19	85	3.35	79	3.10	92	3.62
40	$1\frac{1}{2}$	95	3.74	96	3.78	100	3.94	94	3.70	107	4.21
50	2	105	4.13	106	4.17	110	4.33	104	4.05	117	4.61
65	$2\frac{1}{2}$	130	5.12	131	5.15	135	5.31	129	5.05	142	5.60
80	3	155	6.10	156	6.14	160	6.30	154	6.00	167	6.57
100	4	185	7.28	186	7.31	190	7.48	184	7.20	197	7.76

¹⁾ Mounting between two flanges

Sensor MAG 1100 DN 2 ... 10 ($\frac{1}{12}$ " ... $\frac{3}{8}$ ") with adapters

The MAG 1100 DN 2, 3, 6 and 10 ($\frac{1}{12}$ ", $\frac{1}{8}$ ", $\frac{1}{4}$ " and $\frac{3}{8}$ ") are prepared for assembly with the $\frac{1}{2}$ " pipe connections. Dimensions in mm (inch)

The length "L" varies dependent on the gasket choice.

Stainless steel and Hastelloy pipe connections								PVDF pipe connections	
Without gasket		EPDM		Graphite		PTFE		PTFE	
[mm]	[inch]	[mm]	[inch]	[mm]	[inch]	[mm]	[inch]	[mm]	[inch]
150	5.9	150	5.9	152	6.0	156	6.1	133	5.2

Important note:

For compact installation with the MAG 6000 I, transmitter to be supported to avoid tension on sensor part.

Flow Measurement

SITRANS FM (electromagnetic)

Flow sensors / SITRANS FM MAG 1100 F

Overview



The electromagnetic sensor SITRANS FM MAG 1100 F is designed to meet applications in the food and beverage industry.

Benefits

- Sensor sizes: DN 10 to DN 100 (3/8" to 4")
- AISI 316 stainless steel enclosure
- Sensor: Hygienic connection, 3A approval
- Sanitary design for CIP/SIP cleaning
- Easy commissioning, the SENSORPROM unit automatically updates settings
- Hose proof IP67/NEMA 6 enclosure rating
- Designed that patented in-situ verification can be conducted. Using SENSORPROM fingerprints.

Application

The main applications of the SITRANS FM electromagnetic sensors can be found in the following fields:

- Food industry
- Beverage industry
- Pharmaceutical industry

Design

- Unique mechanical design with a wide range of customer specified sanitary connection
- Compact or remote mounting possible easy "plug & play" field changeable
- Simple on-site upgrade to IP68/NEMA 6P terminal box
- ATEX 2G D version for hazardous areas (ceramic liner)

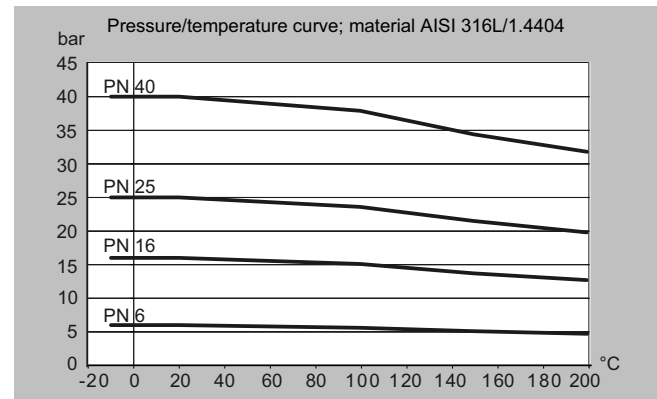
Mode of operation

The flow measuring principle is based on Faraday's law of electromagnetic induction according to which the sensor converts the flow into an electrical voltage proportional to the velocity of the flow.

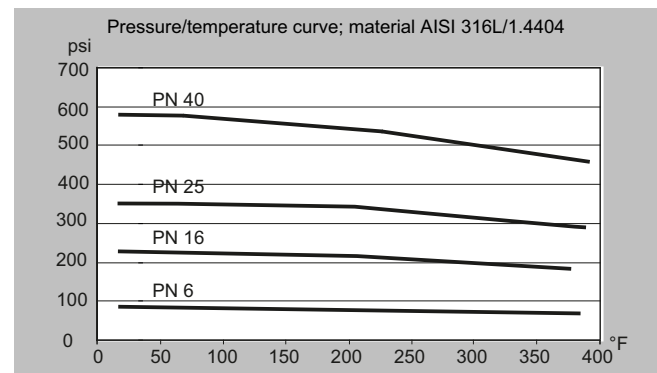
Integration

The complete flowmeter consists of a sensor and an associated transmitter SITRANS FM MAG 5000, 6000 and 6000 I. The flexible communication concept USM II simplifies integration and update to a variety of fieldbus systems such as PROFIBUS DP and PA, Modbus RTU/RS 485, HART, FOUNDATION Fieldbus H1, DeviceNet.

Pressure/temperature curve; material AISI 316L/1.4404



Pressure/temperature curve; material AISI 316L/1.4404



Selection and ordering data

Sensor SITRANS FM MAG 1100 F	Article No. 7ME6140-
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	
Diameter	
DN 10 (3/8")	1 R
DN 15 (1/2")	1 V
DN 25 (1")	2 D
DN 40 (1 1/2")	2 R
DN 50 (2")	2 Y
DN 65 (2 1/2")	3 F
DN 80 (3")	3 M
DN 100 (4")	3 T
Process connections	
None (not suitable for 3A approval)	A
Weld in	
DIN 11850	B
ISO 2037 (SMS 3008)	C
Tri-Weld/BS 4825-1	D
Clamp type	
DIN 32676	G
ISO 2852 (SMS 3016)	H
Tri-Clamp/BS 4825-3	J
Threaded type	
DIN 11851	M
SMS 1145 ¹⁾	N
Liner material	
PFA	1
Ceramic	2
Gasket material¹⁾	
EPDM flat gasket (3A)	0
FPM/FKM flat gasket (3A) (only with ceramic liner)	2
EPDM P gasket (3A) (only with PFA liner)	3
Electrode material	
Hastelloy C (only with PFA liner)	1
Platinum (only with ceramic liner)	2
Transmitter	
Standard sensor for remote transmitter (order transmitter separately), 3A approved	A
Ex sensor for remote transmitter (order transmitter separately), 3A approved	B
MAG 6000 I, Aluminum, 18 ... 90 V DC, 115 ... 230 V AC, FM / CSA Class I Div. 2	C
MAG 6000 I, Aluminum, 18 ... 30 V DC, Ex	D
MAG 6000 I, Aluminum, 115 ... 230 V AC, Ex	E
MAG 6000 I, Aluminum, 18 ... 90 V DC, 115 ... 230 V AC (non-Ex)	F
MAG 6000, Polyamide, 11 ... 30 V DC/11 ... 24 V AC	H
MAG 6000, Polyamide, 115 ... 230 V AC	J
MAG 5000, Polyamide, 11 ... 30 V DC/11 ... 24 V AC	K
MAG 5000, Polyamide, 115 ... 230 V AC	L
Communication	
No communication, add-on possible	A
HART	B
PROFIBUS PA Profile 3 (only MAG 6000/MAG 6000 I)	F
PROFIBUS DP Profile 3 (not for Ex) (only MAG 6000/MAG 6000 I)	G
Modbus RTU/RS 485 (not for Ex) (only MAG 6000/MAG 6000 I)	E
FOUNDATION Fieldbus H1 (only MAG 6000/MAG 6000 I)	J
Cable glands/terminal box	
Metric: Polyamide terminal box or MAG 6000 I compact	1
1/2" NPT: Polyamide terminal box or MAG 6000 I compact	2
Metric: Stainless steel terminal box	3
1/2" NPT: Stainless steel terminal box	4

¹⁾ SMS 1145 standard is not approved by 3A.

Flow Measurement

SITRANS FM (electromagnetic)

Flow sensors / SITRANS FM MAG 1100 F

Selection and ordering data (continued)

Additional information	Order code
Please add "-Z" to Article No. and specify Order code(s) and plain text.	
Certificates	
Pressure test certificate according to EN 10204-3.1	C01
Material certificate according to EN 10204-3.1	C12
Factory certificate according to EN 10204-2.2	C14
Factory certificate according to EN 10204-2.1	C15
Country specific label	
CRN (Canadian Registration Number)	H25
Terminal blocks	
Factory mounted terminal blocks	N02
Tag name plate	
Tag name plate transmitter, stainless steel (specify in plain text)	Y15
Tag name plate, stainless steel (specify in plain text)	Y17
Tag name plate, plastic (self-adhesive)	Y18
Device settings	
Customer-specific transmitter setting	Y20
Factory mounted sensor cables	
Sensor cables wired	Y40
Sensor cables wired and IP68 sealing	Y41
Additional calibrations	
Matched-pair calibration	On request ¹⁾
Accredited matched-pair calibration acc. to ISO/IEC 17025: 2005	On request ¹⁾
Customer-specified calibration up to 10 points	On request ¹⁾
Customer-witnessed calibration (any of above calibration)	On request ¹⁾


¹⁾ Product Variation Request (PVR).

Description	Article No.
• English	A5E02435647

All literature is available to download for free, in a range of languages, at www.siemens.com/processinstrumentation/documentation

Accessories

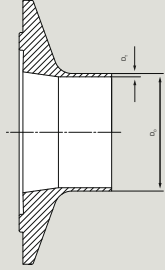
Description	Article No.
Potting kit for IP68/ NEMA 6P sealing of sensor junction box	FDK:085U0220



Spare parts for MAG 1100 F sensor

Description	Article No.
Weld-in connection fittings for use with P gaskets (stainless steel) Material: AISI 316L (1.4404) Only for PFA liner 2 pcs. fittings 2 pcs. clamps (to join flow sensor and fitting), P gaskets not included	

Selection and ordering data (continued)

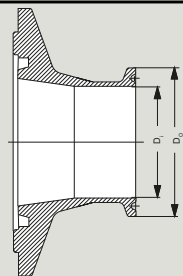
Description				Article No.
DIN 11850				
<u>Adapter</u>		<u>Sensor</u>		
DN (mm)	D ₀ (mm)	D _T (mm)	DN (mm)	
10	13	1.5	10	
15	19	1.5	15	
20	23	1.5	15	
25	29	1.5	25	
32	35	1.5	25	
40	41	1.5	40	
50	53	1.5	50	
65	70	2.0	65	
80	85	2.0	80	
100	104	2.0	100	
ISO 2037				
<u>Adapter</u>		<u>Sensor</u>		
DN (mm)	D ₀ (mm)	D _T (mm)	DN (mm)	
12.7	12.7	1.0	10	
17.2	17.2	1.0	15	
25	25	1.6	25	
33	33.7	1.6	25	
38	38	1.6	40	
40	40	1.6	40	
51	51	1.6	50	
63.5	63.5	1.6	65	
76.1	76.1	1.6	80	
101.6	101.6	2.0	100	
Tri-Weld (BS 4825-1)				
<u>Adapter</u>		<u>Sensor</u>		
DN (mm)	D ₀ (mm)	D _T (mm)	DN (mm)	
12.7	12.7	1.2	10	
19.05	19.05	1.2	15	
25.4	25.4	1.6	25	
38.1	38.1	1.6	40	
50.8	50.8	1.6	50	
63.5	63.5	1.6	65	
76.2	76.2	1.6	80	
101.6	101.6	2.0	100	
Clamp-type connection fittings for use with P gaskets (stainless steel)				
Material: AISI 316L (1.4404) Only for liner PFA 2 pcs. fittings 2 pcs. clamps (to join flow sensor and fitting), P gaskets not included				
DIN 32676		<u>Sensor</u>		
<u>Adapter</u>				

Flow Measurement

SITRANS FM (electromagnetic)

Flow sensors / SITRANS FM MAG 1100 F

Selection and ordering data (continued)

Description				Article No.
DN (mm)	D _o (mm)	D _i (mm)	DN (mm)	
10	34	10	10	
15	34	16	15	
25	50.5	22.6	25	
40	50.5	38	40	
50	64	50	50	
65	91	66	65	
80	106	81	80	
100	119	100	100	
ISO 2852				
Adapter			Sensor	
DN (mm)	D _o (mm)	D _i (mm)	DN (mm)	
25	50.5	22.6	25	A5E02213581
33.7	50.5	31.3	25	A5E02213582
38	50.5	35.6	40	A5E02213583
51	64	48.6	50	A5E02213584
63.5	77.5	60.3	65	A5E02213585
76.1	91	72.9	80	A5E02213586
101.6	119	97.6	100	A5E02213587
Tri-Clamp (BS 4825-3)				
Adapter			Sensor	
DN (mm)	D _o (mm)	D _i (mm)	DN (mm)	
12.7	25.4	9.5	10	A5E02213596
19.05	25.4	15.85	15	A5E02213597
25.4	50.5	22.2	25	A5E02213598
38.1	50.5	34.9	40	A5E02213599
50.8	64	47.6	50	A5E02213600
63.5	77.5	60.3	65	A5E02213601
76.2	91	73	80	A5E02213602
101.6	119	97.6	100	A5E02213603

D_o: Outer diameter
D_i: Inner diameter

Description	Article No.
Threaded type connection fittings for use with P gaskets (stainless steel) Material: AISI 316L (1.4404) Only for PFA liner 2 pcs. fittings 2 pcs. clamps (to join flow sensor and fitting), P gaskets not included	
DIN 11851 Adapter	Sensor

Selection and ordering data (continued)

Description				Article No.
DN (mm)	D _o (mm)	D _i (mm)	DN (mm)	
10	28	10	10	
15	34	16	15	
20	44	20	15	
25	52	26	25	
32	58	32	25	
40	65	38	40	
50	78	50	50	
65	95	66	65	
80	110	81	80	
100	130	100	100	
SMS 1145				
Adapter		Sensor		
DN (mm)	D _o (mm)	D _i (mm)	DN (mm)	
25	40	22.6	25	
38	60	35.6	40	
51	70	48.6	50	
63.5	85	60.3	65	
76	98	72	65	

D_o: Outer diameterD_i: Inner diameter

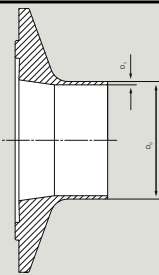
Description	Article No.
Weld-in connection fittings for use with flat gaskets (stainless steel) Material: AISI 316L (1.4404) For PFA liner and ceramic 2 pcs. fittings 2 pcs. clamps (to join flow sensor and fitting), Flat gaskets not included	
DIN 11850¹⁾ Adapter	Sensor

Flow Measurement

SITRANS FM (electromagnetic)

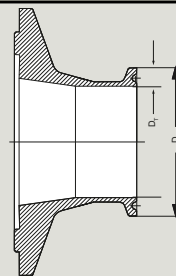
Flow sensors / SITRANS FM MAG 1100 F

Selection and ordering data (continued)

Description				Article No.	
DN (mm)	D _o (mm)	D _T (mm)	DN (mm)		
10	13	1.5	10		FDK:083G2116
15	19	1.5	15		FDK:083G2117
20	23	1.5	15		FDK:083G2118
25	29	1.5	25		FDK:083G2119
32	35	1.5	25		FDK:083G2120
40	41	1.5	40		FDK:083G2121
50	53	1.5	50		FDK:083G2122
65	70	2.0	65		FDK:083G2123
80	85	2.0	80		FDK:083G2124
100	104	2.0	100		FDK:083G2125
ISO 2037¹⁾					
Adapter			Sensor		
DN (mm)	D _o (mm)	D _T (mm)	DN (mm)		
12.7	12.7	1.0	10	A5E03720273	
17.2	17.2	1.0	15	FDK:083G2107	
25	25.6	1.6	25	FDK:083G2109	
33.7	33.7	1.6	25	FDK:083G2100	
38	38	1.6	40	FDK:083G2111	
40	40	1.6	40	FDK:083G2101	
51	51	1.6	50	FDK:083G2112	
63.5	63.5	1.6	65	FDK:083G2113	
76.1	76.1	1.6	80	FDK:083G2114	
101.6	101.6	2.0	100	FDK:083G2115	
114.3	118.3	2.0	100	FDK:083G2105	
Tri-Weld (BS 4825-1)¹⁾					
Adapter			Sensor		
DN (mm)	D _o (mm)	D _T (mm)	DN (mm)		
12.7	12.7	1.2	10	FDK:083G2276	
19.05	19.05	1.2	15	FDK:083G2277	
25.4	25.4	1.6	25	FDK:083G2279	
38	38.1	1.6	40	FDK:083G2281	
50.8	50.8	1.6	50	FDK:083G2282	
63.5	63.5	1.6	65	FDK:083G2283	
76.2	76.2	1.6	80	FDK:083G2284	
101.6	101.6	2.0	100	FDK:083G2285	

Description	Article No.
Clamp-type connection fittings for use with flat gaskets (stainless steel) Material: AISI 316L (1.4404) For PFA liner and ceramic 2 pcs. fittings 2 pcs. clamps (to join flow sensor and fitting), Flat gaskets not included	

Selection and ordering data (continued)

Description				Article No.
DIN 32676¹⁾				
<u>Adapter</u>			<u>Sensor</u>	
DN (mm)	D _o (mm)	D _T (mm)	DN (mm)	
10	34	10	10	
15	34	16	15	
25	50.5	26	25	
40	50.5	38	40	
50	64	50	50	
65	91	66	65	
80	106	81	80	
100	119	100	100	
ISO 2852¹⁾				
<u>Adapter</u>			<u>Sensor</u>	
DN (mm)	D _o (mm)	D _T (mm)	DN (mm)	
25	50.5	22.6	25	FDK:083G2189
33.7	50.5	31.3	25	FDK:083G2190
38	50.5	35.6	40	FDK:083G2191
51	64	48.6	50	FDK:083G2192
63.5	77.5	60.3	65	FDK:083G2193
76.1	91	72.9	80	FDK:083G2194
101.6	119	97.6	100	FDK:083G2195
Tri-Clamp (BS 4825-3)¹⁾				
<u>Adapter</u>			<u>Sensor</u>	
DN (mm)	D _o (mm)	D _T (mm)	DN (mm)	
12.7	25.4	9.5	10	FDK:083G2286
19.05	25.4	15.85	15	FDK:083G2287
25.4	50.5	22.2	25	FDK:083G2289
38.1	50.5	34.9	40	FDK:083G2291
50.8	64	47.6	50	FDK:083G2292
63.5	77.5	60.3	65	FDK:083G2293
76.2	91	73	80	FDK:083G2294
101.6	119	97.6	100	FDK:083G2295

D_o: Outer diameterD_i: Inner diameter¹⁾ Suitable for 3A

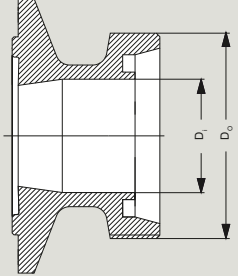
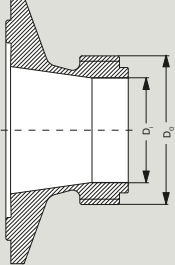
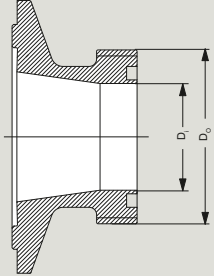
Description	Article No.
Threaded type connection fittings for use with flat gaskets (stainless steel) Material: AISI 316L (1.4404) For PFA liner and ceramic 2 pcs. fittings 2 pcs. clamps (to join flow sensor and fitting), Flat gaskets not included	
DIN 11851¹⁾	
<u>Adapter</u>	<u>Sensor</u>

Flow Measurement

SITRANS FM (electromagnetic)

Flow sensors / SITRANS FM MAG 1100 F

Selection and ordering data (continued)

Description				Article No.
DN (mm)	D _o (mm)	D _i (mm)	DN (mm)	
10	28	10	10	FDK:083G2156
15	34	16	15	FDK:083G2157
20	44	20	15	FDK:083G2158
25	52	26	25	FDK:083G2159
32	58	32	25	FDK:083G2160
40	65	38	40	FDK:083G2161
50	78	50	50	FDK:083G2162
65	95	66	65	FDK:083G2163
80	110	81	80	FDK:083G2164
100	130	100	100	FDK:083G2165
ISO 2853¹⁾				
Adapter			Sensor	
DN (mm)	D _o (mm)	D _i (mm)	DN (mm)	
25	37	22.6	25	FDK:083G2149
38	51	35.6	40	FDK:083G2151
51	64	48.6	50	FDK:083G2152
63.5	78	60.3	65	FDK:083G2153
76.1	91	72.9	80	FDK:083G2154
BS 4825-4¹⁾				
Adapter			Sensor	
DN (mm)	D _o (mm)	D _i (mm)	DN (mm)	
101.6	126	97.6	100	FDK:083G2145
SMS 1145²⁾				
Adapter			Sensor	
DN (mm)	D _o (mm)	D _i (mm)	DN (mm)	
25	40	22.6	25	FDK:083G2139
38	60	35.6	40	FDK:083G2141

Selection and ordering data (continued)

Description				Article No.
51	70	48.6	50	FDK:083G2142
63.5	85	60.3	65	FDK:083G2143
76	98	72	65	FDK:083G2144

D_o: Outer diameterD_i: Inner diameter

1) Suitable for 3A

2) Not suitable for 3A

Accessories for MAG 1100 F sensor

Description	Article No.
Gaskets (delivered in pairs, to be placed between flow sensor and adapter)	
MAG 1100 F (PFA) - P gaskets	
Rubber: EPDM ¹⁾	
• DN 10	A5E02055286
• DN 15	A5E02055287
• DN 25	A5E02055290
• DN 40	A5E02055291
• DN 50	A5E02055292
• DN 65	A5E02055293
• DN 80	A5E02055295
• DN 100	A5E02055297
MAG 1100 F (ceramic) - Flat gaskets	
Rubber: FKM/FPM	
• DN 10	A5E00915707
• DN 15	A5E00915764
• DN 25	A5E00915771
• DN 40	A5E00915773
• DN 50	A5E00915775
• DN 65	A5E00915780
• DN 80	A5E00915782
• DN 100	A5E00915784
MAG 1100 F (PFA, ceramic) - Flat gaskets	
Rubber: EPDM	
• DN 10	FDK:083G2206
• DN 15	FDK:083G2207
• DN 25	FDK:083G2209
• DN 40	FDK:083G2211
• DN 50	FDK:083G2212
• DN 65	FDK:083G2213
• DN 80	FDK:083G2214
• DN 100	FDK:083G2215
Rubber: NBR	
• DN 10	FDK:083G2216
• DN 15	FDK:083G2217
• DN 25	FDK:083G2219
• DN 40	FDK:083G2221
• DN 50	FDK:083G2222
• DN 65	FDK:083G2223
• DN 80	FDK:083G2224

Flow Measurement

SITRANS FM (electromagnetic)

Flow sensors / SITRANS FM MAG 1100 F

Selection and ordering data (continued)

Description	Article No.
• DN 100	FDK:083G2225

¹⁾ Suitable for 3A

Technical specifications

MAG 1100 F	
Measuring principle	Electromagnetic induction
Excitation frequency (Mains supply: 50 Hz/60 Hz)	DN 10 ... 65 (¼" ... 2½"): 12.5 Hz/15 Hz DN 80 ... 100 (3", 4"): 6.25 Hz/7.5 Hz
Process connection	
Nominal size	DN 10 ... 100 (3/8" ... 4")
Process connection	Hygienic adapters available for: <ul style="list-style-type: none"> • Direct welding onto pipe • Clamp fitting • Threaded fitting
Rated operating conditions	
Ambient conditions	
Ambient temperature	
• Sensor	-40 ... +100 °C (-40 ... +212 °F)
• Ex sensor	-20 ... +60 °C (-4 ... +140 °F)
• Compact with transmitter MAG 5000/6000	-20 ... +60 °C (-4 ... +140 °F)
• Compact with transmitter MAG 6000 I ¹⁾	-20 ... +60 °C (-4 ... +140 °F)
• Compact with transmitter MAG 6000 I Ex ¹⁾	-10 ... +60 °C (14 ... 140 °F)
Temperature of medium	
MAG 1100 F (Ceramic)	-20 ... +150 °C (-4 ... +302 °F) Suitable for steam sterilization
MAG 1100 F (PFA)	-30 ... +130 °C (-22 ... +266 °F) Suitable for steam sterilization at 150 °C (302 °F)
Temperature shock	
MAG 1100 F	
• Duration ≤ 1 min, followed by 10 min rest	<ul style="list-style-type: none"> • DN 10, 15, 25: Max. ΔT ≤ 80 °C/min (3/8", ½", 1": Max. ΔT ≤ 144 °F/min) • DN 40, 50, 65: Max. ΔT ≤ 70 °C/min (1½", 2", 2½": Max. ΔT ≤ 126 °F/min) • DN 80, 100: Max. ΔT ≤ 60 °C/min (3", 4": Max. ΔT ≤ 108 °F/min)
MAG 1100 F (PFA)	Max. ± 100 °C (212 °F) momentarily
Operating pressure	
MAG 1100 F (Ceramic)	DN 10 ... 65: 40 bar (3/8" ... 2½": 580 psi) DN 80: 25 bar (3": 363 psi) DN 100: 25 bar (4": 363 psi)
MAG 1100 F (PFA)	Vacuum: 1 x 10 ⁻⁶ bar _{abs} (1.5 x 10 ⁻⁵ psi _{abs}) 20 bar (290 psi) Vacuum: 0.02 bar _{abs} (0.3 psi _{abs}) DN 80 ... DN 100: CO ₂ pressure max. 7 bar (101.5 psi)
Mechanical load (vibration)	
	18 ... 1 000 Hz random in x, y, z, directions for 2 hours according to EN 60068-2-36 Sensor: 3.17 g RMS Sensor with compact MAG 5000/6000 mounted transmitter: 3.17 grms Sensor with compact MAG 6000 I/MAG 6000 I Ex mounted transmitter: 1.14 grms

Technical specifications (continued)

MAG 1100 F	
Mechanical load (vibration)	For compact installation with the MAG 6000 I/MAG 6000 I Ex, transmitter to be supported to avoid tension on sensor part.
Enclosure rating	IP67 to EN 60529 (NEMA 6), 1 mH ₂ O for 30 min
EMC	2014/30/EU
Design	
Weight	See Dimensional drawings
Material	
Enclosure	
• MAG 1100 F	Stainless steel AISI 316L/1.4404
Terminal box (remote version only)	
• Standard	Fibre glass reinforced polyamide
• Option	Stainless steel AISI 316/1.4436
• Ex ATEX (remote version only)	Stainless steel AISI 316/1.4436
Liner	
MAG 1100 F (Ceramic)	Aluminum oxide Al ₂ O ₃ (ceramics)
MAG 1100 F (PFA)	Reinforced PFA (teflon) (not for Ex)
Electrodes	
MAG 1100 F (Ceramic)	Platinum with gold/Titanium brazing alloy
MAG 1100 F (PFA)	<ul style="list-style-type: none"> • DN 10 ... 15 (3/8" ... ½"): Hastelloy C276/2.4819 • DN 25 ... 100 (1" ... 4"): Hastelloy C22/2.4602
Cable entries	<ul style="list-style-type: none"> • Remote installation 2 x M20 or 2 x ½" NPT • Compact installation - MAG 5000/MAG 6000: 4 x M20 or 4 x ½" NPT - MAG 6000 I: 2 x M25 (for supply/output) - MAG 6000 I Ex: 2 x M25 (for supply/output)
Certificates and approvals	
Calibration	<ul style="list-style-type: none"> • Default calibration Zero-point, 2 x 25 %, 2 x 90 %
Hazardous areas	
• MAG 1100 F (Ceramic)	
- Ex-sensor in compact or remote version with MAG 6000 I Ex	<ul style="list-style-type: none"> • ATEX, EAC Ex - Zone 1 Ex d e ia IIB T6 Gb • ATEX - Zone 21 Ex tD A21 IP67
- Standard sensor in compact or remote version with MAG 5000/6000/6000 I Ex	<ul style="list-style-type: none"> • FM - NI Class I Div. 2 Groups A, B, C, D
• MAG 1100 F (PFA)	
- Standard sensor in compact or remote version with MAG 5000/6000/6000 I Ex	<ul style="list-style-type: none"> • FM - NI Class I Div. 2 Groups A, B, C, D

Technical specifications (continued)

MAG 1100 F	
Hygienic	
• MAG 1100 F (Ceramic)	• 3A (remote version with Polyamide terminal box)
• MAG 1100 F (PFA)	• 3A (remote version with Polyamide terminal box)
	• Hygienic EC 1935:2004 European food contact material
Pressure equipment	PED - 2014/68/EU
Others	• EAC (Kazakhstan)

Accessories for MAG 1100 F

Weld-in adapter	
Adapter for welding onto dairy pipe, stainless steel 1.4404	Tri-Weld ISO 2037, DIN 11850, SMS 3008, BS 4825-1
• DN 10, 15, 25, 40, 50 and 65 (3/8", 1/2", 1", 1 1/2", 2" and 2 1/2")	PN 40 (600 psi)
• DN 8 and DN 100 (3" and 4")	PN 25 (350 psi)
Clamp adapter	
DN 10, 15, 25, 40 and 50 (3/8", 1/2", 1", 1 1/2" and 2")	Tri-Clamp, ISO 2852, DIN 32676, SMS 3016, BS 4825-3
DN 65, 80 and 100 (2 1/2", 3" and 4")	PN 16 (200 psi)
	PN 10 (150 psi)
Thread adapter	
DIN 11851	
• DN 10, 15, 25, and 40 (3/8", 1/2", 1", and 1 1/2")	PN 40 (600 psi)
• DN 50, 65, 80 and 100 (2", 2 1/2", 3" and 4")	PN 25 (350 psi)
ISO 2853, BS 4825-4	
• DN 10, 15, 25, 40, 50, 65 and 80 (3/8", 1/2", 1", 1 1/2", 2", 2 1/2" and 3")	PN 16 (200 psi)
SMS 1145	
• DN 25, 40, 50, 65 and 80 (1", 1 1/2", 2", 2 1/2" and 3")	PN 6 (80 psi)
Design	
Material	
Adapter	Stainless steel AISI 316/1.4436
Gasket	
• MAG 1100 F (Ceramic)	FKM/FPM with stainless steel insert (AISI 304/1.4301) (-20 ... +150 °C (-4 ... +302 °F))
	EPDM (-20 ... +150 °C (-4 ... +302 °F))
• MAG 1100 F (PFA)	EPDM (-20 ... +150 °C (-4 ... +302 °F))
	NBR (-20 ... +100 °C (-4 ... +212 °F))

¹⁾ With HART communication max. ambient temperature 50 °C (122 °F).

Note:

When combined sensor and adapter, the operating pressure is the lower rated of the pair.

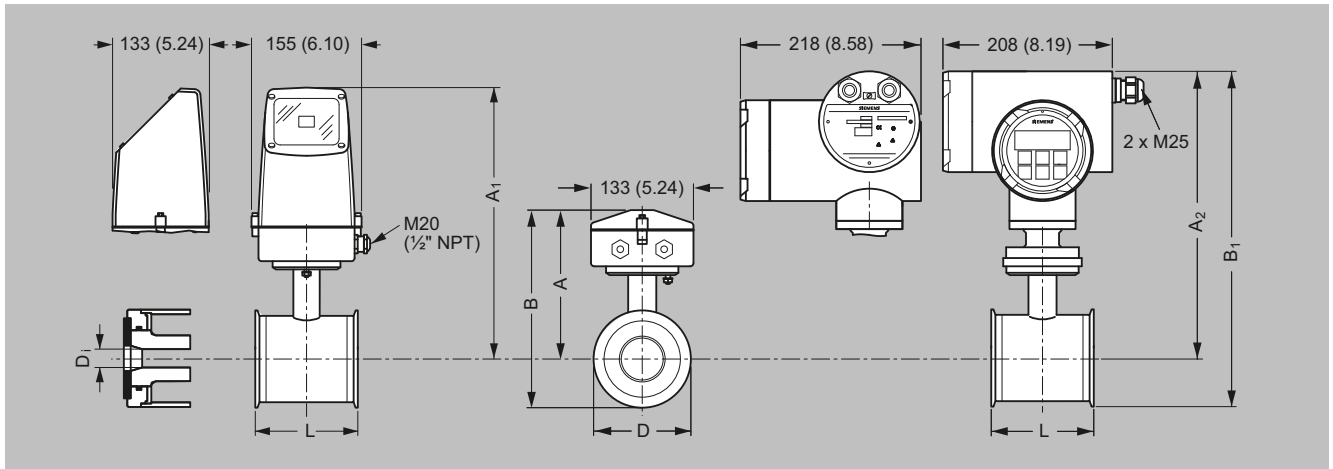
Flow Measurement

SITRANS FM (electromagnetic)

Flow sensors / SITRANS FM MAG 1100 F

Dimensional drawings

Sensor MAG 1100 F compact/remote



Dimensions in mm (inch)

Important note: For compact installation with MAG 6000 I/Ex - Supports the transmitter to avoid tension on the sensor part.

Size DN	L [mm]	A [mm]	B ²⁾ [mm]	B ₁ [mm]	D [mm]	D _i (Al ₂ O ₃) [mm]	D _i PFA [mm]	Weight ¹⁾ [kg]
10	64	161	315	193.7	344.7	64.0	10	2.2
15	64	161	315	193.7	344.7	64.0	16	2.2
25	79	169	323	207.5	359.0	77.5	26	2.7
40	94	179	333	228.0	379.0	91.0	38	3.4
50	104	188	342	247.7	398.7	119.0	50	4.2
65	131	197.5	351	262.6	413.6	130.0	66	5.5
80	156	204	357	281.0	432.0	155.0	81	7.0
100	186	217	370	308.0	459.0	183.0	100	10.0

Size [inch]	L [inch]	A [inch]	B ²⁾ [inch]	B ₁ [inch]	D [inch]	D _i (Al ₂ O ₃) [inch]	D _i PFA [inch]	Weight ¹⁾ [lb]
3/8	2.52	6.34	12.40	7.62	13.57	2.52	0.39	4.8
1/2	2.52	6.34	12.40	7.62	13.57	2.52	0.63	4.8
1	3.11	6.66	12.72	8.17	14.13	3.05	1.02	4.9
1 1/2	3.70	7.05	13.11	8.98	14.92	3.58	1.50	7.5
2	4.09	7.40	13.47	9.75	15.70	4.68	1.97	9.2
2 1/2	5.16	7.78	13.82	10.34	16.28	5.12	2.60	12.0
3	6.14	8.03	14.06	11.06	17.01	6.10	3.19	15.0
4	7.32	8.54	14.57	12.13	18.07	7.20	3.94	22.0

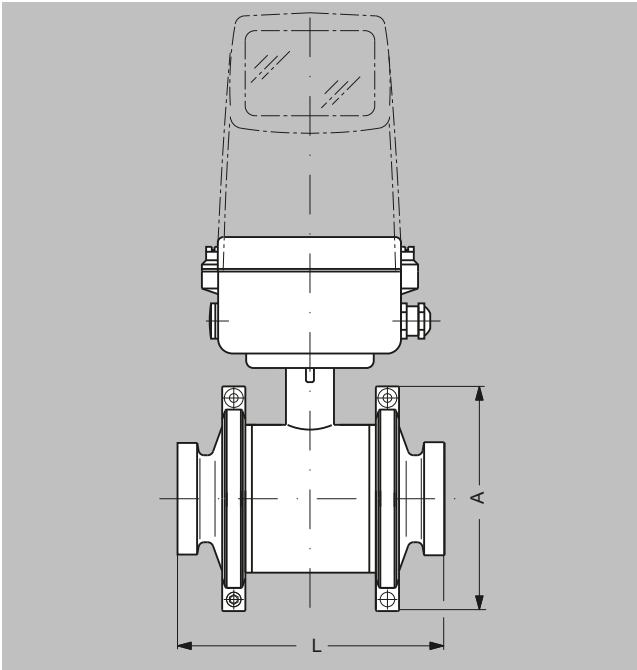
¹⁾ With transmitter MAG 5000 or MAG 6000 compact, weight is increased by approximately 0.8 kg (1.8 lb). With MAG 6000 I weight is increased with 5.5 kg (12.1 lbs).

²⁾ 14.5 mm (0.571") shorter when the stainless steel terminal box is used (always Ex version).

³⁾ A₂ is 3 mm (0.12") shorter than A₁.

Dimensional drawings (continued)

Sensor MAG 1100 F compact/separate – built-in length



Size		A		L ¹⁾	
DN	[Inch]	[mm]	[inch]	[mm]	[inch]
10	3/8	99	3.90	146	5.75
15	1/2	99	3.90	146	5.75
25	1	113	4.45	161	6.34
40	1½	126	4.96	176	6.93
50	2	154	6.06	186	7.32
65	2½	165	6.50	223	8.78
80	3	200	7.87	258	10.16
100	4	225	8.86	288	11.34

¹⁾ The total built-in length "L" is independent of the adapter type selected.

Flow Measurement

SITRANS FM (electromagnetic)

Flow sensors / SITRANS FM MAG 3100 and 3100 HT

Overview



The SITRANS FM MAG 3100 is an electromagnetic flow sensor in a large variety that meets the demands of almost every flow application.

Benefits

- Wide range of sizes: DN 15 to DN 2000 (½" to 78")
- The flexible design is for all applications not covered by the standard industry-specific sensors: MAG 1100, MAG 1100 F, MAG 3100 P and MAG 5100 W
- Wide pressure range: PN 6 to PN 100
- ANSI Class 150/300, AS 2129, AS 4087, JIS K10 and K20. On request up to 690 bar (10 000 psi)
- Wide range of electrode and liner material to fit even the most extreme process media
- Fully welded construction provides a ruggedness that suits the toughest applications and environments.
- Easy commissioning, the SENSORPROM unit automatically updates settings.
- Designed to allow patented SITRANS FM in-situ verification using the SENSORPROM fingerprints.

Application

The main applications of the SITRANS FM electromagnetic flow sensors can be found in the following fields:

- Process industry
- Chemical industry
- Steel industry
- Mining
- Utility
- Power generation and distribution
- Oil and gas/HPI
- Water and waste water

Design

- Compact or remote mounting possible
- Easy "plug & play" field changeability of transmitter
- ATEX and FM/CSA versions
- High temperature sensor for applications with temperatures up to 180 °C (356 °F)
- Meets EEC directives: PED, 2014/68/EU pressure directive for EN 1092-1 flanges
- Built-in length according to ISO 20456, the standard includes sizes up to DN 400
- Onsite or factory upgrade to IP68/NEMA 6P of a standard sensor.

Mode of operation

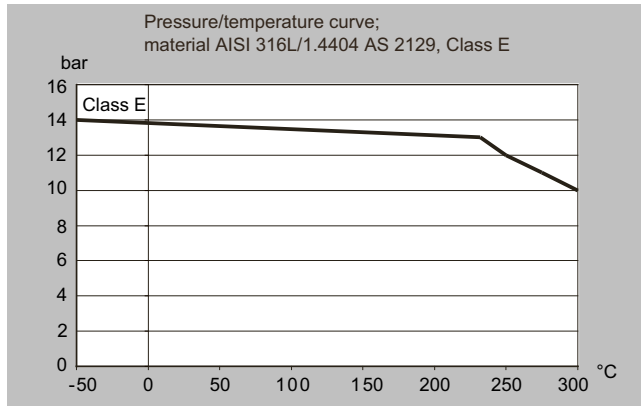
The flow measuring principle is based on Faraday's law of electromagnetic induction according to which the sensor converts the flow into an electrical voltage proportional to the velocity of the flow.

Integration

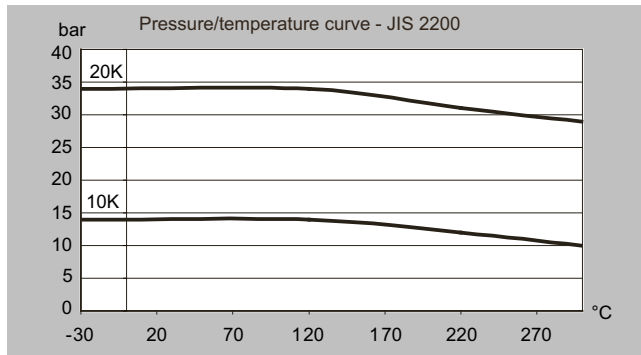
The complete flowmeter consists of a flow sensor and an associated transmitter MAG 5000, 6000 and 6000 I.

The flexible communication concept USM II simplifies integration and update to a variety of fieldbus systems such as HART, FOUNDATION Fieldbus H1, DeviceNet, PROFIBUS DP and PA, Modbus RTU/RS 485.

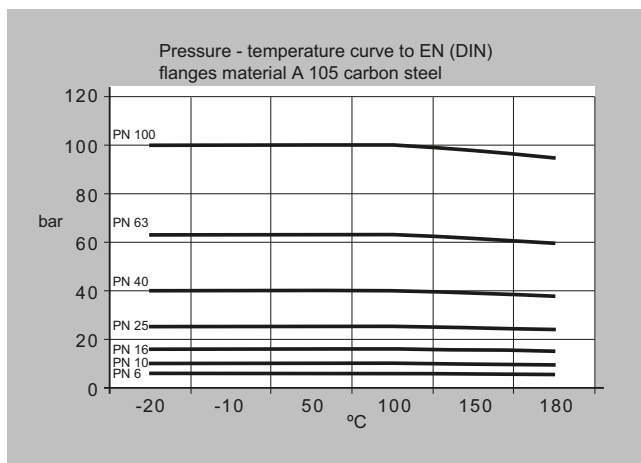
Pressure/temperature curve; material AISI 316L/1.4404 AS 2129, Class E



Pressure/temperature curve - JIS 2200

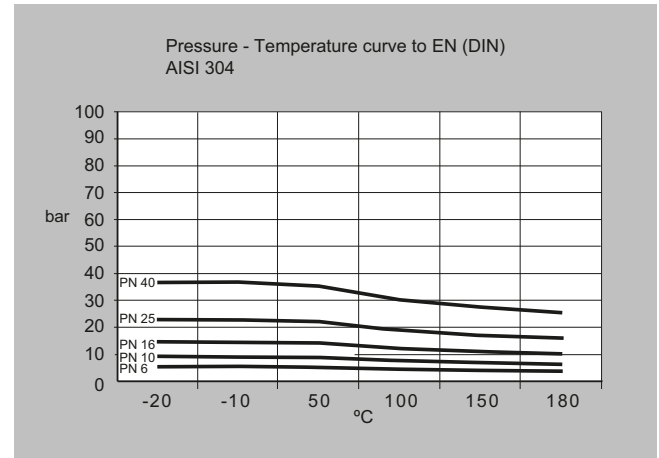


Pressure/temperature curve to EN (DIN) flanges, material A 105 carbon steel

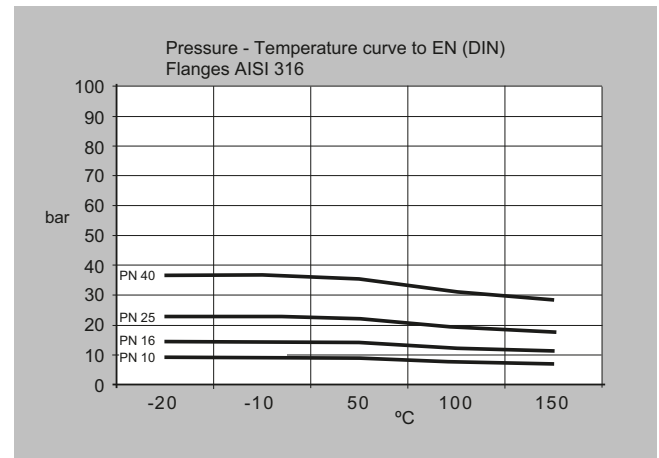


Integration (continued)

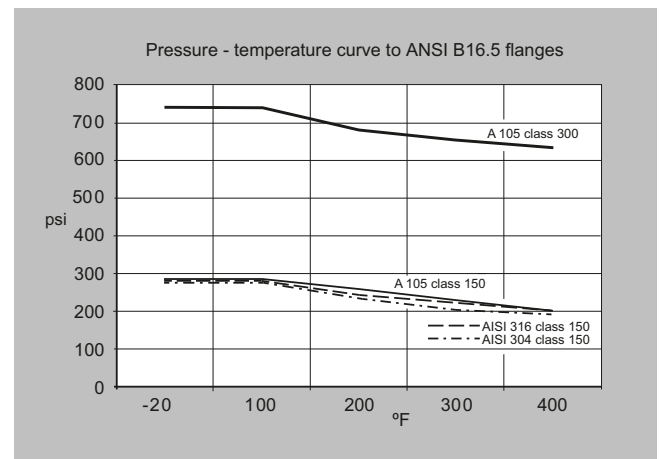
Pressure/temperature curve to EN (DIN) flanges AISI 304



Pressure/temperature curve to EN (DIN) flanges AISI 316



Pressure/temperature curve to ANSI B16.5 flanges



Note: The pressure-temperature curves only assist in the selection of a system. No responsibility is taken for the correctness of the

Flow Measurement

SITRANS FM (electromagnetic)

Flow sensors / SITRANS FM MAG 3100 and 3100 HT

Integration (continued)

information. For further information on PED standard see the section about Pressure Equipment Directive.

Selection and ordering data

Sensor SITRANS FM MAG 3100	Article No. 7ME6310-
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	
Diameter	
DN 15 (½") (PTFE and PFA liner)	1 V
DN 25 (1")	2 D
DN 32 (1 ¼")	2 H
DN 40 (1½")	2 R
DN 50 (2")	2 Y
DN 65 (2½")	3 F
DN 80 (3")	3 M
DN 100 (4")	3 T
DN 125 (5")	4 B
DN 150 (6")	4 H
DN 200 (8")	4 P
DN 250 (10")	4 V
DN 300 (12")	5 D
DN 350 (14")	5 K
DN 400 (16")	5 R
DN 450 (18")	5 Y
DN 500 (20")	6 F
DN 600 (24")	6 P
DN 700 (28")	6 Y
DN 750 (30") (only AWWA and AS 2129)	7 D
DN 800 (32")	7 H
DN 900 (36")	7 M
DN 1000 (40")	7 R
DN 1050 (42") (only AWWA)	7 U
DN 1100 (44") (only AWWA)	7 V
DN 1200 (48")	8 B
DN 1400 (54")	8 F
DN 1500 (60")	8 K
DN 1600 (66")	8 P
DN 1800 (72")	8 T
DN 2000 (80")	8 Y
DN 2200 (88")	8 V
Flange norm and pressure rating	
EN 1092-1	
PN 6 (DN 65 ... 2200 (2½" ... 88"))	A
PN 10 (DN 200 ... 2200 (8" ... 88"))	B
PN 16 (DN 65 ... 1200 (2½" ... 48"))	C
PN 16, non-PED (DN 700 ... 2000 (28" ... 80"))	D
PN 25 (DN 200 ... 600 (8" ... 24"))	E
PN 40 (DN 15 ... 600 (½" ... 24"))	F
PN 63 (DN 50 ... 300 (2" ... 12"))	G
PN 100 (DN 25 ... 300 (1" ... 12"))	H
ANSI B16.5	
Class 150 (½" ... 24")	J
Class 300 (½" ... 24")	K
Class 600 (½" ... 16")	U
AWWA C-207	

Selection and ordering data (continued)

Sensor SITRANS FM MAG 3100	Article No. 7ME6310-			
Class D (28" ... 88")	L			
AS				
2129, table E	M			
4087, PN 16 (DN 50 ... 1200 (2" ... 48")) (not PTFE and PFA)	N			
4087, PN 21 (DN 50 ... 600 (2" ... 24")) (not PTFE and PFA)	P			
4087, PN 35 (DN 50 ... 600 (2" ... 24")) (not PTFE and PFA)	Q			
JIS B 2220:2004				
K10 (1" ... 24")	R			
K20 (1" ... 24")	S			
Flange material				
Carbon steel flanges ASTM A 105, corrosion-resistant coating of category C4	1			
Stainless steel flanges, AISI 304/1.4301, corrosion-resistant coating of category C4	2			
Stainless steel flanges and sensor body, AISI 316L/1.4404, polished	3			
Carbon steel flanges ASTM A 105, 300 µm corrosion-resistant coating of category C5	4			
Stainless steel flanges, AISI 304/1.4301, 300 µm corrosion-resistant coating of category C5	5			
Liner material				
Soft rubber	1			
EPDM	2			
PTFE (DN ≤ 300, PN ≤ 50 bar / ≤ 12", PN ≤ 725 psi), PTFE (350 ≤ DN ≤ 600, PN ≤ 40 bar / 14" ≤ DN ≤ 24", PN ≤ 580 psi)	3			
Ebonite	4			
Linatex (PN ≤ 40 bar (580 psi) DN ≤ 600 (24"))	5			
PFA (DN 15 ... 150 (½" ... 6")) (PN ≤ 40 bar (580 psi))	7			
Electrode material				
(Grounding electrodes not for pressure rating PN 100)				
AISI 316Ti/1.4571 (not for PFA)	1			
Hastelloy C276/2.4819 (PFA liner: Hastelloy C22/2.4602)	2			
Platinum (DN ≤ 300 (12")) (not for Ebonite)	3			
Titanium (not for PFA) (DN ≤ 600/24")	4			
Tantalum (DN ≤ 600/24") (not for Ebonite)	5			
Hastelloy C incl. grounding electrodes (only PFA and PTFE)	6			
Platinum incl. grounding electrodes (only PFA and PTFE)	7			
Tantalum incl. grounding electrodes (only PFA and PTFE)	8			
Ceramic coated stainless steel	9	N	O	A
Ceramic coated Hastelloy C	9	N	O	B
AISI 316Ti incl. grounding electrodes (only PTFE)	9	N	O	C
Titanium incl. grounding electrodes (only PTFE)	9	N	O	D
Transmitter				
Standard sensor for remote transmitter (order transmitter separately)	A			
Ex sensor for remote transmitter (order transmitter separately)	B			
MAG 6000 I, Aluminum 18 ... 90 V DC, 115 ... 230 V AC, FM / CSA Class I Div. 2	C			
MAG 6000 I, Aluminum 18 ... 30 V DC, Ex	D			
MAG 6000 I, Aluminum 115 ... 230 V, Ex	E			
MAG 6000 I, Aluminum 18 ... 90 V DC, 115 ... 230 V AC (non-Ex)	F			
MAG 6000 Polyamide, 11... 30 V DC / 11...24 V AC	H			
MAG 6000, Polyamide, 115 ... 230 V AC	J			
MAG 5000, Polyamide, 11 ... 30 V DC / 11 ... 24 V AC	K			
MAG 5000, Polyamide, 115 ... 230 V AC	L			
Communication				
No communication, add-on possible	A			
HART	B			
PROFIBUS PA Profile 3 (only MAG 6000/MAG 6000 I)	F			
PROFIBUS DP Profile 3 (not for Ex) (only MAG 6000/MAG 6000 I)	G			
Modbus RTU/RS 485 (not for Ex) (only MAG 6000/MAG 6000 I)	E			
FOUNDATION Fieldbus H1 (only MAG 6000/MAG 6000 I)	J			
Cable glands/terminal box				
Metric: Polyamide terminal box or MAG 6000 I compact	1			
½" NPT: Polyamide terminal box or MAG 6000 I compact	2			

Flow Measurement

SITRANS FM (electromagnetic)

Flow sensors / SITRANS FM MAG 3100 and 3100 HT

Selection and ordering data (continued)

Sensor SITRANS FM MAG 3100	Article No. 7ME6310-	• • • • • - • • • • •
Metric: Stainless steel terminal box		3
1/2" NPT: Stainless steel terminal box		4

Order code	
Additional information	
Please add "-Z" to Article No. and specify Order code(s) and plain text.	
Certificates	
Pressure test certificate according to EN 10204-3.1	C01
Material certificate according to EN 10204-3.1	C12
Factory certificate according to EN 10204-2.2	C14
Factory certificate according to EN 10204-2.1	C15
Special calibration	
5-point calibration for DN 15 ... 200 ¹⁾	D01
5-point calibration for DN 250 ... 600 ¹⁾	D02
5-point calibration for DN 700 ... 1200 ¹⁾	D03
10-point calibration for DN 15 ... 200 ²⁾	D06
10-point calibration for DN 250 ... 600 ²⁾	D07
10-point calibration for DN 700 ... 1200 ²⁾	D08
Default (2 × 25 % and 2 × 90 %) match-pair calibration for DN 15 ... 200	D11
Default (2 × 25 % and 2 × 90 %) match-pair calibration for DN 250 ... 600	D12
Default (2 × 25 % and 2 × 90 %) match-pair calibration for DN 700 ... 1200	D13
5-point, matched-pair calibration for DN 15 ... 200 ¹⁾	D15
5-point, matched-pair calibration for DN 250 ... 600 ¹⁾	D16
5-point, matched-pair calibration for DN 700 ... 1200 ¹⁾	D17
10-point, matched-pair calibration for DN 15 ... 200 ²⁾	D18
10-point, matched-pair calibration for DN 250 ... 600 ²⁾	D19
10-point, matched-pair calibration for DN 700 ... 1200 ²⁾	D20
Sensor cables	
<u>Standard coil and electrode cable, PVC jacket</u>	
• 5 m (16 ft)	K01
• 10 m (33 ft)	K02
• 20 m (65 ft)	K04
• 30 m (98 ft)	K06
• 40 m (131 ft)	K07
• 50 m (164 ft)	K08
• 60 m (197 ft)	K09
• 100 m (328 ft)	K10
• 150 m (492 ft)	K11
• 200 m (656 ft)	K12
• 500 m (1640 ft)	K13
<u>Standard coil and special electrode cable, PVC jacket</u>	
• 5 m (16 ft)	K51
• 10 m (33 ft)	K52
• 20 m (65 ft)	K54
• 30 m (98 ft)	K56

Selection and ordering data (continued)

	Order code
• 40 m (131 ft)	K57
• 50 m (164 ft)	K58
• 60 m (197 ft)	K59
• 100 m (328 ft)	K60
• 150 m (492 ft)	K61
• 200 m (656 ft)	K62
• 500 m (1640 ft)	K63
Terminal blocks	
Factory mounted terminal blocks	N02
Country specific label	
CRN (Canadian Registration Number)	H25
Tag name plate	
Tag name plate transmitter, stainless steel (specify in plain text)	Y15
Tag name plate, stainless steel (specify in plain text)	Y17
Tag name plate, plastic (self-adhesive)	Y18
Device settings	
Customer-specific transmitter setting	Y20
Factory mounted sensor cables	
Sensor cables wired	Y40
Sensor cables wired and IP68 sealing	Y41
Additional calibrations	
Accredited matched-pair calibration acc. to ISO/IEC 17025: 2005	On request ³⁾
Customer-specified calibration up to 10 points	On request ³⁾
Customer-witnessed calibration (any of above calibration)	On request ³⁾


1) 20 %, 40 %, 60 %, 80 %, 100 % of factory Q_{max}

2) Ascending and descending at 20 %, 40 %, 60 %, 80 %, 100 % of factory Q_{max}

3) Product Variation Request (PVR)

Description	Article No.
• English	A5E03005599
• German	A5E03086288

All literature is available to download for free, in a range of languages, at <http://www.siemens.com/processinstrumentation/documentation>
Accessories

Description	Article No.	
Potting kit for IP68/NEMA 6P sealing of sensor junction box	FDK-085U0220	

Please use online Product selector to get latest updates.

Product selector link:

<http://www.pia-portal.automation.siemens.com>

Flow Measurement

SITRANS FM (electromagnetic)

Flow sensors / SITRANS FM MAG 3100 and 3100 HT

Selection and ordering data (continued)

Sensor SITRANS FM MAG 3100 HT (High Temperature)	Article No. 7ME6320-
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	
Diameter	
DN 15 (½")	1 V
DN 25 (1")	2 D
DN 40 (1½")	2 R
DN 50 (2")	2 Y
DN 65 (2½")	3 F
DN 80 (3")	3 M
DN 100 (4")	3 T
DN 125 (5")	4 B
DN 150 (6")	4 H
DN 200 (8")	4 P
DN 250 (10")	4 V
DN 300 (12")	5 D
Flange norm and pressure rating	
EN 1092-1	
PN 10 (DN 200 ... 300 (8" ... 12"))	B
PN 16 (DN 65 ... 300 (2½" ... 12"))	C
PN 25 (DN 200 ... 300 (8" ... 12"))	E
PN 40 (DN 15 ... 300 (½" ... 12"))	F
ANSI B16.5	
Class 150 (½" ... 12")	J
Class 300 (½" ... 12")	K
AS	
2129, table E	M
Flange material	
Carbon steel flanges ASTM A 105, corrosion-resistant coating of category C4	1
Stainless steel flanges, AISI 304/1.4301, corrosion-resistant coating of category C4	2
Stainless steel flanges and sensor body, AISI 316L/1.4404, polished	3
Liner material	
PTFE (150 °C (302 °F))	2
PTFE including type E protection rings AISI 316/1.4436 (180 °C (356 °F))	3
PFA (150 °C (302 °F)) (DN 15 ... 150 (½" ... 6"))	7
Electrode material	
AISI 316Ti/1.4571 (not for PFA)	1
Hastelloy C276/2.4819 (PFA liner: Hastelloy C22/2.4602)	2
Platinum	3
Titanium (not for PFA)	4
Tantalum	5
Hastelloy C22/2.4602 incl. grounding electrodes (PFA only)	6
Platinum incl. grounding electrodes (PFA only)	7
Tantalum incl. grounding electrodes (PFA only)	8
Transmitter	
Standard sensor for remote transmitter (order transmitter separately)	A
Ex sensor for remote transmitter (order transmitter separately)	B
MAG 6000 I, Aluminum, 18 ... 90 V DC, 115 ... 230 V AC, FM / CSA Class I Div. 2	C
MAG 6000 I, Aluminum 18 ... 30 V DC, Ex	D
MAG 6000 I, Aluminum 115 ... 230 V AC, Ex	E
MAG 6000 I, Aluminum, 18 ... 90 V DC, 115 ... 230 V AC (non-Ex)	F
MAG 6000, Polyamide, 11 ... 30 V DC/11 ... 24 V AC	H
MAG 6000, Polyamide, 115 ... 230 V AC	J
MAG 5000, Polyamide, 11 ... 30 V DC/11 ... 24 V AC	K
MAG 5000, Polyamide, 115 ... 230 V AC	L
Communication	
No communication, add-on possible	A
HART	B

Selection and ordering data (continued)

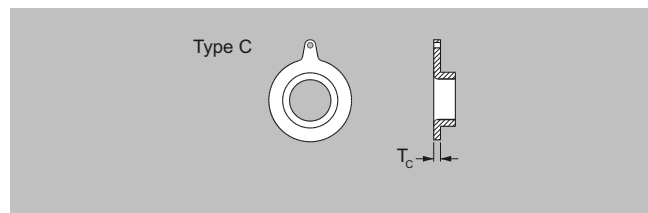
Sensor SITRANS FM MAG 3100 HT (High Temperature)	Article No. 7ME6320-
PROFIBUS PA Profile 3 (only MAG 6000/MAG 6000 I)	• • • • • • • • • • F
PROFIBUS DP Profile 3 (only MAG 6000/MAG 6000 I)	G
Modbus RTU/RS 485 (only MAG 6000/MAG 6000 I)	E
FOUNDATION Fieldbus H1 (only MAG 6000/MAG 6000 I)	J
Cable glands/terminal box	
Metric: Polyamide terminal box (max. 150 °C (302 °F)) or MAG 6000 I compact	1
½" NPT: Polyamide terminal box (max. 150 °C (302 °F)) or MAG 6000 I compact	2
Metric: Stainless steel terminal box	3
½" NPT: Stainless steel terminal box	4

Order code	
Additional information	
Please add "-Z" to Article No. and specify Order code(s) and plain text.	
Certificates	
Pressure test certificate according to EN 10204-3.1	C01
Material certificate according to EN 10204-3.1	C12
Factory certificate according to EN 10204-2.2	C14
Factory certificate according to EN 10204-2.1	C15
Terminal blocks	
Factory mounted terminal blocks	N02
Country specific label	
CRN (Canadian Registration Number)	H25
Tag name plate	
Tag name plate transmitter, stainless steel (specify in plain text)	Y15
Tag name plate, stainless steel (specify in plain text)	Y17
Tag name plate, plastic (self-adhesive)	Y18
Device settings	
Customer-specific transmitter setting	Y20
Factory mounted sensor cables	
Sensor cables wired	Y40
Sensor cables wired and IP68 sealing	Y41
Additional calibrations	
Matched-pair calibration	On request ¹⁾
Accredited matched-pair calibration acc. to ISO/IEC 17025: 2005	On request ¹⁾
Customer-specified calibration up to 10 points	On request ¹⁾
Customer-witnessed calibration (any of above calibration)	On request ¹⁾

¹⁾ Product Variation Request (PVR).

Accessories for MAG 3100 and MAG 3100 HT sensor

Grounding and protection ring - Type C (Stainless steel)¹⁾



- Material AISI 304
- For all liners except PTFE and PFA

Flow Measurement

SITRANS FM (electromagnetic)

Flow sensors / SITRANS FM MAG 3100 and 3100 HT

Selection and ordering data (continued)

• 1 pc.

Size DN	Nominal pressure					
	PN 6	PN 10	PN 16	PN 25	PN 40	AS 2129 Table E
	Article No.	Article No.	Article No.	Article No.	Article No.	Article No.
DN 25					FDK:083N8361	FDK:083N8361
DN 40					FDK:083N8362	FDK:083N8362
DN 50					FDK:083N8344	FDK:083N8344
DN 65	FDK:083N8345		FDK:083N8345		FDK:083N8345	FDK:083N8346
DN 80	FDK:083N8347		FDK:083N8347		FDK:083N8347	FDK:083N8347
DN 100	FDK:083N8070		FDK:083N8025		FDK:083N8025	FDK:083N8025
DN 125	FDK:083N8071		FDK:083N8071		FDK:083N8071	FDK:083N8071
DN 150	FDK:083N8072		FDK:083N8008		FDK:083N8073	FDK:083N8008
DN 200	FDK:083N8074	FDK:083N8011	FDK:083N8011	FDK:083N8011	FDK:083N8075	FDK:083N8011
DN 250	FDK:083N8078	FDK:083N8013	FDK:083N8013	FDK:083N8013	FDK:083N8079	FDK:083N8013
DN 300	FDK:083N8080	FDK:083N8012	FDK:083N8012	FDK:083N8081	FDK:083N8082	FDK:083N8012
DN 350	FDK:083N8083	FDK:083N8039	FDK:083N8039	FDK:083N8084	FDK:083N8085	FDK:083N8039
DN 400	FDK:083N8099	FDK:083N8100	FDK:083N8100	FDK:083N8101	FDK:083N8102	FDK:083N8100
DN 450	FDK:083N8103	FDK:083N8103	FDK:083N8104	FDK:083N8104	FDK:083N8105	FDK:083N8104
DN 500	FDK:083N8107	FDK:083N8107	FDK:083N8108	FDK:083N8108	FDK:083N8109	FDK:083N8108
DN 600	FDK:083N8111	FDK:083N8111	FDK:083N8112	FDK:083N8112		FDK:083N8113
DN 700	FDK:083N8300	FDK:083N8294	FDK:083N8294			FDK:083N8372
DN 750						
DN 800	FDK:083N8303	FDK:083N8304	FDK:083N8304			FDK:083N8373
DN 900	FDK:083N8306	FDK:083N8307	FDK:083N8307			FDK:083N8396
DN 1000	FDK:083N8309	FDK:083N8310	FDK:083N8310			FDK:083N8397
DN 1100		FDK:083N8367	FDK:083N8367			FDK:083N8367
DN 1200	FDK:083N8312	FDK:083N8313	FDK:083N8313			FDK:083N8398
DN 1400	FDK:083N8467	FDK:083N8468	FDK:083N8469			
DN 1500	FDK:083N8471	FDK:083N8472	FDK:083N8473			
DN 1600	FDK:083N8475	FDK:083N8476	FDK:083N8477			
DN 1800	FDK:083N8479	FDK:083N8480	FDK:083N8481			
DN 2000	FDK:083N8483	FDK:083N8484	FDK:083N8485			

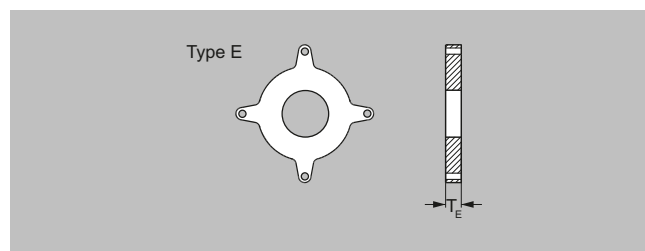
Size Inch	ANSI Class 150	Class 300	JIS K10	JIS K20
	Article No.	Article No.	Article No.	Article No.
1"	FDK:083N8361	FDK:083N8361	FDK:083N8361	FDK:083N8361
1½"	FDK:083N8362	FDK:083N8362	FDK:083N8362	FDK:083N8362
2"	FDK:083N8344	FDK:083N8344	FDK:083N8344	FDK:083N8344
2½"	FDK:083N8345	FDK:083N8345	FDK:083N8345	FDK:083N8345
3"	FDK:083N8347	FDK:083N8347	FDK:083N8347	FDK:083N8347
4"	FDK:083N8025	FDK:083N8025	FDK:083N8070	FDK:083N8025
5"	FDK:083N8071	FDK:083N8071	FDK:083N8071	FDK:083N8071
6"	FDK:083N8008	FDK:083N8073	FDK:083N8008	FDK:083N8008
8"	FDK:083N8011	FDK:083N8076	FDK:083N8011	FDK:083N8011
10"	FDK:083N8013	FDK:083N8079	FDK:083N8013	FDK:083N8079
12"	FDK:083N8012	FDK:083N8082	FDK:083N8012	FDK:083N8081
14"	FDK:083N8039	FDK:083N8085	FDK:083N8083	FDK:083N8039
16"	FDK:083N8100	FDK:083N8102	FDK:083N8100	FDK:083N8101
18"	FDK:083N8104	FDK:083N8106	FDK:083N8103	FDK:083N8104
20"	FDK:083N8107	FDK:083N8110	FDK:083N8107	FDK:083N8108
24"	FDK:083N8113	FDK:083N8114	FDK:083N8111	FDK:083N8112

Selection and ordering data (continued)

Size Inch	AWWA C-207 Article No.
28"	FDK:083N8302
30"	FDK:083N8366
32"	FDK:083N8305
36"	FDK:083N8308
40"	FDK:083N8311
42"	FDK:083N8394
44"	FDK:083N8395
48"	FDK:083N8314
54"	FDK:083N8470
60"	FDK:083N8474
66"	FDK:083N8478
72"	FDK:083N8482
80"	FDK:083N8486

¹⁾ Also for MAG 5100 W (7ME6520 > DN 300/12 inch and 7ME6580).

Grounding and protection ring - Type E (Stainless steel)



- Material: AISI 316
- For all PTFE liners
- 1 pc. incl. straps and screws

Note:

For MAG 3100 HT High temperature version 7ME6320... for PTFE 180 °C (356 °F) versions - grounding ring type E is included and factory mounted.

For use as protection ring order 2 pcs. For use as grounding ring order 1 pc.

Size DN	Nominale pressure					
	PN 6	PN 10	PN 16	PN 25	PN 40	AS2129, Table E
	Article No.	Article No.	Article No.	Article No.	Article No.	Article No.
DN 15					FDK:083N8365	FDK:083N8365
DN 25					FDK:083N8271	FDK:083N8272
DN 40					FDK:083N8278	FDK:083N8280
DN 50					FDK:083N8282	FDK:083N8281
DN 65	FDK:083N8284		FDK:083N8285		FDK:083N8286	FDK:083N8284
DN 80	FDK:083N8288		FDK:083N8289		FDK:083N8290	FDK:083N8293
DN 100	FDK:083N8116		FDK:083N8117		FDK:083N8118	FDK:083N8117
DN 125	FDK:083N8120		FDK:083N8121		FDK:083N8122	FDK:083N8121
DN 150	FDK:083N8124		FDK:083N8125		FDK:083N8126	FDK:083N8128
DN 200	FDK:083N8129	FDK:083N8130	FDK:083N8130	FDK:083N8131	FDK:083N8132	FDK:083N8134
DN 250	FDK:083N8135	FDK:083N8136	FDK:083N8137	FDK:083N8138	FDK:083N8139	FDK:083N8143
DN 300	FDK:083N8144	FDK:083N8144	FDK:083N8145	FDK:083N8146	FDK:083N8147	FDK:083N8151
DN 350	FDK:083N8152	FDK:083N8153	FDK:083N8154	FDK:083N8155	FDK:083N8156	FDK:083N8153
DN 400	FDK:083N8160	FDK:083N8161	FDK:083N8162	FDK:083N8163	FDK:083N8164	FDK:083N8161
DN 450	FDK:083N8168	FDK:083N8169	FDK:083N8170	FDK:083N8171	FDK:083N8172	FDK:083N8176
DN 500	FDK:083N8177	FDK:083N8178	FDK:083N8179	FDK:083N8180	FDK:083N8181	FDK:083N8185
DN 600	FDK:083N8186	FDK:083N8187	FDK:083N8188	FDK:083N8189		A5E32710253

Flow Measurement

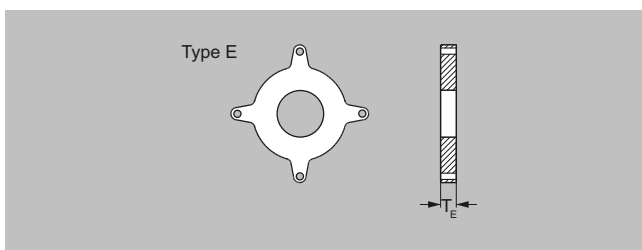
SITRANS FM (electromagnetic)

Flow sensors / SITRANS FM MAG 3100 and 3100 HT

Selection and ordering data (continued)

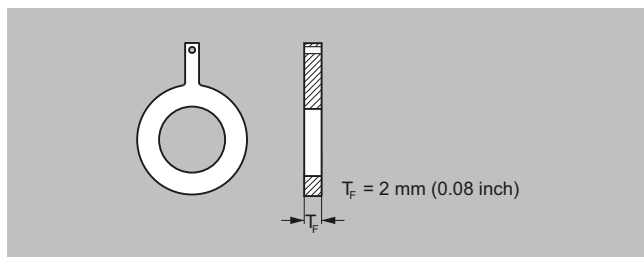
Size Inch	ANSI		JIS K10		JIS K20	
	Class 150	Class 300	Article No.		Article No.	
1/2"	Article No. FDK:083N8365	Article No. FDK:083N8365	Article No.		Article No.	
1"	FDK:083N8272	FDK:083N8272	FDK:083N8271	FDK:083N8271		
1 1/2"	FDK:083N8279	FDK:083N8279	FDK:083N8278	FDK:083N8278		
2"	FDK:083N8283	FDK:083N8283	FDK:083N8282	FDK:083N8282		
2 1/2"	FDK:083N8287	FDK:083N8287	FDK:083N8285	FDK:083N8285		
3"	FDK:083N8291	FDK:083N8292	FDK:083N8288	FDK:083N8289		
4"	FDK:083N8118	FDK:083N8119	FDK:083N8116	FDK:083N8117		
5"	FDK:083N8122	FDK:083N8123	FDK:083N8121	FDK:083N8122		
6"	FDK:083N8126	FDK:083N8127	FDK:083N8125	FDK:083N8126		
8"	FDK:083N8370	FDK:083N8133	FDK:083N8130	FDK:083N8370		
10"	FDK:083N8140	FDK:083N8141	FDK:083N8137	FDK:083N8139		
12"	FDK:083N8148	FDK:083N8149	FDK:083N8144	FDK:083N8146		
14"	FDK:083N8157	FDK:083N8158	FDK:083N8152	FDK:083N8154		
16"	FDK:083N8165	FDK:083N8166	FDK:083N8160	FDK:083N8165		
18"	FDK:083N8173	FDK:083N8174	FDK:083N8169	FDK:083N8171		
20"	FDK:083N8182	FDK:083N8183	FDK:083N8178	FDK:083N8180		
24"	FDK:083N8190	FDK:083N8191	A5E32709738	A5E32710253		

Grounding and protecting ring - Type E (Hastelloy)¹⁾



- Material: Hastelloy C276
- For all PTFE liners
- 1 pc. incl. straps and screws

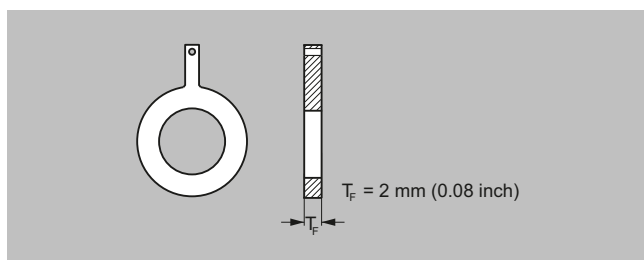
Size DN	Nominal pressure			Size Inch	ANSI	
	PN 6	PN 16	PN 40		Class 150	Class 300
DN 15	Article No.	Article No.	Article No.	1/2"	Article No.	Article No.
DN 25			FDK:083N8487	1"	FDK:083N8487	FDK:083N8487
DN 40			FDK:083N8488	1 1/2"	FDK:083N8489	FDK:083N8489
DN 50			FDK:083N8490	2"	FDK:083N8491	FDK:083N8491
DN 65	FDK:083N8494	FDK:083N8495	FDK:083N8492	2 1/2"	FDK:083N8493	FDK:083N8493
DN 80	FDK:083N8498	FDK:083N8499	FDK:083N8496	3"	FDK:083N8497	FDK:083N8497
DN 100	FDK:083N8503	FDK:083N8504	FDK:083N8500	4"	FDK:083N8501	FDK:083N8502
			FDK:083N8505		FDK:083N8506	FDK:083N8507

Selection and ordering data (continued)Grounding ring - Type Flat ring (Stainless steel)

- Material: AISI 316
- For all liners (PTFE max. 150 °C (302 °F))
- 1 pc.

Size DN	Nominale pressure			Size Inch	ANSI	
	PN 10	PN 16	PN 40		Class 150	Class 300
	Article No.	Article No.	Article No.		Article No.	Article No.
DN 15			A5E01191968	1/2"	A5E01191969	
DN 25			A5E01150880	1"	A5E01150022	A5E01150378
DN 40			A5E01191952	1 1/2"	A5E01191961	
DN 50			A5E01150918	2"	A5E01151121	A5E01151194
DN 65		A5E01191940	A5E01191954	2 1/2"	A5E01191962	
DN 80		A5E01152876	A5E01152876	3"	A5E01152910	A5E01153422
DN 100		A5E01158875	A5E01159072	4"	A5E01159146	A5E01159628
DN 125		A5E01191941	A5E01191956	5"	A5E01191963	
DN 150		A5E01191943	A5E01191957	6"	A5E01191964	
DN 200	A5E01191951	A5E01191944	A5E01191958	8"	A5E01191965	
DN 250	A5E01191950	A5E01191946	A5E01191959	10"	A5E01191966	
DN 300	A5E01191949	A5E01191947	A5E01191960	12"	A5E01191967	

¹⁾ Also for MAG 5100 W (7ME6580).

Grounding ring - Type Flat ring (Hastelloy)

- Material: Hastelloy C276
- For all liners (PTFE max. 150 °C (302 °F))
- 1 pc.

Size DN	Nominale pressure			Size Inch	ANSI	
	PN 6	PN 16	PN 40		Class 150	Class 300
	Article No.	Article No.	Article No.		Article No.	Article No.
DN 15			A5E01191981	1/2"	A5E01191989	
DN 25			A5E01150882	1"	A5E01150028	A5E01150379
DN 40			A5E01191982	1 1/2"	A5E01191990	
DN 50			A5E01150922	2"	A5E01151124	A5E01151197
DN 65		A5E01191971	A5E01191983	2 1/2"	A5E01191991	

Flow Measurement

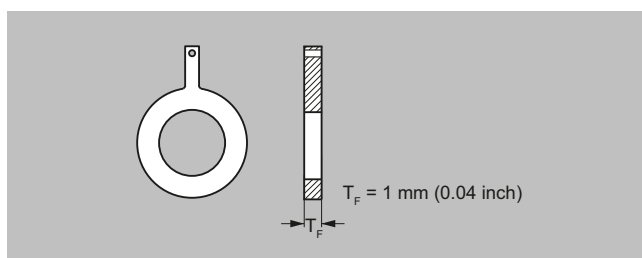
SITRANS FM (electromagnetic)

Flow sensors / SITRANS FM MAG 3100 and 3100 HT

Selection and ordering data (continued)

Size DN	Nominale pressure			Size Inch	ANSI	
	PN 6	PN 16	PN 40		Class 150	Class 300
DN 80		A5E01152889	A5E01152889	3"	A5E01152913	A5E01153424
DN 100		A5E01158886	A5E01159074	4"	A5E01159150	A5E01159629
DN 125		A5E01191973	A5E01191984	5"	A5E01191992	
DN 150		A5E01191974	A5E01191985	6"	A5E01191993	
DN 200	A5E01191978	A5E01191975	A5E01191986	8"	A5E01191994	
DN 250	A5E01191979	A5E01191976	A5E01191987	10"	A5E01191995	
DN 300	A5E01191980	A5E01191977	A5E01191988	12"	A5E01191996	

Grounding ring - Type Flat ring (Tantalum)



- Material: Tantalum
- For all liners (PTFE max. 150 °C (302 °F))
- 1 pc.

Size DN	Nominale pressure		Size Inch	ANSI	
	PN 16	PN 40		Class 150	Class 300
	Article No.	Article No.		Article No.	Article No.
DN 15		A5E01192007	½"	A5E01192010	
DN 25		A5E01150883	1"	A5E01150030	A5E01150381
DN 40		A5E01192008	1½"	A5E01192011	
DN 50		A5E01150926	2"	A5E01151129	A5E01151199
DN 65	A5E01192005	A5E01192009	2½"	A5E01192012	
DN 80	A5E01152890	A5E01152890	3"	A5E01152916	A5E01153427
DN 100	A5E01158891	A5E01159076	4"	A5E01159156	A5E01159631

Technical specifications

Version	MAG 3100	MAG 3100 HT (High Temperature)
Product characteristic	Flexible product program	Flexible product program
Nominal size	DN 15 ... 2000 (½" ... 80")	DN 15 ... 300 (½" ... 12")
Measuring principle	Electromagnetic induction	Electromagnetic induction
Excitation frequency (Mains supply: 50 Hz/60 Hz)	<ul style="list-style-type: none"> • DN 15 ... 65 (½" ... 2½"): 12.5 Hz/15 Hz • DN 80 ... 150 (3" ... 6"): 6.25 Hz/7.5 Hz • DN 200 ... 1200 (8" ... 48"): 3.125 Hz/3.75 Hz • DN 1400 ... 2200 (54" ... 88"): 1.5625 Hz/1.875 Hz 	<ul style="list-style-type: none"> • DN 15 ... 65 (½" ... 2½"): 12.5 Hz/15 Hz • DN 80 ... 150 (3" ... 6"): 6.25 Hz/7.5 Hz • DN 200 ... 300 (8" ... 12"): 3.125 Hz/3.75 Hz
Process connection		
Flanges	EN 1092-1, raised face ¹⁾ (EN 1092-1, DIN 2501 & BS 4504 have the same mating dimensions) <ul style="list-style-type: none"> • DN 65 ... 2200 (2½" ... 88"): PN 6 (87 psi) • DN 200 ... 2200 (8" ... 88"): PN 10 (145 psi) • DN 65 ... 2000 (2½" ... 80"): PN 16 (232 psi) • DN 200 ... 600 (8" ... 24"): PN 25 (362 psi) • DN 15 ... 600 (½" ... 24"): PN 40 (580 psi) • DN 50 ... 300 (2" ... 12"): PN 63 (913 psi) • DN 25 ... 300 (1" ... 12"): PN 100 (1450 psi) ANSI B16.5 (~BS 1560), raised face: <ul style="list-style-type: none"> • ½" ... 24": Class 150 (20 bar (290 psi)) • ½" ... 24": Class 300 (50 bar (725 psi)) • ½" ... 16": Class 600 (100 bar (1450 psi)) AWWA C-207, flat face 28" ... 88": Class D (10 bar) AS 2129, raised face ½" ... 48": Table E AS 4087, raised face: <ul style="list-style-type: none"> • PN 16 (DN 50 ... 1200, 16 bar (232 psi)) • PN 21 (DN 50 ... 600, 21 bar (304 psi)) • PN 35 (DN 50 ... 600, 35 bar (508 psi)) JIS B 2220:2004 <ul style="list-style-type: none"> • K10 (1" ... 24") • K20 (1" ... 24") Other flanges and pressure ratings on request	EN 1092-1, raised face (EN 1092-1, DIN 2501 & BS 4504 have the same mating dimensions) <ul style="list-style-type: none"> • DN 15 ... 300 (½" ... 12"): PN 40 (580 psi) • DN 65 ... 300 (2½" ... 12"): PN 16 (232 psi) • DN 200 ... 300 (8" ... 12"): PN 10 (145 psi) • DN 200 ... 300 (8" ... 12"): PN 25 (362 psi) ANSI B16.5 (~BS 1560), raised face: <ul style="list-style-type: none"> • ½" ... 12": Class 150 (20 bar (290 psi)) • ½" ... 12": Class 300 (50 bar (725 psi)) AS 2129, raised face ½" ... 12": Table E Other flanges and pressure ratings on request
Rated operation conditions		
Ambient temperature (conditions also dependent on liner characteristics)		
• Standard sensor	-40 ... +100 °C (-40 ... +212 °F)	-40 ... +100 °C (-40 ... +212 °F)
• Ex sensor	-20 ... +60 °C (-4 ... +140 °F)	For medium temperature up to 150 °C (302 °F): -20 ... +60 °C (-4 ... +140 °F)

Technical specifications (continued)

Version	MAG 3100	MAG 3100 HT (High Temperature)
• Ex sensor	-20 ... +60 °C (-4 ... +140 °F)	For medium temperature 150 ... 180 °C (302 ... 356 °F): -20 ... +50 °C (-4 ... +122 °F)
• Compact with transmitter		
- MAG 5000/6000	-20 ... +60 °C (-4 ... +140 °F)	-20 ... +60 °C (-4 ... +140 °F)
- MAG 6000 I ⁸⁾	-20 ... +60 °C (-4 ... +140 °F)	-20 ... +60 °C (-4 ... +140 °F)
- MAG 6000 I Ex ⁸⁾	-20 ... +60 °C (-4 ... +140 °F)	-20 ... +60 °C (-4 ... +140 °F)
Operating pressure		
[abs. bar] (maximum operating pressure decreases with increasing operating temperature and with stainless steel flanges)	<ul style="list-style-type: none"> • Softrubber 0.01 ... 100 bar (0.15 ... 1450 psi) • EPDM 0.01 ... 40 bar (0.15 ... 580 psi) • Linatex 0.01 ... 40 bar (0.15 ... 580 psi) • Ebonite 0.01 ... 100 bar (0.15 ... 1450 psi) • PTFE <ul style="list-style-type: none"> - DN ≤ 300 (≤ 12"): 0.3 ... 50 bar (4 ... 725 psi) - 350 ≤ DN ≤ 600 (14" ≤ DN ≤ 24"): 0.3 ... 40 bar (4 ... 580 psi) • PFA <ul style="list-style-type: none"> - DN 15 ... 150 (½" ... 6"): Vacuum 0.02 ... 50 bar (0.29 ... 725 psi) 	<ul style="list-style-type: none"> • PTFE Teflon <ul style="list-style-type: none"> - DN 15 ... 300 (½" ... 12"): 0.3/0.6 ... 50 bar (4/8 ... 725 psi) (180 °C (356 °F)). Factory mounted grounding rings type E in stainless steel and stainless steel terminal box. Can only be used with remote transmitter. • PFA <ul style="list-style-type: none"> - DN 15 ... 150 (½" ... 6"): Vacuum 0.02 ... 50 bar (0.29 ... 725 psi)
Enclosure rating	IP67 to EN 60529/NEMA 6, 1 mH ₂ O for 30 min Option: IP68 to EN 60529/NEMA 6P, 10 mH ₂ O cont.	IP67 to EN 60529/NEMA 6, 1 mH ₂ O for 30 min Option: IP68 to EN 60529/NEMA 6P, 10 mH ₂ O cont.
Pressure drop at 3 m/s	As straight pipe	
Test pressure	1.5 x PN (where applicable)	
Mechanical load (vibration)	18 ... 1000 Hz random in x, y, z, directions for 2 hours according to EN 60068-2-36 Sensor: 3.17 g RMS Sensor with compact MAG 5000/6000 mounted transmitter: 3.17 g RMS Sensor with compact MAG 6000 I/6000 I Ex mounted transmitter: 1.14 g RMS	18 ... 1000 Hz random in x, y, z, directions for 2 hours according to EN 60068-2-36 Sensor: 3.17 g RMS Sensor with compact MAG 5000/6000 mounted transmitter: 3.17 g RMS Sensor with compact MAG 6000 I/6000 I Ex mounted transmitter: 1.14 g RMS
Temperature of medium	<ul style="list-style-type: none"> • Soft rubber 0 ... +70 °C (32 ... 158 °F) • EPDM -10 ... +70 °C (14 ... 158 °F) <ul style="list-style-type: none"> • Linatex (rubber) -40 ... +70 °C (-40 ... +158 °F) (for temperatures below -20 °C (-4 °F) AISI 304 or 316 flanges must be used) 	<ul style="list-style-type: none"> • PTFE -20 ... +150 °C (-4 ... +302 °F) • PTFE -20 ... +180 °C (-4 ... +356 °F) Factory mounted grounding rings type E in stainless steel and stainless steel terminal box. Can only be used with remote transmitter. • PFA -20 ... +150 °C (-4 ... +302 °F)

Flow Measurement

SITRANS FM (electromagnetic)

Flow sensors / SITRANS FM MAG 3100 and 3100 HT

Technical specifications (continued)

Version	MAG 3100	MAG 3100 HT (High Temperature)
Temperature of medium	<ul style="list-style-type: none"> Ebonite 0 ... 95 °C (32 ... 203 °F) PTFE -20 ... +100 °C (-4 ... +212 °F) PFA -20 ... +100 °C (-4 ... +212 °F) 	
EMC	2014/30/EU	2014/30/EU
Design		
Weight	See dimensional drawings	
Flange and housing material	Carbon steel ASTM A 105 with corrosion protection EN ISO 12944 grade C4 or grade C5 (medium durability ≤15 years) or Stainless steel AISI 304/1.4301 flanges and carbon steel housing with corrosion protection EN ISO 12944 grade C4 or grade C5 (durability up to 15 years) or Stainless steel AISI 316L/1.4404 flanges and housing, polished	Carbon steel ASTM A 105 with corrosion protection EN ISO 12944 grade C4 or Stainless steel AISI 304/1.4301 flanges and carbon steel housing with corrosion protection EN ISO 12944 grade C4 or Stainless steel AISI 316Ti/1.4571 flanges and housing, polished
Measuring pipe material	Stainless steel AISI 304/1.4301	Stainless steel AISI 304/1.4301
Electrode material	<ul style="list-style-type: none"> Stainless steel AISI 316Ti/1.4571 Hastelloy C276/2.4819 (PFA: Hastelloy C22/2.4602) Platinum Titanium Tantalum Ceramic coated stainless steel Ceramic coated Hastelloy C 	<ul style="list-style-type: none"> Stainless steel AISI 316Ti/1.4571 Hastelloy C276/2.4819 (PFA: Hastelloy C22/2.4602) Platinum Titanium Tantalum
Grounding electrode material	<ul style="list-style-type: none"> Soft rubber, EPDM, Linatex, Ebonite: grounding electrodes built-in by default for stainless steel and Hastelloy C PTFE: optional in Stainless steel, Hastelloy C, Titanium, Platinum or Tantalum PFA: optional in Hastelloy, Tantalum or Platinum Ceramic coated stainless steel and Hastelloy C276: grounding electrodes built-in by default 	<ul style="list-style-type: none"> PTFE: no grounding electrodes PFA: optional in Hastelloy, Tantalum or Platinum
Terminal box (remote version only)	<ul style="list-style-type: none"> Standard fibre glass reinforced polyamide Option Stainless steel AISI 316/1.4436 Ex Stainless steel AISI 316/1.4436 	<ul style="list-style-type: none"> Standard fibre glass reinforced polyamide (max. 150 °C (302 °F)) Stainless steel AISI 316/1.4436 Ex Stainless steel AISI 316/1.4436
Cable entries	<ul style="list-style-type: none"> Remote installation 2 x M20 or 2 x ½" NPT Compact installation 	<ul style="list-style-type: none"> Remote installation 2 x M20 or 2 x ½" NPT

Technical specifications (continued)

Version	MAG 3100	MAG 3100 HT (High Temperature)
Cable entries	<ul style="list-style-type: none"> MAG 5000/MAG 6000: 4 x M20 or 4 x ½" NPT MAG 6000 I: 2 x M25 or 2 x ½" NPT (for supply/output) MAG 6000 I Ex: 2 x M25 or 2 x ½" NPT (for supply/output) 	
Certificates and approvals		
Calibration		
• Default calibration	Zero-point, 2 x 25 % and 2 x 90 % (default)	Zero-point, 2 x 25 % and 2 x 90 %
• Special calibration	5-point calibration: 20%, 40%, 60%, 80%, 100% of factory Q _{max} 10-point calibration: ascending and descending at 20%, 40%, 60%, 80%, 100% of factory Q _{max} Matched pair calibration: default, 5-point or 10-point	
Hazardous areas ²⁾		
• Ex-sensor in compact or remote version with MAG 6000 I Ex	<ul style="list-style-type: none"> ATEX, FM, CSA, IECEx, EAC Ex, NEPSI - Zone 1 Ex d e ia IIC T6 Gb⁴⁾ - Zone 1 Ex e ia IIC T6 Gb⁵⁾ ATEX, FM, CSA, IECEx - Zone 21 Ex tD A21 IP67 FM - XP IS Class I Div. 1 Groups A, B, C, D⁶⁾ - DIP Class II+III Div. 1 Groups E, F, G⁶⁾ KCs - Zone 1 Ex d e ia IIC T6⁴⁾ - Zone 1 Ex e ia IIC T6⁵⁾ 	<ul style="list-style-type: none"> ATEX, FM, CSA, IECEx, EAC Ex, NEPSI - Zone 1 Ex d e ia IIC T6 Gb⁴⁾ - Zone 1 Ex e ia IIC T6 Gb⁵⁾ ATEX, FM, CSA, IECEx - Zone 21 Ex tD A21 IP67 FM - XP IS Class I Div. 1 Groups A, B, C, D⁶⁾ - DIP Class II+III Div. 1 Groups E, F, G⁶⁾
• Standard sensor with/without MAG 5000/6000/6000 I	<ul style="list-style-type: none"> FM - NI Class I Div. 2 Groups A, B, C, D - NI Class I Zone 2 Groups IIC 	<ul style="list-style-type: none"> FM - NI Class I Div. 2 Groups A, B, C, D - NI Class I Zone 2 Groups IIC
Drinking water	<p>EPDM liner:</p> <ul style="list-style-type: none"> WRAS (WRc, BS6920 material approval for cold water, GB) NSF/ANSI Standard 617 (Cold water, US) ACS listed (F) DVGW W270 (D) KIWA (NL) Belgaqua (B) AS/NZS4020 (Australia/New Zealand) MCERTS (GB) (EPDM or PTFE lining with AISI 316 or Hastelloy electrodes) <p>Ebonite liner</p> <ul style="list-style-type: none"> NSF/ANSI Standard 61/372 (Cold water, US) GB/T5750 (CN) AS/NZS4020 (Australia/New Zealand) 	

Technical specifications (continued)

Version	MAG 3100	MAG 3100 HT (High Temperature)
Pressure equipment	PED conforming: All EN 1092-1 flanges 2014/68/EU ³⁾	PED conforming: All EN 1092-1 flanges 2014/68/EU ³⁾
Others	<ul style="list-style-type: none"> • CRN (Canadian Registration Number) • CPA (China) • EAC (Kazakhstan) 	<ul style="list-style-type: none"> • CRN (Canadian Registration Number) • CPA (China) • EAC (Kazakhstan)

Technical specification for transmitter - please see section about transmitters.

- 1) PN 6-40: DN ≤ 600 type 01 (SORF); DN > 600 type 11 (WNRF); PN 63-100: type 11 (WNRF).
- 2) Not for sensors with 300 µm coating.
- 3) For sizes larger than 600 mm (24") in PN 16 PED conformity is available as a cost-added option. The basic unit will carry the LVD (Low Voltage Directive) and EMC approval. All products sold outside of EU and EFTA are excluded from the Pressure Equipment directive, also products sold into certain market sectors are excluded. These include: (a) Meters used in networks for the supply, distribution and discharge of water; (b) Meters used in pipelines for the conveyance of any fluid from offshore to onshore; (c) Meters used in the extraction of petroleum or gas, including christmas tree and manifold equipment; (d) Any meter mounted on a ship or mobile offshore platform. For further information on the PED standard and requirements see the section about Pressure Equipment Directive.
- 4) In remote version with sensor size DN 15 ... 300 (½" ... 12").
- 5) In remote version with sensor size DN 350 ... 2000 (14" ... 80").
- 6) In compact version with sensor size DN 15 ... 300 (½" ... 12").
- 7) Has to be ordered with the meter. It is not possible to order the certificate afterwards.
- 8) With HART communication max. ambient temperature 50 °C (122 °F).

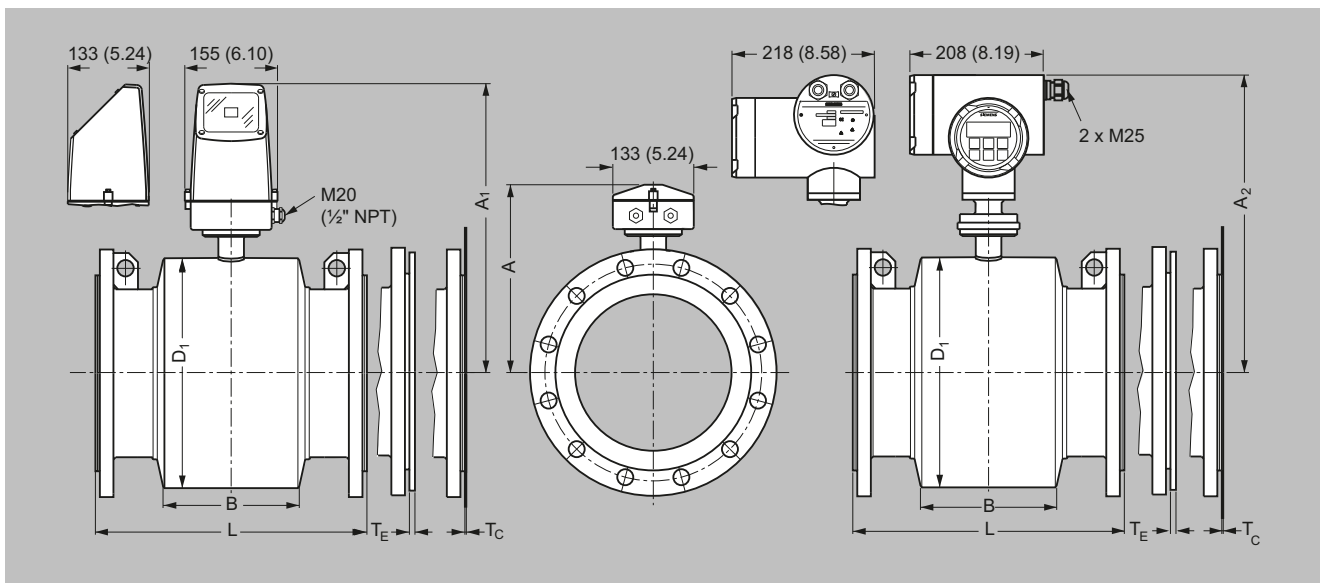
Flow Measurement

SITRANS FM (electromagnetic)

Flow sensors / SITRANS FM MAG 3100 and 3100 HT

Dimensional drawings

MAG 3100 and MAG 3100 HT sensor with compact or remote transmitter



Dimensions in mm (inch)

Metric

DN	A ¹⁾	A ₂	B	D ₁	L ²⁾³⁾	EN 1092-1-201						ANSI 16.5		
						PN 6, 10	PN 16/ PN 16 non-PED	PN 25	PN 40	PN 63	PN 100	Class 1- 50	Class 3- 00	Class 6- 00
[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
15	187	341	338	59	104	-	-/-	-	200	-	-	200	200	-
25	187	341	338	59	104	-	-/-	-	200	-	260	200	200	280 ⁴⁾
32	193	346	336	86	114	-	-/-	-	200	-	280	200	200	300 ⁴⁾
40	197	351	348	82	124	-	-/-	-	200	-	280	200	200	320 ⁴⁾
50	205	359	356	72	139	-	-/-	-	200	276	300	200	200	330 ⁴⁾
65	212	366	363	72	154	200	200/-	-	200	320	350	200	272	370 ⁴⁾
80	222	376	373	72	174	200	200/-	-	272 ⁴⁾	323	340	272 ⁴⁾	272 ⁴⁾	350
100	242	396	393	85	214	250	250/-	-	250	380	400	250	310	460 ⁴⁾
125	255	409	406	85	239	250	250/-	-	250	420	450	250	335	480 ⁴⁾
150	276	430	427	85	282	300	300/-	-	300	415	450	300	300	500 ⁴⁾
200	304	458	455	137	338	350	350/-	350	350	480	530	350	350	600 ⁴⁾
250	332	486	483	157	393	450	450/-	450	450	550	620	450	450	600 ⁴⁾
300	357	511	508	157	444	500	500/-	500	500	600	680	500	500	700 ⁴⁾
350	362	516	513	270	451	550	550/-	550	550	-	-	550	550	800 ⁴⁾
400	387	541	538	270	502	600	600/-	600	600	-	-	600	600	820 ⁴⁾
450	418	572	569	310	563	600	600/-	600	600	-	-	600	640	-
500	443	597	594	350	614	600	600/-	625	680	-	-	600	730	-
600	494	648	645	320	715	600	600/-	750	800	-	-	600	860	-
700	544	698	695	450	816	700	875/700	800	-	-	-	800	-	-
750	571	725	722	556	869	-	-/-	-	-	-	-	950	-	-
800	606	760	757	560	927	800	1000/800	900	-	-	-	900	-	-
900	653	807	804	630	1032	900	1125/900	1000	-	-	-	1100	-	-
1000	704	858	855	670	1136	1000	1250/1000	1100	-	-	-	1100	-	-
1050	704	858	855	670	1136	-	-/-	-	-	-	-	-	-	-
1100	755	904	901	770	1238	-	-/-	-	-	-	-	-	-	-
1200	810	964	961	792	1348	1200	1500/1200	1300	-	-	-	1400	-	-
1400	925	1079	1076	1000	1574	1400	-/1400	-	-	-	-	-	-	-

Dimensional drawings (continued)

DN	A ¹⁾	A ₂	B	D ₁	L ²⁾³⁾	EN 1092-1-201						ANSI 16.5		
						PN 6, 10	PN 16/ PN 16 non-PED	PN 25	PN 40	PN 63	PN 100	Class 50	Class 1-00	Class 3-00
[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
1500	972	1126	1123	1020	1672	1500	-/1500	-	-	-	-	-	-	-
1600	1025	1179	1176	1130	1774	1600	-/1600	-	-	-	-	-	-	-
1800	1123	1277	1274	1250	1974	1800	-/1800	-	-	-	-	-	-	-
2000	1223	1377	1374	1375	2174	2000	-/2000	-	-	-	-	-	-	-
2200	1353	1507	-	1496	2400	2200	-/-	-	-	-	-	-	-	-

1) 14.5 mm shorter with stainless steel terminal box (Ex and high temperature version)

2) When grounding rings are used, the thickness of the grounding ring must be added to the built-in length

3) Tolerances on built-in length (PN 6, PN 10, PN 16, PN 25 and PN 40):

DN 15 to DN 200: +0/-3 mm

DN 250 to DN 400: +0/-5 mm

DN 450 to DN 600: +5/-5 mm

DN 700 to DN 2000: +10/-10 mm

Tolerances on built-in length (PN 63 and PN 100): All sizes +8/-8 mm

4) Not according to ISO 20456

DN	L ¹⁾²⁾		AWWA C-207 Class D	JIS K10	JIS K20	T _C ³⁾	T _E ³⁾	T _F ³⁾	Weight ⁴⁾
	AS 2129 E AS 4087 PN 16, 21, 35	[mm]							
15	200	-	-	200	200	-	6	2	4
25	200	-	-	200	200	1.2	6	2	5
32	200	-	-	200	240 ⁹⁾	1.2	6	2	5
40	200	-	-	200	240 ⁹⁾	1.2	6	2	7
50	200	-	-	200	240 ⁹⁾	1.2	6	2	9
65	200	-	-	200	272 ⁹⁾	1.2	6	2	11
80	200 ⁵⁾	-	-	200 ⁹⁾	272 ⁹⁾	1.2	6	2	12
100	250	-	-	250	310	1.2	6	2	16
125	250	-	-	250	335	1.2	6	2	19
150	300	-	-	300	300	1.2	6	2	27
200	350	-	-	350	350	1.2	8	2	40
250	450	-	-	450	450	1.2	8	2	60
300	500	-	-	500	500	1.6	8	2	80
350	550	-	-	550	550	1.6	8	-	110
400	600	-	-	600	600	1.6	10	-	125
450	600	-	-	600	640	1.6	10	-	175
500	600 ⁶⁾	-	-	600	680	1.6	10	-	200
600	600 ⁷⁾	-	-	600	800	1.6	10	-	287
700	700 ⁸⁾	700	-	-	-	2.0	-	-	330
750	750 ⁸⁾	750	-	-	-	2.0	-	-	360
800	800 ⁸⁾	800	-	-	-	2.0	-	-	450
900	900 ⁸⁾	900	-	-	-	2.0	-	-	530
1000	1000 ⁸⁾	1000	-	-	-	2.0	-	-	660
1050	-	1000	-	-	-	2.0	-	-	660
1100	-	1100	-	-	-	2.0	-	-	1140
1200	1200 ⁵⁾	1200	-	-	-	2.0	-	-	1180
1400	-	1400	-	-	-	2.0	-	-	1600
1500	-	1500	-	-	-	3.0	-	-	2460
1600	-	1600	-	-	-	3.0	-	-	2525
1800	-	1800	-	-	-	3.0	-	-	2930
2000	-	2000	-	-	-	3.0	-	-	3665
2200	-	2200	-	-	-	-	-	-	5690

1) When grounding rings are used, the thickness of the grounding ring must be added to the built-in length.

2) Tolerances on built-in length (PN 6, PN 10, PN 16, PN 25 and PN 40):

DN 15 to DN 200: +0/-3 mm

DN 250 to DN 400: +0/-5 mm

DN 450 to DN 600: +5/-5 mm

DN 700 to DN 2000: +10/-10 mm

Tolerances on built-in length (PN 63 and PN 100): All sizes +8/-8 mm

3) T_C = Protection ring type C, T_E = Grounding ring type E (included and factory mounted for 180 °C PTFE liner), T_F = Grounding ring Type Flat ring

Flow Measurement

SITRANS FM (electromagnetic)

Flow sensors / SITRANS FM MAG 3100 and 3100 HT

Dimensional drawings (continued)

- 4) Weights are approx. (for PN 16) without transmitter.
 5) PN 35 DN 80 = 272 mm (not according to ISO 20456)
 6) PN 35 DN 500 = 680 mm
 7) PN 35 DN 600 = 750 mm
 8) Not AS 4087 PN 21 or PN 35
 9) Not according to ISO 20456
 D = Outside diameter of flange, see flange tables

MAG 3100 and MAG 3100 HT sensor with compact or remote transmitter

Imperial

DN	A ¹⁾	A ₂	B	D ₁	L ²⁾³⁾	EN 1092-1-201						ANSI 16.5/ASME B16.47 ⁴⁾		
						PN 6, 10	PN 16/P- N 16 non-PED	PN 25	PN 40	PN 63	PN 100	Class 1- 50	Class 3- 00	Class 6- 00
[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]
½	7.36	13.31	13.25	2.32	4.09	-	-	-	7.87	-	-	7.87	7.87	-
1	7.36	13.31	13.25	2.32	4.09	-	-	-	7.87	-	10.24 ⁵⁾	7.87	7.87	11.02 ⁵⁾
1¼	7.6	13.6	13.6	3.4	4.5	-	-	-	7.87	-	11.02	7.87	7.87	11.8 ⁵⁾
1½	7.76	13.70	13.64	3.23	4.88	-	-	-	7.87	-	11.02	7.87	7.87	12.60 ⁵⁾
2	8.07	14.01	13.95	2.83	5.47	-	-	-	7.87	10.87 ⁵⁾	11.81	7.87	7.87	12.99 ⁵⁾
2½	8.35	14.29	14.23	2.83	6.06	7.87	7.87/-	-	7.87	12.60 ⁵⁾	13.78	7.87	10.71 ⁵⁾	14.6 ⁵⁾
3	8.74	14.69	14.63	2.83	6.85	7.87	7.87/-	-	10.71 ⁵⁾	12.72 ⁵⁾	13.39	10.71 ⁵⁾	10.71 ⁵⁾	13.78 ⁵⁾
4	9.53	15.47	15.41	3.35	8.43	9.84	9.84/-	-	9.84	14.96 ⁵⁾	-	9.84	12.20 ⁵⁾	18.11 ⁵⁾
5	10.04	15.98	15.92	3.35	9.41	9.84	9.84/-	-	9.84	16.54 ⁵⁾	-	9.84	13.10 ⁵⁾	18.90 ⁵⁾
6	10.87	16.81	16.75	5.39	11.10	11.81	11.81/-	-	11.81	16.34 ⁵⁾	-	11.81	11.81	19.68 ⁵⁾
8	11.97	17.91	17.85	5.39	13.31	13.78	13.78/-	13.78	13.78	18.90 ⁵⁾	-	13.78	13.78	23.62 ⁵⁾
10	13.07	19.02	18.96	6.18	15.47	17.72	17.72/-	17.72	17.72	-	-	17.72	17.72	23.62 ⁵⁾
12	14.05	20.00	19.94	6.18	17.48	19.69	19.69/-	19.69	19.69	-	-	19.69	19.69	27.56 ⁵⁾
14	14.25	20.20	20.14	10.63	17.76	21.65	21.65/-	21.65	21.65	-	-	21.65	21.65	31.5 ⁵⁾
16	15.24	21.18	21.12	10.63	19.76	23.62	23.62/-	23.62	23.62	-	-	23.62	23.62	32.3 ⁵⁾
18	16.45	22.40	22.34	12.20	22.16	23.62	23.62/-	23.62	23.62	-	-	23.62	23.62	-
20	17.44	23.39	23.33	13.78	24.17	23.62	23.62/-	24.61	26.77	-	-	23.62	28.70	-
24	19.45	25.39	25.33	12.59	28.15	23.62	23.62/-	29.53	31.50	-	-	23.62	33.80	-
28	21.42	27.36	27.30	17.72	32.13	27.56	34.45/27.5- 6	31.50	-	-	-	31.50	-	-
30	22.48	28.43	28.37	21.89	34.21	-	-/-	-	-	-	-	37.41	-	-
32	23.86	29.80	29.74	22.05	36.50	31.50	39.37/31.5- 0	35.44	-	-	-	35.44	-	-
36	25.71	31.65	31.59	24.80	40.63	35.43	44.29/35.4- 3	39.38	-	-	-	43.32	-	-
40	27.72	33.85	33.79	26.38	44.72	39.37	49.21/39.3- 7	43.32	-	-	-	43.32	-	-
42	27.72	33.85	33.79	26.38	44.72	-	-/-	-	-	-	-	-	-	-
44	29.72	35.67	35.61	30.31	48.74	-	-/-	-	-	-	-	-	-	-
48	31.89	37.83	37.77	31.18	53.07	47.24	59.06/47.2- 4	51.19	-	-	-	55.12	-	-
54	36.42	42.36	42.30	39.37	61.97	55.12	-/55.12	-	-	-	-	-	-	-
60	38.27	44.21	44.15	40.15	65.83	59.06	59.06/59.0- 6	-	-	-	-	-	-	-
66	40.35	46.30	46.24	44.49	69.84	62.99	-/62.99	-	-	-	-	-	-	-
72	44.21	50.16	50.10	49.21	77.72	70.87	-/70.87	-	-	-	-	-	-	-
80	48.15	54.09	54.03	54.13	85.59	78.74	-/78.74	-	-	-	-	-	-	-
88	53.30	59.03	-	58.90	94.50	86.60	-	-	-	-	-	-	-	-

- 1) 0.571 inch shorter with stainless steel terminal box (Ex and high temperature version)
 2) When grounding rings are used, the thickness of the grounding ring must be added to the built-in length
 3) Tolerances on built-in length (PN 6, PN 10, PN 16, PN 25 and PN 40):
 ½" to 8": +0/-0.12", 10" to DN 16": +0/-0.20", 18" to DN 24": +0.20/-0.20", 28" to DN 80": +0.39/-0.39"
 Tolerances on built-in length (PN 63 and PN 100): All sizes +0.31"/-0.31"
 4) ANSI 16.5 for DN ≤ 24"; ASME B16.47 for DN ≥ 28"
 5) Not according to ISO 20456

Dimensional drawings (continued)

Size	L ¹⁾²⁾ AS 2129 E AS 4087 PN 16, 21, 35	AWWA C-207 Class D	JIS K10	JIS K20	T _{C3} ³⁾	T _E ³⁾	T _F ³⁾	Weight ⁴⁾
[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[lbs]
½	7.87	-	7.87	7.87	-	0.24	0.08	9
1	7.87	-	7.87	7.87	0.05	0.24	0.08	11
1¼	7.87	-	7.87	9.44	0.05	0.24	0.08	11
1½	7.87	-	7.87	9.44	0.05	0.24	0.08	17
2	7.87	-	7.87	9.44	0.05	0.24	0.08	20
2½	7.87	-	7.87	10.70	0.05	0.24	0.08	24
3	7.87 ⁵⁾	-	7.87 ⁸⁾	10.70 ⁹⁾	0.05	0.24	0.08	26
4	9.84	-	9.84	12.20	0.05	0.24	0.08	35
5	9.84	-	9.84	13.18	0.05	0.24	0.08	42
6	11.81	-	11.81	11.81	0.05	0.24	0.08	60
8	13.78	-	13.77	13.77	0.05	0.31	0.08	88
10	17.72	-	17.71	17.71	0.05	0.31	0.08	132
12	19.69	-	19.68	19.68	0.06	0.31	0.08	176
14	21.65	-	21.65	21.65	0.06	0.31	-	242
16	23.62	-	23.62	23.62	0.06	0.39	-	275
18	23.62	-	23.62	25.19	0.06	0.39	-	385
20	23.62 ⁶⁾	-	23.62	26.77	0.06	0.39	-	440
24	23.62 ⁷⁾	-	23.62	31.49	0.06	0.39	-	633
28	27.56 ⁸⁾	27.56	-	-	0.08	-	-	728
30	29.53 ⁸⁾	29.52	-	-	0.08	-	-	794
32	31.80 ⁷⁾	31.50	-	-	0.08	-	-	992
36	35.43 ⁸⁾	35.43	-	-	0.08	-	-	1168
40	39.37 ⁸⁾	39.37	-	-	0.08	-	-	1455
42	-	39.37	-	-	0.08	-	-	1455
44	-	43.31	-	-	0.08	-	-	2513
48	47.24 ⁸⁾	47.24	-	-	0.08	-	-	2601
54	-	55.12	-	-	0.12	-	-	3528
60	-	59.06	-	-	0.12	-	-	5423
66	-	63.00	-	-	0.12	-	-	5566
72	-	70.87	-	-	0.12	-	-	6460
80	-	78.74	-	-	0.12	-	-	8080
88	-	86.6	-	-	-	-	-	12544

1) When grounding rings are used, the thickness of the grounding ring must be added to the built-in length.

2) Tolerances on built-in length (PN 6, PN 10, PN 16, PN 25 and PN 40):

½" to 8": +0/-0.12", 10" to 16": +0/-0.2", 18" to 24": +0.2"/-0.2", 28" to 80": +0.39"/-0.39"

Tolerances on built-in length (PN 63 and PN 100): All sizes +0.31"/-0.31"

3) T_C = Protection ring type C, T_E = Grounding ring type E (included and factory mounted for 356 °F PTFE liner), T_F = Grounding ring Type Flat ring

4) Weights are for ANSI 150 without transmitter.

5) PN 35 DN 80 = 10.07 inch

6) PN 35 DN 500 = 26.77 inch

7) PN 35 DN 600 = 2.53 inch

8) Not AS 4087 PN 21 or PN 35

9) Not according to ISO 20456

D = Outside diameter of flange, see flange tables

Flow Measurement

SITRANS FM (electromagnetic)

Flow sensors / SITRANS FM MAG 3100 P

Overview



The SITRANS FM MAG 3100 P is designed to meet the most common specifications within chemical and process industries.

Benefits

- DN 15 to DN 300 (½" to 12")
- Included in Quick Ship Program (delivery time see PIA LCP)
- Most used flowmeter in the chemical and process industries with PTFE/PFA liner and Hastelloy electrodes
- Excellent chemical resistance
- Full scope of global approvals for hazardous areas:
 - ATEX, FM, CSA, IECEx
 - 24 V and 115/230 V Ex compact and remote
 - intrinsically safe ia analog output
- Comprehensive self-diagnostic for error indication and error logging
- Fully welded construction provides a ruggedness that suits the toughest applications and environments.
- Easy commissioning, the SENSORPROM unit automatically updates settings.
- Conforming to NAMUR recommendations NE 21, NE 32, NE 43, NE 53 and NE 70

Application

The main applications of the SITRANS FM electromagnetic flow sensors can be found in the following fields:

- Chemical industry
- Process industry
- Pulp and paper
- Industrial waste water

Design

- Compact or remote mounting possible
- Easy "plug & play" field changeability of transmitter
- High temperature sensor for applications with temperatures up to 150 °C (302 °F)
- Meets EEC directives: PED, 2014/68/EU pressure directive for EN 1092-1 flanges
- Build-in length according to ISO 20456
- Onsite or factory upgrade to IP68/NEMA 6P of a standard sensor.

Mode of operation

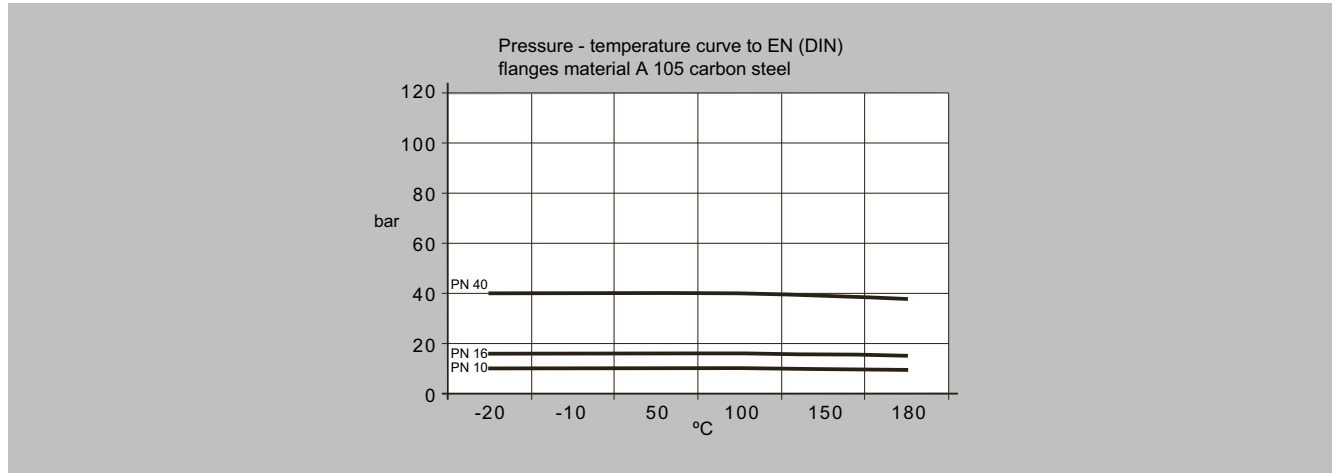
The flow measuring principle is based on Faraday's law of electromagnetic induction according to which the sensor converts the flow into an electrical voltage proportional to the velocity of the flow.

Integration

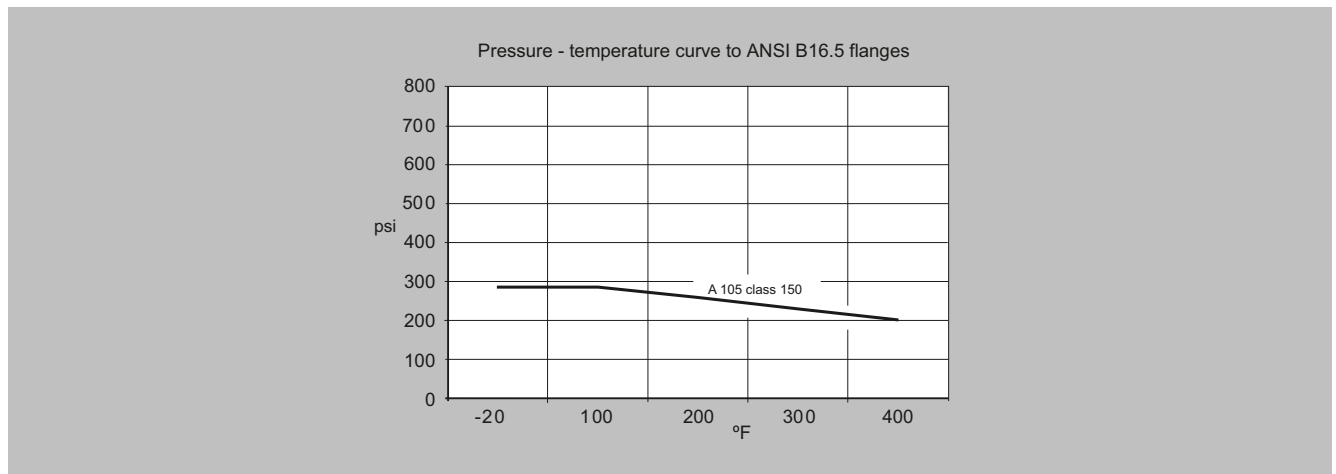
The complete flowmeter consists of a flow sensor and an associated transmitter MAG 5000, 6000 and 6000 I.

The flexible communication concept USM II simplifies integration and update to a variety of fieldbus systems such as HART, FOUNDATION Fieldbus H1, DeviceNet, PROFIBUS DP and PA, Modbus RTU/RS 485.

Pressure-temperature curve to EN (DIN) flanges, material A 105 carbon steel



Pressure-temperature curve to ANSI B16.5 flanges



Note: The pressure-temperature curves only assist in the selection of a system. No responsibility is taken for the correctness of the information. For exact data please refer to the PED requirements.

For further information on the PED standard and requirements, see the section about Pressure Equipment Directive.

Flow Measurement

SITRANS FM (electromagnetic)

Flow sensors / SITRANS FM MAG 3100 P

Selection and ordering data

Sensor SITRANS FM MAG 3100 P (Short delivery time)	Article No. 7ME6340-
● ● ● ● ● - ● ● ● ●	
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	
Diameter	
DN 15 (½")	1 V
DN 25 (1")	2 D
DN 40 (1½")	2 R
DN 50 (2")	2 Y
DN 65 (2½")	3 F
DN 80 (3")	3 M
DN 100 (4")	3 T
DN 125 (5")	4 B
DN 150 (6")	4 H
DN 200 (8")	4 P
DN 250 (10")	4 V
DN 300 (12")	5 D
Flange norm and pressure rating	
<u>EN 1092-1</u>	
PN 10 (DN 200 ... 300 (8" ... 12"))	B
PN 16 (DN 65 ... 300 (2½" ... 12"))	C
PN 40 (DN 15 ... 50 (½" ... 2"))	F
<u>ANSI B16.5</u>	
Class 150 (½" ... 12")	J
Flange material	
Carbon steel flanges ASTM A 105	1
Liner material	
PTFE (150 °C (302 °F))	3
PFA (150 °C (302 °F)) (DN 15 ... 150 (½" ... 6"))	7
Electrode material	
Hastelloy C	2
Platinum	3
Tantalum	5
Hastelloy C incl. grounding electrodes	6
Transmitter	
Standard sensor for remote transmitter (order transmitter separately)	A
Ex sensor for remote transmitter (order transmitter separately)	B
MAG 6000 I, Aluminum, 18 ... 90 V DC, 115 ... 230 V AC, FM / CSA Class I Div. 2	C
MAG 6000 I, Aluminum, 18 ... 30 V DC, Ex	D
MAG 6000 I, Aluminum, 115 ... 230 V AC, Ex	E
MAG 6000 I, Aluminum, 18 ... 90 V DC, 115 ... 230 V AC (non-Ex)	F
MAG 6000, Polyamide, 11 ... 30 V DC/11 ... 24 V AC	H
MAG 6000, Polyamide, 115 ... 230 V AC	J
MAG 5000, Polyamide, 11 ... 30 V DC/11 ... 24 V AC	K
MAG 5000, Polyamide, 115 ... 230 V AC	L
Communication	
No communication, add-on possible	A
HART	B
Modbus RTU/RS 485 (not for Ex) (only MAG 6000/MAG 6000 I)	E
PROFIBUS PA Profile 3 (only MAG 6000/MAG 6000 I)	F
PROFIBUS DP Profile 3 (not for Ex) (only MAG 6000/MAG 6000 I)	G
FOUNDATION Fieldbus H1 (only MAG 6000/6000 I)	J
Cable glands/terminal box	
Metric: Polyamide terminal box or MAG 6000 I compact	1
½" NPT: Polyamide terminal box or MAG 6000 I compact	2
Metric: Stainless steel terminal box	3
½" NPT: Stainless steel terminal box	4


Selection and ordering data (continued)

	Order code
Additional information Please add "-Z" to Article No. and specify Order code(s) and plain text.	
Certificates	
Factory certificate according to EN 10204-2.2	C14
Factory certificate according to EN 10204-2.1	C15
Terminal blocks	
Factory mounted terminal blocks	N02
Country specific label	
CRN (Canadian Registration Number)	H25
Tag name plate	
Tag name plate transmitter, stainless steel (specify in plain text)	Y15
Tag name plate, stainless steel (specify in plain text)	Y17
Tag name plate, plastic (self-adhesive)	Y18
Device settings	
Customer-specific transmitter setting	Y20
Factory mounted sensor cables	
Sensor cables wired	Y40
Sensor cables wired and IP68 sealing	Y41
Additional calibrations	
Matched-pair calibration	On request ¹⁾
Accredited matched-pair calibration acc. to ISO/IEC 17025: 2005	On request ¹⁾
Customer-specified calibration up to 10 points	On request ¹⁾
Customer-witnessed calibration (any of above calibration)	On request ¹⁾

¹⁾ Product Variation Request (PVR).

Description	Article No.
• English	A5E03005599
• German	A5E03086288

All literature is available to download for free, in a range of languages, at <http://www.siemens.com/processinstrumentation/documentation>
Accessories

Description	Article No.	
Potting kit for IP68/NEMA 6P sealing of sensor junction box	FDK-085U0220	

Please use online Product selector to get latest updates.

Product selector link:

<http://www.pia-portal.automation.siemens.com>

Flow Measurement

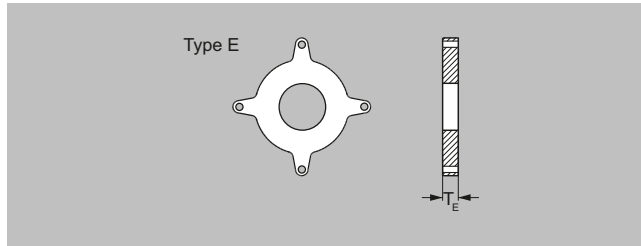
SITRANS FM (electromagnetic)

Flow sensors / SITRANS FM MAG 3100 P

Selection and ordering data (continued)

Accessories for MAG 3100 P sensor

Grounding and protection ring - Type E (Stainless steel)



- Material: AISI 316
- For liner PTFE
- 1 pc. incl. straps and screws

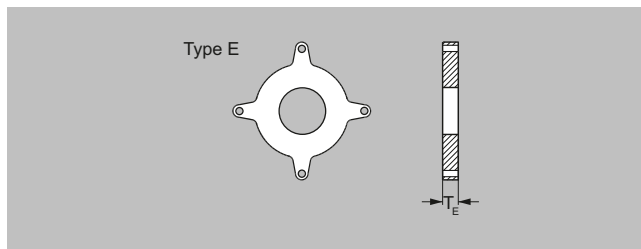
Size DN	Nominal pressure			Size Inch	ANSI ¹⁾ Class 150
	PN 10	PN 16	PN 40		
	Article No.	Article No.	Article No.		Article No.
DN 15			FDK:083N8365	1/2"	FDK:083N8365
DN 25			FDK:083N8271	1"	FDK:083N8272
DN 40			FDK:083N8278	1 1/2"	FDK:083N8279
DN 50			FDK:083N8282	2"	FDK:083N8283
DN 65		FDK:083N8285		2 1/2"	FDK:083N8287
DN 80		FDK:083N8289		3"	FDK:083N8291
DN 100		FDK:083N8117		4"	FDK:083N8118
DN 125		FDK:083N8121		5"	FDK:083N8122
DN 150		FDK:083N8125		6"	FDK:083N8126
DN 200	FDK:083N8130	FDK:083N8130		8"	FDK:083N8370
DN 250	FDK:083N8136	FDK:083N8137		10"	FDK:083N8140
DN 300	FDK:083N8144	FDK:083N8145		12"	FDK:083N8148

Note:

For use as protection ring order 2 pcs.

For use as grounding ring order 1 pc.

Grounding and protection ring - Type E (Hastelloy)



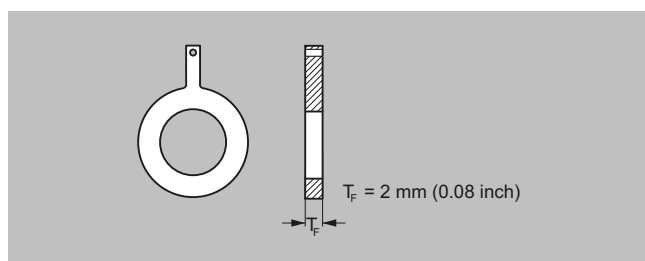
- Material: Hastelloy C276
- For liner PTFE
- 1 pc. incl. straps and screws

Selection and ordering data (continued)

Size DN	Nominal pressure			Size Inch	ANSI ¹⁾ Class 150
	PN 16	PN 40	PN 16		
	Article No.	Article No.	Article No.		Article No.
DN 15		FDK:083N8487		½"	FDK:083N8487
DN 25		FDK:083N8488		1"	FDK:083N8488
DN 40		FDK:083N8490		1½"	FDK:083N8491
DN 50		FDK:083N8492		2"	FDK:083N8493
DN 65	FDK:083N8495			2½"	FDK:083N8497
DN 80	FDK:083N8499			3"	FDK:083N8501
DN 100	FDK:083N8504			4"	FDK:083N8506

¹⁾ For dimensions of MAG 3100 P see Dimensional drawings.

Grounding ring - Type Flat ring (Stainless steel)

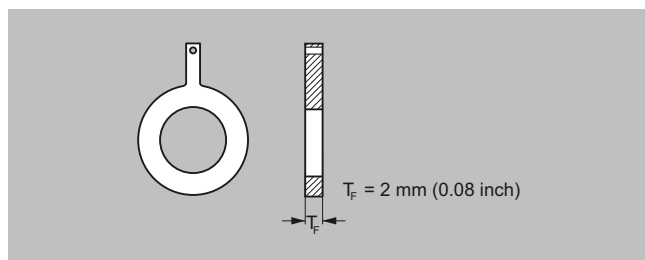


- Material: AISI 316
- For liner PTFE and PFA
- 1 pc.

Size DN	Nominal pressure			Size Inch	ANSI ¹⁾ Class 150
	PN 10	PN 16	PN 40		
	Article No.	Article No.	Article No.		Article No.
DN 15			A5E01191968	½"	A5E01191969
DN 25			A5E01150880	1"	A5E01150022
DN 40			A5E01191952	1½"	A5E01191961
DN 50			A5E01150918	2"	A5E01151121
DN 65		A5E01191940		2½"	A5E01191962
DN 80		A5E01152876		3"	A5E01152910
DN 100		A5E01158875		4"	A5E01159146
DN 125		A5E01191941		5"	A5E01191963
DN 150		A5E01191943		6"	A5E01191964
DN 200	A5E01191951	A5E01191944		8"	A5E01191965
DN 250	A5E01191950	A5E01191946		10"	A5E01191966
DN 300	A5E01191949	A5E01191947		12"	A5E01191967

¹⁾ For dimensions of MAG 3100 P see Dimensional drawings.

Grounding ring - Type Flat ring (Hastelloy)



- Material: Hastelloy C276

Flow Measurement

SITRANS FM (electromagnetic)

Flow sensors / SITRANS FM MAG 3100 P

Selection and ordering data (continued)

- For liner PTFE and PFA
- 1 pc.

Size DN	Nominale pressure			Size Inch	ANSI ¹⁾ Class 150
	PN 10	PN 16	PN 40		
	Article No.	Article No.	Article No.		Article No.
DN 15			A5E01191981	½"	A5E01191989
DN 25			A5E01150882	1"	A5E01150028
DN 40			A5E01191982	1½"	A5E01191990
DN 50			A5E01150922	2"	A5E01151124
DN 65		A5E01191971		2½"	A5E01191991
DN 80		A5E01152889		3"	A5E01152913
DN 100		A5E01158886		4"	A5E01159150
DN 125		A5E01191973		5"	A5E01191992
DN 150		A5E01191974		6"	A5E01191993
DN 200	A5E01191978		A5E01191975	8"	A5E01191994
DN 250	A5E01191979		A5E01191976	10"	A5E01191995
DN 300	A5E01191980		A5E01191977	12"	A5E01191996

¹⁾ For dimensions of MAG 3100 P see Dimensional drawings.

Technical specifications

Version	MAG 3100 P
Product characteristic	Chemical and process industry-oriented (included in Quick Ship Program)
Nominal size	<ul style="list-style-type: none"> • PTFE: DN 15 ... 300 (½" ... 12") • PFA: DN 15 ... 150 (½" ... 6")
Measuring principle	Electromagnetic induction
Excitation frequency (Mains supply: 50 Hz/60 Hz)	<ul style="list-style-type: none"> • DN 15 ... 65 (½" ... 2½"): 12.5 Hz/15 Hz • DN 80 ... 150 (3" ... 6"): 6.25 Hz/7.5 Hz • DN 200 ... 300 (8" ... 12"): 3.125 Hz/3.75 Hz
Process connection	
Flanges	EN 1092-1, raised face ¹⁾ (EN 1092-1, DIN 2501 & BS 4504 have the same mating dimensions) <ul style="list-style-type: none"> • DN 15 ... 50 (½" ... 2"): PN 40 (580 psi) • DN 65 ... 300 (2½" ... 12"): PN 16 (232 psi) • DN 200 ... 300 (8" ... 12"): PN 10 (145 psi) ANSI B16.5 (BS 1560), raised face <ul style="list-style-type: none"> • ½" ... 12": Class 150 (20 bar (290 psi))
Rated operation conditions	
Ambient temperature (conditions also dependent on liner characteristics)	
• Standard sensor	-40 ... +100 °C (-40 ... +212 °F)
• Ex sensor	-20 ... +60 °C (-4 ... +140 °F)
• Compact with transmitter	
- MAG 5000/6000	-20 ... +60 °C (-4 ... +140 °F)
- MAG 6000 I ³⁾	-20 ... +60 °C (-4 ... +140 °F)
- MAG 6000 I Ex ³⁾	-20 ... +60 °C (-4 ... +140 °F)
Operating pressure	
Operating pressure [abs. bar] (maximum operating pressure decreases with increasing operating temperature and with stainless steel flanges)	<ul style="list-style-type: none"> • PTFE <ul style="list-style-type: none"> - DN 15 ... 300 (½" ... 12"): 0.3 ... 40 bar (4 ... 580 psi) • PFA <ul style="list-style-type: none"> - DN 15 ... 150 (½" ... 6"): Vacuum 0.02 ... 50 bar (0.29 ... 725 psi)
Enclosure rating	IP67 to EN 60529/NEMA 6, 1 mH ₂ O for 30 min Option: IP68 to EN 60529/NEMA 6P, 10 mH ₂ O cont. (not for Ex)
Pressure drop at 3 m/s	As straight pipe
Test pressure	1.5 x PN (where applicable)
Mechanical load (Vibration)	<ul style="list-style-type: none"> • 18 ... 1000 Hz random in x, y, z, directions for 2 hours according to EN 60068-2-36 • Sensor: 3.17 g RMS • Sensor with compact MAG 5000/6000 mounted transmitter: 3.17 g RMS • Sensor with compact MAG 6000 I/6000 I Ex mounted transmitter: 1.14 g RMS
Temperature of medium	<ul style="list-style-type: none"> • PTFE -20 ... +150 °C (-4 ... +302 °F) • PFA -20 ... +150 °C (-4 ... +302 °F)
EMC	2014/30/EU
Design	
Weight	See dimensional drawings
Flange and housing material	Carbon steel ASTM A 105 with corrosion protection EN ISO 12944 grade C4
Measuring pipe material	Stainless steel AISI 304/1.4301
Electrode material	PTFE: Hastelloy C276/2.4819, Tantalum PFA: Hastelloy C22/2.4602

Flow Measurement

SITRANS FM (electromagnetic)

Flow sensors / SITRANS FM MAG 3100 P

Technical specifications (continued)

Version	MAG 3100 P
Grounding electrode material	Optional in Hastelloy C22/2.602
Terminal box (remote version only)	<ul style="list-style-type: none"> Standard fibre glass reinforced polyamide Option Stainless steel AISI 316/1.4436 Ex sensor: Stainless steel AISI 316/1.4436
Cable entries	<ul style="list-style-type: none"> Remote installation 2 x M20 or 2 x ½" NPT Compact installation - MAG 5000/MAG 6000: 4 x M20 or 4 x ½" NPT - MAG 6000 I: 2 x M25 or 2 x ½" NPT (for supply/output) - MAG 6000 I Ex de: 2 x M25 or 2 x ½" NPT (for supply/output)
Certificates and approvals	
Calibration	Zero-point, 2 x 25 % and 2 x 90 %
<ul style="list-style-type: none"> Default calibration 	
Hazardous areas	<ul style="list-style-type: none"> ATEX, FM, CSA, IECEx, EAC Ex, NEPSI - Zone 1 Ex d e ia IIC T6 Gb ATEX, FM, CSA, IECEx - Zone 21 Ex tD A21 IP67 FM - XP IS Class I Div. 1 Groups A, B, C, D²⁾ - DIP Class II+III Div. 1 Groups E, F, G²⁾ KCs - Zone 1 Ex d e ia IIC T6
<ul style="list-style-type: none"> Ex-sensor in compact or remote version with MAG 6000 I Ex 	
<ul style="list-style-type: none"> Standard sensor with/without MAG 5000/6000/6000 I 	<ul style="list-style-type: none"> FM - NI Class I Div. 2 Groups A, B, C, D - NI Class I Zone 2 Groups IIC
Pressure equipment	PED conforming: All EN1092-1 flanges - 2014/68/EU
Others	<ul style="list-style-type: none"> CRN (Canadian Registration Number) CPA (China) EAC (Kazakhstan)

1) DN ≤ 600 type 01 (SORF); DN > 600 type 11 (WNRF).

2) In compact version only.

3) With HART communication max. ambient temperature 50 °C (122 °F).

Available Options for the SITRANS MAG 3100 P

The MAG 3100P is designed to meet the most common specifications within chemical and process industries. Therefore not all options are available. If you miss a few options please check out or product MAG 3100 which is covering many more options.

Available Options for Liner PTFE with Platinum electrodes

Diameter MAG 3100 P	Order code	Connection			
		EN 1092-1, PN 10	EN 1092-1, PN 16	EN 1092-1, PN 40	AISI B 16.5, class 150
DN 15, ½"	1V			●	
DN 25, 1"	2D			●	●
DN 40, 1 ½"	2R			●	
DN 50, 2"	2Y			●	●
DN 65, 2 ½"	3F				
DN 80, 3"	3M		●		
DN 100, 4"	3T		●		
DN 125, 5"	4B		●		
DN 150, 6"	4H		●		

Technical specifications (continued)

Diameter MAG 3100 P	Order code	Connection			
		EN 1092-1, PN 10	EN 1092-1, PN 16	EN 1092-1, PN 40	AISI B 16.5, class 150
DN 200, 8"	4P				
DN 250, 10"	4V				
DN 300, 12"	5D				

Available Options for Liner PTFE with Tantalum electrodes

Diameter MAG 3100 P	Order code	Connection			
		EN 1092-1, PN 10	EN 1092-1, PN 16	EN 1092-1, PN 40	AISI B 16.5, class 150
DN 15, ½"	1V			●	
DN 25, 1"	2D			●	●
DN 40, 1 ½"	2R			●	
DN 50, 2"	2Y			●	●
DN 65, 2 ½"	3F		●		
DN 80, 3"	3M		●		●
DN 100, 4"	3T		●		●
DN 125, 5"	4B				
DN 150, 6"	4H		●		
DN 200, 8"	4P		●		
DN 250, 10"	4V		●		
DN 300, 12"	5D				

Available Options for Liner PTFE with Hastelloy C electrodes incl. grounding electrodes

Diameter MAG 3100 P	Order code	Connection			
		EN 1092-1, PN 10	EN 1092-1, PN 16	EN 1092-1, PN 40	AISI B 16.5, class 150
DN 15, ½"	1V			●	
DN 25, 1"	2D			●	●
DN 40, 1 ½"	2R			●	
DN 50, 2"	2Y			●	●
DN 65, 2 ½"	3F		●		
DN 80, 3"	3M		●		●
DN 100, 4"	3T		●		●
DN 125, 5"	4B				
DN 150, 6"	4H		●		●
DN 200, 8"	4P				●
DN 250, 10"	4V				●
DN 300, 12"	5D				

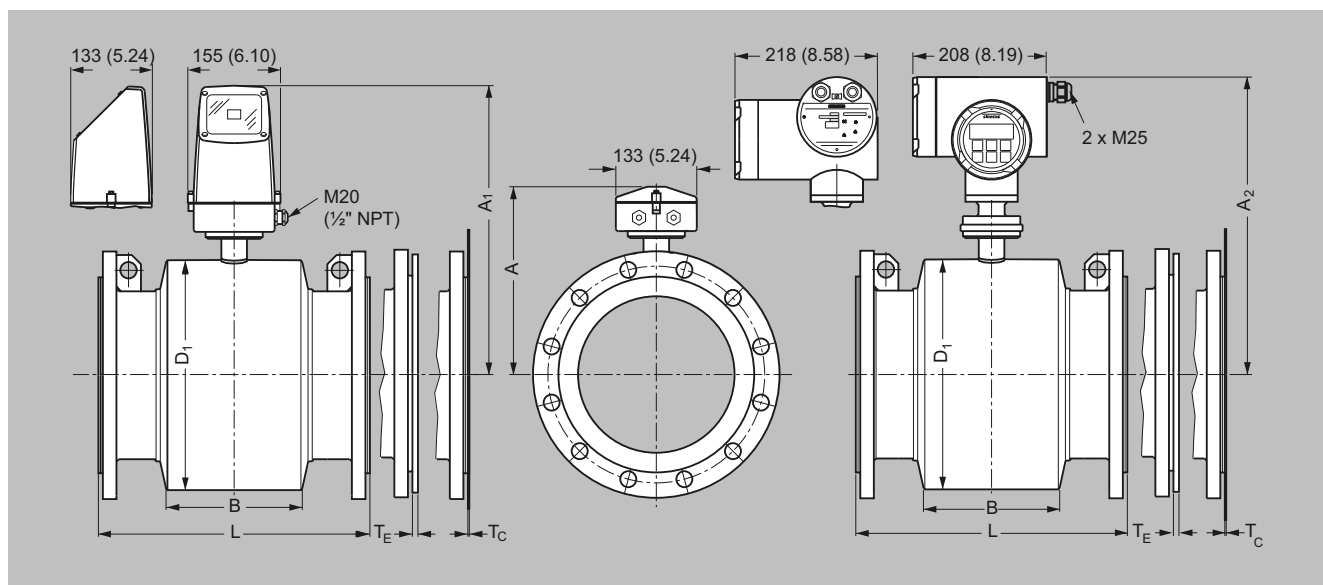
Flow Measurement

SITRANS FM (electromagnetic)

Flow sensors / SITRANS FM MAG 3100 P

Dimensional drawings

MAG 3100 P sensor with compact or remote transmitter



Dimensions in mm (inch)

Metric

DN	A ¹⁾	A ₁	A ₂	B	D1	L ²⁾			ANSI 16.5 Class 150	T _E ³⁾	T _F ³⁾	Weight ⁴⁾
						EN 1092-1-201 PN 10	PN 16	PN 40				
[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[kg]	
15	187	341	338	59	104	-	-	200	200	6	2	4
25	187	341	338	59	104	-	-	200	200	6	2	5
40	197	351	348	82	124	-	-	200	200	6	2	8
50	205	359	356	72	139	-	-	200	200	6	2	9
65	212	369	366	72	154	-	200/-	-	200	6	2	11
80	222	376	373	72	174	-	200/-	-	272 ⁵⁾	6	2	12
100	242	396	393	85	214	-	250/-	-	250	6	2	16
125	255	409	406	85	239	-	250/-	-	250	6	2	19
150	276	430	427	85	282	-	300/-	-	300	6	2	27
200	304	458	455	137	338	350	350/-	-	350	8	2	40
250	332	486	483	157	393	450	450/-	-	450	8	2	60
300	357	511	508	157	444	500	500/-	-	500	8	2	80

¹⁾ 14.5 mm shorter with stainless steel terminal box (Ex and high temperature version)

²⁾ When grounding rings are used, the thickness of the grounding ring must be added to the built-in length.

³⁾ T_E = Grounding ring Type E, T_F = Grounding ring Type Flat ring

⁴⁾ Weights are approx. (for PN 16) without transmitter

⁵⁾ Not according to ISO 20456

- Not available

D = Outside diameter of flange, see flange tables

MAG 3100 P sensor with compact or remote transmitter

Imperial

DN	A ¹⁾	A ₁	A ₂	B	D1	L ²⁾			ANSI 16.5 Class 150	T _E ³⁾	T _F ³⁾	Weight ⁴⁾
						EN 1092-1-201 PN 10	PN 16	PN 40				
[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[lbs]	
½	7.36	13.4	13.34	2.32	4.09	-	-	7.87	7.87	0.24	0.08	9
1	7.36	13.4	13.34	2.32	4.09	-	-	7.87	7.87	0.24	0.08	11
1½	7.76	13.8	13.74	3.23	4.88	-	-	7.87	7.87	0.24	0.08	17

Dimensional drawings (continued)

DN	A ¹⁾	A ₁	A ₂	B	D1	L ²⁾			ANSI 16.5 Class 150	T _E ³⁾	T _F ³⁾	Weight ⁴⁾
						EN 1092-1-201 PN 10	PN 16	PN 40				
[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[lbs]
2	8.07	14.1	14.04	2.83	5.47	-	-	7.87	7.87	0.24	0.08	20
2½	8.35	14.4	14.34	2.83	6.06	-	7.87/-	-	7.87	0.24	0.08	24
3	8.74	14.8	14.74	2.83	6.85	-	7.87/-	-	10.71 ⁵⁾	0.24	0.08	26
4	9.53	15.6	15.54	3.35	8.43	-	9.84/-	-	9.84	0.24	0.08	35
5	10.04	16.1	16.04	3.35	9.41	-	9.84/-	-	9.84	0.24	0.08	42
6	10.87	16.9	16.84	3.35	11.10	-	11.81/-	-	11.81	0.24	0.08	60
8	11.97	18.0	17.94	5.39	13.31	13.78	13.78/-	-	13.78	0.31	0.08	88
10	13.07	19.1	19.04	6.18	15.47	17.72	17.72/-	-	17.72	0.31	0.08	132
12	14.05	20.1	20.04	6.18	17.48	19.69	19.69/-	-	19.69	0.31	0.08	176

¹⁾ 0.571 inch shorter with stainless steel terminal box (Ex and high temperature version)

²⁾ When grounding rings are used, the thickness of the grounding ring must be added to the built-in length.

³⁾ T_E = Grounding ring Type E, T_F = Grounding ring Type Flat ring

⁴⁾ Weights are for ANSI 150 without transmitter.

⁵⁾ Not according to ISO 20456

D = Outside diameter of flange, see flange tables

Flow Measurement

SITRANS FM (electromagnetic)

Flow sensors / SITRANS FM MAG 5100 W

Overview



The SITRANS FM MAG 5100 W is an electromagnetic flow sensor designed to meet ground water, drinking water, wastewater, sewage or sludge applications.

Benefits

- DN 15 to DN 2000 (½" to 80")
- Stock program of MAG 5100 W secures short delivery time
- Connection flanges EN 1092-1 (DIN 2501), ANSI, AWWA, AS and JIS
- NBR Hard Rubber and Ebonite Hard Rubber liner for all water applications
- EPDM liner with drinking water approvals
- Hastelloy integrated grounding and measuring electrodes
- Increased low flow accuracy for water leak detection, due to coned liner design
- Drinking water approvals
- Suitable for direct burial and constant flooding
- Custody transfer approvals for cold water and energy metering (MI-001, KIWA, NMI M10, PTB K7.2)
- Built-in length according to ISO 20456; the standard includes sizes up to DN 400
- Easy commissioning, SENSORPROM unit automatically uploads calibration values and settings
- Designed to allow patented in-situ verification using SENSORPROM fingerprint
- Qualified for operation in non-optimal installation conditions with no straight inlet and outlet run of piping (0 × DN)
- Conform to ISO 4064 and EN 14154 for mechanical flowmeters
- FM Fire Service Meter (Class Number 1044) for automatic fire protection systems
- Meets EEC directives: PED 2014/68/EU pressure directive for EN 1092-1 flanges
- Simple onsite or factory upgrade to IP68/NEMA 6P of a standard sensor
- Type approval of marine equipment (DNV)

Application

The main applications of the SITRANS FM electromagnetic flow sensors can be found in the following fields:

- Water abstraction
- Water treatment
- Water distribution network (leak detection management)
- Custody transfer water meters
- Irrigation
- Waste water treatment
- Filtration plant (e.g. reverse osmosis and ultra-filtration)
- Industrial water applications

Mode of operation

The flow measuring principle is based on Faradays law of electromagnetic induction according to which the sensor converts the flow into an electrical voltage proportional to the velocity of the flow.

Integration

The complete flowmeter consists of a flow sensor and an associated transmitter SITRANS FM MAG 5000, MAG 6000 or MAG 6000 I.

The flexible communication concept USM II simplifies integration and update to a variety of fieldbus systems, e.g. HART, DeviceNet, PROFIBUS DP and PA, FOUNDATION Fieldbus H1 or Modbus RTU/RS 485.

Selection and ordering data

Sensor SITRANS FM MAG 5100 W	Article No. 7ME6520-	Order code
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Diameter	● ● ● ● ● - 2 ● ● ● ● ● ● ● ●	
DN 15 (½")	1	V
DN 25 (1")	2	D
DN 40 (1½")	2	R
DN 50 (2")	2	Y
DN 65 (2½")	3	F
DN 80 (3")	3	M
DN 100 (4")	3	T
DN 125 (5")	4	B
DN 150 (6")	4	H
DN 200 (8")	4	P
DN 250 (10")	4	V
DN 300 (12")	5	D
DN 350 (14")	5	K
DN 400 (16")	5	R
DN 450 (18")	5	Y
DN 500 (20")	6	F
DN 600 (24")	6	P
DN 700 (28")	6	Y
DN 750 (30")	7	D
DN 800 (32")	7	H
DN 900 (36")	7	M
DN 1000 (40")	7	R
DN 1050 (42")	7	U
DN 1100 (44")	7	V
DN 1200 (48")	8	B
DN 1400 (54")	8	F
DN 1500 (60")	8	K
DN 1600 (66")	8	P
DN 1800 (72")	8	T
DN 2000 (80")	8	Y
Flange norm and pressure rating		
EN 1092-1		
PN 6 DN 1400 ... 2000 (54" ... 80")		A
PN 10 (DN 200 ... 2000 (8" ... 80"))		B
PN 16 (DN 50 ... 1200 (2" ... 48"))		C
PN 16, non PED (DN 700 ... 1200 (28" ... 48"))		D
PN 40 (DN 15 ... 40 (½" ... 1½"))		F
ANSI B16.5		
Class 150 (½" ... 24")		J
AWWA C-207		
Class D (28" ... 80")		L
AS 4087		
PN 16 (DN 50 ... 1200 (2" ... 48"))		N
JIS		
B 2220:2004 K10 (1" ... 24")		R
Flange material and coating		
Carbon steel flanges ASTM A 105, corrosion-resistant coating of category C4		1
Carbon steel flanges ASTM A 105, 300 µm corrosion-resistant coating of category C5		4
Liner material		
EPDM		2
NBR		3
Transmitter		
Sensor for remote transmitter (order transmitter separately)		A
MAG 6000 I, Aluminum, 18 ... 90 V DC, 115 ... 230 V AC, FM / CSA Class I Div. 2		C

Flow Measurement

SITRANS FM (electromagnetic)

Flow sensors / SITRANS FM MAG 5100 W

Selection and ordering data (continued)

Sensor SITRANS FM MAG 5100 W	Article No. 7ME6520-	Order code
MAG 6000 I, Aluminum, 18 ... 90 V DC, 115 ... 230 V AC (non-Ex)	● ● ● ● ● - 2 ● ● ● ● ● ● ● ●	F
MAG 6000, Polyamid, 11 ... 30 V DC/11 ... 24 V AC		H
MAG 6000, Polyamid, 115 ... 230 V AC		J
MAG 5000, Polyamid, 11 ... 30 V DC/11 ... 24 V AC		K
MAG 5000, Polyamid, 115 ... 230 V AC		L
MAG 6000 CT, Polyamid, 115 ... 230 V AC		M
MAG 6000 CT, Polyamid, 11 ... 30 V DC/11 ... 24 V AC		R
MAG 5000 CT, Polyamid, 115 ... 230 V AC		S
MAG 5000 CT, Polyamid, 11 ... 30 V DC/11 ... 24 V AC		T
<u>Transmitter including wall-mounting kit for remote design</u>		
MAG 5000, Polyamid, 115 ... 230 V AC, incl. special wall-mounting unit (approved marine equipment)		
• M20×1.5 cable glands		Z P 0 C
• ½" NPT cable glands		Z P 0 D
MAG 6000, Polyamid, 115 ... 230 V AC, incl. special wall-mounting unit (approved marine equipment)		
• M20×1.5 cable glands		Z P 0 G
• ½" NPT cable glands		Z P 0 H
MAG 6000 CT, Polyamid, 11 ... 30 V DC/11 ... 24 V AC, incl. wall-mounting unit		
• M20×1.5 cable glands		Z P 0 J
• ½" NPT cable glands		Z P 0 K
MAG 6000 CT, Polyamid, 115 ... 230 V AC, incl. wall-mounting unit		
• M20×1.5 cable glands		Z P 0 L
• ½" NPT cable glands		Z P 0 M
MAG 5000 CT, Polyamid, 11 ... 30 V DC/11 ... 24 V AC, incl. wall-mounting unit		
• M20×1.5 cable glands		Z P 0 N
• ½" NPT cable glands		Z P 0 P
MAG 5000 CT, Polyamid, 115 ... 230 V AC, incl. wall-mounting unit		
• M20×1.5 cable glands		Z P 0 Q
• ½" NPT cable glands		Z P 0 R
Communication		
None		A
HART		B
PROFIBUS PA Profile 3 (only MAG 6000/ MAG 6000 I)		F
PROFIBUS DP Profile 3 (only MAG 6000/ MAG 6000 I)		G
Modbus RTU/RS 485 (only MAG 6000/ MAG 6000 I)		E
FOUNDATION Fieldbus H1 (only MAG 6000/ MAG 6000 I)		J
Cable glands/terminal box		
Metric: Polyamide terminal box or MAG 6000 I compact		1
½" NPT: Polyamide terminal box or MAG 6000 I compact		2

	Order code
Additional information	
Please add "-Z" to Article No. and specify Order code(s) and plain text.	
Certificates	
Pressure test certificate according to EN 10204-3.1	C01
Material certificate according to EN 10204-3.1	C12
Factory certificate according to EN 10204-2.2	C14
Factory certificate according to EN 10204-2.1	C15
Special calibration	
5-point calibration for DN 15 ... 200 ¹⁾	D01
5-point calibration for DN 250 ... 600 ¹⁾	D02
5-point calibration for DN 700 ... 1200 ¹⁾	D03
10-point calibration for DN 15 ... 200 ²⁾	D06
10-point calibration for DN 250 ... 600 ²⁾	D07

Selection and ordering data (continued)

	Order code
10-point calibration for DN 700 ... 1200 ²⁾	D08
Default (2 × 25 % and 2 × 90 %) matched-pair calibration for DN 15 ... 200	D11
Default (2 × 25 % and 2 × 90 %) matched-pair calibration for DN 250 ... 600	D12
Default (2 × 25 % and 2 × 90 %) matched-pair calibration for DN 700 ... 1200	D13
5-point, matched-pair calibration for DN 15 ... 200 ¹⁾	D15
5-point, matched-pair calibr. for DN 250 ... 600 ¹⁾	D16
5-point, matched-pair calibr. for DN 700 ... 1200 ¹⁾	D17
10-point, matched-pair calibration for DN 15 ... 200 ²⁾	D18
10-point, matched-pair calibr. for DN 250 ... 600 ²⁾	D19
10-point, matched-pair calibr. for DN 700 ... 1200 ²⁾	D20
Accredited 5-point matched-pair calibration acc. to ISO 17025 DN 15 ... 200	D21
Accredited 5-point matched-pair calibration acc. to ISO 17025 DN 250 ... 600	D22
Accredited 5-point matched-pair calibration acc. to ISO 17025 DN 600 ... 1200	D23
Country of origin	
France	F55
Sensor cables	
Standard coil and electrode cable, PVC jacket	
• 5 m (16 ft)	K01
• 10 m (33 ft)	K02
• 20 m (65 ft)	K04
• 30 m (98 ft)	K06
• 40 m (131 ft)	K07
• 50 m (164 ft)	K08
• 60 m (197 ft)	K09
• 100 m (328 ft)	K10
• 150 m (492 ft)	K11
• 200 m (656 ft)	K12
• 500 m (1640 ft)	K13
Standard coil and special electrode cable, PVC jacket	
• 5 m (16 ft)	K51
• 10 m (33 ft)	K52
• 20 m (65 ft)	K54
• 30 m (98 ft)	K56
• 40 m (131 ft)	K57
• 50 m (164 ft)	K58
• 60 m (197 ft)	K59
• 100 m (328 ft)	K60
• 150 m (492 ft)	K61
• 200 m (656 ft)	K62
• 500 m (1640 ft)	K63
Terminal blocks	
Factory mounted terminal blocks	N02
Factory mounted terminal blocks, including wall-mounting kit	N03
Approval/Verification³⁾	
Without verification acc. to OIML R 49 (DN 50 ... 300)	P10
MI-001 Q3/Q1 = 40 (DN 50 ... 300)	P11

Flow Measurement

SITRANS FM (electromagnetic)

Flow sensors / SITRANS FM MAG 5100 W

Selection and ordering data (continued)

	Order code
MI-001 Q3/Q1 = 63 (DN 50 ... 300)	P12
MI-001 Q3/Q1 = 80 (DN 50 ... 300)	P13
MI-001 Q3/Q1 = 160 (DN 50 ... 300)	P16
MI-001 Q3/Q1 = 200 (DN 50 ... 300)	P17
MI-001 Q3/Q1 = 250 (DN 50 ... 300)	P18
Without verification according to OIML R 49 (DN 350 ... 600)	P23
MI-001 Q3/Q1 = 40 (DN 350 ... 600)	P24
MI-001 Q3/Q1 = 63 (DN 350 ... 600)	P25
MI-001 Q3/Q1 = 80 (DN 350 ... 600)	P26
MI-001 Q3/Q1 = 100 (DN 350 ... 600)	P27
Without verification according to OIML R 49 (DN 700 ... 1200)	P28
MI-001 Q3/Q1 = 40 (DN 700 ... 1200)	P29
MI-001 Q3/Q1 = 63 (DN 700 ... 1200)	P30
MI-001 Q3/Q1 = 80 (DN 700 ... 1200)	P31
PTB K7.2 QP/QI = 25 (DN 15 ... 300)	P41
PTB K7.2 QP/QI = 50 (DN 15 ... 300)	P42
PTB K7.2 QP/QI = 100 Lower range (DN 15 ... 300)	P43
PTB K7.2 QP/QI = 100 Upper range (DN 15 ... 300)	P44
PTB K7.2 QP/QI = 250 (DN 50 ... 300)	P45
PTB K7.2 QP/QI = 25 (DN 350 ... 600)	P47
PTB K7.2 QP/QI = 50 (DN 350 ... 600)	P48
PTB K7.2 QP/QI = 100 Lower range (DN 350 ... 600)	P49
Pulse output setting	
Volume / Pulse	
• 0.01 l/pulse	L01
• 0.1 l/pulse	L02
• 0.5 l/pulse	L03
• 1 l/pulse	L04
• 2.5 l/pulse	L05
• 5 l/pulse	L06
• 10 l/pulse	L07
• 25 l/pulse	L08
• 50 l/pulse	L09
• 100 l/pulse	L10
• 250 l/pulse	L11
• 500 l/pulse	L12
• 1 m ³ /pulse	L13
• 5 m ³ /pulse	L14
• 10 m ³ /pulse	L15
• 50 m ³ /pulse	L16
• 100 m ³ /pulse	L17
• 500 m ³ /pulse	L18
• 1000 m ³ /pulse	L19
Pulse width	
• 2 ms	L61
• 4.1 ms	L62
• 8.2 ms	L63
• 16 ms	L64
• 33 ms	L65

Selection and ordering data (continued)

	Order code
• 66 ms	L66
• 130 ms	L67
• 260 ms	L68
• 520 ms	L69
FM Fire Service Approval (with ANSI B16.5 Class 150 flanges)	
DN 50, DN 80 and DN 100 (2", 3" and 4")	P20
DN 150 and DN 200 (6" and 8")	P21
DN 250 and DN 300 (10" and 12")	P22
Country specific label	
FP2E label (France)	H20
ADDC label (Abu Dhabi)	H23
CRN (Canadian Registration Number)	H25
Tag name plate	
Tag name plate transmitter, stainless steel (specify in plain text)	Y15
Tag name plate, stainless steel (specify in plain text)	Y17
Tag name plate, plastic (self-adhesive)	Y18
Device settings	
Customer-specific transmitter setting	Y20
Factory mounted sensor cables	
Sensor cables wired	Y40
Sensor cables wired and IP68 sealing	Y41
Additional calibrations	
Customer-witnessed calibration (any of above calibration)	<i>On request ⁴⁾</i>


1) 20 %, 40 %, 60 %, 80 %, 100 % of factory Q_{max}

2) Ascending and descending at 20 %, 40 %, 60 %, 80 %, 100 % of factory Q_{max}

3) For more details and references of the ranges please see the tables under "Technical specifications"

4) Product Variation Request (PVR)

Accessories

Description	Article No.	
Potting kit for IP68/NEMA 6P sealing of sensor junction box	FDK:085U0220	

MAG 5000/6000 transmitters and sensors are packed in separate boxes, the final assembly takes place during installation at the customer's place. MAG 6000 I transmitters and sensors are delivered compact mounted from factory. Communication module will be pre-mounted in the transmitter.

Please use online Product selector to get latest updates.

<http://www.pia-portal.automation.siemens.com>

Flow Measurement

SITRANS FM (electromagnetic)

Flow sensors / SITRANS FM MAG 5100 W

Technical specifications

Version	MAG 5100 W
Product characteristic	For demanding applications in the water & wastewater industry
Design and nominal size	Coned sensor (octagon liner): DN 15 ... 40 (½" ... 1½") Coned sensor: DN 50 ... 300 (2" ... 12") Full bore sensor: DN 350 ... 2000 (14" ... 80")
Measuring principle	Electromagnetic induction
Excitation frequency (mains supply: 50/60 Hz)	DN 15 ... 65 (½" ... 2½"): 12.5 Hz/15 Hz DN 80 ... 150 (3" ... 6"): 6.25 Hz/7.5 Hz DN 200 ... 300 (8" ... 12"): 3.125 Hz/3.75 Hz DN 350 ... 2000 (14" ... 80"): 1.5625 Hz/1.875 Hz
Process connection	
Flanges ¹⁾	
• EN 1092-1	PN 6 (87 psi): DN 1400 ... 2000 (54" ... 80") Raised face ³⁾ PN 10 (145 psi): DN 200 ... 300 (8" ... 12") Flat face PN 10 (145 psi): DN 350 ... 1200 (14" ... 48") Raised face ³⁾ PN 16 (232 psi): DN 50 ... 300 (2" ... 12") Flat face ³⁾ PN 16 (232 psi): DN 350 ... 1200 (14" ... 48") Raised face PN 40 (580 psi): DN 15 ... 40 (½" ... 1½") Flat face
• ANSI B16.5	Class 150: ½" ... 12" Flat face; 14" ... 24" Raised face
• AWWA C-207	Class D: 28" ... 80", Flat face
• AS4087	PN 16 (232 psi): DN 50 ... 300 (2" ... 12") Flat Face PN 16 (232 psi): DN 350 ... 1200 (14" ... 48") Raised face
• JIS B 2220:2004	K10 (1" ... 24")
Rated operation conditions	
Ambient temperature	
• Sensor	-40 ... +70 °C (-40 ... +158 °F)
• Compact with transmitter	
- MAG 5000/6000 ⁴⁾	-20 ... +60 °C (-4 ... +140 °F)
- MAG 6000 I ⁵⁾	-20 ... +60 °C (-4 ... +140 °F)
Operating pressure (Abs) [abs. bar] (Maximum operating pressure depending on flange standard, decreases with increasing operating temperature)	DN 15 ... 40 (½" ... 1½"): 0.01 ... 40 bar (0.15 ... 580 psi) DN 50 ... 300 (2" ... 12"): 0.03 ... 20 bar (0.44 ... 290 psi) DN 350 ... 1200 (14" ... 48"): 0.01 ... 16 bar (0.15 ... 232 psi) DN 1400 ... 2000 (54" ... 80"): 0.01 ... 10 bar (0.15 ... 145 psi)
Enclosure rating	
• Standard	IP67 to EN 60529/NEMA 6 (1 mH ₂ O for 30 min)
• Option	IP68 to EN 60529/NEMA 6P (10 mH ₂ O continuously)
Pressure drop	DN 15 and 25 (½" and 1"): Max. 20 mbar (0.29 psi) at 1 m/s (3 ft/s) DN 40 ... 300 (1½" ... 12"): Max. 25 mbar (0.36 psi) at 3 m/s (10 ft/s) DN 350 ... 2000 (14" ... 80"): Insignificant
Test pressure	1.5 × PN (where applicable), FM Fire Service: 2 × PN
Mechanical load (vibration)	18 ... 1000 Hz random in x, y, z, directions for 2 hours according to EN 60068-2-36 Sensor: 3.17 g RMS Sensor with compact MAG 5000/6000 mounted transmitter: 3.17 g RMS Sensor with compact MAG 6000 I mounted transmitter: 1.14 g RMS

Technical specifications (continued)

Version	MAG 5100 W
Medium conditions	
Temperature of medium	
• NBR	-10 ... +70 °C (14 ... 158 °F)
• EPDM	-10 ... +70 °C (14 ... 158 °F)
• EPDM (MI-001)	0.1 ... 30 °C (32 ... 76 °F)
• Ebonite	-
EMC	2014/30/EU
Design	
Material	
• Housing and flanges	Carbon steel ASTM A 105 with corrosion protection EN ISO 12944 grade C4 or C5 (durability up to 15 years)
• Electrode	Hastelloy C276
• Grounding electrode	Hastelloy C276
• Measuring pipe	Stainless steel AISI 304/1.4301
• Terminal box	Fibre glass reinforced polyamide
Certificates and approvals	
Calibration	
• Default calibration	Zero-point, 2 x 25 % and 2 x 90 %
• Special calibration	5-point calibration: 20 %, 40 %, 60 %, 80 %, 100 % of factory Q _{max} 10-point calibration: ascending and descending at 20 %, 40 %, 60 %, 80 %, 100 % of factory Q _{max} Matched pair calibration: default, 5-point or 10-point
Custody transfer	<ul style="list-style-type: none"> • MI-001 cold water (EU): DN 50 ... 2000 (2" ... 80") • Kiwa water approval (NL): DN 50 ... DN 1200 (2" ... 48") • Chilled water pattern approval PTB K 7.2 DN 15 ... 1200 (Germany)⁶⁾
Drinking water	EPDM liner: <ul style="list-style-type: none"> • WRAS (WRc, BS6920 material approval for cold water, GB) • NSF/ANSI Standard 61⁷⁾ (Cold water, US) • ACS listed (France) • DVGW W270 (Germany) • Belgaqua (Belgium) • AS/NZS 4020 (Australia/New Zealand)
Marine ⁸⁾	<ul style="list-style-type: none"> • DNV
Hazardous areas ⁷⁾	
Standard sensor with/without MAG 5000/6000/6000 I	<ul style="list-style-type: none"> • FM - NI Class I Div. 2 Groups A, B, C, D¹¹⁾ - NI Class I Zone 2 Groups IIC
Pressure equipment	<ul style="list-style-type: none"> • PED conforming: All EN 1092-1 flanges and ANSI Class 150 (< DN 300 / < 12") – 2014/68/EU⁹⁾
Others	<ul style="list-style-type: none"> • CRN (Canadian Registration Number) • EAC (Russia, Belarus, Kazakhstan) • FM Fire Service Meter acc. to class 1044¹⁰⁾ • VdS: Extinguishing systems DN 50 ... 300 • MCERTS (GB environmental)

¹⁾ DN 750, DN 1050 and DN 1100 (30", 42" and 44") not available with EN 1092-1 (PN 10 and PN 16) and AS4087 flanges

²⁾ Type 01 (SORF)

³⁾ DN ≤ 600 type 01 (SORF); DN > 600 type 11 (WNRF)

⁴⁾ Compact with transmitter MAG 5000 CT/6000 CT -20 ... +50 °C (-4 ... 122 °F)

⁵⁾ With HART communication max. ambient temperature 50 °C (122 °F)

⁶⁾ For verification submit Product Variation Request

⁷⁾ Including Annex G

⁸⁾ In remote version with sensor size DN 50 ... 300 (2" ... 12")

Flow Measurement

SITRANS FM (electromagnetic)

Flow sensors / SITRANS FM MAG 5100 W

Technical specifications (continued)

⁹⁾ For sizes larger than 600 mm (24") in PN 16 PED conformity is available as a cost-added option. The basic unit will only carry the LVD (Low Voltage Directive) and EMC approval. All products sold outside of EU and EFTA are excluded from the directive, also products sold into certain market sectors are excluded. These include: (a) Meters used in networks for the supply, distribution and discharge of water; (b) Meters used in pipelines for the conveyance of any fluid from offshore to onshore; (c) Meters used in the extraction of petroleum or gas, including Christmas tree and manifold equipment; (d) Any meter mounted on a ship or mobile offshore platform. For further information on the PED standard and requirements see the section about Pressure Equipment Directive.

¹⁰⁾ Not for sensors with 300 µm coating

¹¹⁾ FM Class I Div. 2 not available for DN 15

MAG 5100 W (7ME6520) with MAG 6000 CT (Revenue program) MI-001

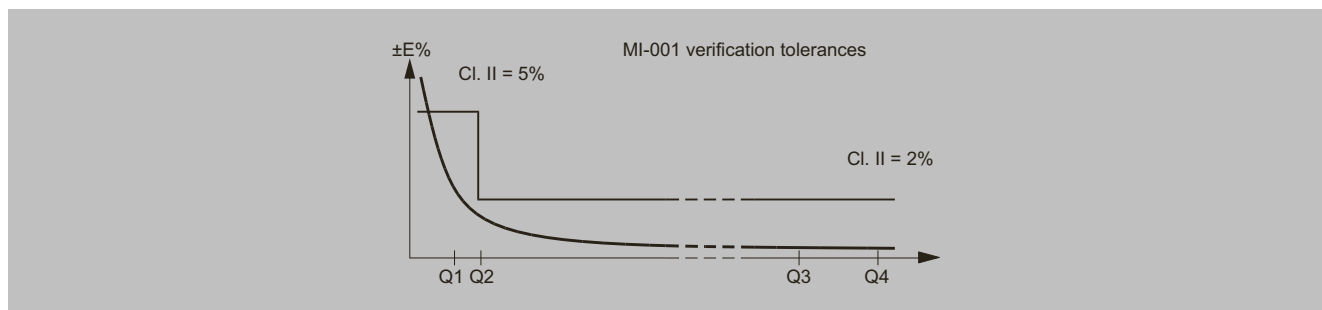
MAG 5100 W CT program is type approved according to international water meter standard OIML R 49. Since the first November 2006 the MI-001 water meter directive is in force, which means that all water meters can be sold across the EU borders if the water meters contain a MI-001 label.

The MAG 5100 W MI-001 verified and labeled products are a Class II approval according to Directive 2014/32/EU of the European Parliament and Council of 26 February, 2014 on measuring instruments, Annex III Water meters (MI-001) in the sizes from DN 50 to DN 1200 (Article No. 7ME6520).

The MID certification is obtained as a modul B + D module approval according to the above mentioned directive.

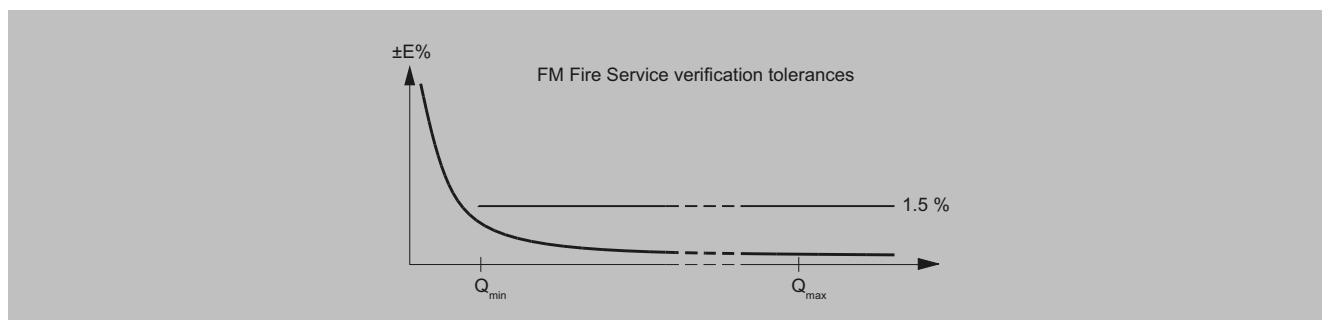
Module B: Type approval according to OIML R 49

Module D: Quality insurance approval of production



MAG 5100 W (7ME6520) with MAG 5000/MAG 6000 or MAG 6000 CT for Fire Service applications

MAG 5100 W (7ME6520) is FM Fire Service approved for automatic fire protection systems. The approval is applicable for the sizes DN 50, DN 80, DN 100, DN 150, DN 200, DN 250 and DN 300 (2", 3", 4", 6", 8", 10" and 12") with ANSI B16.5 Class 150 flanges. The FM Fire Service approved product can be ordered via the Z-options P20, P21 and P22.



MI-001 approval

MAG 5100 W (7ME6520) MI-001 verified and labeled products at a given Q3 and Q3/Q4 = 1.25 and Q2/Q1 = 1.6 measuring ranges see table below:

Order code: P11	DN 50 (2")	DN 65 (2½")	DN 80 (3")	DN 100 (4")	DN 125 (5")	DN 150 (6")	DN 200 (8")	DN 250 (10")	DN 300 (12")
"R" Q3/Q1	40	40	40	40	40	40	40	40	40
Q4 [m³/h]	20	31.25	50	78.75	125	200	312.5	500	787.5
Q3 [m³/h]	16	25	40	63	100	160	250	400	630
Q2 [m³/h]	0.64	1.0	1.6	2.52	4.0	6.4	10.0	16.0	25.2
Q1 [m³/h]	0.4	0.63	1.0	1.58	2.5	4.0	6.25	10.0	15.75

Flow Measurement

SITRANS FM (electromagnetic)

Flow sensors / SITRANS FM MAG 5100 W

Technical specifications (continued)

Order code: P12	DN 50 (2")	DN 65 (2½")	DN 80 (3")	DN 100 (4")	DN 125 (5")	DN 150 (6")	DN 200 (8")	DN 250 (10")	DN 300 (12")
"R" Q3/Q1	63	63	63	63	63	63	63	63	63
Q4 [m³/h]	20	31.25	50	78.75	125	200	312.5	500	787.5
Q3 [m³/h]	16	25	40	63	100	160	250	400	630
Q2 [m³/h]	0.41	0.63	1.02	1.6	2.5	4.1	6.3	10.2	16.0
Q1 [m³/h]	0.25	0.40	0.63	1.00	1.59	2.54	3.97	6.35	10.0

Order code: P13	DN 50 (2")	DN 65 (2½")	DN 80 (3")	DN 100 (4")	DN 125 (5")	DN 150 (6")	DN 200 (8")	DN 250 (10")	DN 300 (12")
"R" Q3/Q1	80	80	80	80	80	80	80	80	80
Q4 [m³/h]	20	31.3	50	78.75	125	200	312.5	500	787.5
Q3 [m³/h]	16	25	40	63	100	160	250	400	630
Q2 [m³/h]	0.32	0.5	0.8	1.26	2.0	3.2	5.0	8.0	12.6
Q1 [m³/h]	0.20	0.31	0.50	0.79	1.25	2.00	3.13	5.00	7.9

Order code: P16	DN 50 (2")	DN 65 (2½")	DN 80 (3")	DN 100 (4")	DN 125 (5")	DN 150 (6")	DN 200 (8")	DN 250 (10")	DN 300 (12")
"R" Q3/Q1	160	160	160	160	160	160	160	160	160
Q4 [m³/h]	50	78.5	125	200	312.5	500	787.5	1250	2000
Q3 [m³/h]	40	63	100	160	250	400	630	1000	1600
Q2 [m³/h]	0.4	0.63	1.0	1.6	2.5	4.0	6.3	10.0	16.0
Q1 [m³/h]	0.25	0.39	0.63	1.0	1.56	2.5	3.94	6.3	10.0

Order code: P17	DN 50 (2")	DN 65 (2½")	DN 80 (3")	DN 100 (4")	DN 125 (5")	DN 150 (6")	DN 200 (8")	DN 250 (10")	DN 300 (12")
"R" Q3/Q1	200	200	200	200	200	200	200	200	200
Q4 [m³/h]	50	78.5	125	200	312.5	500	787.5	1250	2000
Q3 [m³/h]	40	63	100	160	250	400	630	1000	1600
Q2 [m³/h]	0.32	0.50	0.80	1.28	2.0	3.2	5.0	8.0	12.8
Q1 [m³/h]	0.2	0.32	0.50	0.8	1.25	2.0	3.15	5.0	8.0

Order code: P18	DN 50 (2")	DN 65 (2½")	DN 80 (3")	DN 100 (4")	DN 125 (5")	DN 150 (6")	DN 200 (8")	DN 250 (10")	DN 300 (12")
"R" Q3/Q1	250	250	250	250	250	250	250	250	250
Q4 [m³/h]	50	78.5	125	200	312.5	500	787.5	1250	2000
Q3 [m³/h]	40	63	100	160	250	400	630	1000	1600
Q2 [m³/h]	0.26	0.4	0.64	1.02	1.6	2.56	4.0	6.4	10.24
Q1 [m³/h]	0.16	0.25	0.4	0.64	1.0	1.6	2.52	4.0	6.4

Order code: P24	DN 350 (14")	DN 400 (16")	DN 450 (18")	DN 500 (20")	DN 600 (24")
"R" Q3/Q1	40	40	40	40	40
Q4 [m³/h]	1250	1250	2000	2000	3125
Q3 [m³/h]	1000	1000	1600	1600	2500
Q2 [m³/h]	40.0	40.0	64.0	64.0	100.0
Q1 [m³/h]	25.0	25.0	40.0	40.0	62.5

Order code: P25	DN 350 (14")	DN 400 (16")	DN 450 (18")	DN 500 (20")	DN 600 (24")
"R" Q3/Q1	63	63	63	63	63
Q4 [m³/h]	1250	2000	3125	3125	5000
Q3 [m³/h]	1000	1600	2500	2500	4000
Q2 [m³/h]	25.4	40.63	63.49	63.49	101.6
Q1 [m³/h]	15.9	25.4	39.7	39.7	63.49

Order code: P26	DN 350 (14")	DN 400 (16")	DN 450 (18")	DN 500 (20")	DN 600 (24")
"R" Q3/Q1	80	80	80	80	80
Q4 [m³/h]	2000	3125	5000	5000	7875
Q3 [m³/h]	1600	2500	4000	4000	6300
Q2 [m³/h]	32.0	50.0	80.0	80.0	126.0
Q1 [m³/h]	20.0	31.25	50.0	50.0	78.75

Flow Measurement

SITRANS FM (electromagnetic)

Flow sensors / SITRANS FM MAG 5100 W

Technical specifications (continued)

Order code: P27	DN 350 (14")	DN 400 (16")	DN 450 (18")	DN 500 (20")	DN 600 (24")
"R" Q3/Q1	100	100	100	100	100
Q4 [m ³ /h]	3125	3125	5000	5000	7875
Q3 [m³/h]	2500	2500	4000	4000	6300
Q2 [m ³ /h]	40.0	2540.0	64.0	64.0	100.8
Q1 [m ³ /h]	25.0	25.0	40.0	40.0	63.0

Order code: P29	DN 700 (28")	DN 750 (30")	DN 800 (32")	DN 900 (36")	DN 1000 (40")	DN 1200 (48")
"R" Q3/Q1	40	40	40	40	40	40
Q4 [m ³ /h]	5000	5000	5000	7875	7875	7875
Q3 [m³/h]	4000	4000	4000	6300	6300	6300
Q2 [m ³ /h]	160.0	160.0	160.0	252.0	252.0	252.0
Q1 [m ³ /h]	100.0	100.0	100.0	157.5	157.5	157.5

Order code: P30	DN 700 (28")	DN 750 (30")	DN 800 (32")	DN 900 (36")	DN 1000 (40")	DN 1200 (48")
"R" Q3/Q1	63	63	63	63	63	-
Q4 [m ³ /h]	5000	5000	5000	7875	7875	-
Q3 [m³/h]	4000	4000	4000	6300	6300	-
Q2 [m ³ /h]	101.6	101.6	101.6	160.0	160.0	-
Q1 [m ³ /h]	63.5	63.5	63.5	100.0	100.0	-

Order code: P31	DN 700 (28")	DN 750 (30")	DN 800 (32")	DN 900 (36")	DN 1000 (40")	DN 1200 (48")
"R" Q3/Q1	80	80	80	80	80	-
Q4 [m ³ /h]	5000	5000	5000	7875	7875	-
Q3 [m³/h]	4000	4000	4000	6300	6300	-
Q2 [m ³ /h]	80.0	80.0	80.0	126.0	126.0	-
Q1 [m ³ /h]	50.0	50.0	50.0	78.75	78.75	-

The label is placed on the transmitter housing. An example of the product label is shown below:



MI-001 approval valid for:

- DN 50 to 2000 mm (2" to 80")
- Horizontal and vertical installation
- Compact or remote with max. 500 m cable
- Power supply 115 to 230 V AC, 12 to 24 V AC/DC
- With¹⁾ or without communication module

Other restrictions may apply (see certificate).

Special MI-001 settings:

- Unit: m³
- Qmax: Q3
- Low flow cut-off: 0.1 %
- Digital output: Frequency

For other factory settings, see Operating Instructions.

PTB K7.2 approval

MAG 5100 W (7ME6520) PTB K7.2 verified and labeled products at a given Qp and Qs = 1.25 * Qp measuring ranges see table below:

Flow Measurement

SITRANS FM (electromagnetic)

Flow sensors / SITRANS FM MAG 5100 W

Technical specifications (continued)

Order code: P41	DN 15 (½")	DN 25 (1")	DN 40 (1½")	DN 50 (2")	DN 65 (2½")	DN 80 (3")	DN 100 (4")	DN 125 (5")	DN 150 (6")	DN 200 (8")	DN 250 (10")	DN 300 (12")
Qp/Qi	25	25	25	25	25	25	25	25	25	25	25	25
Qs [m³/h]	1.90	4.40	12.50	20	31.25	50	78.75	125	200	312.50	500	787.50
Qp [m³/h]	1.5	3.5	10	16	25	40	63	100	160	250	400	630
Qi [m³/h]	0.06	0.14	0.40	0.64	1	1.60	2.52	4	6.40	10	16	25.20

Order code: P42	DN 15 (½")	DN 25 (1")	DN 40 (1½")	DN 50 (2")	DN 65 (2½")	DN 80 (3")	DN 100 (4")	DN 125 (5")	DN 150 (6")	DN 200 (8")	DN 250 (10")	DN 300 (12")
Qp/Qi	50	50	50	50	50	50	50	50	50	50	50	50
Qs [m³/h]	2.50	4.40	12.50	20	31.25	50	78.75	125	200	312.50	500	787.50
Qp [m³/h]	2	3.5	10	16	25	40	63	100	160	250	400	630
Qi [m³/h]	0.04	0.07	0.20	0.32	0.50	0.80	1.26	2	3.20	5	8	12.60

Order code: P43	DN 15 (½")	DN 25 (1")	DN 40 (1½")	DN 50 (2")	DN 65 (2½")	DN 80 (3")	DN 100 (4")	DN 125 (5")	DN 150 (6")	DN 200 (8")	DN 250 (10")	DN 300 (12")
Qp/Qi	100	100	100	100	100	100	100	100	100	100	100	100
Qs [m³/h]	5	5	12.50	20	31.25	50	78.75	125	200	312.50	500	787.50
Qp [m³/h]	4	4	10	16	25	40	63	100	160	250	400	630
Qi [m³/h]	0.04	0.04	0.10	0.16	0.25	0.40	0.63	1	1.60	2.50	4	6.30

Order code: P44	DN 15 (½")	DN 25 (1")	DN 40 (1½")	DN 50 (2")	DN 65 (2½")	DN 80 (3")	DN 100 (4")	DN 125 (5")	DN 150 (6")	DN 200 (8")	DN 250 (10")	DN 300 (12")
Qp/Qi	100	100	100	100	100	100	100	100	100	100	100	100
Qs [m³/h]	5	5	12.50	20	31.25	50	78.75	125	200	312.50	500	787.50
Qp [m³/h]	4	4	10	16	25	40	63	100	160	250	400	630
Qi [m³/h]	0.04	0.04	0.10	0.16	0.25	0.40	0.63	1	1.60	2.50	4	6.30

Order code: P45	DN 50 (2")	DN 65 (2½")	DN 80 (3")	DN 100 (4")	DN 125 (5")	DN 150 (6")	DN 200 (8")	DN 250 (10")	DN 300 (12")
Qp/Qi	250	250	250	250	250	250	250	250	250
Qs [m³/h]	79	78.75	125	200	313	500	787.50	1250	2000
Qp [m³/h]	63	63	100	160	250	400	630	1000	1600
Qi [m³/h]	0.25	0.25	0.40	0.64	1	1.60	2.52	4	6.40

Order code: P47	DN 350 (14")	DN 400 (16")	DN 450 (18")	DN 500 (20")	DN 600 (24")
Qp/Qi	25	25	25	25	25
Qs [m³/h]	1250	2000	3125	3125	5000
Qp [m³/h]	1000	1600	2500	2500	4000
Qi [m³/h]	40	64	100	100	160

Order code: P48	DN 350 (14")	DN 400 (16")	DN 450 (18")	DN 500 (20")	DN 600 (24")
Qp/Qi	50	50	50	50	50
Qs [m³/h]	1250	2000	3125	3125	5000
Qp [m³/h]	1000	1600	2500	2500	4000
Qi [m³/h]	20	32	50	50	80

Order code: P49	DN 350 (14")	DN 400 (16")	DN 450 (18")	DN 500 (20")	DN 600 (24")
Qp/Qi	100	100	100	100	100
Qs [m³/h]	2000	3125	5000	5000	5000
Qp [m³/h]	1000	1600	2500	2500	4000
Qi [m³/h]	40	64	100	100	160


The label is placed on the transmitter housing. An example of the product label is shown below:

Flow Measurement

SITRANS FM (electromagnetic)

Flow sensors / SITRANS FM MAG 5100 W

Technical specifications (continued)

SIEMENS		
SITRANS F M MAG 6000 CT/5100 W		
Order No.:	7ME69201U-1222A1-2	MAWP (15) at 0.1°C: 18.6bar/270psi/1860kPa
Serial No.:	P01 + P1 + L08 + L09 165039101	MAWP (15) at 50°C: 18.6bar/270psi/1860kPa
Size DN: 15 (1/2 inch.)	Lining: EPDM	Tempia min.: 0.1°C/32°F
Sensor material:	ASTM A 105	Tempia max.: 50°C/122°F
Meter orientation:	All Orientations	Process connection: ANSI B 16.5, Class 150
Equipment Class:	E2, M1/PT6/NECMA 4K	Year of Manuf.: 2022
Cal Factor: 4.554887		SW/HW V: 4.09 X02 / 7
Supply:	DC 11-30V / AC 11-24V	Op: 1.5 m³/h
Certification No.:	DE-19-M-PTB-6041	Qi: 0.06 m³/h
Accuracy: Class II EN 1434		Op/Qi: 25
 Siemens AG, DE - 75181 Karlsruhe Made in France		

PTB K7.2 approval valid for:

- DN 15 to 1200 mm (1/2" to 48")
- Horizontal and vertical installation
- Compact or remote with max. 500 m cable
- Power supply 115 to 230 V AC, 12 to 24 V AC/DC
- With¹⁾ or without communication module

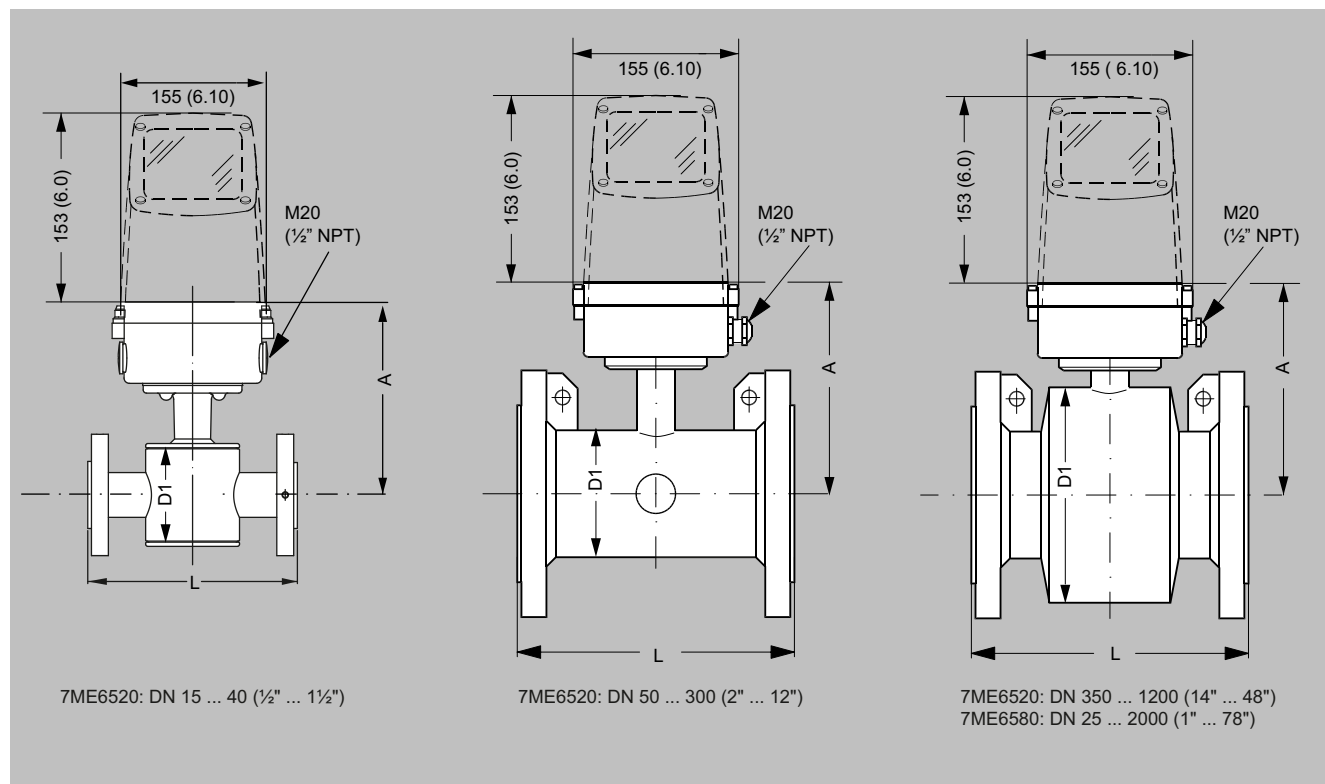
Other restrictions may apply (see certificate).

Special PTB K7.2 settings:

- Qmax: Qs
- Current output: 4 ... 20 mA

For other factory settings, see Operating Instructions.

Dimensional drawings



Nominal size		7ME6520 NBR or EPDM liner				L ¹⁾	
[mm]	[inch]	A [mm]	[inch]	D1 [mm]	[inch]	[mm]	[inch]
15	½	177	7.0	77	3.0	200	7.9
25	1	187	7.4	96	3.8	200	7.9
40	1½	202	8.0	127	5.0	200	7.9
50	2	188	7.4	76	3.0	200	7.9
65	2½	194	7.6	89	3.5	200	7.9
80	3	200	7.9	102	4.0	200	7.9
100	4	207	8.1	114	4.5	250	9.8
125	5	217	8.5	140	5.5	250	9.8
150	6	232	9.1	168	6.6	300	11.8
200	8	257	10.1	219	8.6	350	13.8
250	10	284	11.2	273	10.8	450	17.7
300	12	310	12.2	324	12.8	500	19.7
350	14	382	15.0	451	17.8	550	21.7
400	16	407	16.0	502	19.8	600	23.6
450	18	438	17.2	563	22.2	600	23.6
500	20	463	18.2	614	24.2	600	23.6
600	24	514	20.2	715	28.2	600	23.6
700	28	564	22.2	816	32.1	700	27.6
750	30	591	23.3	869	34.2	750	29.5
800	32	616	24.3	927	36.5	800	31.5
900	36	663	26.1	1032	40.6	900	35.4
1000	40	714	28.1	1136	44.7	1000	39.4
	42	714	28.1	1136	44.7	1000	39.4
	44	765	30.1	1238	48.7	1100	43.3
1200	48	820	32.3	1348	53.1	1200	47.2
1400	54	925	36.4	1574	65.94	1400	55.1
1500	60	972	38.2	1672	65.83	1500	59.1

Flow Measurement

SITRANS FM (electromagnetic)

Flow sensors / SITRANS FM MAG 5100 W

Dimensional drawings (continued)

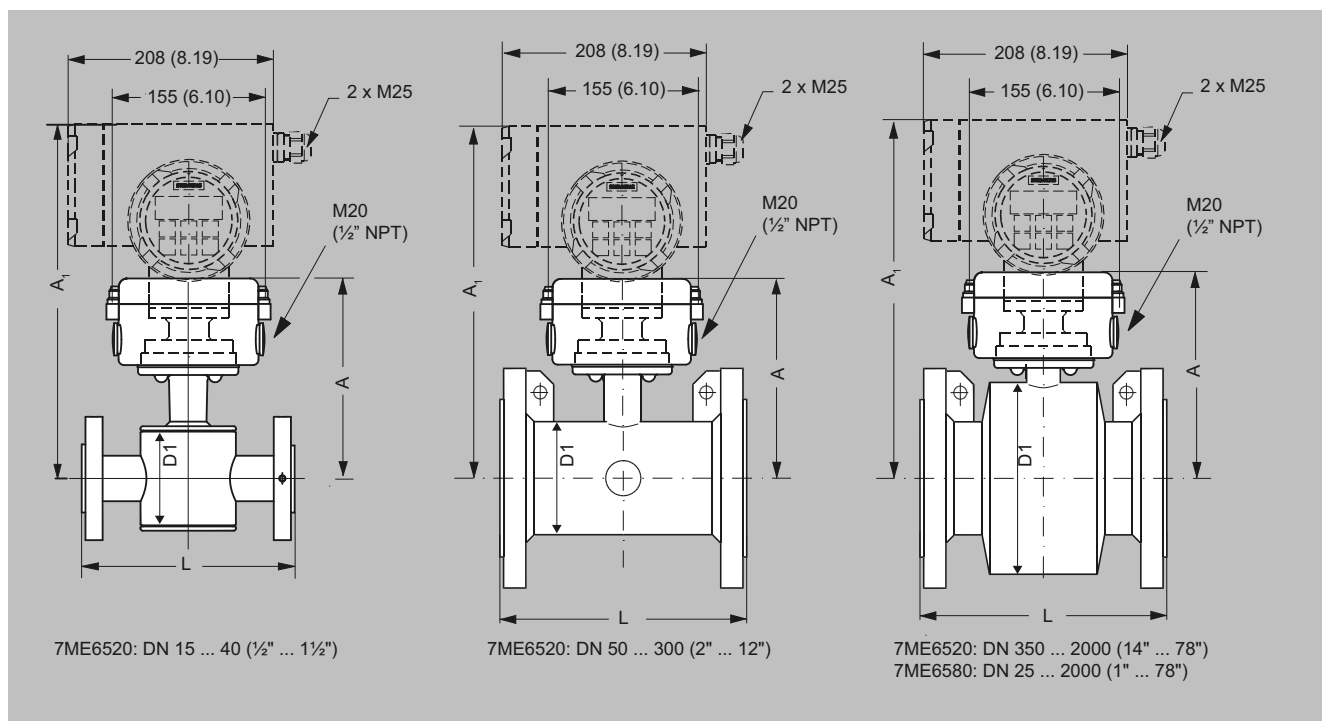
Nominal size		7ME6520 NBR or EPDM liner				L ¹⁾	
[mm]	[inch]	A [mm]	[inch]	D1 [mm]	[inch]	[mm]	[inch]
1600	66	1025	40.4	1774	75.39	1600	63.0
1800	72	1123	44.2	1974	77.72	1800	70.9
2000	80	1223	48.1	2174	85.59	2000	78.7

¹⁾ Tolerances on built-in length:

DN 15 to DN 200 (½" to 8"): +0/-3 mm (+0/-0.12"), DN 250 to DN 400 (10" to 16"): +0/-5 mm (+0/-0.20"),

DN 450 to DN 600 (18" to 24"): +5/-5 mm (+0.20/-0.20"), DN 700 to DN 2000 (28" to 78"): +10/-10 mm (+0.39/-0.39")

MAG 5100 W/6000 I Compact



Nominal size		7ME6520 NBR or EPDM liner				L ¹⁾			
[mm]	[inch]	A [mm]	[inch]	A1 [mm]	[inch]	D1 [mm]	[inch]	[mm]	[inch]
15	½	177	7.0	331	13.0	77	3.0	200	7.9
25	1	187	7.4	341	13.4	96	3.8	200	7.9
40	1½	202	8.0	356	14.0	127	5.0	200	7.9
50	2	188	7.4	342	13.5	76	3.0	200	7.9
65	2½	194	7.6	348	13.7	89	3.5	200	7.9
80	3	200	7.9	354	14.0	102	4.0	200	7.9
100	4	207	8.1	361	14.2	114	4.5	250	9.8
125	5	217	8.5	371	14.6	140	5.5	250	9.8
150	6	232	9.1	386	15.2	168	6.6	300	11.8
200	8	257	10.1	411	16.2	219	8.6	350	13.8
250	10	284	11.2	438	17.2	273	10.8	450	17.7
300	12	310	12.2	464	18.3	324	12.8	500	19.7
350	14	382	15.0	536	21.1	451	17.8	550	21.7
400	16	407	16.0	561	22.1	502	19.8	600	23.6
450	18	438	17.2	592	23.3	563	22.2	600	23.6
500	20	463	18.2	617	24.3	614	24.2	600	23.6
600	24	514	20.2	668	26.3	715	28.2	600	23.6
700	28	564	22.2	718	28.3	816	32.1	700	27.6

Dimensional drawings (continued)

Nominal size		7ME6520 NBR or EPDM liner						L ¹⁾	
[mm]	[inch]	A		A1		D1		[mm]	[inch]
		[mm]	[inch]	[mm]	[inch]	[mm]	[inch]		
750	30	591	23.3	745	29.3	869	34.2	750	29.5
800	32	616	24.3	770	30.3	927	36.5	800	31.5
900	36	663	26.1	817	32.2	1032	40.6	900	35.4
1000	40	714	28.1	868	34.2	1136	44.7	1000	39.4
	42	714	28.1	868	34.2	1136	44.7	1000	39.4
	44	765	30.1	919	36.2	1238	48.7	1100	43.3
1200	48	820	32.3	974	38.3	1348	53.1	1200	47.2
1400	54	925	36.4	1079	42.5	1574	61.97	1400	55.1
1500	60	972	38.2	1126	44.3	1672	65.83	1500	59.1
1600	66	1025	40.4	1179	46.4	1774	59.84	1600	63.0
1800	72	1123	44.2	1277	50.3	1974	77.72	1800	70.9
2000	80	1223	48.1	1377	54.2	2174	85.59	2000	78.7

1) Tolerances on built in length:

DN 15 to DN 200 (½" to 8"): +0/-3 mm (+0/-0.12"), DN 250 to DN 400 (10" to 16"): +0/-5 mm (+0/-0.20")

DN 450 to DN 600 (18" to 24"): +5/-5 mm (+0.20/-0.20"), DN 700 to DN 2000 (28" to 78"): +10/-10 mm (+0.39/-0.39")

Nominal size		7ME6520													
[mm]	[inch]	PN 10		PN 16		PN 40		Class 150		AWWA C-207		AS 4087		JIS10K	
		[kg]	[lbs]	[kg]	[lbs]	[kg]	[lbs]	[kg]	[lbs]	[kg]	[lbs]	[kg]	[lbs]	[kg]	[lbs]
15	½	-	-	-	-	5	11	5	11	-	-	-	-	5	11
25	1	-	-	-	-	6	13	6	13	-	-	-	-	6	13
40	1½	-	-	-	-	9	20	9	20	-	-	-	-	9	20
50	2	-	-	10	22	-	-	10	22	-	-	10	22	10	22
65	2½	-	-	12	26	-	-	12	26	-	-	12	26	12	26
80	3	-	-	13	29	-	-	13	29	-	-	13	29	13	29
100	4	-	-	17	37	-	-	18	40	-	-	17	37	17	37
125	5	-	-	20	44	-	-	21	46	-	-	-	-	20	44
150	6	-	-	27	60	-	-	30	66	-	-	21	57	26	57
200	8	38	84	39	86	-	-	47	104	-	-	64	106	35	77
250	10	51	115	56	123	-	-	64	141	-	-	48	152	51	112
300	12	62	137	72	159	-	-	92	203	-	-	61	189	59	130
350	14	99	218	115	254	-	-	131	289	-	-	106	254	88	194
400	16	121	267	143	315	-	-	161	355	-	-	124	277	113	249
450	18	144	317	177	390	-	-	182	401	-	-	145	311	135	298
500	20	165	364	222	489	-	-	217	478	-	-	175	418	151	333
600	24	225	496	321	708	-	-	305	672	-	-	285	664	179	395
700	28	272	600	331	730	-	-	-	-	284	626	350	704	-	-
750	30	-	-	-	-	-	-	-	-	331	730	-	-	-	-
800	32	300	661	386	851	-	-	-	-	394	869	485	944	-	-
900	36	372	820	482	1063	-	-	-	-	487	1074	645	1362	-	-
1000	40	454	1001	672	1482	-	-	-	-	589	1299	696	1399	-	-
	42	-	-	-	-	-	-	-	-	693	1528	-	-	-	-
	44	-	-	-	-	-	-	-	-	774	1706	-	-	-	-
1200	48	728	1605	1116	2460	-	-	-	-	916	2019	1116	1789	-	-
1400	56	1338	2944	1592	3502	1890	4158	-	-	-	-	1592	3502	-	-
1500	60	1520	3344	1850	4070	2238	4924	-	-	-	-	1950	4290	-	-
1600	64	1696	3731	2110	4642	2525	5555	-	-	-	-	2110	4642	-	-
1800	72	2110	4642	2560	5632	3460	7612	-	-	-	-	2560	5632	-	-
2000	80	2564	5641	3640	8008	4205	9251	-	-	-	-	3640	8008	-	-

Flow Measurement

SITRANS FM (electromagnetic)

Flow transmitters / SITRANS FM MAG 5000 and 6000

Overview



Transmitter MAG 5000/6000 compact version (left) and 19" insert version (right)

The MAG 5000 and 6000 are transmitters engineered for high performance, easy installation, commissioning and maintenance. The transmitters evaluate the signals from the SITRANS FM sensors type MAG 1100, MAG 1100 F, MAG 3100, MAG 3100 P and MAG 5100 W.

Transmitter types:

- MAG 5000: Max. measuring error $\pm 0.4\% \pm 1$ mm/s (incl. sensor)
- MAG 6000: Max. measuring error $\pm 0.2\% \pm 1$ mm/s (incl. sensor, see also sensor specifications) and with additional features such as: "plug & play" add-on bus modules; integrated batch functions.

Benefits

- Superior signal resolution for optimum turn down ratio
- Digital signal processing with many possibilities
- Automatic reading of SENSORPROM data for easy commissioning
- User configurable operation menu with password protection
- 3 lines, 20 characters display in 11 languages
- Flow rate in various units
- Totalizer for forward, reverse and net flow as well as additional information available
- Multiple functional outputs for process control, minimum configuration with analogue, pulse/frequency and relay output (status, flow direction, limits)
- Comprehensive self-diagnostic for error indication and error logging (see SITRANS F M diagnostics)
- Batch control (MAG 6000 only)
- Custody transfer approval: MI-001 for cold water, PTB K 7.2 and OE12/C 040 for chilled water
- MAG 6000 with add-on bus modules for HART, FOUNDATION Fieldbus H1, DeviceNet, Modbus RTU/RS 485, PROFIBUS PA and DP

Application

The SITRANS FM flowmeters are suitable for measuring the flow of almost all electrically conductive liquids, pastes and slurries. The main applications can be found in:

- Water and waste water
- Chemical and pharmaceutical industries
- Food and beverage industries
- Power generation and utility

Design

The transmitter is designed as either IP67 NEMA 6 enclosure for compact or wall mounting or 19" version as a 19" insert as a base to be used in:

- 19" rack systems
- Front panel mounting IP65/NEMA 2
- Panel mounting IP20/NEMA 1
- Wall mounting IP66/NEMA 4X

Several options on 19" versions are available such as:

- Transmitters mounted in safe area for Ex ATEX approved flow sensors (incl. barriers)
- Transmitters with electrode cleaning unit on request

Function

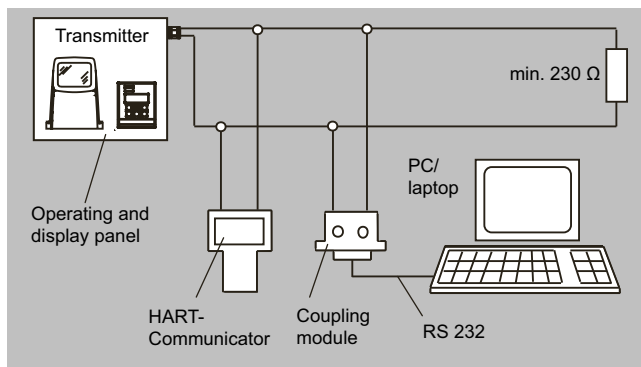
The MAG 5000/6000 are transmitters with a built-in alphanumeric display in several languages. The transmitters evaluate the signals from the associated electromagnetic sensors and also fulfil the task of a power supply unit which provides the magnet coils with a constant current.

Further information on connection, mode of operation and installation can be found in the data sheets for the sensors.

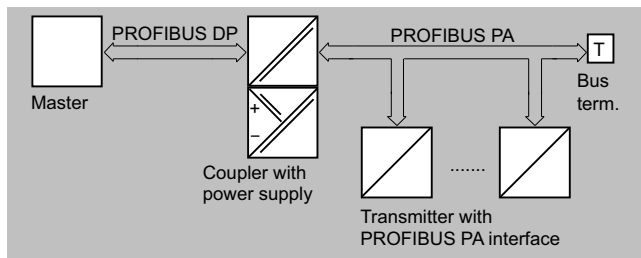
Displays and controls

Operation of the transmitter can be carried out using:

- Control and display unit
- HART communicator
- PC/laptop and SIMATIC PDM software via HART communication
- PC/laptop and SIMATIC PDM software using PROFIBUS or Modbus communication



HART communication



PROFIBUS PA communication





Flow Measurement

SITRANS FM (electromagnetic)

Flow transmitters / SITRANS FM MAG 5000 and 6000


Selection and ordering data

Transmitter MAG 5000

Description	Article No.	
<p>Transmitter MAG 5000 blind for compact and wall mounting; IP67/NEMA 6, fibre glass reinforced polyamide</p> <ul style="list-style-type: none"> • 11 ... 30 V DC/11 ... 24 V AC • 115 ... 230 V AC, 50/60 Hz 	<p>7ME6910-1AA30-0AA0</p> <p>7ME6910-1AA10-0AA0</p>	
<p>Transmitter MAG 5000 display for compact and wall mounting; IP67/NEMA 6, fibre glass reinforced polyamide</p> <ul style="list-style-type: none"> • 11 ... 30 V DC/11 ... 24 V AC • 115 ... 230 V AC, 50/60 Hz • 115 ... 230 V AC, 50/60 Hz, with HART communication 	<p>7ME6910-1AA30-1AA0</p> <p>7ME6910-1AA10-1AA0</p> <p>7ME6910-1AA10-1BA0</p>	
<p>Transmitter MAG 5000 CT for compact and wall mounting, approved for custody transfer, without initial verification (no type approval marking); IP67/NEMA 6, glass fibre reinforced polyamide</p> <ul style="list-style-type: none"> • 11 ... 30 V DC/11 ... 24 V AC • 115 ... 230 V AC, 50/60 Hz 	<p>7ME6910-1AA30-1AD0</p> <p>7ME6910-1AA10-1AD0</p>	
<p>Transmitter MAG 5000 for 19" rack and wall mounting</p> <ul style="list-style-type: none"> • 11 ... 30 V DC/11 ... 24 V AC • 115 ... 230 V AC, 50/60 Hz 	<p>7ME6910-2CA30-1AA0</p> <p>7ME6910-2CA10-1AA0</p>	

Selection and ordering data (continued)

Transmitter MAG 6000






Description	Article No.	
Transmitter MAG 6000 blind for compact and wall mounting; IP67/NEMA 6, glass fibre reinforced polyamide <ul style="list-style-type: none"> • 11 ... 30 V DC/11 ... 24 V AC • 115 ... 230 V AC, 50/60 Hz 	7ME6920-1AA30-0AA0 7ME6920-1AA10-0AA0	
Transmitter MAG 6000 Display for compact and wall mounting; IP67/NEMA 6, glass fibre reinforced polyamide <ul style="list-style-type: none"> • 11 ... 30 V DC/11 ... 24 V AC • 115 ... 230 V AC, 50/60 Hz 	7ME6920-1AA30-1AA0 7ME6920-1AA10-1AA0	
Transmitter MAG 6000 for compact and wall mounting; IP65/NEMA 4, stainless steel AISI 316/1.4436 (only for sensor with stainless steel terminal box) (for remote version order stainless steel terminal box separately) <ul style="list-style-type: none"> • 11 ... 30 V DC/11 ... 24 V AC • 115 ... 230 V AC, 50/60 Hz 	7ME6920-1QA30-1AA0 7ME6920-1QA10-1AA0	
Transmitter MAG 6000 CT for compact and wall mounting, approved for custody transfer without initial verification (no type approval marking); IP67/NEMA 6, glass fibre reinforced polyamide <ul style="list-style-type: none"> • 11 ... 30 V DC/11 ... 24 V AC • 115 ... 230 V AC, 50/60 Hz 	7ME6920-1AA30-1AD0 7ME6920-1AA10-1AD0	
Transmitter MAG 6000 SV for compact and wall mounting; special excitation frequency 44 Hz for Batch application DN ≤ 25/1" IP67/NEMA 6, glass fibre reinforced polyamide <ul style="list-style-type: none"> • 11 ... 30 V DC/11 ... 24 V AC • 115 ... 230 V AC, 50/60 Hz 	7ME6920-1AB30-1AA0 7ME6920-1AB10-1AA0	
Transmitter MAG 6000 for 19" rack and wall mounting <ul style="list-style-type: none"> • 11 ... 30 V DC/11 ... 24 V AC 	7ME6920-2CA30-1AA0	

Flow Measurement


SITRANS FM (electromagnetic)

Flow transmitters / SITRANS FM MAG 5000 and 6000

Selection and ordering data (continued)



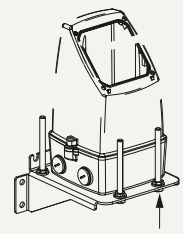
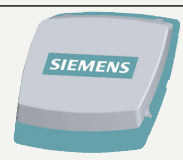


Description	Article No.	
<ul style="list-style-type: none"> 115 ... 230 V AC, 50/60 Hz 	7ME6920-2CA10-1AA0	
Transmitter MAG 6000 SV for 19" rack and wall mounting; special excitation frequency 44 Hz for Batch application DN ≤ 25/1" <ul style="list-style-type: none"> 11 ... 30 V DC/11 ... 24 V AC 115 ... 230 V AC, 50/60 Hz 	7ME6920-2CB30-1AA0 7ME6920-2CB10-1AA0	
MAG 6000 19" insert, complete mounted with IP66/NEMA 4X wall mounting enclosure in ABS plastic; 115 ... 230 V AC, 50/60 Hz; cable gland PG13.5	7ME6920-2EA10-1AA0	
MAG 6000 19" insert with safety barrier for Ex-approved sensors, complete mounted with IP66/NEMA 4X wall mounting enclosure in ABS plastic, 115 ... 230 V AC, 50/60 Hz; cable gland PG13.5 <ul style="list-style-type: none"> For ATEX 2G D sensors 	7ME6920-2MA11-1AA0	
MAG 6000 SV 19" insert, complete mounted with IP66/NEMA 4X wall mounting enclosure in ABS plastic, special excitation frequency 44 Hz for Batch application DN ≤ 25/1"; cable gland PG13.5 <ul style="list-style-type: none"> 11 ... 30 V DC/11 ... 24 V AC 115 ... 230 V AC, 50/60 Hz 	7ME6920-2EB30-1AA0 7ME6920-2EB10-1AA0	

Communication modules for MAG 6000

Description	Article No.	
HART (not for MAG 6000 I)	FDK:085U0226	
Modbus RTU/RS485	FDK:085U0234	
PROFIBUS PA Profile 3	FDK:085U0236	
PROFIBUS DP Profile 3	FDK:085U0237	
DeviceNet	FDK:085U0229	
FOUNDATION Fieldbus H1	A5E02054250	

Selection and ordering data (continued)

Accessories for MAG 5000 and MAG 6000



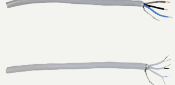



Description	Article No.	
<p>Accessory kit for remote use of sensor with two 5-pin terminal blocks</p>	A5E34827189	
<p>Wall mounting unit for MAG 5000/6000 with IP67/NEMA 6, terminal box in polyamide²⁾</p> <ul style="list-style-type: none"> • 4 × M20 cable glands • 4 × ½" NPT cable glands 	<p>FDK:085U1018</p> <p>FDK:085U1053</p>	
<p>Special wall mounting unit for MAG 5000/6000 IP67/NEMA 6, mounting bracket in stainless steel AISI 316 (1.4401), terminal box in polyamide</p> <ul style="list-style-type: none"> • 4 × M20 cable glands • 4 × ½" NPT cable glands 	<p>A5E36699702</p> <p>A5E36699938</p>	
<p>Sun lid for MAG 5000/6000 transmitter (frame and lid)</p>	A5E02328485	
<p>Standard coil or electrode cable, 3 × 1.5 mm²/18 gage, single shielded with PVC jacket; Temperature range -30 ... +70 °C (-22 ... +158 °F)</p> <ul style="list-style-type: none"> • 5 m (16.5 ft) • 10 m (33 ft) • 20 m (65 ft) • 30 m (98 ft) • 40 m (131 ft) • 50 m (164 ft) • 60 m (197 ft) • 100 m (328 ft) • 150 m (492 ft) • 200 m (656 ft) • 500 m (1640 ft) 	<p>A5E02296523</p> <p>FDK:083F0121</p> <p>FDK:083F0210</p> <p>A5E02297309</p> <p>FDK:083F0211</p> <p>A5E02297317</p> <p>FDK:083F0212</p> <p>FDK:083F0213</p> <p>FDK:083F3052</p> <p>FDK:083F3053</p> <p>FDK:083F3054</p>	
<p>Special electrode cable¹⁾ (empty pipe detection or low conductivity), 3 × 0.25 mm² double shielded with PVC jacket, Temperature range -30 ... +70 °C (-22 ... +158 °F)</p> <ul style="list-style-type: none"> • 10 m (33 ft) 	FDK:083F3020	

Flow Measurement

SITRANS FM (electromagnetic)

Flow transmitters / SITRANS FM MAG 5000 and 6000

Selection and ordering data (continued)

Description	Article No.	
<ul style="list-style-type: none"> • 20 m (65 ft) • 40 m (131 ft) • 60 m (197 ft) • 100 m (328 ft) • 150 m (492 ft) • 200 m (656 ft) • 500 m (1640 ft) 	FDK:083F3095 FDK:083F3094 FDK:083F3093 FDK:083F3092 FDK:083F3056 FDK:083F3057 FDK:083F3058	
Low-noise electrode coaxial cable for low conductivity and high vibration levels, 3 x 0.13 mm², Temperature range -25 ... +85 °C (-13 ... +185 °F) <ul style="list-style-type: none"> • 2 m (6.6 ft) • 5 m (16.5 ft) • 10 m (33 ft) 	A5E02272692 A5E02272723 A5E02272730	
Cable kit including standard coil cable (3 x 1.5 mm²/18 gage, single shielded with PVC jacket) and special electrode cable¹⁾ (3 x 0.25 mm², double shielded with PVC jacket). Temperature range -30 ... +70 °C (-22 ... +158 °F) <ul style="list-style-type: none"> • 5 m (16.5 ft) • 10 m (33 ft) • 15 m (49 ft) • 20 m (65 ft) • 25 m (82 ft) • 30 m (98 ft) • 40 m (131 ft) • 50 m (164 ft) • 60 m (197 ft) • 100 m (328 ft) • 150 m (492 ft) • 200 m (656 ft) • 500 m (1640 ft) 	A5E02296329 A5E01181647 A5E02296464 A5E01181656 A5E02296490 A5E02296494 A5E01181686 A5E02296498 A5E01181689 A5E01181691 A5E01181699 A5E01181703 A5E01181705	
Potting kit for IP68/NEMA 6P sealing of sensor junction box	FDK:085U0220	
19" safety barrier (21 TE)¹⁾ [EEx e ia] IIC for MAG 1100 Ex sensors 12 ... 24 V, 115 ... 230 V and MAG 3100 Ex sensors, incl. back plate (A5E02559810)	FDK:083F5034	
Front panel mounting enclosure IP65/NEMA 2 in ABS plastic for 19" insert (21 TE)	FDK:083F5030	

Selection and ordering data (continued)

Description	Article No.	
Front panel mounting enclosure IP65/NEMA 2 in ABS plastic for 19" insert (42 TE)	FDK:083F5031	
Panel mounting enclosure IP20/NEMA 1 in aluminum for 19" insert (21 TE)	FDK:083F5032	
Panel mounting enclosure IP20/NEMA 1 in aluminum for 19" insert (42 TE)	FDK:083F5033	
Wall mounting enclosure IP66/NEMA 4X in ABS plastic for 19" insert (cable glands and connection board not included). • 21 TE	FDK:083F5037	
• 42 TE	FDK:083F5038	
Front cover (7TE) for panel mounting enclosure	FDK:083F4525	
Sun shield for MAG 5000/6000 transmitter in remote design	A5E01209496	
Sun Shield for MAG 5000/6000 transmitter in compact design on MAG 3100 (DN 15 ... 2000 (1/2" ... 78") or MAG 5100 W (DN 150 ... 1200 (6" ... 48"))	A5E01209500	

¹⁾ Safety cables cannot be used with 19" safety barrier

²⁾ For stainless steel wall mounting kit, order:- M20: FDK:085U1018 and A5E00836867- 1/2 NPT: FDK:085U1053 and A5E00836868

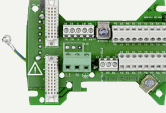


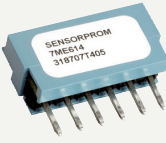



Flow Measurement

SITRANS FM (electromagnetic)

Flow transmitters / SITRANS FM MAG 5000 and 6000

Selection and ordering data (continued)

Spare parts

Description	Article No.	
Connection board (for polyamide terminal box) <ul style="list-style-type: none"> • 12 ... 24 V • 115 ... 230 V 	A5E02559817 A5E02559816	
Connection board (for stainless steel terminal box) <ul style="list-style-type: none"> • 12 ... 24 V • 115 ... 230 V 	A5E02604280 A5E02604272	
Connection board MAG 5000/6000 19" insert for panel mounting enclosure, 12 ... 24 V/115 ... 230 V	A5E02559809	
Connection board MAG 5000/6000 19" insert <ul style="list-style-type: none"> • with safety barrier for panel mounting enclosure, 12 ... 24 V/115 ... 230 V • with safety barrier for panel mounting enclosure, 12 ... 24 V/115 ... 230 V (only for sensors produced before October 2007) • with cleaning unit for panel mounting enclosure, 12 ... 24 V/115 ... 230 V 	A5E02559810 A5E02559811 FDK:083F4123	
SENSORPROM memory unit (sensor code and serial numbers must be specified on order) <ul style="list-style-type: none"> • 2 kB (for MAG 5000/6000/6000 I) - 1 pc. - 10 pcs. 	FDK:085U1005 FDK:083F5052	
Display unit for MAG 5000/6000 <ul style="list-style-type: none"> • Black neutral front 	FDK:085U1038	
<ul style="list-style-type: none"> • SIEMENS front 	FDK:085U1039	
HW key	On request	

Selection and ordering data (continued)




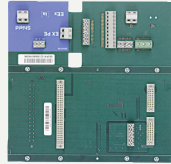
Description	Article No.	
Cable glands (polyamide), 4 pcs. <ul style="list-style-type: none"> • M20 • ½" NPT • PG 13.5, 2 pcs. 	A5E00822490 A5E00822501 FDK:083G0228	 <p>½" NPT</p> <p>M20</p>
Sealing screws for sensor/transmitter, 2 pcs.	FDK:085U0221	
Terminal box, in polyamide, inclusive lid, terminal blocks, gasket and screws	FDK:085U1050 FDK:085U1052	
Terminal box lid, in polyamide	FDK:085U1003	
Terminal box, in stainless steel, inclusive lid, terminal blocks, gasket and screws, for MAG 6000 in stainless steel and for all Ex sensors	A5E00836867 A5E00836868	
Terminal box (3A) for MAG 1100 F in polyamide, inclusive lid, terminal blocks, gasket and screws	A5E00822478 A5E00822479	

Flow Measurement

SITRANS FM (electromagnetic)

Flow transmitters / SITRANS FM MAG 5000 and 6000

Selection and ordering data (continued)

Description	Article No.	
Gasket for terminal box lid in polyamide or for MAG 5000/6000 IP67/ NEMA 6 enclosure in polyamide (5 pcs.)	A5E37086797	
Spare part kit for remote use of sensor with twenty 5-pin terminal blocks	A5E34346873	
Display frame in polyamide for MAG 5000/6000 IP67/NEMA 6 (5 pcs.)	A5E43491675	
Connection board MAG 5000/6000 19" insert for wall mounting enclosure, 12 ... 24 V/115 ... 230 V	A5E02559813	
Connection board MAG 5000/6000 19" insert <ul style="list-style-type: none"> with safety barrier for wall mounting enclosure, 12 ... 24 V/115 ... 230 V with safety barrier for wall mounting enclosure, 12 ... 24 V/115 ... 230 V (only for sensors produced before October 2007) with cleaning unit for wall mounting enclosure, 12 ... 24 V/115 ... 230 V 	A5E02559814 A5E02559812 A5E02559815	

Technical specifications

MAG 5000 and MAG 6000	
Mode of operation	
Measuring principle	Electromagnetic with pulsed constant field
Empty pipe	Detection of empty pipe (special cable required in remote mounted installation)
Excitation frequency	Depend on sensor size
Electrode input impedance	$> 1 \times 10^{14} \Omega$
Input	
Digital input	11 ... 30 V DC, $R_i = 4 \text{ k}\Omega$
• Activation time	50 ms
• Current	$I_{11 \text{ V DC}} = 2.5 \text{ mA}$, $I_{30 \text{ V DC}} = 7 \text{ mA}$
Output	
Current output	
• Signal range	0 ... 20 mA or 4 ... 20 mA
• Load	$< 800 \Omega$
• Time constant	0.1 ... 30 s, adjustable
Digital output	
• Frequency	0 ... 10 kHz, 50 % duty cycle (uni/bidirectional)
• Pulse (active)	24 V DC, 30 mA, $1 \text{ k}\Omega \leq R_i \leq 10 \text{ k}\Omega$, short-circuit-protected (power supplied from flowmeter)
• Pulse (passive)	3 ... 30 V DC, max. 110 mA, $200 \Omega \leq R_i \leq 10 \text{ k}\Omega$ powered from connected equipment)
• Time constant	0.1 ... 30 s, adjustable
Relay output	
• Time constant	Changeover relay, same as current output
• Load	42 V AC/2 A, 24 V DC/1 A
Low flow cut off	0 ... 9.9 % of maximum flow
Galvanic isolation	All inputs and outputs are galvanically isolated
Max. measuring error (incl. sensor and zero point) (for detailed accuracy specifications see "System information")	
• MAG 5000	$\pm 0.4 \% \pm 1 \text{ mm/s}$
• MAG 6000	$\pm 0.2 \% \pm 1 \text{ mm/s}$
Rated operation conditions	
Ambient temperature	
• Operation	<ul style="list-style-type: none"> • Display version: $-20 \dots +60 \text{ }^\circ\text{C}$ ($-4 \dots +140 \text{ }^\circ\text{F}$) • Blind version: $-20 \dots +60 \text{ }^\circ\text{C}$ ($-4 \dots +140 \text{ }^\circ\text{F}$) • Custody transfer (CT) version: $-20 \dots +50 \text{ }^\circ\text{C}$ ($-4 \dots +122 \text{ }^\circ\text{F}$)
• Storage	$-40 \dots +70 \text{ }^\circ\text{C}$ ($-40 \dots +158 \text{ }^\circ\text{F}$)
Mechanical load (vibration)	
Compact version	18 ... 1000 Hz, 3.17 g RMS, sinusoidal in all directions to IEC 68-2-36
19" insert	1 ... 800 Hz, 1 G, sinusoidal in all directions to IEC 68-2-36
Degree of protection	
Compact version	IP67/NEMA 6 to IEC 529 and DIN 40050 (1 mH ₂ O 30 min.)
19" insert	IP20/NEMA 1 to IEC 529 and DIN 40050
EMC performance	IEC/EN 61326-1 (all environments) IEC/EN 61326-2-5
Display and keypad	
Totalizer	Two eight-digit counters for forward, net or reverse flow
Display	Background illumination with alphanumeric text, 3 x 20 characters to indicate flow rate, totalized values, settings and faults; Reverse flow indicated by negative sign
Time constant	Time constant as current output time constant

Flow Measurement

SITRANS FM (electromagnetic)


Flow transmitters / SITRANS FM MAG 5000 and 6000

Technical specifications (continued)

MAG 5000 and MAG 6000	
Design	
Enclosure material	
• Compact version	IP67 / NEMA 6; Fiber glass reinforced polyamide IP65 / NEMA 2; Stainless steel AISI 316/1.4436
• 19"-insert	DIN 41494 steel sheet housing and aluminum front plate with display; width: 21 TE, height: 3 HE
- Panel mounting	IP20/NEMA 1; Aluminium
- Front panel mounting	IP65/NEMA 2; ABS plastic
- Wall mounting	IP66/NEMA 4X; ABS plastic
Dimensions	
• Compact version	See dimensional drawings
• 19" insert	See dimensional drawings
Weight	
• Compact version	0.75 kg (2 lbs)
• 19" insert	See dimensional drawings
Power supply	
	<ul style="list-style-type: none"> • 115 ... 230 V AC +10 % -15 %, 50 ... 60 Hz • 11 ... 30 V DC or 11 ... 24 V AC
Power consumption	
	<ul style="list-style-type: none"> • 230 V AC: 17 VA • 24 V AC: 9 VA, $I_N = 380$ mA, $I_{ST} = 8$ A (30 ms) • 12 V DC: 11 W, $I_N = 920$ mA, $I_{ST} = 4$ A (250 ms) • 24 V DC: 8.4 VA, $I_N = 350$ mA, $I_{ST} = 4$ A (10 ms) <p>$I_{ST} = 4$ A (250 ms): for solar panel please securestable current supply</p>
Certificates and approvals	
General purpose	<ul style="list-style-type: none"> • CE (LVD, EMC, PED, RoHS) • UL (c-UL-us)
Hazardous area	<ul style="list-style-type: none"> • FM, CSA - NI Class I Div. 2 Groups A, B, C, D
Custody transfer	<ul style="list-style-type: none"> • Cold water: MI-001 • Chilled water <ul style="list-style-type: none"> - PTB K 7.2 (Germany) - OE 12/C 040 (Austria)
Marine (only for remote version with MAG 5100 W, DN 50 ... 300)	<ul style="list-style-type: none"> • ABS • Bureau Veritas • DNV-GL • Lloyd's Register
Others	<ul style="list-style-type: none"> • CPA (China) • EAC (Russia, Belarus, Kazakhstan) • KCs (South Korea)
Communication	
Standard	
• MAG 5000	HART 5.2 optional
• MAG 6000	Optional as add-on modules <ul style="list-style-type: none"> • HART 5.2 • Modbus RTU/RS 485 • FOUNDATION Fieldbus H1 • DeviceNet • PROFIBUS PA • PROFIBUS DP

Technical specifications (continued)

Safety barrier (e/ia)

Application	For use with MAG 5000/MAG 6000 19" and MAG 1100 Ex/MAG 3100 Ex		
 Ex approval Cable parameter Electrode	MAG 1100 Ex [EEx e ia] IIB ATEX, EAC Ex		
	MAG 3100 Ex [EEx e ia] IIC ATEX, EAC Ex		
	Group	Capacity in μF	Inductance in mH
	IIC	≤ 4.1	≤ 80
	IIB	≤ 45	≤ 87
IIA	≤ 45	≤ 87	
Ambient temperature			
• During operation	-20 ... +50 °C (-4 ... +122 °F)		
• During storage	-20 ... +70 °C (-4 ... +158 °F)		
Enclosure			
• Material	Standard 19" insert in aluminum/steel (DIN 41494)		
• Width	21 TE (4.75")		
• Height	3 HE (5.25")		
• Rating	IP20/NEMA 1 to EN 60529		
• Mechanical load	1 g, 1 ... 800 Hz sinusoidal in all directions to EN 60068-2-36		

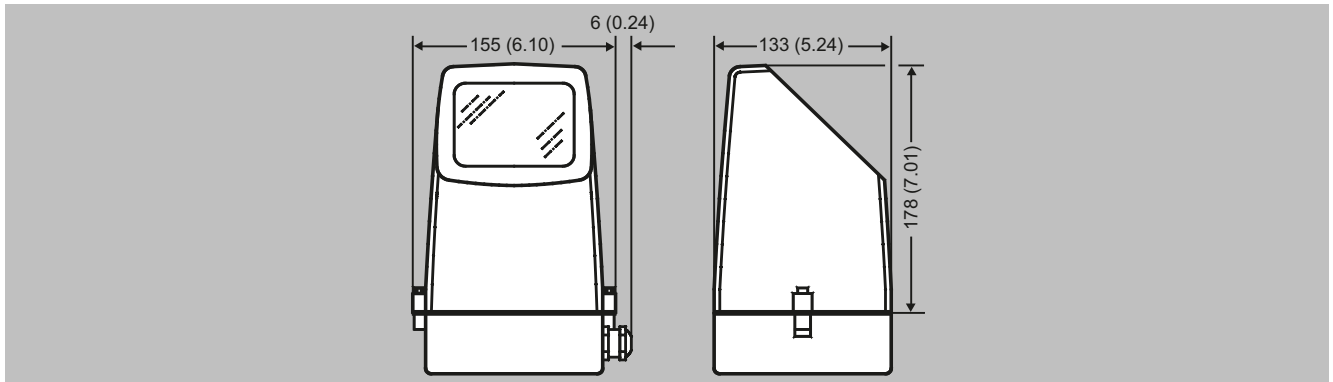
Flow Measurement

SITRANS FM (electromagnetic)

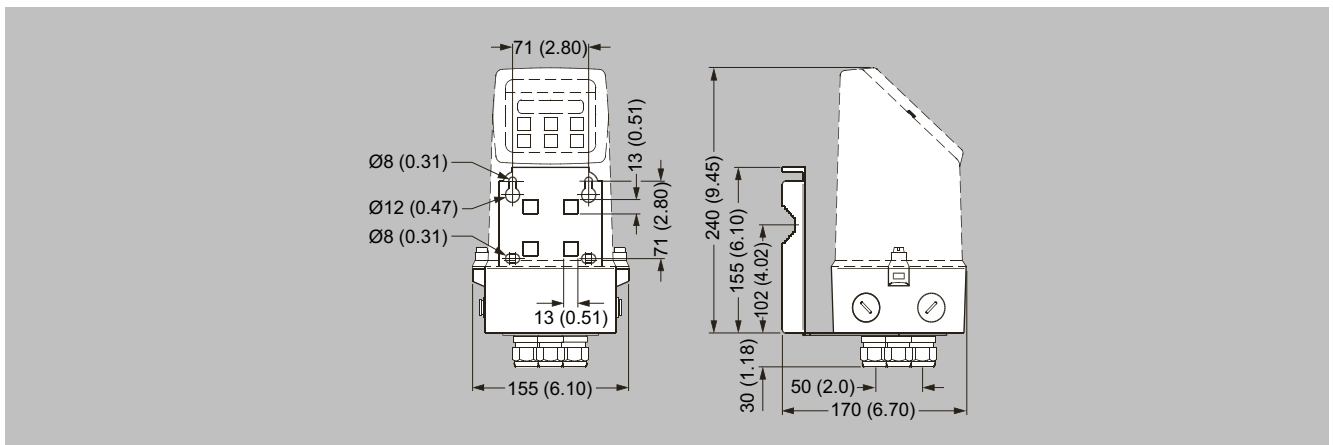
Flow transmitters / SITRANS FM MAG 5000 and 6000

Dimensional drawings

Transmitter IP67/NEMA 6 compact polyamide



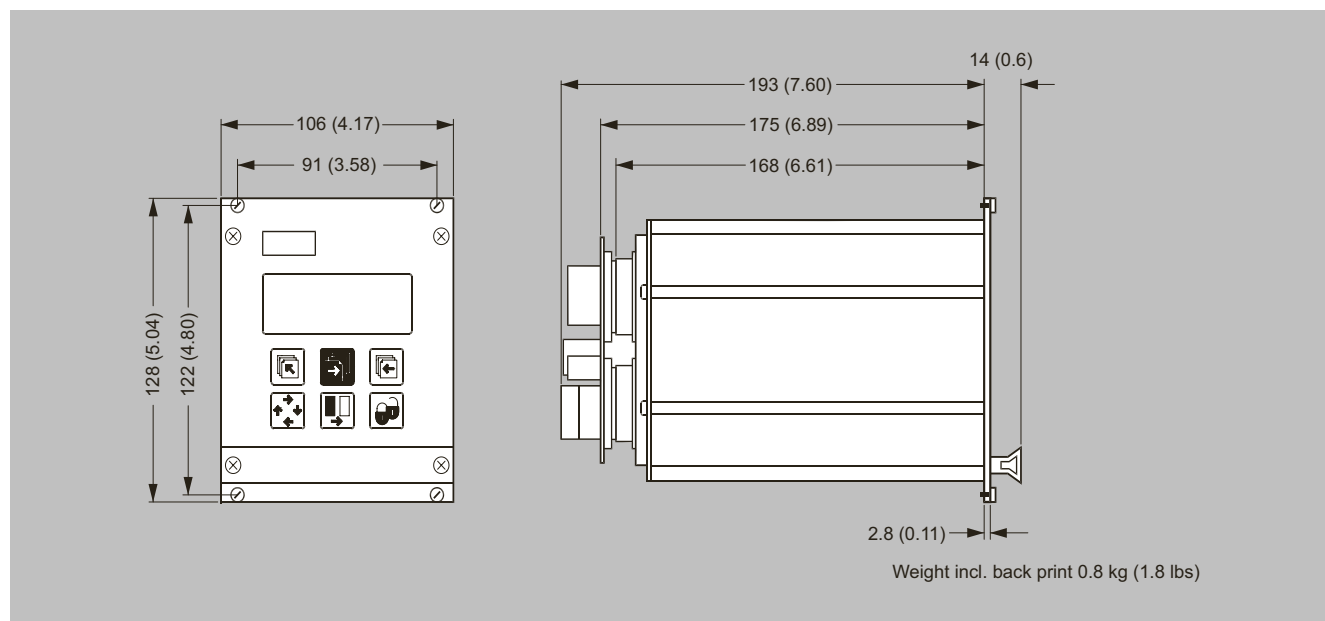
Transmitter compact mounted, dimensions in mm (inch)



Transmitter wall mounted, dimensions in mm (inch)

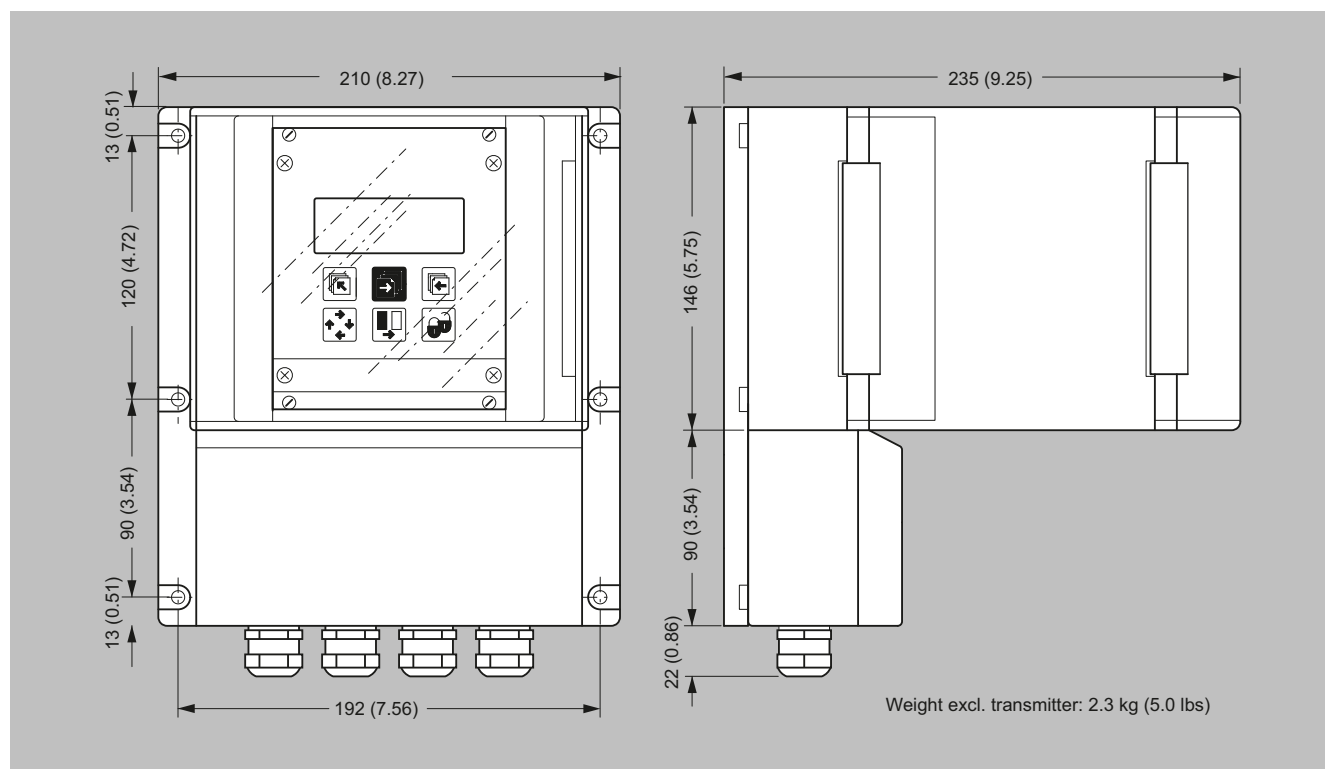
Dimensional drawings (continued)

Transmitter, 19" IP20/NEMA 2 standard unit



Dimensions in mm (inch)

Transmitter, wall mounting IP66/NEMA 4X, 21 TE



Dimensions in mm (inch)

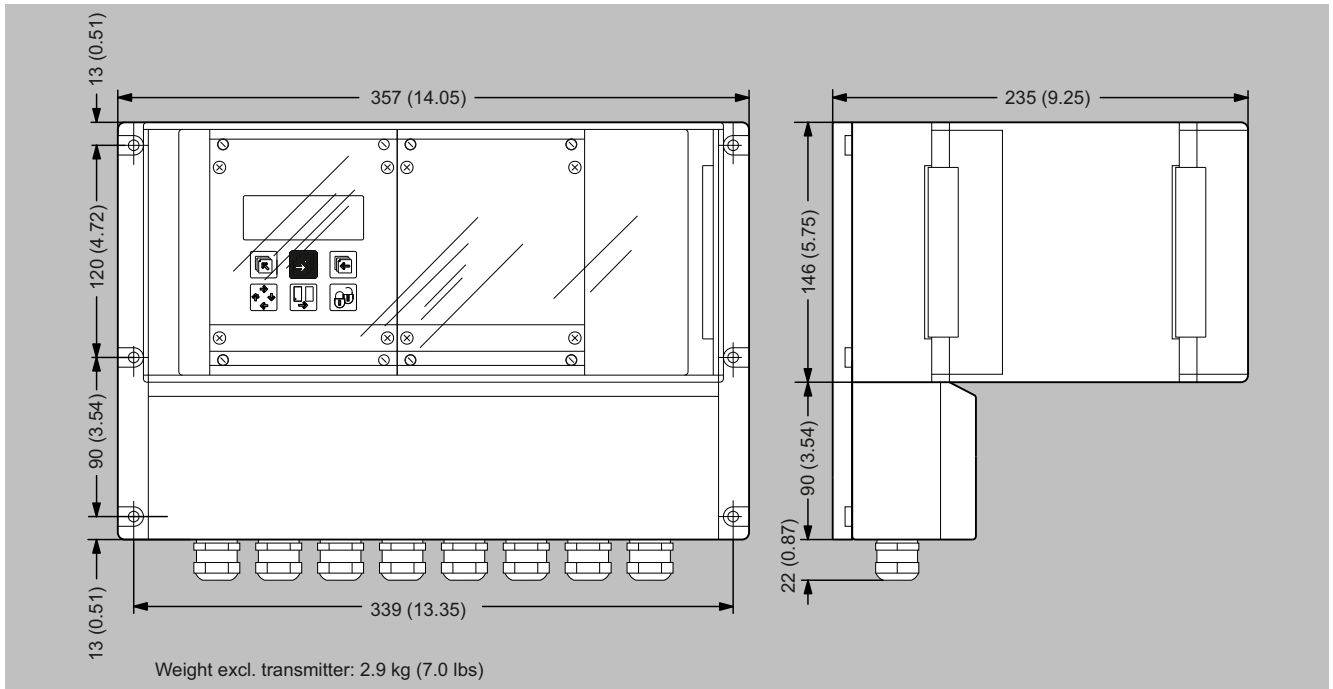
Flow Measurement

SITRANS FM (electromagnetic)

Flow transmitters / SITRANS FM MAG 5000 and 6000

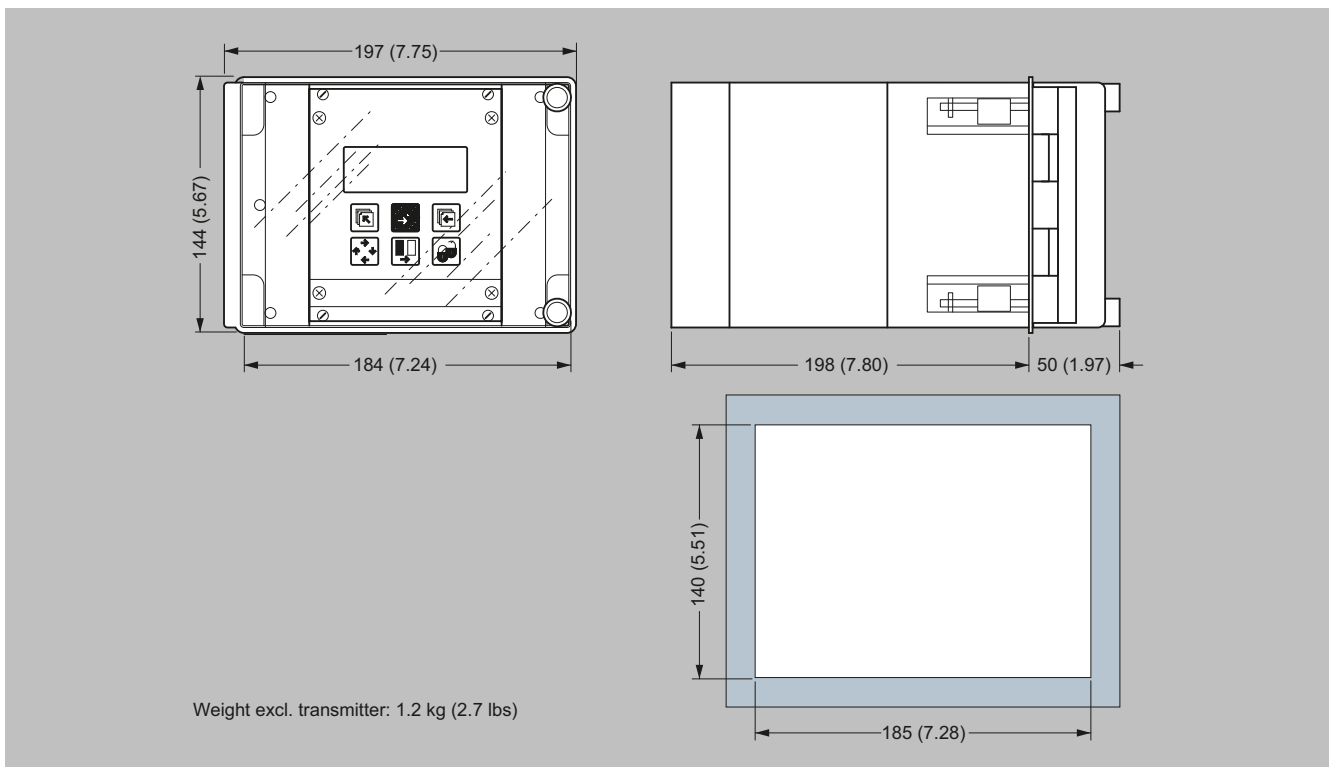
Dimensional drawings (continued)

Transmitter, wall mounting IP66/NEMA 4X, 42 TE



Dimensions in mm (inch)

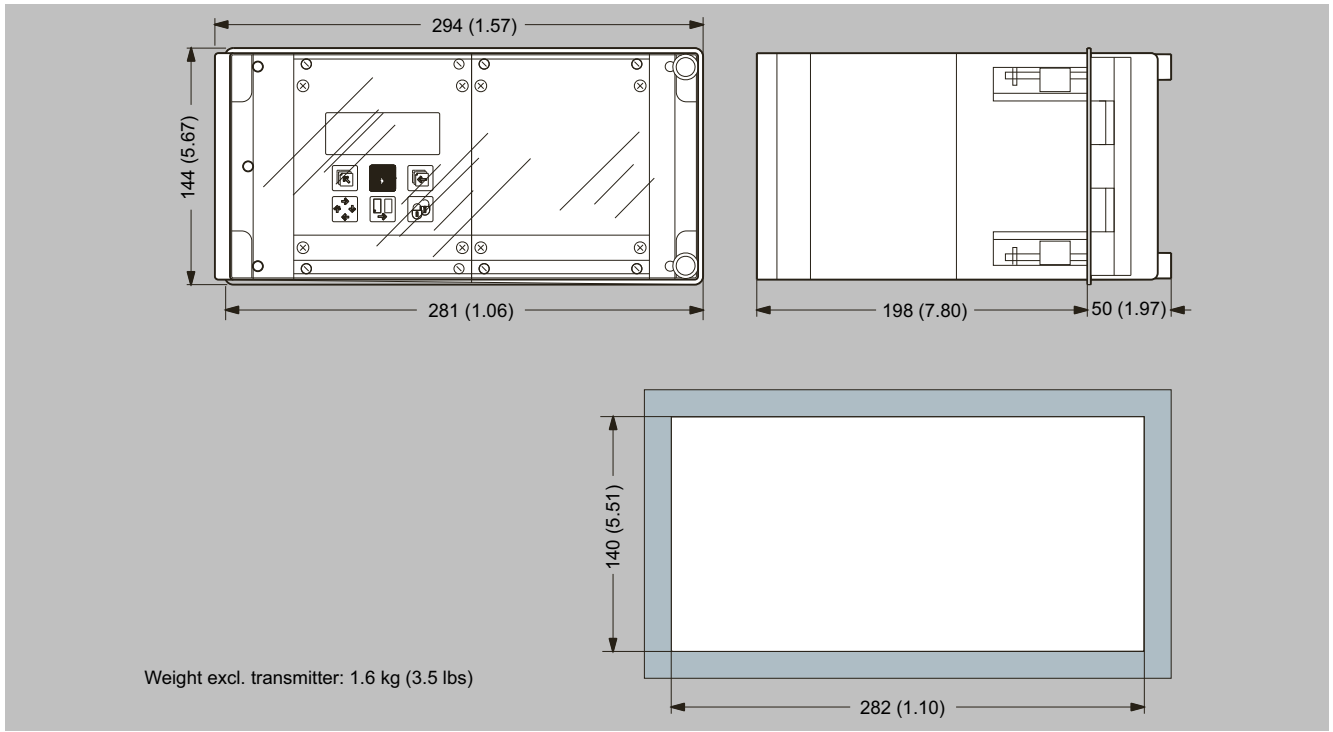
Transmitter, front panel mounting IP65/NEMA 4, 21 TE



Dimensions in mm (inch)

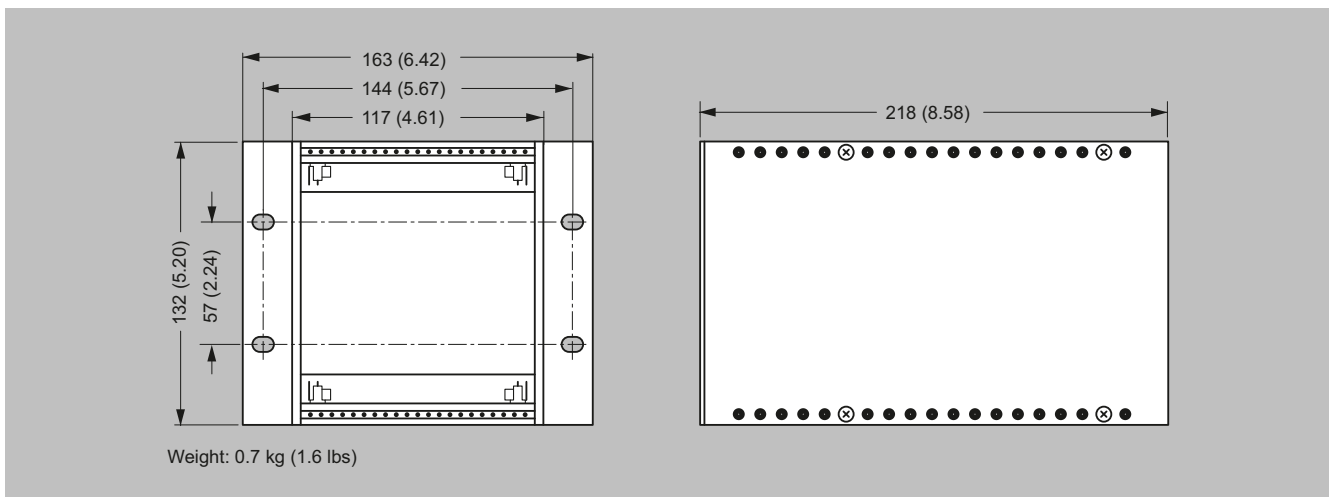
Dimensional drawings (continued)

Transmitter, front panel mounting IP65/NEMA 4, 42 TE



Dimensions in mm (inch)

Transmitter, panel mounting IP20/NEMA 2, 21 TE



Dimensions in mm (inch)

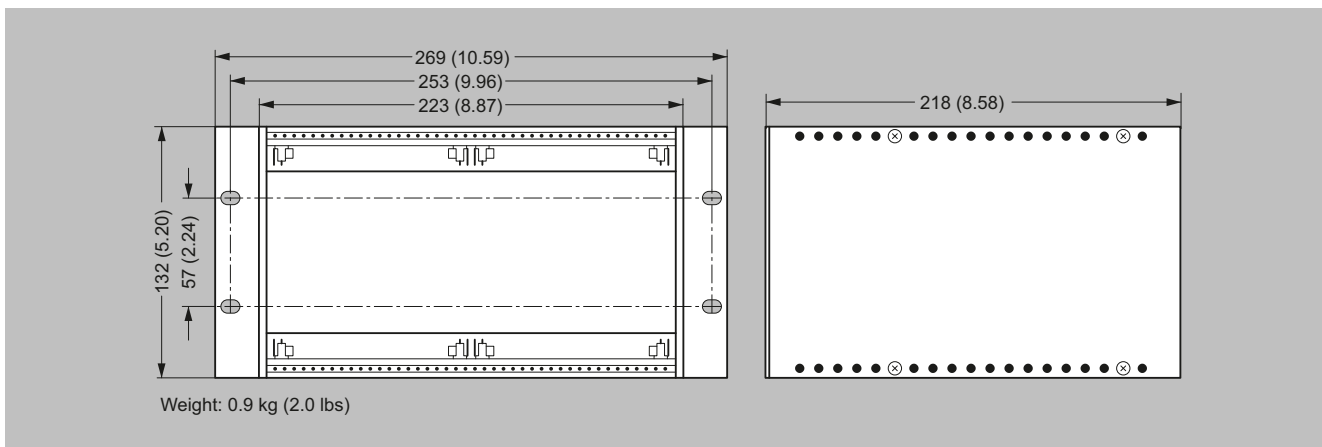
Flow Measurement

SITRANS FM (electromagnetic)

Flow transmitters / SITRANS FM MAG 5000 and 6000

Dimensional drawings (continued)

Transmitter, panel mounting IP20/NEMA 2, 42 TE



Dimensions in mm (inch)

Overview



The SITRANS FM MAG 6000 I/MAG 6000 I Ex de transmitter is designed for the demands in the process industry. The robust die-cast aluminum housing provides superb protection, even in the most harsh industrial environments. Full input and output functionality is given even in the Ex version.

Benefits

- Full range of Ex-rated flowmeters with intrinsically safe rated input and outputs
- For compact or remote installation
- HART, FOUNDATION Fieldbus H1, DeviceNet, PROFIBUS PA and DP, Modbus RTU/RS 485 add-on communication modules available
- Superior signal resolution for optimum turn down ratio
- Digital signal processing with many possibilities
- Automatic reading of SENSORPROM data for easy commissioning
- User configurable operation menu with password protection
 - 3 lines, 20 characters display in 11 languages
 - Flow rate in various units
 - Totalizer for forward, reverse and net flow as well as much more information available
- Multiple functional outputs for process control, minimum configuration with analogue, pulse/frequency and relay output (status, flow direction, limits)
- Comprehensive self-diagnostic for error indication and error logging
- Batch control
- Conforming to NAMUR recommendations NE 21, NE 32, NE 43, NE 53 and NE 70
- Self verification

Design

The transmitter is designed for either compact or remote installation in non-hazardous or hazardous areas (compact mounted transmitter to be ordered together with the sensor).

Function

The following functions are available:

- Flow rate
- 2 measuring ranges
- 2 totalizers
- Low flow cut-off
- Flow direction
- Error system
- Operating time
- Uni-/bidirectional flow
- Limit switches and pulse output
- Batch control

The MAG 6000 I/6000 I Ex de is a microprocessor-based transmitter with a built-in alphanumeric display in several languages. The transmitters evaluate the signals from the associated electromagnetic sensors and also fulfil the task of a power supply unit which provides the magnet coils with a constant current.

Further information on connection, mode of operation and installation can be found in the data sheets for the sensors.

Displays and keypads

Operation of the transmitter can be carried out using:

- Keypad and display unit
- HART communicator
- PC/laptop and SIMATIC PDM software via HART communication
- PC/laptop and SIMATIC PDM software using PROFIBUS or Modbus communication

Flow Measurement

SITRANS FM (electromagnetic)

Flow transmitters / SITRANS FM MAG 6000 I and 6000 I Ex

Selection and ordering data

SITRANS FM Transmitter MAG 6000 I Remote with standard wall mounting bracket, local display, die cast aluminum	Article No. 7ME6930-									
	2	B	A	●	●	-	1	●	A	7
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.										
Supply voltage										
Standard transmitter: 18 ... 90 V DC; 115 ... 230 V AC, 50 ... 60 Hz								2		
Ex transmitter: 18 ... 30 V DC								4		
Ex transmitter: 115 ... 230 V AC, 50 ... 60 Hz								5		
Ex approval										
Standard sensor: FM Class I, Div 2, CSA Class I, Div 2									0	
Standard sensor: no approval for use in hazardous areas									1	
Ex sensor: Hazardous area (ATEX 2 GD; FM Class I, Zone 1; CSA Class I, Zone 1)									2	
Communication										
None										A
HART										B
PROFIBUS PA Profile 3										F
PROFIBUS DP Profile 3 (not for Ex version)										G
Modbus RTU/RS 485 (not for Ex version)										E
FOUNDATION Fieldbus H1										J
Cable gland entries										
Metric										0
½" NPT										2

1) Product Variation Request (PVR).

Further design	Order code
Please add "-Z" to Article No. and specify Order code(s) and plain text	
Tag name plate, stainless steel (specify in plain text)	Y17
Tag name plate, plastic (self-adhesive)	Y18
Special version (specify in plain text)	Y99

Communication modules for MAG 6000 I (All standard outputs can still be used)

Description	Article No.
HART (only for MAG 6000 I/Ex)	FDK:085U0321
Modbus RTU/RS 485 ¹⁾	FDK:085U0234
PROFIBUS PA Profile 3	FDK:085U0236
PROFIBUS DP Profile 3 ¹⁾	FDK:085U0237
DeviceNet ¹⁾	FDK:085U0229
FOUNDATION Fieldbus H1	A5E02054250







1) Not for Ex versions

Accessories for MAG 6000 I/6000 I Ex


Description	Article No.
Standard coil or electrode cable 3 × 1.5 mm ² /18 gage, single shielded with PVC jacket Temperature range: -30 ... +70 °C (-22 ... +158 °F)	
• 5 m (16.5 ft)	A5E02296523
• 10 m (33 ft)	FDK:083F0121
• 20 m (65 ft)	FDK:083F0210
• 30 m (98 ft)	A5E02297309
• 40 m (131 ft)	FDK:083F0211
• 50 m (164 ft)	A5E02297317
• 60 m (197 ft)	FDK:083F0212



Selection and ordering data (continued)

Description	Article No.	
<ul style="list-style-type: none"> • 100 m (328 ft) • 150 m (492 ft) • 200 m (656 ft) • 500 m (1640 ft) 	FDK:083F0213 FDK:083F3052 FDK:083F3053 FDK:083F3054	
Special electrode cable (empty pipe detection or low conductivity) 3 × 0.25 mm ² , double shielded with PVC jacket Temperature range: -30 ... +70 °C (-22 ... +158 °F) <ul style="list-style-type: none"> • 10 m (33 ft) • 20 m (65 ft) • 40 m (131 ft) • 60 m (197 ft) • 100 m (328 ft) • 150 m (492 ft) • 200 m (656 ft) • 500 m (1640 ft) 	FDK:083F3020 FDK:083F3095 FDK:083F3094 FDK:083F3093 FDK:083F3092 FDK:083F3056 FDK:083F3057 FDK:083F3058	
Cable kit including standard coil cable and special electrode cable Standard coil cable: 3 × 1.5 mm ² / 18 gage, single shielded with PVC jacket Special electrode cable: 3 × 0.25 mm ² , double shielded with PVC jacket Temperature range: -30 ... +70 °C (-22 ... +158 °F) <ul style="list-style-type: none"> • 5 m (16.5 ft) • 10 m (33 ft) • 15 m (49 ft) • 20 m (65 ft) • 25 m (82 ft) • 30 m (98 ft) • 40 m (131 ft) • 50 m (164 ft) • 60 m (197 ft) • 100 m (328 ft) • 150 m (492 ft) • 200 m (656 ft) • 500 m (1640 ft) 	A5E02296329 A5E01181647 A5E02296464 A5E01181656 A5E02296490 A5E02296494 A5E01181686 A5E02296498 A5E01181689 A5E01181691 A5E01181699 A5E01181703 A5E01181705	
Low noise electrode coax cable for low conductivity and high vibration levels 3 × 0.13 mm ² . Temperature range -25 °C ... +85 °C (-13 °F ... +185 °F) <ul style="list-style-type: none"> • 2 m (6.6 ft) • 5 m (16.5 ft) • 10 m (33 ft) 	A5E02272692 A5E02272723 A5E02272730	

Spare parts

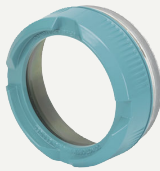




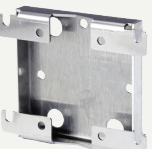
Description	Article No.	
Display unit	FDK:085U3122	

Flow Measurement

SITRANS FM (electromagnetic)

Flow transmitters / SITRANS FM MAG 6000 I and 6000 I Ex

Selection and ordering data (continued)

Description	Article No.	
Accessory bag including cable gland inserts and connectors for sensor cables	FDK:085U3144	
Display lid (non-Ex, Ex) in die-cast aluminum, with corrosion resistant coating (min. 60 µm)	7ME5933-0AC01	
Blind lid for sensor cables connection compartment (only remote version) in die-cast aluminum, with corrosion resistant coating (min. 60 µm) incl. O-ring seal	7ME5933-0AC02	
Blind lid (mains supply, input/outputs) in die-cast aluminum, with corrosion resistant coating (min. 60 µm)	7ME5933-0AC03	
Safety clamp	7ME5933-0AC06	
Standard wall-mounting bracket, stainless steel AISI 316L/1.4404	7ME5933-0AC04	
Special wall-mounting bracket, BI 2.5 DIN 59382 X6Cr17	7ME5933-0AC05	

Complete spare part PCB unit

Description	Article No.	
MAG 6000 I std. (not for Ex), 18 ... 30 V DC; 115 ... 230 V AC Spare PCBA	FDK:085U3123	
MAG 6000 I Ex d 115 ... 230 V AC Spare PCBA only for use with Ex approved sensor and explosion protection "Increased safety" (Ex e)	A5E01013127	
MAG 6000 I Ex d 18 ... 30 V DC Spare PCBA only for use with Ex approved sensor and explosion protection "Increased safety" (Ex e)	A5E01013340	

Please use online Product selector to get latest updates.

Selection and ordering data (continued)

Product selector link:

<http://www.pia-portal.automation.siemens.com>

Technical specifications

MAG 6000 I and MAG 6000 I Ex	
Mode of operation	
Measuring principle	Electromagnetic with pulsed constant field
Empty pipe	Detection of empty pipe (special cable required in remote mounted installation)
Excitation frequency	Depend on sensor size
Electrode input impedance	$> 1 \times 10^{14} \Omega$
Input	
Digital input	11 ... 30 V DC, $R_i = 4.4 \text{ k}\Omega$
• Activation time	50 ms
• Current	$I_{11 \text{ V DC}} = 2.5 \text{ mA}$, $I_{30 \text{ V DC}} = 7 \text{ mA}$
Output	
Current output	
• Signal range	4 ... 20 mA (active/passive)
• Load	$< 560 \Omega$
• Time constant	0.1 ... 30 s, adjustable
Digital output	
• Frequency	0 ... 10 kHz, 50 % duty cycle (uni-/bidirectional)
• Time constant	0.1 ... 30 s, adjustable
• Pulse (passive)	3 ... 30 V DC, max. 110 mA (30 mA Ex version), $200 \Omega \leq R_i \leq 10 \text{ k}\Omega$ (powered from connected equipment)
• Time constant	0.1 ... 30 s, adjustable
Relay output	
• Time constant	Changeover relay, same as current output
• Load	42 V AC/2 A, 24 V DC/1 A
Low flow cut off	0 ... 9.9 % of maximum flow
Galvanic isolation	All inputs and outputs are galvanic isolated.
Max. measuring error	
MAG 6000 I/MAG 6000 I Ex (incl. sensor)	$\pm 0.2 \% \pm 1 \text{ mm/s}$
Rated operation conditions	
Ambient temperature	
• Operation	
- MAG 6000 I ²⁾	-20 ... +60 °C (-4 ... +140 °F)
- MAG 6000 I Ex ²⁾	-20 ... +60 °C (-4 ... 140 °F)
• Storage	-40 ... +70 °C (-40 ... +158 °F)
Mechanical load	18 ... 1000 Hz random in x, y, z, directions for 2 hours according to EN 60068-2-36 Transmitter: 1.14 g RMS
Degree of protection	IP67/NEMA 4X to IEC 529 and DIN 40050 (1 mH ₂ O 30 min.)
EMC performance	<ul style="list-style-type: none"> • IEC/EN 61326-1 (all environments) • IEC/EN 61326-2-5 • NAMUR NE 21
Display and keypad	
Totalizer	Two eight-digit counters for forward, net or reverse flow
Display	Background illumination with alphanumeric text, 3 x 20 characters to indicate flow rate, totalized values, settings and faults; Reverse flow indicated by negative sign
Keypad	Capacitive touch keypad with LED light for feedback indication
Time constant	Time constant as current output time constant

Technical specifications (continued)

MAG 6000 I and MAG 6000 I Ex	
Design	
Enclosure material	Die-cast aluminum, with corrosion resistant Basic Polyester powder coating (min. 60 µm)
• Wall mounting	Wall mounting bracket enclosed for remote version
Dimensions	See dimensional drawings
Weight	See dimensional drawings
Power supply	
	<ul style="list-style-type: none"> • Standard transmitter: 18 ... 90 V DC; 115 ... 230 V AC; 50 ... 60 Hz • Ex transmitter: 18 ... 30 V DC • Ex transmitter: 115 ... 230 V AC; 50 ... 60 Hz
Power consumption	<ul style="list-style-type: none"> • 230 V AC: 20 VA • 24 V DC: 9.6 W, $I_N = 0.4 \text{ A}$, $I_{ST} = 1 \text{ A}$ (3 ms)
Certificates and approvals	
General purpose	• CE (LVD, EMC, PED, RoHS)
Hazardous areas	<ul style="list-style-type: none"> • ATEX, IECEx, FM, CSA, EAC Ex, NEPSI <ul style="list-style-type: none"> - Zone 1 Ex d e [ia] ia IIC T6 Gb • ATEX, IECEx, CSA <ul style="list-style-type: none"> - Zone 21 Ex tD A21 IP67 T85 °C • FM <ul style="list-style-type: none"> - XP IS Class I Div. 1 Groups A, B, C, D - DIP Class II+III Div. 1 Groups E, F, G
Others	<ul style="list-style-type: none"> • CPA (China) • EAC (Russia, Belarus, Kazakhstan) • KCs (South Korea)
Cable entries	
MAG 6000 I	
• Power supply and outputs	2 x M20 (HART)/M25 (PROFIBUS) or 2 x 1/2" NPT (HART)
• Sensor connection	2 x M16 or 2 x 1/2" NPT
MAG 6000 I Ex ATEX 2G D	
• Power supply and outputs	2 x M20
• Sensor connection	2 x M16
Communication	
Standard versions	HART, Modbus RTU/RS 485, FOUNDATION Fieldbus H1, DeviceNet, PROFIBUS PA, PROFIBUS DP add-on modules
Ex versions	HART, PROFIBUS PA (not for Ex version)

1) Applicable for: Compact mounted MAG 6000 I Ex on MAG 3100, sizes DN 15 ... 300 (1/2" ... 12").

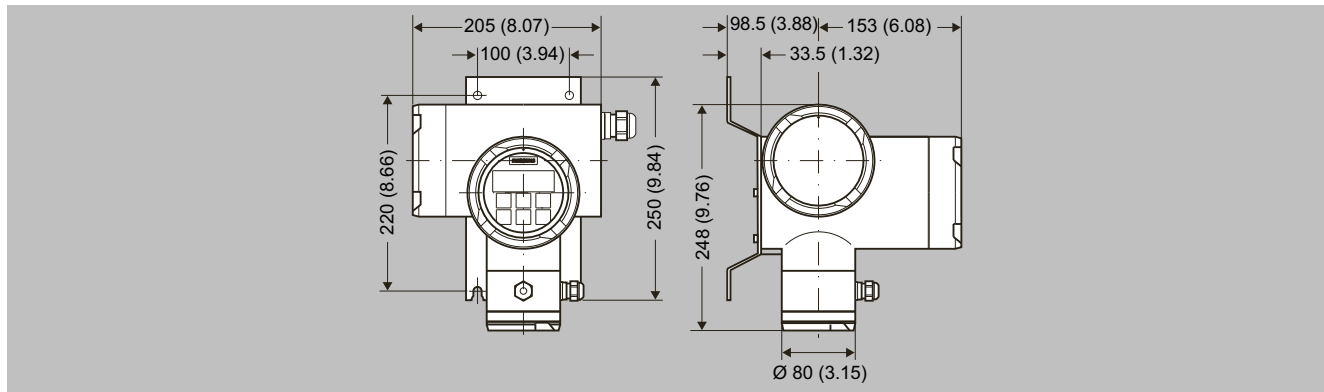
2) With HART communication max. ambient temperature 50 °C (122 °F).

Flow Measurement

SITRANS FM (electromagnetic)

Flow transmitters / SITRANS FM MAG 6000 I and 6000 I Ex

Dimensional drawings



SITRANS FM transmitter MAG 6000 I with wall-mounting bracket, dimensions in mm (inch)

Overview



The SITRANS FM100 is an electromagnetic flow sensor in a compact design for basic applications in the process and OEM industry.

Benefits

- Connection 1/2", 3/4", 1", 2"
- Flow- and temperature measurement
- IO-Link communication
- Dosing function with external control output
- Colored, multi-parameter configurable TFT display, rotatable 90°
- Bidirectional measuring
- Intuitive setup menu via 4 optical touch keys
- 2 freely configurable outputs
- All-metal design: stainless steel
- Included in Quick Ship Program (delivery time see PIA LCP)

Application

The main applications of the SITRANS FM electromagnetic flow sensors can be found in the following fields:

- OEM industry
- Process industry
- Small water cycles: e.g. cooling water, water leakage
- Dosing e.g. in chemical industry

Design

The SITRANS FM100 is designed to measure small- and medium sized flow of conductive liquids. The small build allows to fit the device in almost any space. The robust stainless-steel housing protects the device in changing surroundings.

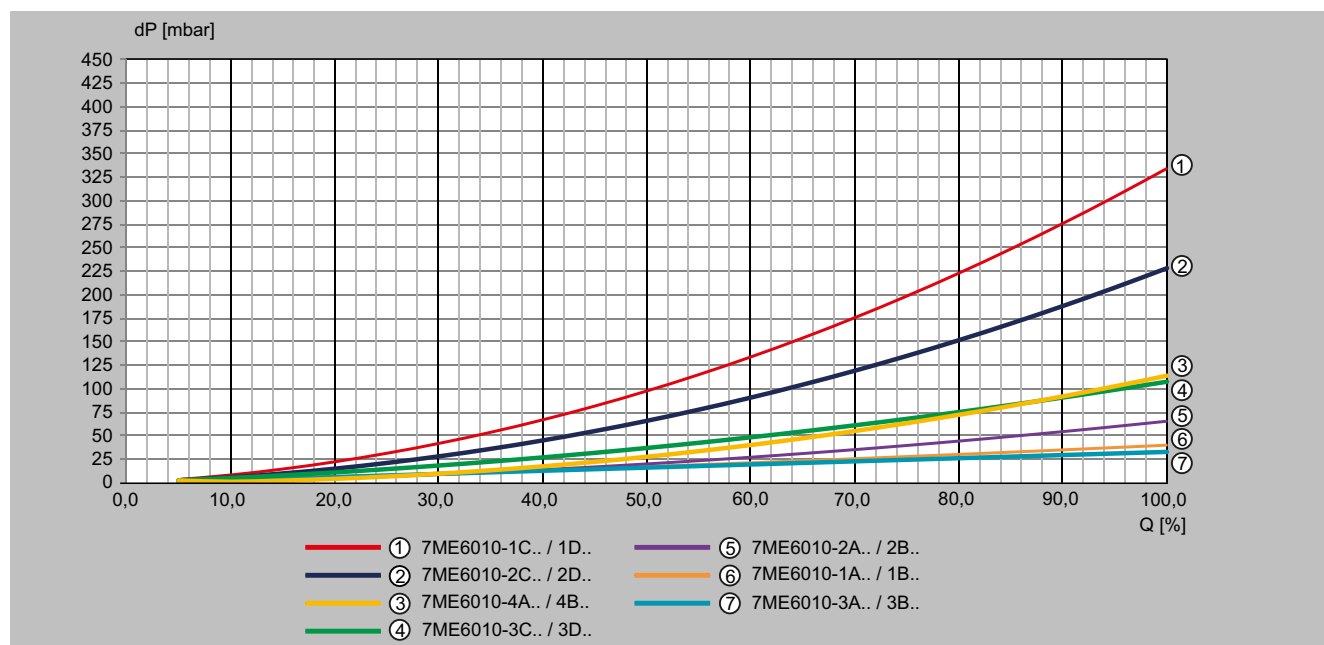
The measurement is displayed on the local screen as well as accessible via 2 freely configurable outputs (pulse-/frequency-/alarm- and analogue).

Mode of operation

The flow measuring principle is based on Faraday's law of electromagnetic induction according to which the sensor converts the flow into an electrical voltage proportional to the velocity of the flow.

Integration

Pressure loss



Flow Measurement

SITRANS FM (electromagnetic)

Modular pulsed DC flowmeters / SITRANS FM100

Selection and ordering data

SITRANS FM100 flowmeter	Article No.								
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.									
Process connection, measuring range									
Male thread G1/2", 0.03 ... 3 l/min								1	A
Male thread G1/2", 0.25 ... 48 gal/h								1	B
Male thread G1/2", 0.04 ... 10 l/min								1	C
Male thread G1/2", 0.011 ... 2,6 gal/min								1	D
Male thread G3/4", 0.1 ... 25 l/min								2	A
Male thread G3/4", 0.025 ... 6,6 gal/min								2	B
Male thread G3/4", 0.2 ... 50 l/min								2	C
Male thread G3/4", 0.053 ... 13 gal/min								2	D
Male thread G1", 0.2 ... 50 l/min								3	A
Male thread G1", 0.053 ... 13 gal/min								3	B
Male thread G1", 0.4 ... 100 l/min								3	C
Male thread G1", 0.1 ... 26 gal/min								3	D
Male thread G2", 1.5 ... 350 l/min								4	A
Female thread 2" NPT, 0.4 ... 92 gal/min								4	B
Transmitter design									
Compact design without cable									A
Gasket material									
FKM/FPM									0
EPDM									1
Quality inspection certificate									
Without									0
3-point factory calibration									3
5-point factory calibration									5

Technical specifications

FM100	
Measuring principle	Electromagnetic induction
Media	Conductive liquid with $\geq 20 \mu\text{S}/\text{cm}$
Accuracy	$< \pm(0.8\% \text{ of reading} + 0.5\% \text{ of full scale})^{1)}$
Repeatability	$\pm 0.2\% \text{ of full scale}$
Response time flow t_{90}	
• Alarm/pulse/frequency output	$< 100 \text{ ms}$
• Current output	$< 1 \text{ s}$
Temperature measurement	
Sensor	PT1000
Accuracy	$\leq \pm 2 \text{ }^\circ\text{C}$ (flow $> 0.2 \text{ m/s}$)
Measuring range	Temperature range of media
Response time temperature t_{90} (signal output)	$< 20 \text{ s}$
Process connection	
Nominal size	G $\frac{1}{2}$ " ... G 2" Compatible NPT adapter available ($\frac{1}{4}$ " ... 2")
Process connection	Threaded fitting
Rated operation conditions	
Mounting position	In all directions, bidirectional measuring
In-/outlet	$3 \times \text{diameter} / 2 \times \text{diameter}$
Ambient temperature	$-20 \dots +70 \text{ }^\circ\text{C}$ ($-4 \dots +158 \text{ }^\circ\text{F}$)
Enclosure rating	IP67
Operating pressure	Max. 16 bar
Pressure drop	See pressure loss diagram
Mechanical load	
• Shock resistance	DIN EN 60068-2-27:2010: 20 g (11 ms)
• Vibration resistance	DIN EN 60068-2-6:2008: 5 g (10 ... 2 000 Hz)
• Environmental testing	DIN EN 60068-2-30:2006: severity level b
EMC	2014/30/EU
Design	
Weight	See dimensional drawings
Housing material	Stainless steel 1.4404
Electrode material	Stainless steel 1.4404
Connection fitting	Stainless steel 1.4404
Insulation parts	PEEK
Seals	FKM (Option: EPDM)
Display	PMMA Operation via 4 optical touch sensors (operation with hand gloves) TFT display, 128×128 pixels, 1.4" display, orientation in 90° steps adjustable, repetition rate adjustable 0.5 ... 10 s
Cable entries	M12x1 4-pin connection
Dimensions	See dimensional drawings
Electrical data	
Power supply	19 ... 30 V DC
Power consumption	Max. 200 mA
Outputs	
• Frequency	Push-Pull, freely scalable, 2kHz @ overflow $f_{\text{min}} @ \text{FS} = 50 \text{ Hz}$ $f_{\text{max}} @ \text{FS} = 1\,000 \text{ Hz}$
• Pulse	Push-Pull, freely scalable, configurable for partial and accumulated totalizer
• Alarm	NPN, PNP, Push-Pull, configurable max. 30 V DC, max. 200 mA short-circuit proof
• Current	0(4) ... 20 mA (active) or 0(2) ... 10 V DC Max. load 500 Ω
Input	
• Control	Active signal U_{high} max. 30 V DC 0 < Low < 10 V DC 15 V DC < High < V_s

Flow Measurement

SITRANS FM (electromagnetic)

Modular pulsed DC flowmeters / SITRANS FM100

Technical specifications (continued)

FM100	
<ul style="list-style-type: none"> Dosing function 	Dosing output OUT2: Push-Pull, High active Control input OUT1: START/STOP 0.5 s < t _{high} < 4 s RESET t _{high} > 5 s
Communication <ul style="list-style-type: none"> Manufacturer ID Manufacturer name Version Bitrate Minimal cycle time SIO-Mode Block parameterization Operational readiness Max. cable length 	IO-Link 42 (decimal), 0x002A (hex) Siemens AG V1.1 COM3 1.1 ms Yes (OUT1 in configuration IO-Link) Yes 10 s 20 m

¹⁾ Under reference conditions:
 - Media temperature: 15 ... 30 °C
 - Ambient temperature: 15 ... 30 °C
 - 1 cST
 - 500 µS/cm
 - 1 bar

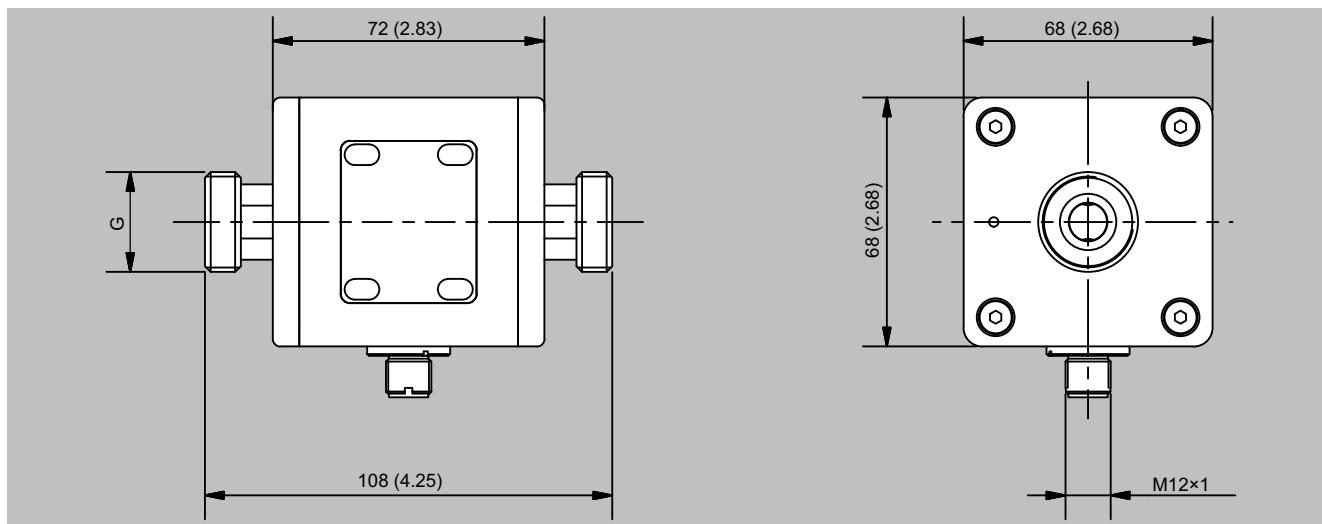
Factory calibration points

Type	Measuring range	Quality inspection certificate	Measuring point [l/min]				
			1	2	3	4	5
7ME6010	1A, 1B	0	1.5	-	-	-	-
		3	0.5	1.5	2.5	-	-
		5	0.5	1	1.5	2	2.5
	1C, 1D	0	5	-	-	-	-
		3	1	5	8	-	-
		5	0.5	2	5	6	8
	2A, 2B	0	12	-	-	-	-
		3	2	12	20	-	-
		5	0.5	2	12	15	20
	2C, 2D	0	25	-	-	-	-
		3	4	25	50	-	-
		5	4	15	25	30	40
	3C, 3D	0	50	-	-	-	-
		3	20	50	80	-	-
		5	8	20	50	60	80
	4A, 4B	0	170	-	-	-	-
		3	20	170	280	-	-
		5	20	100	170	200	280

Dimensional drawings

SITRANS FM100 flowmeter with compact transmitter

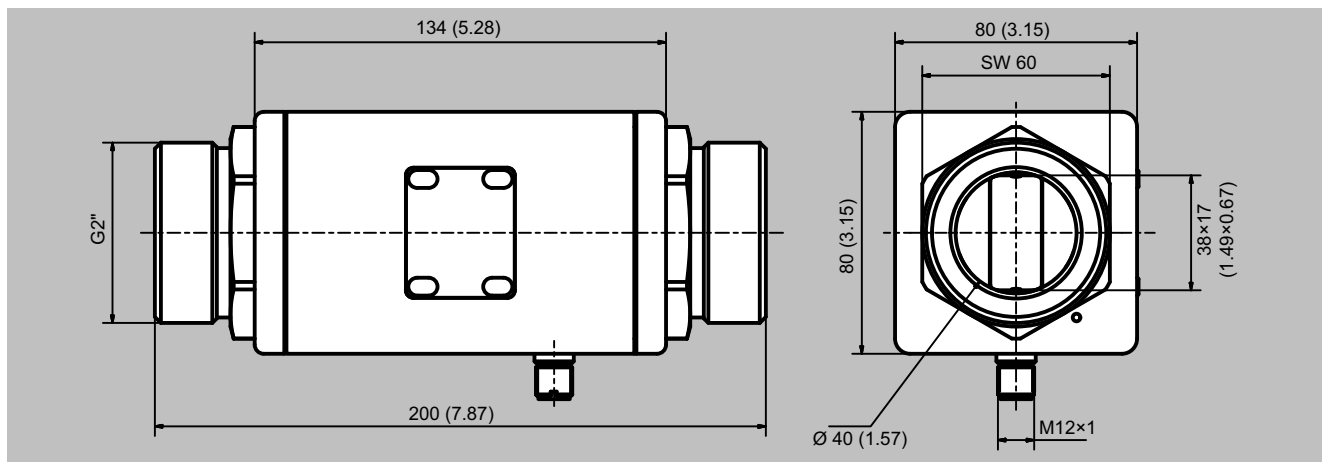
Process connection G1/2", G3/4" and G1



SITRANS FM100 with compact transmitter, process connection G1/2", G3/4" and G1"; dimensions in mm (inch)

Process connection	Nominal size	Weight (g)
Male thread	G1/2"	998
Male thread	G3/4"	988
Male thread	G1"	1010

Process connection G2"



SITRANS FM100 with compact transmitter, process connection G2"; dimensions in mm (inch)

Process connection	Nominal size	Weight (g)
Male thread	G2"	2420

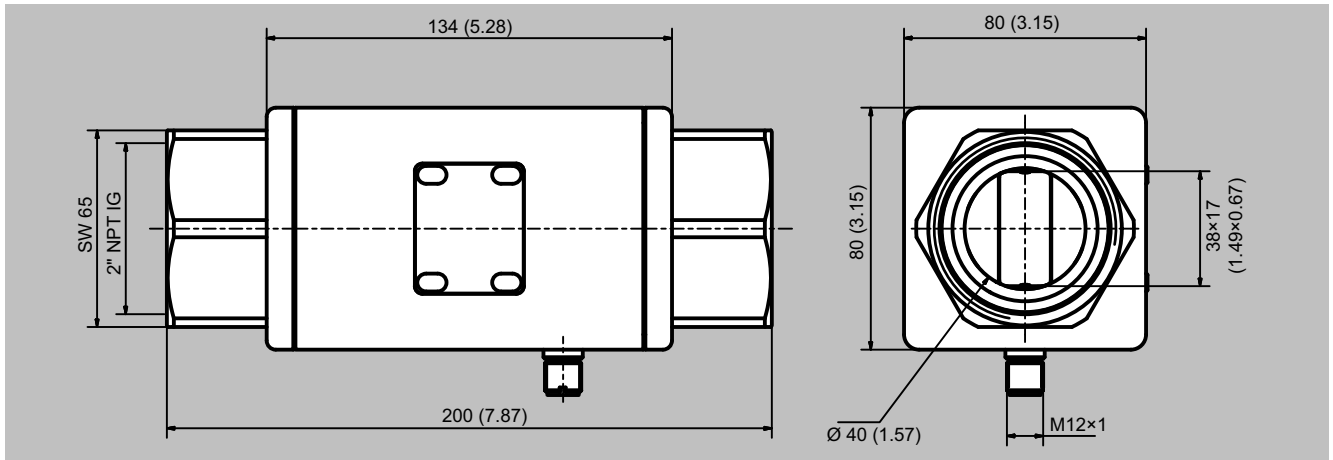
Flow Measurement

SITRANS FM (electromagnetic)

Modular pulsed DC flowmeters / SITRANS FM100

Dimensional drawings (continued)

Process connection 2" NPT IG



SITRANS FM100 with compact transmitter, process connection 2" NPT (female); dimensions in mm (inch)

Process connection	Nominal size	Weight (g)
Female thread	2" NPT IG	2140

SITRANS FM100 inner diameters

Connection, nominal size	Inside diameters (DN)	Range
G1/2"	5 mm	0.03 ... 3 l/min / 0.04 ... 10 l/min
G3/4"	10 mm	0.1 ... 25 l/min / 0.2 ... 50 l/min
G1"	15 mm	0.2 ... 50 l/min / 0.4 ... 100 l/min
2" NPT IG	see dimensional drawings	1.5 ... 350 l/min

Overview



SITRANS FM TRANSMAG 2 with the SITRANS FM MAG 911/E sensor is an AC pulsed alternating field magnetic flowmeter where the magnetic field strength is much higher than conventional DC pulsed magnetic flowmeters.

Benefits

- Wide range of sizes DN 15 to DN 1000 (½" to 40")
- Broad range of liner and electrode materials for extreme process medias
- Fully welded construction provides a ruggedness that suits the toughest applications and environments.
- Automatic reading of SmartPLUG for easy commissioning
- Simple menu operation with two-line display
- Comprehensive self-diagnostic with self-monitoring and internal simulation

Application

The main applications of the SITRANS FM transmitter TRANSMAG 2 can be found in the following sectors:

- Pulp and Paper industry
 - Mining industry
- The patented pulse alternating field technology is ideal for difficult applications like:
- High concentrated paper stock > 3 %
 - Heavy mining slurries up to 70 % solid concentration
 - Mining slurries with magnetic particles
 - Low conductive medias $\geq 1 \mu\text{S/cm}$

Design

- Available for remote mounting
- PROFIBUS PA (profile 2.0) / HART communication
- Analog output and digital outputs for pulses, device status, limits, flow direction, frequency output

Mode of operation

The flow measuring principle is based on Faraday's law of electromagnetic induction according to which the sensor converts the flow into an electrical voltage proportional to the velocity of the flow.

Function

The TRANSMAG 2 is a microprocessor-based transmitter with a built-in alphanumeric display in several languages. The transmitters evaluate the signals from the associated electromagnetic sensors and also fulfill the task of a power supply unit which provides the magnet coils with a constant current.

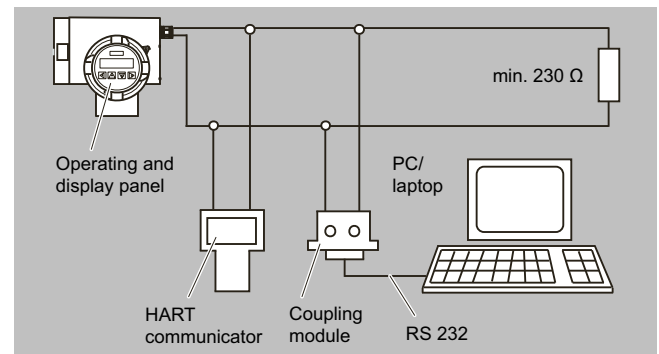
The magnetic flux density in the sensor is additionally monitored by reference coils.

Further information on connection, mode of operation and installation can be found in the data sheets for the sensors.

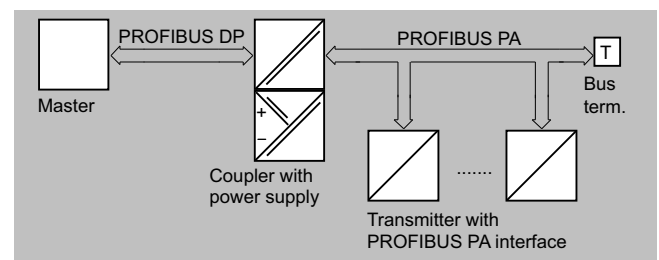
Displays and keypads

Operation of the transmitter can be carried out using:

- Keypad and display unit
- HART communicator
- PC/laptop and SIMATIC PDM software via HART communication
- PC/laptop and SIMATIC PDM software using PROFIBUS PA communication



HART communication



PROFIBUS PA communication

Flow Measurement

SITRANS FM (electromagnetic)

AC powered alternating field flowmeters / SITRANS FM TRANSMAG 2 with SITRANS FM MAG 911/E

Selection and ordering data

Transmitter TRANSMAG 2 Remote with standard wall mounting bracket, local display, die cast aluminum		Article No. 7ME5034-									
		●	A	A	1	1	-	●	A	A	0
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.											
Output/communication											
4 ... 20 mA with HART										0	
PROFIBUS PA										1	
4 ... 20 mA with HART and digital input										2	
Cable glands											
M20 × 1.5										1	
½" NPT										2	

	Order code
Additional information	
Please add "-Z" to Article No. and specify Order code(s) and plain text.	
Special mounting bracket for wall and pipeline installation	A02
Transmitter setting for parameter "TAG number" (specify in plain text, max. 8 characters)	Y15
Transmitter setting for parameter "TAG descriptor" (specify in plain text, max. 16 characters)	Y16
Tag name plate, stainless steel (specify in plain text)	Y17
Special version (specify in plain text)	Y99

Sensor MAG 911/E		Article No. 7ME5610-									
		●	●	●	●	●	-	●	A	A	●
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.											
Nominal size											
DN 15 (½")		1	V								
DN 25 (1")		2	D								
DN 40 (1½")		2	R								
DN 50 (2")		2	Y								
DN 65 (2½")		3	F								
DN 80 (3")		3	M								
DN 100 (4")		3	T								
DN 125 (5")		4	B								
DN 150 (6")		4	H								
DN 200 (8")		4	P								
DN 250 (10")		4	V								
DN 300 (12")		5	D								
DN 350 (14")		5	K								
DN 400 (16")		5	R								
DN 450 (18")		5	Y								
DN 500 (20")		6	F								
DN 600 (24")		6	P								
DN 700 (28")		6	Y								
DN 800 (32")		7	H								
DN 900 (36")		7	M								
DN 1000 (40")		7	R								
Flange norm and pressure rating											
EN 1092-1, PN 10 (DN 200 ... 1000 (8" ... 40"))									B		
EN 1092-1, PN 16 (DN 65 ... 1000 (2½" ... 40"))									C		
EN 1092-1, PN 25 (DN 200 ... 1000 (8" ... 40"))									E		
EN 1092-1, PN 40 (DN 15 ... 1000 (½" ... 40"))									F		
ANSI B16.5, Class 150 (½" ... 24") ¹⁾									J		
ANSI B16.5, Class 300 (½" ... 24") ²⁾									K		
AWWA C-207 Class D (28" ... 40")									L		
JIS 10 K (½" ... 24")									R		

Selection and ordering data (continued)

Sensor MAG 911/E	Article No. 7ME5610-									
	●	●	●	●	●	-	●	A	A	●
Flange material										
Mid steel flanges 1.0460/1.0570										1
Stainless steel flanges, AISI 316L/1.4404										3
Liner material										
Soft rubber (DN 25 to DN 1000)										1
PTFE (DN 15 to DN 600)										3
Hardrubber (DN 15 to DN 1000)										4
Linatex (DN 25 to DN 1000)										5
Novolak (sealing material FFKM) (DN 50 to DN 1000)										6
Electrode material										
AISI 316Ti/1.4571										1
Hastelloy C276/2.4819										2
Platinum										3
Titanium										4
Tantalum										5
Cable glands/terminal box										
Metric: Polyamide terminal box										1
½" NPT: Polyamide terminal box										2
Metric: Stainless steel terminal box										3
½" NPT: Stainless steel terminal box										4

- 1) 20 °C (68 °F), max. 19.6 bar (285 psi) for steel flanges and max. 15.9 bar (231 psi) for stainless steel flanges
 2) 20 °C (68 °F), max. 51.1 bar (741 psi) for steel flanges and max. 41.4 bar (600 psi) for stainless steel flanges

	Order Code
Additional information	
Please add "-Z" to Article No. and specify Order code(s) and plain text.	
Two grounding electrodes made of stainless steel AISI 316Ti/1.4571	A02
Two grounding electrodes made of Hastelloy C276/2.4819	A04
Two grounding electrodes made of Platinum	A05
Two grounding electrodes made of Titanium	A06
Two grounding electrodes made of Tantalum	A07
Factory certificate to EN 10204-2.2	C14
Material certificate according to EN 10204-3.1	C16
Power supply 110 V/60 Hz	P01
Flow range setting: Specify upper flow range value	Y01
Pulse output setting: Specify pulse value (1 pulse/unit)	Y02
Silicon-free version	Y04
Tag name plate, stainless steel (specify in plain text)	Y17
Special version (specify in plain text)	Y99

Cable kit for sensor MAG 911/E	Article No. 7ME5930-										Order code		
	5	●	A	0	0	-	0	A	A	0	●	●	●
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.													
Cable													
Cable kit for sensor MAG 911/E, coil cable 3 × 1.0 mm ² (3 × 0.0016 inch ²), electrode cable 7 × 0.5 mm ² (7 × 0.0008 inch ²), single shielded with PVC jacket													
• Length: 5 m (16.4 ft)													B
• Length: 10 m (32.8 ft)													C
• Length: 20 m (65.6 ft)													D
• Length: 30 m (98.4 ft)													E

Flow Measurement

SITRANS FM (electromagnetic)

AC powered alternating field flowmeters / SITRANS FM TRANSMAG 2 with SITRANS FM MAG 911/E




Selection and ordering data (continued)

Cable kit for sensor MAG 911/E	Article No. 7ME5930-	Order code
• Length: 40 m (131 ft)	5 ● A 0 0 - 0 A A 0 ● ● ●	
• Length: 50 m (164 ft)	F	
• Length: 60 m (197 ft)	G	
• Length: 80 m (260 ft)	H	
• Length: 100 m (328 ft)	J	
• Other length (specify in plain text)	K	
	Z	J 1 Y

Grounding and protection ring for sensor MAG 911/E	Article No.	Order code
Protection ring	7ME5942-	● ● ● ● ●
Grounding ring	7ME5943-	● ● ● ● ●
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Nominal size		
DN 15 (½")		1 V
DN 25 (1")		2 D
DN 40 (1½")		2 R
DN 50 (2")		2 Y
DN 65 (2½")		3 F
DN 80 (3")		3 M
DN 100 (4")		3 T
DN 125 (5")		4 B
DN 150 (6")		4 H
DN 200 (8")		4 P
DN 250 (10")		4 V
DN 300 (12")		5 D
DN 350 (14")		5 K
DN 400 (16")		5 R
DN 450 (18")		5 Y
DN 500 (20")		6 F
DN 600 (24")		6 P
DN 700 (28")		6 Y
DN 800 (32")		7 H
DN 900 (36")		7 M
DN 1000 (40")		7 R
Flange design		
EN 1092-1, PN10		B
EN 1092-1, PN16		C
EN 1092-1, PN25		E
EN 1092-1, PN40		F
AISI B16.5, class 150		J
AISI B16.5, class 300		K
AWWA C-207, class D		L
JIS B2220, 10K		R
Material		
Stainless steel AISI 316/1.4571		1
Hastelloy C4/2.4610		2
Liner		
Soft rubber		1
PTFE		3
Hard rubber		4
Linatex		5
Novolak		6

Selection and ordering data (continued)

Accessories

Description	Article No.	
Standard wall-mounting bracket, stainless steel AISI 316L/1.4404	7ME5933-0AC04	
Special wall-mounting bracket, BI 2.5 DIN 59382 X6Cr17	7ME5933-0AC05	
Potting kit for IP68/ NEMA 6P sealing of sensor junction box	FDK:085U0220	

Spare parts






Description	Article No.	
Display unit	7ME5933-0AC00	
Display lid in die-cast aluminum, with corrosion resistant coating (min. 60 mm)	7ME5933-0AC01	
Blind lid for sensor cables connection compartment (only remote version) in die-cast aluminum, with corrosion resistant coating (min. 60 mm) incl. O-ring seal	7ME5933-0AC02	

Flow Measurement

SITRANS FM (electromagnetic)

AC powered alternating field flowmeters / SITRANS FM TRANSMAG 2 with SITRANS FM MAG 911/E

Selection and ordering data (continued)

Description	Article No.	
Blind lid (mains supply, input/outputs) in die-cast aluminum, with corrosion resistant coating (min. 60 mm)	7ME5933-0AC03	
Safety clamp for electronic cover with glass plate (7ME5933-0AC01)	7ME5933-0AC06	
M20 cable gland set for power and output connection, gray PA plastic, 2 pcs. • cables Ø 6 ... 12 mm (0.24" ... 0.47") • -40 ... +100 °C (-40 ... +212 °F)	A5E02246350	
1/2" NPT cable gland set for power and output connection, gray PA plastic, 2 pcs. • cables Ø 6 ... 12 mm (0.24" ... 0.47") • -40 ... +100 °C (-40 ... +212 °F)	A5E02246396	
M16 x 1.5 cable gland set for sensor connection, brass chrome, 2 pcs. and 2 pcs. blind • cables Ø 5 ... 9 mm (0.20" ... 0.35") • -20 ... +105 °C (-4 ... +221 °F)	A5E02246369	

Technical specifications

TRANSMAG 2	
Mode of operation and design	
Measuring principle	Electromagnetic with pulsed alternating field (PAC)
Magnetic field excitation	Automatic power supply synchronization
<ul style="list-style-type: none"> 50 Hz AC power supply 	Bipolar (16.7 Hz) Bipolar with prepulse (10 Hz) Unipolar (8.33 Hz)
<ul style="list-style-type: none"> 60 Hz AC power supply 	Bipolar (20 Hz) Bipolar with prepulse (12 Hz) Unipolar (10 Hz)
Accuracy under reference conditions	
Measuring tolerance of pulse output	
<ul style="list-style-type: none"> With $v > 0.25$ m/s (0.82 ft/s) 	$\leq \pm 0.5$ % of measured value ± 1.2 mm/s (0.05 inch/s)
<ul style="list-style-type: none"> With $v < 0.25$ m/s (0.82 ft/s) 	± 2.5 mm/s (0.1 inch/s)
Measuring tolerance of analog output	As pulse output plus ± 0.1 % conversion error ± 20 μ A
Repeatability	0.2 % of measured value
Reference conditions	
<ul style="list-style-type: none"> Process temperature 	25 °C \pm 5 °C (77 °F \pm 9 °F)
<ul style="list-style-type: none"> Ambient temperature 	25 °C \pm 5 °C (77 °F \pm 9 °F)
<ul style="list-style-type: none"> Warm-up time 	Min. 30 min
<ul style="list-style-type: none"> Installation conditions 	Inlet pipe section $\geq 10 \times$ DN Outlet pipe section $\geq 5 \times$ DN Installed centered in pipe
<ul style="list-style-type: none"> Medium 	Water without gaseous or solid components
Calibration	
Default calibration, calibration report shipped with sensor	2 \times 20 %, 2 \times 50 % and 2 \times 100 %
Outputs	
Electrical isolation	Outputs electrically isolated from one another and from the power supply, max. 60 V permissible against PE/equipotential bonding
Current output	
	0/4 ... 20 mA (7ME5034-0... or 7ME5034-2...)
<ul style="list-style-type: none"> Signal 	
- Upper limit	0/4 ... 20 mA, selectable
- Failure	20 ... 22.5 mA, optional 3.6; 20 or 24 mA
<ul style="list-style-type: none"> Load 	
- Output	max. 600 Ω , max. load voltage 15 V DC
- For HART communication	≥ 250 Ω
Communication	Via analog output with PC coupling module or HART communicator
<ul style="list-style-type: none"> Protocol 	HART, version 5.1
Digital output	
Signal	
<ul style="list-style-type: none"> Output 	Configurable as active or passive signals
- Active signal	24 V DC, ≤ 24 mA, $R_i = 170$ Ω
- Passive signal	Open collector, max. 30 V DC, 200 mA
Output configuration	
<ul style="list-style-type: none"> Pulse 	
- Pulse significance	≤ 5000 pulses/s
- Pulse width	≥ 0.1 ms
<ul style="list-style-type: none"> Limit frequency 	≤ 10000 Hz
<ul style="list-style-type: none"> Limits 	Limits for flow and quantity, flow direction, alarm
Digital output 2 (relay)	
(only 7ME5034-0...)	

Flow Measurement

SITRANS FM (electromagnetic)

AC powered alternating field flowmeters / SITRANS FM TRANSMAG 2 with SITRANS FM MAG 911/E

Technical specifications (continued)

TRANSMAG 2	
Relay	NC or NO function
• Rating	Max. 5 W, max. 50 V AC/DC, max. 200 mA
• Output configuration	Limits for flow and quantity, flow direction, alarm
Digital input (optional to digital output 2)	Non-intrinsically-safe
(only 7ME5034-2...)	
• Input function configurable as high-active or low-active	Set measured value to zero or reset totalizer
• Signal voltage	Max. 30 V DC, $R_i = 3 \text{ k}\Omega$ High level: +11 ... +30 V DC Low level: -30 ... +5 V DC
<i>For PROFIBUS devices</i>	
PROFIBUS PA (for PROFIBUS-devices 7ME5034-1...)	
• Communication	Layer 1 and 2 according to PROFIBUS PA Transmission according to IEC 1158-2 Layer 7 (protocol layer) according to PROFIBUS PA and DP V1 (EN 50170) Device Class B, device profile 2.0 Max. 4 simultaneous C2 connections
• Bus voltage	9 ... 32 V DC permissible
• Current consumption from bus	10 mA; limited to $\leq 15 \text{ mA}$ in event of fault by electrical current limitation
Rated operating conditions	
Ambient temperature	
• Operation	-20 ... +60 °C (-4 ... +140 °F)
• Storage	-25 ... +80 °C (-13 ... +176 °F)
Degree of protection	IP67/NEMA 4X
Electromagnetic compatibility (EMC)	
• Emitted interference	To IEC/EN 61326 for use in industrial areas
• Noise immunity	To IEC/EN 61326 for use in industrial areas
Design	
Weight of transmitter	4.4 kg (9.7 lb)
Remote version	Transmitter must be connected to sensor using shielded cable
Maximum cable length	100 m (328 ft)
Housing	Die-cast aluminum, painted
Cables entries	Remote installations
• Power supply and outputs	2 x M20 (HART)/M25 (PROFIBUS) or 2 x ½" NPT (HART)
• Sensor connections	2 x M16 (HART) or 2 x ½" NPT
Displays and keypad	
General display	LCD, backlid, two lines with 16 characters each
Multi-display for	Flow, totalizer, flow velocity
Keypad	4 keys for entering parameters
Power supply	
corresponding to rating plate	
• AC supply	100 ... 250 V AC $\pm 15 \%$, 47 ... 63 Hz
• Power consumption	Approx. 120 ... 630 VA, depending on sensor
Line fuse	100 ... 230 V AC: T1.6A
Magnet current fuse	F5A/250 V

Sensor cables between sensor and transmitter

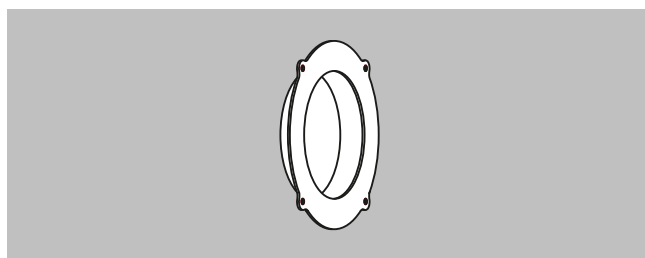
Sufficient shielding must be provided, as well as fixed routing of the signal cables (electrode and coil cable).

Signal cables must be routed free of vibration, and protected against strong magnetic and stray fields. In case of doubt, the sensor cables must be routed in grounded steel conduit. The cable length between the sensor and transmitter must not exceed 100 m (328 ft).

Technical specifications (continued)

MAG 911/E	
Process connection	
Flanges	
<ul style="list-style-type: none"> EN 1092-1, raised face (EN 1092-1, DIN 2501 and BS 4504 have the same mating dimensions) ANSI B16.5 (BS 1560), raised face AWWA C-207, raised face JIS B 2220:2004 	<ul style="list-style-type: none"> DN 200 ... 1000 (8" ... 40"): PN 10 (145 psi) DN 65 ... 1000 (2½" ... 40"): PN 16 (232 psi) DN 200 ... 1000 (8" ... 40"): PN 25 (362 psi) DN 15 ... 1000 (½" ... 40"): PN 40 (580 psi) ½" ... 40": Class 150 (20 bar (290 psi)) ½" ... 24": Class 300 (50 bar (725 psi)) 28" ... 40": Class D (10 bar) ½" ... 24": K10
Media conductivity	
	Minimum conductivity $\geq 1 \mu\text{S/cm}$
Rated operating conditions	
Enclosure rating	
	IP67/NEMA 6 Optional IP68/NEMA 6P
Temperature of medium	
<ul style="list-style-type: none"> Soft rubber Hard rubber PTFE Linatex Novolac 	<ul style="list-style-type: none"> 0 ... +70 °C (32 ... 158 °F) 0 ... +90 °C (32 ... 194 °F) Option: 100 °C (212 °F) -20 ... +150 °C (-4 ... +302 °F) at 25 bar (363 psi) -20 ... +100 °C (-4 ... +212 °F) at 40 bar (580 psi) -40 ... +70 °C (-40 ... +158 °F) (for temperatures below -20 °C (-4 °F) AISI 316L/1.4404 flanges must be used) 130 °C (266 °F) at 40 bar (580 psi)
Design	
Weight	
	See dimensional drawings
Flange and housing material	
	<ul style="list-style-type: none"> Carbon steel ASTM A 105, with corrosion protection EN ISO 12944 grade C3 or AISI 316L/1.4404 flanges and carbon steel housing ASTM A105, with corrosion protection EN ISO 12944 grade C3
Measuring pipe material	
	Stainless steel AISI 304 or higher
Electrode material	
	<ul style="list-style-type: none"> AISI 316/1.4571 Hastelloy C276/2.4819 Platinum Titanium Tantalum
Grounding electrode material	
	Defined via the order code
Terminal box (remote version only)	
	<ul style="list-style-type: none"> Standard: Fibre glass reinforced polyamide Option: Stainless steel AISI 316/1.4436

Protection ring



Flow Measurement

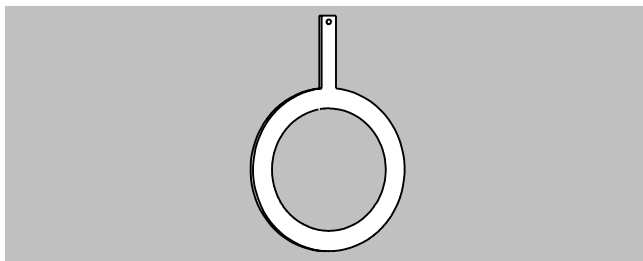
SITRANS FM (electromagnetic)

AC powered alternating field flowmeters / SITRANS FM TRANSMAG 2 with SITRANS FM MAG 911/E

Technical specifications (continued)

Technical specifications	
Function	To protect the edges of liners from abrasion (e.g. gravel, sand etc.). Used mainly with soft rubber liners and for PTFE liners at high temperatures from 100 to 150 °C (212 to 302 °F).
Contact with medium	Yes, please always check resistance to measured medium.
Material	Stainless steel AISI 316/1.4571, optionally Hastelloy C276/2.4819
Material thickness	The overall length of the sensor is increased by 6 mm for DN 15 ... 150 (0.24" for ½" ... 6") or 10 mm for DN 200 ... 600 (0.4" for 8" ... 24")
Standard	Optional for all liners. Must be ordered separately.
Article No.	7ME5942-...

Grounding ring



Technical specifications	
Function	Electrical reference and grounding of the medium. Required if the pipelines are not electrically conducting or are lined (plastic pipelines, concrete pipelines etc.). All grounding rings must be connected to the grounding screw present on the sensor.
Contact with medium	Yes, please always check resistance to measured medium.
Material	Stainless steel AISI 316/1.4571 or Hastelloy C4/2.4610
Material thickness	The overall length of the sensor is increased by 2 mm (0.08") per grounding ring.
Standard	Optional for all liners. Required between the medium and sensor for equipotential bonding between non-conducting pipelines or lined pipelines.
Article No.	7ME5943-...

Important:

The rings must be ordered together with the sensor. Gaskets are not included. In case of replacement please include the sensor MLFB code on the order.

Classification according to pressure equipment directive (PED 2014/68/EU)

Nominal size DN	(inches)	Nominal pressure PN	(MWP psi)	Permissible media	Category
15 ... 25	(½" ... 1")	40	580	Gases fluid group 1 and liquids fluid group 1	Article 4.3
200 ... 300	(8" ... 12")	10	(145)	Gases fluid group 1 and liquids fluid group 1	II
65 ... 250	(2½" ... 10")	16	(232)	Gases fluid group 1 and liquids fluid group 1	II
40 ... 100	(1½" ... 4")	40	(580)	Gases fluid group 1 and liquids fluid group 1	II
350 ... 1000	(14" ... 40")	10	(145)	Gases fluid group 1 and liquids fluid group 1	III

Technical specifications (continued)

Nominal size DN	(inches)	Nominal pressure PN	(MWP psi)	Permissible media	Category
300 ... 1000	(12" ... 40")	16	(232)	Gases fluid group 1 and liquids fluid group 1	III
200 ... 600	(8" ... 24")	25	(363)	Gases fluid group 1 and liquids fluid group 1	III
125 ... 600	(5" ... 24")	40	(580)	Gases fluid group 1 and liquids fluid group 1	III

Notes on pressure equipment directive

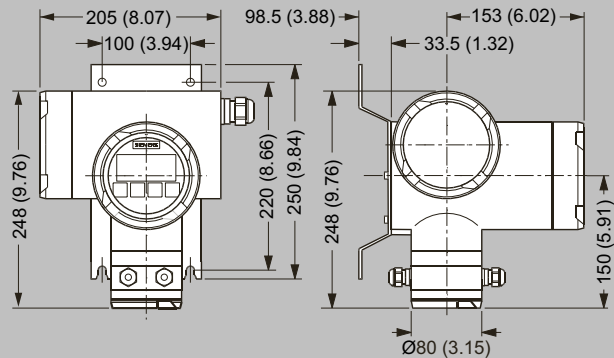
The devices are designed for liquids of danger group "Gases of fluid group 1". The categories differ according to the version, and are listed in the table below.

Flow Measurement

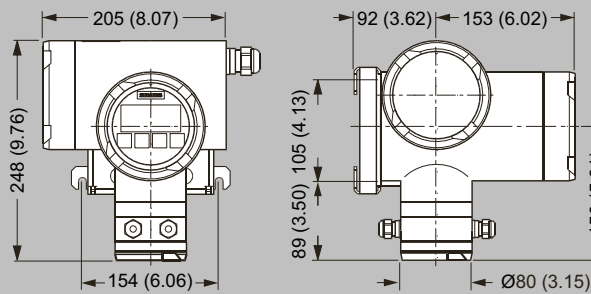
SITRANS FM (electromagnetic)

AC powered alternating field flowmeters / SITRANS FM TRANSMAG 2 with SITRANS FM MAG 911/E

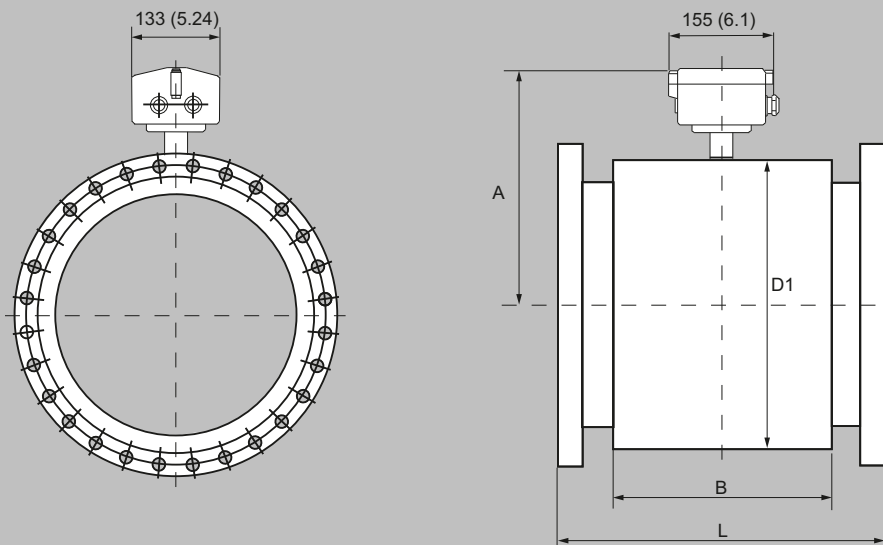
Dimensional drawings



SITRANS FM transmitter TRANSMAG 2 with wall-mounting bracket, dimensions in mm (inch)



SITRANS FM transmitter TRANSMAG 2 with special wall-mounting bracket, dimensions in mm (inch)



SITRANS FM flow sensor MAG 911/E, compact version, dimensions in mm (inches)

Dimensional drawings (continued)

Built-in length MAG 911/E

Nominal size	DN 15 ½"	DN 25 1"	DN 40 1½"	DN 50 2"	DN 65 2½"	DN 80 3"	DN 100 4"	DN 125 5"	DN 150 6"	DN 200 8"	DN 250 10"
Built-in length L¹⁾											
Hard rubber version Linatex/soft rubber version	270 (10.63)	270 (10.63)	280 (11.02)	280 (11.02)	330 (12.99)	340 (13.39)	340 (13.39)	370 (14.57)	370 (14.57)	410 (16.14)	470 (18.50)
PTFE-liner without protection rings	270 (10.63)	270 (10.63)	280 (11.02)	280 (11.02)	330 (12.99)	340 (13.39)	340 (13.39)	370 (14.57)	370 (14.57)	410 (16.14)	470 (18.50)
Novolak-version	-	-	275 (10.83)	275 (10.83)	325 (12.79)	335 (13.19)	333 (13.11)	362 (14.25)	362 (14.25)	401 (15.79)	460 (18.11)
Dimensions of sensor housing											
Housing width B	170 (6.69)	170 (6.69)	170 (6.69)	170 (6.69)	170 (6.69)	170 (6.69)	170 (6.69)	170 (6.69)	170 (6.69)	240 (9.45)	240 (9.45)
Height A	206 (8.11)	206 (8.11)	222 (8.74)	229 (9.02)	262 (10.32)	262 (10.32)	274 (10.79)	286 (11.26)	299 (11.78)	334 (13.15)	358 (14.10)
Housing diameter D ₁	135 (5.35)	135 (5.35)	167 (6.58)	182 (7.17)	247 (9.73)	247 (9.73)	272 (10.71)	296 (11.65)	322 (12.68)	392 (15.43)	440 (17.32)
Weight of PN 16 version in kg (MWP 232 psi version in lb) approx.	8.0 (17.64)	8.5 (18.74)	11.5 (25.35)	25.0 (55.12)	26 (57.32)	27 (59.53)	28 (61.73)	34 (74.95)	38 (83.78)	68 (149.9)	81 (178.6)

Nominal size	DN 300 12"	DN 350 14"	DN 400 16"	DN 450 18"	DN 500 20"	DN 600 24"	DN 700 28"	DN 750 30"	DN 800 32"	DN 900 36"	DN 1000 40"
Built-in length L¹⁾											
Hard rubber version Linatex/soft rubber version	500 (19.68)	550 (21.65)	600 (23.62)	650 (25.59)	650 (25.59)	780 (30.71)	910 (35.83)	910 (35.83)	1040 (40.95)	1170 (46.06)	1300 (51.18)
PTFE-liner without protection rings	500 (19.68)	550 (21.65)	600 (23.62)	660 (25.98)	650 (25.59)	780 (30.71)	-	-	-	-	-
Novolak-version	489 (19.25)	538 (21.18)	592 (23.31)	638 (25.12)	638 (25.12)	772 (30.39)	903 (35.55)	903 (35.55)	1033 (40.63)	1163 (45.79)	1293 (50.91)
Dimensions of sensor housing											
Housing width B	240 (9.45)	225 (8.86)	250 (9.84)	270 (10.63)	300 (11.81)	360 (14.17)	420 (16.54)		500 (19.69)	560 (22.05)	620 (24.41)
Height A	383 (15.08)	375 (14.76)	400 (15.75)	433 (17.05)	453 (17.84)	505 (19.88)	558 (21.97)	590 (23.23)	608 (23.94)	658 (25.91)	713 (28.07)
Housing diameter D ₁	490 (19.29)	474 (18.66)	524 (20.63)	591 (23.26)	629 (24.76)	734 (28.90)	839 (33.03)	904 (35.59)	939 (36.97)	1039 (40.91)	1150 (45.28)
Weight of PN 16 version in kg (MWP 232 psi version in lb) approx.	95 (209.4)	118 (260.2)	161 (354.9)	185 (407.9)	233 (513.7)	401 (884.1)	420 (925.9)	450 (992.1)	500 (1102.3)	560 (1234.6)	620 (1366.9)

¹⁾ Tolerance for built-in length: L + 0.0 mm/-4.0 mm (-0.00/-0.157 inches). With protection rings for > DN 25 +6.0 mm, > DN 200 +10.0 mm (> 1" +0.236 inches, > 8" +0.394 inches)

Flow Measurement

SITRANS FM (electromagnetic)

Battery-operated water meters / SITRANS FM MAG 8000

Overview



MAG 8000 is a comprehensive meter which intelligent information and high performance measurement as well as the easy to install concept take cost of ownership and customer service to a new level for water meter.

Benefits

Easy to install

- Compact or remote solution with factory mounted cable and customer setting from factory
- IP68/NEMA 6P enclosure. Sensor can be buried.
- Flexible power supply - internal or external battery pack or mains power supply with battery back-up possibilities
- Superior measurement
- Down to 0.2% maximum uncertainty
- Suitable for OD in- and outlet conditions
- OIML R 49 type approval
- FM Fire Service Approval
- Bi-directional measurement

Long lasting performance/Low cost of Ownership

- No moving parts means less wear and tear.
- Up to 6 to 10 years maintenance-free operation in typical revenue application
- Robust construction built for the application

Intelligent information, easy to access

- Embedded self-testing and alarm/fault detection feature
- Internal data logger
- Advanced statistics and diagnostics
- Various add-on communication modules

Application

The following MAG 8000 versions are available as stand-alone water meters:

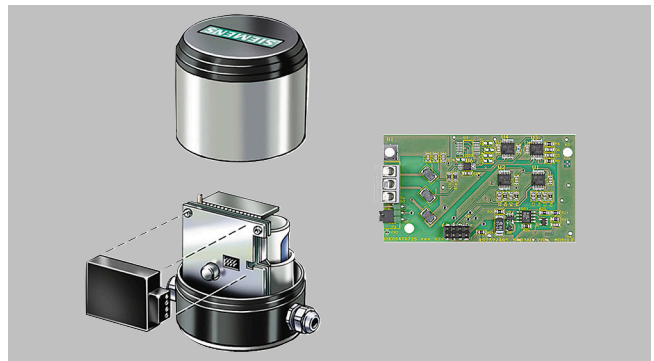
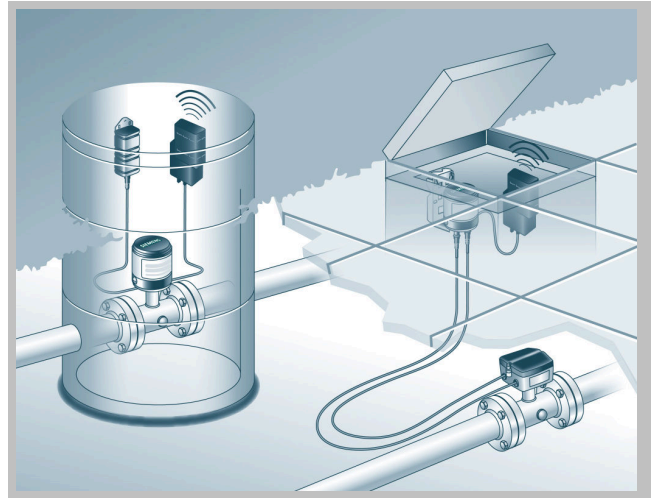
- MAG 8000 (7ME6810) for abstraction and distribution network
- MAG 8000 CT (7ME6820) for revenue and bulk metering

Design

MAG 8000 is designed to minimize power consumption.

The product program consists of

- Basic and advanced version
- Sensor sizes from DN 25 to 1200 (1" to 48")
- Compact and remote installation in IP68/NEMA 6P enclosure and factory-mounted cable
- SIMATIC PDM and Flow Tool PC configuration softwares



Modbus/Encoder module

Function

MAG 8000 is a microprocessor-based water meter with graphical display and key for optimum customer operation and information on site. The transmitter drives the magnetic field in the sensor, evaluates the flow signal from the sensor and calculates the volume passing through. It delivers the required information via the integrated pulse output or communication interfaces as part of a system solution. Its intelligent functionality, information and diagnostic ensure optimum meter performance and information to optimize water supply and billing.



MAG 8000 can be ordered as a Basic or an Advanced version.

Features/Version	MAG 8000 Basic	MAG 8000 Advanced
Measuring frequency in battery power mode (Manually selected) ¹⁾	1/15 or 1/30 or 1/60 Hz	6.25 ... 1/60 Hz depending of sensor size
Output MAG 8000	2 FW/RV/AI/CA	2 FW/RV/AI/CA
Communication	Add-on	Add-on
Data logger	Yes	Yes
Insulation test	Yes	Yes
Leakage detection	No	Yes
Meter utilization	No	Yes
Statistics	No	Yes
Tariff	No	Yes
Settle date (Revenue)	No	Yes

¹⁾ Excitation frequency settings with mains power supply, see technical specifications for each version

Some information is accessible via the display whereas all information is accessible via the IrDA communication interface with the PDM software. Data and parameters are registered in a EEPROM. They can all be read, but changing the information demands a software password or a hardware key attached to the printed circuit board.

The SIMATIC PDM tool gives the possibility of testing and verifying the flowmeter on site and creating a printed "Qualification Certificate" with all specific data that define the quality status of the measurement.

The Qualification Certificate consists of two pages with information about the actual status of the sensor:

Part 1 provides general settings, sensor and battery info, totalizer values and pulse output settings.

Part 2 provides detailed information about electronic and sensor functionality and a main parameter list for evaluating the functionality of the MAG 8000 water meter.

Function (continued)



SIMATIC PDM

For more details about SIMATIC PDM please go to "Communication".

Flow Measurement

SITRANS FM (electromagnetic)

Battery-operated water meters / SITRANS FM MAG 8000

Technical specifications

MAG 8000	
Installation	Compact (integral) Remote with factory-mounted cable 5, 10, 20 or 30 m (16.4, 32.8, 65.6 or 98.4 ft)
Enclosure	Stainless steel top housing (AISI 316) and coated brass bottom Remote wall mount bracket in stainless steel (AISI 304) Remote version terminal box in fibre glass reinforced polyamide
Cable entries	2 × M20 (one gland for one cable of size 6 ... 8 mm (0.02 ... 0.026 ft) is included in the standard delivery)
Display	Display with 8 digits for main information Index, menu and status symbols for dedicated information
Resolution	Totalized information can be displayed with 1, 2 or 3 decimals or automatic adjustment (default)
Flow unit	
Europe	Volume in m ³ and flow rate in m ³ /h
US	Volume in Gallon and flow rate in GPM
Australia	Volume in Mi and flow rate as Ml/d
Optional display units	Volume: m ³ × 100, l × 100, G × 100, G × 1000, MG, CF × 100, CF × 1000, AF, Al, kl, BBL42 Flow: m ³ /min, m ³ /d, l/s, l/min, GPS, GPH, GPD, MGD, CFS, CFM, CFH, BBL42/s, BBL42/min, BBL42/h, BBL42/d
Digital output	2 passive outputs (MOS), individual galvanically isolated Maximum load ±35 V DC, 50 mA short circuit protected
Output A function	Programmable as pulse volume – forward – reverse – forward/net – reverse/net
Output B function	Programmable as pulse volume (like output A), alarm
Output	Max. pulse rate of 50 Hz (pulse B) and 100 Hz (pulse A), pulse width of 5, 10, 50, 100, 500 ms
Communication	IrDA: Standard integrated infrared communication interface with Modbus RTU protocol
Add-on modules	<ul style="list-style-type: none"> RS 232 serial interface with Modbus RTU (Rx/Tx/GND), point to point with max. 15 m cable RS 485 serial interface with Modbus RTU (+/-/GND), multidrop with up to 32 devices with max. 1000 m cable Encoder interface module (for Itron 200WP) "Sensus protocol" 3G/UMTS module with or without analog input cable IIoT Wireless Communication Module with or without analog input cable
Power supply	Auto detection of power source with display symbol for operation power
Internal battery pack	1 D-Cell 3.6 V/16.5 Ah 2 D-Cell 3.6 V/33 Ah
External battery pack	4 D-Cell 3.6 V/66 Ah
Mains power supply	12 ... 24 V AC/DC (10 ... 32 V) 2 VA 115 ... 230 V AC (85 ... 264 V) 2 VA Both mains power supply systems are upgradable for battery backup via internal D-Cell (3.6 V 16.5 Ah) or external battery pack.
Cable	3 m (9.8 ft) for external connection to mains supply (without cable plug)

Technical specifications (continued)

Features	
Application identification	Tag number up to 15 characters
Time and date	Device embedded Real Time Clock (Synchronization with NTP server if 3G/UMTS module or IIoT WCM connected)
Totalizer MAG 8000	Totalizer 1 and Totalizer 2: Configurable to Forward, Reverse and Bidirectional netflow Totalizer 3: (following totalizer 1 setting) resettable via display key
Measurement Low flow cut-off • 7ME6810 • 7ME6820 Empty pipe detection Data logger	Cut-off at 15 mm/s ¹⁾ Cut-off at 15 mm/s ¹⁾ Symbolized in display Logging of 26 records: selectable as daily, weekly or monthly logging
Alarm	Active alarm is indicated on the display.
Data protection	All data stored in an EEPROM. Totalizers 1 and 2 are backed up every 10 min, statistic every hour and power consumption and temperature measurement every 4 hours. Password protection of all parameters and hardware protection of calibration and revenue parameters.
Battery power management	Optimal battery information on remaining capacity. Calculated capacity includes all consuming elements and available battery capacity is adjusted related to change in ambient temperature. Numbers of power-ups Date and time registered for first and last time power alarm.
Diagnostic Continuous self test including Alarm statistics and logging for fault analyzing	Coil current to drive the magnetic field Signal input circuit Data calculation, handling and storing Electrode impedance to check actual media contact Flow simulation to check pulse and communication signal chain for correct scaling Number of sensor measurements (excitations) Transmitter temperature (battery capacity calculation) Low impedance alarm for change in media Flow alarm when defined high flow exceeds Verification mode for fast measure performance check
Insulation test	Test of signal immunity against disturbance and bad installation. Test interval is selectable and measurement is interrupted during the test period of 4 min.
Leakage detection (only Advanced version)	Monitoring the lowest flow or volume during selected time window within 24 hours. Leakage is detected over a selectable period where monitored value exceed the possible leakage level. Min. and max. values are stored with date registration. Last store value visible on the display.
Meter Utilization (only Advanced version)	6 registers for monitoring total time the meter has operated in different flow intervals. Registered intervals are free selectable as % of Q _n (Q3).

Flow Measurement

SITRANS FM (electromagnetic)

Battery-operated water meters / SITRANS FM MAG 8000

Technical specifications (continued)

Features	
Tariff (only Advanced version)	6 tariff registers count the volume delivered within the selected tariff windows, based on time of day or flow rates or a combination. Tariff can also be used for consumption profile where consumption is related to different time intervals or flow rates. Tariff values visible on the display.
Settling date (only Advanced version)	On a predefined date the totalizer 1 index value is stored. Old values are stored to show the latest two totalized 1 index values. Settling values visible on the display.
Statistic (only Advanced version)	Min. flow rate with time and date registration Max. flow rate with time and date registration Min. daily consumption with date registration Max. daily consumption with date registration Latest 7 days total and daily consumption Actual month consumption Latest month consumption
PC Configuration Software PDM	<ul style="list-style-type: none"> • Meter configuration – online and offline mode • Own parameter settings • Parameter documentation • Print and export of data and parameters PDM 9.0/9.1 Service Pack 1

¹⁾ Siemens warrants the measurement accuracy down to a flow velocity of 15 mm/s. For a flow velocity below 15 mm/s, we don't warrant the measurement accuracy.

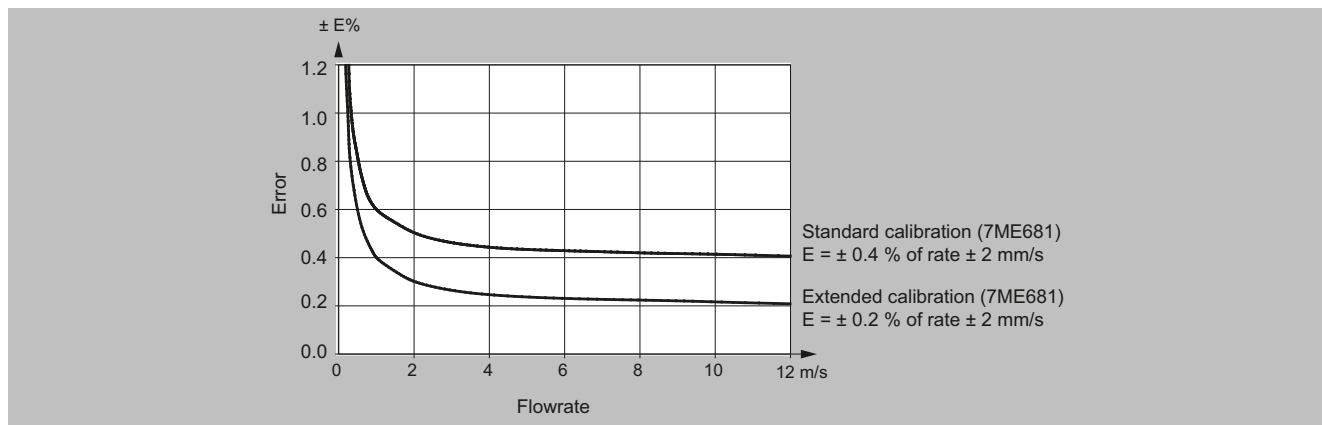
MAG 8000 water meter uncertainty

To ensure continuous accurate measurement, flowmeters must be calibrated. The calibration is conducted at Siemens flow facilities with traceable instruments referring directly to the physical unit of measurement according to the International System of Units (SI).

Therefore, the calibration certificate ensures recognition of the test results worldwide, including the US (NIST traceability).

Siemens offers accredited calibrations assured to ISO 17025 in the flow range from 0.0001 m³/h to 10 000 m³/h. Siemens Flow Instruments accredited laboratories are recognized by ILAC MRA (International Laboratory Accreditation Corporation - Mutual Recognition Arrangement) ensuring international traceability and recognition of the test results worldwide.

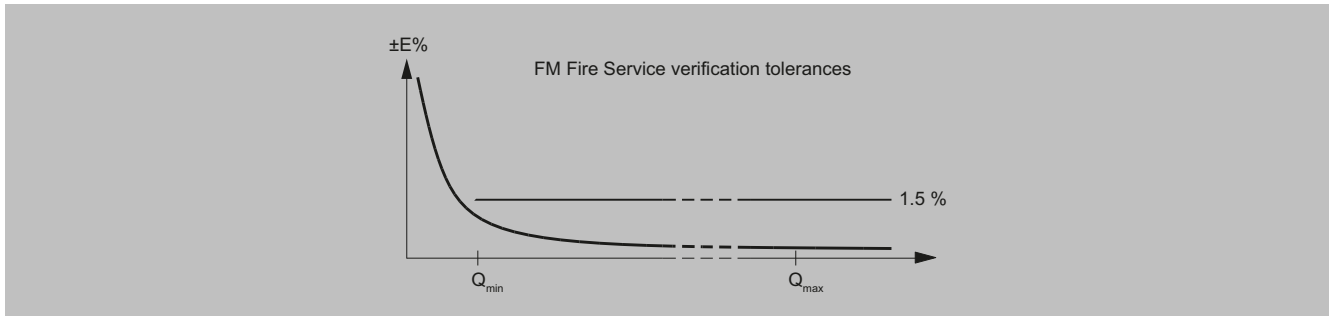
The selected calibration determines the accuracy of the meter. A standard calibration results in max. ±0.4% uncertainty and an extended calibration ±0.2%. A calibration certificate follows every sensor and calibration data are stored in the meter unit.



MAG 8000 (7ME6810) for Fire Service applications

MAG 8000 (7ME6810) is FM Fire Service approved for automatic fire protection systems according to the Fire Service Meters Standard, Class Number 1044. The approval is applicable for the sizes DN 50, DN 80, DN 100, DN 150, DN 200, DN 250, and DN 300 (2", 3", 4", 6", 8", 10", and 12") with ANSI B16.5 Class 150 flanges. The FM Fire Service approved product can be ordered via the Z-options P20, P21 and P22.

Technical specifications (continued)

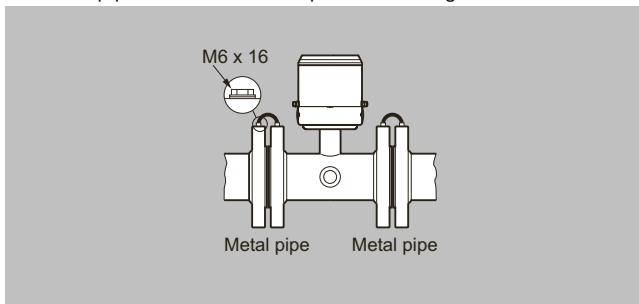


Grounding

The sensor body must be grounded using grounding straps and/or grounding rings to protect the flow signal against stray electrical noise. This ensures that the noise is carried through the sensor body and a noise-free measuring area within the sensor body. For MAG 8000 Irrigation grounding rings on both sides are factory-mounted.

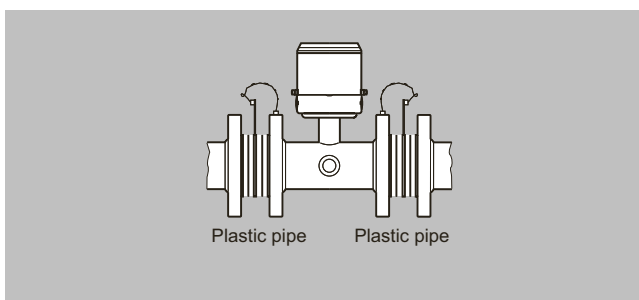
Metal pipes

On metal pipes, connect the straps to both flanges.



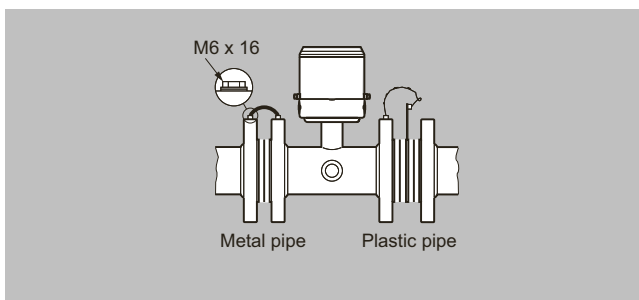
Plastic pipes

On plastic pipes and lined metal pipes, optional grounding rings must be used at both ends. Grounding rings has to be ordered separately see "grounding ring kit".



Combination of metal and plastic pipes

A combination of metal and plastic requires straps for metal pipe and grounding rings for plastic pipe.



Battery operation time and calculation

The battery operation time depends on the connected battery pack as well as the operation condition of the meter.

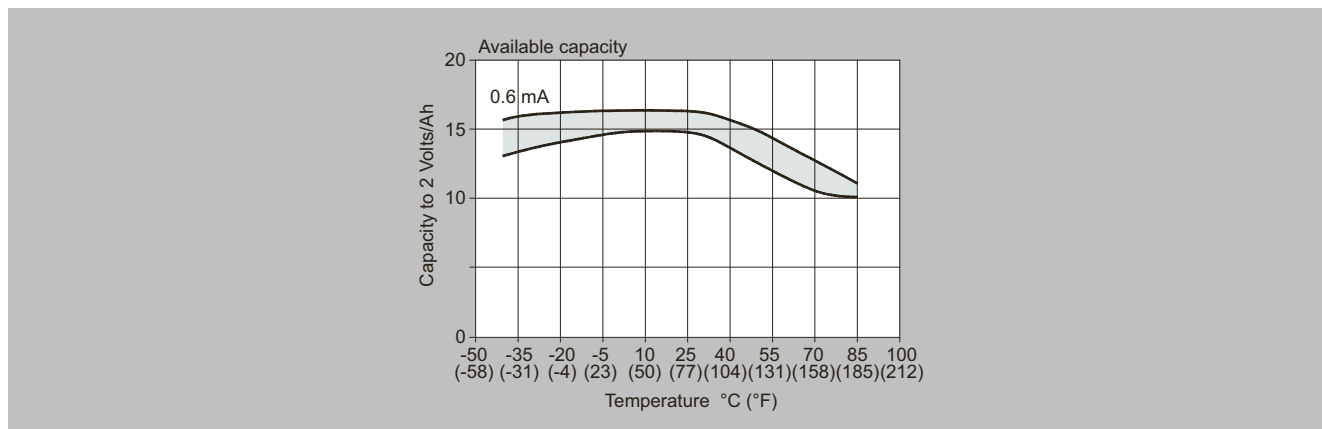
MAG 8000 calculates the remaining capacity every 4 hours and includes all consuming elements. Calculation compensates for temperature influence on battery capacity.

Flow Measurement

SITRANS FM (electromagnetic)

Battery-operated water meters / SITRANS FM MAG 8000

Technical specifications (continued)



The graphic shows the effect from other temperatures. A variation in temperature from 15 °C to 55 °C (59 to 131 °F) reduces the capacity by 17% in the table from 15 Ah to 12.5 Ah.

At typical revenue scenario of expected battery operation time can be seen in the table below.

The measurement for calculating the rest capacity of the battery life time is only completed if the system has no active fatal faults or the empty pipe is active. Maximum battery specification is 10 years operation.

Scenario - Revenue application	
Output A	Pulse rate max. 10 Hz
Output B	Alarm or call-up
Meter dialog	1 hour per month
Add-com	None
Temperature profile	<ul style="list-style-type: none"> • 5% at 0 °C (32 °F) • 80% at 15 °C (59 °F) • 15% at 50 °C (122 °F)

Battery lifetime (subject to the assumptions mentioned above)

MAG 8000 for abstraction and distribution network applications (7ME6810) and MAG 8000 CT for revenue and bulk metering (7ME6820)

Excitation frequency (24 h operation)		1/60 Hz	1/30 Hz	1/15 Hz	1/5 Hz	1.5625 Hz	3.125 Hz	6.25 Hz
2 D-Cell battery 33 Ah Internal battery pack	DN 25 ... 150 (1" ... 6")	9 years	9 years	7 years	43 months	8 months	3 months	2 months
	DN 200 ... 600 (8" ... 24")	9 years	6 years	4 years	22 months	3 months	1 month	N/A
	DN 700 ... 1200 (28" ... 48")	7 years	4 years	2 years	12 months	1 months	N/A	N/A
4 D-Cell battery 66 Ah External battery pack	DN 25 ... 150 (1" ... 68")	15 years	15 years	14 years	86 months	16 months	7 months	4 months
	DN 200 ... 600 (8" ... 24")	15 years	13 years	8 years	44 months	7 months	3 months	N/A
	DN 700 ... 1200 (28" ... 48")	14 years	9 years	5 years	24 months	3 months	N/A	N/A

Typical battery lifetime scenario for MAG 8000 with 3G or IIoT Wireless Communication Module

Transmission once a day and MAG 8000 factory settings	
2 D-Cell battery 33 Ah Internal battery pack	3 ... 4 years
4 D-Cell battery 66 Ah External battery pack	7 ... 8 years

External battery pack can be used as battery backup for mains power supply (if two cable entries in one cable gland are needed, order cable glands with two entries, see accessories)

Serial RS 232/RS 485 add-on communication modules are designed for mains powered systems as the battery operation time will be reduced. At 1 hour communication per month (all meter data collected 2 times per day) and the module is connected, the operation time is reduced to:

Technical specifications (continued)

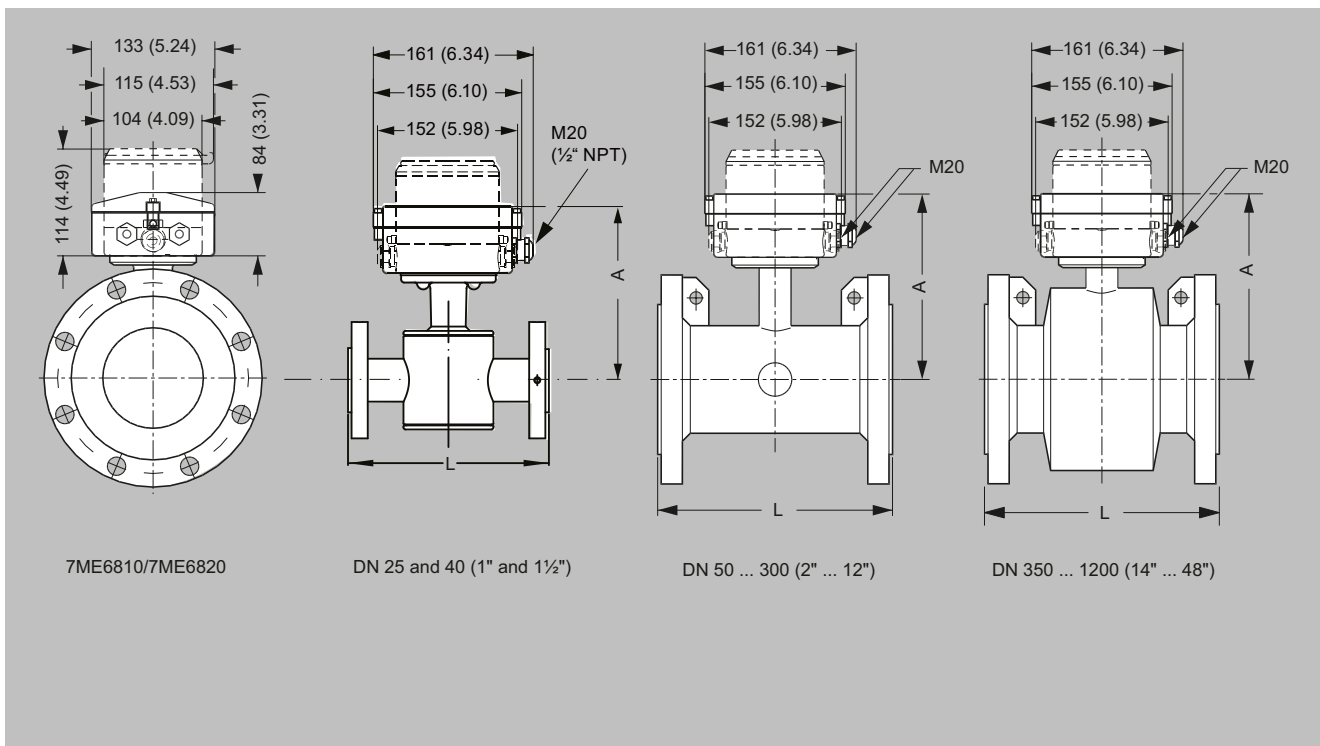
- RS 232:
 - Switched on constantly:
6.4 months for 2 D-cell internal battery pack / 12.8 months for 4 D-cell ext. battery pack
 - Switched on 2 s/day:
39 months for 2 D-cell internal battery pack / 78 months for 4 D-cell ext. battery pack
- RS 485:
 - With the termination resistor on:
2.3 months for 2 D-cell internal battery pack / 4.6 months for 4 D-cell ext. battery pack
 - With the termination resistor off:
39 months for 2 D-cell internal battery pack / 78 months for 4 D-cell ext. battery pack, in case the entire communication time is less than 4 hours/day

Flow Measurement

SITRANS FM (electromagnetic)

Battery-operated water meters / SITRANS FM MAG 8000

Dimensional drawings



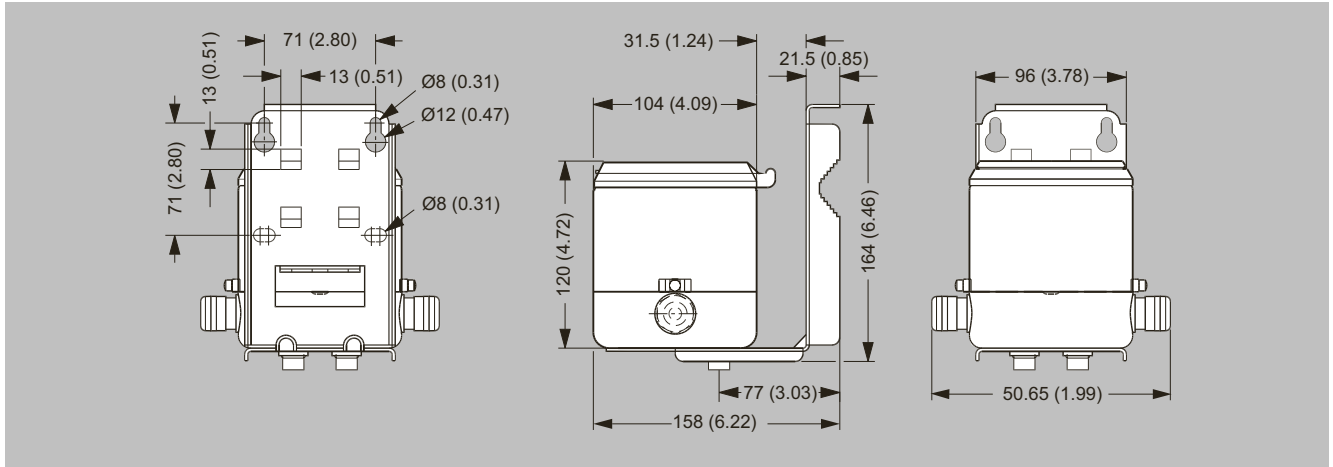
Dimensions in mm (inch)

Nominal DN size	A	L, lengths ¹⁾							Weight ²⁾		
		EPDM (7ME6810 and 7ME6820)	EN 1092-1 PN 10	EN 1092-1 PN 16/PN 1- 6 non-PED	EN 1092-1 PN 40	ANSI 16.5 Class 150	AS 4087 PN 16	AWA C-207 Class D	AS 2129	kg	lb
mm (inch)	mm (inch)	mm	mm	mm	inch	mm	mm	mm	mm	kg	lb
25 (1)	188 (7.4)	-	-	200	7.9	200	-	200	200	6	13
40 (1½)	203 (8.0)	-	-	200	7.9	200	-	200	200	9	20
50 (2)	178 (7.0)	-	200	-	7.9	200	-	-	-	11	25
65 (2½)	181 (7.1)	-	200	-	7.9	200	-	-	-	13	29
80 (3)	191 (7.5)	-	200	-	7.9	200	-	-	-	15	34
100 (4)	197 (7.8)	-	250	-	9.8	250	-	-	-	17	38
125 (5)	210 (8.3)	-	250	-	9.8	250	-	250	-	22	50
150 (6)	224 (8.8)	-	300	-	11.8	300	-	-	-	28	63
200 (8)	249 (9.8)	350	350	-	13.8	350	-	-	-	50	113
250 (10)	276 (10.9)	450	450	-	17.7	450	-	-	-	71	160
300 (12)	303 (11.9)	500	500	-	19.7	500	-	-	-	88	198
350 (14)	365 (14.4)	550	550	-	21.7	550	-	-	-	127	279
400 (16)	391 (15.4)	600	600	-	23.6	600	-	-	-	145	318
450 (18)	421 (16.6)	600	600	-	23.6	600	-	-	-	175	384
500 (20)	447 (17.6)	600	600	-	23.6	600	-	-	-	225	494
600 (24)	497 (19.6)	600	600	-	23.6	600	-	-	-	340	747
700 (28)	548 (21.6)	700	875/700	-	N/A	700	700	-	-	316	694
750 (30)	573 (22.6)	N/A	N/A	-	N/A	N/A	750	-	-	N/A	N/A
800 (32)	603 (23.7)	800	1000/800	-	N/A	800	800	-	-	398	1045
900 (36)	656 (25.8)	900	1125/900	-	N/A	900	900	-	-	476	1045
1000 (40)	708 (27.9)	1000	1250/1000	-	N/A	1000	1000	-	-	602	1322
1050 (42)	708 (27.9)	N/A	N/A	-	N/A	N/A	1050	-	-	N/A	N/A
1100 (44)	759 (29.9)	N/A	N/A	-	N/A	N/A	1100	-	-	N/A	N/A
1200 (48)	814 (32.0)	1200	1500/1200	-	N/A	1200	1200	-	-	887	1996

Dimensional drawings (continued)

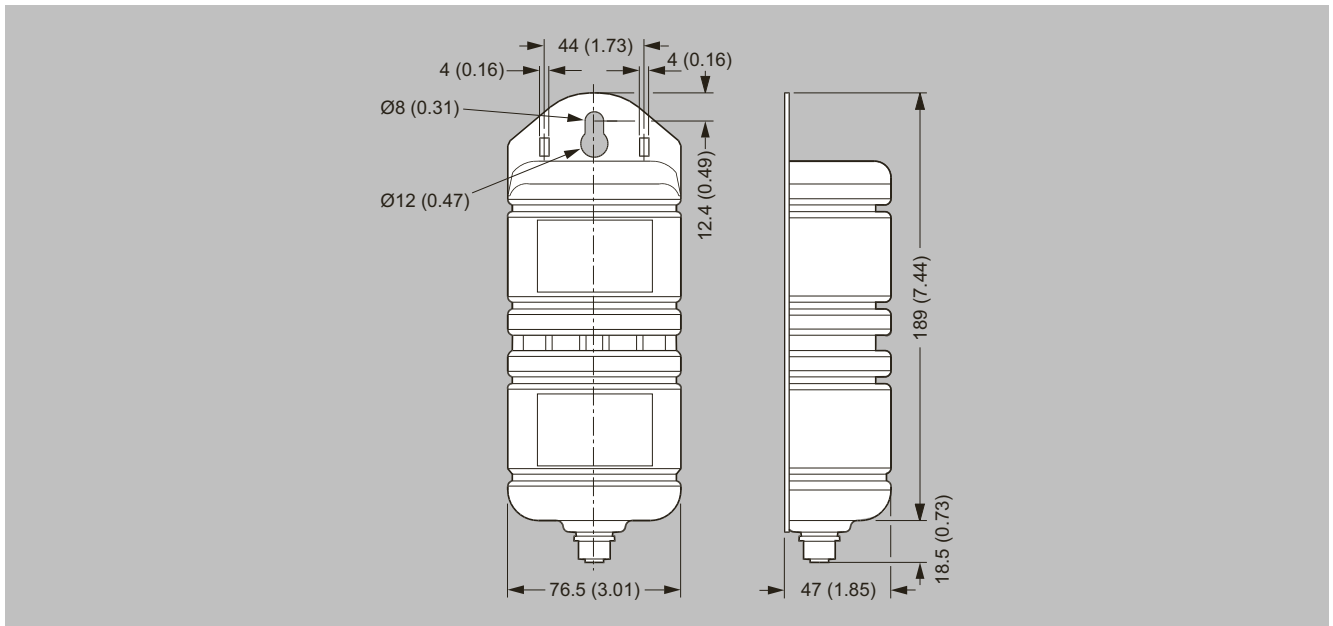
- 1) Tolerances on built-in length: DN 15 to DN 200 (½" to 8"): +0/-3 mm (+0/-0.12"), DN 250 to DN 400 (10" to 16"): +0/-5 mm (+0/-0.20"), DN 450 to DN 600 (18" to 24"): +5/-5 mm (+0.20/-0.20"), DN 700 to DN 1200 (28" to 48"): +10/-10 mm (+0.39/-0.39").
- 2) For remote version the sensor weight is reduced with 2 kg (4.5 lbs).

Remote version



Dimensions in mm (inch), weight 3.5 kg (8 lbs)

External battery pack



Dimensions in mm (inch), weight 2.0 kg (4.5 lbs)

Battery pack has to be mounted in upwards position to ensure maximum battery capacity.

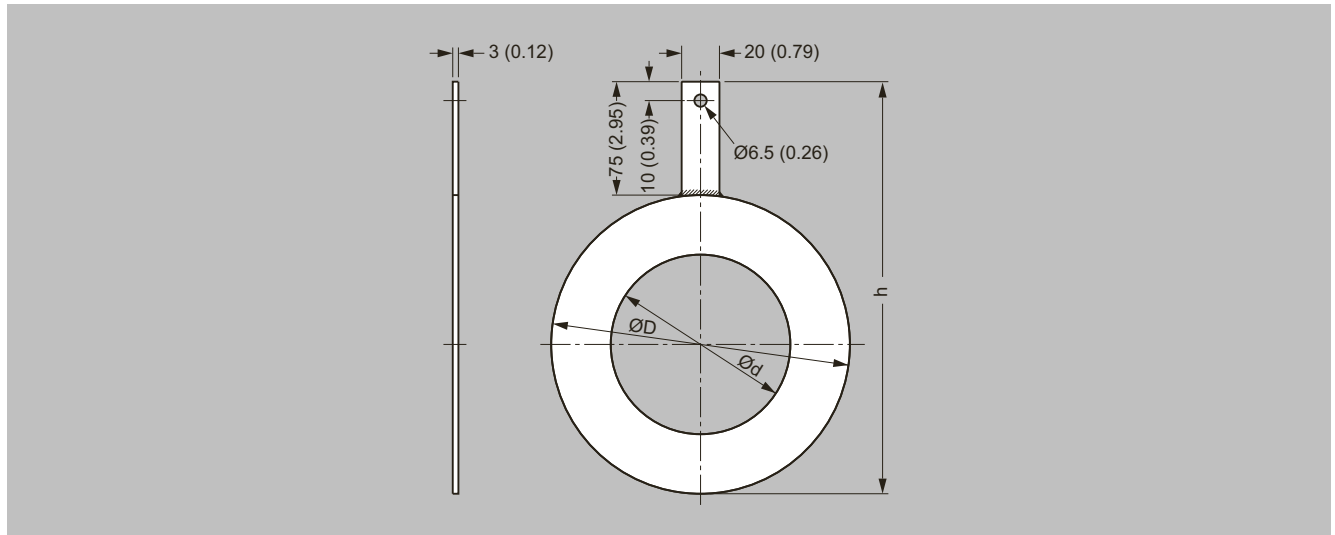
Flow Measurement

SITRANS FM (electromagnetic)

Battery-operated water meters / SITRANS FM MAG 8000

Dimensional drawings (continued)

Grounding rings

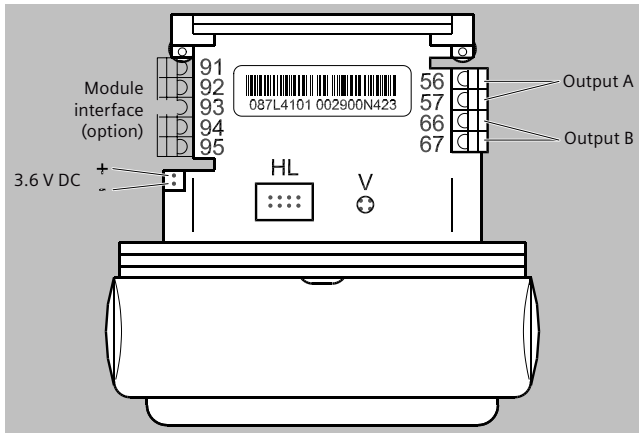


Dimensions in mm (inch) for grounding rings MAG 8000 with EPDM lining (7ME6810 and 7ME6820) DN 25 to DN 300

Dimension	Internal diameter (d)	Outside diameter (D)	h
DN 25	27	68	143
DN 40	38	88	163
DN 50	52	100	175
DN 65	64	120	195
DN 80	79	133	208
DN 100	95	158	233
DN 125	115	188	263
DN 150	145	216	291
DN 200	193	268	343
DN 250	246	324	399
DN 300	295	374	449

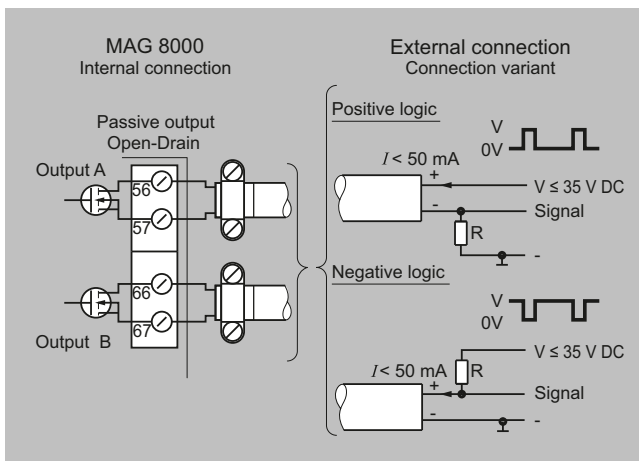
Circuit diagrams

Electrical installation and pulse output – Connection diagram



HL = Hardware lock key connection
 V = Push button for verification mode

Pulse wire connection



The pulse output can be configured as volume, alarm or call-up. The output can be connected as positive or negative logic. R = pull up/down is selected in relation to the V_x power supply and with a max. current I of 50 mA.

Use shielded cable to avoid EMC problems. Make sure the shield is correctly mounted under the cable clamp (no pig tail).

Flow Measurement

SITRANS FM (electromagnetic)

Battery-operated water meters / SITRANS FM MAG 8000 for abstraction and distribution network application

Overview



SITRANS FM MAG 8000 for abstraction and distribution network application

Benefits

Easy to install

- Compact or remote solution with factory mounted cable
- IP68/NEMA 6P enclosure. Sensor can be buried
- Flexible power supply - internal or external battery pack or mains power supply with battery back-up possibilities

Long-term stability/Low cost of ownership

- No moving parts in a robust construction means less wear and tear
- Basic and advanced transmitter versions with different optional add-on communication modules fulfill various customer requirements for high cost efficiency
- Up to 0.2% maximum uncertainty
- Bi-directional measurement with an outstanding low flow performance
- Up to 10 years maintenance-free operation in typical applications

Intelligent information, easy to access

- Advanced information on site
- Advanced statistics and diagnostics
- Optional high-performance 3G/UMTS module offers an efficient solution for remote measurement and monitor via wireless networks

Selection and ordering data

SITRANS FM MAG 8000 water meter	Article No. 7ME6810-
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	
Diameter	
DN 25 (1")	2 D
DN 40 (1½")	2 R
DN 50 (2")	2 Y
DN 65 (2½")	3 F
DN 80 (3")	3 M
DN 100 (4")	3 T
DN 125 (5")	4 B
DN 150 (6")	4 H
DN 200 (8")	4 P
DN 250 (10")	4 V
DN 300 (12")	5 D
DN 350 (14")	5 K
DN 400 (16")	5 R
DN 450 (18")	5 Y
DN 500 (20")	6 F
DN 600 (24")	6 P
DN 700 (28") ¹⁾	6 Y
DN 750 (30") ¹⁾	7 D
DN 800 (32") ¹⁾	7 H
DN 900 (36") ¹⁾	7 M
DN 1000 (40") ¹⁾	7 R
DN 1050 (42") ¹⁾	7 U
DN 1100 (44") ¹⁾	7 V
DN 1200 (48") ¹⁾	8 B
Flange norm and pressure rating	
EN 1092-1, PN 10 (DN 200 ... 1200 (8" ... 48"))	B
EN 1092-1, PN 16 (DN 50 ... 1200 (2" ... 48"))	C
EN 1092-1, PN 16, non-PED (DN 700 ... 1200 (28" ... 48"))	D
EN 1092-1, PN 25 (DN 350 ... 600 (12" ... 24"))	E
EN 1092-1, PN 40 (DN 25 ... 50 (1" ... 1½"), DN 350 ... 600 (12" ... 24"))	F
ANSI B16.5, Class 150	J
AWWA C-207, Class D (28" ... 48")	L
AS 4087, PN 16 (DN 50 ... 1200 (2" ... 48"))	N
Sensor version	
EPDM liner and Hastelloy electrodes, corrosion-resistant coating of category C4	3
EPDM liner and Hastelloy electrodes, 300 µm corrosion-resistant coating of category C5	4
Calibration	
Standard ±0.4% of rate ±2 mm/s	1
Extended ±0.2% of rate ±2 mm/s DN 50 ... 300 (2" ... 12")	2
NMI M 10 (2.5%) without verification	3
Region version	
Europe (m³, m³/h, 50 Hz)	1
USA (Gallon, GPM, 60 Hz)	2
Australia (ML, Ml/d, 50 Hz)	3
Transmitter type and installation	
Basic version integral on sensor	A
Basic version, remote cables mounted on sensor with IP68/NEMA 6P plugs:	
• 5 m (16.4 ft)	B
• 10 m (32.8 ft)	C
• 20 m (65.6 ft)	D
• 30 m (98.4 ft)	E
Advanced version integral on sensor	K
Advanced version, remote cables mounted on sensor with IP68/NEMA 6P plugs:	

Flow Measurement

SITRANS FM (electromagnetic)

Battery-operated water meters / SITRANS FM MAG 8000 for abstraction and distribution network application

Selection and ordering data (continued)

SITRANS FM MAG 8000 water meter	Article No. 7ME6810-
<ul style="list-style-type: none"> • 5 m (16.4 ft) • 10 m (32.8 ft) • 20 m (65.6 ft) • 30 m (98.4 ft) 	L M N P
Communication interface No additional "add-on" communication module installed Serial RS 485 with Modbus RTU (terminated as end device) Serial RS 232 with Modbus RTU Encoder interface with Sensus protocol IIoT Wireless Communication Module with remote antenna including cable 5 m (16.4 ft) ²⁾ IIoT Wireless Communication Module with remote antenna including cable 5 m (16.4 ft) and connection cable 2.5 m (8.2 ft) for analog inputs ²⁾ 3G/UMTS communication module with remote antenna; 5 m (16.4 ft) ²⁾ 3G/UMTS communication module with remote antenna cable 5 m (16.4 ft) and analog input cable 2.5 m (8.2 ft) ²⁾	A B C D L N S T
Power supply Internal battery (battery not included) Internal battery pack installed ²⁾ Power cable 1.5 m (4.9 ft) with IP68/NEMA 6P plugs for external battery (no battery included) 12/24 V AC/DC power supply with battery backup and 3 m (9.8 ft) power cable for external connection (no battery included) 115 ... 230 V AC power supply with battery backup and 3 m (9.8 ft) power cable for external connection (no battery included) External battery (battery included) and 1.5 m (4.9 ft) power cable with IP68/NEMA 6P plugs ²⁾ 12/24 V AC/DC power supply with backup battery included and 3 m (9.8 ft) power cable for external connection ²⁾ 115 ... 230 V AC power supply with backup battery included and 3 m (9.8 ft) power cable for external connection ²⁾ 115 ... 230 V AC power supply with 3 m (9.8 ft) power cable for external connection, with external battery included and 1.5 m (4.9 ft) power cable with IP68/NEMA 6P plugs ²⁾	0 1 2 3 4 5 6 7 8

¹⁾ The diameter DN 700 (28") to DN 1200 (48") is only available as remote transmitter type installation.

²⁾ Lithium batteries are subject to special transportation regulations according to United Nations "Regulation of Dangerous Goods, UN 3090 and UN 3091". Special transport documentation is required to observe these regulations. This may influence both transport time and costs.

Order code	
Options	
Please add "-Z" to Article No. and specify Order code(s) and plain text.	
Certificate	
Inspection certificate 3.1 (EN 10204) - pressure test	C01
Material certificate according to EN 10204-3.1 ¹⁾	C12
Special calibration	
5-point calibration for DN 25 ... 200 ²⁾	D01
5-point calibration for DN 250 ... 600 ²⁾	D02
5-point calibration for DN 700 ... 1200 ²⁾	D03
10-point calibration for DN 25 ... 200 ³⁾	D06
10-point calibration for DN 250 ... 600 ³⁾	D07
10-point calibration for DN 700 ... 1200 ³⁾	D08
Default (2 × 25% and 2 × 90%) match-pair calibration for DN 25 ... 200	D11
Default (2 × 25% and 2 × 90%) match-pair calibration for DN 250 ... 600	D12
Default (2 × 25% and 2 × 90%) match-pair calibration for DN 700 ... 1200	D13
5-point, matched-pair calibration for DN 25 ... 200 ²⁾	D15
5-point, matched-pair calibration for DN 250 ... 600 ²⁾	D16
5-point, matched-pair calibration for DN 700 ... 1200 ²⁾	D17
10-point, matched-pair calibration for DN 25 ... 200 ³⁾	D18
10-point, matched-pair calibration for DN 250 ... 600 ³⁾	D19
10-point, matched-pair calibration for DN 700 ... 1200 ³⁾	D20

Selection and ordering data (continued)

	Order code
Flow unit	
l/s	L00
MGD	L01
CFS	L02
l/min	L03
m ³ /min	L04
GPM	L05
CFM	L06
l/h	L07
m ³ /h	L08
GPH	L09
CFH	L10
GPS	L11
MI/d	L12
m ³ /d	L13
GPD	L14
BBL42/s	L15
BBL42/min	L16
BBL42/h	L17
BBL42/d	L18
Totalizer	
Volume calculation (default totalizer 1 = forward and totalizer 2 = reverse)	
Totalizer 1 = RV, reverse flow	L20
Totalizer 1 = NET, net flow	L22
Totalizer 2 = FW, forward flow	L30
Totalizer 2 = NET, net flow	L31
Volume unit	
m ³	L40
MI	L41
G	L42
AF	L43
l × 100	L44
m ³ × 100	L45
G × 100	L46
CF × 100	L47
MG	L48
G × 1000	L49
CF × 1000	L50
AI	L51
kl	L52
BBL42 (US oil barrel, 1 barrel = 42 US gallons)	L54
Volume unit = AF, amount per pulse A = 1 US Gallon ⁵⁾	L55
Volume unit = AI, amount per pulse A = 1 US Gallon ⁵⁾	L56
Volume unit = CFx100, amount per pulse A = 1 US Gallon ⁵⁾	L57
Volume unit = BBL42, amount per pulse A = 1 US Gallon ⁵⁾	L58
Pulse set up (default pulse A = forward and pulse B = Alarm, pulse width = 50 ms)	
A function = RV, reverse flow	L62
A function = FWnet, forward net flow	L63
A function = RVnet, reverse net flow	L64
A function = Off	L65
Volume per pulse A = × 0.0001 ⁴⁾	L70

Flow Measurement

SITRANS FM (electromagnetic)

Battery-operated water meters / SITRANS FM MAG 8000 for abstraction and distribution network application

Selection and ordering data (continued)

	Order code
Volume per pulse A = $\times 0.001^4$)	L71
Volume per pulse A = $\times 0.01^4$)	L72
Volume per pulse A = $\times 0.1^4$)	L73
Volume per pulse A = $\times 1^4$)	L74
Pulse A pulse width 5 ms (volume per pulse $\times 1$)	L75
Pulse A pulse width 10 ms (volume per pulse $\times 1$)	L76
Pulse A pulse width 50 ms (volume per pulse $\times 1$)	L77
Pulse A pulse width 100 ms (volume per pulse $\times 1$)	L78
Pulse A pulse width 500 ms (volume per pulse $\times 1$)	L79
B function = FW, forward flow	L80
B function = RV, verse flow	L81
B function = FWnet, forward net flow	L82
B function = RVnet, reverse net flow	L83
B function = Alarm	L84
B function = Call up	L85
Volume per pulse B = $\times 0.0001^4$)	L90
Volume per pulse B = $\times 0.001^4$)	L91
Volume per pulse B = $\times 0.01^4$)	L92
Volume per pulse B = $\times 0.1^4$)	L93
Volume per pulse B = $\times 1^4$)	L94
Device operation	
Only operator menu activated	M11
Data logger set up (default month logging)	
DataloggerInterval = Daily	M31
DataloggerInterval = Weekly	M32
Region specific settings	
Low flow cut off = 5 mm/s ⁶⁾	M50
Factory mounted cables	
4.8 m (15.75 ft) pulse cable A+B	M81
4.8 m (15.75 ft) communication cable RS 232/RS 485 terminated as end device	M82
Fixed cable/COM cable, 2 \times 4.8 m, connected at A and B and COM 2 \times 2 \times 2-wire twisted. Marking on Modbus cable	M83
20 m (65.6 ft) pulse cable A+B	M84
20 m (65.6 ft) communication cable RS 232/RS 485 terminated as end device	M85
Fixed cable/COM cable, 2 \times 20 m, connected at A and B and COM 2 \times 2 \times 2-wire twisted. Marking on Modbus cable	M86
Cello 2 channel, input cable 3 m (9.84 ft) with Brad Harrison micro-change 3 way connector	M87
Cello 2 channel, input cable 5 m (16.4 ft) with MIL-C-26482 spec. connectors	M89
Encoder interface cable with connector for ITRON 200WP radio, length 25 ft	M90
Encoder interface cable with connector for ITRON 200WP radio, length 5 ft	M91
SOFREL cable 2 m for LS42 data logger	M92
Adaptors for conduit installation	M94
SOFREL cable 2 m for LS-Flow data logger	M97
FM Fire Service Approval (with ANSI B16.5 Class 150 flanges)	
DN 50, DN 80, DN 100 (2", 3", 4")	P20
DN 150, DN 200 (6", 8")	P21
DN 250, DN 300 (10", 12")	P22

Selection and ordering data (continued)

	Order code
Region/customer specific labels	
KCC label (South Korea)	W28
DIN 43863 label ¹⁾	H21
DIN 43863 label with SWM mark ¹⁾	H22
ADDC label	H23
Country of origin	
France	F55

¹⁾ Under preparation.

²⁾ 20%, 40%, 60%, 80%, 100% of factory Q_{max}

³⁾ Ascending and descending at 20%, 40%, 60%, 80%, 100% of factory Q_{max}

⁴⁾ Pulse width = 10 ms

⁵⁾ Pulse width = 5 ms

⁶⁾ Siemens warrants the measurement accuracy down to a flow velocity of 15 mm/s. For a flow velocity below 15 mm/s, we don't warrant the measurement accuracy.

Operating instructions for SITRANS FM MAG 8000

Description	Article No.
• English	A5E03071515
• German	A5E00740986

All literature is available to download for free, in a range of languages, at <http://www.siemens.com/processinstrumentation/documentation>

Operating instructions for MAG 8000 3G/UMTS communication module

Description	Article No.
• English	A5E03644134

Flow Measurement

SITRANS FM (electromagnetic)

Battery-operated water meters / SITRANS FM MAG 8000 for abstraction and distribution network application

Technical specifications

MAG 8000 for abstraction and distribution network application (7ME6810)	
Accuracy	Standard calibration: $\pm 0.4\% \pm 2$ mm/s Extended calibration DN 50 ... 300 (2" ... 12"): $\pm 0.2\%$ of rate ± 2 mm/s ⁵⁾
Low flow cut-off (default)	15 mm/s
Media conductivity	Clean water > 20 μ S/cm
Temperature	
Ambient	-20 ... +60 °C (-4 ... +140 °F)
Media	0 ... 70 °C (32 ... 158 °F)
Storage	-40 ... +70 °C (-40 ... +158 °F)
Enclosure rating	
Remote sensor	IP68 to EN 60529/NEMA 6P, 10 mH ₂ O continuously
Compact version	IP68 to EN 60529/NEMA 6P, 3 mH ₂ O for six months
Certificates and approvals	
Calibration	
• Standard calibration	2 × 25% and 2 × 90% (default)
• Special calibration	5-point calibration: 20%, 40%, 60%, 80%, 100% of factory Q _{max} 10-point calibration: ascending and descending at 20%, 40%, 60%, 80%, 100% of factory Q _{max} Matched-pair calibration: default, 5-point, 10-point
Material certificate EN 10204-3.1	Available when ordering together with meter ¹⁾
Drinking water approvals	<ul style="list-style-type: none"> • NSF/ANSI Standard 61²⁾ (cold water) USA • WRAS (BS 6920 cold water) UK • ACS Listed France • DVGW W270 Germany • Belgaqua (B) • MCERTS (GB) • AS/NZS4020 (Australia/New Zealand) up to 70°C water temperature
Fire Service Approvals	FM Fire Service Meter (Class Number 1044) ³⁾
Conformity	<ul style="list-style-type: none"> • PED: 2014/68/EU⁴⁾ • EMC: IEC/EN 61326
Sensor version	Coned sensor (octagon liner): DN 25 and 40 (½" ... 1½") Coned sensor: DN 50 ... 300 (2" ... 12") Full bore sensor: DN 350 ... 1200 (14" ... 48")
Sensor material	
• Housing and flanges	DN 25 ... 1200 (2" ... 48"): Carbon steel ASTM A 105 with corrosion-resistant coating of category C4 or C5 according to ISO 12944-2
• Measuring pipe	DN 350 ... 1200 (14" ... 48"): Stainless steel AISI 304/1.4301
Measuring principle	Electromagnetic induction
Excitation frequency	
Basic version	
• Battery-powered	DN 25 ... 150 (1" ... 6"): 1/15 Hz DN 200 ... 600 (8" ... 24"): 1/30 Hz DN 700 ... 1200 (28" ... 48"): 1/60 Hz
• Mains-powered	DN 25 ... 150 (1" ... 6"): 6.25 Hz DN 200 ... 600 (8" ... 24"): 3.125 Hz DN 700 ... 1200 (28" ... 48"): 1.5625 Hz
Advanced version	

Technical specifications (continued)

MAG 8000 for abstraction and distribution network application (7ME6810)	
• Battery-powered	DN 25 ... 150 (1" ... 6"): 1/15 Hz (adjustable up to 6.25 Hz; reduced battery lifetime) DN 200 ... 600 (8" ... 24"): 1/30 Hz (adjustable up to 3.125 Hz; reduced battery lifetime) DN 700 ... 1200 (28" ... 48"): 1/60 Hz (adjustable up to 1.5625 Hz; reduced battery lifetime)
• Mains-powered	DN 25 ... 150 (1" ... 6"): 6.25 Hz DN 200 ... 600 (8" ... 24"): 3.125 Hz DN 700 ... 1200 (28" ... 48"): 1.5625 Hz
Flanges	
EN 1092-1 (DIN 2501)	PN 10 (145 psi): DN 200 ... 300 (8" ... 12") Flat face PN 10 (145 psi): DN 350 ... 1200 (14" ... 48") Raised face ⁶⁾ PN 16 (232 psi): DN 50 ... 300 (2" ... 12") Flat face ⁶⁾ PN 16 (232 psi): DN 350 ... 1200 (14" ... 48") Raised face PN 40 (580 psi): DN 25 and 40 (½" ... 1½") Flat face
ANSI 16.5	Class 150 (20 bar (290 psi)): 1" ... 12" Flat face Class 150 (20 bar (290 psi)): 14" ... 24" Raised face
AWWA C-207	PN 10 (145 psi): 28" ... 48" Flat face
AS 4087	PN 16 (232 psi): DN 50 ... DN 300 (2" ... 12") Flat face PN 16 (232 psi): DN 350 ... DN 1200 (14" ... 48") Raised face
Liner	EPDM
Electrode and grounding electrodes	Hastelloy C276/2.4819
Grounding straps	Grounding straps are premounted from the factory on each side of the sensor.

- 1) Has to be ordered with the meter. It is not possible to order the certificate afterwards.
- 2) Including Annex G.
- 3) Not for sensors with 300 μ m coating.
- 4) For further information on PED standard and requirements see the section about Pressure Equipment Directive.
- 5) Siemens warrants the measurement accuracy down to a flow velocity of 15 mm/s. For a flow velocity below 15 mm/s, we don't warrant the measurement accuracy.
- 6) DN \leq 600 type 01 (SORF); DN > 600 type 11 (WNRFF).

Overview



SITRANS FM MAG 8000 CT, compact version

Benefits

Approvals

- MI-001, OIML R 49/OIML R 49 MAA
- FM Fire Service

Easy to install

- Compact or remote solution with factory mounted cable and customer setting from factory
- IP68/NEMA 6P enclosure. Sensor can be buried.
- Flexible power supply - internal or external battery pack or mains power supply with battery back-up possibilities

Long-term stability/Low cost of ownership

- No moving parts in a robust construction means less wear and tear
- Basic and advanced transmitter versions with different optional add-on communication modules fulfill various customer requirements for high cost efficiency
- Bi-directional measurement with an outstanding low flow performance
- Up to 10 years maintenance-free operation in typical applications
- Insignificant pressure drop

Intelligent information, easy to access

- Advanced information on site
- Advanced statistics and diagnostics
- Connectable to common AMR systems

Flow Measurement

SITRANS FM (electromagnetic)

Battery-operated water meters / SITRANS FM MAG 8000 CT for revenue and bulk metering

Selection and ordering data

SITRANS FM MAG 8000 CT water meter with EPDM liner and Hastelloy electrodes	Article No. 7ME6820-●●●●●-●●●●●									
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.										
Diameter										
DN 50 (2")	2	Y								
DN 65 (2½")	3	F								
DN 80 (3")	3	M								
DN 100 (4")	3	T								
DN 125 (5")	4	B								
DN 150 (6")	4	H								
DN 200 (8")	4	P								
DN 250 (10")	4	V								
DN 300 (12")	5	D								
DN 350 (14")	5	K								
DN 400 (16")	5	R								
DN 450 (18")	5	Y								
DN 500 (20")	6	F								
DN 600 (24")	6	P								
Flange norm and pressure rating										
EN 1092-1, PN 10									B	
EN 1092-1, PN 16									C	
ANSI B16.5, Class 150									J	
AS 4087, PN 16									N	
Sensor version										
EPDM liner and Hastelloy electrodes, corrosion-resistant coating of category C4									0	
EPDM liner and Hastelloy electrodes, 300 µm corrosion-resistant coating of category C5									4	
Approval/Verification²⁾										
Without verification according to OIML R 49 ³⁾									0	
MI-001 Q3/Q1 = 40									1	
MI-001 Q3/Q1 = 63									2	
MI-001 Q3/Q1 = 80									3	
MI-001 Q3/Q1 = 160									4	
MI-001 Q3/Q1 = 200									5	
MI-001 Q3/Q1 = 250									6	
MI-001 Q3/Q1 = 100									7	
Without verification calibrated to OIML R 49-Class II (Q3/Q1 = 250)									8	
Region version										
Europe (m ³ , m ³ /h, 50 Hz)									1	
USA (m ³ , m ³ /h, 60 Hz)									2	
Transmitter type and installation										
Basic version integral on sensor										A
Basic version, remote cables mounted on sensor with IP68/NEMA 6P plugs										
• 5 m (16.4 ft)										B
• 10 m (32.8 ft)										C
• 20 m (65.6 ft)										D
• 30 m (98.4 ft)										E
Advanced version integral on sensor										K
Advanced version, remote cables mounted on sensor with IP68/NEMA 6P plugs										
• 5 m (16.4 ft)										L
• 10 m (32.8 ft)										M
• 20 m (65.6 ft)										N
• 30 m (98.4 ft)										P
Communication interface										
No additional "add-on" communication module installed										A
Serial RS 485 with Modbus RTU (Terminated as end device)										B
Serial RS 232 with Modbus RTU										C
Encoder interface for ITRON 200WP radio with "Sensus" protocol"										D
IIoT Wireless Communication Module with remote antenna including cable 5 m (16.4 ft) ¹⁾										L

Selection and ordering data (continued)

SITRANS FM MAG 8000 CT water meter with EPDM liner and Hastelloy electrodes	Article No. 7ME6820-
IIoT Wireless Communication Module with remote antenna including cable 5 m (16.4 ft) and connection cable 2.5 m (8.2 ft) for analog inputs ¹⁾	N
3G/UMTS communication module with remote antenna; cable 5 m (16.4 ft) ¹⁾	S
3G/UMTS communication module with analog inputs and remote antenna; cable 5 m (16.4 ft) ¹⁾	T
Power supply	
Internal battery (battery not included)	0
Internal battery pack installed ¹⁾	1
Power cable 1.5 m (4.9 ft) with IP68/NEMA 6P plugs for external battery (battery not included)	2
12/24 V AC/DC power supply with battery backup and 3 m (9.8 ft) power cable for external connection (battery not included)	3
115 ... 230 V AC power supply with battery backup and 3 m (9.8 ft) power cable for external connection (battery not included)	4

¹⁾ Lithium batteries are subject to special transportation regulations according to United Nations "Regulation of Dangerous Goods, UN 3090 and UN 3091". Special transport documentation is required to observe these regulations. This may influence both transport time and costs.

²⁾ For more details and references of the ranges please see the tables on the previous pages.

³⁾ Standard calibration or according to FM Fire Service requirements if P20, P21 or P22 is selected as Z option.

Order code	
Options	
Please add "-Z" to Article No. and specify Order code(s) and plain text.	
Certificate	
Inspection certificate 3.1 (EN 10204) - pressure test	C01
Material certificate according to EN 10204-3.1 ¹⁾	C12
Totalizer	
Volume calculation (default totalizer 1 = forward and totalizer 2 = reverse)	
Totalizer 1 = RV, reverse flow	L20
Totalizer 1 = NET, net flow	L22
Totalizer 2 = FW, forward flow	L30
Totalizer 2 = NET, net flow	L31
Pulse set up	
(default pulse A = forward and pulse B = Alarm, pulse width = 50 ms)	
A function = RV, reverse flow	L62
A function = FWnet, forward net flow	L63
A function = RVnet, reverse net flow	L64
A function = Off	L65
Volume per pulse A = $\times 0.001^{2)}$	L71
Volume per pulse A = $\times 0.01^{2)}$	L72
Volume per pulse A = $\times 0.1^{2)}$	L73
Volume per pulse A = $\times 1^{2)}$	L74
B function = FW, forward flow	L80
B function = RV, reverse flow	L81
B function = FWnet, forward net flow	L82
B function = RVnet, reverse net flow	L83
B function = Alarm	L84
B function = Call up	L85
Volume per pulse B = $\times 0.001^{2)}$	L91
Volume per pulse B = $\times 0.01^{2)}$	L92
Volume per pulse B = $\times 0.1^{2)}$	L93
Volume per pulse B = $\times 1^{2)}$	L94
Data logger set up (default month logging)	
DataloggerInterval = Daily	M31
DataloggerInterval = Weekly	M32

Flow Measurement

SITRANS FM (electromagnetic)

Battery-operated water meters / SITRANS FM MAG 8000 CT for revenue and bulk metering

Selection and ordering data (continued)

	Order code
Factory mounted cables	
4.8 m (15.75 ft) pulse cable A+B	M81
4.8 m (15.75 ft) communication cable RS 232/RS 485 terminated as end device	M82
20 m (65.6 ft) pulse cable A+B	M84
20 m (65.6 ft) communication cable RS 232/RS 485 terminated as end device	M85
Cello 2 channel, input cable 3 m (9.84 ft) with Brad Harrison micro-change 3 way connector	M87
Cello 2 channel, input cable 5 m (16.4 ft) with MIL-C-26482 spec. connectors	M89
Encoder interface cable with connector for ITRON 200WP radio, length 25 ft (7.6 m)	M90
Encoder interface cable with connector for ITRON 200WP radio, length 5 ft (1.5 m)	M91
SOFREL cable 2 m (6.6 ft) for LS42 data logger	M92
SOFREL cable 2 m (6.6 ft) for LS-Flow data logger	M97
FM Fire Service Approval (with ANSI B16.5 Class 150 flanges)	
DN 50, DN 80 and DN 100 (2", 3" and 4")	P20
DN 150 and DN 200 (6" and 8")	P21
DN 250 and DN 300 (10" and 12")	P22
Customer label	
FP2E marking (France market only)	C17
FP2E label (France)	H20
DIN 43863 label ¹⁾	H21
DIN 43863 label with SWM mark ¹⁾	H22
ADDC label	H23
Region approval and certificate	
KCC label (South Korea)	W28

¹⁾ Under preparation.

²⁾ Pulse width = 10 ms.

Operating instructions for SITRANS FM MAG 8000

Description	Article No.
• English	A5E03071515
• German	A5E00740986

All literature is available to download for free, in a range of languages, at <http://www.siemens.com/processinstrumentation/documentation>

Operating instructions for MAG 8000 3G/UMTS communication module

Description	Article No.
• English	A5E03644134

Technical specifications

MAG 8000 CT for revenue and bulk metering (7ME6820)	
Accuracy	OIML R 49/OIML R 49 MAA accuracy class I for DN 50, DN 350 ... 600 accuracy class II for DN 50 ... 600 MI-001 verification for DN 50 ... 600 (2" ... 24"), with Q3/Q1 = 315 FM Fire Service for DN 50, DN 80, DN 100, DN 150, DN 200, DN 250, and DN 300 (2", 3", 4", 6", 8", 10", and 12") ±1,5% (Q _{min} to Q _{max}) ⁵⁾
Low flow cut-off (default)	15 mm/s
Media conductivity	Clean water > 20 µs/cm
Temperature	
Ambient	-20 ... +60 °C (-4 ... +140 °F) MI-001: -25 ... +55 °C (-13 ... +131 °F)
Media	0.1 ... 50 °C (32 ... 122 °F)
Storage	-40 ... +70 °C (-22 ... +158 °F)
Enclosure rating	
Remote sensor	IP68 to EN 60529/NEMA 6P, 10 mH ₂ O continuously
Compact version	IP68 to EN 60529/NEMA 6P, 3 mH ₂ O for six months
Certificates and approvals	
Calibration (standard)	2 × 25% and 2 × 90%
Material certificate EN 10204-3.1	Available when ordering together with meter ¹⁾
Drinking water approvals	<ul style="list-style-type: none"> • NSF/ANSI Standard 61²⁾ (cold water) USA • WRAS (BS 6920 cold water) UK • ACS Listed France • DVGW W270 Germany • Belgaqua (B) • MCERTS (GB)
Fire Service approval	FM Fire Service (1044) ³⁾
Custody transfer approval	<ul style="list-style-type: none"> • OIML R 49 and OIML R 49 MAA approval • MI-001 approval (DK-0200-MI001-011)
Conformity	<ul style="list-style-type: none"> • CEN EN 14154, ISO 4064 • PED: 2014/68/EU⁴⁾ <p>For pressure/temperature curves see MAG 3100</p> <ul style="list-style-type: none"> • EMC: IEC/EN 61326 • CRN (DN 50 ... 1200 (2" ... 48"))
Sensor version	Coned sensor: DN 50 ... 300 (2" ... 12") Full bore sensor: DN 350 ... 600 (14" ... 24")
Sensor material	
• Housing and flanges	DN 50 ... 600 (2" ... 24"): Carbon steel ASTM A 105, with corrosion-resistant coating of category C4 or C5 according to ISO 12944-2
• Measuring pipe	DN 350 ... 600 (14" ... 24"): Stainless steel AISI 304/1.4301
Measuring principle	Electromagnetic induction
Excitation frequency	
Basic version	
• Battery-powered	DN 50 ... 150 (2" ... 6"): 1/15 Hz DN 200 ... 600 (8" ... 24"): 1/30 Hz
• Mains-powered	DN 50 ... 150 (2" ... 6"): 6.25 Hz DN 200 ... 600 (8" ... 24"): 3.125 Hz
Advanced version	
• Battery-powered	DN 50 ... 150 (2" ... 6"): 1/15 Hz (adjustable up to 6.25 Hz; reduced battery lifetime) DN 200 ... 600 (8" ... 24"): 1/30 Hz (adjustable up to 3.125 Hz; reduced battery lifetime)

Flow Measurement

SITRANS FM (electromagnetic)

Battery-operated water meters / SITRANS FM MAG 8000 CT for revenue and bulk metering

Technical specifications (continued)

MAG 8000 CT for revenue and bulk metering (7ME6820)	
• Mains-powered	DN 50 ... 150 (2" ... 6"): 6.25 Hz DN 200 ... 600 (8" ... 24"): 3.125 Hz
Flanges	
EN 1092-1 (DIN 2501)	PN 10 (145 psi): DN 200 ... 300 (8" ... 12") Flat face PN 10 (145 psi): DN 350 ... 600 (14" ... 24") Raised face ⁶⁾ PN 16 (232 psi): DN 50 ... 300 (2" ... 12") Flat face ⁶⁾ PN 16 (232 psi): DN 350 ... 600 (14" ... 24") Raised face PN 40 (580 psi): DN 25 and 40 (½" ... 1½") Flat face
ANSI 16.5	Class 150 (20 bar (290 psi)): 1" ... 12" Flat face Class 150 (20 bar (290 psi)): 14" ... 24" Raised face
AS 4087	PN 16 (232 psi): DN 50 ... 300 (2" ... 12") Flat Face PN 16 (232 psi): DN 350 ... 600 (14" ... 24") Raised face
Liner	EPDM
Electrode and grounding electrodes	Hastelloy C276/2.4819
Grounding straps	Grounding straps are premounted from the factory on each side of the sensor.

1) Has to be ordered with the meter. It is not possible to order the certificate afterwards.

2) Including Annex G

3) Not for sensors with 300 µm coating.

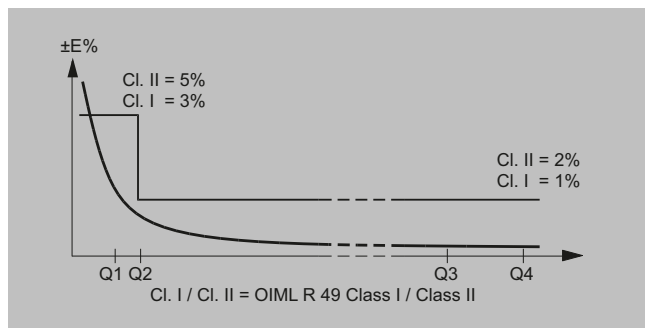
4) For further information on the PED standard and requirements see the section about Pressure Equipment Directive.

5) Siemens warrants the measurement accuracy down to a flow velocity of 15 mm/s. For a flow velocity below 15 mm/s, we don't warrant the measurement accuracy.

6) DN ≤ 600 type 01 (SORF); DN > 600 type 11 (WNRF)

MAG 8000 CT (Revenue program) water meter type approval

MAG 8000 CT program is type approved and verified according to international water meter standard OIML R 49. The custody transfer program is approved as Class 1 (DN 50, DN 350 ... 600) and Class 2 (DN 50 ... 600), at different Q3 and Q3/Q1, according to OIML R 49:2013 specification.



OIML R 49:2013 specification for Class 1¹⁾

7ME6820	DN 50 (2")	DN 350 (14")	DN 400 (16")	DN 450 (18")	DN 500 (20")	DN 600 (24")
R (Q3/Q1)	200	125	125	125	125	125
Q4 [m ³ /h]	78.75	3125	5000	5000	7875	7875
Q3 [m ³ /h]	63	2500	4000	4000	6300	6300
Q2 [m ³ /h]	0.5	32	51.2	51.2	80.64	80.64
Q1 [m ³ /h]	0.32	20	32	32	50.4	50.4

Technical specifications (continued)

OIML R 49:2013 specification for Class 2¹⁾

7ME6820	Horizontal installation													
	DN 50 (2")	DN 65 (2½")	DN 80 (3")	DN 100 (4")	DN 125 (5")	DN 150 (6")	DN 200 (8")	DN 250 (10")	DN 300 (12")	DN 350 (14")	DN 400 (16")	DN 450 (18")	DN 500 (20")	DN 600 (24")
R (Q3/Q1)	315	315	315	315	315	315	315	315	315	200	200	200	200	200
Q4 [m³/h]	78.75	125	200	312.5	500	787.5	1250	2000	2000	3125	5000	5000	7875	7875
Q3 [m³/h]	63	100	160	250	400	630	1000	1600	1600	2500	4000	4000	6300	6300
Q2 [m³/h]	0.32	0.51	0.81	1.27	2.03	3.2	5.08	8.13	8.13	20	32	32	50.4	50.4
Q1 [m³/h]	0.2	0.32	0.51	0.79	1.27	2	3.18	5.08	5.08	12.5	20	20	31.5	31.5

¹⁾ The product will be delivered according to requested specifications, which may deviate from the specifications of the approval frame described in tables below.

MAG 8000 CT (Revenue program) MI-001

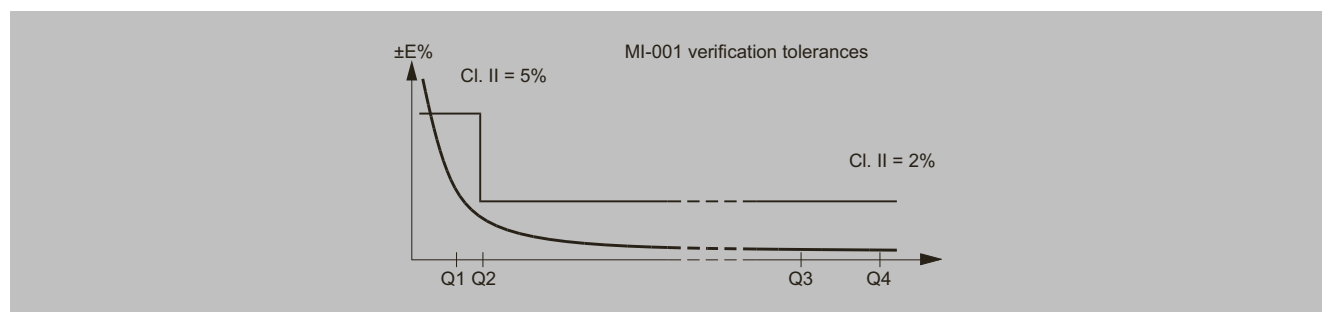
MAG 8000 CT program is type approved according to international water meter standard OIML R 49. Since the first November 2006 the MI-001 water meter directive is in force, which means that all water meters can be sold across the EU borders if the water meters contain a MI-001 label.

The MAG 8000 CT MI-001 verified and labeled products are a Class II approval according to Directive 2014/32/EU of the European Parliament and Council of 26 February, 2014 on measuring instruments, Annex III Water meters (MI-001) in the sizes from DN 50 to DN 600.

The MID certification is obtained as a B + D module approval according to the above mentioned directive.

Module B: Type approval according to OIML R 49

Module D: Quality insurance approval of production



MAG 8000 CT MI-001 verified and labeled products at a given Q3 and Q4/Q3 = 1.25 and Q2/Q1 = 1.6 measuring ranges see below table:

7ME6820-xxx1	DN 50 (2")	DN 65 (2½")	DN 80 (3")	DN 100 (4")	DN 125 (5")	DN 150 (6")	DN 200 (8")	DN 250 (10")	DN 300 (12")	DN 350 (14")	DN 400 (16")	DN 450 (18")	DN 500 (20")	DN 600 (24")
Straight pipe up/0 × DN downstream:	3 × DN													
Orientation:	All									Horizontal				
R (Q3/Q1)	40	40	40	40	40	40	40	40	40	40	40	40	40	40
Q4 [m³/h]	20	31.25	50	78.75	125	200	312.5	500	787.5	787.5	1250	2000	3125	5000
Q3 [m³/h]	16	25	40	63	100	160	250	400	630	630	1000	1600	2500	4000
Q2 [m³/h]	0.64	1	1.6	2.52	4	6.4	10	16	25.2	25.2	40	64	100	160
Q1 [m³/h]	0.4	0.63	1	1.58	2.5	4	6.25	10	15.75	15.75	25	40	62.5	100

7ME6820-xxx2	DN 50 (2")	DN 65 (2½")	DN 80 (3")	DN 100 (4")	DN 125 (5")	DN 150 (6")	DN 200 (8")	DN 250 (10")	DN 300 (12")	DN 350 (14")	DN 400 (16")	DN 450 (18")	DN 500 (20")	DN 600 (24")
Straight pipe up/0 × DN downstream:	3 × DN													
Orientation:	All									Horizontal				
R (Q3/Q1)	63	63	63	63	63	63	63	63	63	63	63	63	63	63
Q4 [m³/h]	20	31.25	50	79	125	200	312.5	500	788	1250	2000	3125	5000	7875
Q3 [m³/h]	16	25	40	63	100	160	250	400	630	1000	1600	2500	4000	6300
Q2 [m³/h]	0.41	0.64	1.02	1.6	2.54	4.06	6.35	10.16	16	25.4	40.63	63.49	101.59	160
Q1 [m³/h]	0.25	0.4	0.64	1	1.59	2.54	3.97	6.35	10	15.87	25.4	39.68	63.49	100

Flow Measurement

SITRANS FM (electromagnetic)

Battery-operated water meters / SITRANS FM MAG 8000 CT for revenue and bulk metering

Technical specifications (continued)

7ME6820-xxxx3	DN 50 (2")	DN 65 (2½")	DN 80 (3")	DN 100 (4")	DN 125 (5")	DN 150 (6")	DN 200 (8")	DN 250 (10")	DN 300 (12")	DN 350 (14")	DN 400 (16")	DN 450 (18")	DN 500 (20")	DN 600 (24")
Straight pipe up/0 × DN downstream:										3 × DN				
Orientation: All										Horizontal				
R (Q3/Q1)	80	80	80	80	80	80	80	80	80	80	80	80	80	80
Q4 [m³/h]	31.25	50	79	125	200	312.5	500	788	1250	2000	3125	3125	5000	7875
Q3 [m³/h]	25	40	63	100	160	250	400	630	1000	1600	2500	2500	4000	6300
Q2 [m³/h]	0.5	0.8	1.26	2	3.2	5	8	12.6	20	32	50	50	80	126
Q1 [m³/h]	0.31	0.5	0.79	1.25	2	3.13	5	7.88	12.5	20	31.25	31.25	50	78.75

7ME6820-xxxx7	DN 50 (2")	DN 65 (2½")	DN 80 (3")	DN 100 (4")	DN 125 (5")	DN 150 (6")	DN 200 (8")	DN 250 (10")	DN 300 (12")	DN 350 (14")	DN 400 (16")	DN 450 (18")	DN 500 (20")	DN 600 (24")
Straight pipe up/0 × DN downstream:										3 × DN				
Orientation: All										Horizontal				
R (Q3/Q1)	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Q4 [m³/h]	31.25	50	78.5	125	200	312.5	500	787.5	1250	2000	3125	5000	5000	7875
Q3 [m³/h]	25	40	63	100	160	250	400	630	1000	1600	2500	4000	4000	6300
Q2 [m³/h]	0.40	0.64	1.008	1.6	2.56	4	6.4	10.08	16	25.6	40	64	64	100.8
Q1 [m³/h]	0.25	0.4	0.63	1	1.6	2.5	4	6.3	10	16	25	40	40	63




7ME6820-xxxx4	DN 50 (2")	DN 65 (2½")	DN 80 (3")	DN 100 (4")	DN 125 (5")	DN 150 (6")	DN 200 (8")	DN 250 (10")	DN 300 (12")	DN 350 (14")	DN 400 (16")	DN 450 (18")	DN 500 (20")	DN 600 (24")
Straight pipe up/0 × DN downstream:										3 × DN				
Orientation: Horizontal														
R (Q3/Q1)	160	160	160	160	160	160	160	160	160	160	160	160	160	160
Q4 [m³/h]	50	79	125	200	312.5	500	788	1250	2000	3125	5000	5000	7875	7875
Q3 [m³/h]	40	63	100	160	250	400	630	1000	1600	2500	4000	4000	6300	6300
Q2 [m³/h]	0.4	0.63	1	1.6	2.5	4	6.3	10	16	25	40	40	63	63
Q1 [m³/h]	0.25	0.39	0.63	1	1.56	2.5	3.94	6.25	10	15.63	25	25	39.38	39.38

7ME6820-xxxx5	DN 50 (2")	DN 65 (2½")	DN 80 (3")	DN 100 (4")	DN 125 (5")	DN 150 (6")	DN 200 (8")	DN 250 (10")	DN 300 (12")
Straight pipe up/0 × DN downstream:									
Orientation: Horizontal									
R (Q3/Q1)	200	200	200	200	200	200	200	200	200
Q4 [m³/h]	78.75	125	200	312.5	500	787.5	1250	2000	2000
Q3 [m³/h]	63	100	160	250	400	630	1000	1600	1600
Q2 [m³/h]	0.5	0.8	1.28	2	3.2	5.04	8	12.8	12.8
Q1 [m³/h]	0.36	0.5	0.8	1.25	2	3.15	5	8	8

Horizontal installation									
7ME6820-xxxx6	DN 50 (2")	DN 65 (2½")	DN 80 (3")	DN 100 (4")	DN 125 (5")	DN 150 (6")	DN 200 (8")	DN 250 (10")	DN 300 (12")
Straight pipe up/0 × DN downstream:									
Orientation: Horizontal									
R (Q3/Q1)	250	250	250	250	250	250	250	250	250
Q4 [m³/h]	78.75	125	200	312.5	500	787.5	1250	2000	2000
Q3 [m³/h]	63	100	160	250	400	630	1000	1600	1600
Q2 [m³/h]	0.40	0.64	1.02	1.6	2.56	4.03	6.4	10.24	10.24
Q1 [m³/h]	0.25	0.4	0.64	1	1.6	2.52	4	6.4	6.4

The Label is placed on the side of the encapsulation.
An example of the product label is shown below:

Technical specifications (continued)

SIEMENS		
SITRANS F M MAG 8000 CT		
Order No.:	7ME68205RJ031AA1	MAWP (PS) at 0.1°C/32°F (TS): 16bar/232psi
Serial No.:	888888H88	MAWP (PS) at 50°C/122°F (TS): 16bar/232psi
Size DN: 400 (16 inch.)	Lining: EPDM	T. media min.: 0.1°C/32°F
Sensor material:	ASTM A 105	T. media max.: 50°C/122°F
Meter orientation:	Horizontal (H)	Process connection: ANSI Class 150
Enclosure:	E2, M1 IP68/NEMA 6P	Year of Manuf.: 2020
Cal Factor: 8.8888888	Fluid group: PED/L2	SW/HW V.: 3.11/15 Tamb.: -25°C to 55°C
Supply:	Lithium battery inside	Q3: 1600 m ³ /H
Certification No.:	DK-0200-MI001-011 U3D3	Q3/Q1: 80
  		
Siemens AG, DE-76181 Karlsruhe		
Made in France		

Installation conditions

Please refer to "System information SITRANS FM electromagnetic flowmeters".

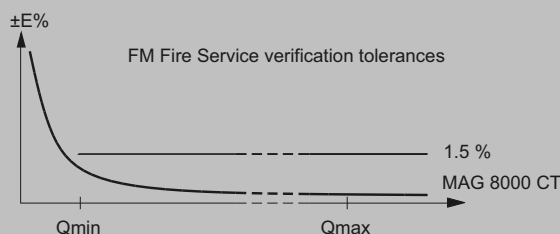
Battery operation time and calculation

The battery operation time depends on the connected battery pack as well as the operation condition of the meter.

MAG 8000 calculates the remaining capacity every 4 hours and includes all consuming elements. Calculation compensates for temperature influence on battery capacity (drawing).

MAG 8000 CT (7ME6820) for Fire Service applications

MAG 8000 CT (7ME6820) is FM Fire Service approved for automatic fire protection systems according to the Fire Service Meters Standard, Class Number 1044. The approval is applicable for the sizes 50, DN 80, DN 100, DN 150, DN 200, DN 250, and DN 300 (2", 3", 4", 6", 8", 10", and 12") with ANSI B16.5 Class 150 flanges. The FM Fire Service approved product can be ordered via the Z-options P20, P21 and P22.



Flow Measurement

SITRANS FM (electromagnetic)

Battery-operated water meters / SITRANS MAG IIoT module

Overview



IIoT Wireless Communication Module

The IIoT Wireless Communication Module¹⁾ for SITRANS FM MAG 8000 is a communication system consisting of a hardware part combined with a web-hosted application for device management and measurement data transfer. The main features of the module are to transmit periodically the flow readings from a MAG 8000 field device to an end user, real time notifications of alarms, online configuration, and remote diagnosis of the field device.

The IIoT Wireless Communication Module is using the public mobile network as channel for transferring the measurement data to the MAG 8000 IIoT Web Application, where only authorized users have access to. In addition, the IIoT Web Application serves as an interface for the end user to provide the measurement data per Email or FTP.

Communication between the field device and web application runs over MQTT protocol, which is a widely used protocol in the IoT (Internet of Things) world.

The IIoT Wireless Communication Module can be installed in the existing MAG 8000 with SW version 3.11 and higher. A Cat M1, NB-IoT or 2G network must be available at the installation site of the MAG 8000.

¹⁾ A rechargeable buffer battery is mandatory, even if the MAG 8000 is mains power operated.

Benefits

The MAG 8000 IIoT Web Application provides options for remote configuration of all MAG 8000 parameters, remote diagnostics, remote qualification and communication via email, FTP / FTPS (TLS/SSL-based encryption).

This provides customers with the flexibility to receive data via email or FTP for the monitoring and control with SITRANS serveIQ or other systems anywhere in the world.

TLS/SSL based data encryption provides a highlevel information security to protect customers data privacy.

The IIoT Wireless Communication Module offers:

- LTE-M and NB-IoT communication with 2G fallback
- Remote Qualification Certificate feature to enable the offsite diagnostic and audit on devices installed anywhere in the world
- 2-channel analog input measurement for external ratiometric pressure transmitter, transmission together with flow measurement (2-in-1 solution)
- Real-time clock synchronization with internet NTP server, ensuring that all measurement data is accurately timestamped
- Data transmission at customer-specified points in time, allowing for synchronization of information from multiple MAG 8000 devices. The package of information retrieved via the csv file includes:
 - Time stamp
 - Flow rate
 - Totalizer 1
 - Totalizer 2
 - Totalizer 3
 - Analog 1 (V)
 - Analog 2 (V)
 - Battery lifetime
 - Alarm list (as decimal format)

Selection and ordering data

Accessories for SITRANS FM MAG 8000 IloT Wireless Communication Module


Description	Article No.	
Upgrade kit MAG 8000 IloT Wireless Communication Module (LTE-M, NB-IoT, 2G) including module, SIM-Card, antenna, adaptor cable, cable gland, O-ring (without rechargeable battery)	A5E51150447	
MAG 8000 IloT Wireless Communication Module (LTE-M, NB-IoT, 2G) including SIM-Card (without rechargeable battery)	A5E51093917	
Antenna set for MAG 8000 IloT WCM PVC, IP68, cable length 5 m (16.4 ft) with SMA male connector (type RG 58) and internal antenna adaptor cable, and single entry cable gland	A5E51198820	
Rechargeable Lithium battery for MAG 8000 IloT Wireless Communication Module¹⁾	A5E03436686	
Analog input cable for MAG 8000 IloT WCM or 3G WCM 2.5 m (8.2 ft) cable with M12 connector (IP67) A-Coding female 5 pins, and two-entry cable gland	A5E03436698	
Antenna adaptor cable for IloT WCM or 3G WCM Package: 2 pieces	A5E41896494	
Cable entry 2 ... 5 mm (0.08 ... 0.20") M12 brass glands with M20 reduction Package of 10 pcs, for 3G/UMTS module antenna cable, power cable of external battery pack, encoder card cable	FDK:087L4154	
Two cable entries 3.5 ... 5 mm (0.14 ... 0.20") M20 brass glands Package: 10 pcs	FDK:087L4158	
Two cable entries 5.5 ... 7.5 mm (0.22 ... 0.30"), M20 brass glands Package: 10 pcs	FDK:087L4159	

Flow Measurement

SITRANS FM (electromagnetic)

Battery-operated water meters / SITRANS MAG IIoT module

Selection and ordering data (continued)

Description	Article No.	
Potting kit for terminal box of flow sensors for IP68/NEMA 6P	FDK:085U0220	

¹⁾ Lithium batteries are subject to special transportation regulations according to United Nations "Regulation of Dangerous Goods, UN 3090 and UN 3091". Special transport documentation is required to observe these regulations. This may influence both transport time and costs.

Overview



3G/UMTS communication module



PC-IrDA connection

MAG 8000 3G/UMTS Wireless Communication Module

The 3G/UMTS wireless communication module is a compact built-in solution which can be installed in the existing MAG 8000 with SW version 3.02 and higher, supporting HSDPA cat. 8/HSUPA Cat.6 at 5 UMTS bands, with the ability to fall back to GSM/GPRS network in case there is no 3G signal. The 3G/UMTS module collects comprehensive measurement data from MAG 8000 at an interval down to 1 minute, allows for data transmission via numerous protocols including SMS, email via SMTP, email via SMTPS (TLS/SSL-based encryption), FTP, and FTPS (TLS/SSL-based encryption, implicit), with a customer configurable transmission interval (down to 1 hour). This provides customers with the flexibility to receive data via email, FTP or text message for the monitoring and control systems anywhere in the world.

TLS/SSL based data encryption provides a high level information security to protect customers data privacy.

The 3G/UMTS module offers:

- Remote Qualification Certificate feature to enable the offsite diagnostic and audit on devices installed anywhere in the world
- 2-channel analog input measurement for external ratiometric pressure transmitter, transmission together with flow measurement (2-in-1 solution)
- 4-20 mA alarm signal detection and realtime SMS alarm for tamper protection and flooding situations
- Real-time clock synchronization with internet NTP server, ensuring that all measurement data is accurately timestamped
- Data transmission at customer-specified points in time, allowing for synchronization of information from multiple MAG 8000 devices

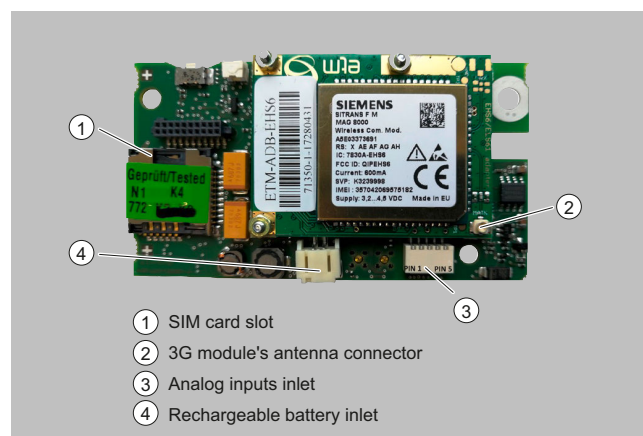
The OPC server specifically designed for the MAG 8000 3G/UMTS module is offered free of charge. With this value-added package,

Overview (continued)

the opportunity for measurement data collection and further processing/analyzing for system integration and automation is offered. The package of information retrieved via the csv file includes:

- Time stamp
- Flow rate
- Tot 1
- Tot 2
- Tot 3
- Analog 1 (mA)
- Analog 2 (V)
- Battery lifetime
- Alarm list (as decimal format)

Electrical installation of 3G/UMTS module



A rechargeable buffer battery is mandatory, even if the MAG 8000 is mains power operated.

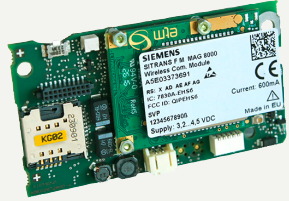
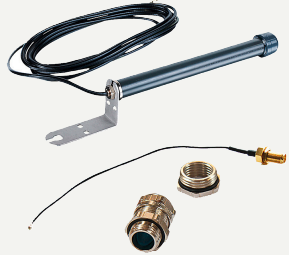


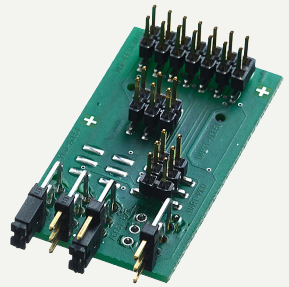

Flow Measurement

SITRANS FM (electromagnetic)





Battery-operated water meters / SITRANS MAG 8000 3G module

Selection and ordering data

Accessories for SITRANS FM MAG 8000 3G WCM

Description	Article No.	
MAG 8000 3G/UMTS module Rechargeable battery, antenna and analog cable input must be ordered separately	A5E41011589	
High gain antenna for MAG 8000 3G/UMTS PVC, IP68, cable length 5 m (16.4 ft), with SMA male connector (type RG 58) and internal antenna adaptor cable, and single entry cable gland	A5E40957990	
Rechargeable lithium battery for MAG 8000 IIoT Wireless Communication Module¹⁾	A5E03436686	
Analog input cable for MAG 8000 IIoT WCM or 3G WCM 2.5 m (8.2 ft) cable with M12 connector (IP67) A-Coding female 5 pins, and two-entry cable gland	A5E03436698	
Service adaptor for 3G/UMTS module	A5E03436699	
Antenna adaptor cable for IIoT WCM or 3G WCM (2 pieces)	A5E41896494	

Selection and ordering data (continued)

Description	Article No.	
Cable entry 2 ... 5 mm (0.08 ... 0.20") M12 brass glands with M20 reduction Package of 10 pcs, for 3G/UMTS module antenna cable, power cable of external battery pack, encoder card cable.	FDK:087L4154	
Two cable entries 3.5 ... 5 mm (0.14 ... 0.20") M20 brass glands Package: 10 pcs	FDK:087L4158	
Two cable entries 5.5 ... 7.5 mm (0.22 ... 0.30"), M20 brass glands Package: 10 pcs	FDK:087L4159	
Potting kit for terminal box of flow sensors for IP68/NEMA 6P	FDK:085U0220	

¹⁾ Lithium batteries are subject to special transportation regulations according to United Nations "Regulation of Dangerous Goods, UN 3090 and UN 3091". Special transport documentation is required to observe these regulations. This may influence both transport time and costs.

Flow Measurement

SITRANS FM (electromagnetic)

Battery-operated water meters / SITRANS MAG 8000 accessories and spare parts

Selection and ordering data

Accessories

Description	Article No.	
IrDA infrared interface adapter with USB for data acquisition with 1.2 m (3.9 ft) cable	FDK:087L4163	
Battery backup for mains power supply 1 pc. D-cell (3.6 V, 16.5 Ah) ¹⁾	A5E03354392	
Internal battery pack one set of 2 D-cell (3.6 V, 33 Ah) and accessories for replacement ¹⁾ incl. NBR O-ring	FDK:087L4150	
Internal battery pack with connector 2 D-cell (3.6 V, 33 Ah), incl. accessories for replacement ¹⁾ and NBR O-ring. Made in Europe.	A5E50698081	
External battery pack IP68/NEMA 6P with connector 4 D-cell (3.6 V, 66 Ah) ¹⁾ ; order cable FDK:087L4152 separately.	FDK:087L4151	
External battery pack, IP68/NEMA 6P with connector 4 D-Cell (3.6 V 66 Ah) without power cable. Made in Europe. ¹⁾	A5E50698048	
Mains power supply 12 ... 24 V AC/DC (average power consumption during line ≤ 0.1 VA) with battery backup and 3 m (9.8 ft) power cable for external connection (backup battery not included) Temperature range Fixed laying: -40 ... +90 °C (-40 ... +194 °F) Flexible application: -30 ... +80 °C (-22 ... +176 °F)	FDK:087L4210	
Mains power supply 115 ... 230 V AC, 50/60 Hz with battery backup up and 3 m (9.8 ft) power cable for external connection (backup battery not included)	FDK:087L4211	
RS 232 add-on module point to point communication interface with Modbus RTU protocol	FDK:087L4212	
RS 485 add-on module multidrop communication interface with Modbus RTU protocol	FDK:087L4213	
Encoder interface module with "Sensus" protocol for ITRON 200WP and 100W radio	A5E02475650	

Selection and ordering data (continued)

Description	Article No.	
One cable entry 2 ... 5 mm (0.08 ... 0.20 "), M12 brass glands with M20 reduction ²⁾ Package of 10 pcs, for 3G/UMTS module antenna cable, power cable of external battery pack, encoder card cable.	FDK:087L4154	
One cable entry 6 ... 8 mm (0.24 ... 0.31 "), M20 brass glands package ²⁾ Package of 10 pcs, for pulse output cable or MODBUS cable, cello cable or mains power supply	FDK:087L4155	
One cable entry 8 ... 11 mm (0.31 ... 0.43 "), M20 brass glands package ²⁾ Package of 10 pcs, for SOFREL cable	FDK:087L4156	
One cable entry 11 ... 15 mm (0.43 ... 0.59 "), M20 brass glands package ²⁾ Package of 10 pcs	FDK:087L4157	
Two cable entries 3.5 ... 5 mm (0.14 ... 0.20 "), M20 brass glands package ²⁾ Package of 10 pcs	FDK:087L4158	
Two cable entries 5.5 ... 7.5 mm (0.22 ... 0.30 "), M20 brass glands package ²⁾ Package of 10 pcs	FDK:087L4159	
Potting kit for terminal box of flow sensors for IP68/NEMA 6P	FDK:085U0220	
MAG 8000 Hardware key to access protected parameters	FDK:087L4165	
MAG 8000 demo - training unit pack operating on Alkaline batteries Transmitter with Flow tool CD, IrDA interface adapter and hardware key (No dangerous goods limitations)	FDK:087L4080	
Alkaline battery for MAG 8000 demo transmitter (3 V 13 Ah) (No dangerous goods limitations)	FDK:087L4142	

Flow Measurement






SITRANS FM (electromagnetic)

Battery-operated water meters / SITRANS MAG 8000 accessories and spare parts

Selection and ordering data (continued)

- 1) Lithium batteries are subject to special transportation regulations according to United Nations "Regulation of Dangerous Goods, UN 3090 and UN 3091". Special transport documentation is required to observe these regulations. This may influence both transport time and costs.
- 2) For cable connection through MAG 8000 transmitter bottom part.

Spare parts

Description	Article No.	
MAG 8000 transmitter compact replacement kit¹⁾. No battery included. With original product label. System number specified by ordering	FDK:087L4166	
MAG 8000 transmitter remote replacement kit¹⁾ No battery included. With original product label. System number specified by ordering	FDK:087L4202	
MAG 8000 (Advanced version) transmitter compact replacement kit¹⁾ No battery included. With blank product label. No system number required	FDK:087L4203	
MAG 8000 (Advanced version) transmitter remote replacement kit¹⁾ No battery included. No system number required	FDK:087L4204	
MAG 8000 (Basic version) transmitter PCB replacement kit¹⁾ No system number required	A5E01171569	
MAG 8000 (advanced version) transmitter PCB replacement kit¹⁾ No system number required	FDK:087L4168	

Selection and ordering data (continued)





Description	Article No.	
Enclosure top including plastic lid, screws, O-ring and blank product label	FDK:087L4167	
Power cable 1.5 m (4.9 ft) with IP68/NEMA 6P plugs for external battery (no battery included); PE jacket, ambient temperature: -20 °C ... +60 °C (-4 °F ... 140 °F)	FDK:087L4152	
Encoder interface cable with IP68/NEMA 6P plugs included, for ITRON 200WP and 100W radio; 22 AWG stranded TC conductors, polypropylene insulation, twisted pair, overall Beldfoil shield, 22 AWG stranded TC drain wire, PVC jacket <ul style="list-style-type: none"> • Length: 152.4 cm (5 ft) • Length: 762 cm (25 ft) 	A5E02551263 A5E02551182	
Service tool kit package with various component for service and replacement. <u>Content:</u> <ul style="list-style-type: none"> • 10 × plastic top lids • 20 × screws • 10 × wire holders • 10 × battery cups, 10 × greased O-rings • 20 × clamp kits • 10 × IrDA adaptor holding rings 	FDK:087L4162	

Flow Measurement

SITRANS FM (electromagnetic)

Battery-operated water meters / SITRANS MAG 8000 accessories and spare parts

Selection and ordering data (continued)

Description	Article No.	
		
		
Remote cable set with IP68/NEMA 6P plugs, M20, 1 pc. <ul style="list-style-type: none"> • 5 m (16.4 ft) • 10 m (32.8 ft) • 20 m (65.6 ft) • 30 m (98.4 ft) 	A5E00862482 A5E00862487 A5E00862492 A5E00862497	
Remote cable set, M20 plug with pre-mounted M40 conduit adaptor <ul style="list-style-type: none"> • 10 m (32.8 ft) • 20 m (65.6 ft) 	A5E33400834 A5E33400836	
Grounding ring service kit, flat ring, in stainless steel AISI 316 1.4436, incl. screws and gaskets, 2 pcs²⁾ <ul style="list-style-type: none"> • DN 25 (1") • DN 40 (1½") • DN 50 (2") • DN 65 (2½") • DN 80 (3") • DN 100 (4") • DN 125 (5") • DN 150 (6") • DN 200 (8") • DN 250 (10") • DN 300 (12") 	A5E01002946 A5E01002947 A5E01002948 A5E01002950 A5E01002952 A5E01002953 A5E01002954 A5E01002955 A5E01002957 A5E01002958 A5E01002962	

¹⁾ Not applicable to custody transfer (CT) verified systems without re-verification.

²⁾ When MAG 8000 (7ME6810 and 7ME6820) is installed in PVC or coated pipelines, grounding rings must be installed additionally. Grounding rings, type C must be used for the 7ME6810 and 7ME6820 routes (sizes > DN 300). Please see grounding rings in the section MAG 3100 Grounding rings and be aware that the mentioned MLFB codes include only 1 grounding ring. Grounding rings DN 25 to DN 300 in stainless steel are packed in pairs and sold as a "grounding ring kit".

Operating instructions for SITRANS FM MAG 8000

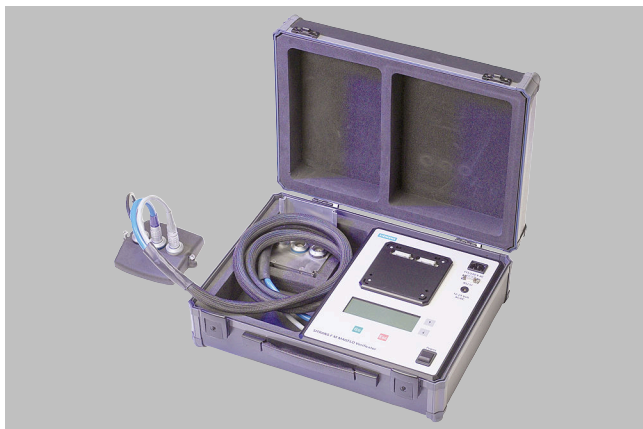
Description	Article No.
• English	A5E03071515
• German	A5E00740986

All literature is available to download for free, in a range of languages, at www.siemens.com/processinstrumentation/documentation

Operating instructions for MAG 8000 3G/UMTS communication module

Description	Article No.
• English	A5E03644134

Overview



The SITRANS FM Verificator is an external tool designed for MAG 5000 and MAG 6000 with MAG 1100, MAG 1100 F, MAG 3100, MAG 3100 P or MAG 5100 W sensors to verify the entire product, the installation and the application.

The goal is to improve operation, reduce downtime and maintain measurement accuracy as long as possible.

The SITRANS FM Verificator is highly advanced and carries out the complex verification and performance check of the entire flowmeter system, according to unique SIEMENS patented principles. The whole verification test is automated and easy to operate so there is no opportunity for human error or influence. The system is traceable to international standards and tested by WRc (Water Research Council).

- Stand alone Verificator to measure a number of selected parameters in the flow sensor and a transmitter which affects the integrity of the flow measurement.
- Up to 20 measurements can be stored in the Verificator.
- The Verificator can be connected via a serial cable to a PC enabling download of the data. A Windows program enables printing and management of vericator reports.

Mode of operation

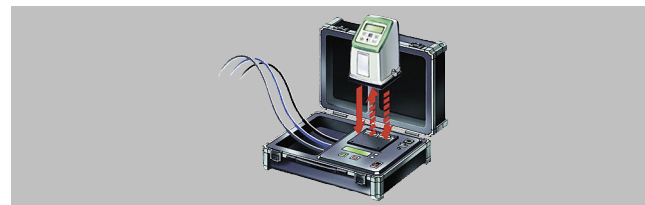
Verification - Steps

Verification of a SITRANS FM flowmeter consists of the following test routines:

1. Transmitter test
2. Flowmeter and cable insulation test
3. Sensor magnetism test

1. Transmitter test

The transmitter test is the traditional way of on-site testing on the market and checks the complete electronic system from signal input to output.

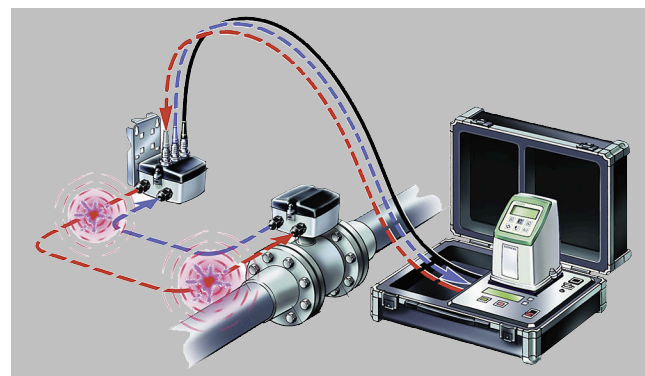


Transmitter test

Using the excitation power output, which is generated to drive the magnetic field of the sensor, the vericator simulates flow signal to the transmitter input. By measuring the transmitter outputs the vericator calculates its accuracy against defined values. Test includes:

- Excitation power to drive the magnetic field
- Signal function from signal input to output
- Signal processing – gain, offset and linearity
- Test of analogue and frequency output

2. Insulation test



Flowmeter insulation test

The verification test of the flowmeter insulation is a "cross-talk" test of the entire flowmeter which ensures that the flow signal generated in the sensor is not affected by any external influences.

In the "cross-talk" test the vericator generates a high voltage disturbance within the coil circuit and then looks for any "cross-talk" induced in the flow signal circuit. By generating dynamic disturbances close-coupled to the flow signal, the flowmeter is tested for noise immunity to a maximum level:

- EMC influence on the flow signal
- Moisture in sensor, connection and terminal box
- Non-conductive deposit coating the electrodes within the sensor

Flow Measurement

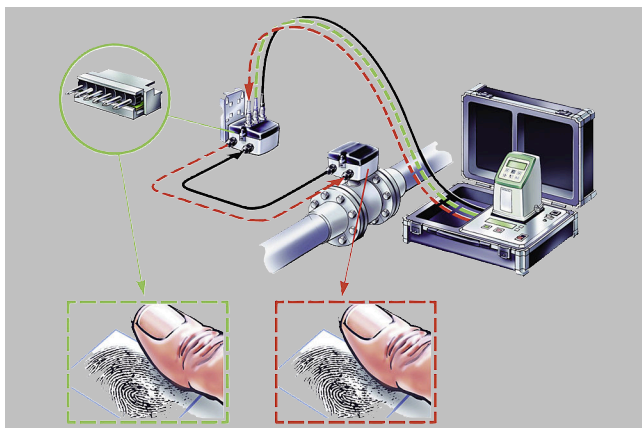
SITRANS FM (electromagnetic)

Field device verification / SITRANS FM Verificator

Mode of operation (continued)

- Missing or poor grounding, shielding and cable connection

3. Sensor magnetism test



Sensor magnetism test

The verification of the sensor magnetism is a “boost” test of the magnetic field coil. The test ensures that the magnetism behaviour is like the first time, by comparing the current sensor magnetism with the “fingerprint” which was determined during initial calibration and stored in the SENSORPROM memory unit.

In the “boost” test the verificator changes the magnetic field in certain pattern and with high voltage to get quick stable magnetic condition. This unique test is fulfilled without any interference or compensation of surrounding temperature or interconnecting cabling.

- Changes in dynamic magnetic behaviour
- Magnetic influence inside and outside the sensor
- Missing or poor coil wire and cable connection

Certificate

The test certificate generated by a PC contains:

- Test result with passed or failed
- Installation specification
- Flowmeter specification and configuration
- Verificator specification with date of calibration ensuring traceability to international standards.

Mode of operation (continued)

MAGFLO® Verification Certificate						
Customer:			MAGFLO® Identification:			
Name	_____		TAG No./Name	0		
Address	_____		Sensor Code No.	7ME634		
Phone	_____		Sensor Serial No.	057701H142		
Email	_____		Transmitter Code No.	7ME692		
	_____		Transmitter Serial No.	109418N080		
	_____		Location	_____		
Results:			Verification file name or No. FT-103FT2801			
			Transmitter Passed			
			Sensor Insulation Passed			
			Magnetic Circuit Passed			
Velocity	Current Output			Frequency Output		
Theoretical	Theoretical	Actual	Deviation	Theoretical	Actual	Deviation
0.5m/s	4.800mA	4.802mA	0.25%	0.500kHz	0.501kHz	0.11%
1.0m/s	5.600mA	5.601mA	0.08%	1.000kHz	1.001kHz	0.07%
3.0m/s	8.800mA	8.804mA	0.08%	3.000kHz	3.004kHz	0.14%
	Current Output 4-20mA			Frequency Output 0-10kHz		
Transmitter Settings:			Sensor Details:			
Basic	Qmax.	2.00000 m ³ /h		Size	DN 15 1/2 IN	
	Flow Direction	Positive		Cal. Factor	0.16531426	
	Low flow Cut-off	1.50%		Correction Factor	1.0	
	Empty Pipe	ON		Excitation Freq.	12.5Hz	
Output	Current Output	ON (4-20mA)				
	Time Constant	5.0 Sec.				
	Relay Output	Error Level				
	Digital Output	Pulse				
	Frequency Range	N/A				
	Time Constant	N/A				
	Volume/pulse	1.0 l/p				
	Pulse width	0.51999998 sec.				
	Pulse polarity	Positiv				
Totalizer 1 value before test	819442.93213 l			Verificator Details (083F5060)		
Totalizer 1 value after test	819458.92334 l			Serial No.	107920N490	
Totalizer 2 value before test	693.87579 l			Device No.	94683	
Totalizer 2 value after test	693.88145 l			Software Version	1.40	
Operating time in days	1068			PC-Software Version	5.01	
				Cal. date	2015.10.26	
				ReCal. date	2016.10.26	
Comments						
These tests verify that the flowmeter is functioning within 2% deviation of the original test parameters.						
Verification is traceable to National and International Standards.						
Date and signature _____						
2016.10.26						

Note:

It is mandatory to have the Verificator returned to the factory once a year for check and re-verification.

Selection and ordering data

Description	Article No.
SITRANS FM Verificator	
11 ... 30 V DC, 11 ... 24 V AC, 115 ... 230 V, 50 Hz	FDK:083F5060
11 ... 30 V DC, 11 ... 24 V AC, 115 ... 230 V, 60 Hz	FDK:083F5061

Overview



SITRANS FC Coriolis mass flowmeters are designed for measurement of a variety of liquids and gases. The meter offers accurate measurement of mass flow, volume flow, density, temperature and fraction.

Compatibility between transmitters and sensors

Transmitter	Compact	Remote	Ex-Approval	Sensor
FCT030	Yes	Yes	Yes	FCS300, DN 15 ... 150
	Yes	Yes	Yes	FCS400, DN 15 ... 50
	No	Yes	Yes	MASS 2100, DI 1.5
	Yes	Yes	Yes	MASS 2100, DI 3, DI 6, DI 15
	No	Yes	Yes	FC300, DN 4
FCT010	Yes	No	Yes	FCS300, DN 15 ... 150
	Yes	No	Yes	FCS400, DN 15 ... 50
	No	Yes	Yes	MASS 2100, DI 1.5
	Yes	Yes	Yes	MASS 2100, DI 3, DI 6, DI 15
	No	Yes	Yes	FC300, DN 4
FCT070	No	Yes	Yes	FCS300, DN 15 ... 150
	No	Yes	Yes	FCS400, DN 15 ... 50
	No	Yes	Yes	MASS 2100, DI 1.5
	No	Yes	Yes	MASS 2100, DI 3, DI 6, DI 15
	No	Yes	Yes	FC300, DN 4

Flow Measurement

SITRANS FC (Coriolis)

System information

Benefits

Greater flexibility

- Wide product program
- High performance and top-end flowmeters
- Compact or remote installation using the same transmitters and sensors within their flowmeter series
- Full integration in SIMATIC solutions

Easier commissioning

All SITRANS FC Coriolis flowmeters feature a sensor related memory unit SensorFlash which stores calibration data and transmitter settings for the lifetime of the product as well as all product documentation and certificates.

At commissioning the flowmeter commences measurement without any initial programming.

Easier service

- Comprehensive self-diagnosis and service menu enhances troubleshooting and meter verification.
- Transmitter replacement requires no programming. SensorFlash data updates all settings after initialization.

Room for growth

- FC330/FC310:
Digital platform allows for any sensor in the range DN 15 to DN 150 to be matched in compact or remote installation.
- FC430/FC410:
Robust and compact sensor dedicated for OEM and skid manufacturer in sizes DN 15 to DN 50. Also available in a true sanitary version.
- MASS 2100/FC300 DN 4 sensors with FCT digital platform transmitters allows all sensors from DI 1.5 to DI 15 to be matched with the FCT010, FCT030 and FCT070 transmitters.
- FCT070 transmitter solution as a fully integrated technology module in SIMATIC ET 200SP. Seamless communicating with all SIMATIC solutions by very fast PROFINET communication. Advanced batch function blocks are available.

Application

Coriolis flowmeters are generally suitable for measuring liquids and gases. The flow measurement is to a large extent independent of changes in process conditions/parameters such as temperature, density, pressure, viscosity, conductivity and flow profile.

Due to this versatility the meter is easy to install and use. The Coriolis flowmeter is recognized for its high accuracy over a wide turn-down ratio and its ability to be a true multi parameter device.

The main applications of the Coriolis flowmeter can be found in all industries, such as:

Industries	
Chemical	Detergents, bulk chemicals, pharmaceuticals, acids, alkalis, filling and dosing
Food and beverage	Dairy products, beer, wine, softdrinks, °Plato/°Brix, fruit juices and pulps, bottling, CO2 dosing, CIP liquids
Automotive	Fuel injection nozzle and pump testing, filling of AC units, engine consumption measurement, paint robots
Oil and gas	Filling of gas bottles, furnace control, test separators, LPG, well-head water-cut monitoring. All hydrocarbon fluids in refineries
Marine	Fuel consumption management, boiler control, bunkering management
Water & waste water	Dosing of chemicals for water treatment

Please see
Product selector
<https://www.pia-portal.automation.siemens.com>
on the Internet,
since some
constraints might
be related to
some of the
features



	FC310 7ME4631	FC330 7ME4633	FCS300 with FCT070 7ME4637	FC410 7ME4611	FC430 7ME4613	FCS400 with FCT070 7ME4617
Design						
Compact	•	•		•	•	
Remote		•	•		•	•
Transmitter enclosure						
Aluminium IP67 Field mounting enclosure	•	•		•	•	
Aluminium IP67 Wall mounting enclosure		•			•	
Noryl (FCT070), IP20/NEMA 2			•			•
Communication						
HART		•			•	
PROFIBUS PA		•			•	
PROFIBUS DP		•			•	
MODBUS RTU/RS 485	•	•		•	•	
SIMATIC integration ET200SP ST & HF (PROFINET)			•			•
Supply voltage						
24 V DC	•	•	•	•	•	•
115/230 V AC		•			•	
Pipe size						
DI 1.5 (1/16")						
DI 3 (1/8")						
DN 4 (1/6")						
DI 6 (1/4")						
DI 15 (1/2")						

Flow Measurement

SITRANS FC (Coriolis)

System information

Application (continued)

Please see Product selector <https://www.pia-portal.automation.siemens.com> on the Internet, since some constrains might be related to some of the features



	FC310 7ME4631	FC330 7ME4633	FCS300 with FCT070 7ME4637	FC410 7ME4611	FC430 7ME4613	FCS400 with FCT070 7ME4617
DN 15 (1/2")	●	●	●	●	●	●
DN 25 (1")	●	●	●	●	●	●
DN 50 (2")	●	●	●	●	●	●
DN 80 (3")	●	●	●			
DN 100 (4")	●	●	●			
DN 150 (6")	●	●	●			
Process connection norms and pressure						
Pipe thread						
NPT ANSI/ASME B.20.1; PN 100	●	●	●	●	●	●
ISO 228/1; PN 100	●	●	●	●	●	●
Flange						
EN 1092-1 PN 16	●	●	●	●	●	●
EN 1092-1 PN 40	●	●	●	●	●	●
EN 1092-1 PN 63	●	●	●	●	●	●
EN 1092-1 PN 100	●	●	●	●	●	●
ANSI B 16.5 Class 150	●	●	●	●	●	●
ANSI B 16.5 Class 300	●	●	●	●	●	●
ANSI B 16.5 Class 600	●	●	●	●	●	●
ANSI B 16.5 Class 900 ¹⁾	●	●	●	●	●	●
ANSI B 16.5 Class 1500 ¹⁾	●	●	●	●	●	●
JIS B2220 10K	●	●	●	●	●	●
JIS B220 20K	●	●	●	●	●	●
JIS B220 40K	●	●	●			
JIS B220 63K	●	●	●			
Hygenic						
DIN 11851	●	●	●	●	●	●
DIN 32676 Clamp Form C Triclam				●	●	●
DIN 32676 Clamp Row A	●	●	●			
DIN 11864-1 GS Form A Row A				●	●	●
DIN 11864-2 BF Form A Row A				●	●	●
DIN 11864-3 BKS Form A Row A				●	●	●
ISO 2852 Clamp				●	●	●
ISO 2853 Threat				●	●	●
SMS 1145	●	●	●	●	●	●
Others on request	●	●	●	●	●	●

Application (continued)

Please see Product selector <https://www.pia-portal.automation.siemens.com> on the Internet, since some constraints might be related to some of the features



	FC310 7ME4631	FC330 7ME4633	FCS300 with FCT070 7ME4637	FC410 7ME4611	FC430 7ME4613	FCS400 with FCT070 7ME4617
Pipe material						
Stainless steel AISI 316L/1.4435/1.4404	•	•	•	•	•	•
Nickel-Alloy C4	•	•	•			
Hastelloy C22/2.4602						
With heating jacket						
Internal U-Tube						
Heating jacket electrical (optional)				•	•	•
Pressure rating						
PN 16	•	•				
PN 40	•	•	•	•	•	•
PN 63	•	•	•	•	•	•
PN 100	•	•	•	•	•	•
PN 130						
PN 160					• ⁵⁾	• ⁵⁾
PN 230						
PN 265						
PN 350						
PN 365						
PN 410						
High-pressure version ²⁾						
Accuracy (liquids)						
Flow error ≤ 0.1 % of rate ³⁾	•	•	•	•	•	•
Flow error ≤ 0.2 % of rate ³⁾	•	•	•			
Density error ≤ 0.0005 g/cm ³				•	•	•
Density error ≤ 0.005 g/cm ³				•	•	•
Density error ≤ 0.001 g/cm ³						
Density error ≤ 0.002 g/cm ³	•	•	•			
Density error ≤ 0.010 g/cm ³	•	•	•			
Cable glands						
½" NPT	•	•	•	•	•	•
M20	•	•	•	•	•	•
Approvals						
Hazardous locations						
ATEX zone 1	•	•	•	• ⁶⁾	• ⁶⁾	• ⁶⁾
IECEx zone 1	•	•	•	• ⁶⁾	• ⁶⁾	• ⁶⁾

Flow Measurement

SITRANS FC (Coriolis)

System information

Application (continued)

Please see Product selector <https://www.pia-portal.automation.siemens.com> on the Internet, since some constraints might be related to some of the features



	FC310 7ME4631	FC330 7ME4633	FCS300 with FCT070 7ME4637	FC410 7ME4611	FC430 7ME4613	FCS400 with FCT070 7ME4617
EAC Ex zone 1	●	●	●	●	●	●
US /CSA) Div 1	●	●	●	●	●	●
Canada (CSA) zone 1	●	●	●	●	●	●
NEPSI	●	●	●	●	●	●
INMETRO	●	●	●	●	●	●
KCs						●
PED						
Fluid group 1 Category III, gas PED Directive 2014/68/EU	●	●	●	●	●	●
CRN						
Category F OF10769.5C CRN	●	●	●	●	●	●
F&B/Pharma						
EHEDG (in preparation)				●	●	●
3A (in preparation)				●	●	●
Marine						
Germanischer Lloyd/det Norske Veritas, Bureau Veritas, Lloyds of London, American Bureau of Shipping, RINA, CCS	●	●		●	●	

Please see Product selector <http://www.pia-portal.automation.siemens.com> on the Internet, since some constraints might be related to some of the features



	MASS 2100 DI 1.5 FC300 DN 4 with FCT010 7ME4811	MASS 2100 DI 1.5 FC300 DN 4 with FCT030 7ME4813	MASS 2100 DI 1.5 FC300 DN 4 with FCT070 7ME4817	MASS 2100 with FCT010 7ME4811	MASS 2100 with FCT030 7ME4813	MASS 2100 with FCT070 7ME4817
Design						
Compact				●	●	
Remote	●	●	●	●	●	●

Application (continued)

Please see
Product selector
<http://www.pia-portal.automation.siemens.com>
on the Internet,
since some
constraints might
be related to
some of the
features



	MASS 2100 DI 1.5 FC300 DN 4 with FCT010 7ME4811	MASS 2100 DI 1.5 FC300 DN 4 with FCT030 7ME4813	MASS 2100 DI 1.5 FC300 DN 4 with FCT070 7ME4817	MASS 2100 with FCT010 7ME4811	MASS 2100 with FCT030 7ME4813	MASS 2100 with FCT070 7ME4817
Transmitter enclosure						
Aluminium IP67 Field mounting enclosure	•	•		•	•	
Aluminium IP67 Wall mounting enclosure		•			•	
Noryl (FCT070), IP20/NEMA 2			•			•
Communication						
HART		•			•	
PROFIBUS PA		•			•	
PROFIBUS DP		•			•	
MODBUS RTU/RS 485	•	•		•	•	
SIMATIC integration ET200SP ST & HF (PROFINET)			•			•
Supply voltage						
24 V DC	•	•	•	•	•	•
115/230 V AC		•			•	
Pipe size						
DI 1.5 (1/16")	•	•	•			
DI 3 (1/8")				•	•	•
DN 4 (1/16")	•	•	•			
DI 6 (1/4")				•	•	•
DI 15 (1/2")				•	•	•
DN 15 (1/2")						
DN 25 (1")						
DN 50 (2")						
DN 80 (3")						
DN 100 (4")						
DN 150 (6")						
Process connection norms and pressure						
Pipe thread						
NPT ANSI/ASME B.20.1; PN 100	•	•	•	•	•	•
ISO 228/1; PN 100	•	•	•	•	•	•
Flange						
EN 1092-1 PN 16						
EN 1092-1 PN 40				•	•	•
EN 1092-1 PN 63						
EN 1092-1 PN 100				•	•	•
ANSI B 16.5 Class 150				•	•	•

Flow Measurement

SITRANS FC (Coriolis)

System information

Application (continued)

Please see Product selector <http://www.pia-portal.automation.siemens.com> on the Internet, since some constraints might be related to some of the features



	MASS 2100 DI 1.5 FC300 DN 4 with FCT010 7ME4811	MASS 2100 DI 1.5 FC300 DN 4 with FCT030 7ME4813	MASS 2100 DI 1.5 FC300 DN 4 with FCT070 7ME4817	MASS 2100 with FCT010 7ME4811	MASS 2100 with FCT030 7ME4813	MASS 2100 with FCT070 7ME4817
ANSI B 16.5 Class 300						
ANSI B 16.5 Class 600				•	•	•
ANSI B 16.5 Class 900 ¹⁾						
ANSI B 16.5 Class 1500 ¹⁾						
JIS B2220 10K						
JIS B2220 20K						
JIS B2220 40K						
JIS B2220 63K						
Hygienic						
DIN 11851				•	•	•
DIN 32676 Clamp Form C Triclamp						
DIN 32676 Clamp Row A						
DIN 11864-1 GS Form A Row A						
DIN 11864-2 BF Form A Row A						
DIN 11864-3 BKS Form A Row A						
ISO 2852 Clamp				•	•	•
ISO 2853 Threat				•	•	•
SMS 1145						
Others on request				•	•	•
Pipe material						
Stainless steel AISI 316L/1.4435/1.4404	•	•	•	•	•	•
Nickel-Alloy C4 Hastelloy C22/2.4602	•	•	•	•	•	•
With heating jacket						
Internal U-Tube				•	•	•
Heating jacket electrical (optional)						
Pressure rating						
PN 16						
PN 40				•	•	•
PN 63						
PN 100	•	•	•	•	•	•
PN 130	•	•	•	•	•	•
PN 160						
PN 230	•	•	•	•	•	•
PN 265				•	•	•

Application (continued)

Please see Product selector <http://www.pia-portal.automation.siemens.com> on the Internet, since some constraints might be related to some of the features



	MASS 2100 DI 1.5 FC300 DN 4 with FCT010 7ME4811	MASS 2100 DI 1.5 FC300 DN 4 with FCT030 7ME4813	MASS 2100 DI 1.5 FC300 DN 4 with FCT070 7ME4817	MASS 2100 with FCT010 7ME4811	MASS 2100 with FCT030 7ME4813	MASS 2100 with FCT070 7ME4817
PN 350				●	●	●
PN 365	●	●	●	●	●	●
PN 410				●	●	●
High-pressure version ²⁾	●	●	●	●	●	●
Accuracy (liquids)						
Flow error ≤ 0.1 % of rate ³⁾	●	●	●	●	●	●
Flow error ≤ 0.2 % of rate ³⁾						
Density error ≤ 0.0005 g/cm ³				●	●	●
Density error ≤ 0.005 g/cm ³				●	●	●
Density error ≤ 0.001 g/cm ³	●	●	●			
Density error ≤ 0.002 g/cm ³						
Density error ≤ 0.010 g/cm ³						
Cable glands						
½" NPT	●	●	●	●	●	●
M20	●	●	●	●	●	●
Approvals						
Hazardous locations						
ATEX zone 1	●	●	●	●	●	●
IECEx zone 1	●	●	●	●	●	●
EAC Ex zone 1	●	●	●	●	●	●
US /CSA) Div 1	●	●	●	●	●	●
Canada (CSA) zone 1	●	●	●	●	●	●
NEPSI						
INMETRO						
KCs	●	●				
PED						
Fluid group 1 Category III, gas PED Directive 2014/68/EU	●	●	●	●	●	●
CRN						
Category F OF10769.5C CRN	●	●	●	● ⁴⁾	● ⁴⁾	● ⁴⁾
F&B/Pharma						
EHEDG (in preparation)						
3A (in preparation)						

Flow Measurement

SITRANS FC (Coriolis)

System information

Application (continued)

Please see Product selector <http://www.pia-portal.automation.siemens.com> on the Internet, since some constraints might be related to some of the features



MASS 2100 DI 1.5
FC300 DN 4 with
FCT010
7ME4811

MASS 2100 DI 1.5
FC300 DN 4 with
FCT030
7ME4813

MASS 2100 DI 1.5
FC300 DN 4 with
FCT070
7ME4817

MASS 2100 with
FCT010
7ME4811

MASS 2100 with
FCT030
7ME4813

MASS 2100 with
FCT070
7ME4817

Marine

Germanischer Lloyd/det Norske Veritas, Bureau Veritas, Lloyds of London, American Bureau of Shipping, RINA, CCS

● = Available

- 1) Sensor pressure and temperature limited to ANSI class 600 rating.
- 2) See technical specifications.
- 3) Increased error for gas mass flow measurement.
- 4) Only DI 6 is CRN.
- 5) Max. 100 bar.
- 6) Also for dust zone 21.

Function

The SITRANS FC flow measuring principle is based on the Coriolis effect. The flowmeter consists of a sensor and a transmitter. The sensor can be digital with an integrated frontend DSL or for low flow sensors also analogue sensors directly connected to the transmitter.

There are following sensors available:

- SITRANS FC MASS 2100 DI 1.5 to DI 15 mm in a single loop design
- SITRANS FC300 DN 4 in a single loop design
- SITRANS FCS300 DN 15 to DN 150 mm in bended dual tube design
- SITRANS FCS400 DN 15 to DN 50 mm in a compact bended dual tube design for OEM and other specific applications.

All sensors can be freely combined with three different transmitters in various configurations and protection style.

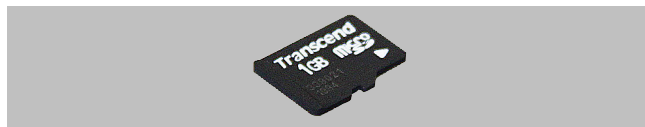
- SITRANS FCT010 transmitter: single channel Modbus
- SITRANS FCT030 transmitter: multi channel transmitter with full graphical display and full feature loaded.
- FCT070 transmitter: for full integration in the Siemens SIMATIC TIA and PCS7 world by the ET 200SP ST & HF. Full functionality including advanced functions blocks for easy integration . Functions block in TIA and APL library

The SITRANS FC sensors are energized by an electro-mechanical driver circuit which oscillates the pipe at its resonant frequency.

Two pick-ups, 1 and 2 are placed symmetrically on both sides of the driver. When liquid or gas flows through the sensor, Coriolis force will act on the measuring pipe and cause a pipe deflection which can be measured as a phase shift on pick-up 1 and 2. The phase shift is proportional to the mass flow rate.

The amplitude of the driver is automatically regulated to ensure a stable output from the 2 pick-ups. The temperature of the tubes is measured by a Pt1000. The flow-proportional signal from the 2 pick-ups, the temperature measurement and the driver frequency are fed into the SITRANS FC transmitter for calculations of mass, volume, fraction, temperature and density. The signal transfer function is based on a DFT technology (Discrete Fourier Transformation).

The transmitter has built-in noise filters, which can be used to improve the meter's performance if the installation and application conditions are not ideal. Typically influence from process noise such as pump pulsations, mechanical vibrations, oscillating valves and aerated flow conditions can be reduced considerably.



SensorFlash flow memory units

FCT010 flow transmitters communicate via Modbus RTU and FCT030 via HART/Modbus/PROFIBUS DP / PROFIBUS PA beside up to 4 individual I/O free programmable as analogue , frequency, pulse or relay outputs. As well as static inputs can be set up.

The FCT070 transmitter is a technology module for the SIMATIC ET 200SP ST & HF system with directly connection from the digital sensor. Full transmitter functionality available to be set up directly in the SIMATIC system. The ET 200SP is very often connected to other SIMATIC systems like PCS7; S7 1200 and S7 1500 via the direct connection by PROFINET. Fast and simple signal transfer and controlling.

Integration

General installation requirements / System design information

The SITRANS FC mass flowmeter is suitable for in- and outdoor installations. The standard instrument meets the requirements of Protection Class IP67/NEMA 4x or IP65. The flowmeter is bidirectional and can be installed in almost any orientation, however, the sensor is not self-emptying in all positions.

It is important to ensure that the meter tubes are always completely filled with homogeneous fluid. Otherwise measuring errors may occur. Suitable fluids are clean liquids, pastes, light slurries or gases. Condensing vapors, aerated liquids or slush are not recommended.

The corrosion and erosion resistance of the fluid-wetted materials must be evaluated to secure long lifetime of the sensor. The pressure drop through the sensor is a function of the properties of the fluid and the flow rate. The Sizing Program (download from www.siemens.com) can be used to calculate the pressure drop and the accuracy over the full flowrange in use for the application.

Sizing

Liquids: The correct sensor size is determined by the allowable pressure drop at the maximum flowrate the meter is used with. After selecting the sensor size the accuracy throughout the flowrate range for the application can be checked by using the Sizing Program.

Gases: The correct size is very often determined by the calculation of the Mach number at maximum flowrate for the application. After that the accuracy throughout the flowrange should be checked.

The preferred flow direction is indicated by the arrow on the flowmeter. Flow in this direction will be indicated as positive.

Note: For some sensor types, specific installation requirement has been taken into account. Please also see under the specific sensor type chapter.

General installation orientation

- FCS300 and FCS400 – sensors.

The optimal installation orientation is vertical with flow upwards (liquids). This ensures that suspended solids or bubbles are completely pushed through the sensor. A drain valve below the sensor will allow the pipe and sensor to drain . To secure selfdraining a up to 10° off vertical installation could be required.

- MASS 2100/FC300 DN4 – sensors.

The optimal installation orientation is horizontal.

Supports

- In order to support the weight of the flowmeter and to ensure reliable measurements when external effects exist (e.g. vibrations), the sensor should be installed in well-supported pipelines. Supports or hangers should be installed symmetrically and stress-free in close proximity to the process connections.

Shut-off devices

- To conduct a system zero adjustment, shut-off devices are ideally required in the pipeline before and after the sensor:
- A bypass valve is recommended where regular zero adjustment is planned to avoid disruption of the flowing system.

Installation: straight run requirements

- The mass flowmeter does not require any flow condition or straight inlet sections. Care should be exercised to ensure that any valves, gates, sight glasses etc. do not cavitate and are not set into vibration by the flowmeter.

System design information

- The presence of gas bubbles in the fluid may result in erroneous measurements, particularly in the density measurement. Therefore, the flowmeter should not be installed at the highest point in the system where bubbles are possibly largest.

Flow Measurement

SITRANS FC (Coriolis)

System information

Integration (continued)

- Long drop lines downstream from the flowmeter should be avoided to prevent the meter tube from draining during operation.
- The flowmeter should not come into contact with any other objects. Avoid attachments to the housing.
- When the cross-section of the connecting pipeline is larger than the sensor size, suitable standard reducers may be installed.
- If strong vibrations exist in the pipeline, they should be damped using elastic pipeline elements. The damping devices must be installed outside the supported flowmeter section and outside the section between the shut-off devices.
- Make sure that any dissolved gases, which are present in many liquids, do not outgas. The back pressure at the outlet should be at least 0.2 bar (3 psi).
- Assure that operation below the vapor pressure cannot occur when a vacuum exists in the meter tube or for fluids which boil readily.
- The sensor should not be installed in the vicinity of strong electromagnetic fields, e.g. near motors, pumps, transformers etc.
- When operating more than one meter in one or multiple interconnected pipelines, the sensors should be spaced distant from each other or the pipelines should be decoupled to prevent cross talk.

Zero adjustment

- In order to adjust the zero under operating conditions it must be possible to reduce the flow rate to „ZERO“ while the meter tube is completely filled. It is important for accurate measurements that during the zero adjustment there are no gas bubbles in the flowmeter. It is also important that the pressure and temperature in the meter tube be the same as that which exists during operation.

Technical specifications

Flowmeter uncertainty/specifications

To ensure continuous accurate measurement, flowmeters must be calibrated.

The Siemens flowmeter calibration process is ISO 9001-certified, ensuring the entire calibration procedure is controlled to the highest quality standards. All primary measuring instrumentation used by the Flow Laboratory during the performance of its calibrations, has been calibrated with international standards traceability referring directly to the physical unit of measurement according to the International System of Units (SI). Therefore the calibration certificate ensures recognition of the test results worldwide, including the US (NIST traceability).

A calibration certificate is shipped with every sensor and calibration data are stored in the SD Memory card. The sensors has the calibration data written to the frontend section DSL. A backup of all calibrations and PDF copies of all certificates are stored in the SensorFlash.

Sensor flow capacity

FCS300 sensors for liquids:

	Q _{min} at 1 % accuracy water ³⁾		Q _{nom} ¹⁾		100 % (Q _{max}) ²⁾	
	kg/h	(lb/min)	kg/h	(lb/min)	kg/h	(lb/min)
DN 15 (½")	70	(2.57)	4 500	(165)	8 000	(294)
DN 25 (1")	240	(8.92)	20 500	(753)	35 000	(1 286)
DN 50 (2")	800	(29.4)	49 000	(1 800)	90 000	(3 307)
DN 80 (3")	2 000	(73.5)	122 000	(4 483)	250 000	(9 186)
DN 100 (4")	4 000	(147)	273 000	(10 031)	520 000	(19 108)
DN 150 (6")	6 900	(253)	459 200	(16 873)	860 000	(31 600)

FCS400 sensors for liquids:

	Q _{min} at 1 % accuracy water		Q _{nom} ¹⁾		100 % (Q _{max}) ²⁾	
	kg/h	(lb/min)	kg/h	(lb/min)	kg/h	(lb/min)
DN 15 (½")	20	(0.73)	3 700	(135)	6 400	(234)
DN 25 (1")	200	(7.32)	11 500	(421)	17 700	(648)
DN 50 (2")	750	(27.4)	50 000	(1 831)	70 700	(2 590)

MASS 2100 and FC300 sensors for liquids:

	Q _{min} at 1 % accuracy water		Q _{nom} ¹⁾		100 % (Q _{max}) ²⁾	
	kg/h	(lb/h)	kg/h	(lb/h)	kg/h	(lb/h)
DI 1.5 (1/16")	0.1	(0.22)	19	(42)	30	(66)
DI 3 (1/8")	1.0	(2.2)	90	(198)	250	(550)
DN 4 (1/6")	1	(2.2)	140	(308)	350	(770)
DI 6 (¼")	5	(11)	500	(1 102)	1 000	(2 200)
DI 15 (½")	20	(44)	3 800	(8 370)	5 600	(12 345)

¹⁾ Q_{nom} = Δ 1 barg @ water 20 °C.

²⁾ Q_{max} = 10 m/sec @ water 20 °C at inlet (up to 25 m/s in the flowtubes).

³⁾ For 0,1% sensor.

For gas applications the massflow rate is depending on the gas type. The max. flowrate is calculated with the Mach-Number to be Ma = 0.3.

• For flow > 5% of the sensors max. flow rate, the error can be read directly from the curve below.

• For flow < 5 % of the sensors max. flow rate, use the formula to calculate the error.

The error curve is plotted from the formula:

$$E = \pm \sqrt{(\text{Cal.})^2 + \left(\frac{Z \times 100}{qm}\right)^2}$$

E = Error [%]

Z = Zero point error [kg/h]¹⁾

qm = Mass flow [kg/h]

Cal. = Calibrated flow accuracy: 0.10, 0.15 or 0.20

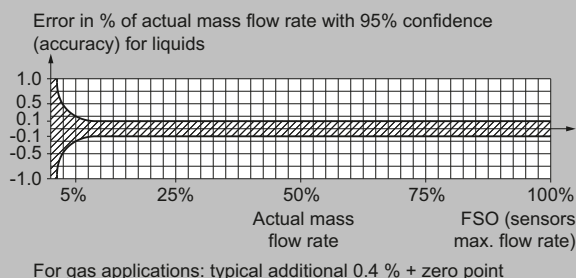
¹⁾ Zero point error for each sensor is shown in the tables below.

Flow Measurement

SITRANS FC (Coriolis)

System information

Technical specifications (continued)



Reference conditions for flow calibration

Flow conditions	Fully developed flow profile
Temperature, medium	25 °C (77 °F) ± 5 K
Temperature, ambient	25 °C (77 °F) +10/-5 K
Liquid pressure	2 ± 1 bar
Density	0.997 g/cm ³
Brix	40 °Brix
Supply voltage	U _n ± 1 %
Warming-up time	30 min.
Cable length	5 m between transmitter and sensor

Additions in the event of deviations from reference conditions

Current output	As pulse output ± (0.1 % of actual current + 0.05 % FS current)
Effect of ambient temperature	<ul style="list-style-type: none"> • Display/actual current/frequency/pulse output: < ± 0.003 % / K act. • Current output: < ± 0.005 % / K act.
Effect of supply voltage	< 0.005 % of measuring value on 1 % alteration

Sensor type	FC300		MASS 2100			
	Sensor size		DI 1.5 (1/16")	DI 3 (1/8")	DI 6 (¼")	DI 15 (½")
Number of measuring pipes	1	1	1	1	1	
Mass flow (liquids)						
Linearity error ¹⁾ [% of rate]	0.10	0.10	0.10	0.10	0.10	
Repeatability of flowrate at rates > 5 % of Q _{max} [% of rate]	0.05	0.05	0.05	0.05	0.05	
Max. zero point error [kg/h]	0.010	0.001	0.010	0.050	0.200	
Density (liquids)						
Density error standard [g/cm ³]	n.a.	0.008	0.008	0.008	0.0008	
Density error extended [g/cm ³]	0.007 ²⁾	0.001	0.0015	0.0015	0.0005	
Repeatability error [g/cm ³]	0.0002	0.0002	0.0002	0.0002	0.0001	
Range [g/cm ³]	0.3 ... 2.9	0.3 ... 2.9	0.3 ... 2.9	0.3 ... 2.9	0.3 ... 2.9	
Temperature						
Error [°K]	0.5	0.5	0.5	0.5	0.5	

¹⁾ Increased error can be expected for gas mass flow measurement (for gas measurement typically additional +0.40 % error).

²⁾ For Hastelloy tubes: 0.0025 g/cm³.

Sensor type	FCS300					
	Sensor size		DN 50 (2")	DN 80 (3")	DN 100 (4")	DN 150 (6")
Number of measuring pipes	2	2	2	2	2	2
Mass flow (liquids)						
Linearity error ¹⁾ : 0.1% sensor % of rate	0.1	0.1	0.1	0.1	0.1	0.1
Linearity error ¹⁾ : 0.2% sensor % of rate	0.2	0.2	0.2	0.2	0.2	0.2

Technical specifications (continued)

Sensor type	FCS300					
	Sensor size	DN 15 (½")	DN 25 (1")	DN 50 (2")	DN 80 (3")	DN 100 (4")
Repeatability of flowrate at rates > 5 % of Q _{max} [% of rate]	0.05	0.05	0.05	0.05	0.1	0.1
Max. zero point error [kg/h]	0.6	2.16	7.2	20.0	41.6	68.8
Density (liquids)						
Density error: 0,1% Massflow Sensor [g/cm ³]	0.002	0.002	0.002	0.002	0.002	0.002
Density error: 0,2% Massflow Sensor [g/cm ³]	0.010	0.010	0.010	0.010	0.010	0.010
Range [kg/dm ³]	0.001 ... 5.0	0.001 ... 5.0	0.001 ... 5.0	0.001 ... 5.0	0.001 ... 5.0	0.001 ... 5.0
Repeatability error [kg/m ³]	± 0.25	± 0.25	± 0.25	± 0.25	± 0.25	± 0.25
Temperature						
Error [°K]	0.5	0.5	0.5	0.5	0.5	0.5

¹⁾ Increased error can be expected for gas mass flow measurement (for gas measurement typically additional +0.4 % error).

Sensor type	FCS400		
	Sensor size	DN 15 (½")	DN 25 (1")
Number of measuring pipes	2	2	2
Mass flow (liquids)			
Linearity error ¹⁾ [% of rate]	0.1	0.1	0.1
Repeatability of flowrate at rates > 5 % of Q _{max} [% of rate]	0.05	0.05	0.05
Max. zero point error [kg/h]	0.2	2.0	7.5
Density (liquids)			
Density error: Standard [g/cm ³]	0.005	0.005	0.005
Density error: Extended [g/cm ³]	0.0005	0.0005	0.0005
Range [kg/dm ³]	0.001 ... 5.0	0.001 ... 5.0	0.001 ... 5.0
Repeatability error [kg/m ³]	± 0.25	± 0.25	± 0.25
Temperature			
Error [°K]	0.5	0.5	0.5

¹⁾ Increased error can be expected for gas mass flow measurement (for gas measurement typically additional up to +0.4 % error).

Technical specifications PROFIBUS PA/DP for FCT030

General specifications	
PROFIBUS device profile	Profile V 4.0 and compatible to V 3.x

Electrical specification DP

Physical layer specifications	
Applicable standard	IEC 61158/EN 50170
Physical Layer (transmission technology)	RS 485
Transmission speed	≤ 12 Mbits/s
Number of stations	Up to 32 per line segment (maximum total of 126)
Cable specifications (Type A)	
Cable design	Two wire twisted pair
Shielding	CU shielding braid or shielding braid and shielding foil
Impedance	35 up to 165 Ω at frequencies from 3 ... 20 MHz
Cable capacity	< 30 pF per meter
Core diameter	> 0.34 mm ² , corresponds to AWG 22
Resistance	< 110 Ω per km
Signal attenuation	Max. 9 dB over total length of line section
Max. bus length	100 m at 12 Mbit/s, up to 1.2 km at 93.75 kbit/s. Extendable by repeaters

Electrical specification PA

Physical layer specifications	
Applicable standard	IEC 61158/EN 50170
Physical Layer (transmission technology)	IEC 61158-2

Flow Measurement

SITRANS FC (Coriolis)

System information

Technical specifications (continued)

Electrical specification PA	
Transmission speed	31.25 Kbits/s
Number of stations	Up to 32 per line segment (maximum total of 126)
Max. basic current [I_b]	14 mA
Fault current [I_{FDE}]	0 mA
Bus voltage	9 ... 32 V (non Ex)
Preferred cable specifications (Type A)	
Cable design	Two wire twisted pair
Conductor area (nominal)	0.8 mm ² (AWG 18)
Loop resistance	44 Ω/km
Impedance	100 Ω ± 20 %
Wave attenuation at 39 kHz	3 dB/km
Capacitive asymmetry	2 nF/km
Bus termination	Passive line terminated on both ends
Max. bus length	Up to 1.9 km. Extendable by repeaters

IS (Intrinsic Safety) data	
General specifications	
Required sensor electronics	Compact mounted SITRANS FCT030
FISCO	Yes
Max. U_i	17.5 V
Max. I_i	380 mA
Max. P_i	5.32 V
Max. L_i	10 μH
Max. C_i	5 nF
Max. U_o	1.3 V
Max. I_o	50 μA
FISCO cable requirements	
Loop resistance R_c	15 ... 150 Ω/km
Loop inductance L_c	0.4 ... 1 mH/km
Capacitance C_c	80 ... 200 nF/km
Max. Spur length in IIC and IIB	30 m
Max. Trunk length in IIC	1 km
Max. Trunk length in IIB	5 km

PROFIBUS parameter support

The following parameters are accessible using a Class 1 Master.

Cyclic services		
Input (Master view)	Parameter	FCT030
	Mass flow	✓
	Volume flow	✓
	Media temperature	✓
	Frame temperature	✓
	Standard volume flow	✓
	Density	✓
	Fraction A ¹⁾	✓
	Fraction B ¹⁾	✓
	Pct Fraction A ¹⁾	✓
	Pct Fraction B ¹⁾	✓
	Totalizer 1	✓
	Totalizer 2	✓
	Totalizer 3	✓
	Digital dosing control	✓
	Analog dosing control	✓
	Dosing status	✓
Output (Master view)	Control totalizer 1+2+3	✓
	Control commands as zero point adjustment	✓

¹⁾ Requires a flowmeter ordered with fraction option.

Overview



FCT030 is based on the latest developments within digital signal processing technology – engineered for high measuring performance, fast response to step changes in flow, fast dosing applications, high immunity against process noise, easy to install commission and maintain.

The FCT030 transmitter delivers true multi-parameter measurements i.e. massflow, volumeflow, standard volumeflow, density, temperature and fraction.

The FCT030 IP67 transmitter can be remote connected or compact mounted with all sensors of type FCS300 sizes DN 15 to DN 150, FCS400 sizes DN 15 to DN 50, MASS 2100 DI 1.5, DI 3, DI 6, DI 15 and FC300 DN 4.

Fraction

The transmitter FCT030 can be set up at works to measure and report various fraction concentrations of two-part mixtures or solutions. Where a discrete relationship exists between concentration and density at particular temperatures a calculation is performed and the percentage concentration by volume or mass of Part A or Part B (100 % minus Part A) is measured. For solutions and some mixtures the total mass, or dry weight, is also available.

In some industries, a selection of standard density scales has been adopted to represent the density or relative density of the process fluid.

If "Standard fractions" option is chosen at ordering, the following fraction or standard density scales can be selected in the setup menu:

- API number
- Balling
- °Baumé light
- °Baumé heavy
- °Brix
- °Oeschlé

Overview (continued)

- Plato
 - Specific Gravity
 - Twaddell
 - %HFCS42
 - %HFCS55
 - %HFCS90
 - Ethanol-Water (ABM)¹⁾ 0 % to 20 %
 - Ethanol-Water (ABM)¹⁾ 15 % to 35 %
 - Ethanol-Water (ABM)¹⁾ 30 % to 55 %
 - Ethanol-Water (ABM)¹⁾ 50 % to 100 %
- ¹⁾ ABM: Alcohol by Mass; ABV: Alcohol by volume on request

Flow Measurement

SITRANS FC (Coriolis)

Transmitters / SITRANS FCT030

Benefits

Flow calculation and measurement

- Dedicated mass flow calculation with DSP technology
- Fast dosing and flow step response with maximum 10 ms response time
- 100 Hz update rate to all outputs
- Maximum data age from pickup to output is 20 ms (two update cycles)
- Independent low flow cut-off settings for mass and volume flowrates
- Automatic zero-point adjustment on command from discrete input or host system
- Empty pipe monitoring

Operation and display

- User-configurable operation display
 - Full graphical display 240 × 160 pixels with up to 6 programmable views
 - Self-explaining alarm handling/log in clear text
 - Help text for all parameters appears automatically in the configuration menu
 - Keypad can be used for controlling dosing as start/stop/hold/reset
- SensorFlash technology stores production specific system documentation and provides removable memory of all flowmeter setups and functions
 - Calibration certificates
 - Pressure and material test certificates (as ordered)
 - Non-volatile memory backup of operational data
 - Transfer of user configuration to other flowmeters
 - Alarm history log
 - Parameter change log
 - Logging of min and max process values
 - Data logging of process values and parameter (including diagnostic parameters)

Alarms and safety

- Advanced diagnosis and service menu enhances troubleshooting and meter validation
- Configurable upper and lower alarm and warning limits for all process values
- Alarm handling can be selected between Siemens and NAMUR standard configurations

Outputs and control

- Built-in dosing controller with compensation and monitoring comprising 3 built-in totalizers
- Multi-parameter outputs, individually configurable for massflow, volumeflow, standard volumeflow, density, temperature or fraction flow such as °Brix or °Plato

Up to four I/O channels are configured as follows:

Channel 1

Channel 1 is 4 to 20 mA analog output with HART 7.5, PROFIBUS PA, PROFIBUS DP or Modbus RS 485 RTU. The current signal can

Benefits (continued)

be configured for massflow, volumeflow or density, standard volume flow, medium temperature, Fraction A and B and Fraction A% and B%.

Channel 2

Channel 2 is a signal output which can be freely configured for any process variable.

- Analog current (0/4 to 20 mA)
- 3 stage analog valve dosing control
- Frequency or pulse
- Digital one or two-valve dosing control in combination with channel 3 or 4
- Operational and alarm status

Channels 3 and 4

Channels 3 and 4 can be ordered with signal (freely configured for any process variable) or relay outputs, or signal input.

Signal

Signal output can be user configured to:

- Analog current (0/4 to 20 mA)
- 3 stage analog valve dosing control
- Frequency or pulse
- Redundant frequency or pulse (linked to Channel 2)
- Digital one or two-valve dosing control
- Operational and alarm status

Relay

Relay output(s) can be user configured to:

- Digital one or two-valve dosing control
- Operation status including flow direction
- Alarm status

Signal input

Signal input can be user configured for

- Dosing control
- Totalizer reset functions
- Force or freeze output(s)
- Initiate automatic zero point adjustment

Signal outputs and inputs for non hazardous areas can be changed for active or passive operations by dip switch.

For hazardous areas Signal outputs and inputs can't be changed by dip switch, and has to be selected individually by ordering.

During service and maintenance all outputs can be forced to a pre-set value for simulation, verification or calibration purposes.

Approvals and certificates

The FCT030 coriolis flowmeter program was designed from the ground up to comply with or exceed the requirements of international standards and regulations.

Application

SITRANS FCT030 transmitters are suitable for applications within the entire process industry where there is a demand for accurate flow measurement. The meter is capable of measuring both liquid and gas flow.

Coriolis flowmeters can be applied in all industries, such as:

- Chemical & Pharma: detergents, bulk chemicals, acids, alkalis, paint mixing systems, solvents and resins, pharmaceuticals, blood products, vaccines, insulin production
- Food & Beverage: dairy products, beer, wine, soft drinks, °Brix/°Plato, fruit juices and pulps, bottling, CO₂ dosing, CIP/SIP-liquids, mixture recipe control
- Automotive: fuel injection nozzle & pump testing, filling of AC units, engine consumption
- Oil & Gas: filling of gas bottles, furnace control, test separators
- Hydrocarbon processing: oil refining, derivatives manufacturing, polymerisation
- Water & Waste Water: dosing of chemicals for water treatment

The multiple outputs and bus communication mean that all of the process information can be read either instantaneously (10 ms update) or periodically as plant operation requires.

Design

The transmitter SITRANS FCT030 is designed in an IP67/NEMA 4X aluminum enclosure with corrosion resistant coating. It can be remote connected or compact mounted with the following sensors:

- FCS300 DN 15, DN 25, DN 50, DN 80, DN 100, DN 150
- FCS400 DN 15, DN 25 and DN 50
- MASS 2100 DI 1.5, DI 3, DI 6, DI 15
- FC300 DN 4

FCT030 is available with current output HART 7.5, Modbus RS 485 RTU, PROFIBUS DP or PROFIBUS PA as standard on Channel 1.

The transmitter has a modular design with discrete, replaceable electronic modules and connection boards to maintain separation between functions and facilitate field service. All modules are fully traceable and their provenance is included in the transmitter setup.

SensorFlash

SensorFlash is a standard, 4 GByte micro SD card with the ability to be updated by PC. It is supplied with each sensor with the complete set of certification documents including calibration report. Material, pressure test, factory conformance certificates are optional at ordering.

The Siemens SensorFlash memory unit offers the following features and benefits:

- Automatically program any similar transmitter in seconds to the operation standard
- Transmitter replacement in less than 5 minutes
- True "plug & play" provided by integrated cross-checking data consistency and HW/SW version verification
- Permanent memory of operational and functional information from the moment that the flowmeter is switched on
- New firmware updates can be downloaded from the Siemens internet portal for Product Support and placed onto SensorFlash (unmounted from the transmitter and inserted into a PC's SD card slot). The firmware is then inserted into the existing flowmeter and the complete system upgraded
- Storing of alarm history log
- Storing of parameter change log
- Storing of process peak values log

Dataloggin on SensorFlash

The following functions are available:

- Logging of process values and diagnostic values simultaneous
- Logging of parameter settings
- Selectable logging interval

Flow Measurement

SITRANS FC (Coriolis)

Transmitters / SITRANS FCT030

Function

The following functions are available:

- Mass flowrate, volume flowrate, density, process temperature, frame temperature, fraction flow
- Up to four output/input channels selected at ordering
- Outputs can be individually configured with mass, volume, density etc.
- Three built-in totalizers which can count forward, backward or forward and backward
- Low flow cut-off, adjustable
- Density cut-off or empty pipe cut-off, adjustable
- Flow direction adjustable
- Alarm system consisting of alarm-log, alarm pending menu
- Internal data logger is updated each 10 minutes with operational data such as system health, totalizer values, all configurations and data needed for custody transfer requirements to OIML R 117 and NTEP
- Display of operating time with real-time clock. Daylight saving time is not implemented
- Uni/bidirectional flow measurement
- Flowrate outputs are freely configurable between maximum negative and maximum positive flows according to the sensor capacity
- Limit switches programmable for flow, density, temperature or fraction process values. Limit points can be graded as warning and alarm for values both above and below nominal process conditions
- Process noise filter for optimization of measurement performance under non-ideal application conditions. 5-stage pumping filter compensates for flow fluctuations caused by e.g. single acting piston pumps
- Full dosing controller with 5 user-configurable recipes
- Automatic zero adjustment menu, with zero point evaluation display
- Full service menu for effective and straight forward application and meter troubleshooting
- Precise temperature measurement ensures optimum accuracy on massflow, density and fraction flow
- Fraction flow computation is based on a 5th-order algorithm matching known applications.
- Audit trail information, stores parameters changes with time stamp information
- Simulation of process values, status information and alarms
- Aerated flow filtering system, for advanced filtering of fluids with gas or air bubbles
- Datalogging of process values and parameter changes on Sensor-Flash

Technical specifications

SITRANS FCT030	
Number of process variables	7
Measurement of	<ul style="list-style-type: none"> • Mass flow • Volume flow • Density • Process media temperature • Standard volume flow • Reference density • Fraction A flow • Fraction B flow • Fraction A % • Fraction B %
Current output	
Current	0 ... 20 mA or 4 ... 20 mA (Channel 1 only 4 ... 20 mA)
Load	Ex i: < 470 Ω (HART ≥ 230 Ω) Non-Ex: < 770 Ω (HART ≥ 230 Ω)
Time constant	0 ... 100 s adjustable
Digital output¹⁾	
Pulse	41.6 μs ... 5 s pulse duration
Frequency	0 ... 12.5 kHz, 50 % duty cycle, 120 % overscale provision
Time constant	0 ... 100 s adjustable
Active	0 ... 24 V DC, 87 mA, short-circuit-protected
Passive	3 ... 30 V DC, max. 110 mA
Relay	Only for channel 3 and 4
Type	Change-over voltage-free relay contact
Load	30 V AC/100 mA
Functions	Alarm level, alarm number, limit, flow direction
Digital input¹⁾	Only for channel 3 and 4
Voltage	15 ... 30 V DC (2 ... 15 mA)
Functionality	Start/stop/hold/continue dosing, reset totalizer 1 and 2, force output, freeze output
Galvanic isolation	All inputs and outputs are galvanically isolated, isolation voltage 500 V
Cut-off	
Low-flow	0 ... 9.9 % of maximum flow
Limit function	Mass flow, volume flow, fraction, density, sensor temperature
Totalizer	Three eight-digit counters for forward, net or reverse flow
Display	<ul style="list-style-type: none"> • Background illumination with alphanumeric text, 3 × 20 characters to indicate flow rate, totalized values, settings and faults • Time constant as current output 1 • Reverse flow indicated by negative sign
Zero point adjustment	Via keypad or remote via digital input
Ambient temperature	
Operation	
• Transmitter	-40 ... +60 °C (-40 ... +140 °F) (humidity max. 95 %)
• Display	-20 ... +60 °C (-4 ... +140 °F)
Storage	
• Transmitter	-40 ... +70 °C (-40 ... +158 °F) (humidity max. 95 %)
• Display	-20 ... +70 °C (-4 ... +158 °F)
Communication Ch1	HART 7.5 PROFIBUS PA PROFIBUS DP Modbus RS 485 RTU

Technical specifications (continued)

SITRANS FCT030	
Enclosure	
Material	Aluminum, corrosion Class C4
Rating	IP67/NEMA 4X to EN/IEC 60529 (1 mH ₂ O for 30 min.)
Mechanical load	18 ... 1000 Hz random, 3.17 g RMS, in all directions, to IEC 68-02-36
Supply voltage	
Supply	20 ... 90 V DC ± 10 % 100 ... 240 V AC ± 10 % 47 ... 63 Hz
Fluctuation	No limit
Power consumption	11 W/30 VA
EMC performance	
Emission	EN 55011/CISPR-11 (Class A)
Immunity	EN/IEC 61236-1 (Industry)
NAMUR	
	Within the value limits according to "General requirements" with error criteria A in accordance with NE 21
Environment	
Environmental conditions acc. to IEC/EN/UL 61010-1	<ul style="list-style-type: none"> • Altitude up to 2000 m • Pollution degree 2
Maintenance	
	The flowmeter has a built-in error log/pending menu which should be inspected on a regular basis
Cable glands	
	Cable glands are available in nylon, nickel plated brass or stainless steel (316L/W1.4404) in the following dimensions: <ul style="list-style-type: none"> • 1 × M25, 2 × M20 • 3 × ½" NPT
Digital cable connection (remote version)	
	Standard industrial signal cable up to 75 m long with 2 × screened pairs or 4-wire overall screen can be laid between the sensor and transmitter. Siemens offers cables in a selection of pre-cut lengths and prepared for either gland or plug connection.
Analog cable connection (MASS 2100/FC300)	
	Standard industrial cable up to 15 m distance between sensor and transmitter. PVC insulated 5 × 2 × Ø 0.34 mm, twisted and screened in pairs, temperature range -20 ... +105 °C Siemens offers cables in a selection of pre-cut lengths.
Approvals FCT030	
Hazardous area (fieldmount housing only) ²⁾	<ul style="list-style-type: none"> • ATEX zone 1, IECEx zone 1, cCSAus (Class 1 Div 1), EAC Ex zone 1, cCSAus Zone 1, NEPSI, INMETRO (depending on version and configuration) <ul style="list-style-type: none"> - ATEX/IECEx Zone 1: Ex db eb ia [ia Ga] IIC T6 Gb - ATEX/IECEx Zone 21 (depending on sensor type): Ex tb [ia Da] IIIC T85°C Db - Canada: Ex db eb ia [ia Ga] IIC T6 Gb Ex tb [ia Da] IIIC T85°C (depending on sensor type) - USA: Class I, II, III, Division 1, Groups A, B, C, D, E, F, Class I Zone 1: AEx db eb ia [ia Ga] IIC T6 Gb Zone 21: AEx tb [ia Da] IIIC T85°C

Technical specifications (continued)

SITRANS FCT030	
Certificates	
CE mark	<ul style="list-style-type: none"> • Pressure equipment • Low voltage directive • WEEE • RoHS
Regional certifications	<ul style="list-style-type: none"> • C-TICK (Australia and New Zealand EMC) • EAC (Belarus, Armenia, Kazakhstan, Russia) • KCC (South Korea) (in preparation)

¹⁾ With 300 Ω internal impedance. For coil switching use the passive output option.

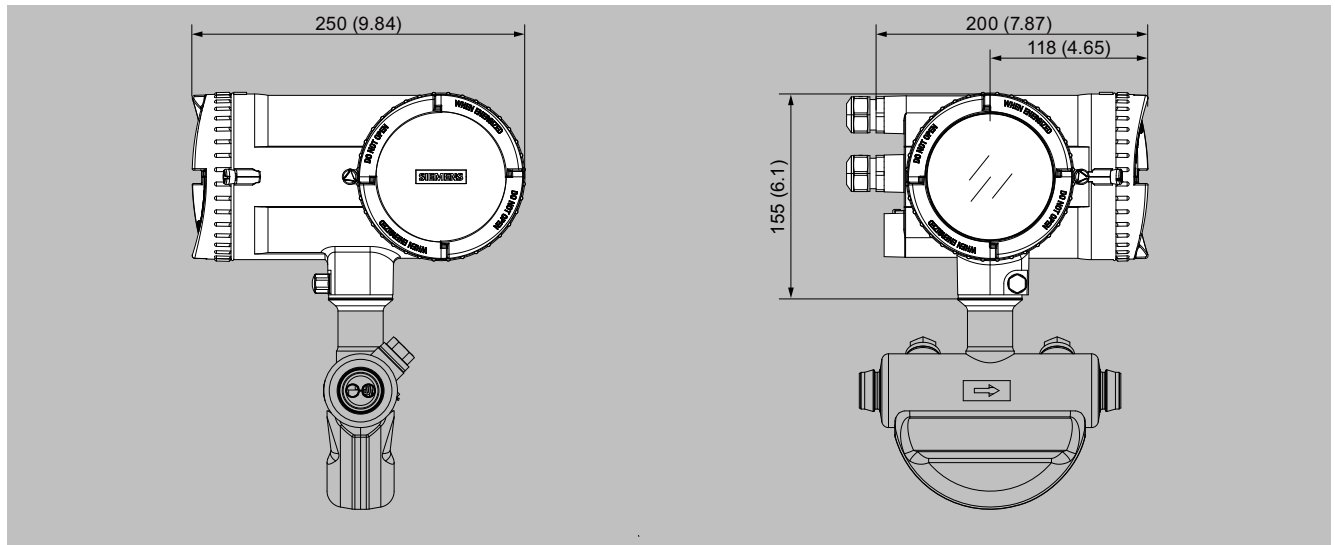
²⁾ Dust certification depending on sensor type.

Flow Measurement

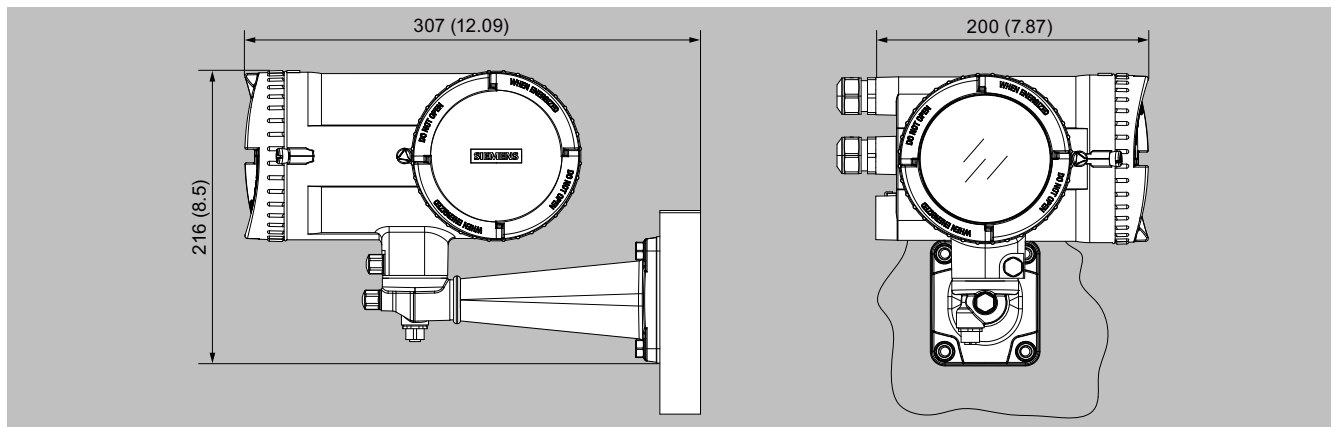
SITRANS FC (Coriolis)

Transmitters / SITRANS FCT030

Dimensional drawings

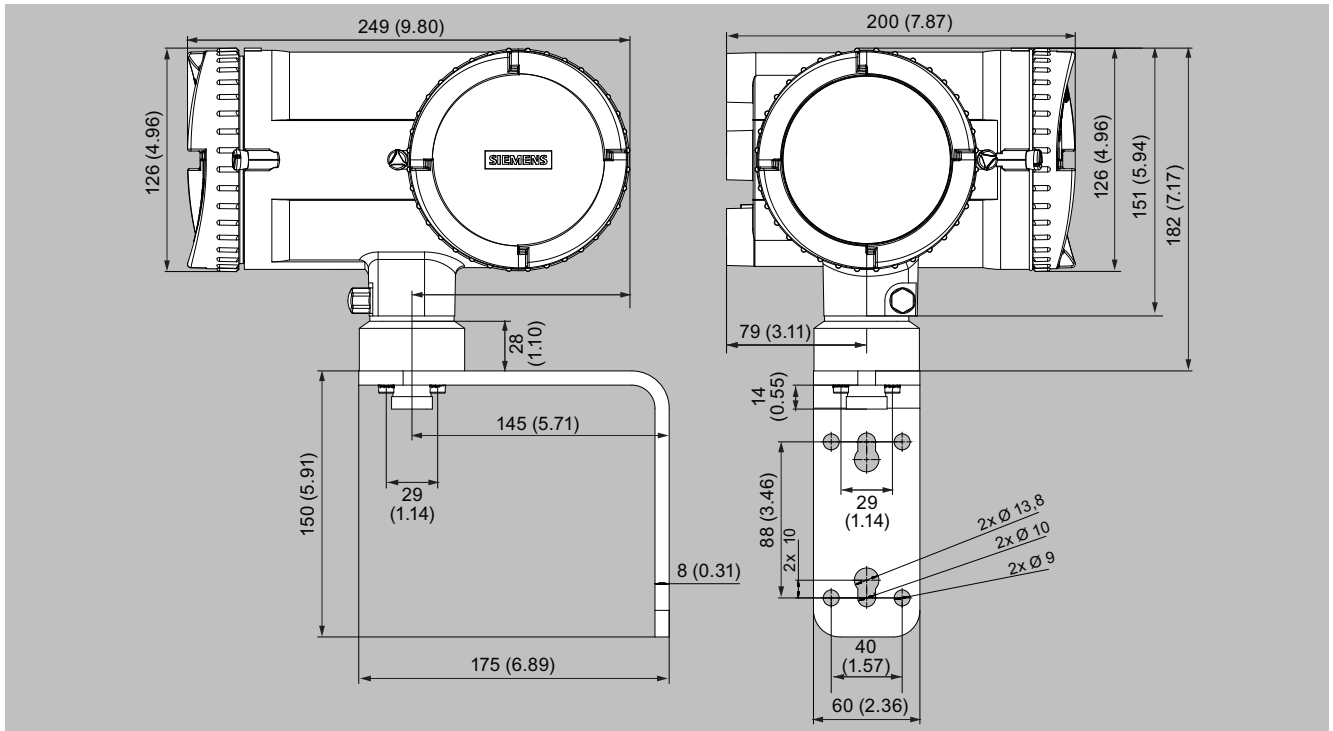


SITRANS FCT030, compact version, dimensions in mm (inch)

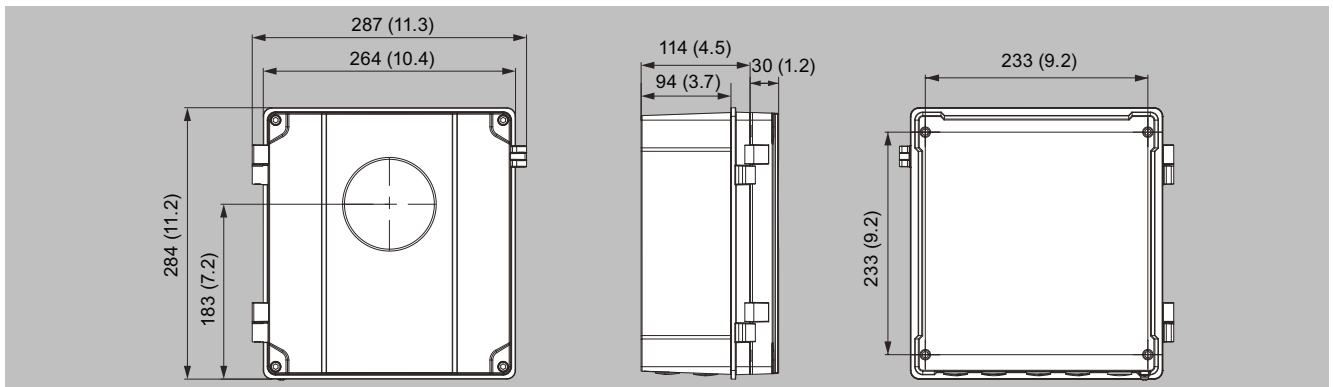


SITRANS FCT030, field mount version for sensors with digital cable and M12 plug connection, dimensions in mm (inch)

Dimensional drawings (continued)



SITRANS FCT030, field mount version for low flow MASS 2100 / FC300 sensors with analog cable, dimensions in mm (inch)



SITRANS FCT030, wall mount version, dimensions in mm (inch)

Flow Measurement

SITRANS FC (Coriolis)

Transmitters / SITRANS FCT010

Overview



FCT010 is based on the latest developments within digital signal processing technology – engineered for high measuring performance, fast response to step changes in flow, fast dosing applications, high immunity against process noise, easy to install commission and maintain.

The FCT010 transmitter delivers true multi-parameter measurements i.e. massflow, volumeflow, standard volumeflow, density, temperature . All with a single Modbus connection.

The FCT010 IP67 transmitter is compact mounted with all sensors of type FCS300, FCS400 , MASS 2100 DI 3, DI 6, DI 15.

For MASS 2100 DI 1.5 to DI 15 and FC300 DN 4 an analogue connection is available for a remote FCT010 solution.

Benefits

Flow calculation and measurement

Dedicated mass flow calculation with DSP technology

- Fast dosing and flow step response with maximum 10 ms response time
- 100 Hz update rate to all outputs
- Independent low flow cut-off settings for mass and volume flowrates
- Automatic zero-point adjustment on command from discrete input or host system

Operation

- User-configurable settings over SIMATIC PDM

Alarms and safety

- Advanced diagnosis and service menu enhances troubleshooting and meter validation
- Configurable upper and lower alarm and warning limits for all process values
- Alarm handling can be selected between Siemens and NAMUR standard configurations

Outputs and control

- Single channel Modbus RTU output
- Individually configurable for massflow, volumeflow, standard volumeflow, density, temperature
- One Totalizer (data not secured by power failure)

Approvals and certificates

The FCT010 coriolis flowmeter program was designed from the ground up to comply with or exceed the requirements of international standards and regulations.

Application

SITRANS FCT010 transmitters are suitable for applications within the entire process industry where there is a demand for accurate flow measurement. The meter is capable of measuring both liquid and gas flow.

Coriolis flowmeters can be applied in all industries, such as:

- Chemical & Pharma: detergents, bulk chemicals, acids, alkalis, paint mixing systems, solvents and resins, pharmaceuticals, blood products, vaccines, insulin production
- Food & Beverage: dairy products, beer, wine, soft drinks, CO2 dosing, CIP/SIP-liquids, mixture recipe control
- Automotive: fuel injection nozzle & pump testing, filling of AC units, engine consumption
- Oil & Gas applications e.g. test separators
- Hydrocarbon processing: oil refining, derivatives manufacturing, polymerisation
- Water & Waste Water: dosing of chemicals for water treatment

The Modbus communication mean that all of the process information can be read either instantaneously (10 ms update) or periodically as plant operation requires.

Design

The transmitter SITRANS FCT010 is designed in an IP67/NEMA 4X aluminum enclosure with corrosion resistant coating.

It is compact mounted with the following sensors:

- FCS300 DN 15, DN 25, DN 50, DN 80, DN 100, DN 150
- FCS400 DN 15, DN 25 and DN 50
- MASS 2100 DI 3, DI 6, DI 15

It can be remote mounted with the following sensors:

- MASS 2100 DI 1.5, DI 3, DI 6, DI 15
- FC300 DN 4

FCT010 is available with Modbus RS 485 RTU as standard.

SensorFlash

SensorFlash is a standard, 4 GByte micro SD card with the ability to be updated by PC. It is supplied with each sensor with the complete set of certification documents including calibration report. Material, pressure test, factory conformance certificates are optional at ordering.

The Siemens SensorFlash memory unit for the FCT010 only has the function of documentation including a parameter backup and a FW bundle. The Sensor Flash is not mounted into the FCT010 and will not have the extra features as the FCT030 transmitter has.

- Storing of alarm history log
- Storing of parameter change log

Function

The following functions are available:

- Mass flowrate, volume flowrate, density, process temperature
- Single Modbus RTU I/O
- Low flow cut-off, adjustable
- Density cut-off or empty pipe cut-off, adjustable
- Flow direction adjustable
- Alarm system consisting of alarm-log, alarm pending menu
- Uni/bidirectional flow measurement
- Flowrate outputs are freely configurable between maximum negative and maximum positive flows according to the sensor capacity
- Process noise filter for optimization of measurement performance under non-ideal application conditions. 5-stage pumping filter compensates for flow fluctuations caused by e.g. single acting piston pumps
- Full service menu for effective and straight forward application and meter troubleshooting
- Aerated flow filtering system, for advanced filtering of fluids with gas or air bubbles

Technical specifications

SITRANS FCT010	
Number of process variables	5
Measurement of	<ul style="list-style-type: none"> • Mass flow • Volume flow • Density • Process media temperature • Standard volume flow
I/O	Modbus RTU
Galvanic isolation	All inputs and outputs are galvanically isolated, isolation voltage 500 V
Cut-off	
Low-flow	0 ... 9.9% of maximum flow
Limit function	Mass flow, volume flow, density, sensor temperature
Totalizer	One eight-digit counters for forward, or reverse flow - data recovery not protected at power loss
Zero point adjustment	Via SIMATIC PDM
Ambient temperature	
Operation	
• Transmitter	-40 ... +60 °C (-40 ... +140 °F) (humidity max. 95 %)
Storage	
• Transmitter	-40 ... +70 °C (-40 ... +158 °F) (humidity max. 95 %)
Communication Ch1	Modbus RS 485 RTU
Enclosure	
Material	Aluminum corrosion Class C4
Rating	IP67/NEMA 4X to EN/IEC 60529 (1 mH2O for 30 min.)
Mechanical load	18 ... 1000 Hz random, 3.17 g RMS, in all directions, to IEC 68-02-36
Supply voltage	
Supply	12 ... 27 V DC Ex d: 12-24 V DC Intrinsic safe: Ui: 20 V, li: 484 mA, Pi: 2.3 W, Li: 0.6 uH, Ci: 1.9 nF
Fluctuation	No limit
Power consumption	1.1 W
EMC performance	
Emission	EN 55011/CISPR-11 (Class A)
Immunity	EN/IEC 61236-1 (Industry)
NAMUR	Within the value limits according to "General requirements" with error criteria A in accordance with NE 21
Environment	
Environmental conditions acc. to IEC/EN/UL 61010-1	<ul style="list-style-type: none"> • Altitude up to 2000 m • Pollution degree 2
Maintenance	The flowmeter has a built-in error log/pending menu which should be inspected on a regular basis.
Cable glands	M12 connector Cable glands are available in nylon, nickel plated brass or stainless steel (316L/W1.4404) in the following dimensions: <ul style="list-style-type: none"> • 1 × M20 • 1 × ½" NPT
Digital cable connection	Standard industrial signal cable up to 75 m long with 2 × screened pairs or 4-wire overall screen can be laid between the sensor and transmitter. Siemens offers cables in a selection of pre-cut lengths and prepared for either gland or plug connection.

Flow Measurement

SITRANS FC (Coriolis)

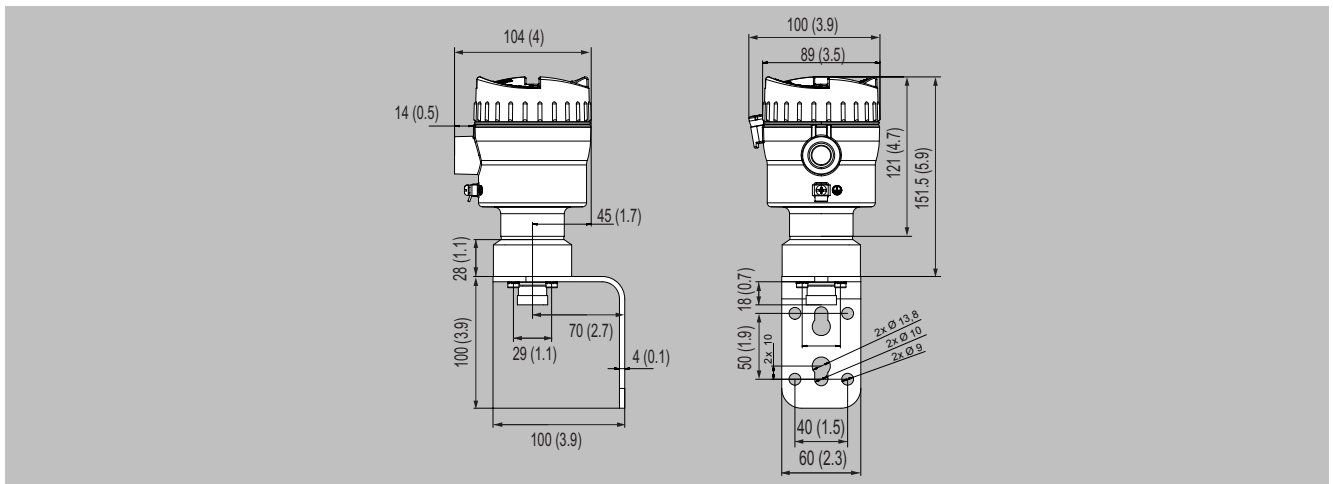
Transmitters / SITRANS FCT010

Technical specifications (continued)

SITRANS FCT010	
Analog cable connection (MASS 2100/FC300)	Standard industrial cable up to 15 m distance between sensor and transmitter. PVC insulated $5 \times 2 \times \varnothing 0.34$ mm, twisted and screened in pairs, temperature range $-20 \dots +105$ °C
Approvals Hazardous area	FCT010 can be installed in zone 1 for gas and zone 21 for dust (dust: depending on sensor type) and Class 1 Div 1 Zone 1 <ul style="list-style-type: none"> • ATEX, IECEx, cCSAus (Class 1 Div 1), EAC Ex, cCSAus Zone 1, NEPSI Zone 1
Certificates CE mark	<ul style="list-style-type: none"> • Pressure equipment • Low voltage directive • WEEE • RoHS
Regional certifications	<ul style="list-style-type: none"> • C-TICK (Australia and New Zealand EMC) • EAC (Belarus, Armenia, Kazakhstan, Russia) • KCC (South Korea) (in preparation)

Dimensional drawings

Dimension for the FCT010 remote mounted (for analog cable connections for MASS 2100 / FC300 DN4)

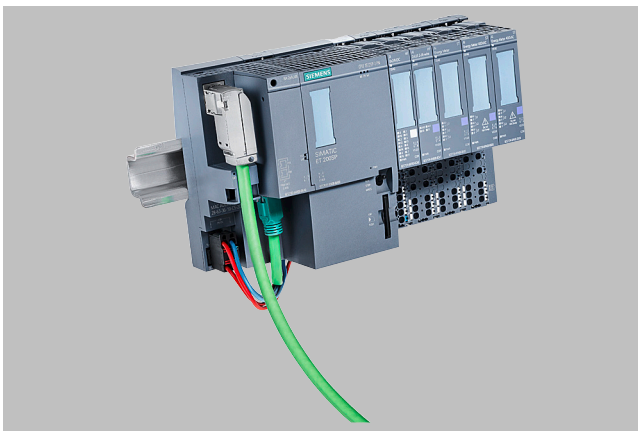


SITRANS FCT010, dimensions in mm (inch)

Overview



SITRANS FCT070 trasnmittter



Mounting on the SIMATIC ET 200SP ST & HF

The technology module SITRANS FCT070 is a Coriolis flow meter transmitter for the SIMATIC ET200SP ST, HF & HA.

The TM SITRANS FCT070 flow transmitter can be operated directly in the SIMATIC PCS7 or in TIA Portal with the FCT070 Faceplates.

TM FCT070 offers real-time data processing and the display of all measuring and status data of the Coriolis flowmeter.

The TM FCT070 can work with all Siemens Coriolis flowmeters. It can be directly connected to the SITRANS FCS300, SITRANS FCS400 and SITRANS FC MASS 2100 / FC300 DN 4.

Benefits

- Easy integration into automation process control as TIA portal and PCS7
- Easy selection and integration of flowmeters via TIA-Selector
- No transmitter between automation and flowmeter required
- Cost effective integration of Coriolis flowmeters for PLC controlled machines
- SITRANS FCT070 is a ET 200SP technology module and can combined with all other SIMATIC ET200SP ST, HF & HA modules
- Fast and trouble-free communication between the flowmeter and the PLC through digital data communication with up to 10 ms update rate
- SITRANS FCT070 and ET 200SP have the ATEX Zone 2 Class 1 Div 2 approvals. With the barrier SITRANS I300 the flowmeters sensor can be used in Ex Zone 1 & Class 1 Div 1 approval
- Included advanced batch functionality without additional modules. I/Os are onboard

Application

SITRANS FCT070 can be used for machine builders and in the process industry plants. The meters are suitable for measuring on liquid and gas. With ET 200SP ST & HF the SITRANS FCT070 can be installed decentralized in small stations, with fast communication to the control room.

The faceplates for TIA-Portal and PCS 7 offer the direct full remote access to the flowmeter.

The main industries for the SITRANS FCT070 transmitter:

- Chemical
- Food and beverage
- Pharmaceutical
- Automotive
- Oil and gas
- Power generation and utility
- Water and waste water

Design

The SITRANS FCT070 is designed as ET200 SP ST, HF & HA module and can directly installed with other ET200 SP modules.

The sensor DSL cable is directly mounted to the ET 200SP ST, HF & HA base unit is providing the supply voltage and the data communication. The SITRANS FC sensors with DSL can be connected directly to the SITRANS FCT070.

For sensors in ATEX Zone 1, the SITRANS I300 barrier must be installed between FCT070 and the FC DSL.

Flow Measurement

SITRANS FC (Coriolis)

Transmitters / SITRANS FCT070

Function

The following key functionalities are available:

- Mass flow rate, volume flow rate, density, temperature and fraction flow
- Three built-in totalizers which can freely be set for counting mass flow, volume flow, standard volume flow and fraction
- Two-stage batch controller
- Two digital inputs
- Two digital outputs
- Low flow cut-off
- Zero point adjustment
- Configurable upper and lower alarm and warning limits for all process values
- Comprehensive status and error reporting

Selection and ordering data

Description	Article No.	
SITRANS FCT070 – Transmitter for ET 2005P	7ME4138-6AA00-0BB1	
BU20-P12+A0+4B, PU1 – BaseUnit plate for ET 2005P	6ES7193-6BP20-0BB1 6ES7193-6BP20-0BB0	
SITRANS I300 – Isolating power supply – Ex barrier	A5E39832532	
Compatible Coriolis sensors		
SITRANS FCS300	7ME4637-...	
SITRANS FCS400	7ME4617-...	
SITRANS MASS 2100	7ME4817-...	
SITRANS FC300 DN4	7ME4817-...	

Description	Article No.	
SITRANS FCT070 system manual	A5E47701533-AA	
• English		
• German		

Technical specifications

SITRANS FCT070	
Measurement of	Mass flow, volume flow, density, temperature, fraction A flow, fraction A %, fraction B flow, fraction B %
Measurement functions	
• Totalizer 1	Mass flow , volume flow, standard volume flow, fraction A, fraction B
• Totalizer 2	Mass flow, volume flow , standard volume flow, fraction A, fraction B
• Totalizer 3	Mass flow, volume flow, standard volume flow , fraction A, fraction B
• Single and 2-stage batch function	Batching function with the use of one or two outputs for dosing at high and low speed
General information	
Product type designation	Technology module TM FCT070
FW update possible	Yes
Usable BaseUnits	BU 20 type B1
ET 200SP	Yes; from FW V4.2 or higher
ET 200SP ST & HF	Compatible and tested ST: Standard HF: High Feature
Engineering with	
	<ul style="list-style-type: none"> STEP 7 TIA Portal configurable/integrated as of version V16 or higher STEP 7 configurable/integrated as of version V5.5 SP4 and higher PCS 7 V9.0 or higher PROFINET as of GSD version/GSD revision GSDML V2.34
Cable	
Maximum cable length to FC DSL	75 m (150 m)
Supply voltage	
Load voltage L+	24 V DC
Rated value (DC)	24 V NEC-Class II
Permissible range, lower limit (DC)	19.2 V
Permissible range, upper limit (DC)	28.8 V
Short-circuit protection	Yes
Reverse polarity protection	Yes; against destruction
Input current	
Current consumption, max.	500 mA
Power loss	
Typical power loss, max.	1.7 W
Protection class	
IP protection	IP20
EMV	
	<ul style="list-style-type: none"> Electrostatic discharge according to IEC 61000-4-2: 2008 Field-related interference according to IEC 61000-4-3: 2006 Burst interference due to Burst according to IEC 61000-4-4: 2012 Conducted interference by surge according to IEC 61000-4-5: 2014 Conducted interference by high-frequency radiation according to IEC 61000-4-6: 2013
Decentralized operation	
• to SIMATIC S7-300	Yes
• to SIMATIC S7-400	Yes
• to SIMATIC S7-1200	Yes
• to SIMATIC S7-1500	Yes
• to standard PROFINET controller	Yes

Technical specifications (continued)

SITRANS FCT070	
Usable with the following flowmeters	<ul style="list-style-type: none"> SITRANS FCS400 SITRANS FCS300 SITRANS FC MASS2100 SITRANS FC300 For hazardous area application the SITRANS I300 can be used as barrier/power supply between sensor and FCT070
Digital inputs 1 and 2	
Free usable inputs 1 and 2	<ul style="list-style-type: none"> Start dosing Stop dosing Pause/resume dosing Start/stop totalizer 1, 2 or 3 Reset totalizer 1, 2 or 3 Zero adjust Force outputs Freeze process values
High signal	<ul style="list-style-type: none"> Nominal voltage: 24 V DC Upper limit: +30 V DC Lower limit: +11 V DC Current: max 35 mA
Low signal	<ul style="list-style-type: none"> Nominal voltage: 0 V DC Lower limit: -30 V DC Upper limit: +5 V DC Current: max 35 mA
Potential separation	<ul style="list-style-type: none"> Module and backplane bus Short circuit protection
Isolation test	707 V DC
Cable length	<ul style="list-style-type: none"> Max. 50 m shielded Max. 25 m unshielded
Digital outputs 1 and 2	
Free useable outputs 1 and 2	<ul style="list-style-type: none"> Alarm acknowledgment Out of specification Failure sensor measuring Function check Status force value Flow direction
Low signal	Max. 1 V
High signal	Min 23.2 V
Switching capacity	300 mA signal high
On lamp load	8 W
Load resistance	80 ... 10 kΩ
Between different circuits	Electronic/thermal
Potential separation	Module and backplane bus
Isolation test	707 V DC
Cable length	<ul style="list-style-type: none"> Max. 50 m shielded Max. 25 m unshielded
Environment	
Ambient temperature during operation	
Minimum installation	-25 °C
horizontal installation, max.	60 °C; observe derating
vertical installation, max.	50 °C; observe derating
Ambient temperature during storage/transport	
Storage, min.	-40 °C
Storage, max.	70 °C
Transport, min.	-40 °C
Transport, max.	70 °C

Flow Measurement

SITRANS FC (Coriolis)

Transmitters / SITRANS FCT070

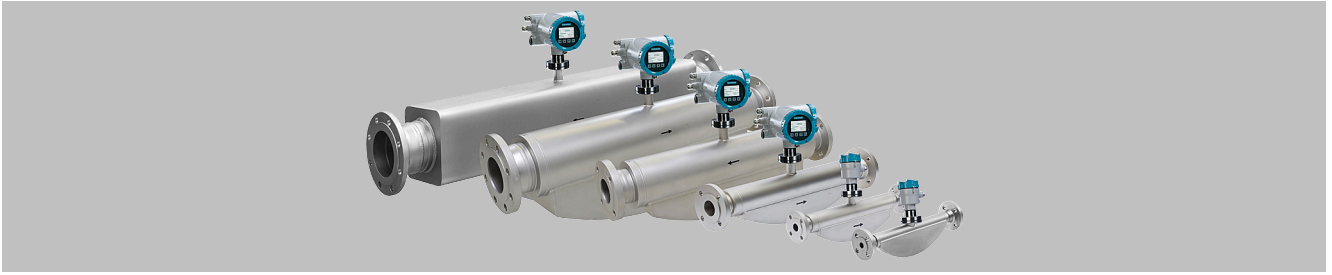
Technical specifications (continued)

SITRANS FCT070	
Relative humidity	
Operation, min.	5 %
Operation, max.	95 %; no condensation
Height in operation	
Ambient air pressure altitude (relative to sea level)	$T_{min} \dots T_{max}$ at 1 080 hPa ... 795 hPa (-1 000 m ... +2 000 m)
EMC performance	
Emission	<ul style="list-style-type: none"> EN 61000-6-4
Electromagnetic compatibility	<ul style="list-style-type: none"> IEC 61000-6-2:2016 IEC 61000-6-4:2018
Emission of radio interference	Class A industrial environment: <ul style="list-style-type: none"> IEC 61000-6-4: 2018 IEC/CISPR 16-2-3: 2008 EN 55016-2-3: 2006
Emission on power supply cables	Class A Industrial environment: <ul style="list-style-type: none"> IEC 61000-6-4: 2018 IEC/CISPR 16-2-1: 2010 EN 55016-2-1: 2009
Certification	
CE mark	Low voltage directive RoHS
UL	ANSI / ISA 12.12.01
CAN/CSA	CSA C22.2 No. 213-M1987 Class I, Div. 2 Group A.B.C.D T4
ATEX	II 3 G Ex ec IIC T4 Gc
IECEx	Ex ec IIC T4 Gc
EAC	Yes
Tick	Yes
KCC	Yes
RoHS	Yes
FM	Class I, Div. 2, Group A.B.C.D T4
Communication	
Digital Sensor Link	460,8 kBits/s
Cable length FCT070 to FC DSL Sensor	75 m (150 m)
Power supply FCS sensor	The operating voltage of the sensors is supplied via the sensor cable directly from the FCT070

Circuit diagrams

Naming	Con.	PIN	BU20 type B1				PIN	Con.	Naming
Digital input	DI0	1	①			②	2	DQ0	Digital output
Digital input	DI1	3					4	DQ1	Digital output
+24 V DC supply voltage for digital inputs	DI_L+	5	③			④	6	nc	
Ground for digital outputs	M	7	⑤			⑥	8	M	Ground for digital outputs
RS 485 data line A for SEN communication	SEN_A	9	⑦			⑧	10	SEN_L+	+24 V DC supply voltage for SEN
RS 485 data line B for SEN communication	SEN_B	11	⑨			⑩	12	SEN_M	GND for SEN supply
+24 V DC supply voltage	L+	13	⑪			⑫	14	M	Ground for supply voltage
	L+	15	⑬			⑭	16	M	
			⑮			⑯			

Pin assignment of the BaseUnit BU20-P12+A0+4B

Overview

The SITRANS FCS300 sensor is available in DN 15 to DN 150 mm sizes in stainless steel AISI 316 L or nickel alloy wetted material. The sensor design consists of process connections, inlet and outlet manifolds mounted in a stiff frame and two parallel tubes equally sharing the process medium flow.

The sensing tubes are curved in the CompactCurve shape which gives high sensitivity and low pressure loss. The CompactCurve shape was selected to ensure that the smallest flows are measured with optimal signal to noise ratio.

The compact sensor design with a split flow dual tube design with high driver frequency is suitable for high end applications in all industry segments e.g. Chemical, Oil & Gas, Refineries, F&B and Power.

A variety of process connections available to cover all common process connections and pressure ratings.

The sensor has a solid stainless steel fully welded enclosure to protect the measuring tubes from any harsh environments. For hazardous area applications the FCS300 comes in a number of common hazardous area approved like Atex, IECEx, cCSAus, EAC, and NEPSI.

Flow Measurement

SITRANS FC (Coriolis)

Sensors and Flowmeter systems / SITRANS FCS300 flow sensor

Integration

The SITRANS FCS300 sensor is suitable for both indoor and outdoor installation and meets the requirements of Protection Class IP67/NEMA 4X. Optionally the sensor can be ordered with hazardous certification to Zone 1 and Div 1 (ATEX, IECEx, cCSAus, EAC Ex, NEPSI).

The flowmeter is bidirectional and can be installed in any orientation. The sensor is self-draining in many positions, with vertical mounting preferred.

It is important to ensure that the sensor tubes are always completely filled with homogeneous fluid; otherwise measuring errors may occur. Suitable fluids are clean liquids, pastes, light slurries or gases. Condensing vapours, aerated liquids or slush are not recommended.

The materials in contact with the process medium must be evaluated for corrosion and erosion resistances for long sensor life.

The pressure drop through the sensor is a function of the properties of the fluid and the flow rate. A pressure loss and accuracy calculator can be found on the Siemens internet site www.siemens.com.

The preferred flow direction is indicated by an arrow on the sensor. Flow in the direction of the arrow will be measured as positive. The flow direction can be adjusted at the transmitter to compensate for reverse installation.

Installation orientation

The optimal installation orientation is vertical with the flow upwards. This ensures that suspended solids or bubbles are completely pushed through the sensor. A drain valve below the sensor will allow the pipe and sensor to drain completely.

Supports

In order to support the weight of the flowmeter and to ensure reliable measurements when external effects exist (e.g. plant vibrations), the sensor should be installed in rigidly supported pipelines.

Supports or hangers should be installed symmetrically and stress-free in close proximity to both of the process connections.

Shut-off devices

To conduct a system zero adjustment, secure shut-off devices are required in the pipeline.

Where possible, shut-off devices should be installed both upstream and downstream of the flowmeter.

Configuration

Installation guidelines

- The mass flowmeter does not require any flow conditioning or straight inlet pipe sections. Care should be exercised however to ensure that any upstream valves, gates, sight glasses etc. do not cavitate and are not set into vibration by the flow.
- It is always preferred to place the flowmeter upstream of any control valve or other pipeline component which may cause flashing, cavitation or vibrations.
- The presence of gas bubbles in the fluid may result in erroneous measurements, particularly in the density measurement. Therefore the flowmeter should not be installed at the lowest pressure point in the liquid piping system or where vapour can collect. Install the meter in pipeline sections with high pressure to maintain system pressure and compress any bubbles.
- Drop lines downstream from the flow sensor should be avoided to prevent the meter tube from draining during flowing conditions. A back-pressure device or orifice is recommended to ensure that flow does not separate within the flow sensor but the metering section remains at positive pressure at all times while there is flow.
- The flowmeter should not come into contact with any other objects. Avoid making attachments to the housing except for the pressure guard components (if required).
- When the connecting pipeline is larger than the sensor size, suitable standard reducers may be installed. A selection of oversize and undersize connections can be ordered - refer to the sizes tables below.
- The flow sensor may be supported at the junction between process connection and the manifold, but should not be used to support adjacent piping. Ensure that the piping is also supported on both sides so that connection stresses are neutral.
- If strong vibrations exist in the pipeline, they should be damped using elastic pipeline elements. The damping devices must be installed outside the supported flowmeter section. Direct connection of flexible elements to the sensor should be avoided.
- Make sure that any dissolved gases, which are present in many liquids, do not outgas. The back pressure at the outlet should be at least 0.2 bar (3 psi) above the vapour pressure of the process fluid.
- Assure that operation below the vapour pressure cannot occur particularly for fluids with low latent heat of vaporisation.
- The sensor should not be installed in the vicinity of strong electromagnetic fields, e.g. near motors, pumps, variable frequency drives, transformers etc.
- When operating meters on a common mounting base the sensors should be mounted and spaced separate from each other to avoid cross-talk and other vibration interferences.
- When operating meters in interconnected pipelines the pipes should be decoupled to prevent cross talk.

Remote system cabling

The system is designed so that standard instrumentation cable with four cores and overall screen or two screened pairs can be used, or cable sets can be ordered with the flowmeter. The cable can be ordered in various set lengths and terminated in the field.

Be aware of maximum sensor length cable depending on product selection, currently 75 m. Data transmission speed and process variable update rates may be affected by the cable characteristics. For best results, choose a cable with the following electrical characteristics:

Configuration (continued)

Property	Unit	Value
Resistance	[Ω/km]	59
Characteristic impedance	[Ω]	100 @ 1 MHz
Insulation resistance	[MΩ/km]	200
Maximum voltage	[V]	300

The flowmeter system applies maximum 15 V DC in operation and is certified intrinsically safe. The complete system is insulation tested to 1 500 V in production.

Cabling solutions which can be ordered with the flowmeter are as follows:

1. High performance plugged cable using M12 connectors into prepared sockets
2. Cable glands for either metric or NPT threaded terminal housings
3. Plain cable in set lengths to be passed through flexible and rigid conduit (not supplied) for metric or NPT threaded terminal housings

Cable for items 1, 2 and 3 are available either gray for standard applications or light blue for Ex applications to identify the circuit as intrinsically safe.

Insulation and heating

For applications where pipeline insulation is required for personnel protection or process temperature maintenance, the SITRANS FCS300 flow sensor may also be insulated. The form and material of insulation is not prescribed and entirely depends on the practices at the application location or plant.

Insulation must not be crowded around the sensor pedestal but shaped at a 45° cone to allow the pedestal to radiate excess heat and maintain a suitable working temperature within the front-end transmitter housing.

Flow Measurement

SITRANS FC (Coriolis)

Sensors and Flowmeter systems / SITRANS FCS300 flow sensor

Technical specifications

Flow sensor FCS300							
Parameter	Unit	Value					
Process media		<ul style="list-style-type: none"> Fluid Group 1 (suitable for dangerous fluids) Aggregate state: Paste/light slurry, liquid and gas 					
Process pressure range	[barg (psi)]	The maximum permissible operating pressure is determined by the respective process connection and the temperature of the medium 316L: 0 ... 100 (0 ... 1 450) Nickel-alloy C4 (2.4610) ³⁾ : 0 ... 100 (0 ... 1 450)					
Process temperature range	[°C (°F)]	The maximum permissible process temperature is determined by the respective process connection -50 ... +205 (-58 ... +400)					
Ambient temperature range	[°C (°F)]	-40 ... +70 (-40 ... +158)					
Transport temperature range	[°C (°F)]	-40 ... +70 (-40 ... +158)					
Density range	[kg/m ³ (lb/ft ³)]	1 ... 5 000 (0.062 ... 312.2)					
No. of process values							
<ul style="list-style-type: none"> Primary process values 		<ul style="list-style-type: none"> Mass flow Density Process medium temperature 					
<ul style="list-style-type: none"> Derived process values 		<ul style="list-style-type: none"> Volume flow Standard volume flow (with reference density) Fraction A:B Fraction % A:B 					
Performance specifications		Sensor					
Parameter	Unit	DN 15	DN 25	DN 50	DN 80	DN 100	DN 150
Max. zero point error		0.6 (0.0235)	2.16 (0.0792)	7.2 (0.264)	20 (0.735)	41.6 (1.628)	68.8 (2.528)
Q _{min} (1 % error) ⁴⁾	[kg/h (lb/min)]	70 (2.57)	240 (8.92)	800 (29.4)	2 000 (73.5)	4 000 (146.9)	6 900 (253.5)
Q _{nom} (1 bar pressure)	[kg/h (lb/min)]	4 500 (163.3)	20 500 (753.2)	49 000 (1 800)	122 000 (4 483)	273 000 (10 031)	459 200 (16 873)
Q _{max} ²⁾	[kg/h (lb/min)]	8 000 (293.9)	35 000 (1 286)	90 000 (3 307)	250 000 (9 186)	520 000 (19 107)	860 000 (31 600)
Linearity error mass flow							
<ul style="list-style-type: none"> for liquids¹⁾ 	0.1% massflow sensor [%]	± 0.1	± 0.1	± 0.1	± 0.1	± 0.1	± 0.1
	0.2% massflow sensor [%]	± 0.2	± 0.2	± 0.2	± 0.2	± 0.2	± 0.2
<ul style="list-style-type: none"> for gases (additional) 	[%]	± 0.40	± 0.40	± 0.40	± 0.40	± 0.40	± 0.40
Repeatability mass flow	[%]	± 0.05	± 0.05	± 0.05	± 0.05	± 0.05	± 0.05
Density accuracy with 0.1%	[kg/m ³ (lb/ft ³)]	± 2 (± 0.124)	± 2 (± 0.124)	± 2 (± 0.124)	± 2 (± 0.124)	± 2 (± 0.124)	± 2 (± 0.124)
Density accuracy with 0.2 %	[kg/m ³ (lb/ft ³)]	± 10 (± 0.62)	± 10 (± 0.62)	± 10 (± 0.62)	± 10 (± 0.62)	± 10 (± 0.62)	± 10 (± 0.62)
Temperature error	[°K]	± 0.5	± 0.5	± 0.5	± 0.5	± 0.5	± 0.5

¹⁾ Increased error can be expected for gas mass flow measurement (for gas measurement typically + 0.40 % error).

²⁾ For gas applications the max. flowrate is calculated at Mach-Number = 0.3.

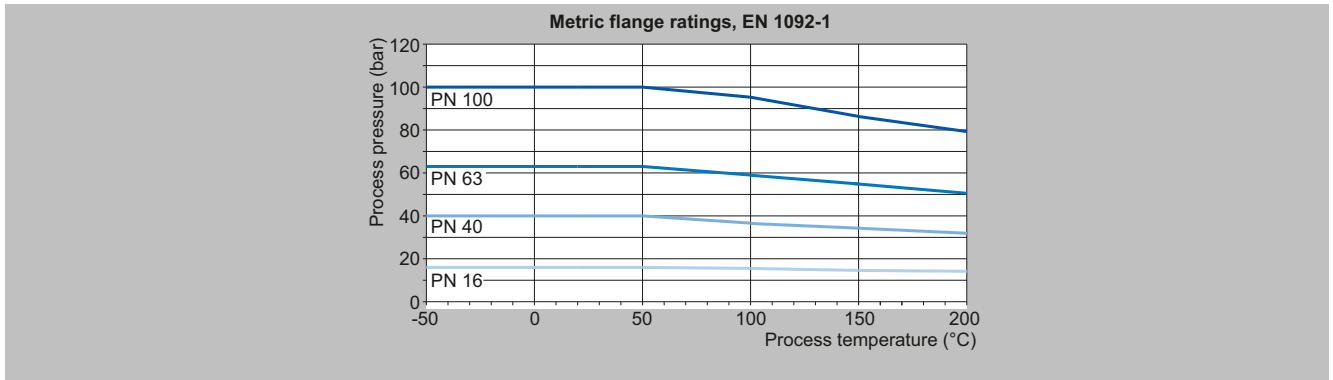
³⁾ Hastelloy C is a registered trademark of Haynes International. C4 nickel alloys are equivalent to Hastelloy C4.

⁴⁾ Valid for the 0.1% sensor.

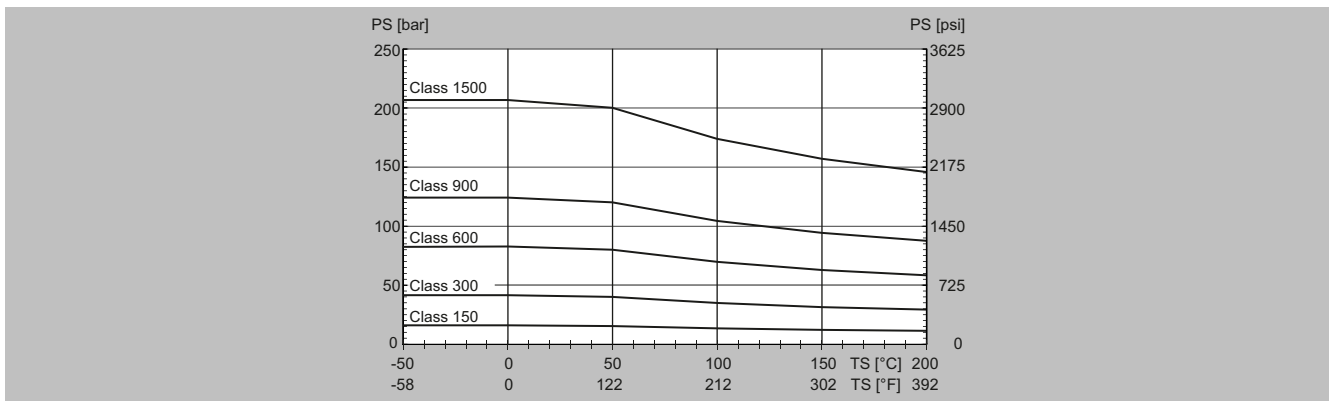
Pressure/temperature curves

With two major exceptions, the pressure rating of the flow sensors is independent of the process medium temperature. Design rules for flange connections in both the EN 1092-1 and ASME B16.5 standards dictate pressure derating with increasing temperature. The charts below show the effect of process medium temperature on the pressure ratings for the flanges within the FCS300 product program.

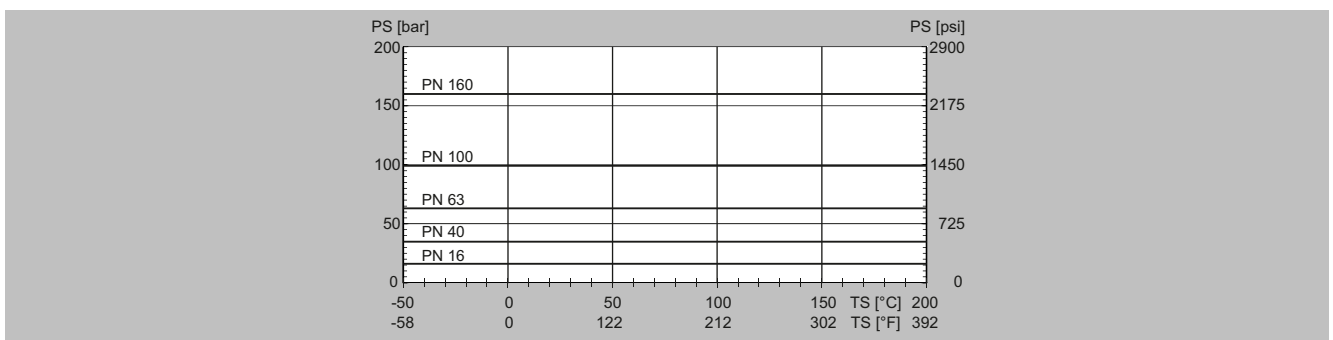
Technical specifications (continued)



EN1092-1 flanged sensors in AISI 316L



Stainless steel ASME flange 1.4571/1.4404 (AISI 316Ti/316L) up to DN200 (8")



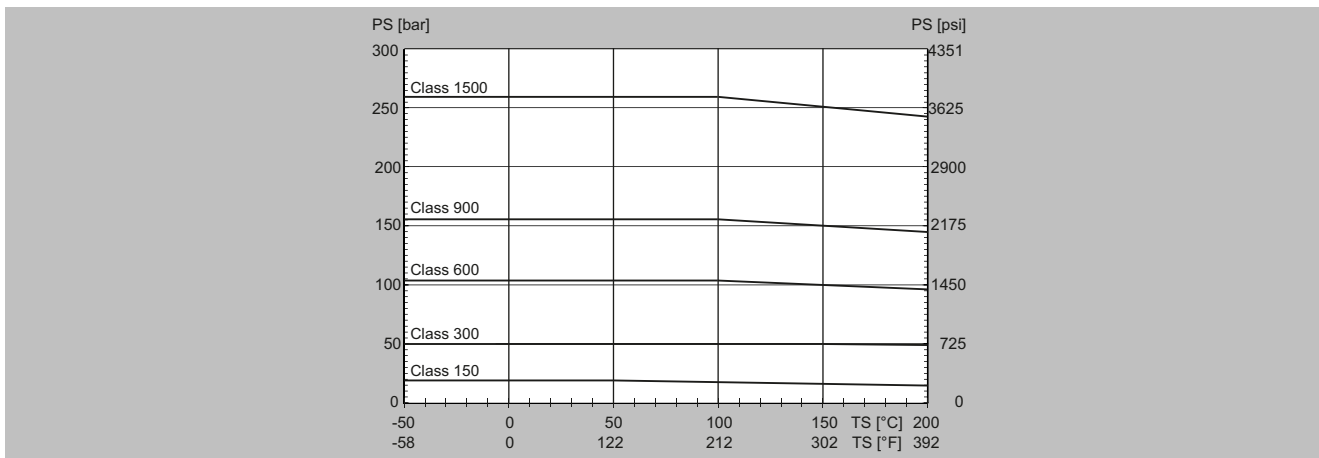
Nickel alloy DIN flange C4 (2.4610) or nickel alloy C22 (2.4602) up to DN200 (8")

Flow Measurement

SITRANS FC (Coriolis)

Sensors and Flowmeter systems / SITRANS FCS300 flow sensor

Technical specifications (continued)



Nickel alloy ASME flange C4 (2.4610) or nickel alloy C22 (2.4602) up to DN200 (8")

Sanitary connections

Design	Nominal size	PS _{max}		TS _{max}		TS _{min}	
		[bar]	[psi]	[°C]	[°F]	[°C]	[°F]
Pipe fitting DIN 11851	DN 15 ... 40 (½ ... 1½")	40	580	140	284	-40	-40
	DN 50 ... 100 (2 ... 4")	25	363	140	284	-40	-40
Pipe fitting SMS 1145	DN 25 ... 80 (1 ... 3")	6	87	140	284	-40	-40
Clamp DIN 32676	DN 15 ... 50 (½ ... 2")	16	232	120	248	-40	-40
	DN 65 ... 100 (2½ ... 4")	10	145	120	248	-40	-40

Sensor variants

SITRANS FCS300 sensors are available in a wide range of process connections. The available combinations of type, sensor size and connection size are shown in the tables below.

Standard variants

Standard: 7ME463-....											
Sensor	Connection	EN 1092-1 B1, PN 16	EN 1092-1 B1, PN 40	EN 1092-1 B2, PN 63	EN 1092-1 B2, PN 100	EN 1092-1 D, PN 40	ANSI B16- .5-2009, class 150	ANSI B16- .5-2009, class 300	ANSI B16- .5-2009, class 600	ANSI B16- .5-2009, class 900	ANSI B16- .5-2009, class 1500
DN 15 (½")	DN 10 (3/8")		•							• ¹⁾	• ¹⁾
	DN 15 (½")		•	•	•	•	•	•			
	DN 20 (¾")		•				•				
DN 25 (1")	DN 20 (¾")		•				•				
	DN 25 (1")		•	•	•	•	•	•		• ¹⁾	• ¹⁾
	DN 40 (1½")		•	•	•	•	•	•			
DN 50 (2")	DN 40 (1½")		•	•	•	•	•	•		•	•
	DN 50 (2")		•	•	•	•	•	•		• ¹⁾	• ¹⁾
	DN 65 (2½")		•	•			•			• ¹⁾	• ¹⁾
DN 80 (3")	DN 65 (2½")		•	•	•	•	•	•		• ¹⁾	• ¹⁾
	DN 80 (3")		•	•	•	•	•	•		• ¹⁾	• ¹⁾
	DN 100 (4")	•	•	•	•	•	•	•		• ¹⁾	• ¹⁾
DN 100 (4")	DN 80 (3")	•	•	•	•	•	•	•		• ¹⁾	• ¹⁾
	DN 100 (4")	•	•	•	•	•	•	•		• ¹⁾	• ¹⁾
	DN 150 (6")	•	•	•	•	•	•	•		• ¹⁾	• ¹⁾
DN 150 (6")	DN 100 (4")	•	•	•	•	•	•	•		• ¹⁾	• ¹⁾
	DN 150 (6")	•	•	•	•	•	•	•		• ¹⁾	• ¹⁾
	DN 200 (8")	•	•	•	•	•	•	•		• ¹⁾	• ¹⁾

Technical specifications (continued)

Standard: 7ME463-...										
Sensor	Connection	ISO 228-1 G female pipe thread	ASME B1.20.1 NPT female pipe thread	DIN 11851 hygienic screwed	DIN 32676 clamp (ISO) Row A	SMS 1145 hygienic screwed	JIS B2220:200- 4/10K	JIS B2220:200- 4/20K	EN 1092-1 PN 16, NAMUR length	EN 1092-1 PN 40, NAMUR length
DN 15 (½")	DN 10 (3/8")	•		•	•		•	•		
	DN 15 (½")	•	•	•	•		•	•		•
	DN 20 (¾")			•	•		•	•		
DN 25 (1")	DN 20 (¾")			•	•		•	•		
	DN 25 (1")			•	•	•	•	•		•
	DN 40 (1½")			•	•	•	•	•		
DN 50 (2")	DN 40 (1½")			•	•	•	•	•		
	DN 50 (2")			•	•	•	•	•		•
	DN 65 (2½")			•	•	•	•	•		
DN 80 (3")	DN 65 (2½")			•	•	•	•	•		
	DN 80 (3")			•	•	•	•	•		•
	DN 100 (4")			•	•		•	•		
DN 100 (4")	DN 80 (3")						•	•		
	DN 100 (4")						•	•	•	
	DN 150 (6")						•	•		
DN 150 (6")	DN 100 (4")							•		
	DN 150 (6")							•	•	
	DN 200 (8")							•		

¹⁾ Apply class 600 p and t ratings for class 900 and class 1500 flanges.

Hygienic sensor variants

The hygienic sensors will have to be ordered with stainless steel tubes 316L/1.4435/1.4404 (polished). Hygienic sensors are offered with process connection conforming to various international quick-connect clamps or threaded connectors. Pressure ratings are according to the relevant standard and the sensor size.

NAMUR sensor variants

The NAMUR variants have built-in lengths according to NAMUR recommendation NE 132. The recommendations of NE 132 are stated for sensors with flanges the same size as the sensor nominal size, and for flanges to EN 1092-1 PN 40 with B1 flange facing. For DN 100 and DN 150 flanges to PN 16.

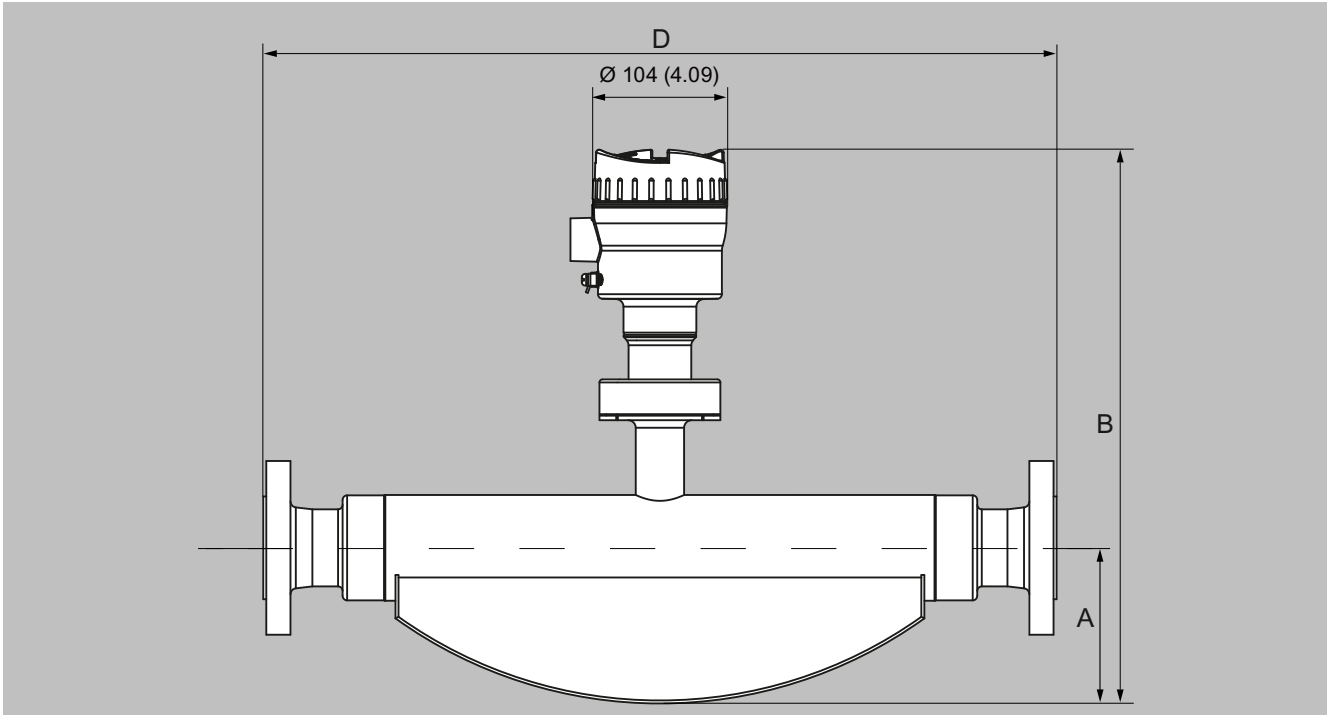
Flow Measurement

SITRANS FC (Coriolis)

Sensors and Flowmeter systems / SITRANS FCS300 flow sensor

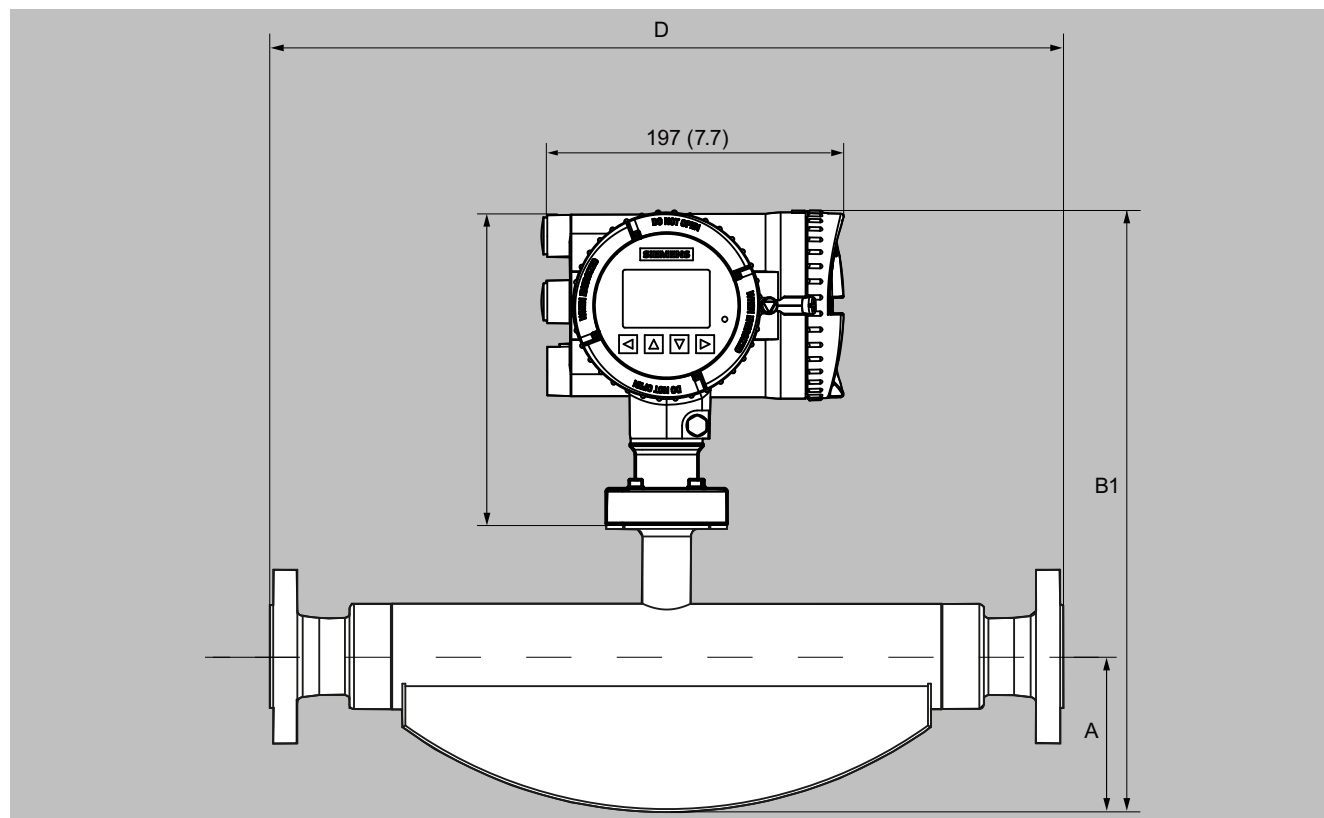
Dimensional drawings

Sensor dimensions



SITRANS FCS300 remote sensor

Dimensional drawings (continued)



SITRANS FCS300 compact

Sensor DN	A		B		B1		Weight ¹⁾	
	[mm]	[inch]	[mm]	[inch]	[mm]	[inch]	[kg]	[lb]
15 (½")	80	3.15	358	14.09	387	15.19	4.6	10.1
25 (1")	103	4.06	398	15.67	427	16.77	7.9	17.4
50 (2")	126	4.96	435	17.13	464	18.23	25.7	56.7
80 (3")	181	7.13	525	20.67	554	21.77	66.5	147
100 (4")	262	10.31	622	24.49	651	25.59	128	282
150 (6")	317	12.48	714	28.11	743	29.21	207	456

¹⁾ For FCT030 compact add 4 kg (8.8 lb)

SITRANS FCS300, dimensions in mm (inch), weights in kg (lb), for a EN 1092 PN 40 flanged version.

The built-in length D depends on the flange.

Overall length

The overall length (**built-in length D**) of each sensor depends on the connection standard and the pressure rating. The tables below summarize the dimensions available at the time of publishing. Please contact Siemens for further information about our desired process connection specification.

Sensor in AISI 316L: 7ME463.-...

Sensor AISI 316L Connection	DN 15 (½")		DN 25 (1")			DN 50 (2")			DN 65 (2½")
	DN 10 (3/8")	DN 15 (½")	DN 20 (¾")	DN 20 (¾")	DN 25 (1")	DN 40 (1½")	DN 40 (1½")	DN 50 (2")	
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
EN 1092-1 B1, PN 16									
EN 1092-1 B1, PN 40	385	385	421	576	525	576	763	715	763
EN 1092-1 B2, PN 63		403			564	572	745	745	
EN 1092-1 B2, PN 100		403			564	572	745	757	
EN 1092-1 D, PN 40		385			525			715	

Flow Measurement

SITRANS FC (Coriolis)

Sensors and Flowmeter systems / SITRANS FCS300 flow sensor

Dimensional drawings (continued)

Sensor Connection	DN 15 (½")			DN 25 (1")			DN 50 (2")		
	DN 10 (3/8")	DN 15 (½")	DN 20 (¾")	DN 20 (¾")	DN 25 (1")	DN 40 (1½")	DN 40 (1½")	DN 50 (2")	DN 65 (2½")
ASME B16.5, class 150		435	421	575	575	576	763	715	763
ASME B16.5, class 300		421			576	576	756	763	
ASME B16.5, class 600		421			576	576	756	773	
ASME B16.5, class 900		421			576		780	790	800
ASME B16.5, class 1500		421			576		780	790	800
ISO 228-1 G female pipe thread		450							
ASME B1.20.1 NPT female pipe thread		450							
DIN 11851 hygienic screwed	413	413	413	590	590	590	763	740	740
DIN 32676 (ISO) Row A hygienic clamp	413	413	413	590	590	590	763	740	740
SMS 1145 hygienic screwed					590	590	763	740	740
JIS B2220/10K	385	385	421	576	525	576	763	715	763
JIS B2220/20K	385	385	421	576	525	576	763	715	763
EN 1092-1 PN 16, NAMUR length									
EN 1092-1 PN 40, NAMUR length		510			600			715	

Sensor Connection	DN 80 (3")			DN 100 (4")			DN 150 (6")		
	DN 65 (2½")	DN 80 (3")	DN 100 (4")	DN 80 (3")	DN 100 (4")	DN 150 (6")	DN 100 (4")	DN 150 (6")	DN 200 (8")
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
EN 1092-1 B1, PN 16			875	1222	1122	1300	1569	1421	1587
EN 1092-1 B1, PN 40	910	870	875	1222	1144	1300	1599	1461	1637
EN 1092-1 B2, PN 63	910	910	1060	1234	1304				
EN 1092-1 B2, PN 100	910	910	1080	1234	1334				
EN 1092-1 D, PN 40		870							
ASME B16.5, class 150		880	880	1244	1144	1330	1630	1485	1650
ASME B16.5, class 300	920	895	1075	1324	1324	1350	1630	1505	1670
ASME B16.5, class 600	920	920	1100	1244	1354	1435	1675	1555	
ASME B16.5, class 900	965	1100	1130	1470	1380	1450	1705	1605	
ASME B16.5, class 1500	965	1300	1150	1500	1400	1510	1725	1665	
ISO 228-1 G female pipe thread									
ASME B1.20.1 NPT female pipe thread									
DIN 11851 hygienic screwed	990	940	940						
DIN 32676 (ISO) Row A hygienic clamp	950	910	910						
SMS 1145 hygienic screwed	990	940							
JIS B2220/10K	910	870		1275	1150	1300			
JIS B2220/20K	920	910		1275	1150	1308	1485		
EN 1092-1 PN 16, NAMUR length									
EN 1092-1 PN 40, NAMUR length		915							

Sensor Connection	DN 15 (½")			DN 25 (1")			DN 50 (2")		
	DN 10 (3/8")	DN 15 (½")	DN 20 (¾")	DN 20 (¾")	DN 25 (1")	DN 40 (1½")	DN 40 (1½")	DN 50 (2")	DN 65 (2½")
	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]
EN 1092-1 B1, PN 16									
EN 1092-1 B1, PN 40	15.16	15.16	16.57	22.68	20.67	22.68	30.04	28.15	30.04
EN 1092-1 B2, PN 63		15.87			22.20	22.52	29.33	29.33	
EN 1092-1 B2, PN 100		15.87			22.20	22.68	29.33	29.33	
EN 1092-1 D, PN 40		15.16			20.67			28.15	
ASME B16.5, class 150		17.13	16.57	22.64	22.64	22.68	30.04	28.15	29.76
ASME B16.5, class 300		16.57			22.68	22.68	29.76	30.04	
ASME B16.5, class 600		16.57			22.68	22.68	29.76	30.43	
ASME B16.5, class 900		16.57			22.68		30.71	31.10	31.50
ASME B16.5, class 1500		16.57			22.68		30.71	31.10	31.50
ISO 228-1 G female pipe thread		17.72							

Dimensional drawings (continued)

Sensor Connection	DN 15 (½")			DN 25 (1")			DN 50 (2")		
	DN 10 (3/8")	DN 15 (½")	DN 20 (¾")	DN 20 (¾")	DN 25 (1")	DN 40 (1½")	DN 40 (1½")	DN 50 (2")	DN 65 (2½")
ASME B1.20.1 NPT female pipe thread		17.72							
DIN 11851 hygienic screwed	16.26	16.26	16.26	23.23	23.23	23.23	30.04	29.13	29.13
DIN 32676 (ISO) Row A hygienic clamp	16.26	16.26	16.26	23.23	23.23	23.23	30.04	29.13	29.13
SMS 1145 hygienic screwed					23.23	23.23	30.04	29.13	29.13
JIS B2220/10K	15.16	15.16	16.57	22.68	20.67	22.68	30.04	28.15	30.04
JIS B2220/20K	15.16	15.16	16.57	22.68	20.67	22.68	30.04	28.15	30.04
EN 1092-1 PN 16, NAMUR length									
EN 1092-1 PN 40, NAMUR length		20.08			23.62			28.15	

Sensor Connection	DN 80 (3")			DN 100 (4")			DN 150 (6")		
	DN 65 (2½")	DN 80 (3")	DN 100 (4")	DN 80 (3")	DN 100 (4")	DN 150 (6")	DN 100 (4")	DN 150 (6")	DN 200 (8")
	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]
EN 1092-1 B1, PN 16			34.45	48.11	44.17	49.61	61.77	55.94	62.48
EN 1092-1 B1, PN 40	35.83	34.25	34.45	48.11	45.04	49.61	62.95	57.52	64.96
EN 1092-1 B2, PN 63	35.83	35.83	41.73	48.58	51.34				
EN 1092-1 B2, PN 100	35.83	35.83	42.52	48.58	52.52				
EN1092-1 D, PN 40		34.25							
ASME B16.5, class 150		34.65	34.65	48.98	45.04	52.36	64.17	58.46	64.96
ASME B16.5, class 300	36.22	35.24	42.32	48.98	52.13	55.12		59.25	65.75
ASME B16.5, class 600	36.22	36.22	43.31	48.98	53.31	57.14	65.94	61.22	
ASME B16.5, class 900	37.99	43.31	44.49	57.87	54.33	57.09	67.13	63.19	
ASME B16.5, class 1500	37.99	51.18	45.28	59.06	55.12	59.45	67.91	65.55	
ISO 228-1 G female pipe thread									
ASME B1.20.1 NPT female pipe thread									
DIN 11851 hygienic screwed	38.98	37.01	37.01						
DIN 32676 (ISO) Row A hygienic clamp	37.40	35.83	35.83						
SMS 1145 hygienic screwed	38.98	37.01							
JIS B2220/10K	35.83	34.25		50.20	45.28	50.20			
JIS B2220/20K	35.83	34.25		50.20	45.28	51.50			
EN 1092-1 PN 16, NAMUR length					55.12			66.93	
EN 1092-1 PN 40, NAMUR length		36.02							

Sensor in nickel-alloy C4: 7ME463.-...

Sensor nickel-alloy C4 Connection	DN 15 (½")			DN 25 (1")			DN 50 (2")		
	DN 10 (3/8")	DN 15 (½")	DN 20 (¾")	DN 20 (¾")	DN 25 (1")	DN 40 (1½")	DN 40 (1½")	DN 50 (2")	DN 65 (2½")
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
EN 1092-1 B1, PN 40	449	442	428	646	614	576	814	764	819
EN 1092-1 B2, PN 63	449	442	428	646	614	576	814	764	819
EN 1092-1 B2, PN 100	449	442	428	646	614	576	814	764	819
ANSI B16.5, class 150		442	428	646	614	576	814	764	819
ANSI B16.5, class 300		442	428	646	614	576	814	764	819
ANSI B16.5, class 600		442	428	646	614	576	814	764	819
JIS B2220/10K		442	428	646	614	576	814	764	819

Flow Measurement

SITRANS FC (Coriolis)

Sensors and Flowmeter systems / SITRANS FCS300 flow sensor

Dimensional drawings (continued)

Sensor Connection	DN 80 (3")		DN 100 (4")			DN 150 (6")			
	DN 65 (2½")	DN 80 (3")	DN 100 (4")	DN 80 (3")	DN 100 (4")	DN 150 (6")	DN 100 (4")	DN 150 (6")	DN 200 (8")
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
EN 1092-1 B1, PN 16			971	1357	1280	1261	1592	1502	
EN 1092-1 B1, PN 40	1021	971	971	1357	1280	1261	1592	1502	
EN 1092-1 B2, PN 63	1021		971	1357	1280	1261	1632	1542	
EN 1092-1 B2, PN 100	1021	971	971	1357	1280	1261	1632	1542	
ANSI B16.5, class 150	1021	971	971	1357	1280	1261	1592	1502	
ANSI B16.5, class 300	1021	971	971	1357	1280	1261	1632	1542	
ANSI B16.5, class 600	1021	971	971	1357	1280	1261	1632	1542	
JIS B2220/10K	1021	971	971	1357	1280	1261	1592	1502	

Sensor Connection	DN 15 (½")		DN 25 (1")			DN 50 (2")			
	DN 10 (3/8")	DN 15 (½")	DN 20 (¾")	DN 20 (¾")	DN 25 (1")	DN 40 (1½")	DN 40 (1½")	DN 50 (2")	DN 65 (2½")
	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]
EN 1092-1 B1, PN 40	17.7	17.4	16.9	25.4	24.2	22.7	32.0	30.1	32.2
EN 1092-1 B2, PN 63	17.7	17.4	16.9	25.4	24.2	22.7	32.0	30.1	32.2
EN 1092-1 B2, PN 100	17.7	17.4	16.9	25.4	24.2	22.7	32.0	30.1	32.2
ANSI B16.5, class 150		17.4	16.9	25.4	24.2	22.7	32.0	30.1	31.2
ANSI B16.5, class 300		17.4	16.9	25.4	24.2	22.7	32.0	30.1	31.2
ANSI B16.5, class 600		17.4	16.9	25.4	24.2	22.7	32.0	30.1	31.2
JIS B2220/10K		17.4	16.9	25.4	24.2	22.7	32.0	30.1	32.2

Sensor Connection	DN 80 (3")		DN 100 (4")			DN 150 (6")			
	DN 65 (2½")	DN 80 (3")	DN 100 (4")	DN 80 (3")	DN 100 (4")	DN 150 (6")	DN 100 (4")	DN 150 (6")	DN 200 (8")
	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]
EN 1092-1 B1, PN 16			38.2	53.4	50.4	49.6	62.7	59.1	
EN 1092-1 B1, PN 40	40.2	38.2	38.2	53.4	50.4	49.6	62.7	59.1	
EN 1092-1 B2, PN 63	40.2		38.2	53.4	50.4	49.6	64.3	60.7	
EN 1092-1 B2, PN 100	40.2	38.2	38.2	53.4	50.4	49.6	64.3	60.7	
ANSI B16.5, class 150	40.2	38.2	38.2	53.4	50.4	49.6	62.7	59.1	
ANSI B16.5, class 300	40.2	38.2	38.2	53.4	50.4	49.6	64.3	60.7	
ANSI B16.5, class 600	40.2	38.2	38.2	53.4	50.4	49.6	64.3	60.7	
JIS B2220/10K	35.83	34.25	41.73	53.4	50.4	49.6	62.7	59.1	

Overview



The complete flowmeter system SITRANS FC330 can be ordered for standard, hygienic or NAMUR service. The flowmeter is based on the latest developments within digital signal processing technology – engineered for high measuring performance:

- Fast response to rapid changes in flow
- Fast dosing applications
- High immunity against process noise
- High turndown ratio of flowrates
- Suitable for liquid and gas service
- Easy to install, commission and maintain

With all global marine approvals the FC330 is ideal for integration in ship fuel efficiency and environmental measurement systems as well as bunkering solutions.

FC330 is available with current output HART 7.5, Modbus RS 485 RTU, PROFIBUS DP or PROFIBUS PA as standard on Channel 1. Additional functions can be freely configured for analog, pulse, frequency, relay or status output or binary input.

The transmitter comes with a user-configurable graphical display and SensorFlash, a micro SD card for configuration backup, firmware update and data storage.

The SITRANS FC330 flowmeter system consists of a SITRANS FCS300 sensor and a SITRANS FCT030 transmitter.

Benefits

- It is compact and light, fitting neatly into dense piping arrangements
- Easy maintenance because modules can be exchanged rapidly
- Effective separation of measurement from plant vibration
- Highly secure operation in safety critical applications
- Non-volatile memory of all setup and operation data
- Reliable measurements due to high signal to noise ratio
- Secure, digital transfer of measurement data from the sensor
- Short overall length; easy drop-in replacement into most existing installations

Flow Measurement

SITRANS FC (Coriolis)

Sensors and Flowmeter systems / SITRANS FC330 flowmeter system

Selection and ordering data

	Article No. 7ME4633-	Order code
SITRANS FC330 digital Coriolis flowmeter with SITRANS FCS300 standard flow sensor compact or remote mounting with FCT030 transmitter	● ● ● ● - ● ● ● ● ● ● ● ●	
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Sensor size, connector size		
DN 15, DN 10 (½", 3/8")	3 F	
DN 15, DN 15 (½", ½")	3 G	
DN 15, DN 20 (½", ¾")	3 H	
DN 25, DN 20 (1", ¾")	3 K	
DN 25, DN 25 (1", 1")	3 L	
DN 25, DN 40 (1", 1½")	3 N	
DN 50, DN 40 (2", 1½")	4 B	
DN 50, DN 50 (2", 2")	4 C	
DN 50, DN 65 (2", 2½")	4 D	
DN 80, DN 65 (3", 2½")	4 J	
DN 80, DN 80 (3", 3")	4 K	
DN 80, DN 100 (3", 4")	4 L	
DN 100, DN 80 (4", 3")	5 M	
DN 100, DN 100 (4", 4")	5 N	
DN 100, DN 150 (4", 6")	5 Q	
DN 150, DN 100 (6", 4")	6 D	
DN 150, DN 150 (6", 6")	6 F	
DN 150, DN 200 (6", 8")	6 H	
Process connection		
EN 1092-1 B1, PN 16	A 0	
EN 1092-1 B1, PN 40	A 1	
EN 1092-1 B2, PN 63	A 2	
EN 1092-1 B2, PN 100	A 3	
EN 1092-1 D, PN 40	A 5	
ASME B16.5 RF, Class 150	D 1	
ASME B16.5 RF, Class 300	D 2	
ASME B16.5 RF, Class 600	D 3	
ASME B16.5 RF, Class 900 (p- and t-rating as Class 600)	D 4	
ASME B16.5 RF, Class 1500 (p- and t-rating as Class 600)	D 5	
ISO 228-1G female pipe thread	E 1	
ASME B1.20.1 NPT female pipe thread	E 3	
DIN 11851 hygienic screwed	F 1	
DIN 32676 hygienic clamp (ISO) Row A	G 2	
SMS 1145 hygienic screwed	K 1	
JIS B2220/10K	L 2	
JIS B2220/20K	L 4	
EN 1092-1, PN 16, NAMUR length	N 1	
EN 1092-1, PN 40, NAMUR length	N 2	
Wetted parts material		
AISI 316L/1.4435/1.4404	1	
AISI 316L/1.4435/1.4404 (polished)	2	
Nickel alloy C4	3	
Calibration/Accuracy class		
0.2 % flow, 10 kg/m ³ density	0	
0.1 % flow, 2 kg/m ³ density	1	
0.1 % Standard fraction (with density 2 kg/m ³)	8	
0.1 % Customer selected fraction	9	N O Y
Mounting style, transmitter housing and material		
None (replacement sensor)		A
Compact, IP67 fieldmount, aluminum		D
Remote, IP67 fieldmount, aluminum, M12		G
Remote, IP67 fieldmount, aluminum, T/Box		K
Remote, IP67, wall mount, aluminium (in preparation)		U
Ex approval (depending on variant)		
Non-Ex		A
ATEX (zone 1)		C

Selection and ordering data (continued)

	Article No. 7ME4633-	Order code
SITRANS FC330 digital Coriolis flowmeter with SITRANS FCS300 standard flow sensor compact or remote mounting with FCT030 transmitter	● ● ● ● - ● ● ● ● ● ● ● ●	
IECEEx (zone 1)		F
US (cCSAus), Div 1		L
Canada (cCSAus), zone 1		M
NEPSI		N
INMETRO (in preparation)		P
KCs		Q
EAC Ex		U
Local User Interface		
None (replacement sensor, DSL only)		0
Blind		1
Graphical, 240 × 160 pxl		3

	Order code
Further designs	
Please add "-Z" to Article No. and specify Order code(s).	
Cable glands	
None (replacement sensor)	A00
Metric, no glands	A01
Metric, nylon, limited to -20 °C/-4 °F	A02
Metric, brass/Ni plated	A05
Metric, stainless steel	A06
NPT, no glands	A11
NPT, nylon, limited to -20 °C/-4 °F	A12
NPT, brass/Ni plated	A15
NPT, stainless steel	A16
Metric thread with M12 socket fitted	A20
Software functions and CT approvals	
None (replacement sensor)	B10
Standard	B11
I/O configuration Ch1	
No output channel	E00
4 ... 20 mA HART Active/Passive (non-Ex)	E02
Ca 4 ... 20 mA HART active (Ex)	E06
Ca 4 ... 20 mA HART passive (Ex)	E07
PROFIBUS PA	E10
PROFIBUS DP (non-Ex)	E11
Modbus RTU RS 485	E14
I/O configuration Ch2 (O), Ch3 (I/O) and Ch4 (I/O)	
None	F00
• Non Ex: Sig O, None, None. Active/passive menu selected	F01
• Non Ex: Sig O, Sig I/O, None. Active/passive menu selected	F02
• Non Ex: Sig O, Sig I/O, Sig I/O. Active/passive menu selected	F03
• Non Ex: Sig O, Sig I/O, R. Active/passive menu selected	F04
• Non Ex: Sig O, R, R. Active/passive menu selected	F05
• Non Ex: Sig O, R, None. Active/passive menu selected	F06
• Ex: pSig O, None, None	F11
• Ex: pSig O, pSig I/O, None	F12
• Ex: pSig O, pSig I/O, pSig I/O	F13
• Ex: pSig O, pSig I/O, R	F14

Flow Measurement

SITRANS FC (Coriolis)

Sensors and Flowmeter systems / SITRANS FC330 flowmeter system

Selection and ordering data (continued)

	Order code
• Ex: pSig O, R, R	F15
• Ex: pSig O, R, None	F16
• Ex: aSig O, None, None	F21
• Ex: aSig O, aSig I/O, None	F22
• Ex: aSig O, aSig I/O, aSig I/O	F23
• Ex: aSig O, aSig I/O, R	F24
• Ex: aSig O, R, R	F25
• Ex: aSig O, R, None	F26
Add-on options and accessories	
Please add "-Z" to Article No. and specify Order code(s).	
Certificates	
Certificate EN 10204-2.2 confirmation of pressure containing material	C01
Certificate EN 10204-3.1 material (wetted parts)	C02
Certificate NACE MR0175-2009 + MR0103-2012	C04
Certificate EN 10204-2.1 Declaration of compliance with the order	C05
Insp. Certificate EN 10204-3.1 for visual, dimensional and functional test	C06
Certificate EN 10204-3.1 PMI Positive material ident. of pressure-cont./wetted parts (confirmation only)	C07
Certificate EN 10204-3.1 P-test Pressure-test acc. AD2000	C08
Test pack (pressure test, non-destructive welding test, welder & welding procedure certificate)	C09
Certificate EN10204-3.1welding X-ray / Dye-penetration test of weldings (pressure cont.)	C10
Certificate EN10204-2.1 Declaration of accuracy	C11
Certificate EN10204-3.1 PMI Positive material ident. of pressure-cont./wetted parts (including heat analysis)	C12
Customer selected calibration	
DN 15 ... 50: Multi-point (5 flows × 1 pass) Flow 10 ... 100 % of Q_{norm}	D60
DN 15 ... 50: Multi-point (10 flows × 1 pass) Flow 10 ... 100 % of Q_{norm}	D61
DN 80: Multi-point (5 flows × 1 pass) Flow 10 ... 100 % of Q_{norm}	D62
DN 80: Multi-point (10 flows × 1 pass) Flow 10 ... 100 % of Q_{norm}	D63
DN 100: Multi-point (5 flows × 1 pass) Flow 10 ... 100 % of Q_{norm}	D64
DN 100: Multi-point (10 flows × 1 pass) Flow 10 ... 100 % of Q_{norm}	D65
DN 150: Multi-point (5 flows × 1 pass) Flow 10 ... 100 % of Q_{norm}	D66
DN 150: Multi-point (8 flows × 1 pass) Flow 10 ... 100 % of Q_{norm}	D67
Cable	
None	L50
5 m (16.4 ft), sensor cable, 4 wire, with 2 pcs M12 plugs mounted	L51
5 m (16.4 ft), sensor cable, 4 wire, without plugs for terminal connection	L52
10 m (32.8 ft), sensor cable, 4 wire, with 2 pcs M12 plugs mounted	L55
10 m (32.8 ft), sensor cable, 4 wire, without plugs for terminal connection	L56

Selection and ordering data (continued)

	Order code
25 m (82 ft), sensor cable, 4 wire, with 2 pcs M12 plugs mounted	L59
25 m (82 ft), sensor cable, 4 wire, without plugs for terminal connection	L60
50 m (164 ft), sensor cable, 4 wire, with 2 pcs M12 plugs mounted	L63
50 m (164 ft), sensor cable, 4 wire, without plugs for terminal connection	L64
75 m (246 ft), sensor cable, 4 wire, with 2 pcs M12 plugs mounted	L67
75 m (246 ft), sensor cable, 4 wire, without plugs for terminal connection	L68
Sensor options	
FCS300 marine approval (in preparation)	S22
SD-Card accessibility via USB (not allowed in USA by Patent)	
Mass storage enabled	S30
Additional data Please add "-Z" to Article No. and specify Order code(s) and plain text.	
Tag name	
Tag name plate, stainless steel	Y17

Notes on I/O configurations:

a or p suffix: The I/O module is selected at ordering with either active or passive function.

Signal: The output can be selected for Current (0 or 4 to 20 mA), frequency or pulse function in the menu.

I: Discrete status input to the flowmeter. Functions are selected in the menu including 'Freeze output', 'Reset totalizer' (only CH3&4).

R: Relay output for discrete status reporting. Function is selected in the menu, including 'Error', 'High flow warning'.

The MLFB structure for FC330 systems must be filled to **this level**, including "-Z" options A., B., E. and F.

Operating instructions for SITRANS FC330

Description	Article No.
English	
• for firmware V 4.0 and onwards	A5E44030648
German	
• for firmware V 4.0 and onwards	TBD

All literature is available to download for free, in a range of languages, at www.siemens.com/processinstrumentation/documentation

Flow Measurement

SITRANS FC (Coriolis)

Sensors and Flowmeter systems / SITRANS FC330 flowmeter system

Technical specifications

SITRANS FC330	
Sizes	DN 15 (½") DN 25 (1") DN 50 (2") DN 80 (3") DN 100 (4") DN 150 (6")
Accuracy	± 0.10 % or 0.20 % for liquids additional ±0.40 for gases
Repeatability	± 0.05 %
Flow range (liquids) (water @ 1 bar pressure loss) (Q _{nom})	
• DN 15	4 500 kg/h (163.3 lb/min)
• DN 25	20 500 kg/h (753.2 lb/min)
• DN 50	49 000 kg/h (1 800 lb/min)
• DN 80	122 000 kg/h (4 483 lb/min)
• DN 100	273 000 kg (10 031 lb/min)
• DN 150	459 200 kg/h (16 873 lb/min)
Architecture	Compact or remote configuration
Display	Full graphical display, 240 × 160 pixels with selection of 6 languages
Power supply	20 ... 90 V DC ± 10 %; 100 ... 240 V AC ± 10 %, 47 ... 63 Hz ± 10 %
Material	
• Sensor	
- Wetted parts	316L stainless steel or nickel alloy C4 ¹⁾
- Enclosure	304 stainless steel
• Transmitter	Aluminum with corrosion-resistant coating class C4
Enclosure rating	IP67 ²⁾
Pressure ratings	
• Measuring tubes	
- 316L	100 bar (1 450 psi)
- Nickel alloy C4	100 bar (1 450 psi)
• Sensor enclosure	No pressure containment
Temperature ratings	
• Process medium	-50 ... +205 °C (-58 ... +400 °F)
• Ambient	-40 ... +60 °C (-40 ... +140 °F) ²⁾
• Display	-20 ... +60 °C (-4 ... +140 °F)
Process connections	
• Flanges	EN 1092-1 B1, EN 1092-1 B2, EN 1092-1 D, ANSI/ASME B16.5, JIS B 2220
• Pipe threads	ASME B1.20 (NPT) female pipe thread, ISO 228-1 G female pipe thread (BSPP)
• Hygienic threads	DIN 11851, SMS 1145
• Hygienic clamps	DIN 32676 (ISO) Row A
Approvals	
• Hazardous area (zone 1)	ATEX, IECEx, EAC Ex, CSA, cCSAus, NEPSI, EAC No dust approval
• Pressure equipment	PED, CRN
• Marine (in preparation for FC330 compact)	Germanischer Lloyd/det Norske Veritas, Bureau Veritas, Lloyds of London, American Bureau of Shipping, RINA (Italy)
NAMUR	NAMUR-compliant (e.g. NE 21, NE 41, NE 107 and NE 132)
I/O	Up to 4 channels combining analog, relay or digital outputs and binary input
Communication	<ul style="list-style-type: none"> • HART • PROFIBUS PA • PROFIBUS DP • Modbus RTU (RS 485)

Technical specifications (continued)

SITRANS FC330	
EMC performance	
Emission	EN 55011/CISPR-11 (Class A)
Immunity	EN/IEC 61326-1 (Industry)
Mechanical load	18 ... 400 Hz random The flowmeter will mechanically tolerate 3.17 g RMS in all directions. Flow accuracy cannot be guaranteed under all conditions.

- 1) Flange wetted parts and raised face surface in nickel alloy and non wetted parts in AISI 316L.
- 2) If operating outdoors, avoid direct sunlight, particularly in warm climatic regions.

Overview



The compact flowmeter SITRANS FC310 can be ordered for industrial, hygienic or NAMUR service.

Intended for integration into OEM skids, machines or pre-assembled plant systems, the flowmeter is based on the latest developments within digital signal processing technology - engineered for high measuring performance:

- Fast response to rapid changes in flow
- Fast dosing applications with control in host system
- High immunity against process noise
- High turndown ratio of flowrates
- Suitable for liquid and gas service
- Easy to install, commission and maintain

With all global marine approvals the FC310 is ideal for integration in ship fuel efficiency and environmental measurement systems as well as bunkering solutions.

The FCT010 transmitter delivers true multi-parameter measurements i.e. massflow, density, temperature.

FC310 is available with Modbus RTU (RS 485) multi-drop serial communication.

The flowmeter is supplied with SensorFlash, a micro SD card containing all relevant certificates. The SITRANS FC310 flowmeter system consists of a SITRANS FCS300 sensor and a SITRANS FCT010 transmitter always compact mounted.

Benefits

- It is compact and light, fitting neatly into dense piping arrangements
- Effective separation of measurement from plant vibration
- Reliable measurements due to high signal to noise ratio
- Short overall length; easy drop-in replacement into most existing installations
- Direct connection to host with high-speed Modbus simplifies machine or skid construction and set-up
- Modbus RS 485 RTU allows simple and easy integration with all Modbus masters with fast update rate of process values

Flow Measurement

SITRANS FC (Coriolis)

Sensors and Flowmeter systems / SITRANS FC310 flowmeter system

Selection and ordering data

	Article No.	Order code
SITRANS FC310 Digital coriolis flowmeter with SITRANS FCS300 standard flow sensor with hygienic and flange/pipe thread connections and compact mounting with FCT010 transmitter	7ME4631-	
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Sensor size, connector size		
DN 15, DN 10 (½", 3/8")	3 F	
DN 15, DN 15 (½", ½")	3 G	
DN 15, DN 20 (½", ¾")	3 H	
DN 25, DN 20 (1", ¾")	3 K	
DN 25, DN 25 (1", 1")	3 L	
DN 25, DN 40 (1", 1½")	3 N	
DN 50, DN 40 (2", 1½")	4 B	
DN 50, DN 50 (2", 2")	4 C	
DN 50, DN 65 (2", 2½")	4 D	
DN 80, DN 65 (3", 2½")	4 J	
DN 80, DN 80 (3", 3")	4 K	
DN 80, DN 100 (3", 4")	4 L	
DN 100, DN 80 (4", 3")	5 M	
DN 100, DN 100 (4", 4")	5 N	
DN 100, DN 150 (4", 6")	5 Q	
DN 150, DN 100 (6", 4")	6 D	
DN 150, DN 150 (6", 6")	6 F	
DN 150, DN 200 (6", 8")	6 H	
Process connection		
EN 1092-1 B1, PN 16	A 0	
EN 1092-1 B1, PN 40	A 1	
EN 1092-1 B2, PN 63	A 2	
EN 1092-1 B2, PN 100	A 3	
EN 1092-1 D, PN 40	A 5	
ASME B16.5 RF, class 150	D 1	
ASME B16.5 RF, class 300	D 2	
ASME B16.5 RF, class 600	D 3	
ASME B16.5 RF, class 900 (p- and t-rating as class 600)	D 4	
ANSI B16.5-2009, class 1500 (p- and t-rating as class 600)	D 5	
ISO 228-1G female pipe thread	E 1	
ASME B1.20.1 NPT female pipe thread	E 3	
DIN 11851 hygienic screwed	F 1	
DIN 32676 hygienic clamp Row A	G 1	
SMS 1145 hygienic screwed	K 1	
JIS B2220/10K	L 2	
JIS B2220/20K	L 4	
EN 1092-1, PN 16, NAMUR length	N 1	
EN 1092-1, PN 40, NAMUR length	N 2	
Wetted parts material		
AISI 316L/1.4435/1.4404	1	
AISI 316L/1.4435/1.4404 (polished)	2	
Nickel alloy C4	3	
Calibration/Accuracy class		
0.2 % flow, 10 kg/m³ density		0
0.1 % flow, 2 kg/m³ density		1
Mounting style, transmitter housing and material		
Compact, IP67, aluminum		D
Ex approval		
Non-Ex		A
ATEX II 2G zone 1		C
IECEX Gb (zone 1)		F
US (cCSAus), Div 1		L
Canada (cCSAus), class I, zone 1		M
NEPSI		N
INMETRO (in preparation)		P
KCs		Q

Flow Measurement

SITRANS FC (Coriolis)

Sensors and Flowmeter systems / SITRANS FC310 flowmeter system

Selection and ordering data (continued)

	Order code
DN 80, multi-point, 5 flows × 1 pass Flow 10 ... 100 % of Q_{norm}	D62
DN 80, multi-point, 10 flows × 1 pass Flow 10 ... 100 % of Q_{norm}	D63
DN 100, multi-point, 5 flows × 1 pass Flow 10 ... 100 % of Q_{norm}	D64
DN 100, multi-point, 10 flows × 1 pass Flow 10 ... 100 % of Q_{norm}	D65
DN 150, multi-point, 5 flows × 1 pass Flow 10 ... 100 % of Q_{norm}	D66
DN 150, multi-point, 8 flows × 1 pass Flow 10 ... 100 % of Q_{norm}	D67
Cable	
None	L50
5 m (16.4 ft), sensor cable, 4 wire, with 2 pcs M12 plugs mounted	L51
5 m (16.4 ft), sensor cable, 4 wire, without plugs for terminal connection	L52
5 m (16.4 ft), sensor cable, 4 wire, with 1 pc M12 plug mounted	L53
10 m (32.8 ft) sensor cable, 4 wire, with 2 pcs M12 plugs mounted	L55
10 m (32.8 ft), sensor cable, 4 wire, without plugs for terminal connection	L56
10 m (32.8 ft), sensor cable, 4 wire, with 1 pc M12 plug mounted	L57
25 m (82 ft), sensor cable, 4 wire, with 2 pcs M12 plugs mounted	L59
25 m (82 ft), sensor cable, 4 wire, without plugs for terminal connection	L60
25 m (82 ft), sensor cable, 4 wire, with 1 pc M12 plug mounted	L61
50 m (164 ft), sensor cable, 4 wire, with 2 pcs M12 plugs mounted	L63
50 m (164 ft), sensor cable, 4 wire, without plugs for terminal connection	L64
50 m (164 ft), sensor cable, 4 wire, with 1 pc M12 plug mounted	L65
75 m (246 ft), sensor cable, 4 wire, with 2 pcs M12 plugs mounted	L67
75 m (246 ft), sensor cable, 4 wire, without plugs for terminal connection	L68
75 m (246 ft), sensor cable, 4 wire, with 1 pc M12 plug mounted	L69
Sensor options	
FCS300 marine approval	S22
Additional data Please add "-Z" to Article No. and specify Order code(s) and plain text.	
Tag name	
Tag name plate, stainless steel	Y17


Operating instructions for SITRANS FC310

Description	Article No.
English	
• for firmware V 4.0 and onwards	A5E44036384
German	
• for firmware V 4.0 and onwards	TBD

All literature is available to download for free, in a range of languages, at www.siemens.com/processinstrumentation/documentation

Selection and ordering data (continued)

Accessories

Description	Article No.	
SITRANS I300 – Isolating power supply – Ex barrier	A5E39832532	 A photograph of the SITRANS I300 Isolating power supply – Ex barrier. It is a blue, rectangular industrial device with a front panel featuring a small display screen and several indicator lights. The top of the device has a terminal block with various connection points. The text 'SITRANS I300 Isolating power supply' is visible on the front panel.

Flow Measurement

SITRANS FC (Coriolis)

Sensors and Flowmeter systems / SITRANS FC310 flowmeter system

Technical specifications

SITRANS FC310	
Sizes	DN 15 (½") DN 25 (1") DN 50 (2") DN 80 (3") DN 100 (4") DN 150 (6")
Accuracy	± 0.10 % or ± 0.20 % Additional ± 0.40 % for gases
Repeatability	± 0.05 %
Flow range (water @ 1 bar pressure loss)	
• DN 15	4 500 kg/h (163.3 lb/min)
• DN 25	20 500 kg/h (753.2 lb/min)
• DN 50	49 000 kg/h (1 800 lb/min)
• DN 80	122 000 kg/h (4 483 lb/min)
• DN 100	273 000 kg/h (10 031 lb/min)
• DN 150	459 200 kg/h (16 873 lb/min)
Power supply	12-27 V DC; 1.1 W
Weight	4.6 ... 207 kg
Material	
• Sensor	
- Measuring tubes	316L stainless steel or nickel alloy C4
- Enclosure	304 stainless steel
• Transmitter	Aluminum with corrosion-resistant coating class C4
Enclosure rating	IP67
Pressure ratings	
• Measuring tubes	
- 316L	100 bar (1 450 psi)
- Nickel alloy C4	100 bar (1 450 psi)
• Sensor enclosure	No pressure containment
Temperature ratings	
• Process medium	-50 ... +205 °C (-58 ... +400 °F)
• Ambient	-40 ... +60 °C (-40 ... +140 °F)
Process connections	
• Flanges	EN 1092-1 B1, EN 1092-1 B2, EN 1092-1 D, ANSI/ASME B16.5, JIS B 2220
• Pipe threads	ASME B1.20 (NPT) female pipe thread, ISO 228-1 G female pipe thread (BSPP)
• Hygienic threads	DIN 11851, SMS 1145
• Hygienic clamps	DIN 32676 Hygenic Clamp Row A
Approvals	
• Hazardous area (zone 1)	ATEX, IECEx, EAC Ex, cCSAus, NEPSI, EAC Ex No dust approval
• Pressure equipment	PED, CRN (in preparation)
• Marine	Germanischer Lloyd/det Norske Veritas, Bureau Veritas, Lloyds of London, American Bureau of Shipping, RINA (Italy)
NAMUR	NAMUR-compliant (e.g. NE 21, NE 41 and NE 132)
Communication	Modbus RS 485 RTU
EMC performance	
Emission	EN 55011/CISPR-11 (Class B)
Immunity	EN/IEC 61326-1 (Industry)
Mechanical load	18 ... 400 Hz random The flowmeter will mechanically tolerate 3.17 g RMS in all directions. Flow accuracy cannot be guaranteed under all conditions.

Overview



Full integration in the Siemens SIMATIC systems PCS 7 or in TIA portal with FCT070 faceplates with the ET 200SP ST & HF powerful IO system for compact control cabinets. The complete flowmeter system consists of a SITRANS FCS300 sensor and a SIMATIC ET200SP Coriolis module FCT070 transmitter.

The transmitter FCT070 offers real-time data processing and the display of all measuring and status data of the Coriolis flowmeter.

For hazardous area the FCS300 sensor can be placed in Ex Zone 1 or Class 1 Div 1 locations. Together with the SITRANS I300 power/barrier module the FCT070 transmitter can be placed in Zone 2 or Div 2 areas.

Benefits

- FCS300 sensor in sizes from DN 15 to 150 mm in a large variety of process connections and wetted materials
- Short overall length; easy drop-in replacement into most existing installations
- Full hazardous area solutions
- Easy integration into automation process control as TIA portal and PCS7
- Easy selection and integration of flowmeters via TIA selector
- Cost effective integration of Coriolis flowmeters for PLC controlled machines
- SITRANS FCT070 ET 200SP technology module and can be combined with all other SIMATIC ET200 ST & HF modules
- The FCT070 has all high-end transmitter functionality integrated including the advanced fraction tables on board
- Fast and trouble-free communication between the flowmeter and the PLC through digital data communication with up to 10 ms update rate
- Integrated advanced two-stage batch controller functionality without additional modules. I/Os are onboard

Flow Measurement

SITRANS FC (Coriolis)

Sensors and Flowmeter systems / SITRANS FCS300 with FCT070 transmitter

Selection and ordering data

	Article No. 7ME4637-
Coriolis sensor SITRANS FCS300 with DSL ready for FCT070 transmitter	● ● ● ● - ● ● ● ●
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	
Sensor size, connector size	
DN 15, DN 10 (½", 3/8")	3 F
DN 15, DN 15 (½", ½")	3 G
DN 15, DN 20 (½", ¾")	3 H
DN 25, DN 20 (1", ¾")	3 K
DN 25, DN 25 (1", 1")	3 L
DN 25, DN 40 (1", 1½")	3 N
DN 50, DN 40 (2", 1½")	4 B
DN 50, DN 50 (2", 2")	4 C
DN 50, DN 65 (2", 2½")	4 D
DN 80, DN 65 (3", 2½")	4 J
DN 80, DN 80 (3", 3")	4 K
DN 80, DN 100 (3", 4")	4 L
DN 100, DN 80 (4", 3")	5 M
DN 100, DN 100 (4", 4")	5 N
DN 100, DN 150 (4", 6")	5 Q
DN 150, DN 100 (6", 4")	6 D
DN 150, DN 150 (6", 6")	6 F
DN 150, DN 200 (6", 8")	6 H
Process connection	
EN 1092-1 B1, PN 16	A 0
EN 1092-1 B1, PN 40	A 1
EN 1092-1 B2, PN 63	A 2
EN 1092-1 B2, PN 100	A 3
EN 1092-1 D, PN 40	A 5
ASME B16.5 RF, Class 150	D 1
ASME B16.5 RF, Class 300	D 2
ASME B16.5 RF, Class 600	D 3
ASME B16.5 RF, Class 900 (p- and t-rating as Class 600)	D 4
ANSI B16.5-2009, Class 1500 (p- and t-rating as Class 600)	D 5
ISO 228-1G female pipe thread	E 1
ASME B1.20.1 NPT female pipe thread	E 3
DIN 11851 hygienic screwed	F 1
DIN 32676 hygienic clamp Row A	G 1
SMS 1145 hygienic screwed	K 1
JIS B2220/10K	L 2
JIS B2220/20K	L 4
EN 1092-1, PN 16, NAMUR length	N 1
EN 1092-1, PN 40, NAMUR length	N 2
Wetted parts material	
AISI 316L/1.4435/1.4404	1
AISI 316L/1.4435/1.4404 (polished)	2
Nickel alloy C4	3
Calibration/Accuracy class	
0.2 % flow, 10 kg/m³ density	0
0.1 % flow, 2 kg/m³ density	1
Mounting style, transmitter housing and material	
Compac, IP67, aluminum	D
Ex approval (sensor)	
Non-Ex	A
ATEX II 2G zone 1	C
IECEx Gb (zone 1)	F
US (cCSAus), Div 1	L
Canada (cCSAus), class I, zone 1	M
NEPSI	N
INMETRO	P
KCs	Q


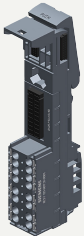
Flow Measurement

SITRANS FC (Coriolis)


Sensors and Flowmeter systems / SITRANS FCS300 with FCT070 transmitter

Selection and ordering data (continued)

	Order code
DN 80, multi-point, 5 flows × 1 pass Flow 10 ... 100% of Q_{norm}	D62
DN 80, multi-point, 10 flows × 1 pass Flow 10 ... 100% of Q_{norm}	D63
DN 100, multi-point, 5 flows × 1 pass Flow 10 ... 100% of Q_{norm}	D64
DN 100, multi-point, 10 flows × 1 pass Flow 10 ... 100% of Q_{norm}	D65
DN 150, multi-point, 5 flows × 1 pass Flow 10 ... 100% of Q_{norm}	D66
DN 150, multi-point, 8 flows × 1 pass Flow 10 ... 100% of Q_{norm}	D67
Cable	
No sensor cable	L50
5 m (16.4 ft), sensor cable, 4 wire, without plugs for terminal connection	L52
5 m (16.4 ft), sensor cable, 4 wire, with 1 pcs M12 plugs mounted	L53
10 m (32.8 ft), standard, without plugs	L56
10 m (32.8 ft), sensor cable, 4 wire, with 1 pcs M12 plugs mounted	L57
25 m (82 ft), standard, without plugs	L60
25 m (82 ft), sensor cable, 4 wire, with 1 pcs M12 plugs mounted	L61
50 m (164 ft), standard, without plugs	L64
50 m (164 ft), sensor cable, 4 wire, with 1 pcs M12 plugs mounted	L65
75 m (246 ft), standard, without plugs	L68
75 m (246 ft), sensor cable, 4 wire, with 1 pcs M12 plugs mounted	L69
Additional data	
Please add "-Z" to Article No. and specify Order code(s) and plain text.	
Tag name	
Tag name plate, stainless steel	Y17

Description	Article No.	
SITRANS FCT070 – Transmitter for ET 200SP	7ME4138-6AA00-0BB1	
BU20-P12+A0+4B, PU1 – BaseUnit plate for ET 200SP	6ES7193-6BP20-0BB0 6ES7193-6BP20-0BB1	

Selection and ordering data (continued)

Description	Article No.	
SITRANS I300 – Isolating power supply – Ex barrier	A5E39832532	 A photograph of the SITRANS I300 Isolating power supply – Ex barrier. It is a blue, rectangular industrial device with a textured surface. The front panel features a small display screen and several indicator lights. The top and bottom edges have rows of terminals for wiring. The text 'SITRANS I300 Isolating power supply' is printed on the front panel.

Flow Measurement

SITRANS FC (Coriolis)

Sensors and Flowmeter systems / SITRANS FCS300 with FCT070 transmitter

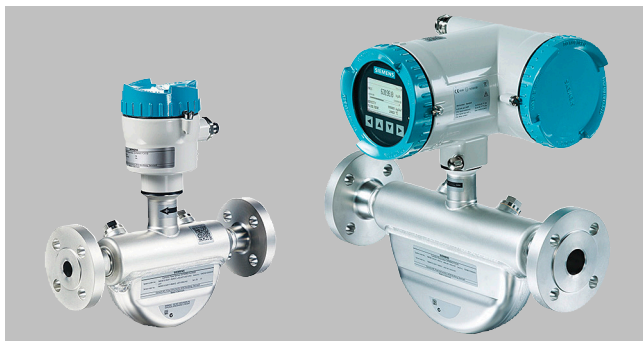
Technical specifications

SITRANS FCS300	
Sizes	DN 15 (½") DN 25 (1") DN 50 (2") DN 80 (3") DN 100 (4") DN 150 (6")
Accuracy	± 0.10 % or 0.20 % for liquids additional ± 0.40 for gases
Repeatability	± 0.05 %
Flow range (liquids) (water @ 1 bar pressure loss) (Q _{nom})	
• DN 15	4 500 kg/h (163.3 lb/min)
• DN 25	20 500 kg/h (753.2 lb/min)
• DN 50	49 000 kg/h (1 800 lb/min)
• DN 80	122 000 kg/h (4 483 lb/min)
• DN 100	273 000 kg/h (10 031 lb/min)
• DN 150	459 200 kg/h (16 873 lb/min)
Measurement of	Mass flow, volume flow, density, temperature, fraction A flow, fraction A %, fraction B flow, fraction B %
Architecture	Remote configuration
System integration	PCS7 and TIA portal with faceplates
Power supply	24 V DC, 19.2 ... 28.8 V
Material	
• Sensor	
• Wetted parts	316L stainless steel or nickel alloy C4
• Enclosure	304 stainless steel
• Transmitter	Aluminum with corrosion-resistant coating class C4
Enclosure rating	Sensor: IP67 FCT070 Transmitter: IP20
Pressure ratings	
• Measuring tubes	
• 316L	100 bar (1 450 psi)
• Nickel alloy C4	100 bar (1 450 psi)
• Sensor enclosure	No pressure containment
Temperature ratings	
• Process medium	-50 ... +205 °C (-58 ... +400 °F)
• Ambient	-40 ... +60 °C (-40 ... +140 °F)
• Display	-20 ... +60 °C (-4 ... +140 °F)
Process connections	
• Flanges	EN 1092-1 B1, EN 1092-1 B2, EN 1092-1 D, ANSI/ASME B16.5, JIS B 2220
• Pipe threads	ASME B1.20 (NPT) female pipe thread, ISO 228-1 G female pipe thread (BSPP)
• Hygienic threads	DIN 11851, SMS 1145
• Hygienic clamps	DIN 32676 hygienic clamp Row A
Approvals	
• Hazardous area	Sensor FCS300: Zone 1 & Class 1 Div 1 ATEX, IECEx, EAC Ex, CSA, cCSAus, NEPSI, EAC No dust approval FCT070 transmitter: Zone 2 & Class 1 Div 2 ATEX, IECEx, EAC Ex, CSA, cCSAus, FM, NEPSI, EAC Ex
• Pressure equipment	PED, CRN
NAMUR	NAMUR-compliant (e.g. NE 21, NE 41, NE 107 and NE 132)
I/O	2 digital Input and 2 digital output Single and 2 stage batch function
Totalizer	3 totalizer
Communication	Integrated PROFINET for SIMATIC integration and other PROFINET Controllers

Technical specifications (continued)

SITRANS FCS300	
EMC performance	
Emission	EN 55011/CISPR-11 (Class A)
Immunity	EN/IEC 61326-1 (Industry)
Mechanical load	18 ... 1000 Hz random The flowmeter will mechanically tolerate 3.17 g RMS in all directions. Flow accuracy cannot be guaranteed under all conditions.

Overview



The SITRANS FCS400 sensor is available in DN 15, DN 25 and DN 50 mm sizes in stainless steel AISI 316 L. The sensor design consists of process connections, inlet and outlet manifolds mounted in a stiff frame and two parallel tubes equally sharing the process medium flow.

The sensing tubes are curved in the CompactCurve shape which gives high sensitivity and low pressure loss. The CompactCurve shape was selected to ensure that the smallest flows are measured with optimal signal to noise ratio.

The super compact sensor design with a split flow dual tube design with very high driver frequency is suitable for high end applications in all industry segments e.g. Chemical, F&B, O&G and Power.

A variety of process connections available to cover all common process connections and pressure ratings.

The sensor has a solid stainless steel fully welded enclosure to protect the measuring tubes from any harsh environments. For hazardous area applications the FCS400 comes in a number of common hazardous area approved like ATEX, IECEx, cCSAus, EAC Ex, KCs and NEPSI.

For sanitary applications the sensor is available with polished inside wetted parts and carry the EHEDG and 3A sanitary certifications (in preparation).

For the chemical industry the FCS400 sensors are available with standardized NAMUR inbuilding length (in preparation).

Integration

The SITRANS FCS400 Massflow sensor is suitable for both indoor and outdoor installation and meets the requirements of Protection Class IP67/NEMA 4X. Optionally the sensor can be ordered with hazardous certification to Zone 1 + 21 (ATEX, IECEx, cCSAus, EAC Ex, NEPSI) or Class I + II + III Div. 1 (cCSAus).

The flowmeter is bidirectional and can be installed in any orientation. The sensor is self-draining in many positions, with vertical mounting preferred.

It is important to ensure that the sensor tubes are always completely filled with homogeneous fluid; otherwise measuring errors may occur. Suitable fluids are clean liquids, pastes, light slurries or gases. Condensing vapours, aerated liquids or slush are not recommended.

The materials in contact with the process medium must be evaluated for corrosion and erosion resistances for long sensor life.

The pressure drop through the sensor is a function of the properties of the fluid and the flow rate. A pressure loss and accuracy calculator can be found on the Siemens Internet site

www.siemens.com/fc430/sizer

The preferred flow direction is indicated by an arrow on the sensor. Flow in the direction of the arrow will be measured as positive. The flow direction can be adjusted at the transmitter to compensate for reverse installation.

Installation orientation

The optimal installation orientation is vertical with the flow upwards. This ensures that suspended solids or bubbles are completely pushed through the sensor. A drain valve below the sensor will allow the pipe and sensor to drain completely.

Supports

In order to support the weight of the flowmeter and to ensure reliable measurements when external effects exist (e.g. plant vibrations), the sensor should be installed in rigidly supported pipelines.

Supports or hangers should be installed symmetrically and stress-free in close proximity to both of the process connections.

Shut-off devices

To conduct a system zero adjustment, secure shut-off devices are required in the pipeline.

Where possible, shut-off devices should be installed both upstream and downstream of the flowmeter.

Flow Measurement

SITRANS FC (Coriolis)

Sensors and Flowmeter systems / SITRANS FCS400 flow sensor

Configuration

Installation guidelines

- The mass flowmeter does not require any flow conditioning or straight inlet pipe sections. Care should be exercised however to ensure that any upstream valves, gates, sight glasses etc. do not cavitate and are not set into vibration by the flow.
- It is always preferred to place the flowmeter upstream of any control valve or other pipeline component which may cause flashing, cavitation or vibrations.
- The presence of gas bubbles in the fluid may result in erroneous measurements, particularly in the density measurement. Therefore the flowmeter should not be installed at the lowest pressure point in the liquid piping system or where vapour can collect. Install the meter in pipeline sections with high pressure to maintain system pressure and compress any bubbles.
- Drop lines downstream from the flow sensor should be avoided to prevent the meter tube from draining during flowing conditions. A back-pressure device or orifice is recommended to ensure that flow does not separate within the flow sensor but the metering section remains at positive pressure at all times while there is flow.
- The flowmeter should not come into contact with any other objects. Avoid making attachments to the housing except for the pressure guard components (if required).
- When the connecting pipeline is larger than the sensor size, suitable standard reducers may be installed. A selection of oversize and undersize connections can be ordered - refer to the sizes tables below.
- The flow sensor may be supported at the junction between process connection and the manifold, but should not be used to support adjacent piping. Ensure that the piping is also supported on both sides so that connection stresses are neutral.
- If strong vibrations exist in the pipeline, they should be damped using elastic pipeline elements. The damping devices must be installed outside the supported flowmeter section. Direct connection of flexible elements to the sensor should be avoided.
- Make sure that any dissolved gases, which are present in many liquids, do not outgas. The back pressure at the outlet should be at least 0.2 bar (3 psi) above the vapour pressure of the process fluid.
- Assure that operation below the vapour pressure cannot occur particularly for fluids with low latent heat of vaporisation.
- The sensor should not be installed in the vicinity of strong electromagnetic fields, e.g. near motors, pumps, variable frequency drives, transformers etc.
- When operating meters on a common mounting base the sensors should be mounted and spaced separate from each other to avoid cross-talk and other vibration interferences.
- When operating meters in interconnected pipelines the pipes should be decoupled to prevent cross talk.

Remote system cabling

The system is designed so that standard instrumentation cable with four cores and overall screen or two screened pairs can be used, or cable sets can be ordered with the flowmeter. The cable can be ordered in various set lengths and terminated in the field.

Be aware of maximum sensor length cable depending on product selection, currently 75 m. Data transmission speed and process variable update rates may be affected by the cable characteristics. For best results, choose a cable with the following electrical characteristics:

Configuration (continued)

Property	Unit	Value
Resistance	[Ω/km]	59
Characteristic impedance	[Ω]	100 @ 1 MHz
Insulation resistance	[MΩ/km]	200
Maximum voltage	[V]	300

The flowmeter system applies maximum 15 V DC in operation and is certified intrinsically safe. The complete system is insulation tested to 1 500 V in production.

Cabling solutions which can be ordered with the flowmeter are as follows:

1. High performance plugged cable using M12 connectors into prepared sockets
2. Cable glands for either metric or NPT threaded terminal housings.
3. Plain cable in set lengths to be passed through flexible and rigid conduit (not supplied) for metric or NPT threaded terminal housings

Cable for items 1, 2 and 3 are available either gray for standard applications or light blue for Ex applications to identify the circuit as intrinsically safe.

Insulation and heating

For applications where pipeline insulation is required for personnel protection or process temperature maintenance, the SITRANS FCS400 flow sensor may also be insulated. The form and material of insulation is not prescribed and entirely depends on the practices at the application location or plant.

Insulation must not be crowded around the sensor pedestal but shaped at a 45° cone to allow the pedestal to radiate excess heat and maintain a suitable working temperature within the front-end housing.

Where trace heating is employed, an electric heating jacket can be ordered as an accessory. It is shaped to the sensor body and controlled from a weatherproof setpoint device.

The jacket can heat the sensor enclosure up to 200 °C (392 °F). However the maximum temperature increase is limited to 70 °C. Further insulation is also recommended for personnel protection or low loss temperature maintenance.

Technical specifications

Flow sensor FCS400		
Parameter	Unit	Value
Process media		<ul style="list-style-type: none"> Fluid Group 1 (suitable for dangerous fluids) Aggregate state: Paste/light slurry, liquid and gas
Process pressure range	[barg (psi)]	316L: 0 ... 100 (0 ... 1 450)
Process temperature range		
• DN 15 ... DN 50	[°C (°F)]	-50 ... +200 (-58 ... +392)
Ambient temperature range	[°C (°F)]	-40 ... +60 (-40 ... +140)
Transport temperature range	[°C (°F)]	-40 ... +70 (-40 ... +158)
Density range	[kg/m ³ (lb/ft ³)]	1 ... 5 000 (0.062 ... 312.2)
No. of process values		
• Primary process values		<ul style="list-style-type: none"> Mass flow Density Process medium temperature
• Derived process values		<ul style="list-style-type: none"> Volume flow Standard volume flow (with reference density) Fraction A:B Fraction % A:B

Performance specifications		Sensor		
Parameter	Unit	DN 15	DN 25	DN 50
Max. zero point error	[kg/h (lb/min)]	0.2 (0.007)	2 (0.073)	7.5 (0.276)
Q _{min} (1 % error) ¹⁾	[kg/h (lb/min)]	20 (0.735)	200 (7.349)	750 (27.558)
Q _{nom} (1 bar pressure) ¹⁾	[kg/h (lb/min)]	3 700 (135.95)	11 500 (422.55)	50 000 (1 837.19)
Q _{max} ¹⁾	[kg/h (lb/min)]	6 400 (235.16)	17 700 (650.36)	70 700 (2 597.78)
Linearity error mass flow				
• for liquids ²⁾	[%]	± 0.1	± 0.1	± 0.1
• for gases	[%]	± 0.35	± 0.35	± 0.35
Repeatability mass flow	[%]	± 0.05	± 0.05	± 0.05
Density accuracy standard calibration ³⁾	[kg/m ³ (lb/ft ³)]	± 5 (± 0.31)	± 5 (± 0.31)	± 5 (± 0.31)
Density accuracy extended calibration ³⁾	[kg/m ³ (lb/ft ³)]	± 0.5 (± 0.031)	± 0.5 (± 0.031)	± 0.5 (± 0.031)
Temperature error	[°C (°F)]	± 0.5 (± 0.9)	± 0.5 (± 0.9)	± 0.5 (± 0.9)

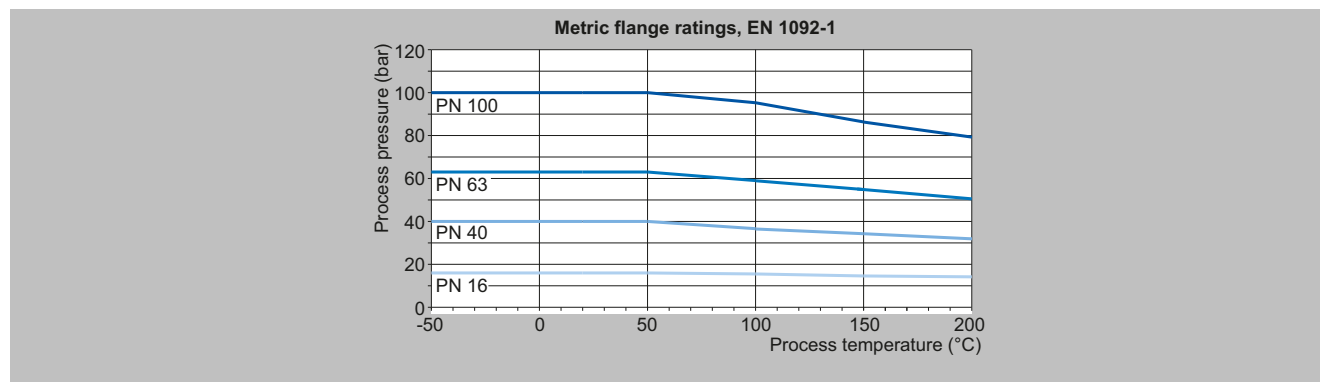
¹⁾ For gas applications the max. flowrate is calculated at Mach-Number = 0.3.

²⁾ Increased error can be expected for gas mass flow measurement.

³⁾ Liquid only.

Pressure/temperature curves

With two major exceptions, the pressure rating of the flow sensors is independent of the process medium temperature. Design rules for flange connections in both the EN 1092-1 and ASME B16.5 standards dictate pressure derating with increasing temperature. The charts below show the effect of process medium temperature on the pressure ratings for the flanges within the FCS400.



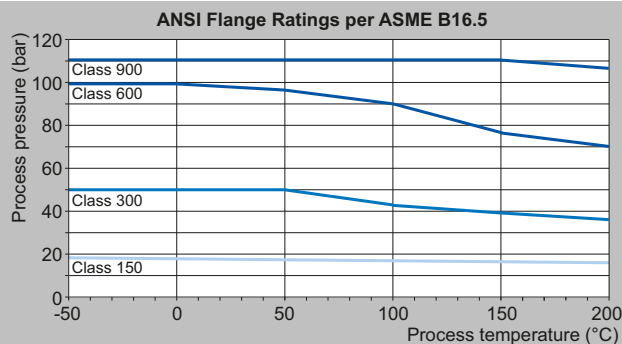
EN 1092-1 flanged sensors

Flow Measurement

SITRANS FC (Coriolis)

Sensors and Flowmeter systems / SITRANS FCS400 flow sensor

Technical specifications (continued)



ASME B16.5 flanged sensors

Sensor variants

SITRANS FCS400 sensors are available in a wide range of process connections. The available combinations of type, sensor size and connection size are shown in the tables below.

Standard sensors

Standard: 7ME461.-..

Sensor	Connection	EN 1092-1 B1, PN 40	EN 1092-1 B1, PN 63	EN 1092-1 B1, PN 100	EN 1092-1 B1, PN 160 ²⁾	EN 1092-1 D Nut, PN 40	EN 1092-1 D Nut, PN 63	EN 1092-1 D Nut, PN 100	EN 1092-1 D Nut, PN 160 ²⁾	ANSI B16.- 5-2009, class 150
DN 15 (½")	DN 6 (¼")									
	DN 10 (3/8")									
	DN 15 (½")	•		•	•	•	•	•	•	•
	DN 20 (¾")	•								•
	DN 25 (1")	•		•						
DN 25 (1")	DN 15 (½")									
	DN 25 (1")	•	•	•	•	•	•	•	•	•
	DN 32 (1¼")	•								
	DN 40 (1½")	•		•						•
DN 50 (2")	DN 25 (1")									
	DN 40 (1½")	•	•	•	•	•	•	•	•	•
	DN 50 (2")	•	•	•	•	•	•	•	•	•

Standard: 7ME461.-..

Sensor	Connection	ANSI B16.- 5-2009, class 300	ANSI B16.- 5-2009, class 600	ANSI B16.- 5-2009, class 900 ¹⁾	ISO 228-1 G pipe thread	ASME B1.2- 0.1 NPT pipe thread	DIN 11851 hygienic thread	DIN 32676 hygienic tri-clamp	DIN 11864- 1A aseptic screwed	DIN 11864- 2A aseptic flanged
DN 15 (½")	DN 6 (¼")				•	•				
	DN 10 (3/8")						•			
	DN 15 (½")	•	•	•	•	•	•	•	•	•
	DN 20 (¾")	•	•					•		
	DN 25 (1")						•			
DN 25 (1")	DN 15 (½")									
	DN 25 (1")	•	•	•	•	•	•	•	•	•
	DN 32 (1¼")						•			
	DN 40 (1½")	•	•					•		
DN 50 (2")	DN 25 (1")									
	DN 40 (1½")			•	•	•	•	•	•	•
	DN 50 (2")	•	•	•	•	•	•	•	•	•

Technical specifications (continued)

Standard: 7ME461-...										
Sensor	Connection	DIN 11864-3A aseptic clamp	ISO 2852 hygienic clamped	ISO 2853 hygienic screwed	SMS 1145 hygienic screwed	12-VCO-4 quick connect	JIS B2220:200-4/10K	JIS B2220:200-4/20K	JIS B2220:200-4/40K	JIS B2220:200-4/63K
DN 15 (½")	DN 6 (¼")									
	DN 10 (3/8")									
	DN 15 (½")	•				•	•	•	•	•
	DN 20 (¾")									
	DN 25 (1")		•	•	•					
DN 25 (1")	DN 15 (½")									
	DN 25 (1")	•	•	•	•		•	•	•	•
	DN 32 (1¼")									
	DN 40 (1½")		•	•						
DN 50 (2")	DN 25 (1")									
	DN 40 (1½")	•	•	•	•		•	•	•	•
	DN 50 (2")	•	•	•	•		•	•	•	•

1) Apply class 600 p and t ratings for class 900 and class 1500 flanges.

2) P and T rating as PN 100.

Hygienic sensor variants (in preparation)

The hygienic sensors all have polished internal wetted material and a maximum internal surface roughness $R_a < 0.8 \mu\text{m}$ and are EHEDG and 3A approved.

Aseptic flanged process connections

The aseptic flanges offered for FCS400 conform with the standard DIN 11864-2A BF-A. The flange fitted to the sensor is therefore the back flange and the seal is an O-ring.

The flange dimensions in the FCS400 program are as follows:

Size DN	Pipe	Bore d_1	Ring OD d_{11}	Bolt circle d_5	Bolt holes	Flange diameter d_{10}
10	13 × 1.5	10	22.4	37	4 × Ø9	54
15	19 × 1.5	16	28.4	42	4 × Ø9	59
20	23 × 1.5	20	32.4	47	4 × Ø9	64
25	29 × 1.5	26	38.4	53	4 × Ø9	70
32	35 × 1.5	32	47.7	59	4 × Ø9	76
40	41 × 1.5	38	53.7	65	4 × Ø9	82
50	53 × 1.5	50	65.7	77	4 × Ø9	94
65	70 × 2.0	66	81.7	95	8 × Ø9	107
80	85 × 2.0	81	97.7	112	8 × Ø11	113

DIN 11864-2A BF-A flange dimensions

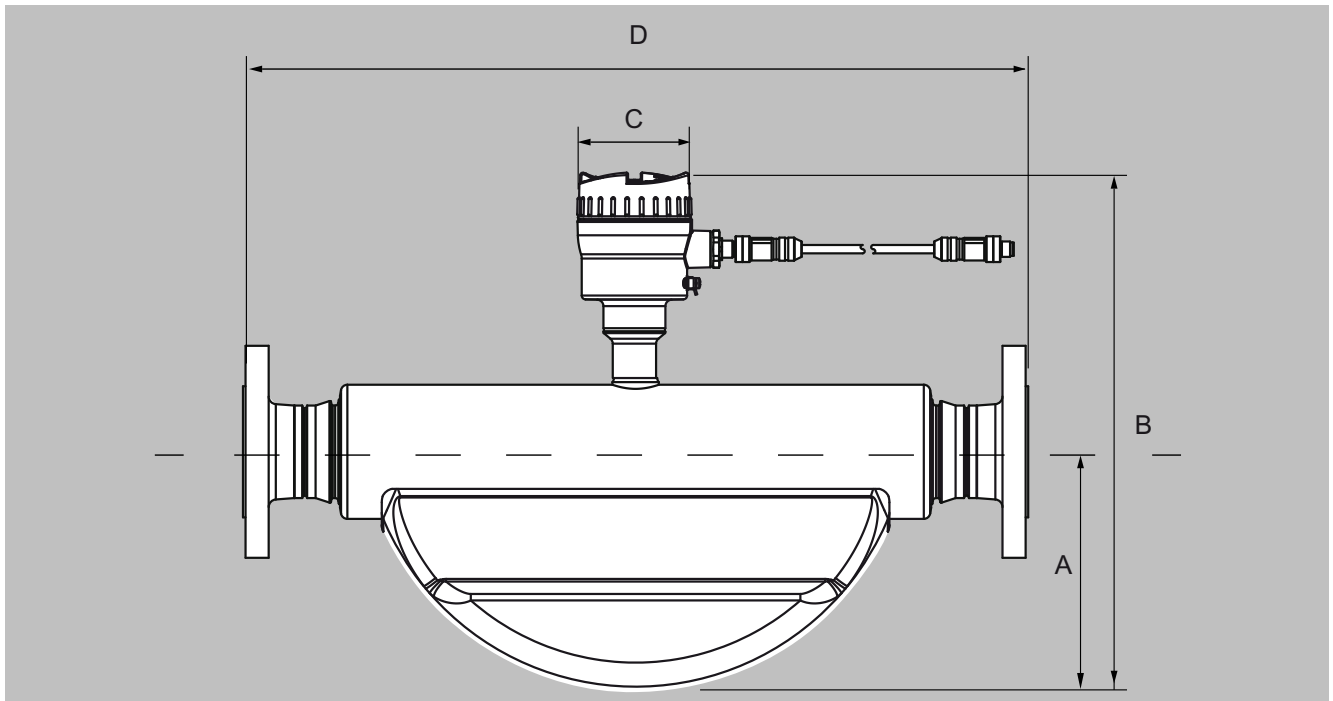
Flow Measurement

SITRANS FC (Coriolis)

Sensors and Flowmeter systems / SITRANS FCS400 flow sensor

Dimensional drawings

Sensor dimensions



Sensor DN	A		B		B1		Weight ¹⁾	
	[mm]	[inch]	[mm]	[inch]	[mm]	[inch]	[kg]	[lb]
15 (½")	90	3.54	280	11.0	314	12.4	4.6	10.1
25 (1")	123	4.84	315	12.4	349	13.8	7.9	17.4
50 (2")	187	7.36	390	15.4	424	16.8	25.7	56.7

1) For FCT030 compact add 4 kg (8.8 lb)

SITRANS FCS400, dimensions in mm (inch), weights in kg (lb), for a EN 1092 PN 40 flanged version. The built-in length D depends on the flange.

Overall length

The overall length (**built-in length D**) of each sensor depends on the connection standard and the pressure rating. The tables below summarize the dimensions available at the time of publishing. Please contact Siemens for further information about our desired process connection specification.

Dimensional drawings (continued)

Standard: 7ME461-...
...

Sensor Connection	DN 15 (½")		DN 15 (½")	DN 20 (¾")	DN 25 (1")	DN 25 (1")		DN 40 (1½")	DN 50 (2")	
	DN 6 (¼")	DN 10 (3/8")				DN 25 (1")	DN 32 (1¼")		DN 40 (1½")	DN 50 (2")
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
EN 1092-1 B1, PN 40			265	265	265	360	360	365	610	610
EN 1092-1 B1, PN 63			265			360			610	610
EN 1092-1 B1, PN 100			270		275	360		365	610	610
EN 1092-1 B1, PN 160			270			360				620
ANSI B16.5, class 150			270	270		360		365		620
ANSI B16.5, class 300			270	270		360		380		620
ANSI B16.5, class 600			270	285		360		380		620
ANSI B16.5, class 900			290			385				620
ISO 228-1 GH pipe thread	265		265			365				620
ANSI B1.20.1 NPT pipe thread	265		270			365				620
DIN 11851 hygienic screwed ¹⁾		265	265		193	360	360		610	610
DIN 32676-C hygienic tri-clamp			265	265		360		360		610
DIN 11864-1 aseptic screwed ¹⁾			265			360			610	610
DIN 11864-2 aseptic flange ¹⁾			265			360			620	610
DIN 11864-3 aseptic clamp ¹⁾			265			360			610	610
ISO 2852 hygienic clamp ¹⁾					265	360		360	610	610
ISO 2853 hygienic screwed ¹⁾			265			360		360		610
SMS 1145 hygienic screwed			285			360			610	610
12-VCO-4 quick connect			285							
JIS B2220/10K			265			360			620	610
JIS B2220/20K			265			360			620	610
JIS B2220/40K			270			360			620	610
JIS B2220/63K			275			370				620

¹⁾ Available with 3A and EHEDG certification.

Sensor Connection	DN 15 (½")		DN 15 (½")	DN 20 (¾")	DN 25 (1")	DN 25 (1")		DN 40 (1½")	DN 50 (2")	
	DN 6 (¼")	DN 10 (3/8")				DN 25 (1")	DN 32 (1¼")		DN 40 (1½")	DN 50 (2")
	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]
EN 1092-1 B1, PN 40			10.43	10.43	10.43	14.17	14.17	14.37	24.02	24.02
EN 1092-1 B1, PN 63			10.43			14.17			24.02	24.02
EN 1092-1 B1, PN 100			10.63		10.83	14.17		14.17	24.02	24.02
EN 1092-1 B1, PN 160			10.63			14.17				24.41
ANSI B16.5, class 150			10.63	10.63		14.17		14.37		24.41
ANSI B16.5, class 300			10.63	10.63		14.17		14.96		24.41
ANSI B16.5, class 600			10.63	11.22		14.17		14.96		24.41
ANSI B16.5, class 900			11.4			15.2				24.41
ISO 228-1 GH pipe thread	10.43		10.43			14.37				24.41
ANSI B1.20.1 NPT pipe thread	10.43		10.63			14.37				24.41
DIN 11851 hygienic screwed ¹⁾		10.43	10.43		7.60	14.17	14.17		24.02	24.02
DIN 32676-C hygienic tri-clamp			10.43	10.43		14.17		14.17		24.02
DIN 11864-1 aseptic screwed ¹⁾			10.43	10.43		14.17				24.02
DIN 11864-2 aseptic flange ¹⁾			10.43	10.43		14.17		10.78	24.41	24.02
DIN 11864-3 aseptic clamp ¹⁾			10.43			14.17			24.02	24.02
ISO 2852 hygienic clamp ¹⁾					10.43	14.17		14.17	24.02	24.02
ISO 2853 hygienic screwed ¹⁾			10.43			14.17		14.17		24.02
SMS 1145 hygienic screwed			10.43			14.17			24.02	24.02
12-VCO-4 quick connect			11.2							
JIS B2220/10K			10.4			14.2			24.4	24.0
JIS B2220/20K			10.4			14.2			24.4	24.0
JIS B2220/40K			10.6			14.2			24.4	24.0
JIS B2220/63K			10.8			14.6				24.4

¹⁾ Available with 3A and EHEDG certification.

Flow Measurement

SITRANS FC (Coriolis)

Sensors and Flowmeter systems / SITRANS FC430 flowmeter for OEM customers

Overview



The complete flowmeter system SITRANS FC consist of a new FCS400 sensor in sizes DN 15 to DN 50 mm and a FCT030 multi-channel/multifunctional in compact or remote versions. The flowmeter is based on the latest developments within digital signal processing technology – engineered for high measuring performance:

- Fast response to rapid changes in flow
- Fast dosing applications
- High immunity against process noise
- High turndown ratio of flowrates
- Suitable for liquid and gas service
- Easy to install, commission and maintain
- Aerated flow filtering system, for advanced filtering of fluids with gas or air bubbles
- Build in Data logger for all process variables and status messages (FCT030)
- Build in Batch functionality (FCT030)

The SITRANS FC430 is available with current output HART 7.5, Modbus RS 485 RTU, PROFIBUS DP or PROFIBUS PA as standard on Channel 1. Additional I/O functions can be freely configured for analog, pulse, frequency, relay or status output, or binary input.

The transmitter comes with a user configurable graphical display and SensorFlash, a micro SD card for configuration backup, firmware update and data storage.

Benefits

- It is truly compact and light, fitting neatly into dense piping arrangements
- Easy maintenance because modules can be exchanged rapidly
- Effective separation of measurement from plant vibration
- Highly secure operation in safety critical applications
- Non-volatile memory of all setup and operation data
- Reliable measurements due to high signal to noise ratio
- Secure, digital transfer of measurement data from the sensor
- Shortest overall length; easy drop-in replacement into most existing installations
- Marine Application: fuel management & consumption; bunkering solutions; boiler control

Selection and ordering data

SITRANS FC430 digital coriolis flowmeter with SITRANS FCS400 standard flow sensor compact or remote mounting with FCT030 transmitter	Article No. 7ME4613- ● ● ● ● ● - ● ● ● ●
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	
Sensor size, connector size	
DN 15, DN 6 (½", ¼")	3 E
DN 15, DN 10 (½", 3/8")	3 F
DN 15, DN 15 (½", ½")	3 G
DN 15, DN 20 (½", ¾")	3 H
DN 15, DN 25 (½", 1")	3 J
DN 25, DN 25 (1", 1")	3 L
DN 25, DN 32 (1", 1¼")	3 M
DN 25, DN 40 (1", 1½")	3 N
DN 50, DN 40 (2", 1½")	4 B
DN 50, DN 50 (2", 2")	4 C
DN 50, DN 65 (2", 2½")	4 D
Process connection	
EN 1092-1 B1, PN 40	A 1
EN 1092-1 B1, PN 63	A 2
EN 1092-1 B1, PN 100	A 3
EN 1092-1 D, PN 40	A 5
EN 1092-1 D, PN 63	A 6
EN 1092-1 D, PN 100	A 7
EN 1092-1 D, PN 160 (max operation pressure 100 bar)	A 8
ASME B16.5 RF, Class 150	D 1
ASME B16.5 RF, Class 300	D 2
ASME B16.5 RF, Class 600	D 3
ASME B16.5 RF, Class 900 (p- and t-rating as Class 600)	D 4
ISO 228-1G female pipe thread	E 1
ASME B1.20.1 NPT female pipe thread	E 3
DIN 11851 hygienic screwed	F 1
DIN 32676, ASME, Form C (inch) (tri-clamp)	G 1
DIN 11864-1 GS Form A Row A, Form A = O-ring type hygienic, aseptic thread connector, hygienic class H3	H 1
DIN 11864-2 BF Form A Row A, Form A = O-ring type hygienic, aseptic flange connector, hygienic class H3	H 2
DIN 11864-3 BKS Form A Row A, Form A = O-ring type hygienic, aseptic clamp connector, hygienic class H3	H 3
ISO 2852 hygienic clamp	J 1
ISO 2853 hygienic thread	J 2
SMS 1145 hygienic screwed	K 1
Quick connect	K 5
JIS B2220/10K	L 2
JIS B2220/20K	L 4
JIS B2220/40K	L 6
JIS B2220/63K	L 7
Wetted parts material	
AISI 316L/1.4435/1.4404	1
AISI 316L/1.4435/1.4404 (polished; EHEDG; 3A) (in preparation)	2
Calibration/Accuracy class	
0.1 % flow, 5 kg/m³ density	1
0.1 % flow, 0.5 kg/m³ density	4
Standard fraction (with density 0.5 kg/m³)	8
Mounting style, transmitter housing and material	
None (replacement sensor)	A
Compact, IP67 fieldmount, aluminum	D
Remote, IP67 fieldmount, aluminum, M12	G
Remote, IP67 fieldmount, aluminum, T/Box	K
Remote, IP67, wall mount, aluminium	U
Ex approval (depending on variant)	
Non-Ex	A
ATEX (zone 1 / zone 21)	C
IECEX (zone 1 / zone 21)	F
US (cCSAus), Div 1	L
Canada (cCSAus), zone 1	M

Flow Measurement

SITRANS FC (Coriolis)

Sensors and Flowmeter systems / SITRANS FC430 flowmeter for OEM customers

Selection and ordering data (continued)

SITRANS FC430 digital coriolis flowmeter with SITRANS FCS400 standard flow sensor compact or remote mounting with FCT030 transmitter	Article No. 7ME4613-	● ● ● ● ● - ● ● ● ●
NEPSI		
INMETRO (in preparation)		N
KCs		P
EAC Ex		Q
Local User Interface		U
None (replacement sensor, DSL only)		0
Blind		1
Graphical, 240 × 160 pxl		3

	Order code
Further designs Please add "-Z" to Article No. and specify Order code(s).	
Cable glands	
None (replacement sensor)	A00
Metric, no glands	A01
Metric, nylon, limited to -20 °C/-4 °F	A02
Metric, brass/Ni plated	A05
Metric, stainless steel	A06
NPT, no glands	A11
NPT, nylon, limited to -20 °C/-4 °F	A12
NPT, brass/Ni plated	A15
NPT, stainless steel	A16
Metric thread with M12 socket fitted	A20
Software functions and CT approvals	
None (replacement sensor)	B10
Standard	B11
I/O configuration Ch1	
No output channel	E00
4 ... 20 mA HART Active/Passive (non-Ex)	E02
Ca 4 ... 20 mA HART active (Ex)	E06
Ca 4 ... 20 mA HART passive (Ex)	E07
PROFIBUS PA	E10
PROFIBUS DP (non-Ex)	E11
Modbus RTU RS 485	E14
I/O configuration Ch2 (O), Ch3 (I/O) and Ch4 (I/O)	
None	F00
• Non Ex: Sig O, None, None. Active/passive menu selected	F01
• Non Ex: Sig O, Sig I/O, None. Active/passive menu selected	F02
• Non Ex: Sig O, Sig I/O, Sig I/O. Active/passive menu selected	F03
• Non Ex: Sig O, Sig I/O, R. Active/passive menu selected	F04
• Non Ex: Sig O, R, R. Active/passive menu selected	F05
• Non Ex: Sig O, R, None. Active/passive menu selected	F06
• Ex: pSig O, None, None	F11
• Ex: pSig O, pSig I/O, None	F12
• Ex: pSig O, pSig I/O, pSig I/O	F13
• Ex: pSig O, pSig I/O, R	F14

Selection and ordering data (continued)

	Order code
• Ex: pSig O, R, R	F15
• Ex: pSig O, R, None	F16
• Ex: aSig O, None, None	F21
• Ex: aSig O, aSig I/O, None	F22
• Ex: aSig O, aSig I/O, aSig I/O	F23
• Ex: aSig O, aSig I/O, R	F24
• Ex: aSig O, R, R	F25
• Ex: aSig O, R, None	F26
Notes on I/O configurations: a or p suffix: The I/O module is selected at ordering with either active or passive function. Signal: The output can be selected for Current (0 or 4 to 20 mA), frequency or pulse function in the menu. I: Discrete status input to the flowmeter. Functions are selected in the menu including 'Freeze output', 'Reset totalizer' (only CH3&4). R: Relay output for discrete status reporting. Function is selected in the menu, including 'Error', 'High flow warning'. The MLFB structure for FC330 systems must be filled to this level , including "-Z" options A., B., E. and F.	
Add-on options and accessories Please add "-Z" to Article No. and specify Order code(s).	
Certificates	
Pressure testing certificate CRN	C01
Pressure testing certificate PED	C02
Material certificate EN 10204-3.1 (wetted parts)	C05
Welding inspection certificate	C07
Factory certificate EN 10204 2.1	C10
Factory certificate EN 10204 2.2	C11
Cleaned for oil and grease	C50
Customer selected calibration	
Multi-point (5 flows × 2 pass) Flow 10 ... 100 % of Q_{norm}	Y60
Multi-point (10 flows × 1 pass) Flow 10 ... 100 % of Q_{norm}	Y61
Multi-point calibration (5 flows × 2 pass) Flow 2 ... 20 % of Q_{norm}	Y69
Multi-point calibration (5 flows × 2 pass) Flow 5 ... 50 % of Q_{norm}	Y71
Multi-point calibration (10 flows × 1 pass) Flow 2 ... 20 % of Q_{norm}	Y72
Multi-point calibration (10 flows × 1 pass) Flow 5 ... 50 % of Q_{norm}	Y73
Cable	
None	L50
5 m (16.4 ft), sensor cable, 4 wire, with 2 pcs M12 plugs mounted	L51
5 m (16.4 ft), sensor cable, 4 wire, without plugs for terminal connection	L52
10 m (32.8 ft), sensor cable, 4 wire, with 2 pcs M12 plugs mounted	L55
10 m (32.8 ft), sensor cable, 4 wire, without plugs for terminal connection	L56
25 m (82 ft), sensor cable, 4 wire, with 2 pcs M12 plugs mounted	L59
25 m (82 ft), sensor cable, 4 wire, without plugs for terminal connection	L60
50 m (164 ft), sensor cable, 4 wire, with 2 pcs M12 plugs mounted	L63

Flow Measurement

SITRANS FC (Coriolis)

Sensors and Flowmeter systems / SITRANS FC430 flowmeter for OEM customers

Selection and ordering data (continued)

	Order code
50 m (164 ft), sensor cable, 4 wire, without plugs for terminal connection	L64
75 m (246 ft), sensor cable, 4 wire, with 2 pcs M12 plugs mounted	L67
75 m (246 ft), sensor cable, 4 wire, without plugs for terminal connection	L68
Sensor options	
FCS400 marine approval	S22
SD-Card accessibility via USB (not allowed in USA by Patent)	
Mass storage enabled	S30
Region-specific approvals and certificates	
South Korea (KCC)	W28
Additional data Please add "-Z" to Article No. and specify Order code(s) and plain text.	
Tag name	
Tag name plate, stainless steel	Y17

Operating instructions for SITRANS FC430

Description	Article No.
English	
• for firmware V 4.0 and onwards	A5E39789392
German	
• for firmware V 4.0 and onwards	TBD

All literature is available to download for free, in a range of languages, at www.siemens.com/processinstrumentation/documentation

Heating jacket for FCS400

Description	Article No.	
Heating jacket, indoor use, 0 ... 200 °C (32 ...392 °F) max. temperature. Complete with 5 m (16.4 ft) high temperature cable fitted. Dedicated plug connection to included controller		
• 230 V AC		
- DN 15 electric	A5E33035287	
- DN 25 electric	A5E33035324	
- DN 50 electric	A5E33035325	
• 115 V AC		
- DN 15 electric	A5E32877520	
- DN 25 electric	A5E32877556	
- DN 50 electric	A5E32877557	
Heating jacket controller, IP65. Digital display for 0 ... 200 °C (32 ...392 °F) control setpoint		
• 230 V AC	A5E03839193	
• 115 V AC	A5E03839194	

Technical specifications

SITRANS FC430	
Sizes	DN 15 (½") DN 25 (1") DN 50 (2")
Accuracy	± 0.10 %
Repeatability	± 0.05 %
Flow range (liquids) Q _{nom} (water @ 1 bar pressure loss)	
• DN 15 (½")	3 700 kg/h (8 157 lb/h)
• DN 25 (1")	11 500 kg/h (25 353 lb/h)
• DN 50 (2")	52 000 kg/h (114 640 lb/h)
Architecture	Compact or remote configuration
Display	Full graphical display, 240 × 160 pixels with selection of 6 languages
Power supply	20 ... 90 V DC ± 10 %; 100 ... 240 V AC ± 10 %, 47 ... 63 Hz ± 10 %
Materials	
• Sensor	
- Wetted parts	316L stainless steel
- Enclosure	304 stainless steel
• Transmitter	Aluminum with corrosion-resistant coating class C4
Enclosure rating	IP67 ¹⁾
Pressure ratings	
• Measuring tubes	
- 316L	100 bar (1 450 psi)
- Sensor enclosure	20 bar (DN 15, DN 25) 17 bar (DN 50)
• Sensor enclosure burst pressure	>160 bar (depending on size)
Temperature ratings	
• Process medium	
- DN 15 ... DN 50	-50 ... +200 °C (-58 ... +392 °F)
• Ambient	-40 ... +60 °C (-40 ... +140 °F) ¹⁾
• Display	-20 ... +60 °C (-4 ... +140 °F)
Process connections	
• Flanges	EN 1092-1 B1, EN 1092-1 D, ANSI/ASME B16.5, JIS B 2220, DIN 11864-2
• Pipe threads	ASME B1.20 (NPT), ISO 228-1 G (BSPP), VCO Quick-connect
• Hygienic threads	DIN 11851, DIN 11864-1A, ISO 2853, SMS 1145
• Hygienic clamps	DIN 11864-3A, DIN 32676-C Tri-clamp, ISO 2852
Approvals	
• Hazardous area	ATEX, IECEx, EAC Ex, NEPSI, CSA, cCSA us, KCs
• Pressure equipment	PED, CRN
NAMUR	NAMUR-compliant (e.g. NE 21, NE 41, NE 107 and NE 132)
I/O	Up to 4 channels combining ana- log, relay or digital outputs and binary input
Communication	<ul style="list-style-type: none"> • HART • PROFIBUS PA • PROFIBUS DP • Modbus RTU (RS 485)
EMC performance	
• Emission	EN 55011/CISPR-11 (Class A)
• Immunity	EN/IEC 61326-1 (Industry)
Mechanical load	18 ... 400 Hz random The flowmeter will mechanically tolerate 3.17 g RMS in all directions. Flow accuracy cannot be guaranteed under all conditions.

Technical specifications (continued)

¹⁾ If operating outdoors, avoid direct sunlight, particularly in warm climatic regions.

Flow Measurement

SITRANS FC (Coriolis)

Sensors and Flowmeter systems / SITRANS FC410 flowmeter for OEM customers

Overview



The compact flowmeter SITRANS FC410 is available in sizes DN 15, DN 25 and DN 50 for standard and hygienic applications.

Intended for integration into OEM skids, machines or pre-assembled plant systems. The sensor design is the marked leader in compact design which makes it easy to integrate in the compact skids. The flowmeter is based on the latest developments within digital signal processing technology - engineered for high measuring performance:

- Fast response to rapid changes in flow
- Marked most compact sensor design
- Fast dosing applications with control in host system
- High immunity against process noise
- High turndown ratio of flowrates
- Suitable for liquid and gas service
- Easy to install, commission and maintain

With all global marine approvals the FC410 is ideal for integration in ship fuel efficiency and environmental measurement systems. The FCT010 transmitter delivers true multi-parameter measurements i.e. massflow, density, temperature.

FC410 is available with Modbus RTU (RS 485) multi-drop serial communication. The flowmeter is supplied with SensorFlash, a micro SD card containing all relevant certificates. The SITRANS FC410 flowmeter system consists of a SITRANS FCS400 sensor and a SITRANS FCT010 transmitter always compact mounted.

Benefits

- It is truly compact and light, fitting neatly into dense piping arrangements
- Easy maintenance because modules can be exchanged rapidly
- Effective separation of measurement from plant vibration
- Reliable measurements due to high signal to noise ratio
- Shortest overall length; easy drop-in replacement into most existing installations
- Direct connection to host with high-speed Modbus simplifies machine or skid construction and set-up
- Modbus RS 485 RTU allows simple and easy integration with all Modbus masters with fast update rate of process values

Selection and ordering data

SITRANS FC410 digital coriolis flowmeter with SITRANS FCS400 standard flow sensor compact or remote mounting with FCT010 transmitter	Article No. 7ME4611-							
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.								
Sensor size, connector size								
DN 15, DN 6 (½", ¼")	3	E						
DN 15, DN 10 (½", 3/8")	3	F						
DN 15, DN 15 (½", ½")	3	G						
DN 15, DN 20 (½", ¾")	3	H						
DN 15, DN 25 (½", 1")	3	J						
DN 25, DN 25 (1", 1")	3	L						
DN 25, DN 32 (1", 1¼")	3	M						
DN 25, DN 40 (1", 1½")	3	N						
DN 50, DN 40 (2", 1½")	4	B						
DN 50, DN 50 (2", 2")	4	C						
DN 50, DN 65 (2", 2½")	4	D						
Process connection								
EN 1092-1 B1, PN 40		A	1					
EN 1092-1 B1, PN 63		A	2					
EN 1092-1 B1, PN 100		A	3					
EN 1092-1 D, PN 40		A	5					
EN 1092-1 D, PN 63		A	6					
EN 1092-1 D, PN 100		A	7					
EN 1092-1 D, PN 160 (max operation pressure 100 bar)		A	8					
ASME B16.5 RF, Class 150		D	1					
ASME B16.5 RF, Class 300		D	2					
ASME B16.5 RF, Class 600		D	3					
ASME B16.5 RF, Class 900 (p- and t-rating as Class 600)		D	4					
ISO 228-1G female pipe thread		E	1					
ASME B1.20.1 NPT female pipe thread		E	3					
DIN 11851 hygienic screwed		F	1					
DIN 32676, ASME, Form C (inch) (tri-clamp)		G	1					
DIN 11864-1 GS Form A Row A, Form A = O-ring type hygienic, aseptic thread connector, hygienic class H3		H	1					
DIN 11864-2 BF Form A Row A, Form A = O-ring type hygienic, aseptic flange connector, hygienic class H3		H	2					
DIN 11864-3 BKS Form A Row A, Form A = O-ring type hygienic, aseptic clamp connector, hygienic class H3		H	3					
ISO 2852 hygienic clamp		J	1					
ISO 2853 hygienic thread		J	2					
SMS 1145 hygienic screwed		K	1					
Quick connect		K	5					
JIS B2220/10K		L	2					
JIS B2220/20K		L	4					
JIS B2220/40K		L	6					
JIS B2220/63K		L	7					
Wetted parts material								
AISI 316L/1.4435/1.4404							1	
Calibration/Accuracy class								
0.1 % flow, 5 kg/m ³ density							1	
0.1 % flow, 0.5 kg/m ³ density							4	
Mounting style, transmitter housing and material								
None (replacement sensor)								A
Compact, IP67 fieldmount, aluminum								D
Ex approval (depending on variant)								
Non-Ex								A
ATEX (zone 1 / zone 21)								C
IECEX (zone 1 / zone 21)								F
US (cCSAus), Div 1								L
Canada (cCSAus), zone 1								M
NEPSI								N
INMETRO (in preparation)								P
KCs								Q
EAC Ex								U

Flow Measurement

SITRANS FC (Coriolis)

Sensors and Flowmeter systems / SITRANS FC410 flowmeter for OEM customers

Selection and ordering data (continued)

SITRANS FC410 digital coriolis flowmeter with SITRANS FCS400 standard flow sensor compact or remote mounting with FCT010 transmitter	Article No. 7ME4611-	● ● ● ● ● - ● ● ● ●
Local User Interface Blind		

	Order code
Further designs Please add "-Z" to Article No. and specify Order code(s).	
Cable glands	
None (replacement sensor)	A00
Metric, no glands	A01
Metric, plastic	A02
Metric, brass/Ni plated	A05
Metric, stainless steel	A06
NPT, no glands	A11
NPT, plastic	A12
NPT, brass/Ni plated	A15
NPT, stainless steel	A16
Metric thread with M12 socket fitted	A20
Software functions and CT approvals	
Standard	B11
I/O configuration Ch1	
Modbus RTU RS 485	E14
I/O configuration Ch2, Ch3 and Ch4	
None	F00
Add-on options and accessories Please add "-Z" to Article No. and specify Order code(s).	
Certificates	
Pressure testing certificate CRN	C01
Pressure testing certificate PED	C02
Material certificate EN 10204-3.1 (wetted parts)	C05
Welding inspection certificate	C07
Factory certificate EN 10204 2.1	C10
Factory certificate EN 10204 2.2	C11
Cleaned for oil and grease	C50
Customer selected calibration	
Multi-point (5 flows × 2 pass) Flow 10 ... 100 % of Q_{norm}	Y60
Multi-point (10 flows × 1 pass) Flow 10 ... 100 % of Q_{norm}	Y61
Multi-point calibration (5 flows × 2 pass) Flow 2 ... 20 % of Q_{norm}	Y69
Multi-point calibration (5 flows × 2 pass) Flow 5 ... 50 % of Q_{norm}	Y71
Multi-point calibration (10 flows × 1 pass) Flow 2 ... 20 % of Q_{norm}	Y72
Multi-point calibration (10 flows × 1 pass) Flow 5 ... 50 % of Q_{norm}	Y73
Cable	
None	L50
5 m (16.4 ft), sensor cable, 4 wire, with 2 pcs M12 plugs mounted	L51
5 m (16.4 ft), sensor cable, 4 wire, without plugs for terminal connection	L52
5 m (16.4 ft), sensor cable, 4 wire, with 1 pc M12 plugs mounted	L53
10 m (32.8 ft), sensor cable, 4 wire, with 2 pcs M12 plugs mounted	L55

Selection and ordering data (continued)

	Order code
10 m (32.8 ft), sensor cable, 4 wire, without plugs for terminal connection	L56
10 m (32.8 ft), sensor cable, 4 wire, with 1 pc M12 plugs mounted	L57
25 m (82 ft), sensor cable, 4 wire, with 2 pcs M12 plugs mounted	L59
25 m (82 ft), sensor cable, 4 wire, without plugs for terminal connection	L60
25 m (82 ft), sensor cable, 4 wire, with 1 pc M12 plugs mounted	L61
50 m (164 ft), sensor cable, 4 wire, with 2 pcs M12 plugs mounted	L63
50 m (164 ft), sensor cable, 4 wire, without plugs for terminal connection	L64
50 m (164 ft), sensor cable, 4 wire, with 1 pc M12 plugs mounted	L65
75 m (246 ft), sensor cable, 4 wire, with 2 pcs M12 plugs mounted	L67
75 m (246 ft), sensor cable, 4 wire, without plugs for terminal connection	L68
75 m (246 ft), sensor cable, 4 wire, with 1 pc M12 plugs mounted	L69
Sensor options	
FCS400 marine approval	S22
Region-specific approvals and certificates	
South Korea (KCC)	W28
Additional data	
Please add "-Z" to Article No. and specify Order code(s) and plain text.	
Tag name	
Tag name plate, stainless steel	Y17

Operating instructions for SITRANS FC410

Description	Article No.
English	
• for firmware V 4.0 and onwards	A5E39789214
German	
• for firmware V 4.0 and onwards	TBD

All literature is available to download for free, in a range of languages, at www.siemens.com/processinstrumentation/documentation

Flow Measurement

SITRANS FC (Coriolis)

Sensors and Flowmeter systems / SITRANS FC410 flowmeter for OEM customers

Technical specifications

SITRANS FC410	
Sizes	DN 15 (½") DN 25 (1") DN 50 (2")
Accuracy	± 0.10 %
Repeatability	± 0.05 %
Flow range (liquids) Q _{nom} (water @ 1 bar pressure loss)	
• DN 15 (½")	3 700 kg/h (8 157 lb/h)
• DN 25 (1")	11 500 kg/h (25 353 lb/h)
• DN 50 (2")	52 000 kg/h (114 640 lb/h)
Architecture	Compact configuration
Display	Full graphical display, 240 × 160 pixels with selection of 6 languages
Power supply	12 ... 27 V DC; 1.1 W
Materials	
• Sensor	
- Wetted parts	316L stainless steel
- Enclosure	304 stainless steel
• Transmitter	Aluminum with corrosion-resistant coating class C4
Enclosure rating	IP67
Pressure ratings	
• Measuring tubes	
- 316L	100 bar (1 450 psi)
- Sensore enclosure	20 bar (DN 15, DN 25) 17 bar (DN 50)
• Sensor enclosure burst pressure	>160 bar (depending on size)
Temperature ratings	
• Process medium	
- DN 15 ... DN 50	-50 ... +200 °C (-58 ... +392 °F)
• Ambient	-40 ... +60 °C (-40 ... +140 °F) ¹⁾
Process connections	
• Flanges	EN 1092-1 B1, EN 1092-1 D, ANSI/ASME B16.5, JIS B 2220, DIN 11864-2
• Pipe threads	ASME B1.20 (NPT), ISO 228-1 G (BSPP), VCO Quick-connect
• Hygienic threads	DIN 11851, DIN 11864-1A, ISO 2853, SMS 1145
• Hygienic clamps	DIN 11864-3A, DIN 32676-C Tri-clamp, ISO 2852
Approvals	
• Hazardous area	ATEX, IECEx, EAC Ex, NEPSI, CSA, cCSA us, KCs
• Pressure equipment	PED, CRN
NAMUR	NAMUR-compliant (e.g. NE 21, NE 41, NE 107 and NE 132)
I/O	Up to 4 channels combining ana- log, relay or digital outputs and binary input
Communication	Modbus RTU (RS 485)
EMC performance	
• Emission	EN 55011/CISPR-11 (Class A)
• Immunity	EN/IEC 61326-1 (Industry)
Mechanical load	18 ... 400 Hz random The flowmeter will mechanically tolerate 3.17 g RMS in all directions. Flow accuracy cannot be guaranteed under all conditions.

¹⁾ If operating outdoors, avoid direct sunlight, particularly in warm climatic regions.

Overview



Full integration in the Siemens SIMATIC systems PCS7 or in TIA portal with FCT070 Faceplates with the ET 200SP ST & HF powerful IO system for compact control cabinets. The complete flowmeter system consists of a SITRANS FCS400 sensor and a Simatic ET200 SP Coriolis module FCT070 transmitter.

TM FCT070 offers real-time data processing and the display of all measuring and status data of the Coriolis flowmeter.

For hazardous area the FCS400 sensor can be placed in Ex Zone 1/21 or Class1 Div 1 locations . Together with the Sitrans I300 power/barrier module the FCT070 transmitter can be place in Zone 2 or Div 2 areas.

Benefits

- FCS400 sensor in sizes from DN 15 to DN 50 mm in a large variety of process connections and wetted materials
- Markeds most compact sensor design
- Full hazardous area solutions
- Easy integration into automation process control as TIA portal and PCS7
- Easy selection and integration of flowmeters via TIA-Selector
- Cost effective integration of Coriolis flowmeters for PLC controlled machines
- SITRANS FCT070 ET 200SP technology module and can combined with all other SIMATIC ET200 ST & HF modules
- The FCT070 has all high-end transmitter functionality integrated including the advanged fraction tables on bord
- Fast and trouble-free communication between the flowmeter and the PLC through digital data communication with up to 10 ms update rate
- Integrated advanced Two-stage batch controller functionality without additional modules. I/Os are onboard

Flow Measurement

SITRANS FC (Coriolis)

Sensors and Flowmeter systems / SITRANS FCS400 with FCT070 transmitter

Selection and ordering data

SITRANS FCS400 standard flow sensor for integration with FCT070 transmitter	Article No. 7ME4617-	● ● ● ● ● - ● ● ● ●
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Sensor size, connector size		
DN 15, DN 6 (½", ¼")	3	E
DN 15, DN 10 (½", 3/8")	3	F
DN 15, DN 15 (½", ½")	3	G
DN 15, DN 20 (½", ¾")	3	H
DN 15, DN 25 (½", 1")	3	J
DN 25, DN 25 (1", 1")	3	L
DN 25, DN 32 (1", 1¼")	3	M
DN 25, DN 40 (1", 1½")	3	N
DN 50, DN 40 (2", 1½")	4	B
DN 50, DN 50 (2", 2")	4	C
DN 50, DN 65 (2", 2½")	4	D
Process connection		
EN 1092-1 B1, PN 40		A 1
EN 1092-1 B1, PN 63		A 2
EN 1092-1 B1, PN 100		A 3
EN 1092-1 D, PN 40		A 5
EN 1092-1 D, PN 63		A 6
EN 1092-1 D, PN 100		A 7
EN 1092-1 D, PN 160 (max operation pressure 100 bar)		A 8
ASME B16.5 RF, class 150		D 1
ASME B16.5 RF, class 300		D 2
ASME B16.5 RF, class 600		D 3
ASME B16.5 RF, class 900 (p- and t-rating as class 600)		D 4
ISO 228-1G female pipe thread		E 1
ASME B1.20.1 NPT female pipe thread		E 3
DIN 11851 hygienic screwed		F 1
DIN 32676, ASME, Form C (inch) (tri-clamp)		G 1
DIN 11864-1 GS Form A Row A, Form A = O-ring type hygienic, aseptic thread connector, hygienic class H3		H 1
DIN 11864-2 BF Form A Row A, Form A = O-ring type hygienic, aseptic flange connector, hygienic class H3		H 2
DIN 11864-3 BKS Form A Row A, Form A = O-ring type hygienic, aseptic clamp connector, hygienic class H3		H 3
ISO 2852 hygienic clamp		J 1
ISO 2853 hygienic thread		J 2
SMS 1145 hygienic screwed		K 1
Quick connect		K 5
JIS B2220/10K		L 2
JIS B2220/20K		L 4
JIS B2220/40K		L 6
JIS B2220/63K		L 7
Wetted parts material		
AISI 316L/1.4435/1.4404		1
Calibration/Accuracy class		
0.1 % flow, 5 kg/m ³ density		1
0.1 % flow, 0.5 kg/m ³ density		4
Mounting style, transmitter housing and material		
Compact, IP67 fieldmount, aluminum		D
Ex approval (depending on variant)		
Non-Ex		A
ATEX (zone 1 / zone 21)		C
IECEX (zone 1 / zone 21)		F
US (cCSAus), Div 1		L
Canada (cCSAus), zone 1		M
NEPSI		N
INMETRO (in preparation)		P
KCs		Q
EAC Ex		U
Local User Interface		
Blind		1

Selection and ordering data (continued)

	Order code
Further designs Please add "-Z" to Article No. and specify Order code(s).	
Cable glands	
Metric, no glands	A01
Metric, plastic	A02
Metric, brass/Ni plated	A05
Metric, stainless steel	A06
NPT, no glands	A11
NPT, plastic	A12
NPT, brass/Ni plated	A15
NPT, stainless steel	A16
Metric thread with M12 socket fitted	A20
Software functions and CT approvals	
Standard software DSL	B10
I/O configuration Ch1	
No output channel (integration of FCT070)	E00
I/O configuration Ch2, Ch3 and Ch4	
None	F00
Add-on options and accessories Please add "-Z" to Article No. and specify Order code(s).	
Certificates	
Pressure testing certificate CRN	C01
Pressure testing certificate PED	C02
Material certificate EN 10204-3.1 (wetted parts)	C05
Welding inspection certificate	C07
Factory certificate EN 10204 2.1	C10
Factory certificate EN 10204 2.2	C11
Cleaned for oil and grease	C50
Customer selected calibration	
Multi-point (5 flows × 2 pass) Flow 10 ... 100 % of Q_{norm}	Y60
Multi-point (10 flows × 1 pass) Flow 10 ... 100 % of Q_{norm}	Y61
Multi-point calibration (5 flows × 2 pass) Flow 2 ... 20 % of Q_{norm}	Y69
Multi-point calibration (5 flows × 2 pass) Flow 5 ... 50 % of Q_{norm}	Y71
Multi-point calibration (10 flows × 1 pass) Flow 2 ... 20 % of Q_{norm}	Y72
Multi-point calibration (10 flows × 1 pass) Flow 5 – 50 % of Q_{norm}	Y73
Cable	
None	L50
5 m (16.4 ft), sensor cable, 4 wire, without plugs for terminal connection	L52
5 m (16.4 ft), sensor cable, 4 wire, with 1 pc M12 plugs mounted	L53
10 m (32.8 ft), sensor cable, 4 wire, without plugs for terminal connection	L56
10 m (32.8 ft), sensor cable, 4 wire, with 1 pc M12 plugs mounted	L57
25 m (82 ft), sensor cable, 4 wire, without plugs for terminal connection	L60
25 m (82 ft), sensor cable, 4 wire, with 1 pc M12 plugs mounted	L61
50 m (164 ft), sensor cable, 4 wire, without plugs for terminal connection	L64


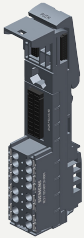

Flow Measurement

SITRANS FC (Coriolis)

Sensors and Flowmeter systems / SITRANS FCS400 with FCT070 transmitter

Selection and ordering data (continued)

	Order code
50 m (164 ft), sensor cable, 4 wire, with 1 pc M12 plugs mounted	L65
75 m (246 ft), sensor cable, 4 wire, without plugs for terminal connection	L68
75 m (246 ft), sensor cable, 4 wire, with 1 pc M12 plugs mounted	L69
Region-specific approvals and certificates	
South Korea (KCC)	W28
Additional data	
Please add "-Z" to Article No. and specify Order code(s) and plain text.	
Tag name	
Tag name plate, stainless steel	Y17

Description	Article No.	
SITRANS FCT070 – Transmitter for ET 200SP	7ME4138-6AA00-0BB1	
BU20-P12+A0+4B, PU1 – BaseUnit plate for ET 200SP	6ES7193-6BP20-0BB0 6ES7193-6BP20-0BB1	
SITRANS I300 – Isolating power supply – Ex barrier	A5E39832532	

All literature is available to download for free, in a range of languages, at www.siemens.com/processinstrumentation/documentation

Technical specifications

SITRANS FCS400 with FCT070 transmitter	
Sizes	DN 15 (½") DN 25 (1") DN 50 (2")
Accuracy	± 0.10 %
Repeatability	± 0.05 %
Flow range (liquids) Q _{nom} (water @ 1 bar pressure loss)	
• DN 15 (½")	3 700 kg/h (8 157 lb/h)
• DN 25 (1")	11 500 kg/h (25 353 lb/h)
• DN 50 (2")	52 000 kg/h (114 640 lb/h)
Measurement of	Mass flow, volume flow, density, temperature Fraction A flow, fraction A % Fraction B flow, fraction B %
Architecture	Remote configuration
System integration	ET200 SP ST & HF; PCS7 and TIA portal with faceplates
Power supply	24 V DC, 19.2 ... 28.8 V
Materials	
• Sensor	
- Wetted parts	316L stainless steel
- Enclosure	304 stainless steel
• Transmitter	Aluminum with corrosion-resistant coating class C4
Enclosure rating	IP67
Pressure ratings	
• Measuring tubes	
- 316L	100 bar (1 450 psi)
- Sensor enclosure	20 bar (DN 15, DN 25) 17 bar (DN 50)
• Sensor enclosure burst pressure	>160 bar (depending on size)
Temperature ratings	
• Process medium	
- DN 15 ... DN 50	-50 ... +200 °C (-58 ... +392 °F)
• Ambient	-40 ... +60 °C (-40 ... +140 °F) ¹⁾
Process connections	
• Flanges	EN 1092-1 B1, EN 1092-1 D, ANSI/ASME B16.5, JIS B 2220, DIN 11864-2
• Pipe threads	ASME B1.20 (NPT), ISO 228-1 G (BSPP), VCO Quick-connect
• Hygienic threads	DIN 11851, DIN 11864-1A, ISO 2853, SMS 1145
• Hygienic clamps	DIN 11864-3A, DIN 32676-C Tri-clamp, ISO 2852
Approvals	
• Hazardous area	FCS400 sensor: ATEX, IECEx, EAC Ex, NEPSI, CSA, cCSA us, KCs FCT070: Zone 2 & Class1 Div 2
• Pressure equipment	PED, CRN
NAMUR	NAMUR-compliant (e.g. NE 21, NE 41, NE 107 and NE 132)
I/O (FCT070)	2 digital Input and 2 digital output
Totalizer (FCT070)	3 totalizer
Communication (FCT070)	Integrated PROFINET for SIMATIC integration and other PROFINET Controllers
EMC performance	
• Emission	EN 55011/CISPR-11 (Class A)
• Immunity	EN/IEC 61326-1 (Industry)
Mechanical load	18 ... 400 Hz random The flowmeter will mechanically tolerate 3.17 g RMS in all directions. Flow accuracy cannot be guaranteed under all conditions.

¹⁾ If operating outdoors, avoid direct sunlight, particularly in warm climatic regions.

Flow Measurement

SITRANS FC (Coriolis)

Sensors and Flowmeter systems / SITRANS FC MASS 2100 and FC300 DN 4

Overview

MASS 2100 DI 1.5 to DI 15 and the FC300 DN4 is suitable for low flow measurement applications of a variety of liquids and gases.

The sensor is designed with a single bended tube in corrosion resistant stainless steel AISI316L or Hastelloy C22 and a solid stainless steel fully welded enclosure to protect the measuring tubes from any harsh environments. For hazardous area applications the MASS 2100 / FC300 DN4 sensor comes in a number of common hazardous area approved variants like ATEX, IECEx, cCSAus, EAC, and NEPSI.

The sensor offers superior performance in terms of flow accuracy, turn-down ratio and density accuracy and delivers true multi-parameter measurements i.e.: mass flow, volume flow, density, temperature and fraction.

With the large variety of process connections and the ability for high pressure solutions up to 1 000 bar, the compact single tube design is especially suitable for high end applications in all industry segments e.g. Automotive, Painting, Chemical, Oil & Gas and F&B. Accurate dosing and mixing down to drops are widely used applications.

The main applications for the MASS 2100 / FC300 DN 4 sensor can be found in:

Chemical industry	Liquid and gas measurement within Miniplant and R&D, dosing of additives and catalysts
Cosmetic industry	Dosing of essence and fragrances
Pharmaceutical industry	High-speed dosing and coating of pills, filling of ampuls/injectors
Food and beverage industry	Dosing of flavourings, colours and additives, density measurement, in-line; Measurement of liquid or gaseous CO ₂
Automotive industry	Fuel injection nozzle and pump testing, filling of AC units, engine consumption, paint robots, ABS test-beds

Integration

The SITRANS MASS 2100/FC300 DN4 sensor are suitable for both indoor and outdoor installation and meets the requirements of Protection Class IP67/NEMA 4X. Optionally the sensor can be ordered with hazardous certification to Zone 1 (ATEX, IECEx, cCSAus, EAC Ex, NEPSI).

It is important to ensure that the sensor tubes are always completely filled with homogeneous fluid; otherwise measuring errors may occur. Suitable fluids are clean liquids, pastes, light slurries or gases. Condensing vapours, aerated liquids or slush are not recommended.

The materials in contact with the process medium must be evaluated for corrosion and erosion resistances for long sensor life.

The pressure drop through the sensor is a function of the properties of the fluid and the flow rate. A pressure loss and accuracy calculator can be found on the Siemens Internet site www.siemens.com

The preferred flow direction is indicated by an arrow on the sensor. Flow in the direction of the arrow will be measured as positive. The flow direction can be adjusted at the transmitter to compensate for reverse installation.

Shut-off devices

To conduct a system zero adjustment, secure shut-off devices are required in the pipeline.

Where possible, shut-off devices should be installed both upstream and downstream of the flowmeter.

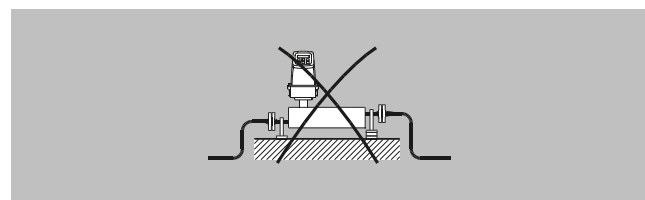
Installation guidelines MASS 2100 DI 3 ... DI 15 (1/8" ... 1/2")

In order to perform according to given specifications for flow and density accuracy, the sensor must be installed using rigid mounting brackets as shown in the installation examples.

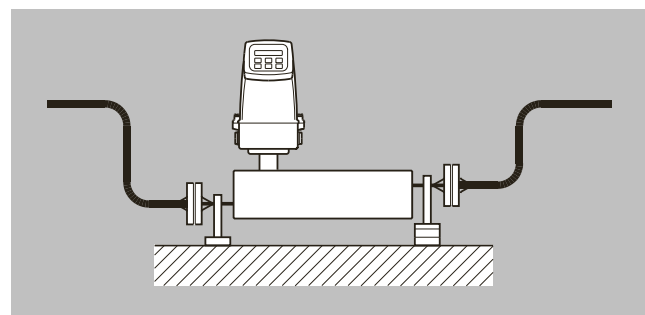
If the liquid is volatile or contains solid particles, vertical mounting is not recommended.

Horizontal:

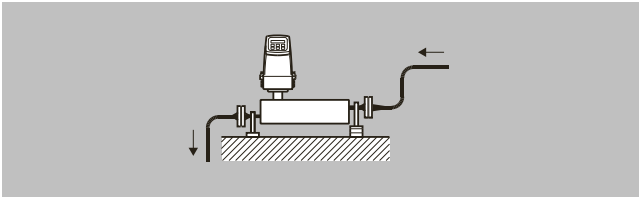
Liquid



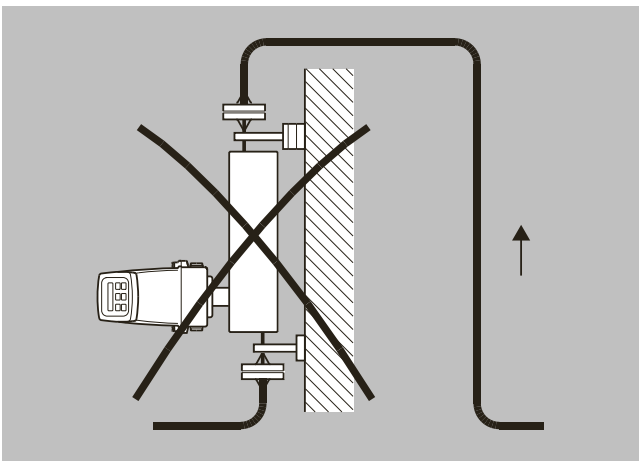
Liquid: example of not recommended horizontal installation



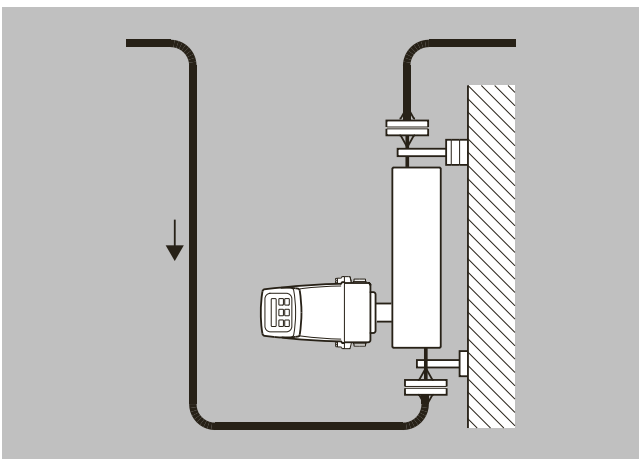
Liquid: example of recommended horizontal installation

Integration (continued)Gas

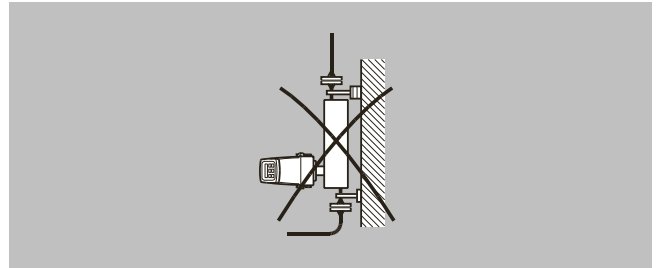
Gas: example of recommended horizontal installation

Vertical:Liquid

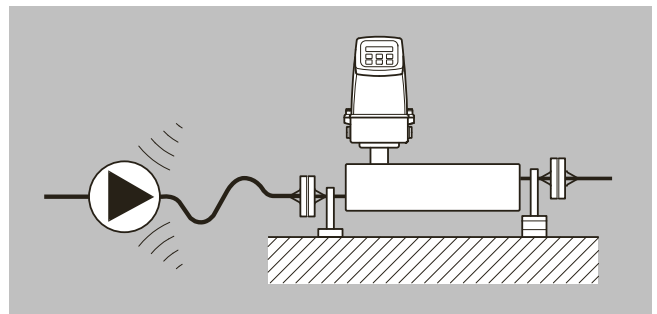
Liquid: example of not recommended vertical installation



Liquid: example of recommended vertical installation

Integration (continued)Gas

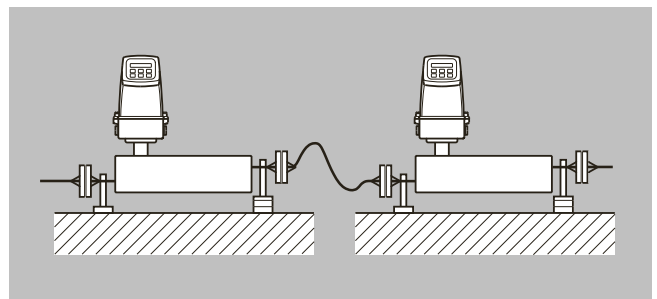
Gas: example of not recommended vertical installation

Vibration

Always locate the flowmeter as far away as possible from components that generate mechanical vibration in the piping. Avoid vibration. If necessary use flexible pipes.

Cross talk

Cross talk between sensors mounted close to each other may disturb the measurement. To avoid cross talk never mount more than one meter on each frame and mount flexible hose connections between the sensors as shown.

Zero point adjustment

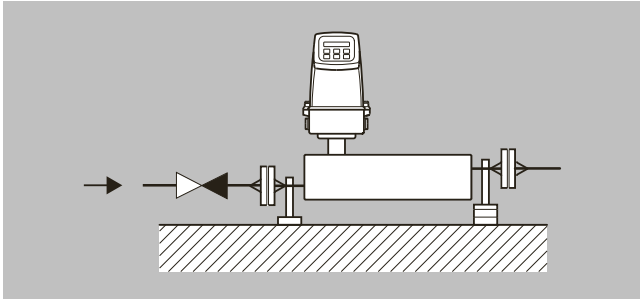
To facilitate zero point adjustment a shut-off valve should always be mounted in connection with the sensor as a proper zero point setting is essential for a good accuracy.

Flow Measurement

SITRANS FC (Coriolis)

Sensors and Flowmeter systems / SITRANS FC MASS 2100 and FC300 DN 4

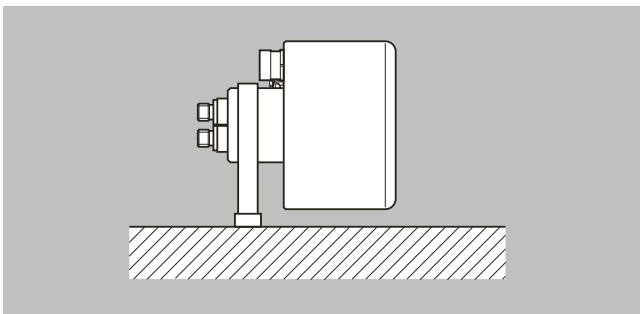
Integration (continued)



Installation guidelines MASS 2100 DI 1.5 (1/16")

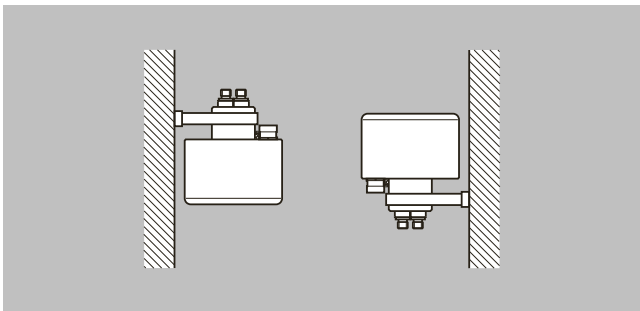
- The optimal installation is horizontal.
If vertical mounting is necessary, upward flow is recommended to facilitate the removal of air bubbles. To remove the air from the sensor the flow speed in the sensor must be at least 1 m/s.
If there are solid particles in the liquid, especially in connection with low flow, it is recommended that the sensor be mounted horizontally with inlet flange uppermost so that particles are more easily flushed out. To ensure that the sensor does not become partially empty, there must be sufficient counter-pressure on the unit min. 0.2 bar (2.9 psi).
- Mount the sensor on a vibration-free wall or steel frame.
- Locate the sensor low in the system in order to avoid an under-pressure in the sensor separating air/gas in the liquid.
- Ensure that the sensor is not emptied of liquid (during normal operation) otherwise incorrect measurement will occur.

Horizontal



Liquid and gas application

Vertical



Liquid application (left), gas application (right)

Integration (continued)

Installation guidelines for SITRANS FC300 sensor

Horizontal installation as shown in figure A is recommended with gas or liquid applications.

This installation is also recommended when the flow velocity is low (< 1 m/s) or the liquid contains solid particles or air bubbles.

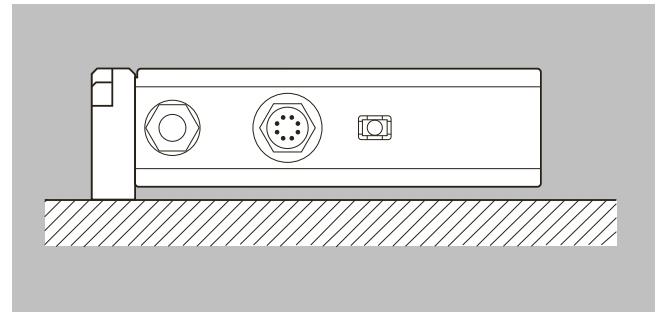
Vertical installation as shown in figure B can be used for liquid or gas applications.

For liquid applications upwards flow is recommended to facilitate the removal of air bubbles and to avoid partly emptying of the sensor.

For gas applications we recommend to place the flow inlet on the sensor high and the outlet low to remove impurities and oil films.

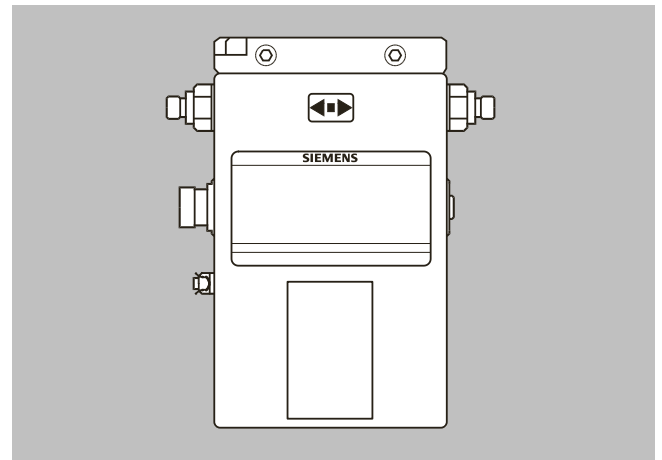
- To ensure that the sensor does not become partly empty, there must be a sufficient counter-pressure on the unit min. 0.2 bar (2.9 psi)
- Mount the sensor on a vibration-free and plane wall or steel frame
- Locate the sensor low in the system in order to avoid under-pressure in the sensor separating air/gas in the liquid
- Ensure that the sensor is not emptied of liquid (during normal operation) otherwise incorrect measurement will occur

Horizontal mounting (recommended)



Liquid or gas (low to high flow)

Vertical mounting



Liquid or gas (medium to high flow)

Technical specifications

Versions dimensions	DI 1.5 (1/16)	DI 3 (1/8)	DI 6 (¼)	DI 15 (5/8)	FC300 DN 4
Inside pipe diameter [mm (inch)] Sensor consists of one continuous pipe	1.5 (0.06)	3.0 (0.12)	6.0 (0.24)	14.0 (0.55)	SS: 3.5 (0.14) Hast. 3.0 (0.12)
Pipe wall thickness [mm (inch)]	0.25 (0.01)	0.5 (0.02)	1.0 (0.04)	1.0 (0.04)	SS: 0.25 (0.0098) Hast. 0.5 (0.0196)
Mass flow measuring range (liquids) [kg/h (lb/h)]	0 ... 30 (0 ... 66)	0 ... 250 (0 ... 550)	0 ... 1 000 (0 ... 2 200)	0 ... 5 600 (0 ... 12 345)	0 ... 350 (0 ... 772)
Density (for liquids) [g/cm ³ (lb/inch ³)]	0 ... 2.9 (0 ... 0.10)	0 ... 2.9 (0 ... 0.10)	0 ... 2.9 (0 ... 0.10)	0 ... 2.9 (0 ... 0.10)	0 ... 2.9 (0 ... 0.10)
Fraction e.g. [°Brix]	0 ... 100	0 ... 70 (applicable temperature range: 10 ... 99 °C (50 ... 210.2 °F))	0 ... 70 (applicable temperature range: 10 ... 99 °C (50 ... 210.2 °F))	0 ... 70 (applicable temperature range: 10 ... 99 °C (50 ... 210.2 °F))	0 ... 100
Temperature					
Media temperature	-50 ... +180 °C (-58 ... +356 °F)	-50 ... +180 °C (-58 ... +356 °F)	-50 ... +180 °C (-58 ... +356 °F)	-50 ... +180 °C (-58 ... +356 °F)	-40 ... 115 (40 ... 239) -40 ... 180 (40 ... 356)
Ambient temperature	-20 ... +50 °C (-4 ... +122 °F)	-20 ... +50 °C (-4 ... +122 °F)	-20 ... +50 °C (-4 ... +122 °F)	-20 ... +50 °C (-4 ... +122 °F)	-20 ... +50 °C (-4 ... +122 °F)
Liquid pressure measuring pipe¹⁾					
Stainless steel [bar (psi)]	230 (3 336)	230 (3 336)	265 (3 844)	130 (1 885)	130 (1 885)
Hastelloy C22/2.4602 [bar (psi)]	365 (5 294)	350 (5 076)	410 (5 946)	200 (2 900)	410 (5 945)
Materials	Measuring pipe, flange and thread connection Stainless steel AISI 316L/1.4435 Hastelloy C22/2.4602				
Enclosure and enclosure material	IP67 (NEMA 4) and stainless steel AISI 326L/1.4404 The housing is not rated for pressure containment				
Process connections²⁾					
Flange					
• DIN 1092-1, PN 40			DN 10	DN 15	
• ANSI B16.5, Class 150			½"	½"	
• ANSI B16.5, Class 600 (Class 300)			½"	½"	
Dairy (screwed connection, PN 16/25/40) ³⁾					
• DIN 11851			DN 10	DN 15	
• ISO 2853/BS 4825 part 4 (SS3351)			25 mm	25 mm	
Dairy clamp connection (PN 16) ³⁾					
• ISO 2853/BS 4825 part 3 (SS3016)			25 mm	25 mm	
Thread					
• ISO 228/1, PN 100	G¼" male	G¼" female	G¼" male	G½" male	G¼" male
• ANSI/ASME B1.20.1, PN 100	¼" NPT male	¼" NPT female	¼" NPT male	½" NPT male	¼" NPT male
Ex-version (sensor)					
• ATEX, IECEX, EAC Ex	Zone 0: Ex ia IIC T3...T6 Ga				
• UL (c-UL-us)	Class I, Div. 1: Grp. A, B, C, D				
• cCSAus	Class 1 Div 1 or Class 1 Zone1				

1) Max. at 20 °C (68 °F), DIN 2413, DIN 17457

2) Other connections to order, see "Selection and Ordering data"

3) Material, AISI 316/1.4401 or corresponding

For accuracy specification see "System information SITRANS FC".

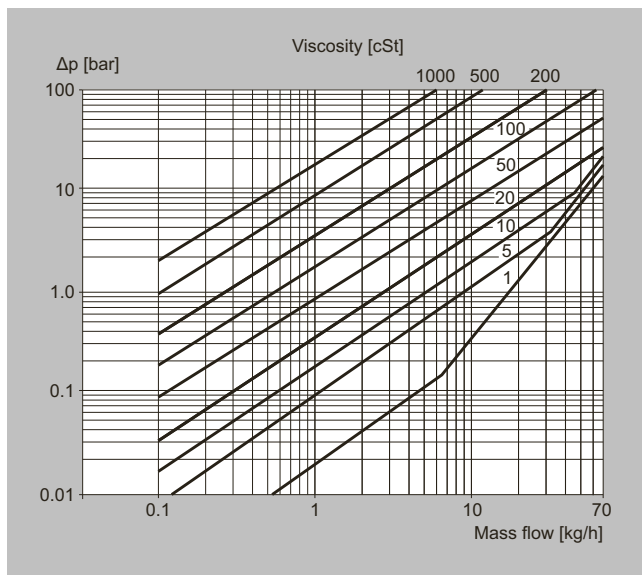
Flow Measurement

SITRANS FC (Coriolis)

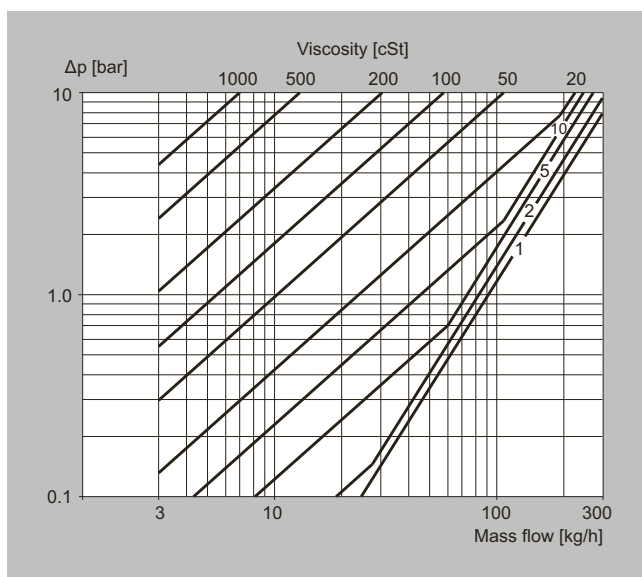
Sensors and Flowmeter systems / SITRANS FC MASS 2100 and FC300 DN 4

Technical specifications (continued)

Pressure drop MASS 2100

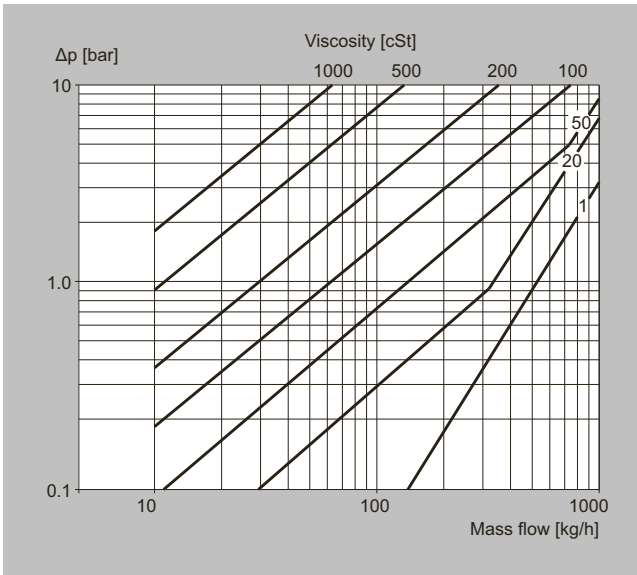


MASS 2100 DI 1.5 (1/16"), pressure drop for density = 1 000 kg/m³

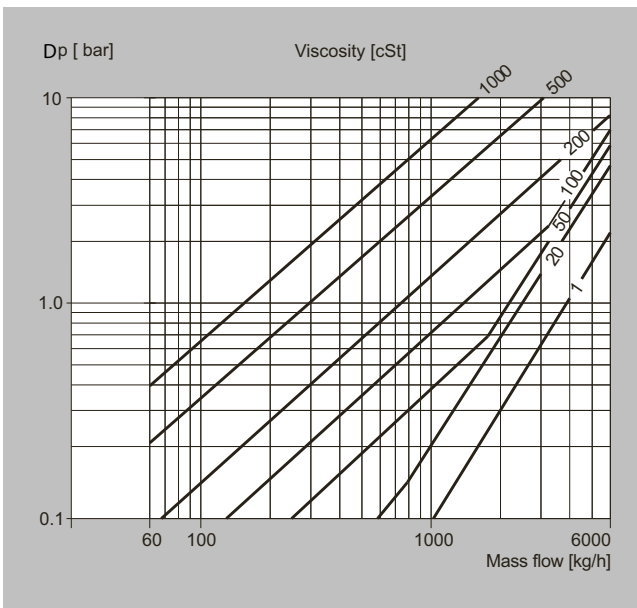


MASS 2100 DI 3 (1/8"), pressure drop for density = 1 000 kg/m³

Technical specifications (continued)



MASS 2100 DI 6 (1/4"), pressure drop for density = 1 000 kg/m³



MASS 2100 DI 15 (1/2"), pressure drop for density = 101 500 kg/m³

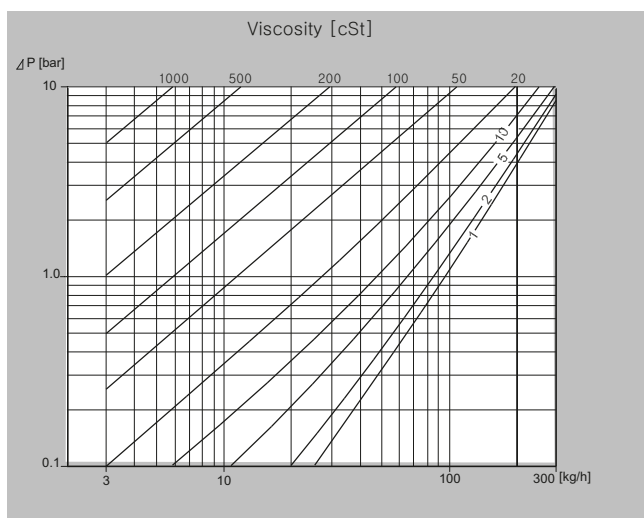
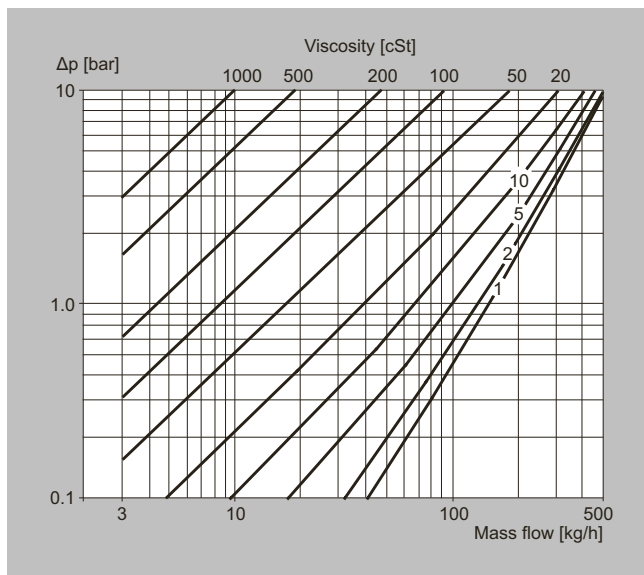
Flow Measurement

SITRANS FC (Coriolis)

Sensors and Flowmeter systems / SITRANS FC MASS 2100 and FC300 DN 4

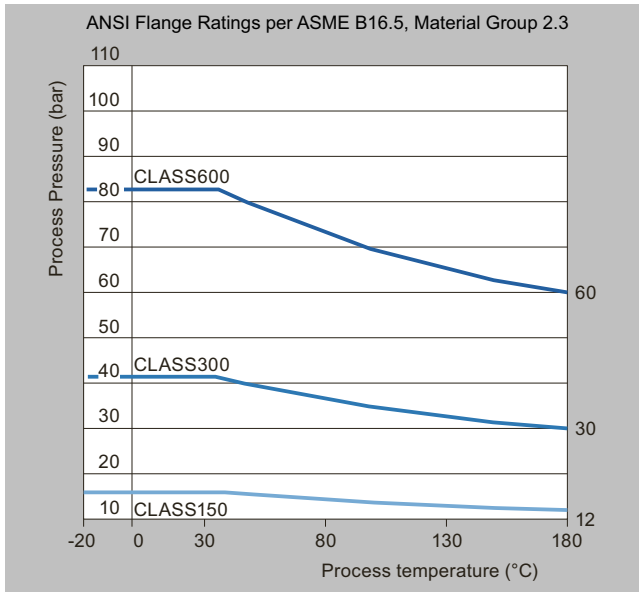
Technical specifications (continued)

Pressure drop FC300 DN4

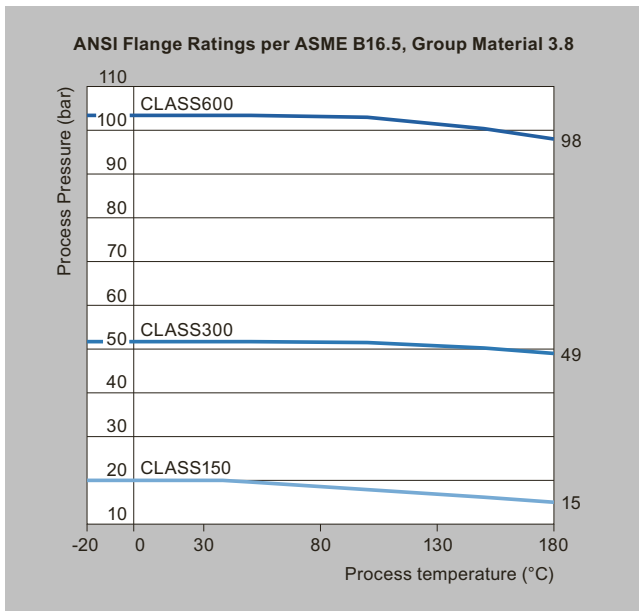


Technical specifications (continued)

Pressure/temperature curves MASS 2100 DI 3 ... 15



ASME flanges B16.5 stainless steel



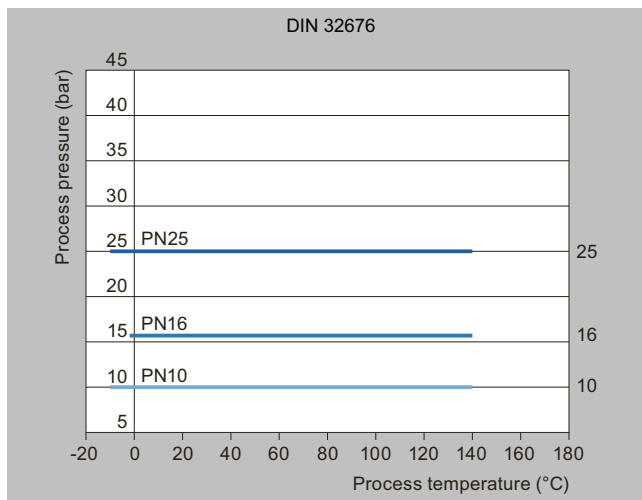
ASME flanges B16.5 Hastelloy C22/2.4602

Flow Measurement

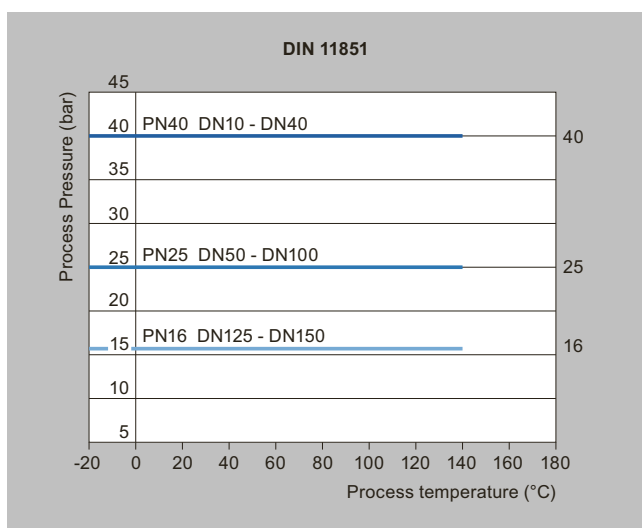
SITRANS FC (Coriolis)

Sensors and Flowmeter systems / SITRANS FC MASS 2100 and FC300 DN 4

Technical specifications (continued)

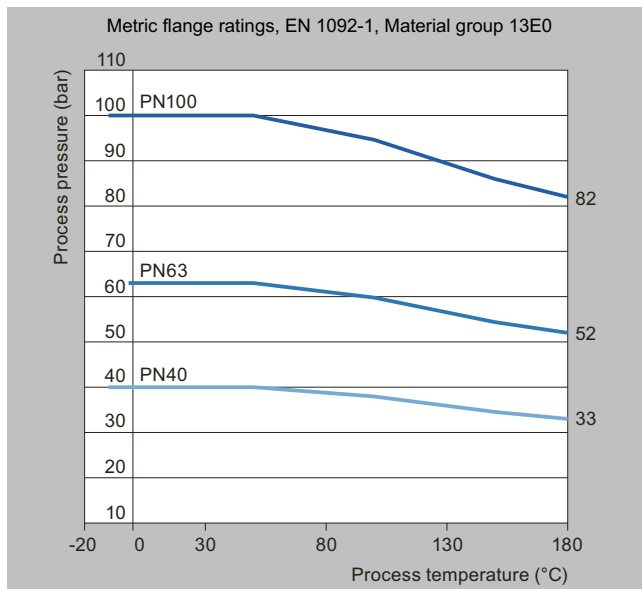


DIN 32676 flanges stainless steel (PN 10 ... PN 25)

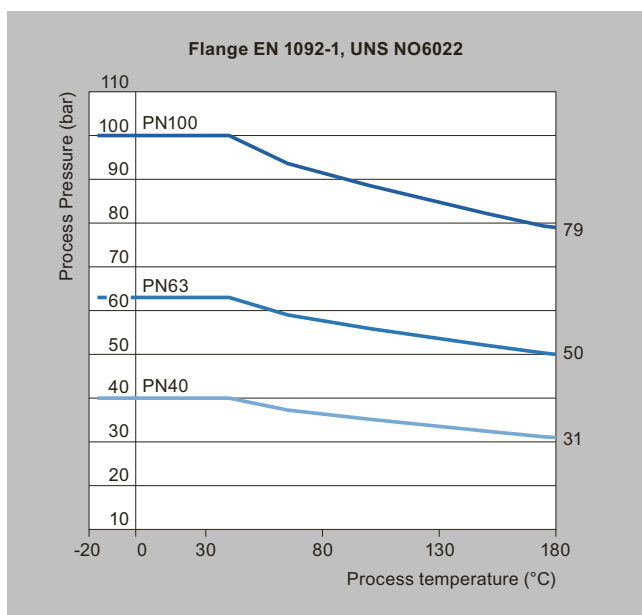


DIN 11851 flanges stainless steel (PN 25 ... PN 40)

Technical specifications (continued)



EN 1092 flanges stainless steel (PN 40 ... PN 100)



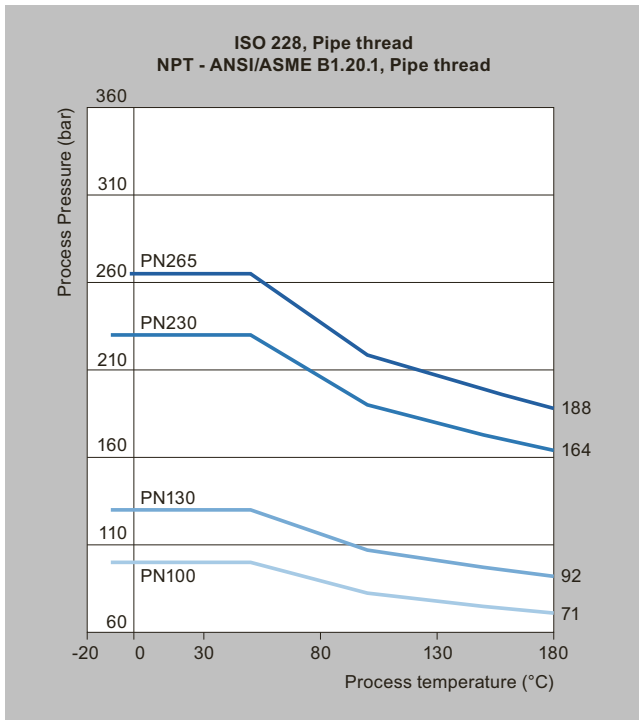
EN 1092 flanges Hastelloy C22/2.4602 (PN 40 ... PN 100)

Flow Measurement

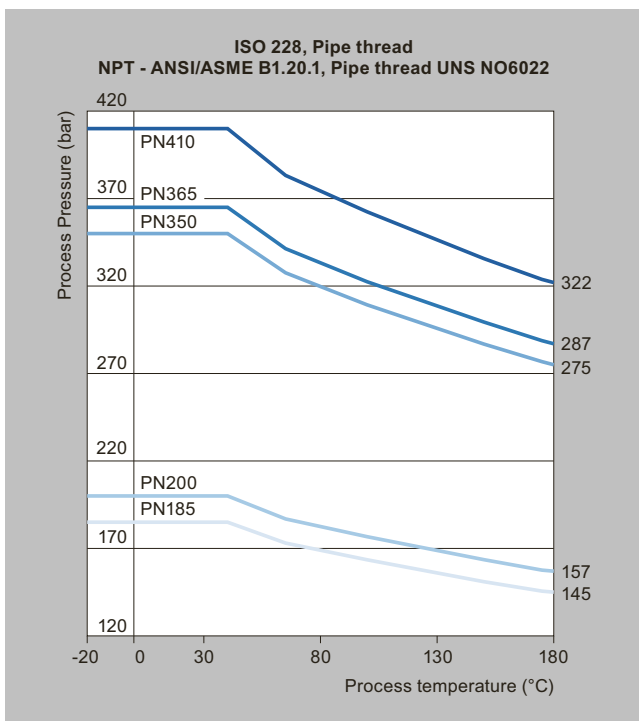
SITRANS FC (Coriolis)

Sensors and Flowmeter systems / SITRANS FC MASS 2100 and FC300 DN 4

Technical specifications (continued)



ISO 228 and NPT pipe thread stainless steel (PN 100 ... PN 265)

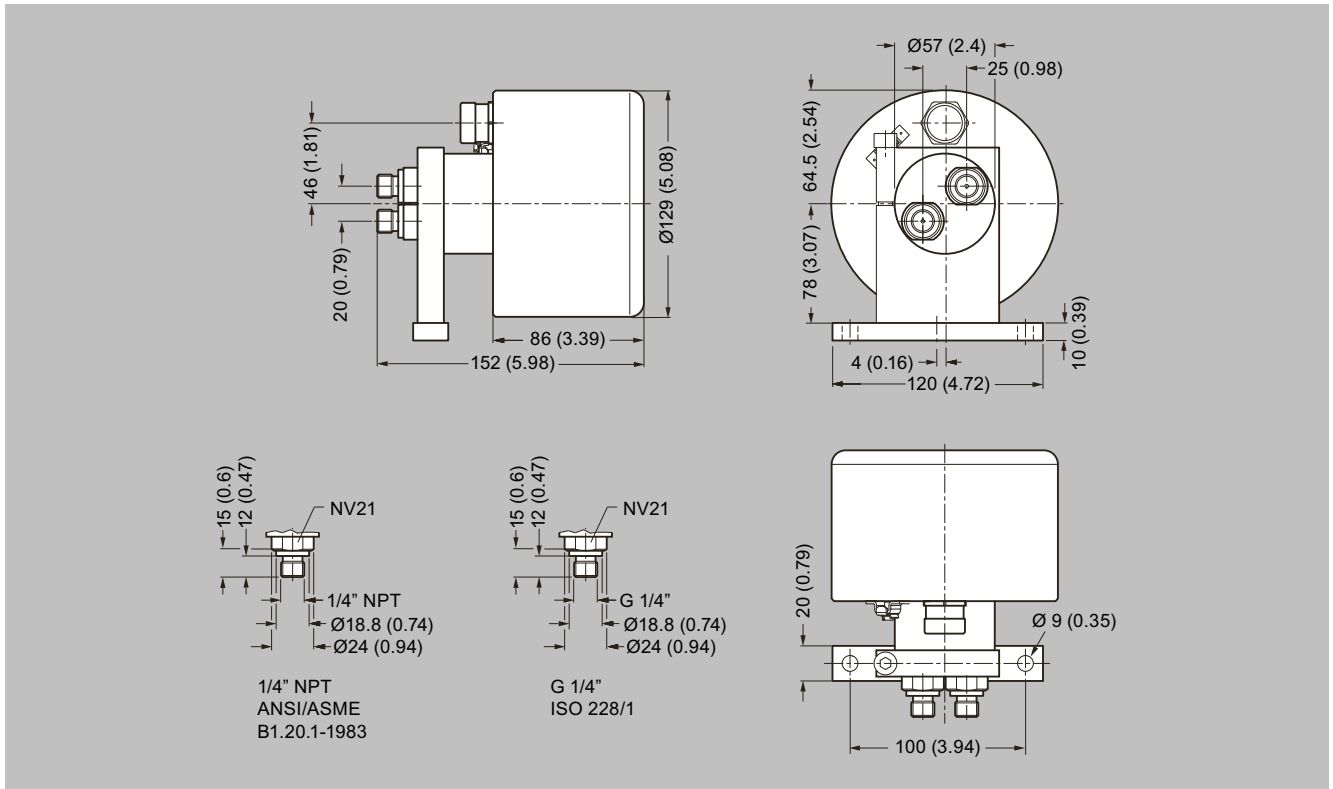


ISO 218 and NPT pipe thread stainless steel (PN 185 ... PN 410)

For further information on the PED standard and requirements, see the pressure equipment directives 2014/68/EU.

Dimensional drawings

MASS 2100 DI 1.5 (1/16")



Dimensions in mm (inch)

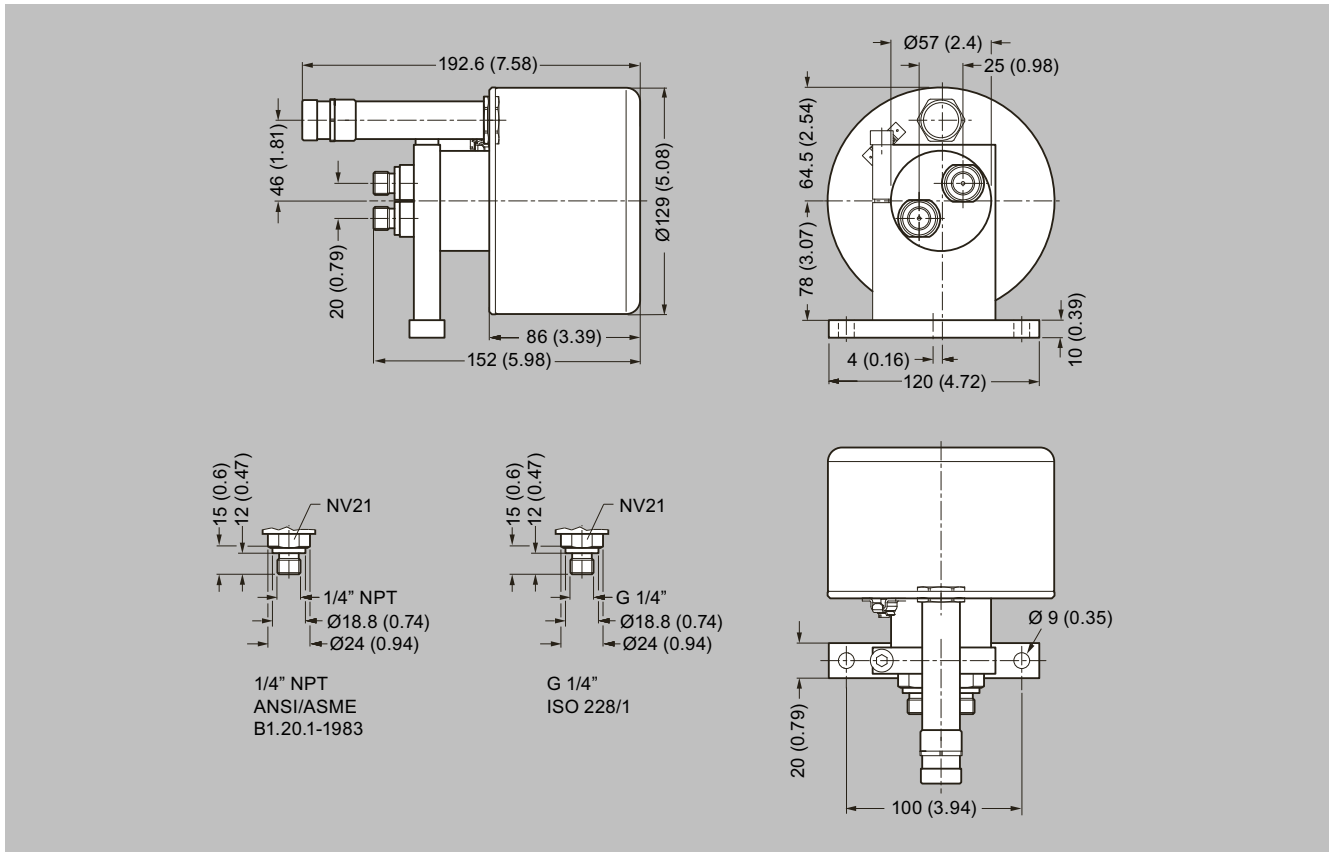
Flow Measurement

SITRANS FC (Coriolis)

Sensors and Flowmeter systems / SITRANS FC MASS 2100 and FC300 DN 4

Dimensional drawings (continued)

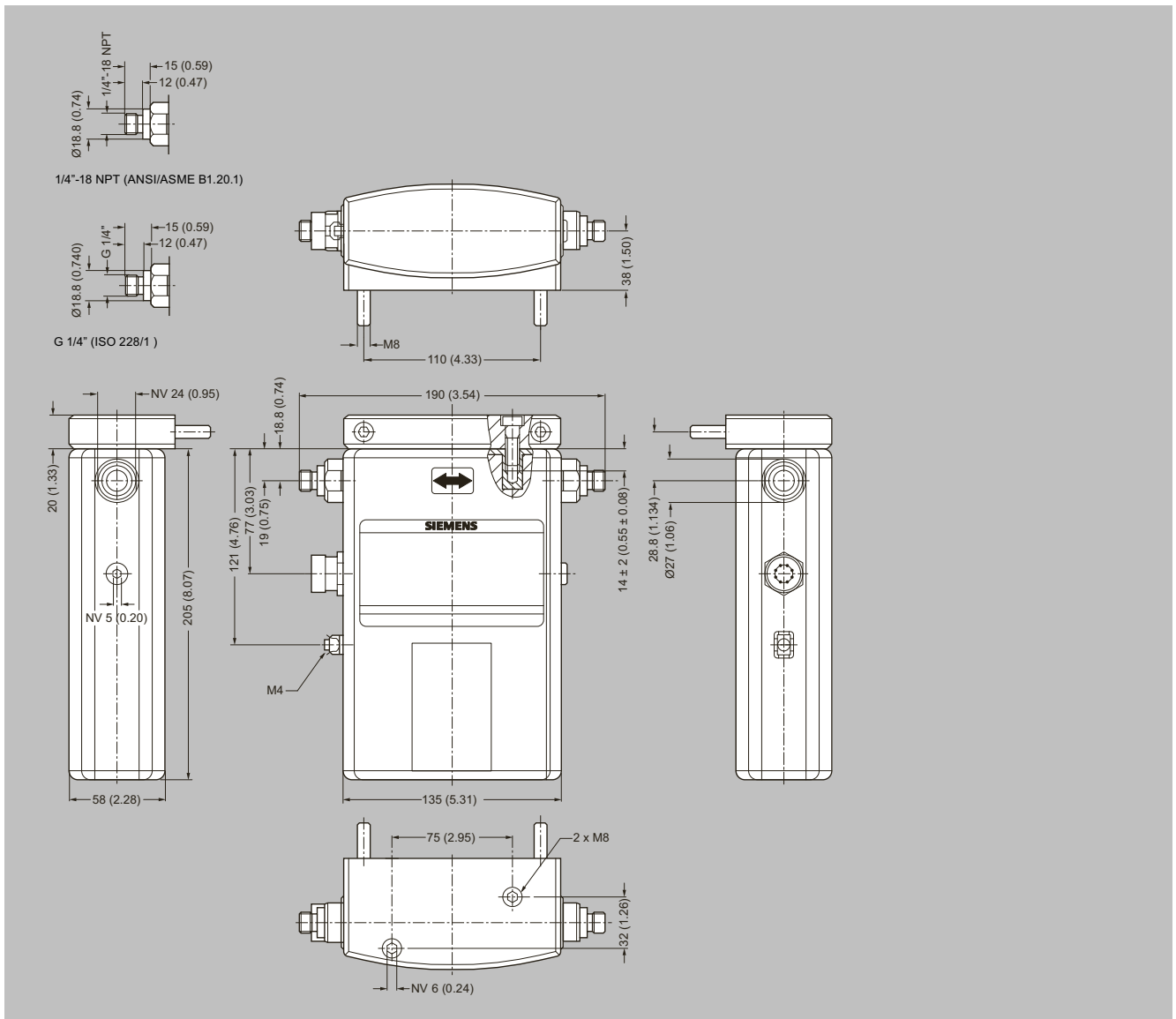
MASS 2100 DI 1.5 High-temperature version to 180 °C (356 °F)



Dimensions in mm (inch)

Dimensional drawings (continued)

SITRANS FC300 DN 4



SITRANS FC300, weight 3.5 kg (7.7 lb), dimensions in mm (inch)

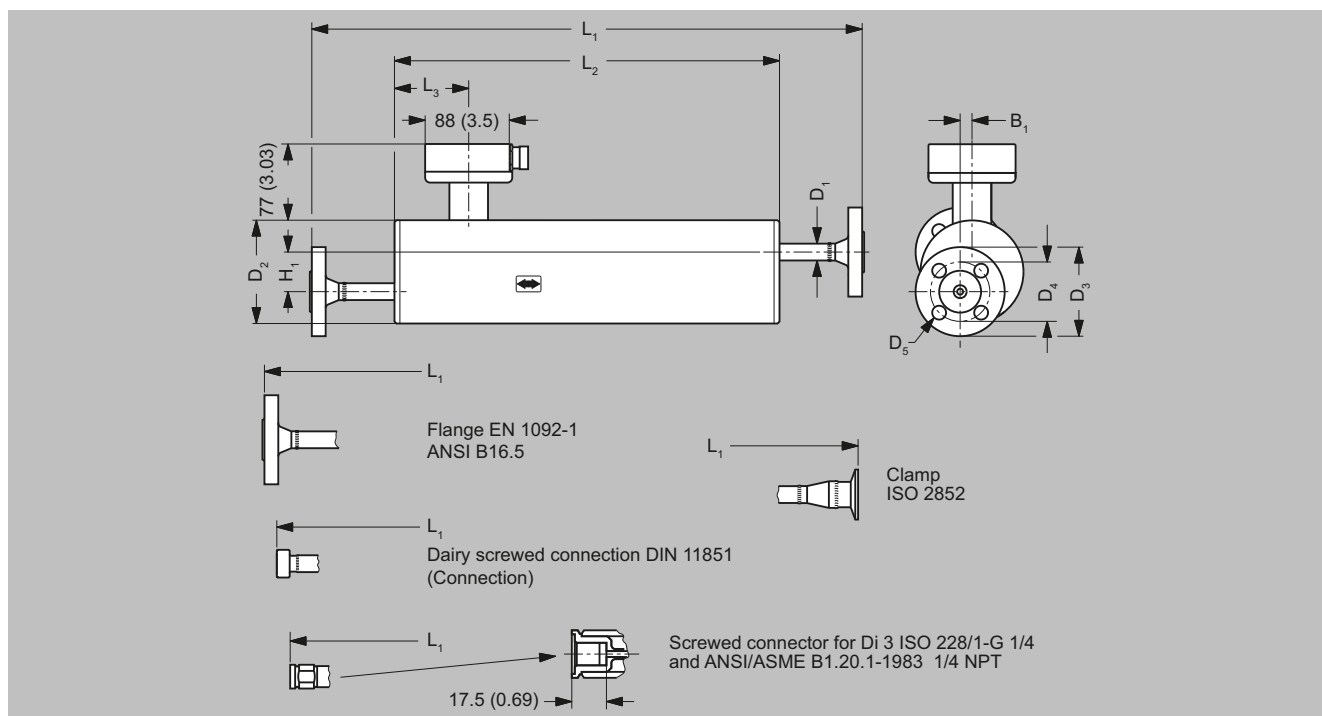
Flow Measurement

SITRANS FC (Coriolis)

Sensors and Flowmeter systems / SITRANS FC MASS 2100 and FC300 DN 4

Dimensional drawings (continued)

MASS 2100 sensor for analog cable connection



Dimensions in mm (inch)

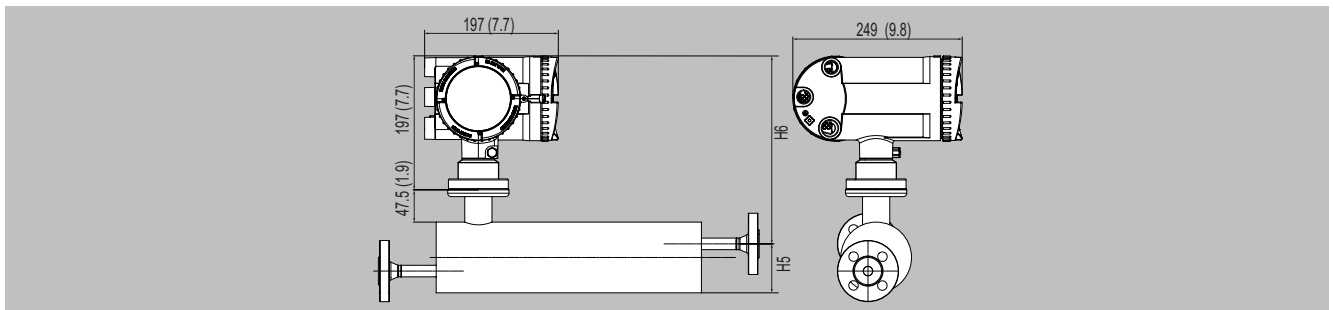
Sensor size	Connections Type	Pressure rating	Size	L1 mm (inch)	L2	L3	H1	B1	D1	D2
DN 3 (1/8")	Pipe thread ISO 228/1 - G 1/4 (female)	PN 100	1/4"	470 (18.50)	280 (11.02)	75.5 (2.97)	60 (2.36)	0	21.3 (0.84)	104 (4.09)
		PN 230	1/4"	470 (18.50)	280 (11.02)	75.5 (2.97)	60 (2.36)	0	21.3 (0.84)	104 (4.09)
		PN 350	1/4"	470 (18.50)	280 (11.02)	75.5 (2.97)	60 (2.36)	0	21.3 (0.84)	104 (4.09)
	Pipe thread ANSI/ASME B 1.20.1 - 1/4" NPT (female)	PN 100	1/4"	470 (18.50)	280 (11.02)	75.5 (2.97)	60 (2.36)	0	21.3 (0.84)	104 (4.09)
		PN 230	1/4"	470 (18.50)	280 (11.02)	75.5 (2.97)	60 (2.36)	0	21.3 (0.84)	104 (4.09)
		PN 350	1/4"	470 (18.50)	280 (11.02)	75.5 (2.97)	60 (2.36)	0	21.3 (0.84)	104 (4.09)
DN 6 (1/4")	Pipe thread ISO 228/1 - G 1/4 (male)	PN 100	1/4"	564 (22.20)	390 (15.35)	62 (2.44)	40 (1.57)	12 (0.47)	17 (0.67)	104 (4.09)
		PN 265	1/4"	564 (22.20)	390 (15.35)	62 (2.44)	40 (1.57)	12 (0.47)	17 (0.67)	104 (4.09)
		PN 410	1/4"	564 (22.20)	390 (15.35)	62 (2.44)	40 (1.57)	12 (0.47)	17 (0.67)	104 (4.09)
	Pipe thread ANSI/ASME B 1.20.1 - 1/4" NPT (male)	PN 100	1/4"	564 (22.20)	390 (15.35)	62 (2.44)	40 (1.57)	12 (0.47)	17 (0.67)	104 (4.09)
		PN 265	1/4"	564 (22.20)	390 (15.35)	62 (2.44)	40 (1.57)	12 (0.47)	17 (0.67)	104 (4.09)
		PN 410	1/4"	564 (22.20)	390 (15.35)	62 (2.44)	40 (1.57)	12 (0.47)	17 (0.67)	104 (4.09)
	Flange EN 1092-1	PN 40	DN 10	562 (22.13)	390 (15.35)	62 (2.44)	40 (1.57)	12 (0.47)	17 (0.67)	104 (4.09)
		PN 100	DN 10	640 (25.20)	390 (15.35)	62 (2.44)	40 (1.57)	12 (0.47)	17 (0.67)	104 (4.09)
	Flange ANSI B16.5	PN 100	DN 10	582 (22.91)	390 (15.35)	62 (2.44)	40 (1.57)	12 (0.47)	17 (0.67)	104 (4.09)
		PN 150	DN 15	653 (25.71)	390 (15.35)	62 (2.44)	40 (1.57)	12 (0.47)	17 (0.67)	104 (4.09)
		Class 150	1/2"	627 (24.69)	390 (15.35)	62 (2.44)	40 (1.57)	12 (0.47)	17 (0.67)	104 (4.09)
		Class 300	3/4"	672 (26.46)	390 (15.35)	62 (2.44)	40 (1.57)	12 (0.47)	17 (0.67)	104 (4.09)
		Class 600	1/2"	610 (24.02)	390 (15.35)	62 (2.44)	40 (1.57)	12 (0.47)	17 (0.67)	104 (4.09)
	Screwed connection DIN 11851	PN 40	DN 10	534 (21.02)	390 (15.35)	62 (2.44)	40 (1.57)	12 (0.47)	17 (0.67)	104 (4.09)
		PN 150	DN 15	574 (22.60)	390 (15.35)	62 (2.44)	40 (1.57)	12 (0.47)	17 (0.67)	104 (4.09)
Clamp ISO 2852	PN 16	25 mm	572 (22.52)	390 (15.35)	62 (2.44)	40 (1.57)	12 (0.47)	17 (0.67)	104 (4.09)	
	PN 25	DN 25	575 (22.64)	390 (15.35)	62 (2.44)	40 (1.57)	12 (0.47)	17 (0.67)	104 (4.09)	
DN 15 (1/2")	Pipe thread ISO 228/1 - G 1/2 (male)	PN 100	1/2"	618 (24.33)	444 (17.48)	75 (2.97)	44 (1.73)	20 (0.79)	21.3 (0.84)	129 (5.08)
		PN 130	1/2"	618 (24.33)	444 (17.48)	75 (2.97)	44 (1.73)	20 (0.79)	21.3 (0.84)	129 (5.08)
		PN 200	1/2"	618 (24.33)	444 (17.48)	75 (2.97)	44 (1.73)	20 (0.79)	21.3 (0.84)	129 (5.08)

Dimensional drawings (continued)

Sensor size	Connections Type	Pressure rating	Size	L1 mm (inch)	L2	L3	H1	B1	D1	D2	
DN 15 (½")	Pipe thread ANSI/ASME B 1.20.1 - ½" NPT (male)	PN 100	½"	618 (24.33)	444 (17.48)	75 (2.97)	44 (1.73)	20 (0.79)	21.3 (0.84)	129 (5.08)	
		PN 130	½"	618 (24.33)	444 (17.48)	75 (2.97)	44 (1.73)	20 (0.79)	21.3 (0.84)	129 (5.08)	
		PN 200	½"	618 (24.33)	444 (17.48)	75 (2.97)	44 (1.73)	20 (0.79)	21.3 (0.84)	129 (5.08)	
	Flange EN 1092-1	PN 40	DN 15	44 (1.73)	622 (24.49)	444 (17.48)	75 (2.97)	44 (1.73)	20 (0.79)	21.3 (0.84)	129 (5.08)
			DN 25	44 (1.73)	724 (28.50)	444 (17.48)	75 (2.97)	44 (1.73)	20 (0.79)	21.3 (0.84)	129 (5.08)
		PN 100	DN 15	44 (1.73)	635 (25.00)	444 (17.48)	75 (2.97)	44 (1.73)	20 (0.79)	21.3 (0.84)	129 (5.08)
			DN 25	44 (1.73)	760 (29.92)	444 (17.48)	75 (2.97)	44 (1.73)	20 (0.79)	21.3 (0.84)	129 (5.08)
	Flange ANSI B16.5	Class 150	½"	44 (1.73)	641 (25.24)	444 (17.48)	75 (2.97)	44 (1.73)	20 (0.79)	21.3 (0.84)	129 (5.08)
			¾"	44 (1.73)	719 (25.24)	444 (17.48)	75 (2.97)	44 (1.73)	20 (0.79)	21.3 (0.84)	129 (5.08)
		Class 600	½"	44 (1.73)	661 (26.02)	444 (17.48)	75 (2.97)	44 (1.73)	20 (0.79)	21.3 (0.84)	129 (5.08)
			¾"	44 (1.73)	742 (29.21)	444 (17.48)	75 (2.97)	44 (1.73)	20 (0.79)	21.3 (0.84)	129 (5.08)
	Screwed connection DIN 11851	PN 40	DN 15	44 (1.73)	588 (23.15)	444 (17.48)	75 (2.97)	44 (1.73)	20 (0.79)	21.3 (0.84)	129 (5.08)
			DN 25	44 (1.73)	674 (26.54)	444 (17.48)	75 (2.97)	44 (1.73)	20 (0.79)	21.3 (0.84)	129 (5.08)
	Clamp ISO 2852	PN 16	DN 25	44 (1.73)	626 (24.65) ¹⁾	444 (17.48)	75 (2.97)	44 (1.73)	20 (0.79)	21.3 (0.84)	129 (5.08)
	Hygienic screwed ISO 2853		DN 25	44 (1.73)	629 (24.76)	444 (17.48)	75 (2.97)	44 (1.73)	20 (0.79)	21.3 (0.84)	129 (5.08)

¹⁾ For Hastelloy L1 is 628 mm (24.72 inch)

Compact with FCT030



Dimensions in mm (inch)

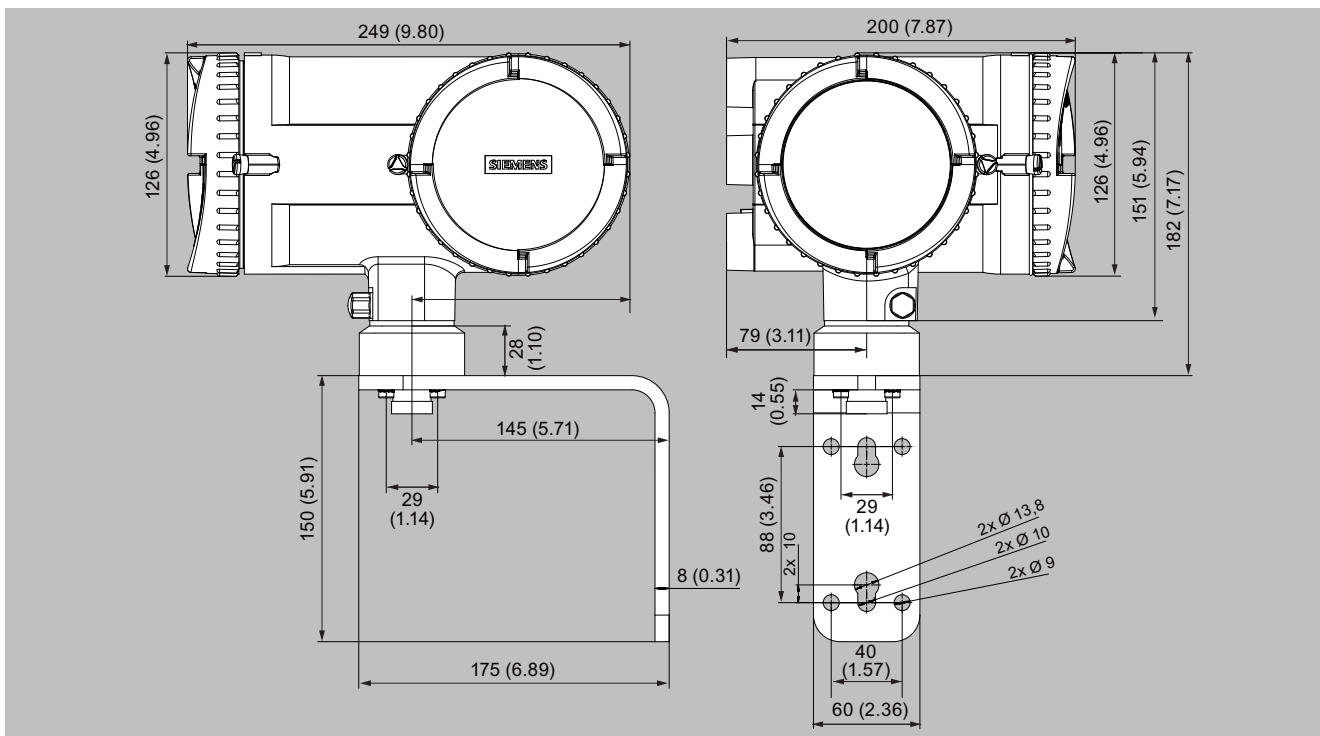
Flow Measurement

SITRANS FC (Coriolis)

Sensors and Flowmeter systems / SITRANS FC MASS 2100 and FC300 DN 4

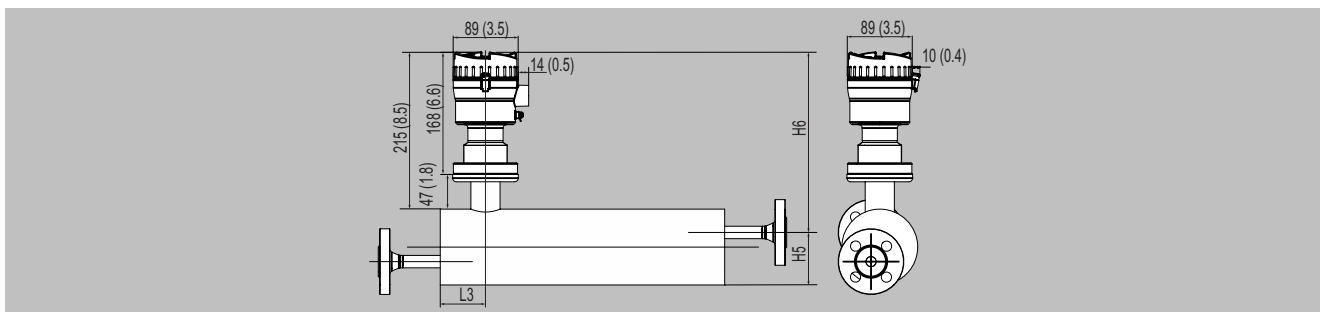
Dimensional drawings (continued)

Transmitter FCT030 remote field mount for M20 analog cable connection



Dimensions in mm (inch)

Compact with FCT010



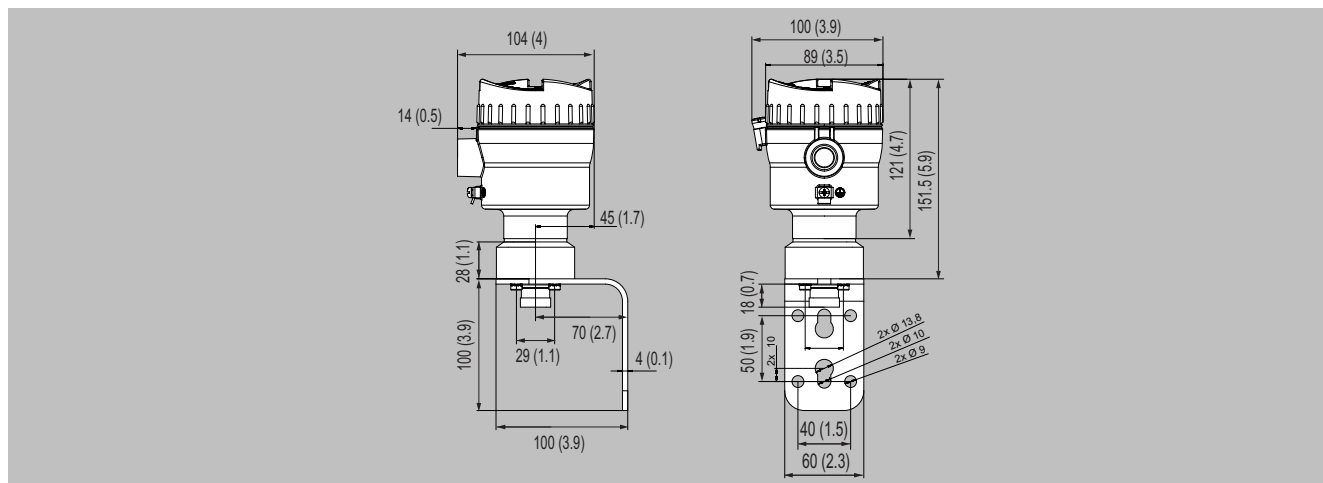
Dimensions in mm (inch)

MASS 2100 with FCT010 transmitter compact

Sensor size	L3 mm (inch)	H5	H6	H5 + H6
DN 3 (1/8")	75.5 (2.97)	82 (3.23)	237 (9.33)	319 (12.56)
DN 6 (1/4")	62 (2.44)	72 (2.83)	247 (9.72)	319 (12.56)
DN 15 (1/2")	75 (2.97)	86.5 (3.41)	257 (10.11)	343.5 (13.52)

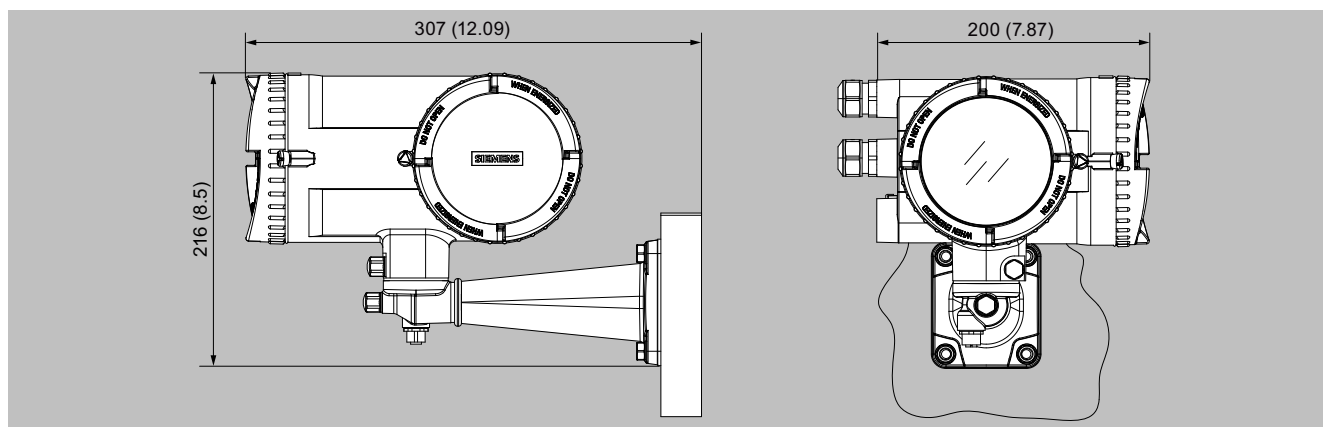
Dimensional drawings (continued)

Dimensions for the FCT010 remote mounted (for analog cable connections for MASS 2100 / FC300 DN4)



Dimensions in mm (inch)

Transmitter FCT030 remote field mount for M12 digital cable connection



Dimensions in mm (inch)

MASS 2100 sensor with "heating jacket"

Sensor size	Connections heated		Size	L5 mm (inch)	H3	B2	D6	D7	D8
	Type	Pressure rating							
DN 3 (1/8")	EN 1092-1	PN 40	DN 15	234 (9.21)	122 (4.8)	22 (0.87)	95 (3.74)	65 (2.56)	14 (0.55)
	ANSI B16.5	Class 150	1/2"	234 (9.21)	131.6 (5.18)	22 (0.87)	88.9 (3.5)	60.5 (2.38)	15.7 (0.62)
DN 6 (1/4")	EN 1092-1	PN 40	DN 15	234 (9.21)	112 (4.41)	22.7 (0.89)	95 (3.74)	65 (2.56)	65 (2.56)
	ANSI B16.5	Class 150	1/2"	234 (9.21)	121.6 (4.79)	22.7 (0.89)	88.9 (3.5)	60.5 (2.38)	60.5 (2.38)
DN 15 (1/2")	EN 1092-1	PN 40	DN 15	234 (9.21)	126.5 (4.98)	31.5 (1.24)	95 (3.74)	65 (2.56)	65 (2.56)
	ANSI B16.5	Class 150	1/2"	234 (9.21)	136.1 (5.36)	31.5 (1.24)	88.9 (3.5)	60.5 (2.38)	60.5 (2.38)

Flow Measurement

SITRANS FC (Coriolis)

Sensors and Flowmeter systems / SITRANS FC MASS 2100 and FC300 DN 4 / MASS 2100 / FC300 DN 4 with FCT030

Overview



Sensors MASS 2100 and FC300 DN 4 with FCT010 / FCT030 transmitters

The SITRANS MASS 2100 and FC300 DN 4 system consists of a SITRANS sensor and a SITRANS FCT030 transmitter.

The flowmeter comes in a compact and remote design depending for all MASS 2100 DI 3 to DI 15.

MASS 2100 DI 1.5 and FC300 DN4 are only available with analogue connection of the FCT030 transmitter.

The flowmeter is based on the latest developments within digital signal processing technology – engineered for high measuring performance:

- Fast response to rapid changes in flow
- Fast dosing applications
- High immunity against process noise
- High turndown ratio of flowrates
- Suitable for liquid and gas service
- Easy to install, commission and maintain

FCT030 is available with current output HART 7.5, Modbus RS 485 RTU, PROFIBUS DP or PROFIBUS PA as standard on Channel 1. Additional functions can be freely configured for analog, pulse, frequency, relay or status output or binary input.

The transmitter comes with a user-configurable graphical display and SensorFlash, a microSD card for configuration backup, firmware update and data storage.

Benefits

- High accuracy better than 0.1 % of mass flow rate
- Large dynamic turn-down ratio better than 500:1
- Densitometer performance available through density accuracy (depending upon sensor size) ranging from 0.0005 to 0.0015 g/cm³ with a typical repeatability better than 0.0001 to 0.0002 g/cm³
- Single continuous tube design, with no internal welds, reductions or flow splitters offers optimal hygiene, safety and CIP cleanability for food and beverage and pharmaceutical applications
- Markets biggest wall thickness, ensuring optimal life-time and corrosion resistance and high-pressure durability
- Balanced pipe design with little mechanical energy-loss, ensures optimal performance and stability under non-ideal and unstable process conditions (pressure, temperature, density-changes etc.)
- Full bore design provides lower pressure loss due to same internal diameter throughout the entire sensor
- 4-wire Pt1000 temperature measurement ensures optimum accuracy on mass flow, density and fraction flow
- Multi-plug electrical connector enables true “plug & play”
- Sensor pipe available in high-quality stainless steel AISI 316L/1.4435 or Hastelloy C22/2.4602 offering optimum corrosion resistance
- Centre-block design decouples process noise from the environment such as vibrations, pulsations, pressure shocks etc. making installation flexible and versatile
- Rugged and space-saving sensor design in stainless steel matching all environments
- High-pressure program as standard

Selection and ordering data

SITRANS FC sensors MASS 2100/FC300 with FCT030 transmitter	Article No. 7ME4813-	Order code
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Sensor type and connector size		
MASS 2100 DI 1.5, 1/4"	1 G	
MASS 2100 DI 3, 1/4"	3 A	
MASS 2100 DI 3, 1/4" Heated w. DIN	3 B	
MASS 2100 DI 3, 1/4" Heated w. ANSI	3 C	
FC300 DN 4, 1/4"	4 A	
MASS 2100 DI 6, 1/4"	6 A	
MASS 2100 DI 6, 1/4" Heated w. EN	6 B	
MASS 2100 DI 6, 1/4" Heated w. ANSI	6 C	
MASS 2100 DI 6, DN 10	6 D	
MASS 2100 DI 6, DN 10 Heated w. EN	6 E	
MASS 2100 DI 6, DN 10 Heated w. ANSI	6 F	
MASS 2100 DI 6, DN 15 (1/2")	6 G	
MASS 2100 DI 6, DN 15 (1/2") Heated w. EN	6 H	
MASS 2100 DI 6, DN 15 (1/2") Heated w. ANSI	6 J	
MASS 2100 DI 6, DN 20 (3/4")	6 K	
MASS 2100 DI 6, DN 20 (3/4") Heated w. EN	6 L	
MASS 2100 DI 6, DN 20 (3/4") Heated w. ANSI	6 M	
MASS 2100 DI 6, DN 25 (1")	6 N	
MASS 2100 DI 6, DN 25 (1") Heated w. EN	6 P	
MASS 2100 DI 6, DN 25 (1") Heated w. ANSI	6 Q	
MASS 2100 DI 15, DN 15 (1/2")	7 A	
MASS 2100 DI 15, DN 15 (1/2") Heated w. EN	7 B	
MASS 2100 DI 15, DN 15 (1/2") Heated w. ANSI	7 C	
MASS 2100 DI 15, DN 20 (3/4")	7 D	
MASS 2100 DI 15, DN 20 (3/4") Heated w. EN	7 E	
MASS 2100 DI 15, DN 20 (3/4") Heated w. ANSI	7 F	
MASS 2100 DI 15, DN 25 (1")	7 G	
MASS 2100 DI 15, DN 25 (1") Heated w. EN	7 H	
MASS 2100 DI 15, DN 25 (1") Heated w. ANSI	7 J	
Process connection/Pressure		
No connections (spare part transmitter)	A 0	
EN 1092-1 B1, PN 40	A 1	
EN 1092-1 B1, PN 100	A 3	
ASME B16.5, RF, Class 150	D 1	
ASME B16.5, RF, Class 600	D 3	
DIN 11851 crewed connection	F 1	
ISO 2852 hygienic clamped	J 1	
ISO 2853 hygienic screwed	J 5	
ISO 228-1 pipe thread, PN 100	C 1	
ISO 228-1 pipe thread, PN 130	C 2	
ISO 228-1 pipe thread, PN 200	C 3	
ISO 228-1 pipe thread, PN 230	C 4	
ISO 228-1 pipe thread, PN 265	C 5	
ISO 228-1 pipe thread, PN 350	C 6	
ISO 228-1 pipe thread, PN 365	C 7	
ISO 228-1 pipe thread, PN 410	C 8	
NPT ASME B 1.20.1 pipe thread, PN 100	N 1	
NPT ASME B 1.20.1 pipe thread, PN 130	N 2	
NPT ASME B 1.20.1 pipe thread, PN 200	N 3	
NPT ASME B 1.20.1 pipe thread, PN 230	N 4	
NPT ASME B 1.20.1 pipe thread, PN 265	N 5	
NPT ASME B 1.20.1 pipe thread, PN 350	N 6	
NPT ASME B 1.20.1 pipe thread, PN 365	N 7	
NPT ASME B 1.20.1 pipe thread, PN 410	N 8	

Flow Measurement

SITRANS FC (Coriolis)

Sensors and Flowmeter systems / SITRANS FC MASS 2100 and FC300 DN 4 / MASS 2100 / FC300 DN 4 with FCT030

Selection and ordering data (continued)

	Article No. 7ME4813-	Order code
SITRANS FC sensors MASS 2100/FC300 with FCT030 transmitter		
Tube material (wetted) and max. operational temperature		
AISI 316L/EN 1.4435, max. 115 °C	1	
AISI 316L/EN 1.4435, max. 125 °C	2	
AISI 316L/EN 1.4435, max. 180 °C	3	
Hastelloy C22/UNS N06022/EN 2.4602, max. 115 °C	5	
Hastelloy C22/UNS N06022/EN 2.4602, max. 125 °C	6	
Hastelloy C22/UNS N06022/EN 2.4602, max. 180 °C	7	
Calibration		
Mass flow calibration 2 flow × 2 points	1	
Mass flow calibration 2 flow × 2 points + density calibration	4	
Standard fraction (selectable by menu) incl density calibration	8	
Individual fraction (on demand)	9	N 0 Y
Mounting style, transmitter housing and material		
Compact mounted, IP67, Aluminium transmitter housing (DI 3, DI 6 and DI 15)	D	
Remote field mounted, IP67, Aluminium housing, M12 socket for digital cable connection (DI 3, DI 6 and DI 15 only)	G	
Remote field mount, IP67, Aluminium housing, terminal box for digital cable connection (DI 3, DI 6 and DI 15)	K	
Wall mount aluminium transmitter housing, M12 socket for digital cable connection (DI 3, DI 6 and DI 15)	U	
Remote field mount, IP67, Aluminium transmitter housing, analog cable connection with M20 connectors	Z	P 0 D
Remote wall mount, IP67, aluminum transmitter housing, analog cable connection with M20 connectors	Z	P 0 E
Ex approvals		
Non-Ex		A
ATEX Zone 1 / 21		C
IECEx Zone 1 / 21 (in preparation)		F
USA (FM, CSA, UL), Zone 1/Div 1		H
Canada (CSA, UL), Zone 1/Div 1		M
EAC Zone 1 / 21		U
Local User Interface		
Blind		1
Graphical, 240 × 160 pixels, glass lid		3

	Order code
Further designs	
Please add "-Z" to Article No. and specify Order code(s).	
Cable glands	
None (mechanical sensor)	A00
Metric, no glands	A01
Metric, plastic	A02
Metric, brass/Ni plated	A05
Metric, stainless steel	A06
NPT, no glands	A11
NPT, plastic	A12
NPT, brass/Ni plated	A15
NPT, stainless steel	A16
Integral M12 socket	A20
SW functions & CT approvals	
Standard	B11
I/O configuration Ch1	
None (replacement sensor)	E00
4 ... 20 mA, HART, active/passive output (non-Ex)	E02
4 ... 20 mA, HART, active Ex	E06
4 ... 20 mA, HART, passive Ex	E07
PROFIBUS PA	E10
PROFIBUS DP	E11
Modbus RTU RS 485 (none-Ex)	E14

Selection and ordering data (continued)

	Order code
I/O configuration Ch2 (O), Ch3 (I/O) and Ch4 (I/O)	
None	F00
Non Ex: Sig O, None, None. Active/passive menu selected	F01
Non Ex: Sig O, Sig I/O, None. Active/passive menu selected	F02
Non Ex: Sig O, Sig I/O, Sig I/O. Active/passive menu selected	F03
Non Ex: Sig O, Sig I/O, R. Active/passive menu selected	F04
Non Ex: Sig O, R, R. Active/passive menu selected	F05
Non Ex: Sig O, R, None. Active/passive menu selected	F06
Ex: pSig O, None, None	F11
Ex: pSig O, pSig I/O, None	F12
Ex: pSig O, pSig I/O, pSig I/O	F13
Ex: pSig O, pSig I/O, R	F14
Ex: pSig O, R, R	F15
Ex: pSig O, R, None	F16
Ex: aSig O, None, None	F21
Ex: aSig O, aSig I/O, None	F22
Ex: aSig O, aSig I/O, aSig I/O	F23
Ex: aSig O, aSig I/O, R	F24
Ex: aSig O, R, R	F25
Ex: aSig O, R, None	F26
Certificates	
Press test certificate CRN	C01
Press test certificate PED	C02
Material certificate EN 10204-3.1	C12
Welding inspection report	C13
Factory certificate according to EN 10204 2.2	C14
Factory certificate according to EN 10204 2.1	C15
Cleaning for oil and grease/ASTM-A380	C50
Sensor data storage	
Sensor with SensorFlash for FCT	S20
Sensor with SensorProm for MASS 6000 (in preparation)	S21
SD-Card accessibility via USB (not allowed in USA by Patent)	
Mass storage enabled	S30
Digital cable sensor-transmitter	
None	L50
5 m (16.4 ft), sensor cable, 4 wire, with 2 pcs M12 plugs mounted	L51
5 m (16.4 ft), sensor cable, 4 wire, without plugs for terminal connection	L52
10 m (32.8 ft) sensor cable, 4 wire, with 2 pcs M12 plugs mounted	L55
10 m (32.8 ft), sensor cable, 4 wire, without plugs for terminal connection	L56
25 m (82 ft), sensor cable, 4 wire, with 2 pcs M12 plugs mounted	L59
25 m (82 ft), sensor cable, 4 wire, without plugs for terminal connection	L60
50 m (164 ft), sensor cable, 4 wire, with 2 pcs M12 plugs mounted	L63

Flow Measurement

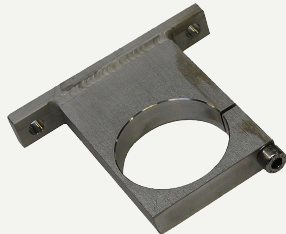
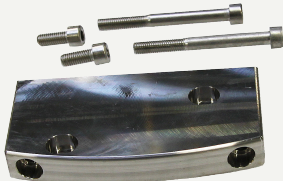
SITRANS FC (Coriolis)

Sensors and Flowmeter systems / SITRANS FC MASS 2100 and FC300 DN 4 / MASS 2100 / FC300 DN 4 with FCT030

Selection and ordering data (continued)

	Order code
50 m (164 ft), sensor cable, 4 wire, without plugs for terminal connection	L64
75 m (246 ft), sensor cable, 4 wire, with 2 pcs M12 plugs mounted	L67
75 m (246 ft), sensor cable, 4 wire, without plugs for terminal connection	L68
Analog cable sensor-transmitter	
1 m cable, analog, with 2 × M20 connectors	L85
2 m cable, analog with 2 × M20 connectors	L86
5 m cable, analog with 2 × M20 connectors	L87
10 m cable, analog with 2 × M20 connectors	L88
15 m cable, analog with 2 × M20 connectors	L89
Additional data	
Please add "-Z" to Article No. and specify Order code(s) and plain text.	
Tag name	
Tag name plate, stainless steel	Y17
Extended calibration	
Multi-point high, (5 flows × 2 passes), 10 ... 100 % of Q_{nom}	Y61
Multi-point high, (10 flows × 1 pass), 10 ... 100 % of Q_{nom}	Y63

Accessories for MASS 2100 and FC300 DN 4 with FCT030 transmitter

Description	Article No.	
Mounting bracket for flow sensor MASS 2100 DI 1.5	A5E02590427	
Mounting bracket for FC300 DN 4 in AISI 304	A5E02590439	

Technical specifications

Sensors MASS 2100 / FC300 DN 4 with FCT030 transmitter	
Sizes	MASS 2100 DI 1.5 (1/16") MASS 2100 DI 3 (1/8") MASS 2100 DI 6 (1/4") MASS 2100 DI 15 (1/2") FC300 DN 4 (1/6")
Accuracy	± 0.10 % for liquids additional ±0.40 for gases
Repeatability	± 0.05 %
Flow range Q norm (liquids) (water @ 1 bar pressure loss) (Q _{nom})	
• DI 1.5	19 kg/h (42 lb/h)
• DI 3	90 kg/h (198 lb/h)
• DI 6	500 kg/h (1 102 lb/h)
• DI 15	3 800 kg/h (8 370 lb/h)
• DN 4	140 kg/h (308 lb/h)
Architecture	Compact: DI 3, DI 6, DI 15 Remote digital: DI 3, DI 6, DI 15 Remote analogue: DI 1.5, DI 3, DI 6, DI 15, DN 4
Display	Full graphical display, 240 × 160 pixels with selection of 6 languages
Power supply	20 ... 90 V DC ± 10 %; 100 ... 240 V AC ± 10 %, 47 ... 63 Hz ± 10 %
Material	
• Sensor	
- Wetted parts	316L stainless steel or Hastelloy C 22
- Enclosure	316L stainless steel
• Transmitter	Aluminum with corrosion-resistant coating Class C4
Enclosure rating	IP67 ¹⁾
Pressure ratings	
• Measuring tubes	
- 316L	Up to 265 bar (3 844 psi), depending on size and process connection
- Nickel Alloy C4	Up to 410 bar (5 945 psi), depending on size and process connection
• Sensor enclosure	No pressure containment
Temperature ratings	
• Process medium	-50 ... +180 °C (-58 ... +356 °F)
• Ambient	-20 ... +50 °C (-4 ... +122 °F) ¹⁾
Process connections (depending on size and pressure rating)	
• Flanges	EN 1092-1 B1, ANSI/ASME B16.5
• Pipe threads	ASME B1.20 (NPT), ISO 228
• Hygienic threads	DIN 11851, ISO 2853/BS 4825 part 4 (SS3016)
• Hygienic clamps	ISO Clamp 2852
Approvals	
• Hazardous area	ATEX, IECEx, EAC Ex, CSA, cCSAus, EAC
• Pressure equipment	PED
NAMUR	NAMUR-compliant (e.g. NE 21, NE 41, NE 107 and NE 132)
I/O	Up to 4 channels combining analog, relay or digital outputs and binary input
Communication	HART PROFIBUS PA PROFIBUS DP Modbus RTU (RS 485)
EMC performance	
• Emission	EN 55011/CISPR-11 (Class A)
• Immunity	EN/IEC 61326-1 (Industry)
Mechanical load	18 ... 1 000 Hz random The flowmeter will mechanically tolerate 3.17 g RMS in all directions. Flow accuracy cannot be guaranteed under all conditions.

Technical specifications (continued)

¹⁾ If operating outdoors, avoid direct sunlight, particularly in warm climatic regions.

Flow Measurement

SITRANS FC (Coriolis)

Sensors and Flowmeter systems / SITRANS FC MASS 2100 and FC300 DN 4 / MASS 2100 / FC300 DN 4 with FCT010

Overview



Sensors MASS 2100 and FC300 DN 4 with FCT010 / FCT030 transmitters

The SITRANS MASS 2100 and FC300 DN 4 system consists of a SITRANS sensor and a SITRANS FCT010 transmitter. The flowmeter comes in a compact design for all MASS 2100 DI 3 to DI 15.

MASS 2100 DI 1.5 to DI 15 and FC300 DN4 are available as remote FCT010 transmitter with analogue connection. Intended for integration into OEM skids, machines or pre-assembled plant systems, the flowmeter is based on the latest developments within digital signal processing technology - engineered for high measuring performance:

- Fast response to rapid changes in flow
- Fast dosing applications with control in host system
- High immunity against process noise
- High turndown ratio of flowrates
- Suitable for liquid and gas service
- Easy to install, commission and maintain

The FCT010 transmitter delivers true multi-parameter measurements i.e. massflow, density, temperature.

FCT010 is available with Modbus RTU (RS 485) multi-drop serial communication. The flowmeter is supplied with SensorFlash, a microSD card containing all relevant certificates.

Benefits

- High accuracy better than 0.1 % of mass flow rate
- Large dynamic turn-down ratio better than 500:1
- Densitometer performance available through density accuracy (depending upon sensor size) ranging from 0.0005 to 0.0015 g/cm³ with a typical repeatability better than 0.0001 to 0.0002 g/cm³
- Single continuous tube design, with no internal welds, reductions or flow splitters offers optimal hygiene, safety and CIP cleanability for food and beverage and pharmaceutical applications
- Markets biggest wall thickness, ensuring optimal life-time and corrosion resistance and high-pressure durability
- Balanced pipe design with little mechanical energy-loss, ensures optimal performance and stability under non-ideal and unstable process conditions (pressure, temperature, density-changes etc.)
- Full bore design provides lower pressure loss due to same internal diameter throughout the entire sensor
- 4-wire Pt1000 temperature measurement ensures optimum accuracy on mass flow, density and fraction flow
- Multi-plug electrical connector enables true "plug & play"
- Sensor pipe available in high-quality stainless steel AISI 316L/1.4435 or Hastelloy C22/2.4602 offering optimum corrosion resistance
- Centre-block design decouples process noise from the environment such as vibrations, pulsations, pressure shocks etc. making installation flexible and versatile
- Rugged and space-saving sensor design in stainless steel matching all environments
- High-pressure program as standard

Selection and ordering data

Selection and Ordering data

SITRANS FC sensors MASS 2100/FC300 with FCT010 transmitter	Article No. 7ME4811-	Order code
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Sensor type and connector size		
MASS 2100 DI 1.5, 1/4"	1 G	
MASS 2100 DI 3, 1/4"	3 A	
MASS 2100 DI 3, 1/4" Heated w. DIN	3 B	
MASS 2100 DI 3, 1/4" Heated w. ANSI	3 C	
FC300 DN 4, 1/4"	4 A	
MASS 2100 DI 6, 1/4"	6 A	
MASS 2100 DI 6, 1/4" Heated w. EN	6 B	
MASS 2100 DI 6, 1/4" Heated w. ANSI	6 C	
MASS 2100 DI 6, DN 10	6 D	
MASS 2100 DI 6, DN 10 Heated w. EN	6 E	
MASS 2100 DI 6, DN 10 Heated w. ANSI	6 F	
MASS 2100 DI 6, DN 15 (1/2")	6 G	
MASS 2100 DI 6, DN 15 (1/2") Heated w. EN	6 H	
MASS 2100 DI 6, DN 15 (1/2") Heated w. ANSI	6 J	
MASS 2100 DI 6, DN 20 (3/4")	6 K	
MASS 2100 DI 6, DN 20 (3/4") Heated w. EN	6 L	
MASS 2100 DI 6, DN 20 (3/4") Heated w. ANSI	6 M	
MASS 2100 DI 6, DN 25 (1")	6 N	
MASS 2100 DI 6, DN 25 (1") Heated w. EN	6 P	
MASS 2100 DI 6, DN 25 (1") Heated w. ANSI	6 Q	
MASS 2100 DI 15, DN 15 (1/2")	7 A	
MASS 2100 DI 15, DN 15 (1/2") Heated w. EN	7 B	
MASS 2100 DI 15, DN 15 (1/2") Heated w. ANSI	7 C	
MASS 2100 DI 15, DN 20 (3/4")	7 D	
MASS 2100 DI 15, DN 20 (3/4") Heated w. EN	7 E	
MASS 2100 DI 15, DN 20 (3/4") Heated w. ANSI	7 F	
MASS 2100 DI 15, DN 25 (1")	7 G	
MASS 2100 DI 15, DN 25 (1") Heated w. EN	7 H	
MASS 2100 DI 15, DN 25 (1") Heated w. ANSI	7 J	
Process connection/Pressure		
No connections (spare part transmitter)	A 0	
EN 1092-1 B1, PN 40	A 1	
EN 1092-1 B1, PN 100	A 3	
ASME B16.5, RF, Class 150	D 1	
ASME B16.5, RF, Class 600	D 3	
DIN 11851 screwed connection	F 1	
ISO 2852 hygienic clamped	J 1	
ISO 2853 hygienic screwed	J 5	
ISO 228-1 pipe thread, PN 100	C 1	
ISO 228-1 pipe thread, PN 130	C 2	
ISO 228-1 pipe thread, PN 200	C 3	
ISO 228-1 pipe thread, PN 230	C 4	
ISO 228-1 pipe thread, PN 265	C 5	
ISO 228-1 pipe thread, PN 350	C 6	
ISO 228-1 pipe thread, PN 365	C 7	
ISO 228-1 pipe thread, PN 410	C 8	
NPT ASME B 1.20.1 pipe thread, PN 100	N 1	
NPT ASME B 1.20.1 pipe thread, PN 130	N 2	
NPT ASME B 1.20.1 pipe thread, PN 200	N 3	
NPT ASME B 1.20.1 pipe thread, PN 230	N 4	
NPT ASME B 1.20.1 pipe thread, PN 265	N 5	
NPT ASME B 1.20.1 pipe thread, PN 350	N 6	
NPT ASME B 1.20.1 pipe thread, PN 365	N 7	
NPT ASME B 1.20.1 pipe thread, PN 410	N 8	

Flow Measurement

SITRANS FC (Coriolis)

Sensors and Flowmeter systems / SITRANS FC MASS 2100 and FC300 DN 4 / MASS 2100 / FC300 DN 4 with FCT010

Selection and ordering data (continued)


	Article No. 7ME4811-	Order code
SITRANS FC sensors MASS 2100/FC300 with FCT010 transmitter	● ● ● ● - ● ● ● ● ● ● ● ●	
Tube material (wetted) and max. operational temperature		
AISI 316L/EN 1.4435, max 115 °C	1	
AISI 316L/EN 1.4435, max 125 °C	2	
AISI 316L/EN 1.4435, max 180 °C	3	
Hastelloy C22/UNS N06022/EN 2.4602, max. 115 °C	5	
Hastelloy C22/UNS N06022/EN 2.4602, max. 125 °C	6	
Hastelloy C22/UNS N06022/EN 2.4602, max. 180 °C	7	
Calibration		
Mass flow calibration 2 flow × 2 points	1	
Mass flow calibration 2 flow × 2 points + density calibration	4	
Mounting style, transmitter housing and material		
Compact mounted, IP67, Aluminium transmitter housing (DI 3, DI 6 and DI 15 only)		D
Remote mounted, IP67, Aluminium transmitter housing, analog cable connection with M20 connectors		Z P 0 D
Ex approvals		
Non-Ex		A
ATEX Zone 1 / 21		C
IECEx Zone 1 / 21 (in preparation)		F
USA (FM, CSA, UL), Zone 1/Div 1		H
Canada (CSA, UL), Zone 1/Div 1		M
EAC Zone 1 / 21		U
Local User Interface		
Blind		1

	Order code
Further designs	
Please add "-Z" to Article No. and specify Order code(s).	
Cable glands	
None (mechanical sensor)	A00
Metric, no glands	A01
Metric, plastic	A02
Metric, brass/Ni plated	A05
Metric, stainless steel	A06
NPT, no glands	A11
NPT, plastic	A12
NPT, brass/Ni plated	A15
NPT, stainless steel	A16
Integral M12 socket	A20
SW functions & CT approvals	
Standard	B11
I/O configuration Ch1	
Modbus RTU RS 485	E14
I/O configuration Ch2, Ch3 and Ch4	
None	F00
Certificates	
Press test certificate CRN	C01
Press test certificate PED	C02
Material certificate EN 10204-3.1	C12
Welding inspection report	C13
Factory certificate according to EN 10204 2.2	C14
Factory certificate according to EN 10204 2.1	C15
Cleaning for oil and grease/ASTM-A380	C50
Cleaned according to PWIS	C51

Selection and ordering data (continued)

	Order code
Digital cable sensor-transmitter	
None	L50
5 m (16.4 ft), sensor cable, 4 wire, with 2 pcs M12 plugs mounted	L51
5 m (16.4 ft), sensor cable, 4 wire, without plugs for terminal connection	L52
5 m (16.4 ft), sensor cable, 4 wire, with 1 pcs M12 plugs mounted	L53
10 m (32.8 ft) standard with M12 connectors fitted	L55
10 m (32.8 ft), standard, without plugs	L56
10 m (32.8 ft), sensor cable, 4 wire, with 1 pcs M12 plugs mounted	L57
25 m (82 ft), standard with M12 connectors fitted	L59
25 m (82 ft), standard, without plugs	L60
25 m (82 ft), sensor cable, 4 wire, with 1 pcs M12 plugs mounted	L61
50 m (164 ft), standard with M12 connectors fitted	L63
50 m (164 ft), standard, without plugs	L64
50 m (164 ft), sensor cable, 4 wire, with 1 pcs M12 plugs mounted	L65
75 m (246 ft), standard with M12 connectors fitted	L67
75 m (246 ft), standard, without plugs	L68
75 m (246 ft), sensor cable, 4 wire, with 1 pcs M12 plugs mounted	L69
Analog cable sensor-transmitter	
1 m cable, analog, with 2 × M20 connectors	L85
2 m cable, analog, with 2 × M20 connectors	L86
5 m cable, analog, with 2 × M20 connectors	L87
10 m cable, analog, with 2 × M20 connectors	L88
15 m cable, analog, with 2 × M20 connectors	L89
Additional data	
Please add "-Z" to Article No. and specify Order code(s) and plain text.	
Tag name	
Tag name plate, stainless steel	Y17
Extended calibration	
Multi-point high, (5 flows × 2 passes), 10 ... 100 % of Q_{nom}	Y61
Multi-point high, (10 flows × 1 pass), 10 ... 100 % of Q_{nom}	Y63

Accessories for MASS 2100 and FC300 DN 4 with FCT010 transmitter

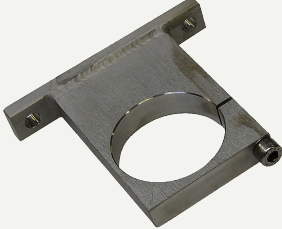
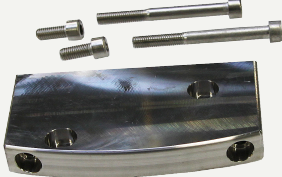
Description	Article No.	
SITRANS I300 – Isolating power supply – Ex barrier	A5E39832532	

Flow Measurement

SITRANS FC (Coriolis)

Sensors and Flowmeter systems / SITRANS FC MASS 2100 and FC300 DN 4 / MASS 2100 / FC300 DN 4 with FCT010

Selection and ordering data (continued)

Description	Article No.	
Mounting bracket for flow sensor MASS 2100 DI 1.5	A5E02590427	
Mounting bracket for FC300 DN 4 in AISI 304	A5E02590439	

Technical specifications

Sensors MASS 2100 / FC300 DN 4 with FCT010 transmitter	
Sizes mm (inch)	MASS 2100 DI 1.5 (1/16") MASS 2100 DI 3 (1/8") MASS 2100 DI 6 (1/4") MASS 2100 DI 15 (1/2") FC300 DN 4 (1/6")
Accuracy	± 0.10 % for liquids additional ±0.40 for gases
Repeatability	± 0.05 %
Flow range Q norm (liquids) (water @ 1 bar pressure loss) (Q _{nom})	
• DI 1.5	19 kg/h (42 lb/h)
• DI 3	90 kg/h (198 lb/h)
• DI 6	500 kg/h (1 102 lb/h)
• DI 15	3 800 kg/h (8 370 lb/h)
• DN 4	140 kg/h (308 lb/h)
Architecture	Compact: DI 3, DI 6, DI 15 Remote analogue: DI 1.5, DI 3, DI 6, DI 15, DN 4
Power supply	12-27 V DC; 1.1 W for Ex d; 12 – 24 V DC; Intrinsic safety power supply: Ui: 20 V, Ii: 484 mA, Pi: 2.3 W, Li: 0.6 uH, Ci: 1.9 nF.
Material	
• Sensor	
- Wetted parts	316L stainless steel or Hastelloy C 22
- Enclosure	316L stainless steel
• Transmitter	Aluminum with corrosion-resistant coating Class C4
Enclosure rating	IP67 ¹⁾
Pressure ratings	
• Measuring tubes	
- 316L	Up to 265 bar (3 844 psi), depending on size and process connection
- Nickel Alloy C4	Up to 410 bar (5 945 psi), depending on size and process connection
• Sensor enclosure	No pressure containment
Temperature ratings	
• Process medium	-50 ... +180 °C (-58 ... +356 °F)
• Ambient	-20 ... +50 °C (-4 ... +122 °F) ¹⁾
Process connections (depending on size and pressure rating)	
• Flanges	EN 1092-1 B1, ANSI/ASME B16.5
• Pipe threads	ASME B1.20 (NPT), ISO 228
• Hygienic threads	DIN 11851, ISO 2853/BS 4825 part 4 (SS3016)
• Hygienic clamps	ISO Clamp 2852
Approvals	
• Hazardous area	ATEX, IECEx, EAC Ex, CSA, cCSAus, EAC
• Pressure equipment	PED
NAMUR	NAMUR-compliant (e.g. NE 21, NE 41, NE 107 and NE 132)
I/O	Up to 4 channels combining analog, relay or digital outputs and binary input
Communication	Modbus RTU (RS 485)
EMC performance	
• Emission	EN 55011/CISPR-11 (Class B)
• Immunity	EN/IEC 61326-1 (Industry)
Mechanical load	18 ... 1 000 Hz random The flowmeter will mechanically tolerate 3.17 g RMS in all directions. Flow accuracy cannot be guaranteed under all conditions.

¹⁾ If operating outdoors, avoid direct sunlight, particularly in warm climatic regions.

Flow Measurement

SITRANS FC (Coriolis)

Sensors and Flowmeter systems / SITRANS FC MASS 2100 and FC300 DN 4 / MASS 2100 / FC300 DN 4 with FCT070

Overview



Sensors MASS 2100 and FC300 DN 4 with FCT010 / FCT030 transmitters



FCT070 transmitter

Full integration in the Siemens SIMATIC systems PCS7 or in TIA portal with FCT070 Faceplates with the ET 200SP ST & HF powerful IO system for compact control cabinets.

The SITRANS MASS 2100 and FC300 DN 4 system consists of a SITRANS sensor and a SITRANS FCT070 transmitter.

The flowmeter comes in a compact design for all MASS 2100 DI 3 to DI 15.

MASS 2100 DI and FC300 DN 4 the DSL is remote mounted with a analogue connection.

The complete flowmeter system consists of a sensor and a SIMATIC ET 200SP ST & HF Coriolis module FCT070 transmitter.

TM FCT070 offers real-time data processing and the display of all measuring and status data of the Coriolis flowmeter.

For hazardous area the MASS 2100 and the FSC300 sensor can be placed in Ex Zone 1 or Class 1 Div 1 locations. Together with the SITRANS I300 power/barrier module the FCT070 transmitter can be place in Zone 2 or Div 2 areas.

Benefits

- High accuracy better than 0.1 % of mass flow rate
- Large dynamic turn-down ratio better than 500:1
- Densitometer performance available through density accuracy (depending upon sensor size) ranging from 0.0005 to 0.0015 g/cm³ with a typical repeatability better than 0.0001 to 0.0002 g/cm³
- Single continuous tube design, with no internal welds, reductions or flow splitters offers optimal hygiene, safety and CIP cleanability for food and beverage and pharmaceutical applications
- Markets biggest wall thickness, ensuring optimal life-time and corrosion resistance and high-pressure durability
- Balanced pipe design with little mechanical energy-loss, ensures optimal performance and stability under non-ideal and unstable process conditions (pressure, temperature, density-changes etc.)
- Full bore design provides lower pressure loss due to same internal diameter throughout the entire sensor
- 4-wire Pt1000 temperature measurement ensures optimum accuracy on mass flow, density and fraction flow
- Multi-plug electrical connector enables true "plug & play"
- Sensor pipe available in high-quality stainless steel AISI 316L/1.4435 or Hastelloy C22/2.4602 offering optimum corrosion resistance
- Centre-block design decouples process noise from the environment such as vibrations, pulsations, pressure shocks etc. making installation flexible and versatile
- Rugged and space-saving sensor design in stainless steel matching all environments
- High-pressure program as standard
- Full hazardous area solutions
- Easy integration into automation process control as TIA portal and PCS7
- Easy selection and integration of flowmeters via TIA-Selector
- Cost effective integration of Coriolis flowmeters for PLC controlled machines
- SITRANS FCT070 ET 200SP technology module and can combined with all other SIMATIC ET200SP ST & HF modules
- The FCT070 has all high -end transmitter functionality integrated including the advanced fraction tables on board
- Fast and trouble-free communication between the flowmeter and the PLC through digital data communication with up to 10 ms update rate
- Integrated advanced Two-stage batch controller functionality without additional modules. I/Os are onboard

Selection and ordering data

SITRANS FC sensors MASS 2100/FC300 DN 4 with DSL ready for FCT070	Article No. 7ME4817-	Order code
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Sensor type and connector size		
MASS 2100 DI 1.5, 1/4"	1	G
MASS 2100 DI 3, 1/4"	3	A
MASS 2100 DI 3, 1/4" Heated w. DIN	3	B
MASS 2100 DI 3, 1/4" Heated w. ANSI	3	C
FC300 DN 4, 1/4"	4	A
MASS 2100 DI 6, 1/4"	6	A
MASS 2100 DI 6, 1/4" Heated w. EN	6	B
MASS 2100 DI 6, 1/4" Heated w. ANSI	6	C
MASS 2100 DI 6, DN 10	6	D
MASS 2100 DI 6, DN 10 Heated w. EN	6	E
MASS 2100 DI 6, DN 10 Heated w. ANSI	6	F
MASS 2100 DI 6, DN 15 (1/2")	6	G
MASS 2100 DI 6, DN 15 (1/2") Heated w. EN	6	H
MASS 2100 DI 6, DN 15 (1/2") Heated w. ANSI	6	J
MASS 2100 DI 6, DN 20 (3/4")	6	K
MASS 2100 DI 6, DN 20 (3/4") Heated w. EN	6	L
MASS 2100 DI 6, DN 20 (3/4") Heated w. ANSI	6	M
MASS 2100 DI 6, DN 25 (1")	6	N
MASS 2100 DI 6, DN 25 (1") Heated w. EN	6	P
MASS 2100 DI 6, DN 25 (1") Heated w. ANSI	6	Q
MASS 2100 DI 15, DN 15 (1/2")	7	A
MASS 2100 DI 15, DN 15 (1/2") Heated w. EN	7	B
MASS 2100 DI 15, DN 15 (1/2") Heated w. ANSI	7	C
MASS 2100 DI 15, DN 20 (3/4")	7	D
MASS 2100 DI 15, DN 20 (3/4") Heated w. EN	7	E
MASS 2100 DI 15, DN 20 (3/4") Heated w. ANSI	7	F
MASS 2100 DI 15, DN 25 (1")	7	G
MASS 2100 DI 15, DN 25 (1") Heated w. EN	7	H
MASS 2100 DI 15, DN 25 (1") Heated w. ANSI	7	J
Process connection/Pressure		
No connections (spare part transmitter)		A 0
EN 1092-1 B1, PN 40		A 1
EN 1092-1 B1, PN 100		A 3
ASME B16.5, RF, Class 150		D 1
ASME B16.5, RF, Class 600		D 3
DIN 11851 crewed connection		F 1
ISO 2852 hygienic clamped		J 1
ISO 2853 hygienic screwed		J 5
ISO 228-1 pipe thread, PN 100		C 1
ISO 228-1 pipe thread, PN 130		C 2
ISO 228-1 pipe thread, PN 200		C 3
ISO 228-1 pipe thread, PN 230		C 4
ISO 228-1 pipe thread, PN 265		C 5
ISO 228-1 pipe thread, PN 350		C 6
ISO 228-1 pipe thread, PN 365		C 7
ISO 228-1 pipe thread, PN 410		C 8
NPT ASME B 1.20.1 pipe thread, PN 100		N 1
NPT ASME B 1.20.1 pipe thread, PN 130		N 2
NPT ASME B 1.20.1 pipe thread, PN 200		N 3
NPT ASME B 1.20.1 pipe thread, PN 230		N 4
NPT ASME B 1.20.1 pipe thread, PN 265		N 5
NPT ASME B 1.20.1 pipe thread, PN 350		N 6
NPT ASME B 1.20.1 pipe thread, PN 365		N 7
NPT ASME B 1.20.1 pipe thread, PN 410		N 8

Flow Measurement

SITRANS FC (Coriolis)

Sensors and Flowmeter systems / SITRANS FC MASS 2100 and FC300 DN 4 / MASS 2100 / FC300 DN 4 with FCT070


Selection and ordering data (continued)

	Article No. 7ME4817-	Order code
SITRANS FC sensors MASS 2100/FC300 DN 4 with DSL ready for FCT070		
Tube material (wetted) and max. operational temperature		
AISI 316L/EN 1.4435, max. 115 °C	1	
AISI 316L/EN 1.4435, max. 125 °C	2	
AISI 316L/EN 1.4435, max. 180 °C	3	
Hastelloy C22/UNS N06022/EN 2.4602, max. 115 °C	5	
Hastelloy C22/UNS N06022/EN 2.4602, max. 125 °C	6	
Hastelloy C22/UNS N06022/EN 2.4602, max. 180 °C	7	
Calibration		
Mass flow calibration 2 flow × 2 points	1	
Mass flow calibration 2 flow × 2 points + density calibration	4	
Mounting style, transmitter housing and material		
Compact mounted, IP67, Aluminium transmitter housing (DI 3, DI 6 and DI 15)		D
Remote field mount, IP67, Aluminium transmitter housing, analog cable connection with M20 connectors		Z P 0 D
Ex approvals		
Non-Ex		A
ATEX Zone 1 / 21		C
IECEx Zone 1 / 21 (in preparation)		F
USA (FM, CSA, UL), Zone 1/Div 1		H
Canada (CSA, UL), Zone 1/Div 1		M
EAC Zone 1 / 21		U
Local User Interface		
Blind		1

	Order code
Further designs	
Please add "-Z" to Article No. and specify Order code(s).	
Cable glands	
None (mechanical sensor)	A00
Metric, no glands	A01
Metric, plastic	A02
Metric, brass/Ni plated	A05
Metric, stainless steel	A06
NPT, no glands	A11
NPT, plastic	A12
NPT, brass/Ni plated	A15
NPT, stainless steel	A16
Integral M12 socket	A20
SW functions & CT approvals	
Standard	B10
I/O configuration Ch1	
None (replacement sensor)	E00
I/O configuration Ch2, Ch3 and Ch4	
None	F00
Certificates	
Press test certificate CRN	C01
Press test certificate PED	C02
Material certificate EN 10204-3.1	C12
Welding inspection report	C13
Factory certificate according to EN 10204 2.2	C14
Factory certificate according to EN 10204 2.1	C15
Cleaning for oil and grease/ASTM-A380	C50

Selection and ordering data (continued)

	Order code
Digital cable sensor-transmitter	
None	L50
5 m (16.4 ft), sensor cable, 4 wire, without plugs for terminal connection	L52
5 m (16.4 ft), sensor cable, 4 wire, with 1 pcs M12 plugs mounted	L53
10 m (32.8 ft), sensor cable, 4 wire, without plugs for terminal connection	L56
10 m (32.8 ft), sensor cable, 4 wire, with 1 pcs M12 plugs mounted	L57
25 m (82 ft), sensor cable, 4 wire, without plugs for terminal connection	L60
25 m (82 ft), sensor cable, 4 wire, with 1 pcs M12 plugs mounted	L61
50 m (164 ft), sensor cable, 4 wire, without plugs for terminal connection	L64
50 m (164 ft), sensor cable, 4 wire, with 1 pcs M12 plugs mounted	L65
75 m (246 ft), sensor cable, 4 wire, without plugs for terminal connection	L68
75 m (246 ft), sensor cable, 4 wire, with 1 pcs M12 plugs mounted	L69
Analog cable sensor-transmitter	
1 m cable, analog, with 2 × M20 connectors	L85
2 m cable, analog with 2 × M20 connectors	L86
5 m cable, analog with 2 × M20 connectors	L87
10 m cable, analog with 2 × M20 connectors	L88
15 m cable, analog with 2 × M20 connectors	L89
Additional data	
Please add "-Z" to Article No. and specify Order code(s) and plain text.	
Tag name	
Tag name plate, stainless steel	Y17
Extended calibration	
Multi-point high, (5 flows × 2 passes), 10 ... 100 % of Q_{nom}	Y61
Multi-point high, (10 flows × 1 pass), 10 ... 100 % of Q_{nom}	Y63

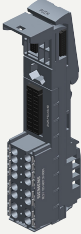

Description	Article No.	
SITRANS FCT070 – Transmitter for ET 200SP	7ME4138-6AA00-0BB1	

Flow Measurement

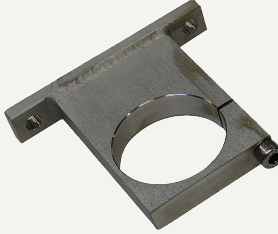
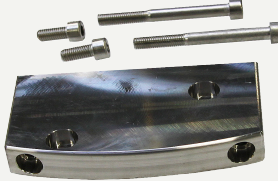
SITRANS FC (Coriolis)

Sensors and Flowmeter systems / SITRANS FC MASS 2100 and FC300 DN 4 / MASS 2100 / FC300 DN 4 with FCT070

Selection and ordering data (continued)

Description	Article No.	
BU20-P12+A0+4B, PU1 – Baseunit plate for ET 200SP	6ES7193-6BP20-0BB0 6ES7193-6BP20-0BB1	
SITRANS I300 – Isolating power supply – Ex barrier	A5E39832532	

Accessories for MASS 2100 and FC300 DN 4 with FCT070 transmitter

Description	Article No.	
Mounting bracket for flow sensor MASS 2100 DI 1.5	A5E02590427	
Mounting bracket for FC300 DN 4 in AISI 304	A5E02590439	

Technical specifications

Sensors MASS 2100 / FC300 DN 4 with FCT070 transmitter	
Sizes mm (inch)	MASS 2100 DI 1.5 (1/16") MASS 2100 DI 3 (1/8") MASS 2100 DI 6 (1/4") MASS 2100 DI 15 (1/2") FC300 DN 4 (1/6")
Accuracy	± 0.10 % for liquids additional ±0.40 for gases
Repeatability	± 0.05 %
Flow range Q norm (liquids) (water @ 1 bar pressure loss) (Q _{nom})	
• DI 1.5	19 kg/h (42 lb/h)
• DI 3	90 kg/h (198 lb/h)
• DI 6	500 kg/h (1 102 lb/h)
• DI 15	3 800 kg/h (8 370 lb/h)
• DN 4	140 kg/h (308 lb/h)
Architecture	Remote configuration
System integration	PCS7 and TIA portal with faceplates
Power supply	24 V DC; 19.2 ... 28.8 V
Material	
• Sensor	
- Wetted parts	316L stainless steel or Hastelloy C 22
- Enclosure	316L stainless steel
• Transmitter	Aluminum with corrosion-resistant coating Class C4
Enclosure rating	Sensor: IP67 FCT070 transmitter: IP20
Pressure ratings	
• Measuring tubes	
- 316L	Up to 265 bar (3 844 psi), depending on size and process connection
- Nickel Alloy C4	Up to 410 bar (5 945 psi), depending on size and process connection
• Sensor enclosure	No pressure containment
Temperature ratings	
• Process medium	-50 ... +180 °C (-58 ... +356 °F)
• Ambient	-40 ... +60 °C (-4 ... +122 °F) ¹⁾
Process connections (depending on size and pressure rating)	
• Flanges	EN 1092-1 B1, ANSI/ASME B16.5
• Pipe threads	ASME B1.20 (NPT), ISO 228
• Hygienic threads	DIN 11851, ISO 2853/BS 4825 part 4 (SS3016)
• Hygienic clamps	ISO Clamp 2852
Approvals	
• Hazardous area	Sensor : ATEX, IECEx, EAC Ex, CSA, cCSAus, EAC FCT070 transmitter: Zone 2 & Class 1 Div 2 ATEX, IECEx, EAC Ex, CSA, cCSAus, FM; NEPSI, EAC
• Pressure equipment	PED
NAMUR	NAMUR-compliant (e.g. NE 21, NE 41, NE 107 and NE 132)
I/O	2 digital Input and 2 digital output Single and 2 stage batch function
Communication	Integrated PROFINET for SIMATIC integration and other PROFINET Controllers
Totalizer	3 totalizer
EMC performance	
• Emission	EN 55011/CISPR-11 (Class A)
• Immunity	EN/IEC 61326-1 (Industry)
Mechanical load	18 ... 1 000 Hz random The flowmeter will mechanically tolerate 3.17 g RMS in all directions. Flow accuracy cannot be guaranteed under all conditions.

Technical specifications (continued)

¹⁾ If operating outdoors, avoid direct sunlight, particularly in warm climatic regions.










Flow Measurement

SITRANS FC (Coriolis)




Spare parts / Digital - Spare parts

Selection and ordering data

Accessories and spare parts for flowmeters

Description	Article No.	
CT connector Tamper cover for CT locking. Fits over the M12 connector at both sensor and transmitter ends of the remote system cable (2 pcs.)	A5E31478498	
Bag of glands (metric) in black plastic ¹⁾	A5E03907414	
Bag of glands, (metric) in gray plastic Ex e/i¹⁾	A5E03907424	
Bag of glands (metric) in AISI 316 SS Ex e/i¹⁾	A5E03907429	
Bag of glands (metric) in Ni-plated brass Ex e/i¹⁾	A5E03907430	
Bag of glands (NPT) in black plastic²⁾	A5E03907435	
Bag of glands (NPT) in gray plastic Ex e/i²⁾	A5E03907451	
Bag of glands (NPT) in AISI 316 SS Ex e/i²⁾	A5E03907467	
Bag of glands (NPT) in Ni-plated brass Ex e/i²⁾	A5E03907473	
Standard cable (non-Ex) with 2 x M12 connectors, PO insulation and PUR sleeve, gray, -40 ... +80 °C (-40 ... +176 °F) • 5 m (16.4 ft) • 10 m (32.8 ft) • 25 m (82 ft) • 50 m (164 ft) • 75 m (246 ft) • 150 m (492 ft), max. +30 °C (86 °F)	A5E03914805 A5E03914850 A5E03914853 A5E03914859 A5E03914861 A5E03914874	
Standard cable (non-Ex) for termination, PO insulation and PUR sleeve, gray, -40 ... +80 °C (-40 ... +176 °F) • 5 m (16.4 ft) • 10 m (32.8 ft) • 25 m (82 ft) • 50 m (164 ft) • 75 m (246 ft) • 150 m (492 ft), max. +30 °C (86 °F)	A5E03914833 A5E03914849 A5E03914854 A5E03914856 A5E03914864 A5E03914873	

Selection and ordering data (continued)



Description	Article No.	
Standard cable (non-Ex) f with M12 connector on one side, PO insulation and PUR sleeve, gray, -40 ... +80 °C (-40 ... +176 °F) • 5 m (16.4 ft) • 10 m (32.8 ft) • 25 m (82 ft) • 50 m (164 ft) • 75 m (246 ft) • 150 m (492 ft), max. +30 °C (86 °F)		
Standard cable (Ex) with 2 x M12 connectors, PO insulation and PUR sleeve, blue, -40 ... +80 °C (-40 ... +176 °F) • 5 m (16.4 ft) • 10 m (32.8 ft) • 25 m (82 ft) • 50 m (164 ft) • 75 m (246 ft) • 150 m (492 ft), max. +30 °C (86 °F)	A5E03914929 A5E03914962 A5E03914995 A5E03915004 A5E03915074 A5E03915088	
Standard cable (Ex) for termination, PO insulation and PUR sleeve, blue, -40 ... +80 °C (-40 ... +176 °F) • 5 m (16.4 ft) • 10 m (32.8 ft) • 25 m (82 ft) • 50 m (164 ft) • 75 m (246 ft) • 150 m (492 ft), max. +30 °C (86 °F)	A5E03914945 A5E03914973 A5E03914984 A5E03915015 A5E03915057 A5E03915100	
Standard cable (Ex) with M12 connector on one side, PO insulation and PUR sleeve, blue, -40 ... +80 °C (-40 ... +176 °F) • 5 m (16.4 ft) • 10 m (32.8 ft) • 25 m (82 ft) • 50 m (164 ft) • 75 m (246 ft) • 150 m (492 ft), max. +30 °C (86 °F)		
Analog signal cable For analog cable connection between MASS 2100/ FC300 sensor and FCT010/FCT030/FCT070 transmitters. 5 x 2 x Ø 0.34 mm screened and twisted in pairs. Blue PVC insulation and sleeve. With two M20 connectors, female/female. -20 ... 105 °C (-4 ... +221 °F), Ex • 1 m (3.28 ft) • 2 m (6.56 ft) • 5 m (16.4 ft) • 10 m (32.8 ft) • 15 m (49.21 ft)	A5E42815465 A5E42521862 A5E42522447 A5E42523233 A5E42523347	

¹⁾ 2 pcs M20; 1 pce M25 with single and dual cable inserts.




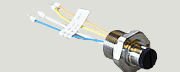
²⁾ 2 pcs 1/2" NPT; 1 pce 1/2" NPT with single and dual cable inserts.

Selection and ordering data (continued)




Heating jacket for FCS400

Description	Article No.	
Heating jacket indoor use, 0 ... 200 °C (32 ... 392 °F) max. temperature. Complete with 5 m (16.4 ft) high temperature cable fitted. Dedicated plug connection to included controller		
<ul style="list-style-type: none"> • 230 V AC, DN 15 electric 	A5E33035287	
<ul style="list-style-type: none"> • 230 V AC, DN 25 electric 	A5E33035324	
<ul style="list-style-type: none"> • 230 V AC, DN 50 electric 	A5E33035325	
<ul style="list-style-type: none"> • 115 V AC, DN 15 electric 	A5E32877520	
<ul style="list-style-type: none"> • 115 V AC, DN 25 electric 	A5E32877556	
<ul style="list-style-type: none"> • 115 V AC, DN 50 electric 	A5E32877557	
Heating jacket controller IP65, digital display for 0 ... 200 °C (32 ... 392 °F) control setpoint		
<ul style="list-style-type: none"> • 230 V AC 	A5E03839193	
<ul style="list-style-type: none"> • 115 V AC 	A5E03839194	




Spare parts - sensor FCS400/FCS300 and MASS 2100/FC300

Description	Article No.	
Blind lid in painted aluminum with silicone o-ring seal	A5E03549295	
Sensor housing <ul style="list-style-type: none"> • Metric • NPT 	A5E03549313 A5E03906080	
Bag of loose parts for sensor including cable strain relief components, washer, seals, silicone o- rings, and assorted screws	A5E03549324	
M12 option for sensor housing in stainless steel pre-wired and potted to replace M12 socket in DSL housing	A5E03906095	


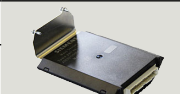





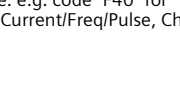

Spare parts - Transmitter FCT030 field mount enclosure (all FW versions)

Description	Article No.	
Display lid in painted aluminum with Ex glass plate and silicone o-ring seal, Ex and Non-Ex	A5E03549344	
Blind lid in painted aluminum with silicone o-ring seal	A5E03549429	
Bag of loose spare parts including cable strain relief components, mounting tool, seals and gasket, assorted screws and washers, hex cap nut, blind connectors, and silicone o-rings	A5E03549396	

Selection and ordering data (continued)

Description	Article No.	
Mounting bracket - FCT030 field mount in painted aluminum for pipe or wall mounting of transmitter FCT030 remote version. Including lock ring, pressure pads and seal cap	A5E03906091	
M12 option - remote in painted aluminum; pre-wired and potted replacement M12 connection for FCT030 field mount transmitter remote version	A5E03906104	
Remote junction box painted aluminum for sensor cable termination at FCT030 transmitter remote version. Pre-wired and potted		
<ul style="list-style-type: none"> • M20 	A5E03906112	
<ul style="list-style-type: none"> • NPT 	A5E03906130	

Spare parts - Transmitter FCT030 (FW 3.1)

Description	Article No.	
Display and keypad assembly for field mount enclosure with Siemens logo for HW 2 and FW 3.1 version	A5E03548971	
Sensor cassette (compact) (HW version 2, FW 3.1.x)	A5E03549142	
Sensor cassette (remote) (HW version 2, FW 3.1.x)	A5E03549098	
Frontend cassette Spare part frontend cassette for remote version of FC430 and cassette for FC410. For firmware 2.02.x	A5E03549191	
Power supply for field mount enclosure 100 ... 240 V AC, 47 ... 63 Hz, 24 ... 90 V DC (HW version 2 and FW 3.1.x)	A5E03549413	
Transmitter cassette (active) 4 ... 20 mA output and HART 7.2 (HW version 2 and FW 3.1.x)	A5E03549357	
Transmitter cassette (passive) 4 ... 20 mA output and HART 7.2 (HW version 2 and FW 3.1.x)	A5E03549383	
I/O assembly Advise Order code F40 to F97, Selection and Ordering data ¹⁾	A5E03939114	
SensorFlash (micro SD card 1G)	A5E03915258	

¹⁾ The I/O configuration must be stated in the "Remark" field. The I/O configuration is found in the F option of the ordering code. e.g. code "F40" for ordering Ch2 Active Current/Freq/Pulse, Ch3 Active Current/Freq/Pulse, Ch4 Active Input.

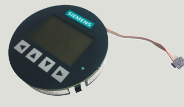


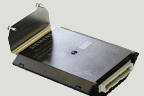



Flow Measurement

SITRANS FC (Coriolis)

Spare parts / Digital - Spare parts

Selection and ordering data (continued)



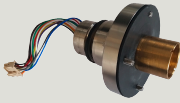
Spare parts FCT030 - Fieldmount enclosure (FW 4.0)

Description	Article No.	
Display and keypad assembly		
<ul style="list-style-type: none"> From firmware 4.0, with Siemens logo 	A5E37705139	
<ul style="list-style-type: none"> From firmware 4.0, neutral version - no company logo 	A5E39844362	
Power supply for field mount enclosure FCT030 V 4.0 Fieldmount 100 ... 240 V AC, 47 ... 63 Hz, 19.2 ... 28.8 V DC	A5E38264471	
Sensor cassette (compact) for systems without DSL and for systems with analog sensor connection, HW version 3, FW version 4.0	A5E41526318	
Sensor cassette (remote) Ex barrier module digital sensor connection (HW version 3, FW version 4.0)	A5E03549098	
Sensor cassette (remote) for systems with DSL, HW version 3, FW version 4.0	A5E03549098	
Frontend cassette Spare part frontend DSL for remote version. For firmware V 4.0	A5E41526286	
SensorFlash (micro SD card 4G)	A5E38288507	
Transmitter cassette for firmware 4.0		
<ul style="list-style-type: none"> Ch1 E02: I/O and comm (active/passive) 4 ... 20 mA output and HART 7.5, Non-Ex 	A5E38013040	
<ul style="list-style-type: none"> Ch1 E06: I/O and comm (-active) 4 ... 20 mA output and HART 7.5, Ex 	A5E38012278	
<ul style="list-style-type: none"> Ch1 E07: I/O and comm (-passive) 4 ... 20 mA output and HART 7.5, Ex 	A5E38013025	
<ul style="list-style-type: none"> Ch1 E10: Communication PROFIBUS PA, Non-Ex & Ex 	A5E41216315	
<ul style="list-style-type: none"> Ch1 E11: Communication PROFIBUS DP, Non-Ex 	A5E41216042	
<ul style="list-style-type: none"> Ch1: Communication Modbus RTU 485, Ex 	A5E38013054	
<ul style="list-style-type: none"> Ch1: Communication Modbus RTU 485, Non-Ex 	A5E38013069	
I/O Cassette for firmware 4.0		
<ul style="list-style-type: none"> F01, Non-Ex Ch2: Current/Frequ./Pulse Ch3: None Ch4: None 	A5E38006256	


Selection and ordering data (continued)

Description	Article No.	
<ul style="list-style-type: none"> F02, Non-Ex Ch2: Current/Frequ./Pulse Ch3: Current/Frequ./Pulse Ch4: None 	A5E38006558	
<ul style="list-style-type: none"> F03, Non-Ex Ch2: Current/Frequ./Pulse Ch3: Current/Frequ./Pulse Ch4: Current/Frequ./Pulse 	A5E38006598	
<ul style="list-style-type: none"> F04, Non-Ex Ch2: Current/Frequ./Pulse Ch3: Current/Frequ./Pulse Ch4: Relay 	A5E38006896	
<ul style="list-style-type: none"> F05, Non-Ex Ch2: Current/Frequ./Pulse Ch3: Relay Ch4: Relay 	A5E38006900	
<ul style="list-style-type: none"> F06, Non-Ex Ch2: Current/Frequ./Pulse Ch3: Relay Ch4: None 	A5E38011432	
<ul style="list-style-type: none"> F11, Ex-passive Ch2: Current/Frequ./Pulse Ch3: None Ch4: None 	A5E38011478	
<ul style="list-style-type: none"> F12, Ex-passive Ch2: Current/Frequ./Pulse Ch3: Current/Frequ./Pulse Ch4: None 	A5E38011509	
<ul style="list-style-type: none"> F13, Ex-passive Ch2: Current/Frequ./Pulse Ch3: Current/Frequ./Pulse Ch4: Current/Frequ./Pulse 	A5E38011541	
<ul style="list-style-type: none"> F14, Ex-passive Ch2: Current/Frequ./Pulse Ch3: Current/Frequ./Pulse Ch4: Relay 	A5E38011600	
<ul style="list-style-type: none"> F15, Ex-passive Ch2: Current/Frequ./Pulse Ch3: Relay Ch4: Relay 	A5E38011618	
<ul style="list-style-type: none"> F16, Ex-passive Ch2: Current/Frequ./Pulse Ch3: Relay Ch4: None 	A5E38011908	
<ul style="list-style-type: none"> F21, Ex-active Ch2: Current/Frequ./Pulse Ch3: None Ch4: None 	A5E38012039	
<ul style="list-style-type: none"> F22, Ex-active Ch2: Current/Frequ./Pulse Ch3: Current/Frequ./Pulse Ch4: None 	A5E38012056	
<ul style="list-style-type: none"> F23, Ex-active Ch2: Current/Frequ./Pulse Ch3: Current/Frequ./Pulse Ch4: Current/Frequ./Pulse 	A5E38012121	
<ul style="list-style-type: none"> F24, Ex-active Ch2: Current/Frequ./Pulse Ch3: Current/Frequ./Pulse Ch4: Relay 	A5E38019235	
<ul style="list-style-type: none"> F25, Ex-active Ch2: Current/Frequ./Pulse Ch3: Relay Ch4: Relay 	A5E38019263	
<ul style="list-style-type: none"> F26, Ex-active Ch2: Current/Frequ./Pulse Ch3: Relay Ch4: None 	A5E38019378	
Adapter cable for FCS400 sensor with new transmitter DSL/FCT010/FCT030, Version 4.0	A5E50371933	
Remote adapter for wall bracket M20 cable connection		
<ul style="list-style-type: none"> Ex 	A5E42404417	
<ul style="list-style-type: none"> Non-Ex 	A5E42846478	

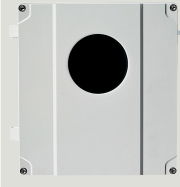
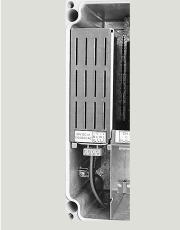
Selection and ordering data (continued)

Description	Article No.	
Wall bracket for FCT030 for M20 analog cable connector	A5E42404426	
Wall bracket for FCT010 for M20 analog cable connector	A5E42404447	
Compact adapter for DSL/FCT030 for upgrade from MASS 2100 DI 3, DI 6, DI 15 with MASS 6000 compact to DSL/FCT030	A5E42846758	
• Ex	A5E42846760	
Compact adapter for DSL/FCT030 FCS300 and FCS400 (DN 100 and DN 150 sensor) adapter for compact mount DSL, FCT010 or FCT030, Ex and Non-Ex	TBD	

Spare parts - FCT030 wall mount enclosure

Description	Article No.	
Display and keypad -assembly	A5E37697615	
• For wall mount enclosure, Siemens logo	A5E39844261	
• For wall mount enclosure, neutral version		
Power supply for wall mount 100 ... 240 V AC, 47 ... 63 Hz, 19.2 ... 28.8 V DC	A5E38263021	
Sensor cassette for FCT030 wall mounting enclosure	TBD	
Foam insert set for wall mount with connectors	A5E38287828	

Selection and ordering data (continued)

Description	Article No.	
Wall mount enclosure front	A5E	
Versions:		
• blind, Siemens version		
• blind, neutral version - no company logo		
• with glass		
Wall mount enclosure bracket for pipe mounting	A5E38288020	
Wall bracket panel mounting	A5E38288032	
Bag of loose spare parts for wall mount including cable strain relief components, mounting tool, seals and gasket, assorted screws and washers, hex cap nut, blind connectors and O-rings	A5E38288072	
Metall kit PSU cover back pane for wall mount enclosure	A5E38415145	
Power input cover plate for wall mount enclosure	A5E38415205	

Flow Measurement

SITRANS FC (Coriolis)

Spare parts / MASS 6000 Generation - Spare parts

Overview



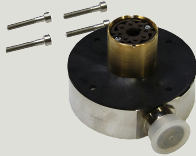


MASS 6000 is based on digital signal processing technology – engineered for high performance, fast flow step response, fast batching applications, high immunity against process noise, easy to install, commission and maintain.

This product is not longer available. Repair and spare parts for MASS 6000 (all models and variants) can still be ordered. See spare part list.

Selection and ordering data

Accessories and spare parts for MASS 6000 generation

Description	Article No.	
Cable with multiple plug Standard blue cable between MASS 6000 and MASS 2100, 5 x 2 x 0.34 mm ² twisted and screened in pairs. Temperature range -20 ... +110 °C (-4 ... +230 °F)		
• 5 m (16.4 ft)	FDK:083H3015	
• 10 m (32.8 ft)	FDK:083H3016	
• 25 m (82 ft)	FDK:083H3017	
• 50 m (164 ft)	FDK:083H3018	
• 75 m (246 ft)	FDK:085U0229	
• 150 m (492 ft)	FDK:083H3055	

Description	Article No.	
Adapter for MASS 2100 M23 electrical adapter for MASS 2100 DI 3, DI 6, DI 15, DI 25 and DI 40	FDK:083L8889	
M20 connector for cable mounting	FDK:083H5056	
2 kB SENSORPROM unit, including programming (Sensor Serial No. and Article No. must be specified by ordering)	FDK:083H4410	

Selection and ordering data (continued)


Description	Article No.	
Cable glands, screwed entries type in polyamide 100 °C (212 °F), black, 2 pcs. • M20	A5E00822490	
• ½" NPT	A5E00822501	
Sun lid for MASS 6000 transmitter (frame and lid)	A5E02328485	

Add-on module


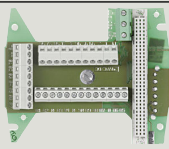




Description	Article No.	
HART ¹⁾	FDK:085U0226	
PROFIBUS PA Profile 3 ¹⁾	FDK:085U0236	
PROFIBUS DP Profile 3	FDK:085U0237	
MODBUS RTU RS 485	FDK:085U0234	
FOUNDATION Fieldbus H1 ¹⁾	A5E02054250	
DeviceNet	FDK:085U0229	

¹⁾ Modules are rated Ex i when used with MASS 6000 Ex d.

Spare parts for compact or remote IP67 version

Description	Article No.	
MASS 6000 transmitter IP67/NEMA 6 Note: No CE declaration Fibre glass reinforced polyamide and without connection board 1 current output 1 frq./pulse output 1 relay output • 115/230 V AC, 50/60 Hz • 24 V AC/DC	A5E44054472 A5E44054482	
Wall mounting unit for IP67/NEMA 6 version with wall bracket, without connection board but with • 4 × M20 cable glands	FDK:085U1018	

Selection and ordering data (continued)

Description	Article No.	
• 4 × ½" NPT cable glands	A5E01164211	
Connection board/PCB Supply voltage: 115/230 V/24 V AC/DC	FDK:083H4260	
Terminal box kit • M20 cable glands • ½" NPT cable glands Change from remote to safe area compact mounting of MASS 6000 IP67/NEMA 6 with MASS 2100. The kit consists of a terminal box in polyamide incl. connection board, cable and connector between PCB and sensor pedestal, PCB, seal and screws (4 pcs.) for mounting on sensor. Not approved for hazardous locations	A5E00832338 A5E00832342	
Terminal box, in polyamide, inclusive lid • M20 cable glands • ½" NPT cable glands Not approved for hazardous locations	FDK:085U1050 FDK:085U1052	
Terminal box - lid in polyamide	FDK:085U1003	
Display and keypad • Siemens Front	FDK:085U1039	

Add-on spare parts required due to RoHs directives and EoL for EU and EU related countries

Description	Article No.	
MASS 6000 IP67 Spare part PCB main • 230 V • 24 V	A5E41718138 A5E41718346	
MASS 6000 19"/IP20 Spare part PCB main • 1 current, 230 V • 3 current, 230 V	A5E43226138 A5E43226145	

Flow Measurement

SITRANS FC (Coriolis)

Spare parts / MASS 6000 Generation - Spare parts

Selection and ordering data (continued)

Description	Article No.
• 1 current, 24 V	A5E43226154
• 3 current, 24 V	A5E43226168
MASS 6000 19"/IP20 Ex Spare part PCB main	
• 1 current, 230 V	A5E43226277
• 3 current, 230 V	A5E43226342
• 1 current, 24 V	A5E43226441
• 3 current, 24 V	A5E43226455
MASS 6000 Ex d, spare part PCB Stainless steel, without module	FDK:083H3061
MASS 6000 Ex d, spare part barriere Stainless steel	A5E41718720
MASS 6000 19"/IP20, barriere PCB, Ex	A5E41718669
MASS 6000 Ex d, connection board Stainless steel	A5E41718522

Accessories

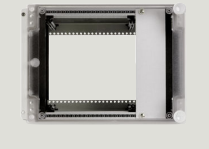


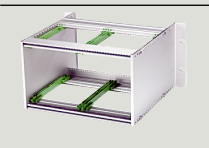
Enclosure (without PCB, connection board)

Description	Article No.
IP66/NEMA 4X, wall mounting enclosure for 19" inserts, 21 TE	FDK:083F5037




Enclosure

Description	Article No.
Panel mounting enclosure for 19" insert (21 TE) IP65/NEMA 2 enclosure in ABS plastic for front panel mounting	FDK:083F5030
Panel mounting enclosure for 19" insert (42 TE) IP65/NEMA 2 enclosure in ABS plastic for front panel mounting	FDK:083F5031
Back of panel mounting enclosure for 19" insert (21 TE) IP20/NEMA 1 enclosure in aluminum	FDK:083F5032
Back of panel mounting enclosure for 19" insert (42 TE) IP20/NEMA 1 enclosure in aluminum	FDK:083F5033



Selection and ordering data (continued)

Description	Article No.
Front cover (7 TE) for panel mounting enclosure	FDK:083F4525





Connection boards/PCB for MASS 6000 and MASS 2100 sensors

Description	Article No.
Connection board MASS 6000 for 19" IP20 rack mounting version • 24 V, 115/230 V	FDK:083H4272
Connection board MASS 6000 Ex [ia] IIC for 19" IP20 rack mounting version • 24 V, 115/230 V	FDK:083H4273
Connection board MASS 6000 for 19" wall mounting version, for enclosure FDK:083F5037/FDK:083F50-38 • 24 V, 115/230 V	FDK:083H4274
Connection board MASS 6000 Ex [ia] IIC for 19" wall mounting version, for enclosure FDK:083F5037/FDK:083F50-38 • 24 V, 115/230 V	FDK:083H4275

Connection boards/PCB for MASS 6000 and MC2 sensors

Description	Article No.
Connection board MASS 6000 for 19" IP20 rack mounting version • 24 V, 115/230 V	FDK:083H4272
Connection board MASS 6000 for Ex application¹⁾ and 19" IP20 rack mounting version (connection board MASS 6000 to MC2 sensors Ex-approved) • 24 V, 115/230 V	FDK:083H4294
Connection board MASS 6000 for 19" wall mounting version, for enclosure FDK:083F5037/FDK:083F50-38 • 24 V, 115/230 V	FDK:083H4274
Connection board MASS 6000 for Ex application¹⁾ and 19" wall mounting version (connection board MASS 6000 to MC2 sensors Ex-approved), for enclosure FDK:083F5037/FDK:083F50-38 • 24 V, 115/230 V	FDK:083H4295



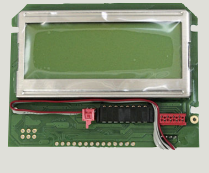
¹⁾ Attention (Ex application): MC2 Ex version sensors must only be connected to connection board FDK:083H4294 or FDK:083H4295.

Selection and ordering data (continued)

Description	Article No.	
Wall mounting enclosure in ABS plastic IP65 with connection board/PCB for Ex application connected to MC2 Ex sensors	FDK:083H4296	

Spare parts 19" versions

Enclosure (without PCB, connection board)

Description	Article No.	
IP66/NEMA 4X, wall mounting enclosure for 19" inserts (without back plates). Use with PCB A5E02559813 or A5E02559814		
• 21 TE	FDK:083F5037	
• 42 TE	FDK:083F5038	
Display unit for 19" versions Order the Display and Keypad accessory from MASS 6000 IP67 compact/remote (FDK:085U1039) and use the display part only for replacement	FDK:083U1039	

Accessories

Add-on module for remote and compact MASS 6000 Ex d

Description	Article No.	
HART (Ex-i)	FDK:085U0226	
PROFIBUS PA Profile 3 (Ex-i)	FDK:085U0236	
FOUNDATION Fieldbus H1 (Ex-i)	A5E02054250	

Operating instructions for SITRANS F add-on modules

Description	Article No.	
HART		
• English	A5E03089708	
Profibus PA/DP		
• English	A5E00726137	
• German	A5E01026429	
MODBUS		
• English	A5E00753974	
• German	A5E03089262	

Selection and ordering data (continued)

Description	Article No.	
FOUNDATION Fieldbus		
• English	A5E02318728	
• German	A5E02488856	
DeviceNet		
• English	A5E03089720	

This device is shipped with Safety Notes and a DVD containing further SITRANS F C literature.

All literature is available to download for free, in a range of languages, at <http://www.siemens.com/processinstrumentation/documentation>

Flow Measurement

SITRANS FC (Coriolis)

Spare parts / SIFLOW FC070

Overview



SIFLOW FC070 is only available as spare part.

SIFLOW FC070 is based on the SIMATIC S7-300 and the MASS 6000 technology.

The SIFLOW FC070 transmitter can be connected analogically with the Sitrans FC MASS 2100 DI 1.5, DI 3, DI 6, DI 15 and the FC300 DN4.

SIFLOW FC070 is available in two versions:

- SIFLOW FC070 Standard
- SIFLOW FC070 Ex & CT

The SIFLOW FC070 transmitter delivers true multi-parameter measurements i.e. mass flow, volume flow, density, temperature and fraction.

SIFLOW FC070 is designed for integration in a variety of automation systems, i.e.:

- Central mounted in S7-300, C7
- Decentralized in ET 200M for use with S7-300 and S7-400 as PROFIBUS DP/PROFINET masters
- Decentralized in ET 200M for use with any automation system using standardized PROFIBUS DP/PROFINET masters
- Stand-alone via a Modbus RTU master, i.e. SIMATIC PDM

Function



The following key functionalities are available:

- Mass flow rate, volume flow rate, density, temperature and fraction flow
- Two built-in totalizers which can freely be set for counting mass, volume or fraction
- 1 frequency/pulse output
- 1 phase shifted 90°/180° frequency/pulse output
- Two-stage batch controller
- 1 digital input
- Low flow cut-off
- Empty pipe detection
- Noise filter settings for different applications

Selection and ordering data

Description	Article No.
<i>SIFLOW FC070 flow transmitter</i> Remember to order 40 pin front plug connector.	7ME4120-2DH20-0EAO
40 pin front plug with screw contacts	6ES7392-1AM00-0AA0
40 pin plug with spring contacts	6ES7392-1BM01-0AA0
<i>SIFLOW FC070 Ex flow transmitter</i> Remember to order 20 pin front plug connector.	7ME4120-2DH21-0EAO
20 pin front plug with screw contacts	6ES7392-1AJ00-0AA0
20 pin plug with spring contacts	6ES7392-1BJ00-0AA0

Accessories

Description	Article No.	
Cable with multiplug for connecting MASS 2100, FCS200 and FC300 sensors, 5 × 2 × 0.34 mm ² twisted and screened in pairs. Temperature range -20 °C ... +110 °C (-4 °F ... +230 °F)		
• 5 m (16.4 ft)	FDK:083H3015	
• 10 m (32.8 ft)	FDK:083H3016	
• 25 m (82 ft)	FDK:083H3017	
• 50 m (164 ft)	FDK:083H3018	
• 75 m (246 ft)	FDK:083H3054	
• 150 m (492 ft)	FDK:083H3055	
Cable without multiplug for connecting MC2 sensors, 5 × 2 × 0.34 mm ² twisted and screened in pairs. Temperature range -20 °C ... +110 °C (-4 °F ... +230 °F)		
• 10 m (32.8 ft)	FDK:083H3001	
• 25 m (82 ft)	FDK:083H3002	
• 75 m (246 ft)	FDK:083H3003	
• 150 m (492 ft)	FDK:083H3004	

Technical specifications

Measurement of	Mass flow, volume flow, density, sensor temperature, fraction A flow, fraction B flow, fraction A in %
Measurement functions <ul style="list-style-type: none"> Totalizer 1 Totalizer 2 Single and 2-stage batch function 4 programmable limits 	Totalization of mass flow, volume flow, fraction A, fraction B Totalization of mass flow, volume flow, fraction A, fraction B Batching function with the use of one or two outputs for dosing in high and low speed 4 programmable high/low limits for mass flow, volume flow, density, sensor temperature, fraction A flow, fraction B flow, fraction A in %. Limits will generate an alarm if reached
Digital input Functions	Start batch, stop batch, start/stop batch, hold/continue batch, reset totalizer 1, reset totalizer 2, reset totalizer 1 and 2, zero adjust, force frequency output, freeze frequency output
High signal	<ul style="list-style-type: none"> Nominal voltage: 24 V DC Lower limit: 15 V DC Upper limit: 30 V DC Current: 2 ... 15 mA
Low signal	<ul style="list-style-type: none"> Nominal voltage: 0 V DC Lower limit: -3 V DC Upper limit: 5 V DC Current: -15 ... +15 mA
Input Switching	Approx. 10 kΩ Max. 100 Hz
Digital output 1 and 2 Functions	<ul style="list-style-type: none"> Output 1: Pulse, frequency, redundancy pulse, redundancy frequency 2-stage batch, batch Output 2: Redundancy pulse, redundancy frequency, 2-stage batch
Voltage supply	3 ... 30 V DC (passive output)
Switching current	Max. 30 mA at 30 V DC
Voltage drop	≤ 3 V DC at max. current
Leakage current	≤ 0.4 mA at max. voltage 30 V DC
Load resistance	1 ... 10 kΩ
Switching frequency	0 ... 12 kHz 50 % duty cycle
Functions	Pulse, frequency, redundancy pulse, redundancy frequency 2-stage batch, batch
Communication Modbus RS 232C	<ul style="list-style-type: none"> Max. baud rate: 115 200 baud Max. line length: 15 m at 115 200 baud Signal level: according to EIA-RS 232C
Modbus RS 485	<ul style="list-style-type: none"> Max. baud rate: 115 200 baud Max. line length: 1 200 m at 115 200 baud Signal level: according to EIA-RS 485 Bus termination: Integrated. Can be enabled by inserting wire jumpers.
Galvanic isolation	All inputs, outputs and communication interfaces are galvanically isolated. Isolation voltage: 500 V
Power Supply	24 V DC nominal
Tolerance	20.4 V DC ... 28.8 V DC
Consumption	Max. 7.2 W
Fuse	T1 A/125 V, not replaceable by operator

Technical specifications (continued)

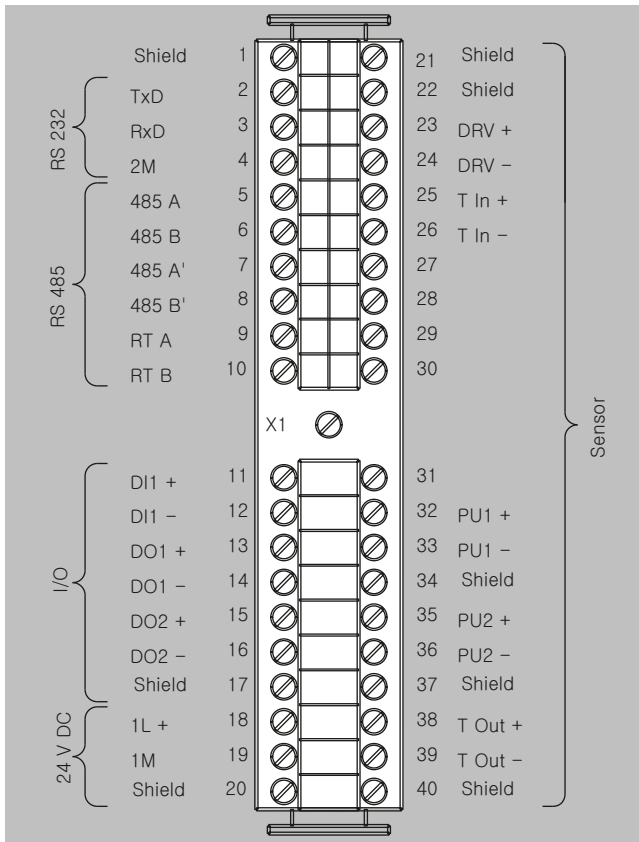
Measurement of	Mass flow, volume flow, density, sensor temperature, fraction A flow, fraction B flow, fraction A in %
Environment Ambient temperature Operation conditions	Storage: -40 °C ... +70 °C (-40 °F ... +158 °F) Horizontally mounted rail: <ul style="list-style-type: none"> SIFLOW FC070 Standard: 0 ... +60 °C (32 ... +140 °F) SIFLOW FC070 Ex CT: -40 ... +60 °C (-40 ... +140 °F) Vertically mounted rail: <ul style="list-style-type: none"> SIFLOW FC070 Standard: 0 ... 45 °C (32 ... 113 °F) SIFLOW FC070 Ex CT: -40 ... +45 °C (-40 ... +113 °F)
Altitude	Operation: -1 000 ... 2 000 m (pressure 795 ... 1 080 hPa)
Enclosure Material Rating Mechanical load	Noryl, color: anthracite IP20/NEMA 2 according to IEC 60529 According to SIMATIC standards (S7-300 devices)
Programming tools SIMATIC S7 SIMATIC PCS7 SIMATIC PDM	Configuration through backplane P-BUS, PLC program and WinCC flexible Configuration through backplane P-BUS and PLC/WinCC faceplates, certified driver Through Modbus port RS 232C and RS 485, certified driver

Flow Measurement

SITRANS FC (Coriolis)

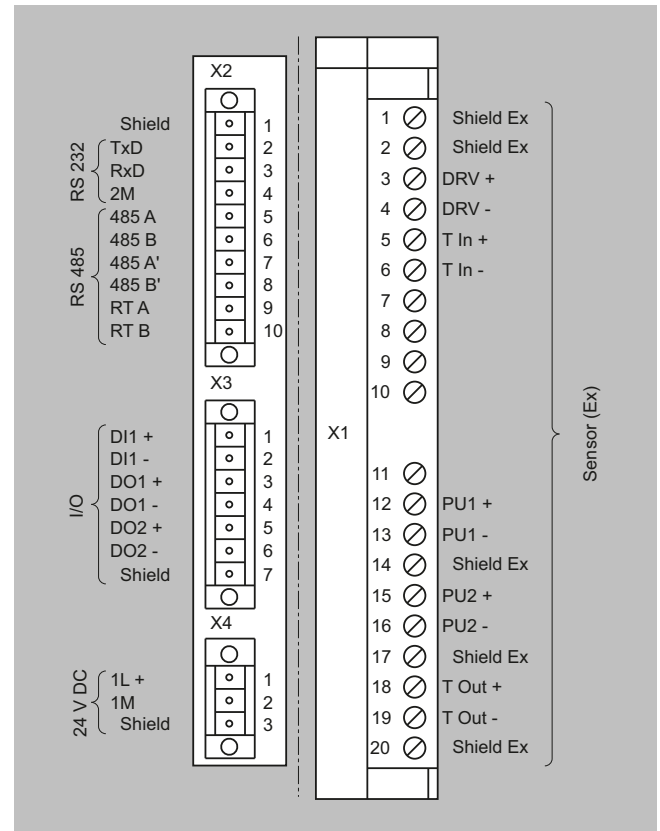
Spare parts / SIFLOW FC070

Circuit diagrams



SIFLOW FC070, electrical connection

Circuit diagrams (continued)



SIFLOW FC070 Ex CT, electrical connection

Overview

Siemens offers two types of ultrasonic flowmeters, inline flowmeters and clamp-on flowmeters. This offers the end user the maximum flexibility to choose the technology that best fits his needs. This following chapter shows the inline versions.



SITRANS FS inline ultrasonic flowmeters measure flow of electrically conductive and non-conductive liquids.

Application

Inline ultrasonic flowmeters are suitable for measuring the flow of liquids with good acoustic permeability, independent of conductivity, viscosity, temperature, density and pressure.

- max. 3 % solids
- max. 3 % air and gas
- max. 350 cSt

The main applications can be found in the following sectors:

- Raw water intake for water treatment plants
- Treated waste water
- Power generation and utility
- Irrigation systems
- Cooling water plants within the industry and in power stations
- Plants transporting non-conductive liquids
- Custody transfer - district heating (MID-004)
- HART/4 to 20 mA output
- PROFIBUS PA

Benefits

- Greater flexibility:
 - Sensor sizes from DN 50 to DN 1200 mm (2" to 48")
 - Inline retrofit as 1-path and 2-path up to DN 1200 (2" to 48")
 - Compact and remote transmitter installation
 - HART and PROFIBUS PA communication
 - Mains or battery powered solutions
 - Dedicated transmitter portfolio for HVAC, power generation, utility and general industry as well as more demanding applications
- Easier service:
 - Exchange of the transducers without interrupting operation
 - Battery lifetime of up to 6 years
- Approvals/certificates:
 - Custody transfer approvals within district heating
 - Standard with calibration certificate

Flow Measurement

SITRANS FS (ultrasonic)

Inline ultrasonic flowmeters / System information

Application

Please see Product selector
<http://www.pia-selector.automation.siemens.com>
 on the Internet, since some
 constrains might be related to
 some of the features



	SONO 3300/ FUS060 7ME3300...	SONO 3100/ FUS060 7ME3100...	SONOKIT/ FUS060, FUS080 7ME3100...	FUE380 7ME3410...	FUS380 7ME3400...
Industry					
Water, treated waste water	XXX	XX	XXX		XXX
Irrigation	XX	XX	XXX		XXX
Utility, district heating water, cooling	XXX	XX	XXX	XXX	XXX
Utility, district heating, CT approvals required				XXX	
Onshore and Offshore applications			XX		X
Design					
Compact transmitter mounted on pipe				•	•
Remote transmitter- Sensor up to 100 m	•	•	•	•	•
Transducers can be replaced under pressure		•	•		
Retrofit on existing steel pipes/non weldable			•		
Transmitter enclosure					
Polyamid, IP67			•	•	•
Die-cast aluminum (painted), IP65	•	•	•		
Communication					
HART	•	•	•		
PROFIBUS PA	•	•	•		
Power supply					
3.6 V Battery			•	•	•
115 ... 230 V AC	•	•	•	•	•
115 ... 230 V AC and 3.6 V battery backup			•	•	•
24 V AC/DC	•	•	•		
Accuracy					
0.25 % (2-path system)		•			
0.50 %	•	•	•	•	•
Sensor design					
1-path ultrasonic measurement		•	•		
2-path ultrasonic measurement	•	•	•	•	•
4-path ultrasonic measurement			•		
Dimension					
DN 50 (2")	•			Die-cast bronze	Die-cast bronze
DN 65 (2½")	•			Die-cast bronze	Die-cast bronze
DN 80 (3")	•			Die-cast bronze	Die-cast bronze
DN 100 (4")	•	•	1-path only	•	•
DN 125 (5")	•	•	1-path only	•	•
DN 150 (6")	•	•	1-path only	•	•
DN 200 (8")	•	•	•	•	•
DN 250 (10")	•	•	•	•	•
DN 300 (12")	•	•	•	•	•
DN 350 (14")		•	•	•	•
DN 400 (16")		•	•	•	•
DN 500 (20")		•	•	•	•
DN 600 (24")			•	•	•
DN 700 (28")			•	•	•

Application (continued)

Please see Product selector
<http://www.pia-selector.automation.siemens.com>
on the Internet, since some
constraints might be related to
some of the features



	SONO 3300/ FUS060 7ME3300...	SONO 3100/ FUS060 7ME3100...	SONOKIT/ FUS060, FUS080 7ME3100...	FUE380 7ME3410...	FUS380 7ME3400...
DN 800 (32")			•	•	•
DN 900 (36")			•	•	•
DN 1000 (40")			•	•	•
DN 1200 (48")			•	•	•
Process connection					
Flanges	•	•		•	•
Flanges norm					
EN 1092-1	•	•		•	•
EN 1759-1	•	•			
ANSI B16.5		•			
Pressure rating					
PN 6			•		
PN 10	•	•	•		
PN 16	•	•	•	•	•
PN 25	•	•	•	•	•
PN 40	•	•	•	•	•
Class 150	•	•			
Class 300	•	•			
Pipe, flange					
Carbon steel	•	•	•	•	•
Die-cast bronze (DN 50, 65, 80)				•	•
Media temperature					
-20 °C (-4 °F)		•	•		
-10 °C (+14 °F)	•	•	•		
+2 °C (+35.6 °F)	•	•	•	Min. 5 °C (41 °F)	•
+60 °C (+140 °F)	•	•	•	•	•
+120 °C (+248 °F)	•	•	•	Compact	Compact
+150 °C (+302 °F)	•	•	•	Die-cast bronze	Die-cast bronze
+160 °C (+320 °F)	•	•	•	•	•
+190 °C (+374 °F)		•	•	•	•
+200 °C (+392 °F)		•	•	•	•
Measuring principle					
Transit time principle	•	•	•	•	•
Approvals					
<u>Custody transfer approval</u>					
MID, MI-004, EN 1434 (European energy meter standard)				•	
Other country-specific type approval available for:					
• Russia	•	•	•	•	•
• China (CPA/CMC)				•	
• Korea KC	•	•	•	•	•
<u>Ex approval</u>					
Ex d ATEX		•	•		
Ex i ATEX	•	•	•		

Flow Measurement

SITRANS FS (ultrasonic)

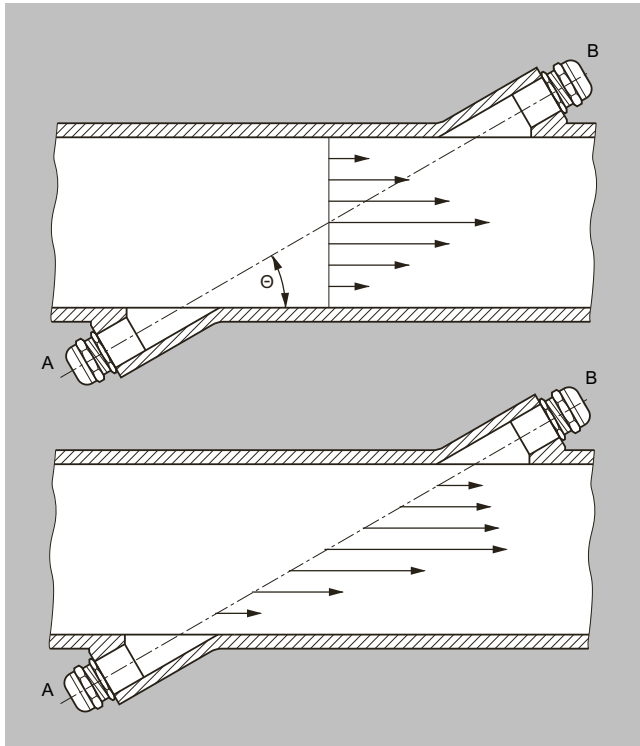
Inline ultrasonic flowmeters / System information

Application (continued)

X = can be used, XX = often used, XXX = most often used, ● = available

Function

Physical principle (single path)



Velocity distribution along sound path

A sound wave traveling in the same direction as the liquid flow arrives at point B from point A in a shorter time than the sound wave traveling against the direction of flow (from point B to A). The difference in sound transit time indicates the flow velocity in the pipe.

Since delay time is measured at short intervals both in and against flow direction, viscosity and temperature have no influence on measurement accuracy.

Measuring principle

In SITRANS F US flowmeters the two ultrasonic transducers are placed at an angle θ in relation to the pipe axis. The transducers function as transmitters and receivers of the ultrasonic signals. Measurement is performed by determining the time the ultrasonic signal takes to travel with and against the flow. The principle can be expressed as follows:

$$v = K \cdot (t_{B,A} - t_{A,B}) / (t_{A,B} \cdot t_{B,A}) = K \cdot \Delta t / t^2$$

v = Average flow velocity

t = Transit time

K = Proportional pipe geometry factor

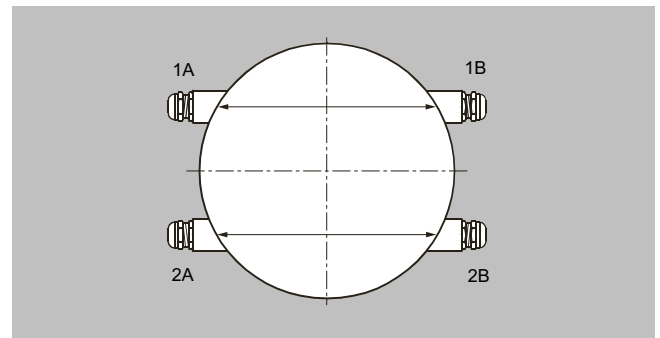
This measuring principle offers the advantage that it is independent of variations in the actual sound velocity of the liquid, i.e. independent of the temperature. Proportional factor K is determined by wet calibration.

Function (continued)

Direct signal processing

The ultrasonic signal is sent directly between the transducers. The advantage gained sending signals from point to point is an extremely good signal strength.

2-path solution



Ultrasonic 2-path flowmeter with 4 transducers. In the upper path transducers 1A/1B and in the lower path 2A / 2B are displayed.

The accuracy of ultrasonic flowmeters depends on the pipe geometry before and after the flowmeter and the number of ultrasonic measuring paths.

When water flows through a pipe, it has a tendency to swirl and/or flow with different velocities inside the pipe, depending on the pipe design.

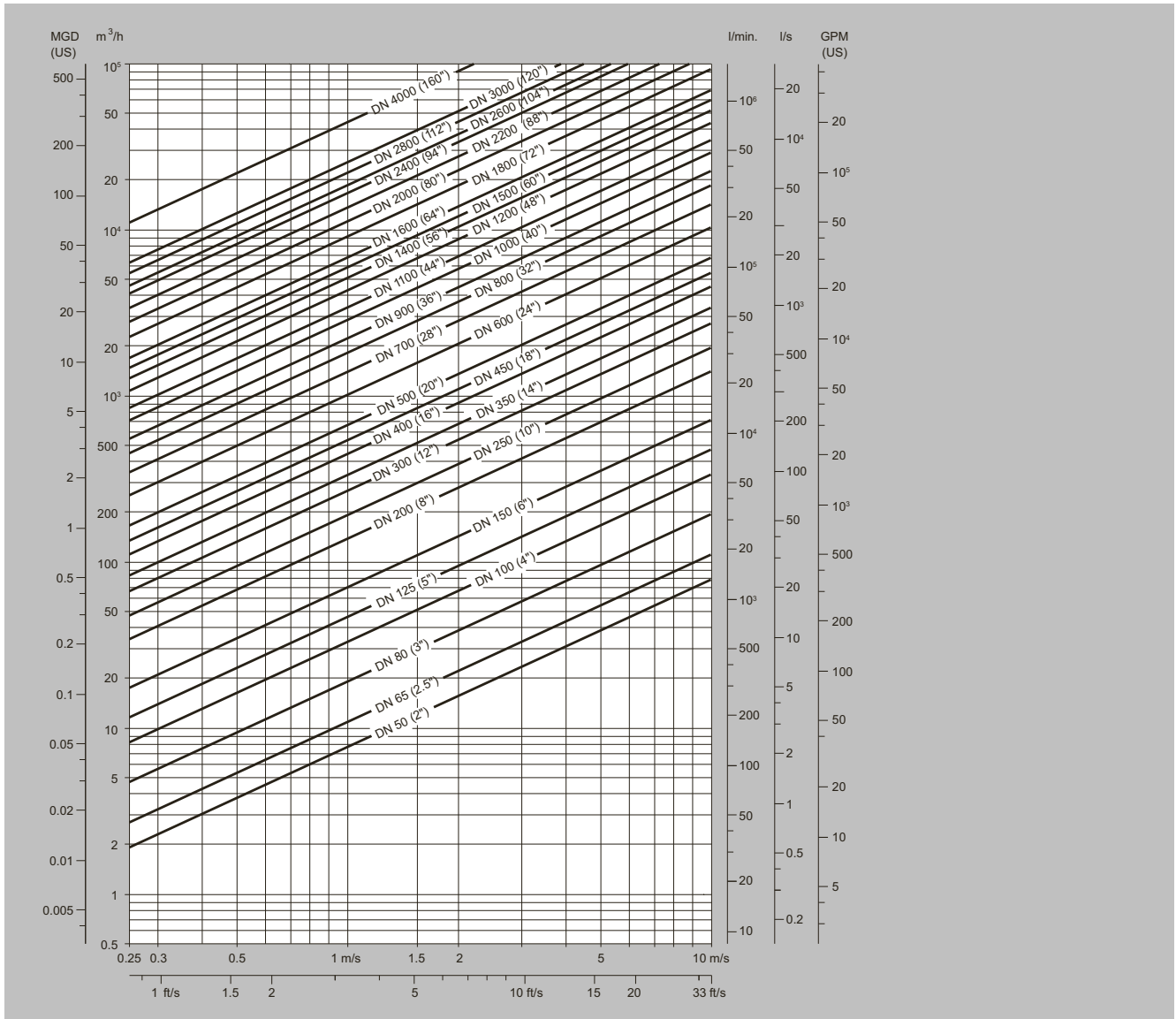
A 2-path ultrasonic flowmeter offers:

- less sensitivity to upstream obstruction like bends, pumps or valves
- high security in the measurements as the meter continues to measure even if, for some reason, one path stops working

Typical straight inlet requirements are upstream $10 \times D_i$ (D_i = diameter of the flowmeter) and downstream $3 \times D_i$.

Typical accuracy that can be reached with 2-path ultrasonic flowmetering is $\pm 0.5\%$ with installations according to above demands.

Technical specifications



Nominal size and flow

Guidelines for selection of sensor

- Min. measuring range: 0 ... 1 m/s
- Max. measuring range: 0 ... 10 m/s

Nominal flow velocity:

- Normal: 1 ... 3 m/s
- Minimum: not permanently below 0.5 m/s
- Maximum: up to 8 m/s

Flow velocity calculation formula:

- $v = (4 \times Q_{\max}) / (\pi \times D_i^2 \times 3600)$
- v in m/s, Q_{\max} in m³/h, D_i in m

Additional to the flow velocity check it is recommended to observe the Reynolds number (Re):

Flow Measurement

SITRANS FS (ultrasonic)

Inline ultrasonic flowmeters / System information

Technical specifications (continued)

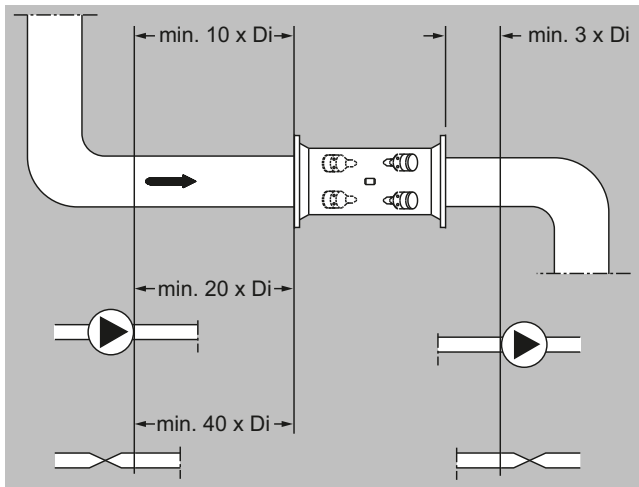
The optimal performance of the flowmeter is with a Re above 10 000, which is typical for flow velocities (water) above 0.5 m/s. Avoid an Re value between 2000 and 5000. In order to observe this and to be above the recommended 0.5 m/s flow velocity limit the sensor size must be reduced.

Re formula: $Re = V \times Di / \text{Viscosity}$

V in m/s, Di in m, Viscosity in cSt ($X \times E^{-6} \text{ m}^2/\text{s}$)

Example: Viscosity for water at 20 °C = $1 \times E^{-6} \text{ m}^2/\text{s}$

Inlet and outlet conditions



Recommended inlets and outlets

To maximize performance inlet and outlet must be straight. There must be a certain distance between flowmeter and bends, pumps and valves. It is also important to centre the flowmeter in relation to pipe flanges and gaskets.

Valves must always be installed after the flowmeter. The only exception is installation of the sensor in a vertical pipe. In this case a valve below the sensor is necessary to allow zero point adjustment. It is important to select a valve which does not alter the flow when fully open.

Recommended inlet/outlet	SONO 3300, SONO 3100	FUS380/FUE380 ¹⁾
90° bend	$10 \times D_i$	$10 \times D_i$
Fully opened valve	$10 \times D_i$	$10 \times D_i$
Partially opened valve	$40 \times D_i$	$40 \times D_i$
2 x 90° bends in same plane	$15 \times D_i$	$15 \times D_i$
2 x 90° bends in two planes	$20 \times D_i$	$20 \times D_i$
Reductions (Outlet $0 \times D_i$)	$10 \times D_i$	$10 \times D_i$
Pumps	$20 \times D_i$	$20 \times D_i$
Outlet	$3 \times D_i$	$3 \times D_i$

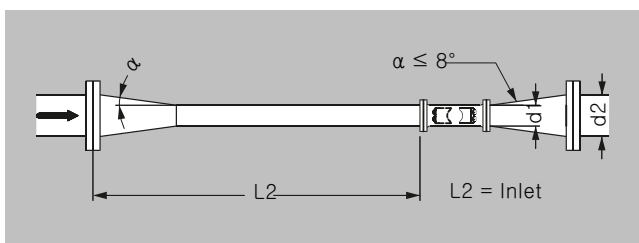
¹⁾ Inlet for FUE380 approved systems: Minimum straight inlet pipe: 1.5 m, but note further recommendations above.

Reductions

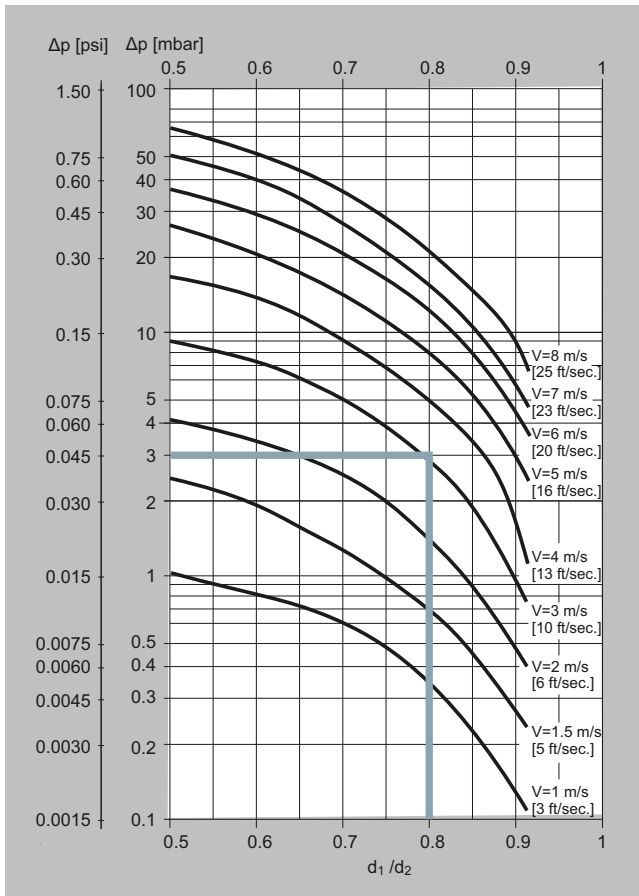
The flowmeter can be installed between two reducers (e.g. DIN 28545). At 8° the pressure drop curve below applies.

Example:

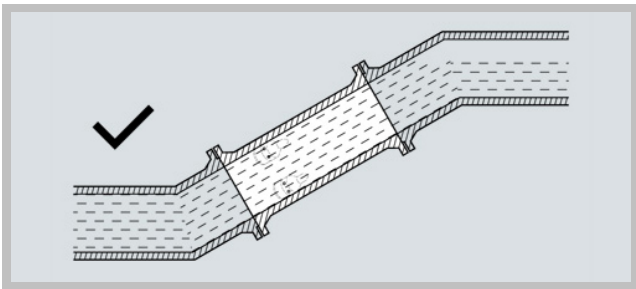
A flow velocity of 3 m/s (V) in a sensor with a diameter reduction from DN 250 to DN 200 ($d_1/d_2 = 0.8$) gives a pressure drop of 3 mbar.



Technical specifications (continued)



The sensor must always be completely filled with liquid:



The following installations must be avoided:

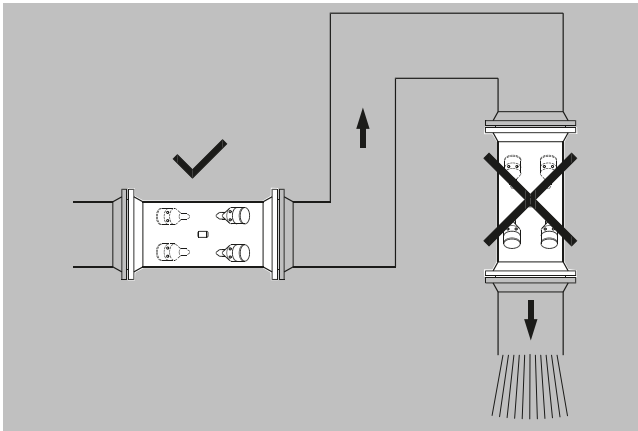
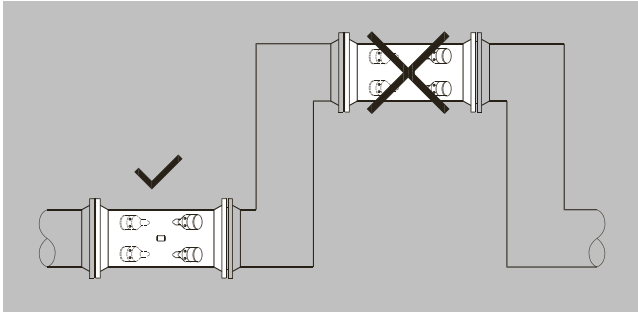
- Installation at the highest point of the pipe system
- Installation in vertical pipes with free outlet

Flow Measurement

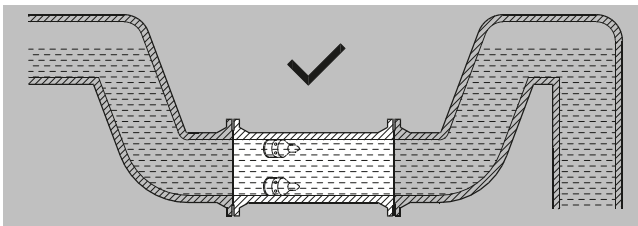
SITRANS FS (ultrasonic)

Inline ultrasonic flowmeters / System information

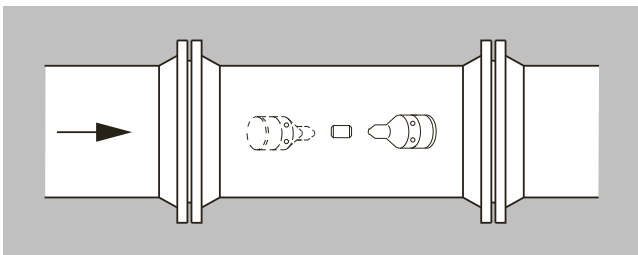
Technical specifications (continued)

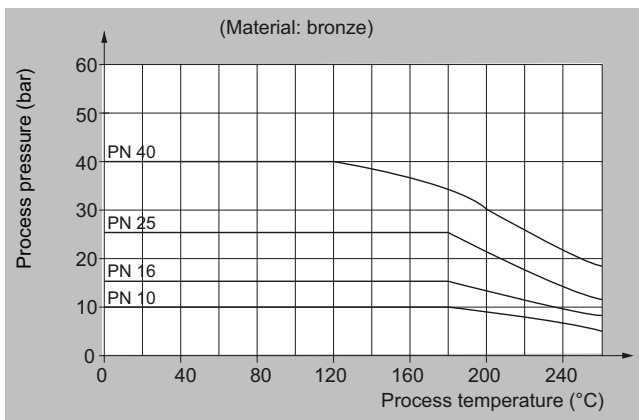
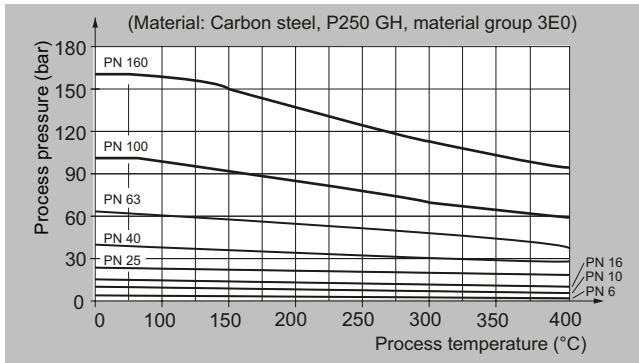
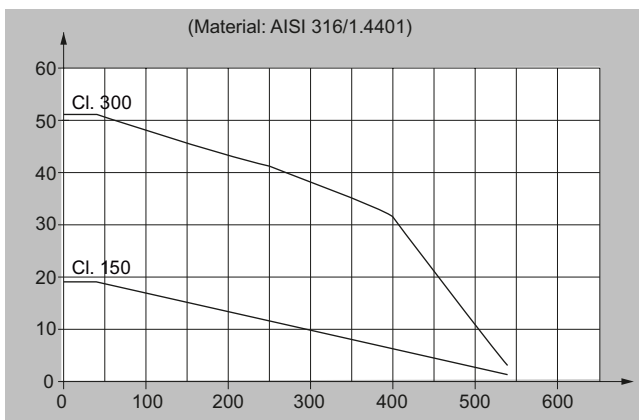


With partially full pipes or pipes with free outlet the flowmeter should be located in a U-shaped tube:



Installing the transducers in horizontal position is recommended:



Technical specifications (continued)**Pressure/temperature curve to EN (DIN) flanges****Pressure/temperature curve to ANSI B16.5 flanges**

Note: The pressure/temperature curves only assist in the selection of a system. No responsibility is taken for the correctness of the information. For exact data please refer to the PED requirements.

Reference conditions

To ensure continuous accurate measurement, flowmeters must be calibrated. The calibration is conducted at Siemens flow facilities with traceable instruments referring directly to the physical unit of measurement according to the International System of Units (SI).

Therefore the calibration certificate ensures recognition of the test results worldwide, including the US (NIST traceability).

Siemens offer accredited calibrations assured to ISO 17025. Siemens Flow Instruments accredited laboratories are recognized by ILAC MRA (International Laboratory Accreditation Corporation - Mutual Recognition Arrangement) ensuring international traceability and recognition of the test results worldwide.

Flowmeter calibration data are stored in the internal EEPROM of the transmitter FUS060 or FUS080.

The system accuracy refers to the following systems:

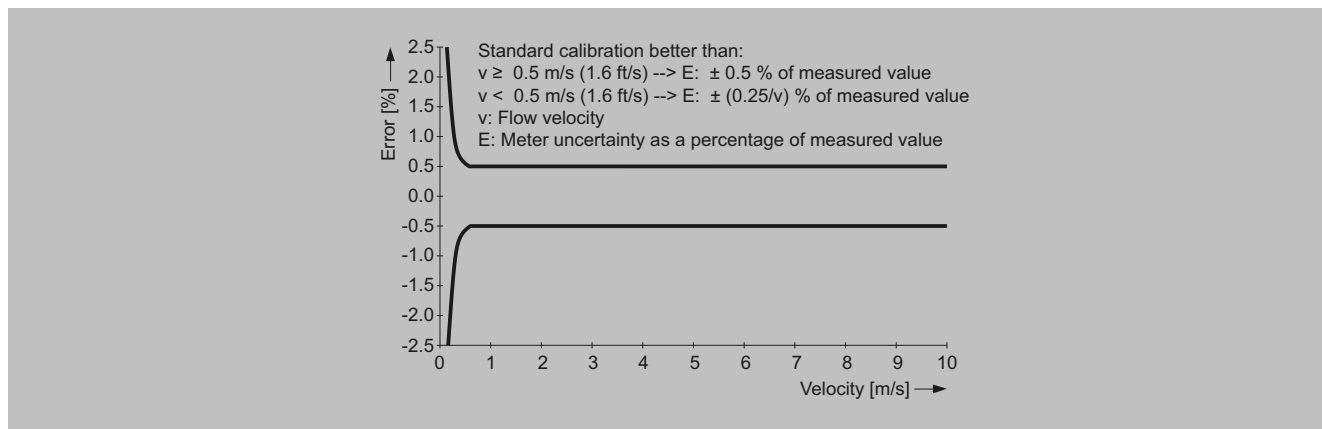
Flow Measurement

SITRANS FS (ultrasonic)

Inline ultrasonic flowmeters / System information

Technical specifications (continued)

SONO 3300/FUS060, SONO 3100/FUS060¹⁾ which are typically calibrated on the frequency output.



Typical calibration reference conditions:

Fluid	Water
Fluid temperature	$22 \pm 5 \text{ }^\circ\text{C}$
Ambient temperature	$22 \pm 5 \text{ }^\circ\text{C}$
Supply voltage	<ul style="list-style-type: none"> • 115/230 V AC +10 ... -15 % • DC 24 V +25 ... -15 %, • AC 24 V $\pm 15 \%$
Straight inlet length	$20 \times D_i$
Outlet	$3 \times D_i$
Rangeability	0 ... 1 m/s to 0 ... 10 m/s
Repeatability	Better than 0.25 % in the range 0.5 ... 10 m/s
Linearity (for water)	
• Reynolds number $1000 < Re < 5000$	Better than 1 %
• Reynolds number > 5000	Better than 0.5 %

¹⁾ Only systems with transmitter FUS060. For systems with transmitter FUS080 see the sections FUS380 and FUE380.

Additional effects of deviations from reference conditions

- Current output: As frequency output ($\pm 0.1 \% \text{ of actual flow} + 0.05 \% \text{ FSO}$)
- Effect of ambient temperature: Frequency/pulse output: $< 0.005 \% \text{ SPAN/K}$; Current output: $< \pm 0.0075 \% \text{ SPAN/K}$
- Effect of supply voltage: 0.005 % of measuring value at 1 % change

Overview



SITRANS FUS060 is a transit time based transmitter designed for ultrasonic flowmetering with dedicated sensors in the FUS inline series up to DN 500. SITRANS FUS060 is engineered for high performance and is suitable for 1- and 2-path flowmeters.

Benefits

- Superior signal resolution for optimum turn down ratio
- Simple menu-based local operation with two-line display and four optical input elements, for unlimited use in potentially explosive atmospheres
- Self-monitoring and diagnostic
- Operate up to 2 paths
- Remote installation up to 120 m from sensor
- 1 analog output (4 to 20 mA) standard with HART-protocol, 1 digital frequency or pulse output, 1 relay output for limit, alarms, flow direction
- PROFIBUS PA Profile 2, 1 digital frequency or pulse output

Application

The main application for flowmeters with the transmitter SITRANS FUS060 is measurement volume of water and waste water.

Design

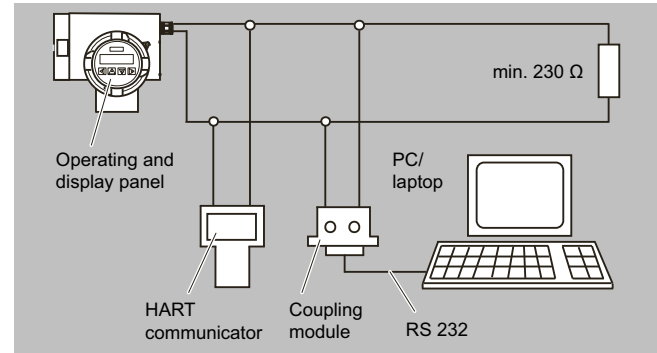
The transmitter FUS060 is designed for use in a flowmeter system together with sensors type SONOKIT, SONO 3300 and SONO 3100. The FUS060 is ordered as part of a complete flowmeter system. It can be ordered separately as spare part and manually programmed with the sensor data.

Function

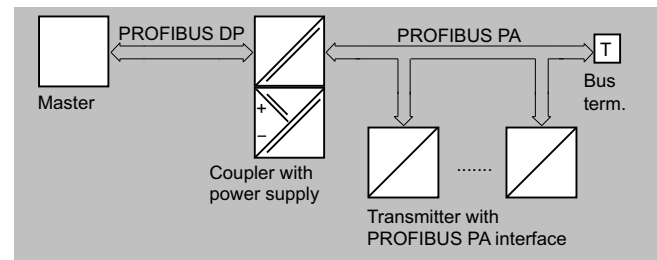
Displays and keypad

Operation of the SITRANS FUS060 transmitter can be carried out using:

- Keypad and display unit
- HART communicator
- PC/laptop and SIMATIC PDM software via HART communication
- PC/laptop and SIMATIC PDM software using PROFIBUS PA communication

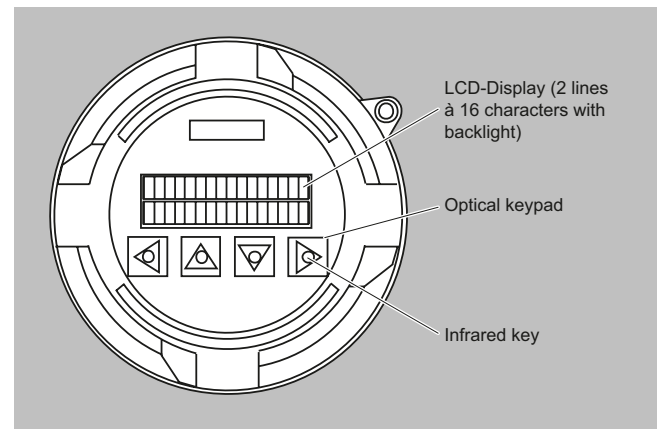


HART communication



PROFIBUS PA communication

The operating and display panel permits simple operation without supplementary equipment. It is not necessary to open the housing. All changes to a setting can therefore also be carried out in the potentially explosive atmosphere.



Operating and display panel

Flow Measurement

SITRANS FS (ultrasonic)

Inline ultrasonic flowmeters / SITRANS FUS060 transmitter

Function (continued)

The individual functions and parameters are selected using a hierarchical, multi-language input menu and four infrared keys. The parameters can be specifically selected and modified using codes, e.g.:

- Operating parameters such as measuring range, physical dimensions, device information
- Limits for flow, totalizer, ultrasonic velocity or ultrasonic amplitude
- Noise suppression using damping, error stages and hysteresis
- Display parameters (freely-configurable display)
- Display in volume or mass dimensions
- Density as constant input value for conversion of volume into mass dimensions
- Forward/backward measurement
- Flow direction
- Diagnostics functions and control values
- Functions of the PROFIBUS PA output:
flow, net quantity (volume or mass), ultrasonic velocity, ultrasonic amplitude, forward quantity (volume or mass), backward quantity (volume or mass)
- Functions of the analog output:
flow, ultrasonic velocity or ultrasonic amplitude
- Functions of digital output 1:
pulse output, frequency output, limit, flow direction or device status
- Functions of digital output 2:
limit, flow direction or device status
- Simulation of output signal via analog output, digital output 1 and digital output 2

The HART protocol is implemented via the analog output (current output). Using this communication facility, the device can be parameterized with a PC/laptop and SIMATIC PDM software in addition to local operation.

In the version with PROFIBUS PA, the analog output is replaced by the digital PROFIBUS PA output. The device can then be parameterized via PROFIBUS communication and with SIMATIC PDM in addition to local operation.

Integration

The transmitter output is often used as input for an automation system or as input for systems of remote reading.

The SITRANS FUS060 transmitter offers current, pulse and relay outputs as standard output functions and supports HART or Profibus PA communication.




The settings of the transmitter output functions are individually programmed via keypad and display menu.

Selection and ordering data**Transmitter FUS060 operating instructions, accessories and spare parts****Operating instructions**

Description	Article No.
• English	A5E01204521

All literature is available to download for free, in a range of languages, at www.siemens.com/processinstrumentation/documentation


Accessories

Description	Article No.	
Standard wall mounting bracket	7ME5933-0AC04	
Special wall-/pipe mounting bracket kit	7ME5933-0AC05	
Safety clamp for electronic cover with glass plate (7ME5933-0AC01)	7ME5933-0AC06	

Process Device Manager SIMATIC PDM	Article No.
SIMATIC PDM For more details about SIMATIC PDM please go to chapter 8 "Digitalization and Communication".	See Selection and ordering data on chapter 8 "Digitalization and Communication"
HART modem with USB interface for communication with FUS060 HART, PC and SIMATIC PDM	7MF4997-1DB

Spare parts**SITRANS FUS060 transmitter, available standard versions**

The transmitter configuration is made in the flowmeter order codes (together with the sensors). The information below is for spare part ordering only and with fixed standardized pre-settings for a DN 2000 2-path system.


Description	Version	Enclosure	Supply	Article No.	
FUS060, 230 V, HART, metric cable glands	Transmitter for remote connection	IP65 (NEMA 4)	115 ... 230 V AC, 50/60 Hz	7ME3050-2BA10-1BA1	
FUS060, 230 V, HART, imperial cable glands	Transmitter for remote connection	IP65 (NEMA 4)	115 ... 230 V AC, 50/60 Hz	7ME3050-2BA10-1BA2	
FUS060, 230 V, PROFIBUS, metric cable glands	Transmitter for remote connection	IP65 (NEMA 4)	115 ... 230 V AC, 50/60 Hz	7ME3050-2BA10-1DA1	
FUS060, 230 V, PROFIBUS, metric cable glands	Transmitter for remote connection	IP65 (NEMA 4)	115 ... 230 V AC, 50/60 Hz	7ME3050-2BA10-1DA2	
FUS060, 24 V, HART, metric cable glands	Transmitter for remote connection	IP65 (NEMA 4)	19 ... 30 V DC/21 ... 26 V - AC	7ME3050-2BA20-1BA1	

Flow Measurement


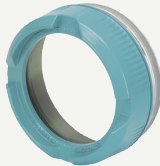



SITRANS FS (ultrasonic)

Inline ultrasonic flowmeters / SITRANS FUS060 transmitter







Selection and ordering data (continued)

Description	Version	Enclosure	Supply	Article No.	
FUS060, 24 V, HART, imperial cable glands	Transmitter for remote connection	IP65 (NEMA 4)	19 ... 30 V DC/21 ... 26 V - AC	7ME3050-2BA20-1BA2	
FUS060, 24 V, PROFIBUS, metric cable glands	Transmitter for remote connection	IP65 (NEMA 4)	19 ... 30 V DC/21 ... 26 V - AC	7ME3050-2BA20-1DA1	
FUS060, 24 V, PROFIBUS, imperial cable glands	Transmitter for remote connection	IP65 (NEMA 4)	19 ... 30 V DC/21 ... 26 V - AC	7ME3050-2BA20-1DA2	

Ordering of pre-configured FUS060 spare transmitters only via PVR (product variation request - special request).

Description	Article No.	
Operating/Display module	7ME5933-0AC00	
Electronics cover with glass plate (non Ex) Die-cast aluminum, with corrosion-resistant Basic Polyester powder coating (min. 60 µm)	7ME5933-0AC01	
Cover for sensor cable and gasket Die-cast aluminum, with corrosion-resistant Basic Polyester powder coating (min. 60 µm)	7ME5933-0AC02	
Cover for mains supply/communication Die-cast aluminum, with corrosion-resistant Basic Polyester powder coating (min. 60 µm)	7ME5933-0AC03	
FUS060 Sensor connection PCBA, Standard versions only, 1 pc.	A5E02551331	
FUS060 Sensor connection PCBA, ATEX version only, 1 pc.	A5E02551334	

Selection and ordering data (continued)


Description	Article No.	
<p>M20 cable gland set for FUS060 (M20) power and output connection, grey PA plastic, 2 pcs.</p> <ul style="list-style-type: none"> • cables Ø 6 ... 12 mm (0.24" ... 0.47") • -40 ... +100 °C (-40 ... +212 °F) 	A5E02246350	
<p>M20 cable gland set for FUS060 ATEX version power and output connection PA plastic: 1 x blue (ATEX Ex i), 1 x grey (ATEX Ex-e)</p> <ul style="list-style-type: none"> • Cables Ø 5 ... 9 mm (0.20" ... 0.35") • -20 ... +95 °C (-4 ... +203 °F) 	A5E02246356	
<p>1/2" NPT cable gland set for FUS060 (NPT) power and output connection, grey PA plastic, 2 pcs.</p> <ul style="list-style-type: none"> • Cables Ø 6 ... 12 mm (0.24" ... 0.47") • -40 ... +100 °C (-40 ... +212 °F) 	A5E02246396	
<p>M25 cable gland set for the FUS060 PA (M25) power and output connection, grey PA plastic, 2 pcs.</p> <ul style="list-style-type: none"> • cables Ø 9 ... 16 mm (0.35" ... 0.63") • -40 ... +100 °C (-40 ... +212 °F) 	A5E02246378	
<p>M16x1.5 cable gland set for FUS060 (M16) sensor connection, gray PA plastic, 2 pcs. and 2 pcs. blind.</p> <ul style="list-style-type: none"> • cables Ø 5 ... 9 mm (0.20" ... 0.35") • -40 ... +100°C (-40 ... +212 °F) 	A5E02593526	
<p>M16 x 1.5 cable gland set for FUS060 (M16) sensor connection, brass chrome, 2 pcs. and 2 pcs. blind</p> <ul style="list-style-type: none"> • cables Ø 5 ... 9 mm (0.20" ... 0.35") • -20 ... +105 °C (-4 ... +221 °F) 	A5E02246369	

Flow Measurement


SITRANS FS (ultrasonic)

Inline ultrasonic flowmeters / SITRANS FUS060 transmitter

Selection and ordering data (continued)

Description	Article No.	
½" NPT cable gland set for FUS060 (NPT) sensor connection, 4 pcs. M16 bush to ½" NPT and 4 pcs. ½" NPT prey PA plastic glands <ul style="list-style-type: none"> • cables Ø 5 ... 9 mm (0.20 ... 0.35") • -20 ... +100 °C (-4 ... +212°F) 	A5E02247877	

Cables for FUS060

Description	Length m (ft)	Article No.	
Coaxial cable for FUS060 (75 Ω, max. 70 °C (158 °F), black PVC); 2 pcs.	3 (9.84)	A5E00875101	
	15 (49.21)	A5E00861432	
	30 (98.43)	A5E01278662	
	60 (196.85)	A5E01278682	
	90 (295.28)	A5E01278687	
	120 (393.70)	A5E01278698	
High temp. coaxial cable for FUS060 with 0.3 m brown PTFE high temp. transducer part, max. 200 °C (392 °F) and black PVC for remaining transmitter part with SMB plug, max. 70 °C (158 °F); impedance 75 Ω; 2 pcs.	3 (9.84)	A5E00875105	
	15 (49.21)	A5E00861435	
	30 (98.43)	A5E01196952	
Special coaxial cable sets with SMB plug for transmitter SITRANS FUS060, PTFE material, temp. -200 ... +200 °C (-328 ... +392 °F), impedance 75 Ω; 2 pcs.	10 (32.84)	A5E02085593	
	15 (49.21)	A5E03262088	
	30 (98.43)	A5E02085644	
	40 (131.23)	A5E02085649	

Technical specifications

Input	
Measurement	Flow by measuring the transit time difference of ultrasonic signals through ultrasonic transducers in DN 100 ... 500 (4" ... 20") 2-path sensor pipes: 1-path or 2-path.
Nominal sizes and number of paths	2-path DN 100 ... 500 (4" ... 20")
Max. cable length	20 m (65.62 ft) (shielded coaxial cable). For Ex version the transducer cable length is restricted to 3 m (9.84 ft) in order to meet requirements for electrical immunity.
Analog output	
Function	Current output programmable for flow, sound velocity or amplitude level. Active current output (13.2 V < open loop voltage < 15.8 V)
• Signal range	4 ... 20 mA
• Upper limit	20 ... 22.5 mA, adjustable
• Signal on alarm	3.6 mA, 22 mA, or 24 mA
• Load	Max. 600 Ω; for non Ex version ≤ 230 Ω for HART communication ≤ 330 Ω for Ex-version
• Only PROFIBUS PA version:	Analog output omitted, is replaced by digital PROFIBUS PA interface
Digital output 1	
Function	Pulse, frequency or status output - programmable for pulses, frequency, alarm, limit or status.
• Active or passive signal, can be configured with positive or negative logic	Active: 24 V DC, ≤ 24 mA, R _i = 300 Ω Passive: open collector, 30 V DC, ≤ 200 mA
• For explosion protection (ATEX version) and PROFIBUS PA version	Only passive: open collector 30 V DC, ≤ 100 mA
• Output function, configurable	Pulse output <ul style="list-style-type: none"> Adjustable pulse significance ≤ 5 000 pulses/s Adjustable pulse width ≥ 0.1 ms Frequency response <ul style="list-style-type: none"> f_{END} selectable up to 10 kHz Limit for flow, totalizers, ultrasonic velocity or ultrasonic amplitude device status, flow direction
Digital output 2	
Function	Relay output - programmable for alarm, limit or status indication.
• Relay, NC or NO contact	Switching capacity max. 5 W Max. 50 V DC, max. 200 mA DC Self-resetting fuse, R _i = 9 Ω
• Output function, configurable	Limit for <ul style="list-style-type: none"> flow, ultrasonic velocity or ultrasonic amplitude flow direction device status
• Only PROFIBUS PA version:	Digital output 2 omitted
Communication via analog output 4 ... 20 mA	
• PC/laptop or HART communicator with SITRANS F flowmeter	
- Load with connection of coupling module	min. 230 Ω
- Load with connection of HART communicator	min. 230 Ω
- Cable	2-wire shielded ≤ 3 km (≤ 1.86 miles) Multi-core shielded ≤ 1.5 km (≤ 0.93 miles)
- Protocol	HART, version 5.1

Technical specifications (continued)

Input	
Communication via PROFIBUS PA interface	Layers 1 + 2 according to PROFIBUS PA Communication system according to IEC 61158/EN 50170
• Power supply	Separate supply, four-wire device Permissible bus voltage 9 ... 32 V See certificates and approvals
• Current consumption from bus	10 mA; ≤ 15 mA in event of error with electronic current limiting
Electrical isolation	
	Outputs electrically isolated from power supply and from another
Accuracy	
Error in measurement (at reference conditions)	
• Pulse output	≤ ± 0,5 % of measured value at 0,5 ... 10 m/s or ≤ ± 0,25V[m/s]% of measured value at flow < 0,5 m/s
• Analog output 4 ... 20 mA	As pulse output plus ± 0.1 % of measured value, ± 20 µA
• Repeatability	≤ ± 0,25 % of measured value at 0.5 ... 10 m/s
Reference conditions (water)	
• Process temperature in the connected sensor	25 °C ± 5 °C (77 °F ± 9 °F)
• Ambient temperature at the transmitter	25 °C ± 5 °C (77 °F ± 9 °F)
• Transmitter warming-up time	30 min.
Rated operation conditions	
<u>Ambient conditions</u>	
Ambient temperature	
• Operation	-20 ... +50 °C (-4 ... +122 °F)
• In potentially explosive atmospheres	Observe temperature classes
• Storage	-25 ... +80 °C (-13 ... +176 °F)
Enclosure rating	IP65 (NEMA 4)
Electromagnetic compatibility	For use in industrial environments
• Emitted interference	To EN 55011 / CISPR-11
• Noise immunity	To EN/IEC 61326-1 (Industry)
<u>Medium conditions</u>	
• Process temperature	-200 ... +250 °C (-328 ... +482 °F) (not directly influenced by medium temperature)
• Gases/solids	Influence accuracy of measurement (approx. max. 3 % gases or solids)
Design	
Separate version	Transmitter is connected to the transducers via 3 ... 120 m (9.8 ft ... 395 ft) long specially shielded cables (coaxial cable) For ATEX versions mounted in the Ex area only with 3 m (9.8 ft) long cables.
Enclosure material	Die-cast aluminium, painted
Wall mounting bracket (standard and special)	Stainless steel (standard: always incl.)
Weight of transmitter	4.4 kg (9.7 lb)
Electrical connection	Cable glands (always incl.) <ul style="list-style-type: none"> Power supply and outputs <ul style="list-style-type: none"> 2 x M20 (HART)/M25 (PROFIBUS) 2 x ½"-NPT (HART) Transducers/sensor <ul style="list-style-type: none"> 2/4 x M16 2/4 x ½"-NPT


Flow Measurement

SITRANS FS (ultrasonic)

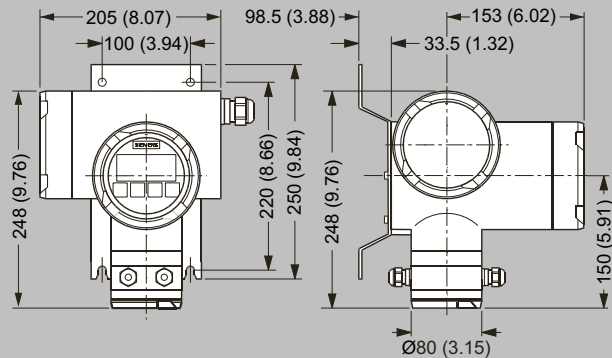
Inline ultrasonic flowmeters / SITRANS FUS060 transmitter

Technical specifications (continued)

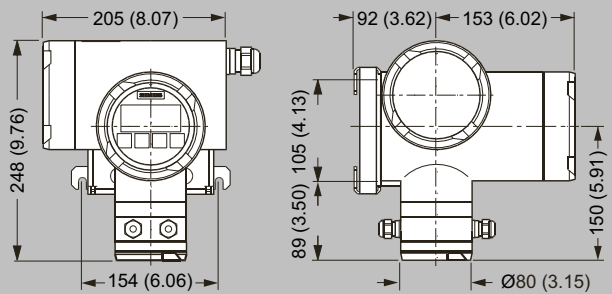
Input	
Display and controls	
Display	LCD, two lines with 16 characters each
<ul style="list-style-type: none"> Multi-display: 2 freely-selectable values are displayed simultaneously in two lines 	Flow, volume, mass flow, mass, flow velocity, speed of sound, ultrasonic signal information, current, frequency, alarm information
Operation	4 infrared keys, hierarchical menu shown with codes
Power supply	
Supply voltage	
<ul style="list-style-type: none"> Standard version 	120 ... 230 V AC \pm 15 % (50/60 Hz) or 19 ... 30 V DC/21 ... 26 V AC
Power failure	No effect for at least 1 period (> 20 ms)
Power consumption	Approx. 10 VA/10 W
Certificates and approvals	
Explosion protection	ATEX II 2 G Ex dem [ia/ib] IIC T6/T4/T3 Gb T6 for media < 85 °C (185 °F) T5 for media < 100 °C (212 °F) T4 for media < 135 °C (275 °F) T3 for media < 200 °C (392 °F)

Coaxial cable		
Standard Coaxial cable (75 Ω)	Coaxial cable with SMB straight plug on one end for connection to the FUS060 Pre-terminated, can be shortened on sensor side	
Outside diameter	\varnothing 5.8 mm	
Length	3, 15, 30, 60, 90, 120 m (9.84, 49.21, 98.43, 196.85, 295.28, 393.70 ft) between sensor and transmitter	
Material (outside jacket)	black PE	
Ambient temperature	-10 ... +70 °C (14 ... 158 °F)	
High temperature Coaxial cable (75 Ω)	Coaxial cable with SMB straight plug on one end for connection to the FUS060	
Outside diameter	\varnothing 5.13 mm (first 0.3 m (0.98 ft) part to the transducer), \varnothing 5.8 mm (for remaining cable to the transmitter – with SMB plug at the end) and between these is a black hot melt junction \varnothing 16 mm (length 70 mm) Fix terminated, can NOT be shortened	
Length	3, 15, 30 m (9.84, 49.21, 98.43 t) between sensor and transmitter (max. 3 m (9.84 ft) transducer cable length for Ex area mounted transmitters)	
Material (outside jacket)	Brown PTFE (0.3 m (0.98 ft) part) and black PE (for remaining cable)	
Ambient temperature	-200 ... +200 °C (-328 ... +392 °F) (brown PTFE transducer part) and -10 ... +70 °C (14 ... 158 °F) (black PE for remaining transmitter cable part)	

Dimensional drawings

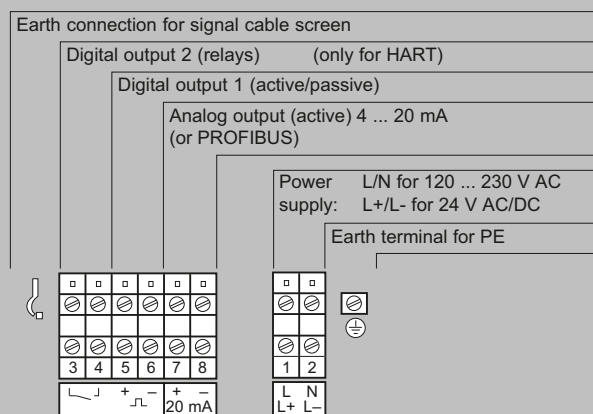


SITRANS FUS060 with standard mounting bracket, dimensions in mm (inch)



SITRANS FUS060 with optional special mounting bracket, dimensions in mm (inch)

Circuit diagrams



Electrical connection SITRANS FUS060

Flow Measurement

SITRANS FS (ultrasonic)

Inline ultrasonic flowmeters / SITRANS FUS080/FUE080 transmitter

Overview



SITRANS FUS080 is a transit time based transmitter designed for ultrasonic flowmetering with any sensor in the FUS in-line series SONOKIT, FUS380 and FUE380 up to DN 1200.

The ultrasonic flowmeter transmitter SITRANS FUS080 comes as battery or mains powered version. The SITRANS FUS080 is designed to measure flow water applications.

The type approved flowmeter series for flowmetering in energy meter custody transfer systems are named SITRANS FUE380.

Benefits

- Battery-powered up to 6 years
- 115/230 V mains-powered with back-up battery option in case of mains power failure
- Fast measuring frequency 15 Hz/0.5 Hz (230 V AC/Battery)
- Easy one button straight forward display
- IrDA optical interface for local communication
- 2-path measuring principle for optimum accuracy
- Compact or remote mounting
- Measures on all district water qualities and water conductivities
- No pressure drop
- Long-term stability
- 2 galvanic isolated digital outputs for easy connection to a calculator (potential free)
- 1 analog 4 to 20 mA output
- Bidirectional measurement, with 2 totalizers and outputs
- Dynamic range Q_i (min) : Q_s (max) up to 1:400
- Compact version with triax cables for highest EMC-protection

Application

The main application for flowmeters with the transmitter SITRANS FUS080 is measurement of water flow in district heating plants, local networks, boiler stations, substations, chiller plants, irrigations plants and other general water applications.

Design

The transmitter type SITRANS FUS080 is designed with fiber-glass reinforced polyamide enclosure for remote or compact installation in normal areas. The remote versions are available with up to 30 meter distance from flowmeter to transmitter. When ordering as a compact version in the series FUS380 and FUE380 the transducer cables are pre-mounted at the sensor.

The transmitter is available in an IP67/NEMA 4X/6 enclosure and is designed for use in the flowmeters series:

- FUS380 (2-path)
- FUE380 (2-path)

The transmitter FUS080 is always ordered as part of a complete flowmeter system.

It can be manually ordered separately as spare part preprogrammed with the given sensor data.

Integration

The flowmeter pulse output is often used as input for an energy meter or as input for digital systems for remote reading.

SITRANS FUS380 has two pulsel outputs, with functions that can be individually selected.

The settings of the transmitter, e. g. flow and pulse output rate, are defined when ordering the complete flowmeter.

If the flowmeter forms part of an energy meter system for custody transfer, no further approvals are needed, except eventually local approvals on the flowmeter.

Selection and ordering data

Transmitter FUS080 operating instructions, accessories and spare parts

Operating instructions

Description	Article No.
for use with SONOKIT	
• English	A5E03059912
Integrated in FUS/FUE380	
• English	A5E00730100
• German	A5E00740611

All literature is available to download for free, in a range of languages, at <http://www.siemens.com/processinstrumentation/documentation>

Accessories

Description	Article No.
Sun lid for FUS080 transmitter (frame and lid)	A5E02328485
Brace (holder) for optical IrDA eye	A5E00695277
IrDA infrared interface adapter with USB for data acquisition with 1.2 m (3.9 ft) cable. Operating system: Windows 10	FDK:087L4163

Process Device Manager SIMATIC PDM	Article No.
SIMATIC PDM For more details about SIMATIC PDM please go to chapter 8 "Digitalization and Communication".	See Selection and Ordering data on chapter "Digitalization and Communication"

Spare parts

A spare part transmitter can be ordered for a specific system. In the description of the following spare part transmitters the related transmitter Article No. found on the device silver front label is noted.

Spare part transmitter for FUS380 systems (7ME3400)

Description	Article No.
FUS080 transmitter 3.6 V battery (no battery included, to be ordered separate) as spare part transmitter for FUS380 flowmeter series. Transmitter Article No. 7ME3450-0AA10-2AA0	A5E02729700

Selection and ordering data (continued)

Description	Article No.
FUS080 transmitter 3.6 V battery (battery included) as spare part transmitter for FUS380 flowmeter series ¹⁾ . Transmitter Article No. 7ME3450-0AA10-2AA0	A5E02729035
FUS080 transmitter 230 V mains as spare part transmitter for FUS380 flowmeter series. Transmitter Article No. 7ME3450-0AA10-2AA0	A5E02699309
FUS080 transmitter 230 V mains with backup-battery as spare part transmitter for FUS380 flowmeter series. Transmitter Article No. 7ME3450-0AA40-2AA0	A5E02729610



When ordering: Inform on flowmeter article no. and flowmeter serial no. (e.g. 7ME3400-xxxx-xxxx-Z, XX.... and xxxxxxHxxx).

Spare part transmitter for FUE380 approved systems (7ME3410)

Only with MID approval marks, no MID verification – only a complete flowmeter can be MID-verified, i.e. sensor together with the transmitter.

Description	Article No.
FUE080 transmitter 3.6 V battery (no battery included, to be ordered separate) as spare part transmitter for FUE380 flowmeter series. Transmitter Article No. 7ME3450-0AA10-2AB0.	A5E02734600
FUE080 transmitter 3.6 V battery (battery included) as spare part transmitter for FUE380 flowmeter series ¹⁾ . Transmitter Article No. 7ME3450-0AA20-2AB0	A5E02734568
FUE080 transmitter 230 V mains as spare part transmitter for FUE380 flowmeter series. Transmitter Article No. 7ME3450-0AA30-2AB0	A5E02734539
FUE080 transmitter 230 V mains with backup-battery as spare part transmitter for FUE380 flowmeter series. Transmitter Article No. 7ME3450-0AA40-2AB0	A5E02734585



When ordering: Inform on flowmeter order no. and flowmeter serial no. (e.g. 7ME3410-xxxx-xxxx-Z, XX.... and xxxxxxHxxx).

Spare part transmitter for SONOKIT systems (7ME3210/7ME3220)


Description	Article No.
FUS080 transmitter 3.6 V battery (no battery included, to be ordered separate) as spare part transmitter for SONOKIT flowmeters. Transmitter Article No. 7ME3450-0AA10-2AA0	A5E03048726

Flow Measurement

SITRANS FS (ultrasonic)

Inline ultrasonic flowmeters / SITRANS FUS080/FUE080 transmitter

Selection and ordering data (continued)








Description	Article No.	
FUS080 transmitter 3.6 V battery (no battery included) as spare part transmitter for SONOKIT flowmeters ¹⁾ Transmitter Article No. 7ME3450-0AA20-2AA0	A5E03048714	
FUS080 transmitter 230 V mains as spare part transmitter for SONOKIT flowmeters. Transmitter Article No. 7ME3450-0AA30-2AA0	A5E03048701	
FUS080 transmitter 230 V mains with backup-battery as spare part transmitter for SONOKIT flowmeters. Transmitter Article No. 7ME3450-0AA40-2AA0	A5E03048719	

When ordering: Inform on flowmeter order no. and flowmeter serial no. (e.g. 7ME3220-xxxx-xxxx-Z, XX.... and xxxxxxHxxx).

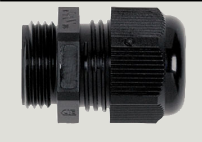
Spare part transmitter for FUS880 retrofitting systems (7ME3440)

Description	Article No.	
Internal battery pack, one set of 2 D-cell (3.6 V 34 Ah)¹⁾ <ul style="list-style-type: none"> 1 pc. pack 24 pcs. pack 	A5E02679676 A5E02896941	
Single battery back-up to main supply (17 Ah)¹⁾	A5E02679923	
Battery cover for transmitter FUS080	A5E00694468	
PG 13.5 cable gland set for FUS080 power and output connection, black PA plastic, 2 pcs., cables Ø 6 ... 12 mm (0.24" ... 0.47"), -40 ... +100 °C (-40 ... +212 °F) Note: For older Version, until 12-2018	FDK:083G0228	
PG 13.5 cable gland set (two cable entries) for FUS080 sensor connection, black PA plastic, 2 pcs., cables Ø 6 ... 12 mm (0.24" ... 0.47"), -40 ... +100 °C (-40 ... +212 °F) Note: For older Version, until 12-2018	A5E00694500	

Selection and ordering data (continued)

Description	Article No.	
SITRANS FUS/FUE380 wall Mounting kit for remote transmitter mounting, including connection plate (DN 50 ... 1200, 2" ... 48") Note: For older Version, until 12-2018	A5E00694509	
SITRANS FUS/FUE380 terminal Box for compact transmitter mounting, including connection plate, (steel sensors only, DN 100 ... 1200, 4" ... 48") Note: For older Version, until 12-2018	A5E00694660	
FUS080 display and keypad with Siemens logo	A5E00873496	
FUS080 display and keypad neutral (without logo)	A5E33147123	
Wall mounting unit for IP67/NEMA 4X/6 version, wall bracket, terminal box in polyamide (SSL version) <ul style="list-style-type: none"> 3 × M20 cable glands (power and 2 × output) (cable glands are supplied on the connection cable) 	A5E34365669	
Connection electronics for transmitters with remote cable connection	A5E34365721	
Connection electronics for sensors with remote cable connection	A5E34365744	
Terminal box for direct pipe mounting made of polyamide with blank plugs (8 pcs) without lid and no pcb, with pedestal mounting (pre-mounted) <ul style="list-style-type: none"> 3 × M20 cable glands (1 pcs power and 2 × output) + 3 × M20 cable glands with pipe mounting adapter 	A5E34365775	
Lid for terminal box	FDK:085U1003	
Cable gland M20 for FUS080/FUE080 plastic black, cable diameter 5 ... 13 mm (0.12 ... 0.51 ft); -20 ... 100 °C (-4 ... +212 °F)	A5E02246304	

Selection and ordering data (continued)

Description	Article No.	
Cable gland M20 set (two cable entries) for FUS/E080 sensor connection, PA-black, 2 pcs.; -40 ... +100 °C (-40 ... +212 °F)	A5E43762073	
Current output module for FUS/E080 passive 4-20 mA add on output module	A5E33961666	


1) Lithium batteries are subject to special transportation regulations according to United Nations "Regulation of Dangerous Goods, UN 3090 and UN 3091". Special transport documentation is required to observe these regulations. This may influence both transport time and costs.

Downloads for DEVICE description FUE380 <http://support.automation.siemens.com/WW/view/en/23036121/133100>


Sensor cables for FUS380/FUE380 flowmeters

Description	Article No.	
Compact connection cable for direct mounting of the transmitter on the pipe	A5E34365172	
FUS080/FUE080 remote cable (connector and cable with 2 x M20 cable glands)		
• 5 m (16.4 ft)	A5E34365162	
• 10 m (32.8 ft)	A5E34365154	
• 20 m (65.6 ft)	A5E34365151	
• 30 m (98.4 ft)	A5E34364386	

Sensor cables for SONOKIT flowmeter with FUS080

Description	Article No.	
Cable set (2 pcs.) remote mounting with SONOKIT flowmeters		
• 15 m (49.2 ft)	A5E02478541	
• 30 m (98.4 ft)	A5E02478551	

Sensor cables for FUS880 retrofitting system (7ME3440)

Description	Article No.	
Coaxial cable with transducer connection for use in SONO 3300 sensors; with 0.3 m brown PTFE high temperature transducer part, max. 200 °C (392 °F) and black PVC for the remaining transmitter part, max. 70 °C (158 °F); cable impedance 75 Ω.		
• 1 x 10 m (32.8 ft)	FDK:085L2400	
• 1 x 20 m (65.6 ft)	FDK:085L2401	
• 1 x 30 m (98.4 ft)	FDK:085L2402	
Transducer spare part set of two transducers with gaskets for STRANS FUS880 retrofitting systems	FDK:087H3007	

Technical specifications

Input	
Measurement	Flow by measuring the transit time difference of ultrasonic signals through ultrasonic transducers in the sensor pipes. Supporting of 1-path or 2-path sensors in sizes DN 50 ... 1200 measuring on water
Measuring rate	
• Battery mode	0.5 Hz
• Mains supply	Up to 15 Hz
• Back-up mode	0.5 Hz (at mains supply drop)
Flow rate	0.02 ... 9 m/s (0.065 ... 29.5 ft/s), bidirectional flowmetering
Output	
	2 pulse or status outputs (A and B), individual galvanically isolated MOS relay outputs, passive mode, max. ± 35 V AC/DC, max. 50 mA
Max. pulse frequency	100 Hz at Q _s (Q _{max}) Note: 20 Hz max. during the transmission to the SITRANS FUE950 energy calculator
Pulse value and length	Selectable with the ordering of the flowmeter
Output A function	Pulse: forward, reverse, forward net, reverse net (preset: forward)
Output B function	Pulse: forward, reverse, forward net, reverse net (preset: forward) or alarm indication or call-up indication (preset: alarm)
Pulse value A and B	0.1 l/p, 0.25 l/p, 0.5 l/p, 1 l/p, 2.5 l/p, 10 l/p, 25 l/p, 50 l/p, 100 l/p, 250 l/p, 500 l/p, 1 m ³ /p, 2.5 m ³ /p, 5 m ³ /p, 10 m ³ /p, 25 m ³ /p, 50 m ³ /p, 100 m ³ /p, 250 m ³ /p, 500 m ³ /p, 1 000 m ³ /p
Pulse length (depending on Q _{max} by DN selection)	5, 10, 20, 50, 100, 200, 500 ms (standard 5 ms)
Alarm indication	Path 1 (F1), path 2 (F2) internal, failure (F3, F4), powers supply warning or low battery indication (F5), Q _{max} overflow (F6), pulse overflow (F7, F8), internal data logger warning (F9)
Analog output	Passive current output 4 ... 20 mA Data span pre-selectable depending on pipe size
Rated operation conditions	
<u>Ambient conditions</u>	
Ambient temperature	
• Operation	-10 ... +60 °C (14 ... 140 °F) (MID version: max. +55 °C (131 °F))
• Storage	-40 ... +85 °C (-40 ... +185 °F) (battery included)
Enclosure rating	IP67/NEMA 4X/6 to EN 60529 and DIN 40050
Electromagnetic compatibility	
• Emitted interference	To EN 55011/CISPR-11
• Immunity	To EN/IEC 61326-1 (Industry)
• MID approved (FUE380 series)	Environment class E2 and M1
Mechanical vibration	2 g, 1 ... 800 Hz sinusoidal in all directions according to IEC 68-2-6
Weight of transmitter	Approx. 1.5 kg (3.3 lb)
Design	
Enclosure material	Fibre-glass reinforced polyamide, light gray color
Wall mounting kit	IP67/NEMA 4X/6 terminal box for the wall mounting of the transmitter, fiber-glass reinforced polyamide with stainless steel bracket, cable glands entries: 2 x 2 M20 or PG 13.5 for power supply and outputs and 2 x M20 or PG 13.5 for the sensor cables, glands (supply and outputs and double cable entries for sensor cables) are included.
Sensor cable	Coaxial cable sets for remote transmitter up to 30 m (98.4 ft) long transducer cable, 75 Ω impedance, cables sets are prepared for the connection to the sensors Triax cables or integral version

Flow Measurement

SITRANS FS (ultrasonic)

Inline ultrasonic flowmeters / SITRANS FUS080/FUE080 transmitter

Technical specifications (continued)

Input	
Display and controls	
Display	LCD, 8 digits, additional 2 digits and symbols for status information
Resolution	Totalized information can be displayed with 1, 2 or 3 decimals or automatic adjustment (default)
Display setting	Flow unit: Preset: m ³ /h Volume unit: Preset: m ³
Push button	One push button for menu selection and display information
Communication (IrDA optical eye)	IrDA – optical communication and control interface with Modbus RTU protocol for read or write transmitter settings and data via PC and PDM tool
Power supply	
Battery	D-cell battery pack, 3.6 V LiSOCl (Lithium Thionyl Chloride, 34 Ah), replaceable, life-and working-time up to 6 years
Mains	87 ... 265 V AC (50 ... 60 Hz) or 87 ... 265 V AC (50 ... 60 Hz) with D-cell single battery backup, 2.6 V LiSOCl (Lithium Thionyl Chloride, 17 Ah), replaceable, life time up to 8 years
Power consumption	
Mains version	Approx. 2.5 VA

SONOKIT, FUS380, FUE380

The flow values and settings are predefined according to dimension selection.

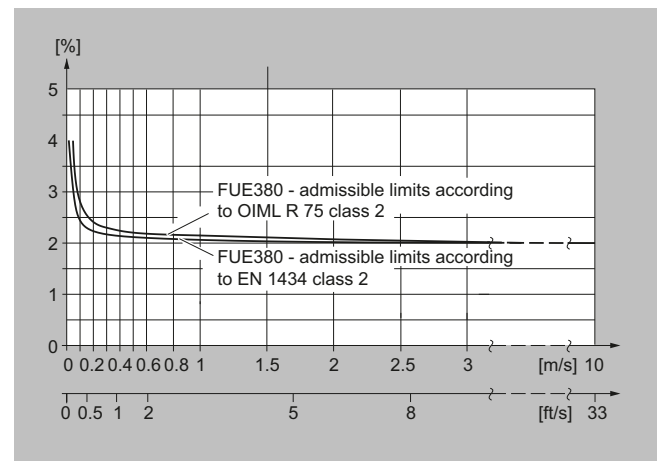
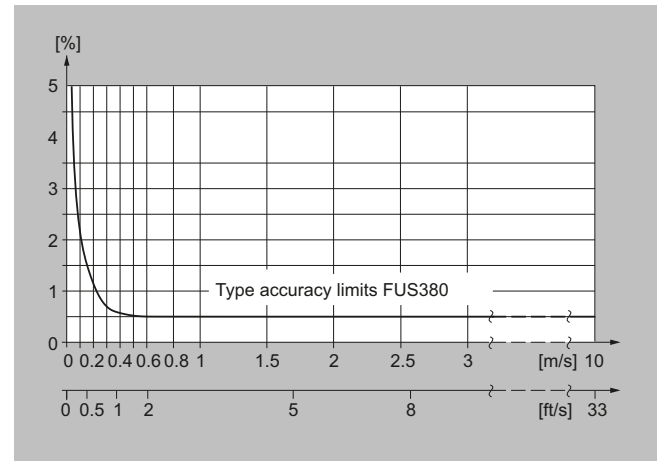
The transmitter settings are changeable by using the SW tool PDM (for FUE380 series some of the setting are only readable, restriction of the approval requirements).

Accuracy/Error in measurement:

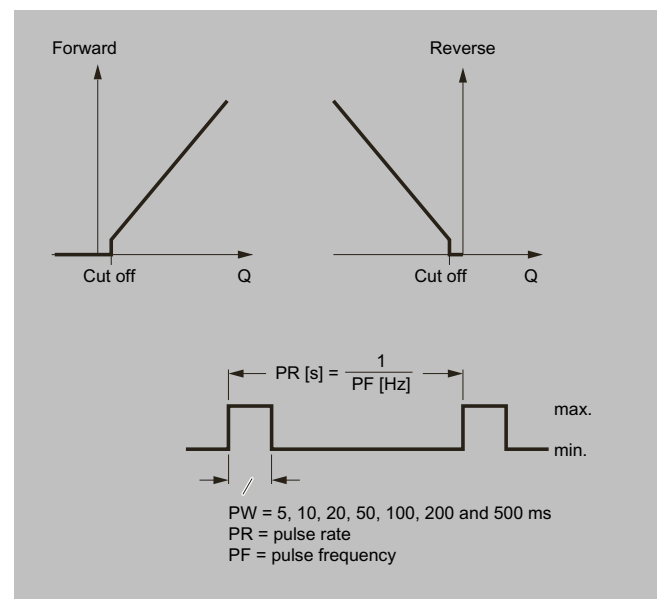
at reference conditions for FUS380 and FUE380 series, SONOKIT series will differ in the accuracy

- Pulse output
 - $\leq \pm 0.5$ % of measured value at 0.5 ... 10 m/s or
 - $\leq \pm 0.25/V$ [m/s] % of measured value at flow < 0.5 m/s
- Repeatability ≤ 0.25 % of measured value at 0.5 ... 10 m/s
- Reference conditions
 - Process temperature and ambient temperature: 25 °C \pm 5 °C (77 °F \pm 9 F)
 - Transmitter warming-up time 30 min.
 - Installation conditions of the sensor: Upstream section > 10 \times DN and downstream section > 5 DN

Technical specifications (continued)



Output configuration

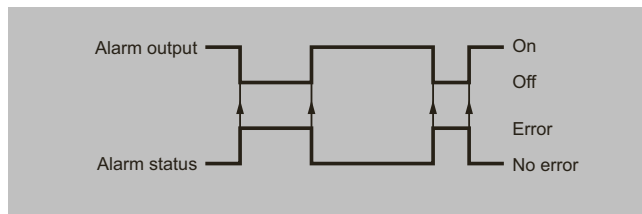


Technical specifications (continued)

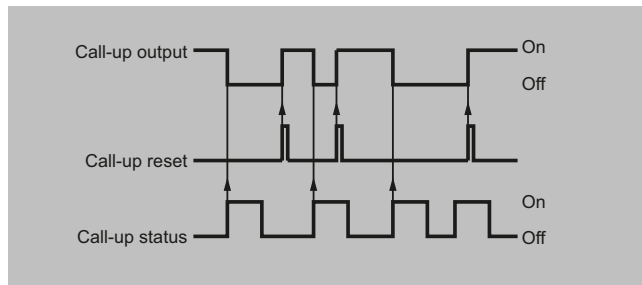
Pulse volume: output A/B configured as volume per pulse, calculated on forward/reverse or net forward/reverse flow. The volume per pulse is free scaleable (via PDM software).

The maximum pulse rate for transmission to an energy calculator depends on its pull-up resistance.

Ratio of max. pulse rate to pull-up	
Pulse frequency (Hz)	Resistance (kOhm)
20	840
30	520
40	360
50	265
60	200
70	155
80	120
90	95
100	60



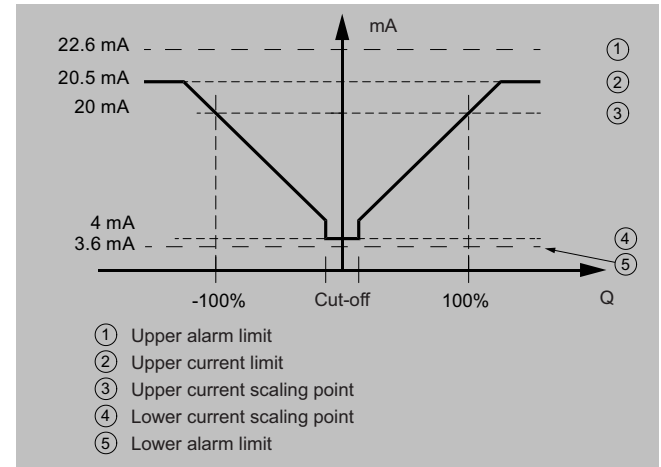
Pulse output B can be used as stated above or as alarm or call-up function.



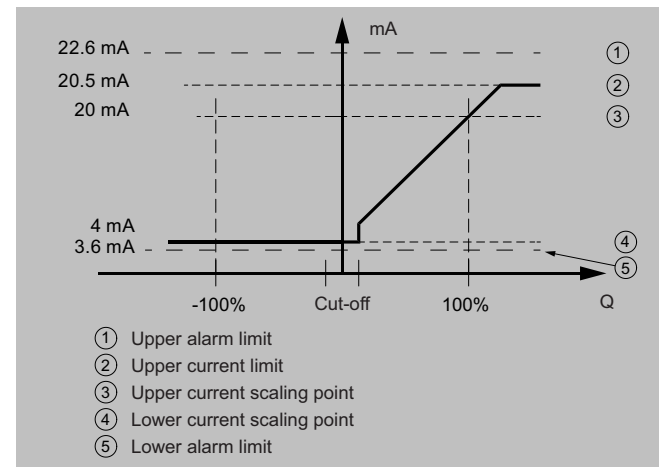
Call-up: the call-up output is active until manually reset by use of PDM tool. The call-up function is activated when an alarm is activated.

Technical specifications (continued)

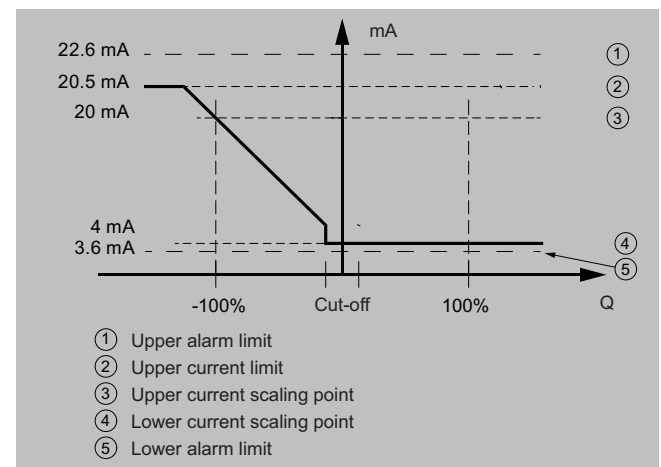
Current output



Bidirectional flow



Positive flow



Negative flow

Flow Measurement

SITRANS FS (ultrasonic)

Inline ultrasonic flowmeters / SITRANS FUS080/FUE080 transmitter

Technical specifications (continued)

Sensor coaxial cable for SONOKIT series with FUS080

Coaxial cable	
Standard coaxial cable (75 Ω)	
Outside diameter	Ø 5.8 mm
Length	15 m, 30 m (49.2 ft, 98.4 ft) between sensor and transmitter
Material (outside jacket)	Black PE
Ambient temperature	-10 ... +70 °C (14 ... 158 °F)

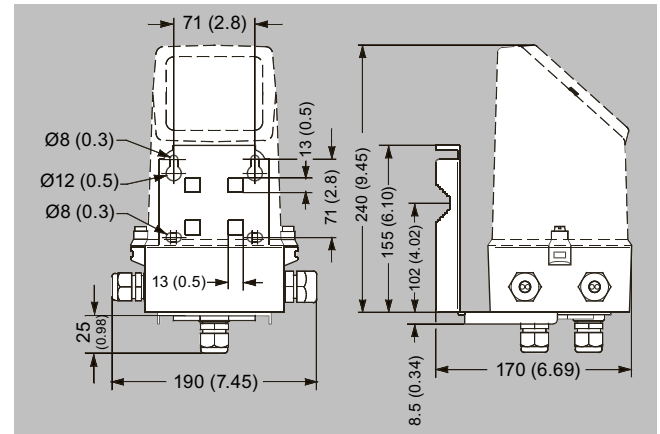


SSL cable for FUS380 /FUE380 series

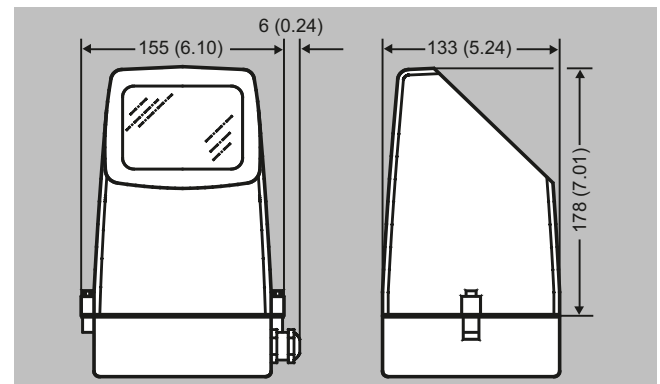
Special SSL cable	
Special SSL	SSL cable to connect sensor electronics with transmitter electronic
Outside diameter	7.1 mm (0.28 in) with RJ45 connector on both ends
Length	Direct connection (internal) for remote distance 5 m, 10 m, 20 m or 30 m
Material outside	Polyurethan (PUR) black glossy finish
Ambient temperature	-40 ... 85 °C (-40 ... 185 °F) High flexible, halogen free, UV resistance

Dimensional drawings

FUS080 transmitter IP67/NEMA 4X/6, wall mounting and compact mounting

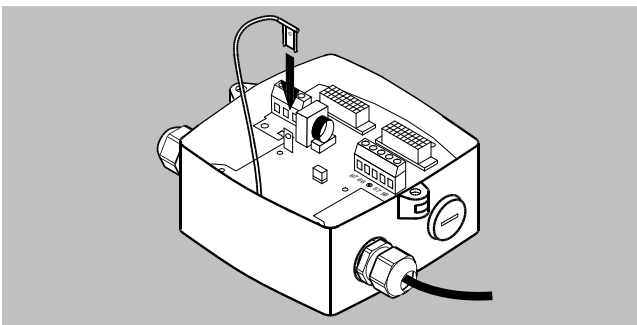
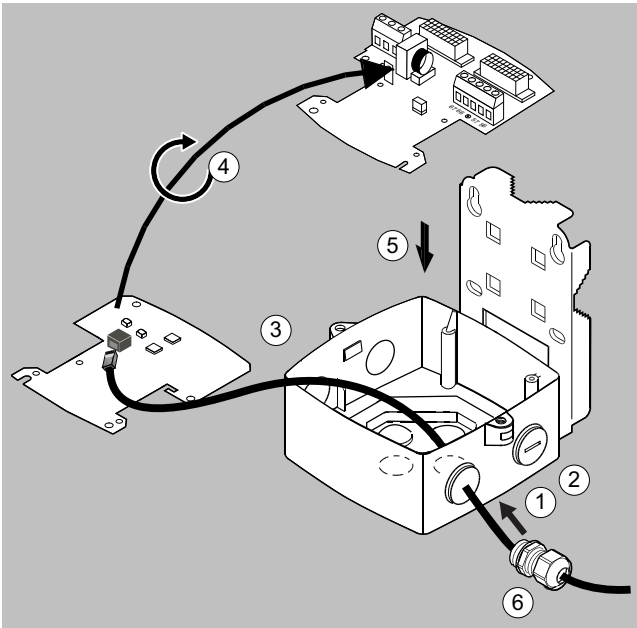


Transmitter wall mounted, dimensions in mm (inch)

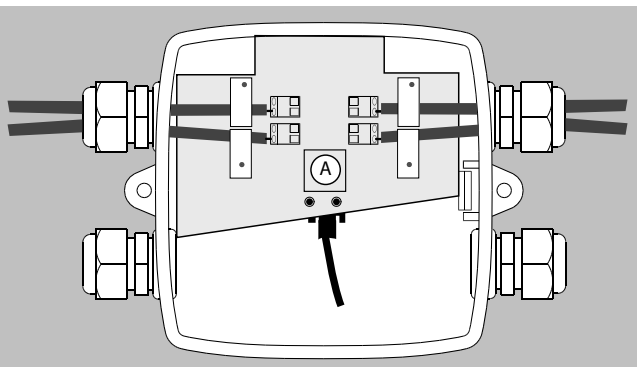


Transmitter compact mounted, dimensions in mm (inch)

Circuit diagrams

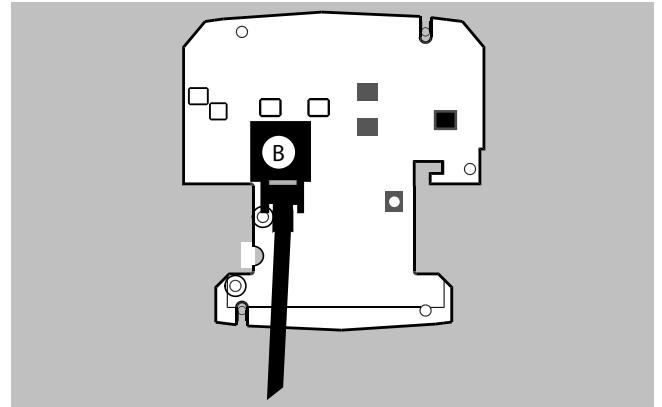


Electrical connection of SITRANS FUS080

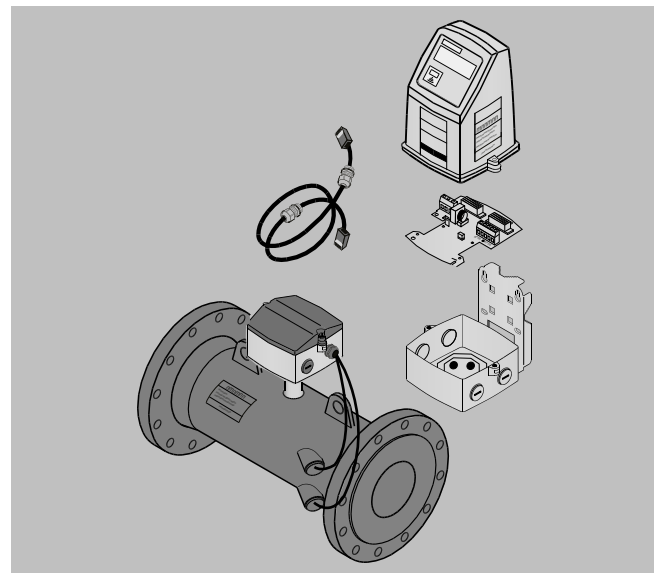


Sensor junction box

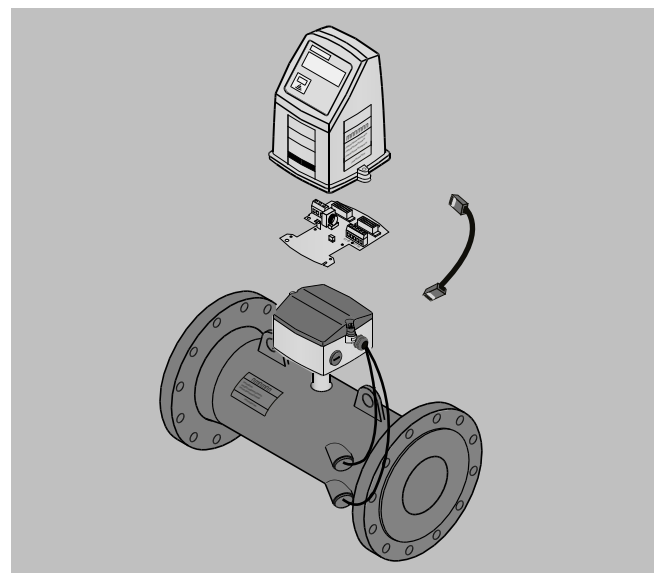
Circuit diagrams (continued)



Electrical connection of transmitter



Separate transmitter



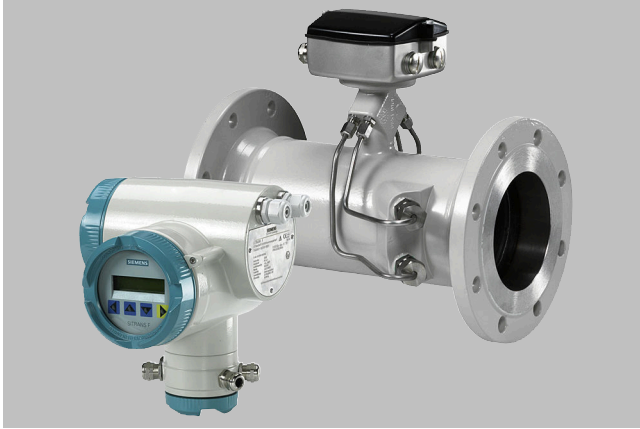
Compact transmitter

Flow Measurement

SITRANS FS (ultrasonic)

Inline ultrasonic flowmeters / SONO 3300/FUS060 flowmeter

Overview



The combination of SONO 3300 sensor and FUS060 transmitter is ideal for applications within the general industry. Measurements are independent of liquid temperature, density, pressure and conductivity. Transducers cannot be replaced.

Benefits

- Robust remote transmitter FUS060
- Robust design for industrial applications
- Measures all liquids less than 350 cSt, conductive or non-conductive
- No pressure drop
- Reliable and accurate flow measurements
- Long-time stability
- ATEX approval

Application

The main application for SONO 3300/FUS060 ultrasonic flowmeter is measurement of volume. SONO 3300/FUS060 can be used for water and treated waste water.

Design

The SONO 3300/FUS060 consists of a casted sensor (DN 50 to 80 (2" to 3")), welded pipes (DN 100 to 300 (4" to 12")) and a transmitter FUS060.

The transmitter can only be mounted separately.

The internal signal cables from transducers to sensor connection box are protected from an aggressive environment by stainless steel pipes.

Sensor installation

See system information.

Selection and ordering data

Sensor SONO 3300 with transmitter FUS060		Article No. 7ME3300-			
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		●	●	●	●
		0	-	●	●
Diameter	Qn setting [m³/h]				
DN 50 (2")	10	1	A		
DN 50 (2")	26	1	B		
DN 50 (2")	60	1	D		
DN 65 (2½")	15	1	E		
DN 65 (2½")	42	1	F		
DN 65 (2½")	100	1	H		
DN 80 (3")	20	1	J		
DN 80 (3")	60	1	K		
DN 80 (3")	150	1	M		
DN 100 (4")	36	1	N		
DN 100 (4")	100	1	P		
DN 100 (4")	230	1	R		
DN 125 (5")	50	1	S		
DN 125 (5")	150	1	T		
DN 125 (5")	360	1	V		
DN 150 (6")	80	2	A		
DN 150 (6")	220	2	B		
DN 150 (6")	500	2	D		
DN 200 (8")	120	2	E		
DN 200 (8")	380	2	F		
DN 200 (8")	900	2	H		
DN 250 (10")	200	2	J		
DN 250 (10")	600	2	K		
DN 250 (10")	1400	2	M		
DN 300 (12")	300	2	N		
DN 300 (12")	850	2	P		
DN 300 (12")	2200	2	R		
Flange norm and pressure rating (all sizes are not available in all pressure ratings)					
EN 1092-1					
• PN 10 (DN 200 ... 300)			B		
• PN 16 (DN 80 ... 300)			C		
• PN 40 (DN 50 ... 300)			E		
ANSI B16.5					
• Class 150 (DN 50 ... 300)			H		
• Class 300 (DN 50 ... 300)			J		
Sensor type (approval) and transmitter mounting					
IP67 standard, remote transmitter				1	
Cable gland entries in FUS060 and SONO 3300					
Cable glands M20 in sensor and in transmitter M25/20/16 × 1.5					1
Transmitter version of SITRANS FUS060					
IP65 (NEMA 4), 120/230 V AC					N
IP65 (NEMA 4), 24 V AC/DC					P
FUS060 output module					
HART, 4 ... 20 mA, 1 pulse output, 1 relay					B
HART, Ex version, 4 ... 20 mA, 1 pulse output, 1 relay					C
PROFIBUS PA, 1 pulse/frequency					D
Transducer coaxial cable					
4 × 3 m, max. 70 °C (158 °F), the only option for Ex i					0
4 × 15 m, max. 70 °C (158 °F)					1
4 × 30 m, high temp. max. 200 °C (392 °F)					2
4 × 30 m, max. 70 °C (158 °F)					3
4 × 60 m, max. 70 °C (158 °F)					4

Flow Measurement

SITRANS FS (ultrasonic)

Inline ultrasonic flowmeters / SONO 3300/FUS060 flowmeter

Selection and ordering data (continued)

Sensor SONO 3300 with transmitter FUS060	Article No. 7ME3300-
4 × 90 m, max. 70 °C (158 °F)	● ● ● ● 0 - ● ● ● ●
4 × 120 m, max. 70 °C (158 °F)	
4 × 3 m, high temp. max. 200 °C (392 °F), the only option for Ex i	
4 × 15 m, high temp. max. 200 °C (392 °F)	

Order code	
Additional information Please add "-Z" to Article No. and specify Order code(s) and plain text.	
Calibration	
Production calibration DN 50 ... DN 300 (with certificate, 2 × 3 points in 10 %, 25 % and 100 % Qn)	Included
Accredited Siemens ISO/IEC 17025 calibration for DN 50 to DN 200 with Qn as selected in Diameter. Calibration certificate: 2 × 5 points in 5 %, 10 %, 25 %, 50% and 100 % Qn (max. flow 630 m ³ /h).	D20
Accredited Siemens ISO/IEC 17025 calibration for DN 200 to DN 300 with Qn as selected in Diameter. Calibration certificate: 2 × 5 points in 5 %, 10 %, 25 %, 50 % and 100 % Qn (max. flow 2000 m ³ /h).	D21
Material certificate	
EN 10204-3.1	F10
Tag name plate	
Stainless steel TAG plate (1 × 24 × 80 mm), wire fixed. Font size depends on text length: 8 mm for 1 ... 10 characters, 4 mm for 11 ... 20 characters (specify in plain text).	Y17

Please use online Product selector to get latest updates. Product selector link:

www.pia-portal.automation.siemens.com

Flowmeter SONO 3300 with FUS060 operating instructions, accessories and spare parts

Operating instructions

Description	Article No.
SITRANS FUS060	
• English	A5E01204521
• German	A5E02123845
SITRANS F US SONO 3300	
• English	A5E01365400
• German	A5E02690975

All literature is available to download for free, in a range of languages, at <http://www.siemens.com/processinstrumentation/documentation>

Accessories

Potting kit

Description	Article No.
Potting kit for terminal box of SONO 3200 transducers for IP68/NEMA 6P (not for Ex sensors)	FDK:085L2403




Spare parts


Cables for SONO 3300 with FUS060



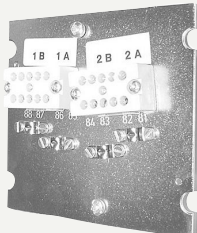
(only as spare parts)

Selection and ordering data (continued)

Description	Length m (ft)	Article No.	
Coax cable for FUS060, (75 Ω, max. 70 °C (158 °F), black PVC) (2 pcs.)	3 (9.84)	A5E00875101	
	15 (49.21)	A5E00861432	
	30 (98.43)	A5E01278662	
	60 (196.85)	A5E01278682	
	90 (295.28)	A5E01278687	
120 (393.70)	A5E01278698		
High temp. coaxial cable for FUS060; with 0.3 m brown PTFE high temp. transducer part (max. 200 °C (392 °F)) and black PVC transmitter part with SMB plug (max. 70 °C (158 °F)); impedance 75 Ω (2 pcs.)	3 (9.84)	A5E00875105	
	15 (49.21)	A5E00861435	
	30 (98.43)	A5E01196952	

Cable glands (for the SONO 3300 terminal box)
(only as spare parts)

Type	Material	Temperature range [°C (°F)]	Article No.	
M20	Nickel plated brass, 2× cables Ø 5 ... 6 mm (2 pcs.)	-25 ... +200 (-13 ... +392)	A5E02246329	

Description	Article No.	
SONO 3300 terminal box lid, in stainless steel painted black (1 pc.)	FDK:085U1505	
Gasket for SONO 3300 terminal lid in EPDM (1 pc.)	FDK:085U1820	
SONO 3300 stainless steel terminal box (1 pc.), M20 cable gland version incl. lid in stainless steel (painted black) and gasket in EPDM	A5E00836867	
Coax cable connecting plate (1 pc.) for SONO 3300 terminal box and use with transmitter type FUS060	A5E02593568	

Flow Measurement

SITRANS FS (ultrasonic)

Inline ultrasonic flowmeters / SONO 3300/FUS060 flowmeter

Technical specifications

The transmitter related to this system is the SITRANS FUS060. For more details see *Technical specifications to the FUS060*.

2-path sensor with flanges and inline transducers	
Error in measurement	
Error in measurement at reference conditions	$V > 0.5 \dots 10 \text{ m/s}$, $\pm 0.5 \%$ of rate ($v = \text{flow speed}$)
Max. flow velocity	10 m/s (32 ft/s)
Nominal size	DN 50, DN 65, DN 80, DN 100, DN 125, DN 150, DN 200, DN 250, DN 300 (2" ... 12")
Media temperature	Separate version: $-10 \dots +160 \text{ }^\circ\text{C}$ (14 ... 320 °F)
Ambient temperature (sensor)	Separate version: $-20 \dots +60 \text{ }^\circ\text{C}$ (-4 ... +140 °F)
Enclosure	Storage: $-40 \dots +85 \text{ }^\circ\text{C}$ (-40 ... +185 °F) Standard version: IP67 (NEMA 4X/NEMA 6)
Process connections	
PN designated EN 1092-1 type 11 (B)	<ul style="list-style-type: none"> DN 50 ... 300 (2" ... 12"), PN 40 DN 100 ... 300 (4" ... 12"), PN 16 DN 200 ... 300 (8" ... 12"), PN 10
Class designated EN 1759-1	<ul style="list-style-type: none"> DN 50 ... 300 (2" ... 12"), class 150 DN 50 ... 300 (2" ... 12"), class 300
Transducer	Inline version welded into pipe
Materials	
Pipe	<ul style="list-style-type: none"> DN 50 ... DN 80 (2" ... 3"): Cast steel EN 1.1131-G5-15Mn5 DN 100 ... DN 300 (4" ... 12"): Carbon steel EN 1.0345-P235GH
Flange	<ul style="list-style-type: none"> DN 50 ... DN 300 (2" ... 12"): EN 1.0025-S235JRG2
Class	ASTM A105
Transducer	Stainless steel AISI 316 or similar
Certificates and approvals	
Conformity certificate	The devices are supplied as standard with a Siemens Certificate of Conformity on DVD.
Material certificate	Material certificate according to EN 10204-3.1 available
NDT examination report	Extended material certificate is optionally available on special request (PVR)
Calibration report	A standard calibration report is shipped with each flowmeter.
Extended accredited ISO/IEC 17025 calibration certificates	Optionally available
Approvals	No custody transfer approvals

The sensors are approved according to EU directive 2014/68/EU regarding fluid group 1, classified in category III. Design according to EN 13480 (PED Directive).

Coax cable between sensor SONO 3300 and transmitter FUS060

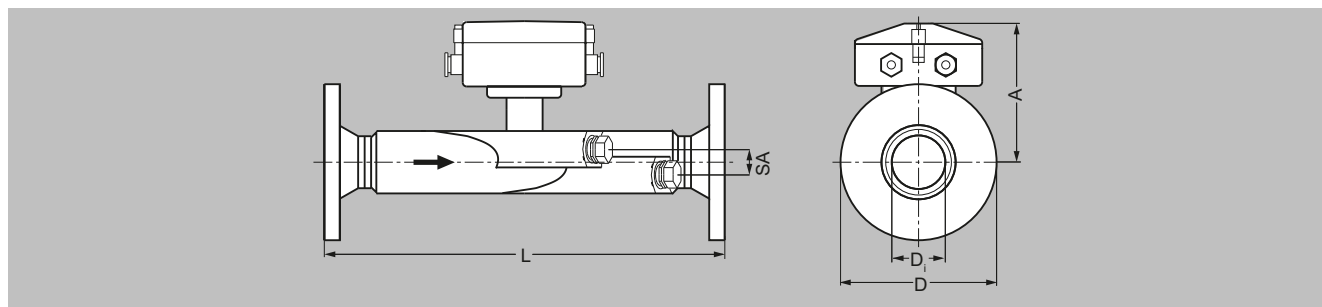
Standard Coax cable (75 Ω)	Coax cable with SMB straight plug on one end for the FUS060 connector
Outside diameter	Ø 5.8 mm
Length	3, 15, 30, 60, 90, 120 m (9.84, 49.21, 98.43, 196.85, 295.28, 393.70 ft) between sensor and transmitter
Material (outside jacket)	black PE
Ambient temperature	$-10 \dots +70 \text{ }^\circ\text{C}$ (14 ... 158 °F)

Technical specifications (continued)

Standard Coax cable (75 Ω)	Coax cable with SMB straight plug on one end for the FUS060 connector
High temperature Coax cable (75 Ω)	Coax cable with SMB straight plug on one end for the FUS060 connector
Outside diameter	Ø 5.13 mm (first 0.3 m (9.84 ft) part to the transducer), Ø 5,8 mm (for remaining cable to the transmitter – with SMB plug at the end) and between these is a black hot melt junction Ø 16 mm (length 70 mm)
Length	3, 15, 30, 60, 90, 120 m (9.84, 49.21, 98.43, 196.85, 295.28, 393.70 ft) between sensor and transmitter (max. 3 m (9.84 ft) transducer cable length for Ex area mounted transmitters)
Material (outside jacket)	Brown PTFE (0.3 m (9.84 ft) part) and black PE (for remaining cable)
Ambient temperature	$-200 \dots +200 \text{ }^\circ\text{C}$ ($-328 \dots +392 \text{ }^\circ\text{F}$) (brown PTFE transducer part) and $-10 \dots +70 \text{ }^\circ\text{C}$ (14 ... 158 °F) (black PE for remaining transmitter cable part)



Dimensional drawings



Sensor SONO 3300, dimensions in mm (inch)

Sensor SONO 3300 with EN 1092-1 norm															
DN	PN 10					PN 16					PN 40				
	L ¹⁾	D	D _i	A	SA	L ¹⁾	D	D _i	A	SA	L ¹⁾	D	D _i	A	SA
	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)
50	-	-	-	-	-	-	-	-	-	-	475 (18.70)	165 (6.50)	54.5 (2.15)	185.3 (7.30)	12.9 (0.51)
65	-	-	-	-	-	-	-	-	-	-	475 (18.70)	185 (7.28)	70.3 (2.77)	191 (7.52)	15.4 (0.61)
80	-	-	-	-	-	380 (14.96)	200 (7.87)	82.5 (3.25)	198 (7.80)	19.1 (0.75)	400 (15.75)	200 (7.87)	82.5 (3.25)	198 (7.80)	19.1 (0.75)
100	-	-	-	-	-	375 (14.76)	220 (8.66)	107.1 (4.22)	217.2 (8.55)	52.5 (2.07)	400 (15.75)	235 (9.25)	106.3 (4.19)	217.2 (8.55)	52.1 (2.05)
125	-	-	-	-	-	375 (14.76)	250 (9.84)	131.7 (5.19)	229.9 (9.05)	64.5 (2.54)	400 (15.75)	270 (10.63)	129.7 (5.11)	229.9 (9.05)	63.6 (2.50)
150	-	-	-	-	-	360 (14.17)	285 (11.22)	159.3 (6.27)	244.2 (9.61)	78.1 (3.07)	400 (15.75)	300 (11.81)	157.1 (6.19)	244.2 (9.61)	77 (3.03)
200	400 (15.75)	340 (13.39)	206.5 (8.13)	259.6 (10.22)	101.2 (3.98)	400 (15.75)	340 (13.39)	206.5 (8.13)	259.6 (10.22)	101.2 (3.98)	450 (17.72)	375 (14.76)	204.9 (8.07)	259.6 (10.22)	100.4 (3.95)
250	400 (15.75)	395 (15.55)	260.4 (10.25)	286.5 (11.28)	127.6 (5.02)	400 (15.75)	405 (15.94)	260.4 (10.25)	286.5 (11.28)	127.6 (5.02)	500 (19.69)	450 (17.72)	255.4 (10.06)	286.5 (11.28)	125.1 (4.93)
300	400 (15.75)	445 (17.52)	309.7 (12.19)	311.9 (12.28)	151.8 (5.98)	420 (16.54)	460 (18.11)	309.7 (12.19)	311.9 (12.28)	151.8 (5.98)	510 (20.08)	515 (20.28)	303.9 (11.96)	311.9 (12.28)	148.9 (5.86)

Sensor SONO 3300 with ANSI norm											
DN	Class 150					Class 300					
	L ²⁾	D	D _i	A	SA	L ²⁾	D	D _i	A	SA	
mm	inch	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)
50	2	510 (20.08)	150 (5.91)	52.3 (2.06)	185.3 (7.30)	12.9 (0.51)	520 (20.47)	165 (6.50)	52.3 (2.06)	185.3 (7.30)	12.9 (0.51)
65	2½	510 (20.08)	180 (7.09)	62.2 (2.45)	191 (7.52)	15.4 (0.61)	520 (20.47)	190 (7.48)	62.2 (2.45)	191 (7.52)	15.4 (0.61)
80	3	420 (16.54)	190 (7.48)	77.7 (3.06)	198 (7.80)	19.1 (0.75)	440 (17.32)	210 (8.27)	77.7 (3.06)	198 (7.80)	19.1 (0.75)
100	4	420 (16.54)	230 (9.06)	101.7 (4.00)	217.2 (8.55)	49.8 (1.96)	440 (17.32)	255 (10.04)	101.7 (4.00)	217.2 (8.55)	49.8 (1.96)
125	5	440 (17.32)	255 (10.04)	128.2 (5.05)	230.7 (9.08)	62.8 (2.47)	460 (18.11)	280 (11.02)	128.2 (5.05)	230.7 (9.08)	62.8 (2.47)
150	6	430 (16.93)	280 (11.02)	154.1 (6.07)	244.2 (9.61)	75.5 (2.97)	450 (17.71)	320 (12.60)	152.3 (6.00)	244.2 (9.61)	74.6 (2.94)
200	8	480 (18.90)	345 (13.58)	201.5 (7.93)	259.6 (10.22)	98.7 (3.89)	500 (19.69)	380 (14.96)	201.5 (7.93)	259.6 (10.22)	98.7 (3.89)
250	10	490 (19.29)	405 (15.94)	253 (9.96)	286.5 (11.28)	124 (4.88)	520 (20.47)	445 (17.52)	253 (9.96)	286.5 (11.28)	124 (4.88)
300	12	550 (21.65)	485 (19.09)	303.8 (11.96)	311.9 (12.28)	148.9 (5.86)	580 (22.83)	520 (20.47)	298.8 (11.76)	311.9 (12.28)	146.4 (5.76)

Sensor SONO 3300 with EN and ANSI norm						
DN	Weight ³⁾					
	EN PN 10	PN 16		PN 40		ANSI Class 150
mm	inch	kg (lbs)		kg (lbs)		kg (lbs)
50	2	-	-	12 (26.5)		11 (24.3)
65	2½	-	-	13 (28.7)		15 (33.1)
80	3	-	14 (30.9)	16 (35.3)		17 (37.5)
100	4	-	13 (28.7)	17 (37.5)		20 (44.1)
125	5	-	17 (37.5)	23 (50.7)		26 (57.3)
150	6	-	21 (43.3)	30 (66.1)		30 (66.1)
						49 (108.0)

Flow Measurement

SITRANS FS (ultrasonic)

Inline ultrasonic flowmeters / SONO 3300/FUS060 flowmeter

Dimensional drawings (continued)

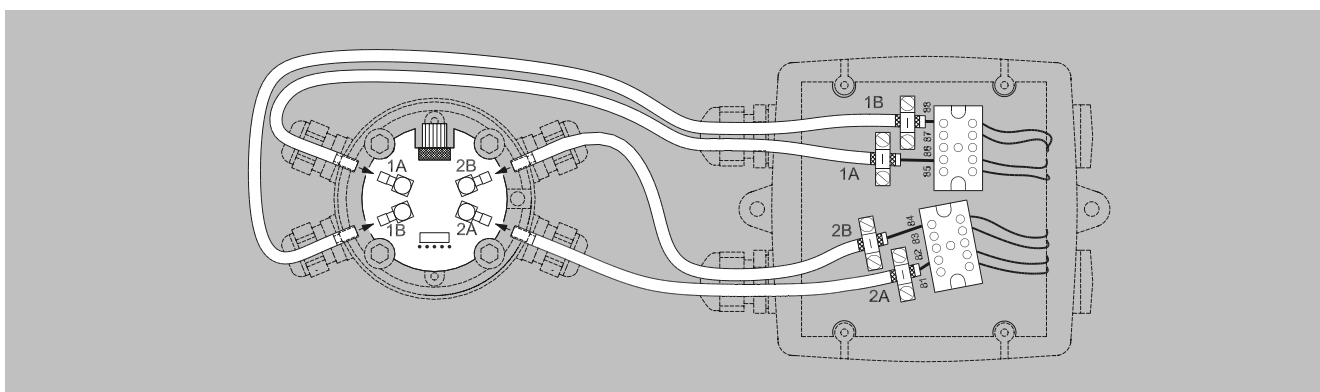
Sensor SONO 3300 with EN and ANSI norm						
Weight ³⁾						
DN	EN	PN 10	PN 16	PN 40	ANSI	Class 300
200	8	33 (72.8)	33 (72.8)	53 (116.8)	50 (116.8)	76 (167.6)
250	10	44 (97.0)	45 (99.2)	86 (189.6)	71 (156.5)	108 (238.1)
300	12	52 (114.6)	60 (132.3)	117 (257.9)	100 (220.4)	159 (350.5)

¹⁾ Length tolerance in mm (inch): DN 50 ... 80 +4/-4 (+0.16/-0.16), DN 100 +6/-7 (+0.24/-0.28), DN 125 ... 200 +7/-8 (+0.28/-0.31), DN 250 +8/-9 (+0.31/-0.35), DN 300 +10/-11 (+0.39/-0.43).

²⁾ Length tolerance in mm (inch): DN 50 ... 80 +4/-4 (+0.16/-0.16), DN 100 +5/-6 (+0.20/-0.24), DN 125 ... 200 +6/-10 (+0.24/-0.39), DN 250 +7/-11 (+0.28/-0.43), DN 300 +10/-15 (+0.39/-0.59).

³⁾ Approximate weights without transmitter FUS060 - weight of FUS060 is 4.4 kg (9.7 lb).

Circuit diagrams



Electrical connection of SITRANS FUS060 and SONO 3300

Overview



SONO3100/FUS060

The combination of the SONO 3100 sensor and the FUS060 transmitter is ideal for applications where process shut-down is impossible during service and where there is a need for extreme high/low temperatures and pressures.

Transducers can be changed without interrupting operation. SONO 3100 can be delivered as a 2-path solution.

Benefits

- Transducers can be replaced under pressure
- Measurement of all liquids less than 350 Cst, conductive or non-conductive
- No pressure drop
- Reliable and accurate flow measurements
- Long-time stability

Application

The main application for SONO 3100 in combination with transmitter type FUS060 is to measure volume flow within:

- Water and waste water

Design

The SONO 3100 in combination with FUS060 consists of a SONO 3100 sensor, SONO 3200 transducers and a FUS060 transmitter.

SONO 3100 is basically supplied in a 2-path solution with flanges in sizes from DN 100 to DN 500.

SONO 3100 is as standard available in carbon steel from DN 100 to DN 500.

FUS060 is designed for remote wall mounting only.

Flow Measurement

SITRANS FS (ultrasonic)

Inline ultrasonic flowmeters / SONO 3100/FUS060 flowmeter

Selection and ordering data

SITRANS F US SONO 3100 sensor 2-path		Article No. 7ME3100-			
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		●	●	●	●
Diameter	Qn setting [m³/h]				
DN 100 (4")	28	1	N		
DN 100 (4")	100	1	P		
DN 100 (4")	220	1	R		
DN 125 (5")	44	1	S		
DN 125 (5")	150	1	T		
DN 125 (5")	360	1	V		
DN 150 (6")	64	2	A		
DN 150 (6")	220	2	B		
DN 150 (6")	500	2	D		
DN 200 (8")	110	2	E		
DN 200 (8")	380	2	F		
DN 200 (8")	900	2	H		
DN 250 (10")	180	2	J		
DN 250 (10")	600	2	K		
DN 250 (10")	1300	2	M		
DN 300 (12")	300	2	N		
DN 300 (12")	850	2	P		
DN 300 (12")	2200	2	R		
DN 350 (14")	350	2	S		
DN 350 (14")	1000	2	T		
DN 350 (14")	2800 ¹⁾	2	V		
DN 400 (16")	450	3	A		
DN 400 (16")	1300	3	B		
DN 400 (16")	3600	3	D		
DN 500 (20")	1300	3	J		
DN 500 (20")	2200	3	K		
DN 500 (20")	4200 ¹⁾	3	M		
Flange norm and pressure rating (All sizes are not available in all pressure ratings)					
EN 1092-1					
• PN 10 (DN 200 ... 600)			B		
• PN 16 (DN 100 ... 600)			C		
• PN 25 (DN 200 ... 600)			D		
• PN 40 (DN 100 ... 500)			E		
ANSI B16.5					
• Class 150 (DN 100 ... 300)			H		
• Class 300 (DN 100 ... 300)			J		
Pipe and flange material					
Carbon steel (DN 100 ... 1200)				1	
Transducer type and approval					
IP67 (NEMA 4X/6) PA housing, PN 40, O-ring, 50 mm, 100 °C (212 °F) (DN 100 ... 600)					1
IP68 SS housing, PN 40, O-ring, 50 mm, 200 °C (392 °F) (DN 100 ... 600)					2
IP68 SS housing, PN 40, O-ring, 50 mm, 180 °C (356 °F), Ex d ATEX approval (only with standard FUS060) (DN 100 ... 600)					3
IP67 (NEMA 4X/6) PA housing, PN 40, flange, 88 mm, 100 °C (212 °F) (DN 100 ... 300)					4
IP68 SS housing, PN 40, flange, 88 mm, 200 °C (392 °F) (DN 100 ... 300)					5
Cable gland entries					
Cable glands M20 in transducers and in transmitter M25/20/16 × 1.5					1
Cable glands ½" NPT in transducers and in transmitter					2
Transmitter version of SITRANS FUS060					
IP65 (NEMA 4), 120/230 V AC					N
IP65 (NEMA 4), 24 V AC/DC					P
FUS060 output module					
HART, 1 pulse output, 1 relay					B
HART Ex, 1 pulse output, 1 relay					C
PROFIBUS PA, 1 pulse/frequency					D

Selection and ordering data (continued)

SITRANS F US SONO 3100 sensor 2-path	Article No. 7ME3100-
Transducer coaxial cable	● ● ● ● ● - ● ● ● ● ●
4 × 3 m, max. 70 °C (158 °F), the only option for Ex i	0
4 × 15 m, max. 70 °C (158 °F)	1
4 × 30 m, high temp. max.200 °C (392 °F)	2
4 × 30 m, max. 70 °C (158 °F)	3
4 × 60 m, max. 70 °C (158 °F)	4
4 × 90 m, max. 70 °C (158 °F)	5
4 × 120 m, max. 70 °C (158 °F)	6
4 × 3 m, high temp. max. 200 °C (392 °F), the only option for Ex i	7
4 × 15 m, high temp. max. 200 °C (392 °F)	8

1) Reduced Q value during calibration (Qn setting unchanged).

Order code	
Additional information Please add "-Z" to Article No. and specify Order code(s) and plain text.	
Calibration	
Production calibration DN 100 ... 600 (with certificate)	Included
Accredited Siemens ISO/IEC 17025 calibration for DN 100 ... 200 with Qn as selected in diameter. Calibration certificate: 2 × 5 points in 5 %, 10 %, 25 %, 50 % and 100 % Qn (max. flow 630 m ³ /h).	D20
Accredited Siemens ISO/IEC 17025 calibration for DN 200 ... 600 with Qn as selected in diameter. Calibration certificate: 2 × 5 points in 5 %, 10 %, 25 %, 50 % and 100 % Qn (max. flow 2800 m ³ /h).	D21
Accredited Siemens ISO/IEC 17025 calibration for DN 400 ... 600 with Qn as selected in diameter. Calibration certificate: 2 × 5 points in 5 %, 10 %, 25 %, 50 % and 100 % Qn (max. flow 8000 m ³ /h).	D22
Material certificate	
EN 10204-3.1	F10
EN 10204-3.1 and 100 % NDT on weldings, DN 100 ... 400	F11
EN 10204-3.1 and 100 % NDT on weldings, DN 500 ... 600	F12
Pressure certificate	
EN 10204-2.3	
Tag name plate	
Stainless steel TAG plate (1 × 24 × 80 mm), wire fixed. Font size depends on text length: 8 mm for 1 ... 10 characters, 4 mm for 11 ... 20 characters (specify in plain text).	Y17

Please use online Product selector to get latest updates:

www.pia-portal.automation.siemens.com

Flowmeter SONO 3100 operating instructions, accessories and spare parts

Operating instructions

Description	Article No.
SITRANS FUS060	
• English	A5E01204521
• German	A5E02123845
SITRANS F US SONO 3100	
• English	A5E00814513

This device is shipped with Safety Notes and a DVD containing further SITRANS F US literature.

All literature is available to download for free, in a range of languages, at <http://www.siemens.com/processinstrumentation/documentation>


Flow Measurement

SITRANS FS (ultrasonic)


Inline ultrasonic flowmeters / SONO 3100/FUS060 flowmeter

Selection and ordering data (continued)

Accessories

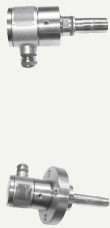
Description	Article No.	
Potting kit for terminal box of SONO 3200 transducers for IP68/NEMA 6P (not for Ex sensors)	FDK:085L2403	

Tools for transducer SONO 3200

Description	Transducer length	Article No.	
Extraction tool for replacement of SONO 3200 O-ring transducers under pressure and for hot-tapping (working conditions: typically water, max. 40 bar (580 psi) and max. 60 °C (140 °F))	50 mm (1.97") transducers	FDK:085B5331	

Spare parts


Transducer SONO 3200 spare parts, complete units

Type	Material	Gasket	Pressure rating	Terminal housing	Approv. Temp. range [°C (°F)]	Length mm (inch)	Article No.	
O-ring	316 SS	O-ring	PN 40	Plastic, PA 6.6 M20	-20 ... +100 (-4 ... +212)	50 (1.97)	FDK:085B5453	
O-ring	316 SS	O-ring	PN 40	316 SS M20	-20 ... +200 (-4 ... +392)	50 (1.97)	FDK:085B5450	
O-ring	316 SS	O-ring	PN 40	316 SS M20	Ex d ¹⁾ -20 ... +180 (-4 ... +356)	50 (1.97)	FDK:085B5451	
O-ring	316 SS	O-ring	PN 40	316 SS M20	Ex-i ²⁾ -10 ... +190 (14 ... 374)	50 (1.97)	A5E00836448	
O-ring	316 SS	O-ring	PN 40	Plastic, PA 6.6 ½" NPT	-20 ... +100 (-4 ... +212)	50 (1.97)	A5E00839472	
O-ring	316 SS	O-ring	PN 40	316 SS ½" NPT	-20 ... +200 (-4 ... +392)	50 (1.97)	A5E00839431	
Flange	316 SS	Graphite	PN 40	Plastic, PA 6.6 M20	-20 ... +100 (-4 ... +212)	88 (3.47)	FDK:085B5461	
Flange	316 SS	Graphite	PN 40	316 SS M20	-20 ... +200 (-4 ... +392)	88 (3.47)	FDK:085B5462	
Flange	316 SS	Graphite	PN 40	316 SS M20	Ex d ¹⁾ -20 ... +180 (-4 ... +356)	88 (3.47)	FDK:085B5463	
Flange	316 SS	Graphite	PN 40	316 SS M20	Ex-i ²⁾ -10 ... +190 (14 ... 374)	88 (3.47)	A5E00836465	
Flange	316 SS	Graphite	PN 40	Plastic, PA 6.6 ½" NPT	-20 ... +100 (-4 ... +212)	88 (3.47)	A5E00839479	
Flange	316 SS	Graphite	PN 40	316 SS ½" NPT	-20 ... +200 (-4 ... +392)	88 (3.47)	A5E00839440	

¹⁾ ATEX (Ex) IIC 2G Ex d IIC T3- T6 Gb



²⁾ For systems with FUS060 ATEX IIC 2G Ex dem [ia/ib] T6/T4/T3

Terminal housing for SONO 3200 sensor





Type	Pressure rating	Material	Temp. range [°C (°F)]	Article No.	
Terminal housing (M20 cable gland)	N/A	PA 6.6	-20 ... +100 (-4 ... +212)	FDK:085B5501	
	N/A	ASTM 316	-20 ... +200 (-4 ... +392)	FDK:085B5504	
Terminal housing (½" NPT cable gland)	N/A	PA 6.6	-20 ... +100 (-4 ... +212)	A5E00839460	
	N/A	ASTM 316	-20 ... +200 (-4 ... +392)	A5E00839427	

Selection and ordering data (continued)



SONO 3200 spare parts, transducer body without terminal housing, including insert

Type	Material	Gasket	Pressure rating	Temp. range [°C (°F)]	Length mm (inch)	Article No.	
O-ring	316 SS	O-ring	PN 40	-20 ... +200 (-4 ... +392)	50 (1.97)	FDK:085B1405	
Flange	316 SS	Graphite	PN 40	-20 ... +200 (-4 ... +392)	88 (3.47)	FDK:085B1464	

Transducer SONO 3200 gaskets

Type	Pressure rating	Material	Temperature range [°C (°F)]	Article No.	
Gasket O-ring (3 pcs. for o-ring transducers)	PN 40	FKM	-20 ... +200 (-4 ... +392)	FDK:085B1089	
Gasket flange	PN 40/160	Graphite	-20 ... +200 (-4 ... +392)	FDK:085B1080	
Gasket and 12 mm (0.47") bolts and nuts for flange transducers (4 pcs.)	PN 40	AISI 316 or equal	-20 ... +200 (-4 ... +392)	FDK:085B1083	
Gasket and 16 mm (0.63") bolts and nuts for flange transducers (4 pcs.)	PN 160	Graphite, 316 SS	-20 ... +200 (-4 ... +392)	FDK:085B1084	

SONO 3200 cable glands


Description	Article No.	
Black PA plastic, cable Ø 5 ... 13 mm (1 pc.) Temperature range: -20 ... 100 °C (-4 ... +212 °F)	A5E02246304	
½" NPT gray PA plastic, cable Ø 5 ... 9 mm (1 pc.) Temperature range: -20 ... 100 °C (-4 ... +212 °F)	A5E02246309	

Flow Measurement


SITRANS FS (ultrasonic)

Inline ultrasonic flowmeters / SONO 3100/FUS060 flowmeter

Selection and ordering data (continued)

Description	Article No.	
<p>½" NPT chrome plated brass, cable Ø 5 ... 9 mm (1 pc.) Temperature range: -40 ... 100 °C (-40 ... +212 °F)</p>	A5E02246258	

Cables for SONO 3100 with FUS060

Description	Length m (ft)	Article No.	
<p>Coaxial cable for FUS060 (75 Ω, max. 70 °C (158 °F), black PVC) (2 pcs.)</p>	3 (9.84)	A5E00875101	
	15 (49.21)	A5E00861432	
	30 (98.43)	A5E01278662	
	60 (196.85)	A5E01278682	
	90 (295.28)	A5E01278687	
<p>High temp. coaxial cable for FUS060 with 0.3 m brown PTFE high temp. transducer part, max 200 °C (392 °F) and black PVC for remaining transmit- ter part with SMB plug, max. 70 °C (158 °F); impedance 75 Ω (2 pcs.)</p>	120 (393.70)	A5E01278698	
	3 (9.84)	A5E00875105	
	15 (49.21)	A5E00861435	
<p>Special coaxial cable sets with SMB plug for transmitter SITRANS FUS060 PTFE material, temp. -200 ... +200 °C (-328 ... +392 °F), impedance 75 Ω (2 pcs.)</p>	30 (98.43)	A5E01196952	
	10 (32.84)	A5E02085593	
	15 (49.21)	A5E03262088	
	30 (98.43)	A5E02085644	
	40 (131.23)	A5E02085649	

Technical specifications

The transmitter related to this system is the SITRANS FUS060.
For more details see *Technical specifications to the FUS060*.

2-paths sensor fitted with four SONO 3200 transducers	
Error in measurement	
Error in measurement at reference conditions	$V > 0.5 \dots 10 \text{ m/s}$, $\pm 0.5 \%$ of rate ($v = \text{flow velocity}$)
Max. flow velocity	10 m/s (32 ft)
Nominal size	DN 100 ... 500 (4" ... 20")
Standard media temperature	-10 ... +200 °C (14 ... 392 °F)
Ambient temperature	-20 ... +60 °C (-4 ... +140 °F)
Enclosure	IP67 (NEMA 4X/6)/IP68 (NEMA 6P)
Process connections	
<u>PN designated EN 1092-1, type 11 (B)</u>	
Pipe material carbon steel	<ul style="list-style-type: none"> • DN 200 ... 500 (8" ... 20"), PN 10 • DN 100 ... 500 (4" ... 20"), PN 16 • DN 200 ... 500 (8" ... 20"), PN 25 • DN 100 ... 500 (4" ... 20"), PN 40
<u>Class designated EN 1759-1</u>	
Pipe material carbon steel	<ul style="list-style-type: none"> • DN 100 ... 500 (4" ... 20"), Class 150 • DN 100 ... 300 (4" ... 12"), Class 300
Transducer SONO 3200	O-ring or flange versions
Materials	
Pipe	Steel EN 1.0345-P235GH
Flange	
PN	EN 10025-S235JRG2, 1E1
Class	ASTM A105,1,1
Transducer body	Stainless steel AISI 316 or similar
Transducer terminal house	Stainless steel AISI 316 or plastic PA 6.6
Certificates and approvals	
Conformity certificate CE	The devices are supplied as standard with a Siemens Certificate of Conformity on DVD.
Material certificates	Material certificate according to EN 10204-3.1 is optionally available.
NDT examination report	Extended material certificate is optionally available.
Pressure certificate	Pressure test according EN 1024-2.3 optionally available
Calibration report	A standard calibration report is shipped with each flowmeter. Optionally available: Extended accredited ISO/IEC 17025 calibration certificates
Approvals	No custody transfer approvals

The sensor SONO 3100 with transmitter FUS060 conforms to Product Family Standard EN 61326/A3 appendix A (Title: Electrical Equipment for Measurement control and laboratory use – EMC requirements).

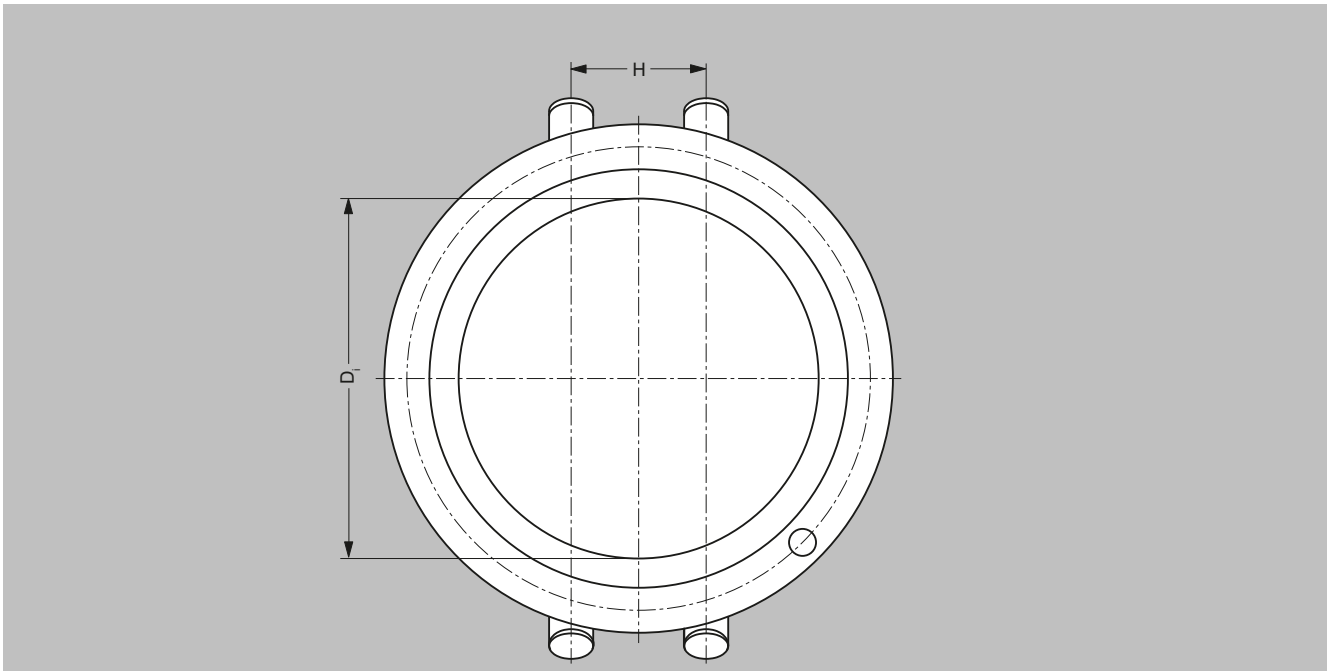
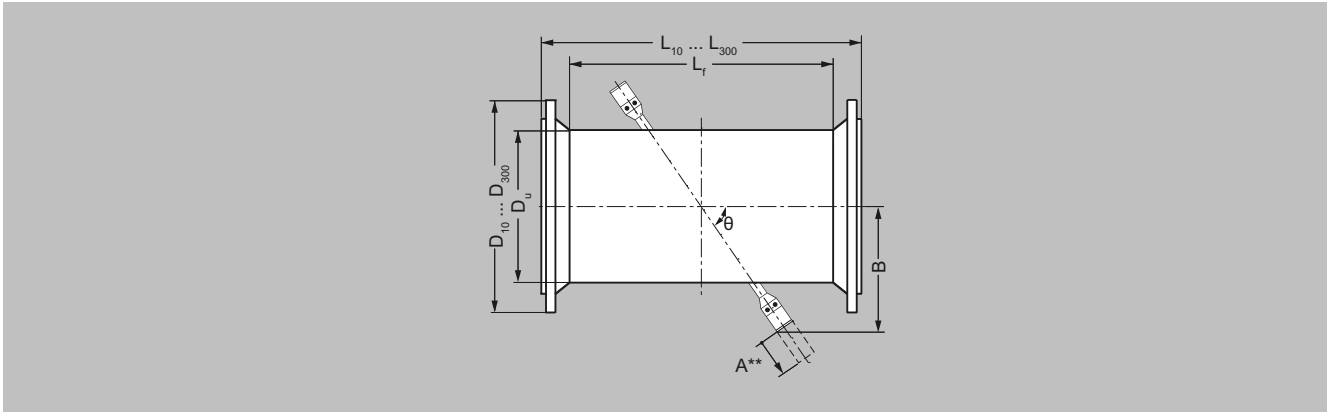
The sensors are approved according to EU directive 2014/68/EU regarding fluid group 1, classified in category III. Design according to EN 13480 (PED Directive).

Flow Measurement

SITRANS FS (ultrasonic)

Inline ultrasonic flowmeters / SONO 3100/FUS060 flowmeter

Dimensional drawings



Sensor SONO 3100 with EN norm

Sensor SONO 3100 with EN norm					
DN	PN 10 ... 40 θ	PN 10 $L_{10}^{(2)}$	PN 16 $L_{16}^{(2)}$	PN 25 $L_{25}^{(2)}$	PN 40 $L_{40}^{(2)}$
	[°]	mm (inch)	mm (inch)	mm (inch)	mm (inch)
100	45 ⁽¹⁾	-	960 (37.80)	-	990 (38.98)
125	45 ⁽¹⁾	-	970 (38.19)	-	990 (38.98)
150	45 ⁽¹⁾	-	970 (38.19)	-	1010 (39.76)
200	45 ⁽¹⁾	790 (31.10)	790 (31.10)	820 (32.28)	840 (33.07)
250	45 ⁽¹⁾	850 (33.46)	850 (33.46)	890 (35.04)	920 (36.22)
300	45 ⁽¹⁾	740 (29.13)	760 (29.92)	790 (31.10)	830 (32.68)
350	45 ⁽¹⁾	770 (30.32)	800 (31.50)	840 (33.07)	880 (34.65)
400	45 ⁽¹⁾	850 (33.46)	875 (34.45)	925 (36.42)	975 (38.39)
500	45 ⁽¹⁾	950 (37.40)	980 (38.59)	1050 (41.34)	1080 (42.52)
600	60	1075 (42.32)	1105 (43.50)	1165 (45.87)	-

Dimensional drawings (continued)

Sensor SONO 3100 with EN norm						
DN	PN 10			PN 16		
	D ₁₀	D _{u 10}	D _{i 10}	D ₁₆	D _{u 16}	D _{i 16}
	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)
100	-	-	-	220 (8.66)	114.3 (4.50)	107.1 (4.22)
125	-	-	-	250 (9.84)	139.7 (5.50)	131.7 (5.19)
150	-	-	-	285 (11.22)	168.3 (6.23)	159.3 (6.27)
200	340 (13.39)	219.1 (8.63)	206.5 (8.13)	340 (13.39)	219.1 (8.63)	206.5 (8.13)
250	395 (15.55)	273 (10.75)	260.4 (10.25)	405 (15.94)	273 (10.75)	260.4 (10.25)
300	445 (17.52)	323.9 (12.75)	309.7 (12.19)	460 (18.11)	323.9 (12.75)	309.7 (12.19)
350	505 (19.88)	355.6 (14.00)	341.4 (13.44)	520 (20.47)	355.6 (14.00)	339.6 (13.37)
400	565 (22.24)	406.4 (16.00)	392.2 (15.44)	580 (22.83)	406.4 (16.00)	390.4 (15.37)
500	670 (26.38)	508 (20.00)	492 (19.37)	715 (28.15)	508 (20.00)	488 (19.21)
600	780 (30.71)	610 (24.02)	594 (23.39)	840 (33.07)	610 (24.02)	586 (23.07)

Sensor SONO 3100 with EN norm						
DN	PN 25			PN 40		
	D ₂₅	D _{u 25}	D _{i 25}	D ₄₀	D _{u 40}	D _{i 40}
	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)
100	-	-	-	235 (9.25)	114.3 (4.50)	106.3 (4.19)
125	-	-	-	270 (10.63)	139.7 (5.50)	129.7 (5.11)
150	-	-	-	300 (11.81)	168.3 (6.23)	157.1 (6.19)
200	360 (14.17)	219.1 (8.63)	206.5 (8.13)	375 (14.76)	219.1 (8.63)	204.9 (8.07)
250	425 (16.73)	273 (10.75)	258.8 (10.19)	450 (17.72)	273 (10.75)	255.4 (10.06)
300	485 (19.09)	323.9 (12.75)	307.9 (12.12)	515 (20.28)	323.9 (12.75)	303.9 (11.96)
350	555 (21.85)	355.6 (14.00)	339.6 (13.37)	580 (22.83)	355.6 (14.00)	333.6 (13.13)
400	620 (24.41)	406.4 (16.00)	388.8 (15.31)	660 (25.98)	406.4 (16.00)	381.4 (15.02)
500	730 (28.74)	508 (20.00)	488 (19.21)	755 (29.72)	508 (20.00)	478 (18.82)
600	845 (33.27)	610 (24.02)	580 (22.83)	-	-	-

Sensor SONO 3100 with EN norm						
DN	PN 10			PN 16		
	H ₁₀	B ₁₀ ³⁾	W _{min} ⁴⁾	H ₁₆	B ₁₆ ³⁾	W _{min} ⁴⁾
	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)
100	-	-	-	42.8 (1.69)	278 (10.94)	3.6 (0.14)
125	-	-	-	64.5 (2.54)	301 (11.85)	4.0 (0.16)
150	-	-	-	78.1 (3.07)	330.5 (13.01)	4.5 (0.18)
200	101.2 (3.98)	379 (14.92)	6.3 (0.25)	101.2 (3.98)	379 (14.92)	6.3 (0.25)
250	127.6 (5.02)	429.5 (16.91)	6.3 (0.25)	127.6 (5.02)	434.5 (17.11)	6.3 (0.25)
300	151.8 (5.98)	476.5 (18.76)	7.1 (0.28)	151.8 (5.98)	484 (19.06)	7.1 (0.28)
350	167.3 (6.59)	520.5 (20.49)	8.0 (0.31)	166.4 (6.55)	527 (20.75)	8.0 (0.31)
400	192.2 (7.57)	572.5 (22.54)	8.0 (0.31)	191.3 (7.53)	579 (22.80)	8.0 (0.31)
500	241.1 (9.49)	668 (26.30)	7.1 (0.28)	239.1 (9.41)	689.5 (27.15)	8.0 (0.31)
600	291.1 (11.46)	783 (30.83)	7.1 (0.28)	287.1 (11.30)	809 (31.85)	8.8 (0.35)

Sensor SONO 3100 with EN norm						
DN	PN 25			PN 40		
	H ₂₅	B ₂₅ ³⁾	W _{min} ⁴⁾	H ₄₀	B ₄₀ ³⁾	W _{min} ⁴⁾
	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)
100	-	-	-	42.5 (1.67)	285.5 (11.24)	3.6 (0.14)
125	-	-	-	63.6 (2.50)	311 (12.24)	4.0 (0.16)
150	-	-	-	77 (3.03)	337 (13.27)	4.5 (0.18)
200	101.2 (3.98)	389 (15.32)	6.3 (0.25)	100.4 (3.95)	395.5 (15.57)	6.3 (0.25)
250	126.8 (4.99)	444.5 (17.50)	7.1 (0.28)	125.1 (4.93)	455 (17.91)	7.1 (0.28)
300	150.9 (5.94)	495.5 (19.51)	8.0 (0.31)	148.9 (5.86)	508.5 (20.02)	8.0 (0.31)
350	166.4 (6.55)	544.5 (21.44)	8.0 (0.31)	163.5 (6.44)	554 (21.81)	8.8 (0.35)

Flow Measurement

SITRANS FS (ultrasonic)

Inline ultrasonic flowmeters / SONO 3100/FUS060 flowmeter

Dimensional drawings (continued)

Sensor SONO 3100 with EN norm						
DN	PN 25			PN 40		
	H ₂₅	B ₂₅ ³⁾	W _{min} ⁴⁾	H ₄₀	B ₄₀ ³⁾	W _{min} ⁴⁾
400	190.5 (7.50)	598 (23.54)	8.8 (0.35)	186.9 (7.36)	615 (24.21)	11.1 (0.44)
500	239.1 (9.41)	697 (27.44)	10.0 (0.39)	234.2 (9.22)	704.5 (27.74)	14.2 (0.56)
600	284.2 (11.19)	809.5 (31.87)	11.0 (0.43)	-	-	-

¹⁾ For all sensors with flange transducers path angle are 60°.

²⁾ Length tolerance for L in mm (inch): DN 100 +6/-7 (+0.24/-0.28), DN 125 ... 200 +7/-8 (+0.28/-0.31), DN 250 +8/-9 (+0.31/-0.35), DN 300 ... 400 +10/-11 (+0.39/-0.43), DN 500 ... 600 +11/-12 (+0.43/-0.47).

³⁾ B dimension value is an approximate information and may differ a little by flange pressure rate.

⁴⁾ Wall thickness for pressure rates PN 10 ... 40. W_{min} wall thickness are min. values. The delivered sensor can have larger wall thicknesses to meet the selected pressure rate. Any specific required wall thickness must be ordered as PVR.

A**)

Space required for replacement of transducer min. 230 mm (9.1 inch).

Sensor SONO 3100 with EN norm, 2-path				
DN	Weight with flange ¹⁾			
	PN 10	PN 16	PN 25	PN 40
	kg (lbs)	kg (lbs)	kg (lbs)	kg (lbs)
100	-	20 (44.1)	24 (52.9)	-
125	-	26 (57.3)	34 (74.0)	-
150	-	33 (72.8)	45 (99.2)	-
200	47 (103.6)	47 (103.6)	58 (127.9)	69 (152.1)
250	63 (138.9)	65 (143.3)	84 (185.2)	111 (244.7)
300	72 (158.7)	80 (176.4)	103 (227.1)	144 (317.5)
350	91 (200.6)	111 (244.7)	143 (315.3)	199 (438.7)
400	113 (249.1)	140 (308.6)	189 (416.7)	284 (626.1)
500	162 (357.1)	229 (504.9)	294 (648.2)	408 (899.5)
600	216 (476.2)	356 (784.8)	445 (981.1)	-

¹⁾ Weight of system incl. process flanges and standard O-ring transducers. For sensors with flange transducer please add approx. 10 kg (22.05 lbs). For SS terminal housings instead of the standard PA housing add approx. 5 kg (11.03 lbs).

Sensor SONO 3100 with ANSI norm

Sensor SONO 3100 with ANSI norm								
Class 150								
DN	θ	L ₁₅₀ ²⁾	D ₁₅₀	D _{u 150}	D _{i 150}	H ₁₅₀	B ₁₅₀ ³⁾	W _{min} ⁴⁾
	[°]	inch (mm)	inch (mm)	inch (mm)	inch (mm)	inch (mm)	inch (mm)	inch (mm)
100	45 ¹⁾	39.86 (1012)	9.06 (230)	4.50 (114.3)	4.00 (101.7)	1.60 (40.7)	11.06 (281)	0.14 (3.6)
125	45 ¹⁾	40.94 (1040)	10.04 (255)	5.56 (141.3)	5.05 (128.2)	2.47 (62.8)	11.91 (302.5)	0.15 (3.8)
150	45 ¹⁾	40.94 (1040)	11.02 (280)	6.63 (168.3)	6.07 (154.1)	2.97 (75.5)	12.83 (326)	0.16 (4.1)
200	45 ¹⁾	34.30 (871)	13.58 (345)	8.63 (219.1)	7.93 (201.5)	3.89 (98.7)	14.94 (379.5)	0.16 (4.1)
250	45 ¹⁾	36.11 (917)	16.00 (405)	10.75 (273)	9.96 (253)	4.88 (124)	16.99 (431.5)	0.18 (4.6)
300	45 ¹⁾	32.90 (836)	19.09 (485)	12.75 (323.8)	11.96 (303.8)	5.86 (148.9)	19.43 (493.5)	0.20 (5.1)
350	45 ¹⁾	35.16 (893)	21.06 (535)	14.00 (355.6)	13.21 (335.6)	6.47 (164.4)	20.96 (532.5)	0.21 (5.3)
400	45 ¹⁾	33.74 (857)	23.43 (595)	16.00 (406.4)	15.21 (386.4)	7.45 (189.3)	23.01 (584.5)	0.22 (5.6)
500	45 ¹⁾	42.76 (1086)	27.56 (700)	20.00 (508)	19.21 (488)	9.41 (239.1)	26.85 (682)	0.26 (6.6)
600	60	47.91 (1217)	32.09 (815)	24.00 (610)	23.23 (590)	11.38 (289.1)	31.44 (798.5)	0.30 (7.6)

Sensor SONO 3100 with ANSI norm								
Class 300								
DN	θ	L ₃₀₀ ²⁾	D ₃₀₀	D _{u 300}	D _{i 300}	H ₃₀₀	B ₃₀₀ ³⁾	W _{min} ⁴⁾
	[°]	inch (mm)	inch (mm)	inch (mm)	inch (mm)	inch (mm)	inch (mm)	inch (mm)
100	45 ¹⁾	40.62 (1032)	10.04 (255)	4.50 (114.3)	4.00 (101.7)	1.60 (40.7)	11.56 (293.5)	0.25 (6.4)
125	45 ¹⁾	41.70 (1059)	11.02 (280)	5.56 (141.3)	5.05 (128.2)	2.47 (62.8)	12.40 (315)	0.27 (6.9)
150	45 ¹⁾	41.70 (1059)	12.60 (320)	6.63 (168.3)	6.00 (152.3)	2.94 (74.6)	13.58 (345)	0.30 (7.6)
200	45 ¹⁾	35.06 (891)	14.96 (380)	8.63 (219.1)	7.93 (201.5)	3.89 (98.7)	15.63 (397)	0.29 (7.4)
250	45 ¹⁾	37.35 (949)	445 (17.52)	10.75 (273)	9.96 (253)	4.88 (124)	17.78 (451.5)	0.34 (8.6)
300	45 ¹⁾	34.14 (867)	520 (20.47)	12.75 (323.8)	11.76 (298.8)	5.76 (146.4)	20.04 (509)	0.39 (9.9)
350	45 ¹⁾	-	-	-	-	-	-	-
400	45 ¹⁾	-	-	-	-	-	-	-

Dimensional drawings (continued)

Sensor SONO 3100 with ANSI norm Class 300								
DN	θ	$L_{300}^{2)}$	D_{300}	$D_{u\ 300}$	$D_{i\ 300}$	H_{300}	$B_{300}^{3)}$	$W_{min}^{4)}$
500	45 ¹⁾	-	-	-	-	-	-	-
600	60	-	-	-	-	-	-	-

1) For all sensors with flange transducers path angle are 60°.

2) Length tolerance in inch (mm): DN 100 +0.12/-0.24 (+5/-6), DN 125 ... 200 +0.24/-0.39 (+6/-10), DN 250 +0.28/-0.43 (+7/-11), DN 300 ... 400 +0.39/-0.59 (+10/-15), DN 500 ... 600 +0.43/-0.63 (+11/-16).

3) B dimension value is an approximate information and may differ a little by flange pressure rate.

4) Minimum wall thickness for pressure rates Class 150 or Class 300. W_{min} wall thickness are min. values. The delivered sensor can have larger wall thicknesses to meet the selected pressure rate. Any specific required wall thickness to be ordered as PVR..

A**)

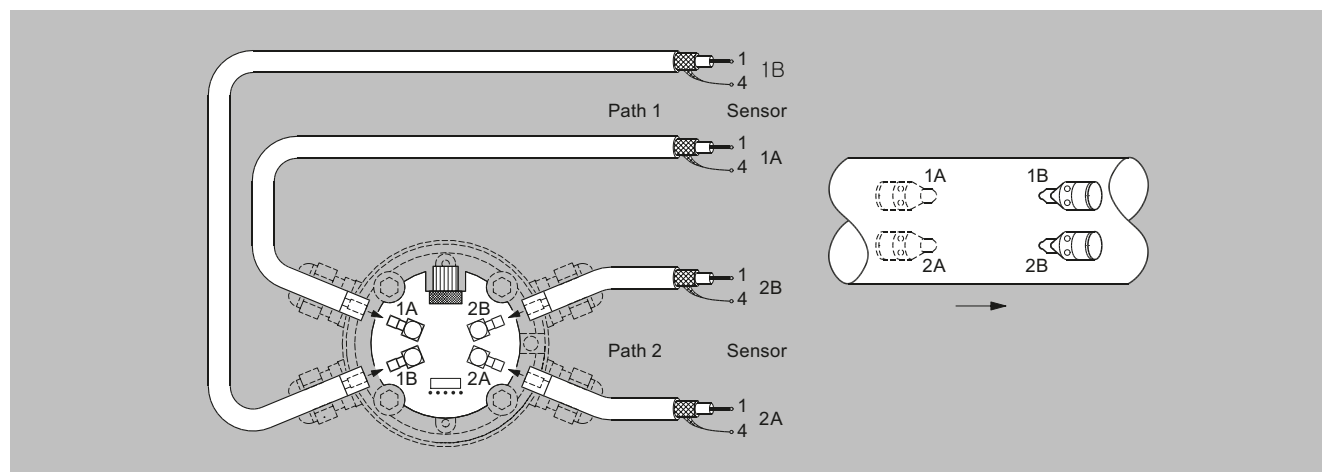
Space required for replacement of transducer min. 9.1 inch (230 mm).

Approximate weights for SONO 3100 sensor with ANSI B16.5 flanges

Sensor SONO 3100 with ANSI norm Weight with flange ¹⁾		
DN (inch)	Class 150	Class 300
	kg (lbs)	kg (lbs)
100 (4")	31 (68.3)	40 (88.2)
125 (5")	41 (90.4)	54 (119.1)
150 (6")	48 (105.8)	70 (154.3)
200 (8")	69 (152.1)	95 (209.4)
250 (10")	99 (218.3)	137 (302.0)
300 (12")	123 (271.2)	187 (412.3)
350 (14")	158 (348.3)	-
400 (16")	184 (405.7)	-
500 (20")	270 (595.2)	-
600 (24")	375 (826.7)	-

1) Weight of system incl. process flanges and standard O-ring transducers. For sensors with flange transducer please add approx. 10 kg (22.05 lbs). For SS terminal housings instead of the standard PA housing add approx. 5 kg (11.03 lb).

Circuit diagrams



Electrical connection of SITRANS FUS060 and SONO 3100

Flow Measurement

SITRANS FS (ultrasonic)

Inline ultrasonic flowmeters / SITRANS FUS380 standard flowmeter

Overview



The 2-path flowmeter SITRANS FUS380 comes as battery or mains-powered and is designed to measure water flow in district heating plants, local networks, boiler stations, substations, chiller plants (including glycol mixes) and other general water applications.

The type-approved flowmeter version is named SITRANS FUE380.

Technically, the meter types SITRANS FUS380 and SITRANS FUE380 are completely identical, only difference is the calibration limit and the type approval for custody transfer.

Benefits

- Battery-powered up to 6 years
- 115/230 V mains-powered with back-up battery option in case of mains power failure
- Fast measuring frequency 15 Hz/0.5 Hz (230 V AC/Battery)
- Easy one-button straight forward display
- 2-path measuring principle for optimum accuracy
- Compact or remote mounting
- Measures on most district water qualities and water conductivities
- No pressure drop
- Long-term stability
- 2 galvanically isolated digital outputs for easy connection to a calculator (potential-free)
- Analog output 4 to 20 mA
- Bidirectional measurement, with 2 totalizers and outputs
- Dynamic range q_i (min) : q_s (max) up to 1:400

Application

The main application for SITRANS FUS380 is measurement of water flow or water flow in energy meter systems in district heating networks or chilled water (including glycol mixes).

Design

The 2-path design of SITRANS FUS380 ensures maximum accuracy under short inlet conditions. The flowmeter consists of a flow sensor pipe, 4 transducers/transducer cables and a transmitter SITRANS FUE080.

The unit is available in a compact or a remote version. Both versions are pre-mounted with short coax-cables. Remote transmitter up to a distance of 30 m by one Sensor link cable (SSL).

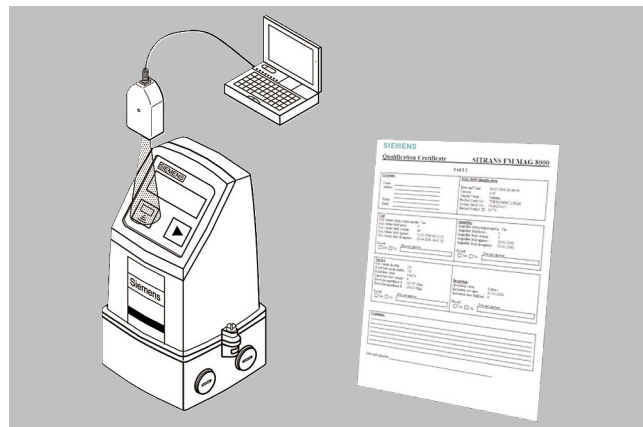
Compact mounting is only possible up to 120 °C (248 °F). The sensor must be isolated to protect transmitter from heat. The transmitter is available in an IP67/NEMA 4X/6 enclosure.

Function

Together with the SIMATIC PDM tool the FUS380 offers the possibility of testing and verifying the flowmeter on site and creating a printed "Qualification Certificate" with specific data that defines the quality status of the measurement.

The Qualification Certificate shows information about the actual status of the flowmeter:

- General settings, flowmeter and battery information, totalizer values, and pulse output settings
- Detailed information about the transmitter and the sensor functionality, and a main parameter list for evaluating the functionality of the flowmeter



Integration

The flowmeter digital output is often used as input for an energy meter or as input for digital systems for remote reading.

SITRANS FUS380 has two digital output functions that can be individually selected.

Pulse output rate is defined when ordering. To get optimal benefit the pulse value must be selected as low as possible.

If the flowmeter forms part of an energy meter system for custody transfer, no further approvals are needed, except possible local approvals on the flowmeter.

Configuration

Configuration SITRANS FUS380

Selection guide SITRANS FUS380, standard version

DN	Q _s (m ³ /h)	Q _{max} (m ³ /h) (105 % of Q _s)	Q _p (m ³ /h)	Q _i (m ³ /h) (1:100 of Q _p)	Cut-off (m ³ /h) (95 % of Q _i)	Cut-off (% of Q _{max})	Typical pulse value ¹⁾ (l/pulse)
50	15	15.75	15	0.15	0.143	0.90	1
50	45	47.25	15	0.15	0.143	0.30	1
50	45	47.25	30	0.3	0.285	0.60	1
65	25	26.25	25	0.25	0.238	0.90	1
65	72	75.6	25	0.25	0.238	0.31	1
65	72	75.6	50	0.5	0.475	0.63	1
80	40	42	40	0.4	0.380	0.90	2.5
80	120	126	40	0.4	0.380	0.30	2.5
80	120	126	80	0.8	0.760	0.60	2.5
100	60	63	60	0.6	0.570	0.90	2.5
100	180	189	60	0.6	0.570	0.30	2.5
100	240	252	120	1.2	1.140	0.45	2.5
125	100	105	100	1	0.950	0.90	2.5
125	280	294	100	1	0.950	0.32	2.5
125	400	420	200	2	1.900	0.45	2.5
150	150	157.5	150	1.5	1.425	0.90	10
150	420	441	150	1.5	1.425	0.32	10
150	560	588	300	3	2.850	0.48	10
200	250	262.5	250	2.5	2.375	0.90	10
200	700	735	250	2.5	2.375	0.32	10
200	900	945	500	5	4.750	0.50	10
250	400	420	400	4	3.800	0.90	10
250	1120	1176	400	4	3.800	0.32	10
250	1400	1470	800	8	7.600	0.52	10
300	560	588	560	5.6	5.320	0.90	50
300	1560	1638	560	5.6	5.320	0.32	50
300	2100	2205	1120	11.2	10.640	0.48	50
350	750	787.5	750	7.5	7.125	0.90	50
350	2100	2205	750	7.5	7.125	0.32	50
350	2800	2940	1500	15	14.250	0.48	50
400	950	997.5	950	9.5	9.025	0.90	50
400	2660	2793	950	9.5	9.025	0.32	50
400	3600	3780	1900	19	18.050	0.48	50
500	1475	1548.75	1475	14.75	14.013	0.90	100
500	4130	4336.5	1475	14.75	14.013	0.32	100
500	5500	5775	2950	29.5	28.025	0.49	100
600	2150	2257.5	2150	21.5	20.425	0.90	100
600	6020	6321	2150	21.5	20.425	0.32	100
600	8000	8400	4300	43	40.850	0.49	100
700	2900	3045	2900	29	27.550	0.90	100
700	8120	8526	2900	29	27.550	0.32	100
700	10 800	11 340	5800	58	55.100	0.49	100
800	3800	3990	3800	38	36.100	0.90	100
800	10 640	11 172	3800	38	36.100	0.32	100
800	14 200	14 910	7600	76	72.200	0.48	100
900	5000	5250	3800	38	36.100	0.69	100
900	14 000	14 700	5000	50	47.500	0.32	100
900	20 000	21 000	5000	50	47.500	0.23	100
1000	6000	6300	3800	38	36.100	0.57	100
1000	16 800	17 640	6000	60	57.000	0.32	100
1000	24 000	25 200	12 000	120	114.000	0.45	100
1200	9000	9450	3800	38	36.100	0.38	100
1200	25 200	26 460	9000	90	85.500	0.32	100
1200	36 000	37 800	18 000	180	171.000	0.45	100

The values Q_i, Q_p and Q_s are shown on the system label of the FUS380. Q_i (Q_{min}) means the minimal and Q_p (Q_{nom}) the nominal flow rate. Q_s is the highest operatable flow rate. The maximum flow rate (Q_{max}) is 105 % of Q_s. The low flow cut-off is 50 % of Q_i.

Flow Measurement

SITRANS FS (ultrasonic)

Inline ultrasonic flowmeters / SITRANS FUS380 standard flowmeter

Configuration (continued)

In order to obtain best pulse output resolution in the range Q_{\min} to Q_s of approx. 100 Hz at Q_s , two or three flow values for every dimension can be selected at ordering. Therefore the ordering data table also shows Q_p (Q_n). This flow rate is between Q_i (Q_{\min}) and Q_s and indicates the normal or typical flow.

To get optimal benefit of the pulses the pulse value and pulse length shall be selected as low as possible. The following calculation formula can be used for determining the shortest pulse value at a pulse length of 5 ms: $L/\text{pulse} > Q_s \text{ (m}^3/\text{h)} / 360$.

For example $Q_s = 300 \text{ m}^3/\text{h}$; $L/\text{pulse} > 300/360$; $L/\text{pulse} > 0.83$; therefore the pulse value must be 1 l/pulse

¹⁾ Typical pulse values for SITRANS FUS380 with pulse length 5 ms. Other values are possible - please see the selections at the 7ME340 order codes.

Selection and ordering data

Flowmeter SITRANS FUS380 (standard)					Article No. 7ME3400-	Order code
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.					● ● ● ● 0 - ● ● A ● ● ● ●	
Diameter	Approval	Pressure rating	Flow setting [m ³ /h]			
			Q_p (Q_n) is the normal flow according to the approval requirements. Q_p and Q_s is shown on the system label.			
			Q_p (Q_n) [m ³ /h]	Q_s [m ³ /h]		
Pipe material: Die-cast bronze						
DN 50 (2")	EN 1434	PN 40	15	15	1	A
DN 50 (2")	EN 1434	PN 40	15	45	1	C
DN 50 (2")	OIML R75	PN 40	30	45	1	D
DN 65 (2½")	EN 1434	PN 40	25	25	1	E
DN 65 (2½")	EN 1434	PN 40	25	72	1	G
DN 65 (2½")	OIML R75	PN 40	50	72	1	H
DN 80 (3")	EN 1434	PN 40	40	40	1	J
DN 80 (3")	EN 1434	PN 40	40	120	1	L
DN 80 (3")	OIML R75	PN 40	80	120	1	M
Pipe material: Carbon steel						
DN 100 (4")	EN 1434	PN 16, PN 40	60	60	1	N
DN 100 (4")	EN 1434	PN 16, PN 40	60	180	1	Q
DN 100 (4")	OIML R75	PN 16, PN 40	120	240	1	R
DN 125 (5")	EN 1434	PN 16, PN 40	100	100	1	S
DN 125 (5")	EN 1434	PN 16, PN 40	100	280	1	U
DN 125 (5")	OIML R75	PN 16, PN 40	200	400	1	V
DN 150 (6")	EN 1434	PN 16, PN 40	150	150	2	A
DN 150 (6")	EN 1434	PN 16, PN 40	150	420	2	C
DN 150 (6")	OIML R75	PN 16, PN 40	300	560	2	D
DN 200 (8")	EN 1434	PN 16, PN 25, PN 40	250	250	2	E
DN 200 (8")	EN 1434	PN 16, PN 25, PN 40	250	700	2	G
DN 200 (8")	OIML R75	PN 16, PN 25, PN 40	500	900	2	H
DN 250 (10")	EN 1434	PN 16, PN 25, PN 40	400	400	2	J
DN 250 (10")	EN 1434	PN 16, PN 25, PN 40	400	1120	2	L
DN 250 (10")	OIML R75	PN 16, PN 25, PN 40	800	1400	2	M
DN 300 (12")	EN 1434	PN 16, PN 25	560	560	2	N
DN 300 (12")	EN 1434	PN 16, PN 25	560	1560	2	Q
DN 300 (12")	OIML R75	PN 16, PN 25	1120	2100	2	R
DN 350 (14")	EN 1434	PN 16, PN 25	750	750	2	S
DN 350 (14")	EN 1434	PN 16, PN 25	750	2100	2	U
DN 350 (14")	OIML R75	PN 16, PN 25	1500	2800	2	V
DN 400 (16")	EN 1434	PN 16, PN 25	950	950	3	A
DN 400 (16")	EN 1434	PN 16, PN 25	950	2660	3	C
DN 400 (16")	OIML R75	PN 16, PN 25	1900	3600	3	D
DN 500 (20")	EN 1434	PN 16, PN 25	1475	1475	3	J
DN 500 (20")	EN 1434	PN 16, PN 25	1475	4130	3	L
DN 500 (20")	OIML R75	PN 16, PN 25	2950	5500	3	M
DN 600 (24")	EN 1434	PN 16, PN 25	2150	2150	3	S
DN 600 (24")	EN 1434	PN 16, PN 25	2150	6020	3	U
DN 600 (24")	OIML R75	PN 16, PN 25	4300	8000	3	V
DN 700 (28")	EN 1434	PN 16, PN 25	2900	2900	4	E

Selection and ordering data (continued)

Flowmeter SITRANS FUS380 (standard)					Article No. 7ME3400-	Order code	
DN 700 (28")	EN 1434	PN 16, PN 25	2900	8120	4 G		
DN 700 (28")	OIML R75	PN 16, PN 25	5800	10800	4 H		
DN 800 (32")	EN 1434	PN 16, PN 25	3800	3800	4 N		
DN 800 (32")	EN 1434	PN 16, PN 25	3800	10640	4 Q		
DN 800 (32")	OIML R75	PN 16, PN 25	7600	14200	4 R		
Remote only							
DN 900 (36")	EN 1434	PN 16, PN 25	5000	5000	5 A		
DN 900 (36")	EN 1434	PN 16, PN 25	5000	14000	5 C		
DN 900 (36")	OIML R75	PN 16, PN 25	10000	20000	5 D		
DN 1000 (40")	EN 1434	PN 16, PN 25	6000	6000	5 J		
DN 1000 (40")	EN 1434	PN 16, PN 25	6000	16800	5 L		
DN 1000 (40")	OIML R75	PN 16, PN 25	12000	24000	5 M		
DN 1200 (48")	EN 1434	PN 16	9000	9000	5 S		
DN 1200 (48")	EN 1434	PN 16	9000	25200	5 U		
DN 1200 (48")	OIML R75	PN 16	18000	36000	5 V		
Flange norm and pressure rating							
System without sensor - only a transmitter FUS080 as spare part - settings as defined with this Article No.						A	
EN 1092-1							
• PN 16 (DN 100 ... 1200)						C	
• PN 25 (DN 200 ... 1000)						D	
• PN 40 (DN 50 ... 250)						E	
Compact/remote connection							
Note: Sensor cable always firmly connected to connection box.							
Compact version, liquid max. 120 °C (248 °F)							
Remote version, liquid max. 150/200 °C (302/392 °F)						0	
Sensor link cable (SSL)							
• 5 m (16.4 ft)						2	
• 10 m (32.8 ft)						3	
• 20 m (65.6 ft)						4	
• 30 m (98.4 ft)						5	
Pulse output value setup							
To get optimal benefit of the pulses the pulse value and pulse length shall be selected as low as possible. The following calculation formula can be used for determining the shortest pulse value at a pulse length of 5 ms: $L/pulse > Q_n (m^3/h) / 360$. For example $Q_n = 300 m^3/h$; $L/pulse > 300/360$; $L/pulse > 0.83$; therefore the pulse value must be 1 l/pulse. In conjunction with energy meters, e.g. the SITRANS FUS950, a pulse count of more than 20 pulses per second should be avoided.							
Pulse value							
• 0.1 l/pulse (not suitable for FUE950 with nominal size 1B)						1	
• 1 l/pulse (not suitable for FUE950 with nominal size 1K up to 2B)						2	
• 2.5 l/pulse (not suitable for FUE950 with nominal size 1T up to 2K)						3	
• 10 l/pulse (not suitable for FUE950 with nominal size 2K up to 3K)						4	
• 50 l/pulse (not suitable for FUE950 with nominal size 3L up to 5V)						5	
• 100 l/pulse (not suitable for FUE950 with nominal size 4H up to 5V)						6	
• 250 l/pulse						7	
• 1 m ³ /pulse						8	
• 0.25 l/pulse (not suitable for FUE950 with nominal size 1B up to 1K)						9	N 0 A
• 0.5 l/pulse (not suitable for FUE950 with nominal size 1C up to 1R)						9	N 0 B
• 5 l/pulse (not suitable for FUE950 with nominal size 2C up to 2T)						9	N 0 C
• 25 l/pulse (not suitable for FUE950 with nominal size 2U up to 4P)						9	N 0 D
• 500 l/pulse						9	N 0 E
• 2.5 m ³ /pulse						9	N 0 F
• 5 m ³ /pulse						9	N 0 G
• 10 m ³ /pulse						9	N 0 H
• 25 m ³ /pulse						9	N 0 J
• 50 m ³ /pulse						9	N 0 K

Flow Measurement

SITRANS FS (ultrasonic)

Inline ultrasonic flowmeters / SITRANS FUS380 standard flowmeter

Selection and ordering data (continued)

Flowmeter SITRANS FUS380 (standard)	Article No. 7ME3400-	Order code
• 100 m ³ /pulse	9	N 0 L
• 250 m ³ /pulse	9	N 0 M
• 500 m ³ /pulse	9	N 0 N
• 1000 m ³ /pulse	9	N 0 P
Flowmeter SITRANS FUS380 (standard)		
Transmitter variant FUS080 power/analog output		
115 ... 230 V AC		B
3.6 V Lithium battery, dual pack is included		D
115 ... 230 V AC, backup 3.6 V DC Lithium battery, single pack is included		E
3.6 V battery version (no battery pack included)		G
Option with 4 ... 20 mA analog output module		
• 115 ... 230 V AC		R
• 115 ... 230 V AC, backup 3.6 V DC, Lithium battery, single pack is included		U
Note: Lithium batteries are subject to special transportation regulations according to United Nations "Regulation of Dangerous Goods, UN 3090 and UN 3091". Special transport documentation is required to observe these regulations. This may influence both transport time and costs.		
Pulse width setup		
Pulse width		
5 ms (standard)		2
10 ms		3
20 ms		4
50 ms		5
100 ms		6
200 ms		7
500 ms		8

	Order code
Additional information Please add "-Z" to Article No. and specify Order code(s) and plain text.	
Calibration/certificate FUS380	
Production calibration for DN 50 ... 1200 with Q _n as selected in diameter. Incl. Calibration protocol: 2 × 3 points, Q _i , 10 % Q _p and Q _p (max. 8000 m ³ /h).	Included
Accredited Siemens ISO/IEC 17025 calibration for DN 50 ... 200 with Q _n as selected in diameter. Certificate: 2 × 5 points, Q _i , 5 %, 10 %, 50 % and 100 % of Q _p (max. 630 m ³ /h).	D20
Accredited Siemens ISO/IEC 17025 calibration for DN 250 ... 600 with Q _n as selected in diameter. Certificate: 2 × 5 points, 5 %, 10 %, 50 % and 100 % of Q _p (max. 2800 m ³ /h).	D21
Accredited Siemens ISO/IEC 17025 calibration, DN 500 ... 1200 with Q _n as selected in diameter. Certificate: 2 × 5 points, Q _i , 5 %, 10 %, 50 % and 100 % of Q _p (max. 8000 m ³ /h).	D22
Output B as reverse flow pulses. No calibration/verification of this function.	E21
Material certificate	
EN 10204-3.1 (pipe material)	C12
Regional specific approval	
KCC marking for Korea	W28
Tag name plate	
Stainless steel TAG plate (1 × 24 × 80 mm), wire fixed. Font size depends on text length: 8 mm for 1 ... 10 characters, 4 mm for 11 ... 20 characters (specify in plain text).	Y17

Please use online Product selector to get latest updates. Product selector link:

www.pia-portal.automation.siemens.com

Selection and ordering data (continued)

Flowmeter SITRANS FUS380 operating instructions, accessories and spare parts

Operating instructions

Description	Article No.
• English	A5E00730100
• German	A5E00740611

All literature is available to download for free, in a range of languages, at <http://www.siemens.com/processinstrumentation/documentation>
For accessories and spare parts see the section about FUS080/FUE080.

Technical specifications

SITRANS FUS380	
Sensor design	2-path sensor with flanges and inline transducers wet-calibrated from factory
Nominal size (DN 50 ... 80 in bronze)	DN 50, 65, 80, 100, 125, 150, 200, 250, 300, 350, 400, 500, 600, 700, 800, 1000, 1200
Pressure rate	PN 16, PN 25, PN 40 EN 1092-1 flanges: • type 01 (B): DN 100 ... 125 • type 11 (B): DN 150 ... 1200 • type 11 (B) 'design': DN 50 ... 80
Pipe material	• DN 100 ... 1200: Carbon Steel EN 1.0345/P235 GH, painted in light-gray • DN 50 ... 80: Die-cast bronze G-CuSn10/W2.1050.01 (EN 1982)
Transducer design	• DN 100 ... 1200: Inline version and welded onto the pipe • DN 50 ... 80: Screwed into the pipe
Transducer material	Stainless steel (AISI 316/1.4404)/brass (CuZn ₃₆ Pb ₂ As)
Sensor operating conditions	
Ambient temperature	
• Operation	-10 ... +60 °C (14 ... 140 °F) (MID version: -10 ... +55 °C (14 ... 131 °F))
• Storage	-40 ... +85 °C (-40 ... +185 °F)
Measured media	Heating water, according to VDI-2035 (pH 8.2 - 10.5), industrial VdTÜV information sheet 1466 and AGFW information sheet FW 510.
Media/surface temperature	DN 100 ... 1200: • Remote: 2 ... 200 °C (35.6 ... 392 °F) DN 50 ... 80: • Remote: 2 ... 150 °C (35.6 ... 302 °F) DN 50 ... DN 1200: • Compact: 2 ... 120 °C (35.6 ... 248 °F)
Degree of protection	Sensor connection IP67/NEMA 4X/6
Max. flow velocity	DN 50 ... 1200: 9 m/s (29.5 ft/s)
Electromagnetic compatibility	
• Emitted interference	To EN 55011/CISPR-11
• Noise immunity	To EN/IEC 61326-1 (Industry)
Transmitter	
The transmitter related to this system is the SITRANS FUS080. For Technical specifications to the FUS080 go to "SITRANS FUS080/FUE080 transmitter".	
Sensor cable	
Transducer cable length	Pre-mounted with short coax-cables
Sensor link cable length (SSL)	5, 10, 20, 30 m (16.4, 32.8, 65.6, 98.4 ft)

Technical specifications (continued)

SITRANS FUS380	
Certificates and approvals	
Conformity certificate (CE)	The devices are supplied as standard with a Siemens Certificate of Conformity on DVD.
Material certificate	Material certificate according EN 10204-3.1 is optionally available.
Calibration report	A standard calibration report is shipped with every flowmeter. Extended accredited ISO/IEC 17025 calibration certificates optionally available.
Approvals	No custody transfer approvals

The sensors are approved according to EU directive 2014/68/EU regarding fluid group 1, classified in category III. Design according to EN 13480 (PED Directive).

SITRANS FUS380 uncertainty

FUS380	
Flow value setting	Predefined settings according to dimension
Approval	No approval
Flow rate v_f	0.02 ... 9 m/s (0.065 ... 29.5 ft/s)
Output A	Pulse: forward, reverse, forward net, reverse net (Preset: forward)
Output B	Pulse forward, reverse, forward net, reverse net, alarm, call-up (Preset: alarm)
Pulse value A & B (depending on DN value)	0.1 l/p, 0.25 l/p, 0.5 l/p, 1 l/p, 2.5 l/p, 10 l/p, 25 l/p, 50 l/p, 100 l/p, 250 l/p, 500 l/p, 1 m ³ /p, 2.5 m ³ /p, 5 m ³ /p, 10 m ³ /p, 25 m ³ /p, 50 m ³ /p, 100 m ³ /p, 250 m ³ /p, 500 m ³ /p, 1000 m ³ /p
Pulse width	5/10/20/50/100/200/500 ms
Flow unit setup	Preset: m ³ /h
Volume unit setup	Preset: m ³

Flowmeter Calibration and traceability

To ensure continuous accurate measurement, flowmeters must be calibrated. The calibration is conducted at Siemens flow facilities with traceable instruments referring directly to the physical unit of measurement according to the International System of Units (SI).

Therefore, the calibration certificate ensures recognition of the test results worldwide, including the US (NIST traceability). Siemens offers accredited calibrations assured to ISO 17025 in the flow range from 0.0001 m³/h to 10 000 m³/h. Siemens Flow Instruments accredited laboratories are recognized by ILAC MRA (International Laboratory Accreditation Corporation - Mutual Recognition Arrangement) ensuring international traceability and recognition of the test results worldwide.

A standard calibration certificate with Q_n as selected flow is shipped with each SITRANS FUS380. This production calibration protocol consists of 2 x 3 points at Q_i , 10 % Q_p and Q_p (max. 4 200 m³/h).

Accuracy SITRANS FUS380:

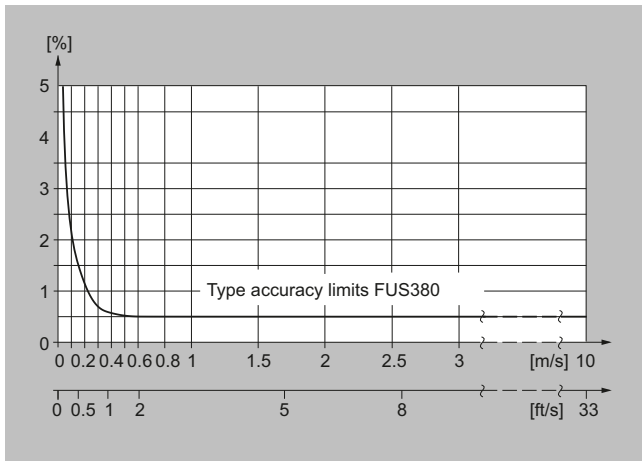
$\pm 0.5\%$ for 0.5 m/s < v < 10 m/s and $\pm 0.25/\sqrt{v_{act}}$ [%] below 0.5 m/s

Flow Measurement

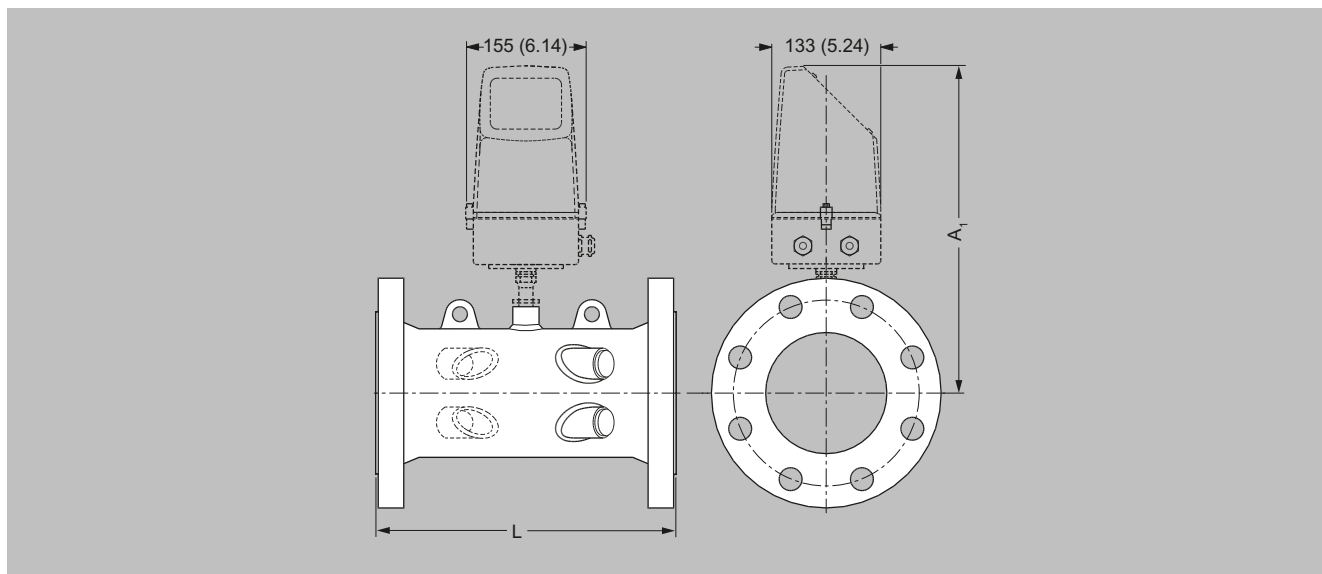
SITRANS FS (ultrasonic)

Inline ultrasonic flowmeters / SITRANS FUS380 standard flowmeter

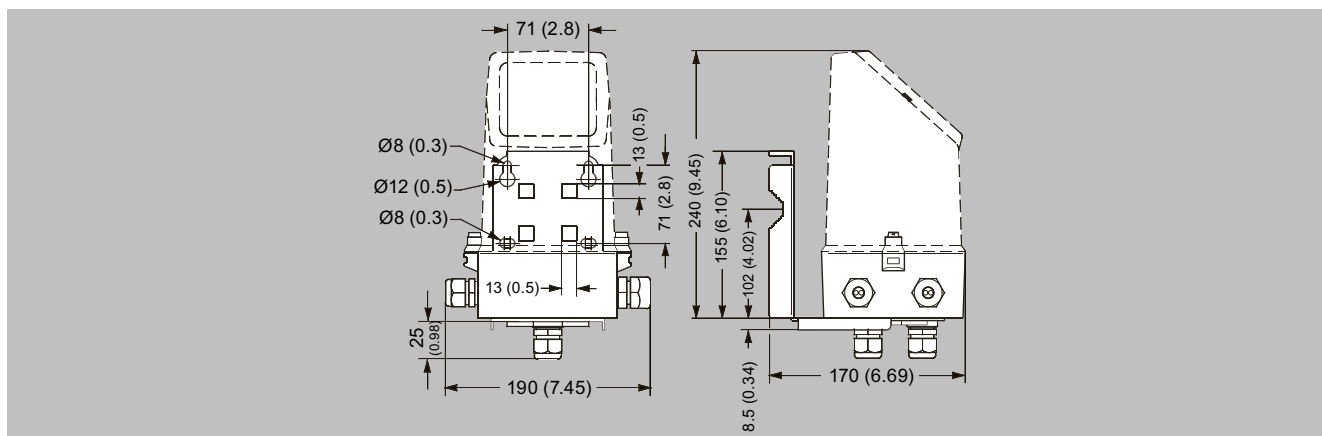
Technical specifications (continued)



Dimensional drawings



Transmitter IP67/NEMA 4X/6, wall mounting



Dimensions in mm (inch)

Sensor dimensions for FUS380 and FUE380

Size	PN 16		PN 25		PN 40		A ₁	Lift hug
	L	Weight	L	Weight	L	Weight		
DN	mm	kg	mm	kg	mm	kg	mm	
50	-	-	-	-	300 +0/-2	10	350	No
65	-	-	-	-	300 +0/-2	15	363	No
80	-	-	-	-	350 +0/-2	18	370	No
100	350 +0/-2	15	-	-	350 +0/-2	18	372	No
125	350 +0/-2	18	-	-	350 +0/-2	24	385	No
150	500 +0/-3	28	-	-	500 +0/-3	34	399	No
200	500 +0/-3	38	500 +0/-3	47	500 +0/-3	55	425	Yes
250	600 +0/-3	60	600 +0/-3	76	600 +0/-3	91	452	Yes
300	500 +0/-3	66	500 +0/-3	81	-	-	478	Yes
350	550 +0/-3	94	550 +0/-3	121	-	-	495	Yes
400	600 +0/-3	124	600 +0/-3	153	-	-	520	Yes
500	625 +0/-3	194	625 +0/-3	231	-	-	570	Yes
600	750 +0/-3	303	750 +0/-3	365	-	-	622	Yes
700	875 +0/-3	361	875 +0/-3	565	-	-	673	Yes

Flow Measurement

SITRANS FS (ultrasonic)

Inline ultrasonic flowmeters / SITRANS FUS380 standard flowmeter

Dimensional drawings (continued)

Size	PN 16		PN 25		PN 40			
800	1000 +0/-3	494	1000 +0/-3	770	-	-	724	Yes
900	1230 +6/-6	535	1300 +6/-6	835	-	-	775	Yes
1000	1300 +6/-6	594	1370 +6/-6	1000	-	-	826	Yes
1200	1360 +6/-6	732	-	-	-	-	928	Yes

Notes:

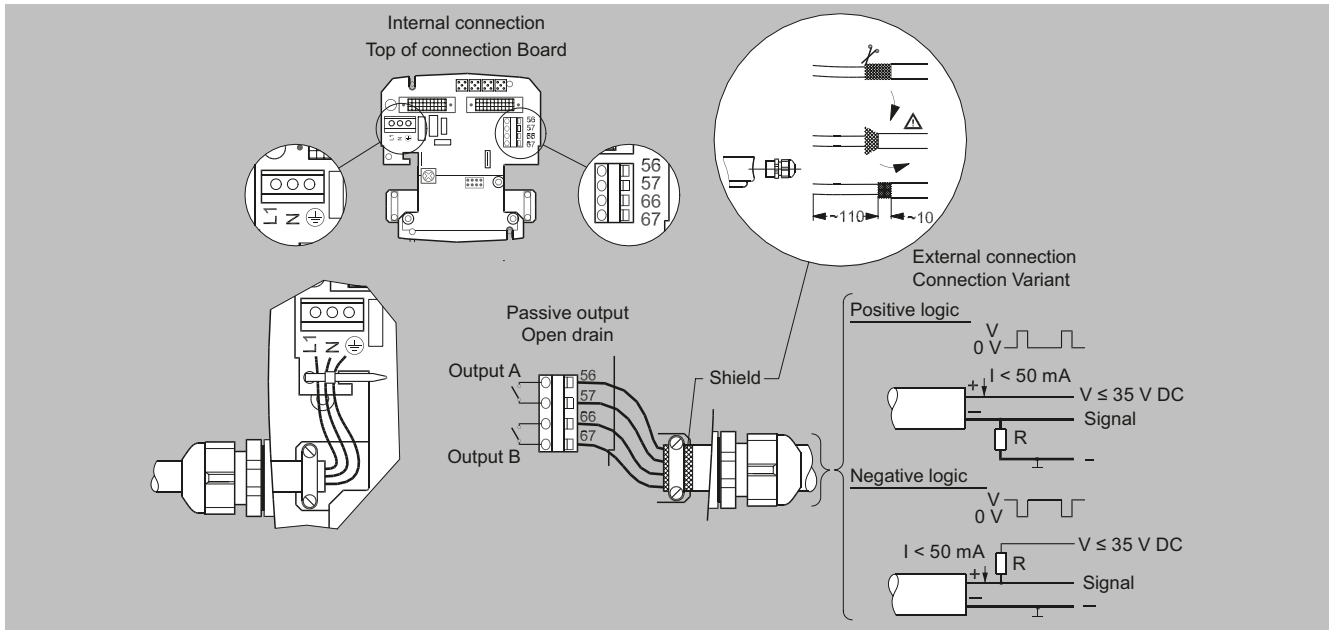
- Weight for transmitter/electronics 1.5 kg (compact version) or approximately 5 kg (remote version including 10 m cable set)
- All weights are **approximate**
- For flange values - see norm EN 1092-1

Size	PN 16		PN 25		PN 40		A ₁	Lift hug
	L	Weight	L	Weight	L	Weight		
inch	inch	lb	inch	lb	inch	lb	inch	
2	-	-	-	-	11.81 +0/-0.08	22	13.78	No
2½	-	-	-	-	11.81 +0/-0.08	33	14.30	No
3	-	-	-	-	13.78 +0/-0.08	40	14.57	No
4	13.78 +0/-0.08	33	-	-	13.78 +0/-0.08	40	14.65	No
5	13.78 +0/-0.08	40	-	-	13.78 +0/-0.08	53	15.16	No
6	19.68 +0/-0.12	62	-	-	19.68 +0/-0.12	75	15.71	No
8	19.68 +0/-0.12	84	19.68 +0/-0.12	104	19.68 +0/-0.12	121	16.74	Yes
10	23.62 +0/-0.12	132	23.62 +0/-0.12	168	23.62 +0/-0.12	201	17.80	Yes
12	19.68 +0/-0.12	146	19.68 +0/-0.12	179	-	-	18.82	Yes
14	21.65 +0/-0.12	207	21.65 +0/-0.12	267	-	-	19.49	Yes
16	23.62 +0/-0.12	273	23.62 +0/-0.12	337	-	-	20.48	Yes
20	24.61 +0/-0.12	428	24.61 +0/-0.12	509	-	-	22.45	Yes
24	29.53 +0/-0.12	668	29.53 +0/-0.12	805	-	-	24.49	Yes
28	34.45 +0/-0.12	796	34.45 +0/-0.12	1246	-	-	26.50	Yes
32	39.37 +0/-0.12	1089	39.37 +0/-0.12	1698	-	-	28.51	Yes
36	48.43 +0/-0.24	1179	51.18 +0/-0.24	1841	-	-	30.52	Yes
40	51.18 +0/-0.24	1310	53.94 +0/-0.24	2205	-	-	32.52	Yes
48	53.34 +0/-0.24	1614	-	-	-	-	36.54	Yes

Notes:

- Weight for transmitter/electronics 3.3 lb (compact version) or approximately 11 lb (remote version including 32.8 ft cable set)
- All weights are **approximate**
- For flange values - see norm EN 1092-1

Circuit diagrams



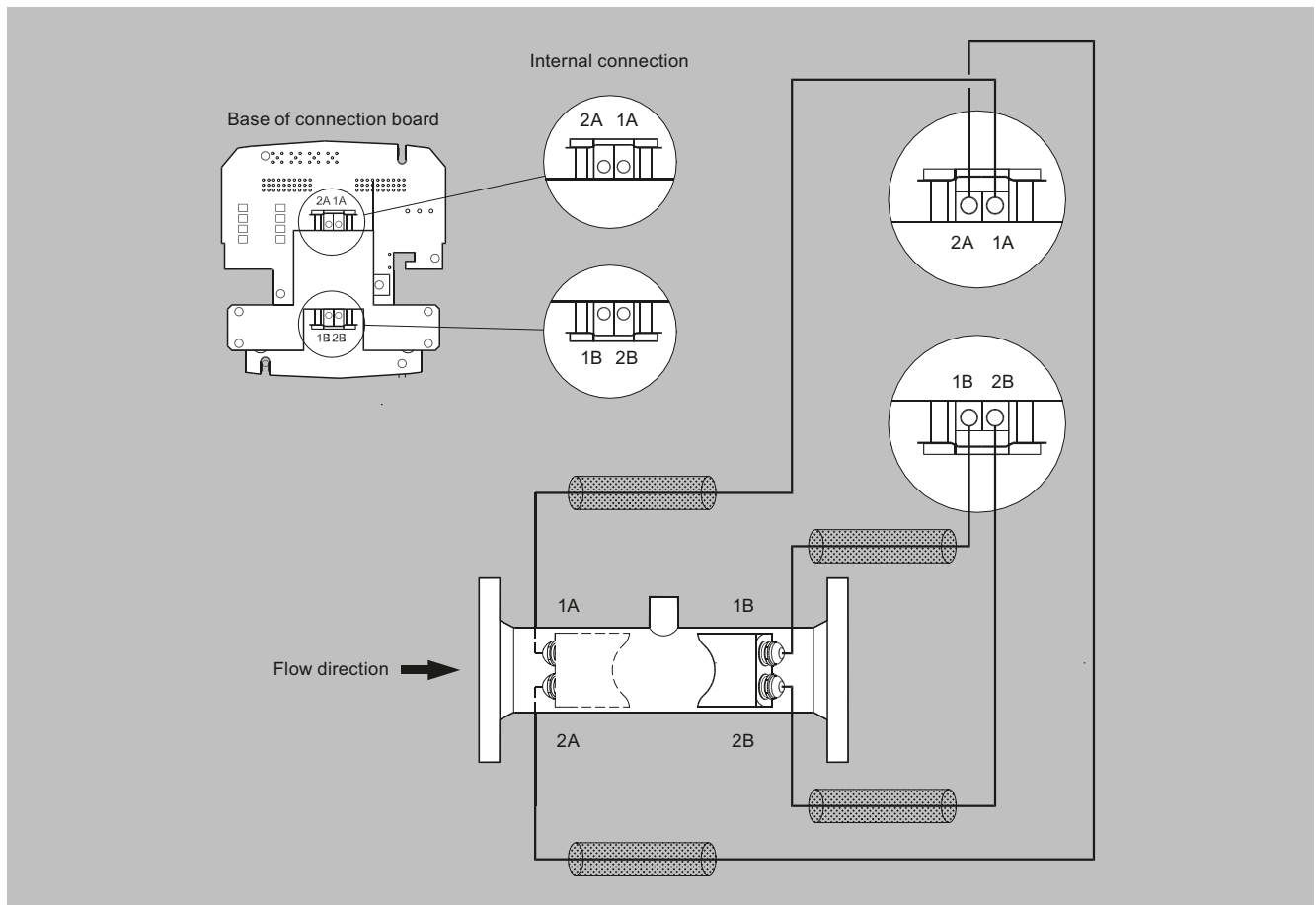
Electrical connection of transmitter SITRANS FUS/FUE380

Flow Measurement

SITRANS FS (ultrasonic)

Inline ultrasonic flowmeters / SITRANS FUS380 standard flowmeter

Circuit diagrams (continued)



Electrical connection of sensor SITRANS FUS/FUE380

Overview



The 2-path flowmeter SITRANS FUE380 comes as battery or mains-powered and is designed to measure water flow in district heating plants, local networks, boiler stations, substations, chiller plants (including glycol mixes without type approval) and other general water applications.

The flowmeter FUE380 is approved according to energy meter standards EN 1434 class 2, OIML R 75 class 2 and MID class 2. Metrological parameters are protected against manipulation. The type-approved flowmeter version is named SITRANS FUE380. For a standard flowmeter type FUS380 without a type approval, see the section about FUS380.

Technically, the meter types SITRANS FUS380 and SITRANS FUE380 are completely identical, only difference is the calibration limit and the type approval for custody transfer.

Benefits

- Battery-powered up to 6 years
- 115/230 V mains-powered with back-up battery option in case of mains power failure
- Fast measuring frequency 15 Hz/0.5 Hz (230 V AC/Battery)
- Easy one-button straight forward display
- 2-path measuring principle for optimum accuracy
- Compact or remote mounting
- Measures on most district water qualities and water conductivities
- No pressure drop
- Long-term stability
- 2 galvanically isolated digital outputs for easy connection to a calculator (potential-free)
- Analog output 4 to 20 mA
- Bidirectional measurement, with 2 totalizers and outputs
- Dynamic range $Q_1:Q_p$ up to 1:50/100 or max. range $Q_1:Q_s$ up to 1:400

Application

The main application for SITRANS FUE380 is measurement of water flow or water flow in energy meter systems for custody transfer in district heating networks or chilled water (including glycol mixes without type approval).

Combined with an energy calculator and a pair of temperature sensors, SITRANS FUE380 can be used as part of an energy meter system. For this purpose Siemens offers energy calculator SITRANS FUE950.

Design

The 2-path design of SITRANS FUE380 ensures maximum accuracy under short inlet conditions. The approved flowmeter consists of a flow sensor pipe, 4 transducers/transducer cables and a transmitter SITRANS FUE080.

The unit is available in a compact or a remote version. Both versions are pre-mounted with short coax-cables. Remote transmitter up to a distance of 30 m by one Sensor link cable (SSL).

Compact mounting is only possible up to 120 °C (248 °F). The sensor must be isolated to protect transmitter from heat. The transmitter is available in an IP67/NEMA 4X/6 enclosure.

FUE380 MI-004 approval

The SITRANS FUE380 program is type-approved according to international energy meter standard EN 1434. On 1 November 2006 the MI-004 energy meter directive became effective providing that all energy meters with a MI-004 verification label can be sold across the EU borders.

The FUE380 are MI-004 verified and labeled products according to Directive 2014/32/EU of the European Parliament and Council of 26 February, 2014 on measuring instruments, Annex IV Thermal Energy Meters (MI-004), in sizes from DN 50 to DN 1200.

The MID certification is obtained as module B + module D approvals according to the above-mentioned directive.

Module B: MI-004 Type approval according to EN 1434: 2007 (approved for media water)

Module D: Quality insurance MID approval of production

The MID system label with the approval information is placed on the side of the transmitter and on the sensor. An example of the product label is shown below:

FUE380 transmitter label (with MID first verification)





FUE380 transmitter label (with MID first verification)

Flow Measurement

SITRANS FS (ultrasonic)

Inline ultrasonic flowmeters / SITRANS FUE380 flowmeter with CT approval

Design (continued)

SIEMENS			
SITRANS FUE380			
Sensor	FDK:087H2537 895310H035	Order No.	7ME3410-2CE02-6ER6
Dimension	DN 150		764305H025
Press. Rating	PN40 PT60 bar	Certification No.	DK-0200-MI004-005
qs	420 m ³ /h	Accuracy Class:	2
qp	150 m ³ /h	Environmental Class:	E2, M1
qi	3 m ³ /h		
Compact system			
Cal. Factor	1.075456		
☉ ambient	-10 .. +55 °C		
☉ water	+15 .. +120 °C		
Prod. Year	2015		
			0200
			0200 EN13480
Siemens A/S Flow Instruments, 6400 Soenderborg, Denmark			
Made in France			

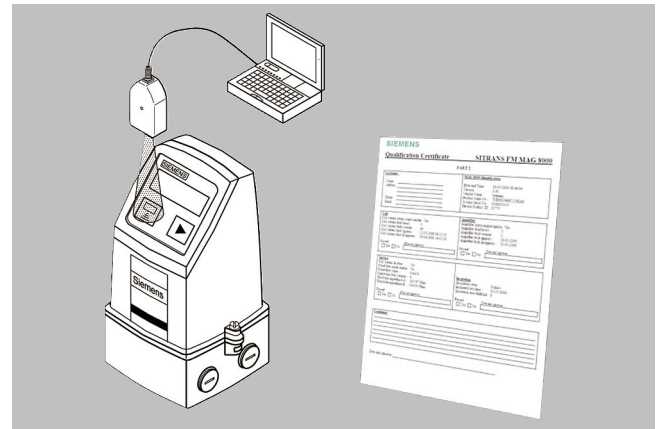
FUE380 sensor label (with MID first verification)

Function

Together with the SIMATIC PDM tool the FUE380 offers the possibility of testing and verifying the flowmeter on site and creating a printed "Qualification Certificate" with specific data that defines the quality status of the measurement.

The Qualification Certificate shows information about the actual status of the flowmeter:

- General settings, flowmeter and battery information, totalizer values, and pulse output settings
- Detailed information about the transmitter and the sensor functionality, and a main parameter list for evaluating the functionality of the flowmeter



Integration

The flowmeter digital output is often used as input for an energy meter or as input for digital systems for remote reading.

SITRANS FUE380 has two digital output functions that can be individually selected.

Pulse output rate is defined when ordering. To get optimal benefit the pulse value must be selected as low as possible.

If the flowmeter forms part of an energy meter system for custody transfer, no further approvals are needed, except possible local approvals on the flowmeter.

Configuration

Configuration SITRANS FUE380 type-approved

Selection guide SITRANS FUE380, type-approved flowmeter

DN	Q _s (m ³ /h)	Q _{max} (m ³ /h) (105% of Q _s)	Q _p (m ³ /h)	Q _i (m ³ /h) (1:50 of Q _p)	Q _i (m ³ /h) (1:100 of Q _p) EN 1434/MID	Cut-off (m ³ /h) (95% of Q _i)	Cut-off (% of Q _{max})	Typical pulse value (I/pulse)
		105%		50	100	95%		
50	30	31.5	15	0.3	-	0.285	0.95	1
50	45	47.25	15	0.3	-	0.285	0.63	1
50	45	47.25	30	-	0.3	0.285	0.63	1
65	50	52.5	25	0.5	-	0.475	0.95	1
65	72	75.6	25	0.5	-	0.475	0.66	1
65	72	75.6	50	-	0.5	0.475	0.66	1
80	80	84	40	0.8	-	0.760	0.95	2.5
80	120	126	40	0.8	-	0.760	0.63	2.5
80	120	126	80	-	0.8	0.760	0.63	2.5
100	120	126	60	1.2	-	1.140	0.95	2.5
100	180	189	60	1.2	-	1.140	0.63	2.5
100	180	189	120	-	1.2	1.140	0.63	2.5
125	200	210	100	2.0	-	1.900	0.95	2.5
125	280	294	100	2.0	-	1.900	0.68	2.5
125	280	294	200	-	2.0	1.900	0.68	2.5
150	300	315	150	3.0	-	2.850	0.95	10
150	420	441	150	3.0	-	2.850	0.68	10
150	420	441	300	-	3.0	2.850	0.68	10
200	500	525	250	5.0	-	4.750	0.95	10
200	700	735	250	5.0	-	4.750	0.68	10
200	700	735	500	-	5.0	4.750	0.68	10
250	800	840	400	8.0	-	7.600	0.95	10
250	1120	1176	400	8.0	-	7.600	0.68	10
250	1120	1176	800	-	8.0	7.600	0.68	10
300	1120	1176	560	11.2	-	10.640	0.95	50
300	1560	1638	560	11.2	-	10.640	0.68	50
300	1560	1638	1120	-	11.2	10.640	0.68	50
350	1500	1575	750	15.0	-	14.250	0.95	50
350	2100	2205	750	15.0	-	14.250	0.68	50
350	2100	2205	1500	-	15.0	14.250	0.68	50
400	1900	1995	950	19.0	-	18.050	0.95	50
400	2660	2793	950	19.0	-	18.050	0.68	50
400	2660	2793	1900	-	19.0	18.050	0.68	50
500	2950	3097.5	1475	29.5	-	28.025	0.95	100
500	4130	4336.5	1475	29.5	-	28.025	0.68	100
500	4130	4336.5	2950	-	29.5	28.025	0.68	100
600	4300	4515	2150	43.0	-	40.850	0.95	100
600	6020	6321	2150	43.0	-	40.850	0.68	100
600	6020	6321	4300	-	43.0	40.850	0.68	100
700	5800	6090	2900	58.0	-	55.100	0.95	100
700	8120	8526	2900	58.0	-	55.100	0.68	100
700	8120	8526	5800	-	58.0	55.100	0.68	100
800	7600	7980	3800	76.0	-	72.200	0.95	100
800	10 640	11 172	3800	76.0	-	72.200	0.68	100
800	10 640	11 172	7600	-	76.0	72.200	0.68	100
900	10 000	10 500	5000	100.0	-	95.000	0.95	100
900	14 000	14 700	5000	100.0	-	95.000	0.68	100
900	14 000	14 700	10 000	-	100.0	95.000	0.68	100
1000	14 000	14 700	10 000	-	100.0	95.000	0.68	100
1200	14 000	14 700	10 000	-	200.0	190.000	1.36	100

Dynamic range Q_i:Q_p: better than 1:100 to OIML R 75 class 2 and MID EN 1434 class 2.

Q_i (Q_{min}) means the minimal and Q_p (Q_{nom}) the nominal flow rate according to the approval requirements.

Q_s is the highest operatable flow rate. The maximum flow rate (Q_{max}) is 105 % of Q_s. The low flow cut off is 95 % of Q_i.

Q_i, Q_p and Q_s are shown on the system nameplate of the FUE380.

Flow Measurement

SITRANS FS (ultrasonic)

Inline ultrasonic flowmeters / SITRANS FUE380 flowmeter with CT approval

Configuration (continued)

In order to obtain best pulse output resolution in the range Q_{\min} to Q_s of approx. 100 Hz at Q_s , two or three flow values for every dimension can be selected at ordering. Therefore the ordering data table also shows Q_p (Q_n). This flow rate is between Q_i (Q_{\min}) and Q_s and indicates the normal or typical flow according to the approval requirements.

Note:

The minimum flow (Q_i) should be checked in the PIA-selector or product master data base (PMD).

To get optimal benefit of the pulses the pulse value and pulse length shall be selected as low as possible. The following calculation formula can be used for determining the shortest pulse value at a pulse length of 5 ms: $L/\text{pulse} > Q_s \text{ (m}^3/\text{h)} / 360$. For example $Q_s = 300 \text{ m}^3/\text{h}$; $L/\text{pulse} > 300/360$; $L/\text{pulse} > 0.83$; therefore the pulse value must be 1 l/pulse.

Selection and ordering data

Flowmeter SITRANS FUE380 (type-approved)					Article No.	Order code
					7ME3410-	
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.					•	•
Diameter	Approval	Pressure rating	Flow setting [m ³ /h]			
			Q_p (Q_n) is the normal flow according to the approval requirements. Q_p and Q_s is shown on the system label.			
			Q_p (Q_n) [m ³ /h]	Q_s [m ³ /h]		
Pipe material: Die-cast bronze						
DN 50 (2")		PN 40	15	30	1	B
DN 50 (2")		PN 40	15	45	1	C
DN 50 (2")	EN 1434	PN 40	30	45	1	D
DN 65 (2½")		PN 40	25	50	1	F
DN 65 (2½")		PN 40	25	72	1	G
DN 65 (2½")	EN 1434	PN 40	50	72	1	H
DN 80 (3")		PN 40	40	80	1	K
DN 80 (3")		PN 40	40	120	1	L
DN 80 (3")	EN 1434	PN 40	80	120	1	M
Pipe material: Carbon steel						
DN 100 (4")		PN 16, PN 40	60	120	1	P
DN 100 (4")		PN 16, PN 40	60	180	1	Q
DN 100 (4")	EN 1434	PN 16, PN 40	120	180	1	R
DN 125 (5")		PN 16, PN 40	100	200	1	T
DN 125 (5")		PN 16, PN 40	100	280	1	U
DN 125 (5")	EN 1434	PN 16, PN 40	200	280	1	V
DN 150 (6")		PN 16, PN 40	150	300	2	B
DN 150 (6")		PN 16, PN 40	150	420	2	C
DN 150 (6")	EN 1434	PN 16, PN 40	300	420	2	D
DN 200 (8")		PN 16, PN 25, PN 40	250	500	2	F
DN 200 (8")		PN 16, PN 25, PN 40	250	700	2	G
DN 200 (8")	EN 1434	PN 16, PN 25, PN 40	500	700	2	H
DN 250 (10")		PN 16, PN 25, PN 40	400	800	2	K
DN 250 (10")		PN 16, PN 25, PN 40	400	1120	2	L
DN 250 (10")	EN 1434	PN 16, PN 25, PN 40	800	1120	2	M
DN 300 (12")		PN 16, PN 25	560	1120	2	P
DN 300 (12")		PN 16, PN 25	560	1560	2	Q
DN 300 (12")	EN 1434	PN 16, PN 25	1120	1560	2	R
DN 350 (14")		PN 16, PN 25	750	1500	2	T
DN 350 (14")		PN 16, PN 25	750	2100	2	U
DN 350 (14")	EN 1434	PN 16, PN 25	1500	2100	2	V
DN 400 (16")		PN 16, PN 25	950	1900	3	B
DN 400 (16")		PN 16, PN 25	950	2660	3	C
DN 400 (16")	EN 1434	PN 16, PN 25	1900	2660	3	D
DN 500 (20")		PN 16, PN 25	1475	2950	3	K
DN 500 (20")		PN 16, PN 25	1475	4130	3	L
DN 500 (20")	EN 1434	PN 16, PN 25	2950	4130	3	M
DN 600 (24")		PN 16, PN 25	2150	4300	3	T

Selection and ordering data (continued)

Flowmeter SITRANS FUE380 (type-approved)	Article No. 7ME3410-	Order code	
DN 600 (24")	PN 16, PN 25	2150 6020	
DN 600 (24")	EN 1434 PN 16, PN 25	4300 6020	
DN 700 (28")	PN 16, PN 25	2900 5800	
DN 700 (28")	PN 16, PN 25	2900 8120	
DN 700 (28")	EN 1434 PN 16, PN 25	5800 8120	
DN 800 (32")	PN 16, PN 25	3800 7600	
DN 800 (32")	PN 16, PN 25	3800 10640	
DN 800 (32")	EN 1434 PN 16, PN 25	7600 10640	
Remote only			
DN 900 (36")	PN 16, PN 25	5000 10000	
DN 900 (36")	PN 16, PN 25	5000 14000	
DN 900 (36")	EN 1434 PN 16, PN 25	10000 14000	
DN 1000 (40")	EN 1434 PN 16, PN 25	10000 14000	
DN 1200 (48")	EN 1434 PN 16	10000 14000	
Flange norm and pressure rating			
System without sensor - only a transmitter			
EN 1092-1			
• PN 16 (DN 100 ... 1200)		C	
• PN 25 (DN 200 ... 1000)		D	
• PN 40 (DN 50 ... 250)		E	
Compact/remote connection			
Note: Sensor cable always firmly connected to connection box.			
Compact version, liquid max. 120 °C (248 °F)			
Remote version, liquid max. 150/200 °C (302/392 °F)			
Sensor link cable (SSL)			
• 5 m (16.4 ft)		2	
• 10 m (32.8 ft)		3	
• 20 m (65.6 ft)		4	
• 30 m (98.4 ft)		5	
Approvals/pulse output			
Without approval (neutral)		0	
With CT approval		1	
With CT approval MID004, authority seal		2	
Pulse output value setup			
To get optimal benefit of the pulses the pulse value and pulse length shall be selected as low as possible. The following calculation formula can be used for determining the shortest pulse value at a pulse length of 5 ms: $L/pulse > Q_v (m^3/h) / 360$. For example $Q_v = 300 m^3/h$; $L/pulse > 300/360$; $L/pulse > 0.83$; therefore the pulse value must be 1 l/pulse. In conjunction with energy meters, e.g. the SITRANS FUS950, a pulse count of more than 20 pulses per second should be avoided.			
Pulse value			
• 0.1 l/pulse (not suitable for FUE950 with nominal size 1B)		1	
• 1 l/pulse (not suitable for FUE950 with nominal size 1K up to 2B)		2	
• 2.5 l/pulse (not suitable for FUE950 with nominal size 1T up to 2K)		3	
• 10 l/pulse (not suitable for FUE950 with nominal size 2K up to 3K)		4	
• 50 l/pulse (not suitable for FUE950 with nominal size 3L up to 5V)		5	
• 100 l/pulse (not suitable for FUE950 with nominal size 4H up to 5V)		6	
• 250 l/pulse		7	
• 1 m ³ /pulse		8	
• 0.25 l/pulse (not suitable for FUE950 with nominal size 1B up to 1K)		9	N O A
• 0.5 l/pulse (not suitable for FUE950 with nominal size 1C up to 1R)		9	N O B
• 5 l/pulse (not suitable for FUE950 with nominal size 2C up to 2T)		9	N O C
• 25 l/pulse (not suitable for FUE950 with nominal size 2U up to 4P)		9	N O D
• 500 l/pulse		9	N O E
• 2.5 m ³ /pulse		9	N O F
• 5 m ³ /pulse		9	N O G

Flow Measurement

SITRANS FS (ultrasonic)

Inline ultrasonic flowmeters / SITRANS FUE380 flowmeter with CT approval

Selection and ordering data (continued)

Flowmeter SITRANS FUE380 (type-approved)	Article No. 7ME3410-	Order code
• 10 m ³ /pulse	9	N 0 H
• 25 m ³ /pulse	9	N 0 J
• 50 m ³ /pulse	9	N 0 K
• 100 m ³ /pulse	9	N 0 L
• 250 m ³ /pulse	9	N 0 M
• 500 m ³ /pulse	9	N 0 N
• 1000 m ³ /pulse	9	N 0 P
Flowmeter SITRANS FUE080 power/analog output		
115 ... 230 V AC		B
3.6 V Lithium battery, dual pack is included		D
115 ... 230 V AC, backup 3.6 V DC Lithium battery, single pack is included		E
3.6 V battery version (no battery pack included)		G
Option with 4 ... 20 mA analog output module		
• 115 ... 230 V AC		R
• 115 ... 230 V AC, backup 3.6 V DC, Lithium battery, single pack is included		U
Note: Lithium batteries are subject to special transportation regulations according to United Nations "Regulation of Dangerous Goods, UN 3090 and UN 3091". Special transport documentation is required to observe these regulations. This may influence both transport time and costs.		
Country specific design		
Neutral, no approval mark		A
China, PA 2008-T222 C		C
Russia, EN 1434/OIML R75 M		M
MID-Approval (MI004), Language on name plate English		R
MID-Approval (MI004), Language on name plate German		S
MID-Approval (MI004), Language on name plate Polish		T
MID-Approval (MI004), Language on name plate French		U
Pulse width setup		
Pulse width		
5 ms (standard)		2
10 ms		3
20 ms		4
50 ms		5
100 ms		6
200 ms		7
500 ms		8

	Order code
Additional information Please add "-Z" to Article No. and specify Order code(s) and plain text.	
Calibration/certificate FUS380	
Production calibration for DN 50 ... 1200 with Q _n as selected in diameter. Incl. Calibration protocol: 2 × 3 points, Q _i , 10 % Q _p and Q _p (max. 8000 m ³ /h).	Included
Accredited Siemens ISO/IEC 17025 calibration for DN 50 ... 200 with Q _n as selected in diameter. Certificate: 2 × 5 points, Q _i , 5 %, 10 %, 50 % and 100 % of Q _p (max. 630 m ³ /h).	D20
Accredited Siemens ISO/IEC 17025 calibration for DN 250 ... 600 with Q _n as selected in diameter. Certificate: 2 × 5 points, 5 %, 10 %, 50 % and 100 % of Q _p (max. 2800 m ³ /h).	D21
Accredited Siemens ISO/IEC 17025 calibration, DN 500 ... 1200 with Q _n as selected in diameter. Certificate: 2 × 5 points, Q _i , 5 %, 10 %, 50 % and 100 % of Q _p (max. 8000 m ³ /h).	D22
Output B as reverse flow pulses. No calibration/verification of this function.	E21

Selection and ordering data (continued)

	Order code
Material certificate	
EN 10204-3.1 (pipe material)	C12
Tag name plate	
Stainless steel TAG plate (1 × 24 × 80 mm), wire fixed. Font size depends on text length: 8 mm for 1 ... 10 characters, 4 mm for 11 ... 20 characters (specify in plain text).	Y17

Please use online Product selector to get latest updates:

<http://www.pia-portal.automation.siemens.com>

Flowmeter SITRANS FUE380 operating instructions, accessories and spare parts

Operating instructions

Description	Article No.
• English	A5E00730100
• German	A5E00740611

All literature is available to download for free, in a range of languages, at <http://www.siemens.com/processinstrumentation/documentation>
For accessories and spare parts see the section about FUS080/FUE080.

Flow Measurement

SITRANS FS (ultrasonic)

Inline ultrasonic flowmeters / SITRANS FUE380 flowmeter with CT approval

Technical specifications

SITRANS FUE380	
Pipe design	2-path sensor with flanges and inline transducers wet-calibrated from factory
Nominal size welded version (DN 50 ... 80 in bronze)	DN 50, 65, 80, 100, 125, 150, 200, 250, 300, 350, 400, 500, 600, 700, 800, 900, 1000, 1200
Pressure rate	PN 16, PN 25, PN 40 EN 1092-1 EN 1092-1 flanges: <ul style="list-style-type: none"> • type 01 (B): DN 100 ... 125 • type 11 (B): DN 150 ... 200 • type 11 (B) 'design': DN 50 ... 80
Pipe material	<ul style="list-style-type: none"> • DN 100 ... 1200: Carbon Steel EN 1.0345/P235 GH, painted in light-gray. • DN 50 ... 80: Die-cast bronze G-CuSn10/W2.1050.01 (EN1982)
Transducer design	<ul style="list-style-type: none"> • DN 100 ... 1200: Inline version and welded onto the pipe • DN 50 ... 80: Screwed into the pipe
Transducer material	Stainless steel (AISI 316/1.4404)/brass (CuZn ₃₆ Pb ₂ As)
Sensor operating conditions	
Ambient temperature	
• Operation	-10 ... +60 °C (14 ... 140 °F) (MID version: -10 ... +55 °C (14 ... 131 °F))
• Storage	-40 ... +85 °C (-40 ... +185 °F)
Measured media	Heating water, according to VDI-2035 (pH 8.2 - 10.5), industrial VdTUV information sheet 1466 and AGFW information sheet FW 510.
Media/surface temperature	DN 100 ... 1200: <ul style="list-style-type: none"> • Remote: 2 ... 200 °C (35.6 ... 392 °F) MID: min. +15 °C/+59 °F DN 50 ... 80: <ul style="list-style-type: none"> • Remote: 2 ... 150 °C (35.6 ... 302 °F) MID: min. +15 °C/+59 °F DN 50 ... 1200: <ul style="list-style-type: none"> • Compact: 2 ... 120 °C (35.6 ... 248 °F) MID: min. +15 °C/+59 °F
Degree of protection	Sensor connection IP67/NEMA 4X/6
Electromagnetic compatibility	
• Emitted interference	To EN 55011/CISPR-11
• Noise immunity	To EN/IEC 61326-1 (Industry)
• MID	Environment class E2 and M1
Max. flow velocity at Q _s	DN 50 ... 1200: 9 m/s (29.5 ft/s)
Transmitter	
The transmitter related to this system is the SITRANS FUS080. For more details see Technical specifications to the FUS080.	
Sensor cable	
Transducer cable length	Pre-mounted with short coax-cables
Sensor Ink cable length (SSL)	5, 10, 20, 30 m (16.4, 32.8, 65.6, 98.4 ft)
Certificates and approvals	
Conformity certificate (CE)	The devices are supplied as standard with a Siemens Certificate of Conformity on DVD.
Material certificate	Material certificate according EN 10204-3.1 is optionally available.
Calibration report	A standard calibration report is shipped with every flowmeter. Extended accredited ISO/IEC 17025 calibration certificates optionally available
Approvals	<ul style="list-style-type: none"> • Approval standards: N 1434 and OIML R 75 Class 2 • Type approval: ID, MI-004, class 2 approval and certification (according to EN 434) • CPA/CMC (China)

Technical specifications (continued)

The sensors are approved according to EU directive 2014/68/EU regarding fluid group 1, classified in category III. Design according to EN 13480 (PED Directive).

Type-dependent settings

Flow value	Predefined according to EN 1434/OIML R 75/MID
Approval	Country specific
Flow rate v _f	0.02 ... 9 m/s (0.065 ... 29.5 ft/s)
Output A	Preset: Forward pulses
Output B	Preset: Alarm
Pulse value A & B (depending on DN value)	Preset: See scheme – previous page Preset for SITRANS FUE950 or free selectable, depending on flow rate (Q _s)
Pulse width	Preset: 5 ms
Flow unit setup	Preset: m ³ /h
Volume unit setup	Preset: m ³

Flowmeter Calibration and traceability

To ensure continuous accurate measurement, flowmeters must be calibrated. The calibration is conducted at Siemens flow facilities with traceable instruments referring directly to the physical unit of measurement according to the International System of Units (SI).

Therefore, the calibration certificate ensures recognition of the test results worldwide, including the US (NIST traceability). Siemens offers accredited calibrations assured to ISO 7025 in the flow range from 0.0001 m³/h to 10 000 m³/h. Siemens Flow Instruments accredited laboratories are recognized by ILAC MRA (International Laboratory Accreditation Corporation - Mutual Recognition Arrangement) ensuring international traceability and recognition of the test results worldwide.

A standard calibration certificate with Q_n as selected flow is shipped with each SITRANS FUE380. This production calibration protocol consists of 2 x 3 points at Q_i, 10% Q_p and Q_p (max. 4 200 m³/h).

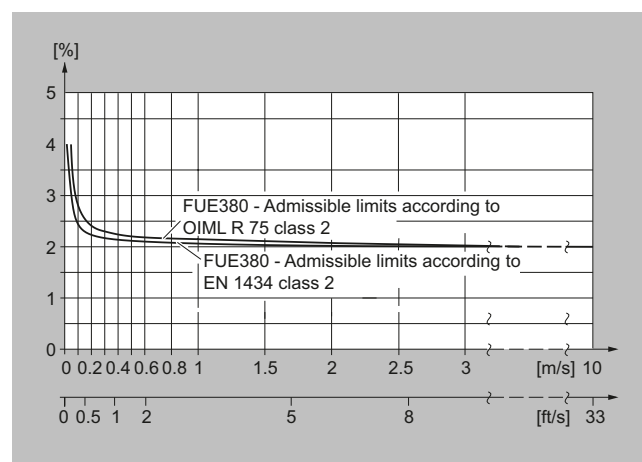
Typical accuracy SITRANS FUE380:

$$\pm (0.5 + 0.02 Q_p/Q) [\%]$$

Q_p according to EN 1434/OIML requirements.

Example: DN 100, Q_p = 60 m³/h at Q = 1.2 m³/h:

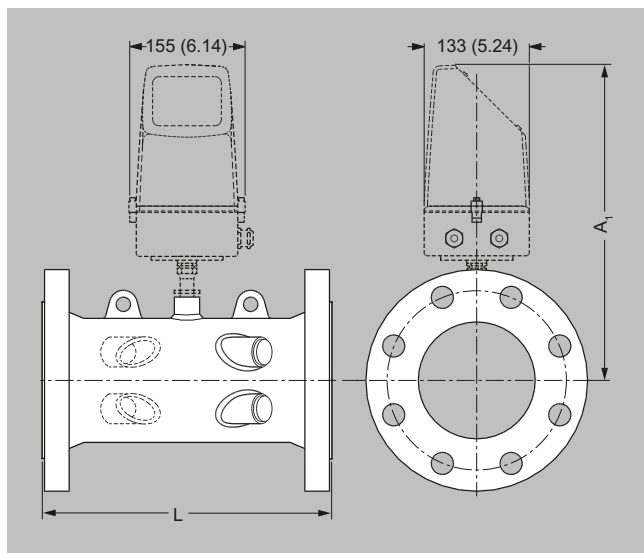
Accuracy at 1.2 m³/h = typical 1.5 %



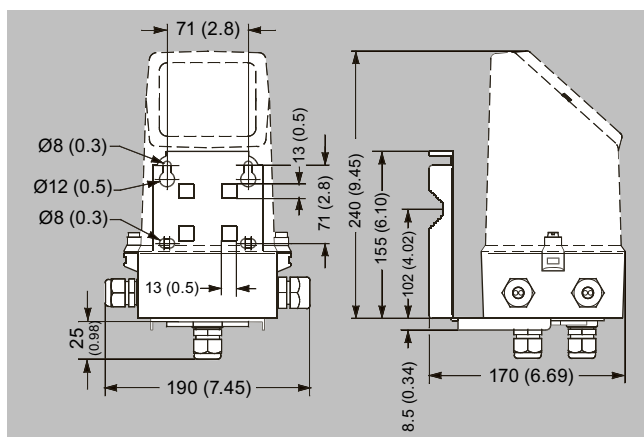
SITRANS FUE380 fulfils the requirements $E_f = \pm (2 + 0.02 Q_p/Q_i)$ max. $\pm 5\%$, according to EN 1434 and OIML R 75, class 2 or MID requirements.

Dimensional drawings

Flowmeter SITRANS FUS380 and FUE380



Transmitter IP67/NEMA 4X/6, wall mounting



Dimensions in mm (inch)

Sensor dimensions for FUS380 and FUE380

Size	PN 16		PN 25		PN 40		A1	Lift hug
	L	Weight	L	Weight	L	Weight		
DN	mm	kg	mm	kg	mm	kg	mm	
50	-	-	-	-	300 +0/-2	10	350	No
65	-	-	-	-	300 +0/-2	15	363	No
80	-	-	-	-	350 +0/-2	18	370	No
100	350 +0/-2	15	-	-	350 +0/-2	18	372	No
125	350 +0/-2	18	-	-	350 +0/-2	24	385	No
150	500 +0/-3	28	-	-	500 +0/-3	34	399	No
200	500 +0/-3	38	500 +0/-3	47	500 +0/-3	55	425	Yes
250	600 +0/-3	60	600 +0/-3	76	600 +0/-3	91	452	Yes
300	500 +0/-3	66	500 +0/-3	81	-	-	478	Yes
350	550 +0/-3	94	550 +0/-3	121	-	-	495	Yes
400	600 +0/-3	124	600 +0/-3	153	-	-	520	Yes

Flow Measurement

SITRANS FS (ultrasonic)

Inline ultrasonic flowmeters / SITRANS FUE380 flowmeter with CT approval

Dimensional drawings (continued)

Size	PN 16		PN 25		PN 40			
500	625 +0/-3	194	625 +0/-3	231	-	-	570	Yes
600	750 +0/-3	303	750 +0/-3	365	-	-	622	Yes
700	875 +0/-3	361	875 +0/-3	553	-	-	673	Yes
800	1000 +0/-3	494	1000 +0/-3	770	-	-	724	Yes
900	1230 +0/-6	535	1300 +0/-6	835	-	-	775	Yes
1000	1300 +0/-6	594	1370 +0/-6	1000	-	-	826	Yes
1200	1360 +0/-6	732	-	-	-	-	928	Yes

Notes:

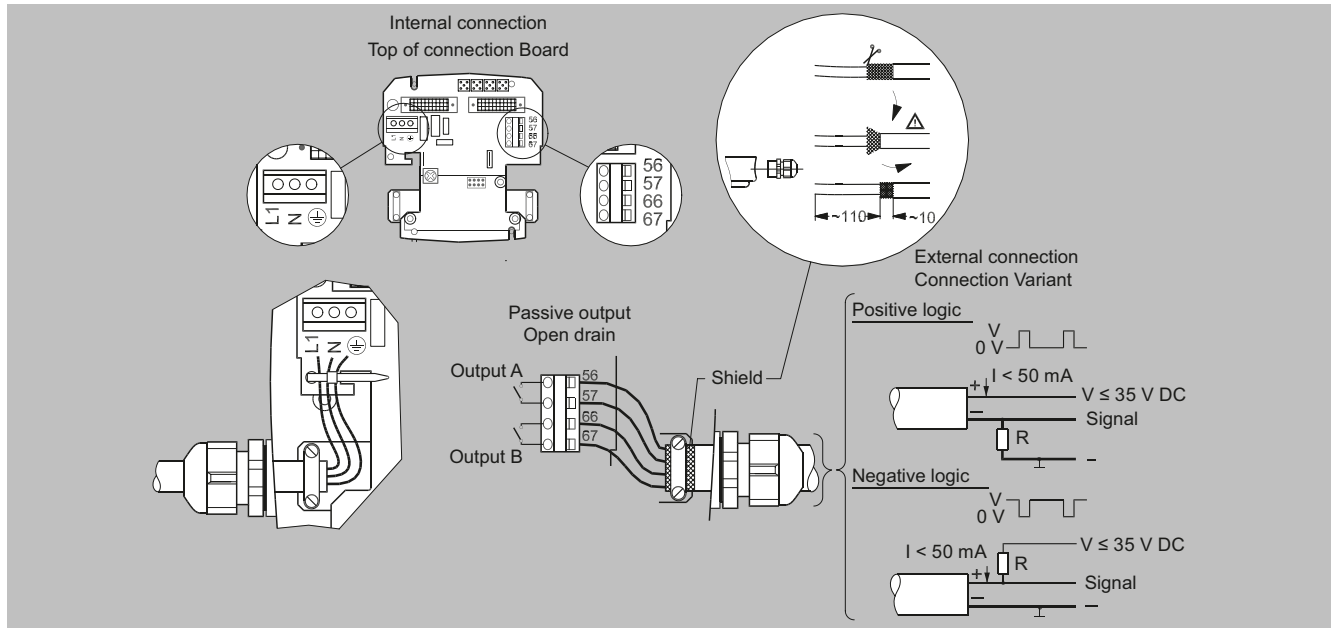
- Weight for transmitter/electronics 1.5 kg (compact version) or approximately 3 kg (remote version including 10 m cable set)
- All weights are **approximate**
- For flange values - see norm EN 1092-1

Size	PN 16		PN 25		PN 40		A1	Lift hug
	L	Weight	L	Weight	L	Weight		
inch	inch	lb	inch	lb	inch	lb	inch	
2	-	-	-	-	11.81 +0/-0.08	22	13.78	No
2½	-	-	-	-	11.81 +0/-0.08	33	14.30	No
3	-	-	-	-	13.78 +0/-0.08	40	14.57	No
4	13.78 +0/-0.08	33	-	-	13.78 +0/-0.08	40	14.65	No
5	13.78 +0/-0.08	40	-	-	13.78 +0/-0.08	53	15.16	No
6	19.68 +0/-0.12	62	-	-	19.68 +0/-0.12	75	15.71	No
8	19.68 +0/-0.12	84	19.68 +0/-0.12	104	19.68 +0/-0.12	121	16.74	Yes
10	23.62 +0/-0.12	132	23.62 +0/-0.12	168	23.62 +0/-0.12	201	17.80	Yes
12	19.68 +0/-0.12	146	19.68 +0/-0.12	179	-	-	18.82	Yes
14	21.65 +0/-0.12	207	21.65 +0/-0.12	267	-	-	19.49	Yes
16	23.62 +0/-0.12	273	23.62 +0/-0.12	337	-	-	20.48	Yes
20	24.61 +0/-0.12	428	24.61 +0/-0.12	509	-	-	22.45	Yes
24	29.53 +0/-0.12	668	29.53 +0/-0.12	805	-	-	24.49	Yes
28	34.45 +0/-0.12	796	34.45 +0/-0.12	1246	-	-	26.50	Yes
32	39.37 +0/-0.12	1089	39.37 +0/-0.12	1698	-	-	28.51	Yes
36	48.43 +0/-0.24	1179	51.18 +0/-0.24	1841	-	-	30.52	Yes
40	51.18 +0/-0.24	1310	53.94 +0/-0.24	2205	-	-	32.52	Yes
48	53.34 +0/-0.24	1614	-	-	-	-	36.54	Yes

Notes:

- Weight for transmitter/electronics 3.3 lb (compact version) or approximately 6.6 lb (remote version including 32.8 ft cable set)
- All weights are **approximate**
- For flange values - see norm EN 1092-1

Circuit diagrams



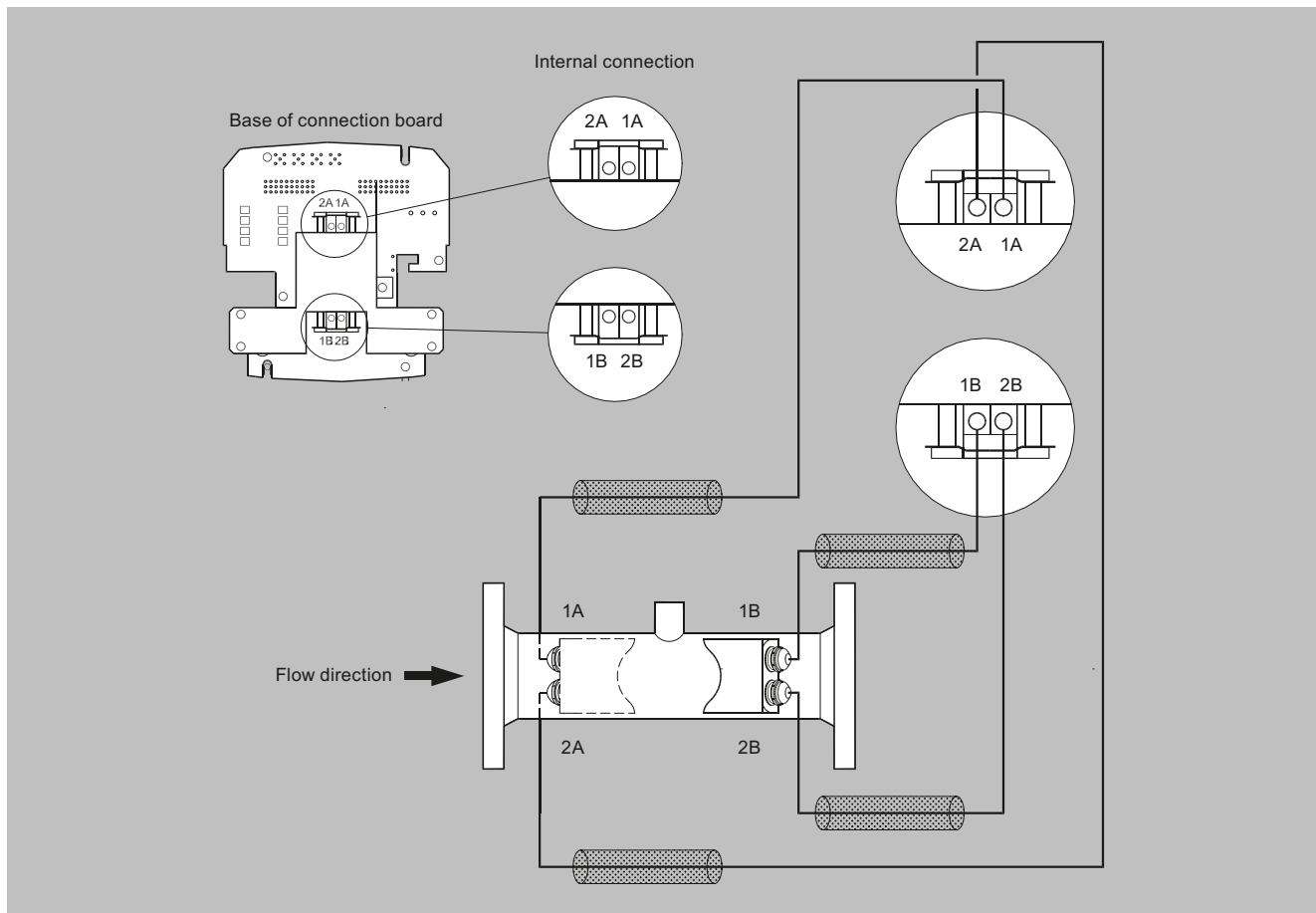
Electrical connection of transmitter SITRANS FUS/FUE380

Flow Measurement

SITRANS FS (ultrasonic)

Inline ultrasonic flowmeters / SITRANS FUE380 flowmeter with CT approval

Circuit diagrams (continued)



Electrical connection of sensor SITRANS FUS/FUE380

Overview



SITRANS FUE950 is a universal thermal energy calculator, which meets the requirements EN 1434 and has the MID and PTB K7.2 approval for energy metering with the media water.

SITRANS FUE950 has been developed for the SITRANS FUS380/FUE380 and alternatively MAG 5000/6000 or FST020. SITRANS FUE950 is modular in construction and can by order be fitted with optional modules depending on the application. The FUE950 supports none of the SITRANS FX, FC products and only some of the FUS clamp-on products.

Benefits

Basic functions

- Prepared for heating, cooling measurement
- Approval for MID for heat metering and PTB K7.2 for cooling
- High-accuracy thermal energy metering, meets EN 1434 requirements
- Measured temperature range -20 ... +190 °C (-4 ... +374 °F)
- Instantaneous values for energy/volume flow
- Battery or mains powered
- Battery version with battery lifetime of typically up to 10 years
- Optical data interface
- Real date and time
- Auto-detection of 2-wire or 4-wire temperature sensors

Additional functions

- Individual tariff functions
- Advanced functions for cooling/heating applications or the combination
- Memory for 24 periods (months, weeks, days)
- Data logger function
- Expandable functionality with 2 optional plug and play add-on modules
- Communication over M-Bus, RS 485 or RS 232

Add-on modules

- Plug-in module with 2 extra pulse inputs
- Plug-in module with 2 pulse outputs
- Plug-in module with combination of input and output pulses
- Plug-in module for M-Bus communication
- Plug-in module for RS 232 or RS 485 communication
- Plug-in module with 2 passive current outputs (4 ... 20 mA)

Flow Measurement

SITRANS FS (ultrasonic)

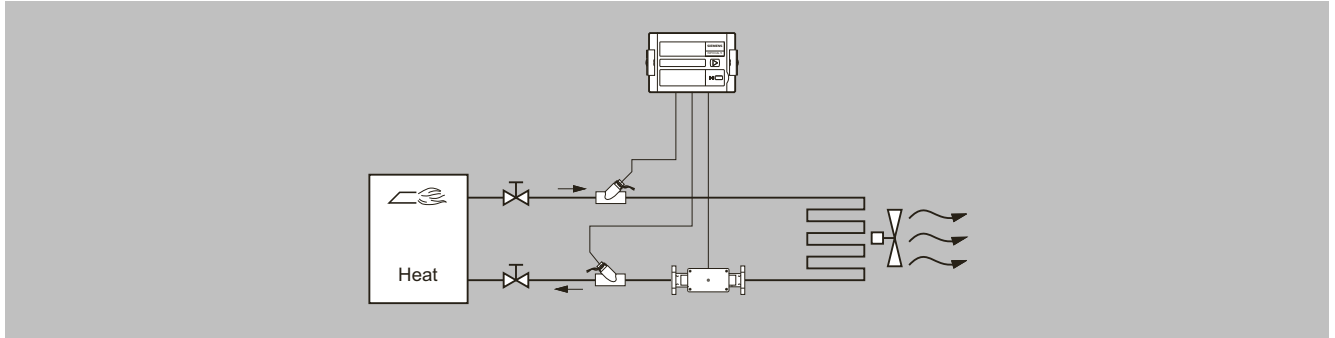
Inline ultrasonic flowmeters / SITRANS FUE950 energy calculator

Application

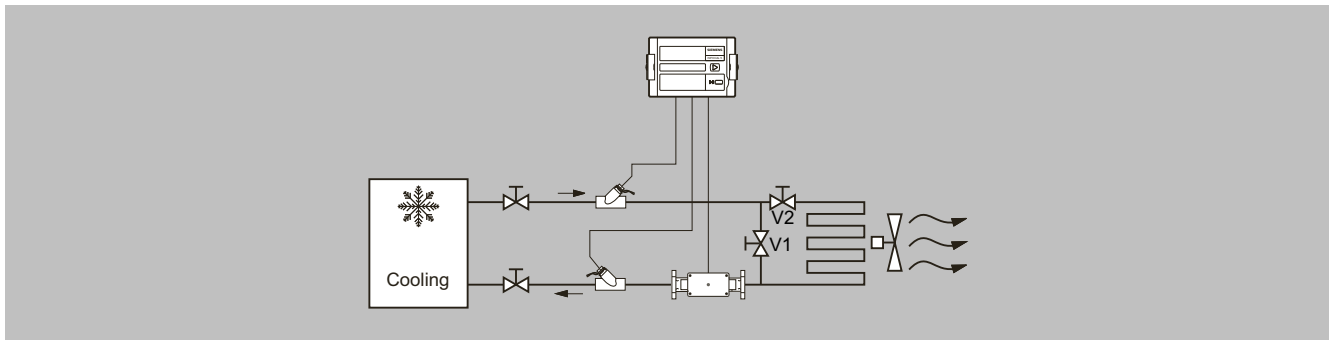
The SITRANS FUE950 is able to handle 3 kinds of applications, means energy calculation in:

- District heating applications
- Chilled water applications
- Combined cooling/heating applications

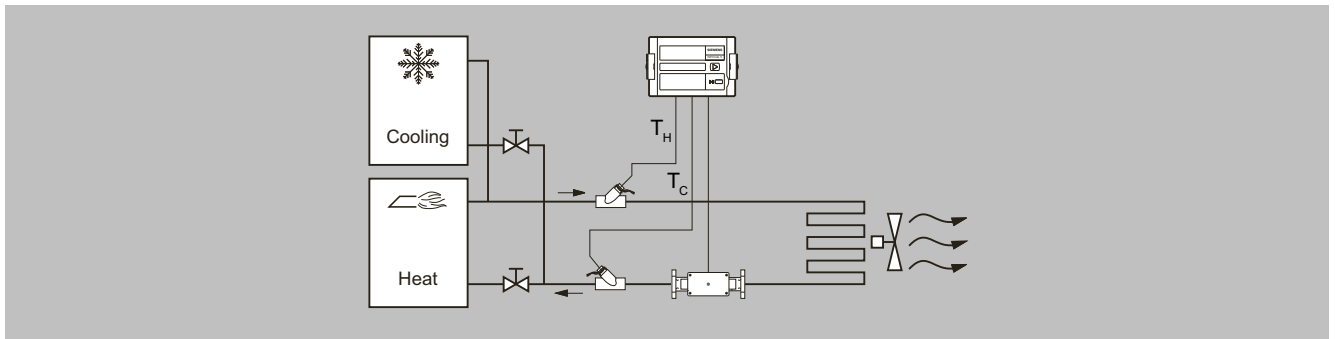
Energy metering in heating, hot water applications (code "A" and "B")



Energy metering in cooling, chilled water applications (code "C" and "D")



Energy metering in combined cooling/heating applications (code "E" and "F")



Design

SITRANS FUE950 has an easy-read 8-digit LCD display with associated pictograms for the various functions. As the display has been made for several applications, some figures/symbols not used for normal district heating applications will be shown.

SITRANS FUE950 has a push button for simple operation and provides user-friendly control via the various display menu loops. The display will always be configured for the application chosen, and for the selected display settings.

The integrator has an IP54 plastic housing and is designed for wall or panel mounting. The housing comes with prepared rubber gaskets cable entries for fast and easy installation.

Operation menu loop structure

The FUE950 display has six menu loops and the menus are numbered in the display from 1 to 6. Some display menus consist of two values (to maximum seven) that are shown alternately at 4-second intervals.

The main menu loop no. 1 with the current data, e.g. for energy, volume, flow rate and temperature, is preprogrammed as default setting.

In the combined heating/cooling configuration the menu loop no. 5 (tariff menu loop) will be activated additionally.

Displays and output pulses

Units: MWh, GJ, Gcal, MBtu, m³, gal, m³/h, GPM, °C, °F and kW; all decimal points are statically (the unit "gal" is shown with factor x 100).

The display unit and the last fractional digit are typical used for the pulse outputs.

Flow Measurement

SITRANS FS (ultrasonic)

Inline ultrasonic flowmeters / SITRANS FUE950 energy calculator

Function

Technical principle

Calculation of energy is based on the following formula:

$$\text{Energy} = \text{Volume} \times (T_{\text{Hot}} - T_{\text{Cold}}) \times K_{\text{factor}} (T_i)$$

Volume: Volume [m³] of a given amount of volume pulses

T_{Hot}: Measured temperature in the hot line

T_{Cold}: Measured temperature in the cold line

K_{factor} (T_i): Thermal coefficient of media enthalpy and heat content

The energy calculation is made by a counter and depends on temperature difference, pulse input frequency and legal requirements.

The calculator always carries out at least one energy calculation every 2 seconds. If the connected flowmeter has not sent enough pulses the energy calculation and flow indication is also based on the 8 seconds value.

Data memory

The FUE950 has a history memory of 24 periods (months, weeks, days). The following values are stored monthly, weekly or daily in the EEPROM on the programmed day of 1...31 (via software tool).

Values	
• Date/Time	• Volume
• Energy	• Error day counter
• Tariff energy 1	• Maximum monthly flow rate
• Tariff energy 2	• Maximum monthly power
• Tariff definition 1	• Date of maximum monthly flow rate
• Tariff definition 2	• Date of maximum monthly power
• Pulse counter input 1	• Pulse counter input 2
• Operation hours	

Data logger memory (LOG)

The LOG of the calculator is stored every 24 hours with all cumulative values in the EEPROM. The storage frequency can be selected from various storage intervals (5, 6, 10, 12, 15, 20, 30, 60 minutes or the default setting of 24 hours). The data which are stored in the LOG could be read out using a software tool and can be used for evaluations.

Extract of possible LOG settings

Storage interval	Values	Number of data records	Recording period
5 minutes	• Error status	440	36.6 hours
15 minutes	• Overload time temperature	440	110 hours
1 hour	• Overload time flow rate	440	18.3 days
24 hours (default setting)	• Forward temperature • Return temperature • Date and time • Energy • Tariff energy 1 • Tariff energy 2 • Tariff definition 1 • Tariff definition 2 • Volume • Error day counter	440	440 days

Maximal Values

The integrator creates max. values for power and flow rate based on consumption time, which are stored in the EEPROM. The integration intervals are adjustable to 6, 15, 30 or 60 minutes and 24 h. Default setting is 60 minutes.

Tariff/Accounting date function

The calculator includes two independent memories in which the accumulated energy at two programmable tariff dates are stored.

- Last accounting date
- Last but one accounting date

Values stored

- Energy
- Volume

Function (continued)

- Tariff counter 1
- Tariff counter 2
- Pulse counter 1
- Pulse counter 2
- Date

The integrator offers two optional tariff memories for monitoring plant load states. Here it concerns threshold value tariffs. Extensive tariff conditions make it possible to adapt the calculator individually to the required customer-specific applications.

Both tariffs are separately configurable and independent from each other. Energy or time can be measured alternatively per tariff register dependent on the tariff mode adjusted in each case.

With the "time triggered tariff function" the switch-on time and the switch-off time are adjustable independent from each other for each day of the week in steps of 15 minutes.

The following tariff limit types of the tariff are possible:
(This example applies to the display at 3 fractional digits after comma)

Type	Description	Limit	Limit resolution
dT	Temperature difference	1 ... 190 °C	1 °C
-dT	Negative temperature difference	1 ... 190 °C	1 °C
TR	Return temperature (low)	1 ... 190 °C	1 °C
TV	Forward temperature (high)	1 ... 190 °C	1 °C
P	Power	10 ... 2500 kW	10 kW
Q	Flow	1 ... 255 m ³ /h	1 m ³ /h
FE	"Theoretically forward energy" with return temperature of 0 °C		
Z	"Time triggered" counting energy		
E	"External" counting energy		

Error handling and memory

Events such as changes and faults are stored in a non-volatile memory with a capacity of up to 127 entries. The following events are recorded:

- Checksum error
- Temperature measurement error
- Error hours
- Start and end of test mode

If SITRANS FUE950 records an error, this will be automatically indicated by a "alarm symbol" on the display.

To protect the reading data, all the relevant data are saved in a non-volatile memory (EEPROM). This memory saves the measured values, device parameters and types of error at regular intervals.

The following events are recorded:

- Temperature sensor error
- Swapped hot and cold temperature sensors
- Battery low warning
- Power supply failure
- Optical communication warning
- RAM checksum error

Outputs/Inputs/CommunicationCommunication interfaces:

SITRANS FUE950 is fitted with an optical infra-red send/receive port in accordance with EN 1434/IEC 61107, protocol standard, EN 1434/EN 60870-3 (M-Bus protocol).

A specific optical head with a permanent magnet (IrDA-adapter) in accordance with EN 1434 can be used for readout data or communication with the parameterization software.

2 ports for optionally plug-in modules

The calculator features 2 ports for the plug-in modules.

One slot is for the function modules and the other for the communication modules.

Flow Measurement

SITRANS FS (ultrasonic)

Inline ultrasonic flowmeters / SITRANS FUE950 energy calculator

Function (continued)

Communication modules

The following communication modules are available as options: RS 232 module, RS 485 module and M-Bus module. The RS 232 and RS 485 communication modules are serial interfaces and permit data exchange with the calculator. For this purpose a special data cable is necessary.

The M-Bus module is a serial interface for communication with external devices (M-Bus Master/Centre). According to the M-Bus structure a number of calculators can be connected to a control centre.

Pulse input module

Two pulse inputs are available. The pulse value and the unit is configurable for energy, water, gas or electrical meter by parameterization software. Data are separate cumulated in different registers and are also stored on the two accounting day's (Tariff registers).

Combined pulse Input/Output module

Two pulse inputs combined with one pulse output are available on one module. The pulse inputs are configurable with value and the unit by parameterization software.

The pulse output is also programmable using the parameterization software.

Pulse output

The calculator provides levels for two optional external pulse outputs, which can be freely programmed using the parameterization software tool.

Default setting is one pulse which occurs per change in the least significant digit in the display with the unit and resolution selected by the device ordering.

Possible pulse output values

- Energy (default setting)
- Volume (default setting)
- Tariff energy 1
- Tariff energy 2
- Tariff condition 1, limit switch
- Tariff condition 2, limit switch
- Energy error
- Volume error
- Volume with specific resolution (0.1, 1.0, 10 or 100)
- Energy with specific resolution (0.1, 1.0, 10 or 100)

Combined current output module

Optional module with 2 passive 4 ... 20 mA outputs.

Possible output values:

- Power (default setting for output #1)
- Flow (default setting for output #2)
- Hot, cold or difference temperature

The settings can be configured by parameterization software. The current output module occupies both ports, means no other plug-in module will possible to plug in.

Module combinations

The calculator has a group of extension modules for communication and another group of extension modules for additional functionality. These modules are available first selected within the calculator, or for retrofitting in the field.

One single function module as well as one single communication module out of following modules is selectable.

Function modules:

- Pulse input module, 2 inputs
- Pulse output module, 2 outputs
- Combined pulse module 2 inputs, 1 output
- Combined current output module, 2 x passive 4 ... 20 mA (occupies both ports)

Communication modules:

- M-Bus (M-Bus protocol according EN 1434-3)
- RS 232 (M-Bus protocol according EN 1434-3)

Function (continued)

- RS 485 (M-Bus protocol according to EN 1434-3)

Integration

SITRANS FUE950 is a multi-purpose energy calculator for media water which meets the requirements of EN 1434. Further, the energy calculator has been specially developed to process volume pulses from SITRANS FUS380/FUE380 or alternatively MAG 5000/6000 or FST020 transmitter.

Selection and ordering data

Energy calculator SITRANS FUE950, MID or PTB K7.2 custody transfer approved			Article No. 7ME3480-		Order code	
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.			●	●	●	●
Flow input setting (IN0) The pulse input value selection must be the same as the pulse output setting of the selected flowmeter. To get optimal function and performance the pulse value must be selected as low as possible according to the maximum flow rate. The following calculation formula can be used for determining the lowest pulse value at a pulse length of 5 ms: $L/pulse > Q_{max} (m^3/h)/360$. For example $Q_{max} = 300 m^3/h$; $L/pulse > 300/360$; $L/pulse > 0.83$; therefore the pulse value must be 1 l/pulse.						
Pulse input in l/pulse or in gal/pulse (with option L05)	Flow limit Q_{max} in m^3/h	Flow limit Q_{max} in GPM¹⁾ (with option L05)				
1	360	6000	2	A		
2.5	900	15000	2	B		
5	1800	30000	2	C		
10	3600	60000	3	A		
25	9000	150000	3	B		
50	18000	300000	3	C		
100	36000	600000	4	A		
250	90000	-	4	B		
500	180000	-	4	C		
1000	360000	-	5	A		
¹⁾ GPM = Gallons per minute						
Calculator application/Flowmeter installation place						
For heating, flowmeter in return pipe (cold pipe), typical standard				A		
For heating, flowmeter in forward pipe (hot pipe)				B		
For cooling, media water, flowmeter in forward pipe (cold pipe)				C		
For cooling, media water, flowmeter in return pipe (hot pipe)				D		
For combined cooling/heating, flowmeter in forward pipe (hot pipe as heating) (MID conformity declaration for heating)				E		
For combined cooling/heating, flowmeter in return pipe (cold pipe as heating) (MID conformity declaration for heating)				F		
Temperature sensor type						
Pt500 setup, no sensor pair included (standard)				0		
Pt500 setup and Pt500 sensor pair (6/140 mm), 4-wire with 5 m connection cable, 6 mm sensor diameter and 140 mm sensor length. MID approved DE-06-MI004-PTB011, PTB approved 22.77/09.01, incl. factory test report (mentioned approvals are only valid if temp. sensors are used with the applicable temperature sensor pockets)				3		
Pt500 setup and Pt500 sensor pair (6/230 mm), 4-wire with 5 m connection cable, 6 mm sensor diameter and 230 mm sensor length. MID approved DE-06-MI004-PTB011, PTB approved 22.77/09.01, incl. factory test report (mentioned approvals are only valid if temp. sensors are used with the applicable temperature sensor pockets)				4		
Pt100 setup, no sensor pair included				5		
Pt 500 setup and PT500 sensor pair (6/50 mm), 2-wire type incl. 5 m cable, 6 mm sensor diameter and 50 mm length, with MID approval (only for use with the applicable temperature sensor pockets)				6		
Pt 500 setup and PT500 sensor pair (6/50 mm), 2-wire type incl. 10 m cable, 6 mm sensor diameter and 50 mm length, with MID approval (only for use with the applicable temperature sensor pockets)				7		
Temperature sensor pocket sets for 6 mm sensor diameter						
No pockets (standard)				0		
Brass pockets for 6 mm 2-wire sensors, length 82/92 mm, G½ inch, max. PN 16 (2 pcs.)				2		

Flow Measurement

SITRANS FS (ultrasonic)

Inline ultrasonic flowmeters / SITRANS FUE950 energy calculator

Selection and ordering data (continued)

Energy calculator SITRANS FUE950, MID or PTB K7.2 custody transfer approved	Article No. 7ME3480-	Order code
Stainless steel pocket, 120/135 mm length for 6 mm sensor diameter, max. PN 40 and max. 5 m/s (2 pcs. for 140 mm 4-wire sensors above)	5	
Stainless steel pockets for 6 mm 2-wire sensors, length 117/127 mm, G½ inch, max. PN 25 (2 pcs.)	6	
Stainless steel pocket, 210/225 mm length for 6 mm sensor diameter, max. PN 40 and max 5 m/s (2 pcs. for 230 mm 4-wire sensors above)	7	
Stainless steel pockets for 6 mm 2-wire sensors, length 155/168 mm, G½ inch, max. PN 25 (2 pcs.)	8	
Voltage supply		
Battery 3.6 V DC (Lithium D-cell type) (standard)		1
Mains power module for 230 V AC supply (incl. back-up battery)		2
Mains power module for 24 V AC supply (incl. back-up battery)		3
No power supply module (power supply ordering separate)		4
Option modules		
No module (standard)		A
1 module (communication module)		
M-Bus module		B
RS 232 module (M-Bus protocol)		C
RS 485 module (M-Bus protocol)		D
1 module (function module)		
Pulse output, 2× output (Out1 "Energy" and Out2 "Volume")		E
Pulse input, 2× input (In1 and In2)		F
Pulse out-/input combination, 2× input and 1× output		G
Combination of 2 modules (communication and function module)		
M-Bus module and Pulse output, 2× output (Out1 "Energy" and Out2 "Volume")		H
M-Bus module and Pulse input, 2× input (In1 and In2)		J
M-Bus module and Pulse out-/input combination, 2× input and 1× output		K
RS 232 module (M-Bus) and Pulse output, 2× output (Out1 "Energy" and Out2 "Volume")		L
RS 232 module (M-Bus) and Pulse input, 2× input (In1 and In2)		M
RS 232 module (M-Bus) and Pulse out-/input combination, 2× input and 1× output		N
RS 485 module (M-Bus) and Pulse output, 2× output (Out1 "Energy" and Out2 "Volume")		P
RS 485 module (M-Bus) and Pulse input, 2× input (In1 and In2)		Q
RS 485 module (M-Bus) and Pulse out-/input combination, 2× input and 1× output		R
Combination current output module, 2× passive 4 ... 20 mA (Out 1 "Power", Out 2 "Flow") (occupies both module Ports 1 and 2)		S
Display units and resolutions		
MWh & kW, m³, m³/h in 2 digit resolution; Temperature: no decimal figures		C
MWh & kW, m³, m³/h in 1 digit resolution; Temperature: no decimal figures		D
MWh & kW, m³, m³/h in 0 digit resolution; Temperature: no decimal figures		E
GJ & kW, m³, m³/h in 2 digit resolution; Temperature: no decimal figures		H
GJ & kW, m³, m³/h in 1 digit resolution; Temperature: no decimal figures		J
GJ & kW, m³, m³/h in 0 digit resolution; Temperature: no decimal figures		K
Gcal & kW, m³, m³/h in 2 digit resolution; Temperature: no decimal figures		M
Gcal & kW, m³, m³/h in 1 digit resolution; Temperature: no decimal figures		N
Gcal & kW, m³, m³/h in 0 digit resolution; Temperature: no decimal figures		P
MBTU & MBTU/h, m³, m³/h in 2 digit resolution; Temperature: no decimal figures		Q
MBTU & MBTU/h, m³, m³/h in 1 digit resolution; Temperature: no decimal figures		R
MBTU & MBTU/h, m³, m³/h in 0 digit resolution; Temperature: no decimal figures		S
Verification/Approval		
Without type approval mark, neutral label (standard)		0
With MID type approval mark (only for heating combinations, selection "A, B, E and F")		1
With MID approval mark and first MID verification (only for heating, selection A, B, E and F")		2
Cooling approval mark, German national cooling approval according PTB-TR-K7.2 (only for cooling and media water, selection "C and D")		7
Cooling approval mark, German national cooling approval according PTB-TR-K7.2 and first verification (only for cooling and media water, selection "C and D")		8
Further designs		
Please add "-Z" to Article No. and specify Order code		
Certificate		
Including factory test report (certificate) of FUE950	Always included	

Selection and ordering data (continued)

Energy calculator SITRANS FUE950, MID or PTB K7.2 custody transfer approved	Article No. 7ME3480-	Order code		
	• • • • • - • • • •	• • • •	• • • •	• • • •
Cooling, setup for non water				
Water/glycol setting for media type "Tyfocor LS (R)" (only with neutral label, no verification and approval)				C 0 2
Optional settings/programming				
Tariff function settings (specify in clear text, up to max. 20 characters)				D 0 2
Pulse output setting of option module (specify in clear text, up to max. 20 characters)				D 0 6
Pulse input setting of option module (specify in clear text, up to max. 20 characters)				D 0 8
Pulse input setting of 4 ... 20 mA option module (please specify 20 mA related type and value in clear text, up to max. 20 characters)				D 1 0
Special display units				
Flow in 'GPM' and Volume in 'gal' (×100) (digits/resolution as selected above, only with 0 digit resolution)				L 0 5
Temperature in deg. F (digit resolution as selected above)				L 3 1

Flowmeter SITRANS FUE950 operating instructions, accessories and spare parts

Operating instructions

Description	Article No.
• English	A5E003424739

This device is shipped with Safety Notes and a DVD containing further SITRANS F US literature.

All literature is available to download for free, in a range of languages, at <http://www.siemens.com/processinstrumentation/documentation>

Accessories

Description	Article No.
Infrared optical head (Bluetooth type) for data acquisition & programming of FUE950	A5E02611768
Bracket for SITRANS FUE950 wall mounting (20 pcs.)	A5E02611769
Cable for data acquisition via RS 232 PC/D-sub 9F/3 wire	A5E02611774

Spare parts

Description	Article No.
Add-on modules for FUE950 (only for 7ME348 versions)	
Pulse input module (2 inputs)	A5E03461432
Pulse output module (2 outputs)	A5E03461436
Combined pulse in-/output module (2 inputs and 1 output)	A5E03461437
RS 232 module (M-Bus protocol)	A5E03461459
RS 485 module (M-Bus protocol)	A5E03461512
M-Bus output module	A5E03461516
Combined current output module, 2 × passive 4 ... 20 mA	A5E03461583
Connection set for option modules (types: Pulse, RS 232/RS 485, M-Bus, mA) (special connection cable with 2 plugs)	A5E03461585
Power supply for FUE950 (only for 7ME348 versions)	
3.6 V D-cell battery for SITRANS FUE950	A5E03461708
230 V AC supply module (incl. internal fuse T50 mA L 250 V and back-up battery) for SITRANS FUE950	A5E03461717
24 V AC supply module for SITRANS FUE950, incl. back-up battery	A5E03461719
Pocket for temperature sensors Pt500 (for related 4-wire Pt500 type only, 1 pc.)	
Stainless steel pocket (1 pc.), 135 mm length for 6 mm sensor diameter, max. PN 40 and max. 5 m/s (recommended for 140 mm sensor length).	A5E03462868
Stainless steel pocket (1 pc.), 225 mm length for 6 mm sensor diameter, max. PN 40 and max. 5 m/s (recommended for 230 mm sensor length).	A5E03462870

Flow Measurement

SITRANS FS (ultrasonic)

Inline ultrasonic flowmeters / SITRANS FUE950 energy calculator

Selection and ordering data (continued)

Description	Article No.
Pt500 4-wire temperature sensor pair (as spare part), with MID MI004 and PTB K7.2 approvals and verification (for related 4-wire sensor pocket types only)	
Pt500 sensor pair (6/140 mm), 4-wire with 5 m connection cable, 6 mm sensor diameter and 140 mm sensor length. MID approved DE-06-MI004-PTB011, PTB approved 22.77/09.01 (mentioned approvals are only valid if temp. sensors are used with the applicable temperature sensor pockets).	A5E03462872
PT500 sensor pair (6/230 mm), 4-wire with 5 m connection cable, 6 mm sensor diameter and 230 mm sensor length. MID approved DE-06-MI004-PTB011, PTB approved 22.77/09.01 (mentioned approvals are only valid if temp. sensors are used with the applicable temperature sensor pockets).	A5E03462878
FUE950 enclosure (only for 7ME348 versions)	
Bottom part of FUE950 enclosure (1 pc.)	A5E03461508
Snap fit for FUE950 enclosure (1 pc.)	A5E03461731
Pocket for Pt500 temperature sensors (for corresponding 2-wire Pt500 types only; 1 pc.)	
Brass pocket 6 mm, G½B × 40 mm (PN 16), 1 pc.	A5E02611778
Brass pocket 6 mm, G½B × 85 mm (PN 16), 1 pc.	A5E02611779
Brass pocket 6 mm, G½B × 120 mm (PN 16), 1 pc.	A5E02611780
Stainless steel 6 mm, G½B × 85 mm (PN 25), 1 pc.	A5E02611781
Stainless steel 6 mm, G½B × 120 mm (PN 25), 1 pc.	A5E02611783
Stainless steel 6 mm, G½B × 155 mm (PN 25), 1 pc.	A5E02611792
Stainless steel 6 mm, G½B × 210 mm (PN 25), 1 pc.	A5E02611793
Pt500 temperature sensor pair, 2-wire cable, 6 mm sensor diameter, with MID/EN-approval (for corresponding 2-wire sensor pocket types only)	
Cable length:	
2 m	A5E02611794
3 m	A5E02611795
5 m	A5E02611796
10 m	A5E02611798

Accessories

Flowmeter SITRANS FUE950 operating instructions, accessories and spare parts**Operating instructions**

Description	Article No.
• English	A5E003424739

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Accessories

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Infrared optical head (Bluetooth type) for data acquisition & programming of FUE950	A5E02611768
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Cable for data acquisition via RS 232 PC/D-sub 9F/3 wire	A5E02611774

Spare parts

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Add-on modules for FUE950 (only for 7ME348 versions)	
Pulse input module (2 inputs)	A5E03461432
Pulse output module (2 outputs)	A5E03461436
Combined pulse in-/output module (2 inputs and 1 output)	A5E03461437
RS232 module (M-Bus protocol)	A5E03461459
RS485 module (M-Bus protocol)	A5E03461512
M-Bus output module	A5E03461516
Combined current output module, 2 x passive 4 ... 20 mA	A5E03461583
Connection set for option modules (types: Pulse, RS 232/RS 485, M-Bus, mA) (special connection cable with 2 plugs)	A5E03461585
Power supply for FUE950 (only for 7ME348 versions)	
3.6 V D-cell battery for SITRANS FUE950	A5E03461708
230 V AC supply module (incl. internal fuse T50 mA L 250 V and back-up battery) for SITRANS FUE950	A5E03461717
24 V AC supply module for SITRANS FUE950, incl. back-up battery	A5E03461719
Pocket for temperature sensors Pt500 (for related 4-wire Pt500 type only, 1 pc.)	
Stainless steel pocket (1 pc.), 135 mm length for 6 mm sensor diameter, max. PN 40 and max. 5 m/s (recommended for 140 mm sensor length).	A5E03462868
Stainless steel pocket (1 pc.), 225 mm length for 6 mm sensor diameter, max. PN 40 and max. 5 m/s (recommended for 230 mm sensor length).	A5E03462870

Accessories (continued)

Description	Article No.
Pt500 4-wire temperature sensor pair (as spare part), with MID MI004 and PTB K7.2 approvals and verification (for related 4-wire sensor pocket types only)	
Pt500 sensor pair (6/140 mm), 4-wire with 5 m connection cable, 6 mm sensor diameter and 140 mm sensor length. MID approved DE-06-MI004-PTB011, PTB approved 22.77/09.01 (mentioned approvals are only valid if temp. sensors are used with the applicable temperature sensor pockets).	A5E03462872
PT500 sensor pair (6/230 mm), 4-wire with 5 m connection cable, 6 mm sensor diameter and 230 mm sensor length. MID approved DE-06-MI004-PTB011, PTB approved 22.77/09.01 (mentioned approvals are only valid if temp. sensors are used with the applicable temperature sensor pockets).	A5E03462878
FUE950 enclosure (only for 7ME348 versions)	
Bottom part of FUE950 enclosure (1 pc.)	A5E03461508
Snap fit for FUE950 enclosure (1 pc.)	A5E03461731
Pocket for Pt500 temperature sensors (for corresponding 2-wire Pt500 types only; 1 pc.)	
Brass pocket 6 mm, G½B x 40 mm (PN 16), 1 pc.	A5E02611778
Brass pocket 6 mm, G½B x 85 mm (PN 16), 1 pc.	A5E02611779
Brass pocket 6 mm, G½B x 120 mm (PN 16), 1 pc.	A5E02611780
Stainless steel 6 mm, G½B x 85 mm (PN 25), 1 pc.	A5E02611781
Stainless steel 6 mm, G½B x 120 mm (PN 25), 1 pc.	A5E02611783
Stainless steel 6 mm, G½B x 155 mm (PN 25), 1 pc.	A5E02611792
Stainless steel 6 mm, G½B x 210 mm (PN 25), 1 pc.	A5E02611793
Pt500 temperature sensor pair, 2-wire cable, 6 mm sensor diameter, with MID/EN-approval (for corresponding 2-wire sensor pocket types only)	
Cable length:	
2 m	A5E02611794
3 m	A5E02611795
5 m	A5E02611796
10 m	A5E02611798

Flow Measurement

SITRANS FS (ultrasonic)

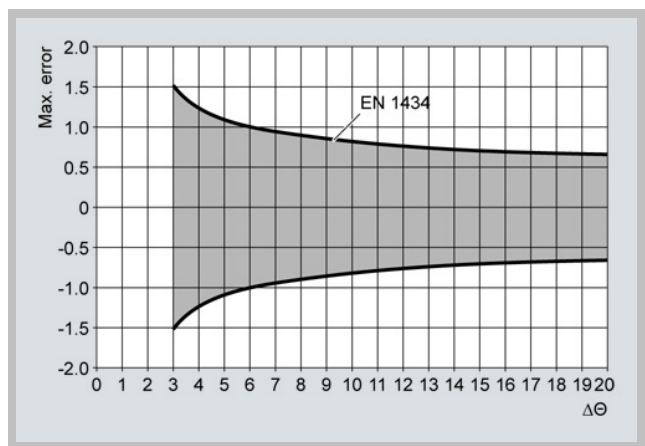
Inline ultrasonic flowmeters / SITRANS FUE950 energy calculator

Technical specifications

SITRANS FUE950	
Approval	MID approved in accordance with energy meter EN 1434 and PTB K7.2 (German national cooling approval)
Approved temperature range	
• Heating	0 ... 180 °C (32 ... 356 °F)
• Cooling	0 ... 105 °C (32 ... 221 °F)
Absolute temperature range	-20 ... +190 °C (-4 ... -374 °F)
Differential temperature	
• Heating	3 ... 177 K (starting at 0.1 K)
• Cooling	3 ... 102 K
Measuring accuracy	Meets requirements of EN 1434 Typically max. $\pm (0.5 + 3 K/\Delta\theta)$ [%] of measured value
Measuring rates	
• Battery type D-cell	Volume: 1 s, temperature: 4 s
• Mains versions	Volume: 1/8 s, temperature: 2 s
Flow range	Depends on pulse input value (IN0), see "Selection and Ordering data"
Power range value	Depends on pulse input value as follows:
Pulste input value (l/P or gal/P)	Max power [kW]
1	15000
2.5	15000
5	15000
10	150000
25	150000
50	150000
100	1500000
250 *)	1500000
500 *)	1500000
1000 *)	15000000

*) not available for gal/pulse

Typical accuracy of FUE950



Typical accuracy of FUE950

User interface (always included)	
Display	8-digit LCD display with associated pictograms/symbols
Units	MWh, GJ, Gcal, MBtu, m ³ /h, GPM, gal, °C, °F, kW, MBtu/h (gal is shown with factor x 100)

Technical specifications (continued)

Typical accuracy of FUE950	
Totalizer value range	99 999 999 or 9 999 999.9 (0 and 1 digit after comma). Display digits: Flow in 6 digits; Volume, power and energy in 8 digits
Values	Power, energy, volume, flow rate, temperatures
Push button	Single push button for the menu controlling
Optical interface IrDA interface	ZVEI optical interface with M-Bus protocol as per EN 1434, connection via separate IrDA-adaptor baud rate: 300 or 2400
Rated operation conditions	
Enclosure	IP54 in accordance with IEC 529
Material	
• Housing	C Lexan 141R (or similar); colors: light gray (top part) and black (bottom part)
• Pipe/wall fitting	PA 6,6 GF25 (or similar)
• Other plastic parts	ABS Cyclocac GPM500 (or similar)
• Gaskets	Neoprene and rubber cable bushings: EPDM 50
• Rubber cable bushings	EPDM 50
Temperature	
• Ambient	5 ... 55 °C (41 ... 131 °F)
• Storage	-25 ... +70 °C (-13 ... +158 °F) Relative ambient humidity < 93 %
Environment class	
• Mechanic class	M1/M2
• Electromagnetic class	E1/E2 (MID) or C (DIN EN 1434)
Temperature input (always included)	
Function	The temperature sensors must be connected to terminals 1-5 and 6-2 (T _H) and 3-7 and 8-4 (T _C) depending on cable type (2-wire or 4-wire).
Temperature range	-20 ... 190 °C (-4 ... 374 °F) for T _H and T _C
Absolute measuring range	
Temperature difference	Start 0.1 K, min. 3 K, max. 177 K
Measurement cut-off	0.125 K
Display resolution	T _H and T _C : 0.1 K ΔT : 0.1 K 16-bit digital resolution AD converter
Sensor types	Pt100 or Pt500 as 2-wire or 4-wire; Standard is Pt500. Sensor cable length: up to 10 m (according EN 1434 and MID-type approval).
Sensor connection	4-wire or 2-wire; auto detection of connection version
Flow input (IN0) (always included)	
Function	Used as standard for flow input of the external flowmeter. The input is marked as 10 (+ Flow Pulse), 11 (- Gnd) on the terminal strip. Note: The pulse input value selection must be the same as the pulse output setting of the flowmeter.
Pulse value	1 ... 1000 l/pulse or 1 ... 100 gal/pulse, selection by corresponding order code. Will be shown at the device label
Pulse frequency	≤ 100 Hz (200 Hz) with FUE/FUS380 ≤ 20 Hz
Pulse ON-time	≥ 3 ms
Pulse OFF-time	≥ 2 ms
Type	Active pulse input
Terminal voltage	3.6 V DC (supplied internally by FUE950)
Flowmeter installation place	The flowmeter installation place can be in the hot line or cold line ("forward or return pipe") selected by corresponding order code. The "installation place" will be shown at the device display and nameplate
Connected cable	Max. 10 m (shielded cables are highly recommended)

Technical specifications (continued)

Typical accuracy of FUE950	
Ports for option modules	
Type	The calculator features 2 ports for optional plug-in modules.
Function modules (Port 1 or 2)	<ul style="list-style-type: none"> Pulse input module, 2 inputs (In1, In2) Pulse output module, 2 outputs (Out1, Out2) Combination module of 2 inputs (In1, In2) and 1 output (Out1)
Current output module (Port 1)	2 passive 4 ... 20 mA (#1, #2) (occupies both port 1 and 2)
Communication modules (Port 1 or 2)	M-Bus, RS 232 or RS 485 (M-Bus protocol, according EN 1434-3)
Pulse output	
Function	The module contains connections for 2 pulse outputs, which can be programmed as desired using a software tool. The pulse outputs are marked as standard as O1, 'gnd' and O2, 'gnd' on the terminal strip and Out1 respectively Out2 in the display.
Type	Passive "open collector" pulse output, outputs potential isolated to each other
Pulse value	Last significant digits of the display (unit/pulse), selection by corresponding order code and setting can be read via display menu, settings changeable via software tool
Pulse output 1	
• Pulse frequency	≤ 4 Hz
• Pulse width	125 ms ± 10 %
• Pulse duration	125 ms ± 10 %
• Pulse break	≥ 125 ms -10 %
Pulse output 2	
• Pulse frequency	≤ 100 Hz, depending on the selected pulse length
• Ratio	Pulse duration/pulse break ~ 1:1
Pulse length	5, 10, 50, 100 ms (default: 5 ms)
External voltage supply	3 ... 30 V DC
Current	≤ 20 mA with a residual voltage of ≤ 0.5 V
Possible pulse output selection	<ul style="list-style-type: none"> Energy (default setting for 'Out1') Volume (default setting for 'Out2') Tariff energy 1 Tariff energy 2 Tariff condition 1 (limit switch) Tariff condition 2 (limit switch) Energy error Volume error Volume with specific display resolution (or with factor 0,1, 10 or 100 thereof) Energy with specific display resolution (or factor 0.1 thereof)
Pulse input	
Function	Add-on module for two additional counters. The pulse input 1 is marked as I1, 'gnd' and the input 2 as I2, 'gnd' on the terminal strip and indicated in the display as separate registers IN1 and IN2 and can also be transferred via the communication modules.
Type	Passive "open collector" pulse inputs, outputs not potential isolated to each other, data are separate cumulated in different registers and are also stored on the two accounting day's.
Pulse value	Pulse value and the unit are configurable for energy, water, gas or electrical meter by a software tool Default: Pulse input 0.1 m3 or 1 gal (if unit 'gal' is ordered with the Z-option "L05")
Pulse frequency	≤ 8 Hz
Pulse length	≥ 10 ms

Technical specifications (continued)

Typical accuracy of FUE950	
External voltage supply	3 V DC (supplied internally by FUE950)
Current	based on $R_i = 2.2 \text{ M}\Omega$
Cable length	< 10 m connection limit
Current output module	
Function	The module contains connections for 2 passive current outputs, which can be programmed individually using the software tool. The outputs are marked „#1“ and „#2“ with corresponding polarity „+“ and „-“ on the terminal strip. The module will be connected on port 1 only, but both ports are occupied by the module.
Terminal voltage	External supply: 10 ... 30 V DC (passive output)
Signal range	4 ... 20 mA; 4 mA = 0 value and 20 mA = default maximum values (for #1: Power in kW and for #2: Flow with the max. values and selected unit). Defaults: For power it is the max. selectable value x 100 000 the last digit of display (e. g. 20 mA = 10 000.0 kW (1 digit res.) or 100 000 kW (0 digit res). For flow it is the max. selectable value x 10 000 the last digit of display (e. g. 20 mA = 1 000.0 m ³ /h (1 digit res.) or 10 000 m ³ /h (0 digit res.).
Load	Max. 800 Ω
Upper limit	Up to 20,5 mA (exceed causes the error current value)
Signal on alarm	Errors are indicated with 3.5 mA or 22.6 mA (programmable, default: 3.5 mA)
Output values	Power, flow, temperature (configuring via software tool; default: for #1: Power and for #2: Flow)
M-Bus output	
Type	The optional M-Bus plug-in module is a serial interface for communication with external devices (M-Bus Repeater)
Protocol	M-Bus according EN 1434-3
Connection	The connection is not polarity-conscious and is electrically isolated, connection of 2 x max. 2.5 mm ² wires, 300 or 2400 baud (auto baud detection), current drawn: one M-Bus load. M-Bus address: Each port has its own primary M-Bus address (Prim1 = the last two digits of the serial number; Prim2 = 0). The secondary address is unique for each calculator and is factory-set to equal the serial number.
RS 232 output	
Type	The optional module RS 232 is a serial interface for data transmission with external devices, e.g. PC; baud rate: 300 or 2400. The module contains a 3-pole terminal strip with terminals marked 62 (TX), 63 (RX) and 64 (GND). For this purpose a special data cable is necessary.
Protocol	M-Bus according EN 1434-3
Connection	The module contains a 3-pole terminal strip with terminals marked 62, 63, 64 (max. 2.5 mm ²); Connected cable length: max 10 m; For communication with a PC a special adapter cable is required (article no. A5E02611774).
RS 485 output	
Function	The optional RS 485 module is a serial interface for data transmission with external devices, e.g. PC; baud rate: 2400. The module contains a 4-pole terminal strip with terminals marked D+, D-, Vcc and GND.
Protocol	M-Bus protocol according EN 1434-3

Flow Measurement

SITRANS FS (ultrasonic)

Inline ultrasonic flowmeters / SITRANS FUE950 energy calculator

Technical specifications (continued)

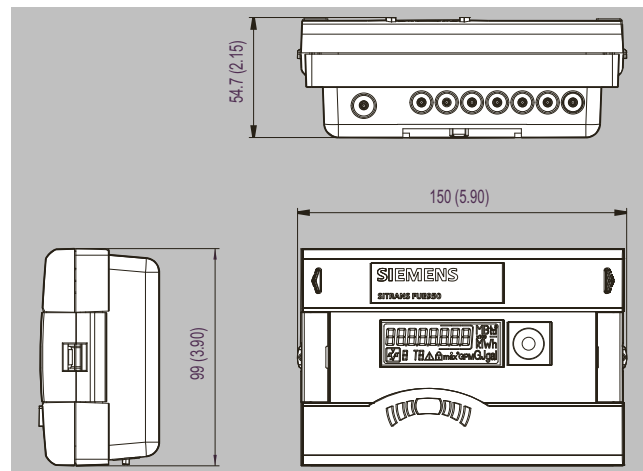
Typical accuracy of FUE950	
Connection	Terminals D+ and D-; electrically isolated; 2400 baud only. An external supply of 12 V DC \pm 5 V (<5 W) is needed for the module (terminals Vcc and GND). The module terminals are max. for 2.5 mm ² wires. Connected cable length: max. 10 m
Power consumption	Typical current appr. 0.15 VA
230 V and 24 V versions	Typical battery lifetime 10 years under normal conditions (no add-on modules, max. 40 °C ambient temperature)
3.6 V D-cell battery	Internal voltage 3.6 V by the battery or plug-in power supply module
Supply data	3.6 V lithium D-cell, battery lifetime typically 16 years with independently powered flowmeter
Battery, 3.6 V type (option)	Plug-in module for 230 V AC (195 ... 253 V AC), 50/60 Hz (incl. battery backup)
230 V AC module (option)	Plug-in module for 24 V AC (12 ... 30 V AC) (incl. battery backup)
24 V AC module (option)	Only with mains supply modules by internal 3.0 V lithium battery (type CR 2032) Displayed values, date and time are still updated, but the measuring functions have stopped, including the flow rate measurement. Communication via optional modules M-Bus, RS 485, RS 232 or optical interface is maintained, affecting the backup battery lifetime.
Battery backup (option)	

Accessories/Software

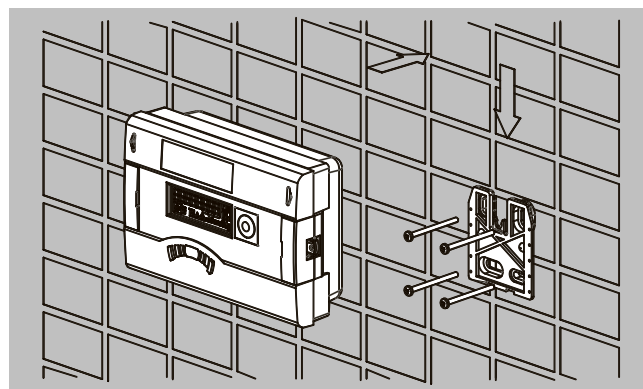
The parameterization software based on the M-Bus is a convenient tool for handling the calculator. It runs on Windows and is used for configuration of the calculator functionality, reading out different memories, printing out calculator logs. For further details please contact your local Siemens representative.

A specific optical head with a permanent magnet in (IrDA adapter with bluetooth) accordance with EN 1434 can be used for programming/altering programming of readout data, configuration data, etc. The reader head can also be used to change measuring data.

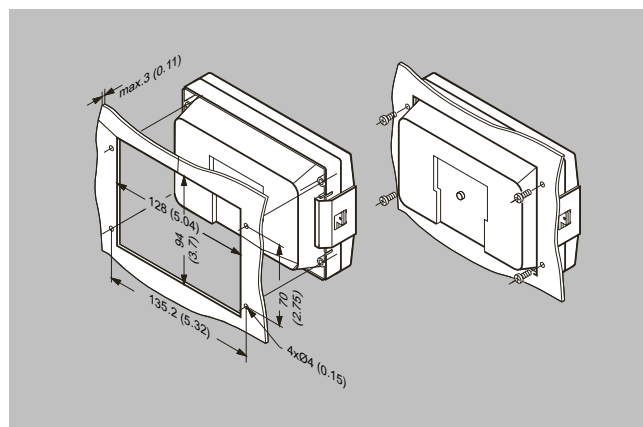
Dimensional drawings



SITRANS FUE950, dimensions in mm (inch)

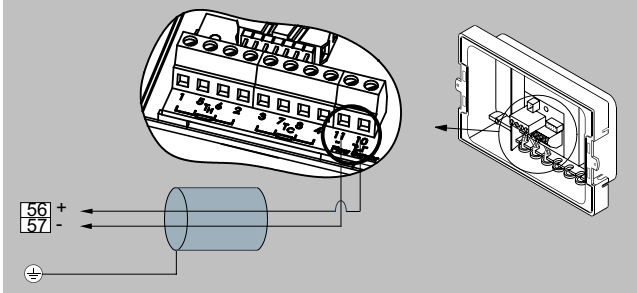


Wall mounting



Panel mounting, dimensions in mm (inch)

Circuit diagrams

**Electrical connection for SITRANS FUS380/FUE380/FUE950 and
MAG 5000/6000/FUE950**

The diagram shows the connection between SITRANS FUE950 (terminals 10 and 11) and FUS380/FUE380 and MAG 5000/6000 (terminals 56 and 57). Temperature sensors must be connected to terminals 5 (1) and 6 (2) (T_H) and 7 (3) and 8 (4) (T_C).

Note:

The right flowmeter pulse output value must be equal to the FUE950 pulse input value and must be checked via the user menu of the transmitter MAG 5000/6000 or nameplate of FUE380 or FUS380.

Flow Measurement

SITRANS FS (ultrasonic)

Inline ultrasonic flowmeters / SITRANS FUE950 energy calculator / Pt500 temperature sensor pairs

Application

The temperature sensor set is designed for use with the Siemens energy calculator type SITRANS FUE950 for measurement of the energy consumption in a district heating or cooling net.

Temperature sensors are one of the integral components of every thermal energy meter in heating or cooling applications. They are used for determining temperature changes in fluids due to energy taken from or supplied to the loop. The temperature is thus measured by mounting temperature sensors upstream and downstream from the point where the exchange in the thermal energy of the system is.

To ensure an accurate measurement of the temperature difference according to MID (EN 1434) or PTB K7.2 the sensors are delivered as matched pairs.

By selection with the corresponding order code the Pt500 sensor pair sets can be delivered with heating approval or with approvals for combined heating/cooling applications.

Technical specifications**Temperature sensor pairs****2-wire Pt500****Pt500 2-wire temperature sensor pair (EN 1434)**

Measuring insert	Pt500 temperature sensor, EN 60751, tolerance class B, 2-wire
Pairing	Paired to EN 1434 (10 ... 130 °C/14 ... 266 °F)
Media temperature	0 ... 150 °C (32 ... 302 °F)
Response time $T_{0.5}$	See sensor pocket specifications
Medium	Typically heating water
Pressure rating	See sensor pocket specifications
Protection	IP65
Pipe material	AISI 304 Ti/1.4303
Dimension	Ø 6 mm
Sensor tube length	50 mm
Cable length	Up to 10 m (32.8 ft), fixed connected silicon cable, 2 connection wire terminals, terminal sleeves to DIN 46228

4-wire Pt500**Pt500 4-wire temperature sensor pair (with MID and PTB K7.2 approval)**

Measuring insert	Pt500 temperature sensor, EN 60751, tolerance class to ISO 751 Class B; 4-wire
Pairing	Matched paired according to EN 1434 at 10, 75 and 140 °C (50, 167 and 284 °F)
Type approval	MID (DE-06-MI004-PTB011) and PTB K7.2 (PTB 22.77/09.01). Only to be mounted with related sensor pockets according to the type approvals.
Media temperature	0 ... 150 °C (32 ... 302 °F)
Permissible temp. pair range for ΔT	
• Heating	3 ... 150 K
• Cooling	3 ... 85 K
Medium	Approved for heating/cooling water
Protection	IP65
Environment	
• Meachnic class	M3
• Electromagnetic class	E1 (MID)
Pressure rating	See sensor pocket specifications
Material	
• Protective tube	Stainless steel AISI 304Ti/1.4571 (or similar), diameter of protective tube: 6 mm
• Connector cable	Silicon cable, 4 connection wire terminals, terminal sleeves to DIN 46228
Sensor tube length	140 or 230 mm (5.51 or 9.06 inch)
Cable length	5 m (16.4 ft), fixed connected

Sensor pockets**Stainless steel sensor pocket (for 4-wire Pt500 types only - standard)**

Media temperature	0 ... 150 °C (32 ... 302 °F)
Approval	Approved only together with 4-wire sensors
Medium	Approved for heating/cooling water; up to max. 5 m/s flow velocity
Pressure rating	PN 40
Length	Face-to-face length 120/135 and 210/225 mm (4.72"/5.23" and 8.27"/8.86")
External diameter	Protective tube 8/11 mm (0.32"/0.43")
Internal diameter	Protective tube 6 mm (0.24")
Pipe connection	Thread G 1/2" (with sealing screw for sensor)
Material	Protective tube AISI 316Ti/1.4571 (or similar)
Use	<ul style="list-style-type: none"> • Use with related 4-wire Pt500 sensors only (according type approval) • For flow velocities up to 5 m/s • Recommended to install with welded sleeve (according to EU standard)

Flow Measurement

SITRANS FS (ultrasonic)

Inline ultrasonic flowmeters / SITRANS FUE950 energy calculator / Pt500 temperature sensor pairs

Technical specifications (continued)

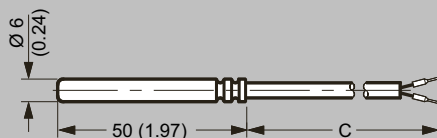
Stainless steel sensor pocket (for 2-wire Pt500 types only, some only available as spare parts)

Media temperature	0 ... 180 °C (32 ... 356 °F)			
Medium	Approved for heating water			
Response time $T_{0.5}$	Typically 13 s at 0.4 m/s without pasta Typically 5 s at 0.4 m/s with pasta			
Pressure rating	PN 25			
Length (in mm)				
• L1	92	127	168	223
• L	82	117	155	210
Material	Stainless steel: AISI 316Ti/1.4571			
Use	For 2-wire Pt500 types only			

Brass sensor pocket (for 2-wire Pt500 types only, some only available as spare part)

Media temperature	0 ... 150 °C (32 ... 302 °F)			
Medium	Approved for heating water			
Response time $T_{0.5}$	Typically 9 s at 0.4 m/s without pasta Typically 5 s at 0.4 m/s with pasta			
Pressure rating	PN 16			
Length (in mm)				
• L1	47	92	127	
• L	40	82	117	
Material	Brass: CuZn ₄₀ Pb ₂ (Ms58)			
Use	For 2-wire Pt500 types only			

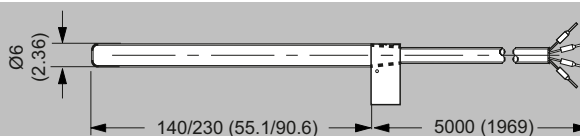
Dimensional drawings

Pt500 2-wire temperature sensor pair (EN 1434)

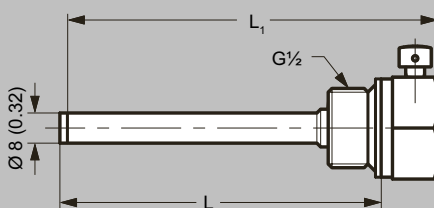
Pt 500 2-wire temperature sensor, dimensions in mm (inch)

Pt500 temperature sensor pair (EN 1434)

Cable length 2, 3, 5 or 10 m ('C' at the dimensional drawing)

Pt500 4-wire temperature sensor pair (with MID and PTB K7.2 approval)

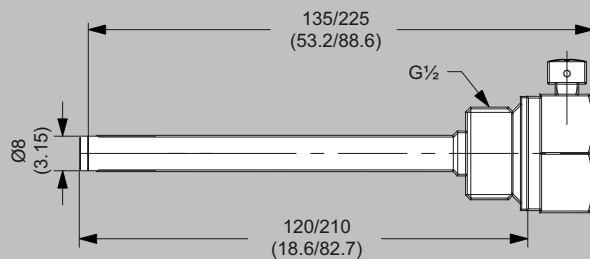
Pt500 4-wire temperature sensor, dimensions in mm (inch)

Stainless steel sensor pocket (for 2-wire Pt500 types only, some only available as spare parts)

Sensor pocket (for 2-wire Pt500 types only), stainless steel, dimensions in mm (inch)

Stainless steel sensor pocket (for 2-wire Pt500 types only)

Length L1 (mm)	92	127	168	223
Length L (mm)	82	117	155	210

Stainless steel sensor pocket (for 4-wire Pt500 types only - standard)

Stainless steel sensor pocket, dimensions in mm (inch)

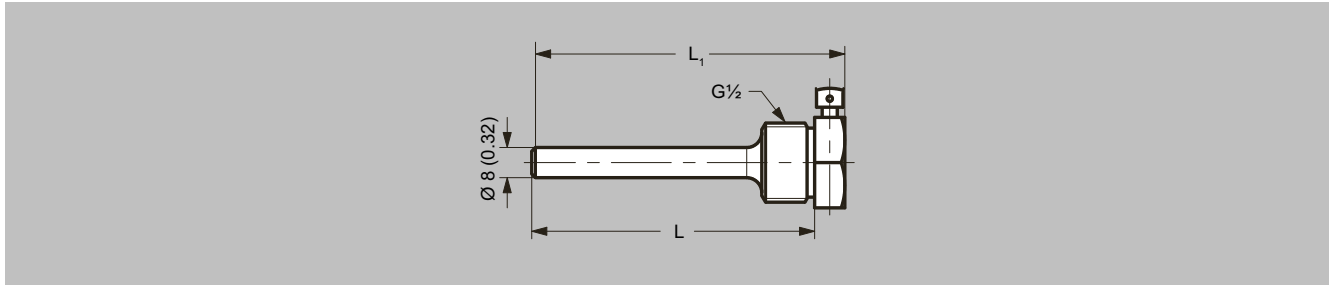
Flow Measurement

SITRANS FS (ultrasonic)

Inline ultrasonic flowmeters / SITRANS FUE950 energy calculator / Pt500 temperature sensor pairs

Dimensional drawings (continued)

Brass sensor pocket (for 2-wire Pt500 types only, some only available as spare part)



Sensor pocket, brass (for 2-wire Pt500 types only), dimensions in mm (inch)

Brass sensor pocket (for 2-wire Pt500 types only)

Length L1 (mm)	47	92	127
Length L (mm)	40	82	117

Overview



SITRANS FST030 with FSS200 and external DSL

SITRANS FS clamp-on ultrasonic flowmeters provide highly accurate measurement while minimizing installation time and maintenance expense.

Benefits

- Easy installation; no need to cut pipe or stop flow
- Minimal maintenance; external sensors do not require periodic cleaning
- No moving parts to foul or wear
- No pressure drop or energy loss
- Wide turn-down ratio
- Single or dual path with internal DSL, up to four paths with external DSL option

System performance

Approvals	<ul style="list-style-type: none"> • ATEX Zone 1, 2 (Sensors: Zone 0, 1, 2) • IECEx Zone 1, 2 (Sensors: Zone 0, 1, 2) • FM/FMc Class I Div. 1, 2 (Sensors: Class I Div. 1)
Accuracy at measuring point	<ul style="list-style-type: none"> ± 0.5 ... 1 % for velocities above 0.3 m/s and >10 diameters straight run ± 0.5 % ± 0.0015 m/s with high precision or universal sensors ± 1 % ± 0.003 m/s with high temperature sensors for velocities above 0.3 m/s and > 10 diameters straight run and optimal installation conditions
Repeatability at measuring point	± 0.25 % (based on ISO 11631)
Accuracy of measuring system	<ul style="list-style-type: none"> ± 0.2 % ± 0.0015 m/s with high precision or universal sensors ± 0.5 % ± 0.003 m/s with high temperature sensors
Repeatability of the measuring system	± 0.05 – 0.1%
Pipe size range	12.7 ... 10 m (0.5" ... 394")
Wall thickness range	0.64 ... 76.2 mm (0.025" ... 3.0")
Pipe material	Any sonically conductive material (steel, plastic, aluminum, glass, cement, ductile iron, copper)
Optional External DSL	Zone 0, 1, 2, Class 1 Div. 1 with Transmitter in Zone 2 Class 1 Div. 2 area

Digitaler Sensor Link (FS-DSL)

The electronics for creating measured values for an ultrasonic measurement are located in a compact module called: Digital Sensor Link.

Together with the ultrasonic sensors, this module creates an analogue measurement signal for volume flow and lots of other data. All data is then immediately digitized and sent to the transmitter without interference.

The advantage: best possible EMC thanks to very short analog signal lines and safer data transfer to possible transmitter variants.

The FS-DSL is suitable for clamp-on sensors as well as for inline - SONO sensors, the set firmware determines the respective technology. The FS-DSL is available for water applications, for oil measurements and also for clamp-on gas measurements.

The module can be used in Ex-Zone 1 (Class 1 Div 1) as an external FS-DSL in a pressure-encapsulated IP 66/67 housing. The distance to the transmitter can be up to 150 m, which is also how the FS-DSL is powered. The FS-DSL offers analog inputs for temperature and pressure and is always designed for up to 4 measuring paths in the external version.

Option:

Optionally, the FS-DSL module is also available integrated in the SITRANS FST030 only in the version as a wall housing, but then with reduced EMC, number of paths and Ex version.

Flow Measurement

SITRANS FS (ultrasonic)

Clamp-on ultrasonic flowmeters / SITRANS FS230 ultrasonic flowmeter

Application

SITRANS FS230 standard functions are suitable for a wide variety of liquid applications, including the following:

- Water industry
 - Raw water
 - Potable water
 - Chemicals
- Wastewater industry
 - Raw sewage
 - Effluent
 - Sludges
 - Mixed liquor
 - Chemicals
- HVAC industry
 - Condensers
 - Hot & cold water systems
- Power industry
 - Nuclear
 - Fossil
 - Hydroelectric
- Processing industry
 - Process control
 - Batching
 - Rate indication
 - Volumetric and mass measurement

SITRANS FS230 hydrocarbon functions are ideal for applications carrying crude oil, refined petroleum or liquefied gas.

Standard volume (high end system)

- Standard (net) volume flow measurement
- Suitable for use in leak detection systems
- Mass flow output measurement
- Chemical and petrochemical processing
- Precise identification of interfaces on multi-liquid pipelines
- Product identification
- Standard density indication
- Applications with multiple liquids having a wide viscosity range
- Automatic gross volume compensation due to viscosity

SITRANS FS230 is ideal for most natural and process gas industry applications, including:

- Checkmetering
- Allocation
- Flow survey verification
- Lost and unaccounted for (LAUF) gas analysis
- Production
- Storage

The FS230 can be supplied with an external DSL option that allows for up to four paths with two additional analog inputs. The External DSL enclosure can be installed in a Zone 1 or Div 1 area near the sensors and measurement pipe using short sensor cables, with communication cable to transmitter up to 150 meters away.

Application (continued)

System information and selection guide

SITRANS FS clamp-on flowmeters	FS230 (Standard)	FS230 (Hydrocarbon)	FS230 (Gas)
Industry/Applications			
Water and aqueous solutions	X	-	-
Utility district heating, cooling	X	-	-
Chemical	X	-	-
Hydrocarbons/petrochemical, multiple products or varying viscosity, liquefied gases, net and gross volume	-	X	-
Hydrocarbons (single product with limited viscosity range) gross volume	X	X	-
Very low flow (< 0.1 m/s) in small pipes	X	-	-
High temperature applications < 232 °C (450 °F)	X	-	-
Refrigeration liquids	X	-	-
Food products	X	-	-
Natural Gas	-	-	X
Other gases i.e. propane, oxygen, argon etc.	-	-	X
Design			
Field clamp-on (non-intrusive)	X	X	X
Standard volume or mass flow; per API MPMS chapter 11.1	-	X	X
Interface detection	-	X	X
Standard density output	-	X	X
Temperature measurement	X	X	X
Analog input	X	X	X
Large graphical display	X	X	X
Configuration and diagnostic software PDM compatible	X	X	X
Number of acoustic paths and channels			
1-path	X	X	X
2-path	X	X	X
3-path (with external DSL)	X	X	X
4-path (with external DSL)	X	X	X
Size			
12.7 ... 10 000 mm (0.5" ... 394")	X	-	-
38 ... 10 000 mm (1.5" ... 394")	-	X	-
38 ... 1 200 mm (1.5" ... 48")	-	-	X
Approvals			
FM /FMc ¹⁾	X	X	X
ATEX	X	X	X
IECEX	X	X	X

¹⁾ NEMA 4X associated equipment in DIV 2 connected to DIV 1 sensors and DIV 1 external DSL.

Flow Measurement

SITRANS FS (ultrasonic)

Clamp-on ultrasonic flowmeters / SITRANS FS230 ultrasonic flowmeter

Selection and ordering data

SITRANS FS230 clamp-on flowmeter	Article No. 7ME372	Order code
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Transmitter model		
Transmitter FST030	3	
Pipe material/temperature		
Transmitter only - no sensor	0	
Steel (stainless steel, carbon steel), temperature range: best use < 80 °C (176 °F)	1	
Steel (stainless steel, carbon steel), temperature range: best use > 80 °C (176 °F)	2	
Plastic (PVC) (for gas applications), temperature: -40 ... 65.5 °C (-40 ... 150 °F)	4	
Plastic (PVC) (for liquid applications), temperature: -40 ... +121 °C (-40 ... 250 °F)	6	
All materials except steel and plastic, temperature: -40 ... +121 °C (-40 ... 250 °F)	7	
Any material, very high temperature: -40 ... +230 °C (-40 ... 446 °F)	8	
Pipe outer diameter range		
Transmitter only - no sensor		A
13 ... 19 mm (0.5 ... 0.75")		B
19.3 ... 30.5 mm (0.76 ... 1.20")		C
30.7 ... 50.8 mm (1.21 ... 2.00")		D
51 ... 76 mm (2.01 ... 3.00")		E
78 ... 127 mm (3.1 ... 5.0")		F
129 ... 203 mm (5.1 ... 8.0")		G
206 ... 305 mm (8.1 ... 12.0")		H
307 ... 508 mm (12.1 ... 20.0")		J
510 ... 1200 mm (20.1 ... 48.0")		K
1200 ... 9144 mm (48.0 ... 360")		L
Pipe wall thickness range		
Transmitter only - no sensor		A
0.635 ... 1.016 mm (0.025 ... 0.04")		B
1.016 ... 1.524 mm (0.04 ... 0.06")		C
1.524 ... 2.032 mm (0.06 ... 0.08")		D
2.032 ... 3.048 mm (0.08 ... 0.12")		E
3.048 ... 4.064 mm (0.12 ... 0.16")		F
4.064 ... 5.842 mm (0.16 ... 0.23")		G
5.842 ... 8.128 mm (0.23 ... 0.32")		H
8.128 ... 11.176 mm (0.32 ... 0.44")		J
11.176 ... 15.748 mm (0.44 ... 0.62")		K
15.748 ... 31.75 mm (0.62 ... 1.25")		L
31.75 ... 50.8 mm (1.25 ... 2.00")		M
Sensor mounting		
Transmitter only - no sensor	0	
Mounting straps only	1	
Standard frames and tracks	2	
Magnetic - no straps	4	
Magnetic - with straps	6	
High precision mount (single enclosure)	7	
High precision mount (dual enclosure)	8	
Number of paths (sensor pairs)		
Transmitter only - no sensor	0	
One path	1	
Two path	2	
Three path	3	
Four path	4	
Environment		
Standard		1
Transmitter/DSL Material and mounting style		
Industrial enclosure transmitter with external FS DSL for remote to the sensors.		G
Transmitter and DSL: aluminum cast, NEMA 4X, max. 4 path, M12 connection between transmitter and FS-DSL with SSL cable		
Industrial enclosure transmitter with external FS DSL for remote to the sensors.		K
Transmitter and DSL: aluminum cast, NEMA 4X, max. 4 path, cable connection between transmitter and FS-DSL with SSL cable		

Selection and ordering data (continued)

	Article No.	Order code
SITRANS FS230 clamp-on flowmeter	7ME372	
Replacement DSL for option V transmitter, no transmitter DSL: aluminium cast, NEMA 4X, M12 socket for DSL to transmitter interconnect cable		N
Replacement DSL for option W transmitter, no transmitter DSL: aluminium cast, NEMA 4X, terminal block for DSL to transmitter interconnect cable		Q
Wallmount transmitter, internal DSL, transmitter: aluminum wallbox, NEMA 4X, DSL: none, direct connected sensor cables, (max 2-path, max. 20 meter sensor cable)		U
Wall box housing, external DSL, remote to sensor Transmitter: aluminum wallbox, NEMA 4X DSL: aluminum cast, NEMA 4X, M12 socket for DSL to transmitter interconnect cable (max 4-path, max. 20 m sensor cable, max. 150 m interconnect cable)		V
Wall box housing, external DSL, remote to sensor Transmitter: aluminum wall box, NEMA 4X DSL: aluminum cast, NEMA 4X, terminal block for DSL to transmitter interconnect cable (max. 4-path, max. 20 m sensor cable, max. 150 m interconnect cable)		W
Ex approvals		
Non-Ex		A
ATEX, wallbox enclosure		B
ATEX, industrial enclosure		C
IECEX, wallbox		E
IECEX, industrial enclosure		F
FM, FMc, wallbox enclosure		G
FM, FMc, industrial enclosure		H
CSA, wallbox enclosure		L
CSA, industrial enclosure		M
ATEX, IECEX, FM, CSA, industrial enclosure		N
ATEX, IECEX, FM, FMc, wallbox enclosure		P
NEPSI		Z
InMetro		Z
KCs		Z
Local User Interface		
Graphical local user interface, 240 × 160 pixels		3

	Order code
Further designs	
Please add "-Z" to Article No. and specify Order code(s).	
Cable glands - transmitter, DSL (not for sensor cables)	
No glands, metric threads on transmitter	A01
No cable glands, NPT thread, nickle plated brass, quantity based on option "G" data place 14	A20
No cable glands, NPT thread, stainless steel, quantity based on option "G" data place 14	A21
Cable glands, nickle plated brass, quantity based on option "G" data place 14	A22
Cable glands, plastic, quantity based on option "G" data place 14	A24
Cable glands, stainless seel, quantity based on option "G" data place 14	A26
No cable glands, NPT thread, nickle plated brass, quantity based on option "K" data place 14	A30
No cable glands, NPT thread, stainless steel, quantity based on option "K" data place 14	A31
Cable glands, nickle plated brass, quantity based on option "K" data place 14	A32
Cable glands, plastic, quantity based on option "K" data place 14	A34
Cable glands, stainless seel, quantity based on option "K" data place 14	A36

Flow Measurement

SITRANS FS (ultrasonic)

Clamp-on ultrasonic flowmeters / SITRANS FS230 ultrasonic flowmeter

Selection and ordering data (continued)

	Order code
No glands, metric thread with NPT thread adapters, nickel plated brass: quantity based on selection "N" in data place 14	A40
No glands, metric thread with NPT thread adapters, stainless steel: quantity based on selection "N" in data place 14	A41
Nickel plated brass glands: quantity based on selection "N" in data place 14	A42
Plastic glands: quantity based on selection "N" in data place 14	A44
Stainless steel glands: quantity based on selection "N" in data place 14	A46
No glands, metric thread with NPT thread adapters, nickel plated brass: quantity based on selection "Q" in data place 14	A50
No glands, metric thread with NPT thread adapters, stainless steel: quantity based on selection "Q" in data place 14	A51
Nickel plated brass glands: quantity based on selection "Q" in data place 14	A52
Plastic glands: quantity based on selection "Q" in data place 14	A54
Stainless steel glands: quantity based on selection "Q" in data place 14	A56
No glands, metric thread with NPT thread adapters, stainless steel: quantity based on selection "U" in data place 14	A60
No glands, metric thread with NPT thread adapters, nickel plated brass: quantity based on selection "U" in data place 14	A61
Nickel plated brass glands: quantity based on selection "U" in data place 14	A62
Plastic glands: quantity based on selection "U" in data place 14	A64
Stainless steel glands: quantity based on selection "U" in data place 14	A66
No glands, metric thread with NPT thread adapters, nickel plated brass: quantity based on selection "V" in data place 14	A70
No glands, metric thread with NPT thread adapters, stainless steel: quantity based on selection "V" in data place 14	A71
Nickel plated brass glands: quantity based on selection "V" in data place 14	A72
Plastic glands: quantity based on selection "V" in data place 14	A74
Stainless steel glands: quantity based on selection "V" in data place 14	A76
No glands, metric thread with NPT thread adapters, nickel plated brass: quantity based on selection "W" in data place 14	A80
No glands, metric thread with NPT thread adapters, stainless steel: Quantity based on selection "W" in data place 14	A81
Nickel plated brass glands: quantity based on selection "W" in data place 14	A82
Plastic glands: quantity based on selection "W" in data place 14	A84
Stainless steel glands: quantity based on selection "W" in data place 14	A86
Software functions and CT approvals	
For standard industry applications (liquids, e.g. water)	B11
Hydrocarbon applications (oil table with temperature and viscosity compensation)	B39
For gas process values	B50

Selection and ordering data (continued)

	Order code
I/O configuration Ch1	
Non-Ex, 4 ... 20 mA HART, menu selected passive/active	E02
Ex, 4 ... 20 mA HART, active	E06
Ex, 4 ... 20 mA HART, passive	E07
Modbus RTU 485	E14
I/O configuration Ch2, Ch3 and Ch4	
None	F00
Non-Ex	
• Ch2: current/freq./pulse, Ch3: none, Ch4: none. Active/passive menu selected	F01
• Ch2: current/freq./pulse, Ch3: current/freq./pulse, Ch4: none. Active/passive menu selected	F02
• Ch2: current/freq./pulse, Ch3: current/freq./pulse, Ch4: current/freq./pulse. Active/passive menu selected	F03
• Ch2: current/freq./pulse, Ch3: current/freq./pulse, Ch4: relay. Active/passive menu selected	F04
• Ch2: current/freq./pulse, Ch3: relay, Ch4: relay. Active/passive menu selected	F05
• Ch2: current/freq./pulse, Ch3: relay, Ch4: none. Active/passive menu selected	F06
Ex Passive	
• Ch2: current/freq./pulse, Ch3: none, Ch4: none	F11
• Ch2: current/freq./pulse, Ch3: current/freq./pulse, Ch4: none	F12
• Ch2: current/freq./pulse, Ch3: current/freq./pulse, Ch4: current/freq./pulse	F13
• Ch2: current/freq./pulse, Ch3: current/freq./pulse, Ch4: relay	F14
• Ch2: current/freq./pulse, Ch3: relay, Ch4: relay	F15
• Ch2: current/freq./pulse, Ch3: relay, Ch4: none	F16
Ex Active	
• Ch2: current/freq./pulse, Ch3: none, Ch4: none	F21
• Ch2: current/freq./pulse, Ch3: current/freq./pulse, Ch4: None	F22
• Ch2: current/freq./pulse, Ch3: current/freq./pulse, Ch4: current/freq./pulse	F23
• Ch2: current/freq./pulse, Ch3: current/freq./pulse, Ch4: relay	F24
• Ch2: current/freq./pulse, Ch3: relay, Ch4: relay	F25
• Ch2: current/freq./pulse, Ch3: relay, Ch4: none	F26
Certificates	
Factory certification 2.2 to EN 10204:2004	C19
DSL strap kit (to strap DSL to pipe)	
• 60.3 mm (2 inch) pipe mount with U-bolts	G01
• Stainless steel strap to mount DSL to pipe DN 60 ... 150 pipe size (2 ... 6 inch)	G03
• Stainless steel strap to mount DSL to pipe DN 150 ... 300 (6 ... 12 inch)	G05
• Stainless steel strap to mount DSL to pipe DN 300 ... 400 (12 ... 16 inch)	G07
• Stainless steel strap to mount DSL to pipe DN 400 ... 600 (16 ... 24 inch)	G08

Flow Measurement

SITRANS FS (ultrasonic)

Clamp-on ultrasonic flowmeters / SITRANS FS230 ultrasonic flowmeter

Selection and ordering data (continued)

	Order code
Temperature sensors and pockets	
1 000 Ω platinum standard clamp-on RTD	J61
1 000 Ω platinum submersible clamp-on RTD	J62
Sensor cables to transmitter/DSL for 1-path	
1 m (3.2 ft) standard/submersible coax sensor cable pair with nylon glands	K21
3 m (9.8 ft) standard/submersible coax sensor cable pair with nylon glands	K22
5 m (16.4 ft) standard/submersible coax sensor cable pair with nylon glands	K23
10 m (32.8 ft) standard/submersible coax sensor cable pair with nylon glands	K24
20 m (65.6 ft) standard/submersible coax sensor cable pair with nylon glands	K25
1 m (3.2 ft) standard/submersible coax sensor cable pair with nickel plated brass glands	K26
3 m (9.8 ft) standard/submersible coax sensor cable pair with nickel plated brass glands	K27
5 m (16.4 ft) standard/submersible coax sensor cable pair with nickel plated brass glands	K28
10 m (32.8 ft) standard/submersible coax sensor cable pair with nickel plated brass glands	K29
20 m (65.6 ft) standard/submersible coax sensor cable pair with nickel plated brass glands	K30
1 m (3.2 ft) standard/submersible coax sensor cable pair with stainless steel glands	K31
3 m (9.8 ft) standard/submersible coax sensor cable pair with stainless steel glands	K32
5 m (16.4 ft) standard/submersible coax sensor cable pair with stainless steel glands	K33
10 m (32.8 ft) standard/submersible coax sensor cable pair with stainless steel glands	K34
20 m (65.6 ft) standard/submersible coax sensor cable pair with stainless steel glands	K35
5 m (16.4 ft) plenum rated coax sensor cable pair with nylon glands	K36
20 m (65.6 ft) plenum rated coax sensor cable pair with nylon glands	K37
5 m (16.4 ft) plenum rated coax sensor cable pair with nickel plated brass glands	K38
20 m (65.6 ft) plenum rated coax sensor cable pair with nickel plated brass glands	K39
5 m (16.4 ft) plenum rated coax sensor cable pair with stainless steel glands	K40
20 m (65.6 ft) plenum rated coax sensor cable pair with stainless steel glands	K41
1 m (3.2 ft) armored sensor cable pair with nickel plated brass glands. Temperature: -25 ... +80 °C	K50
3 m (9.8 ft) armored sensor cable pair with nickel plated brass glands. Temperature: -25 ... +80 °C	K51
5 m (16.4 ft) armored sensor cable pair with nickel plated brass glands. Temperature: -25 ... +80 °C	K52
10 m (32.8 ft) armored sensor cable pair with nickel plated brass glands	K53
20 m (65.6 ft) armored sensor cable pair with nickel plated brass glands	K54
10 m (32.8 ft) standard/submersible coax sensor cable pair with no transmitter glands	K76
20 m (65.6 ft) standard/submersible coax sensor cable pair with no transmitter glands	K77
20 m (65.6 ft) plenum rated coax sensor cable pair with no glands	K78

Selection and ordering data (continued)

	Order code
Sensor cables to transmitter/DSL for 2-path	
1 m (3.2 ft) standard/submersible coax sensor cable pair with nylon glands	T21
3 m (9.8 ft) standard/submersible coax sensor cable pair with nylon glands	T22
5 m (16.4 ft) standard/submersible coax sensor cable pair with nylon glands	T23
10 m (32.8 ft) standard/submersible coax sensor cable pair with nylon glands	T24
20 m (65.6 ft) standard/submersible coax sensor cable pair with nylon glands	T25
1 m (3.2 ft) standard/submersible coax sensor cable pair with nickel plated brass glands	T26
3 m (9.8 ft) standard/submersible coax sensor cable pair with nickel plated brass glands	T27
5 m (16.4 ft) standard/submersible coax sensor cable pair with nickel plated brass glands	T28
10 m (32.8 ft) standard/submersible coax sensor cable pair with nickel plated brass glands	T29
20 m (65.6 ft) standard/submersible coax sensor cable pair with nickel plated brass glands	T30
1 m (3.2 ft) standard/submersible coax sensor cable pair with stainless steel glands	T31
3 m (9.8 ft) standard/submersible coax sensor cable pair with stainless steel glands	T32
5 m (16.4 ft) standard/submersible coax sensor cable pair with stainless steel glands	T33
10 m (32.8 ft) standard/submersible coax sensor cable pair with stainless steel glands	T34
20 m (65.6 ft) standard/submersible coax sensor cable pair with stainless steel glands	T35
5 m (16.4 ft) plenum rated coax sensor cable pair with nylon glands	T36
20 m (65.6 ft) plenum rated coax sensor cable pair with nylon glands	T37
5 m (16.4 ft) plenum rated coax sensor cable pair with nickel plated brass glands	T38
20 m (65.6 ft) plenum rated coax sensor cable pair with nickel plated brass glands	T39
5 m (16.4 ft) plenum rated coax sensor cable pair with stainless steel glands	T40
20 m (65.6 ft) plenum rated coax sensor cable pair with stainless steel glands	T41
1 m (3.2 ft) armored sensor cable pair with nickel plated brass glands. Temperature: -25 ... +80 °C	T50
3 m (9.8 ft) armored sensor cable pair with nickel plated brass glands. Temperature: -25 ... +80 °C	T51
5 m (16.4 ft) armored sensor cable pair with nickel plated brass glands. Temperature: -25 ... +80 °C	T52
10 m (32.8 ft) armored sensor cable pair with nickel plated brass glands	T53
20 m (65.6 ft) armored sensor cable pair with nickel plated brass glands	T54
10 m (32.8 ft) standard/submersible coax sensor cable pair with no transmitter glands	T76
20 m (65.6 ft) standard/submersible coax sensor cable pair with no transmitter glands	T77
20 m (65.6 ft) plenum rated coax sensor cable pair with no glands	T78
Sensor cables to transmitter/DSL for 3-path	
1 m (3.2 ft) standard/submersible coax sensor cable pair with nylon glands	U21
3 m (9.8 ft) standard/submersible coax sensor cable pair with nylon glands	U22

Flow Measurement

SITRANS FS (ultrasonic)

Clamp-on ultrasonic flowmeters / SITRANS FS230 ultrasonic flowmeter

Selection and ordering data (continued)

	Order code
5 m (16.4 ft) standard/submersible coax sensor cable pair with nylon glands	U23
10 m (32.8 ft) standard/submersible coax sensor cable pair with nylon glands	U24
20 m (65.6 ft) standard/submersible coax sensor cable pair with nylon glands	U25
1 m (3.2 ft) standard/submersible coax sensor cable pair with nickel plated brass glands	U26
3 m (9.8 ft) standard/submersible coax sensor cable pair with nickel plated brass glands	U27
5 m (16.4 ft) standard/submersible coax sensor cable pair with nickel plated brass glands	U28
10 m (32.8 ft) standard/submersible coax sensor cable pair with nickel plated brass glands	U29
20 m (65.6 ft) standard/submersible coax sensor cable pair with nickel plated brass glands	U30
1 m (3.2 ft) standard/submersible coax sensor cable pair with stainless steel glands	U31
3 m (9.8 ft) standard/submersible coax sensor cable pair with stainless steel glands	U32
5 m (16.4 ft) standard/submersible coax sensor cable pair with stainless steel glands	U33
10 m (32.8 ft) standard/submersible coax sensor cable pair with stainless steel glands	U34
20 m (65.6 ft) standard/submersible coax sensor cable pair with stainless steel glands	U35
5 m (16.4 ft) plenum rated coax sensor cable pair with nylon glands	U36
20 m (65.6 ft) plenum rated coax sensor cable pair with nylon glands	U37
5 m (16.4 ft) plenum rated coax sensor cable pair with nickel plated brass glands	U38
20 m (65.6 ft) plenum rated coax sensor cable pair with nickel plated brass glands	U39
5 m (16.4 ft) plenum rated coax sensor cable pair with stainless steel glands	U40
20 m (65.6 ft) plenum rated coax sensor cable pair with stainless steel glands	U41
1 m (3.2 ft) armored sensor cable pair with nickel plated brass glands. Temperature: -25 ... +80 °C	U50
3 m (9.8 ft) armored sensor cable pair with nickel plated brass glands. Temperature: -25 ... +80 °C	U51
5 m (16.4 ft) armored sensor cable pair with nickel plated brass glands. Temperature: -25 ... +80 °C	U52
10 m (32.8 ft) armored sensor cable pair with nickel plated brass glands	U53
20 m (65.6 ft) armored sensor cable pair with nickel plated brass glands	U54
10 m (32.8 ft) standard/submersible coax sensor cable pair with no transmitter glands	U76
20 m (65.6 ft) standard/submersible coax sensor cable pair with no transmitter glands	U77
20 m (65.6 ft) plenum rated coax sensor cable pair with no glands	U78
Sensor cables to transmitter/DSL for 4-path	
1 m (3.2 ft) standard/submersible coax sensor cable pair with nylon glands	V21
3 m (9.8 ft) standard/submersible coax sensor cable pair with nylon glands	V22

Selection and ordering data (continued)

	Order code
5 m (16.4 ft) standard/submersible coax sensor cable pair with nylon glands	V23
10 m (32.8 ft) standard/submersible coax sensor cable pair with nylon glands	V24
20 m (65.6 ft) standard/submersible coax sensor cable pair with nylon glands	V25
1 m (3.2 ft) standard/submersible coax sensor cable pair with nickel plated brass glands	V26
3 m (9.8 ft) standard/submersible coax sensor cable pair with nickel plated brass glands	V27
5 m (16.4 ft) standard/submersible coax sensor cable pair with nickel plated brass glands	V28
10 m (32.8 ft) standard/submersible coax sensor cable pair with nickel plated brass glands	V29
20 m (65.6 ft) standard/submersible coax sensor cable pair with nickel plated brass glands	V30
1 m (3.2 ft) standard/submersible coax sensor cable pair with stainless steel glands	V31
3 m (9.8 ft) standard/submersible coax sensor cable pair with stainless steel glands	V32
5 m (16.4 ft) standard/submersible coax sensor cable pair with stainless steel glands	V33
10 m (32.8 ft) standard/submersible coax sensor cable pair with stainless steel glands	V34
20 m (65.6 ft) standard/submersible coax sensor cable pair with stainless steel glands	V35
5 m (16.4 ft) plenum rated coax sensor cable pair with nylon glands	V36
20 m (65.6 ft) plenum rated coax sensor cable pair with nylon glands	V37
5 m (16.4 ft) plenum rated coax sensor cable pair with nickel plated brass glands	V38
20 m (65.6 ft) plenum rated coax sensor cable pair with nickel plated brass glands	V39
5 m (16.4 ft) plenum rated coax sensor cable pair with stainless steel glands	V40
20 m (65.6 ft) plenum rated coax sensor cable pair with stainless steel glands	V41
1 m (3.2 ft) armored sensor cable pair with nickel plated brass glands. Temperature: -25 ... +80 °C	V50
3 m (9.8 ft) armored sensor cable pair with nickel plated brass glands. Temperature: -25 ... +80 °C	V51
5 m (16.4 ft) armored sensor cable pair with nickel plated brass glands. Temperature: -25 ... +80 °C	V52
10 m (32.8 ft) armored sensor cable pair with nickel plated brass glands	V53
20 m (65.6 ft) armored sensor cable pair with nickel plated brass glands	V54
10 m (32.8 ft) standard/submersible coax sensor cable pair with no transmitter glands	V76
20 m (65.6 ft) standard/submersible coax sensor cable pair with no transmitter glands	V77
20 m (65.6 ft) plenum rated coax sensor cable pair with no glands	V78
Cable, DSL to wallbox transmitter	
5 m (16.4 ft) standard DSL cable (2 mounted M12 plugs)	L51
5 m (16.4 ft) standard DSL cable (no plugs mounted)	L52
10 m (32.8 ft) standard DSL cable (2 mounted M12 plugs)	L55
10 m (32.8 ft) standard DSL cable (no plugs mounted)	L56
25 m (82 ft) standard DSL cable (2 mounted plugs)	L59

Flow Measurement

SITRANS FS (ultrasonic)

Clamp-on ultrasonic flowmeters / SITRANS FS230 ultrasonic flowmeter

Selection and ordering data (continued)

	Order code
25 m (82 ft) standard DSL cable (no plugs mounted)	L60
50 m (164 ft) standard DSL cable (2 mounted plugs)	L63
50 m (164 ft) standard DSL cable (no plugs mounted)	L64
75 m (246.1 ft) standard DSL cable (2 mounted plugs)	L67
75 m (246.1 ft) standard DSL cable (no plugs mounted)	L68
150 m (492.1 ft) standard DSL cable (2 mounted plugs)	L71
150 m (492.1 ft) standard DSL cable (no plugs mounted)	L72
RTD cable (clamp temperature sensor to transmitter)	
6 m (20 ft) standard RTD cable	R50
15 m (50 ft) standard RTD cable	R51
30 m (100 ft) standard RTD cable	R52
46 m (150 ft) standard RTD cable	R53
61 m (200 ft) standard RTD cable	R54
91 m (300 ft) standard RTD cable	R55
6 m (20 ft) submersible RTD cable	R56
15 m (50 ft) submersible RTD cable	R57
30 m (100 ft) submersible RTD cable	R58
46 m (150 ft) submersible RTD cable	R59
61 m (200 ft) submersible RTD cable	R60
91 m (300 ft) submersible RTD cable	R61
Mass storage	
Enable mass storage function for SD card (not available for USA)	S30
Country specific approval	
KC-Approval for South Korea	W28
Tag plate	
Tag plate for external DSL, stainless steel	Y14
Tag plate for transmitter, stainless steel	Y15
Tag name plate, stainless steel	Y17

	Article No.
System spare parts	
Tool kits and loose parts	
"F" connector tool kit, 2 per	A5E38145699
Bag of loose spare parts; for wallmount, including cable strain relief components, mounting tool, seals and gasket, assorted screws and washers, hex cap nut, blind plugs, and O-rings	A5E38288072
Electronics assemblies and modules	
Wall mount transmitter	
• Display and keypad assembly	A5E37697615
• Digital Sensor Link (DSL), internal, for wall box, standard process values	A5E38014726
• Digital Sensor Link (DSL), internal, for wall box, hydrocarbon process values	A5E42138542
• Digital Sensor Link (DSL), internal, for wall box, gas process values	A5E47202379
• SensorFlash (4 GB micro SD card) -40 °C ... +85 °C	A5E38288507
• Power supply, for wall box, (240 V AC, 47 ... 63 Hz), (24 ... 90 V DC)	A5E38263021
• Foam insert for wall box with connectors	A5E38287828

Selection and ordering data (continued)

	Article No.
External DSL	
• Digital Sensor Link (DSL), external, module only, standard process values	A5E38014662
• Digital Sensor Link (DSL), external, module only, hydrocarbon process values	A5E37843869
• Digital Sensor Link (DSL), external, module only, gas process values	A5E47202369
• F connector board set: board A, board B and screws for mounting	A5E45882316
• Front end module cover plate with screws for mounting	A5E45882046
Cassettes, I/O configuration and communication	
• Ch1: I/O and comm (active) 4 ... 20 mA output and HART 7.2, Ex	A5E38012278
• Ch1: I/O and comm (passive) 4 ... 20 mA output and HART 7.2, Ex	A5E38013025
• Ch1: communication Modbus RTU 485, Ex	A5E38013054
• Ch1: I/O and comm (active/passive) 4 ... 20 mA output and HART 7.2, Non-Ex	A5E38013040
• Ch1: communication Modbus RTU 485, Non-Ex	A5E38013069
• F01, Non-Ex Ch2: Current/Frequ./Pulse Ch3: None Ch4: None Menu select active/passive	A5E38006256
• F02, Non-Ex Ch2: Current/Frequ./Pulse Ch3: Current/Frequ./Pulse Ch4: None Menu select active/passive	A5E38006558
• F03, Non-Ex Ch2: Current/Frequ./Pulse Ch3: Current/Frequ./Pulse Ch4: Current/Frequ./Pulse Menu select active/passive	A5E38006598
• F04, Non-Ex Ch2: Current/Frequ./Pulse Ch3: Current/Frequ./Pulse Ch4: Relay Menu select active/passive	A5E38006896
• F05, Non-Ex Ch2: Current/Frequ./Pulse Ch3: Relay Ch4: Relay Menu select active/passive	A5E38006900
• F06, Non-Ex Ch2: Current/Frequ./Pulse Ch3: Relay Ch4: None Menu select active/passive	A5E38011432
• F11, Ex-passive Ch2: Current/Freq./Pulse Ch3: None Ch4: None	A5E38011478
• F12, Ex-passive Ch2: Current/Frequ./Pulse Ch3: Current/Frequ./Pulse Ch4: None	A5E38011509
• F13, Ex-passive Ch2: Current/Frequ./Pulse Ch3: Current/Frequ./Pulse Ch4: Current/Frequ./Pulse	A5E38011541

Flow Measurement

SITRANS FS (ultrasonic)

Clamp-on ultrasonic flowmeters / SITRANS FS230 ultrasonic flowmeter

Selection and ordering data (continued)

	Article No.
• F14, Ex-passive Ch2: Current/Frequ./Pulse Ch3: Current/Frequ./Pulse Ch4: Relay	A5E38011600
• F15, Ex-passive Ch2: Current/Frequ./Pulse Ch3: Relay, Ch4: Relay	A5E38011618
• F16, Ex-passive Ch2: Current/Frequ./Pulse Ch3: Relay Ch4: None	A5E38011908
• F21, Ex-active Ch2: Current/Frequ./Pulse Ch3: None Ch4: None	A5E38012039
• F22, Ex-active Ch2: Current/Frequ./Pulse Ch3: Current/Frequ./Pulse Ch4: None	A5E38012056
• F23, Ex-active Ch2: current/freq./pulse, Ch3: current/freq./pulse, Ch4: current/freq./pulse	A5E38012121
• F24, Ex-active Ch2: Current/Frequ./Pulse Ch3: Current/Frequ./Pulse Ch4: Relay	A5E38019235
• F25, Ex-active Ch2: Current/Frequ./Pulse Ch3: Relay Ch4: Relay	A5E38019263
• F26, Ex-active Ch2: Current/Frequ./Pulse Ch3: Relay Ch4: None	A5E38019378
Miscellaneous parts	
General	
• Blind plug brass-nickel 10 pcs (Ex version)	A5E38145685
• Blind plug stainless steel 10 pcs (Ex version)	A5E38145689
• Twist-on F connectors, 4 pcs	A5E38268608
• M12 adapter for DSL or wall mounted transmitter	A5E03906095
Wall mount transmitter	
• Wall bracket "pipe mounting"	A5E38288020
• Wall bracket "panel mounting"	A5E38288032
• Metal kit: PSU cover, back plane	A5E38415145
• Power input cover plate	A5E38415205
External DSL	
• Wall mount bracket and screws for mounting DSL on bracket	A5E45882610
• Lid with O-ring	A5E45818351
• Bag with parts: cable strain reliefs, screws and washers, lid lock screw, grounding parts	A5E38111577
• Accessory pipe mounting kit for FS DSL, max. 60.3 mm (2.4 inch) pipe	A5E36617118001
• Accessory pipe strap kit for FS DSL, DN 50 ... 150 (2 ... 6 inch) pipe	A5E36617118002
• Accessory pipe strap kit for FS DSL, DN 150 ... 300 (6 ... 12 inch) pipe	A5E36617118003

Selection and ordering data (continued)

	Article No.
• Accessory pipe strap kit for FS DSL, DN 300 ... 400 (12 ... 16 inch) pipe	A5E36617118004
• Accessory pipe strap kit for FS DSL, DN 400 ... 600 (16 ... 24 inch) pipe	A5E36617118005
Cable glands	
Set of cable glands, plastic, black, metric	A5E03907414
Set of cable glands, Ex e/i, plastic, metric	A5E03907424
Set of cable glands, Ex e/i, stainless steel, metric	A5E03907429
Set of cable glands, Ex e/i, brass nickel-plated, metric	A5E03907430
Set of cable glands, plastic, black, NPT	A5E03907435
Set of cable glands, Ex e/i, plastic, NPT	A5E03907451
Set of cable glands, Ex e/i, stainless steel, NPT	A5E03907467
Set of cable glands, Ex e/i, brass nickel-plated, NPT	A5E03907473

Article No./Crossreference

Steel (T1)			Steel (T2)			Plastic liquid		
Data place 8,9,10 of 7ME372-... combination	Sensor part number	Sensor Size Code	Data place 8,9,10 of 7ME372-... combination	Sensor part number	Sensor Size Code	Data place 8,9,10 of 7ME372-... combination	Sensor part number	Sensor Size Code
1BB	7ME3950-5LG01	A1HT1	2BB	7ME3950-5LB11	A1	6BB	7ME3950-5LB01	A2
1BC	7ME3950-5LH01	A2HT1	2BC	7ME3950-5LB01	A2	6BC	7ME3950-5LB01	A2
1BD	7ME3950-5LB11	A1	2BD	7ME3950-5LB11	A1	6BD	7ME3950-5LB01	A2
1BE	7ME3950-5LB01	A2	2BE	7ME3950-5LB01	A2	6BE	7ME3950-5LB01	A2
1BF	7ME3950-5LB11	A1	2BF	7ME3950-5LB11	A1	6BF	7ME3950-5LB01	A2
1CB	7ME3950-5LG01	A1HT1	2CB	7ME3950-5LB11	A1	6CB	7ME3950-5LB01	A2
1CC	7ME3950-5LH01	A2HT1	2CC	7ME3950-5LB01	A2	6CC	7ME3950-5LB01	A2
1CD	7ME3950-5LJ01	A3HT1	2CD	7ME3950-5LB11	A1	6CD	7ME3950-5LB01	A2
1CE	7ME3950-5GK01	B1HT1	2CE	7ME3950-5GK21	B1HT2	6CE	7ME3950-5LB01	A2
1CF	7ME3950-5LB11	A1	2CF	7ME3950-5LB11	A1	6CF	7ME3950-5LB01	A2
1CG	7ME3950-5LB11	A1	2CG	7ME3950-5LB11	A1	6CG	7ME3950-5LB01	A2
1DB	7ME3950-5LG01	A1HT1	2DB	7ME3950-5LC11	B1	6DC	7ME3950-5LC01	B3
1DC	7ME3950-5LH01	A2HT1	2DC	7ME3950-5LC21	B2	6DD	7ME3950-5LC01	B3
1DD	7ME3950-5LJ01	A3HT1	2DD	7ME3950-5LC11	B1	6DE	7ME3950-5LC01	B3
1DE	7ME3950-5GK01	B1HT1	2DE	7ME3950-5GK21	B1HT2	6DF	7ME3950-5LC01	B3
1DF	7ME3950-5GL01	B2HT1	2DF	7ME3950-5GL21	B2HT2	6DG	7ME3950-5LC01	B3
1DG	7ME3950-5LC01	B3	2DG	7ME3950-5LC01	B3	6DH	7ME3950-5LC01	B3
1DH	7ME3950-5LC21	B2	2DH	7ME3950-5LC21	B2	6EC	7ME3950-5LC01	B3
1EB	7ME3950-5LG01	A1HT1	2EB	7ME3950-5LC11	B1	6ED	7ME3950-5LC01	B3
1EC	7ME3950-5LH01	A2HT1	2EC	7ME3950-5LC21	B2	6EE	7ME3950-5LC01	B3
1ED	7ME3950-5LJ01	A3HT1	2ED	7ME3950-5LC11	B1	6EF	7ME3950-5LC01	B3
1EE	7ME3950-5GK01	B1HT1	2EE	7ME3950-5GK21	B1HT2	6EG	7ME3950-5LC01	B3
1EF	7ME3950-5GL01	B2HT1	2EF	7ME3950-5GL21	B2HT2	6EH	7ME3950-5LC01	B3
1EG	7ME3950-5GM00	C1HT1	2EG	7ME3950-5GM20	C1HT2	6EJ	7ME3950-5LC01	B3
1EH	7ME3950-5GN00	C2HT1	2EH	7ME3950-5GN20	C2HT2	6EK	7ME3950-5LC01	B3
1EJ	7ME3950-5LC01	B3	2EJ	7ME3950-5LC01	B3	6FE	7ME3950-5LD00	C3
1EK	7ME3950-5LC01	B3	2EK	7ME3950-5LC01	B3	6FF	7ME3950-5LD00	C3
1FC	7ME3950-5LH01	A2HT1	2FC	7ME3950-5LD10	C1	6FG	7ME3950-5LD00	C3
1FD	7ME3950-5LJ01	A3HT1	2FD	7ME3950-5LD10	C1	6FH	7ME3950-5LD00	C3
1FE	7ME3950-5GK01	B1HT1	2FE	7ME3950-5GK21	B1HT2	6FJ	7ME3950-5LD00	C3
1FF	7ME3950-5GL01	B2HT1	2FF	7ME3950-5GL21	B2HT2	6FK	7ME3950-5LD00	C3
1FG	7ME3950-5GM00	C1HT1	2FG	7ME3950-5GM20	C1HT2	6GF	7ME3950-5LD00	C3
1FH	7ME3950-5GN00	C2HT1	2FH	7ME3950-5GN20	C2HT2	6GG	7ME3950-5LD00	C3
1FJ	7ME3950-5GP00	D1HT1	2FJ	7ME3950-5GP20	D1HT2	6GH	7ME3950-5LD00	C3
1FK	7ME3950-5LD10	C1	2FK	7ME3950-5LD10	C1	6GJ	7ME3950-5LD00	C3
1GD	7ME3950-5LJ01	A3HT1	2GD	7ME3950-5LD10	C1	6GK	7ME3950-5LD00	C3
1GE	7ME3950-5GK01	B1HT1	2GE	7ME3950-5GK21	B1HT2	6GL	7ME3950-5LD00	C3
1GF	7ME3950-5GL01	B2HT1	2GF	7ME3950-5GL21	B2HT2	6HG	7ME3950-5LE00	D3
1GG	7ME3950-5GM00	C1HT1	2GG	7ME3950-5GM20	C1HT2	6HH	7ME3950-5LE00	D3
1GH	7ME3950-5GN00	C2HT1	2GH	7ME3950-5GN20	C2HT2	6HJ	7ME3950-5LE00	D3
1GJ	7ME3950-5GP00	D1HT1	2GJ	7ME3950-5GP20	D1HT2	6HK	7ME3950-5LE00	D3

Flow Measurement

SITRANS FS (ultrasonic)

Clamp-on ultrasonic flowmeters / SITRANS FS230 ultrasonic flowmeter

Selection and ordering data (continued)

Steel (T1)			Steel (T2)			Plastic liquid		
1GK	7ME3950-5GQ00	D2HT1	2GK	7ME3950-5GQ20	D2HT2	6HL	7ME3950-5LE00	D3
1GL	7ME3950-5LD00	C3	2GL	7ME3950-5LD00	C3	6HM	7ME3950-5LE00	D3
1HE	7ME3950-5GK01	B1HT1	2HE	7ME3950-5GK21	B1HT2	6JJ	7ME3950-5LE00	D3
1HF	7ME3950-5GL01	B2HT1	2HF	7ME3950-5GL21	B2HT2	6JK	7ME3950-5LE00	D3
1HG	7ME3950-5GM00	C1HT1	2HG	7ME3950-5GM20	C1HT2	6JL	7ME3950-5LE00	D3
1HH	7ME3950-5GN00	C2HT1	2HH	7ME3950-5GN20	C2HT2	6JM	7ME3950-5LE00	D3
1HJ	7ME3950-5GP00	D1HT1	2HJ	7ME3950-5GP20	D1HT2	6KK	7ME3950-5LF00	E2
1HK	7ME3950-5GQ00	D2HT1	2HK	7ME3950-5GQ20	D2HT2	6KL	7ME3950-5LF00	E2
1HL	7ME3950-5GR00	D4HT1	2HL	7ME3950-5GR20	D4HT2	6KM	7ME3950-5LF00	E2
1JG	7ME3950-5GM00	C1HT1	2JG	7ME3950-5GM20	C1HT2	6LM	7ME3950-5LF00	E2
1JH	7ME3950-5GN00	C2HT1	2JH	7ME3950-5GN20	C2HT2			
1JJ	7ME3950-5GP00	D1HT1	2JJ	7ME3950-5GP20	D1HT2			
1JK	7ME3950-5GQ00	D2HT1	2JK	7ME3950-5GQ20	D2HT2			
1JL	7ME3950-5GR00	D4HT1	2JL	7ME3950-5GR20	D4HT2			
1KH	7ME3950-5GN00	C2HT1	2KH	7ME3950-5GN20	C2HT2			
1KJ	7ME3950-5GP00	D1HT1	2KJ	7ME3950-5GP20	D1HT2			
1KK	7ME3950-5GQ00	D2HT1	2KK	7ME3950-5GQ20	D2HT2			
1KL	7ME3950-5GR00	D4HT1	2KL	7ME3950-5GR20	D4HT2			
1LJ	7ME3950-5GP00	D1HT1	2LJ	7ME3950-5GP20	D1HT2			
1LK	7ME3950-5GQ00	D2HT1	2LK	7ME3950-5GQ20	D2HT2			
1LL	7ME3950-5GR00	D4HT1	2LL	7ME3950-5GR20	D4HT2			

Other (Univ)			Other (VH)		
Data place 8,9,10 of 7ME372-... combination	Sensor part number	Sensor Size Code	Data place 8,9,10 of 7ME372-... combination	Sensor part number	Sensor Size Code
7BB	7ME3950-5LB01	A2	8BB	7ME3950-5LA13	1
7BC	7ME3950-5LB01	A2	8BC	7ME3950-5LA13	1
7BD	7ME3950-5LB01	A2	8BD	7ME3950-5LA13	1
7BE	7ME3950-5LB01	A2	8BE	7ME3950-5LA13	1
7BF	7ME3950-5LB01	A2	8BF	7ME3950-5LA13	1
7CB	7ME3950-5LB01	A2	8CB	7ME3950-5LA13	1
7CC	7ME3950-5LB01	A2	8CC	7ME3950-5LA13	1
7CD	7ME3950-5LB01	A2	8CD	7ME3950-5LA13	1
7CE	7ME3950-5LB01	A2	8CE	7ME3950-5LA13	1
7CF	7ME3950-5LB01	A2	8CF	7ME3950-5LA13	1
7CG	7ME3950-5LB01	A2	8CG	7ME3950-5LA13	1
7DB	7ME3950-5LC01	B3	8DB	7ME3950-5LA13	1
7DC	7ME3950-5LC01	B3	8DC	7ME3950-5LA13	1
7DD	7ME3950-5LC01	B3	8DD	7ME3950-5LA13	1
7DE	7ME3950-5LC01	B3	8DE	7ME3950-5LA13	1
7DF	7ME3950-5LC01	B3	8DF	7ME3950-5LA13	1
7DG	7ME3950-5LC01	B3	8DG	7ME3950-5LA13	1
7DH	7ME3950-5LC01	B3	8DH	7ME3950-5LA13	1
7EB	7ME3950-5LC01	B3	8EB	7ME3950-5LA13	1
7EC	7ME3950-5LC01	B3	8EC	7ME3950-5LA13	1
7ED	7ME3950-5LC01	B3	8ED	7ME3950-5LA13	1
7EE	7ME3950-5LC01	B3	8EE	7ME3950-5LA13	1
7EF	7ME3950-5LC01	B3	8EF	7ME3950-5LA13	1
7EG	7ME3950-5LC01	B3	8EG	7ME3950-5LA13	1
7EH	7ME3950-5LC01	B3	8EH	7ME3950-5LA13	1
7EJ	7ME3950-5LC01	B3	8EJ	7ME3950-5LA13	1
7EK	7ME3950-5LC01	B3	8EK	7ME3950-5LA13	1
7FC	7ME3950-5LD00	C3	8FC	7ME3950-5LA23	2
7FD	7ME3950-5LD00	C3	8FD	7ME3950-5LA23	2
7FE	7ME3950-5LD00	C3	8FE	7ME3950-5LA23	2
7FF	7ME3950-5LD00	C3	8FF	7ME3950-5LA23	2
7FG	7ME3950-5LD00	C3	8FG	7ME3950-5LA23	2

Selection and ordering data (continued)

Other (Univ)			Other (VH)		
7FH	7ME3950-5LD00	C3	8FH	7ME3950-5LA23	2
7GD	7ME3950-5LD00	C3	8GD	7ME3950-5LA23	2
7GE	7ME3950-5LD00	C3	8GE	7ME3950-5LA23	2
7GF	7ME3950-5LD00	C3	8GF	7ME3950-5LA23	2
7GG	7ME3950-5LD00	C3	8GG	7ME3950-5LA23	2
7GH	7ME3950-5LD00	C3	8GH	7ME3950-5LA23	2
7GJ	7ME3950-5LD00	C3	8GJ	7ME3950-5LA23	2
7GK	7ME3950-5LD00	C3	8GK	7ME3950-5LA23	2
7GL	7ME3950-5LD00	C3	8GL	7ME3950-5LA23	2
7HE	7ME3950-5LE00	D3	8HE	7ME3950-5LA43	3
7HF	7ME3950-5LE00	D3	8HF	7ME3950-5LA43	3
7HG	7ME3950-5LE00	D3	8HG	7ME3950-5LA43	3
7HH	7ME3950-5LE00	D3	8HH	7ME3950-5LA43	3
7HJ	7ME3950-5LE00	D3	8HJ	7ME3950-5LA43	3
7HK	7ME3950-5LE00	D3	8HK	7ME3950-5LA43	3
7HL	7ME3950-5LE00	D3	8HL	7ME3950-5LA43	3
7HM	7ME3950-5LE00	D3	8HM	7ME3950-5LA43	3
7JG	7ME3950-5LE00	D3	8JG	7ME3950-5LA43	3
7JH	7ME3950-5LE00	D3	8JH	7ME3950-5LA43	3
7JJ	7ME3950-5LE00	D3	8JJ	7ME3950-5LA43	3
7JK	7ME3950-5LE00	D3	8JK	7ME3950-5LA43	3
7JL	7ME3950-5LE00	D3	8JL	7ME3950-5LA43	3
7JM	7ME3950-5LE00	D3	8JM	7ME3950-5LA43	3
7KH	7ME3950-5LF00	E2	8KH	7ME3950-5LA73	4
7KJ	7ME3950-5LF00	E2	8KJ	7ME3950-5LA73	4
7KK	7ME3950-5LF00	E2	8KK	7ME3950-5LA73	4
7KL	7ME3950-5LF00	E2	8KL	7ME3950-5LA73	4
7KM	7ME3950-5LF00	E2	8KM	7ME3950-5LA73	4
7LJ	7ME3950-5LF00	E2	8LJ	7ME3950-5LA73	4
7LK	7ME3950-5LF00	E2	8LK	7ME3950-5LA73	4
7LL	7ME3950-5LF00	E2	8LL	7ME3950-5LA73	4
7LM	7ME3950-5LF00	E2	8LM	7ME3950-5LA73	4

	Article No.	Option			
Spare parts (system) SITRANS FS230 IP65/IP66 (Nema 4X)	7ME3950-	●	●	●	●
Approvals					
All, FM/FMc, ATEX, IECEX - Flow sensors	5				
All, FM/FMc, ATEX, IECEX - Temperature sensors	1				
Spare sensor code For liquid flow sensors pipe ranges please refer to catalog sensor selection chart in the FSS200 section					
Flow sensors for use with mounting frames or tracks Suitable for pipes other than steel or stainless steel Temperature -40 ... +121 °C (-40 ... +250 °F)					
• A1 Universal	5	L	B	1	1
• A2 Universal	5	L	B	0	1
• B1 Universal	5	L	C	1	1
• B2 Universal	5	L	C	2	1
• B3 Universal	5	L	C	0	1
• C1 Universal	5	L	D	1	0
• C2 Universal	5	L	D	2	0
• C3 Universal	5	L	D	0	0
• D1 Universal	5	L	E	1	0
• D2 Universal	5	L	E	2	0

Flow Measurement

SITRANS FS (ultrasonic)

Clamp-on ultrasonic flowmeters / SITRANS FS230 ultrasonic flowmeter

Selection and ordering data (continued)

	Article No.	Option
Spare parts (system)		
SITRANS FS230	7ME3950-●●●●●	
IP65/IP66 (Nema 4X)		
• D3 Universal	5 L E 0 0	
• E1 Universal	5 L F 1 0	
• E2 Universal	5 L F 0 0	
• E3 Universal	5 L F 2 0	
Gas and liquid sensors for use with mounting frames or tracks		
Suitable for steel or stainless steel pipes		
Temperature T1		
• A1H high precision	5 L G 0 1	
• A2H high precision	5 L H 0 1	
• A3H high precision	5 L J 0 1	
• B1H high precision	5 G K 0 1	
• B2H high precision	5 G L 0 1	
• B3H high precision	5 G t 0 1	
• C1H high precision	5 G M 0 0	
• C2H high precision	5 G N 0 0	
• D1H high precision	5 G P 0 0	
• D2H high precision	5 G Q 0 0	
• D3H high precision	5 G U 0 0	
• D4H high precision	5 G R 0 0	
Temperature T2		
• B1H high precision	5 G K 2 1	
• B2H high precision	5 G L 2 1	
• B3H high precision	5 G T 2 1	
• C1H high precision	5 G M 2 0	
• C2H high precision	5 G N 2 0	
• D1H high precision	5 G P 2 0	
• D2H high precision	5 G Q 2 0	
• D3H high precision	5 G U 2 0	
• D4H high precision	5 G R 2 0	
High temperature universal liquid sensors		
Very high temperature up to 230 °C (446 °F)		
• Size 1 (∅ 12.7 ... 100 mm (0.47 ... 3.94"))	5 L A 1 3	
• Size 2 (∅ 30 ... 200 mm (1.18 ... 7.87"))	5 L A 2 3	
• Size 2A (∅ 30 ... 200 mm (1.18 ... 7.87"))	5 L A 3 3	
• Size 3 (∅ 150 ... 610 mm (5.9 ... 24.0"))	5 L A 4 3	
• Size 3A (∅ 150 ... 610 mm (5.9 ... 24.0"))	5 L A 6 3	
• Size 4 (∅ 400 ... 1200 mm (16.75 ... 47.24"))	5 L A 7 3	
• Size 4A (∅ 400 ... 1200 mm (16.75 ... 47.24"))	5 L A 8 3	
RTD sensors for temperature measurement		
Standard clamp-on RTD	1 T A 0 0	
Submersible clamp-on RTD	1 T B 0 0	
Insertion sensor PT1000 for use with thermowells - non Ex. For variants please select SITRANS TS500 (7MC7500)		
SITRANS TS500 Insert 140 mm (5.5 in)	7MC7500-1JB26-4BF3-Z	E00
SITRANS TS500 Insert 216 mm (8.5 in)	7MC7500-1JC06-6BF3-Z	E00+Y44
SITRANS TS500 Insert 292 mm (11.5 in)	7MC7500-1JC06-6BF3-Z	E00+Y44
SITRANS TS500 Insert 368 mm (14.5 in)	7MC7500-1JD06-6BF3-Z	E00+Y44
SITRANS TS500 Insert 444 mm (17.5 in)	7MC7500-1JE06-6BF3-Z	E00+Y44
SITRANS TS500 Insert 597 mm (23.5 in)	7MC7500-1JE06-6BF3-Z	E00+Y44
Insert thermowells for TS550 RTD		
For details or variants please select Thermowell BAR (7MT2351)		
SITRANS TS Thermowell 140 mm (5.5 in)	7MT2351-0AB02-1EB2-Z	Y44

Selection and ordering data (continued)

	Article No.	Option
Spare parts (system)		
SITRANS FS230 IP65/IP66 (Nema 4X)	7ME3950-	● ● ● ● ●
SITRANS TS Thermowell 216 mm (8.5 in)	7MT2351-0BB02-1EB2-Z	Y44
SITRANS TS Thermowell 292 mm (11.5 in)	7MT2351-0CB02-1EB2	
SITRANS TS Thermowell 368 mm (14.5 in)	7MT2351-0CB02-1EB2-Z	Y44
SITRANS TS Thermowell 444 mm (17.5 in)	7MT2351-0DB02-1EB2-Z	Y44
SITRANS TS Thermowell 597 mm (23.5 in)	7MT2351-0EB02-1EB2-Z	Y44
	Article No.	
Spare parts (Miscellaneous)		
SITRANS FS Clamp-on	7ME3960-	● ● ● ● ●
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
FS230 dedicated sensor mounting hardware		
Sensor mounting frames for		
Universal sensor size B, for pipes > 125 mm (5 inch)	CQO:1012FN-PB	
Universal sensor size C	0 M C 0 0	
Universal sensor size D	0 M C 0 1	
Universal sensor size E	0 M C 0 2	
High precision sensor size B, for pipes > 125 mm (5 inch)	CQO:1012FNH-PB	
High precision sensor size C	3 M D 0 0	
High precision sensor size D	3 M D 0 1	
Magnetic mounting frames for size C, D, E, universal and high precision sensors	3 M D 0 2	
Spacer bars (for indexing sensors on pipe)		
Spacer bar for pipes to 200 mm/8 inch (liquid), 600 mm/24 inch (gas)	3 M S 1 0	
Spacer bar for pipes to 500 mm/20 inch (liquid), DN 1200/48 inch (gas)	3 M S 2 0	
Spacer bar for pipes to 800 mm/32 inch (liquid)	3 M S 3 0	
Spacer bar for pipes to 1200 mm/48 inch (liquid). Must be used with 7ME39600SM30	3 M S 4 0	
Mounting straps (slotted stainless steel)		
For pipes		
DN 50 ... 150 (2" ... 4")	0 S M 0 0	
DN 50 ... 300 (2" ... 12")	0 S M 1 0	
DN 300 ... 600 (12" ... 24")	0 S M 2 0	
DN 600 ... 1200 (24" ... 48")	0 S M 3 0	
DN 1200 ... 1500 (48" ... 60")	0 S M 4 0	
DN 1500 ... 2100 (60" ... 84")	0 S M 5 0	
DN 2100 ... 3000 (84" ... 120")	0 S M 6 0	
High precision mounting enclosures for sensors		
Stainless steel mounts for high precision size "C" sensors, single enclosure	0 W S 5 0	
Stainless steel mounts for high precision size "D/E" sensors, single enclosure	0 W S 6 0	
Stainless steel mounts for high precision size "C" sensors, dual enclosure	0 W D 5 0	
Stainless steel mounts for high precision size "D/E" sensors, dual enclosure	0 W D 6 0	
Stainless steel bands for high precision mounting enclosures		
Mounting strap for pipe diameter to		
300 mm (13")	0 S M 0 1	
600 mm (24")	0 S M 1 1	
1200 mm (48")	0 S M 2 1	
1500 mm (60")	0 S M 3 1	
2130 mm (84")	0 S M 4 1	
3050 mm (120")	0 S M 5 1	
5486 mm (216")	0 S M 6 1	
ADAPTER, MTG STRAP, TEMP COMP	CQO:1012WSM-A2	
Sensor mounting tracks (aluminum with mounting straps) for pipes < 125 mm (5 inch)		
Universal sensor size A or B	0 M A 0 0	
High precision sensor size A or B	0 M B 0 0	
Stainless mounting tracks for high temperature 991 sensors		
Size 1 high temperature sensor pair	CQO: 992MTNHMSH-1	
Size 2 high temperature sensor pair	CQO: 992MTNHMSH-2	
Size 3 high temperature sensor pair	CQO: 992MTNHMSH-3	
Size 4 high temperature sensor pair	CQO: 992MTNHMSH-4	

Flow Measurement

SITRANS FS (ultrasonic)

Clamp-on ultrasonic flowmeters / SITRANS FS230 ultrasonic flowmeter

Selection and ordering data (continued)

Spare parts (Miscellaneous) SITRANS FS Clamp-on	Article No.				
	7ME3960-	●	●	●	●
Clamp-on RTD mounting hardware for dedicated systems					
RTD mounting hardware for dedicated system					
1152 ... 610 mm (6 ... 24")		0	M	R	0 0
12.7 ... 50.8 mm (0.5 ... 2")		0	M	R	0 1
31.8 ... 203.2 mm (1.25 ... 8")		0	M	R	0 2
508 ... 1219 mm (20 ... 48")		0	M	R	0 4
Sensor cables					
Coax (CE mark)					
10 m (32.8 ft) armored sensor cable pair with nickel plated brass glands	A5E38028474004				
20 m (65.6 ft) armored sensor cable pair with nickel plated brass glands	A5E38028474005				
10 m (32.8 ft) standard/submersible Coax sensor cable pair with Nylon glands	A5E39669934004				
20 m (65.6 ft) standard/submersible Coax sensor cable pair with Nylon glands	A5E39669934005				
10 m (32.8 ft) standard/submersible Coax sensor cable pair with nickel plated brass glands	A5E39669934009				
20 m (65.6 ft) standard/submersible Coax sensor cable pair with nickel plated brass glands	A5E39669934010				
10 m (32.8 ft) standard/submersible Coax sensor cable pair with stainless steel glands	A5E39669934014				
20 m (65.6 ft) standard/submersible Coax sensor cable pair with stainless steel glands	A5E39669934015				
20 m (65.6 ft) plenum rated Coax sensor cable pair with Nylon glands	A5E39669934020				
20 m (65.6 ft) plenum rated Coax sensor cable pair with nickel plated brass glands	A5E39669934025				
20 m (65.6 ft) plenum rated Coax sensor cable pair with stainless steel glands	A5E39669934030				
Cable glands and adapters					
Cable gland set M20, nylon	A5E38145321				
Cable gland set M20, nickel/brass	A5E38145323				
Cable gland set M20, stainless steel	A5E38145327				
Iris glands, set of 2, nickel plated brass	A5E38635890				
Iris glands, set of 2, stainless steel	A5E38635986				
M20xNPT adapters, set of 8, brass/nickel	A5E38145635				
M20xNPT adapters, set of 8, brass/nickel, Ex	A5E38309159				
M20xNPT adapters, set of 8, stainless steel	A5E38145643				
RTD temperature sensor cables					
6 m (20 ft) standard RTD cable		0	C	R	0 1
15 m (50 ft) standard RTD cable		0	C	R	0 2
30 m (100 ft) standard RTD cable		0	C	R	0 3
46 m (150 ft) standard RTD cable		0	C	R	0 4
61 m (200 ft) standard RTD cable		0	C	R	0 5
91 m (300 ft) standard RTD cable		0	C	R	0 6
6 m (20 ft) submersible RTD cable		0	C	R	1 1
15 m (50 ft) submersible RTD cable		0	C	R	1 2
30 m (100 ft) submersible RTD cable		0	C	R	1 3
46 m (150 ft) submersible RTD cable		0	C	R	1 4
61 m (200 ft) submersible RTD cable		0	C	R	1 5
91 m (300 ft) submersible RTD cable		0	C	R	1 6
Dedicated cable termination kits for:					
Standard, plenum sensor cable (NEMA 4X and NEMA 7 wall)		0	C	T	0 1
Submersible sensor cable (NEMA 4X and NEMA 7 wall)		0	C	T	1 1
Clamp-on RTD cable termination kit for standard RTD		0	C	T	2 1
Clamp-on RTD cable termination kit for submersible RTD		0	C	T	3 1
Insert RTD cable termination kit		0	C	T	4 1
Termination kit for armored cable	CQO:1012CNFX-TK				
Ultrasonic couplants					
Temporary water based for portable systems: 350 ml (12 oz): -34 ... +38 °C (-30 ... +100 °F)		0	U	C	1 0
Permanent synthetic polymer based: 90 ml (3 oz) -40 ... +190 °C (-40 ... +375 °F)		0	U	C	2 0
Permanent high temperature fluoroether: 163 ml (5.5 oz): -40 ... +230 °C (-40 ... +450 °F)		0	U	C	3 1
Dry coupling pad kit (10 pieces)		0	U	C	4 0
Permanent vulcanizing silicone rubber couplant: 90 ml (3 oz): -40...+120C (-40...+250F)	CQO:CC112				
Permanent high temperature silicone grease: 12 ml (0.4 oz): -40 ... +230 °C (-40 ... +450 °F)	CQO:CC117B				
Permanent high temperature silicone grease: 150 ml (5 oz): -40 ... +230 °C (-40 ... +450 °F)	CQO:CC117A				
Couplant for submersible sensor applications	CQO:CC120				

Selection and ordering data (continued)

Spare parts (Miscellaneous)	Article No.					
SITRANS FS Clamp-on	7ME3960- ● ● ● ● ●					
Pipe damping films						
B1, B2, B3, C1 and C2 sensors		0	D	M	1	0
D1 and D3 sensors		0	D	M	2	0
D2 sensor		0	D	M	3	0
D4 sensor		0	D	M	4	0
Universal sensor test blocks						
Test block for size A and B universal sensors		0	T	B	1	0
Test block for size C and D universal sensors		0	T	B	2	0
Thickness gauge						
Stand alone thickness gauge		7ME39510TG20				
Cable, DSL to wallbox transmitter						
Standard cable (non-Ex) with 2 × M12 connectors, PO insulation and PUR sleeve, gray, -40 ... +80 °C (-40 ... +176 °F)						
• 5 m (16.4 ft)		A5E03914805				
• 10 m (32.8 ft)		A5E03914850				
• 25 m (82 ft)		A5E03914853				
• 50 m (164 ft)		A5E03914859				
• 75 m (246 ft)		A5E03914861				
• 150 m (492 ft)		A5E03914874				
Standard cable (non-Ex) for termination, PO insulation and PUR sleeve, gray, -40 ... +80 °C (-40 ... +176 °F)						
• 5 m (16.4 ft)		A5E03914833				
• 10 m (32.8 ft)		A5E03914849				
• 25 m (82 ft)		A5E03914854				
• 50 m (164 ft)		A5E03914856				
• 75 m (246 ft)		A5E03914864				
• 150 m (492 ft)		A5E03914873				
Standard cable (Ex) with 2 × M12 connectors, PO insulation and PUR sleeve, blue, -40 ... +80 °C (-40 ... +176 °F)						
• 5 m (16.4 ft)		A5E03914929				
• 10 m (32.8 ft)		A5E03914962				
• 25 m (82 ft)		A5E03914995				
• 50 m (164 ft)		A5E03915004				
• 75 m (246 ft)		A5E03915074				
• 150 m (492 ft)		A5E03915088				
Standard cable (Ex) for termination, PO insulation and PUR sleeve, blue, -40 ... +80 °C (-40 ... +176 °F)						
• 5 m (16.4 ft)		A5E03914945				
• 10 m (32.8 ft)		A5E03914973				
• 25 m (82 ft)		A5E03914984				
• 50 m (164 ft)		A5E03915015				
• 75 m (246 ft)		A5E03915057				
• 150 m (492 ft)		A5E03915100				

Flow Measurement

SITRANS FS (ultrasonic)

Clamp-on ultrasonic flowmeters / SITRANS FSS200 ultrasonic flow sensor

Application



SITRANS FSS200 Clamp-on ultrasonic flow sensor

Sensor type selection guide

Considerations for sensor selection	Standard sensors supported in MLFB		Notes
	High precision	Universal	
Media			
General survey (clean liquids) on non-steel pipes	-	X	-
General survey (clean liquids) on a limited range of steel pipes	X	-	-
Moderately aerated liquid or slurry, up to 121 °C (250 °F)	X	-	-
Permanent installation on steel pipe (clean liquids and gases)	X	-	-
Installation in offshore or corrosive environment	X ¹⁾	X ²⁾	Sensor size C/D/E come standard as corrosion resistant. Size A and B optional stainless steel
Liquid temperature greater than 120 °C (248 °F)	O	X	FSS200 high temperature metal block sensors - up to 232 °C (450 °F)
Operation on single pipeline flowing multiple products	X	O	-
Pipe material			
Steel	X	-	-
Steel pipe with diameter/wall thickness ratio < 10	O	X	-
Non-steel pipe material (copper, ductile iron, cast iron, etc.)	O	X	High precision sensors can also be used on plastic and aluminum pipes in special cases
Wall thickness > 31.75 mm (1.25")	O	X	-

O = not suitable

X = preferred choice

¹⁾ For steel and stainless steel pipes only

²⁾ Not preferred for steel pipes

Definitions

Sensor chart	Description
FSS200	Formerly 1011 clamp-on sensors of the 1010 systems
Standard	Standard system sensor, selectable as part of a configured product
Special	Sensors available for non-standard applications and pipes. Contact tech support for application use
Corrosions resistant	Stainless steel metal parts on all Size C, D and E and all high temperature sensors
Aluminum	Aluminum metal parts on all HP and Universal size A and B (Corrosion resistant on request for size B)
Spare	Not available as part of a configured product, must be ordered separately
CE	Transmitter and sensors certified for sale in the EU
Trackless mount	Sensors fixed only by straps, no other mounting (spacer bar as an option) - not recommended
Tracks	Permanent installation for universal size A/B, high precision size A/B and all sizes of high temperature. Tracks always come as dual-part for either direct or reflect mounting, and always with straps.
Frames	Three sizes, for permanent installation for universal size C/ D/ E, and for high precision size C/D. For universal and high precision size B available for pipes > 125 OD (Spare)
T1	Usable from -40 ... +120 °C (-40 ... +248 °F), but best for Ø temperature below 80 °C (< 176 °F); standard
T2	Usable from -40 ... +120 °C (-40 ... +248 °F), but best for Ø temperature above 80 °C (< 176 °F)
Submersible	Sensors can be used submerged; adding Denso for supplemental protection is recommended

Application (continued)

Approvals

Approvals for FSS200 sensors

Canada, USA	Class I, Division 1, Groups A, B, C, D Class II, Division 1, Groups E, F, G Class III Class I, Zone 0, AEx/Ex ia IIC T6...T4 Gc Class II, Zone 21; AEx/Ex ib IIIC T70°C...T110°C Db
<ul style="list-style-type: none"> • FM16CA0142X • FM16U50280X • CSA 80083297X 	
ATEX, UKEx, IECEx	II 1G Ex ia IIC T6...T4 Ga II 2D Ex ib IIIC T70°C...T110°C Db
<ul style="list-style-type: none"> • IECEx FMG 17.0004X • FM16ATEX0090 • FM21UKEX0057X 	
Ambient temperature range	Depends on the sensor
Dust temperature class	$T_{dust} = T_a^{max} + 10 \text{ °K}$ (T70 °C für $T_a = 60 \text{ °C}$, T110 °C für $T_a = 100 \text{ °C}$)

Sensor availability guide

FSS200 Universal Sensor

FSS200 Universal Sensor -40 ... 120 °C (-40 ... +248 °F) plastic - stainless steel housing CE IP68												
Sensor models	Stand- ard	Spare only	ATEX, FM, FMc, IECEX	Corro- sion resist- ant	Track- less	Tracks	Frames	High preci- sion mount	T1 ²⁾	T2 ³⁾	Sub- mers- ible	Catalog
A1 Universal for pipe OD – 5.8 ... 50.8 mm (0.23" ... 2")	-	X	X	X	X ¹⁾	X	-	-	-	-	X	-
A2 Universal for pipe OD – 12.7 ... 50.8 mm (0.5" ... 2")	X	-	X	X	X ¹⁾	X	-	-	-	-	X	X
B1 Universal for pipe OD – 12.7 ... 76 mm (0.5" ... 3")	-	X	X	X	X ¹⁾	X	X	-	-	-	X	-
B2 Universal for pipe OD – 12.7 ... 76 mm (0.5" ... 3")	-	X	X	X	X ¹⁾	X	X	-	-	-	X	-
B3 Universal for pipe OD – 19 ... 127 mm (0.75" ... 5")	X	-	X	X	X ¹⁾	X	X	-	-	-	X	X
C1 Universal for pipe OD – 51 ... 254 mm (2" ... 10")	-	X	X	X	X	-	X	-	-	-	X	-
C2 Universal for pipe OD – 51 ... 254 mm (2" ... 10")	-	X	X	X	X	-	X	-	-	-	X	-
C3 Universal for pipe OD – 51 ... 305 mm (2" ... 12")	X	-	X	X	X	-	X	-	-	-	X	X
D1 Universal for pipe OD – 102 ... 508 mm (4" ... 20")	-	X	X	X	X	-	X	-	-	-	X	-
D2 Universal for pipe OD – 152 ... 610 mm (6" ... 24")	-	X	X	X	X	-	X	-	-	-	X	-
D3 Universal for pipe OD – 203 ... 610 mm (8" ... 24")	X	-	X	X	X	-	X	-	-	-	X	X
E1 Universal for pipe OD – 254 ... 3048 mm (10" ... 120")	-	X	X	X	X	-	X	-	-	-	X	-
E2 Universal for pipe OD – 254 ... 6096 mm (10" ... 240")	X	-	X	X	X	-	X	-	-	-	X	X
E3 Universal for pipe OD – 304 ... 10007 mm (12" ... 394")	-	X	X	X	X	-	X	X	-	-	X	-

X = available

1) Usable but not recommended for selection

2) Best use at a temperature of < 80 °C (176 °F)

3) Best use at a temperature of > 80 °C (176 °F)

Flow Measurement

SITRANS FS (ultrasonic)

Clamp-on ultrasonic flowmeters / SITRANS FSS200 ultrasonic flow sensor

Application (continued)

FSS200 High Precision Sensor

FSS200 High Precision Sensor -40 ... 120 °C (-40 ... +248 °F) plastic - stainless steel housing T1/T2 CE IP68												
Sensor models	Stand- ard	Spare only	ATEX/F- M/FMc/I- ECEX	Corro- sion resist- ant	Track- less	Tracks	Frames	High pre- cision mount	T1 ²⁾	T2 ³⁾	Sub- mersible	Catalog
A1H (High Precision) for pipe WT - 0.64 ... 1.0 mm (0.025" ... 0.04")	-	X	X	X	X ¹⁾	X	-	-	X	-	X	X
A2H (High Precision) for pipe WT - 1.0 ... 1.5 mm (0.04" ... 0.06")	X	-	X	X	X ¹⁾	X	-	-	X	-	X	X
A3H (High Precision) for pipe WT - 1.5 ... 2.0 mm (0.06" ... 0.08")	X	-	X	X	X ¹⁾	X	-	-	X	-	X	X
B1H (High Precision) for pipe WT - 2.0 ... 3.0 mm (0.08" ... 0.12")	X	-	X	X	X ¹⁾	X	X	-	X	X	X	X
B2H (High Precision) for pipe WT - 3.0 ... 4.1 mm (0.12" ... 0.16")	X	-	X	X	X ¹⁾	X	X	-	X	X	X	X
B3H (High Precision) for pipe WT - 2.7 ... 3.3 mm (0.106" ... 0.128")	-	X	X	X	X ¹⁾	X	X	-	X	X	X	X
C1H (High Precision) for pipe WT - 4.1 ... 5.8 mm (0.16" ... 0.23")	X	-	X	X	X	-	X	X	X	X	X	X
C2H (High Precision) for pipe WT - 5.8 ... 8.1 mm (0.23" ... 0.32")	X	-	X	X	X	-	X	X	X	X	X	X
D1H (High Precision) for pipe WT - 8.1 ... 11.2 mm (0.32" ... 0.44")	X	-	X	X	X	-	X	X	X	X	X	X
D2H (High Precision) for pipe WT - 11.2 ... 15.7 mm (0.44" ... 0.62")	X	-	X	X	X	-	X	X	X	X	X	X
D3H (High Precision) for pipe WT - 7.4 ... 9.0 mm (0.293" ... 0.354")	-	X	X	X	X	-	X	X	X	X	X	X
D4H (High Precision) for pipe WT - 15.7 ... 31.8 mm (0.62" ... 1.25")	X	-	X	X	X	-	X	X	X	X	X	X

X = available

1) Usable but not recommended for selection

2) Best use at a temperature of < 80 °C (176 °F)

3) Best use at a temperature of > 80 °C (176 °F)

FSS200 High Temperature Universal Sensor

FSS200 High Temperature Universal Sensor -40 ... +230 °C (-40 ... +446 °F)												
Sensor models	Stand- ard	Spare only	ATEX/F- M/FMc/I- ECEX	Corro- sion resist- ant	Track- less	Tracks	Frames	High pre- cision mount	T1 ¹⁾	T2 ²⁾	Sub- mersible	Catalog
High Temperature size 1 ... 230 °C (Ø 12.7 ... 100 mm)	-	X	X	X	-	X	-	-	-	-	-	-
High Temperature size 2 ... 230 °C (Ø 30 ... 200 mm)	X	-	X	X	-	X	-	-	-	-	-	X
High Temperature size 3 ... 230 °C (Ø 150 ... 610 mm)	X	-	X	X	-	X	-	-	-	-	-	X
High Temperature size 4 ... 230 °C (Ø 400 ... 1200 mm)	X	-	X	X	-	X	-	-	-	-	-	X
High Temperature size 2A ... 230 °C (Ø 30 ... 200 mm)	-	X	X	X	-	X	-	-	-	-	-	-
High Temperature size 3A ... 230 °C (Ø 150 ... 610 mm)	-	X	X	X	-	X	-	-	-	-	-	-
High Temperature size 4A ... 230 °C (Ø 400 ... 1200 mm)	-	X	X	X	-	X	-	-	-	-	-	-

1) Best use at a temperature of < 80 °C (176 °F)

2) Best use at a temperature of > 80 °C (176 °F)

Application (continued)**Sensor mounting availability guide**

Mounting	Sensor FSS200 Universal dedicated	FSS200 Dedicated high precision	FSS200 High temperature universal
Trackless ¹⁾	X	X	-
Tracks universal dedicated	X	-	-
Tracks HP dedicated	-	X	-
Frames universal dedicated	X	-	-
Frames HP dedicated	-	X	-
Tracks high temperature universal	-	-	X
High precision mounting single enclosure	-	X	-
High precision mounting dual enclosure	-	X	-
SpacerBar	X	X	-
Straps	X	X	X
Denso	X	X	-

¹⁾ Usable but not recommended

Flow Measurement

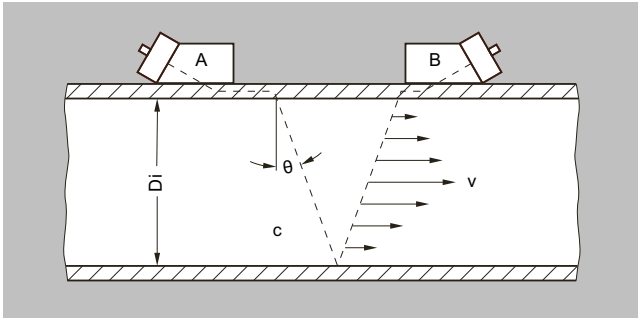
SITRANS FS (ultrasonic)

Clamp-on ultrasonic flowmeters / SITRANS FSS200 ultrasonic flow sensor

Function

Operating principle

The SITRANS FS system is a transit-time ultrasonic meter that provides exceptional performance using a non-intrusive clamp-on approach. Ultrasonic sensors transmit and receive acoustic signals directly through the existing pipe wall, where the fluid refraction angle is governed by Snell's law of refraction.



Clamp-on sensor mounted in a reflect configuration

The beam refraction angle is calculated as follows:

$$\sin \theta = c / V_{\phi}$$

c = Velocity of sound in fluid

V_{ϕ} = Phase velocity (a constant in the pipe wall)

The flowmeter automatically compensates for any change in fluid sound velocity (or beam angle) in response to variations in the average transit time between sensors A and B. By subtracting the computed fixed times (within the sensor and pipe wall) from the measured average transit time, the meter can then infer the required transit time in the fluid (T_{Fluid}).

The sound waves traveling in the same direction as the flow ($T_{A,B}$) arrive earlier than sound waves traveling against the direction of flow ($T_{B,A}$). This time difference (Δt) is used to compute the line integrated flow velocity (v) as shown in the equation below:

$$v = V_{\phi} / 2 \cdot \Delta t / T_{\text{Fluid}}$$

Once the raw flow velocity is determined, the fluid Reynolds Number (Re) must be determined to properly correct for fully developed flow profile. This requires the entry of the fluid's kinematic viscosity (visc) as shown in the equations below, where Q represents the final flow profile compensated volumetric flow rate.

$$Re = D_i \cdot v / \text{visc} \quad Q = K(Re) \cdot (\pi / 4 \cdot D_i^2) \cdot v$$

v = Flow velocity

$\text{visc} = \mu / \rho$ = (dynamic viscosity / density)

$K(Re)$ = Reynolds flow profile compensation

In wetted type ultrasonic flowmeters the meter constants are configured prior to leaving the factory. As this is not possible with clamp-on meters, the settings must be made by the customer at the time of installation. These settings include pipe diameter, wall thickness, liquid viscosity, etc.

SITRANS clamp-on flowmeters that include temperature sensing can be configured to dynamically infer changes in fluid viscosity for the purpose of computing the most accurate flow profile compensation (K_{Re}).

Ultrasonic sensor types

Two basic types of clamp-on sensors can be selected for use with the SITRANS FS flowmeter. The lower cost "universal" sensor is the most common type in the industry and is suitable for most single liquid applications where the sound velocity does not vary much.

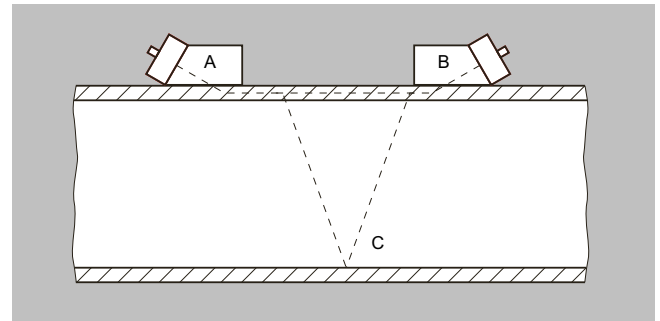
This sensor type can be used on any sonically conductive pipe material (including steel) making it well suited for portable survey applications. Universal sensors are selected based on the pipe dia-

Function (continued)

meter range alone, so wall thickness is less important to the selection process.

The second sensor type is the patented "WideBeam" sensor (called high precision), which utilizes the pipe wall as a kind of waveguide to optimize the signal to noise ratio and provide a wider area of vibration. This makes this kind of sensor less sensitive to any change in the fluid medium.

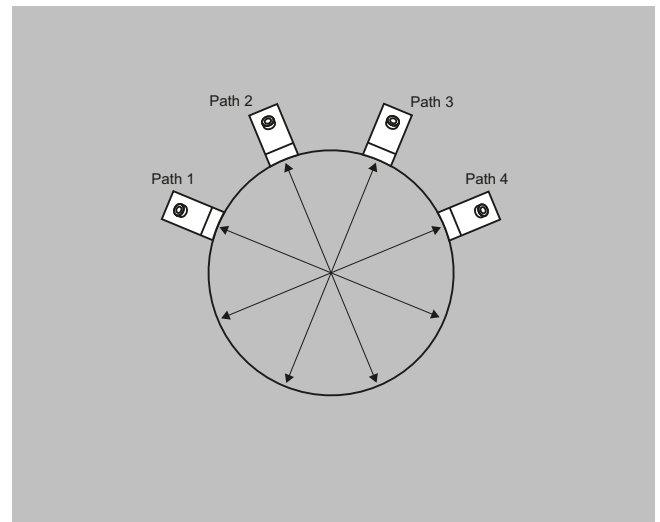
The WideBeam sensor is designed for steel pipes, but can also be used with aluminum and titanium. It is the preferred sensor for HPI applications. Note that unlike the universal type, this sensor selection is dependent only on the pipe's wall thickness.



Multi-path flowmeters

For improved flow profile averaging, redundancy or better cost per measurement, clamp-on meters can be supplied with 1, 2, 3 or 4 path measurement systems.

In the standard FS230 systems, these can be installed on a single pipe as shown below (four paths on same pipe).



Four path installation example

SITRANS meter family description

SITRANS FS230 clamp-on flowmeters

The FS230 system is a basic function, permanent (or dedicated) Clamp-on meter that is available with a full range of safety approvals and I/Os. This meter can be used in a wide range of applications.

FST030 transmitter standard flow functions

When configured with standard flow functions, the FST030 transmitter is typically programmed with a fixed viscosity and specific

Function (continued)

gravity entry, which can limit the mass flow and volumetric flow accuracy when highly variable (multi-product) liquid properties flow through the same pipeline.

It will have the ability to accommodate clamp-on RTDs, or analog input from a temperature transmitter.

FST030 hydrocarbon flow functions

When configured with hydrocarbon functions, the FST030 can be used for applications that will flow a wide range of viscosity with a standard volume (mass) and interface detection functions available. All functions rely on a variable referred to as "Liquident (TM)", which is used to infer the liquid's viscosity and density. This variable represents the measured liquid sonic velocity compensated by the operating temperature and pressure, so for a given liquid product the measured Liquident (TM) output will remain constant over a wide range of pressure or temperature.

Standard volume description

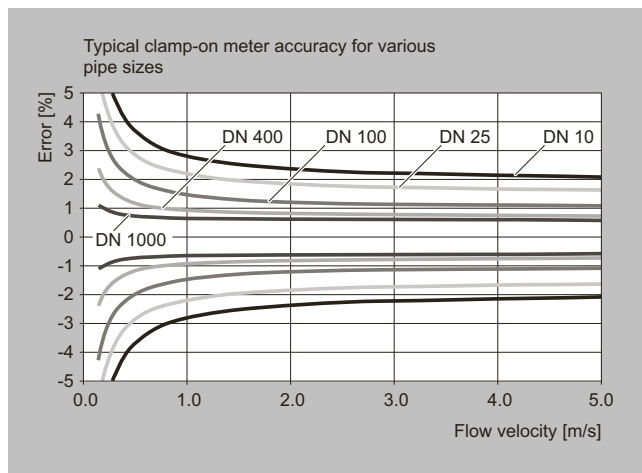
This Liquident (TM) variable can also be used to identify the liquid flowing through the pipe as well as its physical properties (density, viscosity and compressibility) at base conditions. With this information the meter can be configured to output a temperature and pressure compensated (standard) volume flow rate using the API MPMS chapter 11.2.1 methods as shown below.

Correction for temperature	
Compute thermal expansion coefficient (α_b): $\alpha_b = KO / \rho_b^2 + K1 / \rho_b$	where KO and K1 are constants dependent on type of liquid and ρ_b is the liquid density at base conditions
Compute temperature correction factor (K_t): $K_t = \rho_b * \text{EXP}(-\alpha_b \Delta T (1 + 0.8 \alpha_b \Delta T))$	where $\Delta T = (T - \text{base temperature})$
Correction for pressure	
Compute compressibility factor (F): $F = \text{EXP}(A + B T + (C + D T) / \rho_b^2)$	where A, B, C and D are constants, and "T" is liquid temperature
Compute pressure correction factor (K_p): $K_p = 1 / (1 - F (P_{\text{act}} - P_{\text{base}}) * 10^{-4})$	
Final volume correction	
$Q_{\text{std}} = Q_{\text{act}} * K_t * K_p$	

Available outputs from this meter include: API, standard density, mass flowrate, standard volume flowrate and liquid identification.

General installation guidelines for transit time clamp-on sensor

- Minimum measuring range: 0 to ± 0.3 m/s velocity (see meter accuracy graph below for more detail)
- Maximum measuring range: 0 to ± 12 m/s (± 30 m/s for high precision sensors). Final flow range determination requires application review

**Function (continued)**

- Pipe must be completely full within the sensor installation volume for accurate flow measurement
- Typical MINIMUM straight pipe requirements are: 10 Diameters upstream / 5 Diameters downstream. Additional straight run is required for double out-of-plane elbows and partially open valves
- Sensors should be installed at least 20° off vertical for horizontal pipes. This reduces the chance of beam interference from gas buildup at the top of the pipe
- Operation inside the Reynolds transition region, between $1\ 000 < Re < 5\ 000$ should be avoided for best accuracy
- Submersible and direct burial installations can be accommodated. Consult sales representative for details
- Ultrasonic coupling compound is provided with all sensor orders. Insure that a permanent coupling compound is used for long term installations
- Refer to the "Sensor type selection guide" to insure proper application of the equipment

Flow Measurement

SITRANS FS (ultrasonic)

Clamp-on ultrasonic flowmeters / SITRANS FST030 transmitter

Overview



FST030 is based on the latest developments within Digital Signal Processing (DSP) technology – engineered for high measuring performance, fast response to step changes in flow, high immunity against process noise, easy to install commission and maintain.

The FST030 transmitter delivers true multi-parameter measurements i.e. volume flow, standard volume flow, density, mass flow, fluid sound velocity and temperature.

The multiple outputs and bus communication mean that all primary process information can be read either instantaneously (10 ms update) or periodically as required by plant operations.

Process values

- Volume flow
- Mass flow
- Flow velocity
- Sound velocity
- Standard volume flow (hydrocarbon variant only)
- Density
- Kinematic viscosity
- Pressure
- Medium temperature
- Specific gravity (hydrocarbon variant only)
- Totalizer 1
- Totalizer 2
- Totalizer 3
- Standard density (hydrocarbon variant only)
- Standard specific gravity (hydrocarbon variant only)
- Standardizing factor (hydrocarbon variant only)
- Liquident (hydrocarbon variant only)
- API gravity (hydrocarbon variant only)
- Standard API gravity (hydrocarbon variant only)
- Standard kinematic viscosity (hydrocarbon variant only)
- Liquid identifier (hydrocarbon variant only)

Benefits

Flow calculation and measurement

- Dedicated volume flow calculation with DSP technology
- 100 Hz update rate for all output on all primary process values
- Maximum data age from sensor to output is 20 ms
- Independent low flow cut-off settings for volume and mass flow, standard volume flow and velocity
- Zero-point adjustment on command from discrete input or host system

Operation and display

- User-configurable operation display
 - Full graphical display 240 x 160 pixels with up to 6 programmable views
 - Self-explaining alarm handling/log in clear text
 - Help text for all parameters appears automatically in the configuration menu
- SensorFlash technology stores production specific system documentation and provides removable memory of all flowmeter setups and functions
 - Calibration certificates (with ordered calibration)
 - Non-volatile memory backup of operational data
 - Transfer of user configuration to other flowmeters
 - 4 GB SD card for storage and data logging
 - Audit trail of all parameter changes
 - Alarm logging

Alarms and safety

- Advanced diagnosis and service menu enhances troubleshooting and meter validation
- Configurable upper and lower alarm and warning limits for all process values
- Alarm handling can be selected between Siemens and NAMUR standard configurations

Outputs and control

- Monitoring comprising of 3 individually configurable totalizers
- Multi-parameter outputs, configurable outputs assigned individually to any of the following parameters:
 - Volume flow
 - Standard volume flow
 - Mass flow
 - Flow velocity
 - Sound velocity
 - Density
 - Process viscosity
 - Process pressure
 - Process/medium temperature

Up to six I/O channels are configured as follows.

Benefits (continued)**Channel 1**

Channel 1 is 4 to 20 mA analog output with HART 7.5. The current signal can be configured for massflow, volume flow and includes the availability of active or passive function selected by wiring on the non-Ex terminals. Alternative Modbus RTU RS 485 is available.

Channel 2

Channel 2 is a signal output which can be freely configured for any process variable.

- Analog current (0/4 to 20 mA)
- Frequency or pulse
- Operational and alarm status

Channels 3 and 4

Channels 3 and 4 can be ordered with signal (freely configured for any process variable) or relay outputs, or signal input.

Signal output

Signal output can be user configured to:

- Analog current (0/4 to 20 mA)
- Frequency or pulse
- Redundant frequency or pulse (linked to channel 2)
- Operational and alarm status

Signal input

Signal input can be user-configured for:

- Totalizer reset functions
- Force outputs or freeze process values
- Initiate automatic zero point adjustment

Relay

Relay output(s) can be user configured to:

- Alarm status

4-20 mA signal outputs and inputs are ordered as active or passive for Ex versions, active and passive for non-Ex versions - function selected by wiring on the terminals.

During initial commissioning of the flowmeter, all outputs can be forced to a preset value for simulation, verification or calibration purposes.

Channels 5 and 6 (with internal DSL)

- RTD temperature inputs for 1000, 500 or 100 Ω RTD's - 2, 3 or 4 wire RTD's supported
- Channels 5 and 6 (with external DSL option)
- RTD Temperature inputs or 4-20 ma inputs. Selectable in menu.

Approvals and certificates

The SITRANS FST030 transmitter was designed to comply with or exceed the requirements of international standards and regulations.

Design

The SITRANS FST030 is designed in an IP67/NEMA 4X aluminum enclosure with corrosion resistant coating. It can be wall or pipe mounted and the enclosure can be locked with a padlock or wired with lead security seals. Includes all flow and DSL functions integrated into one unit.

The FST030 is available as standard with one current, HART 7.5 output and can be ordered with additional input/output functions.

The SITRANS FST030 wall mount housing transmitter has a modular design with discrete, replaceable electronic modules and connection boards to maintain separation between functions and facilitate field service. All modules are fully traceable and their provenance is included in the transmitter setup.

SensorFlash

SensorFlash is a standard, 4 GB micro SD card with the ability to be updated by PC. It is supplied with each transmitter and comes with a complete set of certification documents including report if ordered. Factory conformance certificates are optional at ordering.

The Siemens SensorFlash memory unit offers the following features and benefits:

- Copy site setups to SD card for easy transfer to other similar transmitters
- Permanent database of operational and functional information from the moment that the flowmeter is switched on
- New firmware updates can be downloaded from the Siemens internet portal for Product Support and placed onto Sensor-Flash (unmounted from the transmitter and inserted into a PC's SD card slot). The firmware is then inserted into the existing flowmeter for system/firmware upgrade.

SITRANS FST030 industrial housing

Separate field enclosure with modular design. The FST030 can be installed direct in the field. The SITRANS FST030 use always the separate FS DSL for the sensor connection.

Flow Measurement

SITRANS FS (ultrasonic)

Clamp-on ultrasonic flowmeters / SITRANS FST030 transmitter

Function

The following functions are available:

- Up to four configurable outputs and 2 RTD input channels selected at ordering
- Outputs can be individually configured for mass flow, volume flow, etc.
- Three built-in totalizers which can count positive, negative or net flows
- Independent low flow cut-offs, adjustable
- Uni/bidirectional flow measurement
- Flow direction adjustable
- Alarm system consisting of alarm-log, alarm pending menu
- Change log, logs all changes made to menu parameters or via communications
- Internal data logger
- Display of operating time with real-time clock
- Flowrate outputs are freely configurable between maximum negative and maximum positive flows according to the sensor capacity
- Limit switches programmable for flow, density and temperature. Limit points can be graded as warning and alarm for values both above and below nominal process conditions
- Zero adjustment menu, with zero point evaluation display
- Full service menu for effective and straight forward application and meter troubleshooting
- Precise temperature measurement ensures optimal accuracy on massflow and density
- Fully compatible with Siemens PDM version 8.2 service pack 1 or higher

Technical specifications

SITRANS FST030	
Process media	<ul style="list-style-type: none"> • Suitable for virtually any sonically conductive fluid, including hazardous liquids • Aggregate state: Light slurry and liquid
Process variables	<ul style="list-style-type: none"> • Volume flow • Mass flow • Flow velocity • Sound velocity • Standard volume flow (hydrocarbon variant only) • Density • Kinematic viscosity • Pressure • Medium temperature • Specific gravity (hydrocarbon variant only) • Totalizer 1 • Totalizer 2 • Totalizer 3 • Standard density (hydrocarbon variant only) • Standard specific gravity (hydrocarbon variant only) • Standardizing factor (hydrocarbon variant only) • Liquident (hydrocarbon variant only) • API gravity (hydrocarbon variant only) • Standard API gravity (hydrocarbon variant only) • Standard kinematic viscosity (hydrocarbon variant only) • Liquid identifier (hydrocarbon variant only)
Current output	
Current	0 ... 20 mA or 4 ... 20 mA (channel 1 only 4 ... 20 mA)
Load	< 500 Ω per channel
Time constant	0 ... 100 s adjustable
Digital output	
Pulse	41.6 μs ... 5 s pulse duration
Frequency	0 ... 10 kHz, 50 % duty cycle, 120 % oversample provision
Time constant	0 ... 100 s adjustable
Active	0 ... 22 V DC, 30 mA, short-circuit-protected
Passive	3 ... 30 V DC, max. 110 mA
Relay	
Type	SPDT dry contact relay
Load	30 V AC/100 mA
Functions	Alarm level, alarm number, limit, flow direction
Digital input	
Voltage	15 ... 30 V DC (2 ... 15 mA)
Current	4 ... 20 mA
Functionality	Reset totalizer 1, 2 and 3, force output, freeze process values, zero point adjustment
Galvanic isolation	All inputs and outputs are galvanically isolated, isolation voltage 500 V
Alarm and warning limit	Available for all process values
Totalizer	Three counters for forward, net and reverse flow
Display	<ul style="list-style-type: none"> • Background illumination with alphanumeric text to indicate flow rate, totalized values, settings and faults • Adjustable damping constant of 0 ... 100 s • Reverse flow indicated by negative sign

Technical specifications (continued)

SITRANS FST030	
SD card functions	<ul style="list-style-type: none"> Parameter change log Configurable data logger FW update log Diagnostic log Error and alarm log Parameter backup
Ambient temperature	
Operation	
• Transmitter	-40 ... +60 °C (-40 ... +140 °F), humidity max. 95 %
• Display	-20 ... +60 °C (-4 ... +140 °F)
Storage	
• Transmitter	-40 ... +70 °C (-40 ... +158 °F), humidity max. 95 %
Communication	HART 7.5 Modbus RTU RS 485
Enclosure	
Material	Aluminum
Rating	IP66/67, NEMA 4X to IEC 529 and DIN 40050 (1 mH ₂ O for 30 min.)
Mechanical load	18 ... 400 Hz random, 3.17 g RMS, in all directions
Power supply	
Universal	20 ... 27 V DC 100 ... 240 V AC, 47 ... 63 Hz
Fluctuation	No limit
Power consumption	20 W/22 VA
Minimum pressure for gas	10 bar (145 psi), gas composition and application dependent; plastic pipes support operation at atmospheric pressure. For lower pressure application please contact sales
Environment	
Environmental conditions according to IEC/EN/UL 61010-1	<ul style="list-style-type: none"> Altitude up to 2 000 m Pollution degree 2 Overvoltage category II
Maintenance	The flowmeter has a built-in error log/pending menu which should be inspected on a regular basis
Cable glands	Cable glands are available in nylon, nickel plated brass or stainless steel (316L/W1.4404)
Approvals for FST030 wall mount enclosure	
Canada, USA	Class I, Division 2, Groups A, B, C, D Class II, Division 2, Groups F, G Class III, Division 2 Class I, Zone 2, AEx ia nA [ia Ga] IIC T6...T5 Gc Class I, Zone 2; AEx/Ex ec ia [ia Ga] IIC T6...T5 Gc Class II, Zone 2; AEx/Ex tc [ia Da] IIIC T85°C Dc
• FM17CA0110X • FM17US0219X • CSA 21CA80072942X	
ATEX, UKEx, IECEx	II 3(1) G Ex ec ia [ia Ga] IIC T6...T5 Gc II 3(1) D Ex tc [ia Da] IIIC T85°C Dc
• FM17ATEX0055X • FM21UKEX0059X • IECEx FMG 17.0023X	
Inmetro	Ex ex ia [ia Ga] IIC T6 Gc Ex tc [ia Ga] IIIC T85°C Dc
• BRA 21.GE0013X	
Ambient temperature range	T6 for -40 °C ≤ T _a ≤ 45 °C T5 for -40 °C ≤ T _a ≤ 60 °C T5 85 °C for -40 °C ≤ T _a ≤ 60 °C

Technical specifications (continued)

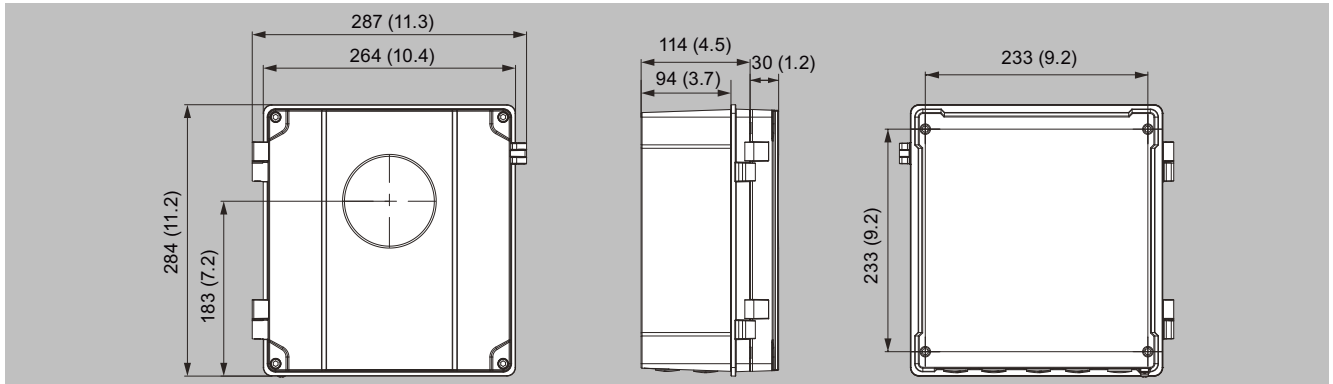
SITRANS FST030	
Approvals for FST030 industrial enclosure	
Canada, USA	Canada: Ex db eb ia [ia Ga] IIC T6 Gb Ex tb [ia Da] IIIC T85°C USA: Class I, Division 1, Groups A, B, C, D Class II, Division 1, Groups E, F, G Class III, Division 1 Class I, Zone 1: AEx db eb ia [ia Ga] IIC T6 Gb Class II, Zone 2: AEx tc [ia Da] IIIC T85°C II 2(1) G Ex db eb ia [ia Ga] IIC T6 Gb II 2(1) D Ex tb [ia Da] IIIC T85°C Db
• CSA 2508628 • FM18US0063X • FM21CA0019X	
ATEX, UKEx, IECEx	
• Sira 11ATEX1342X • CSAE 21UKEX1109X • IECEx SIR 11.0150X	
Inmetro	Ex db eb ia [ia Ga] IIC T6 Gb Ex tb [ia Da] IIIC T85°C Db
• BRA 21.GE0013X	
Ambient temperature range	T _a = -40 ... 60 °C
Approvals for FS230 external DSL	
Canada, USA	IS Class I, Division 1, Groups A, B, C, D IS Class II, Division 1, Groups E, F, G IS Class III, Division 1 Class I, Zone 0; AEx/Ex ia IIC T6...T5 Gc Class II, Zone 2; AEx/Ex ib IIIC T64°C...T74°C Db
• FM16CA0157X • FM16US0318X • CSA 21CA8007621X	
ATEX, UKEx, IECEx	II 1 G Ex ia IIC T6...T5 Ga II 2 D Ex ib IIIC T5 64°C...T5 74°C Db
• FM16ATEX0094X • FM21UKEX0058X • IECEx FMG 16.0037X	
Inmetro	Ex ia IIC T6...T5 Ga Ex ib IIIC T5 64°C Db
• BRA 21.GE001	
EAC Ex	Ex ia IIC T6...T5 Ga Ex ib IIIC T64°C...T5 74 °C Db
Ambient temperature range	T6: -40 °C ≤ T _a ≤ 50 °C T5: -40 °C ≤ T _a ≤ 60 °C T5 64 °C: -40 °C ≤ T _a ≤ 50 °C T5 74 °C: -40 °C ≤ T _a ≤ 60 °C
Certificates	
CE conformity marking	<ul style="list-style-type: none"> Low voltage directive WEEE RoHS
EMC performance	
Emission	CISPR 11:2009/A1:2010 and EN 55011:2009/A1:2010
Immunity	IEC/EN 61326-1:2013

Flow Measurement

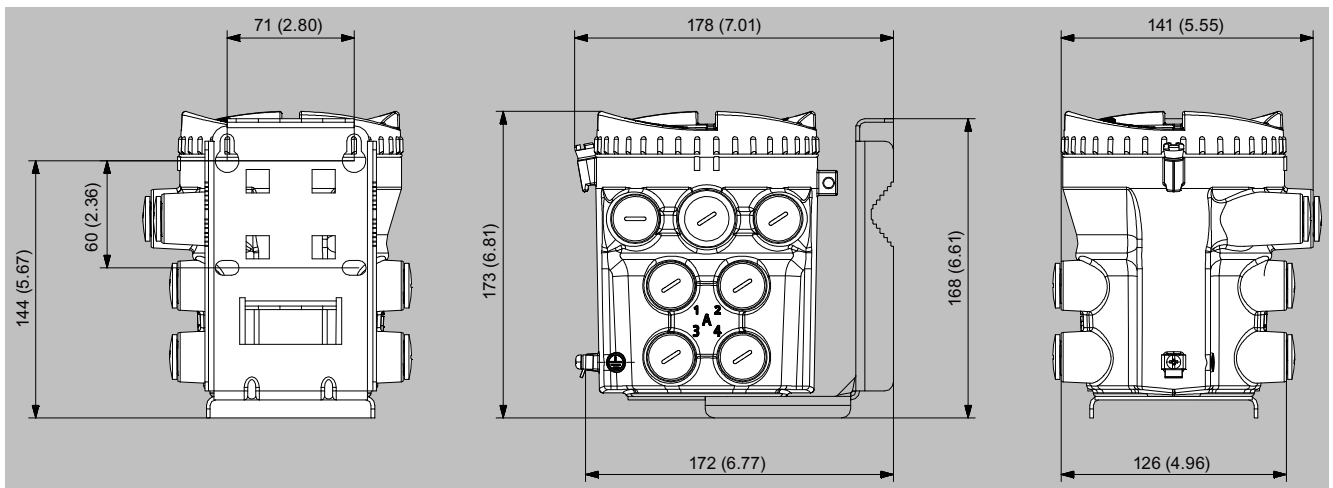
SITRANS FS (ultrasonic)

Clamp-on ultrasonic flowmeters / SITRANS FST030 transmitter

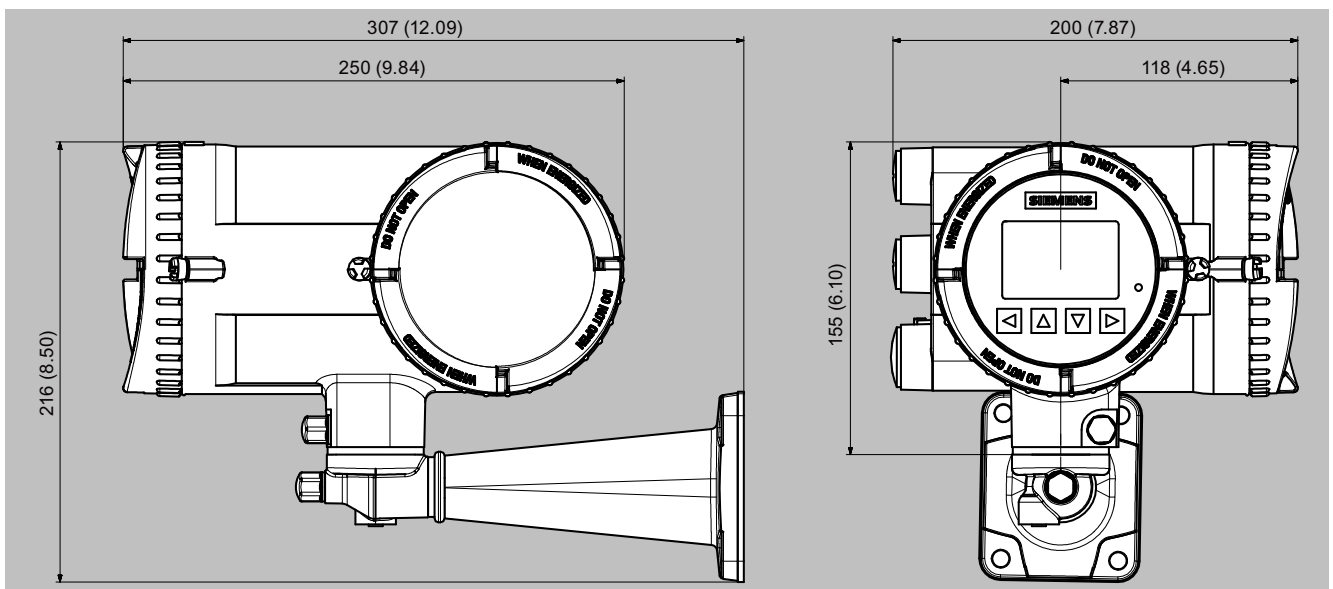
Dimensional drawings



SITRANS FST030, wall mount version, dimensions in mm (inch)

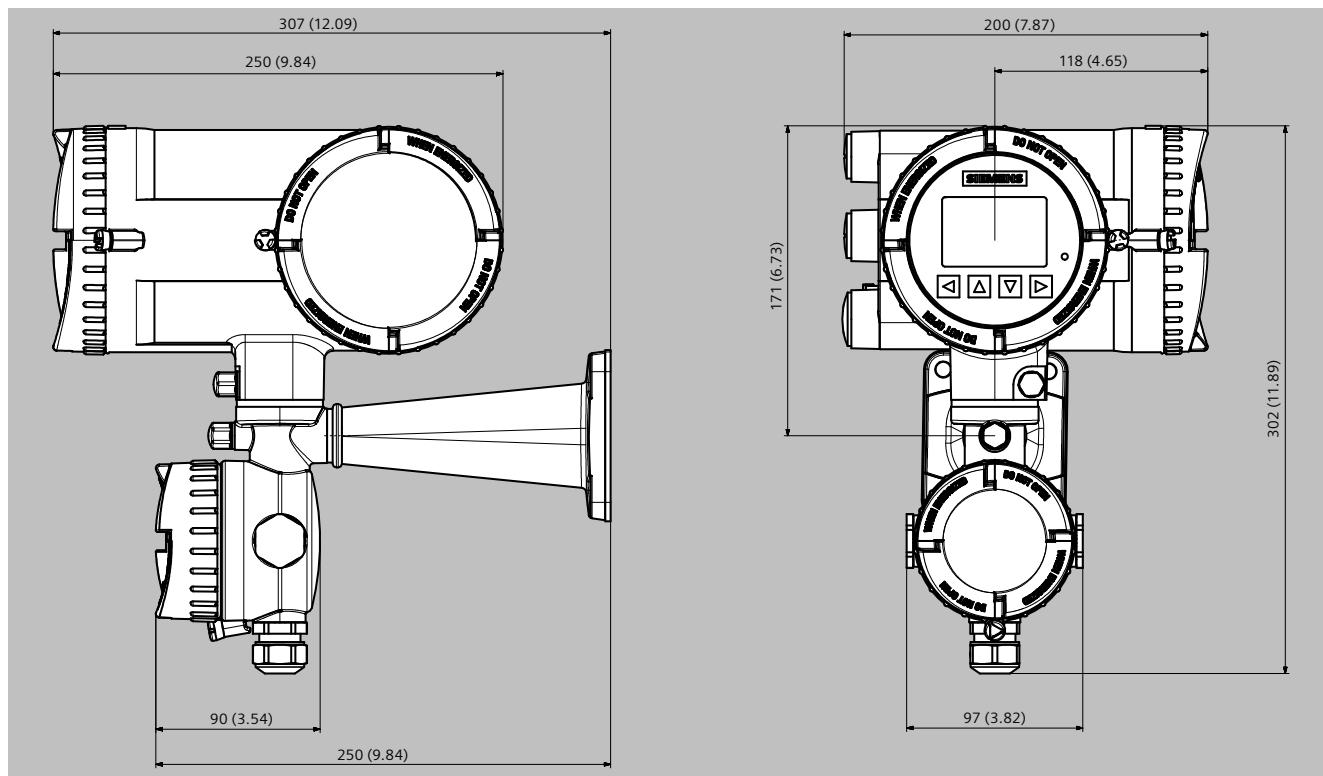


External DSL, dimensions in mm (inch)



SITRANS FST030 industrial transmitter with M12 connection, dimensions in mm (inch)

Dimensional drawings (continued)



SITRANS FST030 with terminal house, dimensions in mm (inch)

Flow Measurement

SITRANS FS (ultrasonic)

Clamp-on ultrasonic flowmeters / SITRANS FS220 ultrasonic flowmeter

Overview



The SITRANS FS220 is a clamp-on ultrasonic flow system consisting of an FST020 transmitter and FSS200 clamp-on sensors.

The transmitter classification FST020 describes a basic clamp-on ultrasonic flowmeter for basic application requirements. Based on the same digitalized platform as the FST030 this system provides the same accuracy and similar functions on a lower cost level. This system is ideal for water measurement and any application not requiring temperature or viscosity compensation.

Benefits

- Easy installation at any time; no production stop, no need to cut pipe or stop flow
- Minimal maintenance; external sensors do not require periodic cleaning
- No moving parts to foul or wear. No contact with media
- No pressure drop or energy loss
- Wide turn-down ratio, bidirectional and high stability at zero flow conditions
- Anomaly compensation tool for correction of non-ideal straight pipe runs. Automatic compensation during backflow
- Optional WideBeam technology ensures highest performance and accuracy
- Compatible with all previously installed transit time sensors

Application

The SITRANS FS220 can be used for the following application conditions:

- Pipe sizes from 10 mm to 10 m
- Pipe materials: ideal for all metals, glass, FRP and most PVC variants; NOT for concrete pipes and special compound pipes
- Pipe wall thickness from 1 to 35 mm; specials on request up to 65 mm
- Media temperatures from -40 to 121 °C; universal high temperature sensors for up to 230 °C max.

Underground/submerged locations, non-ideal environments, strong pipe vibrations

SITRANS FS220 flowmeters are suitable for most clean liquid applications, including the following:

- Water and wastewater industry
 - Potable water
 - Water and aqueous solutions
 - Wastewater, influent & effluent
 - Processed sewage, sludge
- Chemical feed industry
 - Sodium hypochlorite
 - Sodium hydroxide
- HVAC and power industries
 - Coolant flow
 - Fuel flow
 - Utility district heating, cooling
 - Refrigeration liquids
- Process control
 - Chemicals
 - Pharmaceuticals
 - Food products
 - Very low flow sensitivity (< 0.1 m/s)
 - High temperature liquids > 120 °C (248 °F)

Sensor type selection guide

Application condition Note all that apply before making selection	Standard sensor supported in MLFB		Notes
	High precision	Universal	
Media			
General survey (clean liquids) on non-steel pipes	-	X	-
General survey (clean liquids) on a limited range of steel pipes	X	-	-

Flow Measurement

SITRANS FS (ultrasonic)

Clamp-on ultrasonic flowmeters / SITRANS FS220 ultrasonic flowmeter

Application (continued)

Application condition Note all that apply before making selection	Standard sensor supported in MLFB		Notes
	High precision	Universal	
Moderately aerated liquid or slurry, up to 121 °C (250 °F)	X	-	-
Permanent installation on steel pipe (clean liquids)	X	-	-
Installation in offshore or corrosive environment	X	-	With optional stainless steel mounting
Liquid temperature greater than 120 °C (248 °F)	O	X	High temperature metal block sensors (up to 230 °C (446 °F))
Operation on single pipeline flowing multiple products	X	O	-
Pipe material			
Steel	X	-	-
Steel pipe with diameter/wall thickness ratio < 10	O	X	-
Non-steel pipe material (copper, ductile iron, cast iron, etc.)	O	X	High precision sensors can also be used on plastic and aluminum pipes in special cases

O = not suitable

X = preferred choice

Definitions

Sensor chart	Description
FSS200	Formerly 1011 clamp-on sensors of the 1010 systems
Standard	Standard system sensor, selectable as part of a configured product
Special	Sensors available for non-standard applications and pipes. Contact tech support for application use
Corrosion resistant	Stainless steel metal parts on all Size C, D and E and all high temperature sensors
Aluminum	Aluminum metal parts on all HP and Universal size A and B (Corrosion resistant on request for size B)
Spare	Not available as part of a configured product, must be ordered separately
CE	Transmitter and sensors certified for sale in the EU
Trackless mount	Sensors fixed only by straps, no other mounting (spacer bar as an option) - not recommended
Tracks	Permanent installation for universal size A/B, high precision size A/B and all sizes of high temperature. Tracks always come as dual-part for either direct or reflect mounting, and always with straps.
Frames	Three sizes, for permanent installation for universal size C/ D/ E, and for high precision size C/D. For universal and high precision size B available for pipes > 125 OD (Spare)
T1	Usable from -40 ... +120 °C (-40 ... +248 °F), but best for Ø temperature below 80 °C (< 176 °F); standard
T2	Usable from -40 ... +120 °C (-40 ... +248 °F), but best for Ø temperature above 80 °C (< 176 °F)
Submersible	Sensors can be used submerged; adding Denso for supplemental protection is recommended

Sensor availability guide

Universal Sensor

Universal Sensor -40 ... 120 °C housing CE IP68										
Sensor models	Standard	Spare only	Corrosion resistant	Trackless	Tracks	Frames	T1 ¹⁾	T2 ²⁾	Submersible	Catalog
A1 Universal for pipe OD – 5.8 ... 50.8 mm (0.23" ... 2")	-	X	-	-	X	-	-	-	X	-
A2 Universal for pipe OD – 12.7 ... 50.8 mm (0.5" ... 2")	X	-	-	-	X	-	-	-	X	X
B1 Universal for pipe OD – 12.7 ... 76 mm (0.5" ... 3")	-	X	-	-	X	X	-	-	X	-
B2 Universal for pipe OD – 12.7 ... 76 mm (0.5" ... 3")	-	X	-	-	X	X	-	-	X	-
B3 Universal for pipe OD – 19 ... 127 mm (0.75" ... 5")	X	-	-	-	X	X	-	-	X	X
C1 Universal for pipe OD – 51 ... 254 mm (2" ... 10")	-	X	X	X	-	X	-	-	X	-
C2 Universal for pipe OD – 51 ... 254 mm (2" ... 10")	-	X	X	X	-	X	-	-	X	-
C3 Universal for pipe OD – 51 ... 305 mm (2" ... 12")	X	-	X	X	-	X	-	-	X	X
D1 Universal for pipe OD – 102 ... 508 mm (4" ... 20")	-	X	X	X	-	X	-	-	X	-

Application (continued)

Universal Sensor -40 ... 120 °C housing CE IP68										
Sensor models	Standard	Spare only	Corrosion resistant	Trackless	Tracks	Frames	T1 ¹⁾	T2 ²⁾	Submersible	Catalog
D2 Universal for pipe OD – 152 ... 610 mm (6" ... 24")	-	X	X	X	-	X	-	-	X	-
D3 Universal for pipe OD – 203 ... 610 mm (8" ... 24")	X	-	X	X	-	X	-	-	X	X
*E1 Universal for pipe OD – 254 ... 3048 mm (10" ... 120")	-	X	X	X	-	X	-	-	X	-
*E2 Universal for pipe OD – 254 ... 6096 mm (10" ... 240")	X	-	X	X	-	X	-	-	X	X

1) Best use at a temperature of < 80 °C (176 °F)

2) Best use at a temperature of 80 ... 120 °C (176 ... 248 °F)

High Precision Sensor

High Precision Sensor -40 ... 120 °C (-40 ... +248 °F) T1 (T2) CE IP68										
Sensor models	Standard	Spare only	Corrosion resistant	Trackless	Tracks	Frames	T1 ¹⁾	T2 ²⁾	Submersible	Catalog
A1H (High Precision) for pipe WT - 0.64 ... 1.0 mm (0.025" ... 0.04")	-	X	-	-	X	-	X	-	X	X
A2H (High Precision) for pipe WT - 1.0 ... 1.5 mm (0.04" ... 0.06")	X	-	-	-	X	-	X	-	X	X
A3H (High Precision) for pipe WT - 1.5 ... 2.0 mm (0.06" ... 0.08")	X	-	-	-	X	-	X	-	X	X
B1H (High Precision) for pipe WT - 2.0 ... 3.0 mm (0.08" ... 0.12")	X	-	-	-	X	X	X	X	X	X
B2H (High Precision) for pipe WT - 3.0 ... 4.1 mm (0.12" ... 0.16")	X	-	-	-	X	X	X	X	X	X
B3H (High Precision) for pipe WT - 2.7 ... 3.3 mm (0.106" ... 0.128")	-	X	-	-	X	X	X	X	X	X
C1H (High Precision) for pipe WT - 4.1 ... 5.8 mm (0.16" ... 0.23")	X	-	X	X	-	X	X	X	X	X
C2H (High Precision) for pipe WT - 5.8 ... 8.1 mm (0.23" ... 0.32")	X	-	X	X	-	X	X	X	X	X
* D1H (High Precision) for pipe WT - 8.1 ... 11.2 mm (0.32" ... 0.44")	X	-	X	X	-	X	X	X	X	X
* D2H (High Precision) for pipe WT - 11.2 ... 15.7 mm (0.44" ... 0.62")	X	-	X	X	-	X	X	X	X	X
* D3H (High Precision) for pipe WT - 7.4 ... 9.0 mm (0.293" ... 0.354")	-	X	X	X	-	X	X	X	X	X
* D4H (High Precision) for pipe WT - 15.7 ... 31.8 mm (0.62" ... 1.25")	X	-	X	X	-	X	X	X	X	X

1) Best use at a temperature of < 80 °C (176 °F)

2) Best use at a temperature of 80 ... 120 °C (176 ... 248 °F)

High Temperature Universal Sensor

High Temperature Universal Sensor -40 ... +230 °C (-40 ... +446 °F)										
Sensor models	Standard	Spare only	Corrosion resistant	Trackless	Tracks	Frames	T1 ¹⁾	T2 ²⁾	Submersible	Catalog
High Temperature size 1 ... 230 °C (Ø 12.7 ... 100 mm)	-	X	X	-	X	-	-	-	X	-
High Temperature size 2 ... 230 °C (Ø 30 ... 200 mm)	X	-	X	-	X	-	-	-	X	X
High Temperature size 3 ... 230 °C (Ø 150 ... 610 mm)	X	-	X	-	X	-	-	-	X	X
High Temperature size 4 ... 230 °C (Ø 400 ... 1200 mm)	X	-	X	-	X	-	-	-	X	X
High Temperature size 2A ... 230 °C (Ø 30 ... 200 mm)	-	X	X	-	X	-	-	-	X	-
High Temperature size 3A ... 230 °C (Ø 150 ... 610 mm)	-	X	X	-	X	-	-	-	X	-
High Temperature size 4A ... 230 °C (Ø 400 ... 1200 mm)	-	X	X	-	X	-	-	-	X	-

1) Best use at a temperature of < 80 °C (176 °F)

2) Best use at a temperature of 80 ... 120 °C (176 ... 248 °F)

Flow Measurement

SITRANS FS (ultrasonic)

Clamp-on ultrasonic flowmeters / SITRANS FS220 ultrasonic flowmeter

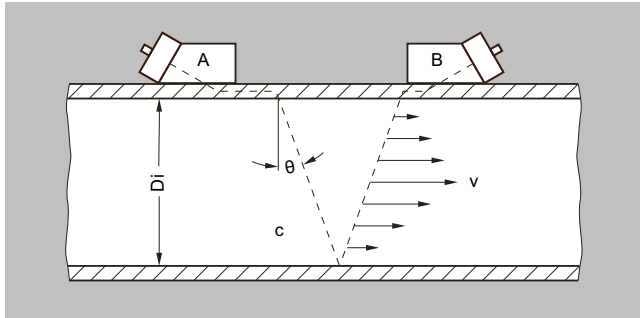
Application (continued)

Sensor mounting availability guide

Mounting	Sensor (Dedicated) Universal	High precision	High temperature universal
Trackless (straps only)	X	X	-
Tracks universal dedicated	X	-	-
Tracks HP dedicated	-	X	-
Frames universal dedicated	X	-	-
Frames HP dedicated	-	X	-
Tracks high temperature universal	-	-	X
High precision mounting single enclosure for one pair sensors	-	X	-
High precision mounting dual enclosure for one pair sensors	-	X	-
SpacerBar	X	X	-
Straps	X	X	X
Denso	X	X	-

Function**Operating principle**

The SITRANS FS system is a transit-time ultrasonic meter that provides exceptional performance using a non-intrusive clamp-on approach. Ultrasonic sensors transmit and receive acoustic signals directly through the existing pipe wall, where the fluid refraction angle is governed by Snell's law of refraction.



Clamp-on sensor mounted in a reflect configuration

The beam refraction angle is calculated as follows:

$$\sin \theta = c / V_{\phi}$$

c = Velocity of sound in fluid

V_{ϕ} = Phase velocity (a constant in the pipe wall)

The flowmeter automatically compensates for any change in fluid sound velocity (or beam angle) in response to variations in the average transit time between sensors A and B. By subtracting the computed fixed times (within the sensor and pipe wall) from the measured average transit time, the meter can then infer the required transit time in the fluid (T_{Fluid}).

The sound waves traveling in the same direction as the flow ($T_{A,B}$) arrive earlier than sound waves traveling against the direction of flow ($T_{B,A}$). This time difference (Δt) is used to compute the line integrated flow velocity (v) as shown in the equation below:

$$v = V_{\phi} / 2 \cdot \Delta t / T_{\text{Fluid}}$$

Once the raw flow velocity is determined, the fluid Reynolds Number (Re) must be determined to properly correct for fully developed flow profile. This requires the entry of the fluid's kinematic viscosity (visc) as shown in the equations below, where Q represents the final flow profile compensated volumetric flow rate.

$$Re = Di \cdot v / \text{visc} \quad Q = K(Re) \cdot (\pi / 4 \cdot Di^2) \cdot v$$

v = Flow velocity

$\text{visc} = \mu / \rho$ = (dynamic viscosity / density)

$K(Re)$ = Reynolds flow profile compensation

In wetted type ultrasonic flowmeters the meter constants are configured prior to leaving the factory. As this is not possible with clamp-on meters, the settings must be made by the customer at the time of installation. These settings include pipe diameter, wall thickness, liquid viscosity, etc.

SITRANS clamp-on flowmeters that include temperature sensing can be configured to dynamically infer changes in fluid viscosity for the purpose of computing the most accurate flow profile compensation (K_{Re}).

Ultrasonic sensor types

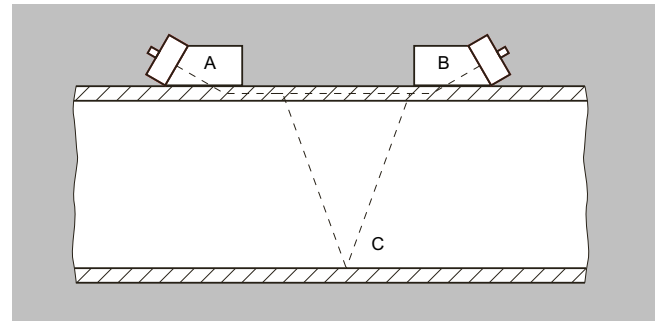
Two basic types of clamp-on sensors can be selected for use with the SITRANS FS flowmeter. The lower cost "universal" sensor is the most common type in the industry and is suitable for most single liquid applications where the sound velocity does not vary much. This sensor type can be used on any sonically conductive pipe material (including steel) making it well suited for temporary survey

Function (continued)

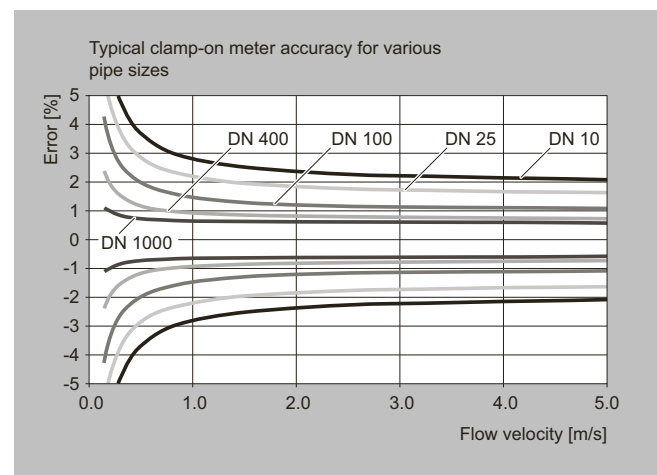
applications. Universal sensors are selected based on the pipe diameter range alone, so wall thickness is less important to the selection process.

The second sensor type is the patented "WideBeam" sensor (called high precision), which utilizes the pipe wall as a kind of waveguide to optimize the signal to noise ratio and provide a wider area of vibration. This makes this kind of sensor less sensitive to any change in the fluid medium.

The WideBeam sensor is designed for steel pipes, but can also be used with aluminum and titanium. It is the preferred sensor for HPI applications. Note that unlike the universal type, this sensor selection is dependent only on the pipe's wall thickness.

**General installation guidelines for SITRANS FSS200 clamp-on sensor**

- Minimum measuring range: 0 to ± 0.3 m/s velocity (see meter accuracy graph on next page for more detail)
- Maximum measuring range: 0 to ± 12 m/s (± 30 m/s for high precision sensors). Final flow range determination requires application review



- Pipe must be completely full within the sensor installation volume for accurate flow measurement
- Typical MINIMUM straight pipe requirements are: 10 Diameters upstream/5 Diameters downstream. Additional straight run is required for double out-of-plane elbows and partially open valves.
- Sensors should be installed at least 20° off vertical for horizontal pipes. This reduces the chance of beam interference from gas buildup at the top of the pipe

Flow Measurement

SITRANS FS (ultrasonic)

Clamp-on ultrasonic flowmeters / SITRANS FS220 ultrasonic flowmeter

Function (continued)

- Operation inside the Reynolds transition region, between $1000 < Re < 5000$ should be avoided for best accuracy
- Submersible and direct burial installations can be accommodated. Consult sales representative for details
- Ultrasonic coupling compound is provided with all sensor orders. Insure that a permanent coupling compound is used for long term installations
- Refer to the "Sensor type selection guide" to insure proper application of the equipment

Selection and ordering data

Spare parts (FSS200 sensors)		Article No.				
SITRANS F US clamp-on		7ME3950- 5 ● ● ● ●				
Temperature range for all sensors is unless otherwise noted -40 °C ... +120 °C (-40 °F ... +248 °F)						
Ideal operating temperatures as follows:						
T1: -40 ... +8065 °C (-40 ... +176 °F)						0
T2: -80 ... 121 °C (30 ... 250 °F)						2
Spare sensor code (Stainless steel construction)						
<u>Liquid flow sensors for use with mounting frames or tracks (including portable)</u>						
FSS200 A2 universal			L	B	0	1
FSS200 B3 universal			L	C	0	1
FSS200 C3 universal			L	D	0	0
FSS200 D3 universal			L	E	0	0
FSS200 E2 universal			L	F	0	0
FSS200 A1H (high precision)			L	G	0	1
FSS200 A2H (high precision)			L	H	0	1
FSS200 A3H (high precision)			L	J	0	1
FSS200 B1H (high precision)			G	K		1
FSS200 B2H (high precision)			G	L		1
FSS200 B3H (high precision)			G	T		1
FSS200 C1H (high precision)			G	M		0
FSS200 C2H (high precision)			G	N		0
FSS200 D1H (high precision)			G	P		0
FSS200 D2H (high precision)			G	Q		0
FSS200 D3H (high precision)			G	U		0
FSS200 D4H (high precision)			G	R		0
<u>High temperature universal liquid sensors up to 230 °C (446 °F)</u>						
FSS200 high temperature sensor size 1 for Ø 12.7 ... 100 mm			L	A	1	3
FSS200 high temperature sensor size 2 for Ø 30 ... 200 mm			L	A	2	3
FSS200 high temperature sensor size 3 for Ø 150 ... 600 mm			L	A	4	3
FSS200 high temperature sensor size 4 for Ø 400 ... 1200 mm			L	A	7	3

Spare parts (Miscellaneous)		Article No.					
SITRANS F US clamp-on		7ME3960- ● ● ● ● ●					
Dedicated sensor mounting hardware							
Sensor mounting tracks (dual part aluminium with mounting straps) for pipes < 125 mm (5 inch)							
• Tracks for Universal sensor pair size A or B			0	M	A	0	0
• Tracks for High precision sensor pair size A or B			0	M	B	0	0
Sensor mounting frames pair with mounting straps							
• Frames for universal sensor size B (for pipes >125 mm (5 inch))			CQO:1012FN-PB				
• Frames for universal sensor size C			0	M	C	0	0
• Frames for universal sensor size D			0	M	C	0	1
• Frames for universal sensor size E			0	M	C	0	2

Selection and ordering data (continued)

Spare parts (Miscellaneous) SITRANS F US clamp-on	Article No.
<ul style="list-style-type: none"> Frames for High precision sensor size B (for pipes >125 mm (5 inch)) Frames for High precision sensor size C Frames for High precision sensor size D 	7ME3960- ● ● ● ● ● CQO:1012FNH-PB
<ul style="list-style-type: none"> Mounting straps for mounting frames (slotted stainless steel) Straps for pipes from DN 50 ... 150 Straps for pipes from DN 50 ... 300 Straps for pipes from DN 300 ... 600 Straps for pipes from DN 600 ... 1200 Straps for pipes from DN 1200 ... 1500 Straps for pipes from DN 1500 ... 2100 Straps for pipes from DN 2100 ... 3000 	0 M D 0 0 0 M D 0 1 0 S M 0 0 0 S M 1 0 0 S M 2 0 0 S M 3 0 0 S M 4 0 0 S M 5 0 0 S M 6 0
<ul style="list-style-type: none"> Spacer bars (for indexing sensors on pipe) Spacer bar for pipes to 200 mm/8 inch (liquid), 600 mm/24 inch (gas) Spacer bar for pipes to 500 mm/20 inch (liquid), DN 1200/48 inch (gas) Spacer bar for pipes to 800 mm/32 inch (liquid) Spacer bar-extension for pipes to 1200 mm/48 inch (liquid), only use in conjunction with 7ME3960-0MS30 	0 M S 1 0 0 M S 2 0 0 M S 3 0 0 M S 4 0
<ul style="list-style-type: none"> High precision mounting enclosures. Spacer bar is included; straps should be ordered separately Stainless steel mounts for high precision size "C" sensor pair, single enclosure (each) Stainless steel mounts for high precision size "D/E" sensor pair, single enclosure (each) Stainless steel mounts for high precision size "C" sensors, dual enclosure (pair) Stainless steel mounts for high precision size "D/E" sensors, dual enclosure (pair) 	0 W S 5 0 0 W S 6 0 0 W D 5 0 0 W D 6 0
Stainless steel straps for weld seal enclosure mounting (2 x required for dual enclosures) Mounting strap for pipe diameter to 300 mm (13 inch) Mounting strap for pipe diameter to 600 mm (24 inch) Mounting strap for pipe diameter to 1200 mm (48 inch) Mounting strap for pipe diameter to 1500 mm (60 inch) Mounting strap for pipe diameter to 2130 mm (84 inch) Mounting strap for pipe diameter to 3050 mm (120 inch)	0 S M 0 1 0 S M 1 1 0 S M 2 1 0 S M 3 1 0 S M 4 1 0 S M 5 1
Stainless mounting tracks for high temp 991 sensors, with straps, dual part for direct and reflect ount, inc. straps Size 1 high temp sensor pair Size 2 high temp sensor pair Size 3 high temp sensor pair Size 4 high temp sensor pair	CQO:992MTNHMSH-1 CQO:992MTNHMSH-2 CQO:992MTNHMSH-3 CQO:992MTNHMSH-4
Dedicated cable termination kits For externally supplied sensor cables, standard and plenum	0 C T 0 1
Cable gland kit (normally supplied with transmitter) for IP65 NEMA 4X enclosures	A5E41693895
Ultrasonic couplant Temporary water based for portable systems: 350 ml (12 oz): -34 ... +38 °C (-30 ... +100 °F) Permanent synthetic polymer based: 90 ml (3 oz) -40 ... +190 °C (-40 ... +375 °F) Permanent high temp fluoroether: -40 ... +230 °C (-40 ... +450 °F) Permanent vulcanizing silicone rubber couplant: 90 ml (3 oz): -40 ... +120 °C (-40 ... +250 °F) Permanent high temp silicone grease: 12 ml (0.4 oz): -40 ... +230 °C (-40 ... +450 °F) Permanent high temp silicone grease: 150 ml (5 oz): -40 ... +230 °C (-40 ... +450 °F) Couplant for submersible sensor applications	0 U C 1 0 0 U C 2 0 0 U C 3 0 CQO:CC112 CQO:CC117 CQO:CC117A CQO:CC120
Dry coupling pads (qty of 10): -34 ... +200 °C (-30 ... +392 °F)	0 U C 4 0
Universal sensor test blocks Test block for size A and B universal sensors Test block for size C and D universal sensors	0 T B 1 0 0 T B 2 0


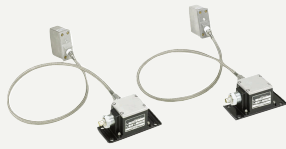


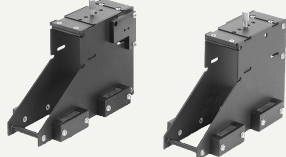


Flow Measurement

SITRANS FS (ultrasonic)

Clamp-on ultrasonic flowmeters / SITRANS FS220 ultrasonic flowmeter

Selection and ordering data (continued)

Accessories

Description	Article No.	
<p>FSS200 universal sensors Selected for general purpose measurement. Since they are selected based on diameter only, a wide range of pipe sizes and materials can be covered with a minimum number of sensors. These can also be selected for cost savings on applications where standard accuracy is sufficient.</p>	7ME3950-...	
<p>FSS200 high precision sensors Selected for increased performance on steel pipes. They provide the highest accuracy achievable by the meters and therefore should be selected whenever higher accuracy / repeatability is required primarily based on pipe wall thickness.</p>	7ME3950...	
<p>FSS200 high temperature sensors Selected whenever pipe temperature will exceed 250 °F (120 °C) up to a maximum of 450 °F (232 °C). They are universal type and can therefore be used on any pipe material and are selected by pipe diameter. Constructed in stainless steel. Connection junction box included.</p>	7ME3950-...	
<p>Mounting tracks Typically used on smaller pipes for easier and more stable mounting of dedicated universal style sensor size A or B; also available for dedicated high precision sensor size A or B.</p>	7ME3960-...	
<p>Mounting frames These items are useful in simplifying sensor installation. They are strapped to the pipe first and then the sensors are installed, making the installation less cumbersome and more precise. They also enable easy repeated mounting of the sensors assuring alignment to the original sensor positioning. They may be left in place at each measurement location where periodic flow surveys are conducted to simplify subsequent installations and ensure repeatable results.</p>	7ME3960-...	
<p>Magnetic mounting frames Magnetic mounting frames are designed to simplify clamp-on sensor installation on pipelines 8 inches (DN 200) and larger by eliminating the need for straps to secure them. They feature powerful magnets to ensure quick and accurate setup. Compatible with all C, D and E universal and high-precision sensors belonging to the SITRANS FSS200 clamp-on family. Magnetic mounting frames are constructed in aluminum for a high level of durability. Ideal use on temporary installations.</p>	7ME3960-0MD02	
<p>Test block Used for checking operation of a meter and sensors prior to a field installation, or as a troubleshooting tool. Selected by sensor size, each block accommodates 2 sensor sizes. Available only for universal sensors.</p>	7ME3960...	
<p>Straps Used to fasten sensors or mounting frames to pipe for dedicated meter installations. Stainless steel construction for corrosion resistance.</p>	7ME3960-...	

Selection and ordering data (continued)

Description	Article No.	
Cable gland Cable gland kit for use with SITRANS FST020 transmitters housed in IP65 NEMA 4X wall mount enclosures. Kit contains two single port glands for power and one dual port gland for sensor cables.	A5E41693895	
Ultrasonic couplant Fills any voids between sensor emitting surface and pipe wall to allow maximum energy transfer between sensor and pipe. Several different types of couplants are employed as determined by the application conditions and type of installation (Temporary or permanent).	7ME3960-...	
Dry couplant The dry coupling pad is intended for use in any liquid, clamp-on transit time or Doppler applications that require a more durable coupling material. Installation is easy by simply placing one strip of material between sensor and pipe. Not intended for clamp-on gas where damping material is used. The temperature range is -34 to +200 °C (-30 to +392 °F).	7ME3960-...	
Termination kit (flow sensors) Termination kit for one pair of sensor cables. These can be provided in cases where users will be purchasing bulk cable directly and cutting to length at site, or when existing cable length is to be altered. Selected by cable type.	7ME3960-...	
FST020 transmitter module Main transmitter module for FST020 including SD-card and firmware load	A5E41693884	
FST020 transmitter module cover AC Cover for FST020 Main transmitter module for AC powered units; includes label and screws	A5E41693888	
FST020 transmitter module cover DC Cover for FST020 Main transmitter module for DC powered units; includes label and screws	A5E41693889	
FST020 enclosure cover Enclosure lid for FST020; includes display module, connection label and screws	A5E38846901	
FST020 power supply AC Power supply module for FST020, AC power	7ML1830-1MD	
FST020 power supply DC Power supply module for FST020, DC power	7ML1830-1ME	
SensorFlash SD-card 4 GB micro SD card -40 °C ... +85 °C for FST020 or FST030 for data storage, firmware and back-up	A5E38288507	
Hardware kit Various nuts, screws, and grounding strap for FST020 transmitter	A5E41944763	

Flow Measurement

SITRANS FS (ultrasonic)



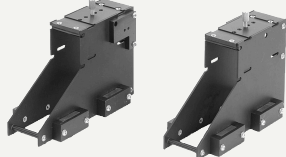

Clamp-on ultrasonic flowmeters / SITRANS FS220 ultrasonic flowmeter

Selection and ordering data (continued)

Description	Article No.	
Sensor cables FSS220 (IP65 NEMA 4X) wall mount Sensor cable for connection between FSS200 sensors and FST020 transmitter		
Sensor cable pair, terminated, 5 m	A5E39669934031	
Sensor cable pair, terminated, 10 m	A5E39669934032	
Sensor cable pair, terminated, 20 m	A5E39669934033	
Sensor cable pair, terminated, 30 m	A5E39669934042	
Sensor cable pair, terminated, 60 m	A5E39669934043	
Sensor cable pair, terminated, 100 m	A5E39669934044	

Accessories

Accessories

Description	Article No.	
FSS200 Universal Sensors Selected for general purpose measurement. Since they are selected based on diameter only, a wide range of pipe sizes and materials can be covered with a minimum number of sensors. These can also be selected for cost savings on applications where standard accuracy is sufficient.	7ME3950-...	
FSS200 High Precision Sensors Selected for increased performance on steel pipes. They provide the highest accuracy achievable by the meters and therefore should be selected whenever higher accuracy / repeatability is required primarily based on pipe wall thickness.	7ME3950-...	
FSS200 High Temperature Sensors Selected whenever pipe temperature will exceed 250 °F (120 °C) up to a maximum of 450 °F (232 °C). They are universal type and can therefore be used on any pipe material and are selected by pipe diameter. Constructed in stainless steel. Connection junction box included.	7ME3950-...	
Mounting tracks Typically used on smaller pipes for easier and more stable mounting of dedicated universal style sensor size A or B; also available for dedicated high precision sensor size A or B.	7ME3960-...	
Mounting Frames These items are useful in simplifying sensor installation. They are strapped to the pipe first and then the sensors are installed, making the installation less cumbersome and more precise. They also enable easy repeated mounting of the sensors assuring alignment to the original sensor positioning. They may be left in place at each measurement location where periodic flow surveys are conducted to simplify subsequent installations and ensure repeatable results.	7ME3960-...	
Magnetic mounting frames Magnetic mounting frames are designed to simplify clamp-on sensor installation on pipelines 8 inches (DN 200) and larger by eliminating the need for straps to secure them. They feature powerful magnets to ensure quick and accurate setup. Compatible with all C, D and E universal and high-precision sensors belonging to the SITRANS FSS200 clamp-on family. Magnetic mounting frames are constructed in aluminum for a high level of durability. Ideal use on temporary installations.	7ME3960-0MD02	
Test Block Used for checking operation of a meter and sensors prior to a field installation, or as a troubleshooting tool. Selected by sensor size, each block accommodates 2 sensor sizes. Available only for universal sensors.	7ME3960-...	
Straps Used to fasten sensors or mounting frames to pipe for dedicated meter installations. Stainless steel construction for corrosion resistance.	7ME3960-...	

Flow Measurement




SITRANS FS (ultrasonic)

Clamp-on ultrasonic flowmeters / SITRANS FS220 ultrasonic flowmeter

Accessories (continued)

Description	Article No.	
<p>Cable Gland Cable gland kit for use with SITRANS FST020 transmitters housed in IP65 NEMA 4X wall mount enclosures. Kit contains two single port glands for power and one dual port gland for sensor cables.</p>	A5E41693895	
<p>Ultrasonic Couplant Fills any voids between sensor emitting surface and pipe wall to allow maximum energy transfer between sensor and pipe. Several different types of couplants are employed as determined by the application conditions and type of installation (Temporary or permanent).</p>	7ME3960-...	
<p>Dry Couplant The dry coupling pad is intended for use in any liquid, clamp-on transit time or Doppler applications that require a more durable coupling material. Installation is easy by simply placing one strip of material between sensor and pipe. Not intended for clamp-on gas where damping material is used. The temperature range is -34 to +200 °C (-30 to +392 °F).</p>	7ME3960-...	
<p>Termination Kit (Flow Sensors) Termination kit for one pair of sensor cables. These can be provided in cases where users will be purchasing bulk cable directly and cutting to length at site, or when existing cable length is to be altered. Selected by cable type.</p>	7ME3960-...	
<p>FST020 Transmitter module Main transmitter module for FST020 including SD-card and firmware load</p>	A5E41693884	
<p>FST020 Transmitter module cover AC Cover for FST020 Main transmitter module for AC powered units; includes label and screws</p>	A5E41693888	
<p>FST020 Transmitter module cover DC Cover for FST020 Main transmitter module for DC powered units; includes label and screws</p>	A5E41693889	
<p>FST020 Enclosure cover Enclosure lid for FST020; includes display module, connection label and screws</p>	A5E38846901	
<p>FST020 Power Supply AC Power supply module for FST020, AC power</p>	7ML1830-1MD	
<p>FST020 Power Supply DC Power supply module for FST020, DC power</p>	7ML1830-1ME	
<p>SensorFlash SD-card 4 GB micro SD card -40 °C ... +85 °C for FST020 or FST030 for data storage, firmware and back-up</p>	A5E38288507	
<p>Hardware kit Various nuts, screws, and grounding strap for FST020 transmitter</p>	A5E41944763	

Accessories (continued)

Description	Article No.	
Sensor cable pair, 5 m Sensor cable for connection between FSS200 sensors and FST020 transmitter, 5 meters in length	A5E39669934031	
Sensor cable pair, 10 m Sensor cable for connection between FSS200 sensors and FST020 transmitter, 10 meters in length	A5E39669934032	
Sensor cable pair, 20 m Sensor cable for connection between FSS200 sensors and FST020 transmitter, 20 meters in length	A5E39669934033	
Enclosure mounting kit Mounting kit to fix enclosure on a 2" stanchion pipe	QCB:1012NMB1	

Flow Measurement

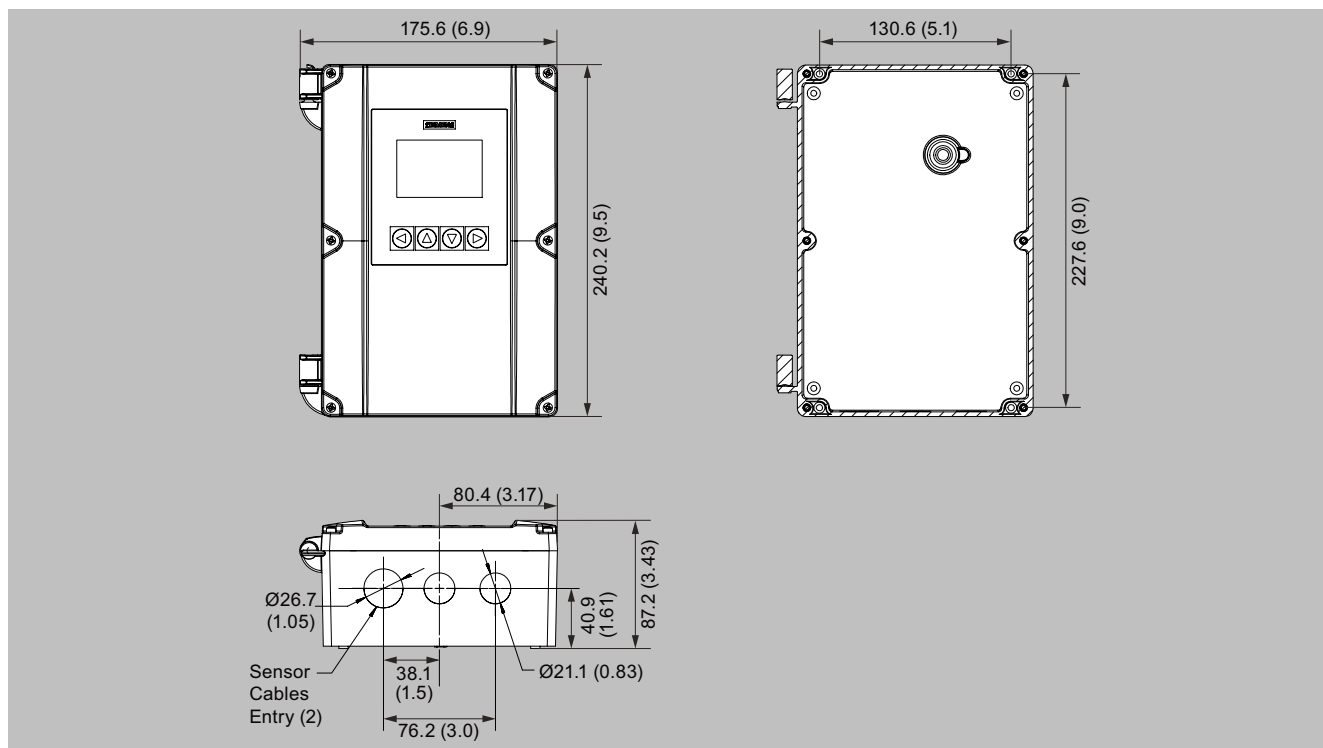
SITRANS FS (ultrasonic)

Clamp-on ultrasonic flowmeters / SITRANS FS220 ultrasonic flowmeter

Technical specifications

SITRANS FS220	
Rangeability	
Flow range	±12 m/s (±40 ft/s), depending on pipe size higher or lower
Flow direction	bi-directional
Flow sensitivity	0.001 m/s (0.003 ft/s) flow rate independent
Digital inputs	
Totalizer Hold	Optically isolated diode Activated On: Input voltage: 2 ... 10 V DC
Totalizer Reset	Optically isolated diode Activated On: Input voltage: 2 ... 10 V DC
Output	
Current	4 ... 20 mA (isolated) Externally powered 10 ... 30 V DC
Passive	30 V DC, 3 V AC max. Relay: 41.6 ms ... 5 s pulse duration Frequency: 0 ... 12.5 kHz (50 % duty cycle)
Pulse	Optically isolated transistor 10 mA, 30 V DC max.
Accuracy	
	For velocities above 0.3 m/s (1 ft/s), ±1.0 % of flow
Repeatability	± 0.25 % (according to ISO 11631)
Zero Drift	0.1 % of rate; < ±0.001 m/s (±0.003 ft/s)
Data refresh rate	100 Hz
Transmitter conditions	
Operating temperature	-10 ... +50 °C (14 ... 122 °F)
Storage temperature	-20 ... +60 °C (-4 ... +140 °F)
Degree of protection	IP65, NEMA 4X
Design	
Weight	1.4 kg (3.0 lb)
Dimensions (W x H x D)	176 x 240 x 87 mm (6.9 x 9.5 x 3.4 inch)
Enclosure material	Polycarbonate
Power supply	
	100 ... 240 V AC @ 20 VA or 11.5 ... 28.5 V DC @ 10 W
Certificates and approvals	
Unclassified locations	
• General Safety	UL, cUL, CE

Dimensional drawings



SITRANS FST020 IP65 (NEMA 4X), wall mount enclosure, dimensions in mm (inch)

Flow Measurement

SITRANS FS (ultrasonic)

Clamp-on ultrasonic flowmeters / SITRANS FST020 transmitter, wall mount housing

Overview



The SITRANS FST020 is the basic device for simple and cost-effective clamp-on applications. As a single-path device, it is suitable for flow measurement on liquids that do not require temperature or viscosity consideration and where highest accuracies are not required.

Historically, the FST020 comes from the clamp-on family of analog FUS1010 transmitters. Since the revision in 2017, the updated transmitter is now part of a digital platform based on the latest developments within Digital Signal Processing (DSP) technology - engineered for high measuring performance, fast response to step changes in flow, high immunity against process noise and simplicity in installation, commissioning and maintenance.

The FST020 transmitter delivers standard parameter measurements i.e. volume flow, flow speed or sound velocity by analog outputs and Modbus communication.

Process values

- Volume flow
- Flow velocity
- Sound velocity
- Totalizer 1

Benefits

Flow calculation and measurement

- Dedicated volume flow calculation with DSP technology
- 100 Hz update rate for all primary process values
- Maximum data age from sensor to output is 20 ms
- Independent low flow cut-off settings for volume flow and velocity
- Zero-point adjustment on command from discrete input or host system

Operation and display

- User-configurable operation display
 - Fully graphical display 240 x 160 pixel display with up to 6 programmable views
 - Self-explaining alarm handling/log in clear text
 - Help text for all parameters appears automatically in the configuration menu
- SensorFlash technology stores production specific system documentation and provides removable memory of all flowmeter setups and functions
 - Calibration certificates (with ordered calibration)
 - Non-volatile memory backup of operational data
 - Transfer of user configuration to other flowmeters
 - 4 GB SD card for storage and data logging
 - Audit trail of all parameter changes
 - Alarm logging

Alarms and safety

- Advanced diagnosis and service menu enhances troubleshooting and meter validation
- Configurable upper and lower alarm and warning limits for all process values

Outputs and control

- Monitoring comprised of 1 individually configurable totalizer
- Single parameter outputs that can be assigned individually to any of the following parameters:
 - Volume flow
 - Flow velocity
 - Sound velocity
 - Flow direction

Channel 1 is 4 to 20 mA analog output. The current signal can be configured for passive volume flow.

Relay output(s) can be user configured to Alarm status or warning. Modbus RTU RS 485 comes as standard.

Signal input

The signal input can be user-configured for:

- Totalizer reset functions
- Forcing outputs or freezing process values
- Initiating automatic zero point adjustment

Benefits (continued)***Approvals and certificates***

The SITRANS FST020 transmitter was designed to comply with or exceed the requirements of international standards and regulations.

Design

- Field clamp-on (non-intrusive)
- Single path, for only one pair of sensors on one pipe
- IP65 (NEMA 4X) wall mount housing, constructed of polycarbonate
- Available AC or DC power, 100 to 240 V AC, 11.5 to 28.5 V DC

Function

- 240 x 160 pixel graphical display with 4 key navigation and back-light
- 6 user programmable views for individual process and diagnostic information
- Modbus RTU communication
- 100 Hz update rate for all primary process value
- Independent low flow cut-off settings for volume and flow velocity
- Fully compatible with Siemens PDM version 8.2 service pack 1 or higher
- Bidirectional flow operation
- Menus available in English and German

Flow Measurement

SITRANS FS (ultrasonic)

Clamp-on ultrasonic flowmeters / SITRANS FST020 transmitter, wall mount housing

Selection and ordering data

Transmitter SITRANS FST020 (Basic), IP65 (NEMA 4X)				Article No. 7ME3570-	Order code
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.				● ● ● 4 0 - 0 ● ● ● ● ● ●	
Number of ultrasonic paths					
Single path				1	
Flowmeter functions and I/O configurations					
With display, keypad, 1× 4 ... 20 mA, 1× relay, 1× pulse/frequency, 2× digital input, Modbus RTU				J	
Meter power options					
100 ... 240 V AC				A	
11.5 ... 28.5 V DC				B	
Sensor FSS200¹⁾					
When ordering a flow system, sensors always come automatically with suitable mounting equipment. Smaller sensor sizes A & B come with mounting tracks, while sensor sizes C, D & E are supplied with frames and spacer bars. Straps provided are for the indicated maximum OD listed below. Strap kits are available to accommodate larger pipes (refer to spare part list). Refer to "Sensor Selection Charts" to find the most suitable sensors for specific pipe sizes and wall thicknesses.					
No sensor					A
For the following Universal sensors, temperature range is -40 ... +121 °C (-40 ... +250 °F), FSS200 Universal: select according to outer pipe diameter					
FSS200 Universal	A2	12.7 ... 50 mm (0.5 ... 2")	Track mount and straps provided up to 75 mm (3")		B
FSS200 Universal	B3	19 ... 127 mm (0.75 ... 5")	Track mount and straps provided up to 125 mm (5")		C
FSS200 Universal	C3	51 ... 305 mm (2 ... 12")	Mounting frame, straps and spacer bar provided up to 330 mm (13")		D
FSS200 Universal	D3	203 ... 610 mm (8 ... 24")	Mounting frame and straps and spacer bar provided up to 600 mm (24")		E
FSS200 Universal	E2	304 ... 9144 mm (12 ... 360")	Mounting frame and straps and spacer bar provided up to 1200 mm (48")		F
For the following High Precision sensors T1, temperature range is -40 ... +120 °C (-40 ... +248 °F), FSS200 High Precision: select according to pipe wall thickness					
FSS200 HP	A1H	0.6 ... 1.0 mm (0.025 ... 0.4")	Track mount and straps provided up to 75 mm (3")		G
FSS200 HP	A2H	1.0 ... 1.5 mm (0.04 ... 0.06")	Track mount and straps provided up to 75 mm (3")		H
FSS200 HP	A3H	1.5 ... 2.0 mm (0.06 ... 0.08")	Track mount and straps provided up to 75 mm (3")		J
FSS200 HP	B1H	2.0 ... 3.0 mm (0.08 ... 0.12")	Track mount and straps provided up to 125 mm (5")		K
FSS200 HP	B2H	3.0 ... 4.1 mm (0.12 ... 0.16")	Track mount and straps provided up to 125 mm (5")		L
FSS200 HP	C1H	4.1 ... 5.8 mm (0.16 ... 0.23")	Mounting frame, straps and spacer bar up to 600 min (24")		M
FSS200 HP	C2H	5.8 ... 8.1 mm (0.23 ... 0.32")	Mounting frame, straps and spacer bar up to 600 min (24")		N
FSS200 HP	D1H	8.1 ... 11.2 mm (0.32 ... 0.44")	Mounting frame and straps provided up to 1200 mm (48") ¹⁾		P
FSS200 HP	D2H	11.2 ... 15.7 mm (0.44 ... 0.62")	Mounting frame and straps provided up to 1200 mm (48") ¹⁾		Q
FSS200 HP	D4H	15.7 ... 31.8 mm (0.62 ... 1.25")	Mounting frame and straps provided up to 1200 mm (48") ¹⁾		R
For the following High Temperature sensors, temperature range is -40 ... +230 °C (-40 ... +446 °F), FSS200 High Temperature: select according to outer diameter					
FSS200 HT	Size 2	30 ... 200 mm (1 ... 8")	Mounting track and straps provided up to 250 mm (10")	Z	P 1 A

Clamp-on ultrasonic flowmeters / SITRANS FST020 transmitter, wall mount housing

Selection and ordering data (continued)

Transmitter SITRANS FST020 (Basic), IP65 (NEMA 4X)				Article No. 7ME3570-	Order code													
				●	●	●	4	0	-	0	●	●	●	●	●	●		
FSS200 HT	Size 3	150 ... 610 mm (6 ... 24")	Mounting track and straps provided up to 650 mm (26")								Z				P	2	A	
FSS200 HT	Size 4	400 ... 1200 mm (16 ... 48")	Mounting track and straps provided bar provided up to 1250 mm (50")								Z				P	3	A	
Sensor cable (pair - terminated)																		
No sensor cable												A						
Sensor cable, HDPE jacket, submersible, length																		
• 5 m (16.4 ft)													P					
• 10 m (32.8 ft)														Q				
• 20 m (65.6 ft)														R				
• 30 m (98.4 ft)														S				
• 60 m (196.8 ft)														T				
• 100 m (328 ft)														U				
Approvals																		
UL, ULc, CE																1		

- 1) Supplied spacer bar supports pipes up to 1050 mm (42"). For pipes larger than 1050 mm (42") purchase also, spare part 7ME3960-0MS40 (1012BN-4).
2) Made of stainless steel construction.

Further designs	Order code
Please add "-Z" to Article No. and specify Order code(s).	
Cable termination kit for customer supplied sensor cable pair	
Sensor cable termination for standard and plenum cable	T01
Mass storage	
Enable mass storage function or SD-card (not available for USA)	S30
Tag and name plates	
Tag plate, transmitter and sensor	Y19

Flow Measurement

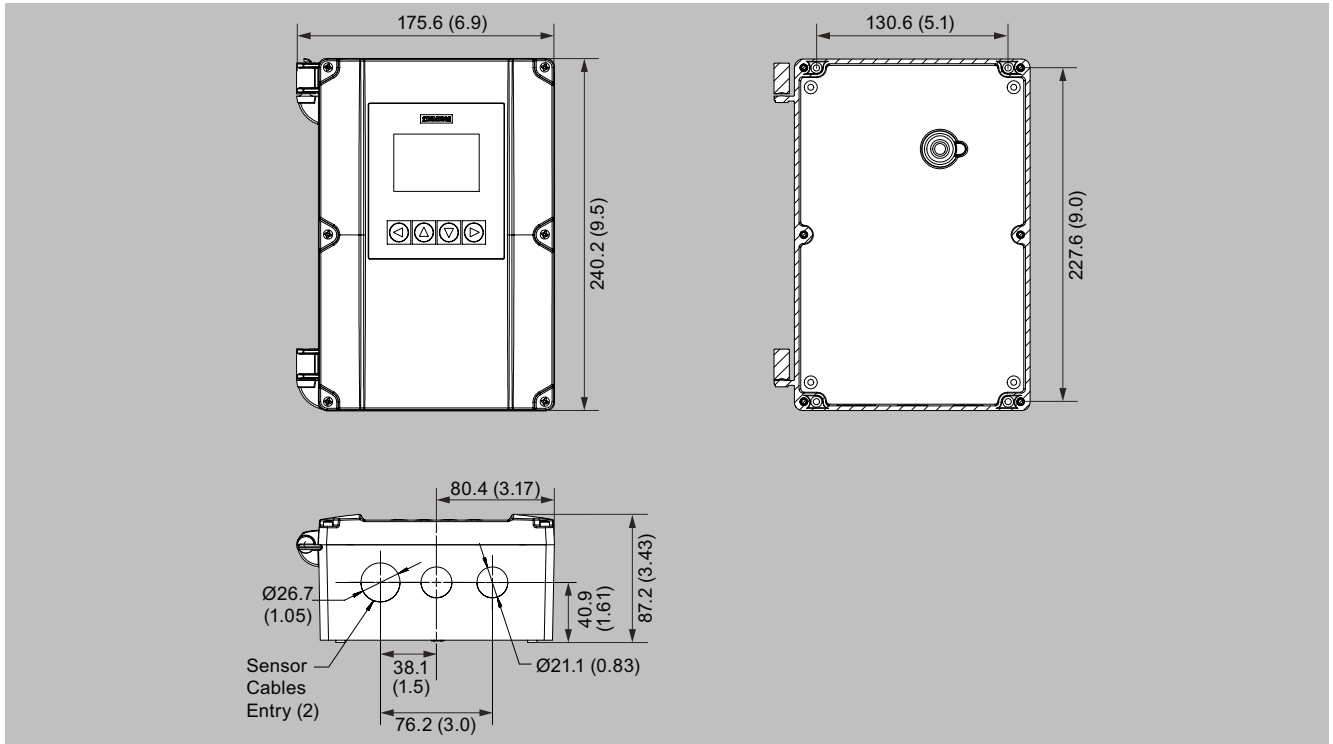
SITRANS FS (ultrasonic)

Clamp-on ultrasonic flowmeters / SITRANS FST020 transmitter, wall mount housing

Technical specifications

SITRANS FST020	
Input	
Flow range	± 12 m/s (± 40 ft/s), depending on pipe size higher or lower
Flow direction	bi-directional
Flow sensitivity	0.0003 m/s (0.001 ft/s) flow rate independent
Digital inputs	
Totalizer Hold	Optically isolated diode Activated ON: Input voltage: 2 ... 10 V DC
Totalizer Reset	Optically isolated diode Activated ON: Input voltage: 2 ... 10 V DC
Output	
Current	4 ... 20 mA (isolated) Externally powered 10 ... 30 V DC
Passive	30 V DC, 3 VA AC max.
Pulse	Optically isolated transistor 10 mA, 30 V DC max Relay: 41.6 ms ... 5 s pulse duration Frequency: 0 ... 12.5 kHz (50 % duty cycle)
Accuracy	
Accuracy	For velocities above 0.3 m/s (1 ft/s), ±1.0 % of flow
Repeatability	± 0.25 % (according to ISO 11631)
Zero Drift	0.1 % of rate; < ±0.001 m/s (±0.003 ft/s)
Data refresh rate	100 Hz
Rated operation conditions	
Operating temperature	-10 ... +50 °C (14 ... +122 °F)
Storage temperature	-20 ... +60 °C (-4 ... +140 °F)
Degree of protection	IP65/NEMA 4X
Design	
Weight	1.4 kg (3.0 lbs)
Dimensions (W x H x D)	176 x 240 x 87 mm (6.9 x 9.5 x 3.4 inch)
Enclosure material	Polycarbonate
Power supply	
	100 ... 240 V AC @ 20 VA or 11.5 ... 28.5 V DC @ 10 W
Certificates and approvals	
Unclassified locations	
• General safety	UL, cUL, CE

Dimensional drawings



SITRANS FST020 IP65 (NEMA 4X), wall mount enclosure, dimensions in mm (inch)

Flow Measurement

SITRANS FS (ultrasonic)

Clamp-on ultrasonic flowmeters / SITRANS FS290 ultrasonic flow system

Overview



SITRANS FST090 clamp-on ultrasonic flowmeter

The portable clamp-on ultrasonic flow measurement system SITRANS FS290 is formed by the SITRANS FST090 portable clamp-on flowmeter with FSS200 sensors.

This system represents the next generation of digital flow measurement which allows you to easily measure or check flows in pipes.

Benefits

The SITRANS FST090 transmitter is based on the innovative technology of the FST020 and FST030 and is therefore identical in use and operation. The FST090 transmitter is flexible, versatile, practical: in conjunction with the SITRANS FSS200 clamp-on sensors, it is up to practically any challenge.

The main benefits at a glance:

- Easy installation: just clamp it on, with no need to cut pipe or stop flow
- Minimal maintenance: sensors do not require upkeep or cleaning
- No moving parts to foul or wear
- No pressure drop or energy loss
- Wide turn-down ratio
- Precise single path measuring

Application



The SITRANS FS290 is often used for temporary checks in water supply and disposal. Cooling or hot water, reference quantities or leaks can be checked quickly in this way. A typical example is the monitoring and testing of fire protection systems or other emergency applications where there is flow.

The portable device is also versatile in the temporary use of measured values for stationary when measuring devices that have been removed for repair or calibration. In fact, the FS290 can be used almost anywhere liquid ultrasonic flow measurement is needed: such as check metering, i.e. the periodic checking of built-in clamp on sensors.

The SITRANS FS290 can be used to measure flow in many different material pipes. However, cement pipes and special plastic composite pipes cannot be used though due to their physical properties.

Inner coatings or liners are stored in the device and are taken into account when entering.

The SITRANS FS290 is suitable for pipes up to 5000 mm (200 inches) and for pipe wall thicknesses up to 50 mm (2.0 inches).

The recommended medium temperature range is from -40 °C to +121 °C. (-40 °F to 250 °F). For higher temperatures Siemens offers high temperature sensors up to maximum 230 °C (446 °F).

The transmitter comes supplied with a liquid table with all common material data for easy media selection. Relevant data can be easily and quickly adopted.

The SITRANS FS290 is not suitable for gases, steam and inhomogeneous liquids.

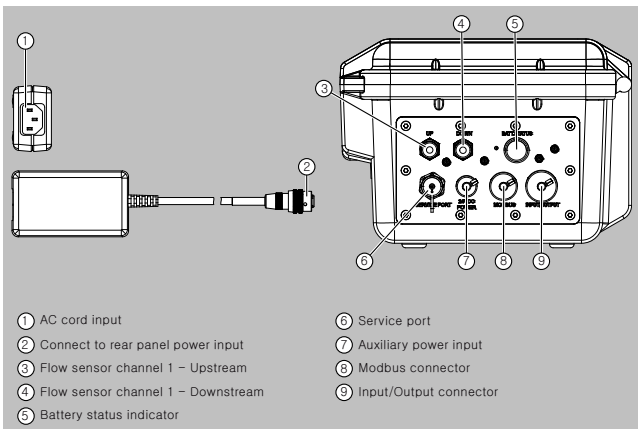
Design



The precision electronics of the SITRANS FST090 portable ultrasonic transmitter are housed in a robust weather proof case. The case protects the electronics under harshest of field conditions. The process and control connections are accessed on the top of the device, with industrial connectors, that can be quickly and securely employed. The system can be powered with an swappable rechargeable battery, providing power for 24 hours or more as well as via mains power with the system's Vac power adapter, for a more permeant installation.

The transmitter reads the measured process values from the transducers and calculates derived values, that are converted into flow values that are then displayed. The FST090 provides Modbus communications, as well as a 4-20 mA output, a single relay and two digital inputs for totalizer start/stop and reset. Additionally there is also a pulse/frequency output an USB service port, and a local multi functional display. The system provides easy to use totalizers, access control, diagnostics, and menu driven system configuration.

Connecting plate



SITRANS FST090, AC power and connections

Easy sensor installation

Mounting rails are ideal for small sensors of sizes A and B. For the larger sensors C, D and E, mounting frames with spacers are suitable. Both rails and frames can be easily attached to the pipe using tension chains without tools. The correct sensor distance is made using calculated index points. The sensors are then clamped exactly there. The distance ruler supplied as standard helps with alignment and specifies the index distance. There is no need to measure the sensor distance on the pipe for the best possible current signal, the

Design (continued)

sensors are always on optimally aligned for every possible condition.

Magnetic frames can be used universally for all sensor sizes C, D and E. Industrial magnets ensure a strong hold on steel pipes. They can also be used on plastic pipes, with the use of tightening straps that are required for this application. A spacer bar ensures easy sensor positioning.

Mode of operation

The SITRANS FST090 calculates the optimal sensor distance based on the calculation of pipe material, size and wall thickness, taking into account the liquid to be measured. The distance is given as an LTN value and as an index value to a reference point. The LTN value allows the distance between the sensors to be checked precisely.

Each measuring path is formed by two coordinated sensors that transmit ultrasonic signals back and forth through the pipe. Using the time difference between the two signals, the transmitter calculates the resulting measurement.

The transmitter performs analog signal processing for the sensor pair and digitalizes the generated measurements for display. The data measured is periodically recorded on the inserted SD storage card. Data output can be user-defined or take place via either analog signal or Modbus RTU.

Users can install clamp-on sensors on the pipe during ongoing operation, which means the pipe is not cut open and the flow does not need to be stopped.

High-tech reduces transmitter errors below 0.15%

The SITRANS FST090 is based on the technology of the industry leading transmitter SITRANS FST030. The analog data acquisition is digitized immediately, thus enabling signal processing in real time. The electronics of the SITRANS FST090 have been developed in so that the transmitter error is less than 0.15% under ideal measuring conditions. For normal use under good conditions, a measurement inaccuracy of 1% or less is realistic.

Measurement errors in ultrasonic flow measurements are often caused by anomalies in the inlet area. Insufficient distance to a 90° or room bend (3D double bend) causes flow profile disturbances that a clamp-on measuring device cannot easily compensate for. In portable applications, the built in patented anomaly tool helps to improve measurement accuracy under these challenging conditions.

Long battery life, easy battery change

An improved energy manager allows battery operation for at least twenty four hours at full load.

A battery change during operation is possible without any problems. As an ideal supplement to existing stationary measurements, the SITRANS FST090 can also be programmed with Siemens Process Device Manager (PDM) software via the USB interface and then integrated into control systems.

Flow Measurement

SITRANS FS (ultrasonic)

Clamp-on ultrasonic flowmeters / SITRANS FS290 ultrasonic flow system

Mode of operation (continued)



SITRANS FST090 transmitter with battery

Selection and ordering data

SITRANS FS290 clamp-on flowmeter	7ME374			
	●	-	●	●
Click on the Article No. for the online -configuration in the PIA Life Cycle Portal				
Transmitter model				
Transmitter FST090 portable clamp-on	5			
FSS200 sensor pair clamp-on for portable use, incl. suitable pipe mounting material				
No sensors	0	A		
Universal: for all pipe materials; temperature -40 ... +120 °C (-40 ... +250 °F)				
FSS200 universal size A2, for pipes 12.7 ... 50 mm (0.5 ... 2") supplied with portable mounting tracks for pipes up to 130 mm (5")	0	B		
FSS200 universal size B3, for pipes 19 ... 127 mm (0.75 ... 5") supplied with portable mounting tracks for pipes up to 130 mm (5")	0	C		
FSS200 universal size C3, for pipes 51 ... 305 mm (2 ... 12") supplied with portable frame set for pipes up to 330 mm (13")	0	D		
FSS200 universal size D3, for pipes 203 ... 610 mm (8 ... 24") supplied with portable frame set for pipes up to 330 mm (13")	0	E		
FSS200 universal size E2, for pipes 304 ... 6000 mm (12 ... 240") supplied with portable frame set for pipes up to 600 mm (24")	0	F		
High Precision: ideal for steel pipes; temperature -40 ... +121 °C (-40 ... +250 °F)				
FSS200 high precision size A1H, for steel pipes with wall thickness 0.6 ... 1 mm (0.03 ... 0.4") supplied with portable mounting tracks for pipes up to 130 mm (5")	0	G		
FSS200 high precision size A2H, for steel pipes with wall thickness 1 ... 1.5 mm (0.04 ... 0.6") supplied with portable mounting tracks for pipes up to 130 mm (5")	0	H		
FSS200 high precision size A3H, for steel pipes with wall thickness 1.5 ... 2 mm (0.06 ... 0.8") supplied with portable mounting tracks for pipes up to 130 mm (5")	0	J		
FSS200 high precision size B1H, for steel pipes with wall thickness 2 ... 3 mm (0.08 ... 0.12") supplied with portable mounting tracks for pipes up to 130 mm (5")	0	K		
FSS200 high precision size B2H, for steel pipes with wall thickness 3 ... 4.1 mm (0.12 ... 0.16") supplied with portable mounting tracks for pipes up to 130 mm (5")	0	L		
FSS200 high precision size C1H, for steel pipes with wall thickness 4.1 ... 5.8 mm (0.16 ... 0.23") supplied with portable frame sets for pipes up to 610 mm (24")	0	M		
FSS200 high precision size C2H, for steel pipes with wall thickness 5.8 ... 8.1 mm (0.23 ... 0.32") supplied with portable frame sets for pipes up to 610 mm (24")	0	N		
FSS200 high precision size D1H, for steel pipes with wall thickness 8.1 ... 11.2 mm (0.32 ... 0.44") supplied with portable frame sets for pipes up to 1200 mm (48")	0	P		
FSS200 high precision size D2H, for steel pipes with wall thickness 11.2 ... 15.7 mm (0.44 ... 0.62") supplied with portable frame sets for pipes up to 1200 mm (48")	0	Q		
FSS200 high precision size D4H, for steel pipes with wall thickness 15.7 ... 31.8 mm (0.62 ... 1.25") supplied with portable frame sets for pipes up to 1200 mm (48")	0	R		
Universal high temperature (HT): for all pipe materials; -40 ... +230 °C (-40 ... +446 °F)				
FSS200 Universal HT size 1, for pipes 10 ... 100 mm (0.47 ... 3.95") supplied with mounting tracks for pipes up to 150 mm (6")	1	A		
FSS200 Universal HT size 2, for pipes 30 ... 200 mm (1.5 ... 8") -supplied with mounting tracks for pipes up to 250 mm (10")	1	B		
FSS200 Universal HT size 3, for pipes 150 ... 610 mm (6 ... 25") -supplied with mounting tracks for pipes up to 650 mm (26")	1	C		
FSS200 Universal HT size 4, for pipes 400 ... 1200 mm (16 ... 48") supplied with mounting tracks for pipes up to 1200 mm (48")	1	D		
Sensor bundle - check meter kit with magnet frames, straps and spacer bar				
Standard Performance, for any pipe material:				
• Small pipe check meter kit – Standard Performance, for diameters 12 ... 400 mm (0.5 ... 16"). Includes universal sensors B3, C3, D3, with tracks, magnet frames, straps, and spacer bar	2	K		
• Complete pipe check meter kit – Standard Performance, for diameters 8 ... 6100 mm (0.38 ... 240"). Includes universal sensors A2, B3, C3, D3, E2 with tracks, magnet frames, straps, and spacer bar	2	L		
High performance, for steel or plastic pipes, suitable for in-situ verification of flow instruments and flow surveys on critical applications in all industries:				
• Medium pipe check meter kit – High Performance, for steel or plastic pipe material with wall thickness 4.1 mm ... 11.2 mm (0.160 ... 0.440") and any homogeneous liquid. Includes high precision sensors sizes C1H, C2H, D1H	2	M		
• Extended pipe check meter kit – High Performance, for steel or plastic pipe material with wall thickness 4.1 ... 15.7 mm (0.16 ... 620"). Includes high precision sensors C1H, C2H, D1H, D2H	2	N		
• Complete pipe range check meter kit – High Performance, for steel or plastic pipe material with wall thickness 3 ... 15.7 mm (0.12 ... 620"). Includes high precision sensors B2H, C1H, C2H, D1H, D2H, with mounting tracks, magnet frames, straps, and spacer bar	2	P		
Fast charger for rechargeable battery pack				
No charger				A
Charger type A for Europe (CEE7/7)				B
Charger type C for Australia (AS3112)				C
Charger type D for U.K. (BS1363)				D
Charger type J for Japan (JIS8303)				E
Charger type K for U.S. (NEMA 5-15P)				F
Charger type L for Switzerland (SEV1011)				G

Flow Measurement

SITRANS FS (ultrasonic)

Clamp-on ultrasonic flowmeters / SITRANS FS290 ultrasonic flow system

Selection and ordering data (continued)

SITRANS FS290 clamp-on flowmeter	7ME374
Akku-Pack Lithium-Ion for battery use	
No battery	0
One battery pack rechargeable	1
Two battery pack rechargeable	2
Three battery pack rechargeable	3
Output signals and Modbus usage	
Without connection terminal box	0
Connection terminal box, with connection terminals for quick connection to the FST090 multi-connector, for Modbus (8) and the inputs and outputs (9)	1
Number of ultrasonic paths	
One path (default value 1)	1
Default Value B	
Polycarbonate portable enclosure (default value B)	B
Digital sensor link	
Sensor link integrated in transmitter (default value B)	B
External power supply unit	
Without power supply unit	0
Power adaptor type A plug for Europe (CEE7/7)	1
Power adaptor type C plug for Australia (AS3112)	2
Power adaptor type D plug for U.K. (BS1363)	3
Power adaptor type J plug for Japan (JIS8303)	4
Power adaptor type K plug for U.S. (NEMA 5-15P)	5
Power adaptor type L plug for Switzerland (SEV1011)	6

Order code	
Options	
Please add "-Z" to Article No. and specify Order code(s) and plain text.	
Sensor cable set pair, complete	
2 × 6 m (20 ft) PVC coaxial cable FST090 to the sensor with BNC connection	K21
2 × 15 m (50 ft) PVC coaxial cable FST090 to the sensor with BNC connection	K22
Mass storage	
Mass storage device function (outside USA mandatory)	S30

Artikel-Nr.	
Accessories	
Sensor cable set pair, complete	
Sensor cable 6 m (20 ft) for FST090	A5E51114688
Sensor cable 15 m (50 ft) for FST090	A5E51114689
External power supply unit	
Power adaptor type A plug for Europe (CEE7/7)	7ME39403PR00
Power adaptor type C plug for Australia (AS3112)	7ME39403PS00
Power adaptor type D plug for U.K. (BS1363)	7ME39403PT00
Power adaptor type J plug for Japan (JIS8303)	7ME39403PQ00
Power adaptor type K plug for U.S. (NEMA 5-15P)	7ME39403PU00
Power adaptor type L plug for Switzerland (SEV1011)	7ME39403PV00
Akku-Pack Lithium-Ion for battery use	
Replacement battery	A5E50949498
Fast charger for rechargeable battery pack	
Charger type A for Europe (CEE7/7)	7ME39404PR00
Charger type C for Australia (AS3112)	7ME39404PS00
Charger type D for U.K. (BS1363)	7ME39404PT00
Charger type J for Japan (JIS8303)	7ME39404PQ00
Charger type K for U.S. (NEMA 5-15P)	7ME39404PU00

Selection and ordering data (continued)

	Artikel-Nr.
Charger type L for Switzerland (SEV1011)	7ME39404PV00
Junction box	
Junction box with terminal connection for fast connection to the FS290 bulk head connection for Modbus (8), the in- and outputs (9)	A5E50726323
Cable	
I/O cable with plug for the FST090 (connector 9)	A5E51100281
Cable for Modbus with plug for the FST090 (connector 8)	A5E51100285
Connector adapter F/BNC	
"F" connector to BNC adapter (order 2 pcs per transducer set)	CQO:1012NFPA

Flow Measurement

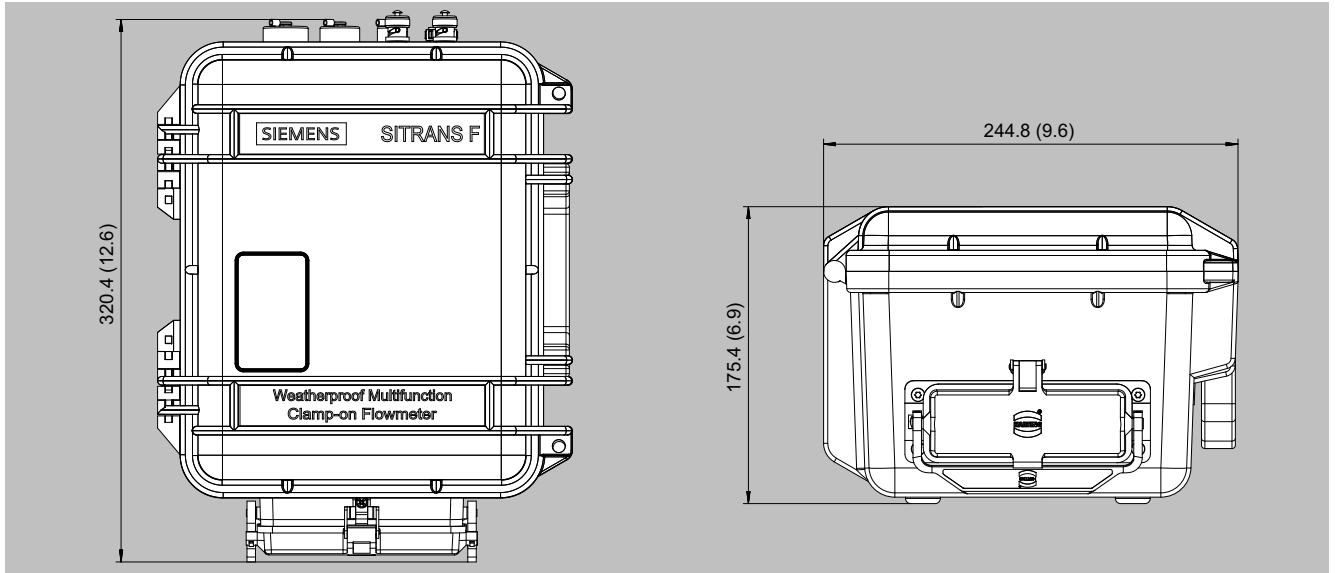
SITRANS FS (ultrasonic)

Clamp-on ultrasonic flowmeters / SITRANS FS290 ultrasonic flow system

Technical specifications

SITRANS FST090	
Design	
Dimension (L × B × H)	320.4 × 244.8 × 175.4 mm (12.6 × 9.6 × 6.9 inch)
Weight	2.8 kg (6.0 lb)
Housing material	Polypropelen (weatherproof)
Architecture	
Input / display	4 pushbuttons, illuminated graphic display, 240 × 160 pixels
Programming	Menu assistant, free input, 50 measuring locations can be saved
Language selection	Switchable, with 14 languages available (English, German, Italian, French, Spanish, Portuguese, Danish, Swedish, Finnish, Dutch, Chinese, Japanese, Russian, Polish)
Sensors	
Sensor cable	FSS200 clamp-on sensors portable, compatible with older FUP1010 sensors PVC length 6 m (19.6 ft)/ 15 m (49 ft) with connector
Power	
External power supply	Transmitter power: DC 11.5 ... 28.5 V at 10 W External power supply 100 ... 240 V AC / 24 V DC, 10 W
Battery pack	Lithium-ion battery (99 Wh), 24 V DC with operation of up to 24 hours per battery charge. Swapping between battery and power pack possible without interrupting the flow measurement
Charger for battery pack	Battery charger with quick charge function: 19 ... 26 V DC -2.8 A max. External battery charger AC-Adapter: 100 ... 240 V AC 50-60 Hz, 1.7 A
Adjustable measuring range	
Flow rate range	± 12 m/s (± 40 ft/s), depending on the pipe width larger or smaller
Flow direction	Bidirectional
Flow sensitivity	0.001 m/s (0.003 ft/s), independent from the flow rate
Input/output connector	
Digital inputs	
• Stop counter	Optocoupler Enabled ON: Input voltage: DC 2 ... 10 V
• Reset counter	Optocoupler Activated ON: Input voltage: DC 2 ... 10 V
Output option	
• Current	4 ... 20 mA (isolated) External current 10 ... 30 V DC
• Relay	DC 30 V, AC 3 V max. pulse: 41.6 ms ... 5 s Pulse duration Frequency: 0 ... 12.5 kHz (50% load cycle)
• Pulse rate	Optical transistor 10 mA, DC 30 V max.
Communication	
Diagnostic option	Modbus RTU RS 485 Logger, alarms and events, separated in table shape
USB service connection	
Accuracy	USB - SIMATIC PDM / internal memory External memory 4 GB (possible up to 32 GB) for years of recording
Repeatability	At speeds above 0.3 m/s (1 ft/s), ±1.0% of flow rate
Zero drift	±0.25% (according to ISO 11631)
Data repetition rate	0.1% of the flow; < ±0.001 m/s (±0.003 ft/s) 100 Hz
Environmental conditions	
Operating temperature	-10 ... +50 °C (14 ... 122 °F)
Storage temperature	-20 ... +60 °C (-4 ... +140 °F)
Protection class	<ul style="list-style-type: none"> • IP65 with lid closed • IP67 with lid open
Certificates and approvals	
General safety	UL, ULc, CE

Dimensional drawings



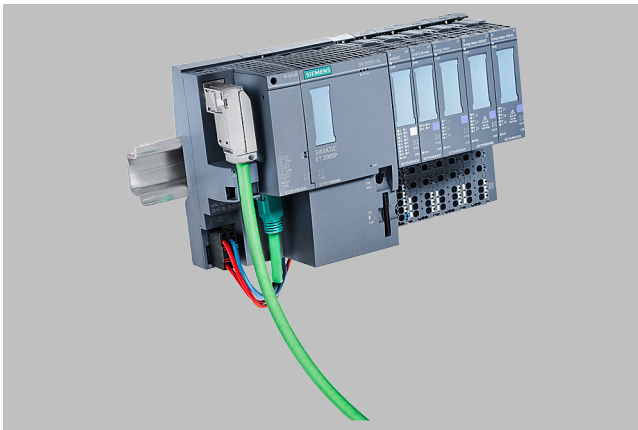
SITRANS FST090, net weight 4.1 Kg (9.038 lb), dimensions in mm (inch)

Flow Measurement

SITRANS FS (ultrasonic)

Clamp-on ultrasonic flowmeters / SITRANS FST070 transmitter

Overview



The technology module SITRANS FST070 is an ultrasonic clamp-on flowmeter transmitter for the SIMATIC ET200SP.

The TM SITRANS FST070 flow transmitter can be operated directly in the SIMATIC PCS 7 or in TIA Portal with the FST070 faceplates. SITRANS FST070 offers real-time data processing and the display of all measuring and status data of the Ultrasonic flowmeter.

The TM FST070 can work with all Siemens ultrasonic clamp-on flowmeters. It can be connected to the FS DSL with FSS200 clamp-on sensors.



SITRANS FS DSL with FSS200 clamp-on sensors

Benefits

- Easy integration into automation process control as TIA portal and PCS7 (SIMATIC)
- Easy selection and integration of flowmeters via TIA selector
- Precast face plates for TIA portal and PCS7
- No additional transmitter between automation and clamp-on sensors required
- Cost effective integration of clamp-on flowmeters for water treatments, control rooms with PCS7
- SITRANS FST070 ET 200SP technology module can combined with all other SIMATIC ET200 modules
- Fast and trouble-free communication between the flowmeter and the PLC through digital data communication with up to 10 ms update rate
- SITRANS FST070 and ET 200SP have the ATEX Zone 2 Class 1 Div 2 approvals. With the barrier SITRANS I300 the flowmeters sensor can be used in Ex Zone 1/0 Class 1 Div 1 approval

Application

SITRANS FST070 can be used for machine builders, in the chemical industry or water treatments. The meters are suitable for measuring on liquid, hydrocarbon and gas. With ET 200SP the SITRANS FST070 can be installed decentralized in small stations, with fast communication to the control room. The faceplates for TIA portal and PCS 7 offer the direct full remote access to the flow meter. The main industries for the SITRANS FST070 transmitter:

- Chemical
- Pharmaceutical
- District Energy
- Water and waste water
- Oil
- Gas

Design


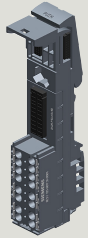

The SITRANS FST070 is designed as ET200 SP module and can directly installed with other ET200 SP modules. The FS DSL cable is directly mounted to the ET 200SP base unit is providing the supply voltage and the data communication. The SITRANS FSS200 clamp-on sensors with FS DSL can be connected directly to the SITRANS FST070. For sensors in ATEX Zone 0 or 1, the SITRANS I300 barrier must be installed between FST070 and the FS DSL.

Function

The following key functionalities are available:

- Volume flow rate, mass flow, flow velocity, density, temperature, pressure, kinematic viscosity, standard volume flow (hydrocarbon)
- Three built-in totalizers which can freely be set for counting volume flow, mass flow
- Two digital inputs
- Two digital outputs
- Low flow cut-off
- Zero point adjustment
- Configurable upper and lower alarm and warning limits for all process values
- Comprehensive status and error reporting

Selection and ordering data

Description	Article No.	
SITRANS FST070 – Transmitter for ET 200SP	7ME3448-6AA00-0BB1	
BU20-P12+A0+4B, PU1 – BaseUnit plate for ET 200SP	6ES7193-6BP20-0BB1	
SITRANS I300 – Isolating power supply – Ex barrier	A5E39832532	
SITRANS FS DSL M12-SSL cable and FSS200 clamp-on sensors	7ME3720-.....1N..	Configuration with the SIEMENS PIA selector SITRANS FS230 ultrasonic clamp-on
SITRANS FS DSL SSL terminal connection and FSS200 clamp-on sensors	7ME3720-.....1Q..	Configuration with the SIEMENS PIA selector SITRANS FS230 ultrasonic clamp-on

Description	Article No.
SITRANS FST070 system manual	A5E49982949-AA
• English	
• German	

Flow Measurement

SITRANS FS (ultrasonic)

Clamp-on ultrasonic flowmeters / SITRANS FST070 transmitter

Technical specifications

SITRANS FST070	
Measurement of	Volume flow rate, mass flow, flow velocity, density, temperature, pressure, kinematic viscosity, standard volume flow (hydrocarbon)
Measurement functions	
• Totalizer 1	Volume flow, mass flow, standard volume flow
• Totalizer 2	Volume flow, mass flow; standard volume flow
• Totalizer 3	Volume flow, mass flow; standard volume flow
General information	
Product type designation	Technology module TM FST070
FW update possible	Yes
Usable BaseUnits	BU 20 type B1
ET 200SP	Yes
Engineering with	<ul style="list-style-type: none"> STEP 7 TIA Portal configurable/integrated as of version V17 or higher STEP 7 configurable/integrated as of version V5.6 SP4 and higher PCS 7 V9.1 or higher PROFINET as of GSD version/GSD revision GSDML V2.35
Cable	
Maximum cable length to FS DSL	75 m (max. 150 m)
Supply voltage	
Load voltage L+	24 V DC
Rated value (DC)	24 V NEC-Class II
Permissible range, lower limit (DC)	19.2 V
Permissible range, upper limit (DC)	28.8 V
Short-circuit protection	Yes
Reverse polarity protection	Yes; against destruction
Input current	
Current consumption, max.	500 mA
Power loss	
Typical power loss, max.	1.7 W
Protection class	
IP protection	IP20
EMV	<ul style="list-style-type: none"> Electrostatic discharge according to IEC 61000-4-2: 2008 Field-related interference according to IEC 61000-4-3: 2006 Burst interference due to burst according to IEC 61000-4-4: 2012 Conducted interference by surge according to IEC 61000-4-5: 2014 Conducted interference by high-frequency radiation according to IEC 61000-4-6: 2013
Decentralized operation	
• to SIMATIC S7-300	Yes
• to SIMATIC S7-400	Yes
• to SIMATIC S7-1200	Yes
• to SIMATIC S7-1500	Yes
• to standard PROFINET controller	Yes
Usable with the following flowmeters	SITRANS FS DSL with FSS200 For hazardous area application the SITRANS I300 can be used as barrier/power supply between sensor and FST070

Technical specifications (continued)

SITRANS FST070	
Digital inputs 1 and 2	
Free useable inputs 1 and 2	<ul style="list-style-type: none"> Start/stop totalizer 1, 2 or 3 Reset totalizer 1, 2 or 3 Zero adjust Force outputs Freeze process values
High signal	<ul style="list-style-type: none"> Nominal voltage: 24 V DC Upper limit: +30 V DC Lower limit: +11 V DC Current: max 35 mA
Low signal	<ul style="list-style-type: none"> Nominal voltage: 0 V DC Lower limit: -30 V DC Upper limit: +5 V DC Current: max 35 mA
Potential separation	<ul style="list-style-type: none"> Module and backplane bus Short circuit protection
Isolation test	707 V DC
Cable length	<ul style="list-style-type: none"> Max. 50 m shielded Max. 25 m unshielded
Digital outputs 1 and 2	
Free useable outputs 1 and 2	<ul style="list-style-type: none"> Alarm acknowledgment Out of specification Failure sensor measuring Function check Flow direction
Low signal	Max. 1 V
High signal	Min 23.2 V
Switching capacity	300 mA signal high
On lamp load	8 W
Load resistance	80 ... 10 kΩ
Between different circuits	Electronic/thermal
Potential separation	Module and backplane bus
Isolation test	707 V DC
Cable length	<ul style="list-style-type: none"> Max. 50 m shielded Max. 25 m unshielded
Environment	
Ambient temperature during operation	
Minimum installation	-25 °C
Horizontal installation, max.	60 °C; observe derating
Vertical installation, max.	50 °C; observe derating
Ambient temperature during storage/transport	
Storage, min.	-40 °C
Storage, max.	70 °C
Transport, min.	-40 °C
Transport, max.	70 °C
Relative humidity	
Operation, min.	5 %
Operation, max.	95 %; no condensation
Height in operation	
Ambient air pressure altitude (relative to sea level)	$T_{min} \dots T_{max}$ at 1 080 hPa ... 795 hPa (-1 000 ... +2 000 m)
EMC performance	
Emission	<ul style="list-style-type: none"> EN 61000-6-4
Electromagnetic compatibility	<ul style="list-style-type: none"> IEC 61000-6-2: 2016 IEC 61000-6-4: 2018

Technical specifications (continued)

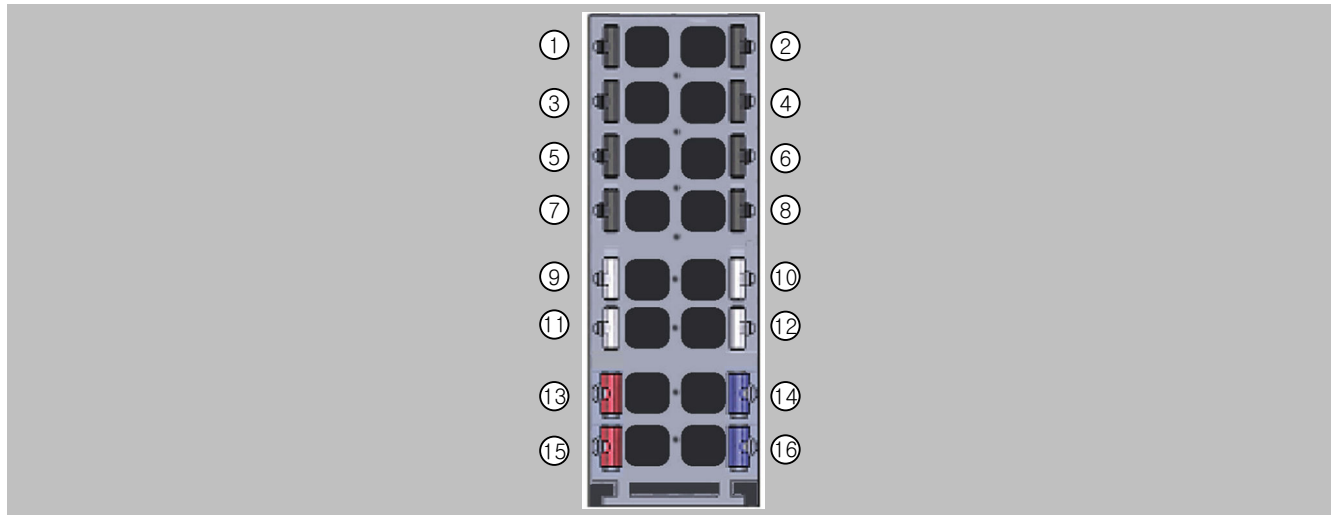
SITRANS FST070	
Emission of radio interference	Class A industrial environment: <ul style="list-style-type: none"> • IEC 61000-6-4: 2018 • IEC/CISPR 16-2-3: 2008 • EN 55016-2-3: 2006
Emission on power supply cables	Class A Industrial environment: <ul style="list-style-type: none"> • IEC 61000-6-4: 2018 • IEC/CISPR 16-2-1: 2010 • EN 55016-2-1: 2009
Certification	
CE mark	Low voltage directive RoHS
UL	ANSI / ISA 12.12.01
CAN/CSA	CSA C22.2 No. 213-M1987 Class I, Div. 2 Group A.B.C.D T4
ATEX	II 3 G Ex ec IIC T4 Gc
IECEX	Ex ec IIC T4 Gc
Tick	Yes
KCC	Yes
RoHS	Yes
FM	Class I, Div. 2, Group A.B.C.D T4
Communication	
Digital Sensor Link	460.8 kBits/s
Cable length FST070 to FC DSL Sensor	75 m (150 m)
Power supply FS sensors	The operating voltage of the sensors is supplied via the sensor cable directly from the FST070

Flow Measurement

SITRANS FS (ultrasonic)

Clamp-on ultrasonic flowmeters / SITRANS FST070 transmitter

Circuit diagrams



Pin assignment of the BaseUnit BU20-P12+A0+4B

Naming	Configuration	PIN
Digital input	DIO	1
Digital output	DQ0	2
Digital input	DI1	3
Digital output	DQ1	4
+24 V DC supply voltage for digital inputs	DI_L+	5
-	nc	6
Ground for digital outputs	M	7
Ground for digital outputs	M	8
RS 485 data line B for SEN communication	SEN_B	9
+24 V DC supply voltage for SEN	SEN_L+	10
RS 485 data line A for SEN communication	SEN_A	11
GND for SEN supply	SEN_M	12
+24 V DC supply voltage for SEN	L+	13
Ground for supply voltage	M	14
+24 V DC supply voltage for SEN	L+	15
Ground for supply voltage	M	16

Overview

Accessories / Spare parts for clamp-on ultrasonic flowmeters

Description	Article No.	Symbol
<p>Universal portable sensors Selected generally for portable systems where a wide variety of pipes are to be measured. Since they are selected based on diameter only, a wide range of pipe sizes and materials can be covered with a minimum number of sensors. These can also be selected as a cost savings on applications where standard accuracy is sufficient.</p>	7ME3951-...	
<p>High precision sensors Selected generally for dedicated meters since the need to cover a range of pipes is not a requirement. They provide the highest accuracy achievable by the meters and therefore should be selected whenever higher accuracy/repeatability is required. They are only applicable to steel pipes but no other metals, and are selected solely by wall thickness.</p>	7ME3950-...	
<p>High temperature sensors Are selected whenever pipe temperature will exceed 250 °F (120 °C) up to a maximum of 450 °F (232 °C). They are universal type and can therefore be used on any pipe material and are selected by pipe diameter.</p>	7ME3950-...	
<p>High precision mount These provide the most secure and strongest mounting of the flow sensors. They are generally selected for "High End" meter types where maximum performance criteria applies. They accommodate high precision sensors designed to mount inside these enclosures. May be welded to the pipe if so desired by the customer. They come in 2-piece or 1-piece configurations depending upon the application pipe size and type (Liquid/Gas).</p>	7ME3960-...	
<p>Mounting tracks Typically used on smaller pipes for easier and more stable mounting for dedicated universal style sensor size A or B, also available for dedicated high precision sensor size A or B.</p>	7ME3960-...	
<p>Magnetic mounting frames Magnetic mounting frames are designed to simplify clamp-on sensor installation on pipelines 8 inches (DN200) and larger by eliminating the need for straps to secure them. They feature powerful magnets to ensure quick and accurate setup. Compatible with all C, D and E universal and high-precision sensors belonging to the SITRANS F US clamp-on family, magnetic mounting frames can be installed on any carbon steel pipe and are constructed in aluminum for a high level of durability.</p>	7ME3960-0MD02	
<p>Mounting frames These items are useful in simplifying sensor installation. They are strapped to the pipe first then the sensors are installed, making the installation less cumbersome and more precise. They also enable easy repeated mounting of the sensors assuring conformation to the original sensor positioning. They may be left in place at each measurement location where periodic flow surveys are conducted to simplify subsequent installations and ensure repeatable results.</p>	7ME3960-...	
<p>Spacer bars Sensors are required to be mounted at a set distance from each other as determined by pipe size and medium being measured. The spacer bar simplifies this requirement by eliminating the need to undertake a precise dimensional measurement. The flowmeter will specify a specific spacing index which is easily accommodated with the marked indices on the bar.</p>	7ME3960-...	

Flow Measurement

SITRANS FS (ultrasonic)

Clamp-on ultrasonic flowmeters / Accessories and spare parts

Overview (continued)

Description	Article No.	Symbol
<p>Clamp-on RTD's 1000 W platinum RTD's for use where temperature is required. Used with Energy Meters to record supply/return temperature. For this purpose precision matched pairs (to 0.02 °C) are supplied. Single RTD's are also used with FUH and FUG meters to enable live calculations of "Liquident" and Standard Volume Correction.</p>	7ME3950-...	
<p>Insert RTD's SITRANS FST030 is suitable for PT100, PT500 and PT1000. Please select best appropriate RTD and thermowell in SIEMENS product family SITRANS TS500</p>	7MC7500-... 7MT2351-...	
<p>Standard cable (flow sensor or RTD) Selected for general purpose installations where no special application requirements exist.</p>	7ME3960-...	
<p>Submersible cable (flow sensor) Polyethylene jacketed, for locations that experience periodical or continual submersion of the flow sensors.</p>	7ME3960-...	
<p>Plenum cable (flow sensor or RTD) For temperatures above 180 °F. Teflon jacketed to withstand high temperatures, is used when high temp sensors are specified.</p>	7ME3960-...	
<p>Armored cable (flow sensor) Double shielded cable, selected when cable will not be installed in conduit between meter and sensors.</p>	7ME3960-...	
<p>Temperature sensor cable Cable to connect field installed RTD to flowmeter, available in Teflon wrapped, plenum or submersible grade. Typically used for FUE, FUH and FUG series meters where a temperature sensor is employed.</p>	7ME3960-...	

Overview (continued)



Description	Article No.	Symbol
<p>Straps</p> <p>Used to fasten sensors or mounting frames to pipe for dedicated meter installations. Stainless steel construction for corrosion resistance.</p>	7ME3960-...	
<p>Chains (EZ clamps)</p> <p>Used to fasten portable sensors or mounting frames to pipe. Thumbscrews eliminate need for hand tools when mounting sensors, and allow for easy on/off operations.</p>	7ME3960-...	
<p>Ultrasonic couplant</p> <p>Fills any voids between sensor emitting surface and pipe wall to allow maximum energy transfer between sensor and pipe. Several different types of couplants are employed as determined by the application conditions and type of installation (Temporary or permanent).</p>	7ME3960-...	
<p>Dry couplant</p> <p>The dry coupling pad is intended for use in any liquid, clamp-on transit time or Doppler applications that require a more durable coupling material. Installation is easy by simply placing one strip of material between sensor and pipe. Not intended for clamp-on gas where damping material is used. The temperature range is -34 to +200 °C (-30 to +392 °F).</p>	7ME3960-...	
<p>Damping material</p> <p>Used with gas meters, and required as part of their sensor installation. This material absorbs excess ultrasonic energy from the pipe wall to enable the meter to detect and operate with low amplitude sensor signals normally associated with Clamp-on Gas applications.</p>	7ME3960-...	
<p>Test block</p> <p>Used for checking operation of a meter and sensors prior to a field installation, or as a troubleshooting tool. Selected by sensor size, each block accommodates 2 sensor sizes. Available only for universal sensors.</p>	7ME3960-...	

Flow Measurement

SITRANS FS (ultrasonic)

Clamp-on ultrasonic flowmeters / Accessories and spare parts

Overview (continued)

Description	Article No.	Symbol
<p>Termination kit (flow sensor or RTD) Provides the connectors, labels and shrink tubing or other associated hardware to complete the termination of a specific cable type. These can be provided in cases where users will be purchasing bulk cable directly and cutting to length at their site, or when existing cable length is to be altered. Selected by cable type.</p>	7ME3960-...	
<p>Cable gland kit Cable gland kit for use with SITRANS FUS1010, FUH1010 and FUG1010 Ultrasonic Flowmeters housed in IP65 NEMA 4X wall mount enclosures. Kit contains a total of 5 glands to manage and seal the exit and entry of wires and cables to ancillary devices.</p>	A5E32834162	

Selection and ordering data

RTD cable selection chart (Dedicated, each)

RTD cable codes for length and type				
Cable length m (ft)	Standard -40 ... +200 °C (-40 ... +392 °F)	Submersible -40 ... +200 °C (-40 ... +392 °F)	for insert RTD -40 ... +200 °C (-40 ... 392 °F)	for submersible insert RTD -40 ... +200 °C (-40 ... 392 °F)
	Order code			
6 (20)	R01	R11	R21	R31
15 (50)	R02	R12	R22	R32
30 (100)	R03	R13	R23	R33
46 (150)	R04	R14	R24	R34
61 (200)	R05	R15	R25	R35
91 (300)	R06	R16	R26	R36

Overview



SITRANS FX Vortex flowmeter are designed for use in industrial applications and optimally suited to the demands in auxiliary supply systems.

The proven principle of vortex flowmeters is suitable for measurement of liquids, gases and vapors unaffected by conductivity, viscosity, temperature and pressure.

Benefits

- Integrated pressure and temperature compensation
- Temperature compensation for saturated steam included as standard
- High measuring accuracy
- Maintenance-free sensor
- Non-wearing, fully welded stainless steel construction with high resistance to corrosion, pressure and temperature
- SIL2 certified according to IEC 61508 Edition 2
- Use in hazardous areas
- Integrated reduction of nominal diameter for space-saving and economic installation and large measuring ranges
- Redundant data management: Easy exchange of electronics without loss of calibration and configuration data
- FAD (Free Air Delivery) functionality
- Gross and net heat calculation to support advanced energy management
- Remote version with cable length up to 50 m (164 ft)

Even the basic version of the vortex flowmeter SITRANS FX330 is equipped with temperature compensation for saturated steam applications. With the optional pressure sensor the SITRANS FX330 has integrated density compensation for calculation of corrected volume and mass (online density compensation). The density compensation for calculation of corrected volume and mass is based on the standards of NIST for gases and IAPWS for steam.

Higher measuring accuracy with the use of compact measuring systems

With the classic installation of a vortex flowmeter and separate pressure and temperature sensor as well as flow calculator, all errors occurring in the measuring chain must be taken into account when determining system accuracy. This can result in a measuring error between ± 3 to 5 %.

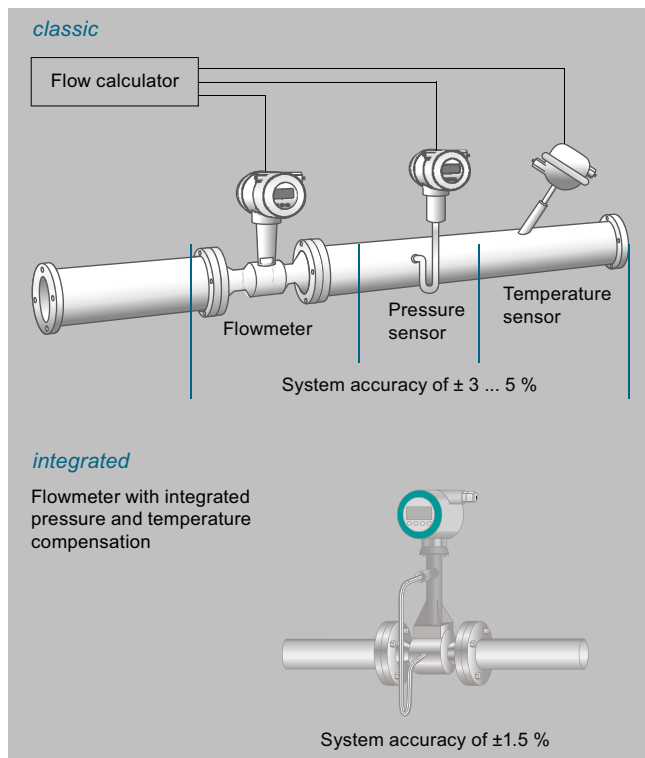
Using a vortex flowmeter with integrated pressure and temperature compensation such as the SITRANS FX330 allows you not only to lower installation costs but also increase the measuring accuracy of the measuring point. In this case the accuracy is ± 1.5 % of the measured value.

Flow Measurement

SITRANS FX (Vortex)

SITRANS FX330

Benefits (continued)



The SITRANS FX330 in flange design is available with integrated reduction of nominal diameter for space-saving installations and large measuring spans. About 90% of all vortex flowmeters are ordered one size smaller than the line diameter in order to increase the flow speed and to get a wider measuring range. Here, the line has to be reduced before and widened after the sensor, typically including 20x DN inlet and 5x DN outlet run. With the reduction and widening of nominal diameter included in the sensor, it is no longer necessary. To compensate the non-existent straight inlet run between reduction and the vortex bluff body, these devices are specially calibrated and linearized.

A new feature of the SITRANS FX330 is the advanced signal processing and filtering called AVFD (Advanced Vortex Frequency Detection): Interferences and disturbances in the measuring signal are suppressed, signals outside from the relevant frequency band are filtered out.

Redundant data management prevents loss of calibration and configuration data when changing electronics or display.

By default, all SITRANS FX330 meters are factory-calibrated (traceable to international standards) and pre-set according to customer specifications. The SITRANS FX330 also comes with an installation wizard to ease installation; e.g. in a steam application it will only show related settings.

Developed according to the standard IEC 61508 edition 2, the SITRANS FX330 can be used in safety-related application with classification SIL2 for continuous volume flow measurement.

Application

- Measurement of saturated steam and superheated steam
- Steam boiler monitoring
- Heat metering of steam and hot water
- Measurement of consumption of industrial gases
- Measurement of consumption in compressed air systems
- Monitoring of compressor output
- Evaluation of Free Air Delivery (FAD)
- SIP and CIP processes in the food, beverage and pharmaceutical industries
- Measuring of conductive and non-conductive liquids
- Safety-related measurement in SIL applications (SIL2)

Gross and net heat quantity calculation

The SITRANS FX330 was designed for applications in auxiliary and supply service lines, such as internal monitoring of energy flows for saturated and superheated steam or hot water. Equipped with temperature sensor as standard, the device can be installed as heat meter in the feed line directly connected with an external temperature sensor in the return line. The gross and net heat calculation can be fed into a DCS to support advanced energy management.

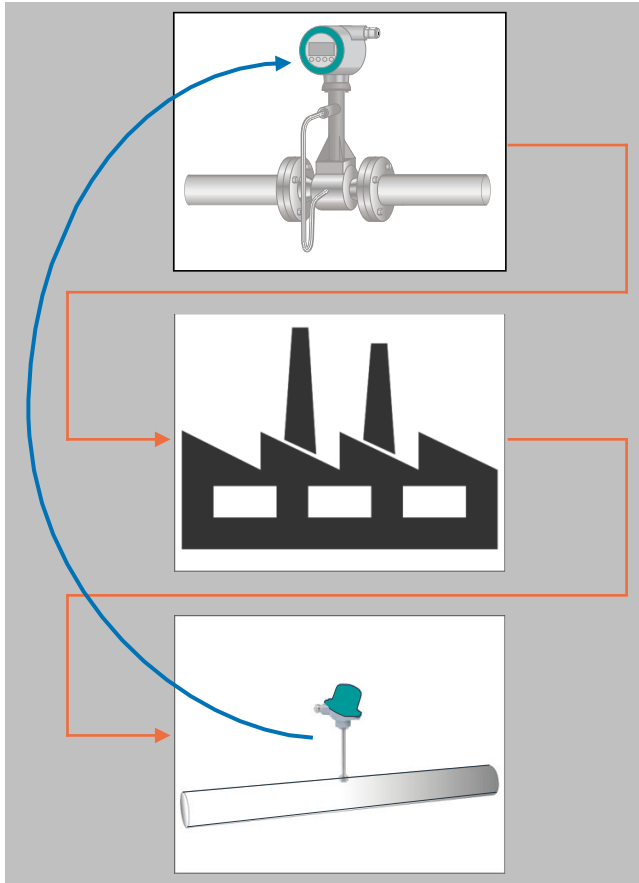
When it comes to energy, the most accurate measurement of consumption is essential. By combining flow, temperature and pressure measurements in one device, SITRANS FX330 provides the basis for a precise mass flow calculation.

In steam applications, the software even determines the enthalpy - the heat content - of the steam. Therefore, SITRANS FX330 is able to calculate the gross heat quantity.

In case net heat quantity consumption of process is asked for, a single temperature sensor can be added to the return line. SITRANS FX330 uses the readings to calculate the amount of heat consumed.

The SITRANS FX330 thereby proves itself to be a reliable partner.

Application (continued)



Design

SITRANS FX330 Flange



Flange version with integrated temperature compensation as standard for saturated steam and optional pressure compensation for superheated steam, gases and wet gases

Integrated reduction of nominal diameter for space-saving and economic installations plus large measuring ranges

Also in remote design with field housing and connection cable up to 50 m (164 ft)

With shut off valve allowing

- exchange and calibration of pressure sensor
- pressure and leak testing of pipeline without interrupting the process

SITRANS FX330 Sandwich



All advantages of the flange version in a space-saving sandwich design; centering rings guarantee an easy installation without any offset

Integrated reduction of nominal diameter not available

Also in remote design with field housing and connection cable up to 50 m (164 ft)

With shut off valve allowing

- exchange and calibration of pressure sensor
- pressure and leak testing of pipeline without interrupting the process

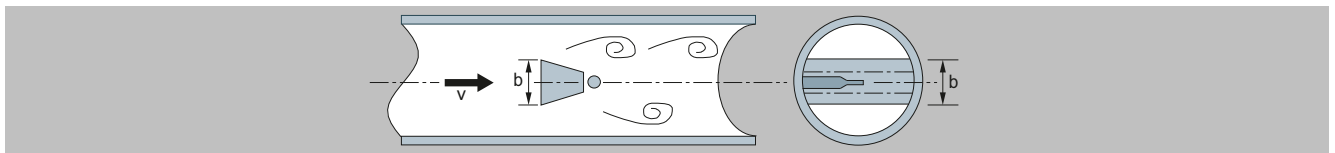
Function

Vortex flowmeters are used to measure the flow of gases, vapors and liquids in completely filled pipes. The measuring principle is based on the principle of the Karman vortex street. Inside the measuring sensor vortices are shed from a bluff body and are detected by a sensor located behind.

The nondimensional Strouhal number S describes the relationship between vortex frequency f , width b of the bluff body and the mean flow velocity v :

$$f = (S \cdot v) / b$$

The vortex frequency is recorded at the sensor and evaluated at the converter.



Functional principle

Flow Measurement

SITRANS FX (Vortex)

SITRANS FX330

Configuration

Available combinations of sensors and connection size for SITRANS FX330 in flanged design

SITRANS FX330 Flanged (7ME2610-...)										
Sensor size	Connection size	EN 1092-1, Form B1/B-2, PN 10	EN 1092-1, Form B1/B-2, PN 16	EN 1092-1, Form B1/B-2, PN 25	EN 1092-1, Form B1/B-2, PN 40	EN 1092-1, Form B1/B-2, PN 63	EN 1092-1, Form B1/B-2, PN 100	ANSI B16.5, class 150	ANSI B16.5, class 300	ANSI B16.5, class 600
DN 15	DN 15	-	-	-	X	-	X	X	X	X
	DN 25	-	-	-	X	-	X	X	X	X
	DN 40	-	-	-	X	-	X	X	X	X
DN 25	DN 25	-	-	-	X	-	X	X	X	X
	DN 40	-	-	-	X	-	X	X	X	X
	DN 50	-	X	-	X	X	X	X	X	X
DN 40	DN 40	-	-	-	X	-	X	X	X	X
	DN 50	-	X	-	X	X	X	X	X	X
	DN 80	-	X	-	X	X	X	X	X	X
DN 50	DN 50	-	X	-	X	X	X	X	X	X
	DN 80	-	X	-	X	X	X	X	X	X
	DN 100	-	X	-	X	X	X	X	X	X
DN 80	DN 80	-	X	-	X	X	X	X	X	X
	DN 100	-	X	-	X	X	X	X	X	X
	DN 150	-	X	-	X	X	X	X	X	X
DN 100	DN 100	-	X	-	X	X	X	X	X	X
	DN 150	-	X	-	X	X	X	X	X	X
	DN 200	X	X	X	X	-	-	X	X	-
DN 150	DN 150	-	X	-	X	X	X	X	X	X
	DN 200	X	X	X	X	-	-	X	X	-
	DN 250	X	X	X	X	-	-	X	X	-
DN 200	DN 200	X	X	X	X	-	-	X	X	-
	DN 250	X	X	X	X	-	-	X	X	-
	DN 300	X	X	X	X	-	-	X	X	-
DN 250	DN 250	X	X	X	X	-	-	X	X	-
	DN 300	X	X	X	X	-	-	X	X	-
DN 300	DN 300	X	X	X	X	-	-	X	X	-

X = available

- = not available

Selection and ordering data

SITRANS FX330 Flanged		Article No.	
Not approved for SIL2 safety applications		7ME2610-	
Approved for SIL2 safety applications		7ME2611-	
		● ● ● ● ● - ● ● ● ●	
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.			
Sensor size	Connection size		
DN 15 (½")	DN 15 (½")	1	A
	DN 25 (1")	1	B
	DN 40 (1½")	1	C
DN 25 (1")	DN 25 (1")	2	B
	DN 40 (1½")	2	C
	DN 50 (2")	2	D
DN 40 (1½")	DN 40 (1½")	2	K
	DN 50 (2")	2	L
	DN 80 (3")	2	M
DN 50 (2")	DN 50 (2")	2	R
	DN 80 (3")	2	S
	DN 100 (4")	2	T
DN 80 (3")	DN 80 (3")	3	L
	DN 100 (4")	3	M
	DN 150 (6")	3	R
DN 100 (4")	DN 100 (4")	3	S
	DN 150 (6")	3	T
	DN 200 (8")	3	Q
DN 150 (6")	DN 150 (6")	4	M
	DN 200 (8")	4	P
	DN 250 (10")	4	Q
DN 200 (8")	DN 200 (8")	4	T
	DN 250 (10")	4	U
	DN 300 (12")	4	V
DN 250 (10")	DN 250 (10")	4	W
	DN 300 (12")	4	Y
DN 300 (12")	DN 300 (12")	5	E
Process connection and pressure rate			
EN 1092-1 type B1			
PN 10	DN 200 ... 300		A
PN 16	DN 50 ... 300		B
PN 25	DN 200 ... 300		C
PN 40	DN 15 ... 300		D
PN 63	DN 50 ... 150		E
PN 100	DN 15 ... 150		F
ANSI B16.5 RF			
Class 150	½ ... 12"		J
Class 300	½ ... 12"		K
Class 600	½ ... 6"		L
System design			
Compact version	No cable		0
Remote version	Cable length with order code L..		1
Transmitter housing			
Aluminum			0
Aluminum, silicon free			1
Stainless steel			2
Stainless steel (remote version)			3
Dual version, aluminum			6
Dual version, aluminum, silicon free			7
Communication			
HART			0
PROFIBUS PA			1
FOUNDATION Fieldbus			2

Flow Measurement

SITRANS FX (Vortex)

SITRANS FX330

Selection and ordering data (continued)

	Article No.									
SITRANS FX330 Flanged										
Not approved for SIL2 safety applications	7ME2610-									
Approved for SIL2 safety applications	7ME2611-									
	●	●	●	●	●	-	●	●	●	●
Ex approval										
Without Ex approval										A
ATEX II2 G Ex ia										B
ATEX II2 G Ex d										C
ATEX II3 G Ex nA										D
ATEX II2 D Ex tb										E
QPS IS Class I Div.1										F
QPS XP Class I Div.1										G
QPS NI Class I Div. 2										H
QPS DIP Class I, III Div. 1										J
IECEX II2 G Ex ia										K
IECEX II2 G Ex d										L
IECEX II3 G Ex nA										M
IECEX II2 D Ex tb										N
EAC Ex i (On Hold)										R
EAC Ex d (On Hold)										S
EAC Ex nA (On Hold)										T
EAC Ex t (On Hold)										U
Pressure sensor and gasket material										
Without pressure sensor										A
With pressure sensor and gasket material FPM (Viton), Range:										
1 bar (14.5 psi)										B
2 bar (29 psi)										C
4 bar (58 psi)										D
6 bar (87 psi)										E
10 bar (145 psi)										F
16 bar (232 psi)										G
25 bar (363 psi)										H
40 bar (580 psi)										J
60 bar (870 psi)										K
100 bar (1450 psi)										L
With pressure sensor and gasket material FFKM (Kalrez), Range:										
1 bar (14.5 psi)										M
2 bar (29 psi)										N
4 bar (58 psi)										P
6 bar (87 psi)										Q
10 bar (145 psi)										R
16 bar (232 psi)										S
25 bar (363 psi)										T
40 bar (580 psi)										U
60 bar (870 psi)										V
100 bar (1450 psi)										W
Software version										
Standard - Uncompensated for gases, steam and liquids including temperature compensation for saturated steam										0
Standard + Heat meter for saturated steam and water										1
Density compensation for steam + Heat meter for saturated and superheated steam										2
Density compensation for gases, wet gases and mixed gases + FAD										3

Selection and ordering data (continued)

		Article No.	
SITRANS FX330 Sandwich		7ME2710-	
Not approved for SIL2 safety applications		7ME2711-	
Approved for SIL2 safety applications		● ● ● ● ● - ● ● ● ●	
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.			
Sensor size			
DN 15 (½")		1	A
DN 25 (1")		2	B
DN 40 (1½")		2	K
DN 50 (2")		2	R
DN 80 (3")		3	L
DN 100 (4")		3	S
Pressure rating			
EN 1092-1			
PN 16	DN 15 ... 100		B
PN 25	DN 15 ... 100		C
PN 40	DN 15 ... 100		D
PN 63	DN 15 ... 100		E
PN 100	DN 15 ... 100		F
ANSI B16.5			
Class 150	½ ... 4"		J
Class 300	½ ... 4"		K
Class 600	½ ... 4"		L
System design			
Compact version	No cable		0
Remote version	Cable length with Order code L..		1
Transmitter housing			
Aluminum			0
Aluminum, silicon free			1
Communication			
HART			0
PROFIBUS PA			1
FOUNDATION Fieldbus			2
Ex approval			
Without Ex approval			A
ATEX II2 G Ex ia			B
ATEX II2 G Ex d			C
ATEX II3 G Ex nA			D
ATEX II2 D Ex tb			E
QPS IS Class I Div.1			F
QPS XP Class I Div.1			G
QPS NI Class I Div. 2			H
QPS DIP Class I, III Div. 1			J
IECEX II2 G Ex ia			K
IECEX II2 G Ex d			L
IECEX II3 G Ex nA			M
IECEX II2 D Ex tb			N
EAC Ex i (On Hold)			R
EAC Ex d (On Hold)			S
EAC Ex nA (On Hold)			T
EAC Ex t (On Hold)			U
Pressure sensor and gasket material			
Without pressure sensor			A
With pressure sensor and gasket material FPM (Viton), Range:			
1 bar (14.5 psi)			B
2 bar (29 psi)			C
4 bar (58 psi)			D
6 bar (87 psi)			E
10 bar (145 psi)			F
16 bar (232 psi)			G

Flow Measurement

SITRANS FX (Vortex)

SITRANS FX330

Selection and ordering data (continued)

	Article No.
SITRANS FX330 Sandwich	
Not approved for SIL2 safety applications	7ME2710-
Approved for SIL2 safety applications	7ME2711-
	● ● ● ● ● - ● ● ● ●
25 bar (363 psi)	H
40 bar (580 psi)	J
60 bar (870 psi)	K
100 bar (1450 psi)	L
With pressure sensor and gasket material FFKM (Kalrez), Range:	
1 bar (14.5 psi)	M
2 bar (29 psi)	N
4 bar (58 psi)	P
6 bar (87 psi)	Q
10 bar (145 psi)	R
16 bar (232 psi)	S
25 bar (363 psi)	T
40 bar (580 psi)	U
60 bar (870 psi)	V
100 bar (1450 psi)	W
Software version	
Standard - Uncompensated for gases, steam and liquids including temperature compensation for saturated steam	0
Standard + Heat meter for saturated steam and water	1
Density compensation for steam + Heat meter for saturated and superheated steam	2
Density compensation for gases, wet gases and mixed gases + FAD	3

	Order code
Additional information	
Please add "-Z" to Article No. and specify as minimum Order code Y40, Y41, Y42, Y43, Y44 and Y45 in plain text.	
Application data	
Medium: Specify medium (liquid, gas, steam or customer-specific)	Y40
Temperature: Specify operating temperature with unit	Y41
Pressure: Specify operating pressure with unit	Y42
Density: Specify density with unit	Y43
Viscosity: Specify viscosity with unit	Y44
Flow rate: Specify max. flow rate with unit	Y45

Operating instruction

All literature is available to download for free, in a range of languages, at www.siemens.com/processinstrumentation/documentation

	Order code
Further designs	
Please add "-Z" to Article No. and specify Order code.	
Cable connection	
Without cable glands	A01
M20 × 1.5 cable glands (3 cable entries) in plastic, grey	A02
M20 × 1.5 cable glands (3 cable entries) in plastic, blue	A03
M20 × 1.5 cable glands (3 cable entries) made of brass, Ex-d/t/nA	A04
M20 × 1.5 cable glands (3 cable entries) made of stainless steel, Ex-d/t/nA	A06
1/2" NPT conduit connection in stainless steel (3 cable entries, cable glands not included)	A07
M20 × 1.5 cable glands (2 cable entries - 1 plugged) in plastic, grey	A12
M20 × 1.5 cable glands (2 cable entries - 1 plugged) in plastic, blue	A13

Selection and ordering data (continued)

	Order code
M20 × 1.5 cable glands (2 cable entries - 1 plugged) made of brass, Ex-d/t/nA	A14
M20 × 1.5 cable glands (2 cable entries - 1 plugged) made of stainless steel, Ex-d/t/nA	A16
1/2" NPT conduit connection in stainless steel (2 cable entries - 1 plugged, cable glands not included)	A17
M20 × 1.5 cable glands (1 cable entry - 2 plugged) in plastic, grey	A22
M20 × 1.5 cable glands (1 cable entry - 2 plugged) in plastic, blue	A23
M20 × 1.5 cable glands (1 cable entry - 2 plugged) made of brass, Ex-d/t/nA	A24
M20 × 1.5 cable glands (1 cable entry - 2 plugged) made of stainless steel, Ex-d/t/nA	A26
1/2" NPT conduit connection in stainless steel (3 cable entries, cable glands not included)	A27
M20x1.5 cable glands (3 cable entries) made of brass, Ex-d/t/nA approved for Dual Version	A34
M20x1.5 cable glands (3 cable entries) made of Stainless steel, Ex-d/t approved for Dual Version	A36
1/2" NPT conduit connection in stainless steel (3 cable entries, cable glands not included) for Dual Version	A37
M20x1.5 cable glands (2 cable entries - 1 plugged) made of brass, Ex-d/t/nA approved for Dual Version	A44
M20x1.5 cable glands (2 cable entries - 1 plugged) made of Stainless steel, Ex-d/t approved for Dual Version	A46
1/2" NPT conduit connection in stainless steel (2 cable entries - 1 plugged, cable glands not included) for Dual Version	A47
1/2" NPT conduit connection in stainless steel (2 cable entries - 1 plugged, cable glands not included) for Dual Version	A54
M20x1.5 cable glands (1 cable entry - 2 plugged) made of brass, Ex-d/t/nA approved for Dual Version	A56
1/2" NPT conduit connection in stainless steel (1 cable entry - 2 plugged, cable glands not included) for Dual Version	A57
Isolation valve	
With isolation valve	B10
<i>Language</i>	
English	B11
Chinese	B12
Russian	B13
Certificates	
Certificate of compliance according to EN 10204-2.1	C10
Pressure test + Inspection certificate according to EN 10204-3.1	C11
Material certification of pressure bearing metal parts according to EN 10204-3.1	C12
Material in accordance with NACE MR0175/ISO 15156	C13
PMI of pressure bearing metal parts + Inspection certificate according to EN 10204-3.1	C14
Material certificate of pressure bearing metal parts according to EN 10204-3.1 + PMI	C15
Dye penetration test of wetted welds	C16
X-ray test on pressurized weld DN 15 – 80 acc. to EN	C17
X-ray test on pressurized weld DN 100 – 300 acc. to EN	C18
Dye pen test on pressurized welds acc. to ASME	C19
X-ray test on press. welds DN 15 – 80 acc. to ASME	C20
X-ray test on press. welds DN 100 - 300 acc. to ASME	C21

Flow Measurement

SITRANS FX (Vortex)

SITRANS FX330

Selection and ordering data (continued)

	Order code
Calibration	
5-point calibration with certificate	D11
General approval	
World (CE) except: EAC, KCC, UKCA, CRN	E00
EAC (On Hold)	E07
UKCA (In Preparation)	E13
KC	E20
CRN	E70
Cleaning	
Final cleaning for standard applications incl. certificate 2.1	K50
Final cleaning for standard applications incl. certificate 3.1	K51
Final oil & grease free cleaning for oxygen applications incl. certificate 2.1	K52
Final oil & grease free cleaning for oxygen applications incl. certificate 3.1	K53
Cable length for remote design	
5 m (16 ft)	L01
10 m (32 ft)	L02
15 m (49 ft)	L03
20 m (65 ft)	L04
25 m (82 ft)	L05
30 m (98 ft)	L06
35 m (114 ft)	L07
40 m (131 ft)	L08
45 m (147 ft)	L09
50 m (164 ft)	L10
5 m (16 ft) UV resistant	L31
10 m (32 ft) UV resistant	L32
15 m (49 ft) UV resistant	L33
20 m (65 ft) UV resistant	L34
25 m (82 ft) UV resistant	L35
30 m (98 ft) UV resistant	L36
35 m (114 ft) UV resistant	L37
40 m (131 ft) UV resistant	L38
45 m (147 ft) UV resistant	L39
50 m (164 ft) UV resistant	L40
Tag name plate	
TAG name plate in stainless steel 40 × 20 mm (Add plain text)	Y17
TAG name plate in stainless steel tag 120 × 46 mm (Add plain text)	Y18

SITRANS FX330 spare parts

Description	Article No.
Transmitter electronic for SITRANS FX330	
• FXT030 in compact design with HART (non-Ex/Ex-i)	KRH-16000100
• FXT030 in compact design with HART (Ex-d)	A5E38663398
Display with HMI and data memory	A5E38663613
Seal disc 21.8 × 12 × 0.1	KRH-17000700
O-ring pickup	KRH-17001400
O-ring for pressure screw 17.13 × 2.62, FPM 70	KRH-17001200
Cover gasket O-ring	KRH-16000300
Front Cover (non Ex)	KRH-16002000

Selection and ordering data (continued)

Description	Article No.
Front Cover (Ex)	KRH-16002500
Back Cover	KRH-16003000
Converter housing gasket, 59,35,5-2-N	KRH-16000400
O-ring	
• 20 × 1, FPM (DIN 3771)	KRH-17001100
• 10 × 2, NBR	KRH-17001000
DUBOX plug 5 pole, linear, RM2	KRH-17000800
Cable feed through 10 pole (non Ex)	KRH-16000500
Shut-off valve	KRH-17004000
Centering rings for Sandwich-Version	
• DN 15	KRH-17006000
• DN 25	KRH-17006001
• DN 40	KRH-17006002
• DN 50	KRH-17006003
• DN 50 (300 lbs, 600 lbs)	KRH-17006004
• DN 50 (JIS 10K, 16K, 20K)	KRH-17006005
• DN 80	KRH-17006006
• DN 100	KRH-17006007
Wall housing incl. Neck (incl. Screws, Gaskets and cable glands)	KRH-16112002
Sensor replacement kit including seal disc, socket, pickup and O-rings (for pickup and pressure screw) ¹⁾	
• DN 15	KRH-16111100
• DN 25	KRH-16111150
• DN 40	KRH-16111200
• DN 50	KRH-16111210
• DN 80	KRH-16111220
• DN 100	KRH-16111230
• DN 150 ... 300	KRH-16111300
Pressure sensor replacement kit including pressure sensor with calibration certificate, DUBOX plug and O-rings ¹⁾	
• 1 bar	KRH-16111350
• 2 bar	KRH-16111370
• 4 bar	KRH-16111400
• 6 bar	KRH-16111401
• 10 bar	KRH-16111402
• 16 bar	KRH-16111403
• 25 bar	KRH-16111404
• 40 bar	KRH-16111405
• 60 bar	KRH-16111406
• 100 bar	KRH-16111407
Upgrade Kit SITRANS FX300 (requires serial number of device to be replaced)	On request

¹⁾ Pick-up resp. pressure sensor replacement kits are delivered with replacement instructions. Please note that in case of pick-up or pressure sensor replacement the factory pressure test gets invalid and has to be repeated with test pressure PTmax indicated on the type plate.

SITRANS FX330 Flow Straightener	Article No.
	7ME2900- ● ● ● 0 0
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	
Material	
Stainless steel 1.4404 (316L)	1

Flow Measurement

SITRANS FX (Vortex)

SITRANS FX330

Selection and ordering data (continued)

SITRANS FX330 Flow Straightener	Article No.				
	7ME2900-	●	●	●	0 0
Nominal size					
DN 15 / ANSI ½"					A
DN 25 / ANSI 1"					B
DN 40 / ANSI 1½"					C
DN 50 / ANSI 2"					D
DN 80 / ANSI 3"					E
DN 100 / ANSI 4"					F
DN 150 / ANSI 6"					G
DN 200 / ANSI 8"					H
DN 250 / ANSI 10"					J
DN 300 / ANSI 12"					K
Pressure rating					
PN 10					A
PN 16					B
PN 25					C
PN 40					D
PN 63					E
PN 100					F
Class 150					J
Class 300					K
Class 600					L

	Order code
Additional information Please add "-Z" to Article No. and specify Order code.	
Certificates	
Certificate of compliance to EN 10204-2.1	C10
Material certification of pressure bearing parts to EN 10204-3.1	C12
Material in accordance with NACE MR0175/ISO 15156	C13
PMI of pressure bearing parts + Inspection certificate according to EN 10204-3.1	C14
Material certificate of pressure bearing parts according to EN 10204-3.1 + PMI	C15
Cleaning	
Free of oil and grease (wetted parts)	K46
Free of oil and grease (wetted parts) + Inspection certificate according to EN 10204-3.1	K48

Technical specifications

SITRANS FX330	
Range of application	Flow measurement of liquids, gases and vapors
Mode of operation	Karman vortex street
Measuring principle	
Primary measured value	<ul style="list-style-type: none"> • Volume flow • Mass flow • Corrected volume flow • Density • Temperature • Pressure • Heat energy
Design	
Transmitter	
• Compact and remote version	Cable length up to 50 m (164 ft)
Sensor	Flange version Sandwich version
• Integrated temperature measurement	Yes Yes
• Reduction of nominal diameter	Yes No
• Pressure and temperature compensation	Yes Yes
• Isolation valve	Yes Yes
• Dual measuring device	Yes No
Display	4-line graphical display (backlit) with control keys
Operation	<ul style="list-style-type: none"> • Via local display (languages: German, English, French, Italian, Spanish, Swedish, Danish, Czech, Polish, Russian, Chinese, Turkish, Slovenian) • Via SIMATIC PDM
Accuracy	
Volume flow	
• Liquids	
- Re ≥ 20 000	± 0.75 % of measured value
- 10 000 < Re < 20 000	± 2.0 % of measured value
• Gases and vapors	
- Re ≥ 20 000	± 1.0 % of measured value
- 10 000 < Re < 20 000	± 2.0 % of measured value
Mass flow/Corrected volume flow	
• Gases and vapors	
- Re ≥ 20 000	± 1.5 % of measured value
- 10 000 < Re < 20 000	± 2.5 % of measured value
Mass flow	
• Liquid/water	
- Re ≥ 20 000	± 1.5 % of measured value
- 10 000 < Re < 20 000	± 2.5 % of measured value
Repeatability (Volume flow)	± 0.1 % of measured value
Operating conditions	
Temperature ratings	
• Medium	-40 ... +240 °C (-40 ... +465 °F)
• Ambient	
- Non-Ex	-40 ... +85 °C (-40 ... +185 °F)
- Ex	-40 ... +65 °C (-40 ... +140 °F)
• Storage	-40 ... +85 °C (-40 ... +185 °F)
Pressure ratings	Max. 100 bar (1450 psi), higher pressure rates on request
Max. allowable test pressure	

Technical specifications (continued)

SITRANS FX330	
• With integrated pressure sensor and isolation valve (closed)	1.5 x PN
• With integrated pressure sensor and without isolation valve	2 times the measuring range of pressure sensor
Process medium	
• Density	Taken into consideration when sizing
• Viscosity	< 10 cP
• Reynold's number	> 10000
Recommended flow velocities	
• Liquids	0.3 ... 7 m/s (0.98 ... 23 ft/s)
• Gases and vapors	2.0 ... 80 m/s (6.6 ... 262.5 ft/s)
- DN 15	3.0 ... 45 m/s (9.8 ... 148 ft/s)
- DN 25	2.0 ... 70 m/s (6.6 ... 230 ft/s)
	For detailed information see operating instructions "Intended use"
Installation conditions	
Inlet run	
• For undisturbed flow profile, after pipe section with reducer, after 1 x 90° pipe bend	≥ 15 x DN
• After 2 x 90° pipe bend	≥ 30 x DN
• After 2 x 90° three-dimensional pipe bend	≥ 40 x DN
• After control valves	≥ 50 x DN
• Before flow conditioner	≥ 2 x DN
• After flow conditioner	≥ 8 x DN
Outlet run	≥ 5 x DN
Material	
Sensor and process connections	
• Standard	1.4404/316L
• Option	Hastelloy C22 on request
Transmitter housing	Aluminum
• Standard	Aluminum die-cast, two-layer coating (epoxy/polyester)
• Option	Die-cast aluminum with finish for advanced requirements / 1.4409 / 316L / A 351-CF3M
Pressure sensor gasket	
• Standard	FPM
• Option	FFKM
Sensor gasket (Pick-up)	
• Standard	1.4535/316L
• Option	Hastelloy C276
Process connections	
DIN EN 1092-1	DN 15 ... 300 / PN 16 ... 100
ANSI B16.5	½" ... 12"/150 ... 600 lb
	For valid combinations of connection size and pressure rating see table in section "Configuration"
Enclosure rating	
Standard	Compact and remote version: IP66/IP67
Option	Remote version: IP66/IP68 for sensor
Power supply	
Non-Ex version	14 ... 36 V DC
Ex version	14 ... 30 V DC
Inputs/Outputs	
Current output	4 ... 20 mA, HART
Binary output	Pulse/Frequency/Status/Limit switch
Current input	4 ... 20 mA, passive

Flow Measurement

SITRANS FX (Vortex)

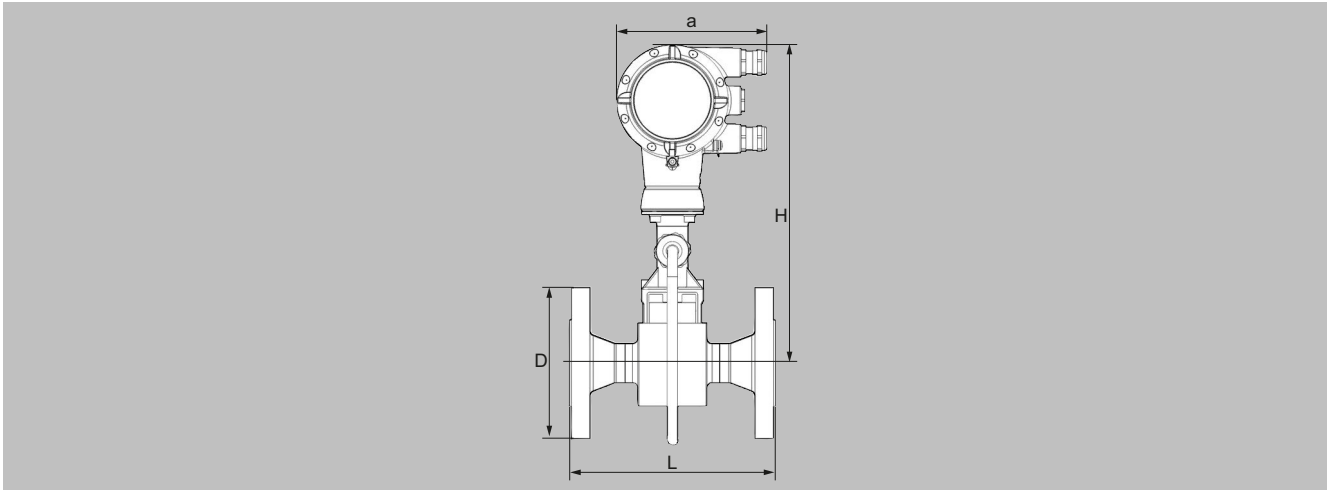
SITRANS FX330

Technical specifications (continued)

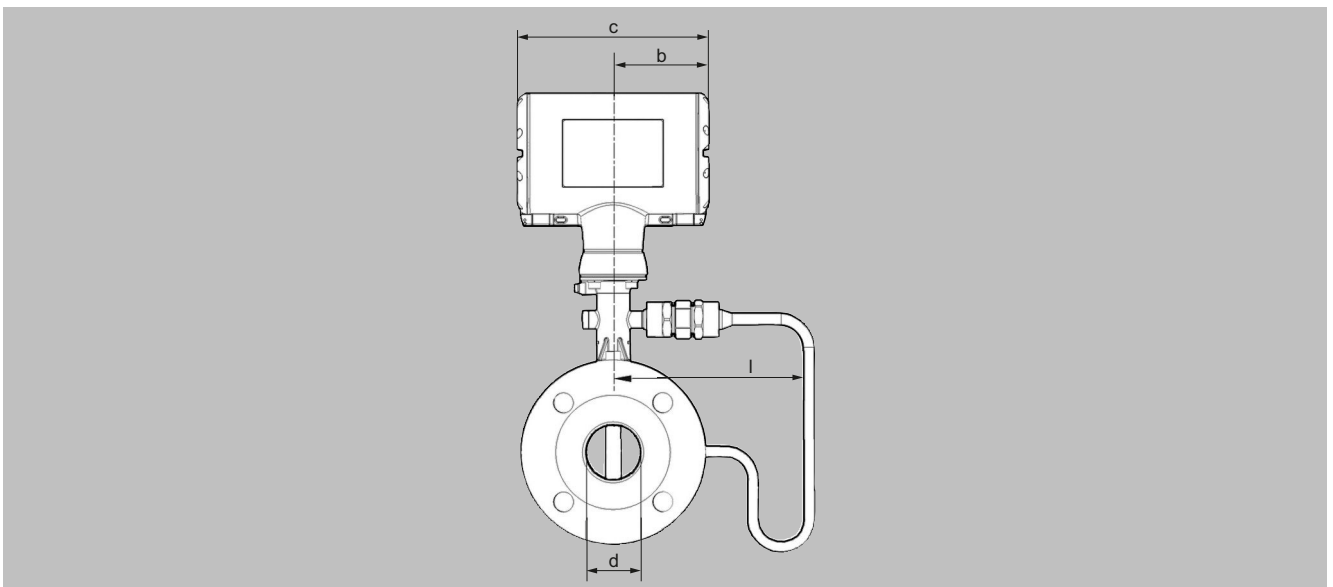
SITRANS FX330	
Communication	HART 7 PROFIBUS PA FOUNDATION Fieldbus
Calibration	
Standard calibration	3-point calibration: 3 x 15 %, 3 x 50 %, 3 x 80 %
Special calibration	5-point calibration: 3 x 15 %, 3 x 30 %, 3 x 50 %, 3 x 60 %, 3 x 80 %
Certificates and approvals	
Ex approvals	ATEX, QPS, IECEx
CE declaration of conformity	PED 2014/68/EU EMC 2014/30/EU
Safety integration level (SIL)	SIL2 according to IEC 61508

Dimensional drawings

Compact version



SITRANS FX330 (Vortex), Flanged version with pressure sensor, front view



SITRANS FX330 (Vortex), Flanged version with pressure sensor, side view

Flange version EN 1092-1

Size DN	Pressure rating PN	Dimensions [mm (inch)] a = 148.5 (5.85), b = 85.8 (3.38), c = 171.5 (6.76)					Weight [kg (lb)]			
		d	d FR ¹⁾	d FR ²⁾	D	L	H	l	Flowmeter (without pressure sensor)	Flowmeter (with pressure sensor)
15	40	17.3 (0.68)	-	-	95 (3.74)	200 (7.87)	358.8 (14.2)	169.3 (6.67)	5.5 (12.13)	6.1 (13.45)
15	100	17.3 (0.68)	-	-	105 (4.13)	200 (7.87)	358.8 (14.2)	169.3 (6.67)	6.5 (14.33)	7.1 (15.65)
25	40	28.5 (1.12)	17.3 (0.68)	-	115 (4.53)	200 (7.87)	358.4 (14.1)	169.3 (6.67)	7.3 (16.09)	7.9 (17.42)
25	100	28.5 (1.12)	17.3 (0.68)	-	140 (5.51)	200 (7.87)	358.4 (14.1)	169.3 (6.67)	9.3 (20.50)	9.9 (21.83)
40	40	43.1 (1.70)	28.5 (1.12)	17.3 (0.68)	150 (5.91)	200 (7.87)	362.3 (14.3)	169.5 (6.67)	10.2 (22.49)	10.8 (23.81)
40	100	42.5 (1.67)	28.5 (1.12)	17.3 (0.68)	170 (6.69)	200 (7.87)	362.3 (14.3)	169.5 (6.67)	14.2 (31.31)	14.8 (32.63)

Flow Measurement

SITRANS FX (Vortex)

SITRANS FX330

Dimensional drawings (continued)

Size DN	Pressure rating PN	Dimensions [mm (inch)] a = 148.5 (5.85), b = 85.8 (3.38), c = 171.5 (6.76)							Weight [kg (lb)]	
		d	d FR ¹⁾	d FR ²⁾	D	L	H	I	Flowmeter (without pressure sensor)	Flowmeter (with pressure sensor)
50	16	54.5 (2.15)	42.5 (1.67)	28.5 (1.12)	165 (6.50)	200 (7.87)	368.3 (14.5)	169.3 (6.67)	12.1 (26.68)	12.7 (28.00)
50	40	54.5 (2.15)	42.5 (1.67)	28.5 (1.12)	165 (6.50)	200 (7.87)	368.3 (14.5)	169.3 (6.67)	12.3 (27.12)	12.9 (28.44)
50	63	54.5 (2.15)	42.5 (1.67)	28.5 (1.12)	180 (7.09)	200 (7.87)	368.3 (14.5)	169.3 (6.67)	16.3 (35.94)	16.9 (37.26)
50	100	53.9 (2.12)	42.5 (1.67)	28.5 (1.12)	195 (7.68)	200 (7.87)	368.3 (14.5)	169.3 (6.67)	17.8 (39.24)	18.4 (40.57)
80	16	82.5 (3.25)	54.5 (2.15)	42.5 (1.67)	200 (7.87)	200 (7.87)	380.3 (15.0)	169.3 (6.67)	16.8 (37.04)	17.4 (38.36)
80	40	82.5 (3.25)	54.5 (2.15)	42.5 (1.67)	200 (7.87)	200 (7.87)	380.3 (15.0)	169.3 (6.67)	18.8 (41.45)	19.4 (42.77)
80	63	81.7 (3.22)	54.5 (2.15)	42.5 (1.67)	215 (8.46)	200 (7.87)	380.3 (15.0)	169.3 (6.67)	22.8 (50.27)	23.4 (51.59)
80	100	80.9 (3.19)	54.5 (2.15)	42.5 (1.67)	230 (9.06)	200 (7.87)	380.3 (15.0)	169.3 (6.67)	26.8 (59.08)	27.4 (60.41)
100	16	107 (4.21)	80.9 (3.19)	54.5 (2.15)	220 (8.66)	250 (9.84)	396.8 (15.7)	171.5 (6.75)	21.4 (47.18)	22 (48.50)
100	40	107 (4.21)	80.9 (3.19)	54.5 (2.15)	235 (9.25)	250 (9.84)	396.8 (15.7)	171.5 (6.75)	24.4 (53.79)	25 (55.12)
100	63	106 (4.17)	80.9 (3.19)	54.5 (2.15)	250 (9.84)	250 (9.84)	396.8 (15.7)	171.5 (6.75)	29.4 (64.82)	30 (66.14)
100	100	104 (4.09)	80.9 (3.19)	54.5 (2.15)	265 (10.43)	250 (9.84)	396.8 (15.7)	171.5 (6.75)	35.4 (78.04)	36 (79.37)
150	16	159 (6.26)	107 (4.21)	80.9 (3.19)	285 (11.22)	300 (11.81)	416.3 (16.4)	191.5 (7.54)	35.2 (77.60)	35.8 (78.93)
150	40	159 (6.26)	107 (4.21)	80.9 (3.19)	300 (11.81)	300 (11.81)	416.3 (16.4)	191.5 (7.54)	41.2 (90.83)	41.8 (92.15)
150	63	157 (6.18)	107 (4.21)	80.9 (3.19)	345 (13.58)	300 (11.81)	416.3 (16.4)	191.5 (7.54)	59.2 (130.51)	59.8 (131.84)
150	100	154 (6.06)	107 (4.21)	80.9 (3.19)	355 (13.98)	300 (11.81)	416.3 (16.4)	191.5 (7.54)	67.2 (148.15)	67.8 (149.47)
200	10	207 (8.15)	159 (6.26)	107 (4.21)	340 (13.39)	300 (11.81)	442.1 (17.4)	202.8 (7.98)	37.8 (83.33)	38.4 (84.66)
200	16	207 (8.15)	159 (6.26)	107 (4.21)	340 (13.39)	300 (11.81)	442.1 (17.4)	202.8 (7.98)	37.8 (83.33)	38.4 (84.66)
200	25	207 (8.15)	159 (6.26)	107 (4.21)	360 (14.17)	300 (11.81)	442.1 (17.4)	202.8 (7.98)	46.8 (103.18)	47.4 (104.50)
200	40	207 (8.15)	159 (6.26)	107 (4.21)	375 (14.76)	300 (11.81)	442.1 (17.4)	202.8 (7.98)	54.8 (120.81)	55.4 (122.14)
250	10	260 (10.24)	207 (8.15)	159.3 (6.27)	395 (15.55)	380 (14.96)	468.8 (18.5)	229.5 (9.04)	57.4 (126.55)	58.0 (127.87)
250	16	260 (10.24)	207 (8.15)	159.3 (6.27)	405 (15.94)	380 (14.96)	468.8 (18.5)	229.5 (9.04)	58.4 (128.75)	59.0 (130.07)
250	25	259 (10.20)	207 (8.15)	159.3 (6.27)	425 (16.73)	380 (14.96)	468.8 (18.5)	229.5 (9.04)	74.4 (164.02)	75.0 (165.35)
250	40	259 (10.20)	207 (8.15)	159.3 (6.27)	450 (17.72)	380 (14.96)	468.8 (18.5)	229.5 (9.04)	92.4 (203.71)	93.0 (205.03)
300	10	310 (12.20)	260 (10.24)	207 (8.15)	445 (17.52)	450 (17.72)	492.8 (19.4)	255 (10.04)	75.7 (166.89)	76.3 (168.21)
300	16	310 (12.20)	260 (10.24)	207 (8.15)	460 (18.11)	450 (17.72)	492.8 (19.4)	255 (10.04)	82.2 (181.22)	82.8 (182.54)
300	25	308 (12.13)	260 (10.24)	207 (8.15)	485 (19.09)	450 (17.72)	492.8 (19.4)	255 (10.04)	98.7 (217.60)	99.3 (218.92)
300	40	308 (12.13)	260 (10.24)	207 (8.15)	515 (20.28)	450 (17.72)	492.8 (19.4)	255 (10.04)	127.5 (281.09)	128.1 (282.41)

1) FR - single reduction

2) F2R - double reduction

Flange version ANSI B16.5

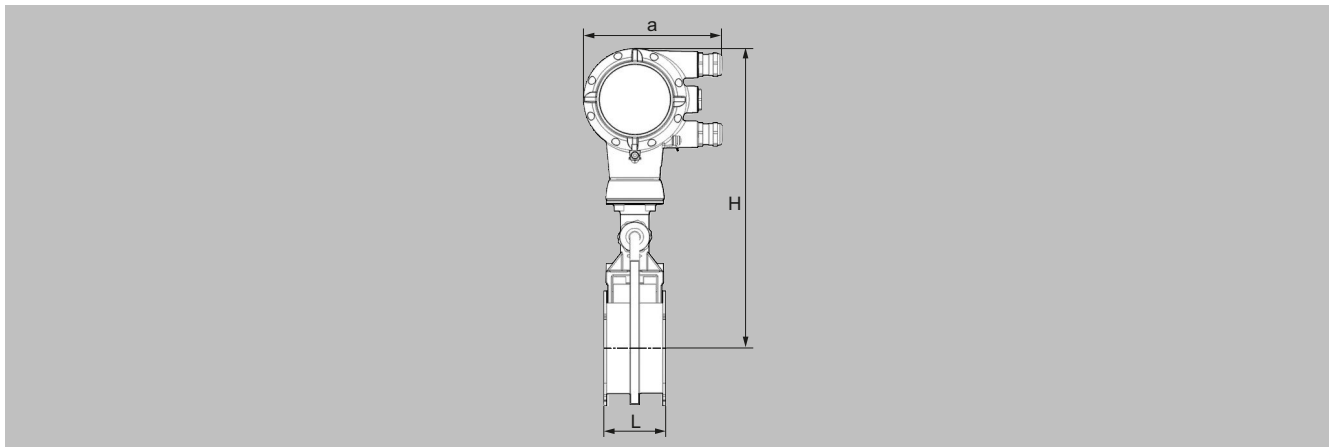
Size DN	Pressure rating Class	Dimensions [mm (inch)] a = 148.5 (5.85), b = 85.8 (3.38), c = 171.5 (6.76)					Weight [kg (lb)]			
		d	d FR ¹⁾	d FR ²⁾	D	L	H	I	Flowmeter (without pressure sensor)	Flowmeter (with pressure sensor)
½	150	16 (0.63)	-	-	90 (3.5)	200 (7.9)	358.8 (14.2)	169.3 (6.67)	4.5 (9.92)	5.1 (11.24)
½	300	16 (0.63)	-	-	95 (3.7)	200 (7.9)	358.8 (14.2)	169.3 (6.67)	4.9 (10.80)	5.5 (12.13)
½	600	14 (0.55)	-	-	95 (3.7)	200 (7.9)	358.8 (14.2)	169.3 (6.67)	5.1 (11.24)	5.7 (12.57)
1	150	27 (1.1)	15.8 (0.62)	-	110 (4.3)	200 (7.9)	358.4 (14.1)	169.3 (6.67)	6.2 (13.67)	6.8 (14.99)
1	300	27 (1.1)	15.8 (0.62)	-	125 (4.9)	200 (7.9)	358.4 (14.1)	169.3 (6.67)	7.2 (15.87)	7.8 (17.20)
1	600	24 (1.0)	15.8 (0.62)	-	125 (4.9)	200 (7.9)	358.4 (14.1)	169.3 (6.67)	7.5 (16.53)	8.1 (17.86)
1½	150	41 (1.6)	26.6 (1.1)	15.8 (0.6)	125 (4.9)	200 (7.9)	362.3 (14.3)	169.5 (6.67)	8.3 (18.30)	8.9 (19.62)
1½	300	41 (1.6)	26.6 (1.1)	15.8 (0.6)	155 (6.1)	200 (7.9)	362.3 (14.3)	169.5 (6.67)	10.4 (22.93)	11 (24.25)
1½	600	38 (1.5)	26.6 (1.1)	15.8 (0.6)	155 (6.1)	200 (7.9)	362.3 (14.3)	169.5 (6.67)	11.4 (25.13)	12 (26.46)
2	150	53 (2.1)	40.9 (1.6)	26.6 (1.1)	150 (5.9)	200 (7.9)	368.3 (14.5)	169.5 (6.67)	11 (24.25)	11.6 (25.57)
2	300	53 (2.1)	40.9 (1.6)	26.6 (1.1)	165 (6.5)	200 (7.9)	368.3 (14.5)	169.5 (6.67)	12.4 (27.34)	13 (28.66)
2	600	49 (1.9)	40.9 (1.6)	26.6 (1.1)	165 (6.5)	200 (7.9)	368.3 (14.5)	169.5 (6.67)	13.9 (30.64)	14.5 (31.97)
3	150	78 (3.1)	52.6 (2.1)	40.9 (1.6)	190 (7.5)	200 (7.9)	380.3 (15.0)	169.3 (6.67)	19.8 (43.65)	20.4 (44.97)
3	300	78 (3.1)	52.6 (2.1)	40.9 (1.6)	210 (8.3)	200 (7.9)	380.3 (15.0)	169.3 (6.67)	22.8 (50.27)	23.4 (51.59)
3	600	74 (2.9)	52.6 (2.1)	40.9 (1.6)	210 (8.3)	200 (7.9)	380.3 (15.0)	169.3 (6.67)	23.8 (52.47)	24.4 (53.79)
4	150	102 (4.0)	78 (3.1)	52.6 (2.1)	230 (9.1)	250 (9.8)	396.8 (15.7)	171.5 (6.76)	23.4 (51.59)	24 (52.91)
4	300	102 (4.0)	78 (3.1)	52.6 (2.1)	255 (10)	250 (9.8)	396.8 (15.7)	171.5 (6.76)	31.4 (69.23)	32 (70.55)
4	600	97 (3.8)	78 (3.1)	52.6 (2.1)	275 (11)	250 (9.8)	396.8 (15.7)	171.5 (6.76)	40.4 (89.07)	41 (90.39)

Dimensional drawings (continued)

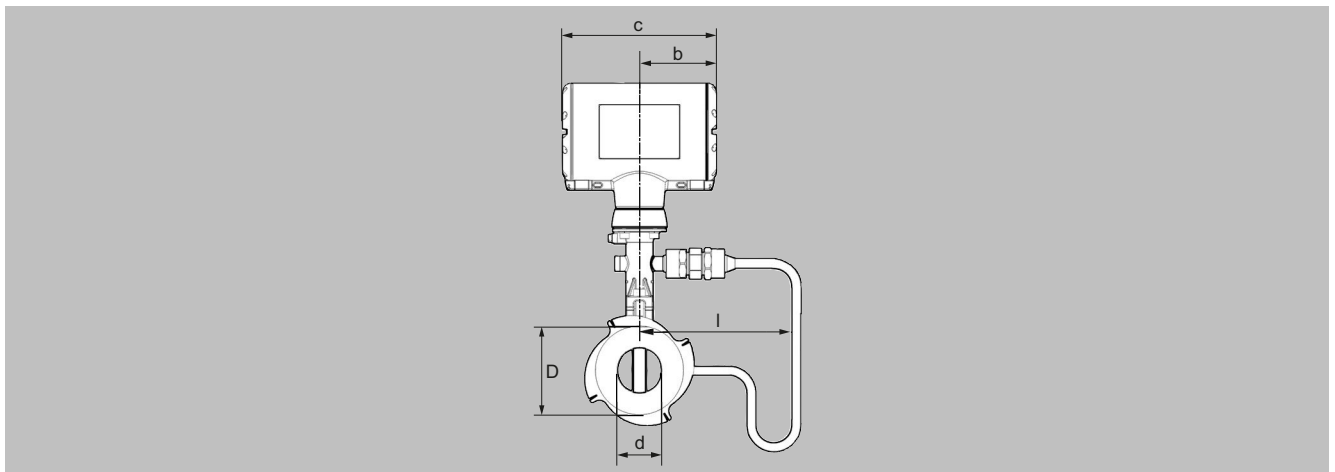
Size DN	Pressure rating Class	Dimensions [mm (inch)] a = 148.5 (5.85), b = 85.8 (3.38), c = 171.5 (6.76)							Weight [kg (lb)]	
		d	d FR ¹⁾	d FR ²⁾	D	L	H	I	Flowmeter (without pressure sensor)	Flowmeter (with pressure sensor)
6	150	154 (6.1)	102 (4.0)	78.0 (3.1)	280 (11)	300 (12)	416.3 (16.4)	191.5 (7.54)	36.2 (79.81)	36.8 (81.13)
6	300	154 (6.1)	102 (4.0)	78.0 (3.1)	320 (13)	300 (12)	416.3 (16.4)	191.5 (7.54)	51.2 (112.88)	51.8 (114.20)
6	600	146 (5.8)	102 (4.0)	78.0 (3.1)	355 (14)	300 (12)	416.3 (16.4)	191.5 (7.54)	76.2 (167.99)	76.8 (169.31)
8	150	203 (8.0)	154 (6.1)	102 (4.0)	345 (14)	300 (12)	442.1 (17.4)	202.8 (8.0)	50.0 (110.23)	50.6 (111.55)
8	300	203 (8.0)	154 (6.1)	102 (4.0)	380 (15)	300 (12)	442.1 (17.4)	202.8 (8.0)	74.8 (164.91)	75.4 (166.23)
10	150	255 (10.0)	203 (8.0)	154 (6.1)	405 (16)	380 (15)	468.8 (18.5)	229.5 (9.04)	74.4 (164.02)	75.0 (165.35)
10	300	255 (10.0)	203 (8.0)	154 (6.1)	455 (18)	380 (15)	468.8 (18.5)	229.5 (9.04)	106.4 (234.57)	107.0 (235.89)
12	150	305 (12.0)	255 (10.0)	203 (8.0)	485 (19)	450 (18)	492.8 (19.4)	255 (10.0)	106.4 (234.35)	107.0 (235.67)
12	300	305 (12.0)	255 (10.0)	203 (8.0)	520 (21)	450 (18)	492.8 (19.4)	255 (10.0)	151.4 (333.56)	152.0 (334.88)

1) FR - single reduction

2) F2R - double reduction



SITRANS FX330 (Vortex), Sandwich version with pressure sensor, front view



SITRANS FX330 (Vortex), Sandwich version with pressure sensor, side view

Flow Measurement

SITRANS FX (Vortex)

SITRANS FX330

Dimensional drawings (continued)

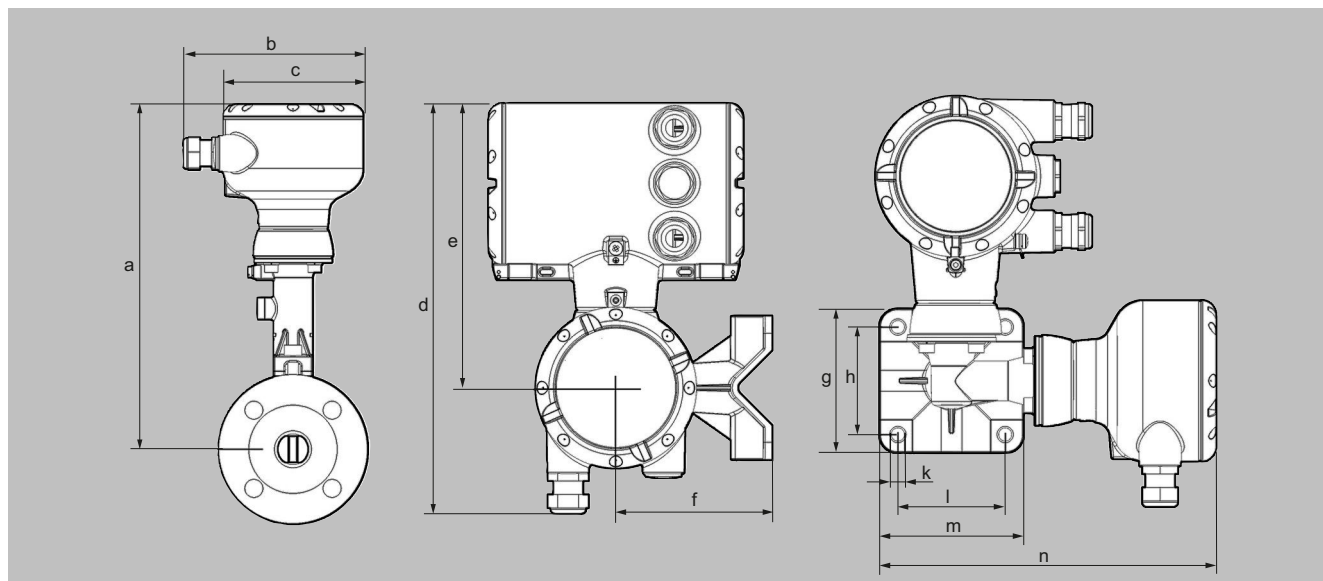
Sandwich version EN

Size DN	Pressure rating PN	Dimensions [mm (inch)]								Weight [kg (lb)]	
		a	b	c	d	D	L	H	I	Flowmeter (without pressure sensor)	Flowmeter (with pressure sensor)
15	16 ... 100	133 (5.24)	105 (4.13)	179 (7.05)	16 (0.63)	45 (1.77)	65 (2.56)	265 (10.43)	174.25 (6.86)	3.5 (7.72)	4.1 (9.04)
25	16 ... 100	133 (5.24)	105 (4.13)	179 (7.05)	24 (0.94)	65 (2.56)	65 (2.56)	265 (10.43)	174.25 (6.86)	4.3 (9.48)	4.9 (10.80)
40	16 ... 100	133 (5.24)	105 (4.13)	179 (7.05)	38 (1.50)	82 (3.23)	65 (2.56)	270 (10.63)	174.5 (6.87)	4.9 (10.80)	5.5 (12.13)
50	16 ... 100	133 (5.24)	105 (4.13)	179 (7.05)	50 (1.97)	102 (4.02)	65 (2.56)	275 (10.83)	174.5 (6.87)	6 (13.23)	6.6 (14.55)
80	16 ... 100	133 (5.24)	105 (4.13)	179 (7.05)	74 (2.91)	135 (5.31)	65 (2.56)	290 (11.42)	174.25 (6.86)	8.2 (18.08)	8.8 (19.40)
100	16 ... 100	133 (5.24)	105 (4.13)	179 (7.05)	97 (3.82)	158 (6.22)	65 (2.56)	310 (12.20)	176.5 (6.95)	9.5 (20.94)	10.1 (22.27)

Sandwich version ANSI

Size DN	Pressure rating Class	Dimensions [inch]								Weight [lb]	
		a	b	c	d	D	L	H	I	Flowmeter (without pressure sensor)	Flowmeter (with pressure sensor)
½"	150, 300	5.32	4.26	7.25	0.63	1.77	2.56	10.43	6.82	7.72	9.04
½"	600	5.32	4.26	7.25	0.55	1.77	2.56	10.43	6.82	7.72	9.04
1"	150, 300, 600	5.32	4.26	7.25	0.94	2.56	2.56	10.43	6.82	9.48	10.80
1½"	150, 300, 600	5.32	4.26	7.25	1.50	3.23	2.56	10.63	6.82	10.80	12.13
2"	150, 300, 600	5.32	4.26	7.25	1.97	4.02	2.56	10.83	6.82	13.23	14.55
3"	150, 300, 600	5.32	4.26	7.25	2.91	5.31	2.56	11.42	6.82	18.08	19.40
4"	150, 300, 600	5.32	4.26	7.25	3.82	6.22	2.56	12.20	6.82	20.94	22.27

Remote version



SITRANS FX330 (Vortex), Remote version

Dimension a

DN	Flanged and Sandwich version					Flanged version				
	15 (½")	25 (1")	40 (1½")	50 (2")	80 (3")	100 (4")	150 (6")	200 (8")	250 (10")	300 (12")
[mm]	265.7	265.2	269.2	275.2	287.2	303.7	323.2	348.9	375.7	399.7
[inch]	10.5	10.4	10.6	10.8	11.3	12.0	12.7	13.7	14.8	15.7

Dimensional drawings (continued)

Dimension a F1/2R

Flanged version										
DN	15 (½")	25 (1")	40 (1½")	50 (2")	80 (3")	100 (4")	150 (6")	200 (8")	250 (10")	300 (12")
F1R ¹⁾ [mm]	-	315.7	315.2	319.2	325.2	337.2	353.7	373.2	398.9	425.7
F1R ¹⁾ [inch]	-	12.4	12.4	12.6	12.8	13.3	13.9	14.7	15.7	16.8
F2R ²⁾ [mm]	-	-	315.7	315.2	319.2	325.2	337.2	353.7	373.2	398.9
F2R ²⁾ [inch]	-	-	12.4	12.4	12.6	12.8	13.3	13.9	14.7	15.7

Dimension b ... n

	b	c	d	e	f	g	h	j	k	l	m	n
[mm]	139	108	276	191	105	97	72	108	9	72	97	226
[inch]	5.46	4.25	10.9	7.53	4.14	3.82	2.84	4.25	0.35	2.84	3.82	8.90

Flow tables

Measuring range limits

Size	Q _{min}	Q _{max}	Q _{min}	Q _{max}
DN to EN 1092-1	DN to NSI B16.5	EN 1092-1 [m ³ /h]	EN 1092-1 [m ³ /h]	ANSI B16.5 [m ³ /h]
Water				
15	½"	0.45	5.07	0.44
25	1"	0.81	11.40	0.81
40	1½"	2.04	28.58	2.04
50	2"	3.53	49.48	3.53
80	3"	7.74	108.37	7.74
100	4"	13.30	186.22	13.30
150	6"	30.13	421.86	30.13
200	8"	56.60	792.42	56.60
250	10"	90.48	1 266.8	90.48
300	12"	131.41	1 839.8	131.41

Values based on water at 20 °C (68 °F)

Size	Q _{min}	Q _{max}	Q _{min}	Q _{max}
DN to EN 1092-1	DN to NSI B16.5	EN 1092-1 [m ³ /h]	EN 1092-1 [m ³ /h]	ANSI B16.5 [m ³ /h]
Air				
15	½"	6.80	25.33	6.72
25	1"	10.20	81.43	10.20
40	1½"	25.35	326.63	25.35
50	2"	43.89	565.49	43.89
80	3"	96.14	1 238.64	96.14
100	4"	165.19	2 128.27	165.19
150	6"	374.23	4 821.60	374.23
200	8"	702.95	9 056.8	702.95
250	10"	1 123.7	14 478.0	1 123.7
300	12"	1 632.1	21 028.0	1 632.1

Values based on air at 20 °C (68 °F) and 1.013 bar_{abs} (14.7 psi_{abs})

Flow rate limits

Product	Nominal sizes to EN	to ANSI	Minimum flow rates [m/s]	Maximum flow rates [m/s]
Liquids	DN 15 ... DN 300	DN ½" ... DN 12"	0.5 x (998/ρ) ^{0.51}	7 x (998/ρ) ^{0.47 1)}
Gas, steam/vapor	DN 15 ... DN 300	DN ½" ... DN 12"	6 x (1.29/ρ) ^{0.52}	7 x (998/ρ) ^{0.47 3)}

ρ = operating density [kg/m³]

1) Minimum flow rate 0.3 m/s (0.984 ft/s) - maximum flow rate 7 m/s (23 ft/s)

2) Minimum flow rate 2 m/s (6.6 ft/s)

3) Maximum flow rate 80 m/s (262 ft/s); DN 15: 45 m/s (148 ft/s) and DN 25: 70 m/s (230 ft/s)

Flow Measurement

SITRANS FX (Vortex)

SITRANS FX330

Dimensional drawings (continued)

Measuring range saturated steam: 1 ... 7 bar

Overpressure [bar]	1		3.5		5.2		7		
Density [kg/m ³]	1.13498	1.13498	2.4258	2.4258	3.27653	3.27653	4.16732	4.16732	
Temperature [°C]	120.6	120.6	148.2	148.2	160.4	160.4	170.6	170.6	
Flow [kg/h]	min.	max.	min.	max.	min.	max.	min.	max.	
DN to EN 1092-1	DN to ASME								
	B16.5								
15	½"	5.87	28.75	7.68	61.46	8.93	83.01	10.06	105.57
25	1"	11.82	92.42	17.28	197.53	20.09	266.81	22.66	339.35
40	1½"	29.64	370.71	43.33	792.33	50.63	1 070.2	56.80	1 361.2
50	2"	51.31	641.82	75.02	1 371.8	87.19	1 852.8	98.33	2 356.6
80	3"	112.41	1 405.8	164.33	3 004.7	191.00	4 058.4	215.39	5 161.8
100	4"	193.14	2 415.5	282.36	5 162.7	328.16	6 973.3	370.09	8 869.2
150	6"	437.56	5 472.4	639.69	11 696.0	743.45	15 798.0	838.44	20 093.0
200	8"	821.9	10 279.0	1 201.6	21 970.0	1 396.5	29 675.0	1 574.9	37 743.0
250	10"	1 313.9	16 433.0	1 920.9	35 122.0	2 232.5	47 439.0	2 517.7	60 337.0
300	12"	1 908.3	23 866.0	2 789.8	51 010.0	3 242.4	68 899.0	3 656.6	87 630.0

Measuring range saturated steam: 10.5 ... 20 bar

Overpressure [bar]	10.5		14.0		17.5		20.0		
Density [kg/m ³]	5.88803	5.88803	7.60297	7.60297	9.31702	9.31702	10.5442	10.5442	
Temperature [°C]	186.2	186.2	198.5	198.5	208.7	208.7	215.0	215.0	
Flow [kg/h]	min.	max.	min.	max.	min.	max.	min.	max.	
DN to EN 1092-1	DN to ANSI								
	B16.5								
15	½"	12.78	149.17	16.51	192.61	20.23	236.04	22.89	267.12
25	1"	26.93	479.46	30.60	619.11	33.87	758.69	36.04	858.62
40	1½"	67.51	1 878.2	76.72	2 150.7	84.93	2 395.3	90.35	2 557.7
50	2"	116.89	3 251.7	132.82	3 723.4	147.03	4 147.0	156.42	4 428.1
80	3"	256.03	7 122.4	290.93	8 155.8	322.06	9 083.7	342.62	9 699.3
100	4"	439.91	12 238	499.90	14 013.0	553.38	15 608.0	588.69	16 666.0
150	6"	996.62	27 725.0	1 132.5	31 747.0	1 253.7	35 359.0	1 333.7	37 756.0
200	8"	1 872.1	52 079.0	2 127.3	59 634.0	2 354.9	66 419.0	2 505.2	70 921.0
250	10"	2 992.7	83 254.0	3 400.7	95 333.0	3 764.6	106 180.0	4 004.9	113 380.0
300	12"	4 346.5	120 920.0	4 939.1	138 460.0	5 467.5	154 210.0	5 816.5	164 660.0

Measuring range saturated steam: 15 ... 100 psig

Overpressure [psig]	15		50		75		100		
Density [lbs/ft ³]	0.0719	0.0719	0.1497	0.1497	0.2036	0.2036	0.2569	0.2569	
Temperature [°F]	249.98	249.98	297.86	297.86	320.36	320.36	338.184	338.184	
Flow [lbs/h]	min.	max.	min.	max.	min.	max.	min.	max.	
DN to EN 1092-1	DN to ANSI								
	B16.5								
15	½"	12.95	64.35	16.83	133.87	19.62	182.02	22.04	229.63
25	1"	26.25	206.83	37.86	430.30	44.15	585.06	49.59	738.09
40	1½"	65.81	829.61	94.92	1 726	110.68	2 346.7	124.32	2 960.5
50	2"	113.94	1 436.3	164.34	2 988	191.63	4 062.9	215.23	5 125.6
80	3"	249.57	3 146.1	360.00	6 545.3	419.74	8 899.4	471.45	11 227
100	4"	428.81	5 405.7	618.51	11 246	721.21	15 291	810.06	19 291
150	6"	971.47	12 246	1 401.2	25 478	1 633.9	34 642	1 835.2	43 703
200	8"	1 824.8	23 004	2 632.1	47 859	3 069.1	65 072	3 447.2	82 092
250	10"	2 917.2	36 774	4 207.7	76 508	4 906.4	104 030	5 510.8	131 230
300	12"	4 236.8	53 410	6 111.1	111 120	7 125.8	151 080	8 003.6	190 600

Measuring range saturated steam: 150 ... 300 psig

Overpressure [psig]	150		200		250		300	
Density [lbs/ft ³]	0.3627	0.3627	0.4681	0.4681	0.5735	0.5735	0.6792	0.6792
Temperature [°F]	366.08	366.08	388.04	388.04	406.22	406.22	422.06	422.06
Flow [lbs/h]	min.	max.	min.	max.	min.	max.	min.	max.

Dimensional drawings (continued)

Overpressure [psig]		150		200		250		300	
DN to EN 1092-1	DN to ANSI B16.5								
15	½"	27.79	324.21	35.86	418.47	43.94	512.66	52.04	607.12
25	1"	58.93	1 042.1	66.94	1 345.1	74.10	1 647.8	80.63	1 951.5
40	1½"	147.72	4 107.2	167.83	4 702.8	185.76	5 237	202.15	5 728
50	2"	255.75	7 111.9	290.56	8 141.9	321.60	9 066.8	350.00	9 917
80	3"	560.19	15 578	636.44	17 834	704.43	19 860	766.60	21 722
100	4"	962.54	26 766	1 093.5	30 643	1 210.4	34 124	1 317.2	37 324
150	6"	2 180.6	60 639	2 477.4	69 421	2 742.1	77 307	2 984	84 556
200	8"	4 096.1	113 900	4 653.6	130 400	5 150.7	145 210	5 605.2	158 830
250	10"	6 548.1	182 090	7 439.3	208 460	8 234.1	232 140	8 960.6	253 910
300	12"	9 510.2	264 460	10 805	302 760	11 959	337 150	13 014	368 770

Flow Measurement

SITRANS FVA (variable area meters)

SITRANS FVA250

Overview



SITRANS FVA250 variable area meter

Benefits

- Standard version available at short notice
- Robust all-metal valve with impact-resistant housing cover
- Can also be used for corrosive and flammable media
- Can be used at high pressures and temperatures
- Product and percentage scales
- Can be optionally fitted with heating and cooling sheaths
- Contamination-resistant guiding for float

Application

The devices are particularly suitable for measuring:

- Water
- Liquids
- Anti-corrosives and lubricants
- Solvents
- Saturated and superheated steam
- Food and beverages
- Industrial gases

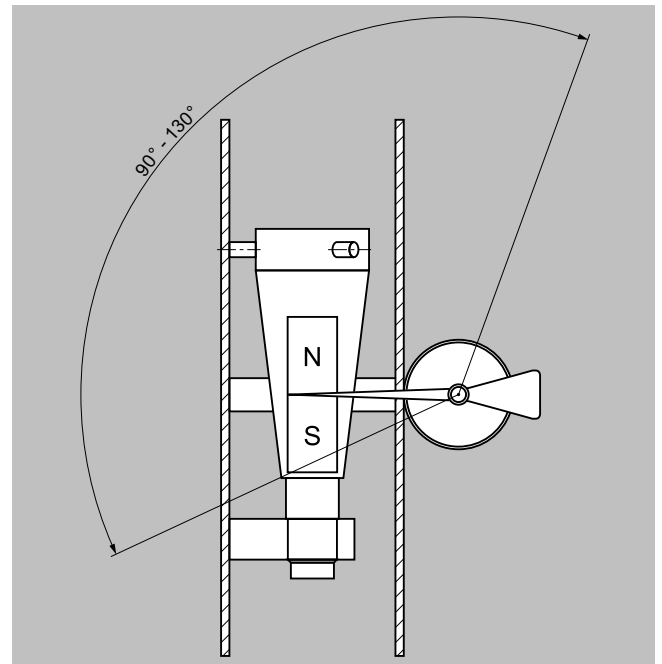
Design

Due to its full metal design, the SITRANS FVA250 variable area meter with a standard length of 250 mm (9.84 inch) can be used to measure many different types of liquids and gases passing through closed piping. The robust design means that it can also be used in harsh conditions. The various types of flange connections, linings and float materials satisfy the requirements of the pharmaceutical and chemical industries.

The measured value is displayed directly on the scale with the standard version. For process monitoring and control, the device can be equipped with a transmitter (MEM) as well as limit switches.

Function

Flow measurement with the SITRANS FVA250 is performed according to the float principle. The flowing medium lifts the conical float in the measuring ring. This increases the ring gap until an equilibrium is established between the buoyant force of the medium and the weight of the float. The height of the float is directly proportional to the flow rate. The movement of the float is transmitted from one magnet to another magnet in the display unit outside of the measuring tube.



Measuring cone/scale angle

Selection and ordering data

SITRANS FVA250 full metal variable area meter				Article No. 7ME586	●	-	●	●	●	●	-	●	●	●
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.														
Flow tube														
<u>Liquid</u>		<u>Gas</u>												
5 ... 40 l/h		0.15 ... 1.3 m ³ /h												1
50 ... 600 l/h		1.5 ... 17 m ³ /h												2
1 000 ... 4 000 l/h		30 ... 110 m ³ /h												3
2.5 ... 6 m ³ /h		70 ... 170 m ³ /h												4
4 ... 25 m ³ /h		30 ... 700 m ³ /h												5
16 ... 50 m ³ /h		460 ... 1 350 m ³ /h												6
60 ... 100 m ³ /h		1 700 ... 3 000 m ³ /h												7
Design														
<u>Type: CF-S (standard)</u>														
Fitting: Stainless steel Flange: Stainless steel Float: Stainless steel														
<u>Type: EF-H</u>														
Fitting: Stainless steel, Hastelloy Flange: Stainless steel, Hastelloy Float: Hastelloy														
<u>Type: FF-P</u>														
Fitting: Stainless steel with PTFE lining Flange: Stainless steel with PTFE lining Float: PTFE														
Diameter														
DN 15/ANSI ½"														
DN 20/ANSI ¾"														
DN 25/ANSI 1"														
DN 32/ANSI 1¼"														
DN 40/ANSI 1½"														
DN 50/ANSI 2"														
DN 65/ANSI 2½"														
DN 80/ANSI 3"														
DN 100/ANSI 4"														
Female thread ¼"														
Female thread 3/8"														
Female thread ½"														
Female thread ¾"														
Female thread 1"														
Female thread 1¼"														
Female thread 1½"														
Female thread 2"														
Process connection														
EN 1092-1, PN 16, Form B1														
EN 1092-1, PN 40, Form B1														
EN 1092-1, PN 63, Form B2														
EN 1092-1, PN 100, Form B2														
ANSI B16.5, class 150 RF														
ANSI B16.5, class 300 RF														
ANSI B16.5, class 600 RF														
ISO 228-1 G pipe thread PN 63														
ISO 228-1 G pipe thread PN 100														
ANSI B1.20.1 NPT pipe thread 900 lbs														
ANSI B1.20.1 NPT pipe thread 1500 lbs														
Measuring ranges														
<u>Liquids</u>		<u>Gases</u>												
l/h	(USgpm)	m ³ /h	(scfm)											
0.5 ... 5	(0.0022 ... 0.022)	0.015 ... 0.15	(0.0088 ... 0.088)											1 0
0 ... 10	(0.0044 ... 0.044)	0.03 ... 0.3	(0.0177 ... 0.177)											1 1
1.6 ... 16	(0.007 ... 0.07)	0.045 ... 0.45	(0.0265 ... 0.283)											1 2

Flow Measurement

SITRANS FVA (variable area meters)

SITRANS FVA250

Selection and ordering data (continued)

SITRANS FVA250 full metal variable area meter				Article No. 7ME586	● - ● ● ● ● ● - ● ● ● ●
2.5 ... 25	(0.011 ... 0.11)	0.075 ... 0.75	(0.0441 ... 0.441)		1 3
4 ... 40	(0.018 ... 0.18)	0.13 ... 1.3	(0.0765 ... 0.765)		1 4
5 ... 50	(0.022 ... 0.22)	0.15 ... 1.5	(0.0883 ... 0.883)		1 5
7 ... 70	(0.031 ... 0.31)	0.2 ... 2	(0.12 ... 1.24)		1 6
10 ... 100	(0.044 ... 0.44)	0.3 ... 3	(0.177 ... 1.77)		1 7
16 ... 160	(0.07 ... 0.7)	0.5 ... 5	(0.29 ... 2.71)		2 0
25 ... 250	(0.11 ... 1.1)	0.7 ... 7	(0.412 ... 4.12)		2 1
40 ... 400	(0.176 ... 1.76)	1.0 ... 11	(0.589 ... 6.47)		2 2
60 ... 600	(0.264 ... 2.64)	1.7 ... 17	(1 ... 10)		2 3
100 ... 1 000	(0.44 ... 4.4)	2 ... 30	(1.77 ... 17.66)		2 4
160 ... 1 600	(0.7 ... 7)	3 ... 46	(2.35 ... 27.07)		2 5
250 ... 2 500	(1.1 ... 11)	6 ... 70	(4.12 ... 41.2)		2 6
400 ... 4 000	(1.76 ... 17.6)	10 ... 110	(6.47 ... 64.74)		2 7
600 ... 6 000	(2.64 ... 26.4)	16 ... 170	(10 ... 100)		3 0
1 000 ... 10 000	(4.4 ... 44)	28 ... 290	(17.1 ... 170.7)		3 1
1 600 ... 16 000	(7 ... 70)	45 ... 460	(27.1 ... 270.7)		3 2
2 000 ... 20 000	(8.8 ... 88)	55 ... 550	(32.4 ... 323.7)		3 3
2 500 ... 25 000	(11 ... 110)	69 ... 700	(41.2 ... 412)		3 4
4 000 ... 40 000	(17.6 ... 176)	109 ... 1 100	(64.7 ... 647.4)		3 5
5 000 ... 50 000	(22 ... 220)	134 ... 1 350	(79.5 ... 794.6)		3 6
6 000 ... 60 000	(26.4 ... 264)	169 ... 1 700	(100 ... 1 000)		3 7
8 000 ... 80 000	(35.2 ... 352)	239 ... 2 400	(141.3 ... 1 413)		4 0
10 000 ... 100 000	(44 ... 440)	299 ... 3 000	(176.6 ... 1 766)		4 1
Display unit / process temperature					
Standard (aluminum) - up to 200 °C with local display/150 °C with electrical output					0
Standard (aluminum) with displaced display - up to 350 °C with local display and electrical outputs					1
Stainless steel IP66 - up to 200 °C with local display/150 °C with electrical outputs					2
Stainless steel IP66 with displaced display - up to 350 °C with local display and electrical outputs					3
Heating/cooling jacket					
Without (standard)					A
With flange connection EN1092-1 DN 15 PN 40					B
With flange connection ½" ANSI B16.5 Class 150 RF					C
Display/outputs					
With display					A
With display, 1 limit switch					B
With display, 2 limit switches					C
With display, HART and 4 to 20 mA					D
With display, HART, 4 to 20 mA, 2 limit switches					E
With display, HART, 4 to 20 mA, 1 limit switch					F
With display, PROFIBUS PA					G
Calibration					
Standard calibration					
• Without calibration certificate					0
• With calibration certificate					1

Other types of liquid and gas measurement	Order code
Please add "-Z" to Article No. and specify Order code.	
Certificates	
Certificate of compliance EN 10204-2.1	C10
Factory inspection certificate EN 10204-2.2	C11
Material certificate according to EN 10204-3.1	C12
Dye penetration test on pressure bearing weldings	C13
X-ray test of pressure bearing weldings	C14
Pressure test with acceptance test certificate 3.1 according to EN 10204	C15
PMI (positive material identification) test of pressure bearing metal parts	C16

Selection and ordering data (continued)

Other types of liquid and gas measurement	Order code
Float damping	
With float damping	D01
Flange sealing surface	
Sealing surface according to EN 1092-1 welding neck flange	
• DN 15	N11
• DN 20	N12
• DN 25	N13
• DN 32	N14
• DN 40	N15
• DN 50	N16
• DN 65	N17
• DN 80	N18
• DN 100	N19
Sealing surface according to ANSI B16.5 welding neck flange	
• ½ inch	N21
• ¾ inch	N22
• 1 inch	N23
• 1¼ inch	N24
• 1½ inch	N25
• 2 inch	N26
• 2½ inch	N27
• 3 inch	N28
• 4 inch	N29
Specification of medium process data (specify in plain text)	
Specification always required for each order:	Y01
Medium Operating pressure Operating temperature Density (only for customer-specified medium) Viscosity (only for customer-specified medium) Measuring range	
TAG plate	
TAG plate in stainless steel (add plain text)	Y17
Cleaning to company standard	
Cleaning Class 2, with identification free of oil and grease	K46
Cleaning Class 1, with identification free of oil, grease and silicon	K48
Approvals	
With ATEX approval	M51
Special version (specify in plain text)	Y99

Note: For possible combinations of nominal sizes and flow tube, see tables under "Dimensional drawings".

Operating instructions

Description	Article-No.
SITRANS FVA250	
• English	A5E03821131
• German	A5E32108136

All literature is available to download for free, in a range of languages, at www.siemens.com/processinstrumentation/documentation

Flow Measurement

SITRANS FVA (variable area meters)

SITRANS FVA250

Technical specifications

SITRANS FVA250	
Application	See under "Application"
Design and function	See under "Design" and "Function"
Principle of measurement	Variable-area flowmeter
Input	
Measuring range	See table on page 3/xx
Pressure ratings	PN 16 ... 100 (232 ... 1 450 psi) depending on the version (see table under "Measuring range availability guide")
Installation / flow direction	Vertical/from bottom to top
Rated conditions	
Ambient temperature	
• With local display	-40 ... +80 °C (-40 ... +176 °F)
• With limit switches	-40 ... +65 °C (-40 ... +149 °F)
• With electric remote encoder (MEM)	-40 ... +70 °C (-40 ... +158 °F)
Measuring accuracy acc. to VDI/VDE 3513-2	
• For liquids	± 1.6 % (q _G = 50 %)
• For gases	± 2.0 % (q _G = 50 %)
Reproducibility	0.5 % of the measuring range limit (URV)
Operating temperature	See table "Measuring range availability guide"
Operating pressure	Minimum operating pressure > 2x pressure drop (see table on page 3/xx)
Design	
Flanges	EN 1092-1, ANSI B16.5
Material	
• Fitting	Stainless steel, Hastelloy
• Float	Stainless steel, Hastelloy, PTFE
• Wetted parts materials	Stainless steel, PTFE, Hastelloy depending on version
Degree of protection (display unit)	
• Display unit made of aluminum	IP65
• Display unit made of stainless steel	IP66
Electromagnetic compatibility	
• EN 61000-6-2: 2011	Interference immunity industrial sector
• EN 61000-6-3	Interference immunity residential sector
• EN 55011: 2011	Group 1, Class B
• NAMUR recommendation	NE 21

Classification according to pressure equipment directive (PED 2014/68/EU)

	Article No. 7ME586.-	Permissible media	Category
DN 15	xAxxx-xxxx	Gases of fluid group 1 and liquids of fluid group 1	Article 4.3
DN 20	xBxxx-xxxx	Gases of fluid group 1 and liquids of fluid group 1	Article 4.3
DN 25	xCxxx-xxxx	Gases of fluid group 1 and liquids of fluid group 1	Article 4.3
DN 32	xDxxx-xxxx	Gases of fluid group 1 and liquids of fluid group 1	III
DN 40	xExxx-xxxx	Gases of fluid group 1 and liquids of fluid group 1	III
DN 50	xFxxx-xxxx	Gases of fluid group 1 and liquids of fluid group 1	III
DN 65	CGxxx-xxxx	Gases of fluid group 1 and liquids of fluid group 1	III
DN 80	xHxxx-xxxx	Gases of fluid group 1 and liquids of fluid group 1	III
DN 100	xJxxx-xxxx	Gases of fluid group 1 and liquids of fluid group 1	III

Technical specifications (continued)

Technical specifications of contacts

Limit switch	
Cable gland	M20x1.5
Auxiliary power supply	5 ... 25 V DC
Isolation (2 contacts)	Electrically isolated
Limit switch	SJ3.5-N-BU
• Switching function	NAMUR NC
Nominal voltage U_0	8.2 V DC (R_f approx. 1 k Ω)
Explosion protection	II 2G EEx ia IIC T6 - T4 Gb
EC Type Examination Certificate for Directive 2014/34/EU	PTB 99 ATEX 2219 X

Transmitter (MEM) with 4 to 20 mA, pulse output and limit switch	
Cable gland	M20x1.5
Auxiliary power supply	14 ... 30 V DC
Analog output	4 ... 20 mA (2-wire)
Binary output	Pulses, limit switch
• Pulses	Max. pulse rate 10 Hz
• Limit switch	SJ3.5-N-BU (NAMUR, IEC 60947-5-6:1999)
Temperature influence	$\leq \pm 0.5\%$ of the measuring range limit (URV)/10 K
Explosion protection	II 2G Ex ia IIC T6 Gb
EC Type Examination Certificate for Directive 2014/34/EU	BVS 07 ATEX E 033

Transmitter (MEM) PROFIBUS PA	
Cable gland	M20x1.5
Auxiliary power supply	10 ... 25 V DC
Basic current	< 16.5 mA
Fault current	< 18 mA
Transfer rate	31.25 Kbaud
Temperature influence	$\leq \pm 0.5\%$ of the measuring range limit (URV)/10 K
Explosion protection	II 2G Ex ia IIC T6 Gb
EC Type Examination Certificate for Directive 2014/34/EU	BVS 07 ATEX E 033

Float damping

Float damping is recommended

- Generally for gas measurement
- When air bubbles in the medium cannot be avoided
- When there are pressure surges in the lines caused by a delay in the flow, for example, due to rapid throttling or blocking
- When turbulence, pulsations or other instabilities cause the float to vibrate
- When the flow pressure cannot be built up slowly
- When vibrations in the line cannot be avoided

Measuring range availability guide

Version	CF-S	EF-H	FF-P
Wetted parts materials	Mat. No. 1.4404/AISI 316L	Hastelloy	PTFE
Fitting	Mat. No. 1.4404/AISI 316L	\leq DN 25 (1"): Hastelloy > DN 25 (1"): Hastelloy/Mat. No. 1.4404/AISI 316L	Mat. No. 1.4404/AISI 316L with PTFE lining
Flange	Mat. No. 1.4404/AISI 316L	\leq DN 25 (1"): Hastelloy > DN 25 (1"): Hastelloy/Mat. No. 1.4404/AISI 316L	Mat. Nno. 1.4404/AISI 316L with PTFE lining
Float/flow tube	Mat. No. 1.4404/AISI 316L	Hastelloy	PTFE

Flow Measurement

SITRANS FVA (variable area meters)

SITRANS FVA250

Technical specifications (continued)

Version	CF-S	EF-H	FF-P
Max. media temperature	-20 ... +200 °C (-4 ... +392 °F) (optional -80 ... +350 °C (-112 ... +662 °F))	-20 ... +200 °C (-4 ... +392 °F) (optional -80 ... +350 °C (-112 ... +662 °F))	-20 ... +125 °C (-4 ... +257 °F)
Nominal pressure	DN15 ... 50 (1/2" ... 2") PN 40 (580 psi) DN 65 ... 100 (2 1/2" ... 4") PN 16 (232 psi)	DN 15 ... 50 (1/2" ... 2") PN 40 (580 psi) DN 65 ... 100 (2 1/2" ... 4") PN 16 (232 psi)	PN 16 (232 psi)
Reference data for measuring range specifications	Fluid in l/h with density: 1.0 kg/l, temperature 20 °C (68 °F), viscosity 1 mPa.s Gas in m3/h with density: 1.293 kg/m3, temperature 0 °C (32 °F), viscosity: 0.0181 mPa.s, pe = 0 bar (0 psi)	Fluid in l/h with density: 1.0 kg/l, temperature 20 °C (68 °F), viscosity 1 mPa.s Gas in m3/h with density: 1.293 kg/m3, temperature 0 °C (32 °F), viscosity: 0.0181 mPa.s, pe = 0 bar (0 psi)	Fluid in l/h with density: 1.0 kg/l, temperature 20 °C (68 °F), viscosity 1 mPa.s Gas in m3/h with density: 1.293 kg/m3, temperature 0 °C (32 °F), viscosity: 0.0181 mPa.s, pe = 0 bar (0 psi)

Order code	Pressure loss [mbar]							Measuring ranges (dynamic 1:10)			
	Measurement cone							Liquids		Gases	
	1	2	3	4	5	6	7	[l/h]	[USgpm]	[m ³ /h]	[scfm]
10	40 ¹⁾	-	-	-	-	-	-	0.5 ... 5	0.0022 ... 0.022	0.015 ... 0.15	0.0088 ... 0.088
11	44 ¹⁾	-	-	-	-	-	-	0 ... 10	0.0044 ... 0.044	0.03 ... 0.3	0.0177 ... 0.177
12	40 ¹⁾	-	-	-	-	-	-	1.6 ... 16	0.007 ... 0.07	0.045 ... 0.48	0.0265 ... 0.283
13	40 ¹⁾	-	-	-	-	-	-	2.5 ... 25	0.011 ... 0.11	0.075 ... 0.75	0.0441 ... 0.441
14	40 ¹⁾	-	-	-	-	-	-	4 ... 40	0.018 ... 0.18	0.13 ... 1.3	0.0765 ... 0.765
15	-	40 ²⁾	-	-	-	-	-	5 ... 50	0.022 ... 0.22	0.15 ... 1.5	0.0883 ... 0.883
16	-	40 ²⁾	-	-	-	-	-	7 ... 70	0.031 ... 0.31	0.2 ... 2.1	0.12 ... 1.24
17	-	60	-	-	-	-	-	10 ... 100	0.044 ... 0.44	0.3 ... 3	0.177 ... 1.77
20	-	60	-	-	-	-	-	16 ... 160	0.07 ... 0.7	0.5 ... 4.6	0.29 ... 2.71
21	-	60	-	-	-	-	-	25 ... 250	0.011 ... 1.1	0.07 ... 7	0.412 ... 4.12
22	-	70	-	-	-	-	-	40 ... 400	0.176 ... 1.76	1.0 ... 11	0.589 ... 6.47
23	-	80	-	-	-	-	-	60 ... 600	0.264 ... 2.64	1.7 ... 17	1 ... 10
24	-	-	60	-	-	-	-	100 ... 1 000	0.44 ... 4.4	2 ... 30	1.77 ... 17.66
25	-	-	70	-	-	-	-	160 ... 1 600	0.7 ... 7	3 ... 46	2.35 ... 27.07
26	-	-	100	50 ²⁾	-	-	-	250 ... 2 500	1.1 ... 11	6 ... 70	4.12 ... 41.2
27	-	-	240 ²⁾	120 ²⁾	80	-	-	400 ... 4 000	1.76 ... 17.6	10 ... 110	6.47 ... 64.74
30	-	-	-	180 ²⁾	90	-	-	600 ... 6 000	2.64 ... 26.4	16 ... 170	10 ... 100
31	-	-	-	-	110	-	-	1 000 ... 10 000	4.4 ... 44	28 ... 290	17.1 ... 170.7
32	-	-	-	-	230	70	-	1 600 ... 16 000	7 ... 70	45 ... 460	27.1 ... 270.7
33	-	-	-	-	230	70 ²⁾	-	2 000 ... 20 000	8.8 ... 88	55 ... 550	32.4 ... 323.7
34	-	-	-	-	500 ²⁾	100	-	2 500 ... 25 000	11 ... 110	69 ... 700	41.2 ... 412
35	-	-	-	-	-	350 ²⁾	120	4 000 ... 40 000	17.6 ... 176	109 ... 1 100	64.7 ... 647.4
36	-	-	-	-	-	350 ²⁾	120 ²⁾	5 000 ... 50 000	22 ... 220	134 ... 1 350	79.5 ... 794.6
37	-	-	-	-	-	-	360 ²⁾	6 000 ... 60 000	26.4 ... 264	169 ... 1 700	100 ... 1 000
40	-	-	-	-	-	-	600 ²⁾	8 000 ... 80 000	35.2 ... 352	239 ... 2 400	141.3 ... 1 413
41	-	-	-	-	-	-	600 ²⁾	10 000 ... 100 000	44 ... 440	299 ... 3 000	176.6 ... 1 766

Note: Female thread connector (DIN ISO 228, NPT ANSI B 1.20.1) not available for FF-P.

- Not available

¹⁾ Not available for EF-H and FF-P

²⁾ Not available for FF-P

Technical specifications (continued)

Sensor size availability guide

Type CF-S and EF-H

Order code	Diameter		Flow tube						
	Flange		1	2	3	4	5	6	7
A	DN 15	½"	● ¹⁾	●	●	-	-	-	-
B	DN 20	¾"	● ¹⁾	●	●	-	-	-	-
C	DN 25	1"	● ¹⁾	●	●	● ²⁾	-	-	-
D	DN 32	1¼"	● ¹⁾	●	●	●	-	-	-
E	DN 40	1½"	● ¹⁾	●	●	●	● ²⁾	-	-
F	DN 50	2"	● ¹⁾	●	●	●	●	-	-
G	DN 65	2½"	-	-	●	●	●	● ²⁾	-
H	DN 80	3"	-	-	-	●	●	●	-
J	DN 100	4"	-	-	-	-	●	●	●

Type FF-P

Order code	Diameter		Flow tube						
	Flange		1	2	3	4	5	6	7
A	DN 15	½"	-	● ²⁾	-	-	-	-	-
B	DN 20	¾"	-	● ³⁾	-	-	-	-	-
C	DN 25	1"	-	●	●	-	-	-	-
D	DN 32	1¼"	-	-	-	-	-	-	-
E	DN 40	1½"	-	-	-	●	-	-	-
F	DN 50	2"	-	-	-	-	●	-	-
G	DN 65	2½"	-	-	-	-	-	-	-
H	DN 80	3"	-	-	-	-	-	●	-
J	DN 100	4"	-	-	-	-	-	-	●

Type CF-S and EF-H

Order code	Diameter		Flow tube						
	Female thread		1	2	3	4	5	6	7
Q	G ¼"	¼" NPT	●	●	-	-	-	-	-
R	G 3/8"	3/8" NPT	●	●	-	-	-	-	-
S	G ½"	½" NPT	●	●	●	●	-	-	-
T	G ¾"	¾" NPT	●	●	●	●	-	-	-
U	G 1"	1" NPT	●	●	●	●	●	-	-
V	G 1¼"	1¼" NPT	●	●	-	●	●	-	-
W	G 1½"	1½" NPT	-	-	-	●	●	-	-
X	G 2"	2" NPT	-	-	-	-	●	-	-

Note: Female thread not available for type FF-P.

● Available

- Not available

1) Not available for type EF-H

2) Only with EN 1092-1 flange

3) Only with ANSI B16.5 flange

Flange sealing surface selection guide

Order code	Diameter		Flow tube						
	flange	EN 1092-1	1	2	3	4	5	6	7
A	DN 15	N11	N11	N11	-	-	-	-	-
B	DN 20	N12	N12	N12	-	-	-	-	-
C	DN 25	-	-	N13	N13	-	-	-	-
D	DN 32	-	-	-	N14	-	-	-	-
E	DN 40	-	-	-	N15	N15	-	-	-
F	DN 50	-	-	-	-	N16	-	-	-
G	DN 65	-	-	-	-	-	N17	-	-
H	DN 80	-	-	-	-	-	N18	-	-
J	DN 100	-	-	-	-	-	-	-	N19

Flow Measurement

SITRANS FVA (variable area meters)

SITRANS FVA250

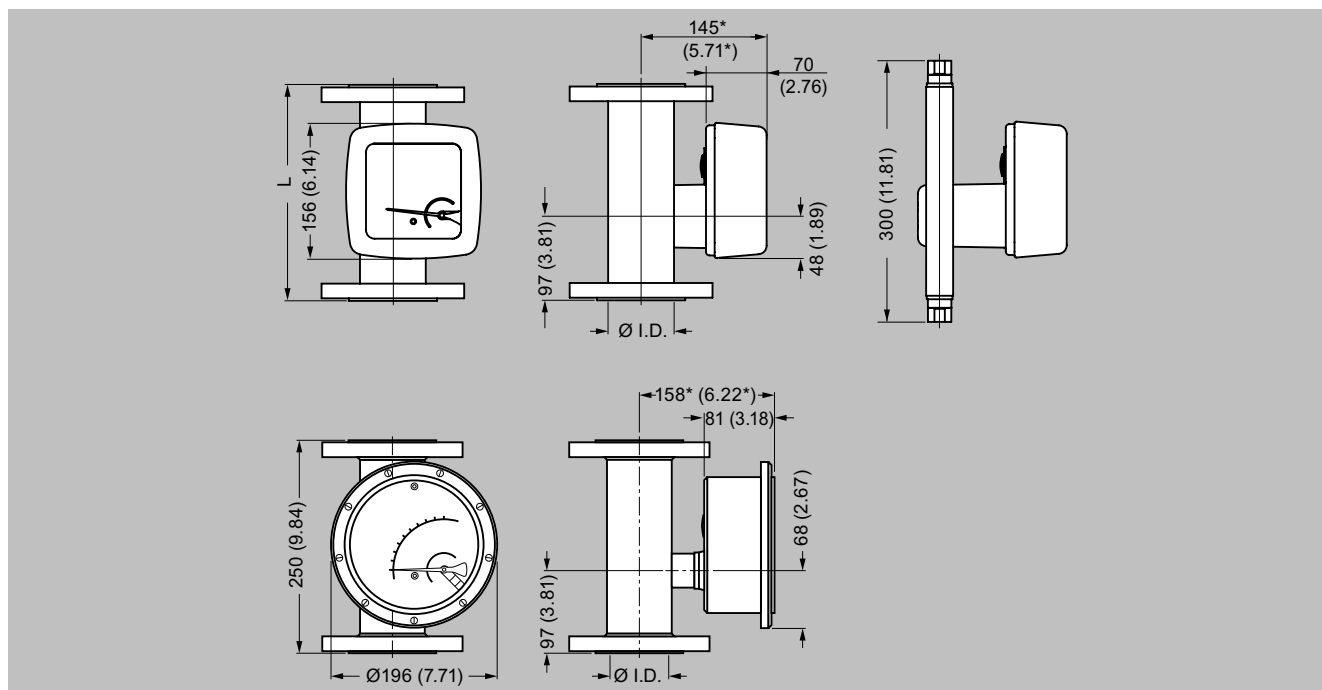
Technical specifications (continued)

Type FF-P

Order code	Diameter flange ASME B16.5	Flow tube						
		1	2	3	4	5	6	7
A	½"	N21	N21	N21	-	-	-	-
B	¾"	N22	N22	N22	-	-	-	-
C	1"	-	-	N23	-	-	-	-
D	1¼"	-	-	-	N24	-	-	-
E	1½"	-	-	-	N25	-	-	-
F	2"	-	-	-	-	N26	-	-
G	2½"	-	-	-	-	N27	-	-
H	3"	-	-	-	-	-	N28	-
J	4"	-	-	-	-	-	-	N29

- Not available

Dimensional drawings



SITRANS FVA250, dimensions in mm

Order code	Diameter flange EN 1092-1	Flow tube I.D. [mm]						
		1	2	3	4	5	6	7
A	DN 15	26 ¹⁾	26 ¹⁾	32 ¹⁾	-	-	-	-
B	DN 20	26 ¹⁾	26 ¹⁾	32 ¹⁾	-	-	-	-
C	DN 25	26	26	32 ¹⁾	46 ¹⁾	-	-	-
D	DN 32	26	26	32	46 ¹⁾	-	-	-
E	DN 40	26	26	32	46 ¹⁾	70 ¹⁾	-	-
F	DN 50	26	26	32	46	70 ¹⁾	-	-
G	DN 65	-	-	32	46	70	102 ¹⁾	-
H	DN 80	-	-	-	46	70	102 ¹⁾	-
J	DN 100	-	-	-	-	70	102	125 ¹⁾

- Not available

* +100 mm with pulled-out display unit

1) Flange sealing surface not according to EN 1092-1 (Please select N-option for EN 1092-1 compliant flange sealing surface)

Order code	Diameter flange EN 1092-1	Flow tube I.D. [mm]						
		1	2	3	4	5	6	7
A	½"	1.02 ¹⁾	1.02 ¹⁾	1.26 ¹⁾²⁾	-	-	-	-
B	¾"	1.02 ¹⁾	1.02 ¹⁾	1.26 ¹⁾	-	-	-	-
C	1"	1.02	1.02	1.26 ¹⁾	-	-	-	-
D	1¼"	1.02	1.02	1.26	1.81 ¹⁾	-	-	-
E	1½"	1.02	1.02	1.26	1.81 ¹⁾	-	-	-
F	2"	1.02	1.02	1.26	1.81	2.76 ¹⁾	-	-
G	2½"	-	-	1.26	1.81	2.76	-	-
H	3"	-	-	-	1.81	2.76	4.02 ¹⁾	-
J	4"	-	-	-	-	2.76	4.02	4.92 ¹⁾

- Not available

* +3.94 inch with pulled-out display unit

1) Flange sealing surface not according to ANSI B16.5 (Please select N-option for ANSI B16.5 compliant flange sealing surface)

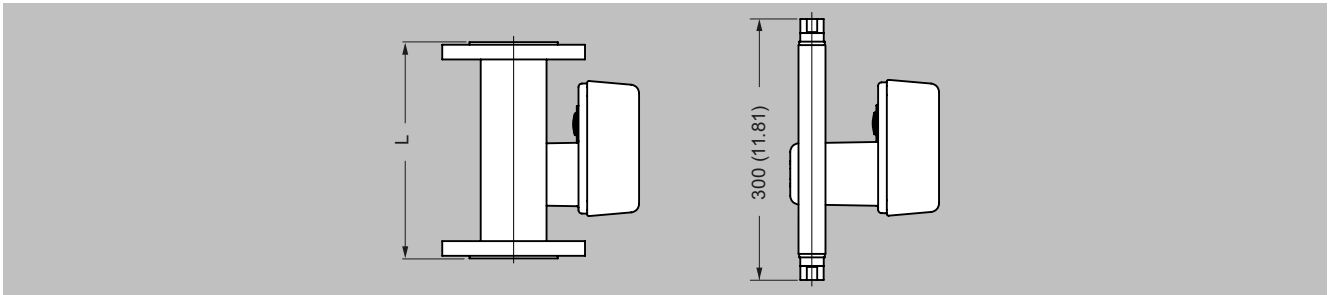
Flow Measurement

SITRANS FVA (variable area meters)

SITRANS FVA250

Dimensional drawings (continued)

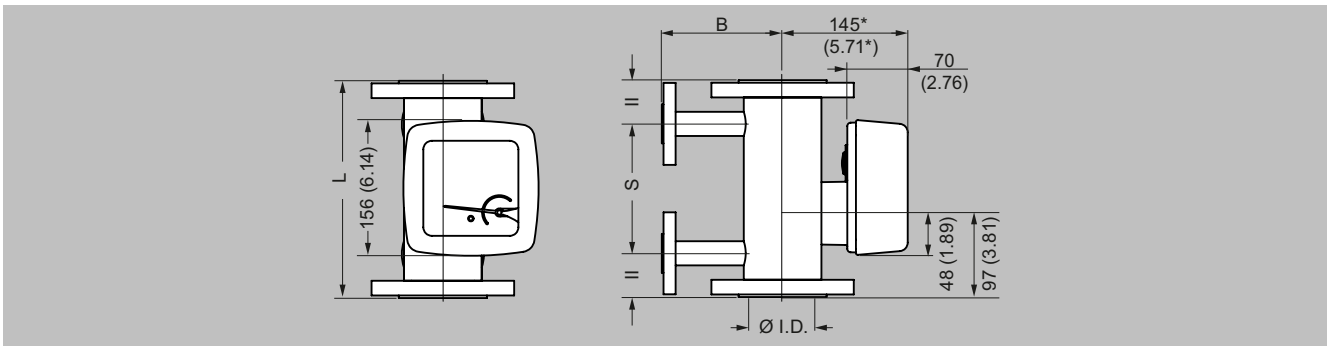
2) Flange with threaded holes



SITRANS FVA250 build-in length, dimensions in mm (inch)

Diameter	EN 1092-1				Diameter	ANSI B16.5		
	PN 16	PN 16	PN 16	PN 16		class 150	class 300	class 600
DN 15	-	250 (9.84)	-	250 (9.84)	½"	250 (9.84)	250 (9.84)	250 (9.84)
DN 20	-	250 (9.84)	-	250 (9.84)	¾"	250 (9.84)	250 (9.84)	250 (9.84)
DN 25	-	250 (9.84)	-	250 (9.84)	1"	250 (9.84)	250 (9.84)	250 (9.84)
DN 32	-	250 (9.84)	-	250 (9.84)	1¼"	250 (9.84)	250 (9.84)	250 (9.84)
DN 40	-	250 (9.84)	-	250 (9.84)	1½"	250 (9.84)	250 (9.84)	250 (9.84)
DN 50	-	250 (9.84)	250 (9.84)	300 (11.81)	2"	250 (9.84)	250 (9.84)	300 (11.81)
DN 65	250 (9.84)	250 (9.84)	-	-	2½"	250 (9.84)	300 (11.81)	300 (11.81)
DN 80	250 (9.84)	250 (9.84)	-	-	3"	250 (9.84)	300 (11.81)	300 (11.81)
DN 100	250 (9.84)	250 (9.84)	-	-	4"	250 (9.84)	300 (11.81)	300 (11.81)

- Not available

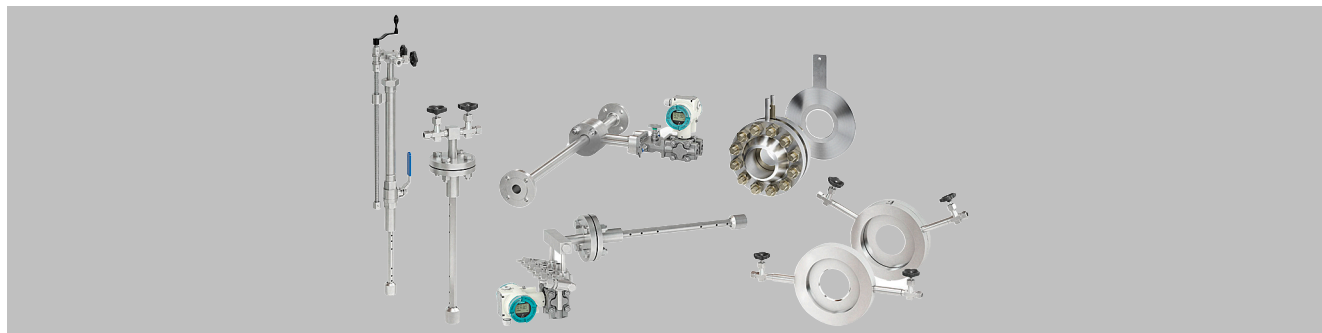


SITRANS FVA250 with heating/cooling jacket, dimensions, in mm (inch)

Diameter	B (flange)		B (Ermeto)		S		Weight	
	mm	inch	mm	inch	mm	inch	kg	lbs
15 (½")	110	4.33	53	2.09	150	5.91	3,0	6.6
20 (¾")	110	4.33	53	2.09	150	5.91	3,0	6.6
25 (1")	110	4.33	58,5	2.3	150	5.91	4,2	9.3
32 (1¼")	110	4.33	58,5	2.3	150	5.91	5,2	11.5
40 (1½")	130	5.12	63	2.48	150	5.91	6,0	13.2
50 (2")	140	5.51	77,5	3.05	150	5.91	7,5	16.5
65 (2½")	140	5.51	77,5	3.05	150	5.91	8,5	18.7
80 (3")	160	6.3	93,5	3.68	150	5.91	13	28.7
100 (4")	175	6.89	110	4.33	120	4.72	18	39.7

* + 100 mm (3.94 inch) with pulled-out display unit

Overview





With the SITRANS FP product line Siemens offers a complete solution for differential pressure flow measurements. This well-established technology is suitable for all kinds of applications – liquids, dry or humid gases and steam. Due to the robust though variable design it has been and still is one of the main technologies for flow measurement in various industries.

The new product line offers full flexibility for your processes. SITRANS FP is not a simple substitution of our previous orifice program but a completely new setup. A new digital sizing process ensures minimum effort during presales and full traceability in aftersales. The differential pressure portfolio consists of the averaging pitot tube measuring system SITRANS FPS300 and the primary elements according to ISO 5167 (orifices) SITRANS FPS200.

Product overview

SITRANS FP230/FPS200 primary elements according to ISO 5167

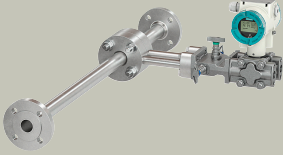

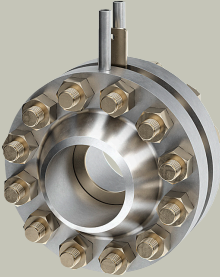
Product name	Fluid	Design	Pressure tapping	Nominal size	Article No.
Standard orifice plate with corner pressure tappings Compact orifice plate with integrated corner pressure tappings in carbon or stainless steel 	<ul style="list-style-type: none"> • Gas • Steam • Liquid 	<ul style="list-style-type: none"> • Remote • Compact 	Corner tapping	DN 50 ... 500 (2 ...20 inch)	7ME171.-.....
Standard orifice plate with annular chamber Standard orifice plate with annular chamber and pressure tapping in carbon or stainless steel 	<ul style="list-style-type: none"> • Gas • Steam • Liquid 	<ul style="list-style-type: none"> • Remote • Compact 	Annular chamber	DN 50 ... 600 (2 ...24 inch)	7ME172.-.....

Flow Measurement


SITRANS FP (differential pressure flow measurement)

Introduction

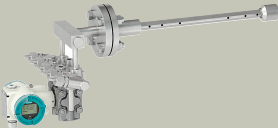

Overview (continued)

Product name	Fluid	Design	Pressure tapping	Nominal size	Article No.
Orifice meter run Orifice meter run with flanges ends in carbon or stainless steel 	<ul style="list-style-type: none"> • Gas • Steam • Liquid 	<ul style="list-style-type: none"> • Remote • Compact 	Annular chamber	DN 10 ... 50 (3/8 ...2 inch)	7ME173.-.....
Orifice plate Orifice plate for installation between flanges in stainless steel 	<ul style="list-style-type: none"> • Gas • Steam • Liquid 	<ul style="list-style-type: none"> • Remote 	Not included	DN 50 ... 600 (2 ...24 inch)	7ME174.-.....
Orifice plate with orifice flange Orifice flange pair according to ASME B36.16 with orifice plate in carbon steel (flanges) or stainless steel 	<ul style="list-style-type: none"> • Gas • Liquid 	<ul style="list-style-type: none"> • Remote 	In the flange	DN 50 ... 600 (2 ...24 inch)	7ME175.-.....

SITRANS FP330/FPS300 averaging pitot tube

Product name	Fluid	Design	Mounting type	Nominal size	Article No.
Averaging pitot tube for gases and liquids 	<ul style="list-style-type: none"> • Gas • Liquid 	<ul style="list-style-type: none"> • Remote • Compact 	Flange, cutting ring	DN 40 ... 4000 (1½" ... 160")	7ME161.-.....

Overview (continued)

Product name	Fluid	Design	Mounting type	Nominal size	Article No.
Averaging pitot tube for steam applications 	<ul style="list-style-type: none"> • Superheated steam • Saturated steam 	<ul style="list-style-type: none"> • Remote • Compact 	Flange	DN 40 ... 2000 (1½" ... 80")	7ME162.-.....
Averaging pitot tube with FASTLOK The sensor can be assembled and disassembled into the pipe without interrupting plant operation. 	<ul style="list-style-type: none"> • Dry gas • Wet gas • Liquid 	<ul style="list-style-type: none"> • Remote • Compact 	Screwed ball valve	DN 40 ... 2000 (1½" ... 80")	7ME163.-.....

Sizing procedure

The SITRANS FP sizing tool is available via PIA Life Cycle Portal and supports you in choosing the right device within this portfolio:
pia-portal.automation.siemens.com

After registration you have access to a web-based sizing procedure generating reference IDs which can be used as application data for the ordering process.

Benefits

- Suitable for a vast range of different applications
- Available as pre-mounted compact system as well as remote parts
- Advanced intelligent sizing procedure
- Web-based sizing and data storage enables full traceability and easy communication
- All benefits of SITRANS P320 available

Application

The SITRANS FP230/330 devices are applicable in a variety of applications:

Chemical industry

- Different materials for aggressive substances
- Namur NE107, self-monitoring and diagnostics
- Namur NE21, increase EMC conformity
- Measurement of various liquid and gas media

Oil & Gas industry

- Complete setup made of stainless steel
- Robust design and well-established technology
- Measurement of liquid and gas hydrocarbons

Power industry

- QAL1 approval for continuous emission monitoring applications according to EN 15267
- Specific design for steam applications
- Measurement of steam, condensate and water and others
- Cost-effective device
- Easy commissioning

Flow Measurement

SITRANS FP (differential pressure flow measurement)

Introduction

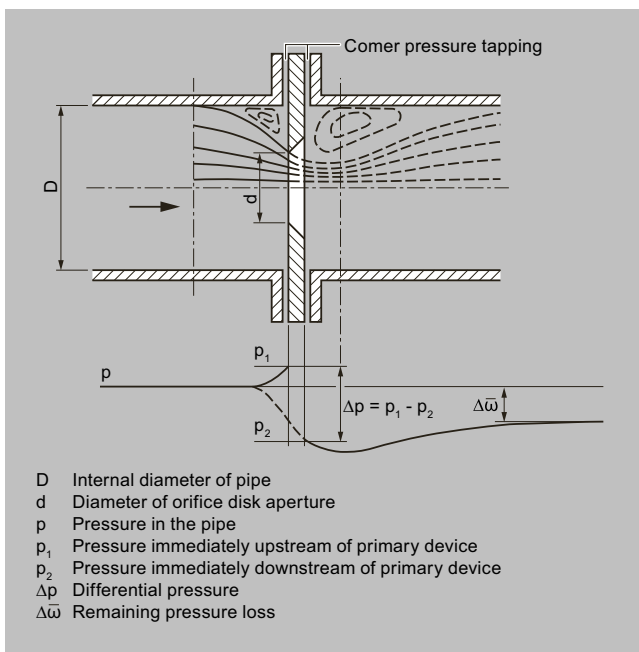
Function

Mode of operation

The so-called primary element (orifice plate, averaging pitot tube, etc.) creates a differential pressure. The pressure is transferred to the measuring cell of the differential pressure transmitter. This can be done through a compact installation where the differential pressure transmitter is installed directly at the primary element or as remote installation through separately installed pipes that connect primary element and differential pressure transmitter.

Different types and designs of primary elements for differential pressure flow measurement have been established historically. Traditional primary elements such as orifice meters are harmonized in the international standard ISO 5167. Other primary elements such as the averaging pitot tube follow the same working principle, they are not standardized but are widely used and accepted.

Principle of the differential pressure method



Principle of the differential pressure method: Pressure curve at orifice plate

The differential pressure method is based on the law of continuity and Bernoulli's energy equation. A primary differential pressure device is installed at the measuring point to measure the flow. The primary element restricts the pipe.

According to the law of continuity, the mass flow of a moving fluid (gas, steam or liquid) in a pipeline is the same at all points. If the cross-section is reduced at one point, the flow velocity must increase at this point. Thus, the restriction causes an overpressure directly in front of the primary element and a drop in pressure behind the primary element. This pressure drop is greatly influenced by the degree of restriction. This degree is usually measured in relation of the diameters of the restriction to the diameter of the pipe, the diameter ratio β:

$$\beta = d / D$$

The difference between overpressure before the primary element and lower pressure after the primary element is called differential pressure (Δp , "delta p"). According to Bernoulli's energy equation, the square-root of the differential pressure is proportional to the flow rate:

$$q \sim \sqrt{\Delta p}$$

Function (continued)

The created differential pressure is partly recovered with sufficient distance to the primary element but a permanent pressure drop, $\Delta\omega$, remains.

The exact flow equation of ISO 5167 additionally considers the properties of the primary device, the pipe, and the fluid:

$$q = f(C, \Delta p, \rho, \epsilon, \beta)$$

Where:

- q: mass flow
- Δp: differential pressure
- C: "coefficient of discharge"
- ρ: density of fluid before the point of measurement
- ε: expansion number
- β: diameter ratio

The C-factor is determined during design of the differential pressure flowmeter. For certain types of flowmeters it is a constant (e.g. Venturi flowmeters), for others it is slightly non-linear and dependent on flow rate (orifice flowmeters).

The expansion number considers the change in fluid properties due to the differential pressure itself.

All factors will be considered during the design of the differential pressure flowmeter.

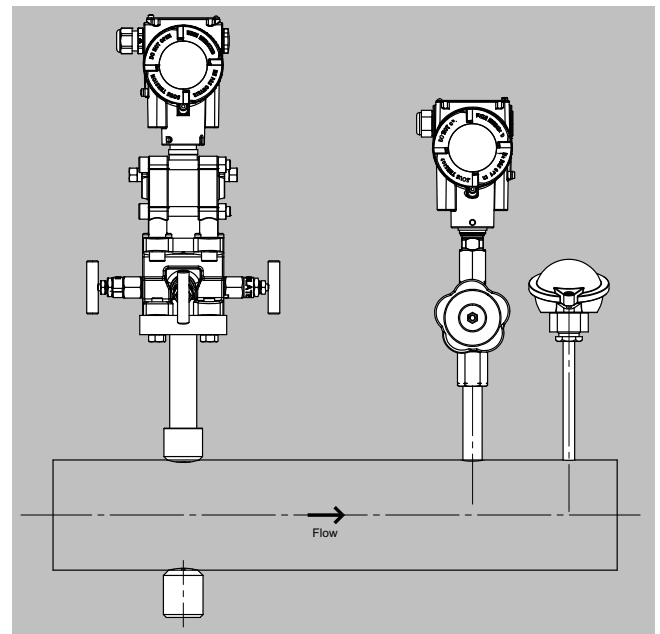
For flow measurement applications where all quantities (density, pressure, temperature, etc.) can – with sufficient accuracy – be considered constant, it can be reduced to the basic relation given above:

$$q \sim \sqrt{\Delta p}$$

Differential pressure flow measurement in practice

A differential pressure flow measurement usually consists of at least 3 components:

- primary element (orifice, pitot tube, etc.)
- manifold (plus primary shut-off valve for remote installations)
- differential pressure transmitter



Function (continued)

The picture above shows all these components installed together in a "compact" arrangement (manifold and differential pressure transmitter sitting on top of the primary element).

Depending on the process the application might require additional components such as:

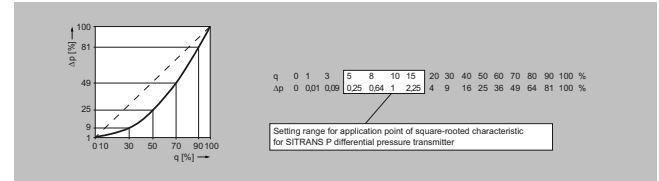
- absolute pressure measurement
- temperature measurement

which are also shown above. If absolute pressure and/or temperature are not constant, these quantities have to be measured as well to calculate the density changes caused by the change of these process conditions. This process is called "compensation" meaning recalculation of actual fluid density based on actual process conditions as explained above.

Characteristic curves

Based on the relations described above differential pressure measurement systems generally show a square-root relationship between differential pressure and flow. Therefore, a square-root transmitter is required to create a linear flow characteristic. If no square-root characteristic is selected, the transmitter will output a signal proportional to differential pressure.

The conversion from differential pressure to flow has to be done in a subsequent system (flow computer, DCS, etc.). This is required if additional measurements such as absolute pressure and/or temperature are connected to such a system to correct for changes in operational density (so called "compensation").



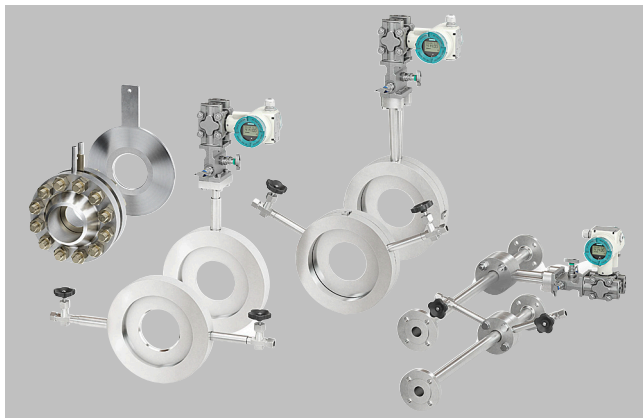
Relationship between flow q and differential pressure Δp

Flow Measurement

SITRANS FP (differential pressure flow measurement)

SITRANS FP230/FPS200 primary elements (ISO 5167)

Overview



Primary differential pressure devices are standardized mechanical flow sensors, often also referred to as differential pressure transducers. The primary differential pressure devices are calculated and manufactured according to DIN EN ISO 5167.

Through constriction of the line diameter in the pressure device, the flow rate creates a differential pressure that is converted with the help of a differential pressure transmitter into a proportional current signal or flow value. The assignment of differential pressure to flow is created by a calculation of the primary differential pressure device.

Primary differential pressure devices are suitable for single-phase media such as gas, steam and liquids without solid components.

Benefits

- Suitable for universal use across the globe and widely accepted in all industries
- Very robust and can be used in a wide range of nominal diameters
- Suitable for high temperature and pressure ranges
- Low uncertainty of measurement
- No wet calibration required as they use an internationally standardized flow rate measurement procedure
- Differential pressure transmitter can be used over a long distance from the measuring location
- Differential pressure method is well known and has a large installed base
- SITRANS P differential pressure transmitter is easy to parameterize again if process data change. They are adapted by recalculating and assigning new parameters to the transmitter or, in case of an orifice plate with annular chamber, by using a new orifice plate

Application

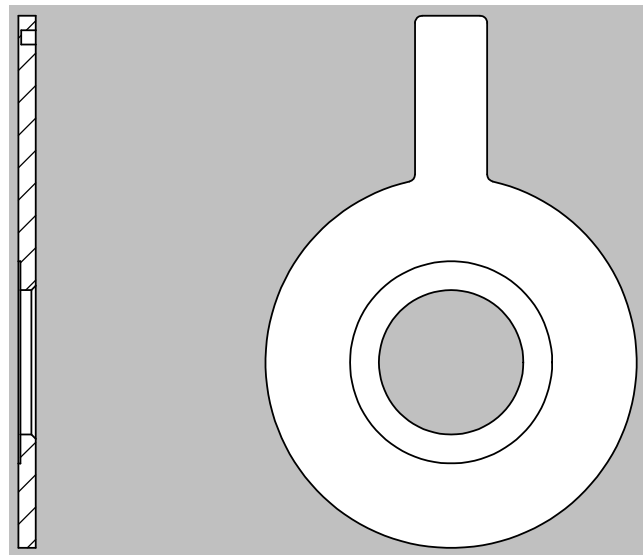
- Technical gases
- Compressed air
- Fresh and combustion air
- Steam/Heat quantities
- Heat transfer fluids
- Water

Design

Basics: Orifices for flow measurement

Orifice plates are usually differentiated by their type of installation, type of differential pressure tapping and the shape of the orifice.

The characteristic differential pressure is created by the orifice bore which is the defined circular opening. It is usually of square edged concentric type according to ISO 5167-2 positioned in the middle of the pipe.



The main features are a sharp edge, a cylindrical bore of a certain length and a conical bevel tapering to the rear. Alternatively, the relevant standards provide for deviating designs, which are used for applications with highly viscous (e.g. quarter-circle nozzles) or contaminated media (e.g. segment orifices).

The standard design is permitted by the standard for an inner diameter of the pipe between 50 mm and 1000 mm. For pipes with smaller inside diameters, standards such as ISO 15377-TR or ASME MFC-14M which go beyond these standards must be taken into account. Orifice plates for pipes with small inside diameters are usually designed as meter tubes.

In order to reduce the uncertainties of these meter tubes, the devices can be calibrated on a flow test bench if required on request.

Types of differential pressure tapings

The differential pressure can be tapped in different ways:

Corner tapping

Directly in front of and behind the orifice plate an opening is placed in the corner of a carrier ring to measure upstream and downstream pressure. Both pressure signals are routed through these openings to the outside.

Corner tapping with annular chamber

The orifice plate is held by an annular chamber. Upstream and downstream pressure are measured through an annular gap opening between carrier ring and orifice plate. Both pressure signals are averaged over the entire circumference and routed outside.

Flange tapping

The orifice plate is held between two so-called orifice flanges. Upstream and downstream pressure signals are measured through flange taps which are drilled into the flanges.

Design (continued)

Tapping with distance D, D/2

The orifice plate is held between regular flanges. Upstream and downstream pressure signals are measured through taps in the pipe with distance of D (upstream) and D/2 (downstream) to the orifice plate.

Designs

- Standard orifice plate with corner pressure tapplings (7ME171)
- Standard orifice plate with annular chamber (7ME172)
- Orifice meter run (7ME173)
- Orifice plate (7ME174)
- Orifice plate with orifice flanges (7ME175)

Mounting arrangements

For more information on installation position and piping, please see the Operating Instructions "SITRANS FPS200" on SIOS.

Integration

The orifice plate is installed between two flanges in the pipeline. Using condensation pots (for steam) and initial shut-off valves, the differential pressure of the high-pressure side and low-pressure side is directed through differential pressure lines to a manifold and to the differential pressure transmitter. For fluids with pressure and temperature fluctuations it makes sense to take an additional measurement of the pressure and temperature in order to correct the flow signal of the transmitter in a subsequent correction computer.

Selection of mounting point

The flow measuring regulations DIN EN ISO 5167 not only consider the design of primary differential pressure devices, but also assume that their installation is in accordance with the standard so that the specified tolerances can be retained. The required inlet and outlet pipe sections according to ISO 5167 can be found in the calculation protocol of the respective orifice plate. Configuration of the pipeline should allow for standardized installation (required inlet and outlet pipe section). Particular attention must be paid to ensure that the primary device can be fitted in a sufficiently long straight section of pipe. Bends, valves and similar should be fitted sufficiently far upstream of the primary device to prevent them having a detrimental effect. Primary devices with a large diameter ratio are particularly sensitive to interferences.

Design of measuring point

The design of the measuring point depends on the medium and on the spatial conditions. The designs for gas and water only differ with regard to the position of the tapping sockets (see section "Tapping sockets"); condensation pots are provided for steam applications.

Orifice meter runs

On lines with small nominal diameters (DN 10 to DN 50) the measurements are influenced by the wall roughness and diameter tolerances of the pipes, more than measurements with larger nominal diameters. These influences are counteracted by using orifice meter runs with fitted inlet and outlet pipe sections made of precision pipes. For exact measurements with orifice meter runs, the flow coefficient C can be determined by means of calibration.

Technical specifications

SITRANS FP230/FPS200	
General design	
Working principle	Differential pressure orifice meter (other ISO 5167 primary elements on request)
Media	<ul style="list-style-type: none"> • Steam (saturated, superheated) • Gas (dry, up to 100% water saturated) • Liquids (water, non-conductive liquids, oil, etc.)
Transmitter installation	<ul style="list-style-type: none"> • Compact mount with differential pressure transmitter (acc. to IEC 61518) • Remote mounted differential pressure transmitter
Bidirectional flow	On request
Design	According to ISO 5167-2 (2003); for orifice plates smaller than 50 mm inner diameter according to ISO/TR 15377 or ASME MFC-14M:2003
Accuracy	
Uncertainty at design flow (of Sensor Coefficient of Discharge)	Typically in the range of 0.5 ... 1.2% (depends on application and final design)
Measurement range	Typically between up to 1:5 ... 1:10 (real measurement range depends on transmitter performance and non-linearity of coefficient of discharge)
Operating conditions	
Pressure	Max. PN 100 or Class 600 (higher pressure ratings on request)
Temperature	According to EN 1092-1 or ASME B16.5 (exact maximum temperature depends on sensor design)
Pressure loss	30 ... 80% of differential pressure
Installation conditions	
Straight inlet diameter	Will be calculated by sizing tool (depends on β -coefficient, typically in the range of 16 ... 44 x inner diameter behind 90° elbow, can be reduced with 0.5% added uncertainty)
Straight outlet diameter	Will be calculated by sizing tool (depends on β -coefficient, typically in the range of 6 ... 8 x inner diameter, can be reduced with 0.5% added uncertainty) Note: For detailed calculation of recommended installation pipe length please refer to sizing tool or manual
Design	
Material orifice plate	Standard: <ul style="list-style-type: none"> • Stainless steel 1.4404/AISI 316L • Carbon steel (other materials on request)
Material orifice flanges / orifice holder	<ul style="list-style-type: none"> • Stainless steel 1.4404/AISI 316L • Carbon steel (other materials on request)
Pipe diameter	<ul style="list-style-type: none"> • DIN: DN 10 ... 600 • ASME: 3/8" ... 24" (other sizes on request)
Process connection	Orifice meter runs: Flanges EN 1092-1 B1 or ASME B16.5 RF All other designs: Suitable for installation between flanges EN 1092-1 B1 or ASME B16.5 RF (other process connections on request)
Length	Orifice with carrier ring and pressure tapplings: 40 mm (65 mm for compact steam applications) Orifice plate with annular chamber: 65 mm Orifice meter run: depends on pipe diameter (see below) Single piece orifice for orifice flanges (with or without orifice flanges): depends on pipe diameter (see below)

Flow Measurement

SITRANS FP (differential pressure flow measurement)

SITRANS FP230/FPS200 primary elements (ISO 5167)

Technical specifications (continued)

SITRANS FP230/FPS200

Approvals

• Hazardous area	(see differential pressure transmitter)
• Enclosure rating	(see differential pressure transmitter)
• Operational safety	(see differential pressure transmitter)

Accessories

Z-Options for cable glands, plugs, labeling, approvals, blanking plugs, flanges seals, device settings, etc. according to SITRANS P320

Options

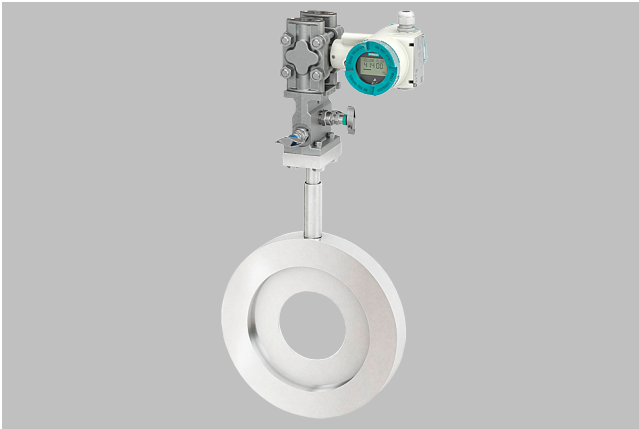
Further versions that are available on request:

- Other types of primary differential pressure device: nozzles, venturi nozzles, classic venturi tubes etc.
- Other nominal diameters and nominal pressures to EN, ASME and other standards
- Other lengths, special lengths
- Other materials
- Sealing face with recess or groove
- Flushing rings
- Other tapping sockets, multiple tapplings
- Material acceptance test certificates or cold water pressure tests

More information

For more information please see the Installation Instructions and the Instruction Manuals SITRANS P on SIOS.

Application



SITRANS FP230 compact design



SITRANS FPS200 remote design

Compact orifice plate with integrated pressure tapings in carbon or stainless steel for flow measurement of gas, steam and liquid.

Flow Measurement

SITRANS FP (differential pressure flow measurement)

SITRANS FP230/FPS200 primary elements (ISO 5167) / Standard orifice plate with corner pressure tapplings

Design

Standard orifice plates with integral tapplings are manufactured from a single body and are therefore particularly inexpensive. The pressure tapping takes place at two points and is integrated into the carrier ring. Differential pressure connection can be compact and remote. The instruments are easy to handle and offer good accuracy with reasonable inlet and outlet runs. They are installed between regular flanges.

Nominal size

- EN: DN 50 ... 500
- ASME: 2 ... 20 inch

Nominal pressure

- EN: PN 6 ... 100
- ASME: class 150 ... 600

Differential pressure tapping

- Corner tapping: Measurement of differential pressure at 2 points in the corner of the carrier ring

Sealing face

- According to EN 1092-1: flat (for flanges type B1 and B2)
- According to ASME B16.5: flat (for flanges RF and SF)

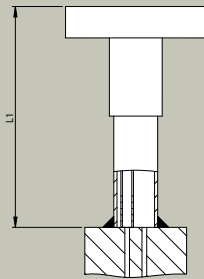
Material

- Orifice: Carbon steel / orifice edge: ER307
- Orifice: 316L/1.4404 / orifice edge: 316L/1.4404

Connection length

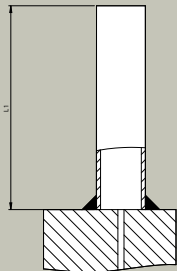
Connection length

Compact mount for gas and liquids



- L1 = 130 mm
- Max. isolation = 110 mm

Remote mount for gas and liquids

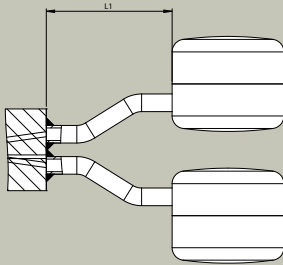


- L1 = 100 mm
- Max. isolation = 80 mm

Design (continued)

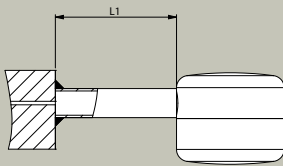
Connection length

Compact mount for steam



- L1 = 150 mm
- Max. isolation = 110 mm

Remote mount for steam

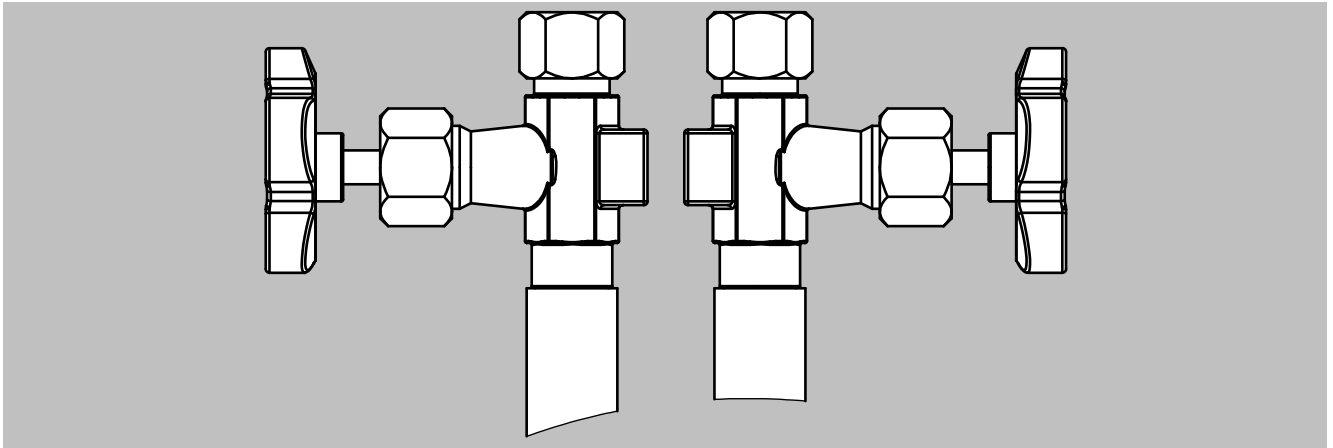


- L1 = 150 mm
- Max. isolation = 140 mm

Tapping sockets

Gases and liquids

Remote design



For single body standard orifice plates in remote design, the angle α between the pressure tappings depends on the pressure rating and the nominal diameter of the flanges.

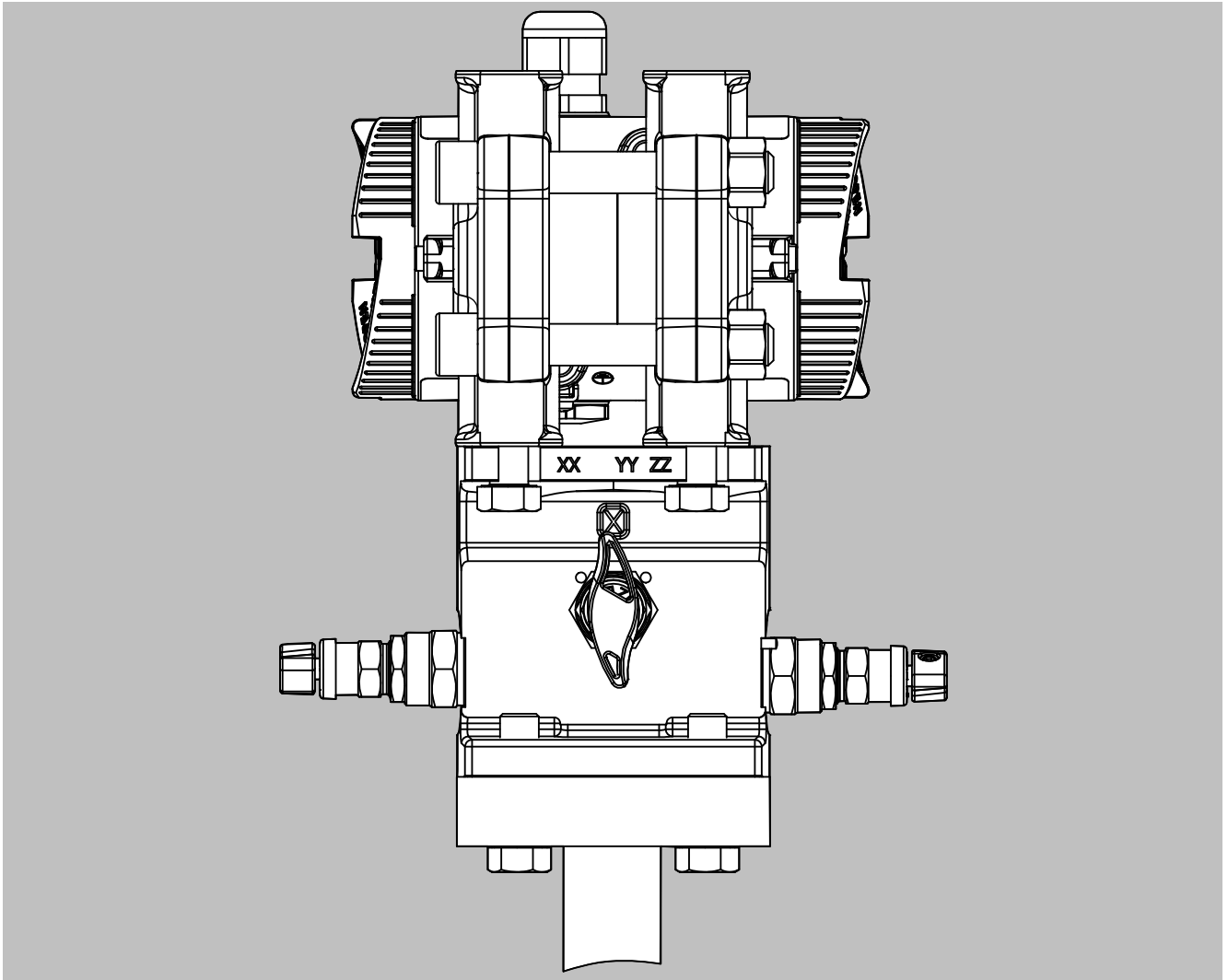
Flow Measurement

SITRANS FP (differential pressure flow measurement)

SITRANS FP230/FPS200 primary elements (ISO 5167) / Standard orifice plate with corner pressure tapings

Design (continued)

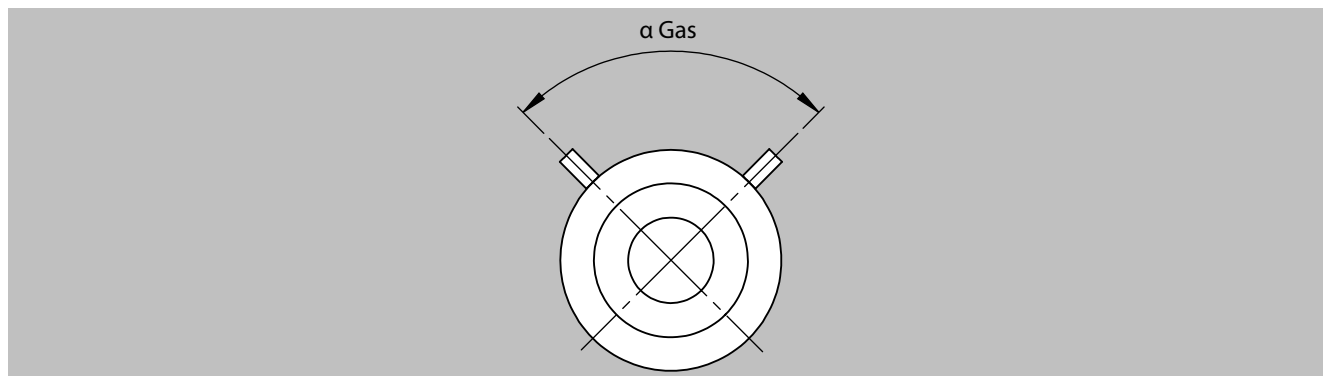
Compact design



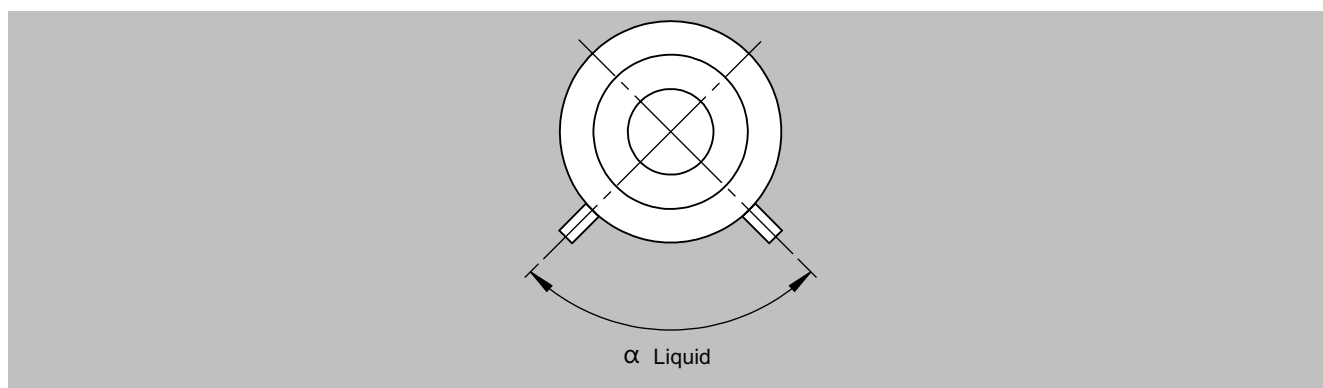
For single body standard orifice plates in compact design, a so-called flange plate is used. The manifold and the differential pressure transmitter are mounted on this flange plate.

Design (continued)

Tap position/angle in horizontal pipe



Tap position/angle in horizontal pipe (gas)



Tap position/angle in horizontal pipe (liquid)

Remote design for gases and liquids for DIN flange

Nominal size	DIN flange						
	PN 6	PN 10	PN 16	PN 25	PN 40	PN 64	PN 100
DN 50	135	135	135	135	135	135	135
DN 65	135	135	135 ^{*)}	90	90	90	90
DN 80	135	90	90	90	90	90	90
DN 100	135	90	90	90	90	90	90
DN 125	90	90	90	90	90	90	90
DN 150	90	90	90	90	90	90	60
DN 175	90	90	90	60	60	60	60
DN 200	90	90	60	60	60	60	60
DN 250	60	60	60	60	60	60	60
DN 300	60	60	60	45	45	45	45
DN 350	60	45	45	45	45	45	45
DN 400	45	45	45	45	45	45	45
DN 450	45	36	36	36	-	-	-
DN 500	36	36	36	36	36	36	36

^{*)} Fitting for DN 65 PN 16 flange with 4 holes. If design for flange with 8 holes is required, please add a comment to the corresponding project within the sizing tool.

Flow Measurement

SITRANS FP (differential pressure flow measurement)

SITRANS FP230/FPS200 primary elements (ISO 5167) / Standard orifice plate with corner pressure tapings

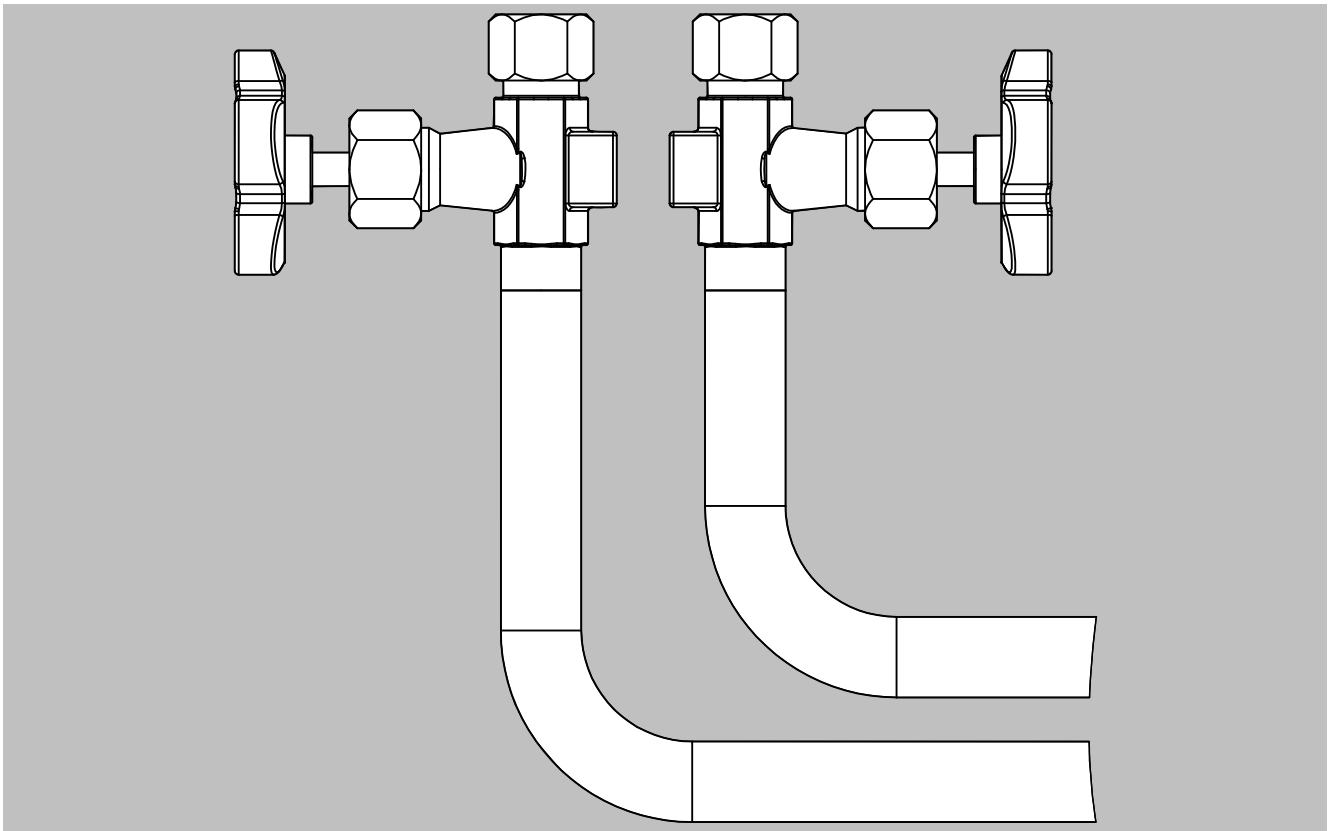
Design (continued)

Remote design for gases and liquids for ANSI flange

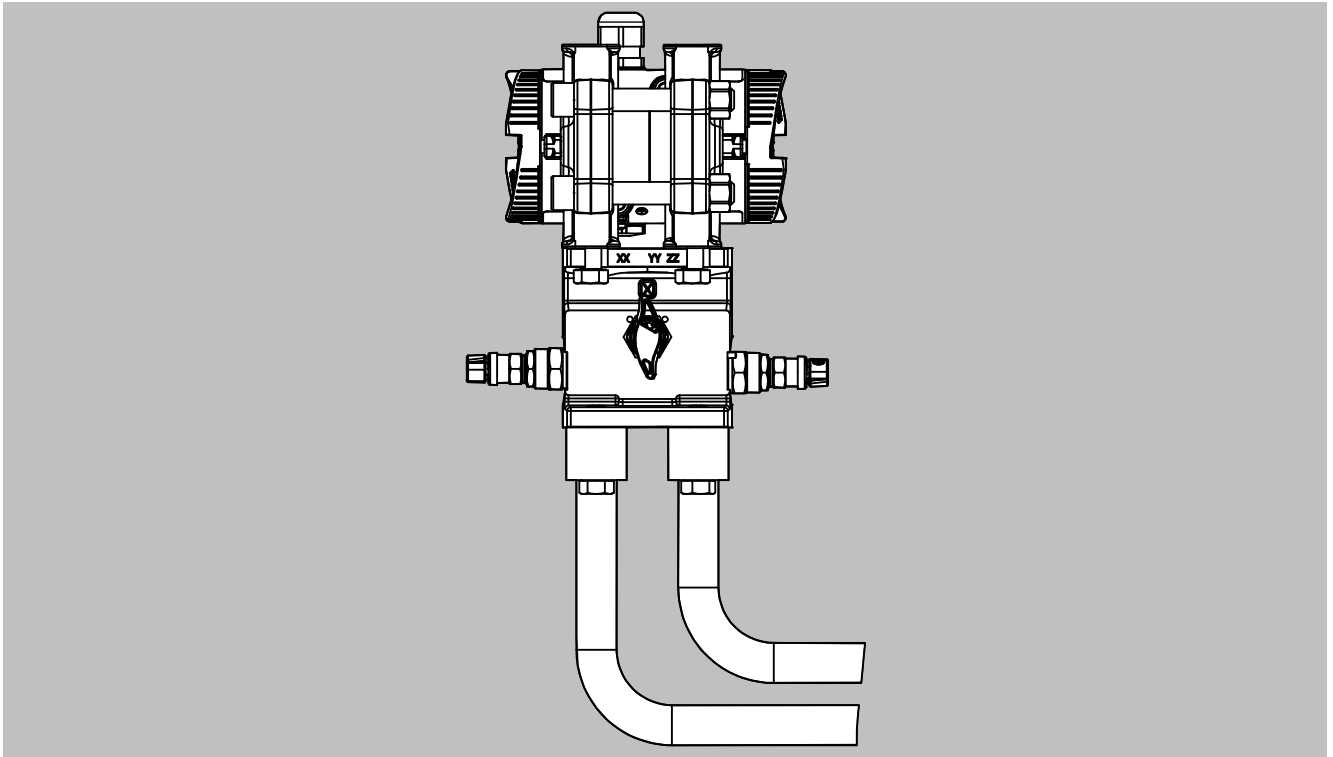
Nominal size	ANSI flange		
	Class 150	Class 300	Class 600
2"	135	90	90
2,5"	135	90	90
3"	135	90	90
4"	90	90	90
5"	90	90	90
6"	90	60	60
8"	90	60	60
10"	60	45	45
12"	60	45	36
14"	60	36	36
16"	45	36	36
18"	45	30	36
20"	36	30	30

Wet gases

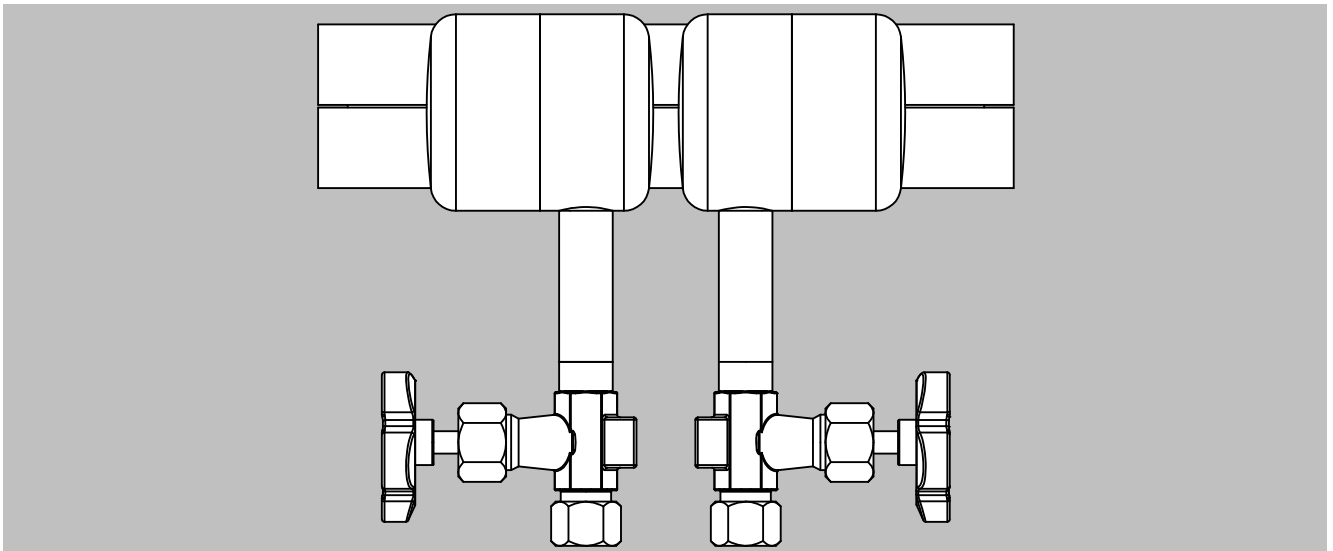
Remote design



For single body standard orifice plates in remote design for wet gases, nozzles bent at right angles with welded-on valves are used. This design is only necessary for vertical pipes. For horizontal pipes, the design for gases and liquids can be selected because the nozzles point up as listed in the table above.

Design (continued)Compact design

For single body standard orifice plates in compact design for wet gases, nozzles bent at right angles with oval flanges are used. The manifold and the differential pressure transmitter are mounted on these oval flanges. This design is only necessary for vertical pipes. For horizontal pipes, the design for gases and liquids can be selected because the flange plate with manifold and transmitter always points up.

SteamRemote design

For single body standard orifice plates in remote design for steam, the condensate vessels with shut-off valves are welded at an angle of 180°.

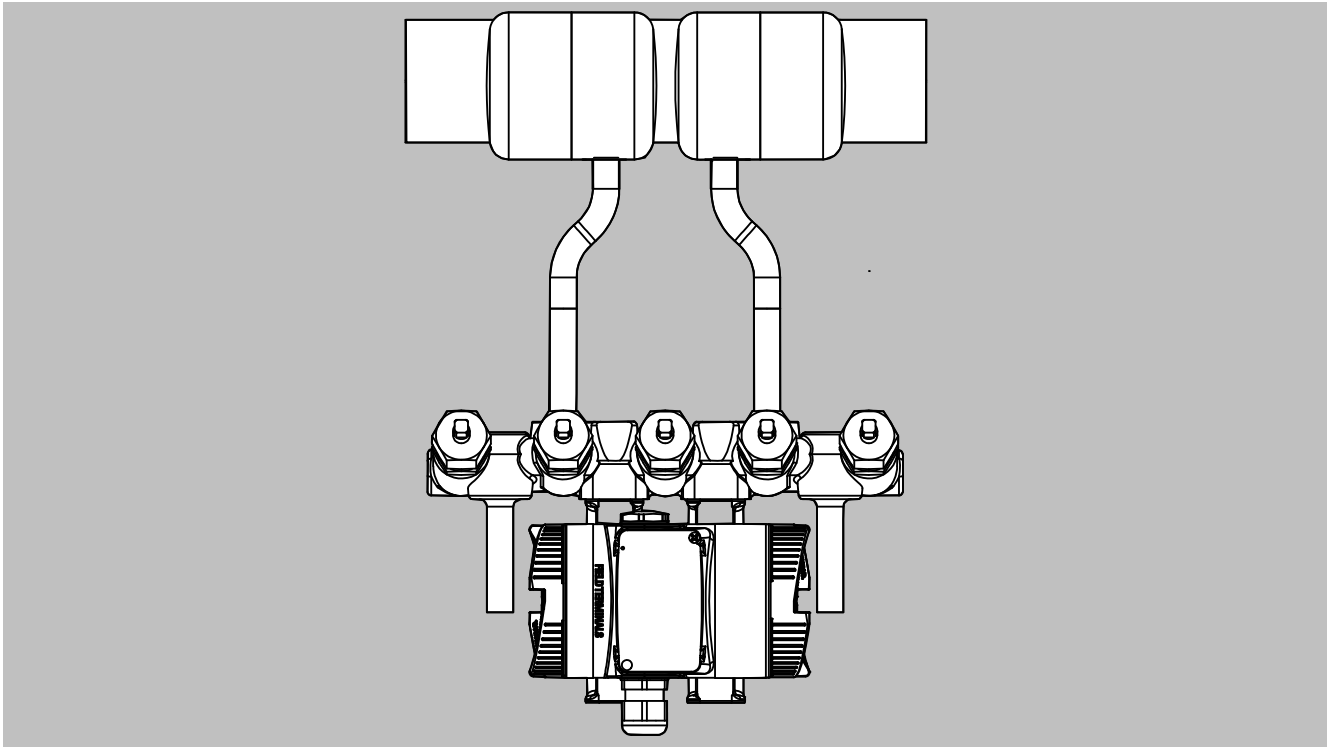
Flow Measurement

SITRANS FP (differential pressure flow measurement)

SITRANS FP230/FPS200 primary elements (ISO 5167) / Standard orifice plate with corner pressure tapplings

Design (continued)

Compact remote



For single body standard orifice plates in compact design for steam, the condensate vessels and the manifold are welded-on one side. The orifice has a width of 65 mm in this case (deviating from the standard).

SITRANS FP230/FPS200 primary elements (ISO 5167) / Standard orifice plate with corner pressure tapings

Selection and ordering data

SITRANS FP230/FPS200 standard orifice plate with corner pressure tapings	Article No. 7ME171 ● - ● ● ● ● 0 - ● ● ● ●
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	
Communication	
HART (4 ... 20 mA)	0
PROFIBUS PA	1
FOUNDATION Fieldbus	2
Without transmitter	8
Nominal size	
DN 50 (2")	1 D
DN 65 (2½")	1 E
DN 80 (3")	1 F
DN 100 (4")	2 G
DN 125 (5")	2 H
DN 150 (6")	2 J
DN 200 (8")	2 K
DN 250 (10")	2 L
DN 300 (12")	2 M
DN 350 (14")	2 N
DN 400 (16")	2 P
DN 450 (18")	2 Q
DN 500 (20")	2 R
Nominal pressure	
Flange EN 1092-1 type B1 PN 6	A
Flange EN 1092-1 type B1 PN 10	B
Flange EN 1092-1 type B1 PN 16	C
Flange EN 1092-1 type B1 PN 25	D
Flange EN 1092-1 type B1 PN 40	E
Flange EN 1092-1 type B1 PN 64	F
Flange EN 1092-1 type B1 PN 100	G
Flange ASME B16.5 Class 150	Q
Flange ASME B16.5 Class 300	R
Flange ASME B16.5 Class 600	S
Wetted parts material	
Orifice: Carbon steel / orifice edge: ER307	0
Orifice: 316L/1.4404 / orifice edge: 316L/1.4404	1
System design	
Compact design for dry gases (horizontal and vertical pipes)	0
Compact design for liquids	1
Compact design for wet gases (only vertical pipes)	2
Compact design for steam	3
Remote design for dry gases	4
Remote design for liquids	5
Remote design for wet gases	6
Remote design for steam	7
Type of protection of pressure transmitter	
No Ex / without pressure transmitter	A
Intrinsic safety	B
Explosion proof	C
Intrinsic safety, Explosion proof	D
Dust ignition proof zone 21/22 (DIP), increased safety zone 2	L
Dust ignition proof zone 20/21/22 (DIP), increased safety zone 2	M
Intrinsic safety, Explosion proof, Dust ignition proof zone 21/22 (DIP), increased safety zone 2	S
Intrinsic safety, Explosion proof, Dust ignition proof zone 21/22 (DIP), increased safety zone 2, class division	T
Electrical connections/cable entries of pressure transmitter	
Without pressure transmitter	A
2 × M20 × 1.5	F
2 × 1/2-14 NPT	M
Local operation/display of pressure transmitter	
Without display (closed lid) / without pressure transmitter	0
With display (closed lid)	1

Flow Measurement

SITRANS FP (differential pressure flow measurement)

SITRANS FP230/FPS200 primary elements (ISO 5167) / Standard orifice plate with corner pressure tapings

Selection and ordering data (continued)

SITRANS FP230/FPS200 standard orifice plate with corner pressure tapings	Article No. 7ME171 ● - ● ● ● ● 0 - ● ● ● ●
With display (lid with glass window)	

	Order code
Further designs*	
Please add "-Z" to Article No. and specify Order code(s) and plain text.	
Certificates of primary element incl. manifolds	
Inspection certificate of the primary element (EN 10204-3.1) - material of pressure-containing and wetted parts	C52
Factory certificate of the primary element (EN 10204-2.2) - wetted parts (MR 0175-2015)	C54
Dimensional record of the primary element	C55
Inspection certificate (DIN EN 571-1) - dye penetration test of weldings	C56
Hydrostatic pressure test of the primary element (EN 13480-5) of weldings	C58
Dimensional drawing 1:1 DWG of the primary element	C59
Maximum measuring span of pressure transmitter	
20 mbar (8.037 inH ₂ O)	I01
60 mbar (24.11 inH ₂ O)	I02
250 mbar (100.5 inH ₂ O)	I03
600 mbar (241.1 inH ₂ O)	I04
1600 mbar (643 inH ₂ O)	I05
Shut-off valves	
With mounted shut-off valves DN8 made of carbon steel, up to 300 °C with tube fitting 12 mm	T50
With mounted shut-off valves DN8 made of stainless steel, up to 300 °C with tube fitting 12 mm	T51
With mounted shut-off valves DN8 made of carbon steel, up to 300 °C and condensate vessel made of carbon steel with tube fitting 12 mm	T56
With mounted shut-off valves DN8 made of stainless steel, and condensate vessel made of stainless steel with tube fitting 12 mm	T57
Valve manifolds for mounting on primary element	
With mounted manifold (3-fold) made of stainless steel, PTFE sealings, cadmium-plated steel screws	U40
With mounted manifold (3-fold) made of stainless steel, PTFE sealings, stainless steel screws	U41
With mounted manifold (5-fold) made of stainless steel, PTFE sealings, cadmium-plated steel screws	U42
With mounted manifold (5-fold) made of stainless steel, PTFE sealings, stainless steel screws	U43
With mounted manifold (5-fold) made of carbon steel, up to 300 °C cadmium-plated steel screws and condensate vessel made of carbon steel	U46
With enclosed manifold (3-fold) made of stainless steel, PTFE sealings, cadmium-plated steel screws with tube fitting 12 mm	U50
With enclosed manifold (3-fold) made of stainless steel, PTFE sealings, stainless steel screws with tube fitting 12 mm	U51
With enclosed manifold (5-fold) made of stainless steel, PTFE sealings, cadmium-plated steel screws with tube fitting 12 mm	U52

Selection and ordering data (continued)

	Order code
With enclosed manifold (5-fold) made of stainless steel, PTFE sealings, stainless steel screws with tube fitting 12 mm	U53
With enclosed manifold (5-fold) made of carbon steel, up to 300 °C cadmium-plated steel screws with tube fitting 12 mm	U56
Application data	
ID number of the primary element according to sizing tool	Y40

* For further options, please refer to SITRANS P320.

Scope of delivery

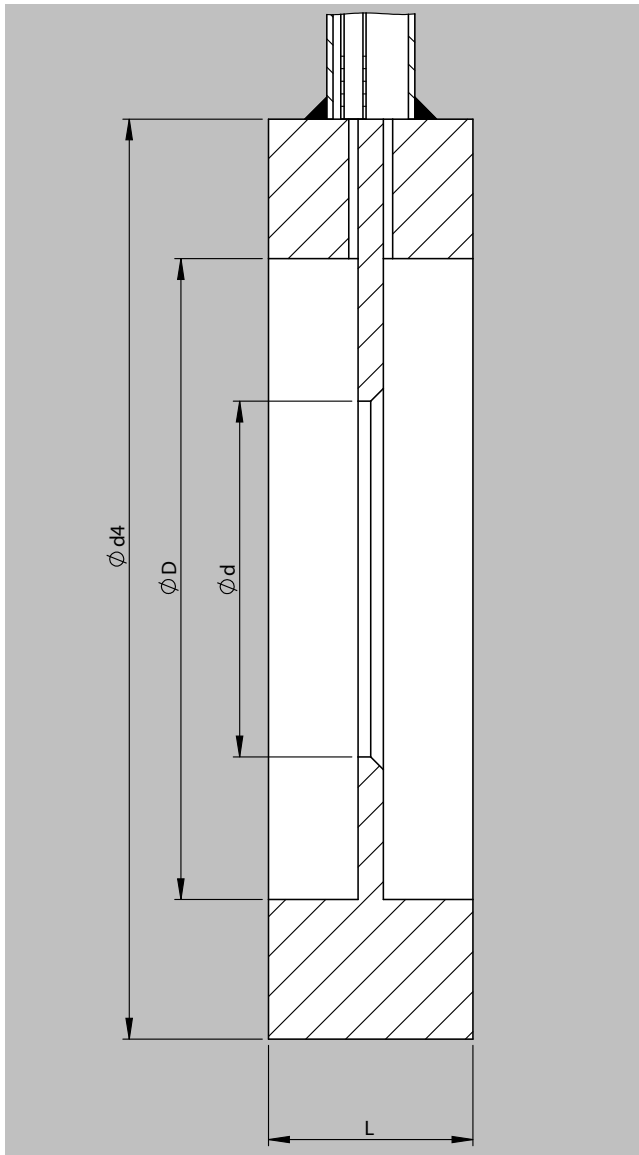
- Orifice with pressure tapping in carrier ring
- Condensation pots for steam applications
- Shut-off valves for remote design (options T5x selected in PIA)
- Manifold for compact/remote design (options U4x, U5x selected in PIA) incl. mounting brackets

Flow Measurement

SITRANS FP (differential pressure flow measurement)

SITRANS FP230/FPS200 primary elements (ISO 5167) / Standard orifice plate with corner pressure tapings

Dimensional drawings



L: Overall length 40 mm (65 mm for compact steam applications)

d: According to sizing calculation

D: According to inner diameter of pipe (sizing tool)

d4: See table below

Nominal size	Outer diameter d4 / Sealing face: flat						
	PN 6	PN 10	PN 16	PN 25	PN 40	PN 63	PN 100
DN 50	96	107	107	107	107	113	119
DN 65	116	127	127	127	127	138	144
DN 80	132	142	142	142	142	148	154
DN 100	152	162	162	168	168	174	180
DN 125	182	192	192	194	194	210	217
DN 150	207	218	218	224	224	247	257
DN 200	262	273	273	284	290	309	324
DN 250	317	328	329	340	352	364	391
DN 300	373	378	384	400	417	424	458
DN 350	423	438	444	457	474	486	512

Flow Measurement

SITRANS FP (differential pressure flow measurement)

SITRANS FP230/FPS200 primary elements (ISO 5167) / Standard orifice plate with corner pressure tapings

Dimensional drawings (continued)

Nominal size	Outer diameter d4 / Sealing face: flat						
	PN 6	PN 10	PN 16	PN 25	PN 40	PN 63	PN 100
DN 400	473	489	495	514	546	543	-
DN 500	578	594	617	624	628	-	-

Nominal size	Outer diameter d4 / Sealing face: flat		
	Class 150	Class 300	Class 600
2"	105	111	111
2,5"	124	130	130
3"	137	149	149
4"	175	181	194
5"	197	216	241
6"	222	251	267
8"	279	308	321
10"	340	362	400
12"	410	422	457
14"	451	486	492
16"	514	540	565
20"	549	597	613

Flow Measurement

SITRANS FP (differential pressure flow measurement)

SITRANS FP230/FPS200 primary elements (ISO 5167) / Standard orifice plate with annular chamber

Application



SITRANS FP230 compact design



SITRANS FPS200 remote design

Orifice plate with annular chamber pressure tapping in carbon or stainless steel for flow measurement of gas, steam and liquid.

Design

Annular chamber orifice plates consist of two rings pressed together, between which the orifice plate is clamped. The pressure is measured upstream and downstream through an annular chamber. The accuracy is comparable to that of the standard orifice plate.

Orifice plates with annular chamber tapplings consist of a two-piece carrier ring with annular chamber and integral tapplings and an inserted orifice plate. Pressure before and after the orifice is averaged through the annular chamber. Tapping connections are integrated into each part of the carrier ring. Differential pressure connection can be compact and remote. The instruments are easy to handle and offer good accuracy with reasonable inlet and outlet runs. They are installed between regular flanges. The orifice can be disassembled to replace the inserted orifice plate.

Nominal sizes

- EN: DN 50 ... 600
- ASME: 2 ... 24 inch

Nominal pressure

- EN: PN 6 ... 64 (for steam applications maximum of PN 16 is recommended)
- ASME: class 150 ... 600 (for steam applications maximum of class 150 is recommended)

Pressure tapping

- Annular chamber: Corner tapping through annular chamber

Connection length

- Suitable for gases and liquids for a maximum of approx. 80 mm pipe insulation
- Suitable for steam for a maximum of approx. 140 mm pipe insulation

Sealing face

- According to EN 1092-1: flat (for flanges type B1 and B2)
- According to ASME B16.5: flat (for flanges RF and SF)

Material

- Carrier ring: Carbon steel / orifice plate: 316L/1.4404
- Carrier ring: 316L/1.4404 / orifice plate: 316L/1.4404

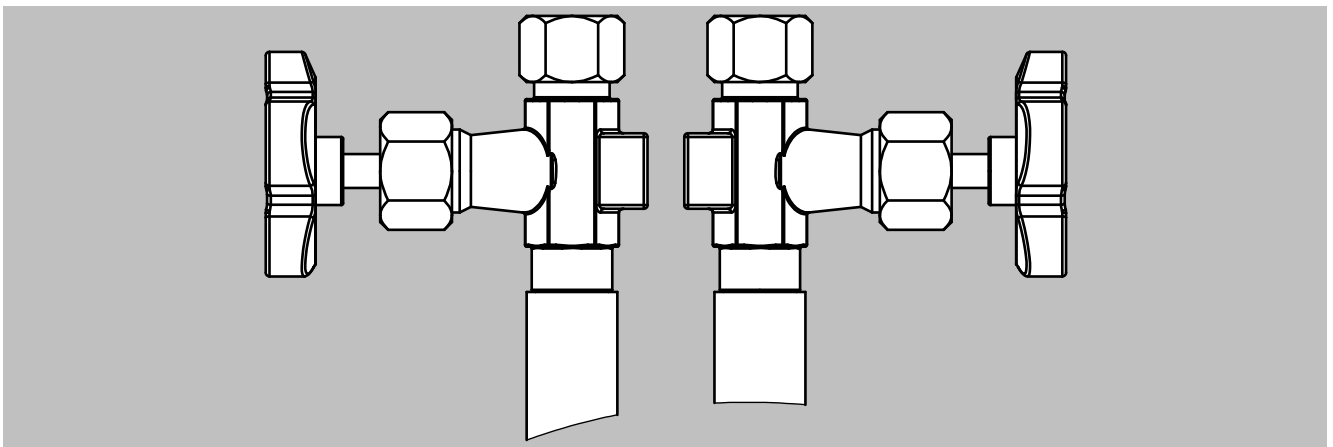
Gaskets

- Gas and liquids: Klingersil C4400
- Steam: Graphite with stainless steel inlay

Tapping sockets

Gases and liquids

Remote design



For annular chamber orifice plates in remote design, the angle α between the pressure tap depends on the pressure rating and the nominal size of the flanges.

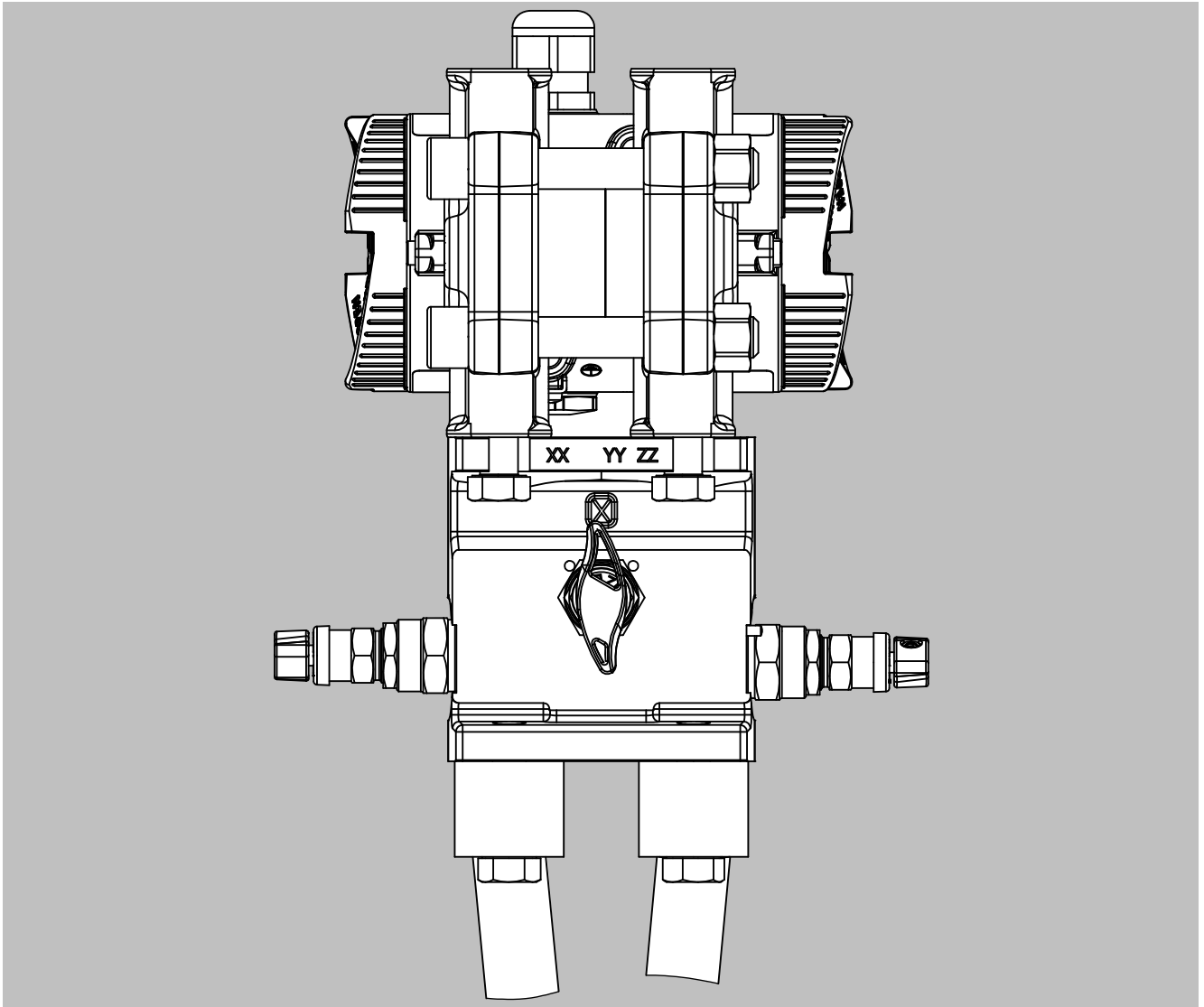
Flow Measurement

SITRANS FP (differential pressure flow measurement)

SITRANS FP230/FPS200 primary elements (ISO 5167) / Standard orifice plate with annular chamber

Design (continued)

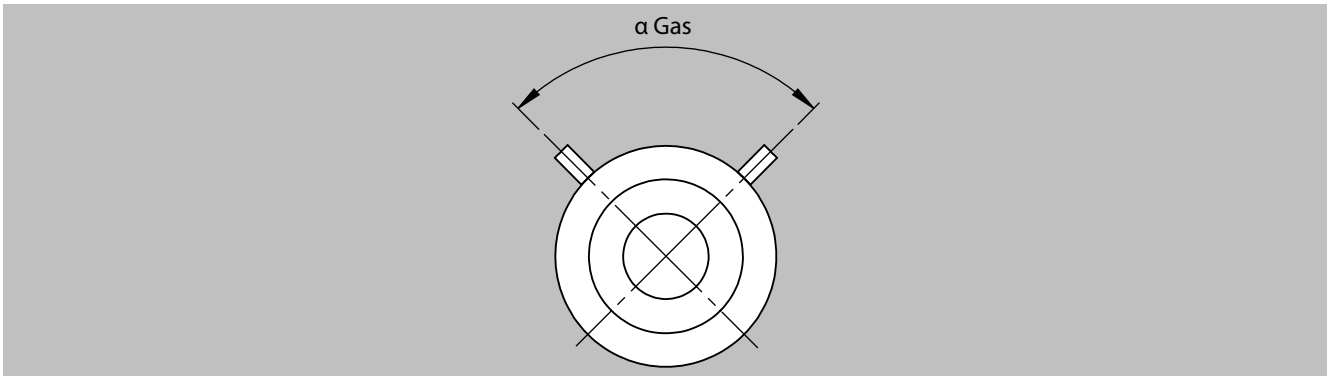
Compact design



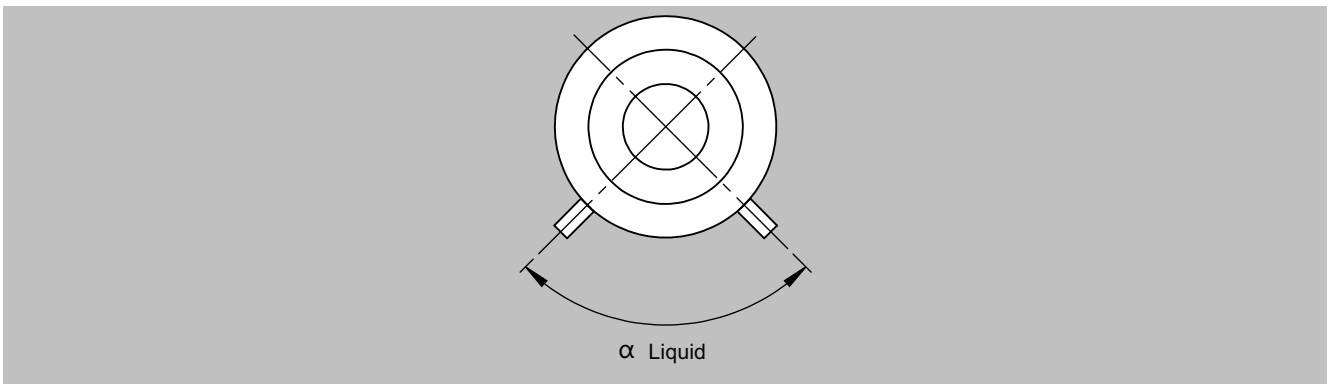
For annular chamber orifice plates in compact design, so-called oval flanges are used. The manifold and the differential pressure transmitter are mounted on these oval flanges.

Design (continued)

Tap position/angle in horizontal pipe



Tap position/angle in horizontal pipe (gas)



Tap position/angle in horizontal pipe (liquid)

Nominal size	DIN flange					
	PN 6	PN 10	PN 16	PN 25	PN 40	PN 64
DN 50	135	135	135	135	135	135
DN 65	135	135	135 ^{*)}	90	90	90
DN 80	135	90	90	90	90	90
DN 100	135	90	90	90	90	90
DN 125	90	90	90	90	90	90
DN 150	90	90	90	90	90	90
DN 175	90	90	90	60	60	60
DN 200	90	90	60	60	60	60
DN 250	60	60	60	60	60	60
DN 300	60	60	60	45	45	45
DN 350	60	45	45	45	45	45
DN 400	45	45	45	45	45	45
DN 450	45	36	36	36	-	-
DN 500	36	36	36	36	36	36

^{*)} Fitting for DN 65 PN 16 flange with 4 holes. If design for flange with 8 holes is required, please add a comment to the corresponding project within the sizing tool.

Flow Measurement

SITRANS FP (differential pressure flow measurement)

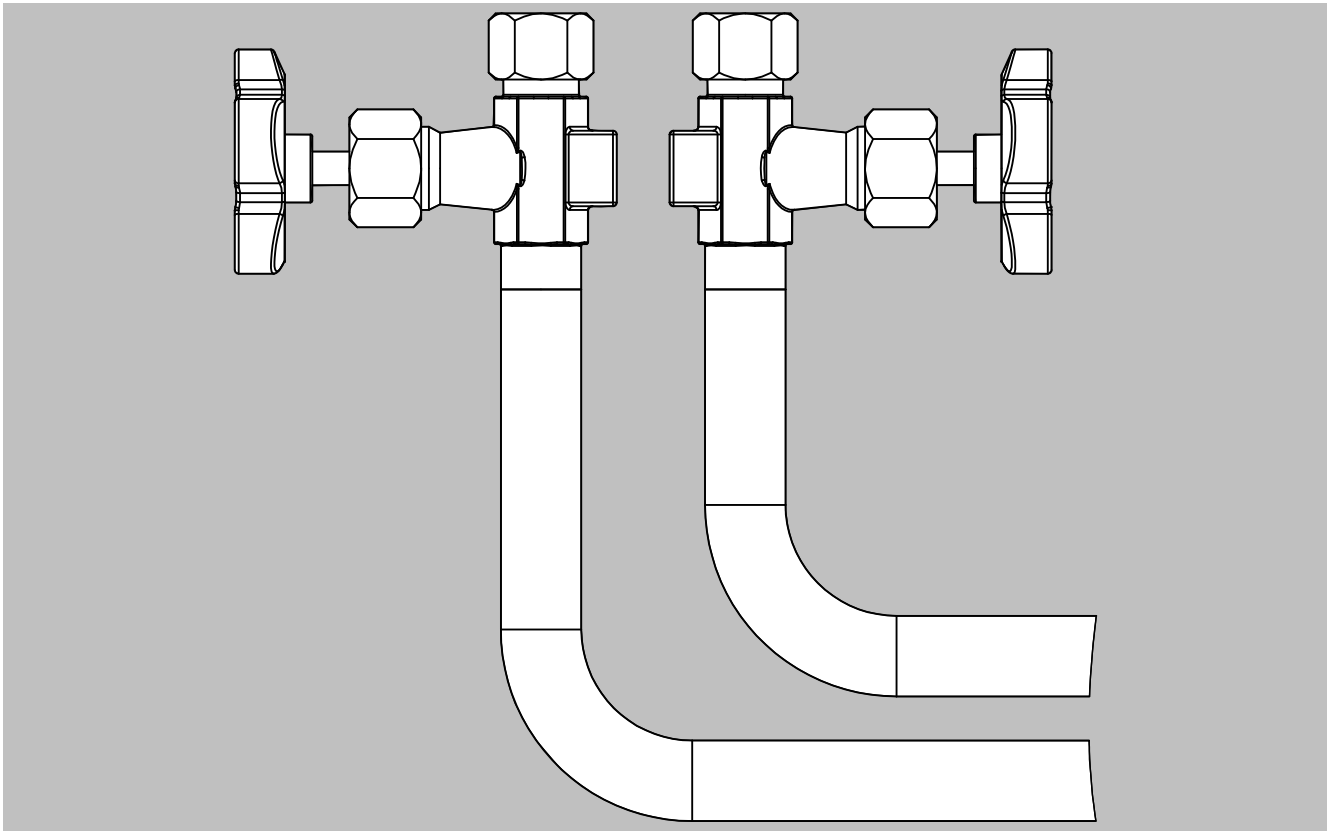
SITRANS FP230/FPS200 primary elements (ISO 5167) / Standard orifice plate with annular chamber

Design (continued)

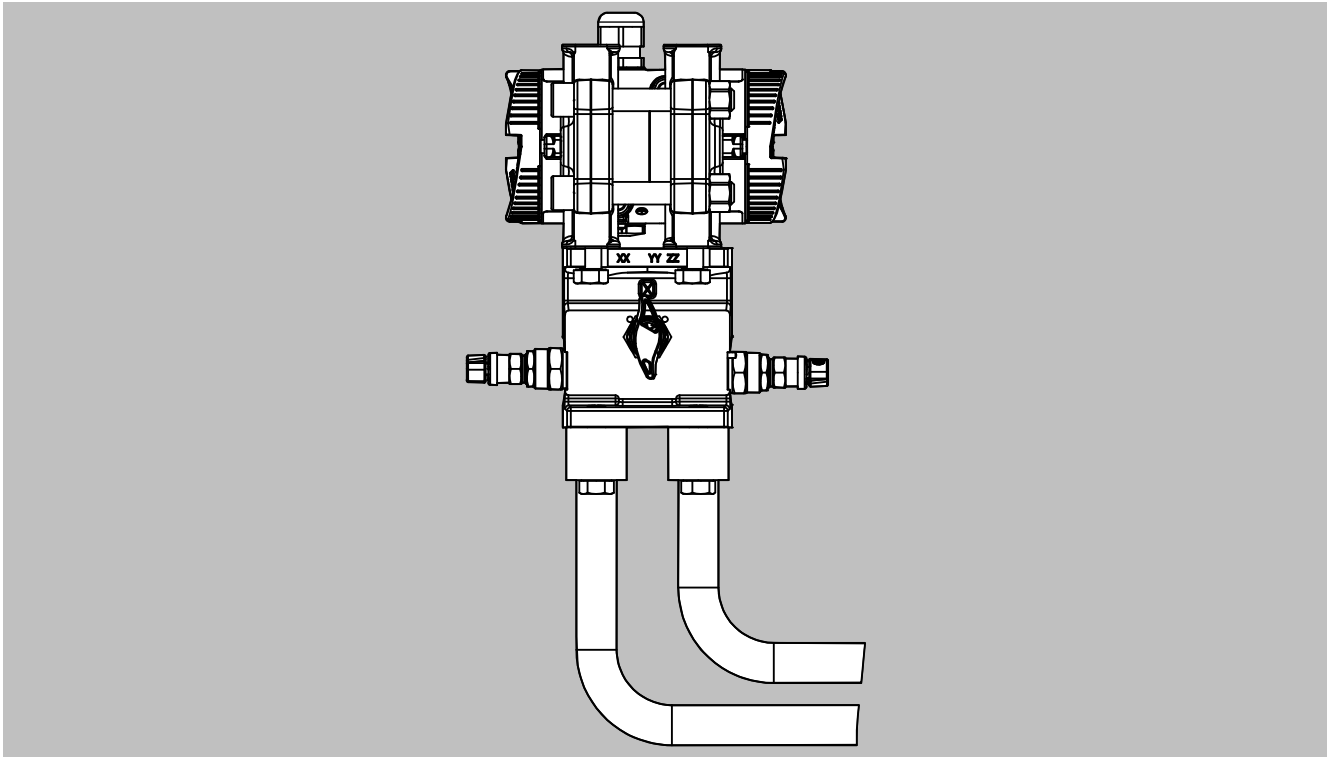
Nominal size	ANSI flange		
	Class 150	Class 300	Class 600
2"	135	90	90
2,5"	135	90	90
3"	135	90	90
4"	90	90	90
5"	90	90	90
6"	90	60	60
8"	90	60	60
10"	60	45	45
12"	60	45	36
14"	60	36	36
16"	45	36	36
18"	45	30	36
20"	36	30	30
22"	36	30	30
24"	36	30	30

Wet gases

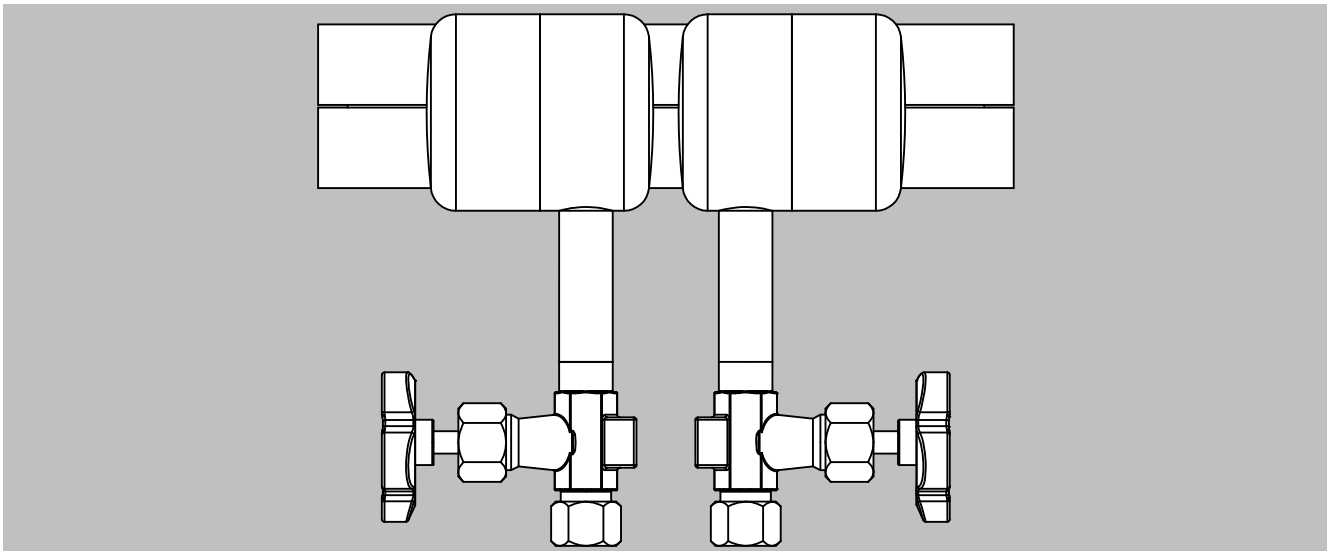
Remote design



For annular chamber orifice plates in remote design for wet gases, nozzles bent at right angles with welded-on valves are used. This design is only necessary **for vertical pipes**. For horizontal pipes, the design for gases and liquids can be selected because the nozzles point up as listed in the table above.

Design (continued)Compact design

For annular chamber orifice plates in compact design for wet gases, nozzles bent at right angles with oval flanges are used. The manifold and the differential pressure transmitter are mounted on these oval flanges. This design is only necessary **for vertical pipes**. For horizontal pipes, the design for gases and liquids can be selected because the flange plate with manifold and transmitter always points up.

SteamRemote design

For annular chamber orifice plates in remote design for steam, the condensate vessels with shut-off valves are mounted at an angle of 0°.

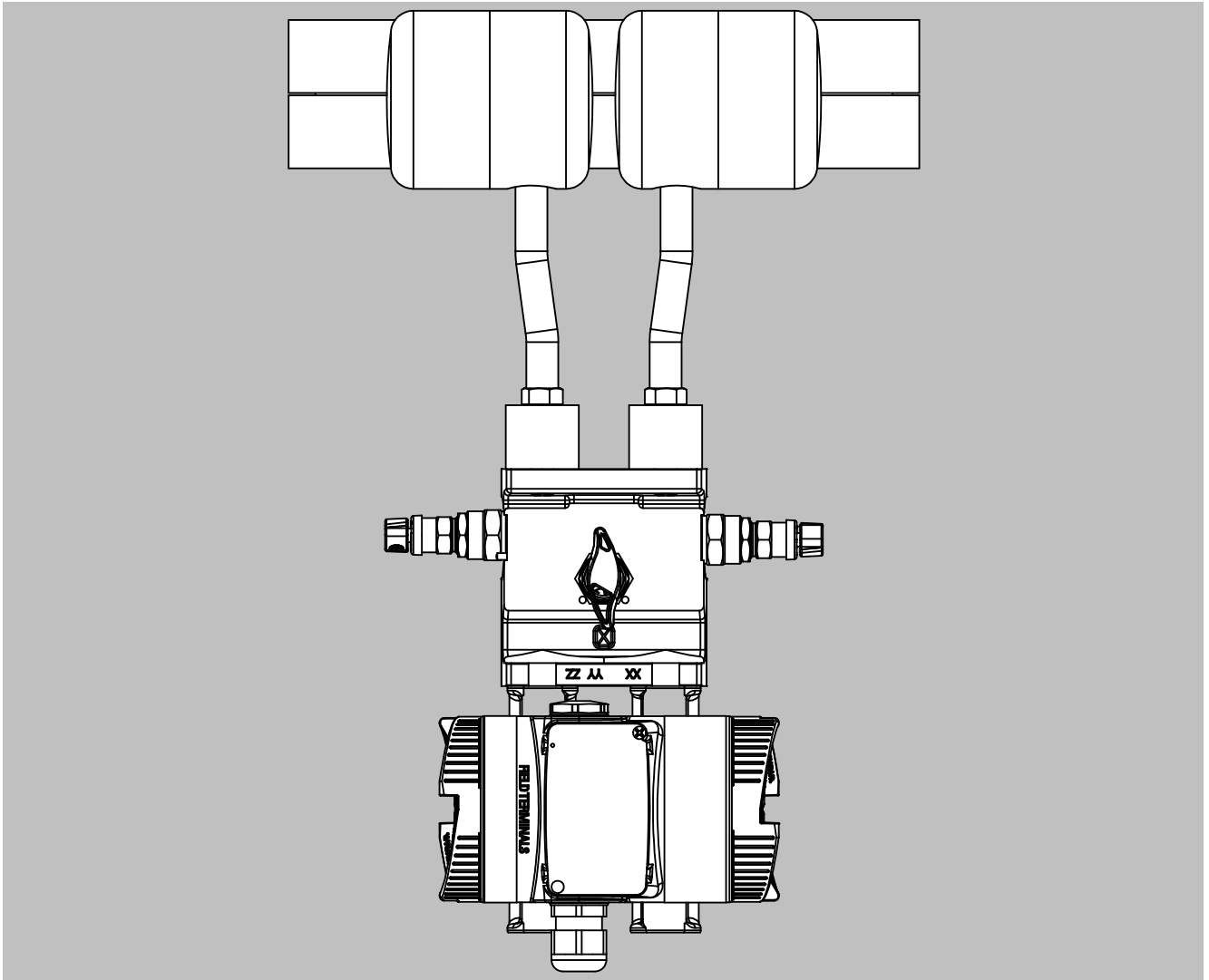
Flow Measurement

SITRANS FP (differential pressure flow measurement)

SITRANS FP230/FPS200 primary elements (ISO 5167) / Standard orifice plate with annular chamber

Design (continued)

Compact design



For annular chamber orifice plates in compact design for steam, the condensate vessels are mounted on one side. The manifold and the differential pressure transmitter are mounted to the condensate vessels using oval flanges. The condensate vessels are equipped with filling nozzles, which means a 3-way manifold can be used.

Flow Measurement

SITRANS FP (differential pressure flow measurement)

SITRANS FP230/FPS200 primary elements (ISO 5167) / Standard orifice plate with annular chamber

Selection and ordering data

SITRANS FP230/FPS200 standard orifice plate with annular chamber		Article No.	
		7ME172	● - ● ● ● ● 0 - ● ● ● ●
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.			
Communication			
HART (4 ... 20 mA)		0	
PROFIBUS PA		1	
FOUNDATION Fieldbus		2	
Without transmitter		8	
Nominal size			
DN 50 (2")		1	D
DN 65 (2½")		1	E
DN 80 (3")		1	F
DN 100 (4")		2	G
DN 125 (5")		2	H
DN 150 (6")		2	J
DN 200 (8")		2	K
DN 250 (10")		2	L
DN 300 (12")		2	M
DN 350 (14")		2	N
DN 400 (16")		2	P
DN 450 (18")		2	Q
DN 500 (20")		2	R
DN 600 (24")		2	S
Nominal pressure			
Flange EN 1092-1 type B1 PN 6			A
Flange EN 1092-1 type B1 PN 10			B
Flange EN 1092-1 type B1 PN 16			C
Flange EN 1092-1 type B1 PN 25			D
Flange EN 1092-1 type B1 PN 40			E
Flange EN 1092-1 type B1 PN 64			F
Flange ASME B16.5 Class 150			Q
Flange ASME B16.5 Class 300			R
Flange ASME B16.5 Class 600			S
Wetted part materials			
Carrier ring: Carbon steel / orifice plate: 316L/1.4404			2
Carrier ring: 316L/1.4404 / orifice plate: 316L/1.4404			3
System design			
Compact design for dry gases (horizontal and vertical pipes)			0
Compact design for liquids			1
Compact design for wet gases (only vertical pipes)			2
Compact design for steam			3
Remote design for dry gases			4
Remote design for liquids			5
Remote design for wet gases			6
Remote design for steam			7
Type of protection of pressure transmitter			
No Ex / without pressure transmitter			A
Intrinsic safety			B
Explosion proof			C
Intrinsic safety, Explosion proof			D
Dust ignition proof zone 21/22 (DIP), increased safety zone 2			L
Dust ignition proof zone 20/21/22 (DIP), increased safety zone 2			M
Intrinsic safety, Explosion proof, Dust ignition proof zone 21/22 (DIP), increased safety zone 2			S
Intrinsic safety, Explosion proof, Dust ignition proof zone 21/22 (DIP), increased safety zone 2, class division			T
Electrical connections/cable entries of pressure transmitter			
Without pressure transmitter			A
2 × M20 × 1.5			F
2 × 1/2-14 NPT			M
Local operation/display of pressure transmitter			
Without display (closed lid) / without pressure transmitter			0
With display (closed lid)			1

Flow Measurement

SITRANS FP (differential pressure flow measurement)

SITRANS FP230/FPS200 primary elements (ISO 5167) / Standard orifice plate with annular chamber

Selection and ordering data (continued)

SITRANS FP230/FPS200 standard orifice plate with annular chamber	Article No. 7ME172 ● - ● ● ● ● 0 - ● ● ● ●
With display (lid with glass window)	2

	Order code
Further designs*	
Please add "-Z" to Article No. and specify Order code(s) and plain text.	
Certificates of primary element incl. manifolds	
Inspection certificate of the primary element (EN 10204-3.1) - material of pressure-containing and wetted parts	C52
Factory certificate of the primary element (EN 10204-2.2) - wetted parts (MR 0175-2015)	C54
Dimensional record of the primary element	C55
Inspection certificate (DIN EN 571-1) - dye penetration test of weldings	C56
Hydrostatic pressure test of the primary element (EN 13480-5) of weldings	C58
Dimensional drawing 1:1 DWG of the primary element	C59
Maximum measuring span of pressure transmitter	
20 mbar (8.037 inH ₂ O)	I01
60 mbar (24.11 inH ₂ O)	I02
250 mbar (100.5 inH ₂ O)	I03
600 mbar (241.1 inH ₂ O)	I04
1600 mbar (643 inH ₂ O)	I05
Shut-off valves	
With mounted shut-off valves DN8 made of carbon steel, up to 300 °C with tube fitting 12 mm	T50
With mounted shut-off valves DN8 made of stainless steel, up to 300 °C with tube fitting 12 mm	T51
With mounted shut-off valves DN8 made of carbon steel, up to 300 °C and condensate vessel made of carbon steel with tube fitting 12 mm	T56
With mounted shut-off valves DN8 made of stainless steel, and condensate vessel made of stainless steel with tube fitting 12 mm	T57
Valve manifolds for mounting on primary element	
With mounted manifold (3-fold) made of stainless steel, PTFE sealings, cadmium-plated steel screws	U40
With mounted manifold (3-fold) made of stainless steel, PTFE sealings, stainless steel screws	U41
With mounted manifold (5-fold) made of stainless steel, PTFE sealings, cadmium-plated steel screws	U42
With mounted manifold (5-fold) made of stainless steel, PTFE sealings, stainless steel screws	U43
With mounted manifold (5-fold) made of carbon steel, up to 300 °C cadmium-plated steel screws and condensate vessel made of carbon steel	U46
With mounted manifold (3-fold) made of stainless steel, PTFE sealings, stainless steel screws and condensation vessels incl. filling union 1/2" NPT made of stainless steel	U47
With enclosed manifold (3-fold) made of stainless steel, PTFE sealings, cadmium-plated steel screws with tube fitting 12 mm	U50
With enclosed manifold (3-fold) made of stainless steel, PTFE sealings, stainless steel screws with tube fitting 12 mm	U51

Selection and ordering data (continued)

	Order code
With enclosed manifold (5-fold) made of stainless steel, PTFE sealings, cadmium-plated steel screws with tube fitting 12 mm	U52
With enclosed manifold (5-fold) made of stainless steel, PTFE sealings, stainless steel screws with tube fitting 12 mm	U53
With enclosed manifold (5-fold) made of carbon steel, up to 300 °C cadmium-plated steel screws with tube fitting 12 mm	U56
Application data	
ID number of the primary element according to sizing tool	Y40

* For further options, please refer to SITRANS P320.

Scope of delivery

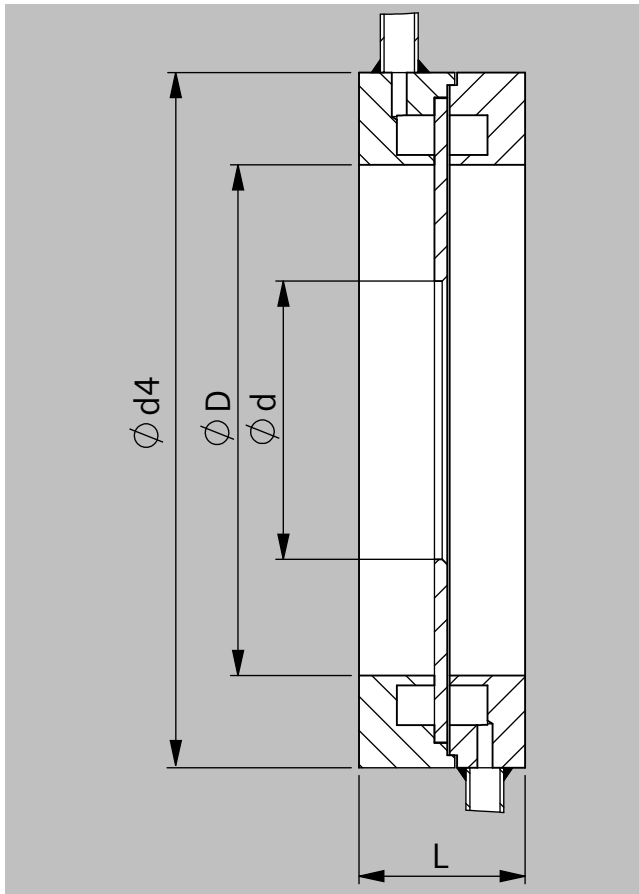
- Annular chamber consisting of two pieces, each with integrated pressure tapping
- Orifice plate mounted in annular chamber
- Gasket for annular chamber
- Condensation pots for steam applications
- Shut-off valves for remote design (options T5x selected in PIA)
- Manifold for compact/remote design (options U4x, U5x selected in PIA) incl. mounting brackets

Flow Measurement

SITRANS FP (differential pressure flow measurement)

SITRANS FP230/FPS200 primary elements (ISO 5167) / Standard orifice plate with annular chamber

Dimensional drawings



L: Overall length 65 mm

d: According to sizing calculation

D: According to inner diameter of pipe (sizing tool)

d4: See table below

Nominal size	Outer diameter d4 / Sealing face: flat						
	PN 6	PN 10	PN 16	PN 25	PN 40	PN 63	PN 100
DN 50	96	107	107	107	107	113	119
DN 65	116	127	127	127	127	138	144
DN 80	132	142	142	142	142	148	154
DN 100	152	162	162	168	168	174	180
DN 125	182	192	192	194	194	210	217
DN 150	207	218	218	224	224	247	257
DN 200	262	273	273	284	290	309	324
DN 250	317	328	329	340	352	364	391
DN 300	373	378	384	400	417	424	458
DN 350	423	438	444	457	474	486	512
DN 400	473	489	495	514	546	543	-
DN 500	578	594	617	624	628	-	-

Nominal size	Outer diameter d4 / Sealing face: flat		
	Class 150	Class 300	Class 600
2"	105	111	111
2,5"	124	130	130
3"	137	149	149
4"	175	181	194

Dimensional drawings (continued)

Nominal size	Outer diameter d4 / Sealing face: flat		
	Class 150	Class 300	Class 600
5"	197	216	241
6"	222	251	267
8"	279	308	321
10"	340	362	400
12"	410	422	457
14"	451	486	492
16"	514	540	565
20"	549	597	613

Flow Measurement

SITRANS FP (differential pressure flow measurement)

SITRANS FP230/FPS200 primary elements (ISO 5167) / Orifice meter run

Application



SITRANS FP230 compact design



SITRANS FPS200 remote design

Orifice meter run with flanges ends in carbon or stainless steel for flow measurement of gas, steam and liquid.

Design

Orifice meter runs for small diameter pipes come with partial straight inlet and outlet pipe runs with flanged ends. The pipes are connected to an annular chamber where the orifice plate is mounted. The annular chamber consists of a two-piece carrier ring with annular chamber and integral tapings and an inserted orifice plate.

Pressure before and after the orifice is averaged through the annular chamber. Tapping connections are integrated into each part of the carrier ring. Differential pressure connection can be compact and remote. The instruments are easy to install in the pipe system. Additional straight pipe length may be required before and after the orifice meter run. The orifice can be disassembled to replace the inserted orifice plate.

Nominal sizes

- EN: DN 10 ... 50
- ASME: 3/8 ... 2 inch

Nominal pressure

- EN: PN 6 ... 64
- ASME: class 150 ... 600

Pressure tapping

- Annular chamber: Corner tapping through annular chamber

Connection length

- Suitable for gases for a maximum of approx. 80 mm pipe insulation
- Suitable for steam for a maximum of approx. 140 mm pipe insulation

Sealing face

- According to EN 1092-1: flat (for flanges type B1 and B2)
- According to ASME B16.5: flat (for flanges RF and SF)

Material

- Pipe/Flanges: Carbon steel / orifice plate: 316L/1.4404
- Pipe/Flanges: 316L/1.4404 / orifice plate: 316L/1.4404

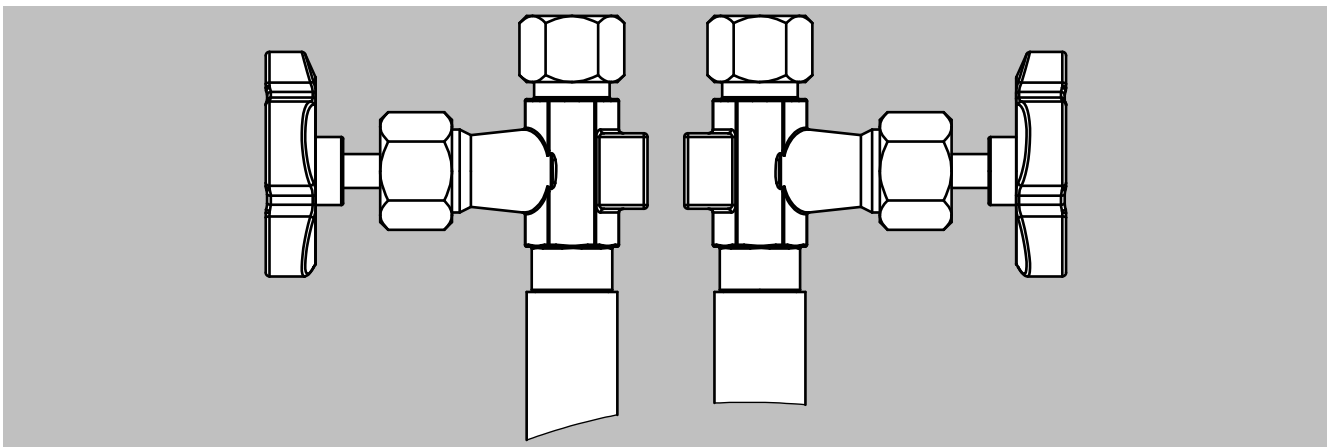
Gaskets

- Gas and liquids: Klingersil C4400
- Steam: Graphite with stainless steel inlay

Tapping sockets

Gases and liquids

Remote design



For metering pipes in remote design, the angle α between the pressure taps is 135°.

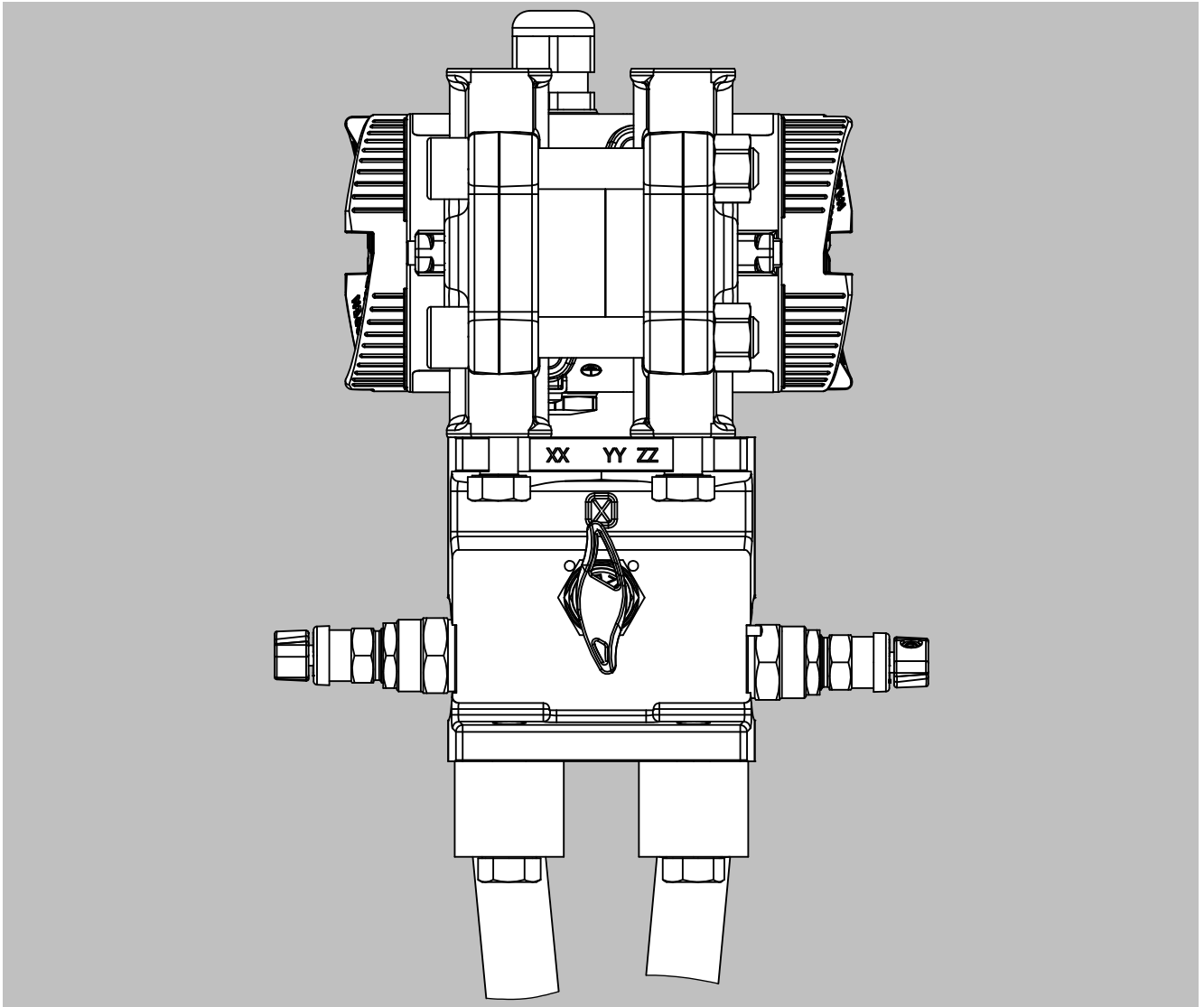
Flow Measurement

SITRANS FP (differential pressure flow measurement)

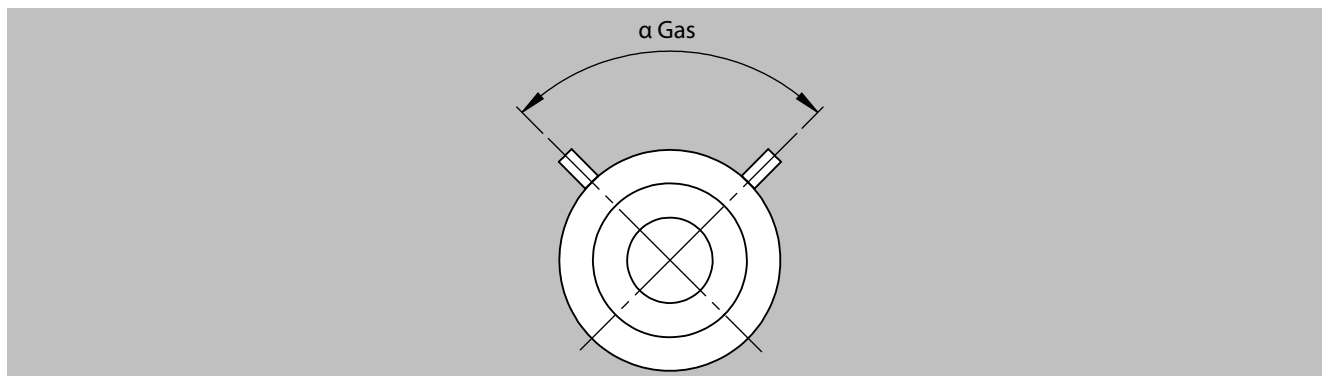
SITRANS FP230/FPS200 primary elements (ISO 5167) / Orifice meter run

Design (continued)

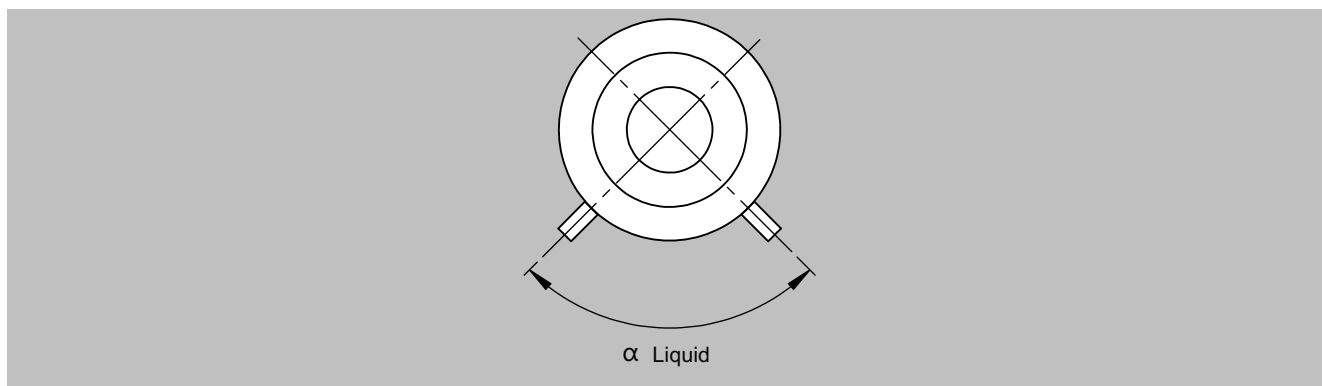
Compact design



For metering pipes in compact design, so-called oval flanges are used. The manifold and the differential pressure transmitter are mounted on these oval flanges.

Design (continued)Tap position/angle in horizontal pipe

Tap position/angle in horizontal pipe (gas)



Tap position/angle in horizontal pipe (liquid)

Flow Measurement

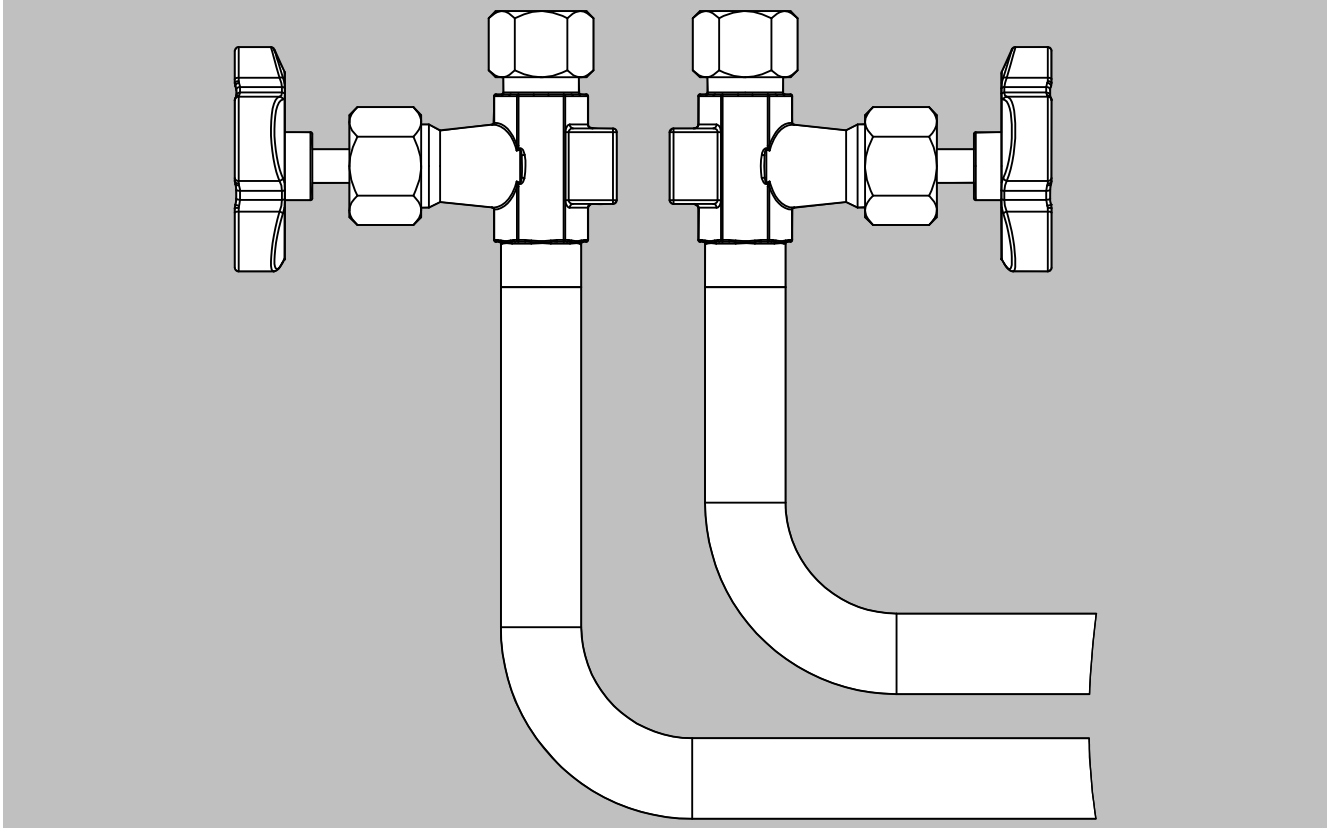
SITRANS FP (differential pressure flow measurement)

SITRANS FP230/FPS200 primary elements (ISO 5167) / Orifice meter run

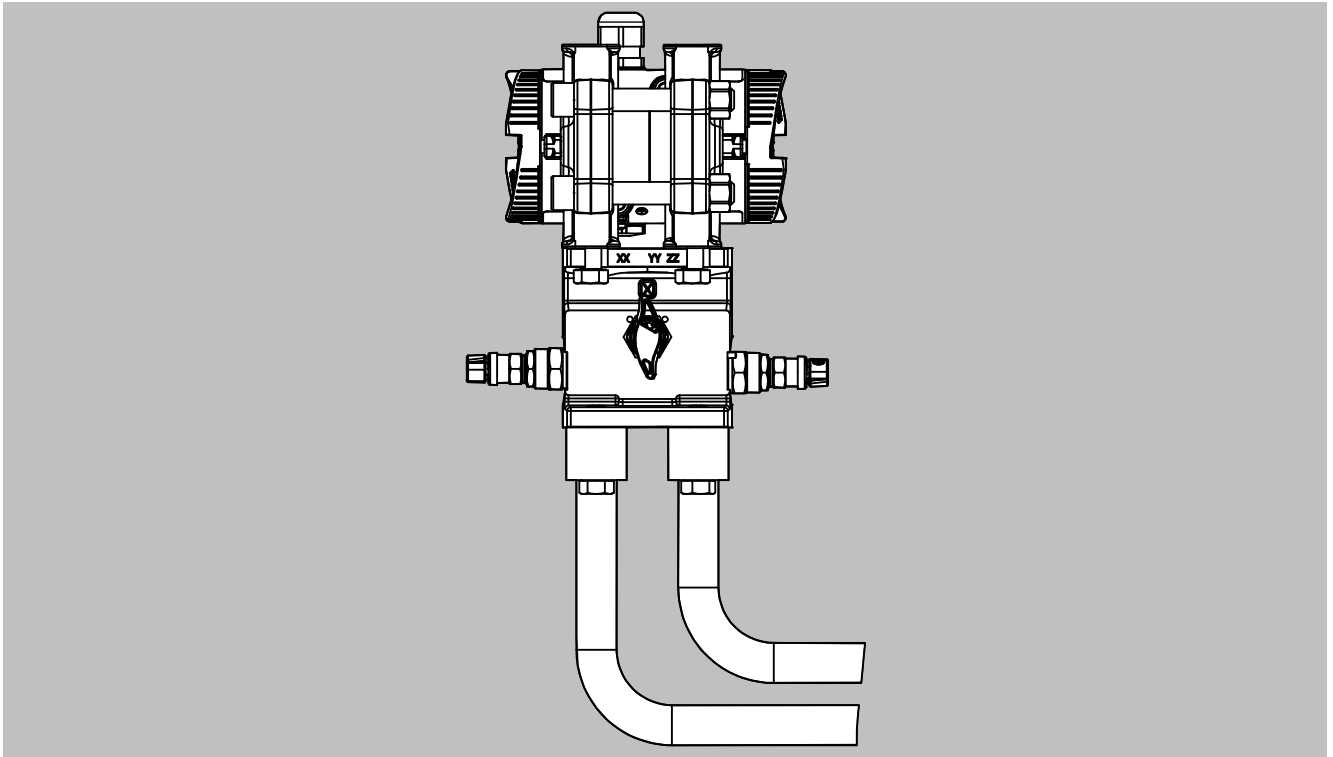
Design (continued)

Wet gases

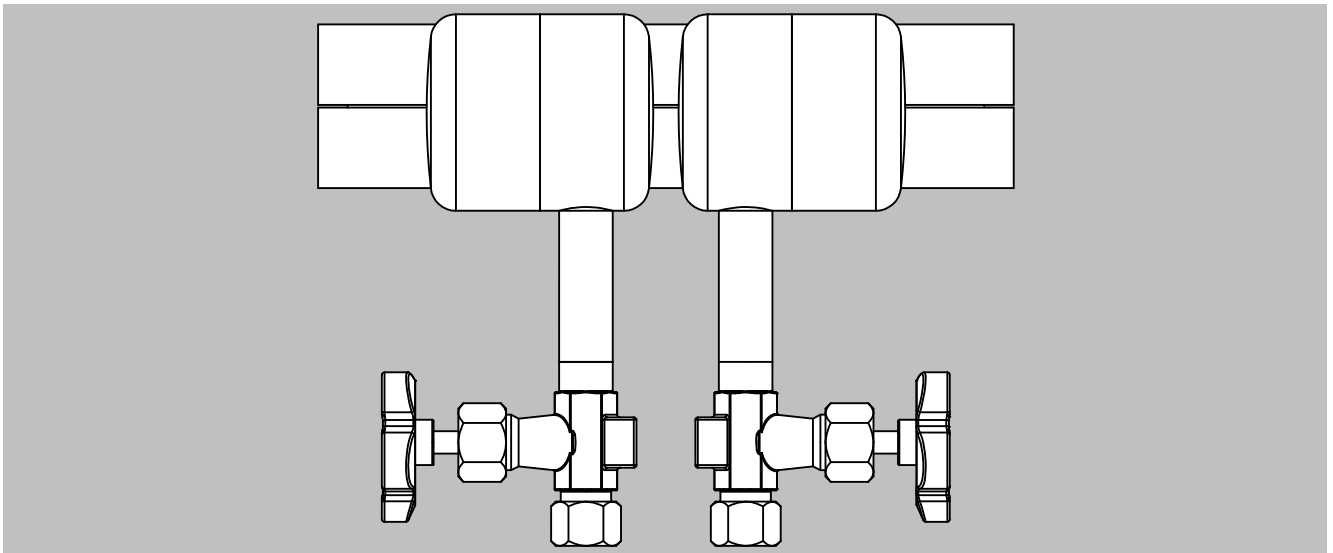
Remote design



For metering pipes in remote design for wet gases, nozzles bent at right angles with welded-on valves are used. This design is only necessary for vertical pipes. For horizontal pipes, the design for gases and liquids can be selected because the nozzles point up as listed in the table above.

Design (continued)Compact design

For metering pipes in compact design for wet gases, nozzles bent at right angles with oval flanges are used. The manifold and the differential pressure transmitter are mounted on these oval flanges. This design is only necessary for vertical pipes. For horizontal pipes, the design for gases and liquids can be selected because the flange plate with manifold and transmitter always points up.

SteamRemote design

For metering pipes in remote design for steam, the condensate vessels with shut-off valves are mounted at an angle of 180°.

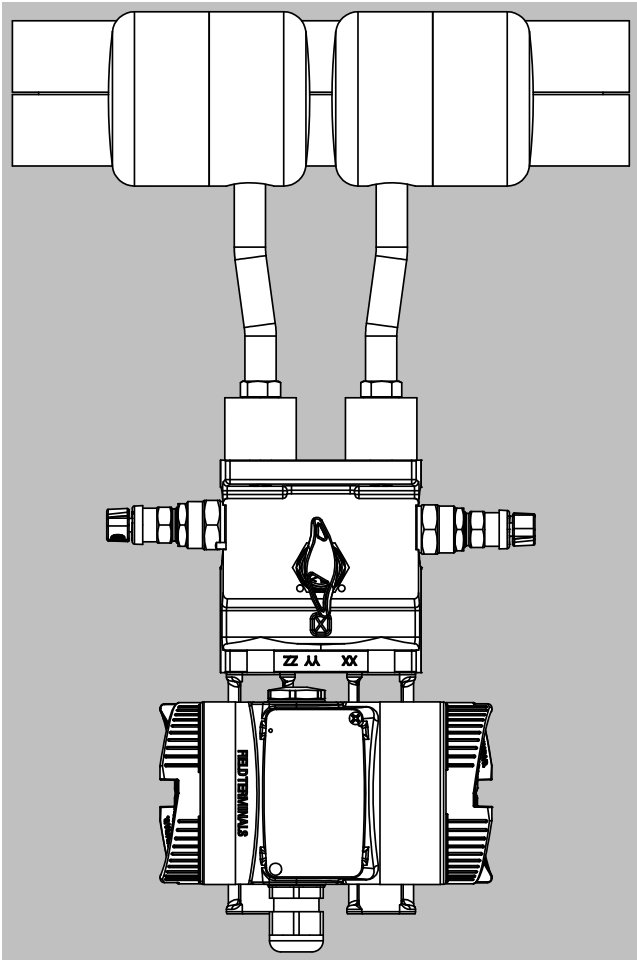
Flow Measurement

SITRANS FP (differential pressure flow measurement)

SITRANS FP230/FPS200 primary elements (ISO 5167) / Orifice meter run

Design (continued)

Compact design



For metering pipes in compact design for steam, the condensate vessels are mounted on one side. The manifold and the differential pressure transmitter are mounted to the condensate vessels using oval flanges. The condensate vessels are equipped with filling nozzles, which means a 3-way manifold can be used.

Flow Measurement

SITRANS FP (differential pressure flow measurement)

SITRANS FP230/FPS200 primary elements (ISO 5167) / Orifice meter run

Selection and ordering data

	Article No.
SITRANS FP230/FPS200 orifice meter run	7ME173 ● - ● ● ● ● 0 - ● ● ● ●
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	
Communication	
HART (4 ... 20 mA)	0
PROFIBUS PA	1
FOUNDATION Fieldbus	2
Without transmitter	8
Nominal size	
DN 10 (3/8")	0 A
DN 15 (1/2")	0 B
DN 20 (3/4")	0 C
DN 25 (1")	0 D
DN 32 (1 1/4")	0 E
DN 40 (1 1/2")	1 C
DN 50 (2")	1 D
Nominal pressure	
Flange EN 1092-1 type B1 PN 6	A
Flange EN 1092-1 type B1 PN 10	B
Flange EN 1092-1 type B1 PN 16	C
Flange EN 1092-1 type B1 PN 25	D
Flange EN 1092-1 type B1 PN 40	E
Flange EN 1092-1 type B1 PN 64	F
Flange ASME B16.5 Class 150	Q
Flange ASME B16.5 Class 300	R
Flange ASME B16.5 Class 600	S
Wetted parts material	
Pipe/Flanges: Carbon steel / orifice plate: 316L/1.4404	4
Pipe/Flanges: 316L/1.4404 / orifice plate: 316L/1.4404	5
System design	
Compact design for dry gases (horizontal and vertical pipes)	0
Compact design for liquids	1
Compact design for wet gases (only vertical pipes)	2
Compact design for steam	3
Remote design for dry gases	4
Remote design for liquids	5
Remote design for wet gases	6
Remote design for steam	7
Type of protection of pressure transmitter	
No Ex / without pressure transmitter	A
Intrinsic safety	B
Explosion proof	C
Intrinsic safety, Explosion proof	D
Dust ignition proof zone 21/22 (DIP), increased safety zone 2	L
Dust ignition proof zone 20/21/22 (DIP), increased safety zone 2	M
Intrinsic safety, Explosion proof, Dust ignition proof zone 21/22 (DIP), increased safety zone 2	S
Intrinsic safety, Explosion proof, Dust ignition proof zone 21/22 (DIP), increased safety zone 2, class division	T
Electrical connections/cable entries of pressure transmitter	
Without pressure transmitter	A
2 × M20 × 1.5	F
2 × 1/2-14 NPT	M
Local operation/display of pressure transmitter	
Without display (closed lid) / without pressure transmitter	0
With display (closed lid)	1
With display (lid with glass window)	2

Flow Measurement

SITRANS FP (differential pressure flow measurement)

SITRANS FP230/FPS200 primary elements (ISO 5167) / Orifice meter run

Selection and ordering data (continued)

	Order code
Further designs*	
Please add "-Z" to Article No. and specify Order code(s) and plain text.	
Certificates of primary element incl. manifolds	
Inspection certificate of the primary element (EN 10204-3.1) - material of pressure-containing and wetted parts	C52
Factory certificate of the primary element (EN 10204-2.2) - wetted parts (MR 0175-2015)	C54
Dimensional record of the primary element	C55
Inspection certificate (DIN EN 571-1) - dye penetration test of weldings	C56
Hydrostatic pressure test of the primary element (EN 13480-5) of weldings	C58
Dimensional drawing 1:1 DWG of the primary element	C59
Maximum measuring span of pressure transmitter	
20 mbar (8.037 inH ₂ O)	I01
60 mbar (24.11 inH ₂ O)	I02
250 mbar (100.5 inH ₂ O)	I03
600 mbar (241.1 inH ₂ O)	I04
1600 mbar (643 inH ₂ O)	I05
Shut-off valves	
With mounted shut-off valves DN8 made of carbon steel, up to 300 °C with tube fitting 12 mm	T50
With mounted shut-off valves DN8 made of stainless steel, up to 300 °C with tube fitting 12 mm	T51
With mounted shut-off valves DN8 made of carbon steel, up to 300 °C and condensate vessel made of carbon steel with tube fitting 12 mm	T56
With mounted shut-off valves DN8 made of stainless steel, and condensate vessel made of stainless steel with tube fitting 12 mm	T57
Valve manifolds for mounting on primary element	
With mounted manifold (3-fold) made of stainless steel, PTFE sealings, cadmium-plated steel screws	U40
With mounted manifold (3-fold) made of stainless steel, PTFE sealings, stainless steel screws	U41
With mounted manifold (5-fold) made of stainless steel, PTFE sealings, cadmium-plated steel screws	U42
With mounted manifold (5-fold) made of stainless steel, PTFE sealings, stainless steel screws	U43
With mounted manifold (5-fold) made of carbon steel, up to 300 °C cadmium-plated steel screws and condensate vessel made of carbon steel	U46
With mounted manifold (3-fold) made of stainless steel, PTFE sealings, stainless steel screws and condensation vessels incl. filling union 1/2" NPT made of stainless steel	U47
With enclosed manifold (3-fold) made of stainless steel, PTFE sealings, cadmium-plated steel screws with tube fitting 12 mm	U50
With enclosed manifold (3-fold) made of stainless steel, PTFE sealings, stainless steel screws with tube fitting 12 mm	U51
With enclosed manifold (5-fold) made of stainless steel, PTFE sealings, cadmium-plated steel screws with tube fitting 12 mm	U52
With enclosed manifold (5-fold) made of stainless steel, PTFE sealings, stainless steel screws with tube fitting 12 mm	U53
With enclosed manifold (5-fold) made of carbon steel, up to 300 °C cadmium-plated steel screws with tube fitting 12 mm	U56

Selection and ordering data (continued)

	Order code
Application data	
ID number of the primary element according to sizing tool	Y40

* For further options, please refer to SITRANS P320.

Scope of delivery

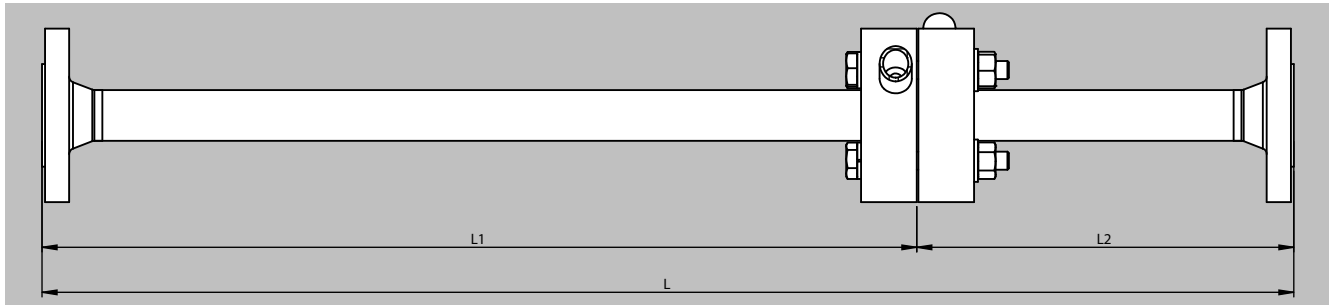
- Orifice meter run consisting of 2 parts, each with flanged ends, pipe, and annular chamber with integrated pressure tapping
- Orifice plate mounted in annular chamber
- Gasket for annular chamber
- Screws and nuts for annular chamber
- Condensation pots for steam applications
- Shut-off valves for remote design (options T5x selected in PIA)
- Manifold for compact/remote design (options U4x, U5x selected in PIA) incl. mounting brackets

Flow Measurement

SITRANS FP (differential pressure flow measurement)

SITRANS FP230/FPS200 primary elements (ISO 5167) / Orifice meter run

Dimensional drawings



Overall length

Nominal size	DN 10 3/8"	DN 15 1/2"	DN 20 3/4"	DN 25 1"	DN 32 1 1/4"	DN 40 1 1/2"	DN 50 2"
L	400	550	700	900	1100	1300	1500
L1	230	380	500	650	800	1000	1200
L2	170	170	200	250	300	300	300

Pipe dimensions

Carbon steel							
Nominal size	PN 16	PN 40	PN 63	Nominal size	Class 150	Class 300	Class 600
DN 10	21.3 × 6.3	21.3 × 6,3	21.3 × 6,3	3/8"	21.3 × 7.47 ¹⁾	21.3 × 7.47 ¹⁾	21.3 × 7.47 ¹⁾
DN 15	21.3 × 2.6	21.3 × 2.6	21.3 × 2.6	1/2"	21.3 × 3.73	21.3 × 3.73	21.3 × 3.73
DN 20	26.9 × 2.6	26.9 × 2.6	26.9 × 2.6	3/4"	26.7 × 2.87	26.7 × 2.87	26,7 × 2.87
DN 25	33.7 × 2.6	33,7 × 2.6	33,7 × 2.6	1"	33.4 × 3.38	33.4 × 3.38	33.4 × 3.38
DN 32	42.4 × 2.6	42.4 × 2.6	n/a	1 1/4"	42.2 × 3.56	42.2 × 3.56	42.2 × 3.56
DN 40	48.3 × 2.6	48.3 × 2.6	48.3 × 2.9	1 1/2"	48.3 × 3.68	48.3 × 3.68	48.3 × 3.68
DN 50	60.3 × 2.9	60.3 × 2.9	60.3 × 3.6	2"	60.3 × 3.91	60.3 × 3.91	60.3 × 3.91

Stainless steel							
Nominal size	PN 16	PN 40	PN 63	Nominal size	Class 150	Class 300	Class 600
DN 10	21.3 × 7.47	21.3 × 7.47	21.3 × 7.47	3/8"	21.3 × 2.77 ¹⁾	21.3 × 2.77 ¹⁾	21.3 × 2.77 ¹⁾
DN 15	21.3 × 2.77	21.3 × 2.77	21.3 × 3.73	1/2"	21.3 × 2.77	21.3 × 2.77	21.3 × 2.77
DN 20	26.7 × 2.87	26.7 × 2.87	26.7 × 3.91	3/4"	26.7 × 2.87	26.7 × 2.87	26.7 × 2.87
DN 25	33.4 × 3.38	33.4 × 3.38	33.4 × 3.38	1"	33.4 × 3.38	33.4 × 3.38	33.4 × 3.38
DN 32	42.2 × 3.56	42.2 × 3.56	n/a	1 1/4"	42.2 × 3.56	42.2 × 3.56	42.2 × 3.56
DN 40	48.3 × 2.77	48.3 × 2.77	48.3 × 3.68	1 1/2"	48.3 × 3.68	48.3 × 3.68	48.3 × 3.68
DN 50	60.3 × 3.91	60.3 × 3.91	60.3 × 3.91	2"	60.3 × 3.91	60.3 × 3.91	60.3 × 3.91

¹⁾ Orifice meter runs with 3/8" diameter will be built with 1/2" flanges.

Application



SITRANS FPS200 remote design

Orifice plate for installation between flanges in stainless steel for flow measurement of gas, steam and liquid.

Design

Orifice plates for the installation with flange tappings consist of the orifice plate with a welded-on marking and grip plate. The plates have no pressure tappings and are therefore normally mounted between measuring flanges containing the pressure tappings.

Pressure tapping

- Not included

Sealing face

- According to EN 1092-1: flat (for flanges type B1 and B2)
- According to ASME B16.5: flat (for flanges RF and SF)

Material

- 316L/1.4404

Flow Measurement

SITRANS FP (differential pressure flow measurement)

SITRANS FP230/FPS200 primary elements (ISO 5167) / Orifice plate

Selection and ordering data

SITRANS FP230/FPS200 orifice plate		Article No. 7ME174 ● - ● ● ● ● 0 - ● ● ● ●	
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.			
Communication			
HART (4 ... 20 mA)		0	
PROFIBUS PA		1	
FOUNDATION Fieldbus		2	
Without transmitter		8	
Nominal size			
DN 50 (2")		1	D
DN 65 (2½")		1	E
DN 80 (3")		1	F
DN 100 (4")		2	G
DN 125 (5")		2	H
DN 150 (6")		2	J
DN 200 (8")		2	K
DN 250 (10")		2	L
DN 300 (12")		2	M
DN 350 (14")		2	N
DN 400 (16")		2	P
DN 450 (18")		2	Q
DN 500 (20")		2	R
DN 600 (24")		2	S
Nominal pressure			
Flange EN 1092-1 type B1 PN 6			A
Flange EN 1092-1 type B1 PN 10			B
Flange EN 1092-1 type B1 PN 16			C
Flange EN 1092-1 type B1 PN 25			D
Flange EN 1092-1 type B1 PN 40			E
Flange EN 1092-1 type B1 PN 64			F
Flange EN 1092-1 type B1 PN 100			G
Flange ASME B16.5 Class 150			Q
Flange ASME B16.5 Class 300			R
Flange ASME B16.5 Class 600			S
Wetted parts material			
Orifice plate: 316L/1.4404			6
System design			
Without connection for pressure lines			8
Type of protection of pressure transmitter			
No Ex / without pressure transmitter			A
Intrinsic safety			B
Explosion proof			C
Intrinsic safety, Explosion proof			D
Dust ignition proof zone 21/22 (DIP), increased safety zone 2			L
Dust ignition proof zone 20/21/22 (DIP), increased safety zone 2			M
Intrinsic safety, Explosion proof, Dust ignition proof zone 21/22 (DIP), increased safety zone 2			S
Intrinsic safety, Explosion proof, Dust ignition proof zone 21/22 (DIP), increased safety zone 2, class division			T
Electrical connections/cable entries of pressure transmitter			
Without pressure transmitter			A
2 × M20 × 1.5			F
2 × 1/2-14 NPT			M
Local operation/display of pressure transmitter			
Without display (closed lid) / without pressure transmitter			0
With display (closed lid)			1
With display (lid with glass window)			2

Selection and ordering data (continued)

	Order code
Further designs*	
Please add "-Z" to Article No. and specify Order code(s) and plain text.	
Certificates of primary element incl. manifolds	
Inspection certificate of the primary element (EN 10204-3.1) - material of pressure-containing and wetted parts	C52
Factory certificate of the primary element (EN 10204-2.2) - wetted parts (MR 0175-2015)	C54
Dimensional record of the primary element	C55
Dimensional drawing 1:1 DWG of the primary element	C59
Maximum measuring span of pressure transmitter	
20 mbar (8.037 inH ₂ O)	I01
60 mbar (24.11 inH ₂ O)	I02
250 mbar (100.5 inH ₂ O)	I03
600 mbar (241.1 inH ₂ O)	I04
1600 mbar (643 inH ₂ O)	I05
Valve manifolds for mounting on primary element	
With enclosed manifold (3-fold) made of stainless steel, PTFE sealings, cadmium-plated steel screws with tube fitting 12 mm	U50
With enclosed manifold (3-fold) made of stainless steel, PTFE sealings, stainless steel screws with tube fitting 12 mm	U51
With enclosed manifold (5-fold) made of stainless steel, PTFE sealings, cadmium-plated steel screws with tube fitting 12 mm	U52
With enclosed manifold (5-fold) made of stainless steel, PTFE sealings, stainless steel screws with tube fitting 12 mm	U53
Application data	
ID number of the primary element according to sizing tool	Y40

* For further options, please refer to SITRANS P320.

Scope of delivery

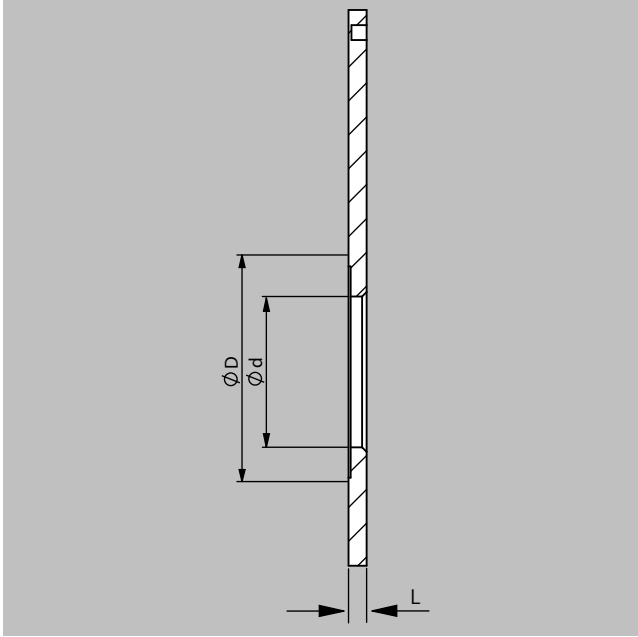
- Orifice plate
- Manifold for compact/remote design (options U4x, U5x selected in PIA) incl. mounting brackets

Flow Measurement

SITRANS FP (differential pressure flow measurement)

SITRANS FP230/FPS200 primary elements (ISO 5167) / Orifice plate

Dimensional drawings



L: Overall length

d: According to sizing calculation

D: According to inner diameter of pipe (sizing tool)

Nominal size of orifice plate

DIN/EN

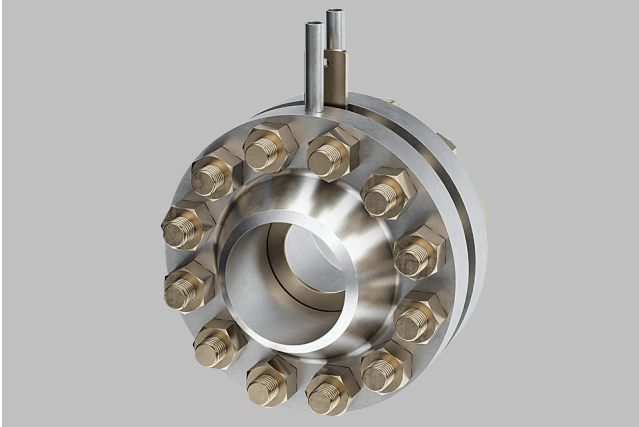
DN	Nominal size, up to														
	50	65	80	100	125	150	175	200	250	300	350	400	450	500	600
mm	3	3	4	4	4	4	4	4	4	4	4	4	4	6	6

ASME

DN	Nominal size, up to															
	2"	2,5"	3"	4"	5"	6"	7"	8"	10"	12"	14"	16"	18"	20"	22"	24"
mm	3	3	3	3	3	3	6	6	6	6	6	10	10	10	12	12

*) Not standardized in DIN standard.

Up to DN 50 adjusted for general practice. Nominal width designed for a differential pressure of up to 1000 mbar.

Application

SITRANS FPS200 remote design

Orifice flange pair according to ASME B16.36 with orifice plate in carbon steel (flanges) or stainless steel for flow measurement of gas and liquid.

Design

The orifice plate is mounted between traditional orifice flanges according to ASME B16.36. The orifice flanges are manufactured with integral pressure tappings. System design is always remote. The orifice plate can be exchanged. The flanges have to be welded into the pipe.

- Design of orifice plate, see Orifice plates

Differential pressure tapping

- In the flange: Differential pressure tapping in special measuring flanges with integrated connectors in the flange, always remote

Tapping sockets

- 0°

Connection length

- For gases and liquids suitable for up to approx. 80 mm pipe insulation

Sealing face

- According to ASME B16.5: flat

Materials

- Flange carbon steel, plate 316L
- Flange and plate 316L

Gaskets

- Spiral graphite

Flow Measurement

SITRANS FP (differential pressure flow measurement)

SITRANS FP230/FPS200 primary elements (ISO 5167) / Orifice plate with orifice flanges (ASME B16.36)

Selection and ordering data

SITRANS FP230/FPS200 orifice plate with orifice flanges		Article No. 7ME175 ● - ● ● ● ● 0 - ● ● ● ●	
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.			
Communication			
HART (4 ... 20 mA)		0	
PROFIBUS PA		1	
FOUNDATION Fieldbus		2	
Without transmitter		8	
Nominal size			
DN 50 (2")		1	D
DN 65 (2½")		1	E
DN 80 (3")		1	F
DN 100 (4")		2	G
DN 125 (5")		2	H
DN 150 (6")		2	J
DN 200 (8")		2	K
DN 250 (10")		2	L
DN 300 (12")		2	M
DN 350 (14")		2	N
DN 400 (16")		2	P
DN 450 (18")		2	Q
DN 500 (20")		2	R
DN 600 (24")		2	S
Nominal pressure			
Flange ASME B16.5 Class 300			R
Flange ASME B16.5 Class 600			S
Wetted parts material			
Flanges: Carbon steel / orifice plate: 316L/1.4404			7
Flanges: 316L/1.4404 / orifice plate: 316L/1.4404			8
System design			
Remote design for dry gases			4
Remote design for liquids			5
Remote design for wet gases			6
Type of protection of pressure transmitter			
No Ex / without pressure transmitter			A
Intrinsic safety			B
Explosion proof			C
Intrinsic safety, Explosion proof			D
Dust ignition proof zone 21/22 (DIP), increased safety zone 2			L
Dust ignition proof zone 20/21/22 (DIP), increased safety zone 2			M
Intrinsic safety, Explosion proof, Dust ignition proof zone 21/22 (DIP), increased safety zone 2			S
Intrinsic safety, Explosion proof, Dust ignition proof zone 21/22 (DIP), increased safety zone 2, class division			T
Electrical connections/cable entries of pressure transmitter			
Without pressure transmitter			A
2 × M20 × 1.5			F
2 × 1/2-14 NPT			M
Local operation/display of pressure transmitter			
Without display (closed lid) / without pressure transmitter			0
With display (closed lid)			1
With display (lid with glass window)			2

Order code	
Further designs*	
Please add "-Z" to Article No. and specify Order code(s) and plain text.	
Certificates of primary element incl. manifolds	
Inspection certificate of the primary element (EN 10204-3.1) - material of pressure-containing and wetted parts	C52
Factory certificate of the primary element (EN 10204-2.2) - wetted parts (MR 0175-2015)	C54

Selection and ordering data (continued)

	Order code
Dimensional record of the primary element	C55
Dimensional drawing 1:1 DWG of the primary element	C59
Maximum measuring span of pressure transmitter	
20 mbar (8.037 inH ₂ O)	I01
60 mbar (24.11 inH ₂ O)	I02
250 mbar (100.5 inH ₂ O)	I03
600 mbar (241.1 inH ₂ O)	I04
1600 mbar (643 inH ₂ O)	I05
Shut-off valves	
With mounted shut-off valves DN8 made of carbon steel, up to 300 °C with tube fitting 12 mm	T50
With mounted shut-off valves DN8 made of stainless steel, up to 300 °C with tube fitting 12 mm	T51
Valve manifolds for mounting on primary element	
With enclosed manifold (3-fold) made of stainless steel, PTFE sealings, cadmium-plated steel screws with tube fitting 12 mm	U50
With enclosed manifold (3-fold) made of stainless steel, PTFE sealings, stainless steel screws with tube fitting 12 mm	U51
With enclosed manifold (5-fold) made of stainless steel, PTFE sealings, cadmium-plated steel screws with tube fitting 12 mm	U52
With enclosed manifold (5-fold) made of stainless steel, PTFE sealings, stainless steel screws with tube fitting 12 mm	U53
Application data	
ID number of the primary element according to sizing tool	Y40

* For further options, please refer to SITRANS P320.

Scope of delivery

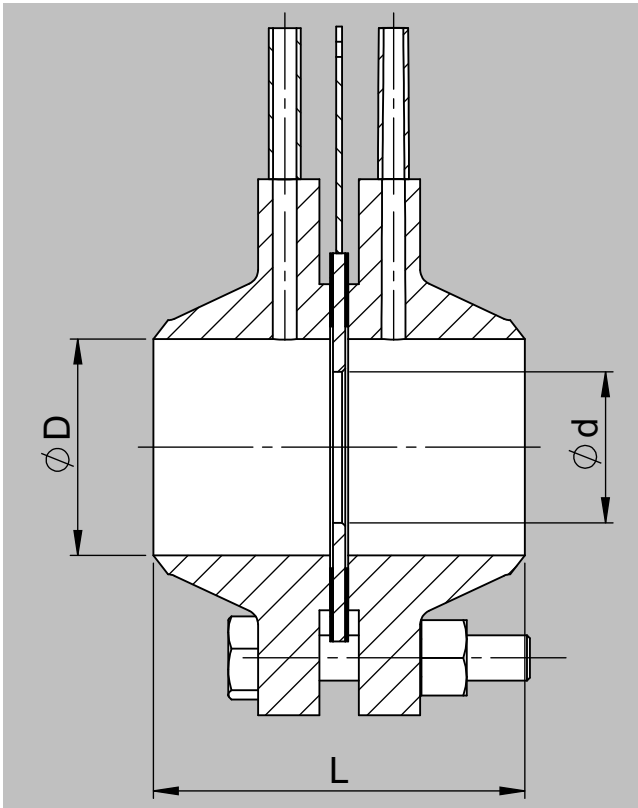
- Orifice plate
- Orifice flanges according to ASME B16.36 with pressure tapings
- 2× Gaskets for orifice flanges
- Screws and nuts
- Shut-off valves for remote design (options T5x selected in PIA)
- Manifold for compact/remote design (options U4x, U5x selected in PIA) incl. mounting brackets

Flow Measurement

SITRANS FP (differential pressure flow measurement)

SITRANS FP230/FPS200 primary elements (ISO 5167) / Orifice plate with orifice flanges (ASME B16.36)

Dimensional drawings



L: Overall length

d: According to sizing calculation

D: According to inner diameter of pipe (sizing tool)

Overall length

DN/Inch	PN/lbs	L	Hex nut bolt	Bolts (pcs.)	Gasket
24	600	433.10	1 7/8	24	2.0
20	600	407.70	1 5/8	24	2.0
18	600	395.00	1 5/8	20	2.0
16	600	382.30	1 1/2	20	2.0
14	600	352.90	1 3/8	20	2.0
12	600	333.60	1 1/4	20	2.0
10	600	327.50	1 1/4	16	2.0
8	600	286.40	1 1/8	12	2.0
6	600	254.40	1	12	2.0
4	600	222.90	7/8	8	2.0
3	600	184.80	3/4	8	2.0
2½	600	184.80	3/4	8	2.0
2	600	178.70	5/8	8	2.0
24	300	350.30	1 1/2	24	2.0
20	300	338.10	1 1/4	24	2.0
18	300	331.50	1 1/4	24	2.0
16	300	306.10	1 1/4	20	2.0
14	300	295.50	1 1/8	20	2.0
12	300	270.10	1 1/8	16	2.0
10	300	244.70	1	16	2.0
8	300	229.50	7/8	12	2.0

Dimensional drawings (continued)

DN/Inch	PN/lbs	L	Hex nut bolt	Bolts (pcs.)	Gasket
6	300	207.16	3/4	12	2.0
4	300	190.90	3/4	8	2.0
3	300	184.80	3/4	8	2.0
2½	300	184.80	3/4	8	2.0
2	300	178.70	5/8	4	2.0

Nominal size of orifice plate

DIN/EN

DN	Nominal size, up to														
	50	65	80	100	125	150	175	200	250	300	350	400	450	500	600
mm	3	3	4	4	4	4	4	4	4	4	4	4	4	6	6

ASME

DN	Nominal size, up to															
	2"	2.5"	3"	4"	5"	6"	7"	8"	10"	12"	14"	16"	18"	20"	22"	24"
mm	3	3	3	3	3	3	6	6	6	6	6	10	10	10	12	12

Nominal size designed for a differential pressure of up to 1000 mbar.

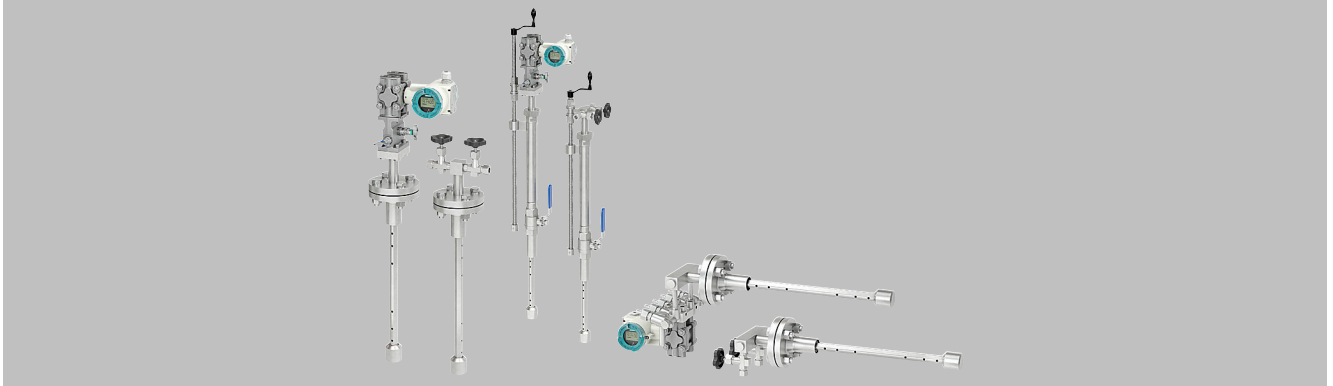
The specified dimensions are approximate dimensions, exact dimensions depend on the gasket used.

Flow Measurement

SITRANS FP (differential pressure flow measurement)

SITRANS FP330/FPS300 averaging pitot tube

Overview



Due to the robust technology and the simple principle of measurement, averaging pitot tubes can be used in many different ways even under difficult conditions and offer considerable advantages over other measuring technology from easy installation to long-term measuring stability.

Further special advantages are the possibilities of bidirectional flow measurement as well as the integration of temperature and pressure measurement.

Benefits

- Easy to retrofit (no rebuilding of the pipe)
- Easy to install
- Good for large nominal diameters
- Wide range of application (media, nominal diameters, process conditions)
- Minor measurement inaccuracy
- Special designs possible for special applications
- Also work in rectangular ducts and pipes

Application

- Technical Gases
- Compressed Air
- Exhaust Air
- Fresh and Combustion Air
- Heat Transfer Fluids
- Water
- Exhaust Gas
- Steam/Heat Quantities

Design

Basics: Averaging pitot tubes for flow measurement

- Mounting by insertion into the pipe (no flange-to-flange instrument)
- Differential pressure generation through forced flow
- Variation of the classic "pitot tube" through multiple metering orifices (so-called "averaging pitot tube")
- Design follows manufacturer guidelines, not standardized

Designs

- Averaging pitot tube for gases and liquids (7ME161)
- Averaging pitot tube for steam applications (7ME162)
- Averaging pitot tube with FASTLOK (7ME163), to remove sensor during operation without interruption of process

System design

- Compact design for dry gases and liquids without integrated temperature measurement
- Compact design for wet gases with or without integrated temperature measurement as well as for dry gases and liquids with integrated temperature measurement
- Compact design for steam with or without integrated temperature measurement
- Remote design for dry or wet gases, liquids and steam

Function

Design of the averaging pitot tube

Similar to other differential pressure devices averaging pitot tubes create a differential pressure to measure flow. They are not specified in the general standard ISO 5167, but they follow the same technical principle. In contrast to the classic primary elements, averaging pitot tubes are not "in-line" devices but consist of a "profile" that is inserted into the side of the pipeline.

Differential pressure is created when fluid flows around the profile of the averaging pitot tube. Since the constriction of the pipeline by the profile in relation to the cross-sectional area is much smaller than, for example, with an orifice plate, the created differential pressure and the respective permanent pressure drop are smaller.

The flow comes to a complete stop at the upstream side of the averaging pitot tube creating the upstream pressure. At the downstream side a negative pressure is created by the so-called Kármán vortex street. The differential pressure (difference between upstream pressure and negative pressure) is the measurement signal and is proportional to the flow rate. This results in the following basic formula for flow measurement with averaging pitot tubes:

$$q_m = A \cdot k \cdot \sqrt{2 \cdot \Delta p \cdot \rho}$$

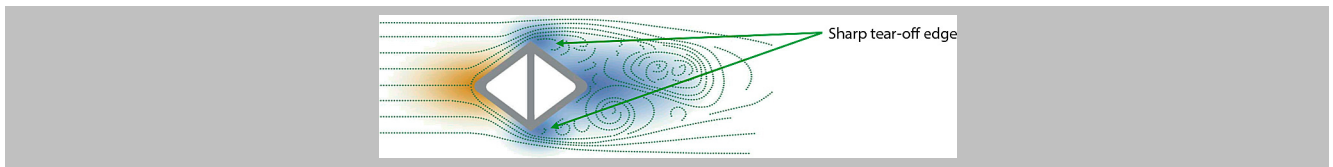
q_m : mass flow

A: cross-sectional area of the pipe

k: device factor of the pitot tube

Δp : differential pressure

ρ : density



The k-factor is the device factor of the averaging pitot tube and is determined, among other things, by the shape of the profile of the pitot tube. Thanks to the sharp-edged shape of the profile, it remains constant over a very wide Reynolds number range and enables linear flow measurement.

The averaging pitot tube features the same number of measuring openings on the front and back. The special distribution of the measuring openings over the cross section allows geometric averaging in case of uneven flow distribution and thus an accurate measurement even with very short inlet and outlet distances. The generated upstream and downstream pressures are averaged in the respective chambers and routed to the differential pressure transmitter.

Flow Measurement

SITRANS FP (differential pressure flow measurement)

SITRANS FP330/FPS300 averaging pitot tube

Technical specifications

SITRANS FP330/FPS300	
General design	
Working principle	Multi-port averaging pitot tube for round and rectangular pipes
Media	<ul style="list-style-type: none"> • Steam (saturated, superheated) • Gas (dry, up to 100% water saturated) (automatic purging unit for high dust applications on request) • Liquids (water, non-conductive liquids, oil, etc.)
Transmitter installation	<ul style="list-style-type: none"> • Compact mount with differential pressure transmitter • Remote mounted differential pressure transmitter
Bidirectional flow	Yes (symmetric sensor design)
Calculation	According to manufacturer standard
Accuracy	
Linearity (of Sensor k-Factor)	Re > 20 000: 1%
Repeatability (of Sensor k-Factor)	Re > 20 000: 0.1%
Measurement range	Typically, up to 1:10 (real measurement range depends on transmitter performance)
Operating conditions	
Pressure	Flange: Max. PN 100 Cutting Ring: Max. PN 40 (max. 180 °C) FASTLOK: Max. PN 16 (max. 180 °C) (higher pressure ratings on request)
Temperature	Stainless Steel sensor: -100 ... 500 °C 16Mo3: -20 ... 530 °C Alloy: -20 ... 700 °C (exact maximum temperature depends on sensor design, feasibility will be calculated by sizing tool)
Pressure loss	generally, <10% of differential pressure
Installation conditions	
Straight inlet diameter	7 × Inner diameter behind 90° elbow
Straight outlet diameter	3 × Inner diameter (for detailed calculation of recommended installation pipe length please refer to sizing tool or manual)
Design	
Material sensor	Standard: Stainless steel 1.4404/ AISI 316L Optional: 1.5415/16Mo3, Alloy C22 (other materials on request)
Diameter	40 ... 4000 mm (larger sensors on request)
Material mounting parts	Standard: Carbon steel Optional: Stainless Steel 1.4404 / AISI 316L (other materials on request)
Process connection	Flange EN 1092-1 B1 Flange ASME B16.5 RF Cutting Ring fitting FASTLOK (retractable design) (other process connections on request)
Thickness of pipe insulation	0 ... 200 mm
Approvals	
Hazardous area	(see differential pressure transmitter)
Enclosure rating	(see differential pressure transmitter)
Operational safety	(see differential pressure transmitter)
QAL1, SIRA	

Options

Further versions that are available on request:

- Weld-in sensor for high pressure steam
- Calibrated metering pipes
- FASTLOK with flange ball valve
- Etc.

More information

For more information please see the Installation Instructions and the Instruction Manuals SITRANS P on SIOS.

Accessories

Z-Options for Cable Glands, Plugs, Labeling, Approvals, blanking plugs, flangs seals, device settings, etc. according to SITRANS P320

Application



SITRANS FP330 compact design



SITRANS FPS300 remote design

These sensors are using the averaging pitot tube technology and can be used wherever flow rates of gases or liquids are to be measured.

Flow Measurement

SITRANS FP (differential pressure flow measurement)

SITRANS FP330/FPS300 averaging pitot tube / Averaging pitot tube for gases and liquids

Design

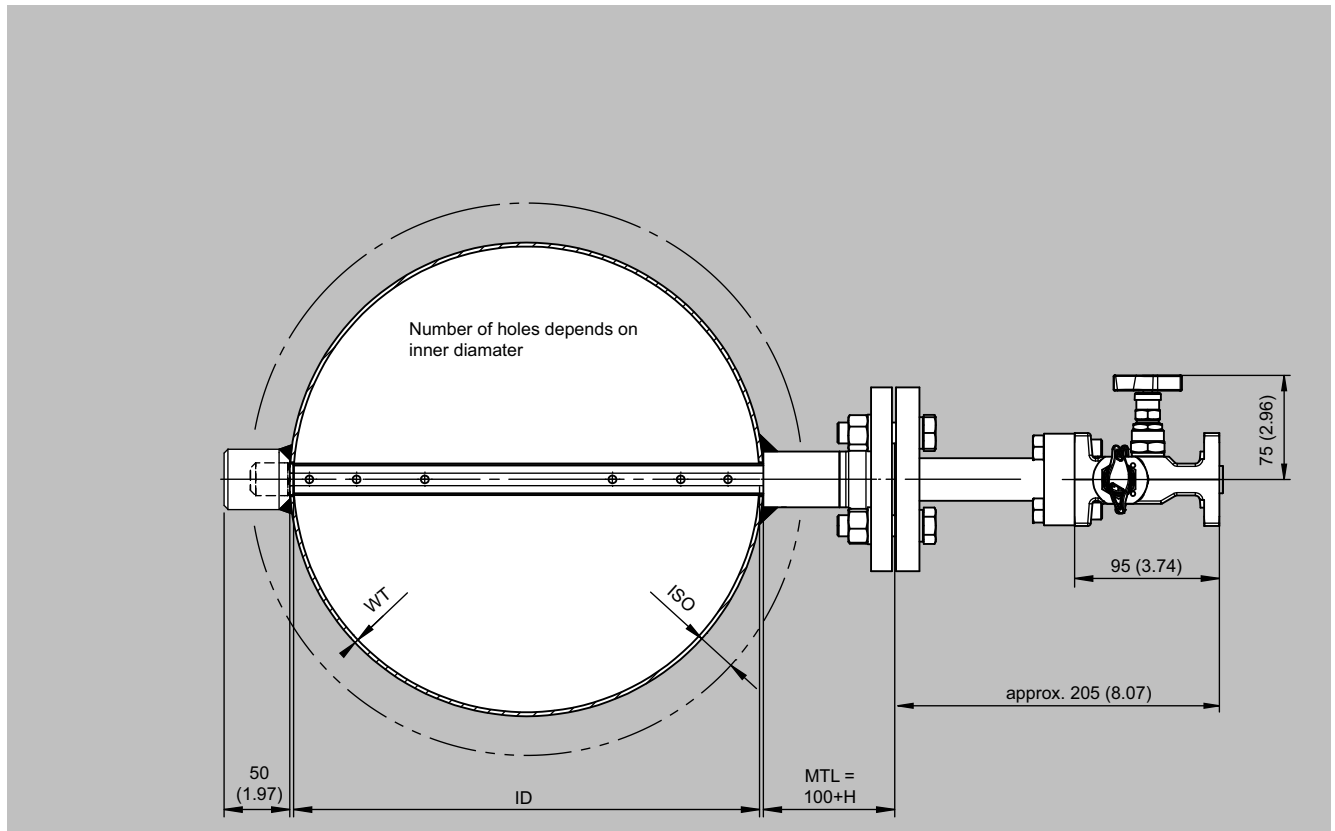
Mounting type

- Flange
- Cutting ring

Material: carbon steel, stainless steel

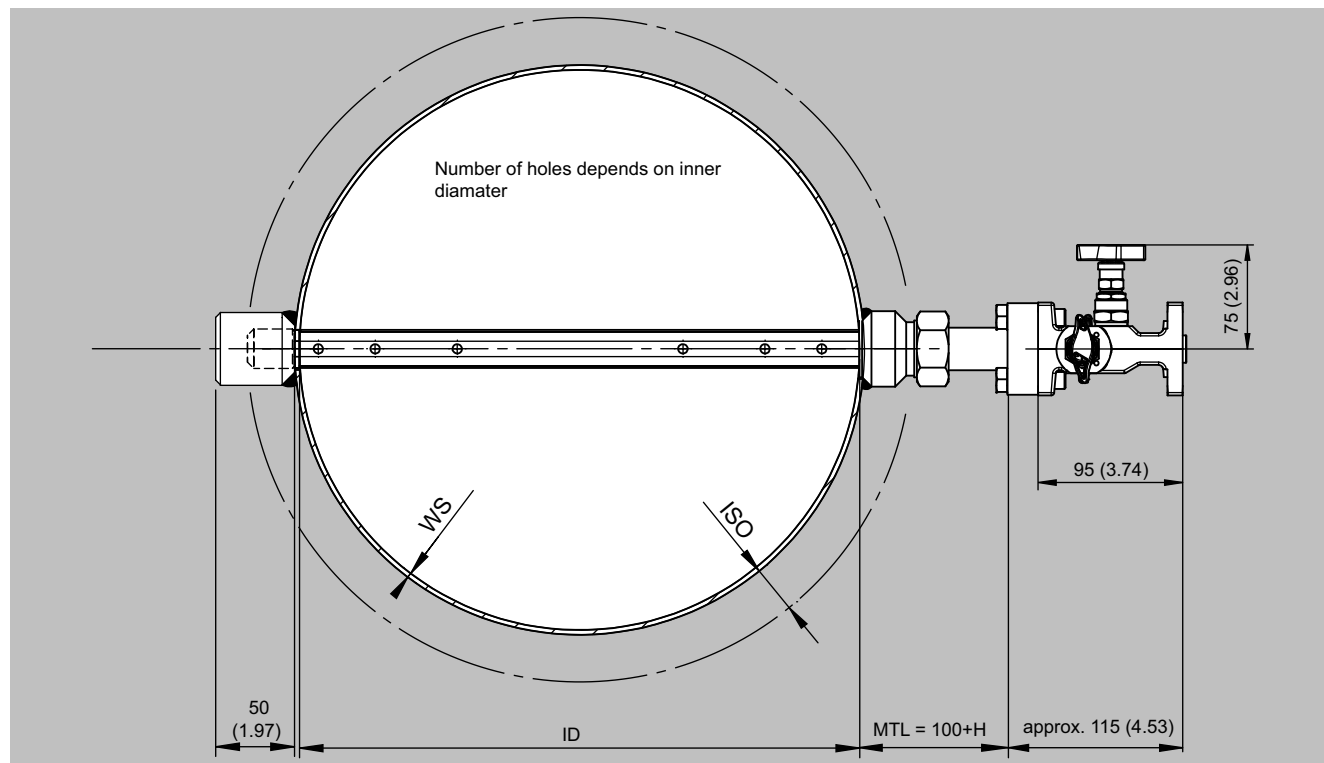
The averaging pitot tube can be mounted to pipes and ducts either with a traditional flange or a cutting ring fitting:

Flange mounting



Design (continued)

Cutting ring mounting



The required mounting components are always supplied together with the averaging pitot tube.

Flange mounting style can be applied to a large range of applications and is widely accepted. Cutting ring mounting style has a limited temperature and pressure range (see max. pressure and max. temperature below) but provides an economic alternative for simple flow measurement applications.

Dimensions of mounting parts

Flange mounting	Profile 10	Profile 22	Profile 32	Profile 50
PN 16	-	-	-	DN 80
PN 40	DN 15	DN 32	DN 40	On request
PN 100	DN 25	DN 40	DN 40	On request
Class 150	½"	1 ¼"	1 ½"	3"
Class 300	½"	1 ¼"	1 ½"	On request
Class 600	1"	1 ½"	1 ½"	On request

Cutting ring mounting	Profile 10	Profile 22
PN 40	M22	M36

Standard lengths of mounting parts (MTL)

Profile 10	Profile 22	Profile 32	Profile 50
80 mm	100 mm	100 mm	120 mm

Mounting part length can be increased based on thermal pipe insulation in 50 mm steps (H).

System design of differential pressure connection

The differential pressure transmitter can be installed in compact design (at the averaging pitot tube) or in remote design.

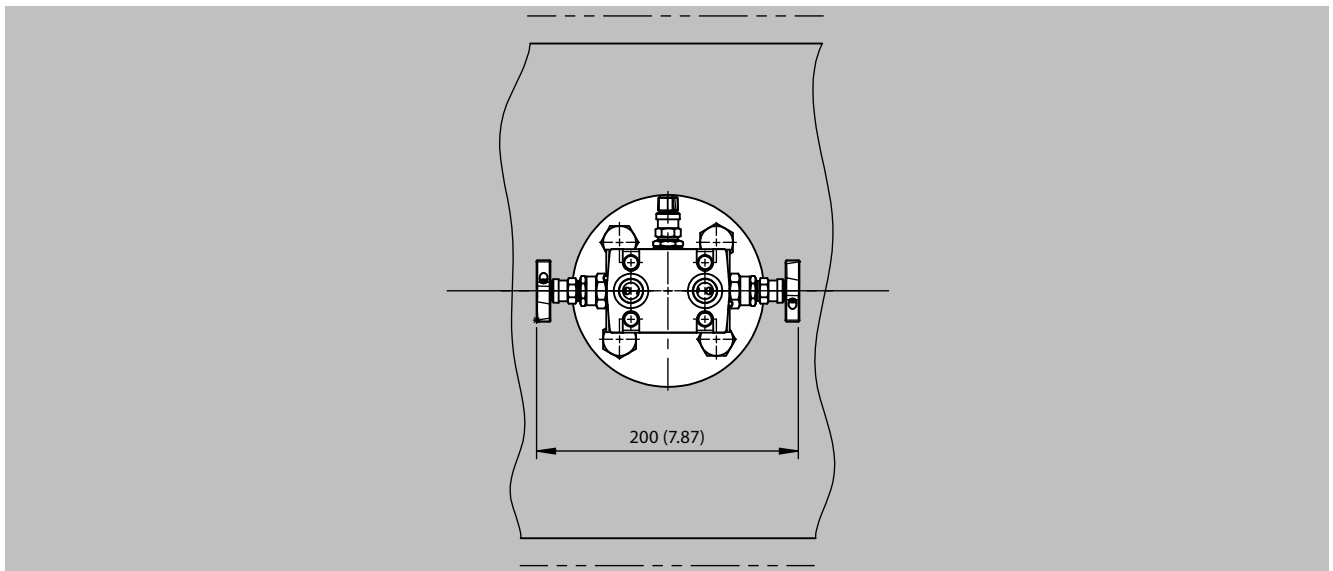
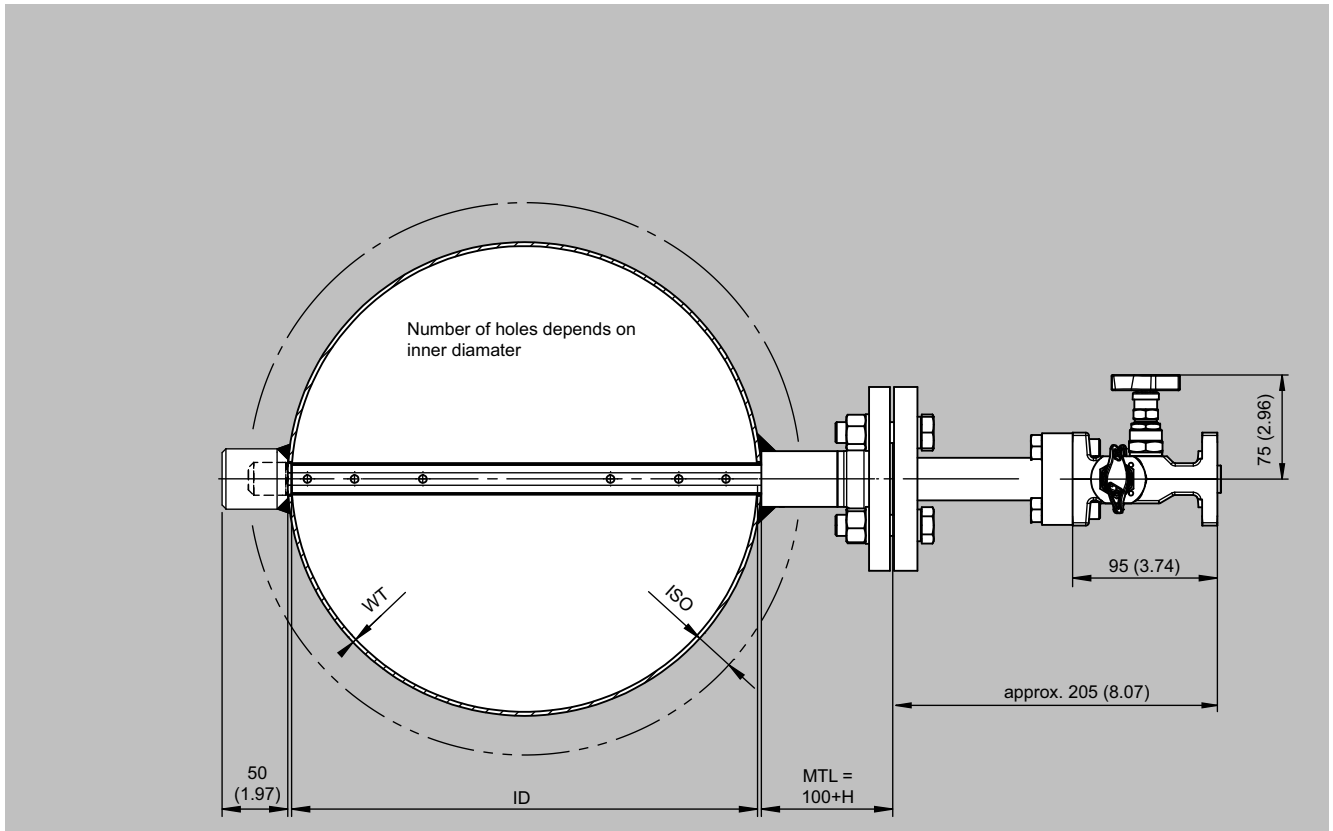
Flow Measurement

SITRANS FP (differential pressure flow measurement)

SITRANS FP330/FPS300 averaging pitot tube / Averaging pitot tube for gases and liquids

Design (continued)

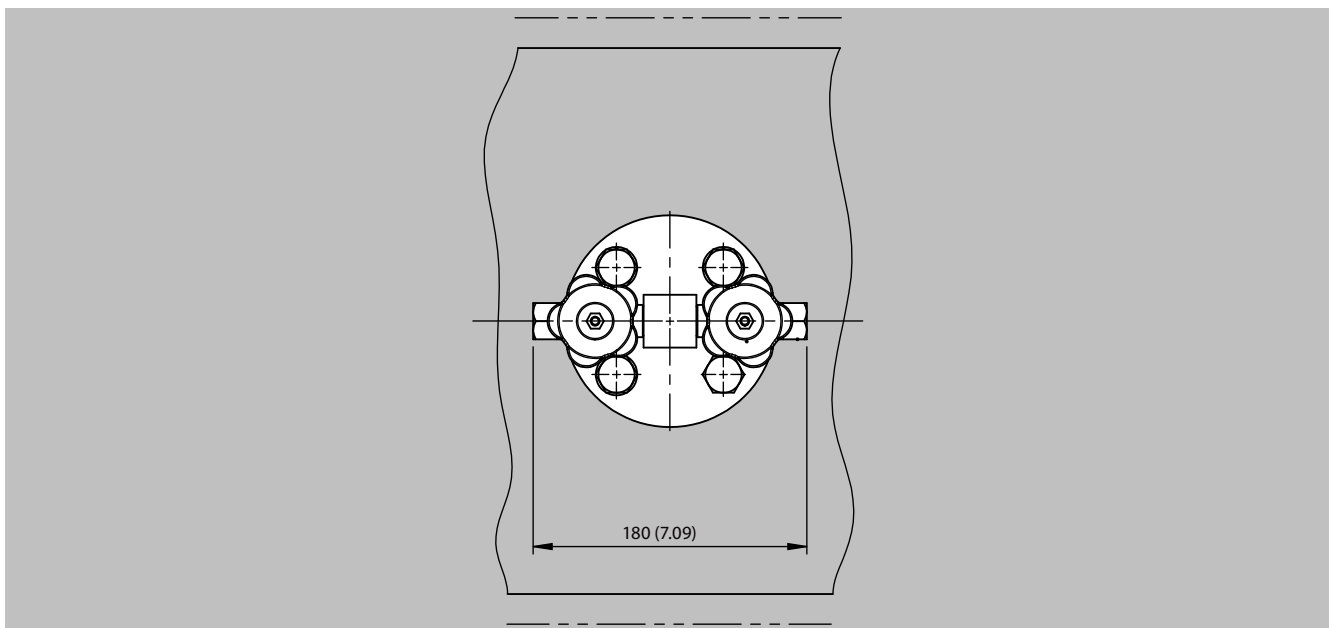
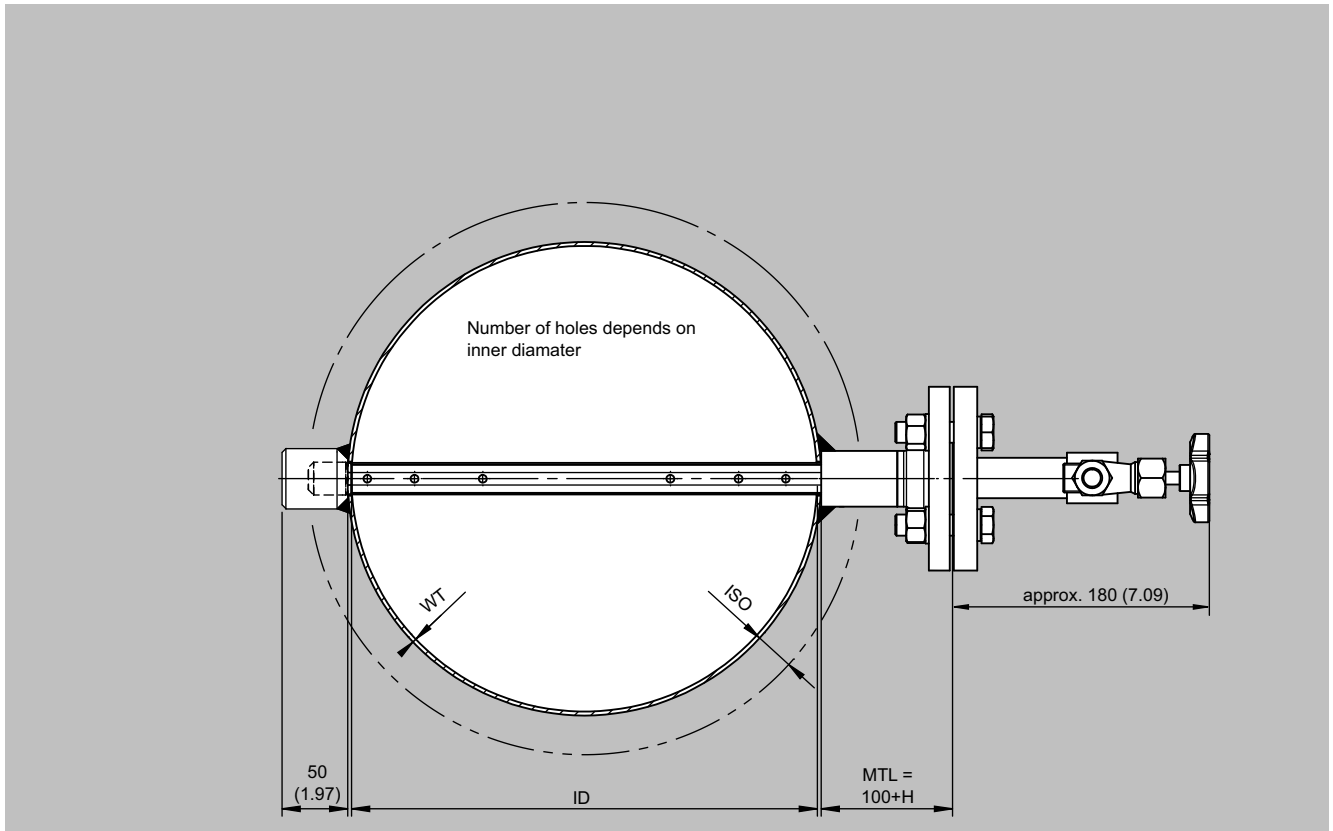
Gas and liquid application, compact design



For gas and liquid applications with compact design the averaging pitot tube is equipped with a traditional flange plate to mount manifold and differential pressure transmitter directly at the sensor.

Design (continued)

Gas and liquid application, remote design



For gas and liquid applications with remote design the averaging pitot tube is equipped with valves mounted directly to the sensor. Impulse pressure piping (not supplied) has to be installed from the valves to the remote mounted manifold and differential pressure transmitter.

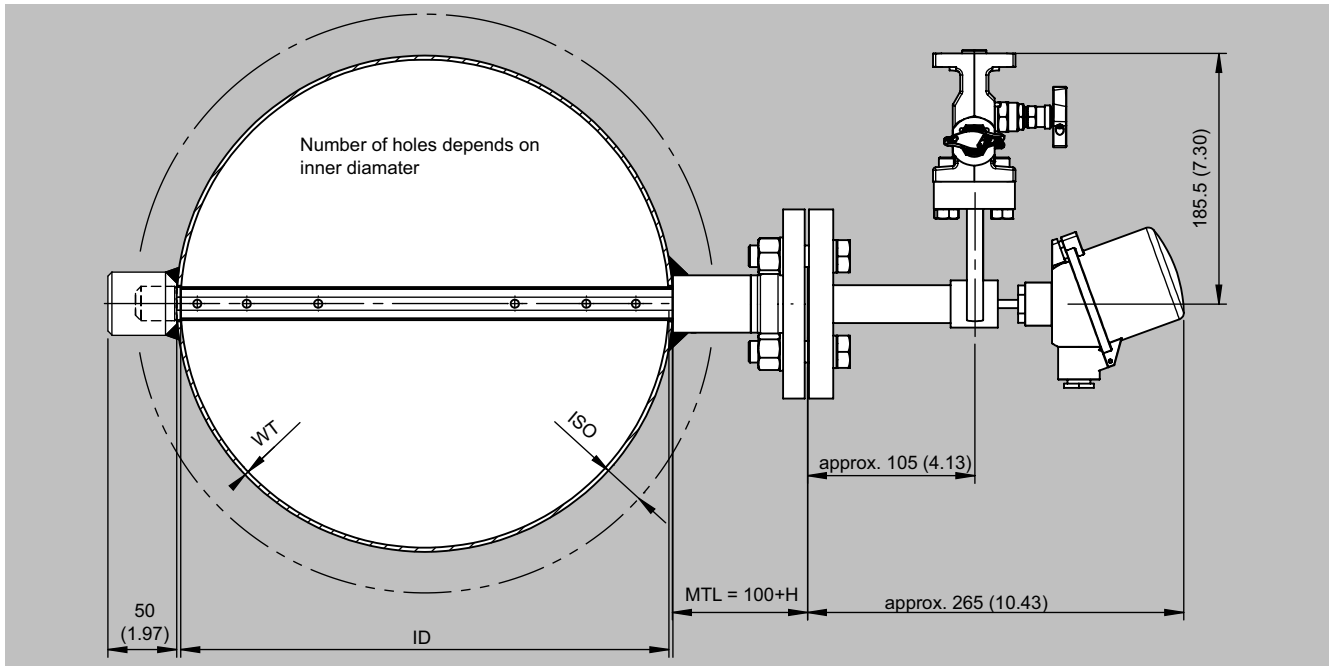
Flow Measurement

SITRANS FP (differential pressure flow measurement)

SITRANS FP330/FPS300 averaging pitot tube / Averaging pitot tube for gases and liquids

Design (continued)

Gas and liquid application, compact design for wet gases and/or with integrated temperature measurement with PT100



The averaging pitot tube is equipped with a 90° rotated flange plate to mount manifold and differential pressure transmitter directly at the sensor. The rotated flange plate serves the purpose of providing space for the integrated temperature measurement and will also allow condensed water of wet gases to flow back from the outside assembly into the averaging pitot tube. This is particularly useful for installations in vertical pipes, or in horizontal pipes where the averaging pitot tube has to be mounted from the side. If the pitot tube can be mounted from the top, a regular flange plate is sufficient.

Averaging pitot tube materials

- Standard: 1.4404/316L
- Option: Alloy C22

Mounting parts materials

- Carbon steel, 1.4404/316L

Flange gaskets

- Up to PN 40: Klingersil C4400
- As of PN 63: graphite with stainless steel insert

Integrated temperature measurement using PT100

- Can be integrated in averaging pitot tube (> DN 100, only 1.4404, ≤ PN 40)

Max. pressure

- EN 1092-1: up to PN 100 (for flange), PN 40 (for cutting ring)
- ASME B16.5: up to Class 600 (for flange)

Max. temperature

- Mounting parts:
 - Flange: according to EN 1092-1 or ASME B16.5
 - Cutting ring: 200 °C (carbon steel), 400 °C (stainless steel)
- Sensor: will be calculated by sizing tool

Selection and ordering data

SITRANS FP330/FPS300 averaging pitot tube for gases and liquids	Article No.
	7ME161 ● - ● ● ● ● ● - ● ● ● ●
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	
Communication	
HART (4 ... 20 mA)	0
PROFIBUS PA	1
FOUNDATION Fieldbus	2
Without transmitter	8
Nominal size/Sensor type (according to sizing tool)	
DN 40/Sensor type 10	1 C
DN 50/Sensor type 10	1 D
DN 65/Sensor type 10	1 E
DN 80/Sensor type 10	1 F
DN 100/Sensor type 10	1 G
DN 125/Sensor type 10	1 H
DN 100/Sensor type 22	2 G
DN 125/Sensor type 22	2 H
DN 150/Sensor type 22	2 J
DN 200/Sensor type 22	2 K
DN 250/Sensor type 22	2 L
DN 300/Sensor type 22	2 M
DN 350/Sensor type 22	2 N
DN 400/Sensor type 22	2 P
DN 450/Sensor type 22	2 Q
DN 500/Sensor type 22	2 R
DN 600/Sensor type 22	2 S
DN 700/Sensor type 22	2 T
DN 800/Sensor type 22	2 U
DN 900/Sensor type 22	2 V
DN 1000/Sensor type 22	2 W
DN 1100/Sensor type 22	2 X
DN 1200/Sensor type 22	2 Y
DN 300/Sensor type 32	3 M
DN 350/Sensor type 32	3 N
DN 400/Sensor type 32	3 P
DN 450/Sensor type 32	3 Q
DN 500/Sensor type 32	3 R
DN 600/Sensor type 32	3 S
DN 700/Sensor type 32	3 T
DN 800/Sensor type 32	3 U
DN 900/Sensor type 32	3 V
DN 1000/Sensor type 32	3 W
DN 1100/Sensor type 32	3 X
DN 1200/Sensor type 32	3 Y
DN 1400/Sensor type 32	4 A
DN 1500/Sensor type 32	4 B
DN 1600/Sensor type 32	4 C
DN 1800/Sensor type 32	4 D
DN 2000/Sensor type 32	4 E
DN 2200/Sensor type 32	4 F
DN 2400/Sensor type 32	4 G
DN 500/Sensor type 50	5 R
DN 600/Sensor type 50	5 S
DN 700/Sensor type 50	5 T
DN 800/Sensor type 50	5 U
DN 900/Sensor type 50	5 V
DN 1000/Sensor type 50	5 W
DN 1100/Sensor type 50	5 X
DN 1200/Sensor type 50	5 Y
DN 1400/Sensor type 50	6 A
DN 1500/Sensor type 50	6 B
DN 1600/Sensor type 50	6 C

Flow Measurement

SITRANS FP (differential pressure flow measurement)

SITRANS FP330/FPS300 averaging pitot tube / Averaging pitot tube for gases and liquids

Selection and ordering data (continued)

	Article No.
SITRANS FP330/FPS300 averaging pitot tube for gases and liquids	7ME161 ● - ● ● ● ● ● - ● ● ● ●
DN 1800/Sensor type 50	6 D
DN 2000/Sensor type 50	6 E
DN 2200/Sensor type 50	6 F
DN 2400/Sensor type 50	6 G
DN 2600/Sensor type 50	6 H
DN 2800/Sensor type 50	6 J
DN 3000/Sensor type 50	6 K
DN 3200/Sensor type 50	6 L
DN 3400/Sensor type 50	6 M
DN 3600/Sensor type 50	6 N
DN 3800/Sensor type 50	6 P
DN 4000/Sensor type 50	6 Q
Process connection/wetted parts material	
Flange EN 1092-1 type B1, PN 16/stainless steel 316L/1.4404	C
Flange EN 1092-1 type B1, PN 40/stainless steel 316L/1.4404	E
Flange EN 1092-1 type B1, PN 64/100/stainless steel 316L/1.4404	F
Flange EN 1092-1 type B1, PN 160/stainless steel 316L/1.4404	H
Flange EN 1092-1 type B1, PN 16/alloy C22 (up to max. 0.5 bar g)	L
Flange EN 1092-1 type B1, PN 40/alloy C22 (up to max. 0.5 bar g)	M
Cutting ring PN 40/stainless steel 316L/1.4404	N
Flange ASME B16.5, Class 150 RF/stainless steel 316L/1.4404	Q
Flange ASME B16.5, Class 300 RF/stainless steel 316L/1.4404	R
Flange ASME B16.5, Class 600 RF/stainless steel 316L/1.4404	S
Flange ASME B16.5, Class 900 RF/stainless steel 316L/1.4404	T
Flange ASME B16.5, Class 150 RF/alloy C22 (up to max. 0.5 bar g)	W
Material of welding parts/type of end support	
Carbon steel P235GH/without end support	0
Stainless steel 316L/1.4404 / without end support	1
Heat-resistant steel 16Mo3/1.5415 / without end support	2
Carbon steel P235GH mounting components with closed end support	3
Stainless steel 316L/1.4404 / closed end support	4
Heat-resistant steel 16Mo3/1.5415 / closed end support	5
Carbon steel P235GH/end support with flange	6
Stainless steel 316L/1.4404 / end support with flange	7
Thickness of pipe insulation	
Pipe insulation: 0 ... < 50 mm	0
Pipe insulation: 50 ... < 100 mm	1
Pipe insulation: 100 ... < 150 mm	2
Pipe insulation: 150 ... < 200 mm	3
System design	
Compact design for dry gases and liquids without integrated temperature measurement	0
Compact design for wet gases with or without integrated temperature measurement as well as for dry gases and liquids with integrated temperature measurement	1
Remote design for dry gases, wet gases and liquids	3
Type of protection of pressure transmitter	
No Ex/without pressure transmitter	A
Intrinsic safety	B
Explosion proof	C
Intrinsic safety, Explosion proof	D
Dust ignition proof zone 21/22 (DIP), increased safety zone 2	L
Dust ignition proof zone 20/21/22 (DIP), increased safety zone 2	M
Intrinsic safety, Explosion proof, Dust ignition proof zone 21/22 (DIP), increased safety zone 2	S
Intrinsic safety, Explosion proof, Dust ignition proof zone 21/22 (DIP), increased safety zone 2, class division	T
Electrical connections/cable entries of pressure transmitter	
Without pressure transmitter	A
2 x M20 x 1.5	F
2 x 1/2-14 NPT	M
Local operation/display of pressure transmitter	
Without display (closed lid)/without pressure transmitter	0
With display (closed lid)	1

Selection and ordering data (continued)

SITRANS FP330/FPS300 averaging pitot tube for gases and liquids	Article No. 7ME161 ● - ● ● ● ● ● - ● ● ● ●
With display (lid with glass window)	2

	Order code
Further designs*	
Please add "-Z" to Article No. and specify Order code(s) and plain text.	
Certificates of primary element incl. fittings	
Inspection certificate of the primary element (EN 10204-3.1) - material of pressure-containing and wetted parts	C52
Factory certificate of the primary element (EN 10204-2.2) - wetted parts (MR 0175-2015)	C54
Dimensional record of the primary element	C55
Inspection certificate (DIN EN 571-1) - dye penetration test of weldings	C56
Hydrostatic pressure test of the primary element (EN 13480-5)	C58
Dimensional drawing 1:1 DWG of the primary element	C59
Maximum measuring span of pressure transmitter	
20 mbar (8.037 inH ₂ O)	I01
60 mbar (24.11 inH ₂ O)	I02
250 mbar (100.5 inH ₂ O)	I03
600 mbar (241.1 inH ₂ O)	I04
1600 mbar (643 inH ₂ O)	I05
Integrated temperature measurement	
Integrated temperature measurement with Pt100; cl. A; 3-wire; without head transmitter	S01
Integrated temperature measurement with Pt100; cl. A; 3-wire; ATEX II 1/2G Ex ia IIC T5 Ga/Gb; without head transmitter	S02
Integrated temperature measurement with Pt100; cl. A; 3-wire; incl. Head transmitter TH320, General Purpose (non Ex) (CE, RCM, FM, CSA) (7NG0310-0BA00-0AAA)	S03
Integrated temperature measurement with Pt100; cl. A; 3-wire; ATEX II 1/2G Ex ia IIC T5 Ga/Gb; incl. Head transmitter TH320, Ex i, Ex nA (ec)(Ex- Zone)/IS, NIFW, NI (Class-Div) (ATEX, IECEx, CSA, FM, NEPSI) (7NG0310-0BA00-0NA0)	S04
Shut-off valves	
With mounted shut-off valves DN8 made of carbon steel, up to 300 °C with tube fitting 12 mm	T50
With mounted shut-off valves DN8 made of stainless steel, up to 300 °C with tube fitting 12 mm	T51
With mounted ball valve made of stainless steel, up to 200 °C with tube fitting 12 mm	T59
Valve manifolds for mounting on primary element	
With mounted manifold (3-fold) made of stainless steel, PTFE sealings, cadmium-plated steel screws	U40
With mounted manifold (3-fold) made of stainless steel, PTFE sealings, stainless steel screws	U41
With mounted manifold (5-fold) made of stainless steel, PTFE sealings, cadmium-plated steel screws	U42
With mounted manifold (5-fold) made of stainless steel, PTFE sealings, stainless steel screws	U43
With mounted multi-way cock made of stainless steel, PTFE sealings, cadmium-plated steel screws	U44

Flow Measurement

SITRANS FP (differential pressure flow measurement)

SITRANS FP330/FPS300 averaging pitot tube / Averaging pitot tube for gases and liquids

Selection and ordering data (continued)

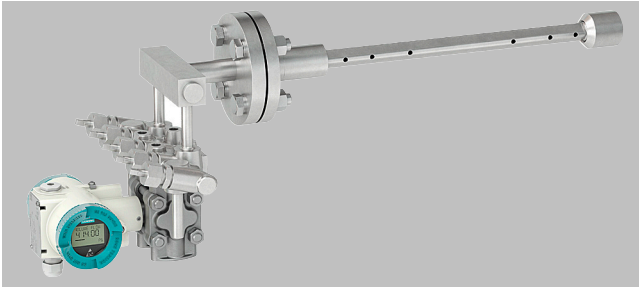
	Order code
With mounted multi-way cock made of stainless steel, PTFE sealings, stainless steel screws	U45
With enclosed manifold (3-fold) made of stainless steel, PTFE sealings, cadmium-plated steel screws with tube fitting 12 mm	U50
With enclosed manifold (3-fold) made of stainless steel, PTFE sealings, stainless steel screws with tube fitting 12 mm	U51
With enclosed manifold (5-fold) made of stainless steel, PTFE sealings, cadmium-plated steel screws with tube fitting 12 mm	U52
With enclosed manifold (5-fold) made of stainless steel, PTFE sealings, stainless steel screws with tube fitting 12 mm	U53
With enclosed multi-way cock made of stainless steel, PTFE sealings, cadmium-plated steel screws with tube fitting 12 mm	U54
With enclosed multi-way cock made of stainless steel, PTFE sealings, stainless steel screws with tube fitting 12 mm	U55
Application data	
ID number of the primary element according to sizing tool	Y40
Measuring range setting (temperature transmitter): lower range value (max. 5 characters), upper range value (max. 5 characters), unit (C, F)	Y41

* For further options, please refer to SITRANS P320.

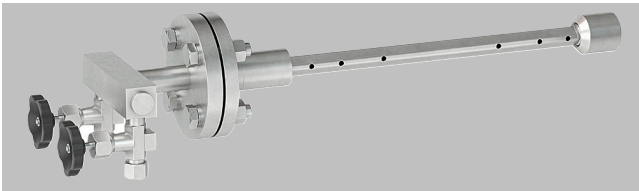
Scope of delivery

- Averaging pitot tube with differential pressure connections
- Mounting part:
 - Flanged installation: Flanged mounting part including gasket, screws and nuts.
 - Cutting ring installation: Welding socket, cutting ring, nut
- If necessary: closed counter support
- Shut-off valves for remote design (options T5x selected in PIA)
- Manifold for compact/remote design (options U4x, U5x selected in PIA) incl. mounting brackets

Application



SITRANS FP330 compact design



SITRANS FPS300 remote design

These sensors for steam probes are used wherever flow of superheated or saturated steam is to be measured.

Flow Measurement

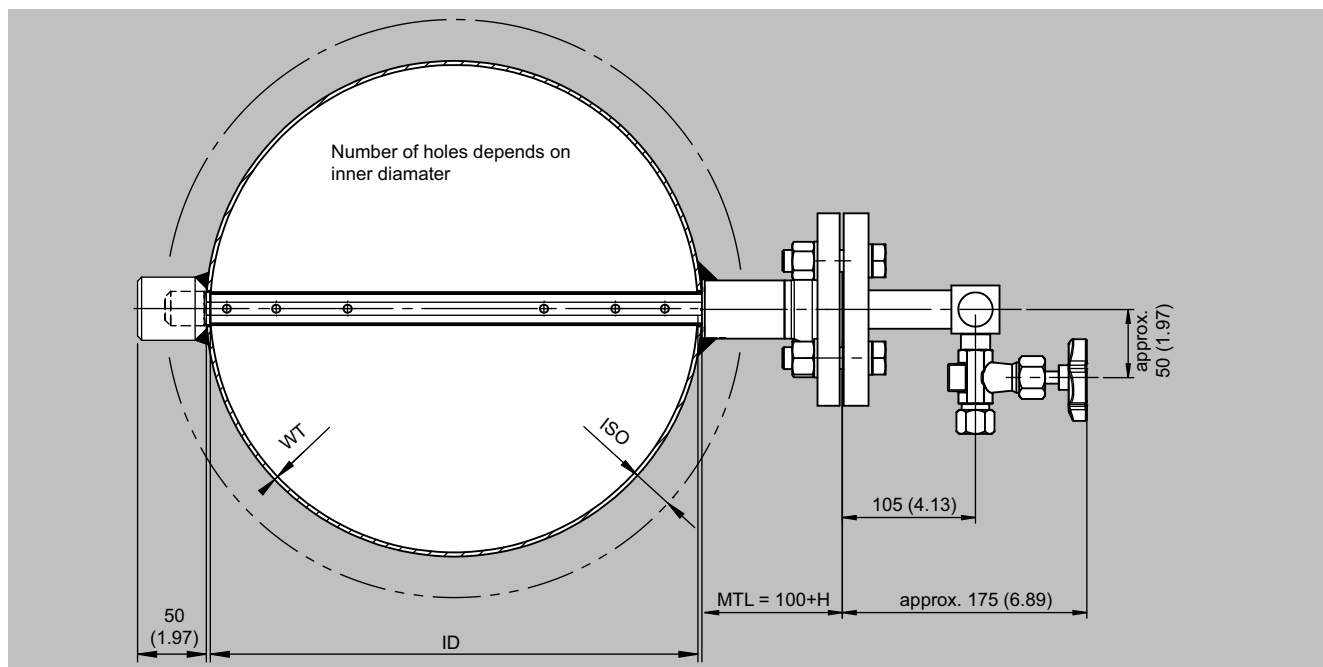
SITRANS FP (differential pressure flow measurement)

SITRANS FP330/FPS300 averaging pitot tube / Averaging pitot tube for steam applications

Design

Mounting type

The averaging pitot tube for steam can be mounted to pipes with a traditional flange:



Dimensions of mounting parts

Flange mounting	Profile 10	Profile 22	Profile 32
PN 40	DN 15	DN 32	DN 40
PN 100	DN 25	DN 40	DN 40
Class 150	1/2"	1 1/4"	1 1/2"
Class 300	1/2"	1 1/4"	1 1/2"
Class 600	1"	1 1/2"	1 1/2"

Standard lengths of mounting parts

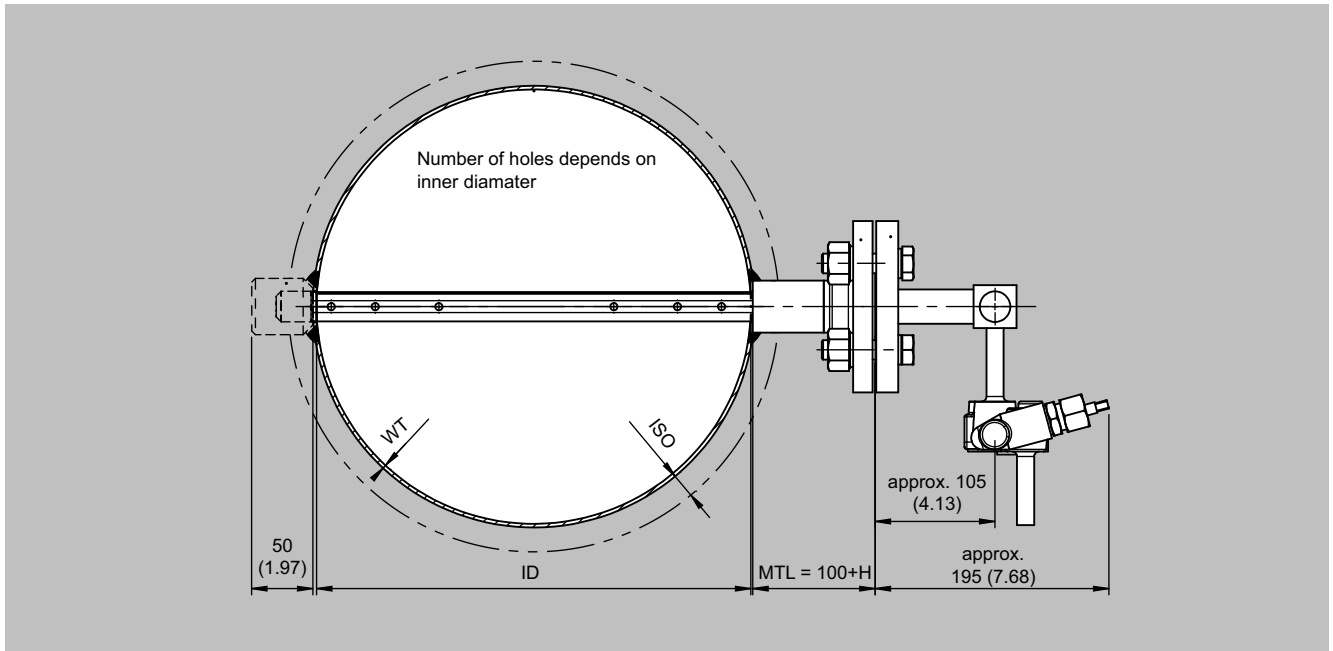
Profile 10	Profile 22	Profile 32
80 mm	100 mm	100 mm

System design of differential pressure connection

The differential pressure transmitter can be installed in compact design (at the averaging pitot tube) or in remote design.

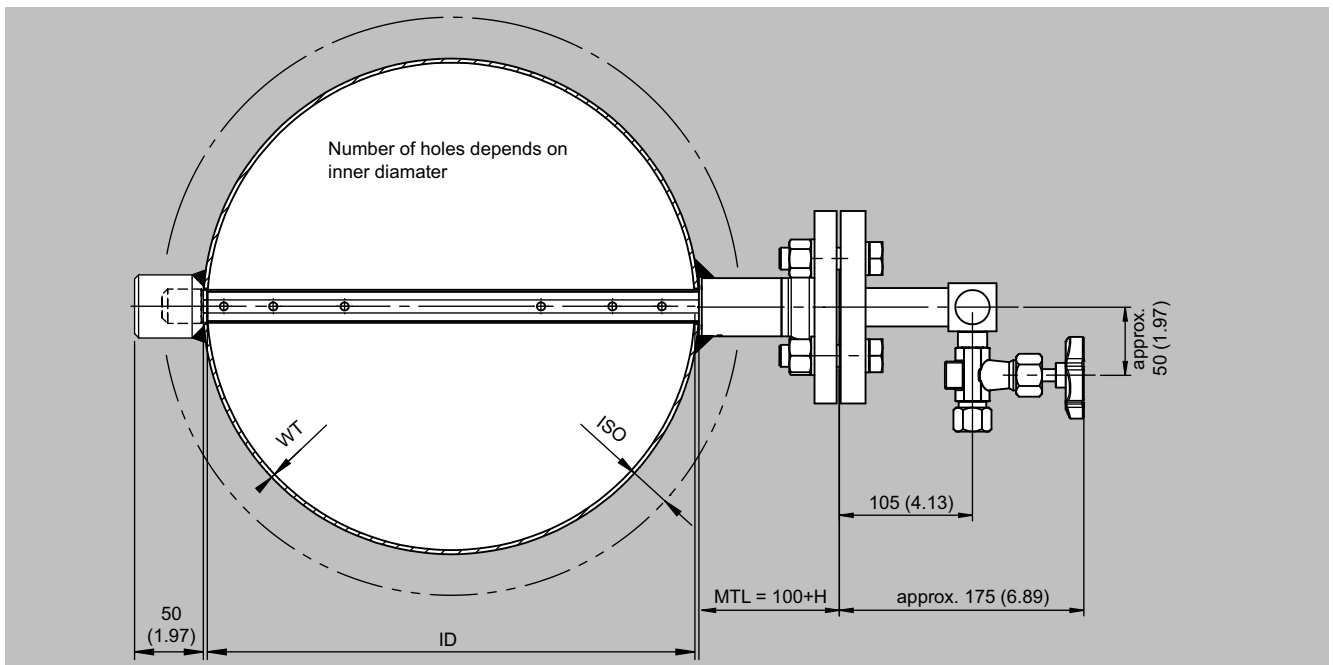
Design (continued)

Steam applications, compact design



For steam applications with compact design the averaging pitot tube sensor is equipped with integrated condensation pots, a 5-way-manifold is welded directly to the sensor.

Steam applications, remote design



For steam applications with remote design the averaging pitot tube sensor is equipped with integrated condensation pots, valves are welded directly to the sensor. Impulse pressure piping (not supplied) has to be installed from the valves to the remote mounted manifold and differential pressure transmitter.

Profile width

- Depending on selected type

Flow Measurement

SITRANS FP (differential pressure flow measurement)

SITRANS FP330/FPS300 averaging pitot tube / Averaging pitot tube for steam applications

Design (continued)

Averaging pitot tube materials

- Standard: 1.4404/316L
- Option: 16Mo3/1.5415

Mounting parts materials

- Carbon steel, 1.4404/316L

Flange gaskets

- Up to PN 40: graphite
- As of PN 63: graphite with stainless steel insert

Integrated temperature measurement using PT100

- Can be integrated in averaging pitot tube (> DN 100, only 1.4404, ≤ PN 40)

Max. pressure

- EN: up to PN 100
- ASME: up to Class 600

Max. temperature

- Mounting parts: According to EN 1092-1 or ASME B16.5
- Sensor: Will be calculated by sizing tool

Selection and ordering data

SITRANS FP330/FPS300 averaging pitot tube for steam applications	Article No.										
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	7ME162	●	-	●	●	●	●	-	●	●	●
Communication											
HART (4 ... 20 mA)	0										
PROFIBUS PA	1										
FOUNDATION Fieldbus	2										
Without transmitter	8										
Nominal size/Sensor type (according to sizing tool)											
DN 40/Sensor type 10		1	C								
DN 50/Sensor type 10		1	D								
DN 65/Sensor type 10		1	E								
DN 80/Sensor type 10		1	F								
DN 100/Sensor type 10		1	G								
DN 125/Sensor type 10		1	H								
DN 100/Sensor type 22		2	G								
DN 125/Sensor type 22		2	H								
DN 150/Sensor type 22		2	J								
DN 200/Sensor type 22		2	K								
DN 250/Sensor type 22		2	L								
DN 300/Sensor type 22		2	M								
DN 350/Sensor type 22		2	N								
DN 400/Sensor type 22		2	P								
DN 450/Sensor type 22		2	Q								
DN 500/Sensor type 22		2	R								
DN 600/Sensor type 22		2	S								
DN 700/Sensor type 22		2	T								
DN 800/Sensor type 22		2	U								
DN 900/Sensor type 22		2	V								
DN 1000/Sensor type 22		2	W								
DN 1100/Sensor type 22		2	X								
DN 1200/Sensor type 22		2	Y								
DN 300/Sensor type 32		3	M								
DN 350/Sensor type 32		3	N								
DN 400/Sensor type 32		3	P								
DN 450/Sensor type 32		3	Q								
DN 500/Sensor type 32		3	R								
DN 600/Sensor type 32		3	S								
DN 700/Sensor type 32		3	T								
DN 800/Sensor type 32		3	U								
DN 900/Sensor type 32		3	V								
DN 1000/Sensor type 32		3	W								
DN 1100/Sensor type 32		3	X								
DN 1200/Sensor type 32		3	Y								
DN 1400/Sensor type 32		4	A								
DN 1500/Sensor type 32		4	B								
DN 1600/Sensor type 32		4	C								
DN 1800/Sensor type 32		4	D								
DN 2000/Sensor type 32		4	E								
DN 500/Sensor type 50		5	R								
DN 600/Sensor type 50		5	S								
DN 700/Sensor type 50		5	T								
DN 800/Sensor type 50		5	U								
DN 900/Sensor type 50		5	V								
DN 1000/Sensor type 50		5	W								
DN 1100/Sensor type 50		5	X								
DN 1200/Sensor type 50		5	Y								
DN 1400/Sensor type 50		6	A								
DN 1500/Sensor type 50		6	B								
DN 1600/Sensor type 50		6	C								
DN 1800/Sensor type 50		6	D								
DN 2000/Sensor type 50		6	E								

Flow Measurement

SITRANS FP (differential pressure flow measurement)

SITRANS FP330/FPS300 averaging pitot tube / Averaging pitot tube for steam applications

Selection and ordering data (continued)

SITRANS FP330/FPS300 averaging pitot tube for steam applications		Article No.
		7ME162 ● - ● ● ● ● ● - ● ● ● ● ●
Process connection/wetted parts material		
Flange EN 1092-1 type B1, PN 16/stainless steel 316L/1.4404		C
Flange EN 1092-1 type B1, PN 40/stainless steel 316L/1.4404		E
Flange EN 1092-1 type B1, PN 64/100/stainless steel 316L/1.4404		F
Flange EN 1092-1 type B1, PN 160/stainless steel 316L/1.4404		H
Flange EN 1092-1 type B1, PN 64/100/heat-resistant steel 16Mo3/1.5415		J
Flange ASME B16.5, Class 150 RF/stainless steel 316L/1.4404		Q
Flange ASME B16.5, Class 300 RF/stainless steel 316L/1.4404		R
Flange ASME B16.5, Class 600 RF/stainless steel 316L/1.4404		S
Flange ASME B16.5, Class 900 RF/stainless steel 316L/1.4404		T
Flange ASME B16.5, Class 600 RF/heat-resistant steel 16Mo3/1.5415		U
Material of welding parts/type of end support		
Carbon steel P235GH/without end support		0
Stainless steel 316L/1.4404 / without end support		1
Heat-resistant steel 16Mo3/1.5415 / without end support		2
Carbon steel P235GH mounting components with closed end support		3
Stainless steel 316L/1.4404 / closed end support		4
Heat-resistant steel 16Mo3/1.5415 / closed end support		5
Carbon steel P235GH/end support with flange		6
Stainless steel 316L/1.4404 / end support with flange		7
Thickness of pipe insulation		
Pipe insulation: 0 ... < 50 mm		0
Pipe insulation: 50 ... < 100 mm		1
Pipe insulation: 100 ... < 150 mm		2
Pipe insulation: 150 ... < 200 mm		3
System design		
Compact design for steam with or without integrated temperature measurement		2
Remote design for dry gases, wet gases and liquids		3
Type of protection of pressure transmitter		
No Ex/without pressure transmitter		A
Intrinsic safety		B
Explosion proof		C
Intrinsic safety, Explosion proof		D
Dust ignition proof zone 21/22 (DIP), increased safety zone 2		L
Dust ignition proof zone 20/21/22 (DIP), increased safety zone 2		M
Intrinsic safety, Explosion proof, Dust ignition proof zone 21/22 (DIP), increased safety zone 2		S
Intrinsic safety, Explosion proof, Dust ignition proof zone 21/22 (DIP), increased safety zone 2, class division		T
Electrical connections/cable entries of pressure transmitter		
Without pressure transmitter		A
2 × M20 × 1.5		F
2 × 1/2-14 NPT		M
Local operation/display of pressure transmitter		
Without display (closed lid)/without pressure transmitter		0
With display (closed lid)		1
With display (lid with glass window)		2

Order code	
Further designs*	
Please add "-Z" to Article No. and specify Order code(s) and plain text.	
Certificates of primary element incl. fittings	
Inspection certificate of the primary element (EN 10204-3.1) - material of pressure-containing and wetted parts	C52
Factory certificate of the primary element (EN 10204-2.2) - wetted parts (MR 0175-2015)	C54

Selection and ordering data (continued)

	Order code
Dimensional record of the primary element	C55
Inspection certificate (DIN EN 571-1) - dye penetration test of weldings	C56
Hydrostatic pressure test of the primary element (EN 13480-5)	C58
Dimensional drawing 1:1 DWG of the primary element	C59
Maximum measuring span of pressure transmitter	
20 mbar (8.037 inH ² O)	I01
60 mbar (24.11 inH ² O)	I02
250 mbar (100.5 inH ² O)	I03
600 mbar (241.1 inH ² O)	I04
1600 mbar (643 inH ₂ O)	I05
Integrated temperature measurement	
Integrated temperature measurement with Pt100; cl. A; 3-wire; without head transmitter	S01
Integrated temperature measurement with Pt100; cl. A; 3-wire; ATEX II 1/2G Ex ia IIC T5 Ga/Gb; without head transmitter	S02
Integrated temperature measurement with Pt100; cl. A; 3-wire; incl. Head transmitter TH320, General Purpose (non Ex) (CE, RCM, FM, CSA) (7NG0310-0BA00-0AA0)	S03
Integrated temperature measurement with Pt100; cl. A; 3-wire; ATEX II 1/2G Ex ia IIC T5 Ga/Gb; incl. Head transmitter TH320, Ex I, Ex nA (ec)(Ex-Zone)/IS, NIFW, NI (Class-Div) (ATEX, IECEx, CSA, FM, NEPSI) (7NG0310-0BA00-0NA0)	S04
Shut-off valves	
With mounted shut-off valves DN8 made of carbon steel, up to 300 °C with tube fitting 12 mm	T50
With mounted shut-off valves DN8 made of stainless steel, up to 300 °C with tube fitting 12 mm	T51
With mounted shut off valves DN8 made of carbon steel, up to 550 °C with butt weld end 14 × 2,5 mm	T58
Valve manifolds for mounting on primary element	
With mounted manifold (5-fold) made of carbon steel, up to 300 °C cadmium-plated steel screws	U46
With mounted manifold (5-fold) made of carbon steel, up to 550 °C cadmium-plated steel screws with butt weld end 14 × 2,5 mm	U48
With enclosed manifold (5-fold) made of carbon steel, up to 300 °C cadmium-plated steel screws with tube fitting 12 mm	U56
With enclosed manifold (5-fold) made of carbon steel, up to 550 °C cadmium-plated steel screws with butt weld end 14 × 2,5 mm	U58
Application data	
ID number of the primary element according to sizing tool	Y40
Measuring range setting (temperature transmitter): lower range value (max. 5 characters), upper range value (max. 5 characters), unit (C, F)	Y41

* For further options, please refer to SITRANS P320.

Scope of delivery

- Averaging pitot tube with integrated condensation pots and differential pressure connections
- Flanged mounting part including gasket, screws and nuts
- If necessary: closed counter support
- Shut-off valves for remote design (options T5x selected in PIA)
- Manifold for compact/remote design (options U4x, U5x selected in PIA) incl. mounting brackets

Flow Measurement

SITRANS FP (differential pressure flow measurement)

SITRANS FP330/FPS300 averaging pitot tube / Averaging pitot tube with FASTLOK

Application



SITRANS FP330 compact design



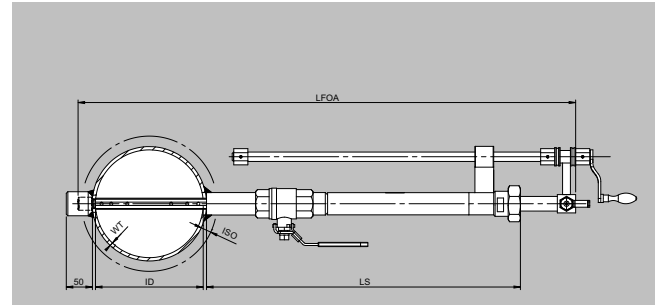
SITRANS FPS300 remote design

In the FASTLOK version the sensor can be assembled and disassembled into the pipe without interrupting plant operation. This pitot tube is used for dry gases, wet gases and liquids. On request it is available in different pressure ratings or with an integrated gear drive.

Design

Mounting type

The averaging pitot tube with FASTLOK mechanism is mounted with a screwed ball valve. A threaded nozzle is welded to the pipe onto which the ball valve is screwed.



Isolation mechanism

- Ball valve with screwed-on threaded pipe with gland packing

Retraction mechanism

- The sensor is inserted or removed into/out of the pipe by turning the operating handle on top of the threaded rod. A gland packing prevents gas or liquid from exiting while the isolation ball valve is opened.

System design of differential pressure connection¹⁾

- Compact, remote

Profile width

- Depending on selected type

Averaging pitot tube materials

- 1.4404/316L

Mounting parts materials

- Carbon steel, 1.4404/316L

Ball valve material

- Stainless steel 1.4404

Gasket ball valve

- PTFE

Pressure rating

- PN16

Max. temperature

- Approx. 200 °C

¹⁾ For details see Design under the section "Averaging pitot tube for gas and liquids".

Selection and ordering data

SITRANS FP330/FPS300 averaging pitot tube with FASTLOK		Article No.
		7ME163 ● - ● ● ● ● ● - ● ● ● ●
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Communication		
HART (4 ... 20 mA)		0
PROFIBUS PA		1
FOUNDATION Fieldbus		2
Without transmitter		8
Nominal size/Sensor type (according to sizing tool)		
DN 40/Sensor type 10		1 C
DN 50/Sensor type 10		1 D
DN 65/Sensor type 10		1 E
DN 80/Sensor type 10		1 F
DN 100/Sensor type 10		1 G
DN 125/Sensor type 10		1 H
DN 100/Sensor type 22		2 G
DN 125/Sensor type 22		2 H
DN 150/Sensor type 22		2 J
DN 200/Sensor type 22		2 K
DN 250/Sensor type 22		2 L
DN 300/Sensor type 22		2 M
DN 350/Sensor type 22		2 N
DN 400/Sensor type 22		2 P
DN 450/Sensor type 22		2 Q
DN 500/Sensor type 22		2 R
DN 600/Sensor type 22		2 S
DN 700/Sensor type 22		2 T
DN 800/Sensor type 22		2 U
DN 900/Sensor type 22		2 V
DN 1000/Sensor type 22		2 W
DN 1100/Sensor type 22		2 X
DN 1200/Sensor type 22		2 Y
DN 300/Sensor type 32		3 M
DN 350/Sensor type 32		3 N
DN 400/Sensor type 32		3 P
DN 450/Sensor type 32		3 Q
DN 500/Sensor type 32		3 R
DN 600/Sensor type 32		3 S
DN 700/Sensor type 32		3 T
DN 800/Sensor type 32		3 U
DN 900/Sensor type 32		3 V
DN 1000/Sensor type 32		3 W
DN 1100/Sensor type 32		3 X
DN 1200/Sensor type 32		3 Y
DN 1400/Sensor type 32		4 A
DN 1500/Sensor type 32		4 B
DN 1600/Sensor type 32		4 C
DN 1800/Sensor type 32		4 D
DN 2000/Sensor type 32		4 E
DN 500/Sensor type 50		5 R
DN 600/Sensor type 50		5 S
DN 700/Sensor type 50		5 T
DN 800/Sensor type 50		5 U
DN 900/Sensor type 50		5 V
DN 1000/Sensor type 50		5 W
DN 1100/Sensor type 50		5 X
DN 1200/Sensor type 50		5 Y
DN 1400/Sensor type 50		6 A
DN 1500/Sensor type 50		6 B
DN 1600/Sensor type 50		6 C
DN 1800/Sensor type 50		6 D
DN 2000/Sensor type 50		6 E

Flow Measurement

SITRANS FP (differential pressure flow measurement)

SITRANS FP330/FPS300 averaging pitot tube / Averaging pitot tube with FASTLOK

Selection and ordering data (continued)

SITRANS FP330/FPS300 averaging pitot tube with FASTLOK		Article No.
		7ME163 ● - ● ● ● ● ● - ● ● ● ● ●
Process connection/wetted parts material		
Cutting ring PN40/stainless steel 316L/1.4404		N
Material of welding parts/type of end support		
Carbon steel P235GH/without end support		0
Stainless steel 316L/1.4404 / without end support		1
Carbon steel P235GH mounting components with closed end support		3
Stainless steel 316L/1.4404 / closed end support		4
Thickness of pipe insulation		
Pipe insulation: 0 ... < 50 mm		0
Pipe insulation: 50 ... < 100 mm		1
Pipe insulation: 100 ... < 150 mm		2
Pipe insulation: 150 ... < 200 mm		3
System design		
Compact design for dry gases and liquids without integrated temperature measurement		0
Compact design for wet gases with or without integrated temperature measurement as well as for dry gases and liquids with integrated temperature measurement		1
Remote design for dry gases, wet gases and liquids		3
Type of protection of pressure transmitter		
No Ex/without pressure transmitter		A
Intrinsic safety		B
Explosion proof		C
Intrinsic safety, Explosion proof		D
Dust ignition proof zone 21/22 (DIP), increased safety zone 2		L
Dust ignition proof zone 20/21/22 (DIP), increased safety zone 2		M
Intrinsic safety, Explosion proof, Dust ignition proof zone 21/22 (DIP), increased safety zone 2		S
Intrinsic safety, Explosion proof, Dust ignition proof zone 21/22 (DIP), increased safety zone 2, class division		T
Electrical connections/cable entries of pressure transmitter		
Without pressure transmitter		A
2 × M20 × 1.5		F
2 × 1/2-14 NPT		M
Local operation/display of pressure transmitter		
Without display (closed lid)/without pressure transmitter		0
With display (closed lid)		1
With display (lid with glass window)		2

Order code	
Further designs*	
Please add "-Z" to Article No. and specify Order code(s) and plain text.	
Certificates of primary element incl. fittings	
Inspection certificate of the primary element (EN 10204-3.1) - material of pressure-containing and wetted parts	C52
Factory certificate of the primary element (EN 10204-2.2) - wetted parts (MR 0175-2015)	C54
Dimensional record of the primary element	C55
Dimensional drawing 1:1 DWG of the primary element	C59
Maximum measuring span of pressure transmitter	
20 mbar (8.037 inH ₂ O)	I01
60 mbar (24.11 inH ₂ O)	I02
250 mbar (100.5 inH ₂ O)	I03
600 mbar (241.1 inH ₂ O)	I04
1600 mbar (643 inH ₂ O)	I05
Shut-off valves	
With mounted shut-off valves DN8 made of carbon steel, up to 300 °C with tube fitting 12 mm	T50
With mounted shut-off valves DN8 made of stainless steel, up to 300 °C with tube fitting 12 mm	T51

Selection and ordering data (continued)

	Order code
With mounted ball valve made of stainless steel, up to 200 °C with tube fitting 12 mm	T59
Valve manifolds for mounting on primary element	
With mounted manifold (3-fold) made of stainless steel, PTFE sealings, cadmium-plated steel screws	U40
With mounted manifold (3-fold) made of stainless steel, PTFE sealings, stainless steel screws	U41
With mounted manifold (5-fold) made of stainless steel, PTFE sealings, cadmium-plated steel screws	U42
With mounted manifold (5-fold) made of stainless steel, PTFE sealings, stainless steel screws	U43
With mounted multi-way cock made of stainless steel, PTFE sealings, cadmium-plated steel screws	U44
With mounted multi-way cock made of stainless steel, PTFE sealings, stainless steel screws	U45
With enclosed manifold (3-fold) made of stainless steel, PTFE sealings, cadmium-plated steel screws with tube fitting 12 mm	U50
With enclosed manifold (3-fold) made of stainless steel, PTFE sealings, stainless steel screws with tube fitting 12 mm	U51
With enclosed manifold (5-fold) made of stainless steel, PTFE sealings, cadmium-plated steel screws with tube fitting 12 mm	U52
With enclosed manifold (5-fold) made of stainless steel, PTFE sealings, stainless steel screws with tube fitting 12 mm	U53
With enclosed multi-way cock made of stainless steel, PTFE sealings, cadmium-plated steel screws with tube fitting 12 mm	U54
With enclosed multi-way cock made of stainless steel, PTFE sealings, stainless steel screws with tube fitting 12 mm	U55
Application data	
ID number of the primary element according to sizing tool	Y40

* For further options, please refer to SITRANS P320.

Scope of delivery

- Averaging pitot tube with removal mechanism, packing gland, differential pressure connection
- Mounting part threaded welding socket with isolation ball valve
- If necessary: closed counter support
- Shut-off valves for remote design (options T5x selected in PIA)
- Manifold for compact/remote design (options U4x, U5x selected in PIA) incl. mounting brackets

Level Measurement






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4/107	SITRANS LVL200
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4/345	SITRANS LR250 Polypropylene Lens Antenna



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Overview

	Application	Device description	Programming Software
<p>Point level measurement - Capacitance switches</p> 	<p>An ultra compact, capacitance switch for point level detection in constricted spaces, water based liquids, slurries, and foam.</p>	<p>SITRANS LCS050</p> <ul style="list-style-type: none"> • Easy installation with no need for adjustment. • Low maintenance with no moving parts. • Highly visible 360 degree status indication. 	
<p>Point level measurement - RF Capacitance switches</p> 	<p>Powerful range of level switches suitable for a variety of industries.</p>	<p>Pointek CLS100/CLS200/CLS300</p> <ul style="list-style-type: none"> • CLS100: compact 2-wire inverse frequency shift capacitance switch for level detection in constricted spaces, interfaces, solids, liquids, slurries, and foam. • CLS200: a versatile inverse frequency shift capacitance level switch with optional rod/cable choices and configurable output, ideal for detection of liquids, solids, slurries, foam, and interfaces; digital version (with PROFIBUS PA) includes a display and provides additional diagnostic features. Functional Safety (SIL 2). Device suitable for use in accordance with IEC 61508 and IEC 61511. • CLS300: inverse frequency shift capacitance level switch with optional rod/cable choices and configurable output. It is ideal for detecting liquids, solids, slurries, foam and interfaces in demanding conditions where high pressure and temperatures are present; digital version (with PROFIBUS PA) includes a display and provides additional diagnostic features. 	<p>-</p> <p>SIMATIC PDM</p> <p>SIMATIC PDM</p>
<p>Point level measurement - Vibrating switches</p> 	<p>Reliable vibrating point level switches for liquid and slurry applications across all industries.</p> <p>Reliable vibrating point level switches for bulk solids in a wide variety of applications.</p>	<p>SITRANS LVL100/LVL200</p> <ul style="list-style-type: none"> • LVL100: compact vibrating level switch for use in liquid and slurry applications such as overflow, high, low, and demand level applications. Also ideal for dry run protection. • LVL200: advanced vibrating level switch for use in liquid and slurry applications. Suited for most hazardous area applications such as: overflow, high, low, demand, and dry run protection. Functional Safety (SIL 2). Device suitable for use in accordance with IEC 61508 and IEC 61511. <p>SITRANS LVS100/LVS200/LVS300</p> <ul style="list-style-type: none"> • LVS100: vibrating point level switch designed to be impervious to external vibrations and to provide reliable performance in demanding bulk solids applications. • LVS200: vibrating point level switch designed to be impervious to external vibrations and to provide reliable performance in demanding bulk solids applications. • LVS300: vibrating rod point level switch for high, low, or demand level detection of bulk solids. Durable probe, ideal for larger granule sizes. 	<p>-</p> <p>-</p> <p>-</p>




Level Measurement

Product overview

Overview (continued)

	Application	Device description	Programming Software
<p>Point level measurement - Rotating paddle switches</p> 	<p>Reliable rotating point level switches for bulk solids in a wide variety of applications.</p>	<p>SITRANS LPS200</p> <ul style="list-style-type: none"> Rotating paddle switch for detection of high, low, and demand levels in a wide variety of bulk solids industries. Unique engineering provides long-lasting, reliable performance. Functional Safety (SIL 2). Device suitable for use in accordance with IEC 61508 and IEC 61511. 	-
<p>Point level measurement - Ultrasonic switch</p> 	<p>Ultrasonic non-contacting switch with two switch points for level detection of bulk solids, liquids and slurries in a wide variety of industries.</p>	<p>Pointek ULS200</p> <ul style="list-style-type: none"> Rugged design, no moving parts, and virtually maintenance-free. Transducer available in ETFE or PVDF copolymer and therefore inert to most chemicals. 	-
<p>Continuous level measurement - Controllers</p> 	<p>SITRANS LT500 is a versatile, single and multi-vessel level monitor/controller for virtually any application in a wide range of industries.</p>	<p>SITRANS LT500</p> <ul style="list-style-type: none"> Level, volume, and flow measurements in open channels, differential control, extended pump control, and alarm functions. Easy to use HMI display with local four-button programming, menu-driven parameters, and wizard support for key applications. 	-

Overview (continued)

	Application	Device description	Programming Software
	<p>The SITRANS LUT400 series controllers are compact, single point, long-range ultrasonic controllers for continuous level or volume measurement of liquids, slurries, and solids, and high accuracy monitoring of open channel flow.</p>	<p>SITRANS LUT420/430/440 In addition to industry leading 1 mm (0.04 inch) accuracy, each of the three models in the series are compatible with our full range of EchoMax transducers and offer varying degrees of pump, alarm, and other control functionality, all from a very compact and easy-to-use interface.</p> <ul style="list-style-type: none"> • 1 mm accuracy. • HART communications. • Next Generation Sonic Intelligence. 	SIMATIC PDM
	<p>Versatile short- to medium-range ultrasonic single- and dual-vessel level controller for virtually any application in a wide range of industries.</p>	<p>MultiRanger 100/200</p> <ul style="list-style-type: none"> • Using non-contacting ultrasonic technology, the controller measures the level in short to medium range applications up to 15 m (50 ft) of solids, liquids, or slurries • Auto False-Echo Suppression of false echoes 	SIMATIC PDM
	<p>Ultrasonic level controller for up to six pumps - control, differential control, and open channel flow monitoring.</p>	<p>HydroRanger 200</p> <ul style="list-style-type: none"> • An economical, low-maintenance solution delivering control efficiency and productivity needed to meet today's exacting standards • Auto False-Echo Suppression of false echoes 	SIMATIC PDM




Level Measurement

Product overview

Overview (continued)

	Application	Device description	Programming Software
Continuous level measurement - Ultrasonic transmitters    	<p>SITRANS LU150 and LU180 are short-range integrated ultrasonic level transmitters. These 2-wire, 4 to 20 mA loop powered transmitter are ideal for liquids, slurries, and bulk materials in open or closed vessels to 5 m (16.4 ft).</p>	<p>SITRANS LU150</p> <ul style="list-style-type: none"> • LU150 is approved for general purpose applications. • Easy to install, program, and maintain. • Patented Sonic Intelligence echo processing. <p>SITRANS LU180</p> <ul style="list-style-type: none"> • LU180 is approved for intrinsically safe applications. • Easy to install, program, and maintain. • Patented Sonic Intelligence echo processing. 	-
	<p>2-wire loop powered ultrasonic transmitter for level, volume, and flow monitoring of liquids in open channels, storage vessels and simple process vessels.</p>	<p>SITRANS Probe LU</p> <ul style="list-style-type: none"> • Continuous level measurement up to 12 m (40 ft) range. • Sonic Intelligence signal processing. • Auto False-Echo Suppression. 	SIMATIC PDM
	<p>Ultrasonic level transmitter with HART, 4 to 20 mA is ideal for level, volume, and volume flow measurements. It works with liquids, slurries, and bulk materials up to 12 meters (40 feet).</p>	<p>SITRANS Probe LU240</p> <ul style="list-style-type: none"> • Continuous level measurement up to 12 m (40 ft) range. • Next generation Process Intelligence signal processing. • Auto False-Echo Suppression for fixed obstruction avoidance. • Fast and easy configuration with quick start wizards. 	SIMATIC PDM
	<p>Compact level transmitter with integrated transducer for accurate level measurement of liquid applications.</p>	<p>The Probe</p> <ul style="list-style-type: none"> • A short-range integrated ultrasonic level transmitter, ideal for liquids and slurries in open or closed vessels. • 3 wire system with mA output and alarm relay. 	-
Continuous level measurement - Ultrasonic transducers 	<p>ST-H: ETFE or PVDF transducer for chemicals XRS-5: Standard transducer for applications to 8 m (26 ft)</p>	<p>ST-H/EchoMax XRS-5</p> <ul style="list-style-type: none"> • ST-H: the narrow design of the ST-H allows the sensor to be mounted using a 2 inch connection • XRS-5: narrow beam angle of only 10°, measuring range maximum 8 m (26 ft) for measurement of liquids, solids, and slurries 	-





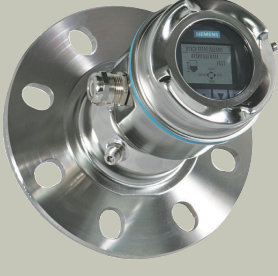
Overview (continued)

	Application	Device description	Programming Software
	<p>Transducers for liquids and bulk solids XPS series: Hermetically sealed PVDF enclosure for chemical immunity</p>	<p>EchoMax XPS</p> <ul style="list-style-type: none"> XPS series offers versions for various distances up to 30 m (100 ft) and up to a maximum temperature of 95 °C (203 °F) 	-
<p>Continuous level measurement - Radar transmitters</p>  	<p>SITRANS LR100: a compact radar transmitter for continuous level measurement of liquids and slurries to a range of 8 m (26 ft). SITRANS LR110: a compact radar transmitter for continuous level measurement of liquids, slurries, or solids to a range of 15 m (49.2 ft).</p> <p>Compact radar transmitter for continuous level measurement of liquids and solids to a range of 30 m (98.4 ft).</p>	<p>SITRANS LR100</p> <ul style="list-style-type: none"> Bluetooth connectivity for easy setup with SITRANS mobile IQ Chemically resistant PVDF enclosure W band FMCW radar yields narrow beam with small antenna for superior performance in short range applications 5 mm accuracy <p>SITRANS LR110</p> <ul style="list-style-type: none"> Bluetooth connectivity for easy setup with SITRANS mobile IQ Chemically resistant PVDF enclosure W band FMCW radar yields narrow beam with small antenna for superior performance in short range applications HART 7.0 or Modbus RTU communication for intelligent integration into your application 2 mm accuracy and zero near range distance yields optimum inventory management capability <p>SITRANS LR120</p> <ul style="list-style-type: none"> Bluetooth connectivity for easy setup with SITRANS mobile IQ Chemically resistant PVDF enclosure W band FMCW radar yields narrow beam with small antenna for superior performance in short range applications HART 7.0 or Modbus RTU communication for intelligent integration into your application Submergence shield accessory prevents build up on sensor during flooding conditions 2 mm accuracy and zero near range distance yields optimum inventory management capability 	

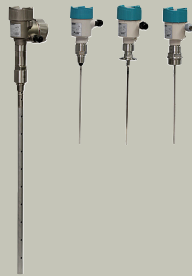
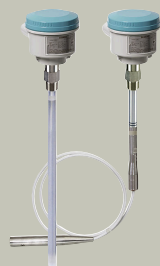

Level Measurement

Product overview

Overview (continued)

	Application	Device description	Programming Software
	<p>SITRANS LR140: a 2 wire loop powered radar transmitter for continuous level measurement of liquids and slurries to a range of 8 m (26 ft). SITRANS LR150: a compact radar transmitter for continuous level measurement of liquids, slurries, and solids to a range of 15 m (49.2 ft), with optional HMI.</p>	<p>SITRANS LR140</p> <ul style="list-style-type: none"> • Bluetooth connectivity for easy setup with SITRANS mobile IQ. • Chemically resistant PVDF sensor. • W band FMCW radar yields narrow beam with small antenna for superior performance in short range applications. <p>SITRANS LR150</p> <ul style="list-style-type: none"> • Bluetooth connectivity for easy setup with SITRANS mobile IQ. • Optional HMI with pushbutton programming and local diagnostic data. • Chemically resistant PVDF sensor. • W band FMCW radar yields narrow beam with small antenna for superior performance in short range applications. 	
	<p>2-wire, 6 GHz pulse radar level transmitter for continuous monitoring of liquids and slurries in storage and process vessels including high temperature and pressure, to a range of 20 m (66 ft).</p>	<p>SITRANS LR200</p> <ul style="list-style-type: none"> • Program without opening the lid, even in hazardous areas, using patented infrared IS handheld programmer • Special Uni-Construction hermetically sealed polypropylene rod antenna has integrated threaded connection • Built-in alphanumeric display with support in four languages 	<p>SIMATIC PDM AMS SITRANS DTM</p>
	<p>2-wire, 25 GHz pulse radar level transmitter for continuous monitoring of liquids and slurries in storage and process vessels including high temperature and pressure, to a range of 20 m (66 ft); antenna designs ideal for small vessels, low dielectric media, food & beverages and corrosive/aggressive media.</p>	<p>SITRANS LR250</p> <ul style="list-style-type: none"> • Simple operation using the graphical local user interface (LUI) • Plug-and-play setup using the intuitive Quick Start Wizard • 25 GHz high frequency allows for small horn antennas and easy mounting in nozzles • Process Intelligence signal processing for improved measurement reliability and Auto False-Echo Suppression of fixed obstructions 	<p>SIMATIC PDM AMS SITRANS DTM</p>
	<p>4-wire, 24 GHz FMCW radar level transmitter with extremely high signal-to-noise ratio and advanced signal processing for continuous monitoring of solids up to 100 m (328 ft); ideal for measurement in extreme dust and high temperature applications</p>	<p>SITRANS LR460</p> <ul style="list-style-type: none"> • Process Intelligence for advanced signal processing and quick and easy adjustment • Self-guided Quick Start Wizard for plug and play startup • 100 m (328 ft) range for long-range and difficult applications 	<p>SIMATIC PDM</p>
	<p>2-wire, 78 GHz FMCW radar level transmitter for continuous monitoring of solids and liquids to a range of 100 m (328 ft); easy to install, plug and play, virtually no maintenance</p>	<p>SITRANS LR560</p> <ul style="list-style-type: none"> • Rugged stainless steel design • 78 GHz high frequency provides very narrow beam, virtually no mounting nozzle noise, and optimal reflection from sloped solids • Aimer option to direct beam to area of interest, such as draw point of cone • Air purge connection is included for self-cleaning of extremely sticky solids • Lens antenna is highly resistant to product buildup • Local display interface (LDI) allows local programming and diagnostics 	<p>SIMATIC PDM AMS SITRANS DTM</p>

Overview (continued)

Application	Device description	Programming Software
Continuous level measurement - Guided wave radar transmitters  <p>Guided wave radar transmitters for short- and medium-range level, level/interface, and volume measurement of liquids, slurries, and solids. The four LG models are unaffected by changes in process conditions, high temperatures and pressures, and provide a wide range of hygienic options.</p>	SITRANS LG240/250/260/270 <ul style="list-style-type: none"> Measures accurately on materials with dielectric (dK) as low as 1.4 Guided wave radar measurement for up to 2 mm (0.08 inch) accuracy Measures level, level/interface, and volume of solids, slurries, and liquids 4 button programming for quick setup Reliable level measurement on harsh applications with pressure up to 400 bar g (40 000 kPa) and temperatures as high as 450 °C (842 °F) 	SIMATIC PDM SITRANS DTM
Continuous level measurement - Capacitance transmitters  <p>For liquids and solids applications, ideal for standard industrial applications in chemical, hydrocarbon processing, food and beverage, and mining, aggregate and cement industries.</p>	SITRANS LC300 <ul style="list-style-type: none"> Sophisticated, but easy-to-adjust microprocessor combined with field-proven probes Active shield technology ensures measurements are unaffected by vapors, product deposits, dust, and condensation 	-
Communications 	SmartLinx Module, Dolphin Plus software <ul style="list-style-type: none"> Optional communication modules, SmartLinx, provide direct digital connection to popular industrial fieldbus systems Dolphin Plus for quick and easy configuring, monitoring, tuning, and diagnostics of Siemens devices 	-

Level Measurement Selector						
Continuous Level Conditions	Ultrasonic	Radar	Guided Wave Radar	Capacitance	Gravimetric	Hydrostatic pressure
Measurement						
Level	x	x	x	x	•	x
Interface (liquid/liquid)			x	•		x
Interface (liquid/solid)	•			•		
Volume	x	x	x	•	•	x
Mass					x	x
Flow (open channel)	x	•				
Level Applications						
Changing density	x	x	x	x		
Changing dielectric	x	x	x	•	x	x
Aggressive chemicals	x	x	x	x	x	x
Pressure/vacuum		x	x	x	x	x
High temperature		x	x	x	x	x

Level Measurement

Product overview

Overview (continued)

Level Measurement Selector						
Continuous Level Conditions	Ultrasonic	Radar	Guided Wave Radar	Capacitance	Gravimetric	Hydrostatic pressure
Cryogenic			x		x	
Turbulence	x	x	•	•	x	x
Steam		•	x	•	x	x
Hydrocarbon vapors/solvents		x	x	x	x	x
Foam	•	•	•	•	x	x
Buildup	•	•	•	•	x	•
High viscosity	x	x	•	•	x	•
Dust	•	x	x	x	x	
Solids powders	•	x	•	•	x	
Solids granules/pellets < 25 mm (1 inch)	x	x	•	•	x	
Solids > 25 mm (1 inch)	x	x			x	
High angle of repose	•	x	x	•	x	

x preferred

• condition dependent

Level Measurement Selector				
Point Level Conditions	Vibration	Capacitance	Paddle	Ultrasonic
Measurement				
Level	x	x	x	x
Interface (liquid/liquid)		x		
Interface (liquid/solid)	•			
Volume				
Mass				
Flow (open channel)				
Level Applications				
Changing density	x	x	x	x
Changing dielectric	x	•	x	x
Aggressive chemicals	x	x	•	x
Pressure/vacuum	x	x	x	
High temperature	x	x	x	
Cryogenic	x			
Turbulence	•	•		x
Steam	x	•	x	
Hydrocarbon vapors/solvents	x	•		
Foam	•	•		•
Buildup	•	•	x	•
High viscosity	•	•	•	x
Dust	x	x	x	•
Solids powders	x	•	x	•

Overview (continued)

Level Measurement Selector				
Point Level				
Conditions	Vibration	Capacitance	Paddle	Ultrasonic
Solids granules/pellets < 25 mm (1 inch)	x	•	x	x
Solids > 25 mm (1 inch)	•	•	x	x
High angle of repose	x	x	x	•

x preferred

• condition dependent

Level Measurement

Point level measurement

Capacitance switches / SITRANS LCS050

Overview



SITRANS LCS050 is an ultra-compact, capacitance switch for point level detection in constricted spaces, water-based liquids, slurries, and foam.

Benefits

- Easy installation with no need for adjustment
- Low maintenance with no moving parts
- Highly visible 360-degree status indication
- M12 connector for ease of installation
- IO-Link communication option for advanced monitoring and configuration

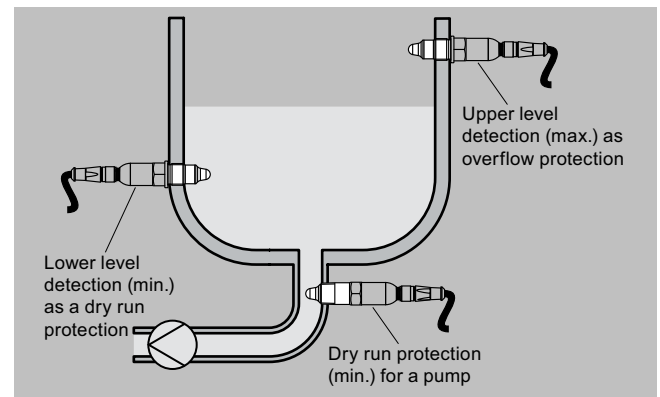
Application

The SITRANS LCS050's ultra-compact design, short insertion length of 15 mm (0.59 inch), and versatility in various applications in vessels or pipes, makes it a good replacement for traditional point level switches.

Its advanced alternating capacitance field at the sensor tip ensures material detection based on changes in capacitance, providing repeatable performance. The PEEK probe is chemically resistant with an effective process operating temperature range from -20 to +100 °C (-4 to +212 °F) and supports sterilization in place at 135 °C (275 °F) for up to 1 hour. The product design ensures reliability in a vibrating environment such as agitated tanks up to 5 g.

- Key Applications: water-based liquids with > 10 % water (alcohols, acids, cleaning agents), slurries and foam for point level, overflow and dry run protection including small pipes due to its compact design.

Configuration



SITRANS LCS050, installation examples

Selection and ordering data

SITRANS LCS050 Point level switch		Article No.	
Compact, point level switch, detects level in liquids. For use with overflow, high, low, and demand applications as well as pump protection. Compact design is ideal for confined spaces. Support for IO-Link communications.		7ML5772- ● ● ● ● 0 - 0 A A 0	
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.			
Approvals			
Ordinary location		1	
With FDA, Regulation (EC) No. 1935/2004		2	
Process connection			
Thread M24 x 1.5 PN 25, DIN 13 / 316L, EPDM		A	A
Thread G ½" PN 25, DIN 3852-A / 316L		A	B
Thread G ½" PN 25, ISO228-1 / 316L (Ra < 0.76 µm); for ½" hygiene adapter		A	C
Thread ½" NPT PN 25, ASME B1.20.1 / 316L		A	D
Thread G ¾" PN 25, DIN 3852-A / 316L		A	E
Thread ¾" NPT PN 25, ASME B1.20.1 / 316L		A	F
Thread G 1" PN 25, DIN 3852-A / 316L		A	G
Thread G 1" PN 25, ISO228-1, hygiene design / 316L (Ra < 0.76 µm), EPDM, for hygiene adapter sealing with O-ring		A	H
Thread 1" NPT PN 25, ASME B1.20.1 / 316L		A	J
Thread G 1" PN 25, ISO228-1, cone 40° / 316L (Ra < 0.76 µm); for hygiene adapter metallically sealing		A	K
Electronics			
Three-wire transistor with IO-Link			1

Selection and ordering data

Accessories	
Hygienic adapter for G ½" is available, contact factory for pricing.	
Welded socket, suitable for LCS050 series, with threaded fittings or hygienic connections is available, contact factory for pricing	
Operating instructions	
Note: due to ATEX regulations one Quick start manual is included with every product.	
All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation .	

Level Measurement

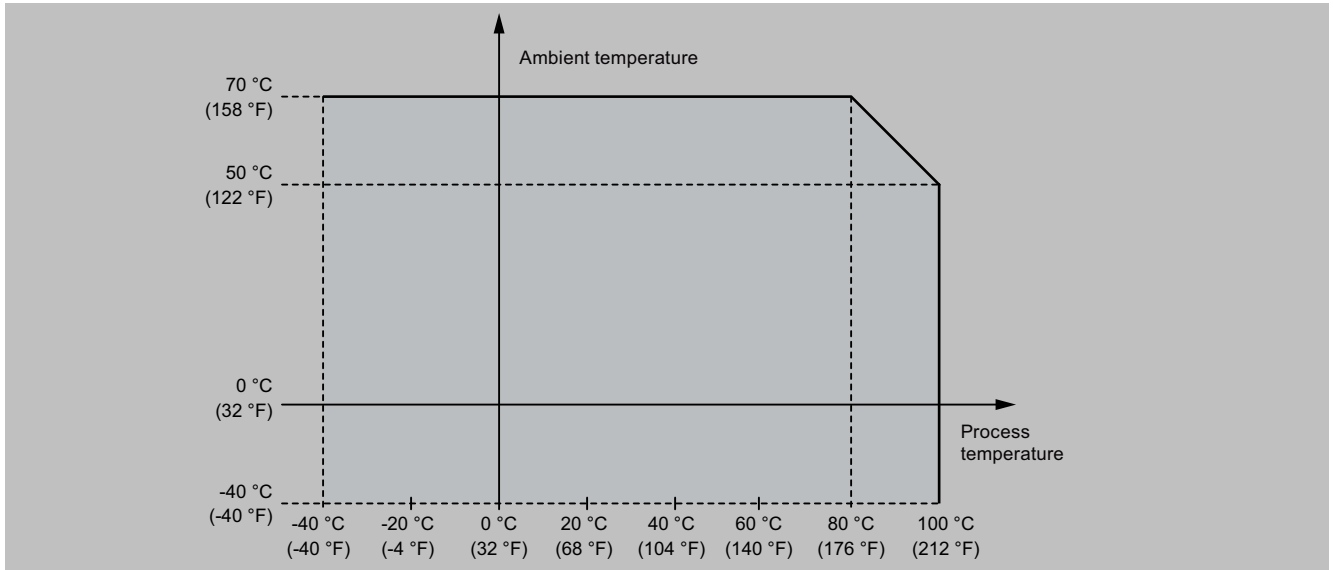
Point level measurement

Capacitance switches / SITRANS LCS050

Technical specifications

SITRANS LCS050	
Mode of operation	
Measuring principle	Capacitance level detection
Input	
Measured variable	Change in picoFarad (pF)
Output	
Output signal	
• Alarm output	Transistor (PNP/NPN) IO-Link acc. to IEC 61131-9
• Fail-safe mode	Min. or max.
Accuracy	
Hysteresis	Approx. 1 mm (0.04 inch)
Rated operating conditions	
Installation conditions	
• Location	Indoor/outdoor
Ambient conditions	
• Ambient temperature	-40 ... +70 °C (-40 ... +158 °F)
• Storage temperature	-40 ... +80 °C (-40 ... +176 °F)
• Installation category	I
• Pollution degree	4
Medium conditions	
• Relative dielectric constant ϵ_r	Min. 2
• Process temperature	-20 ... +100 °C (-4 ... +212 °F) up to 1 hour, 135 °C (275 °F)
• Pressure (vessel)	-1 ... 25 bar/-100 ... 2 500 kPa (-14.5 ... 363 psig)
• Degree of protection	
- M 12x 1 plug	IP66/IP67/IP69
Design	<u>Enclosure/integral cable version</u>
Material	
• Body	316L and plastic (polycarbonate)
Sensor length	15 mm (0.59 inch)
Process connection material of probe/wetted parts	<ul style="list-style-type: none"> • Connection: 316L stainless steel • Device seal: FKM (hygienic version EPDM) • Sensor tip: PEEK
Connection (Enclosure version)	M12 x 1 plug
Process connection	Pipe thread, cylindrical (DIN 3852-A) G $\frac{1}{2}$, G $\frac{3}{4}$, G1 pipe thread, conical (ASME B1.20.1) $\frac{1}{2}$ NPT, $\frac{3}{4}$ NPT, 1 NPT metric fine thread, cylindrical M24 x 1.5
Power supply	
Standard	12 ... 35 V DC
Certificates and approvals	General: CE, UKCA

Characteristic curves



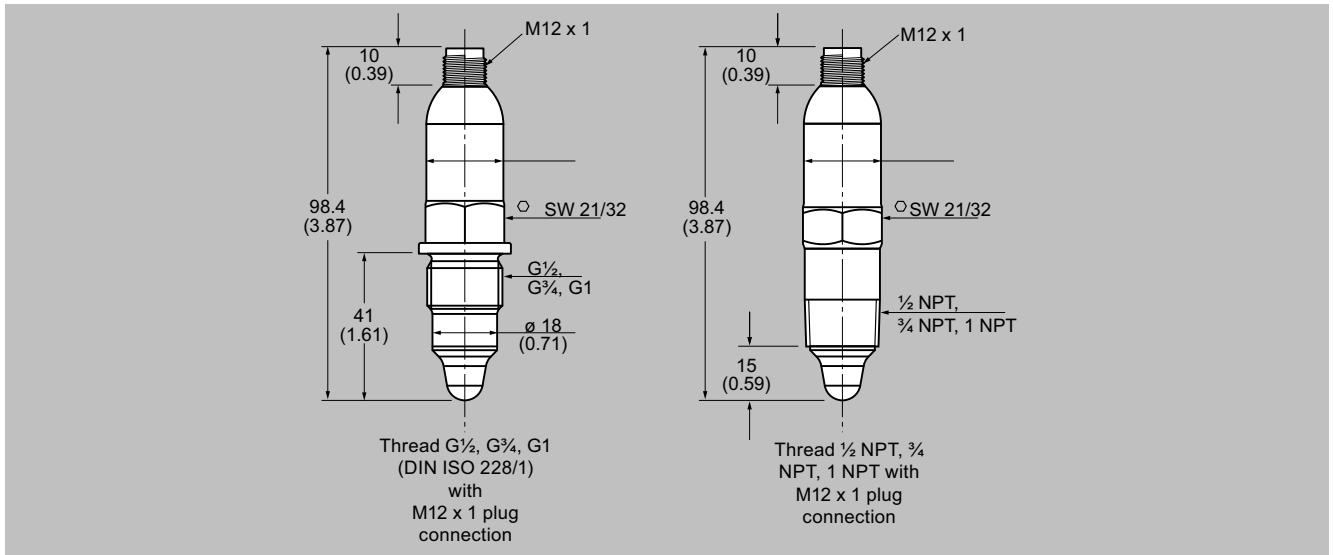
SITRANS LCS050 ambient temperature/process temperature curve

Level Measurement

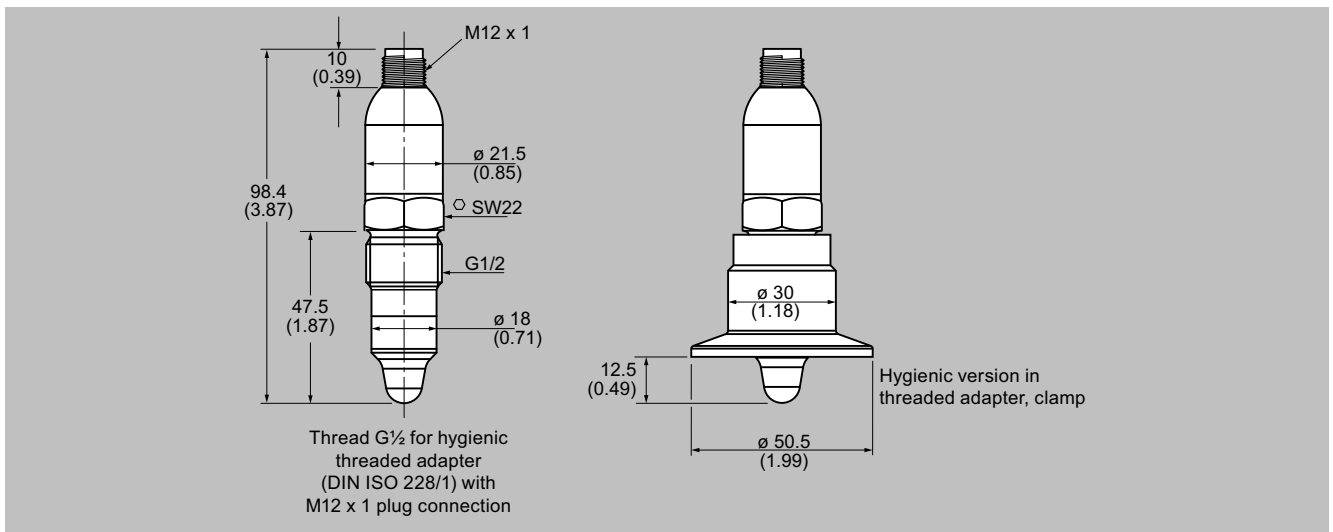
Point level measurement

Capacitance switches / SITRANS LCS050

Dimensional drawings

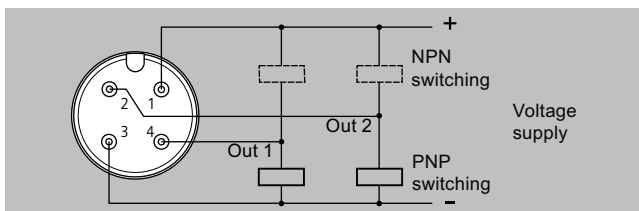


SITRANS LCS050, standard version - thread, dimensions in mm (inch)



SITRANS LCS050, hygienic version - thread, dimensions in mm (inch)

Circuit diagrams



SITRANS LCS050 connections

Overview

Introduction

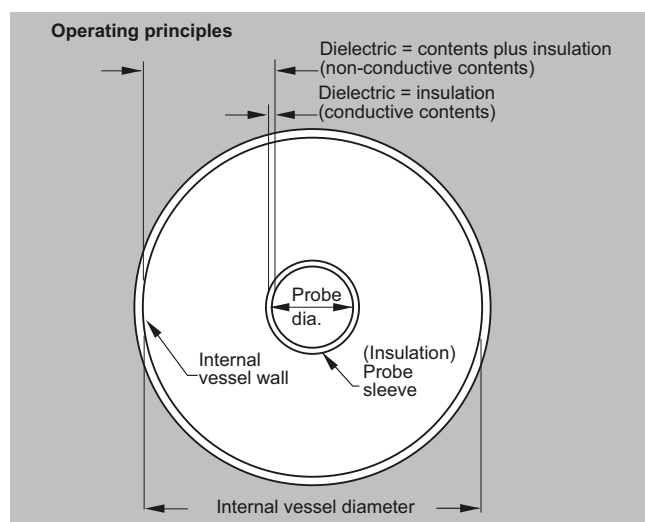
Inverse frequency shift capacitance point level and material detection switches are designed to withstand the harsh environments of high pressure and high temperature applications.

Inverse Frequency Technology

Siemens inverse frequency shift capacitance devices incorporate a unique frequency-based approach to level measurement. The capacitance units monitor the effect of capacitance based on frequency change. The relationship between capacitance and frequency is inverse. Because small level changes result in a large frequency change, the result is excellent resolution and accuracy.

Principle of Operation

Inverse frequency shift capacitance devices require two components: a reference electrode of a variable capacitor and the measurement electrode. In capacitive level measurement, the environment (typically the vessel wall) acts as the reference electrode, while the probe supplies the measurement electrode. The dielectric is composed of the vessel contents and, if the measurement electrode is insulated, the insulating layer.



Inverse frequency shift capacitance operation

Capacitance is affected by the surface area of the electrodes, the separation distance between the electrodes and the dielectric constant of the vessel contents. The dielectric constant is the measure of a material's ability to store energy. The relative dielectric constant of air (vacuum) is 1; all other materials have a higher value.

Mode of operation

Common Terms

Capacitance

The property of a system of conductors and dielectrics that permits the storage of electricity when a potential difference exists between the conductors. Its value is expressed as the ratio of a quantity of electricity to a potential difference and the unit is a Farad.

Capacitor

A device in a circuit that has the potential to store an electric charge. Typically a capacitor has two conductors or electrodes separated by a layer of a non-conducting material called a dielectric. With the conductors on opposite sides of the dielectric layer oppositely charged by a source of voltage, the electrical energy of the charged system is stored in the polarized dielectric.

Dielectric constant

The ability of a dielectric to store electrical potential energy under the influence of an electric field. This is measured by a ratio which compares the capacitance of a condenser with the material as dielectric to its capacitance with a vacuum/dry air as dielectric: the dielectric constant of air is 1.

Active shield

The portion of the probe isolated from the active measurement section. The sensor signal is connected to the active shield portion of the probe, eliminating the electrical potential difference between the shield and the measurement section. So, the shield portion of the probe near the process connection is not affected by changes in vapor concentration, material buildup, dust, or condensation.

Level Measurement

Point level measurement

RF Capacitance

Technical specifications

Point Level Measurement			
Criteria	Pointek CLS100	Pointek CLS200	Pointek CLS300
Typical applications	Liquids, slurries, powders, granules, applications in constricted spaces	Liquids, slurries, powders, granules, foam, food, and pharmaceuticals, petrochemicals	Liquids, slurries, powders, granules, relatively high pressure, and temperature, hazardous areas
Max. length including sensor	100 mm (4 inch)	Rod: 5.5 m (18 ft) Cable: up to 30 m (98 ft)	Rod: 1 m (40 inch) Cable: 25 m (82 ft)
Process temperature (Temperature ratings are pressure dependent. See Pressure/Temperature curves for respective product.)	<ul style="list-style-type: none"> Stainless steel process connection: -30 ... +100 °C (22 ... +212 °F) Fully Synthetic (PPS process connection): -10 ... +100 °C (14 ... 212 °F) 	<ul style="list-style-type: none"> -40 ... +85 °C (-40 ... +185 °F) With thermal isolator: -40 ... +125 °C (-40 ... +257 °F) 	<ul style="list-style-type: none"> -40 ... +200 °C (-40 ... +392 °F) HT version: -40 ... +400 °C (-40 ... +752 °F)
Process pressure (Pressure ratings are temperature dependent. See Pressure/Temperature curves for respective product.)	Up to 10 bar g (146 psi g)	<ul style="list-style-type: none"> Rod versions: Up to 25 bar g (365 psi g) Cable version: Up to 10 bar g (146 psi g) 	Up to 35 bar g (511 psi g)
Output	Stainless steel cable or enclosure version: <ul style="list-style-type: none"> 4 ... 20/20 ... 4 mA, 2-wire current loop Solid-state output Fully-synthetic version (PPS) <ul style="list-style-type: none"> Relay output 	Standard: <ul style="list-style-type: none"> 1 SPDT Form C relay, solid-state switch Digital: <ul style="list-style-type: none"> Solid-state switch included 	Standard: <ul style="list-style-type: none"> 1 SPDT Form C relay, solid-state switch Digital: <ul style="list-style-type: none"> Solid-state switch included
Communications		Standard: <ul style="list-style-type: none"> 3 LED indicators Digital: <ul style="list-style-type: none"> PROFIBUS PA; SIMATIC PDM compatible 	Standard: <ul style="list-style-type: none"> 3 LED indicators Digital: <ul style="list-style-type: none"> PROFIBUS PA; SIMATIC PDM compatible
Power Specifications	Standard: <ul style="list-style-type: none"> 12 ... 33 V DC Intrinsically Safe (Stainless steel version only): <ul style="list-style-type: none"> 10 ... 30 V DC 	Standard: <ul style="list-style-type: none"> 12 ... 250 V AC/DC, 0 ... 60 Hz, 2 W max. Digital: <ul style="list-style-type: none"> Bus voltage: 12 ... 30 V DC, IS version: 12 ... 24 V DC Current consumption: 12.5 mA 	Standard: <ul style="list-style-type: none"> 12 ... 250 V AC/DC, 0 ... 60 Hz, 2 W max. Digital: <ul style="list-style-type: none"> Bus voltage: 12 ... 30 V DC, IS version: 12 ... 24 V DC Current consumption: 12.5 mA
Approvals	Stainless steel cable or enclosure version: <ul style="list-style-type: none"> CE, CSA, FM, ATEX, RCM, Lloyds Register, WHG Fully-synthetic version (PPS): <ul style="list-style-type: none"> CSA, FM 	CSA, FM, CE, ATEX, RCM, Lloyds Register, WHG, Vlare II	CSA, FM, CE, ATEX, RCM, Lloyds Register, WHG, Vlare II

Overview



Pointek CLS100 is a compact, 2-wire, inverse frequency shift capacitance switch for level and material detection in constricted spaces, interfaces, solids, liquids, slurries, and foam; with the ability to tune out buildup on probe.

Benefits

- Easy installation with verification by built-in LED
- Low maintenance with no moving parts
- Sensitivity adjustment
- Integrated cable or PBT enclosure versions available
- Intrinsically Safe, Dust Ignition Proof, and General Purpose options available

Application

Pointek CLS100's short insertion length of 100 mm (4 inch) and versatility in various applications and in vessels or pipes makes it a good replacement for traditional capacitance sensors.

Its advanced tip-sensing technology provides accurate, repeatable switchpoint performance. The PPS (Polyphenylene sulfide) probe [optional PVDF (Polyvinylidene Fluoride)] is chemically resistant with an effective process operating temperature range from -30 to +100 °C (-22 to +212 °F) (7ML5501), and -10 to +100 °C (14 to 212 °F) (7ML5610). The fully potted design ensures reliability in a vibrating environment such as agitated tanks up to 4 g. When used with a SensGuard protection cover, the CLS100 is protected from shearing, impact, and abrasion in tough primary processes.

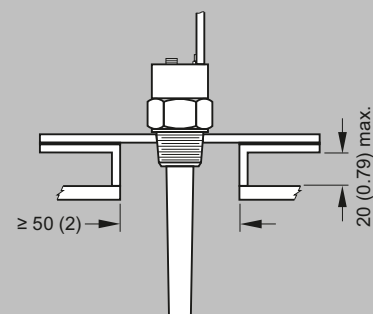
The Pointek CLS100 is available in three versions. The integral cable version has a stainless steel process connection and probe options of PPS or PVDF. The fully synthetic version has a thermoplastic polyester enclosure with a PPS process connection combined with a PPS probe. The standard enclosure version has a thermoplastic polyester enclosure with a stainless steel process connection in combination with a PPS or PVDF probe.

- Key Applications: liquids, slurries, powders, granules, food and pharmaceuticals, chemicals, hazardous areas

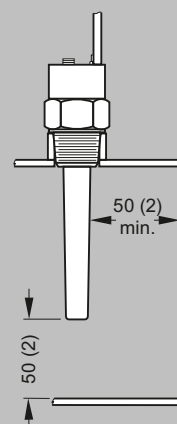
Configuration

Installation

Standpipes



Wall restriction



Pointek CLS100 installation, dimensions in mm (inch)

Level Measurement

Point level measurement

RF Capacitance / Pointek CLS100

Selection and ordering data

	Article No.				
Pointek CLS100 RF Capacitance point level switch, stainless steel process connection Detects level and interface in liquids, solids, slurries and foam. Compact, with 100 mm (4 inch) insertion, adaptable sensitivity, with the ability to tune out build-up on probe.	7ML5501- 0	●	●	●	●
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.					
Process Connection ¾" NPT [(Taper), ANSI/ASME B1.20.1] R 1" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] G 1" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]		A			
		E			
		J			
Approvals General Purpose: CE, CSA, FM, RCM CSA/FM Class I, II, and III, Div. 1, Groups A, B, C, D, E, F, G T4; ATEX II 1 GD ½ GD EEx ia IIC T4 ... T6 T107 °C ¹⁾ CSA/FM Class II and III, Div. 1, Groups E, F, G ¹⁾			A		
			C		
			G		
Device version Integral cable version (PPS probe) Enclosure version (PPS probe), ½" NPT cable inlet Integral cable version with PVDF probe body Enclosure version with PVDF probe body (½" NPT cable inlet) Enclosure version (PPS probe), M20 x 1.5 cable inlet Enclosure version with PVDF probe body, M20 x 1.5 cable inlet					1 3 5 6 7 8
Overfill protection Not required Required (WHG)					0 1

¹⁾ Barrier or Intrinsically Safe power supply required for Intrinsically Safe protection.

Selection and Ordering data	Order code
Further designs Please add "-Z" to Article No. and specify Order code(s). Stainless steel tag [70 x 13 mm (2.75 x 0.5 inch)]: Measuring-point number/identification (max. 20 characters) specify in plain text FFKM seal O-ring ¹⁾ Material inspection Certificate Type 3.1 per EN 10204 INMETRO ²⁾	Y17 A22 C12 E34
Operating Instructions Note: due to ATEX regulations one Quick start manual is included with every product. All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation	

¹⁾ See also CLS100 pressure/temperature curve.

²⁾ Available only with Approvals option C.

Selection and Ordering data	Article No.
Accessories SensGuard, ¾" NPT (PPS). Only available for CLS100 with ¾" NPT thread.	7ML1830-1DL
SensGuard, R 1" (BSPT) (PPS). Only available for CLS100 with ¾" NPT thread.	7ML1830-1DM
Tag, stainless steel, 12 x 45 mm (0.47 x 1.77 inch), one text line, suitable for enclosures	7ML1930-1AC
Siemens Intrinsically Safe Barrier (DC powered), ATEX II 1 G EEx ia	7NG4124-0AA00
½" NPT General Purpose Cable Entry IP68/IP69K NEMA 6, -40 ... +80 °C (-40 ... +176 °F), Dust Ignition Proof, cable size 6 ... 12 mm (0.236 ... 0.472 inch)	7ML1830-1JA
M20 x 1.5 General Purpose Cable Entry IP68/IP69K NEMA 6, -40 ... +80 °C (-40 ... +176 °F), Dust Ignition Proof, cable size 7 ... 12 mm (0.275 ... 0.472 inch)	7ML1830-1JC

Selection and ordering data (continued)

	Article No.				
Pointek CLS100 RF Capacitance point level switch, PPS process connection Detects level and interface in liquids, solids, slurries, and foam. Compact, with 100 mm (4 inch) insertion, adaptable sensitivity, with the ability to tune out build-up on probe.	7ML5610- 0	●	●	●	●
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.					
Process connection (PPS)					
¾" NPT [(Taper), ANSI/ASME B1.20.1] (PPS probe body)			A		
R 1" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] (PPS probe body)			B		
Approvals					
General Purpose: CSA, FM				D	
Versions/Options					
Enclosure version, PPS process connection, ½" NPT cable inlet					1
Enclosure version, PPS process connection, M20 x 1.5					2
Overfill protection					
Not required					0
Required					1

Selection and Ordering data	Order code
Further designs	
Please add "-Z" to Article No. and specify Order code(s).	
Stainless steel tag [70 x 13 mm (2.75 x 0.5 inch)]: Measuring-point number/identification (max. 20 characters) specify in plain text	Y17
Material inspection Certificate Type 3.1 per EN 10204	C12

Selection and ordering data	Article No.
Operating Instructions	
Note: due to ATEX regulations one Quick start manual is included with every product. All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation	
Accessories	
SensGuard, ¾" NPT (PPS). Only available for CLS100 with ¾" NPT thread.	7ML1830-1DL
SensGuard, R 1" (BSPT) (PPS). Only available for CLS100 with ¾" NPT thread.	7ML1830-1DM
Tag, stainless steel, 12 x 45 mm, (0.47 x 1.77 inch) one text line, suitable for enclosures	7ML1930-1AC

1) See also CLS100 pressure/temperature curve.

Level Measurement

Point level measurement

RF Capacitance / Pointek CLS100

Technical specifications

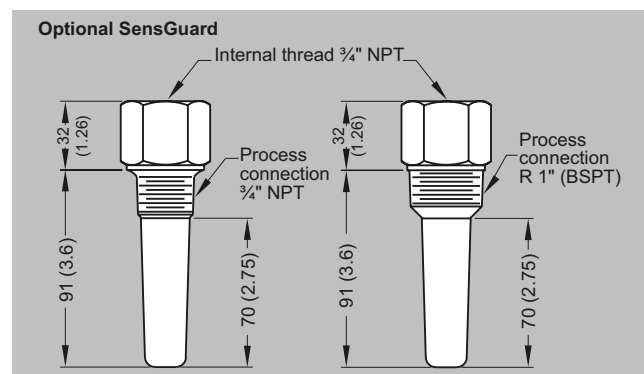
Pointek CLS100	Stainless steel process connection (integral cable or enclosure version) (7ML5501)	Fully synthetic process connection (enclosure version only) (7ML5610)
Mode of operation		
Measuring principle	Inverse frequency shift capacitive level detection	Inverse frequency shift capacitive level detection
Input		
Measured variable	Change in pF	Change in pF
Output		
Output signal		
• Alarm output	4 ... 20/20 ... 4 mA 2-wire loop	4 ... 20/20 ... 4 mA 2-wire loop
• Switch output ¹⁾	Solid-state: 30 V DC/30 V AC, max. 82 mA	Max. switching voltage: 60 V DC/30 V AC Max. switching current: 1 A
• Fail-safe mode	Min. or max.	Min. or max.
Accuracy		
Repeatability	2 mm (0.08 inch)	2 mm (0.08 inch)
Rated operating conditions ²⁾		
Installation conditions		
• Location	Indoor/outdoor	Indoor/outdoor
Ambient conditions		
• Ambient temperature	-30 ... +85 °C (-22 ... +185 °F)	-10 ... +85 °C (14 ... 185 °F)
• Storage temperature	-40 ... 85 °C (-40 ... +185 °F)	-40 ... 85 °C (-40 ... +185 °F)
• Installation category	I	I
• Pollution degree	4	4
Medium conditions		
• Relative dielectric constant ϵ_r	Min. 1.5	Min. 1.5
• Process temperature	-30 ... +100 °C (-22 ... +212 °F)	-10 ... +100 °C (14 ... 212 °F)
• Pressure (vessel)	-1 ... +10 bar g (-14.6 ... +146 psi g), nominal ²⁾	-1 ... +10 bar g (-14.6 ... +146 psi g), nominal
• Degree of protection		
- Enclosure version	IP68/Type 4/NEMA 4	IP68/Type 4/NEMA 4
- Integral cable version	IP65/Type 4/NEMA 4	Not applicable
• Cable inlet	½" NPT (M20 x 1.5 optional)	½" NPT (M20 x 1.5 optional)
Design	<u>Enclosure/Integral cable version</u>	<u>Fully synthetic version</u>
Material		
• Body (Enclosure version)	Thermoplastic polyester	Thermoplastic polyester
• Lid (Enclosure version)	Transparent thermoplastic polycarbonate (PC)	Transparent thermoplastic polycarbonate (PC)
• Integrated cable body (Integral cable version)	316L stainless steel	Not applicable
Sensor length (nominal)	100 mm (4 inch)	100 mm (4 inch)
Process connection material of probe/wetted parts ³⁾	Connection: 316L stainless steel; Process seal: FKM (optional FFKM); Sensor: PPS (optional PVDF) ⁴⁾	PPS process connection and PPS sensor (Uni-Construction)
Connection (Enclosure version)	Internal 5-point terminal block, ½" NPT wiring entrance, M20 x 1.5 optional	Removable internal 5-point terminal block, ½" NPT wiring entrance, M20 x 1.5 optional

Technical specifications (continued)

Pointek CLS100	Stainless steel process connection (integral cable or enclosure version) (7ML5501)	Fully synthetic process connection (enclosure version only) (7ML5610)
Connection (Integral cable version)	4 conductors, 1 m (3.3 ft), 0.5 mm ² (22 AWG), shielded, polyester jacket	Not applicable
Process connection	¾" NPT [(Taper), ANSI/ASME B1.20.1] R 1" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] G 1" [(BSPP), EN ISO 228-1/PP (JIS-P), JIS B 0202]	¾" NPT [(Taper), ANSI/ASME B1.20.1] R 1" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]
Power supply		
Standard	12 ... 33 V DC	12 ... 33 V DC
Intrinsically Safe	10 ... 30 V DC (Intrinsically Safe barrier required)	Not applicable
Certificates and approvals	<ul style="list-style-type: none"> • General: CE, CSA, FM, RCM • Marine: Lloyds Register of Shipping, categories ENV1, ENV2, and ENV5 • Dust Ignition Proof (barrier required): CSA/FM Class II and III, Div. 1, Groups E, F, G T4 • Intrinsically Safe (barrier required): CSA/FM Class I, II, and III, Div. 1, Groups A, B, C, D, E, F, G T4 • ATEX II 1 GD ½ GD EEx ia IIC T4 to T6 T107 °C • Overfill protection: WHG (Germany) 	<ul style="list-style-type: none"> • General: CSA, FM

- 1) When synthetic process connection version (7ML5610) is used in wet locations, switching voltage of the relay is limited to 35 V DC/16 V AC.
- 2) When operation is in areas classified as hazardous, observe restrictions according to relevant certificate. See also CLS100 Pressure/Temperature curves.
- 3) For caustic materials, consult a local sales person for alternative O-rings. For more information, please visit http://www.automation.siemens.com/aspa_app.
- 4) When FFKM O-ring (Option A22) is selected, process temperature is restricted to -20 °C (-4 °F).

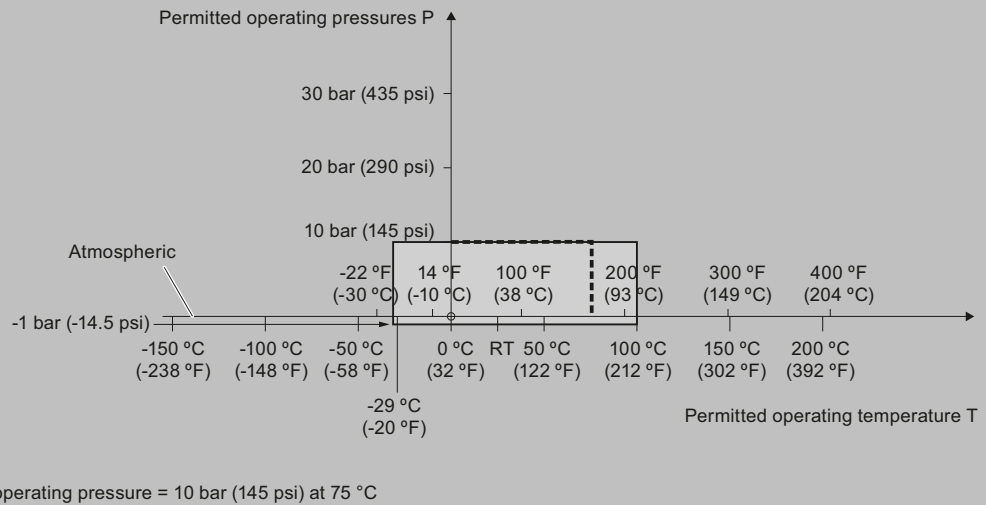
Options



Optional SensGuard, dimensions in mm (inch)

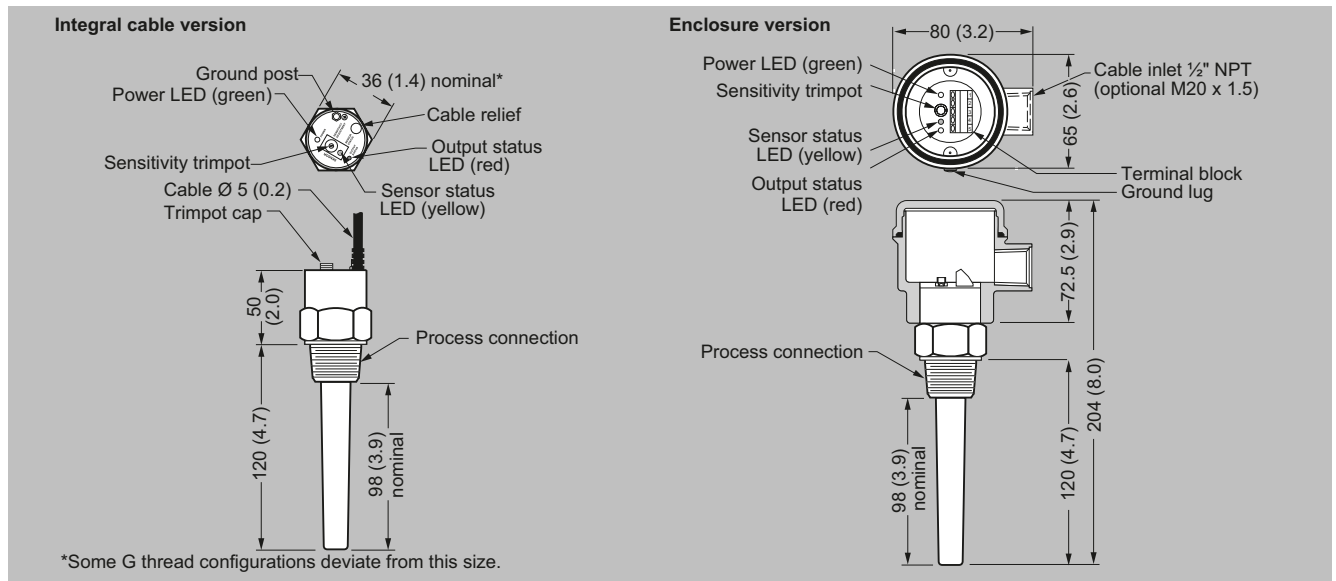
Characteristic curves

Pressure/temperature curve CLS100
Threaded process connections (7ML5501)



Pointek CLS100 process pressure/temperature derating curves

Dimensional drawings



Pointek CLS100, dimensions in mm (inch)

Level Measurement

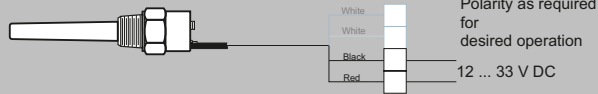
Point level measurement

RF Capacitance / Pointek CLS100

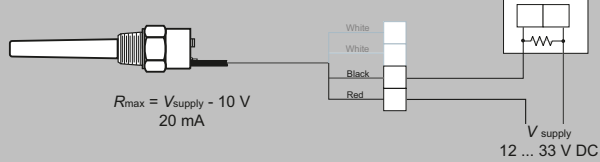
Circuit diagrams

Integral Cable Version - Non Intrinsically Safe only

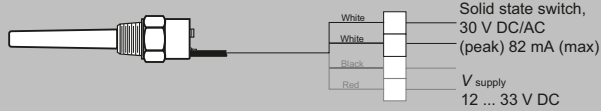
LOW/HIGH Alarm



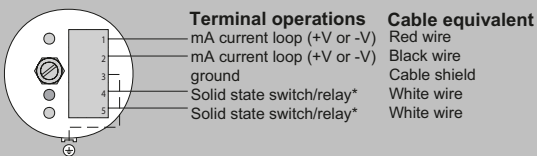
4/20 mA Loop Alarm



Solid State Switch Version



Enclosure and Fully Synthetic Version



* Switch/relay normally open in unpowered state

* Relay not available on Pointek CLS100 IS version (7ML5501)

Note:

When driving an inductive load (for example, an external relay), a protection diode must be connected in the correct polarity to prevent possible switch damage due to inductive spikes generated by switching the inductor (please refer to instruction manual). Intrinsically Safe Models - please follow local regulations and area classifications; refer to instruction manual for more details.

Pointek CLS100 connections

Overview



Pointek CLS200 (standard version) is a versatile inverse frequency shift capacitance level and material detection switch with optional rod/cable choices and configurable output. CLS200 is ideal for detection of liquids, solids, slurries, foam, and interfaces and has the ability to tune out buildup on the probe.

Benefits

- Potted construction protects signal circuit from shock, vibration, humidity, and/or condensation
- High chemical resistance
- Level detection independent of tank or pipe earth reference
- Insensitive to product buildup due to high frequency oscillation
- 3 LED indicators for sensor status, output status, and power
- Suitable for API 2350

Application

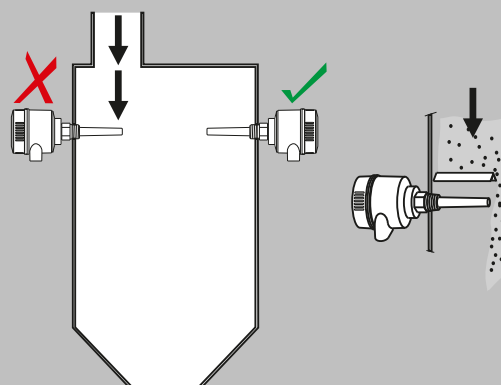
Pointek CLS200 standard version has 3 LED indicators with basic relay and solid-state switch alarms. Universal switch for solids/liquids and interface.

The power supply is galvanically isolated and accepts a wide range of voltages (12 to 250 V AC/DC). When used with thermal isolator, the stainless steel and PPS (PVDF optional) materials used in the probe construction provide a temperature rating up to 125 °C (257 °F) on the process wetted portion of the probe. The switch responds to any material with a dielectric constant of 1.5 or more by detecting a change in oscillating frequency, and it can be set to detect before contact or on contact with the probe. The CLS200 operates independently of the tank wall or pipe so it does not require an external reference electrode for level detection in a non-conductive vessel such as concrete or plastic (EMC regulations applicable in some regions).

- Key Applications: liquids, slurries, powders, granules, pressurized applications, hazardous areas

Configuration

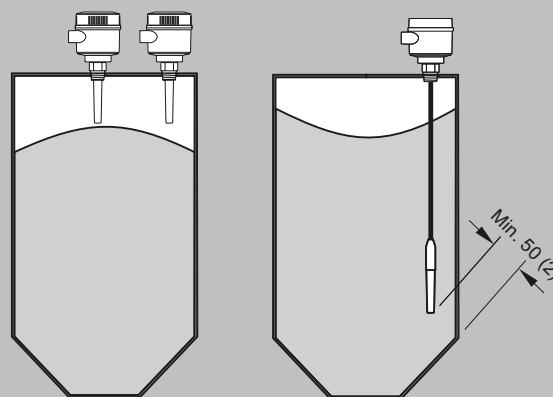
Installation



Keep unit out of path of falling material, or protect probe from falling material.



Avoid areas where material build up occurs.



Install probe at least 50 (2) from tank wall.

Pointek CLS200 installation, dimensions in mm (inch)

Level Measurement

Point level measurement

RF Capacitance / Pointek CLS200 - Standard

Selection and ordering data

Pointek CLS200 RF Capacitance point level switch, rod design Detects level and interface in liquids, solids, slurries, and foam. Adjustable, 5.5 m (18.04 ft), insertion, adaptable sensitivity, with the ability to tune out build-up on probe.	Article No. 7ML5630- ● ● ● ● ● - ● ● ● 0	
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Process connection		
<u>Threaded, 316L stainless steel</u>		
¾" NPT [(Taper), ASME B1.20.1]	0	A
1" NPT [(Taper), ASME B1.20.1]	0	B
1¼" NPT [(Taper), ASME B1.20.1]	0	C
1½" NPT [(Taper), ASME B1.20.1]	0	D
R ¾" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]	1	A
R 1" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]	1	B
R 1½" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]	1	D
G ¾" [(BSPP), EN SO 228-1/PF (JIS-P), JIS B 0202]	3	A
G 1" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]	3	B
G 1½" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]	3	D
<u>Welded flange, 316L stainless steel, raised face</u>		
1" ASME, 150 lb	5	A
1" ASME, 300 lb	5	B
1" ASME, 600 lb	5	C
1½" ASME, 150 lb	5	D
1½" ASME, 300 lb	5	E
1½" ASME, 600 lb	5	F
2" ASME, 150 lb	5	G
2" ASME, 300 lb	5	H
2" ASME, 600 lb	5	J
3" ASME, 150 lb	5	K
3" ASME, 300 lb	5	L
3" ASME, 600 lb	5	M
4" ASME, 150 lb	5	N
4" ASME, 300 lb	5	P
4" ASME, 600 lb	5	Q
<u>Welded flange, 316L stainless steel, Type A flat faced</u>		
DN 25, PN 16	6	A
DN 25, PN 40	6	B
DN 40, PN 16	6	C
DN 40, PN 40	6	D
DN 50, PN 16	6	E
DN 50, PN 40	6	F
DN 80, PN 16	6	G
DN 80, PN 40	6	H
DN 100, PN 16	6	J
DN 100, PN 40 (Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1 standard.)	6	K
Probe length		
(length from flange face) (threaded lengths include process thread)		
<u>Note: No Y01 needed in Order code for standard lengths</u>		
Compact [threaded 120 mm (4.72 inch), Flanged 98 mm (3.86 inch)]		A
Extended rod, 250 mm (9.84 inch)		B
Extended rod, 350 mm (13.78 inch)		C
Extended rod, 500 mm (19.69 inch)		D
Extended rod, 750 mm (29.53 inch)		E
Extended rod, 1 000 mm (39.37 inch)		F
Extended rod, 1 250 mm (49.21 inch)		G
Extended rod, 1 350 mm (53.15 inch)		H
Extended rod, 1 500 mm (59.06 inch)		J
Extended rod, 1 750 mm (68.90 inch)		K
Extended rod, 2 000 mm (78.74 inch)		L

Selection and ordering data (continued)

	Article No.
Pointek CLS200 RF Capacitance point level switch, rod design Detects level and interface in liquids, solids, slurries, and foam. Adjustable, 5.5 m (18.04 ft), insertion, adaptable sensitivity, with the ability to tune out build-up on probe.	7ML5630- ● ● ● ● ● - ● ● ● 0
Add Order code Y01 and plain text: "Insertion length ... mm"	
Extended rod, 210 ... 1 000 mm (8.27 ... 39.37 inch)	M
Extended rod, 1 001 ... 2 000 mm (39.41 ... 78.74 inch)	N
Extended rod, 2 001 ... 3 000 mm (78.78 ... 118.11 inch)	P
Extended rod, 3 001 ... 4 000 mm (118.15 ... 157.48 inch)	Q
Extended rod, 4 001 ... 5 000 mm (157.52 ... 196.85 inch)	R
Extended rod, 5 001 ... 5 500 mm (196.89 ... 216.53 inch)	S
Thermal isolator	
Without thermal isolator	0
With thermal isolator [for process connection temperatures over 85 °C (185 °F)]	1
Remote mount electronics and mounting bracket	
With 2 m (79 inch) of cable ¹⁾²⁾	2
With 5 m (197 inch) of cable ¹⁾²⁾	3
Wetted seals	
FKM	0
FFKM [for process temperatures above -20 °C (-4 °F)]	1
Probe material	
316L stainless steel with PPS probe body	0
316L stainless steel with PVDF probe body	1
Approvals	
Dust Ignition Proof:CE, RCM, ATEX II 1/2 D T100 °C	C
Flameproof Enclosure with IS Probe: CE, RCM, ATEX II 1 G EEx d[ia] IIC T6 ... T4, ATEX II 1/2 D T100 °Cb	D
Flameproof Enclosure with IS Probe, with WHG approval: CE, RCM, ATEX II 1/2 G EEx d[ia] IIC T6 ... T4, ATEX II 1/2 D T100 °C	E
Dust Ignition Proof with IS Probe: CSA/FM Class II, Div. 1, Groups E, F, G, CSA/FM Class III T4	F
Explosion Proof Enclosure with IS Probe: CSA/FM Class I, Div. 1, Groups A, B, C, D, CSA/FM Class II, Div. 1, Groups E, F, G, CSA/FM Class III T4	G
General Purpose (CSA, FM)	H
General Purpose (CE, RCM)	J
General Purpose (CSA, FM, CE, RCM) with WHG approval	K
Enclosure and lid	
Aluminum epoxy coated	
2 x ½" NPT via adapter - cable inlet, IP65	A
2 x M20 x 1.5 cable inlet, IP65	B
2 x ½" NPT via adapter - cable inlet, IP68	C
2 x M20 x 1.5 cable inlet IP68	D

¹⁾ Barrier or Intrinsically Safe power supply required for Intrinsically Safe protection.

²⁾ Available with Approval options F, G, and H.

Selection and Ordering data	Order code
Further designs	
Please add "-Z" to Article No. and specify Order code(s).	
Total insertion length: enter the total insertion length in plain text description	Y01
Stainless steel tag [70 x 13 mm (2.75 x 0.5 inch)]: Measuring-point number/identification (max. 27 characters) specify in plain text	Y15
Manufacturer's test certificate: M to DIN 55350, Part 18 and ISO 9000	C11
Material inspection Certificate Type 3.1 per EN 10204	C12
SIL/IEC 61508 Declaration of Conformity [SIL 2 (overspill)]	C20
INMETRO ¹⁾	E34

Level Measurement

Point level measurement

RF Capacitance / Pointek CLS200 - Standard

Selection and ordering data (continued)

Selection and Ordering data	Order code
Operating Instructions All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation	
Accessories	See accessories shown following CLS200 Digital selection and ordering data.

1) Available only with Approvals options C, D, E.

	Article No.	
Pointek CLS200 RF Capacitance point level switch, cable design Detects level and interface in liquids, solids, slurries, and foam. Cable extension options to 30 m (98.43 ft), adaptable sensitivity, with the ability to tune out build-up on probe.	7ML5631-	● ● ● ● ● - ● ● ● 0
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Process connection		
<u>Threaded, 316L stainless steel</u>		
¾" NPT [(Taper), ASME B1.20.1]	0	A
1" NPT [(Taper), ASME B1.20.1]	0	B
1¼" NPT [(Taper), ASME B1.20.1]	0	C
1½" NPT [(Taper), ASME B1.20.1]	0	D
R ¾" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]	1	A
R 1" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]	1	B
R 1½" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]	1	D
G ¾" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]	3	A
G 1" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]	3	B
G 1½" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]	3	D
<u>Welded flange, 316L stainless steel, raised face</u>		
1" ASME, 150 lb	5	A
1" ASME, 300 lb	5	B
1" ASME, 600 lb	5	C
1½" ASME, 150 lb	5	D
1½" ASME, 300 lb	5	E
1½" ASME, 600 lb	5	F
2" ASME, 150 lb	5	G
2" ASME, 300 lb	5	H
2" ASME, 600 lb	5	J
3" ASME, 150 lb	5	K
3" ASME, 300 lb	5	L
3" ASME, 600 lb	5	M
4" ASME, 150 lb	5	N
4" ASME, 300 lb	5	P
4" ASME, 600 lb	5	Q
<u>Welded flange, 316L stainless steel, Type A flat faced</u>		
DN 25, PN 16	6	A
DN 25, PN 40	6	B
DN 40, PN 16	6	C
DN 40, PN 40	6	D
DN 50, PN 16	6	E
DN 50, PN 40	6	F
DN 80, PN 16	6	G
DN 80, PN 40	6	H
DN 100, PN 16	6	J
DN 100, PN 40	6	K
(Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1 standard.)		

Selection and ordering data (continued)

	Article No.									
Pointek CLS200 RF Capacitance point level switch, cable design Detects level and interface in liquids, solids, slurries, and foam. Cable extension options to 30 m (98.43 ft), adaptable sensitivity, with the ability to tune out build-up on probe.	7	M	L	5	6	3	1	-	0	0
Probe length (length from flange face) (threaded lengths include process thread)										
Note: No Y01 needed in Order code for standard lengths										
Extended cable, 3 000 mm (118.11 inch), length can be determined by customer on assembly ¹⁾									A	
Extended cable, 6 000 mm (236.22 inch), length can be determined by customer on assembly ¹⁾									B	
Add Order code Y01 and plain text: "Insertion length ... mm"										
Extended cable, 500 ... 5 000 mm (19.69 ... 196.85 inch)									C	
Extended cable, 5 001 ... 1 000 mm (196.89 ... 393.70 inch)									D	
Extended cable, 10 001 ... 15 000 mm (393.74 ... 590.55 inch)									E	
Extended cable, 15 001 ... 20 000 mm (590.59 ... 787.4 inch)									F	
Extended cable, 20 001 ... 25 000 mm (787.44 ... 984.25 inch)									G	
Extended cable, 25 001 ... 30 000 mm (984.29 ... 1 181.1 inch)									H	
Thermal isolator										
Without thermal isolator									0	
With thermal isolator [for process connection temperatures over 85 °C (185 °F)]									1	
Remote mount electronics and mounting bracket										
With 2 m (79 inch) of cable ²⁾									2	
With 5 m (197 inch) of cable ²⁾									3	
Wetted seals										
FKM and PTFE									0	
FFKM and PTFE [for process temperatures above -20 °C (-4 °F)]									1	
Probe material										
FEP jacketed cable with PPS probe body									0	
FEP jacketed cable with PVDF probe body									1	
Approvals										
Dust Ignition Proof: CE, RCM, ATEX II 1/2 D T100 °C										C
Flameproof Enclosure with IS Probe: CE, RCM, ATEX II 1 G EEx d[ia] IIC T6 ... T4, ATEX II 1/2 D T100 °C										D
Flameproof Enclosure with IS Probe, with WHG approval: CE, RCM, ATEX II 1/2 G EEx d[ia] IIC T6 ... T4, ATEX II 1/2 D T100 °C										E
Dust Ignition Proof with IS Probe: CSA/FM Class II, Div. 1, Groups E, F, G, CSA/FM Class III T4										F
Explosion Proof Enclosure with IS Probe: CSA/FM Class I, Div. 1, Groups A, B, C, D, CSA/FM Class II, Div. 1, Groups E, F, G, CSA/FM Class III T4										G
General Purpose (CSA, FM)										H
General Purpose (CE, RCM)										J
General Purpose (CSA, FM, CE, RCM) with WHG approval										K
Enclosure and lid										
Aluminum epoxy coated										
2 x 1/2" NPT via adapter - cable inlet, IP65										A
2 x M20 x 1.5 cable inlet, IP65										B
2 x 1/2" NPT via adapter - cable inlet, IP68										C
2 x M20 x 1.5 cable inlet, IP68										D

1) Sensor detached to allow customer to set desired cable length.

2) Available with Approvals options F ... H.

Level Measurement

Point level measurement

RF Capacitance / Pointek CLS200 - Standard

Selection and ordering data (continued)

Selection and Ordering data	Order code
Further designs	
Please add "-Z" to Article No. and specify Order code(s).	
Total insertion length: enter the total insertion length in plain text description	Y01
Stainless steel tag [70 x 13 mm (2.75 x 0.5 inch)]: Measuring-point number/identification (max. 27 characters) specify in plain text	Y15
Manufacturer's test certificate: M to DIN 55350, Part 18 and ISO 9000	C11
Material inspection Certificate Type 3.1 per EN 10204	C12
SIL/IEC 61508 Declaration of Conformity [SIL 2 (overspill)]	C20
INMETRO ¹⁾	E34
Operating Instructions	
All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation	
Accessories	See accessories shown following CLS200 Digital selection and ordering data.

¹⁾ Available only with Approvals options C, D, E.

	Article No.										
Pointek CLS200 RF Capacitance point level switch, sanitary rod design	7	M	L	5	6	3	2	-	0	0	0
Detects level and interface in liquids, solids, slurries, and foam. Adjustable, 5.5 m (18.04 ft), insertion, adaptable sensitivity, with the ability to tune out build-up on probe.											
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.											
Process connection											
<u>Sanitary 316L stainless steel</u>											
1" sanitary fitting clamp			8			A					
1½" sanitary fitting clamp			8			B					
2" sanitary fitting clamp			8			C					
2½" sanitary fitting clamp			8			D					
3" sanitary fitting clamp (Note: Sanitary connection dimensionally corresponds to the applicable ISO 2852 standard)			8			E					
Probe length (length from process connection face)											
<u>Note: No Y01 needed in Order code for standard lengths</u>											
Compact, 98 mm (3.86 inch)										A	
Extended rod, 250 mm (9.84 inch)										B	
Extended rod, 350 mm (13.78 inch)										C	
Extended rod, 500 mm (19.69 inch)										D	
Extended rod, 750 mm (29.53 inch)										E	
Extended rod, 1 000 mm (39.37 inch)										F	
Extended rod, 1 250 mm (49.21 inch)										G	
Extended rod, 1 350 mm (53.15 inch)										H	
Extended rod, 1 500 mm (59.06 inch)										J	
Extended rod, 1 750 mm (68.90 inch)										K	
Extended rod, 2 000 mm (78.74 inch)										L	
<u>Add Order code Y01 and plain text:</u> <u>"Insertion length ... mm"</u>											
Extended rod, 110 ... 350 mm (4.3 ... 13.78 inch)										M	
Extended rod, 351 ... 1 000 mm (13.78 ... 39.37 inch)										N	
Extended rod, 1 001 ... 2 000 mm (39.41 ... 78.74 inch)										P	
Extended rod, 2 001 ... 3 000 mm (78.78 ... 118.11 inch)										Q	
Extended rod, 3 001 ... 4 000 mm (118.15 ... 157.48 inch)										R	
Extended rod, 4 001 ... 5 000 mm (157.52 ... 196.85 inch)										S	
Extended rod, 5 001 ... 5 500 mm (196.89 ... 216.53 inch)										T	

Selection and ordering data (continued)

	Article No.									
Pointek CLS200 RF Capacitance point level switch, sanitary rod design Detects level and interface in liquids, solids, slurries, and foam. Adjustable, 5.5 m (18.04 ft), insertion, adaptable sensitivity, with the ability to tune out build-up on probe.	7	M	L	5	6	3	2	-	0	0
Thermal isolator										
Thermal isolator									0	
With thermal isolator [for process connection temperatures over 85 °C (185 °F)]									1	
Remote mount electronics and mounting bracket										
Remote mount electronics and mounting bracket									2	
Remote mount electronics with 5 m (197 inch) of cable									3	
Wetted seals										
FKM									0	
FFKM [for process temperatures above -20 °C (-4 °F)]									1	
Probe material										
316L stainless steel with PPS probe body									0	
316L stainless steel with PVDF probe body									1	
Approvals										
Dust Ignition Proof: CE, RCM, ATEX II ½ D T100 °C										C
Flameproof Enclosure with IS Probe: CE, RCM, ATEX II 1 G EEx d[ia] IIC T6 ... T4, ATEX II ½ D T100 °C										D
Flameproof Enclosure with IS Probe: CE, RCM, ATEX II 1 G EEx d[ia] IIC T6 ... T4, ATEX II ½ D T100 °C										E
Dust Ignition Proof with IS Probe: CSA/FM Class II, Div. 1, Groups E, F, G, CSA/FM Class III T4										F
Explosion Proof Enclosure With IS Probe: CSA/FM Class I, Div. 1, Gr. A, B, C, D CSA/FM Class II, Div. 1, Gr. E, F, G CSA/FM Class III T4										G
General Purpose (CSA, FM)										H
General Purpose (CE, RCM)										J
General Purpose (CSA, FM, CE, RCM) with WHG approval										K
Enclosure and lid										
<u>Aluminum epoxy coated</u>										
2 x ½" NPT via adapter - cable inlet, IP65										A
2 x M20 x 1.5 cable inlet, IP65										B
2 x ½" NPT via adapter - cable inlet, IP68										C
2 x M20 x 1.5 cable inlet, IP68										D

Selection and Ordering data	Order code
Further designs	
Please add "-Z" to Article No. and specify Order code(s).	
Total insertion length: enter the total insertion length in plain text description	Y01
Stainless steel tag [70 x 13 mm (2.75 x 0.5 inch)]: Measuring-point number/identification (max. 27 characters) specify in plain text	Y15
Manufacturer's test certificate: M to DIN 55350, Part 18 and ISO 9000	C11
Material inspection Certificate Type 3.1 per EN 10204	C12
SIL/IEC 61508 Declaration of Conformity [SIL 2 (overspill)]	C20
INMETRO ¹⁾	E34
Operating Instructions	
All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation	

Level Measurement

Point level measurement

RF Capacitance / Pointek CLS200 - Standard

Selection and ordering data (continued)

Selection and Ordering data	Order code
Accessories	See accessories shown following CLS200 Digital selection and ordering data.

¹⁾ Available only with Approvals options C, D, E.

Pointek CLS200 RF Capacitance point level switch, sliding coupling design Detects level and interface in liquids, solids, slurries, and foam. Adjustable, 5.5 m (18.04 ft), insertion, adaptable sensitivity, with the ability to tune out build-up on probe.	Article No.										
	7	M	L	5	6	3	3	-	0	0	0
Process connection											
<u>Threaded, 316L stainless steel</u>											
¾" NPT [(Taper), ASME B1.20.1]											A
1" NPT [(Taper), ASME B1.20.1]											B
1¼" NPT [(Taper), ASME B1.20.1]											C
1½" NPT [(Taper), ASME B1.20.1]											D
R ¾" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]											A
R 1" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]											B
R 1½" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]											D
G ¾" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]											A
G 1" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]											B
G 1½" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]											D
Probe length (length from flange face) (threaded lengths include process thread)											
<u>Note: No Y01 needed in Order code for standard lengths</u>											
Extended rod, 350 mm (13.78 inch)											C
Extended rod, 500 mm (19.69 inch)											D
Extended rod, 750 mm (29.53 inch)											E
Extended rod, 1 000 mm (39.37 inch)											F
Extended rod, 1 250 mm (49.21 inch)											G
Extended rod, 1 350 mm (53.15 inch)											H
Extended rod, 1 500 mm (59.06 inch)											J
Extended rod, 1 750 mm (68.90 inch)											K
Extended rod, 2 000 mm (78.74 inch)											L
<u>Add Order code Y01 and plain text: "Insertion length ... mm"</u>											
Extended rod, 350 ... 1 000 mm (13.78 ... 39.37 inch)											M
Extended rod, 1 001 ... 2 000 mm (39.41 ... 78.74 inch)											N
Extended rod, 2 001 ... 3 000 mm (78.78 ... 118.11 inch)											P
Extended rod, 3 001 ... 4 000 mm (118.15 ... 157.48 inch)											Q
Extended rod, 4 001 ... 5 000 mm (157.52 ... 196.85 inch)											R
Extended rod, 5 001 ... 5 500 mm (196.89 ... 216.53 inch)											S
Thermal isolator											
Without thermal isolator											0
With thermal isolator [for process connection temperatures over 85 °C (185 °F)]											1
Remote mount electronics and mounting bracket											
With 2 m (79 inch) of cable ¹⁾											2
With 5 m (197 inch) of cable ¹⁾											3
Wetted seals											
FKM and PTFE											0
FFKM and PTFE [for process temperatures above -20 °C (-4 °F)]											1
Probe material											
316L stainless steel with PPS probe body											0
316L stainless steel with PVDF probe body											1

Selection and ordering data (continued)

	Article No.
Pointek CLS200 RF Capacitance point level switch, sliding coupling design Detects level and interface in liquids, solids, slurries, and foam. Adjustable, 5.5 m (18.04 ft), insertion, adaptable sensitivity, with the ability to tune out build-up on probe.	7ML5633- ● ● ● ● ● - ● ● ● 0
Approvals	
Dust Ignition Proof: CE, RCM, ATEX II 1/2 D T100 °C	C
Flameproof Enclosure with IS Probe: CE, RCM, ATEX II 1 G EEx d[ia] IIC T6 ... T4, ATEX II 1/2 D T100 °C	D
Flameproof Enclosure with IS Probe, with WHG approval: CE, RCM, ATEX II 1/2 G EEx d[ia] IIC T6 ... T4, ATEX II 1/2 D T100 °C	E
Dust Ignition Proof with IS Probe: CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4	F
Explosion Proof Enclosure with IS Probe: CSA/FM Class I, Div. 1, Groups A, B, C, D CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4	G
General Purpose (CSA, FM)	H
General Purpose: CE, RCM	J
General Purpose (CSA, FM, CE, RCM) with WHG approval	K
Enclosure and lid	
Aluminum epoxy coated	
2 x 1/2" NPT via adapter - cable inlet, IP65	A
2 x M20 x 1.5 cable inlet, IP65	B
2 x 1/2" NPT via adapter - cable inlet, IP68	C
2 x M20 x 1.5 cable inlet, IP68	D

¹⁾ Available with Approvals options F ... H.

Selection and Ordering data	Order code
Further designs	
Please add "-Z" to Article No. and specify Order code(s).	
Total insertion length: enter the total insertion length in plain text description	Y01
Stainless steel tag [70 x 13 mm (2.75 x 0.5 inch)]: Measuring-point number/identification (max. 27 characters) specify in plain text	Y15
Manufacturer's test certificate: M to DIN 55350, Part 18 and ISO 9000	C11
Material inspection Certificate Type 3.1 per EN 10204	C12
SIL/IEC 61508 Declaration of Conformity [SIL 2 (overspill)]	C20
INMETRO ¹⁾	E34
Operating Instructions	
All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation	
Accessories	See accessories shown following CLS200 Digital selection and ordering data.

¹⁾ Available only with Approval options C, D, E.

Level Measurement

Point level measurement

RF Capacitance / Pointek CLS200 - Standard

Technical specifications

Pointek CLS200 - Standard	
Mode of operation	
Measuring principle	Inverse frequency shift capacitive level detection
Input	
Measured variable	Change in picroFarad (pF)
Output	
Output signal	
• Relay output	1 SPDT Form C relay
- Max. contact voltage	<ul style="list-style-type: none"> • 30 V DC • 250 V AC
- Max. contact current	<ul style="list-style-type: none"> • 5 A DC • 8 A AC
- Max. switching capacity	150 W DC 2 000 VA AC
- Time delay (ON and/or OFF)	1 ... 60 s
• Solid-state output	
- Output	Galvanically isolated
- Protection	Against reversed polarity (bipolar)
- Max. switching voltage	<ul style="list-style-type: none"> • 30 V DC • 30 V peak AC
- Max. load current	82 mA
- Voltage drop	< 1 V, typical at 50 mA
- Time delay (pre or post switching)	1 ... 60 s
Rated operating conditions¹⁾	
Installation conditions	
• Location	Indoor/outdoor
Ambient conditions	
• Ambient temperature	-40 ... +85 °C (-40 ... +185 °F) ²⁾
• Storage temperature	-40 ... +85 °C (-40 ... +185 °F)
• Installation category	II
• Pollution degree	4
Medium conditions	Liquids, bulk solids, slurries and interfaces
• Relative dielectric constant ϵ_r	Min. 1.5
• Process temperature	
- Without thermal isolator	-40 ... +85 °C (-40 ... +185 °F) ²⁾
- With thermal isolator	-40 ... +125 °C (-40 ... +257 °F)
• Process pressure (rod version)	-1 ... +25 bar g (-14.6 ... +365 psi g) (nominal)
• Process pressure (cable version) ³⁾	-1 ... +10 bar g (-14.6 ... +150 psi g) (nominal)
• Process pressure (sliding coupling version)	-1 ... +10 bar g (-14.6 ... +150 psi g) (nominal)
Electromagnetic compatibility	To comply with CE EMC regulations (where applicable); the CLS200 should be installed per the instruction manual.
Design	
Material	
• Enclosure	Epoxy-coated aluminum with gasket
• Optional thermal isolator	316L stainless steel
Connection	Removable terminal block, max. 2.5mm ²
Degree of protection	IP65/Type 4/NEMA 4 (optional IP68)
Cable inlet	2 x M20 x 1.5 thread (option: 2 x 1/2" NPT conduit entry including 1 plugged entry)
Power supply	12 ... 250 V AC/DC, 0 ... 60 Hz max. 2 W
Certificates and approvals	
General Purpose	CSA, FM, CE, RCM
Dust Ignition Proof	ATEX II 1/2 D T100 °C

Technical specifications (continued)

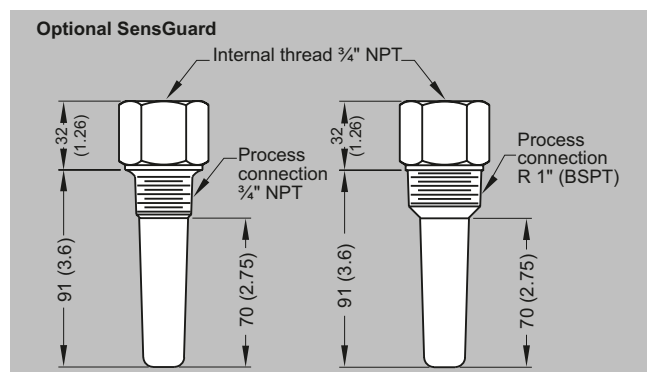
Pointek CLS200 - Standard	
Flameproof Enclosure With IS Probe	ATEX II 1 G EEx d[ia] IIC T6 ... T4 ATEX II ½ D T100 °C
Dust Ignition Proof with IS Probe	CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4
Explosion Proof Enclosure With IS Probe	CSA/FM Class I, Div. 1, Groups A, B, C, D CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4
Marine	Lloyds Register of Shipping, Categories ENV1, ENV2, and ENV5
Overfill Protection	WHG (Germany) VLAREM II
Others	Pattern Approval (China), SIL

- When operation is in areas classified as hazardous, observe restrictions according to relevant certificate. See also CLS200 pressure/temperature curves.
- Thermal isolator is used if process connection temperature exceeds 85 °C (185 °F)
- Pressure rating of process seal is temperature dependent. See also CLS200 pressure/temperature curves.

Design: Probe	Rod version	Sanitary version	Cable version	Sliding Coupling version
Max. length	5 500 mm (216.53 inch)	5 500 mm (216.53 inch)	<ul style="list-style-type: none"> 30 000 mm (1 181.1 inch) liquids and slurries 5 000 mm (196.85 inch) solids (under loads) 	5 500 mm (216.53 inch)
Process connection	R ¾", 1", 1¼", 1½" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] ¾", 1", 1¼", 1½" NPT [(Taper), ASME B1.20.1] G ¾", 1", 1½" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202] 316L stainless steel ASME/EN flange	1½", 2" sanitary fitting clamp 316L stainless steel	R ¾", 1", 1¼", 1½" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] ¾", 1", 1¼", 1½" NPT [(Taper), ASME B1.20.1] G ¾", 1", 1½" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202] 316L stainless steel ASME/EN flange	R ¾", 1", 1¼", 1½" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] ¾", 1", 1¼", 1½" NPT [(Taper), ASME B1.20.1] G ¾", 1", 1½" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]
Extension material	316L stainless steel optional PFA coated ¹⁾	316L stainless steel	Fluoroethylene propylene (FEP) cable with stainless steel core	316L stainless steel
Sensor wetted parts	PPS (optional PVDF)	PPS (optional PVDF)	PPS (optional PVDF)	PPS (optional PVDF)
O-ring seal material	FKM (optional FFKM) ²⁾	FKM (optional FFKM) ²⁾	FKM (optional FFKM) ²⁾	FKM (optional FFKM) ²⁾
Thermal isolator ³⁾	Optional	Optional	Optional	Optional
Extension	User selected length	User selected length	Cable extension	User selected length

- PFA coating (7ML5634 and 7ML5644) has 120 micron thickness
- For caustic materials, consult a local sales person for alternative O-rings. For more information, please visit http://www.automation.siemens.com/aspa_app.
- Thermal isolator is used if process connection temperature exceeds 85 °C (185 °F)

Options



Optional SensGuard, dimensions in mm (inch)

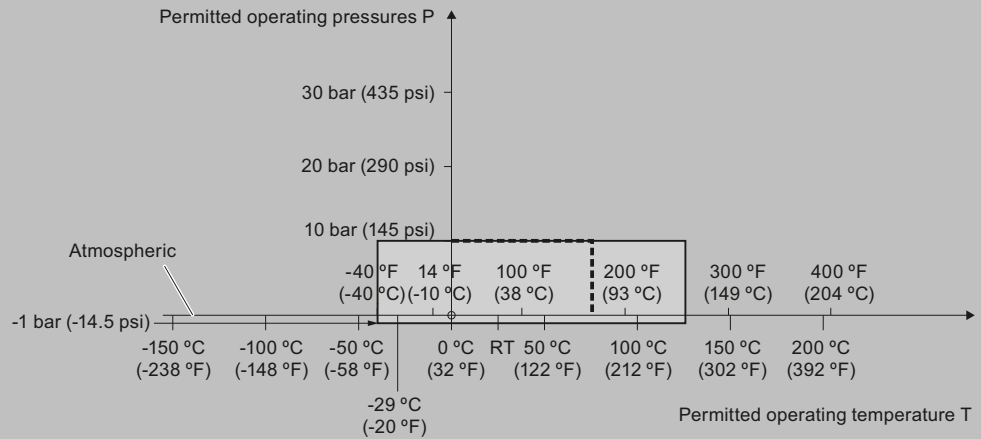
Level Measurement

Point level measurement

RF Capacitance / Pointek CLS200 - Standard

Characteristic curves

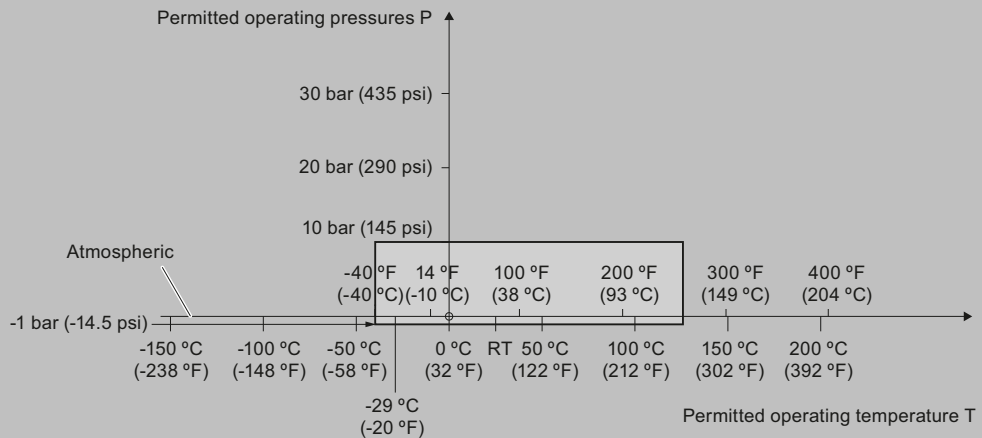
Pressure/temperature curve
CLS200 sliding coupling
threaded process connections
(7ML5633 and 7ML5643)



--- Example:
 Permitted operating pressure = 10 bar (145 psi) at 75 °C

Pointek CLS200 process pressure/temperature derating curves (7ML5633 and 7ML5643)

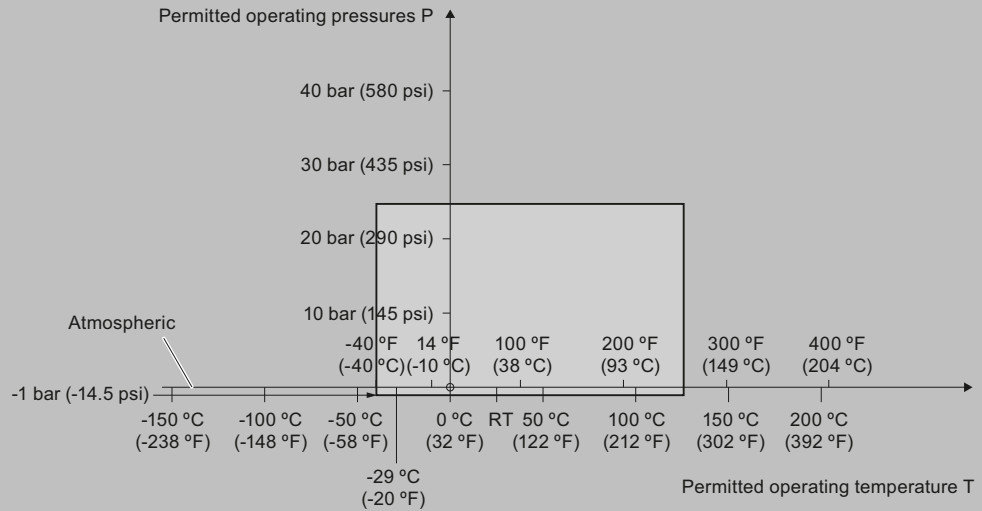
Pressure/temperature curve
CLS200 cable
Threaded process connections
(7ML5631 and 7ML5641)



Pointek CLS200 process pressure/temperature derating curves (7ML5631 and 7ML5641)

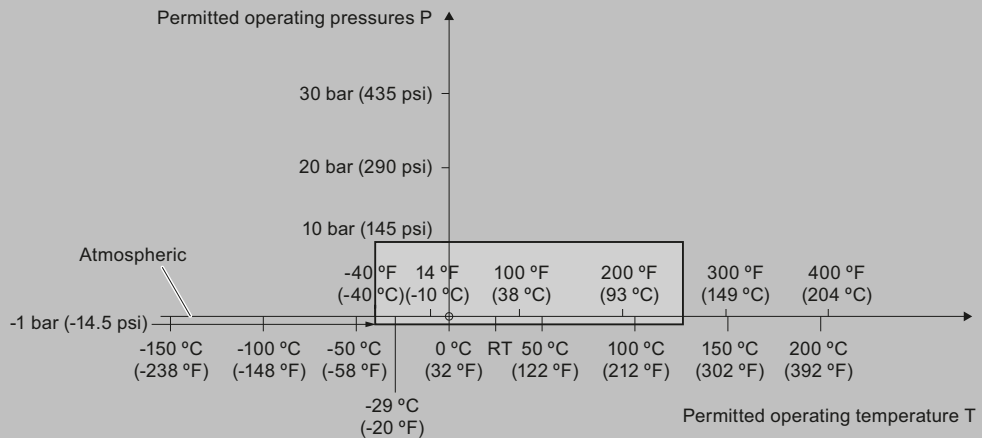
Characteristic curves (continued)

Pressure/temperature curve
 CLS200 compact and extended rod
 Threaded process connections
 (7ML5630 and 7ML5640)



Pointek CLS200 process pressure/temperature derating curves (7ML5630 or 7ML5640)

Pressure/temperature curve
 CLS200 compact and extended sanitary type
 Sanitary process connections
 (7ML5632 and 7ML5642)



Pointek CLS200 process pressure/temperature derating curves (7ML5632 and 7ML5642)

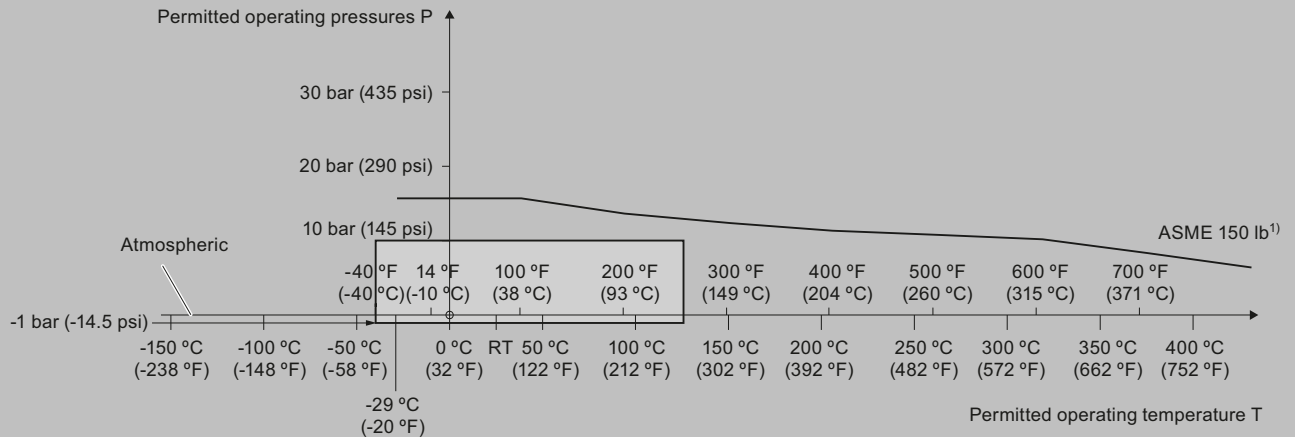
Level Measurement

Point level measurement

RF Capacitance / Pointek CLS200 - Standard

Characteristic curves (continued)

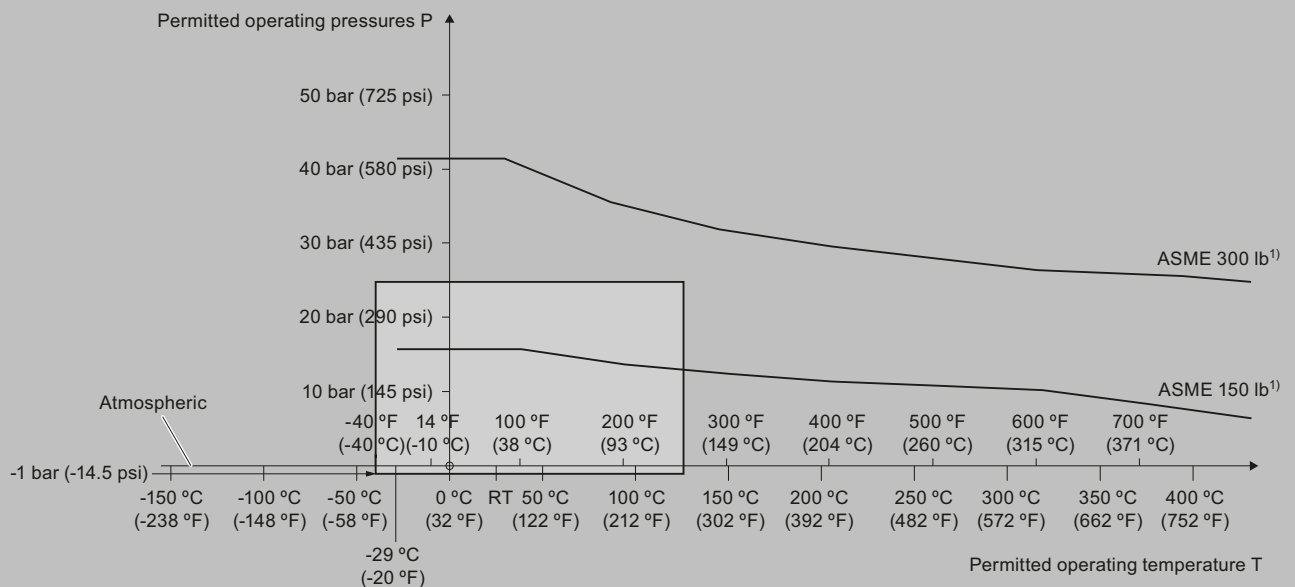
Pressure/temperature curve
CLS200, cable
ASME flanged process connections
(7ML5631 and 7ML5641)



1) The curve denotes the minimum allowable flange class for the shaded area below.

Pointek CLS200 process pressure/temperature derating curves (7ML5631 and 7ML5641)

Pressure/temperature curve
CLS200 compact and extended rod
ASME flanged process connections
(7ML5630 and 7ML5640)

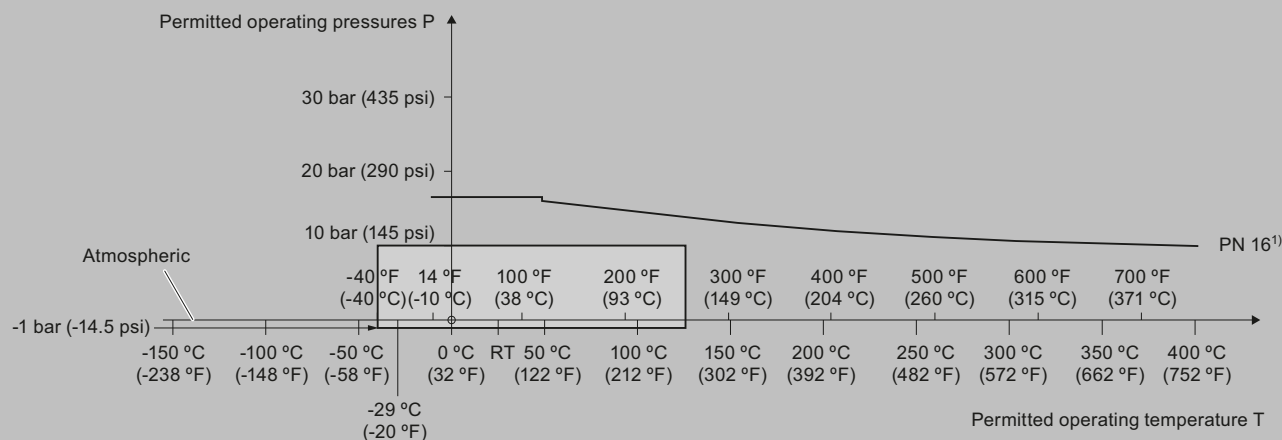


1) The curve denotes the minimum allowable flange class for the shaded area below.

Pointek CLS200 process pressure/temperature derating curves (7ML5630 and 7ML5640)

Characteristic curves (continued)

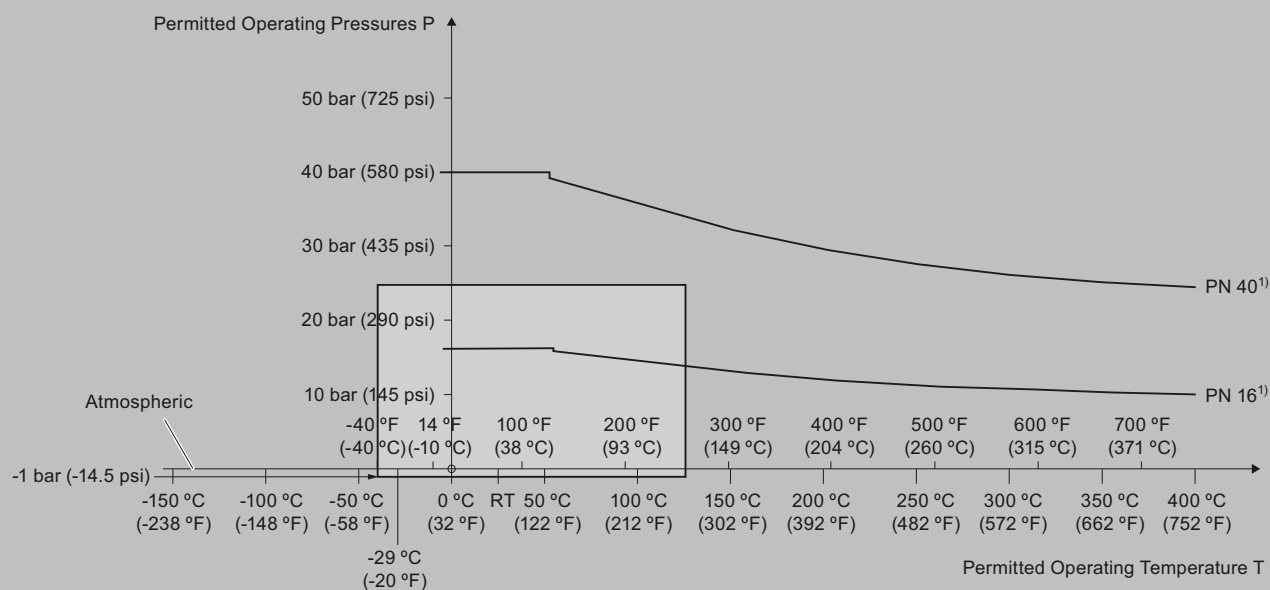
Pressure/temperature curve
CLS200 cable
EN flanged process connections
(7ML5631 and 7ML5641)



¹⁾ The curve denotes the minimum allowable flange class for the shaded area below.

Pointek CLS200 process pressure/temperature derating curves (7ML5631 and 7ML5641)

Pressure/Temperature Curve
CLS200 Compact and Extended Rod
EN Flanged Process Connections
(7ML5630 and 7ML5640)



¹⁾ The curve denotes the minimum allowable flange class for the shaded area below.

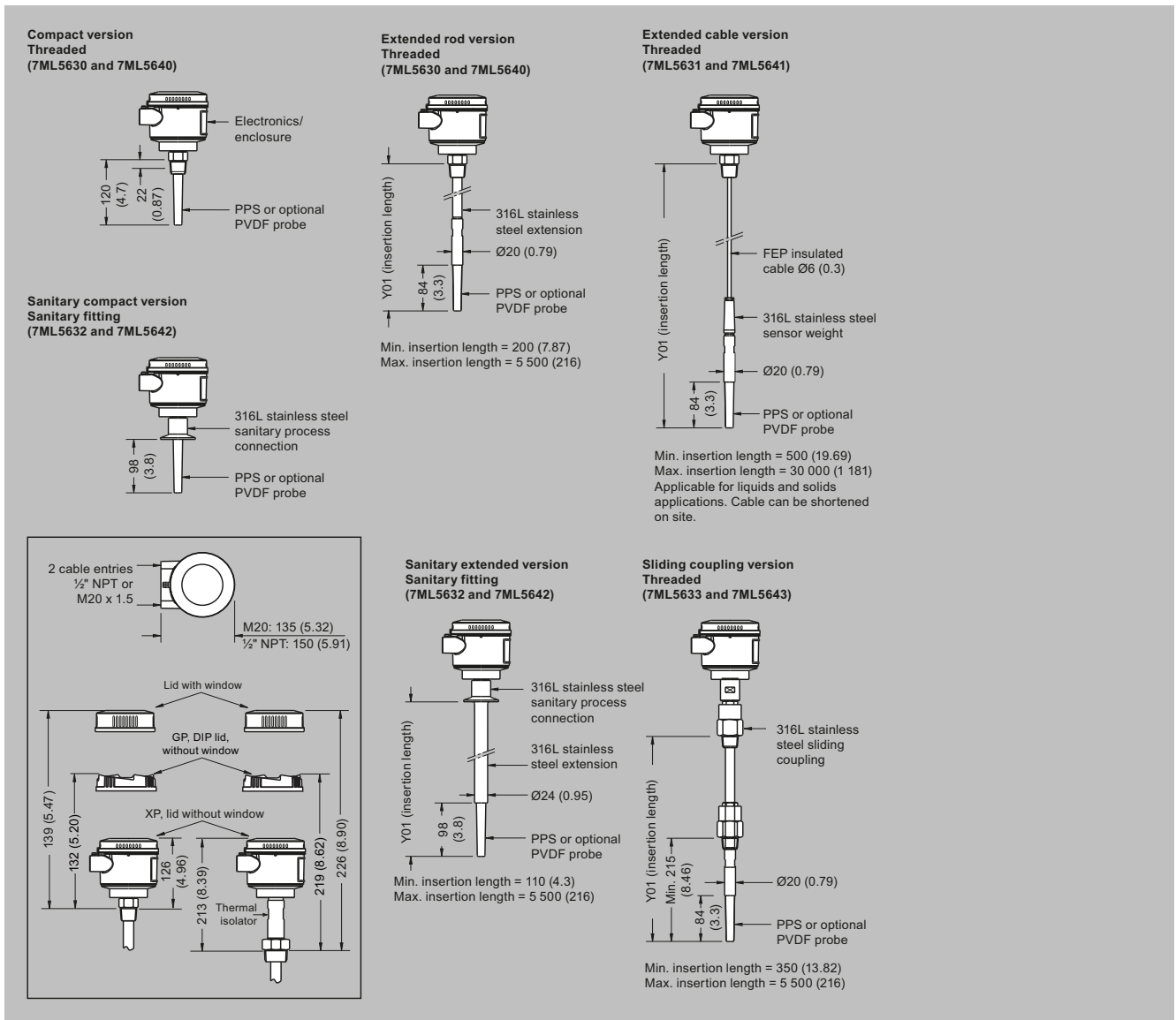
Pointek CLS200 process pressure/temperature derating curves (7ML5630 and 7ML5640)

Level Measurement

Point level measurement

RF Capacitance / Pointek CLS200 - Standard

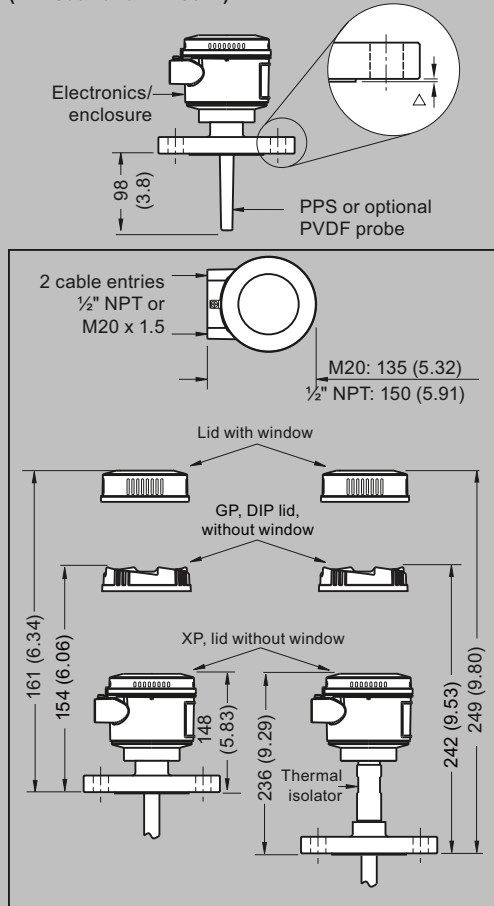
Dimensional drawings



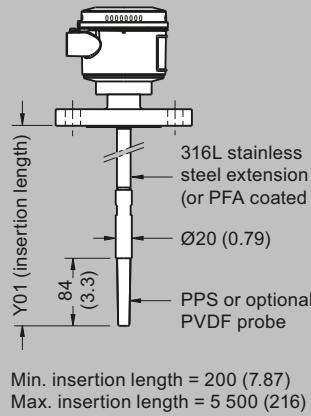
Pointek CLS200 threaded/sanitary process connection, dimensions in mm (inch)

Dimensional drawings (continued)

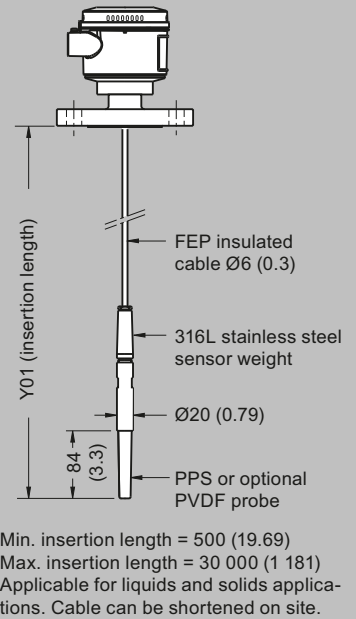
Compact version
Welded Flange (7ML5630 and 7ML5640)
Welded Flange, PFA coated
(7ML5634 and 7ML5644)



Extended rod version
Welded Flange (7ML5630 and 7ML5640)
Welded Flange, PFA coated
(7ML5634 and 7ML5644)



Extended cable version
Welded Flange
(7ML5631 and 7ML5641)



Flange Facing (raised face)	
Flange Class	Facing thickness
△ ASME 150/300	2 (0.08)
△ ASME 600/900	7 (0.28)
△ PN16/40	2 (0.08)

Insertion length does not include any raised face/gasket face dimension (see Flange Facing Table above)

Pointek CLS200 flanged process connections, dimensions in mm (inch)

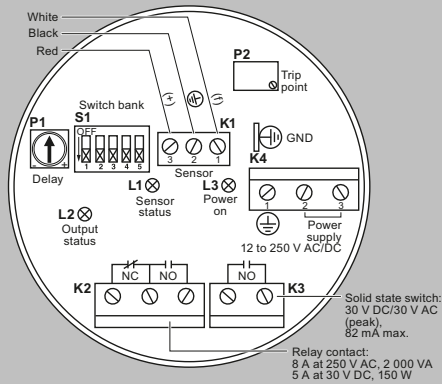
Level Measurement

Point level measurement

RF Capacitance / Pointek CLS200 - Standard

Circuit diagrams

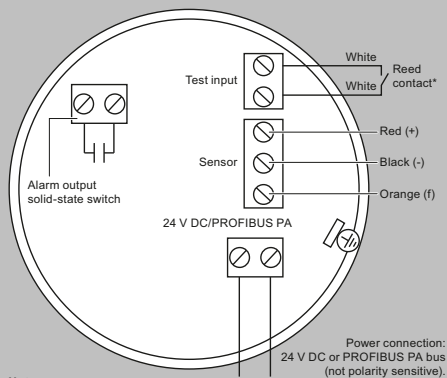
Wiring: Pointek CLS200 standard



Notes:

- Identification label is on underside of lid. Switch and potentiometer settings are for illustration purposes only (refer to operation/setup in manual).
- All field wiring must have insulation suitable for at least 250 V.
- Relay contact terminals are for use with equipment having no accessible live parts and wiring having insulation suitable for at least 250 V.
- Maximum working voltage between adjacent relay contacts shall be 250 V.
- Refer to the Instruction Manual or contact Siemens representative for detailed wiring information.

Wiring: Pointek CLS200 Digital



Notes:

Refer to the instruction manual or contact a Siemens representative for detailed wiring information.

***Magnet activated sensor Test**

A magnet can be used to test the sensor without opening the lid of the Pointek CLS200 Digital version. Bring the magnet close to the test area indicated on the enclosure. The sensor test starts and finishes automatically after 10 seconds.



Pointek CLS200 connections

Overview



Pointek CLS200 (digital version) is a versatile inverse frequency shift capacitance level and material detection switch with optional rod/cable choices and configurable output. CLS200 is ideal for detection of liquids, solids, slurries, foam, and interfaces and has the ability to tune out buildup on the probe. The digital version includes PROFIBUS PA, an LCD display, and advanced diagnostic features.

Benefits

- Potted construction protects signal circuit from shock, vibration, humidity, and/or condensation
- High chemical resistance
- Level detection independent of tank or pipe earth reference
- Insensitive to product buildup due to high frequency oscillation
- High sensitivity allows installation in a wide range of liquids, solids or slurry applications
- Integral LCD display allows for easy menu-driven setup
- PROFIBUS PA communication (SIMATIC PDM compatible)

Application

Pointek CLS200 digital version provides an integral LCD display for stand-alone use, and also provides PROFIBUS PA communication (Profile version 3.0, Class B) for connection to a network.

The power supply is galvanically isolated and accepts a wide range of voltages (12 to 30 V DC). When used with thermal isolator, the stainless steel and PPS (PVDF optional) materials used in the probe construction provide a temperature rating up to 125 °C (257 °F) on the process wetted portion of the probe. The switch responds to any material with a dielectric constant of 1.5 or more by detecting a change in oscillating frequency, and it can be set to detect before contact or on contact with the probe. The menu-driven setup allows precise control of the switch point signal damping and alarm functions.

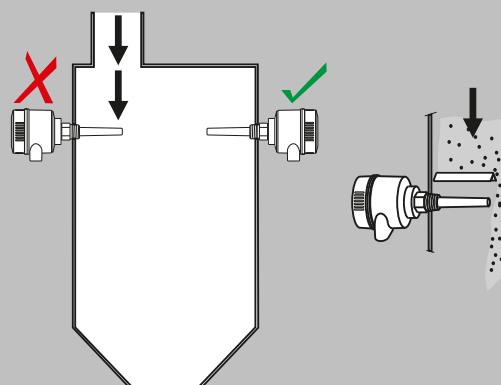
When connected to the PROFIBUS network, advanced diagnostics and set up using SIMATIC PDM are possible.

The CLS200 operates independently of the tank wall or pipe so it does not require an external reference electrode for level detection in a non-conductive vessel such as concrete or plastic (EMC regulations applicable in some regions).

- Key Applications: liquids, slurries, powders, granules, pressurized applications, hazardous areas

Configuration

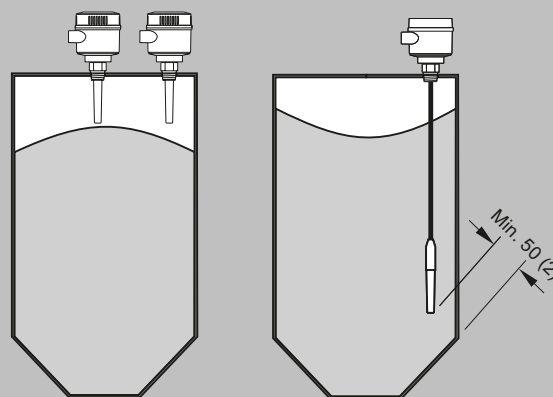
Installation



Keep unit out of path of falling material, or protect probe from falling material.



Avoid areas where material build up occurs.



Install probe at least 50 (2) from tank wall.

Pointek CLS200 installation, dimensions in mm (inch)

Level Measurement

Point level measurement

RF Capacitance / Pointek CLS200 - Digital

Selection and ordering data

	Article No.	
Pointek CLS200 RF Capacitance point level switch, digital, rod design Detects level and interface in liquids, solids, slurries, and foam. Adjustable, 5.5 m (18.04 ft), insertion, adaptable sensitivity, with the ability to tune out build-up on probe. With display and digital communications.	7ML5640-	● ● ● ● ● - ● ● ● 0
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Process connection		
<u>Threaded, 316L stainless steel</u>		
¾" NPT [(Taper), ASME B1.20.1]	0	A
1" NPT [(Taper), ASME B1.20.1]	0	B
1¼" NPT [(Taper), ASME B1.20.1]	0	C
1½" NPT [(Taper), ASME B1.20.1]	0	D
R ¾" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]	1	A
R 1" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]	1	B
R 1½" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]	1	D
G ¾" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]	3	A
G 1" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]	3	B
G 1½" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]	3	D
<u>Welded flange, 316L stainless steel, raised face</u>		
1" ASME, 150 lb	5	A
1" ASME, 300 lb	5	B
1" ASME, 600 lb	5	C
1½" ASME, 150 lb	5	D
1½" ASME, 300 lb	5	E
1½" ASME, 600 lb	5	F
2" ASME, 150 lb	5	G
2" ASME, 300 lb	5	H
2" ASME, 600 lb	5	J
3" ASME, 150 lb	5	K
3" ASME, 300 lb	5	L
3" ASME, 600 lb	5	M
4" ASME, 150 lb	5	N
4" ASME, 300 lb	5	P
4" ASME, 600 lb	5	Q
<u>Welded flange, 316L stainless steel, Type A flat faced</u>		
DN 25, PN 16	6	A
DN 25, PN 40	6	B
DN 40, PN 16	6	C
DN 40, PN 40	6	D
DN 50, PN 16	6	E
DN 50, PN 40	6	F
DN 80, PN 16	6	G
DN 80, PN 40	6	H
DN 100, PN 16	6	J
DN 100, PN 40	6	K
(Note: flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1 standard.)		
Probe length (length from flange face) (threaded lengths include process thread)		
<u>Note: No Y01 needed in Order code for standard lengths</u>		
Compact [threaded 120 mm (4.72 inch), Flanged 98 mm (3.86 inch)]		A
Extended rod, 250 mm (9.84 inch)		B
Extended rod, 350 mm (13.78 inch)		C
Extended rod, 500 mm (19.69 inch)		D
Extended rod, 750 mm (29.53 inch)		E
Extended rod, 1 000 mm (39.37 inch)		F
Extended rod, 1 250 mm (49.21 inch)		G
Extended rod, 1 350 mm (53.15 inch)		H

Selection and ordering data (continued)

	Article No.
Pointek CLS200 RF Capacitance point level switch, digital, rod design Detects level and interface in liquids, solids, slurries, and foam. Adjustable, 5.5 m (18.04 ft), insertion, adaptable sensitivity, with the ability to tune out build-up on probe. With display and digital communications.	7ML5640- ● ● ● ● ● - ● ● ● ● 0
Extended rod, 1 500 mm (59.06 inch)	J
Extended rod, 1 750 mm (68.90 inch)	K
Extended rod, 2 000 mm (78.74 inch)	L
Add Order code Y01 and plain text: "Insertion length ... mm"	
Extended rod, 210 ... 1 000 mm (8.27 ... 39.37 inch)	M
Extended rod, 1 001 ... 2 000 mm (39.41 ... 78.74 inch)	N
Extended rod, 2 001 ... 3 000 mm (78.78 ... 118.11 inch)	P
Extended rod, 3 001 ... 4 000 mm (118.15 ... 157.48 inch)	Q
Extended rod, 4 001 ... 5 000 mm (157.52 ... 196.85 inch)	R
Extended rod, 5 001 ... 5 500 mm (196.89 ... 216.53 inch)	S
Thermal isolator	
Without thermal isolator	0
With thermal isolator [for process connection temperatures over 85 °C (185 °F)]	1
Remote mount electronics and mounting bracket	
With 2 m (79 inch) of cable ²⁾	2
With 5 m (197 inch) of cable ²⁾	3
Wetted seals	
FKM	0
FFKM [for process temperatures above -20 °C (-4 °F)]	1
Probe material	
316L stainless steel with PPS probe body	0
316L stainless steel with PVDF probe body	1
Approvals	
Non-Sparking: CE, RCM, ATEX II 3 G Ex nA II T6 ... T4, ATEX II 2 D IP6X T100 °C	B
Dust Ignition Proof: CE, RCM, ATEX II ½ D T100 °C	C
Intrinsically Safe: ¹⁾ CE, RCM, ATEX II 1 G EEx ia IIC T6 ... T4, ATEX II ½ D IP6X T100 °C	D
Flameproof Enclosure with IS Probe: CE, RCM, ATEX II ½ G EEx d[ia] IIC T6 ... T4, ATEX II ½ D T100 °C	E
Non-incendive: CSA/FM Class I, Div. 2, Groups A, B, C, D CSA/FM Class II, Div. 2, Groups F, G CSA/FM Class III T4 or T6	F
Dust Ignition Proof with IS Probe: CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4	G
Intrinsically Safe: ¹⁾ CSA/FM Class I, Div. 1, Groups A, B, C, D CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4	H
Explosion Proof with IS Probe: CSA/FM Class I, Div. 1, Groups A, B, C, D CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4	J
General Purpose (CSA, FM)	K
General Purpose (CE, RCM)	L
Enclosure and lid	
Aluminum epoxy coated	
2 x ½" NPT via adapter - cable inlet, IP65	A
2 x M20 x 1.5 cable inlet, IP65	B
2 x ½" NPT via adapter - cable inlet, IP68	C
2 x M20 x 1.5 cable inlet, IP68	D

1)

Barrier or Intrinsically Safe power supply required for Intrinsically Safe protection.

2) Available with Approvals options F, G, H, J, and K.

Level Measurement

Point level measurement

RF Capacitance / Pointek CLS200 - Digital

Selection and ordering data (continued)

Selection and Ordering data	Order code
Further designs	
Please add "-Z" to Article No. and specify Order code(s).	
Total insertion length: enter the total insertion length in plain text description	Y01
Stainless steel tag [70 x 13 mm (2.75 x 0.5 inch)]: Measuring-point number/identification (max. 27 characters) specify in plain text	Y15
Manufacturer's test certificate: M to DIN 55350, Part 18 and ISO 9000	C11
Material inspection certificate Type 3.1 per EN 10204 INMETRO ¹⁾	C12 E34
Operating Instructions	
All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation	
Accessories	See accessories shown following CLS200 Digital selection and ordering data.

¹⁾ Available only with Approvals options C and E.

	Article No.									
Pointek CLS200 RF Capacitance point level switch, digital, cable design	7	M	L	5	6	4	1	-	0	0
Detects level and interface in liquids, solids, slurries, and foam. Cable extension options to 30 m (98.43 ft), adaptable sensitivity, with the ability to tune out build-up on probe. With display and digital communications.										
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.										
Process connection										
<u>Threaded, 316L stainless steel</u>										
¾" NPT [(Taper), ASME B1.20.1]	0									A
1" NPT [(Taper), ASME B1.20.1]	0									B
1¼" NPT [(Taper), ASME B1.20.1]	0									C
1½" NPT [(Taper), ASME B1.20.1]	0									D
R ¾" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]	1									A
R 1" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]	1									B
R 1½" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]	1									D
G ¾" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]	3									A
G 1" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]	3									B
G 1½" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]	3									D
<u>Welded flange, 316L stainless steel, raised face</u>										
1" ASME, 150 lb	5									A
1" ASME, 300 lb	5									B
1" ASME, 600 lb	5									C
1½" ASME, 150 lb	5									D
1½" ASME, 300 lb	5									E
1½" ASME, 600 lb	5									F
2" ASME, 150 lb	5									G
2" ASME, 300 lb	5									H
2" ASME, 600 lb	5									J
3" ASME, 150 lb	5									K
3" ASME, 300 lb	5									L
3" ASME, 600 lb	5									M
4" ASME, 150 lb	5									N
4" ASME, 300 lb	5									P
4" ASME, 600 lb	5									Q

Selection and ordering data (continued)

Pointek CLS200 RF Capacitance point level switch, digital, cable design Detects level and interface in liquids, solids, slurries, and foam. Cable extension options to 30 m (98.43 ft), adaptable sensitivity, with the ability to tune out build-up on probe. With display and digital communications.	Article No. 7ML5641- ● ● ● ● ● - ● ● ● ● 0									
<u>Welded flange, 316L stainless steel, Type A flat faced</u>										
DN 25, PN 16	6	A								
DN 25, PN 40	6	B								
DN 40, PN 16	6	C								
DN 40, PN 40	6	D								
DN 50, PN 16	6	E								
DN 50, PN 40	6	F								
DN 80, PN 16	6	G								
DN 80, PN 40	6	H								
DN 100, PN 16	6	J								
DN 100, PN 40	6	K								
(Note: flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1 standard.)										
Probe length (length from flange face) (threaded lengths include process thread)										
Note: No Y01 needed in Order code for standard lengths										
Extended cable, 3 000 mm (118.11 inch), length can be determined by customer on assembly		A								
Extended cable, 6 000 mm (236.22 inch), length can be determined by customer on assembly		B								
Add Order code Y01 and plain text: "Insertion length ... mm"										
Extended cable, 500 ... 5 000 mm (19.69 ... 196.85 inch)		C								
Extended cable, 5 001 ... 10 000 mm (196.89 ... 393.70 inch)		D								
Extended cable, 10 001 ... 15 000 mm (393.74 ... 590.55 inch)		E								
Extended cable, 15 001 ... 20 000 mm (590.59 ... 787.40 inch)		F								
Extended cable, 20 001 ... 25 000 mm (787.44 ... 984.25 inch)		G								
Extended cable, 25 001 ... 30 000 mm (984.29 ... 1 181.10 inch)		H								
Thermal isolator										
Without thermal isolator								0		
With thermal isolator [for process connection temperatures over 85 °C (185 °F)]								1		
Remote mount electronics and mounting bracket										
With 2 m (79 inch) of cable ²⁾									2	
With 5 m (197 inch) of cable ²⁾									3	
Wetted seals										
FKM and PTFE									0	
FFKM and PTFE [for process temperatures above -20 °C (-4 °F)]									1	
Probe material										
FEP jacketed cable with PPS probe body										0
FEP jacketed cable with PVDF probe body										1
Approvals										
Non-Sparking: CE, RCM, ATEX II 3 G Ex nA II T6 ... T4, ATEX II 2 D IP6X T100 °C										
Dust Ignition Proof: CE, RCM, ATEX II ½ D T100 °C										
Intrinsically Safe:¹⁾ CE, RCM, ATEX II 1 G EEx ia IIC T6 ... T4, ATEX II ½ D IP6X T100 °C										
Flameproof Enclosure with IS Probe: CE, RCM, ATEX II ½ G EEx d[ia] IIC T6 ... T4, ATEX II ½ D T100 °C										
Non-incendive: CSA/FM Class I, Div. 2, Groups A, B, C, D CSA/FM Class II, Div. 2, Groups F, G CSA/FM Class III T4 or T6										

Level Measurement

Point level measurement

RF Capacitance / Pointek CLS200 - Digital

Selection and ordering data (continued)

		Article No.									
Pointek CLS200 RF Capacitance point level switch, digital, cable design Detects level and interface in liquids, solids, slurries, and foam. Cable extension options to 30 m (98.43 ft), adaptable sensitivity, with the ability to tune out build-up on probe. With display and digital communications.		7	M	L	5	6	4	1	-	0	0
Dust Ignition Proof with IS Probe: CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4											G
Intrinsically Safe: ¹⁾ CSA/FM Class I, Div. 1, Groups A, B, C, D CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4											H
Explosion Proof with IS Probe: CSA/FM Class I, Div. 1, Groups A, B, C, D CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4											J
General Purpose (CSA, FM)											K
General Purpose (CE, RCM)											L
Enclosure and lid											
<u>Aluminum epoxy coated</u>											
2 x ½" NPT via adapter - cable inlet, IP65											A
2 x M20 x 1.5 cable inlet, IP65											B
2 x ½" NPT via adapter - cable inlet, IP68											C
2 x M20 x 1.5 cable inlet, IP68											D

- 1) Barrier or Intrinsically Safe power supply required for Intrinsically Safe protection.
 2) Available with Approvals options F, G, H, J, and K.

Selection and Ordering data	Order code
Further designs	
Please add "-Z" to Article No. and specify Order code(s).	
Total insertion length: enter the total insertion length in plain text description	Y01
Stainless steel tag [70 x 13 mm (2.75 x 0.5 inch)]: Measuring-point number/identification (max. 27 characters) specify in plain text	Y15
Manufacturer's test certificate: M to DIN 55350, Part 18 and ISO 9000	C11
Material inspection Certificate Type 3.1 per EN 10204 INMETRO ¹⁾	C12 E34
Operating Instructions	
All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation	
Accessories	See accessories shown following CLS200 Digital selection and ordering data.

- 1) Available only with Approvals options C and E.

		Article No.									
Pointek CLS200 RF Capacitance point level switch, digital, sanitary rod design. Detects level and interface in liquids, solids, slurries, and foam. Adjustable, 5.5 m (18.04 ft), insertion, adaptable sensitivity, with the ability to tune out build-up on probe. With display and digital communications.		7	M	L	5	6	4	1	-	0	0
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.											
Process connection											
<u>Sanitary 316L stainless steel</u>											
1" sanitary fitting clamp											8 A
1½" sanitary fitting clamp											8 B

Selection and ordering data (continued)

	Article No.									
Pointek CLS200 RF Capacitance point level switch, digital, sanitary rod design. Detects level and interface in liquids, solids, slurries, and foam. Adjustable, 5.5 m (18.04 ft), insertion, adaptable sensitivity, with the ability to tune out build-up on probe. With display and digital communications.	7	M	L	5	6	4	2	-	0	0
2" sanitary fitting clamp				8						C
2½" sanitary fitting clamp				8						D
3" sanitary fitting clamp (Note: Sanitary connection dimensionally corresponds to the applicable ISO 2852 standard.)				8						E
Probe length (length from process connection face)										
Note: No Y01 needed in Order code for standard lengths										
Compact, 98 mm (3.86 inch)										A
Extended rod, 250 mm (9.84 inch)										B
Extended rod, 350 mm (13.78 inch)										C
Extended rod, 500 mm (19.69 inch)										D
Extended rod, 750 mm (29.53 inch)										E
Extended rod, 1 000 mm (39.37 inch)										F
Extended rod, 1 250 mm (49.21 inch)										G
Extended rod, 1 350 mm (53.15 inch)										H
Extended rod, 1 500 mm (59.06 inch)										J
Extended rod, 1 750 mm (68.90 inch)										K
Extended rod, 2 000 mm (78.74 inch)										L
Add Order code Y01 and plain text: "Insertion length ... mm"										
Extended rod, 110 ... 350 mm (4.3 ... 13.78 inch)										M
Extended rod, 351 ... 1 000 mm (13.82 ... 39.37 inch)										N
Extended rod, 1 001 ... 2 000 mm (39.41 ... 78.74 inch)										P
Extended rod, 2 001 ... 3 000 mm (78.78 ... 118.11 inch)										Q
Extended rod, 3 001 ... 4 000 mm (118.15 ... 157.48 inch)										R
Extended rod, 4 001 ... 5 000 mm (157.52 ... 196.85 inch)										S
Extended rod, 5 001 ... 5 500 mm (196.89 ... 216.53 inch)										T
Thermal isolator										
Without thermal isolator										0
With thermal isolator [for process connection temperatures over 85 °C (185 °F)]										1
Remote mount electronics and mounting bracket										
With 2 m (79 inch) of cable ²⁾										2
With 5 m (197 inch) of cable ²⁾										3
Wetted seals										
FKM										0
FFKM [for process temperatures above -20 °C (-4 °F)]										1
Probe material										
316L stainless steel with PPS probe body										0
316L stainless steel with PVDF probe body										1
Approvals										
Non-Sparking: CE, RCM, ATEX II 3 G Ex nA II T6 ... T4, ATEX II 2 D IP6X T100 °C										B
Dust Ignition Proof: CE, RCM, ATEX II ½ D T100 °C										C
Intrinsically Safe: ¹⁾ CE, RCM, ATEX II 1 G EEx ia IIC T6 ... T4, ATEX II ½ D IP6X T100 °C										D
Flameproof Enclosure with IS Probe: CE, RCM, ATEX II ½ G EEx d[ia] IIC T6 ... T4, ATEX II ½ D T100 °C										E
Non-incendive: CSA/FM Class I, Div. 2, Groups A, B, C, D CSA/FM Class II, Div. 2, Groups F, G CSA/FM Class III T4 or T6										F

Level Measurement

Point level measurement

RF Capacitance / Pointek CLS200 - Digital

Selection and ordering data (continued)

										Article No.	
Pointek CLS200 RF Capacitance point level switch, digital, sanitary rod design. Detects level and interface in liquids, solids, slurries, and foam. Adjustable, 5.5 m (18.04 ft), insertion, adaptable sensitivity, with the ability to tune out build-up on probe. With display and digital communications.										7ML5642- ● ● ● ● ● - ● ● ● 0	
Dust Ignition Proof with IS Probe: CSA/IFM Class II, Div. 1, Groups E, F, G CSA/IFM Class III T4										G	
Intrinsically Safe: ¹⁾ CSA/IFM Class I, Div. 1, Groups A, B, C, D CSA/IFM Class II, Div. 1, Groups E, F, G CSA/IFM Class III T4										H	
Explosion Proof with IS Probe: CSA/IFM Class I, Div. 1, Groups A, B, C, D CSA/IFM Class II, Div. 1, Groups E, F, G CSA/IFM Class III T4										J	
General Purpose (CSA, FCM)										K	
General Purpose (CE, RCM)										L	
Enclosure and lid											
<u>Aluminum epoxy coated</u>											
2 x ½" NPT via adapter - cable inlet, IP65										A	
2 x M20 x 1.5 cable inlet, IP65										B	
2 x ½" NPT via adapter - cable inlet, IP68										C	
2 x M20 x 1.5 cable inlet, IP68										D	

- 1) Barrier or Intrinsically Safe power supply required for Intrinsically Safe protection.
 2) Available with Approvals options F, G, H, J, and K.

Selection and Ordering data	Order code
Further designs	
Please add "-Z" to Article No. and specify Order code(s).	
Total insertion length: enter the total insertion length in plain text description	Y01
Stainless steel tag [70 x 13 mm (2.75 x 0.5 inch)]: Measuring-point number/identification (max. 27 characters) specify in plain text	Y15
Manufacturer's test certificate: M to DIN 55350, Part 18 and ISO 9000	C11
Material inspection Certificate Type 3.1 per EN 10204 INMETRO ¹⁾	C12 E34
Operating Instructions	
All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation	
Accessories	See accessories shown following CLS200 Digital selection and ordering data.

- 1) Available only with Approvals options C and E.

										Article No.	
Pointek CLS200 RF Capacitance point level switch, digital, sliding coupling design. Detects level and interface in liquids, solids, slurries, and foam. Adjustable, 5.5 m (18.04 ft), insertion, adaptable sensitivity, with the ability to tune out build-up on probe. With display and digital communications.										7ML5643- ● ● ● ● ● - ● ● ● 0	
Process connection											
<u>Threaded, 316L stainless steel</u>											
¾" NPT [(Taper), ASME B1.20.1]										0 A	
1" NPT [(Taper), ASME B1.20.1]										0 B	

Selection and ordering data (continued)

	Article No.									
Pointek CLS200 RF Capacitance point level switch, digital, sliding coupling design. Detects level and interface in liquids, solids, slurries, and, foam. Adjustable, 5.5 m (18.04 ft), insertion, adaptable sensitivity, with the ability to tune out build-up on probe. With display and digital communications.	7	M	L	5	6	4	3	-	0	0
1¼" NPT [(Taper), ASME B1.20.1]	0	C								
1½" NPT [(Taper), ASME B1.20.1]	0	D								
R ¾" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]	1	A								
R 1" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]	1	B								
R 1½" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]	1	D								
G ¾" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]	3	A								
G 1" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]	3	B								
G 1½" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]	3	D								
Probe length (length from flange face) (threaded lengths include process thread)										
Note: No Y01 needed in Order code for standard lengths										
Extended rod, 350 mm (13.78 inch)										C
Extended rod, 500 mm (19.69 inch)										D
Extended rod, 750 mm (29.53 inch)										E
Extended rod, 1 000 mm (39.37 inch)										F
Extended rod, 1 250 mm (49.21 inch)										G
Extended rod, 1 350 mm (53.15 inch)										H
Extended rod, 1 500 mm (59.06 inch)										J
Extended rod, 1 750 mm (68.90 inch)										K
Extended rod, 2 000 mm (78.74 inch)										L
Add Order code Y01 and plain text: "Insertion length ... mm"										
Extended rod, 350 ... 1 000 mm (13.82 ... 39.37 inch)										M
Extended rod, 1 001 ... 2 000 mm (39.41 ... 78.74 inch)										N
Extended rod, 2 001 ... 3 000 mm (78.78 ... 118.11 inch)										P
Extended rod, 3 001 ... 4 000 mm (118.15 ... 157.48 inch)										Q
Extended rod, 4 001 ... 5 000 mm (157.52 ... 196.85 inch)										R
Extended rod, 5 001 ... 5 500 mm (196.89 ... 216.53 inch)										S
Thermal isolator										
Without thermal isolator										0
With thermal isolator [for process connection temperatures over 85 °C (185 °F)]										1
Remote mount electronics and mounting bracket										
With 2 m (79 inch) of cable ²⁾										2
With 5 m (197 inch) of cable ²⁾										3
Wetted seals										
FKM and PTFE										0
FKM and PTFE [for process temperatures above -20 °C (-4 °F)]										1
Probe material										
316L stainless steel with PPS probe body										0
316L stainless steel with PVDF probe body										1
Approvals										
Non-Sparking: CE, RCM, ATEX II 3 G Ex nA II T6 ... T4, ATEX II 2 D IP6X T100 °C										B
Dust Ignition Proof: CE, RCM, ATEX II 1/2 D T100 °C										C
Intrinsically Safe: ¹⁾ CE, RCM, ATEX II 1 G EEx ia IIC T6 ... T4, ATEX II 1/2 D IP6X T100 °C										D
Flameproof Enclosure with IS Probe: CE, RCM, ATEX II 1/2 G EEx d[ia] IIC T6 ... T4, ATEX II 1/2 D T100 °C										E
Non-incendive: CSA/FM Class I, Div. 2, Groups A, B, C, D CSA/FM Class II, Div. 2, Groups F, G CSA/FM Class III T4 or T6										F

Level Measurement

Point level measurement

RF Capacitance / Pointek CLS200 - Digital

Selection and ordering data (continued)

	Article No.
Pointek CLS200 RF Capacitance point level switch, digital, sliding coupling design. Detects level and interface in liquids, solids, slurries, and, foam. Adjustable, 5.5 m (18.04 ft), insertion, adaptable sensitivity, with the ability to tune out build-up on probe. With display and digital communications.	7ML5643-●●●●●-●●●●0
Dust Ignition Proof with IS Probe: CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4	G
Intrinsically Safe: ¹⁾ CSA/FM Class I, Div. 1, Groups A, B, C, D CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4	H
Explosion Proof with IS Probe: CSA/FM Class I, Div. 1, Groups A, B, C, D CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4	J
General Purpose (CSA, FM)	K
General Purpose (CE, RCM)	L
Enclosure and lid	
<u>Aluminum epoxy coated</u>	
2 x ½" NPT via adapter - cable inlet, IP65	A
2 x M20 x 1.5 cable inlet, IP65	B
2 x ½" NPT via adapter - cable inlet, IP68	C
2 x M20 x 1.5 cable inlet, IP68	D

- 1) Barrier or Intrinsically Safe power supply required for Intrinsically Safe protection.
 2) Available with Approvals options F, G, H, J, and K.

Selection and Ordering data	Order code
Further designs	
Please add "-Z" to Article No. and specify Order code(s).	
Total insertion length: enter the total insertion length in plain text description	Y01
Stainless steel tag [70 x 13 mm (2.75 x 0.5 inch)]: Measuring-point number/identification (max. 27 characters) specify in plain text	Y15
Manufacturer's test certificate: M to DIN 55350, Part 18 and ISO 9000	C11
Material inspection Certificate Type 3.1 per EN 10204 INMETRO ¹⁾	C12 E34
Operating Instructions	
All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation	
Accessories	See accessories shown following CLS200 Digital selection and ordering data.

- 1) Available only with Approvals options C and E.

Selection and Ordering data	Article No.
Accessories	
SensGuard, ¾" NPT (PPS). Only available for CLS200 with ¾" NPT thread.	7ML1830-1DL
SensGuard, R 1" (BSPT) (PPS). Only available for CLS200 with ¾" NPT thread.	7ML1830-1DM

Selection and ordering data (continued)

Selection and Ordering data	Article No.
One metallic cable gland M20 x 1.5, -40 ... +80 °C (-40 ... +176 °F), Dust Ignition Proof, with integrated shield connection (available for PROFIBUS PA)	7ML1930-1AQ
General Purpose	
½" NPT General Purpose Cable Entry IP68/IP69K NEMA 6, -40 ... +80 °C (-40 ... +176 °F), Dust Ignition Proof, cable size 6 ... 12 mm (0.236 ... 0.472 inch)	7ML1830-1JA
M20 x 1.5 General Purpose Cable Entry IP68/IP69K NEMA 6, -40 ... +80 °C (-40 ... +176 °F), Dust Ignition Proof, cable size 7 ... 12 mm (0.275 ... 0.472 inch)	7ML1830-1JC
Hazardous Locations	
1/2" NPT EMC rated Cable Gland: Dust Ignition Proof, Flameproof Exd, and Increased Safety ATEX II 2 GD ExtD A21 (Zone 1, Zone 2, Zone 21, Zone 22, and in Gas Groups IIA, IIB and IIC) 60 ... +80 °C IP66, IP67, IP68, NEMA4X, cable sizes 5.5 ... 12 mm (0.216 ... 0.472 inch)	7ML1830-1JB
M20 EMC rated Cable Gland: Dust Ignition Proof, Flameproof Exd, and Increased Safety ATEX II 2 GD ExtD A21 (Zone 1, Zone 2, Zone 21, Zone 22 and in Gas Groups IIA, IIB and IIC) 60 ... +80 °C IP66, IP67, IP68, NEMA4X, cable sizes 5.5 ... 12 mm (0.216 ... 0.472 inch)	7ML1830-1JD
Blind threaded flanges are available. Customers interested in a custom designed device should consult a local sales person. For more information, please visit http://www.automation.siemens.com/aspa_app .	
Pointek Specials	See Pointek Specials following the CLS300 Digital selection and ordering data.

Level Measurement

Point level measurement

RF Capacitance / Pointek CLS200 - Digital

Technical specifications

Pointek CLS200 - Digital	
Mode of operation	
Measuring principle	Inverse frequency shift capacitive level detection
Input	
Measured variable	Change in picroFarad (pF)
Output	
Output signal	
• Solid-state output	
- Output	Galvanically isolated
- Protection	Against reversed polarity (bipolar)
- Max. switching voltage	<ul style="list-style-type: none"> • 30 V (DC) • 30 V peak (AC)
- Max. load current	82 mA
- Voltage drop	< 1 V, typical at 50 mA
- Time delay (ON and/or OFF)	Programmable by user (0 ... 100 s)
• Fail-safe mode	Min. or max.
• Connection	Removable terminal block
Rated operating conditions¹⁾	
Installation conditions	
• Location	Indoor/outdoor
Ambient conditions	
• Ambient temperature	-40 ... +85 °C (-40 ... +185 °F) ²⁾
• Storage temperature	-40 ... +85 °C (-40 ... +185 °F)
• Installation category	II
• Pollution degree	4
Medium conditions	Liquids, bulk solids, slurries, and interfaces
• Relative dielectric constant ϵ_r	Min. 1.5
• Process temperature	
- Without thermal isolator	-40 ... +85 °C (-40 ... +185 °F) ²⁾
- With thermal isolator	-40 ... +125 °C (-40 ... +257 °F)
• Process pressure (rod version)	-1 ... +25 bar g (-14.6 ... +365 psi g) (nominal)
• Process pressure (cable version) ³⁾	-1 ... +10 bar g (-14.6 ... +150 psi g) (nominal)
• Process pressure (sliding coupling version)	-1 ... +10 bar g (-14.6 ... +150 psi g) (nominal)
Design	
Material	
• Enclosure	Epoxy-coated aluminum with gasket
• Optional thermal isolator	316L stainless steel
Connection	Removable terminal block, max. 2.5 mm ²
Degree of protection	IP65/Type 4/NEMA 4 (optional IP68)
Cable inlet	2 x M20 x 1.5 thread (option: 2 x ½" NPT conduit entry including 1 plugged entry)
Electromagnetic compatibility	To comply with CE EMC regulations (where applicable); the CLS200 should be installed per the instruction manual.
Power supply	
Bus voltage	Standard: 12 ... 30 V DC Intrinsically Safe: 12 ... 24 V DC
Current consumption	12.5 mA
Certificates and approvals	
General Purpose	CSA, FM, CE, RCM
Dust Ignition Proof	ATEX II 1/2 D T100 °C

Technical specifications (continued)

Pointek CLS200 - Digital	
Dust Ignition Proof with IS Probe	CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4
Flameproof Enclosure with IS Probe	ATEX II 1/2 G EEx d[ia] IIC T6 ... T4 ATEX II 1/2 D T100 °C
Explosion Proof with IS Probe	CSA/FM Class I, Div. 1, Groups A, B, C, D CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4
Intrinsically Safe ⁴⁾	ATEX II 1 G EEx ia IIC T6 ... T4 ATEX II 1/2 D IP6X T100 °C CSA/FM Class I, Div. 1, Groups A, B, C, D CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4
Non-incendive	CSA/FM Class I, Div. 2, Groups A, B, C, D CSA/FM Class II, Div. 2, Groups F, G CSA/FM Class III T4 or T6
Non-Sparking	ATEX II 3 G Ex nA IIC T6 ... T4 ATEX II 2 D IP6X T100 °C UKEX II 3 G Ex ec IIC T6 ... T4 UKEX II 2 D IP6x T100°C
Marine	Lloyds Register of Shipping, Categories ENV1, ENV2, and ENV5
Others	Pattern Approval (China)
Communication	PROFIBUS PA (IEC 61158 CPF3 CP3/2) Bus physical layer: IEC 61158-2 MBP (IS) Device profile: PROFIBUS PA profile for Process Control Devices Version 3.0, Class B FISCO field device

- 1) When operation is in areas classified as hazardous, observe restrictions according to relevant certificate. See also CLS200 pressure/temperature curves.
- 2) Thermal isolator is used if process connection temperature exceeds 85 °C (185 °F)
- 3) Pressure rating of process seal is temperature dependent. See also CLS200 pressure/temperature curves.
- 4) Barrier or Intrinsically Safe power supply required for Intrinsically Safe protection

Design: Probe	Rod version	Sanitary version	Cable version	Sliding Coupling version
Max. length	5 500 mm (216.53 inch)	5 500 mm (216.53 inch)	<ul style="list-style-type: none"> • 30 000 mm (1 181.1 inch) liquids and slurries • 5 000 mm (196.85 inch) solids (under loads) 	5 500 mm (216.53 inch)
Process connection	R 3/4", 1", 1 1/4", 1 1/2" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] 3/4", 1", 1 1/4", 1 1/2" NPT [(Taper), ASME B1.20.1] G 3/4", 1", 1 1/2" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202] 316L stainless steel ASME/EN flange	1/2", 2" sanitary fitting clamp 316L stainless steel	R 3/4", 1", 1 1/4", 1 1/2" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] 3/4", 1", 1 1/4", 1 1/2" NPT [(Taper), ASME B1.20.1] G 3/4", 1", 1 1/2" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202] 316L stainless steel ASME/EN flange	R 3/4", 1", 1 1/4", 1 1/2" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] 3/4", 1", 1 1/4", 1 1/2" NPT [(Taper), ASME B1.20.1] G 3/4", 1", 1 1/2" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]
Extension material	316L stainless steel optional PFA coated ¹⁾	316L stainless steel	Fluoroethylene propylene (FEP) cable with stainless steel core	316L stainless steel
Sensor wetted parts	PPS (optional PVDF)	PPS (optional PVDF)	PPS (optional PVDF)	PPS (optional PVDF)
O-ring seal material	FKM (optional FFKM) ²⁾	FKM (optional FFKM) ²⁾	FKM (optional FFKM) ²⁾	FKM (optional FFKM) ²⁾
Thermal isolator ³⁾	Optional	Optional	Optional	Optional
Extension	User selected length	User selected length	Cable extension	User selected length

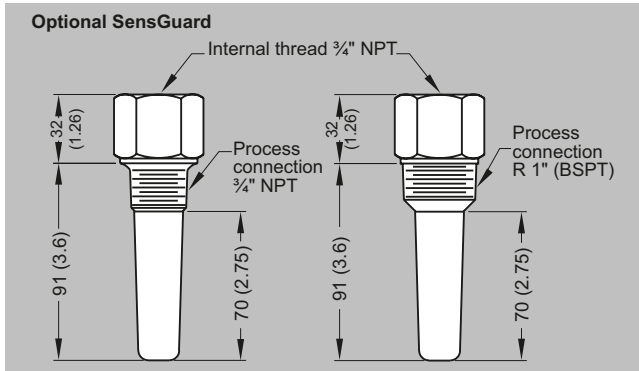
- 1) PFA coating (7ML5634 and 7ML5644) has 120 micron thickness
- 2) For caustic materials, consult a local sales person for alternative O-rings. For more information, please visit http://www.automation.siemens.com/aspa_app.
- 3) Thermal isolator is used if process connection temperature exceeds 85 °C (185 °F).

Level Measurement

Point level measurement

RF Capacitance / Pointek CLS200 - Digital

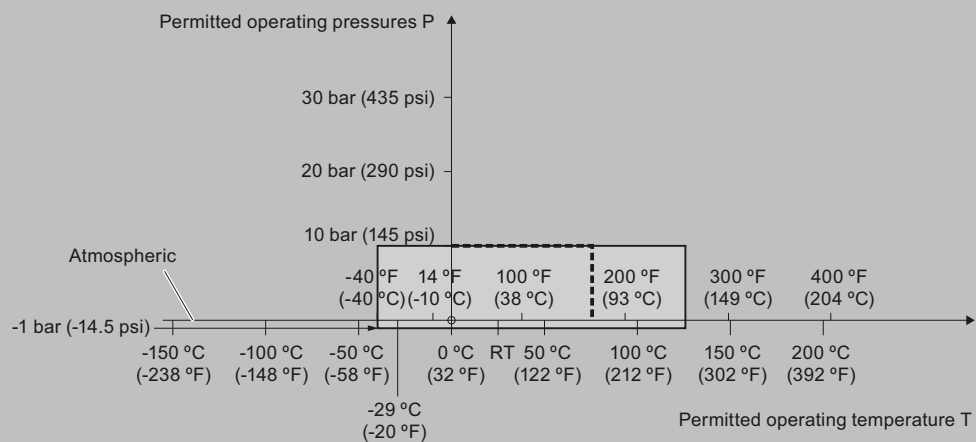
Options



Optional SensGuard, dimensions in mm (inch)

Characteristic curves

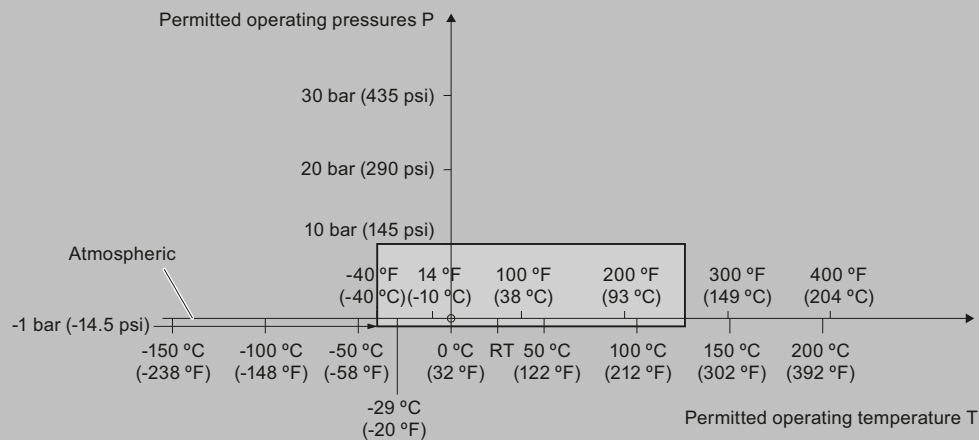
Pressure/temperature curve
CLS200 sliding coupling
threaded process connections
(7ML5633 and 7ML5643)



--- Example:
 Permitted operating pressure = 10 bar (145 psi) at 75 °C

Pointek CLS200 process pressure/temperature derating curves (7ML5633 and 7ML5643)

Pressure/temperature curve
CLS200 cable
Threaded process connections
(7ML5631 and 7ML5641)



Pointek CLS200 process pressure/temperature derating curves (7ML5631 and 7ML5641)

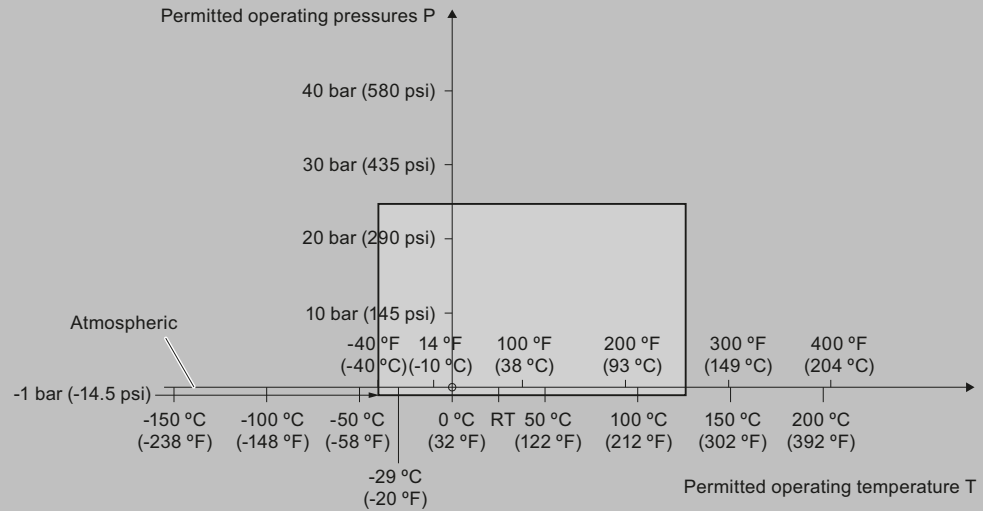
Level Measurement

Point level measurement

RF Capacitance / Pointek CLS200 - Digital

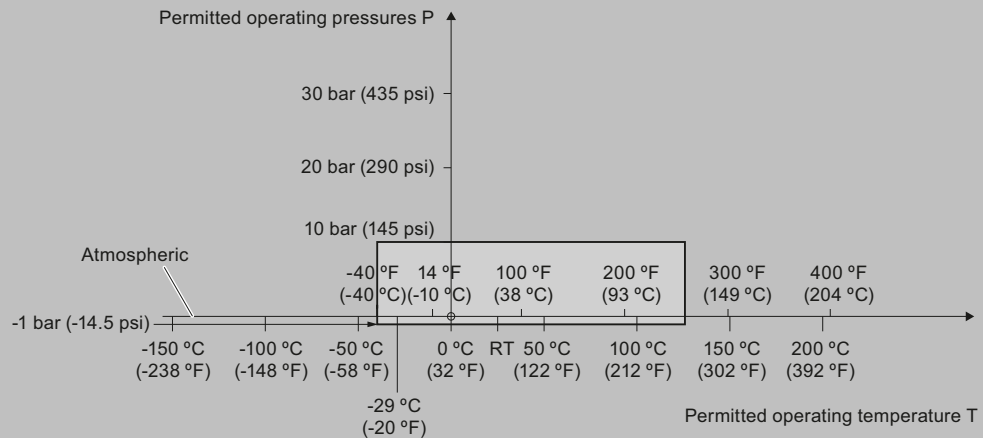
Characteristic curves (continued)

Pressure/temperature curve
CLS200 compact and extended rod
Threaded process connections
(7ML5630 and 7ML5640)



Pointek CLS200 process pressure/temperature derating curves (7ML5630 or 7ML5640)

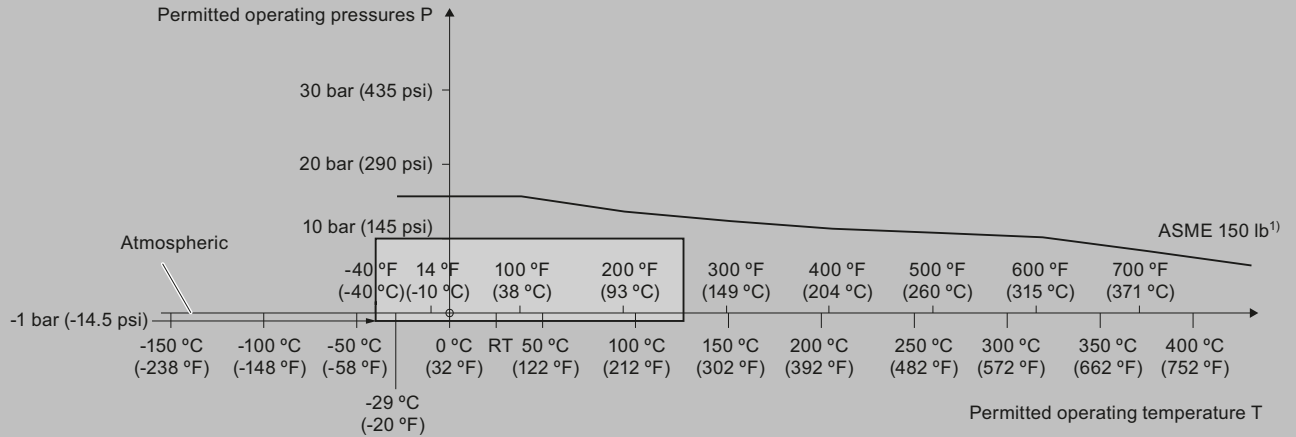
Pressure/temperature curve
CLS200 compact and extended sanitary type
Sanitary process connections
(7ML5632 and 7ML5642)



Pointek CLS200 process pressure/temperature derating curves (7ML5632 and 7ML5642)

Characteristic curves (continued)

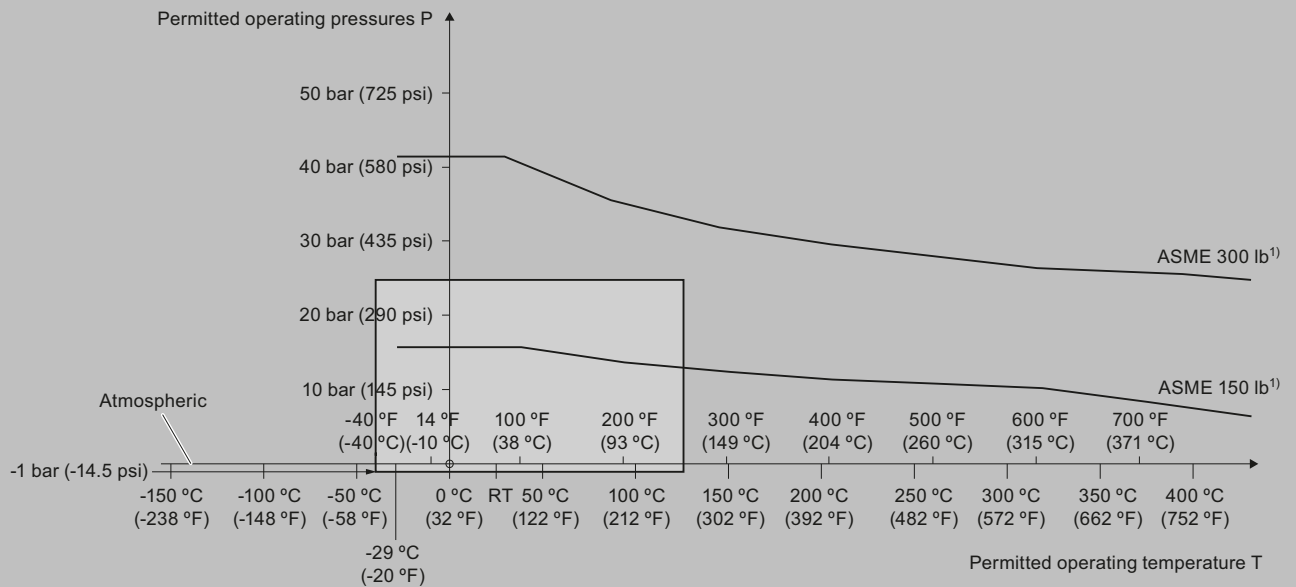
Pressure/temperature curve
CLS200, cable
ASME flanged process connections
(7ML5631 and 7ML5641)



1) The curve denotes the minimum allowable flange class for the shaded area below.

Pointek CLS200 process pressure/temperature derating curves (7ML5631 and 7ML5641)

Pressure/temperature curve
CLS200 compact and extended rod
ASME flanged process connections
(7ML5630 and 7ML5640)



1) The curve denotes the minimum allowable flange class for the shaded area below.

Pointek CLS200 process pressure/temperature derating curves (7ML5630 and 7ML5640)

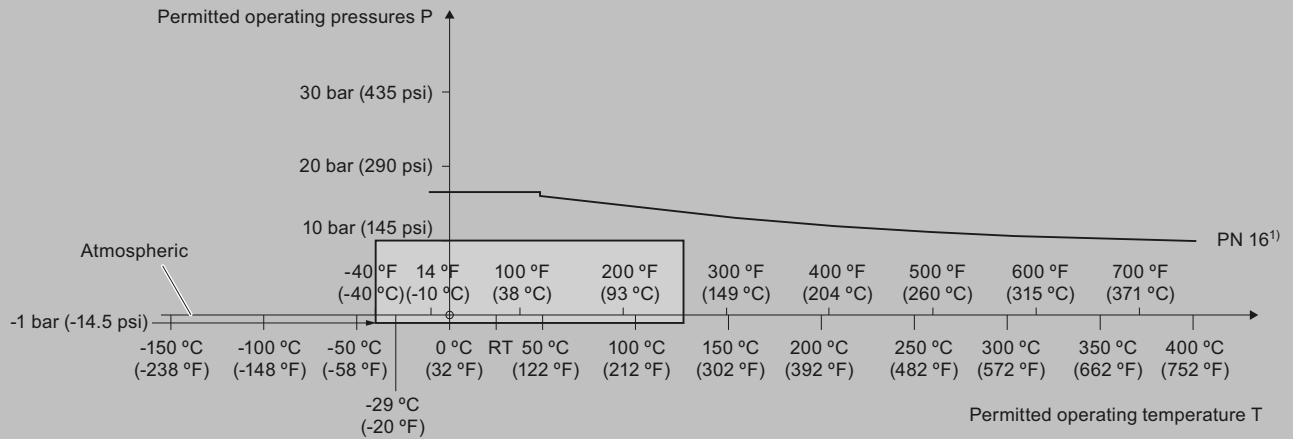
Level Measurement

Point level measurement

RF Capacitance / Pointek CLS200 - Digital

Characteristic curves (continued)

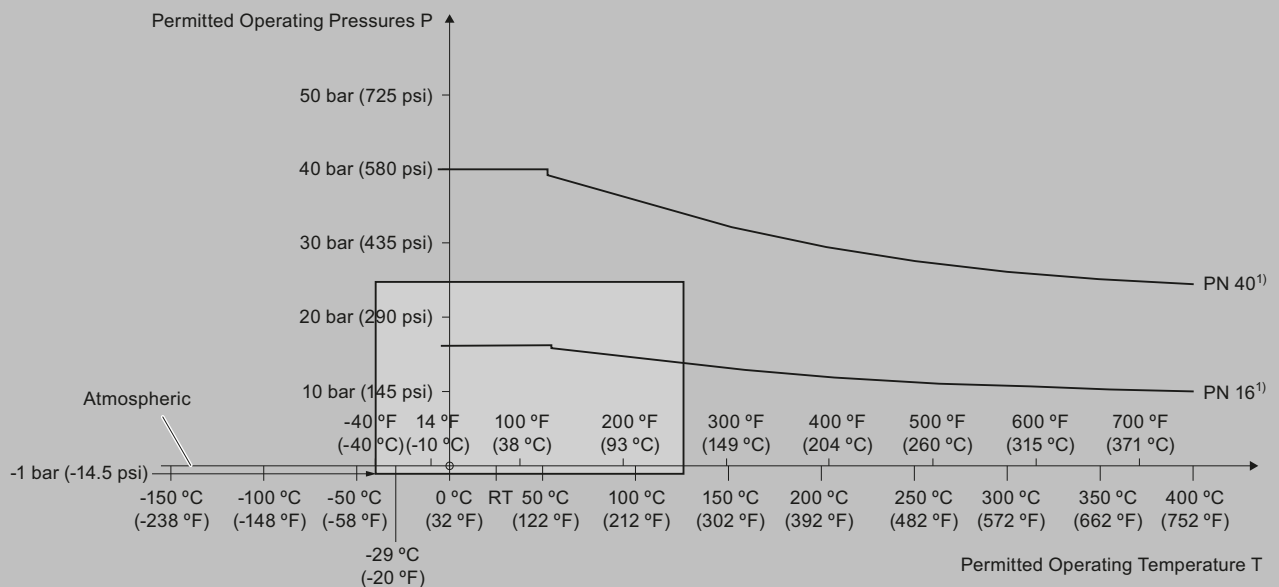
Pressure/temperature curve
CLS200 cable
EN flanged process connections
(7ML5631 and 7ML5641)



1) The curve denotes the minimum allowable flange class for the shaded area below.

Pointek CLS200 process pressure/temperature derating curves (7ML5631 and 7ML5641)

Pressure/Temperature Curve
CLS200 Compact and Extended Rod
EN Flanged Process Connections
(7ML5630 and 7ML5640)

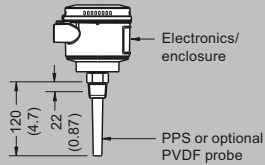


1) The curve denotes the minimum allowable flange class for the shaded area below.

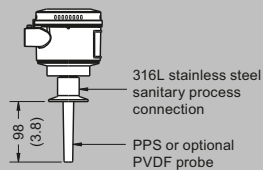
Pointek CLS200 process pressure/temperature derating curves (7ML5630 and 7ML5640)

Dimensional drawings

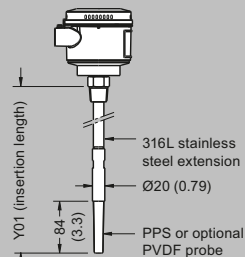
Compact version
Threaded
(7ML5630 and 7ML5640)



Sanitary compact version
Sanitary fitting
(7ML5632 and 7ML5642)

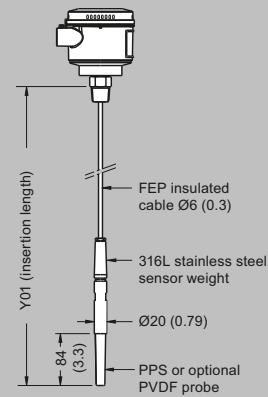


Extended rod version
Threaded
(7ML5630 and 7ML5640)

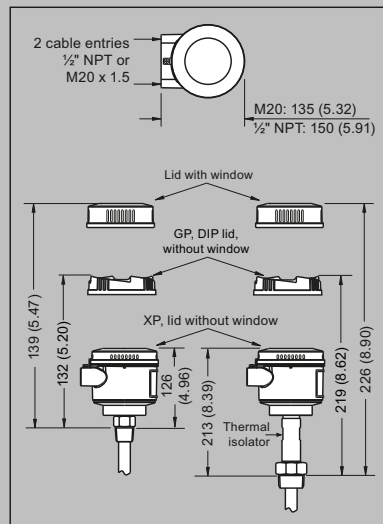


Min. insertion length = 200 (7.87)
Max. insertion length = 5 500 (216)

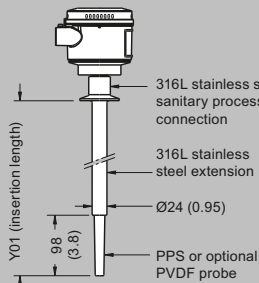
Extended cable version
Threaded
(7ML5631 and 7ML5641)



Min. insertion length = 500 (19.69)
Max. insertion length = 30 000 (1 181)
Applicable for liquids and solids applications. Cable can be shortened on site.

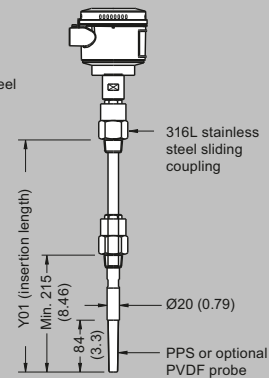


Sanitary extended version
Sanitary fitting
(7ML5632 and 7ML5642)



Min. insertion length = 110 (4.3)
Max. insertion length = 5 500 (216)

Sliding coupling version
Threaded
(7ML5633 and 7ML5643)



Min. insertion length = 350 (13.82)
Max. insertion length = 5 500 (216)

Pointek CLS200 threaded/sanitary process connections, dimensions in mm (inch)

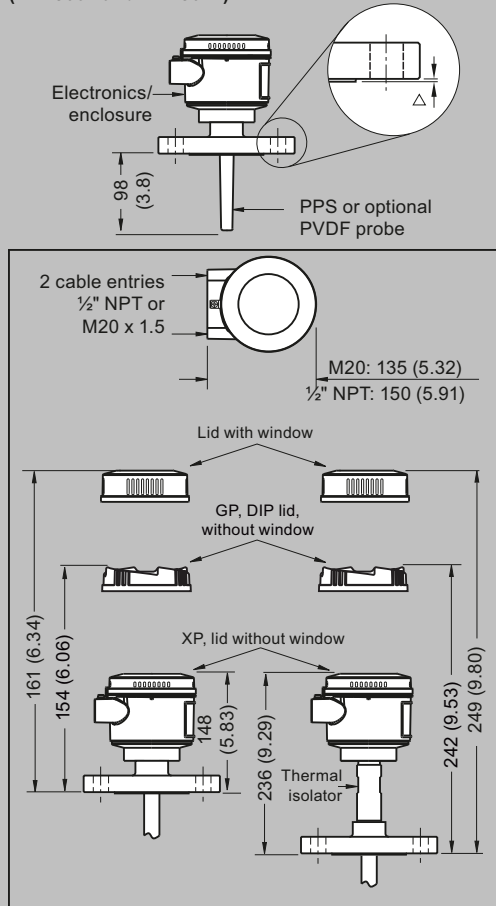
Level Measurement

Point level measurement

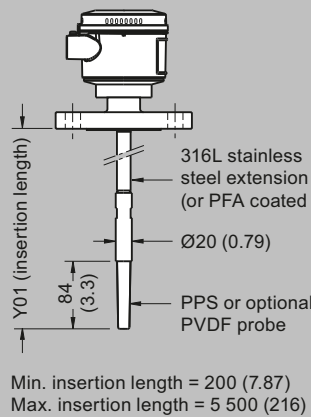
RF Capacitance / Pointek CLS200 - Digital

Dimensional drawings (continued)

Compact version
Welded Flange (7ML5630 and 7ML5640)
Welded Flange, PFA coated
(7ML5634 and 7ML5644)

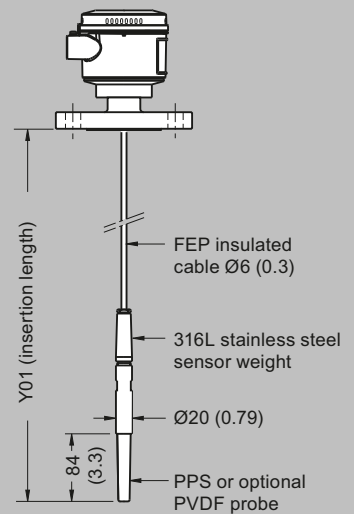


Extended rod version
Welded Flange (7ML5630 and 7ML5640)
Welded Flange, PFA coated
(7ML5634 and 7ML5644)



Min. insertion length = 200 (7.87)
 Max. insertion length = 5 500 (216)

Extended cable version
Welded Flange
(7ML5631 and 7ML5641)



Min. insertion length = 500 (19.69)
 Max. insertion length = 30 000 (1 181)
 Applicable for liquids and solids applications. Cable can be shortened on site.

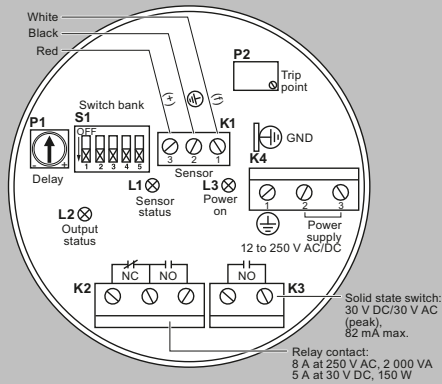
Flange Facing (raised face)	
Flange Class	Facing thickness
△ ASME 150/300	2 (0.08)
△ ASME 600/900	7 (0.28)
△ PN16/40	2 (0.08)

Insertion length does not include any raised face/gasket face dimension (see Flange Facing Table above)

Pointek CLS200 flanged process connections, dimensions in mm (inch)

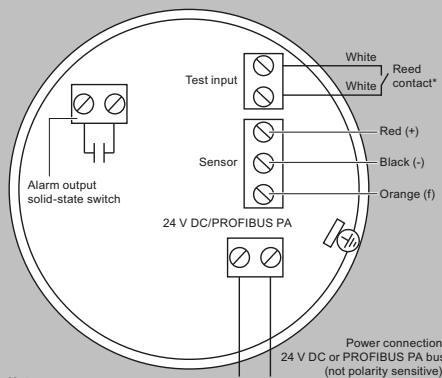
Circuit diagrams

Wiring: Pointek CLS200 standard



- Notes:**
- Identification label is on underside of lid. Switch and potentiometer settings are for illustration purposes only (refer to operation/setup in manual).
 - All field wiring must have insulation suitable for at least 250 V.
 - Relay contact terminals are for use with equipment having no accessible live parts and wiring having insulation suitable for at least 250 V.
 - Maximum working voltage between adjacent relay contacts shall be 250 V.
 - Refer to the Instruction Manual or contact Siemens representative for detailed wiring information.

Wiring: Pointek CLS200 Digital



- Notes:**
- Refer to the instruction manual or contact a Siemens representative for detailed wiring information.

***Magnet activated sensor Test**

A magnet can be used to test the sensor without opening the lid of the Pointek CLS200 Digital version. Bring the magnet close to the test area indicated on the enclosure. The sensor test starts and finishes automatically after 10 seconds.



Pointek CLS200 connections

Level Measurement

Point level measurement

RF Capacitance / Pointek CLS300 - Standard

Overview



Pointek CLS300 (standard version) is an inverse frequency shift capacitance level and material detection switch with optional rod/cable choices and configurable output. CLS300 is ideal for detecting liquids, solids, slurries, foam, and interfaces in demanding conditions where high pressure and temperatures are present and has the ability to tune out buildup on the probe.

Benefits

- Active-Shield technology so measurement is unaffected by material buildup or nozzle interference in active shield section
- Performs in extremely abrasive conditions because of solid rod construction
- Three LED indicators for adjustment control, output status, and power
- High-temperature version up to 400 °C (752 °F)

Application

Pointek CLS300 standard version has three LED indicators with basic relay and solid-state switch alarms.

The robust design of CLS300 makes it specifically applicable for heavy solids applications where abrasive materials occur as in the mining industry. The fully potted electronics are unaffected by condensation, dust or vibration.

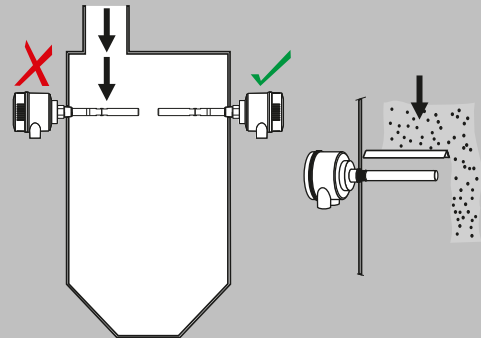
Wetted parts are made of stainless steel with a PFA shield for high chemical resistance, and of ceramic and stainless steel for high temperature version. Materials with low or high dielectric constants can be accurately detected. The unique Active Shield suppresses interference from material buildup or long installation nozzles.

The unique modular design of the Pointek CLS300 provides a wide range of configurations, process connections, extensions and approvals to meet the temperature and pressure requirements of specific applications. The modular design makes ordering easier and reduces stocking requirements. A wide range of probe configurations are available, including rod and cable versions.

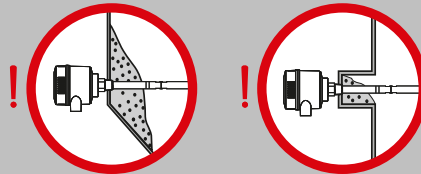
- Key Applications: liquids, slurries, bulk solids, relatively high pressure and temperature, hazardous areas, milling and mining applications

Configuration

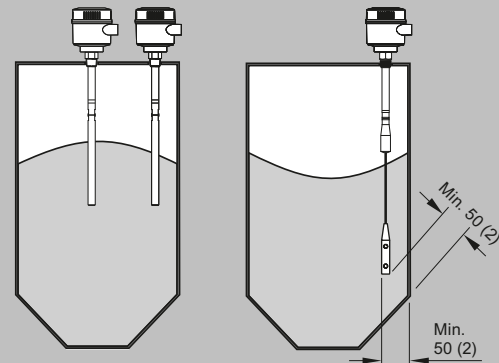
Installation



Keep unit out of path of falling material, or protect probe from falling material.



Build up of material in active shield area does not affect switch operation.



Install probe at least 50 (2) from tank wall.
Note angle of repose and adjust accordingly.

Pointek CLS300 installation, dimensions in mm (inch)

Selection and ordering data

Pointek CLS300 RF Capacitance point level switch, rod design. Detects level and interface in aggressive liquids, solids, slurries, and foam. Adjustable, 1 m (3.28 ft), insertion, adaptable sensitivity, with active shield to tune out build-up on probe.	Article No. 7MLS650- ● ● ● ● ● - ● ● ● ●		
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.			
Process connection			
<u>Threaded, 316L stainless steel</u>			
¾" NPT [(Taper), ASME B1.20.1]	0	A	
1" NPT [(Taper), ASME B1.20.1]	0	B	
1¼" NPT [(Taper), ASME B1.20.1]	0	C	
1½" NPT [(Taper), ASME B1.20.1]	0	D	
R ¾" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]	1	A	
R 1" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]	1	B	
R 1½" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]	1	D	
G ¾" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]	3	A	
G 1" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]	3	B	
G 1½" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]	3	D	
<u>Welded flange, 316L stainless steel, raised face</u>			
1" ASME, 150 lb	5	A	
1" ASME, 300 lb	5	B	
1" ASME, 600 lb	5	C	
1½" ASME, 150 lb	5	D	
1½" ASME, 300 lb	5	E	
1½" ASME, 600 lb	5	F	
2" ASME, 150 lb	5	G	
2" ASME, 300 lb	5	H	
2" ASME, 600 lb	5	J	
3" ASME, 150 lb	5	K	
3" ASME, 300 lb	5	L	
3" ASME, 600 lb	5	M	
4" ASME, 150 lb	5	N	
4" ASME, 300 lb	5	P	
4" ASME, 600 lb	5	Q	
<u>Welded flange, 316L stainless steel, Type A flat faced</u>			
DN 25, PN 16	6	A	
DN 25, PN 40	6	B	
DN 40, PN 16	6	C	
DN 40, PN 40	6	D	
DN 50, PN 16	6	E	
DN 50, PN 40	6	F	
DN 80, PN 16	6	G	
DN 80, PN 40	6	H	
DN 100, PN 16	6	J	
DN 100, PN 40 (Note: flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1 standard.)	6	K	
Probe length			
(length from flange face) (threaded lengths include process thread)			
<u>Note: No Y01 needed in Order code for standard lengths</u>			
Standard version, rod 350 mm (13.78 inch)		A	
Extended rod, length 500 mm (19.69 inch)		B	
Extended rod, length 750 mm (29.53 inch)		C	
Extended rod, length 1 000 mm (39.37 inch)		D	
<u>Add Order code Y01 and plain text: "Insertion length ... mm"</u>			
Extended rod, factory adjusted length 250 ... 499 mm (9.8 ... 19.65 inch)		E	
Extended rod, factory adjusted length 500 ... 749 mm (19.69 ... 29.49 inch)		F	
Extended rod, factory adjusted length 750 ... 999 mm (29.53 ... 39.3 inch)		G	
Thermal isolator			
Without thermal isolator			0
With thermal isolator [for process connection temperatures over 85 °C (185 °F)]			1

Level Measurement

Point level measurement

RF Capacitance / Pointek CLS300 - Standard

Selection and ordering data (continued)

	Article No.
Pointek CLS300 RF Capacitance point level switch, rod design. Detects level and interface in aggressive liquids, solids, slurries, and foam. Adjustable, 1 m (3.28 ft), insertion, adaptable sensitivity, with active shield to tune out build-up on probe.	7ML5650- ● ● ● ● ● - ● ● ● ● ●
Wetted seals	
FKM	0
FFKM [for process temperatures above -20 °C (-4 °F)]	1
Probe material	
316L stainless steel with PFA lining and PEEK isolators	0
Approvals	
Dust Ignition Proof with IS Probe: CE, RCM, ATEX II ½ D T100 °C	C
Flameproof Enclosure with IS Probe: CE, RCM, ATEX II ½ G EEx d[ia] IIC T6 ... T1, ATEX II ½ D T100 °C	D
Flameproof Enclosure with IS Probe, with WHG approval: CE, RCM, ATEX II ½ G EEx d[ia] IIC T6 ... T1, ATEX II ½ D T100 °C	E
Dust Ignition Proof with IS Probe: CSA/FM Class II, Div. 1, Groups E, F, G, CSA/FM Class III T4	F
Explosion Proof Enclosure with IS Probe: CSA/FM Class I, Div. 1, Groups A, B, C, D, CSA/FM Class II, Div. 1, Groups E, F, G, CSA/FM Class III T4	G
General Purpose (CSA, FM)	H
General Purpose (CE, RCM)	J
General Purpose with WHG approval (CSA, FM, CE, RCM)	K
Enclosure and lid	
Aluminum epoxy coated	
2 x ½" NPT via adapter - cable inlet, IP65	A
2 x M20 x 1.5 cable inlet, IP65	B
2 x ½" NPT via adapter - cable inlet, IP68	C
2 x M20 x 1.5 cable inlet, IP68	D
Active shield length	
Standard length - (125 mm threaded, 105 mm flanged)	0
Extended shield - (250 mm threaded, 230 mm flanged) ¹⁾	1
Extended shield - (400 mm threaded, 380 mm flanged) ²⁾	2

¹⁾ Available with Probe version options B ... D, F, G only [≥ 500 mm (19.69 inch)].

²⁾ Available with Probe version options C, D, and G only [≥ 750 mm (29.53 inch)].

Selection and Ordering data	Order code
Further designs	
Please add "-Z" to Article No. and specify Order code(s).	
Total insertion length: enter the total insertion length in plain text description	Y01
Stainless steel tag [70 x 13 mm (2.75 x 0.5 inch)]: Measuring-point number/identification (max. 27 characters) specify in plain text	Y15
Manufacturer's test certificate: M to DIN 55350, Part 18 and to ISO 9000	C11
Material Inspection Certificate Type 3.1 per EN 10204 INMETRO ¹⁾	C12 E34
Operating Instructions	
All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation .	
Accessories	See accessories following CLS300 Digital selection and ordering data.

¹⁾ Available only with Approvals options C, D, E.

Selection and ordering data (continued)

	Article No.											
Pointek CLS300 RF Capacitance point level switch, cable design. Detects level and interface in aggressive liquids, solids, slurries, and foam. Cable extension options to 25 m (82.02 ft), adaptable sensitivity, with active shield to tune out build-up on probe.	7	M	L	5	6	5	1	-	6	6	6	6
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.												
Process connection												
<u>Threaded, 316L stainless steel</u>												
1¼" NPT [(Taper), ASME B1.20.1]	0											C
1½" NPT [(Taper), ASME B1.20.1]	0											D
R 1½" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]	1											D
G 1½" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]	3											D
<u>Welded flange, 316L stainless steel, raised face</u>												
1½" ASME, 150 lb	5											D
1½" ASME, 300 lb	5											E
1½" ASME, 600 lb	5											F
2" ASME, 150 lb	5											G
2" ASME, 300 lb	5											H
2" ASME, 600 lb	5											J
3" ASME, 150 lb	5											K
3" ASME, 300 lb	5											L
3" ASME, 600 lb	5											M
4" ASME, 150 lb	5											N
4" ASME, 300 lb	5											P
4" ASME, 600 lb	5											Q
<u>Welded flange, 316L stainless steel, Type A flat faced</u>												
DN 40, PN 16	6											C
DN 40, PN 40	6											D
DN 50, PN 16	6											E
DN 50, PN 40	6											F
DN 80, PN 16	6											G
DN 80, PN 40	6											H
DN 100, PN 16	6											J
DN 100, PN 40	6											K
(Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1 standard.)												
Probe length												
(length from flange face) (threaded lengths include process thread)												
<u>Note: No Y01 needed in Order code for standard lengths</u>												
Extended cable, 3 000 mm (118.11 inch), length can be shortened by customer												A
Extended cable, 6 000 mm (236.22 inch), length can be shortened by customer												B
<u>Add Order code Y01 and plain text: "Insertion length ... mm"</u>												
Extended cable, 500 ... 1 000 mm (19.69 ... 39.37 inch) ²⁾												E
Extended cable, 1 001 ... 5 000 mm (39.41 ... 196.85 inch)												F
Extended cable, 5 001 ... 10 000 mm (196.89 ... 393.70 inch)												G
Extended cable, 10 001 ... 15 000 mm (393.74 ... 590.55 inch)												H
Extended cable, 15 001 ... 20 000 mm (590.59 ... 787.40 inch)												J
Extended cable, 20 001 ... 25 000 mm (787.44 ... 984.25 inch)												K
Thermal isolator												
Without thermal isolator									0			
With thermal isolator [for process connection temperatures over 85 °C (185 °F)]									1			
Wetted seals												
FKM											0	
FFKM [for process temperatures above -20 °C (-4 °F)]											1	
Probe material												
Bare 316L stainless steel cable, PEEK isolators and 316L stainless steel cable weight											0	
PFA coated cable, PEEK isolators and 316L stainless steel cable weight											1	

Level Measurement

Point level measurement

RF Capacitance / Pointek CLS300 - Standard

Selection and ordering data (continued)

	Article No.
Pointek CLS300 RF Capacitance point level switch, cable design. Detects level and interface in aggressive liquids, solids, slurries, and foam. Cable extension options to 25 m (82.02 ft), adaptable sensitivity, with active shield to tune out build-up on probe.	7ML5651- ● ● ● ● ● - ● ● ● ●
Approvals Dust Ignition Proof with IS Probe: CE, RCM, ATEX II ½ D T100 °C Flameproof Enclosure with IS Probe: CE, RCM, ATEX II ½ G EEx d[ia] IIC T6 ... T1, ATEX II ½ D T100 °C Flameproof Enclosure with IS Probe, with WHG approval: CE, RCM, ATEX II ½ G EEx d[ia] IIC T6 ... T1, ATEX II ½ D T100 °C Dust Ignition Proof with IS Probe: CSA/FM Class II, Div. 1, Groups E, F, G, CSA/FM Class III T4 Explosion Proof Enclosure with IS Probe: CSA/FM Class I, Div. 1, Groups A, B, C, D, CSA/FM Class II, Div. 1, Groups E, F, G, CSA/FM Class III T4 General Purpose (CSA, FM) General Purpose (CE, RCM) General Purpose with WHG approval (CSA, FM, CE, RCM)	C D E F G H J K
Enclosure and lid <u>Aluminum epoxy coated</u> 2 x ½" NPT via adapter - cable inlet, IP65 2 x M20 x 1.5 cable inlet, IP65 2 x ½" NPT via adapter - cable inlet, IP68 2 x M20 x 1.5 cable inlet, IP68	A B C D
Active shield length Standard length - (125 mm threaded, 105 mm flanged) Extended shield - (250 mm threaded, 230 mm flanged) ¹⁾ Extended shield - (400 mm threaded, 380 mm flanged) ¹⁾	0 1 2

¹⁾ Available with Probe version options A, B, F ... K, only [$\geq 1\ 000$ mm (39.7 inch)].

²⁾ Not available with Active shield option 1.

Selection and Ordering data	Order code
Further designs Please add "-Z" to Article No. and specify Order code(s). Total insertion length: enter the total insertion length in plain text description Stainless steel tag [70 x 13 mm (2.75 x 0.5 inch)]: Measuring-point number/identification (max. 27 characters) specify in plain text Manufacturer's test certificate: M to DIN 55350, Part 18 and to ISO 9000 Material Inspection Certificate Type 3.1 per EN 10204 INMETRO ¹⁾	Y01 Y15 C11 C12 E34
Operating Instructions All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation .	
Accessories	See accessories following CLS300 Digital selection and ordering data.

¹⁾ Available only with Approvals options C, D, E.

Selection and ordering data (continued)

Pointek CLS300 RF Capacitance point level switch, high temperature design. Detects level and interface in aggressive liquids, solids, slurries, and foam. Adjustable, 1 m (3.28 ft), insertion, adaptable sensitivity, with active shield to tune out build-up on probe.	Article No. 7ML5652- ● ● ● 0 ● - ● ● ● ● ●
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	
Process connection	
<u>Threaded, 316L stainless steel</u>	
¾" NPT [(Taper), ASME B1.20.1]	0 A
1" NPT [(Taper), ASME B1.20.1]	0 B
1¼" NPT [(Taper), ASME B1.20.1]	0 C
1½" NPT [(Taper), ASME B1.20.1]	0 D
R ¾" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]	1 A
R 1" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]	1 B
R 1½" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]	1 D
G ¾" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]	3 A
G 1" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]	3 B
G 1½" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]	3 D
<u>Welded flange, 316L stainless steel, raised face</u>	
1" ASME, 150 lb	5 A
1" ASME, 300 lb	5 B
1" ASME, 600 lb	5 C
1½" ASME, 150 lb	5 D
1½" ASME, 300 lb	5 E
1½" ASME, 600 lb	5 F
2" ASME, 150 lb	5 G
2" ASME, 300 lb	5 H
2" ASME, 600 lb	5 J
3" ASME, 150 lb	5 K
3" ASME, 300 lb	5 L
3" ASME, 600 lb	5 M
4" ASME, 150 lb	5 N
4" ASME, 300 lb	5 P
4" ASME, 600 lb	5 Q
<u>Welded flange, 316L stainless steel, Type A flat faced</u>	
DN 25, PN 16	6 A
DN 25, PN 40	6 B
DN 40, PN 16	6 C
DN 40, PN 40	6 D
DN 50, PN 16	6 E
DN 50, PN 40	6 F
DN 80, PN 16	6 G
DN 80, PN 40	6 H
DN 100, PN 16	6 J
DN 100, PN 40	6 K
(Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1 standard.)	
Probe length	
(length from flange face) (threaded lengths include process thread)	
<u>Note: No Y01 needed in Order code for standard lengths</u>	
Standard version rod, 350 mm (13.78 inch)	A
Extended rod, length 500 mm (19.69 inch)	B
Extended rod, length 750 mm (29.53 inch)	C
Extended rod, length 1 000 mm (39.37 inch)	D
<u>Add Order code Y01 and plain text: "Insertion length ... mm"</u>	
Extended rod, factory adjusted length 250 ... 499 mm (9.8 ... 19.65 inch)	E
Extended rod, factory adjusted length 500 ... 749 mm (19.69 ... 29.49 inch)	F
Extended rod, factory adjusted length 750 ... 999 mm (29.53 ... 39.3 inch)	G

Level Measurement

Point level measurement

RF Capacitance / Pointek CLS300 - Standard

Selection and ordering data (continued)

	Article No.
Pointek CLS300 RF Capacitance point level switch, high temperature design. Detects level and interface in aggressive liquids, solids, slurries, and foam. Adjustable, 1 m (3.28 ft), insertion, adaptable sensitivity, with active shield to tune out build-up on probe.	7ML5652- ● ● ● 0 ● - ● ● ● ●
Wetted seals	
Graphite	0
Probe material	
316L stainless steel with ceramic (ZrO ₂) isolators	0
Approvals	
Dust Ignition Proof with IS Probe: CE, RCM, ATEX II ½ D T100 °C	C
Flameproof Enclosure with IS Probe: CE, RCM, ATEX II ½ G EEx d[ia] IIC T6 ... T1, ATEX II ½ D T100 °C	D
Flameproof Enclosure with IS Probe with WHG approval: CE, RCM, ATEX II ½ G EEx d[ia] IIC T6 ... T1, ATEX II ½ D T100 °C	E
Dust Ignition Proof with IS Probe: CSA/FM Class II, Div. 1, Groups E, F, G, CSA/FM Class III T4	F
Explosion Proof Enclosure with IS Probe: CSA/FM Class I, Div. 1, Groups A, B, C, D, CSA/FM Class II, Div. 1, Groups E, F, G, CSA/FM Class III T4	G
General Purpose (CSA, FM)	H
General Purpose (CE, RCM)	J
General Purpose with WHG approval (CSA, FM, CE, RCM)	K
Enclosure and lid	
<u>Aluminum epoxy coated</u>	
2 x ½" NPT via adapter - cable inlet, IP65	A
2 x M20 x 1.5 cable inlet, IP65	B
2 x ½" NPT via adapter - cable inlet, IP68	C
2 x M20 x 1.5 cable inlet, IP68	D
Active shield length	
Standard length - (125 mm threaded, 105 mm flanged)	0
Extended shield - (250 mm threaded, 230 mm flanged) ¹⁾	1
Extended shield - (400 mm threaded, 380 mm flanged) ²⁾	2

1) Available with Probe version options B ... D, F, G only [≥ 500 mm (19.69 inch)].

2) Available with Probe version options C, D, and G only [≥ 750 mm (29.53 inch)].

Selection and Ordering data	Order code
Further designs	
Please add "-Z" to Article No. and specify Order code(s).	
Total insertion length: enter the total insertion length in plain text description ¹⁾	Y01
Stainless steel tag [70 x 13 mm (2.75 x 0.5 inch)]: Measuring-point number/identification (max. 27 characters) specify in plain text	Y15
Manufacturer's test certificate: M to DIN 55350, Part 18 and to ISO 9000	C11
Material Inspection Certificate Type 3.1 per EN 10204 INMETRO ²⁾	C12 E34
Operating Instructions	
All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation .	
Accessories	See accessories following CLS300 Digital selection and ordering data.

1) Not available with Probe length option B.

2) Available only with Approvals options C, D, E.

Technical specifications

Pointek CLS300 - Standard	
Mode of operation	
Measuring principle	Inverse frequency shift capacitive level detection
Input	
Measured variable	Change in pF
Output	
Output signal	
• Relay output	1 SPDT Form C relay
- Max. contact voltage	<ul style="list-style-type: none"> • 30 V DC • 250 V AC
- Max. contact current	<ul style="list-style-type: none"> • 5 A (DC) • 8 A (AC)
- Max. switching capacity	<ul style="list-style-type: none"> • 150 W (DC) • 2 000 VA (AC)
- Time delay (ON and/or OFF)	1 ... 60 s
• Solid-state output	
- Output	Galvanically isolated
- Protection	Against reversed polarity (bipolar)
- Max. switching voltage	<ul style="list-style-type: none"> • 30 V (DC) • 30 V peak (AC)
- Max. load current	82 mA
- Voltage drop	< 1 V, typical at 50 mA
- Time delay (pre or post switching)	1 ... 60 s
Accuracy	
Resolution	
• Min. sensitivity (pF)	1 % change in actual capacitance
• Max. temperature error	0.2 % of actual capacitance value
Rated operating conditions¹⁾	
Installation conditions	
• Location	Indoor/outdoor
Ambient conditions	
• Ambient temperature	-40 ... +85 °C (-40 ... +185 °F) ²⁾
• Storage temperature	-40 ... +85 °C (-40 ... +185 °F)
Medium conditions	Liquids, bulk solids, slurries and interfaces, and applications with viscous materials
• Relative dielectric constant ϵ_r	Min. 1.5
• Process temperature	
- Rod/Cable version	-40 ... +200 °C (-40 ... +392 °F) ²⁾
- High-temperature version	-40 ... +400 °C (-40 ... +752 °F)
• Process pressure ³⁾	-1 ... +35 bar g (-14.6 ... +511 psi g)
Design	
Material (enclosure)	Powder-coated aluminum with gasket
Degree of Protection	Standard: Type 4/NEMA 4/IP65 Optional: Type 4/NEMA 4/IP68
Cable inlet	2 x M20 x 1.5 thread (option: 2 x ½" NPT conduit entry including 1 plugged entry)
Controls and displays	
Displays	3 LEDs, for probe status, output status and power supply
Potentiometers	2 potentiometers for time delay and sensitivity
Switches	5 DIP switches for delay on/off, fail-safe high/low, time delay test/adjust, high/low sensitivity, test delay settings
Power supply	
Supply	12 ... 250 V AC/DC, 0 ... 60 Hz, galvanically isolated, 2 W

Level Measurement

Point level measurement

RF Capacitance / Pointek CLS300 - Standard

Technical specifications (continued)

Pointek CLS300 - Standard	
Certificates and approvals	
General Purpose	CSA, FM, CE, RCM
Flameproof Enclosure with IS Probe	ATEX II ½ G EEx d[ia] IIC T6 ... T1 ATEX II ½ D T100 °C
Dust Ignition Proof with IS Probe	ATEX II ½ D T100 °C CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4
Explosion Proof Enclosure with IS Probe	CSA/FM Class I, Div. 1, Groups A, B, C, D CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4
Marine	Lloyds Register of Shipping, Categories ENV1, ENV2, and ENV5
Overfill Protection	WHG (Germany) VLAREM II (Belgium)
Others	Pattern Approval (China)

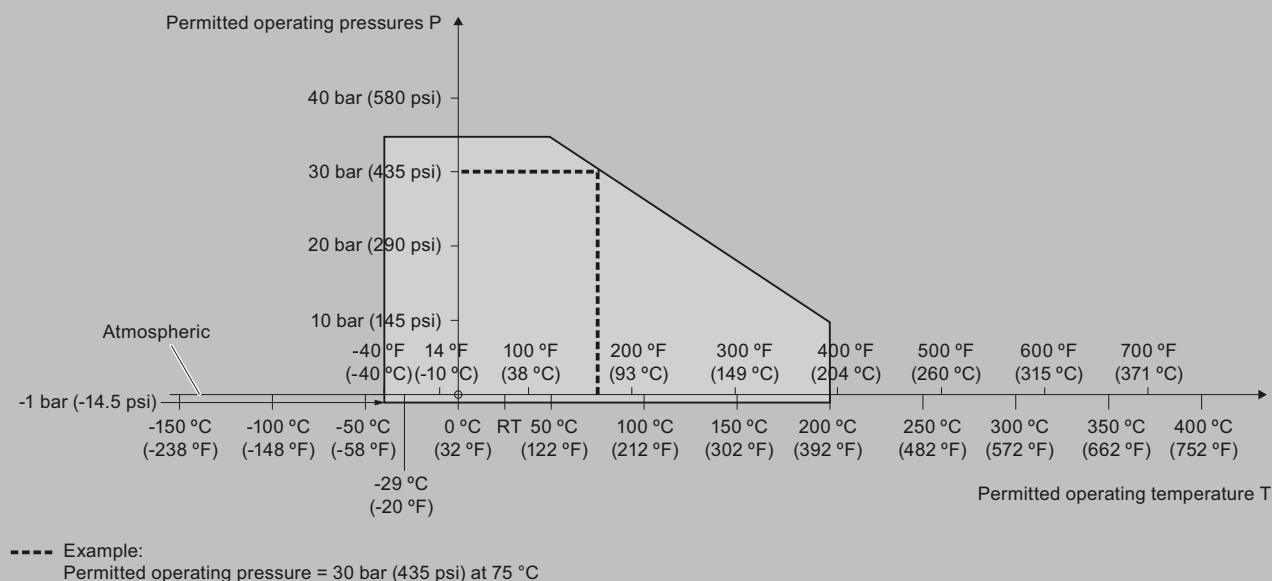
- 1) When operation is in areas classified as hazardous, observe restrictions according to relevant certificate. See also CLS300 pressure/temperature curves.
- 2) Thermal isolator is used if process connection temperature exceeds 85 °C (185 °F).
- 3) Pressure rating of process seal is temperature dependent. See also CLS300 pressure/temperature curves.

Design: Probe	Rod version	High Temperature version	Cable version
Length	Min. 250 mm (9.8 inch), max. 1 000 mm (40 inch)	Min. 250 mm (9.8 inch), max. 1 000 mm (40 inch)	Min. 1 000 mm (40 inch), max. 25 000 mm (984 inch)
Sensor wetted parts	PFA (no insulation on active probe), 316L stainless steel, PEEK isolators	Ceramic (ZrO ₂ ¹⁾ isolators (no insulation on active probe), 316L stainless steel	316 stainless steel, optional PFA, PEEK isolators
O-ring seal material	FKM (optional FFKM) ²⁾	Graphite ²⁾	FKM (optional FFKM) ²⁾
Thermal isolator	Optional	Standard	Optional
Extension	User-selectable length	User-selectable length	User selectable cable length

- 1) Zirconium Oxide
- 2) For caustic materials, consult a local sales person for alternative O-rings. For more information, please visit http://www.automation.siemens.com/aspa_app.

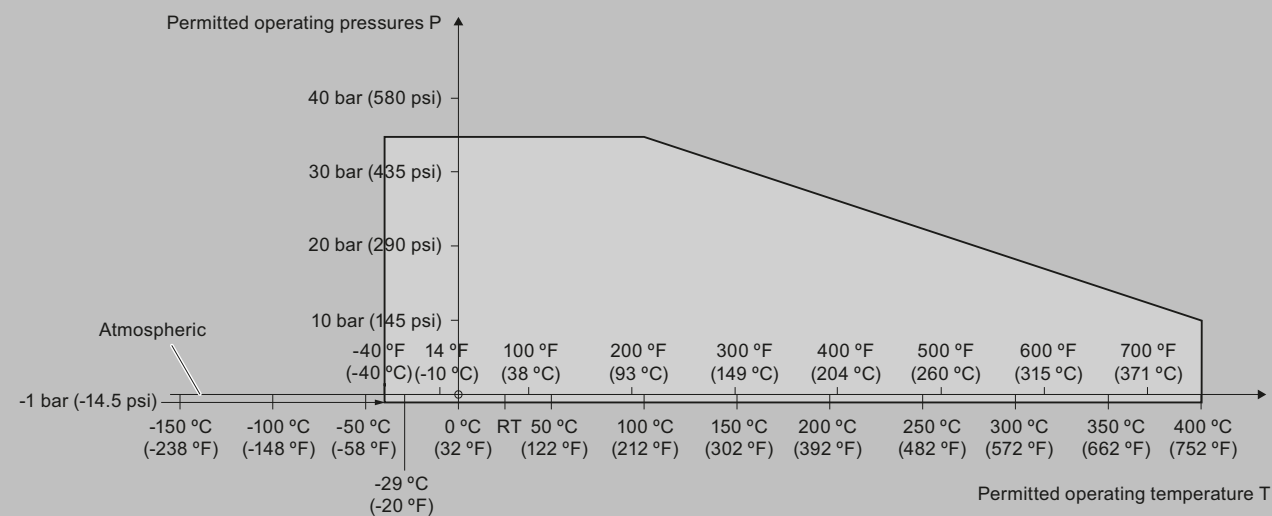
Characteristic curves

Pressure/temperature curve
CLS300 extended rod and cable probes
Threaded process connections
(7ML5650, 7ML5651, 7ML5660 and 7ML5661)



Pointek CLS300 process pressure/temperature derating curves (7ML5650, 7ML5651, 7ML5660, and 7ML5661)

Pressure/temperature curve
CLS300 high temperature rod probes
Threaded process connections
(7ML5652 and 7ML5662)



Pointek CLS300 process pressure/temperature derating curves (7ML5652 and 7ML5662)

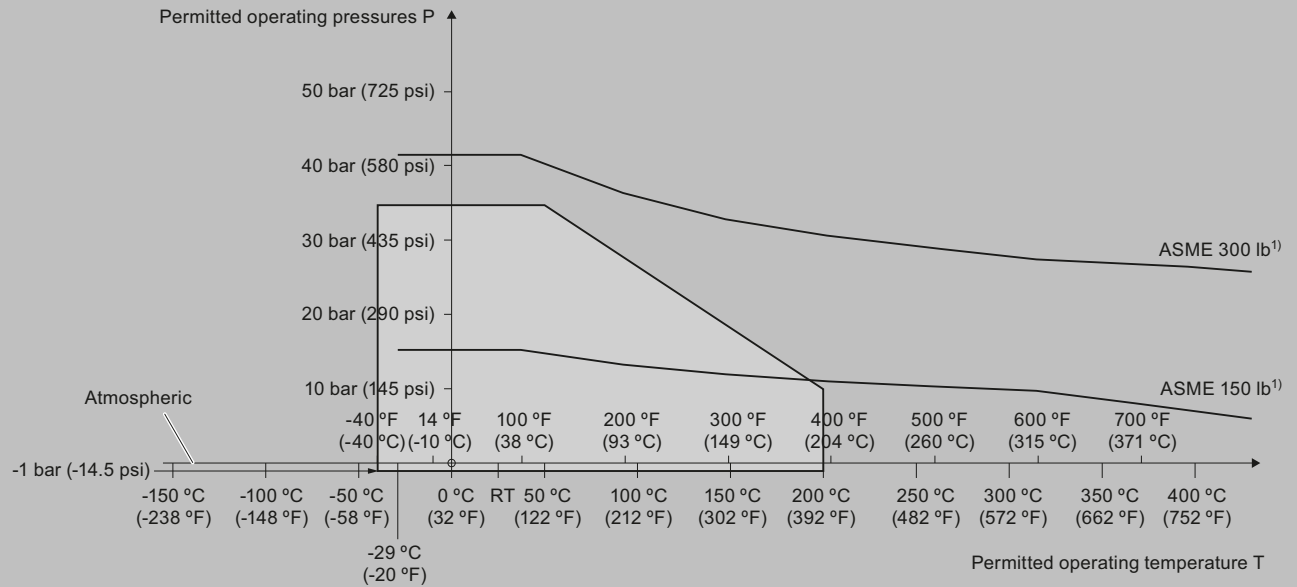
Level Measurement

Point level measurement

RF Capacitance / Pointek CLS300 - Standard

Characteristic curves (continued)

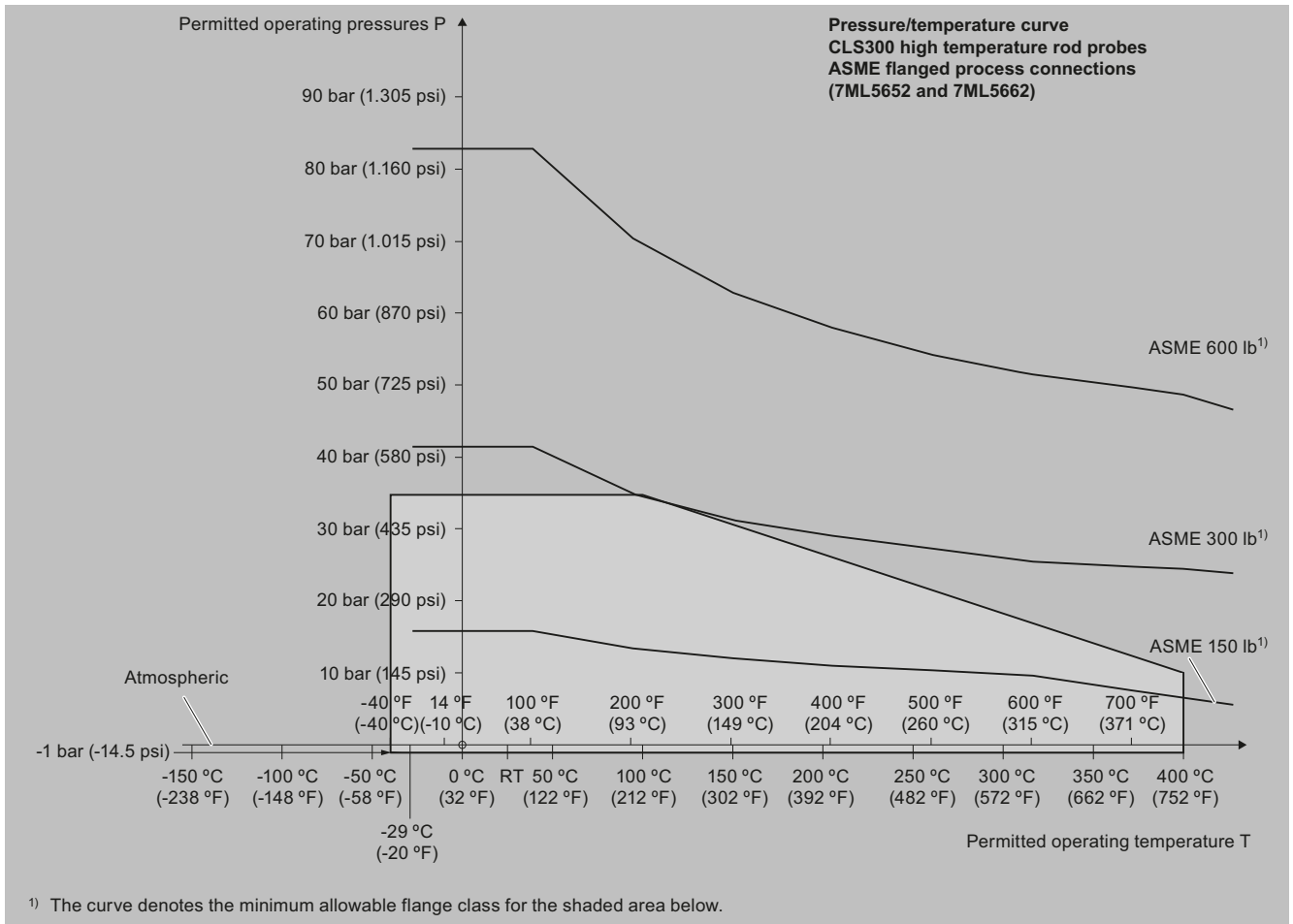
Pressure/temperature curve
CLS300 extended rod and cable probes
ASME flanged process connections
(7ML5650, 7ML5651, 7ML5660 and 7ML5661)



¹⁾ The curve denotes the minimum allowable flange class for the shaded area below.

Pointek CLS300 process pressure/temperature derating curves (7ML5650, 7ML5651, 7ML5660, and 7ML5661)

Characteristic curves (continued)



Pointek CLS300 process pressure/temperature derating curves (7ML5652 and 7ML5662)

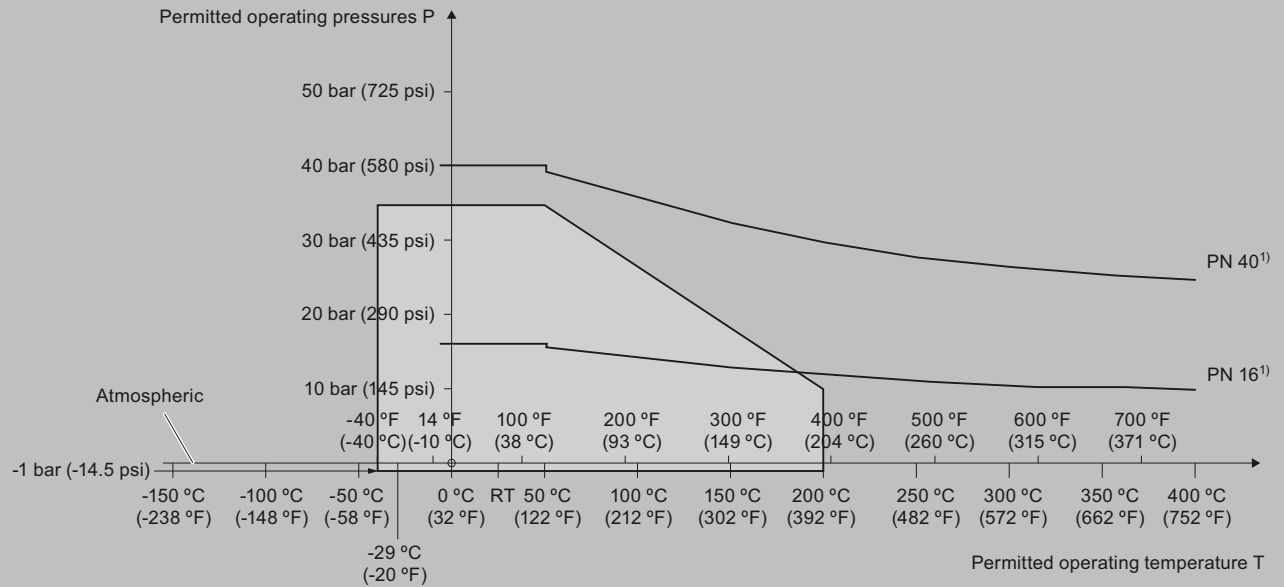
Level Measurement

Point level measurement

RF Capacitance / Pointek CLS300 - Standard

Characteristic curves (continued)

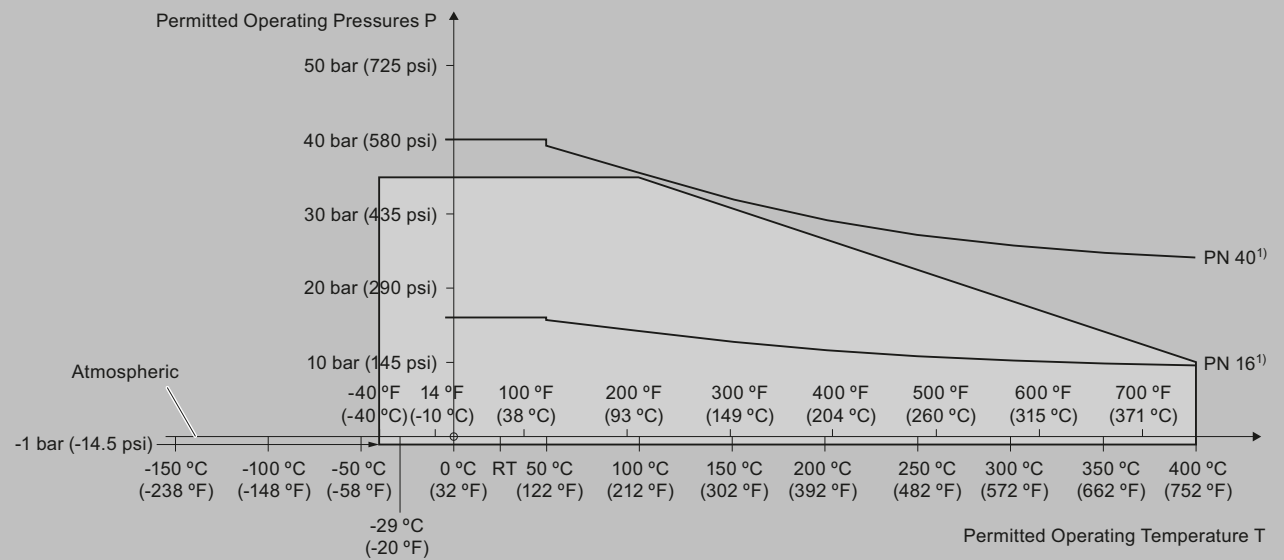
Pressure/temperature curve
CLS300 extended rod and cable probes
EN flanged process connections
(7ML5650, 7ML5651, 7ML5660 and 7ML5661)



¹⁾ The curve denotes the minimum allowable flange class for the shaded area below.

Pointek CLS300 process pressure/temperature derating curves (7ML5650, 7ML5651, 7ML5660, and 7ML5661)

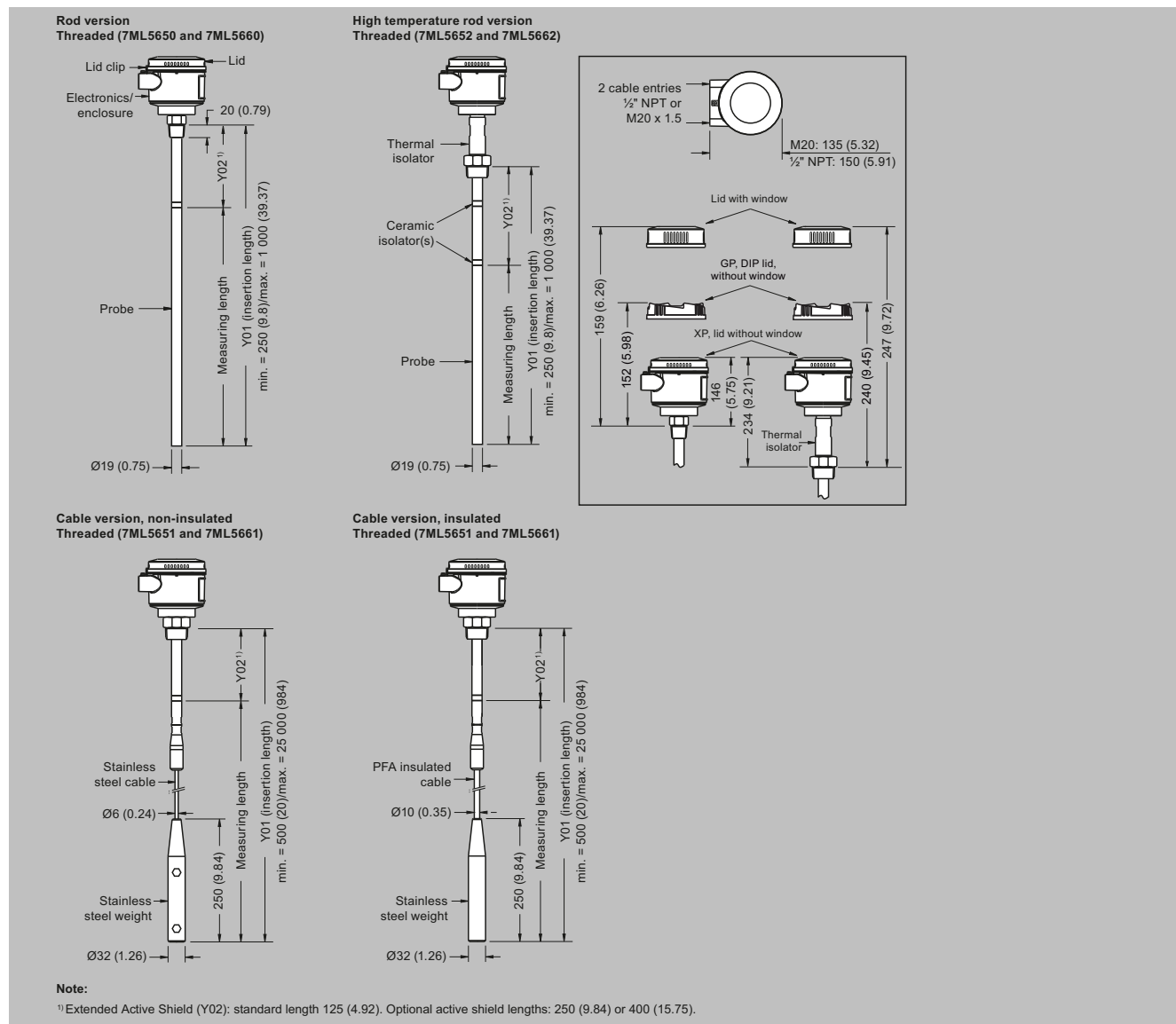
Pressure/Temperature Curve
CLS300 High Temperature Rod Probes
EN Flanged Process Connections (7ML5652 and 7ML5662)



¹⁾ The curve denotes the minimum allowable flange class for the shaded area below.

Pointek CLS300 process pressure/temperature derating curves (7ML5652 and 7ML5662)

Dimensional drawings



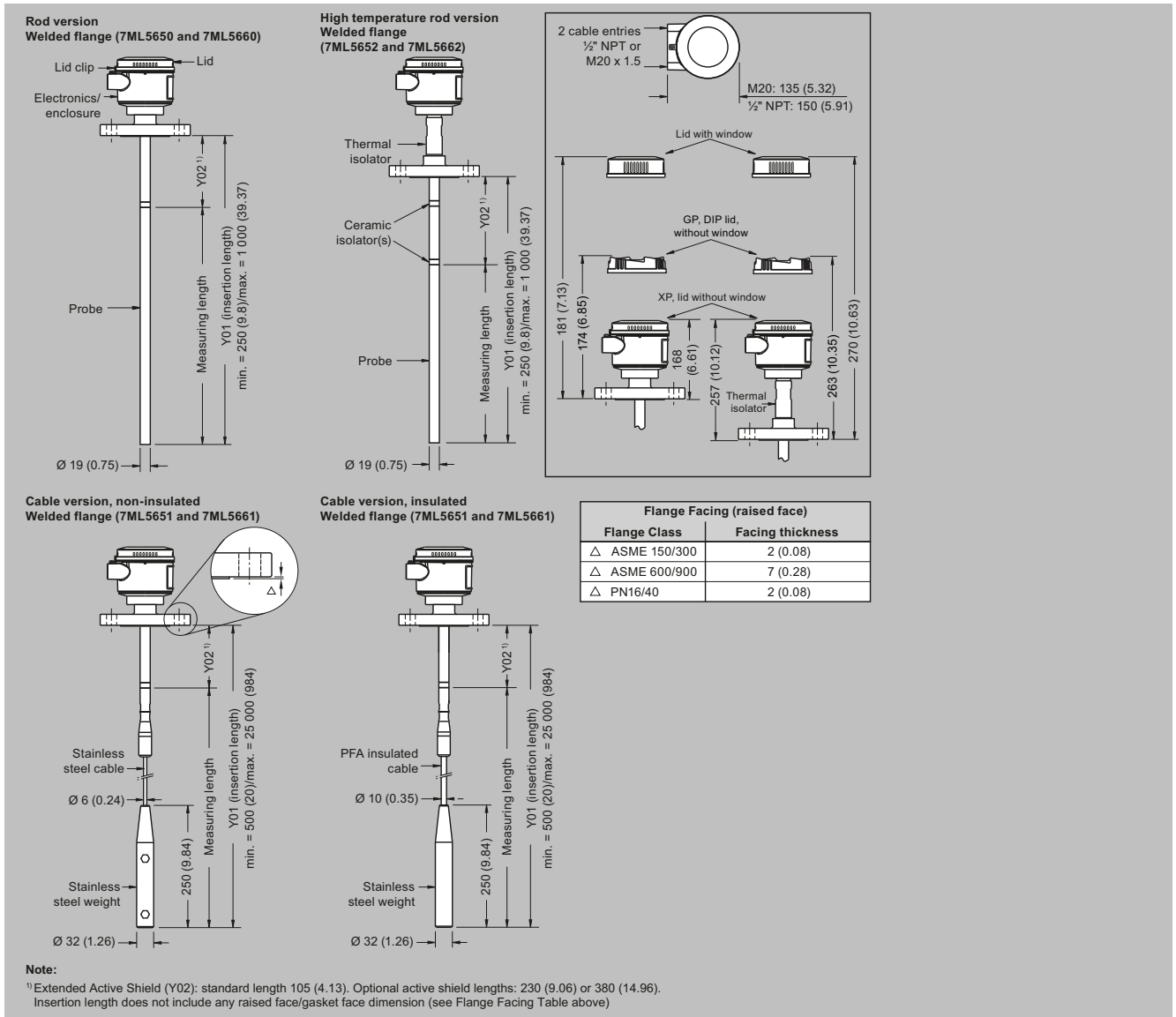
Pointek CLS300 threaded process connections, dimensions in mm (inch)

Level Measurement

Point level measurement

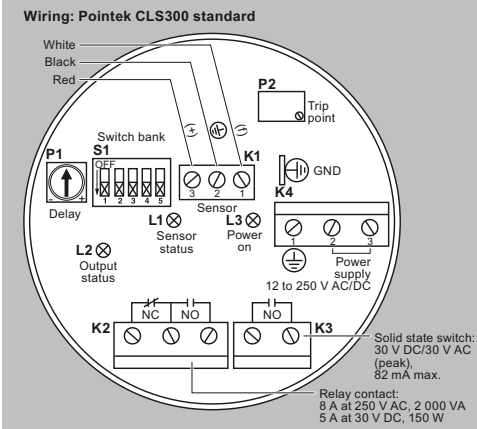
RF Capacitance / Pointek CLS300 - Standard

Dimensional drawings (continued)



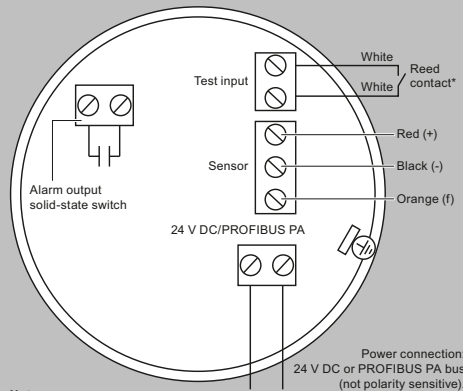
Pointek CLS300 flanged process connections, dimensions in mm (inch)

Circuit diagrams



- Notes:**
- Identification label is on underside of lid. Switch and potentiometer settings are for illustration purposes only (refer to operation/setup in manual).
 - All field wiring must have insulation suitable for at least 250 V.
 - Relay contact terminals are for use with equipment having no accessible live parts and wiring having insulation suitable for at least 250 V.
 - Maximum working voltage between adjacent relay contacts shall be 250 V.
 - Refer to the Instruction manual or contact Siemens representative for detailed wiring information.

Wiring: Pointek CLS300 digital



- Notes:**
- Refer to the instruction manual or contact a Siemens representative for detailed wiring information.

***Magnet activated sensor test**

A magnet can be used to test the sensor without opening the lid of the Pointek CLS300 digital version. Bring the magnet close to the test area indicated on the enclosure. The sensor test starts and finishes automatically after 10 seconds.



Pointek CLS300 connections

Level Measurement

Point level measurement

RF Capacitance / Pointek CLS300 - Digital

Overview



Pointek CLS300 (digital version) is an inverse frequency shift capacitance level and material detection switch with optional rod/cable choices and configurable output. It is ideal for detecting liquids, solids, slurries, foam, and interfaces in demanding conditions where high pressure and temperatures are present and has the ability to tune out buildup on the probe. The digital version includes PROFIBUS PA, an LCD display, and advanced diagnostic features.

Benefits

- Active-Shield technology so measurement is unaffected by material buildup or nozzle interference in active shield section
- Performs in extremely abrasive conditions because of solid rod construction
- Push-button calibration, full-function diagnostics
- High sensitivity allows installation in a wide range of liquids, solids or slurry applications
- Integral LCD display allows for easy menu-driven setup
- PROFIBUS PA communication (SIMATIC PDM compatible)

Application

Pointek CLS300 digital version provides an integral LCD display for stand-alone use, with PROFIBUS PA communication (Profile version 3.0, Class B) when required. Solid-state switch alarm is standard.

The robust design of CLS300 makes it specifically applicable for heavy solids applications where abrasive materials occur as in the mining industry.

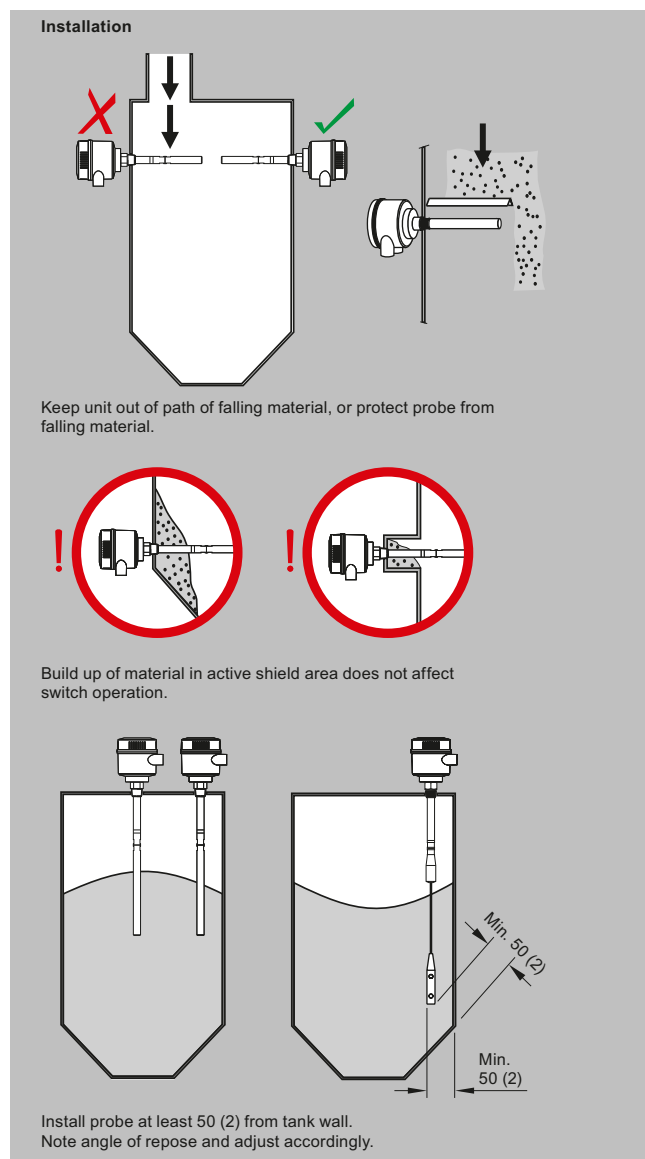
The fully potted electronics are unaffected by condensation, dust or vibration.

Wetted parts are made of stainless steel with a PFA shield for high chemical resistance, and of ceramic and stainless steel for high temperature version. Materials with low or high dielectric constants can be accurately detected. The unique Active Shield suppresses interference from material buildup or long installation nozzles.

The unique modular design of the Pointek CLS300 provides a wide range of configurations, process connections, extensions and approvals to meet the temperature and pressure requirements of specific applications. The modular design makes ordering easier and reduces stocking requirements. A wide range of probe configurations are available, including rod and cable versions.

- Key Applications: liquids, slurries, bulk solids, relatively high pressure and temperature, hazardous areas, milling and mining applications

Configuration



Pointek CLS300 installation, dimensions in mm (inch)

Level Measurement

Point level measurement

RF Capacitance / Pointek CLS300 - Digital

Selection and ordering data

	Article No.	
Pointek CLS300 RF Capacitance point level switch, digital, rod design. Detects level and interface in aggressive liquids, solids, slurries, and foam. Adjustable, 1 m (3.28 ft), insertion, adaptable sensitivity, and active shield to tune out build-up on probe. With display and digital communications.	7ML5660-	● ● ● ● ● - ● ● ● ●
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Process connection		
<u>Threaded, 316L stainless steel</u>		
¾" NPT [(Taper), ASME B1.20.1]	0	A
1" NPT [(Taper), ASME B1.20.1]	0	B
1¼" NPT [(Taper), ASME B1.20.1]	0	C
1½" NPT [(Taper), ASME B1.20.1]	0	D
R ¾" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]	1	A
R 1" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]	1	B
R 1½" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]	1	D
G ¾" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]	3	A
G 1" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]	3	B
G 1½" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]	3	D
<u>Welded flange, 316L stainless steel, raised face</u>		
1" ASME, 150 lb	5	A
1" ASME, 300 lb	5	B
1" ASME, 600 lb	5	C
1½" ASME, 150 lb	5	D
1½" ASME, 300 lb	5	E
1½" ASME, 600 lb	5	F
2" ASME, 150 lb	5	G
2" ASME, 300 lb	5	H
2" ASME, 600 lb	5	J
3" ASME, 150 lb	5	K
3" ASME, 300 lb	5	L
3" ASME, 600 lb	5	M
4" ASME, 150 lb	5	N
4" ASME, 300 lb	5	P
4" ASME, 600 lb	5	Q
<u>Welded flange, 316L stainless steel, Type A flat faced</u>		
DN 25, PN 16	6	A
DN 25, PN 40	6	B
DN 40, PN 16	6	C
DN 40, PN 40	6	D
DN 50, PN 16	6	E
DN 50, PN 40	6	F
DN 80, PN 16	6	G
DN 80, PN 40	6	H
DN 100, PN 16	6	J
DN 100, PN 40 (Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1 standard.)	6	K
Probe length		
(length from flange face) (threaded lengths include process thread)		
<u>Note: No Y01 needed in Order code for standard lengths</u>		
Standard version, rod 350 mm (13.78 inch)		A
Extended rod, length 500 mm (19.69 inch)		B
Extended rod, length 750 mm (29.53 inch)		C
Extended rod, length 1 000 mm (39.37 inch)		D
<u>Add Order code Y01 and plain text: "Insertion length ... mm"</u>		
Extended rod, factory adjusted length 250 ... 499 mm (9.8 ... 19.65 inch)		E
Extended rod, factory adjusted length 500 ... 749 mm (19.69 ... 29.49 inch)		F
Extended rod, factory adjusted length 750 ... 999 mm (29.53 ... 39.3 inch)		G

Level Measurement

Point level measurement

RF Capacitance / Pointek CLS300 - Digital

Selection and ordering data (continued)

Selection and Ordering data	Order code
Operating Instructions All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation .	
Accessories	See accessories following CLS300 Digital selection and ordering data.

¹⁾ Available only with Approvals options B and D.

Article No.											
Pointek CLS300 RF Capacitance point level switch, digital, cable design. Detects level and interface in aggressive liquids, solids, slurries, and foam. Cable extension options to 25 m (82.02 ft), adaptable sensitivity, with active shield to tune out build-up on probe. With display and digital communications.	7	M	L	5	6	6	1	-	6	6	6
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.											
Process connection											
<u>Threaded, 316L stainless steel</u>											
1¼" NPT [(Taper), ASME B1.20.1]	0										C
1½" NPT [(Taper), ASME B1.20.1]	0										D
R 1½" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]	1										D
G 1½" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]	3										D
<u>Welded flange, 316L stainless steel, raised face</u>											
1½" ASME, 150 lb	5										D
1½" ASME, 300 lb	5										E
1½" ASME, 600 lb	5										F
2" ASME, 150 lb	5										G
2" ASME, 300 lb	5										H
2" ASME, 600 lb	5										J
3" ASME, 150 lb	5										K
3" ASME, 300 lb	5										L
3" ASME, 600 lb	5										M
4" ASME, 150 lb	5										N
4" ASME, 300 lb	5										P
4" ASME, 600 lb	5										Q
<u>Welded flange, 316L stainless steel, Type A flat faced</u>											
DN 40, PN 16	6										C
DN 40, PN 40	6										D
DN 50, PN 16	6										E
DN 50, PN 40	6										F
DN 80, PN 16	6										G
DN 80, PN 40	6										H
DN 100, PN 16	6										J
DN 100, PN 40 (Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1 standard.)	6										K
Probe length (length from flange face) (threaded lengths include process thread)											
<u>Note: No Y01 needed in Order code for standard lengths</u>											
Extended cable, 3 000 mm (118.11 inch), length can be shortened by customer											A
Extended cable, 6 000 mm (236.22 inch), length can be shortened by customer											B
<u>Add Order code Y01 and plain text: "Insertion length ... mm"</u>											
Extended cable, 500 ... 1 000 mm (19.69 ... 39.37 inch) ³⁾											E
Extended cable, 1 001 ... 5 000 mm (39.41 ... 196.85 inch)											F
Extended cable, 5 001 ... 10 000 mm (196.89 ... 393.70 inch)											G
Extended cable, 10 001 ... 15 000 mm (393.74 ... 590.55 inch)											H
Extended cable, 15 001 ... 20 000 mm (590.59 ... 787.40 inch)											J
Extended cable, 20 001 ... 25 000 mm (787.44 ... 984.25 inch)											K

Selection and ordering data (continued)

	Article No.
Pointek CLS300 RF Capacitance point level switch, digital, cable design. Detects level and interface in aggressive liquids, solids, slurries, and foam. Cable extension options to 25 m (82.02 ft), adaptable sensitivity, with active shield to tune out build-up on probe. With display and digital communications.	7ML5661- ● ● ● ● ● - ● ● ● ● ●
Thermal isolator	
Without thermal isolator	0
With thermal isolator [for process connection temperatures over 85 °C (185 °F)]	1
Wetted seals	
FKM	0
FFKM [for process temperatures above -20 °C (-4 °F)]	1
Probe material	
Bare 316L stainless steel cable, PEEK isolators and 316L stainless steel cable weight	0
PFA coated cable, PEEK isolators and 316L stainless steel cable weight	1
Approvals	
Dust Ignition Proof: CE, RCM, ATEX II ½ D, 2 D IP6X T100 °C	B
Intrinsically Safe ¹⁾ : CE, RCM, ATEX II 1 G EEx ia IIC T6 ... T4, ATEX II ½ D, 2 D IP6X T100 °C	C
Flameproof Enclosure with IS Probe: CE, RCM, ATEX II ½ G EEx d[ia] IIC T6 ... T4, ATEX II ½ D T100 °C	D
Intrinsically Safe ¹⁾ CSA/FM Class I, Div. 1, Groups A, B, C, D CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4	F
Explosion Proof Enclosure with IS Probe: CSA/FM Class I, Div. 1, Groups A, B, C, D CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4	G
General Purpose (CSA, FM)	H
General Purpose (CSA, FM, CE, RCM)	J
Enclosure and Lid	
<u>Aluminum epoxy coated</u>	
2 x ½" NPT via adapter - cable inlet, IP65	A
2 x M20 x 1.5 cable inlet, IP65	B
2 x ½" NPT via adapter - cable inlet, IP68	C
2 x M20 x 1.5 cable inlet, IP68	D
Active shield length	
Standard length - (125 mm threaded, 105 mm flanged)	0
Extended shield - (250 mm threaded, 230 mm flanged) ²⁾	1
Extended shield - (400 mm threaded, 380 mm flanged) ²⁾	2

¹⁾ Barrier or Intrinsically Safe power supply required for Intrinsically Safe protection.

²⁾ Available with Probe version options A, B, F ... K, only [≥ 1 000 mm (39.7 inch)].

³⁾ Not available with Active shield option 1.

Selection and Ordering data	Order code
Further designs	
Please add "-Z" to Article No. and specify Order code(s).	
Total insertion length: enter the total insertion length in plain text description	Y01
Stainless steel tag [70 x 13 mm (2.75 x 0.5 inch)]: Measuring-point number/identification (max. 27 characters) specify in plain text	Y15
Manufacturer's test certificate: M to DIN 55350, Part 18 and to ISO 9000	C11
Material inspection Certificate Type 3.1 per EN 10204	C12
INMETRO ¹⁾	E34
Operating Instructions	
All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation .	

Level Measurement

Point level measurement

RF Capacitance / Pointek CLS300 - Digital

Selection and ordering data (continued)

Selection and Ordering data	Order code
Accessories	See accessories following CLS300 Digital selection and ordering data.

1) Available only with Approvals options B and D.

Pointek CLS300 RF Capacitance point level switch, digital, high temperature design. Detects level and interface in aggressive liquids, solids, slurries, and foam. Adjustable, 1 m (3.28 ft), insertion, adaptable sensitivity, with active shield to tune out build-up on probe. With display and digital communications.	Article No.																			
	7ML5662	●	●	●	0	●	-	●	●	●	●	●	●	●	●	●	●	●	●	●
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.																				
Process connection																				
<u>Threaded, 316L stainless steel</u>																				
¾" NPT [(Taper), ASME B1.20.1]	0	A																		
1" NPT [(Taper), ASME B1.20.1]	0	B																		
1¼" NPT [(Taper), ASME B1.20.1]	0	C																		
1½" NPT [(Taper), ASME B1.20.1]	0	D																		
R ¾" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]	1	A																		
R 1" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]	1	B																		
R 1½" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]	1	D																		
G ¾" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]	3	A																		
G 1" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]	3	B																		
G 1½" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]	3	D																		
<u>Welded flange, 316L stainless steel, raised face</u>																				
1" ASME, 150 lb	5	A																		
1" ASME, 300 lb	5	B																		
1" ASME, 600 lb	5	C																		
1½" ASME, 150 lb	5	D																		
1½" ASME, 300 lb	5	E																		
1½" ASME, 600 lb	5	F																		
2" ASME, 150 lb	5	G																		
2" ASME, 300 lb	5	H																		
2" ASME, 600 lb	5	J																		
3" ASME, 150 lb	5	K																		
3" ASME, 300 lb	5	L																		
3" ASME, 600 lb	5	M																		
4" ASME, 150 lb	5	N																		
4" ASME, 300 lb	5	P																		
4" ASME, 600 lb	5	Q																		
<u>Welded flange, 316L stainless steel, Type A flat faced</u>																				
DN 25, PN 16	6	A																		
DN 25, PN 40	6	B																		
DN 40, PN 16	6	C																		
DN 40, PN 40	6	D																		
DN 50, PN 16	6	E																		
DN 50, PN 40	6	F																		
DN 80, PN 16	6	G																		
DN 80, PN 40	6	H																		
DN 100, PN 16	6	J																		
DN 100, PN 40 (Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1 standard.)	6	K																		
Probe length (length from flange face) (threaded lengths include process thread)																				
<u>Note: No Y01 needed in Order code for standard lengths</u>																				
Standard version rod, 350 mm (13.78 inch)		A																		
Extended rod, length 500 mm (19.69 inch)		B																		

Selection and ordering data (continued)

	Article No.
Pointek CLS300 RF Capacitance point level switch, digital, high temperature design. Detects level and interface in aggressive liquids, solids, slurries, and foam. Adjustable, 1 m (3.28 ft), insertion, adaptable sensitivity, with active shield to tune out build-up on probe. With display and digital communications.	7ML5662- ● ● ● 0 ● - ● ● ● ●
Extended rod, length 750 mm (29.53 inch)	C
Extended rod, length 1 000 mm (39.37 inch)	D
Add Order code Y01 and plain text: "Insertion length ... mm"	
Extended rod, factory adjusted length 250 ... 499 mm (9.8 ... 19.65 inch)	E
Extended rod, factory adjusted length 500 ... 749 mm (19.69 ... 29.49 inch)	F
Extended rod, factory adjusted length 750 ... 999 mm (29.53 ... 39.3 inch)	G
Wetted seals	
Graphite	0
Probe material	
316L stainless steel with ceramic (ZrO ₂)isolators	0
Approvals	
Dust Ignition Proof CE, RCM, ATEX II ½ D, 2 D IP6X T100 °C	B
Intrinsically Safe ¹⁾ : CE, RCM, ATEX II 1 G EEEx ia IIC T6 ... T4, ATEX II ½ D, 2 D IP6X T100 °C	C
Flameproof Enclosure with IS Probe: CE, RCM, ATEX II ½ G EEEx d[ia] IIC T6 ... T4, ATEX II ½ D T100 °C	D
Intrinsically Safe ¹⁾ CSA/FM Class I, Div. 1, Groups A, B, C, D CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4	F
Explosion Proof Enclosure with IS Probe: CSA/FM Class I, Div. 1, Groups A, B, C, D CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4	G
General Purpose (CSA, FM)	H
General Purpose (CSA, FM, CE, RCM)	J
Enclosure and Lid	
Aluminum epoxy coated	
2 x ½" NPT via adapter - cable inlet, IP65	A
2 x M20 x 1.5 cable inlet, IP65	B
2 x ½" NPT via adapter - cable inlet, IP68	C
2 x M20 x 1.5 cable inlet, IP68	D
Active shield length	
Standard length - (125 mm threaded, 105 mm flanged)	0
Extended shield - (250 mm threaded, 230 mm flanged) ²⁾	1
Extended shield - (400 mm threaded, 380 mm flanged) ³⁾	2

¹⁾ Barrier or Intrinsically Safe power supply required for Intrinsically Safe protection.

²⁾ Available with Probe version options B ... D, F, G only [≥ 500 mm (19.69 inch)].

³⁾ Available with Probe version options C, D, and G only [≥ 750 mm (29.53 inch)].

Selection and Ordering data	Order code
Further designs	
Please add "-Z" to Article No. and specify Order code(s).	
Total insertion length: enter the total insertion length in plain text description	Y01
Stainless steel tag [70 x 13 mm (2.75 x 0.5 inch)]: Measuring-point number/identification (max. 27 characters) specify in plain text	Y15
Manufacturer's test certificate: M to DIN 55350, Part 18 and to ISO 9000	C11
Material Inspection Certificate Type 3.1 per EN 10204	C12
INMETRO ¹⁾	E34

Level Measurement

Point level measurement

RF Capacitance / Pointek CLS300 - Digital

Selection and ordering data (continued)

Selection and Ordering data	Order code
Operating Instructions All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation .	
Accessories	See accessories following CLS300 Digital selection and ordering data.

¹⁾ Available only with Approvals options B and D.

Selection and Ordering data	Article No.
Accessories	
One metallic cable gland M20 x 1.5, -40 ... +80 °C (-40 ... +176 °F) with integrated shield connection (available for PROFIBUS PA)	7ML1930-1AQ
General Purpose	
½" NPT General Purpose Cable Entry IP68/IP69K NEMA 6, -40 ... +80 °C (-40 ... +176 °F), Dust Ignition Proof, cable size 6 ... 12 mm (0.236 ... 0.472 inch)	7ML1830-1JA
M20 x 1.5 General Purpose Cable Entry IP68/IP69K NEMA 6, -40 ... +80 °C (-40 ... +176 °F), Dust Ignition Proof, cable size 7 ... 12 mm (0.275 ... 0.472 inch)	7ML1830-1JC
Hazardous Locations	
½" NPT EMC rated Cable Gland: Dust Ignition Proof, Flameproof Exd, and Increased Safety ATEX II 2 GD ExtD A21 (Zone 1, Zone 2, Zone 21, Zone 22, and in Gas Groups IIA, IIB and IIC) -60 ... +80 °C IP66, IP67, IP68, NEMA4X, cable sizes 5.5 ... 12 mm (0.216 ... 0.472 inch)	7ML1830-1JB
M20 EMC rated Cable Gland: Dust Ignition Proof, Flameproof Exd, and Increased Safety ATEX II 2 GD ExtD A21 (Zone 1, Zone 2, Zone 21, Zone 22, and in Gas Groups IIA, IIB and IIC) -60 ... +80 °C IP66, IP67, IP68, NEMA4X, cable sizes 5.5 ... 12 mm (0.216 ... 0.472 inch)	7ML1830-1JD
<i>Blind threaded flanges are available. Customers interested in a custom designed device should consult a local sales person. For more information, please visit http://www.automation.siemens.com/aspa_app.</i>	
Pointek Specials	See page 4/60

Pointek Specials ¹⁾	Article No.
CLS100 Polycarbonate Lid and Gasket, FKM Kit, lid and gasket, CLS100 enclosure version	A5E01163671
CLS100 Miscellaneous Parts Custom length of cable is available only for 7ML5501-xxx1x and 7ML5501-xxx5x ²⁾	
CLS200 Gasket (IP65), Synprene Spare gasket, enclosure version (IP65 versions only)	A5E01163672
CLS200 Gasket (IP68), Silicone Spare gasket, enclosure version (IP68 versions)	A5E01163673
CLS200/CLS300/LC300 Blind Lid Spare aluminum blind lid (for standard versions only)	A5E01163674
CLS200/CLS300 Lid with window Spare aluminum lid with window	A5E01163676
CLS200 Sensor Kit for cable units Kit, sensor for cable units, PPS, standard, FKM	A5E01163677
Kit, sensor for cable units, PPS, digital, FKM	A5E01163678

Selection and ordering data (continued)

Pointek Specials ¹⁾	Article No.
Kit, sensor for cable units, PPS, standard, FFKM	A5E01163679
Kit, sensor for cable units, PPS, digital, FFKM	A5E01163680
Kit, sensor for cable units, PVDF, standard, FKM	A5E01163681
Kit, sensor for cable units, PVDF, digital, FKM	A5E01163682
Kit, sensor for cable units, PVDF, standard, FFKM	A5E01163683
Kit, sensor for cable units, PVDF, digital, FFKM	A5E01163684
CLS200 Mounting Bracket, 316L stainless steel	
Spare mounting bracket, mounting hole 27 mm (1 inch)	A5E01163685
CLS200 PROFIBUS Connector (IP65)	
Spare, PROFIBUS connector (IP65 versions only)	A5E01163686
CLS200 Miscellaneous Parts	
CLS200 with FFKM O-rings (any version) ²⁾	
CLS200 Electronics	
Test magnet, digital version	7ML1830-1JE
Amplifier/power supply kit, standard version	A5E03251681
Amplifier/power supply, digital version	7ML1830-1JF
LCD display, digital version	7ML1830-1JK
CLS300 Cable Extensions, 316L stainless steel	
Kit, stainless steel cable extension, 1 m, adjustable by customer	A5E01163688
Kit, stainless steel cable extension, 3 m, adjustable by customer	A5E01163689
Kit, stainless steel cable extension, 5 m, adjustable by customer	A5E01163690
Kit, stainless steel cable extension, 10 m, adjustable by customer	A5E01163691
Kit, stainless steel cable extension, 15 m, adjustable by customer	A5E01163693
Kit, stainless steel cable extension, 20 m, adjustable by customer	A5E01163695
CLS300 Cable Extensions, 316 stainless steel with PFA coating	
Kit, PFA cable extension, 1 m, adjustable by customer	A5E01163697
Kit, PFA cable extension, 3 m, adjustable by customer	A5E01163698
Kit, PFA cable extension, 5 m, adjustable by customer	A5E01163699
Kit, PFA cable extension, 10 m, adjustable by customer	A5E01163700
Kit, PFA cable extension, 15 m, adjustable by customer	A5E01163701
Kit, PFA cable extension, 20 m, adjustable by customer	A5E01163702
CLS300 Rod Kits, 316L stainless steel	
Kit, stainless steel rod 180 mm (7.09 inch) to be used with CLS300 units only (with standard active shield). Insertion length after installation is 350 mm (13.78 inch).	A5E01163719
Kit, stainless steel rod 330 mm (12.99 inch) to be used with CLS300 units only (with standard active shield). Insertion length after installation is 500 mm (19.69 inch).	A5E01163720
Kit, stainless steel rod 580 mm (22.83 inch) to be used with CLS300 units only (with standard active shield). Insertion length after installation is 750 mm (29.53 inch).	A5E01163721
Kit, stainless steel rod 830 mm (32.68 inch) to be used with CLS300 units only (with standard active shield). Insertion length after installation is 1 000 mm (39.37 inch).	A5E01163722
Kit, stainless steel rod 1330 mm (52.36 inch) to be used with CLS300 units only (with standard active shield). Insertion length after installation is 1 500 mm (59.06 inch). ²⁾	
Kit, stainless steel rod 1830 mm (72.05 inch) to be used with CLS300 units only (with standard active shield). Insertion length after installation is 2 000 mm (78.74 inch). ²⁾	
Kit, stainless steel rod customized length up to 1 m ²⁾	
Kit, stainless steel rod customized length up to 2 m ²⁾	
CLS300 Electronics Kits with drivers (for rod or cable versions)	
Kit, electronics with driver, standard CLS300. To be used in cable versions with length greater than 5 m. ³⁾⁴⁾	A5E01163723
Kit, electronics with driver, digital CLS300. To be used in cable versions with length greater than 5 m. ³⁾⁴⁾	A5E01163725
CLS300 Electronics Kits with drivers (for cable versions)	
Kit, electronics with driver, standard CLS300. To be used in cable versions with length greater than 5 m. ³⁾⁴⁾	A5E01163724
Kit, electronics with driver, digital CLS300. To be used in cable versions with length greater than 5 m. ³⁾⁴⁾	A5E01163726
CLS300 Electronics	
Test magnet, digital version	7ML1830-1JE
Amplifier/power supply kit, standard version	A5E03251683

Level Measurement

Point level measurement

RF Capacitance / Pointek CLS300 - Digital

Selection and ordering data (continued)

Pointek Specials ¹⁾	Article No.
Amplifier/power supply, digital version	7ML1830-1JF
LCD display, digital version	7ML1830-1JK
CLS300 Weight Kit, 316L stainless steel	
Kit, spare stainless steel weight. To be used in any cable version of CLS300.	A5E01163727

- ¹⁾ Special flange sizes and facings are available. Please consult a local sales person for details.
- ²⁾ Please consult a local sales person for part number and pricing
- ³⁾ For General Purpose approvals only
- ⁴⁾ To maintain approvals, qualified trained Siemens personnel required for part replacement

Customers interested in a custom designed device should consult a local sales person. For more information, please visit http://www.automation.siemens.com/aspa_app.

Technical specifications

Pointek CLS300 Digital	
Mode of operation	
Measuring principle	Inverse frequency shift capacitive level detection
Input	
Measured variable	Change in picroFarad (pF)
Output	
Solid-state output	
• Output	Galvanically isolated
• Protection	Against reversed polarity (bipolar)
• Max. switching voltage	<ul style="list-style-type: none"> • 30 V (DC) • 30 V peak (AC)
• Max. load current	82 mA
• Voltage drop	< 1 V, typical at 50 mA
• Time delay (pre or post switching)	Programmable by user (0 ... 100 s)
Fail-safe mode	Min. or max.
Connection	Removable terminal block
Accuracy	
Resolution	
• Min. sensitivity (pF)	1 % change in actual capacitance
• Max. temperature error	0.2 % of actual capacitance value
Rated operating conditions¹⁾	
Installation conditions	
• Location	Indoor/outdoor
Ambient conditions	
• Ambient temperature	-40 ... +85 °C (-40 ... +185 °F) ²⁾
• Storage temperature	-40 ... +85 °C (-40 ... +185 °F)
Medium conditions	Liquids, bulk solids, slurries, interfaces, and applications with viscous materials
• Relative dielectric constant ϵ_r	Min. 1.5
• Process temperature	
- Rod/Cable version	-40 ... +200 °C (-40 ... +392 °F) ²⁾
- High Temperature version	-40 ... +400 °C (-40 ... +752 °F)
• Process pressure ³⁾	-1 ... +35 bar g (-14.6 ... +511 psi g)
Design	
Material (enclosure)	Powder-coated aluminum with gasket
Degree of protection	Standard: Type 4/NEMA 4/IP65 Optional: Type 4/NEMA 4/IP68
Cable inlet	2 x M20 x 1.5 thread (option: 2 x 1/2" NPT conduit entry including 1 plugged entry)
Controls and displays	
Local display	LCD
Configuration	<ul style="list-style-type: none"> • Locally, using 3 button keypad (for stand-alone operation) • Remotely, using SIMATIC PDM (for installation on a network)
Power supply	
Bus voltage (at process connection)	<ul style="list-style-type: none"> • Standard: 12 ... 30 V DC • Intrinsically Safe: 12 ... 24 V DC
Current consumption	12.5 mA
Certificates and approvals	
General Purpose	CSA, FM, CE, RCM
Dust Ignition Proof	ATEX II 1/2 D, 2 D IP6X T100 °C

Level Measurement

Point level measurement

RF Capacitance / Pointek CLS300 - Digital

Technical specifications (continued)

Pointek CLS300 Digital	
Flameproof Enclosure With IS Probe	ATEX II 1/2 G EEx d[ia] IIC T6 ... T4 ATEX II 1/2 D T100 °C
Dust Ignition Proof With IS Probe	CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4
Intrinsically Safe ⁴⁾	ATEX II 1 G EEx ia IIC T6 ... T4 ATEX II 1/2 D, 2 D IP6X T100 °C CSA/FM Class I, Div. 1, Groups A, B, C, D CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4
Non-incendive	CSA/FM Class I, Div. 2, Groups A, B, C, D CSA/FM Class II, Div. 2, Groups F, G CSA/FM Class III T4 or T6
Explosion Proof with IS Probe	CSA/FM Class I, Div. 1, Groups A, B, C, D CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4
Marine	Lloyds Register of Shipping, Categories ENV1, ENV2, and ENV5
Others	Pattern Approval (China)
Communication	PROFIBUS PA (IEC 61158 CPF3 CP3/2) Bus physical layer: IEC 61158-2 MBP-(IS) Device profile: PROFIBUS PA profile for Process Control Devices Version 3.0, Class B FISCO field device

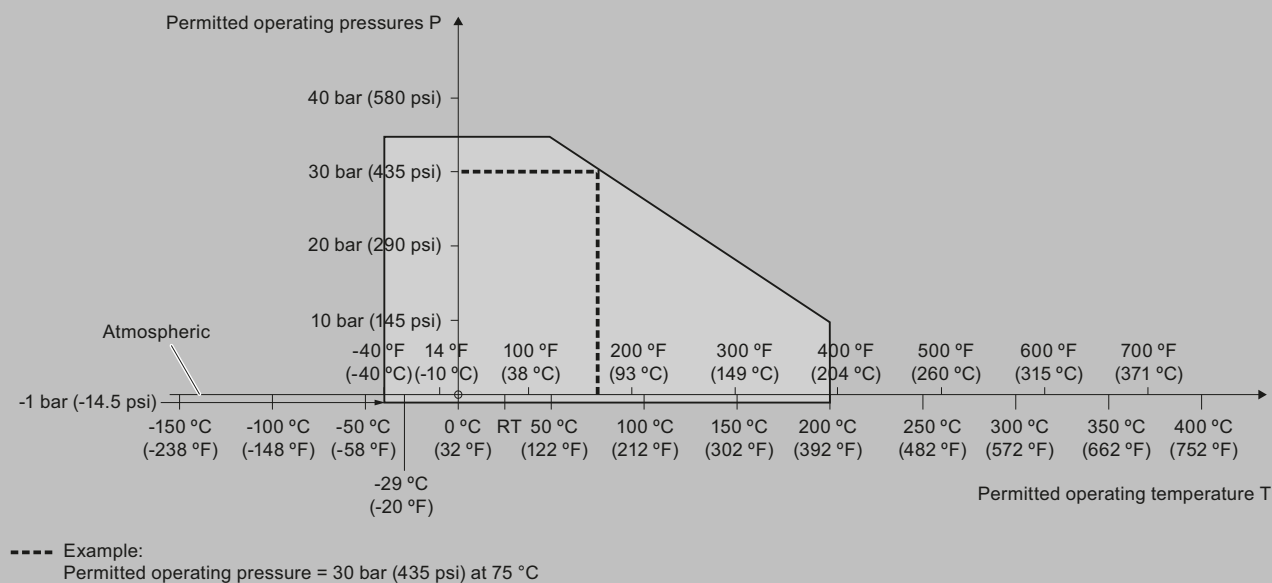
- ¹⁾ When operation is in areas classified as hazardous, observe restrictions according to relevant certificate. See also CLS300 pressure/temperature curves.
- ²⁾ Thermal isolator is used if process connection temperature exceeds 85 °C (185 °F)
- ³⁾ Pressure rating of process seal is temperature dependent. See also CLS300 pressure/temperature curves.
- ⁴⁾ Barrier or Intrinsically Safe power supply required for Intrinsically Safe protection

Design: Probe			
	Rod version	High Temperature version	Cable version
Length	Min. 250 mm (9.8 inch), max. 1 000 mm (40 inch)	Min. 250 mm (9.8 inch), max. 1 000 mm (40 inch)	Min. 1 000 mm (40 inch), max. 25 000 mm (984 inch)
Sensor wetted parts	PFA (no insulation on active probe), 316L stainless steel, PEEK isolators	Ceramic (ZrO ₂ ¹⁾) isolators (no insulation on active probe), 316L stainless steel	316 stainless steel, optional PFA, PEEK isolators
O-ring seal material	FKM (optional FFKM) ²⁾	Graphite ²⁾	FKM (optional FFKM) ²⁾
Thermal isolator	Optional	Standard	Optional
Extension	User selectable length	User selectable length	User selectable cable length

- ¹⁾ Zirconium Oxide
- ²⁾ For caustic materials, consult a local sales person for alternative O-rings. For more information, please visit http://www.automation.siemens.com/aspa_app.

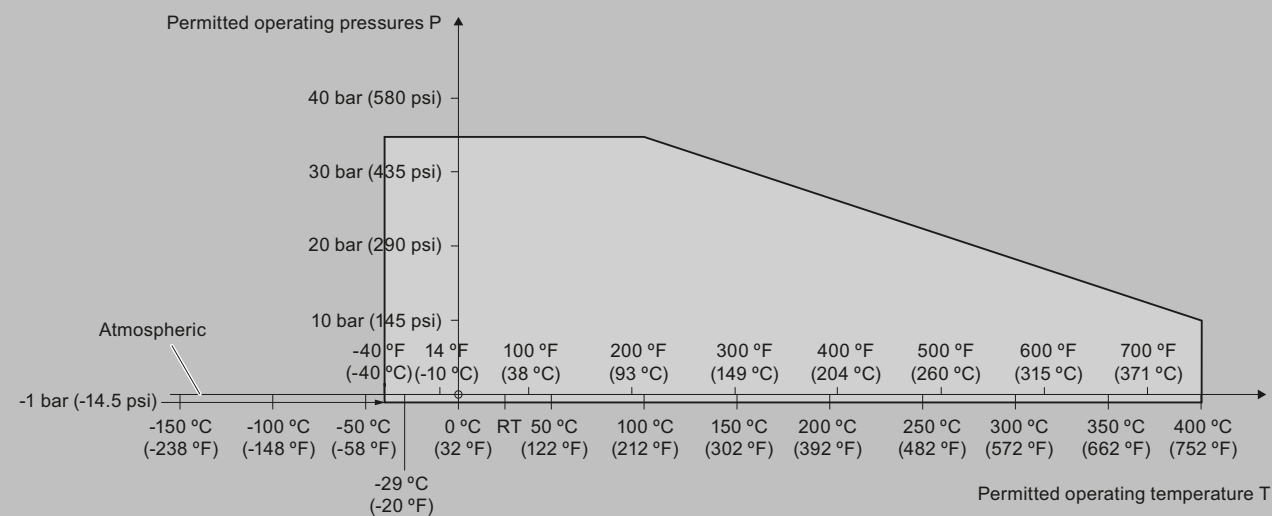
Characteristic curves

Pressure/temperature curve
CLS300 extended rod and cable probes
Threaded process connections
(7ML5650, 7ML5651, 7ML5660 and 7ML5661)



Pointek CLS300 process pressure/temperature derating curves (7ML5650, 7ML5651, 7ML5660 and 7ML5661)

Pressure/temperature curve
CLS300 high temperature rod probes
Threaded process connections
(7ML5652 and 7ML5662)



Pointek CLS300 process pressure/temperature derating curves (7ML5652 and 7ML5662)

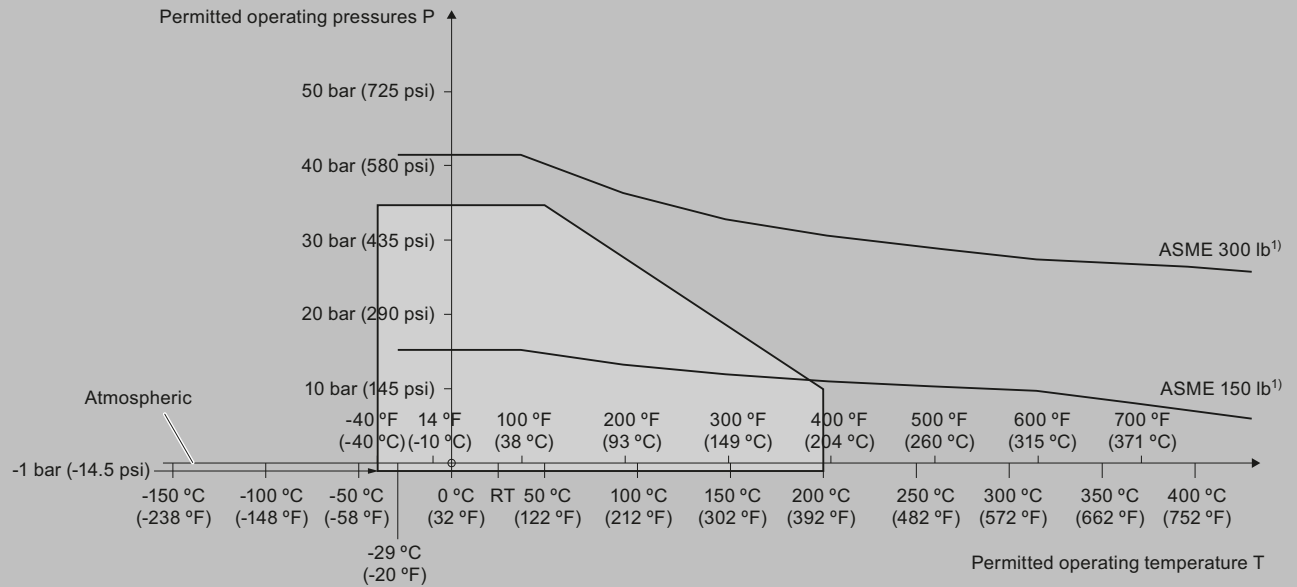
Level Measurement

Point level measurement

RF Capacitance / Pointek CLS300 - Digital

Characteristic curves (continued)

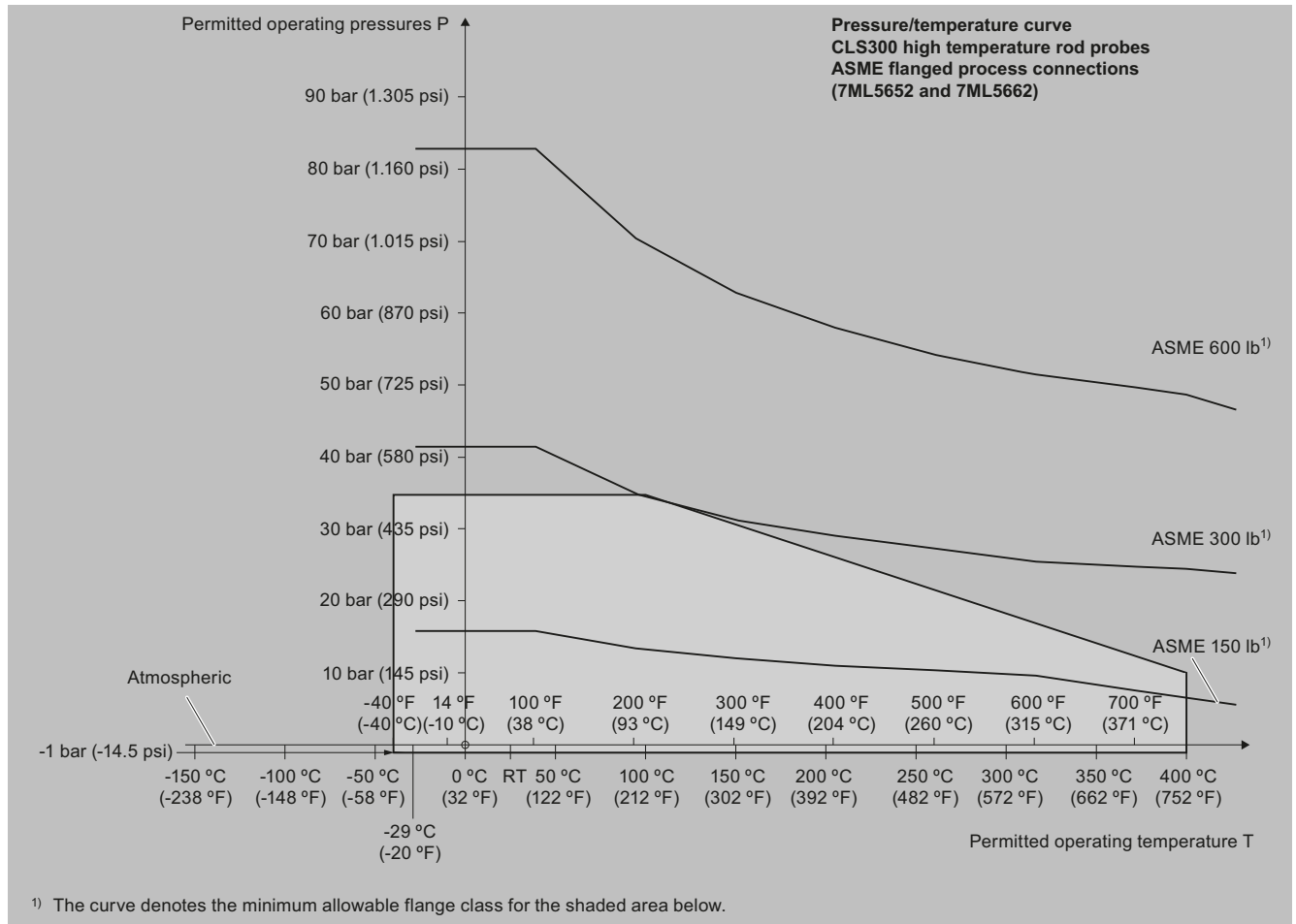
Pressure/temperature curve
 CLS300 extended rod and cable probes
 ASME flanged process connections
 (7ML5650, 7ML5651, 7ML5660 and 7ML5661)



¹⁾ The curve denotes the minimum allowable flange class for the shaded area below.

Pointek CLS300 process pressure/temperature derating curves (7ML5650, 7ML5651, 7ML5660, and 7ML5661)

Characteristic curves (continued)



Pointek CLS300 process pressure/temperature derating curves (7ML5652 and 7ML5662)

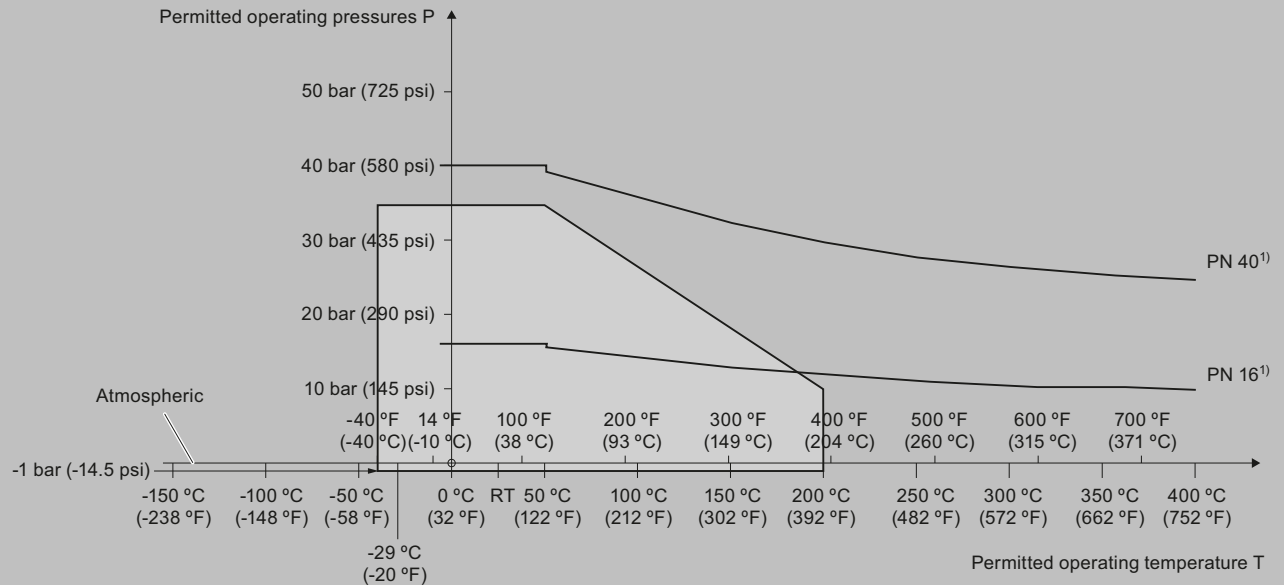
Level Measurement

Point level measurement

RF Capacitance / Pointek CLS300 - Digital

Characteristic curves (continued)

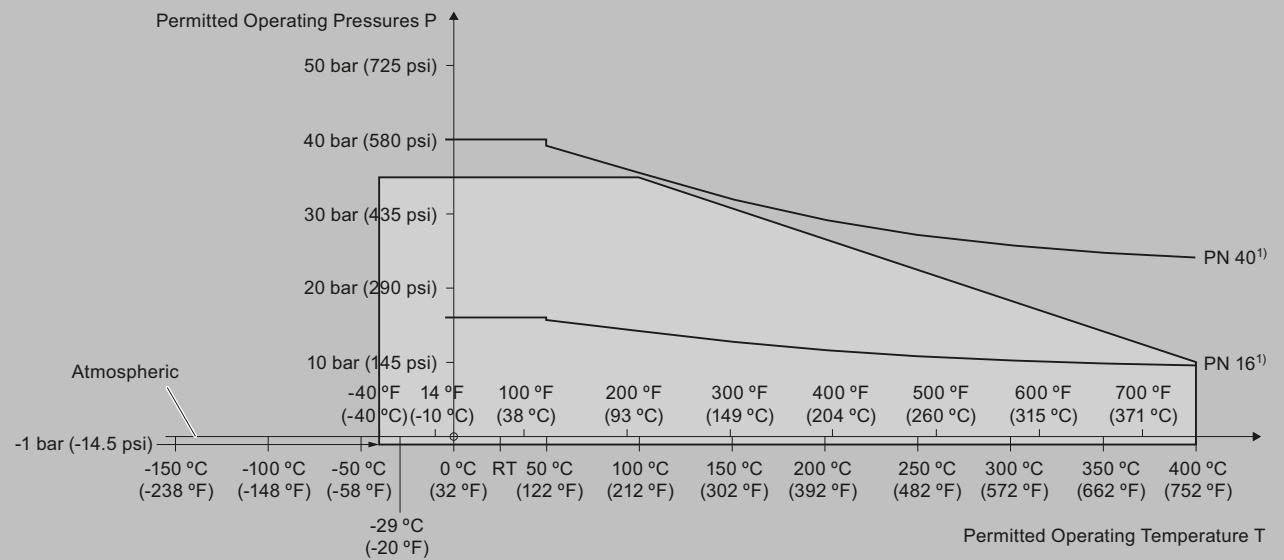
Pressure/temperature curve
CLS300 extended rod and cable probes
EN flanged process connections
(7ML5650, 7ML5651, 7ML5660 and 7ML5661)



¹⁾ The curve denotes the minimum allowable flange class for the shaded area below.

Pointek CLS300 process pressure/temperature derating curves (7ML5650, 7ML5651, 7ML5660 and 7ML5661)

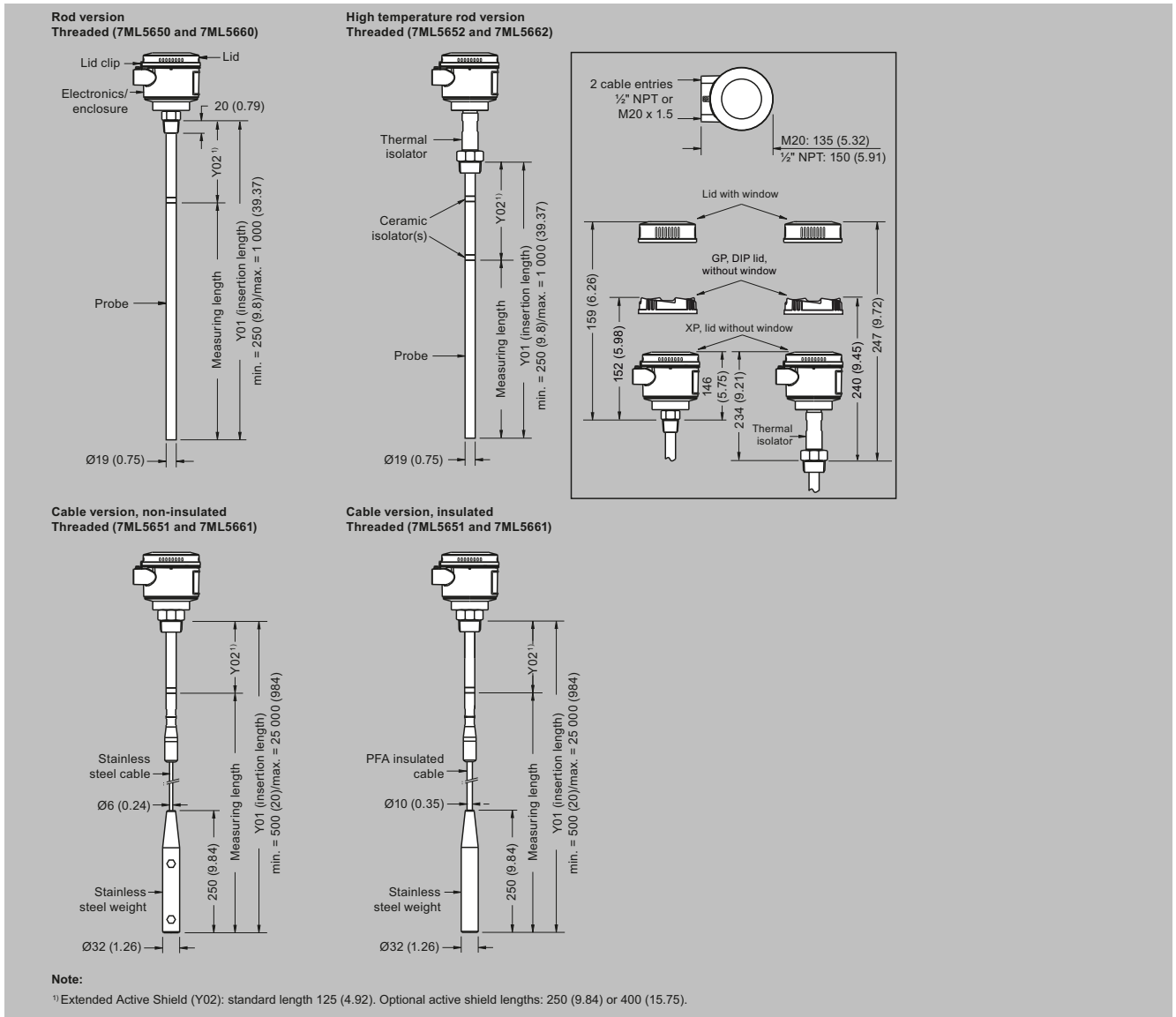
Pressure/Temperature Curve
CLS300 High Temperature Rod Probes
EN Flanged Process Connections (7ML5652 and 7ML5662)



¹⁾ The curve denotes the minimum allowable flange class for the shaded area below.

Pointek CLS300 process pressure/temperature derating curves (7ML5652 and 7ML5662)

Dimensional drawings



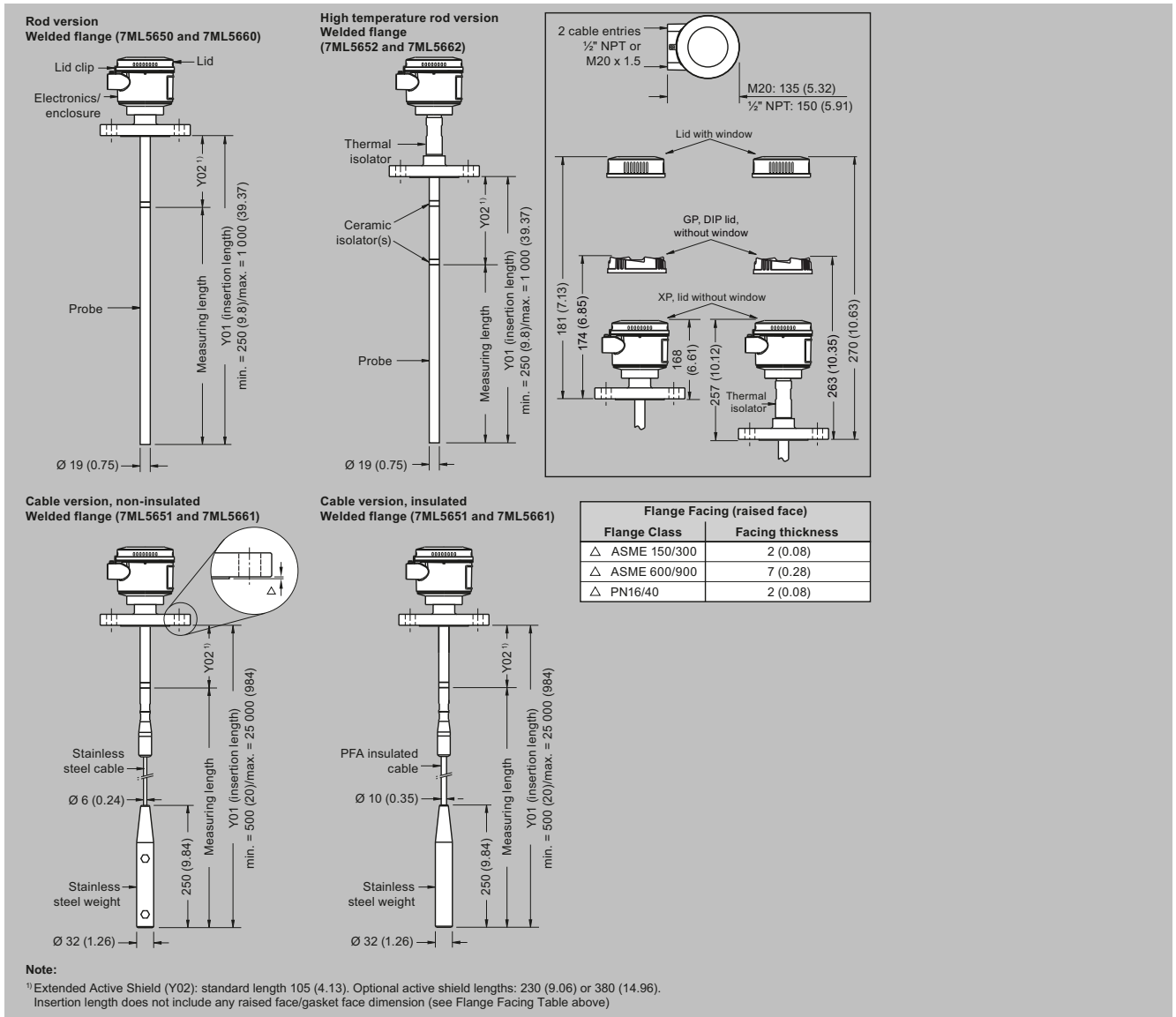
Pointek CLS300 threaded process connections, dimensions in mm (inch)

Level Measurement

Point level measurement

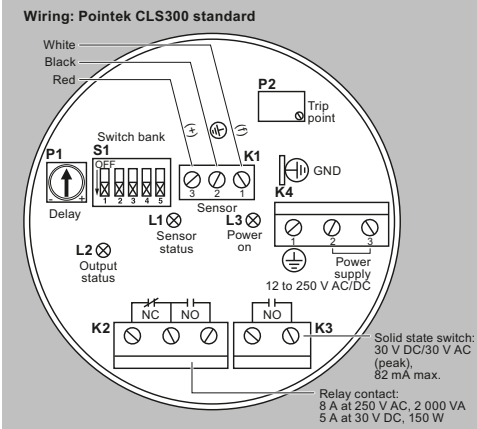
RF Capacitance / Pointek CLS300 - Digital

Dimensional drawings (continued)

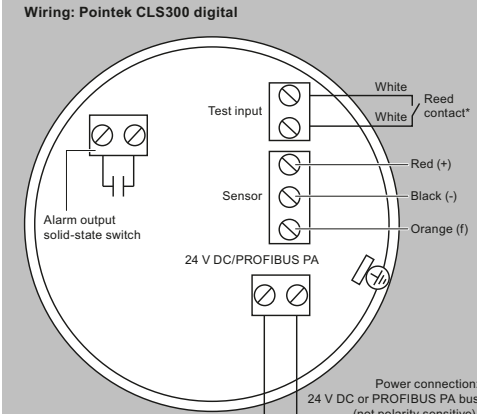


Pointek CLS300 flanged process connections, dimensions in mm (inch)

Circuit diagrams



- Notes:**
- Identification label is on underside of lid. Switch and potentiometer settings are for illustration purposes only (refer to operation/setup in manual).
 - All field wiring must have insulation suitable for at least 250 V.
 - Relay contact terminals are for use with equipment having no accessible live parts and wiring having insulation suitable for at least 250 V.
 - Maximum working voltage between adjacent relay contacts shall be 250 V.
 - Refer to the Instruction manual or contact Siemens representative for detailed wiring information.



- Notes:**
- Refer to the instruction manual or contact a Siemens representative for detailed wiring information.

***Magnet activated sensor test**
A magnet can be used to test the sensor without opening the lid of the Pointek CLS300 digital version. Bring the magnet close to the test area indicated on the enclosure. The sensor test starts and finishes automatically after 10 seconds.



Pointek CLS300 connections

Level Measurement

Point level measurement

Vibrating switches / SITRANS LVL100

Overview



SITRANS LVL100 is a compact vibrating level switch for material detection in liquid and slurry applications such as overflow, high, low and demand applications, as well as pump protection. It is ideal for use in confined spaces.

Benefits

- Proven vibrating level switch technology for liquids
- Compact insertion length of 40 mm (1.57 inch) for confined space applications
- Available starting at 1/2" threaded process connections
- Fault monitoring for corrosion, loss of vibration, or line break to the piezo drive
- Integrated test function to confirm correct operation

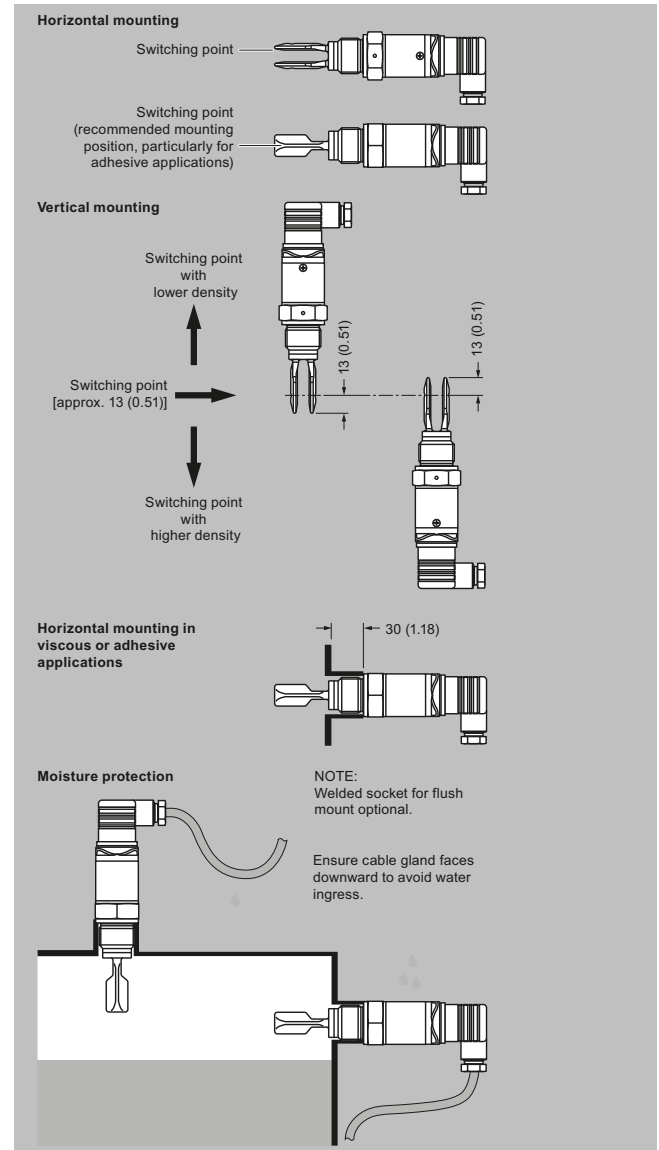
Application

SITRANS LVL100 is a compact level switch designed for industrial use in all areas of process technology and can be used for material detection with liquids and slurries. With an insertion length of only 40 mm (1.57 inch), SITRANS LVL100 can be mounted in small pipes and confined space applications. It is virtually unaffected by the chemical and physical properties of the liquid. The LVL100 can be used in difficult conditions including turbulence, air bubbles, foam generation, buildup, or external vibration.

The tuning fork is piezoelectrically energized and vibrates at a mechanical resonance frequency of approximately 1 200 Hz. The vibration frequency changes when the tuning fork is covered by the medium. This change is detected by the integrated oscillator and converted into a switching command. The integrated electronics evaluate the level signal and output a switching signal to connected devices.

- Key Applications: for use in liquids and slurries, for level measurement, overflow, and dry run protection

Configuration



SITRANS LVL100 installation, dimensions in mm (inch)

Selection and ordering data

	Article No.										
SITRANS LVL100 Vibrating point level switch Detects level and material in liquids and slurries. Compact, with 40 mm (1.6 inch) insertion.	7	M	L	5	7	4	5	-		A	0
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.											
Approvals											
Ordinary Locations/General Purpose (Non-Ex), CE, UKCA											1
CE, UKCA, Marine Approvals (ABS, CCS, DNV-GL, LR, RINA) ⁵⁾											2
CE, UKCA, Overfill Protection (WHG) ¹⁾											3
Canada/US for Ordinary Locations/General Purpose (Non-Ex), CE, UKCA ⁷⁾											4
Version/Process temperature											
Standard -40 ... +100 °C (-40 ... +212 °F) ²⁾										A	
Extended -40 ... +150 °C (-40 ... +302 °F) ²⁾⁶⁾										B	
Hygienic applications -40 ... +150 °C (-40 ... +302 °F) ³⁾										C	
Process connection											
Thread G¾" A PN 64/316L										A	0
Thread G¾" A PN 64/316L Ra < 0.8 µm										A	1
Thread ¾" NPT PN 64/316L										A	2
Thread ¾" NPT PN 64/316L Ra < 0.8 µm										A	3
Thread G1" A PN 64/316L										A	4
Thread G1" A PN 64/316L Ra < 0.8 µm										A	5
Thread 1" NPT PN 64/316L										A	6
Thread 1" NPT PN 64/316L Ra < 0.8 µm										A	7
Tri-Clamp 1" PN 16 DIN 32676/316L Ra < 0.8 µm										A	8
Tri-Clamp 1½" PN 16 DIN 32676/316L Ra < 0.8 µm										B	0
Tri-Clamp 2" PN 16 DIN 32676/316L Ra < 0.8 µm										B	1
Bolting DN 25 PN 40 DIN 11851/316L Ra < 0.8 µm										B	2
Bolting DN 40 PN 40 DIN 11851/316L Ra < 0.8 µm										B	3
Bolting DN 50 PN 25 DIN 11851/316L Ra < 0.8 µm										B	4
SMS DN 38 PN 6 316L Ra < 0.8 µm										B	5
Hygienic fitting with compression nut F40 PN 25/316L Ra < 0.8 µm										B	6
Thread G½" (DIN 3852-A) PN 64/316L										C	0
Thread G½" (DIN 3852-A) PN 64/316L Ra < 0.8 µm										C	1
Thread ½" NPT (ASME B1.20.1) PN 64/316L										C	2
Thread ½" NPT (ASME B1.20.1) PN 64/316L Ra < 0.8 µm										C	3
Thread R¾" PN 64, EN 10226-1/316L										D	0
R1 Thread R1 PN 64, EN 10226-1/316L										D	1
RF Thread R1 PN 64, EN 10226-1/316L (Ra < 0.8 µm)										D	2
Electronics											
Contactless electronic switch 20 ... 250 V AC/DC ⁴⁾											1
Transistor output PNP 10 ... 35 V DC											2
I/O link 18 ... 30 V DC											3
Housing											
316L											1
Electrical connection/Protection											
M12 x 1/IP67											A
According to ISO4400 including plug/IP65											B
According to DIN 43650 incl. plug with QuickOn connection/IP65											C
M12 x 1 incl. 5 m cable/IP68 (0.2 bar)											D

1) Available only with Electronics option 2.

2) Available only with Process connection options A0, A2, A4, A6, C0, C2, D0, and D1.

3) Available only with Process connection options A1, A3, A5, and A7 ... B6, C1, C3, and D2.

4) Available only with Electrical connection/Protection options B and C.

5) Available only with Process temperature options A and B.

6) Available only with Marine approval options DNV and GL.

7) Available only with Electrical connection/Protection option B.

Level Measurement

Point level measurement

Vibrating switches / SITRANS LVL100

Selection and ordering data (continued)

Selection and ordering data	Order code
Further designs	
Please add "-Z" to Article No. and specify Order code(s).	
Cleaning including certificate (oil, grease and silicone free)	W01
Identification Label, foil laser marking	Y16
Acceptance test Certificate 2.2 for material EN 10204	C15
3.1-Inspection Certificate for instrument with test data (EN 10204)	C25

Selection and ordering data	Article No.
Operating Instructions	
All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation .	
Spare Parts	
<u>LVL100 Threaded Welded Socket</u>	
G $\frac{3}{4}$ " A/316L with FKM Seal	7ML1930-1EE
G1" A/316L with FKM Seal	7ML1930-1EF
M27 x 1.5/316L with FKM Seal	7ML1930-1EG
G $\frac{3}{4}$ " A/316L with EPDM Seal	7ML1930-1EH
G1" A/316L with EPDM Seal	7ML1930-1EJ
M27 x 1.5/316L with EPDM Seal	7ML1930-1EK

Technical specifications

SITRANS LVL100	
Mode of operation	
Measuring principle	Vibrating point level switch
Input	
Measured variable	High and low and demand
Output	
Output options	<ul style="list-style-type: none"> • Contactless electronic switch • Transistor output PNP
Measuring accuracy	
Hysteresis	Approx. 2 mm (0.08 inch) with vertical installation
Switching delay	Approx. 500 ms (on/off)
Frequency	Approx. 1 100 Hz
Rated operating conditions	
Installation conditions	
• Location	Indoor/outdoor
Ambient conditions	
• Ambient temperature	-40 ... +70 °C (-40 ... +158 °F)
• Storage temperature	-40 ... +80 °C (-40 ... +176 °F)
• Installation category	III
• Pollution degree	2
Medium conditions	
• Temperature	
- Standard	-40 ... +100 °C (-40 ... +212 °F)
- High temperature option	-40 ... +150 °C (-40 ... +302 °F)
• Pressure (vessel)	-1 ... 64 bar g (-14.5 ... 928 psi g)
• Density	0.7 ... 2.5 g/cm ³ (0.025 ... 0.09 lb/in ³)
Design	
Material	
• Enclosure	316L and Plastic PEI
• Tuning fork	316L (1.4404 or 1.4435)
• Process connection (threaded)	316L (1.4404 or 1.4435)
• Process seal	Klingsil C-4400
Process connection	
• Pipe thread, cylindrical (ISO 228 T1)	G ½" A, G ¾" A, or G 1" A
• Pipe thread, tapered	½" NPT, ¾" NPT, or 1" NPT
• Hygienic fittings	Bolting DN 40 PN 40
	Tri-clamp 1", 1½", 2" PN 10
Degree of protection	IP65/Type 4/NEMA 4 (with DIN 43650 valve plug), IP66/67 or IP68 (with M12 connector)
Conduit entry	1 x M12 [IP66/IP67 or IP68 (0.2 bar)]
Weight (housing)	250 g (9 oz)
Power supply	
Supply voltage	20 ... 253 V AC, 50/60 Hz 20 ... 253 V DC
Power consumption	Max. 0.5 W
Certificates and approvals	<ul style="list-style-type: none"> • Overfill protection (WHG) • Marine approvals (ABS, CCS, DNV-GL, LR, RINA)

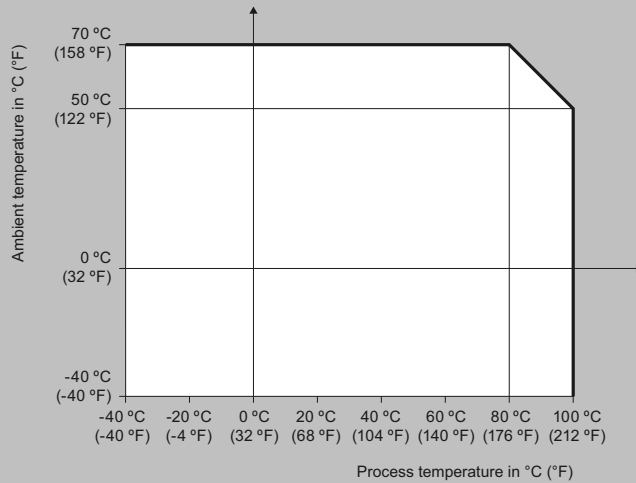
Level Measurement

Point level measurement

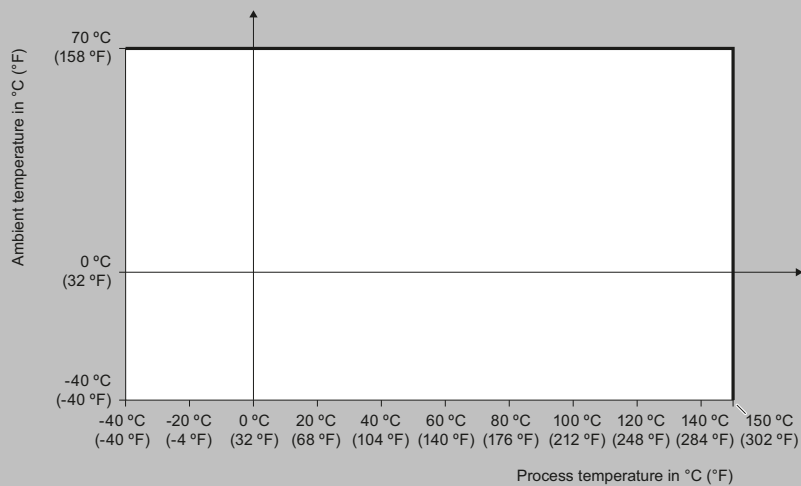
Vibrating switches / SITRANS LVL100

Characteristic curves

Ambient temperature to process temperature dependency
(standard version)

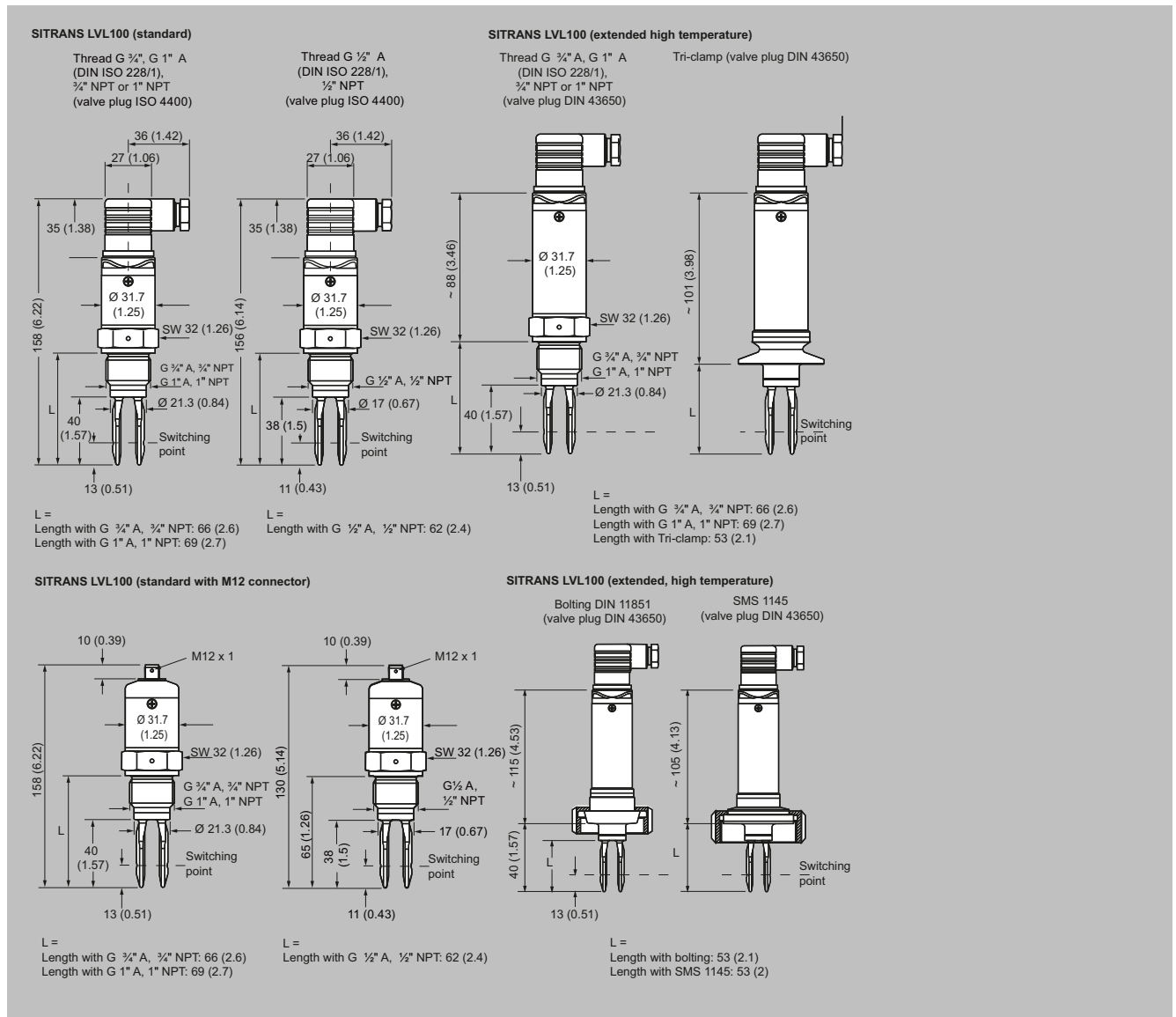


Ambient temperature to process temperature dependency
(high temperature version)

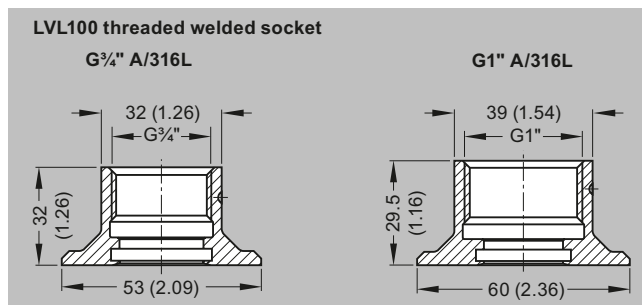


SITRANS LVL100 ambient temperature/process temperature derating curves

Dimensional drawings



SITRANS LVL100, dimensions in mm (inch)



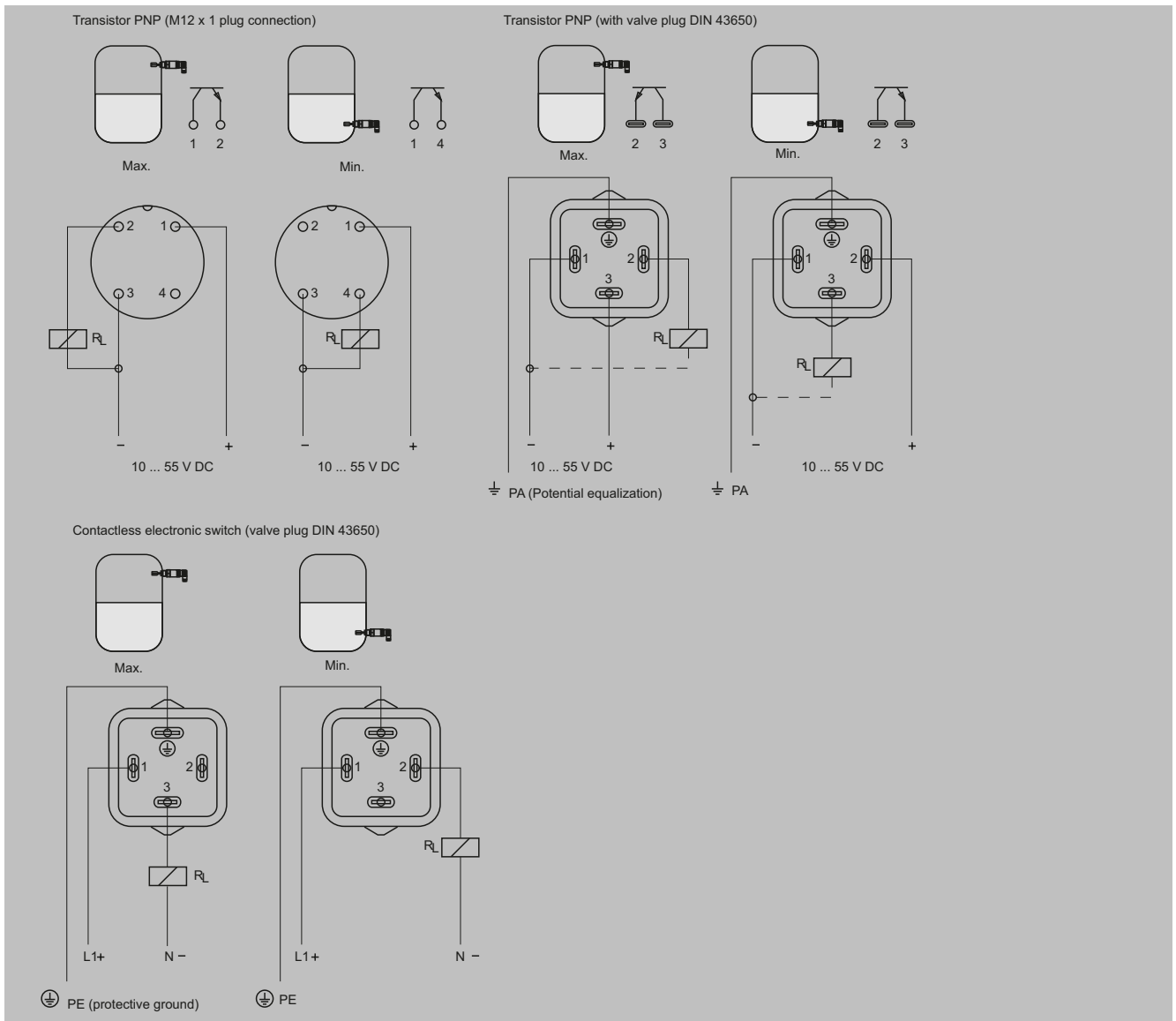
SITRANS LVL100 welded socket, dimensions in mm (inch)

Level Measurement

Point level measurement

Vibrating switches / SITRANS LVL100

Circuit diagrams



SITRANS LVL100 connections

Overview



SITRANS LVL200 is a standard vibrating level switch for material detection in liquid and slurry applications such as overflow, high, low, and demand applications, as well as pump protection. For use in SIL-2 applications.

Benefits

- Proven vibrating level switch technology for liquids
- Compact insertion length of 40 mm (1.57 inch) for confined space applications
- Fault monitoring for corrosion, loss of vibration or line break to the piezo drive
- Functional Safety (SIL 2). Device suitable for use in accordance with IEC 61508 and IEC 61511
- Hygienic process connections
- Suitable for API 2350
- Optional remote test signal conditioner

Application

SITRANS LVL200 is a level switch designed for industrial use in all areas of process technology and can be used with liquids and slurries. With a tuning fork insertion length of only 40 mm (1.57 inch), SITRANS LVL200 can be mounted in small pipes and applications with confined space. The LVL200 can be used to measure products with a minimum density of $> 0.5 \text{ g/cm}^3$ (0.018 lb/in^3). The LVL200 can be used in difficult conditions including turbulence, air bubbles, foam generation, buildup, or external vibration.

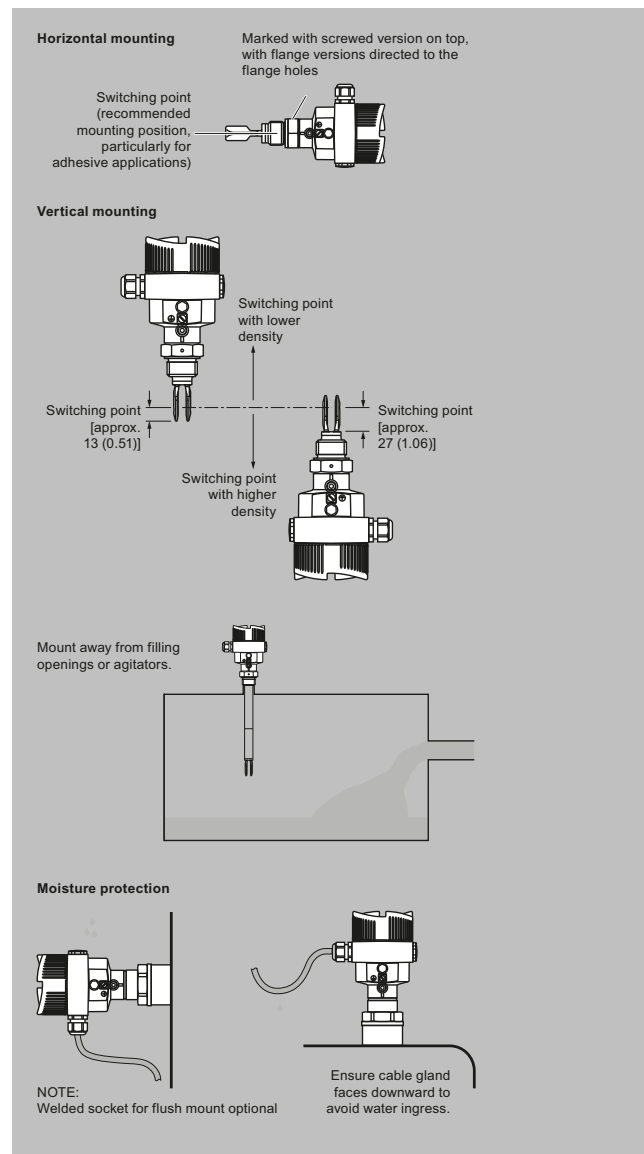
SITRANS LVL200 continuously monitors faults via frequency evaluation, providing early detection of strong corrosion or damage on the tuning fork, loss of vibration, or a line break to the piezo drive.

The tuning fork is piezoelectrically energized and vibrates at its mechanical resonance frequency of approximately 1 200 Hz. The vibration frequency changes when the tuning fork is covered by the medium. This change is detected by the integrated oscillator and converted into a switching command. The integrated electronics evaluate the level signal and output a switching signal, directly operating connected devices.

The optional signal conditioner provides a remote test feature to ensure continuous product reliability.

- Key Applications: for use in liquids and slurries, for level measurement, overflow, and dry run protection

Configuration



SITRANS LVL200 installation, dimensions in mm (inch)

Level Measurement

Point level measurement

Vibrating switches / SITRANS LVL200

Selection and ordering data

	Article No.					Ord. Code			
SITRANS LVL200 Vibrating point level switch, standard design Detects level and material in liquids and slurries. Short insertion. For hazardous applications.	7ML5746-●●●●●-●●A0	●	●	●	●	●	●	●	●
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.									
Electronics									
Contactless electronic switch 20 ... 250 V AC/DC ¹⁾⁹⁾²⁴⁾	1								
Double relay (DPDT) 20 ... 72 V DC/20 ... 250 V AC ²⁴⁾	2								
NAMUR signal ⁹⁾	4								
Transistor (NPN/PNP) 10 ... 55 V DC ¹⁾²⁵⁾	5								
Two-wire (8/16 mA) 12 ... 36 V DC ²⁷⁾	6								
Approvals									
CE						A			
Overfill protection (WHG) ⁹⁾						B			
ATEX II 1G, ½G, 2G Ex ia IIC T6 ⁶⁾						W			
ATEX II 1G, ½G, 2G Ex ia IIC T6 + WHG ⁶⁾⁹⁾						C			
ATEX II ½G, 2G Ex d IIC T6 + WHG ⁵⁾¹⁵⁾						D			
ATEX II 1G, ½G, 2G Ex ia IIC T6 + shipping approvals ⁶⁾¹⁶⁾						E			
ATEX II ½G, 2G Ex d IIC T6 + shipping approvals ⁵⁾¹⁵⁾						F			
ATEX II 1G, ½G, 2G Ex ia IIC T6 + ATEX II ½D IP6X T ⁶⁾⁷⁾¹⁷⁾						G			
IECEX Ex ia IIC T6 ⁶⁾¹⁸⁾						H			
Shipping approvals ¹⁶⁾						K			
ATEX II 3G Ex nA II T5 ... T1 X ¹⁴⁾¹⁹⁾						L			
FM (IS) Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G ⁶⁾²⁰⁾						N			
FM (XP) Class I, Div. 1, Groups A, B, C, D; (DIP) Class II, III, Div. 1, Groups E, F, G ²⁾⁵⁾¹⁰⁾						P			
FM (NI) Class I, Div. 2, Groups A, B, C, D, CE ²¹⁾						Q			
IECEX d IIC T6 ... T2 Ga/Gb ⁵⁾¹⁵⁾						R			
CSA (XP) Class I, II, III Div. 1, Groups A, B, C, D, E, F, G ⁵⁾¹⁵⁾						S			
CSA (NI) Class I, II, III, Div. 2, Groups A, B, C, D, E, F, G, CE ²²⁾						T			
BR-Ex d IIC T6 ... T2 ⁵⁾²³⁾						U			
CSA (IS) Class I, II, III Div. 1, Groups A, B, C, D, E, F, G ⁶⁾⁹⁾						V			
ATEX II ½D, 2D ExtD A20/21, A21 IP6 T... ⁶⁾¹⁹⁾						X			
GOST-R/EAC + ATEX II 1G, ½G, 2G Ex ia IIC T6 + WHG ⁹⁾²⁶⁾						Z	J	1	A
GOST-R/EAC + ATEX II ½G, Ex d IIC T2 ... T6 + WHG ⁵⁾¹⁵⁾²⁸⁾						Z	J	1	B
GOST-R/EAC + ATEX II ½G, Ex d IIC T2 ... T6 + Ship approval ⁵⁾¹⁵⁾²⁸⁾						Z	J	1	C
GOST-R/EAC + ATEX II 1G, ½G, 2G Ex ia IIC T6 + II ½D, 2D ExtD ⁷⁾¹⁷⁾²⁸⁾						Z	J	1	D
GOST-R/EAC + ATEX II ½D, 2D ExtD A20/21, A21 IP6 T... ¹⁷⁾²⁶⁾						Z	J	1	E
Process connection									
Thread G¾" A, PN 64/316L						A	0	0	
Thread G¾" A, PN 64/316L Ra < 0.8 µm						A	0	1	
Thread ¾" NPT, PN 64/316L						A	0	2	
Thread ¾" NPT, PN 64/316L Ra < 0.8 µm						A	0	3	
Thread ¾" NPT, PN 64/Alloy 400 (2.4360)						A	0	4	
Thread G¾" A, PN 64/Alloy C22 (2.4602)						A	0	5	
Thread ¾" NPT, PN 64/Alloy C22 (2.4602)						A	0	6	
Thread G1" A, PN 64/316L						A	0	7	
Thread G1" A, PN 64/316L ECTFE coated MB1982 ⁴⁾						A	0	8	
Thread G1" A, PN 64/316L PFA coated ⁴⁾						A	1	0	
Thread G1" A, PN 64/Alloy 400 (2.4360)						A	1	1	
Thread G1" A, PN 64/316L Ra < 0.8 µm						A	1	2	
Thread 1" NPT, PN 64/316L						A	1	3	
Thread 1" NPT, PN 64/316L ECTFE coated MB1982 ⁴⁾						A	1	4	
Thread 1" NPT, PN 64/316L PFA-coated ⁴⁾						A	1	5	
Thread 1" NPT, PN 64/Alloy 400 (2.4360)						A	1	6	
Thread 1" NPT, PN 64/316L Ra < 0.8 µm						A	1	7	
Thread G1" A, PN 64/Alloy C22 (2.4602)						A	1	8	
Thread G1" A, PN 64/Alloy C22 (2.4602) Ra < 0.3 µm						A	2	0	
Thread G1½" A, PN 64/316L						A	2	1	

Selection and ordering data (continued)

	Article No.	Ord. Code
SITRANS LVL200 Vibrating point level switch, standard design Detects level and material in liquids and slurries. Short insertion. For hazardous applications.	7ML5746- ● ● ● ● ● - ● ● A 0	● ● ●
Thread G1½" A, PN 64/316L Ra < 0.8 µm	A 2 2	
Thread G1½" A, PN 64/Alloy C22 (2.4602)	A 2 3	
Thread 1" NPT, PN 64/Alloy C22 (2.4602)	A 2 4	
Thread 1½" NPT, PN 64/316L	A 2 5	
Thread 1½" NPT, PN 64/316L Ra < 0.8 µm	A 2 6	
Thread 1½" NPT, PN 64/Alloy C22 (2.4602)	A 2 7	
Thread G2" A, PN 64/316L	A 2 8	
Thread M27 x 1.5, PN 64/316L	A 3 0	
Conus DN 25, PN 40/316L Ra < 0.3 µm	A 3 1	
Conus DN 25, PN 40/316L Ra < 0.8 µm	A 3 2	
Conus DN 25, PN 40/ECTFE (ZB3033) ⁴⁾	A 3 3	
Conus M52, PN 40/316L	A 3 4	
Conus M52, PN 40/316L Ra < 0.3 µm	A 3 5	
Conus M52, PN 40/316L Ra < 0.8 µm	A 3 6	
Tri-Clamp 1", PN 16/316L Ra < 0.3 µm	A 3 7	
Tri-Clamp 1", PN 16/Alloy C22 (2.4602)	A 3 8	
Tri-Clamp 1", PN 16/316L Ra < 0.8 µm	A 4 0	
Tri-Clamp 1½", PN 16/316L Ra < 0.3 µm	A 4 1	
Tri-Clamp 1½", PN 16/Alloy C22 (2.4602)	A 4 2	
Tri-Clamp 1½", PN 16/316L Ra < 0.8 µm	A 4 3	
Tri-Clamp 2", PN 16/316L Ra < 0.3 µm	A 4 4	
Tri-Clamp 2", PN 16/Alloy C22 (2.4602)	A 4 5	
Tri-Clamp 2", PN 16/316L Ra < 0.8 µm	A 4 6	
Tri-Clamp 2½", PN 10/316L Ra < 0.3 µm	A 4 7	
Tri-Clamp 2½", PN 10/316L Ra < 0.8 µm	A 4 8	
Tri-Clamp 3", PN 10/316L Ra < 0.3 µm	A 5 0	
Tri-Clamp 3", PN 10/316L Ra < 0.8 µm	A 5 1	
Bolting DN 32, PN 40 DIN11851/316L Ra < 0.3 µm	A 5 2	
Bolting DN 32, PN 40 DIN11851/316L Ra < 0.8 µm	A 5 3	
Bolting DN 25, PN 40 DIN11851/316L Ra < 0.3 µm	A 5 4	
Bolting DN 25, PN 40 DIN11851/316L Ra < 0.8 µm	A 5 5	
Bolting DN 40, PN 40 DIN11851/316L Ra < 0.3 µm	A 5 6	
Bolting DN 40, PN 40 DIN11851/316L Ra < 0.8 µm	A 5 7	
Bolting DN 40, PN 40 DIN11864-1 A/316L Ra < 0.8 µm ZB3052	A 5 8	
Bolting DN 50, PN 25 DIN11851/316L Ra < 0.3 µm	A 6 0	
Bolting DN 50, PN 25 DIN11851/316L Ra < 0.8 µm	A 6 1	
Bolting DN 50, PN 25 DIN11864-1 A/316L Ra < 0.8 µm ZB3052	A 6 2	
Hygienic w. compr. nut F40, PN 25/316L	A 6 3	
Hygienic w. compr. nut F40, PN 25/316L Ra < 0.3 µm	A 6 4	
Hygienic w. compr. nut F40, PN 25/316L Ra < 0.8 µm	A 6 5	
Varivent N50-40/316L Ra < 0.3 µm	A 6 6	
Varivent N50-40/316L Ra < 0.8 µm	A 6 7	
Varivent N125/100/316L Ra < 0.8 µm	A 6 8	
DRD flange, PN 40/316L ZB3007	A 7 0	
SMS DN 38/316L Ra < 0.8 µm ⁴⁾	A 7 1	
SMS DN 51, PN 6/316L Ra < 0.8 µm ⁴⁾	A 7 2	
Swagelok VCR screwing ZG2579, PN 64/316L	A 7 3	
Neumo biocontrol size 25, PN 16/316L Ra < 0.8 µm	A 7 4	
Neumo biocontrol size 50, PN 16/316L Ra < 0.8 µm ⁴⁾	A 7 5	
Neumo biocontrol size 65, PN 16/316L Ra < 0.8 µm	A 7 6	
Neumo biocontrol size 80, PN 16/316L Ra < 0.8 µm	A 7 7	
SÜDMO DN 50, PN 10/316L Ra < 0.8 µm	A 7 8	
Small flange DN 25, PN 1.5 DIN 28403/316L pol. Ra < 0.8 µm	A 8 0	
Small flange DN 40, PN 1.5 DIN 28403/316L pol. Ra < 0.8 µm	A 8 1	
Ingold connection, PN16/316L a < 0.8 µm (acc. to MB2523)	A 8 2	
Ingold connection, PN 16/Alloy C22 (2.4602) Ra < 0.8 µm (acc. to MB6017)	A 8 3	
Terminal DN 33.7 PN 40 DIN 11864-3-A-/316L BN2 Ra < 0.8 µm ⁴⁾	A 8 4	

Level Measurement

Point level measurement

Vibrating switches / SITRANS LVL200

Selection and ordering data (continued)

	Article No.										Ord. Code		
	7	M	L	5	7	4	6	-	A	0			
SITRANS LVL200 Vibrating point level switch, standard design													
Detects level and material in liquids and slurries.													
Short insertion. For hazardous applications.													
Hygienic fl. DN 50 PN 16 DIN 11864-2-A-/316L Ra < 0.8 µm									A	8	5		
Flange DN 25, PN 6 Form C, DIN 2501/316L									A	8	6		
Flange DN 25, PN 6 Form C, DIN 2501/PFA ⁴⁾									A	8	7		
Flange DN 25, PN 40 Form C, DIN 2501/316L									A	8	8		
Flange DN 25, PN 40 Form C, DIN 2501/Alloy C22 (2.4602)									B	0	0		
Flange DN 25, PN 40 Form C, DIN 2501/ECTFE ⁴⁾									B	0	1		
Flange DN 25, PN 40 Form C, DIN 2501/PFA ⁴⁾									B	0	2		
Flange DN 25, PN 40 Form C, DIN 2501/Enamelled									B	0	3		
Flange DN 25, PN 40 Form D, DIN 2501/316L									B	0	4		
Flange DN 25, PN 40 Form F, DIN 2501/316L									B	0	5		
Flange DN 25, PN 40 Form N, DIN 2501/316L									B	0	6		
Flange DN 25, PN 40 Form N, DIN 2501/Alloy C22 (2.4602)									B	0	7		
Flange DN 25, PN 40 Form N, DIN 2501/Alloy 400 (2.4360) solid									B	0	8		
Flange DN 25, PN 40 V13, DIN 2501/316L									B	1	0		
Flange DN 32, PN 40 Form C, DIN 2501/316L									B	1	1		
Flange DN 32, PN 40 Form C, DIN 2501/ECTFE ⁴⁾									B	1	2		
Flange DN 40, PN 6 Form C, DIN 2501/316L									B	1	3		
Flange DN 40, PN 6 Form C, DIN 2501/ECTFE ⁴⁾									B	1	4		
Flange DN 40, PN 40 Form C, DIN 2501/316L									B	1	5		
Flange DN 40, PN 40 Form C, DIN 2501/Alloy C22 (2.4602)									B	1	6		
Flange DN 40, PN 40 Form C, DIN 2501/ECTFE ⁴⁾									B	1	7		
Flange DN 40, PN 40 Form C, DIN 2501/PFA ⁴⁾									B	1	8		
Flange DN 40, PN 40 Form C, DIN 2501/Enamelled ³⁾									B	2	0		
Flange DN 40, PN 40 Form F, DIN 2501/316L									B	2	1		
Flange DN 40, PN 40 Form N, DIN 2501/316L									B	2	2		
Flange DN 40, PN 40 Form E, DIN 2501/316L									B	2	3		
Flange DN 40, PN 40 V13, DIN 2501/316L									B	2	4		
Flange DN 50, PN 40 Form C, DIN 2501/316L									B	2	5		
Flange DN 50, PN 40 Form C, DIN 2501/Alloy C22 (2.4602)									B	2	6		
Flange DN 50, PN 40 Form C, DIN 2501/ECTFE ⁴⁾									B	2	7		
Flange DN 50, PN 40 Form C, DIN 2501/ECTFE (ZB3108) ⁴⁾									B	2	8		
Flange DN 50, PN 40 Form C, DIN 2501/PFA ⁴⁾									B	3	0		
Flange DN 50, PN 40 Form D, DIN 2501/316L									B	3	1		
Flange DN 50, PN 40 Form D, DIN 2501/Alloy C22 (2.4602)									B	3	2		
Flange DN 50, PN 40 Form F, DIN 2501/316L									B	3	3		
Flange DN 50, PN 40 Form N, DIN 2501/316L									B	3	4		
Flange DN 50, PN 40 Form N, DIN 2501/Alloy C22 (2.4602)									B	3	5		
Flange DN 50, PN 40 Form E, DIN 2501/316L									B	3	6		
Flange DN 50, PN 40 V13, DIN 2501/316L									B	3	7		
Flange DN 50, PN 40 R13, DIN 2501/316L									B	3	8		
Flange DN 50, PN 64 Form F, DIN 2501/316L									B	4	0		
Flange DN 50, PN 64 Form N, DIN 2501/Alloy C22 (2.4602)									B	4	1		
Flange DN 50, PN 64 Form C, DIN 2501/316L									B	4	2		
Flange DN 50, PN 64 Form L, DIN 2501/316L									B	4	3		
Flange DN 50, PN 100 Form E, DIN 2501/316L									B	4	4		
Flange DN 50, PN 100 Form L, DIN 2501/316L									B	4	5		
Flange DN 65, PN 40 Form C, DIN 2501/316L									B	4	6		
Flange DN 65, PN 40 Form C, DIN 2501/Alloy C22 (2.4602)									B	4	7		
Flange DN 65, PN 40 Form C, DIN 2501/ECTFE ⁴⁾									B	4	8		
Flange DN 65, PN 40 Form C, DIN 2501/PFA ⁴⁾									B	5	0		
Flange DN 65, PN 40 Form F, DIN 2501/316L									B	5	1		
Flange DN 65, PN 64 Form E, DIN 2501/316L									B	5	2		
Flange DN 80, PN 40 Form C, DIN 2501/316L									B	5	3		
Flange DN 80, PN 40 Form C, DIN 2501/Alloy C22 (2.4602)									B	5	4		
Flange DN 80, PN 40 Form C, DIN 2501/ECTFE ⁴⁾									B	5	5		
Flange DN 80, PN 40 Form C, DIN 2501/PFA ⁴⁾									B	5	6		
Flange DN 80, PN 40 Form C, DIN 2501/Enamelled ³⁾									B	5	7		

Selection and ordering data (continued)

	Article No.	Ord. Code
SITRANS LVL200 Vibrating point level switch, standard design Detects level and material in liquids and slurries. Short insertion. For hazardous applications.	7ML5746- ● ● ● ● ● - ● ● A 0	● ● ●
Flange DN 80, PN 40 Form F, DIN 2501/316L	B 5 8	
Flange DN 80, PN 40 Form N, DIN 2501/316L	B 6 0	
Flange DN 100, PN 16 Form C, DIN 2501/316L	B 6 2	
Flange DN 100, PN 16 Form C, DIN 2501/Alloy C22 (2.4602)	B 6 3	
Flange DN 100, PN 16 Form C, DIN 2501/ECTFE ⁴⁾	B 6 4	
Flange DN 100, PN 16 Form C, DIN 2501/PFA ⁴⁾	B 6 5	
Flange DN 100, PN 16 Form C, DIN 2501/Enamelled ³⁾	B 6 6	
Flange DN 100, PN 16 Form D, DIN 2501/316L	B 6 7	
Flange DN 100, PN 16 Form F, DIN 2501/316L	B 6 8	
Flange DN 100, PN 16 Form N, DIN 2501/316L	B 7 0	
Flange DN 100, PN 40 Form C, DIN 2501/316L	B 7 1	
Flange DN 100, PN 40 Form C, DIN 2501/ECTFE ⁴⁾	B 7 2	
Flange DN 100, PN 40 Form C, DIN 2501/PFA ⁴⁾	B 7 3	
Flange DN 100, PN 40 Form C, DIN 2501/Enamelled ³⁾	B 7 4	
Flange DN 100, PN 40 Form F, DIN 2501/316L	B 7 5	
Flange DN 100, PN 40 Form N, DIN 2501/316L	B 7 6	
Flange DN 100, PN 40 V13, DIN 2501/316L	B 7 7	
Flange DN 100, PN 64 Form E, DIN 2501/316L	B 7 8	
Flange DN 100, PN 100 Form E, DIN 2501/316L	B 8 0	
Flange DN 100, PN 100 Form L, DIN 2501/316L	B 8 1	
Flange DN 125, PN 16 Form F, DIN 2501/316L	B 8 2	
Flange DN 125, PN 40 Form C, DIN 2501/316L	B 8 3	
Flange DN 125, PN 40 Form N, DIN 2512/ 316L	B 8 4	
Flange DN 150, PN 16 Form C, DIN 2501/316L	B 8 5	
Flange DN 150, PN 16 Form C, DIN 2501/Alloy C22 (2.4602)	B 8 6	
Flange DN 150, PN 16 Form C, DIN 2501/ECTFE ⁴⁾	B 8 7	
Flange DN 150, PN 16 Form C, DIN 2501/PFA ⁴⁾	B 8 8	
Flange DN 150, PN 16 Form D, DIN 2501/316L	C 0 0	
Flange DN 150, PN 40 Form C, DIN 2501/316L	C 0 1	
Flange DN 150, PN 40 Form C, DIN 2501/Alloy C22 (2.4602)	C 0 2	
Flange DN 150, PN 40 Form F, DIN 2501/316L	C 0 3	
Flange DN 150, PN 40 Form N, DIN 2512/316L	C 0 4	
Flange DN 200, PN 10 Form C, DIN 2501/ECTFE ⁴⁾	C 0 5	
Flange DN 200, PN 16 Form C, DIN 2501/316L	C 0 6	
Flange DN 25, PN 40 Form B1, EN 1092-1/316L	C 0 7	
Flange DN 25, PN 40 Form B1, EN 1092-1/Alloy C22 (2.4602)	C 0 8	
Flange DN 25, PN 40 Form B1, EN/316L/PFA ⁴⁾	C 1 0	
Flange DN 25, PN 40 Form B1, EN 1092-1/Enamelled ³⁾	C 1 1	
Flange DN 25, PN 40 Form B2, EN 1092-1/316L	C 1 2	
Flange DN 25, PN 40 Form F, EN 1092-1/316L	C 1 3	
Flange DN 25, PN 63 Form B1, EN 1092-1/316L	C 1 4	
Flange DN 25, PN 100 Form B2, EN 1092-1/316L	C 1 5	
Flange DN 40, PN 40 Form B1, EN/316L	C 1 6	
Flange DN 40, PN 40 Form B1, EN 1092-1/PFA ⁴⁾	C 1 7	
Flange DN 40, PN 40 Form B2, EN/316L	C 1 8	
Flange DN 50, PN 40 Form B1, EN/316L	C 2 0	
Flange DN 50, PN 40 Form B1, EN 1092-1/Alloy C22 (2.4602)	C 2 1	
Flange DN 50, PN 40 Form B1, EN 1092-1/Alloy 400 (2.4360) ZB2977	C 2 2	
Flange DN 50, PN 40 Form B1, EN 1092-1/ECTFE ⁴⁾	C 2 3	
Flange DN 50, PN 40 Form B1, EN/316L/PFA ⁴⁾	C 2 4	
Flange DN 50, PN 40 Form B1, EN 1092-1/Enamelled ³⁾	C 2 5	
Flange DN 50, PN 40 Form C, EN 1092-1/316L	C 2 6	
Flange DN 50, PN 40 Form D, EN/316L	C 2 7	
Flange DN 50, PN 40 Form D, EN 1092-1/Alloy C22 (2.4602)	C 2 8	
Flange DN 50, PN 40 Form B2, EN 1092-1/316L	C 3 0	
Flange DN 50, PN 40 Form E, EN 1092-1/316L	C 3 1	
Flange DN 80, PN 40 Form B1, EN 1092-1/316L	C 3 2	

Level Measurement

Point level measurement

Vibrating switches / SITRANS LVL200

Selection and ordering data (continued)

	Article No.	Ord. Code
SITRANS LVL200 Vibrating point level switch, standard design Detects level and material in liquids and slurries. Short insertion. For hazardous applications.	7ML5746- ● ● ● ● ● - ● ● A 0	● ● ●
Flange DN 80, PN 40 Form B1, EN 1092-1/Alloy C22 (2.4602)	C 3 3	
Flange DN 80, PN 40 Form B1, EN 1092-1/ECTFE ⁴⁾	C 3 4	
Flange DN 80, PN 40 Form B1, EN 1092-1/Enamelled ³⁾	C 3 5	
Flange DN 80, PN 40 Form B2, EN 1092-1/316L	C 3 6	
Flange DN 100, PN 16 Form B1, EN 1092-1/316L	C 3 7	
Flange DN 100, PN 16 Form B1, EN 1092-1/Alloy C22 (2.4602)	C 3 8	
Flange DN 100, PN 16 Form B1, EN 1092-1/Enamelled ³⁾	C 4 0	
Flange DN 100, PN 40 Form B1, EN 1092-1/316L	C 4 1	
Flange DN 100, PN 40 Form B1, EN 1092-1/Enamelled ³⁾	C 4 2	
Flange DN 100, PN 40 Form C, EN 1092-1/316L	C 4 3	
Flange DN 100, PN 63 Form B2, EN 1092-1/316L	C 4 4	
Flange DN 150, PN 16 Form B1, EN 1092-1/316L	C 4 5	
Flange DN 150, PN 16 Form B1, EN 1092-1/PFA ⁴⁾	C 4 6	
Flange DN 150, PN 40 Form B1, EN 1092-1/316L	C 4 7	
Flange DN 150, PN 40 Form B1, EN 1092-1/ECTFE ⁴⁾	C 4 8	
Flange DN 150, PN 40 Form B2, EN 1092-1/316L	C 5 0	
Flange 1" 150 lb RF, ASME B16.5/316L	C 5 1	
Flange 1" 150 lb RF, ASME B16.5/Alloy C22 (2.4602)	C 5 2	
Flange 1" 150 lb RF, ASME B16.5/Alloy 400 (2.4360) ZB2977	C 5 3	
Flange 1" 150 lb RF, ASME B16.5/ECTFE ⁴⁾	C 5 4	
Flange 1" 150 lb RF, ASME B16.5/PFA ⁴⁾	C 5 5	
Flange 1" 150 lb RF, ASME B16.5/Enamelled ³⁾	C 5 6	
Flange 1" 300 lb RF, ASME B16.5/316L	C 5 7	
Flange 1" 300 lb RF, ASME B16.5/ECTFE ⁴⁾	C 5 8	
Flange 1" 600 lb RF, ASME B16.5/316L	C 6 0	
Flange 1½" 150 lb RF, ASME B16.5/316L	C 6 1	
Flange 1½" 150 lb RF, ASME B16.5/Alloy C22 (2.4602)	C 6 2	
Flange 1½" 150 lb RF, ASME B16.5/ECTFE ⁴⁾	C 6 3	
Flange 1½" 150 lb RF, ASME B16.5/PFA ⁴⁾	C 6 4	
Flange 1½" 150 lb RF, ASME B16.5 Enamelled ³⁾	C 6 5	
Flange 1½" 150 lb FF, ASME B16.5/ECTFE ⁴⁾	C 6 6	
Flange 1½" 300 lb RF, ASME B16.5/316L	C 6 7	
Flange 1½" 300 lb RF, ASME B16.5/Alloy 400 (2.4360) ZB2977	C 6 8	
Flange 1½" 300 lb RF, ASME B16.5/ECTFE ³⁾	C 7 0	
Flange 1½" 600 lb RF, ASME B16.5/316L	C 7 1	
Flange 2" 150 lb RF, ASME B16.5/316L	C 7 2	
Flange 2" 150 lb RF, ASME B16.5/Alloy C22 (2.4602)	C 7 3	
Flange 2" 150 lb RF, ASME B16.5/Alloy 400 (2.4360) ZB2977	C 7 4	
Flange 2" 150 lb RF, ASME B16.5/ECTFE ⁴⁾	C 7 5	
Flange 2" 150 lb RF, ASME B16.5/PFA ⁴⁾	C 7 6	
Flange 2" 150 lb RF, ASME B16.5/Enamelled ³⁾	C 7 7	
Flange 2" 150 lb FF, ASME B16.5/316L	C 7 8	
Flange 2" 150 lb FF, ASME B16.5/ECTF ⁴⁾	C 8 0	
Flange 2" 150 lb SG (small groove), ASME B16.5/316L	C 8 1	
Flange 2" 300 lb RF, ASME B16.5/316L	C 8 2	
Flange 2" 300 lb RF, ASME B16.5/Alloy C22 (2.4602)	C 8 3	
Flange 2" 300 lb RF, ASME B16.5/ECTFE ⁴⁾	C 8 5	
Flange 2" 300 lb RF, ASME B16.5/PFA ⁴⁾	C 8 6	
Flange 2" 300 lb RF, ASME B16.5 Enamelled ³⁾	C 8 7	
Flange 2" 300 lb RJF, ASME B16.5/316L	C 8 8	
Flange 2" 300 lb ST, ASME B16.5/316L	D 0 0	
Flange 2" 300 lb LG (large groove), ASME B16.5/316L	D 0 1	
Flange 2" 300 lb LT, ASME B16.5/316L	D 0 2	
Flange 2" 600 lb RF, ASME B16.5/316L	D 0 3	
Flange 2" 600 lb RF, ASME B16.5/Alloy 400 (2.4360) ZB2977	D 0 4	
Flange 2" 600 lb RF, ASME B16.5/ECTFE ⁴⁾	D 0 5	
Flange 2" 600 lb RJF, ASME B16.5/316L	D 0 6	

Selection and ordering data (continued)

	Article No.	Ord. Code
SITRANS LVL200 Vibrating point level switch, standard design Detects level and material in liquids and slurries. Short insertion. For hazardous applications.	7ML5746-●●●●●-●●A0	●●●
Flange 2" 600 lb LG, ASME B16.5/316L	D 0 7	
Flange 2" 900 lb RJF, ASME B16.5/316L	D 0 8	
Flange 2½" 150 lb RF, ASME B16.5/316L	D 1 0	
Flange 2½" 300 lb RF, ASME B16.5/316L	D 1 1	
Flange 3" 150 lb RF, ASME B16.5/316L	D 1 2	
Flange 3" 150 lb RF, ASME B16.5/Alloy C22 (2.4602)	D 1 3	
Flange 3" 150 lb RF, ASME B16.5/ECTFE ⁴⁾	D 1 4	
Flange 3" 150 lb RF, ASME B16.5/PFA ⁴⁾	D 1 5	
Flange 3" 150 lb RF, ASME B16.5/Enamelled ³⁾	D 1 6	
Flange 3" 150 lb FF, ASME B16.5/316L	D 1 7	
Flange 3" 150 lb FF, ASME B16.5/ECTFE ⁴⁾	D 1 8	
Flange 3" 150 lb FF, ASME B16.5/PFA ⁴⁾	D 2 0	
Flange 3" 300 lb RF, ASME B16.5/316L	D 2 1	
Flange 3" 300 lb RF, ASME B16.5/Alloy C22 (2.4602)	D 2 2	
Flange 3" 300 lb RF, ASME B16.5/ECTFE ⁴⁾	D 2 3	
Flange 3" 300 lb RF, ASME B16.5/PFA ⁴⁾	D 2 4	
Flange 3" 300 lb RF, ASME B16.5/Enamelled ³⁾	D 2 5	
Flange 3" 600 lb RF, ASME B16.5/316L	D 2 6	
Flange 3½" 150 lb RF, ASME B16.5/316L	D 2 7	
Flange 3½" 150 lb RF, ASME B16.5/ECTFE ⁴⁾	D 2 8	
Flange 4" 150 lb RF, ASME B16.5/316L	D 3 0	
Flange 4" 150 lb RF, ASME B16.5/Alloy C22 (2.4602)	D 3 1	
Flange 4" 150 lb RF, ASME B16.5/ECTFE ⁴⁾	D 3 2	
Flange 4" 150 lb RF, ASME B16.5/PFA ⁴⁾	D 3 3	
Flange 4" 150 lb RF, ASME B16.5/Enamelled ³⁾	D 3 4	
Flange 4" 150 lb LT, ASME B16.5/316L	D 3 5	
Flange 4" 300 lb RF, ASME B16.5/316L	D 3 6	
Flange 4" 300 lb RF, ASME B16.5/Alloy C22 (2.4602)	D 3 7	
Flange 4" 300 lb RF, ASME B16.5/ECTFE ⁴⁾	D 3 8	
Flange 4" 300 lb RJF, ASME B16.5/316L	D 4 0	
Flange 4" 300 lb LG, ASME B16.5/316L	D 4 1	
Flange 4" 300 lb LT, ASME B16.5/316L	D 4 2	
Flange 4" 600 lb RF, ASME B16.5/316L	D 4 3	
Flange 4" 600 lb RJF, ASME B16.5/316L	D 4 4	
Flange 6" 150 lb RF, ASME B16.5/316L	D 4 5	
Flange 6" 150 lb RF, ASME B16.5/Alloy C22 (2.4602)	D 4 6	
Flange 6" 150 lb RF, ASME B16.5/ECTFE ⁴⁾	D 4 7	
Flange 6" 150 lb RF, ASME B16.5/PFA ⁴⁾	D 4 8	
Flange 6" 150 lb RJF, ASME B16.5/316L	D 5 0	
Flange 6" 300 lb RF, ASME B16.5/316L	D 5 1	
Flange 8" 150 lb RF, ASME B16.5/316L	D 5 2	
Flange 8" 150 lb RF, ASME B16.5/ECTFE ⁴⁾	D 5 3	
Flange 1" BS.10 Table E/316L	D 5 4	
Flange 1" BS.10 Table E/PFA ⁴⁾	D 5 5	
Flange 1½" BS.10 Table E/316L	D 5 6	
Flange 3½" BS.10 Table E/316L	D 5 7	
Flange 4" BS.10 Table E/ECTFE ⁴⁾	D 5 8	
Flange DN 40 10K, JIS/316L	D 6 0	
Flange DN 50 10K, JIS/316L	D 6 1	
Flange DN 80 10K, JIS/316L	D 6 2	
Flange DN 100 10K, JIS/316L	D 6 3	
Thread R1 PN 64, EN 10226-1/316L	D 6 5	
Flange 2" 900 lb RF, ASME B16.5/316L	D 7 0	
Adapter/Process temperature		
Without adapter/-50 ... +150 °C (-58 ... +302 °F)		1
With adapter/-50 ... +200 °C (-58 ... +392 °F) ¹³⁾		2

Level Measurement

Point level measurement

Vibrating switches / SITRANS LVL200

Selection and ordering data (continued)

	Article No.	Ord. Code
SITRANS LVL200 Vibrating point level switch, standard design Detects level and material in liquids and slurries. Short insertion. For hazardous applications.	7ML5746-●●●●●-●●A0	●●●
With adapter/-50 ... +250 °C (-58 ... +482 °F)		3
With gas-tight leadthrough/-50 ... +150 °C (-58 ... +302 °F)		4
With gas-tight leadthrough/-50 ... +250 °C (-58 ... +482 °F)		5
Housing/Cable entry		
Aluminum IP66/IP67/M20 x 1.5		A
Aluminum IP66/IP67/1/2" NPT		B
316L stainless steel (electropolished) IP66/IP67/M20 x 1.5		C
316L stainless steel (electropolished) IP66/IP67/1/2" NPT		D
Plastic single chamber IP66/IP67/M20 x 1.5		E
Plastic single chamber IP66/IP67/1/2" NPT		F
Stainless steel chamber (precision casting) IP66/IP67/M20 x 1.5		G
Stainless steel chamber (precision casting) IP66/IP67/1/2" NPT		H
Aluminum IP66/IP67/M20 x 1.5 Special HARTING plug HAN 7D (bent according to Tier One (ZB7555) ¹¹⁾		V

Selection and Ordering data	Order code
Further designs	
Please add "-Z" to Article No. and specify Order code(s).	
Switching status indication with colors red-green ¹²⁾	A21
Cleaning including Certificate (oil, grease, and silicone free)	W01
Identification label (measurement loop) stainless steel: max. 40 characters, add in plain text. To add more than one line, use a coma ",," for line break.	Y17
Identification Label (measurement loop) foil: max. 40 characters add in plain text. To add more than one line, use a coma ",," for line break.	Y18
NACE0175 to 3.1 Material Certificate for material (EN10204 NACE MR 0175) ⁸⁾ Note: not available with Process Connection and Rigid extension coatings PFA, ECTFE, and Enamel. NACE not available with Hygienic process connections.	D07
Material Inspection certificate 3.1 of EN 10204 ⁸⁾	C05
2.2-Factory certificate for material (EN 10204) ⁸⁾	C15
Functional Safety (SIL 2). Device suitable for use in accordance with IEC 61508 and IEC 61511 ⁸⁾	C20
Dye penetration test, results confirmed via a 3.1 certificate/instrument (EN 10204) ⁸⁾	C13
X-ray test + 3.1 certificate/instrument ⁸⁾	C14
Positive material identification test + 3.1 certificate/instrument ⁸⁾	C16
Roughness test + 3.1 certificate/instrument ⁸⁾	C18
3.1-Inspection Certificate for instrument with test data (EN 10204) ⁸⁾	C25
Quality and test plan	C26
Inspection certificate 3.1 (EN 10204) - device and pressure test ⁸⁾	C31
Helium leak test + 3.1 certificate/instrument ⁸⁾	C32
Ferrite measuring accuracy to DIN 32514-1 + 3.1 certificate/instrument ⁸⁾	C60
Pressure test according to Norsok + 3.1 certificate/instrument ⁸⁾	C61
Factory declaration 2.1 (EN 10204) - certificate suitable for tropical regions with all attachment parts of metal	C65
Operating Instructions	
All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation	

Selection and ordering data (continued)

Spare Parts and Accessories	Article No.
Electronics module SITRANS LVL200 Relay	7ML1830-1NC
Electronics module SITRANS LVL200 Contactless	7ML1930-6AA
NAMUR spare electronics module	A5E35817107
SITRANS SCSC single channel signal conditioner and remote test	7ML5760
SITRANS TCSC two channel signal conditioner and remote test	7ML5761
<u>LVL200 Threaded Welded Socket</u>	
• G¾" A/316L with FKM Seal	7ML1930-1EE
• G1" A/316L with FKM Seal	7ML1930-1EF
• M27 x 1.5/316L with FKM Seal	7ML1930-1EG
• G¾" A/316L with EPDM Seal	7ML1930-1EH
• G1" A/316L with EPDM Seal	7ML1930-1EJ
• M27 x 1.5/316L with EPDM Seal	7ML1930-1EK

- 1) Available only with Adapter/Process temperature options 1, 3, 4, and 5.
- 2) Available only with Housing/Protection/Cable option B.
- 3) Available only with Adapter/Process Temperature options 1, 2, and 4.
- 4) Not available with Adapter/Process Temperature options 2, 3, and 5.
- 5) Not available with Adapter/Process Temperature options 2, 4, and 5.
- 6) Available only with Electronics options 4 and 6.
- 7) Not available with ECTFE coated probe options.
- 8) Listed Certificates are not available with all configurations please contact factory for more information.
- 9) Not available with Housing/Protection/Cable Option V.
- 10) Not available with PFA and ECTFE coating options.
- 11) Available only with Approval option A.
- 12) Available only with Relay Electronic options and Non-hazardous Approval options.
- 13) Available only with Enamelled Process connection options.
- 14) Available only with Electronic options 4, 5, and 6.
- 15) Available only with Aluminum Housing/Protection/Cable options.
- 16) Not available with Stainless Steel (electropolished) Housing/Protection/Cable options and certain glands.
- 17) Not available with Plastic and Stainless Steel (electropolished) Housing/Protection/Cable options and certain glands.
- 18) Not available with Housing/Protection/Cable options D, and V.
- 19) Not available with Plastic Housing/Protection/Cable options and certain glands.
- 20) Not available with Housing/Protection/Cable options A, E, G, and V.
- 21) Available only with Housing/Protection/Cable options B, D, F, and H.
- 22) Not available with Housing/Protection/Cable options C and V.
- 23) Available only with Housing/Protection/Cable options A, B, and H.
- 24) Not available with Approval options C, E, G, H, L, N, V, W, J1A, J1D, and J1E.
- 25) Not available with Approval options C, E, G, H, N, V, W, J1A, J1D, and J1E.
- 26) Available only with Electronic option 4.
- 27) Not available with EAC approval options.
- 28) Not available with Electronic option 6.

	Article No.	Ord. Code
SITRANS LVL200 Vibrating point level switch, rigid extension design Detects level and material in liquids and slurries. Top mount, with extension options to 6 m (19.69 ft). Ideal for hazardous applications.	7ML5747- ● ● ● ● ● - ● ● ● ● ●	● ● ●
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Electronics		
Contactless electronic switch 20 ... 250 V AC/DC ¹⁾⁹⁾¹⁴⁾	1	
Double relay (DPDT) 20 ... 72 V DC/20 ... 250 V AC ¹⁴⁾	2	
NAMUR signal ⁹⁾	4	
Transistor (NPN/PNP) 10 ... 55 V DC ¹⁾¹⁵⁾	5	
Two-wire (8/16 mA) 12 ... 36 V DC ²⁵⁾	6	
Approvals		
CE	A	
Overfill protection (WHG) ⁹⁾	B	
ATEX II 1G, ½G, 2G Ex ia IIC T6 ⁶⁾	W	
ATEX II 1G, ½G, 2G Ex ia IIC T6 + WHG ⁶⁾⁹⁾	C	
ATEX II ½G, 2G Ex d IIC T6 + WHG ⁵⁾⁷⁾¹⁶⁾	D	

Selection and ordering data (continued)

	Article No.	Ord. Code
SITRANS LVL200 Vibrating point level switch, rigid extension design Detects level and material in liquids and slurries. Top mount, with extension options to 6 m (19.69 ft). Ideal for hazardous applications.	7ML5747- ● ● ● ● ● - ● ● ● ● ●	● ● ●
Conus M52 PN 40/316L Ra < 0.3 µm	A 3 6	
Conus M52 PN 40/316L Ra < 0.8 µm	A 3 7	
Tri-Clamp 1" PN 16/316L Ra < 0.3 µm	A 3 8	
Tri-Clamp 1" PN 16/Alloy C22 (2.4602)	A 4 0	
Tri-Clamp 1" PN 16/316L Ra < 0.8 µm	A 4 1	
Tri-Clamp 1½" PN 16/316L Ra < 0.3 µm	A 4 2	
Tri-Clamp 1½" PN 16/Alloy C22 (2.4602)	A 4 3	
Tri-Clamp 1½" PN 16/316L Ra < 0.8 µm	A 4 4	
Tri-Clamp 2" PN 16/316L Ra < 0.3 µm	A 4 5	
Tri-Clamp 2" PN 16/Alloy C22 (2.4602)	A 4 6	
Tri-Clamp 2" PN 16/316L Ra < 0.8 µm	A 4 7	
Tri-Clamp 2½" PN 10/316L Ra < 0.3 µm	A 4 8	
Tri-Clamp 2½" PN 10/316L Ra < 0.8 µm	A 5 0	
Tri-Clamp 3" PN 10/316L Ra < 0.3 µm	A 5 1	
Clamp 3" PN16 (ø91 mm) DIN32676, ISO2852/ 316L (Ra < 0.8 µm)	A 5 2	
Bolting DN 32 PN 40 DIN 11851/316L Ra < 0.3 µm	A 5 3	
Bolting DN 32 PN 40 DIN 11851/316L Ra < 0.8 µm	A 5 4	
Bolting DN 25 PN 40 DIN 11851/316L Ra < 0.3 µm	A 5 5	
Bolting DN 25 PN 40 DIN 11851/316L Ra < 0.8 µm	A 5 6	
Bolting DN 40 PN 40 DIN 11851/316L Ra < 0.3 µm	A 5 7	
Bolting DN 40 PN 40 DIN 11851/316L Ra < 0.8 µm	A 5 8	
Bolting DN 40 PN 40 DIN 11864-1 A/316L Ra < 0.8 µm ZB3052	A 6 0	
Bolting DN 50 PN 25 DIN 11851/316L Ra < 0.3 µm	A 6 1	
Bolting DN 50 PN 25 DIN 11851/316L Ra < 0.8 µm	A 6 2	
Bolting DN 50 PN 25 DIN 11864-1 A/316L Ra < 0.8 µm ZB3052	A 6 3	
Hygienic w.compr.nut F40 PN 25/316L	A 6 4	
Hygienic w.compr.nut F40 PN 25/316L Ra < 0.3 µm	A 6 5	
Hygienic w.compr.nut F40 PN 25/316L Ra < 0.8 µm	A 6 6	
Varivent N50-40/316L Ra < 0.3 µm	A 6 7	
Varivent N50-40/316L Ra < 0.8 µm	A 6 8	
Varivent N125/100/316L Ra < 0.8 µm	A 7 0	
DRD flange PN 40/316L ZB3007	A 7 1	
SMS DN 38/316L Ra < 0.8 µm ⁴⁾	A 7 2	
SMS DN 51 PN 6/316L Ra < 0.8 µm ⁴⁾	A 7 3	
Swagelok VCR screwing ZG2579 PN 64/316L	A 7 4	
Neumo biocontrol size 25 PN 16/316L Ra < 0.8 µm	A 7 5	
Neumo biocontrol size 50 PN 16/316L Ra < 0.8 µm	A 7 6	
SÜDMO DN 50 PN 10/316L Ra < 0.8 µm	A 8 0	
Small flange DN 25 PN 1.5 DIN 28403/316L pol. Ra < 0.8 µm	A 8 1	
Small flange DN 40 PN 1.5 DIN 28403/316L pol. Ra < 0.8 µm	A 8 2	
Ingold connection PN 16/316L Ra < 0.8 µm	A 8 3	
Collar clamp connection DN 33,7 PN 40 Form A, DIN 11864-3/1.4435 (BN2, Ra < 0.8 µm)	A 8 4	
Collar flange DN 50 PN 16 Form A, DIN 11864-2/316L (Ra < 0.8 µm)	A 8 5	
Flange DN 25 PN 6 Form C, DIN 2501/316L	A 8 6	
Flange DN 25 PN 6 Form C, DIN 2501/PFA ⁴⁾	A 8 7	
Flange DN 25 PN 40 Form C, DIN 2501/316L	A 8 8	
Flange DN 25 PN 40 Form C, DIN 2501/Alloy C22 (2.4602) plated	B 0 0	
Flange DN 25 PN 40 Form C, DIN 2501/ECTFE ⁴⁾	B 0 1	
Flange DN 25 PN 40 Form C, DIN 2501/PFA ⁴⁾	B 0 2	
Flange DN 25 PN 40 Form D, DIN 2501/316L	B 0 3	
Flange DN 25 PN 40 Form F, DIN 2501/316L	B 0 4	
Flange DN 25 PN 40 Form N, DIN 2501/316L	B 0 5	
Flange DN 25 PN 40 Form N, DIN 2501/Alloy 400 (2.4360) solid	B 0 7	
Flange DN 25 PN 40 V13, DIN 2501/316L	B 0 8	

Level Measurement

Point level measurement

Vibrating switches / SITRANS LVL200

Selection and ordering data (continued)

SITRANS LVL200 Vibrating point level switch, rigid extension design Detects level and material in liquids and slurries. Top mount, with extension options to 6 m (19.69 ft). Ideal for hazardous applications.	Article No. 7ML5747- ● ● ● ● ● - ● ● ● ●	Ord. Code ● ● ●
Flange DN 32 PN 40 Form C, DIN 2501/316L	B 1 0	
Flange DN 32 PN 40 Form C, DIN 2501/ECTFE ⁴⁾	B 1 1	
Flange DN 40 PN 6 Form C, DIN 2501/316L	B 1 2	
Flange DN 40 PN 6 Form C, DIN 2501/ECTFE ⁴⁾	B 1 3	
Flange DN 40 PN 40 Form C, DIN 2501/316L	B 1 4	
Flange DN 40 PN 40 Form C, DIN 2501/Alloy C22 (2.4602) plated	B 1 5	
Flange DN 40 PN 40 Form C, DIN 2501/ECTFE ⁴⁾	B 1 6	
Flange DN 40 PN 40 Form C, DIN 2501/PFA ⁴⁾	B 1 7	
Flange DN 40 PN 40 Form C, DIN 2501/Enamelled ³⁾	B 1 8	
Flange DN 40 PN 40 Form F, DIN 2501/316L	B 2 0	
Flange DN 40 PN 40 Form N, DIN 2501/316L	B 2 1	
Flange DN 40 PN 40 Form E, DIN 2501/316L	B 2 2	
Flange DN 40 PN 40 V13, DIN 2501/316L	B 2 3	
Flange DN 50 PN 40 Form C, DIN 2501/316L	B 2 4	
Flange DN 50 PN 40 Form C, DIN 2501/Alloy C22 (2.4602) plated	B 2 5	
Flange DN 50 PN 40 Form C, DIN 2501/ECTFE ⁴⁾	B 2 6	
Flange DN 50 PN 40 Form C, DIN 2501/ECTFE (ZB3108) ⁴⁾	B 2 7	
Flange DN 50 PN 40 Form C, DIN 2501/PFA ⁴⁾	B 2 8	
Flange DN 50 PN 40 Form D, DIN 2501/316L	B 3 0	
Flange DN 50 PN 40 Form D, DIN 2501/Alloy C22 (2.4602)	B 3 1	
Flange DN 50 PN 40 Form F, DIN 2501/316L	B 3 2	
Flange DN 50 PN 40 Form N, DIN 2501/316L	B 3 3	
Flange DN 50 PN 40 Form N, DIN 2501/Alloy C22 (2.4602) solid	B 3 4	
Flange DN 50 PN 40 Form E, DIN 2501/316L	B 3 5	
Flange DN 50 PN 40 V13, DIN 2501/316L	B 3 6	
Flange DN 50 PN 40 R13, DIN 2501/316L	B 3 7	
Flange DN 50 PN 64 Form F, DIN 2501/316L	B 3 8	
Flange DN 50 PN 64 Form C, DIN 2501/316L	B 4 1	
Flange DN 50 PN 64 Form L, DIN 2501/316L	B 4 2	
Flange DN 50 PN 100 Form E, DIN 2501/316L	B 4 3	
Flange DN 50 PN 100 Form L, DIN 2501/316L	B 4 4	
Flange DN 65 PN 40 Form C, DIN 2501/316L	B 4 5	
Flange DN 65 PN 40 Form C, DIN 2501/ECTFE ⁴⁾	B 4 7	
Flange DN 65 PN 40 Form C, DIN 2501/PFA ⁴⁾	B 4 8	
Flange DN 65 PN 40 Form F, DIN 2501/316L	B 5 0	
Flange DN 65 PN 64 Form E, DIN 2501/316L	B 5 1	
Flange DN 80 PN 40 Form C, DIN 2501/316L	B 5 2	
Flange DN 80 PN 40 Form C, DIN 2501/Alloy C22 (2.4602) plated	B 5 3	
Flange DN 80 PN 40 Form C, DIN 2501/ECTFE ⁴⁾	B 5 4	
Flange DN 80 PN 40 Form C, DIN 2501/PFA ⁴⁾	B 5 5	
Flange DN 80 PN 40 Form F, DIN 2501/316L	B 5 6	
Flange DN 80 PN 40 Form N, DIN 2501/316L	B 5 7	
Flange DN 100 PN 16 Form C, DIN 2501/316L	B 6 0	
Flange DN 100 PN 16 Form C, DIN 2501/Alloy C22 (2.4602) plated	B 6 1	
Flange DN 100 PN 16 Form C, DIN 2501/ECTFE ⁴⁾	B 6 2	
Flange DN 100 PN 16 Form C, DIN 2501/PFA ⁴⁾	B 6 3	
Flange DN 100 PN 16 Form D, DIN 2501/316L	B 6 4	
Flange DN 100 PN 16 Form F, DIN 2501/316L	B 6 5	
Flange DN 100 PN 16 Form N, DIN 2501/316L	B 6 6	
Flange DN 100 PN 40 Form C, DIN 2501/316L	B 6 7	
Flange DN 100 PN 40 Form C, DIN 2501/ECTFE ⁴⁾	B 6 8	
Flange DN 100 PN 40 Form C, DIN 2501/PFA ⁴⁾	B 7 0	
Flange DN 100 PN 40 Form C, DIN 2501/Enamelled ³⁾	B 7 1	
Flange DN 100 PN 40 Form F, DIN 2501/316L	B 7 2	

Selection and ordering data (continued)

	Article No.	Ord. Code
SITRANS LVL200 Vibrating point level switch, rigid extension design Detects level and material in liquids and slurries. Top mount, with extension options to 6 m (19.69 ft). Ideal for hazardous applications.	7ML5747- ● ● ● ● ● - ● ● ● ● ●	● ● ●
Flange DN 100 PN 40 Form N, DIN 2501/316L	B 7 3	
Flange DN 100 PN 40 V13, DIN 2501/316L	B 7 4	
Flange DN 100 PN 64 Form E, DIN 2501/316L	B 7 5	
Flange DN 100 PN 100 Form E, DIN 2501/316L	B 7 6	
Flange DN 100 PN 100 Form L, DIN 2501/316L	B 7 7	
Flange DN 125 PN 16 Form F, DIN 2501/316L	B 7 8	
Flange DN 125 PN 40 Form C, DIN 2501/316L	B 8 0	
Flange DN 125 PN 40 Form N, DIN 2512/316L	B 8 1	
Flange DN 150 PN 16 Form C, DIN 2501/316L	B 8 2	
Flange DN 150 PN 16 Form C, DIN 2501/Alloy C22 (2.4602) plated	B 8 3	
Flange DN 150 PN 16 Form C, DIN 2501/ECTFE ⁴⁾	B 8 4	
Flange DN 150 PN 16 Form C, DIN 2501/PFA ⁴⁾	B 8 5	
Flange DN 150 PN 16 Form D, DIN 2501/316L	B 8 6	
Flange DN 150 PN 40 Form C, DIN 2501/316L	B 8 7	
Flange DN 150 PN 40 Form C, DIN 2501/Alloy C22 (2.4602) plated	B 8 8	
Flange DN 150 PN 40 Form F, DIN 2501/316L	C 0 0	
Flange DN 150 PN 40 Form N, DIN 2512/316L	C 0 1	
Flange DN 200 PN 10 Form C, DIN 2501/ECTFE ⁴⁾	C 0 2	
Flange DN 200 PN 16 Form C, DIN 2501/316L	C 0 3	
Flange DN 25 PN 40 Form B1, EN 1092-1/316L	C 0 4	
Flange DN 25 PN 40 Form B1, EN 1092-1/Alloy C22 (2.4602) plated	C 0 5	
Flange DN 25 PN 40 Form B1, EN/316L/PFA ⁴⁾	C 0 6	
Flange DN 25 PN 40 Form B1, EN 1092-1/Enamelled ³⁾	C 0 7	
Flange DN 25 PN 40 Form B2, EN 1092-1/316L	C 0 8	
Flange DN 25 PN 40 Form F, EN 1092-1/316L	C 1 0	
Flange DN 25 PN 63 Form B1, EN 1092-1/316L	C 1 1	
Flange DN 25 PN 100 Form B2, EN 1092-1/316L	C 1 2	
Flange DN 40 PN 40 Form B1, EN/316L	C 1 3	
Flange DN 40 PN 40 Form B1, EN 1092-1/PFA ⁴⁾	C 1 4	
Flange DN 40 PN 40 Form B2, EN/316L	C 1 5	
Flange DN 50 PN 40 Form B1, EN/316L	C 1 6	
Flange DN 50 PN 40 Form B1, EN 1092-1/Alloy C22 (2.4602) plated	C 1 7	
Flange DN 50 PN 40 Form B1, EN 1092-1/Alloy 400 (2.4360) ZB2977	C 1 8	
Flange DN 50 PN 40 Form B1, EN 1092-1/ECTFE ⁴⁾	C 2 0	
Flange DN 50 PN 40 Form B1, EN/316L/PFA ⁴⁾	C 2 1	
Flange DN 50 PN 40 Form B1, EN 1092-1/Enamelled ³⁾	C 2 2	
Flange DN 50 PN 40 Form C, EN 1092-1/316L	C 2 3	
Flange DN 50 PN 40 Form D, EN/316L	C 2 4	
Flange DN 50 PN 40 Form B2, EN 1092-1/316L	C 2 6	
Flange DN 50 PN 40 Form E, EN 1092-1/316L	C 2 7	
Flange DN 80 PN 40 Form B1, EN 1092-1/316L	C 2 8	
Flange DN 80 PN 40 Form B1, EN 1092-1/Alloy C22 (2.4602) plated	C 3 0	
Flange DN 80 PN 40 Form B1, EN 1092-1/ECTFE ⁴⁾	C 3 1	
Flange DN 80 PN 40 Form B1, EN 1092-1/Enamelled ³⁾	C 3 2	
Flange DN 80 PN 40 Form B2, EN 1092-1/316L	C 3 3	
Flange DN 100 PN 16 Form B1, EN 1092-1/316L	C 3 4	
Flange DN 100 PN 16 Form B1, EN 1092-1/Alloy C22 (2.4602) plated	C 3 5	
Flange DN 100 PN 16 Form B1, EN 1092-1/Enamelled ³⁾	C 3 6	
Flange DN 100 PN 40 Form B1, EN 1092-1/316L	C 3 7	
Flange DN 100 PN 40 Form B1, EN 1092-1/Enamelled ³⁾	C 3 8	
Flange DN 100 PN 40 Form C, EN 1092-1/316L	C 4 0	
Flange DN 100 PN 63 Form B2, EN 1092-1/316L	C 4 1	
Flange DN 150 PN 16 Form B1, EN 1092-1/316L	C 4 2	
Flange DN 150 PN 16 Form B1, EN 1092-1/PFA ⁴⁾	C 4 3	

Level Measurement

Point level measurement

Vibrating switches / SITRANS LVL200

Selection and ordering data (continued)

SITRANS LVL200 Vibrating point level switch, rigid extension design Detects level and material in liquids and slurries. Top mount, with extension options to 6 m (19.69 ft). Ideal for hazardous applications.	Article No. 7ML5747- ● ● ● ● ● - ● ● ● ●	Ord. Code ● ● ●
Flange DN 150 PN 40 Form B1, EN 1092-1/316L	C 4 4	
Flange DN 150 PN 40 Form B1, EN 1092-1/ECTFE ⁴⁾	C 4 5	
Flange DN 150 PN 40 Form B2, EN 1092-1/316L	C 4 6	
Flange 1" 150 lb ASME B16.5/316L	C 4 7	
Flange 1" 150 lb RF, ASME B16.5/Alloy C22 (2.4602) plated	C 4 8	
Flange 1" 150 lb RF, ASME B16.5/Alloy 400 (2.4360) ZB2977	C 5 0	
Flange 1" 150 lb RF, ASME B16.5/ECTFE ⁴⁾	C 5 1	
Flange 1" 150 lb RF, ASME B16.5/PFA ⁴⁾	C 5 2	
Flange 1" 150 lb RF, ASME B16.5/Enamelled ³⁾	C 5 3	
Flange 1" 300 lb RF, ASME B16.5/316L	C 5 4	
Flange 1" 300 lb RF, ASME B16.5/ECTFE ⁴⁾	C 5 5	
Flange 1" 600 lb RF, ASME B16.5/316L	C 5 6	
Flange 1½" 150 lb RF, ASME B16.5/316L	C 5 7	
Flange 1½" 150 lb RF, ASME B16.5/Alloy C22 (2.4602) plated	C 5 8	
Flange 1½" 150 lb RF, ASME B16.5/ECTFE ⁴⁾	C 6 0	
Flange 1½" 150 lb RF, ASME B16.5/PFA ⁴⁾	C 6 1	
Flange 1½" 150 lb RF, ASME B16.5 Enamelled ³⁾	C 6 2	
Flange 1½" 150 lb FF, ASME B16.5/ECTFE ⁴⁾	C 6 3	
Flange 1½" 300 lb RF, ASME B16.5/316L	C 6 4	
Flange 1½" 300 lb RF, ASME B16.5/Alloy 400 (2.4360) ZB2977	C 6 5	
Flange 1½" 300 lb RF, ASME B16.5/ECTFE ⁴⁾	C 6 6	
Flange 1½" 600 lb RF, ASME B16.5/316L	C 6 7	
Flange 2" 150 lb RF, ASME B16.5/316L	C 6 8	
Flange 2" 150 lb RF, ASME B16.5/Alloy C22 (2.4602) plated	C 7 0	
Flange 2" 150 lb RF, ASME B16.5/Alloy 400 (2.4360) ZB2977	C 7 1	
Flange 2" 150 lb RF, ASME B16.5/ECTFE ⁴⁾	C 7 2	
Flange 2" 150 lb RF, ASME B16.5/PFA ⁴⁾	C 7 3	
Flange 2" 150 lb RF, ASME B16.5/Enamelled ³⁾	C 7 4	
Flange 2" 150 lb FF, ASME B16.5/316L	C 7 5	
Flange 2" 150 lb FF, ASME B16.5/ECTFE ⁴⁾	C 7 6	
Flange 2" 150 lb SG (small groove), ASME B16.5/316L	C 7 7	
Flange 2" 300 lb RF, ASME B16.5/316L	C 7 8	
Flange 2" 300 lb RF, ASME B16.5/Alloy C22 (2.4602) plated	C 8 0	
Flange 2" 300 lb RF, ASME B16.5/ECTFE ⁴⁾	C 8 2	
Flange 2" 300 lb RF, ASME B16.5/PFA ⁴⁾	C 8 3	
Flange 2" 300 lb RJF, ASME B16.5/316L	C 8 5	
Flange 2" 300 lb ST, ASME B16.5/316L	C 8 6	
Flange 2" 300 lb LG (large groove), ASME B16.5/316L	C 8 7	
Flange 2" 300 lb LT, ASME B16.5/316L	C 8 8	
Flange 2" 600 lb RF, ASME B16.5/316L	D 0 0	
Flange 2" 600 lb RF, ASME B16.5/Alloy 400 (2.4360) ZB2977	D 0 1	
Flange 2" 600 lb RF, ASME B16.5/ECTFE ⁴⁾	D 0 2	
Flange 2" 600 lb RJF, ASME B16.5/316L	D 0 3	
Flange 2" 600 lb LG, ASME B16.5/316L	D 0 4	
Flange 2" 900 lb RJF, ASME B16.5/316L	D 0 5	
Flange 2½" 150 lb RF, ASME B16.5/316L	D 0 6	
Flange 2½" 300 lb RF, ASME B16.5/316L	D 0 7	
Flange 3" 150 lb RF, ASME B16.5/316L	D 0 8	
Flange 3" 150 lb RF, ASME B16.5/Alloy C22 (2.4602) plated	D 1 0	
Flange 3" 150 lb RF, ASME B16.5/Alloy 400 (2.4360) ZB2977	D 1 1	
Flange 3" 150 lb RF, ASME B16.5/ECTFE ⁴⁾	D 1 2	
Flange 3" 150 lb RF, ASME B16.5/PFA ⁴⁾	D 1 3	
Flange 3" 150 lb RF, ASME B16.5/Enamelled ³⁾	D 1 4	
Flange 3" 150 lb FF, ASME B16.5/316L	D 1 5	

Selection and ordering data (continued)

	Article No.	Ord. Code
SITRANS LVL200 Vibrating point level switch, rigid extension design Detects level and material in liquids and slurries. Top mount, with extension options to 6 m (19.69 ft). Ideal for hazardous applications.	7ML5747- ● ● ● ● ● - ● ● ● ● ●	● ● ●
Flange 3" 150 lb FF, ASME B16.5/ECTFE ⁴⁾	D 1 6	
Flange 3" 150 lb FF, ASME B16.5/PFA ⁴⁾	D 1 7	
Flange 3" 300 lb RF, ASME B16.5/316L	D 1 8	
Flange 3" 300 lb RF, ASME B16.5/Alloy C22 (2.4602) plated	D 2 0	
Flange 3" 300 lb RF, ASME B16.5/ECTFE ⁴⁾	D 2 1	
Flange 3" 300 lb RF, ASME B16.5/PFA ⁴⁾	D 2 2	
Flange 3" 300 lb RF, ASME B16.5/Enamelled ³⁾	D 2 3	
Flange 3" 600 lb RF, ASME B16.5/316L	D 2 4	
Flange 3½" 150 lb RF, ASME B16.5/316L	D 2 5	
Flange 3½" 150 lb RF, ASME B16.5/ECTFE ⁴⁾	D 2 6	
Flange 4" 150 lb RF, ASME B16.5/316L	D 2 7	
Flange 4" 150 lb RF, ASME B16.5/Alloy C22 (2.4602) plated	D 2 8	
Flange 4" 150 lb RF, ASME B16.5/ECTFE ⁴⁾	D 3 0	
Flange 4" 150 lb RF, ASME B16.5/PFA ⁴⁾	D 3 1	
Flange 4" 150 lb RF, ASME B16.5/Enamelled ³⁾	D 3 2	
Flange 4" 150 lb LT, ASME B16.5/316L	D 3 3	
Flange 4" 300 lb RF, ASME B16.5/316L	D 3 4	
Flange 4" 300 lb RF, ASME B16.5/Alloy C22 (2.4602) plated	D 3 5	
Flange 4" 300 lb RF, ASME B16.5/ECTFE ⁴⁾	D 3 6	
Flange 4" 300 lb RJF, ASME B16.5/316L	D 3 7	
Flange 4" 300 lb LG, ASME B16.5/316L	D 3 8	
Flange 4" 300 lb LT, ASME B16.5/316L	D 4 0	
Flange 4" 600 lb RF, ASME B16.5/316L	D 4 1	
Flange 4" 600 lb RJF, ASME B16.5/316L	D 4 2	
Flange 5" 150 lb RF, ASME B16.5/316L	D 4 3	
Flange 6" 150 lb RF, ASME B16.5/316L	D 4 4	
Flange 6" 150 lb RF, ASME B16.5/Alloy C22 (2.4602) plated	D 4 5	
Flange 6" 150 lb RF, ASME B16.5/ECTFE ⁴⁾	D 4 6	
Flange 6" 150 lb RF, ASME B16.5/PFA ⁴⁾	D 4 7	
Flange 6" 150 lb RJF, ASME B16.5/316L	D 4 8	
Flange 6" 300 lb RF, ASME B16.5/316L	D 5 0	
Flange 8" 150 lb RF, ASME B16.5/316L	D 5 1	
Flange 8" 150 lb RF, ASME B16.5/ECTFE ⁴⁾	D 5 2	
Flange 1" BS.10 Table E/316L	D 5 3	
Flange 1" BS.10 Table E/PFA ⁴⁾	D 5 4	
Flange 1½" BS.10 Table E/316L	D 5 5	
Flange 3½" BS.10 Table E/316L	D 5 6	
Flange 4" BS.10 Table E/ECTFE ⁴⁾	D 5 7	
Flange DN 40 10K, JIS/316L	D 5 8	
Flange DN 50 10K, JIS/316L	D 6 0	
Flange DN 80 10K, JIS/316L	D 6 1	
Flange DN 100 10K, JIS/316L	D 6 2	
Thread R1 PN 64, EN10226-1/316L ¹¹⁾	D 6 5	
Flange 2" 900 lb RF, ASME B16.5/316L	D 7 0	
Flange 4" 150 lb RF, ASME B16.5/Alloy C22 (2.4602) solid	D 7 1	
Flange NPS 2" Class 1500 RJF, ASME B16.5 / 316/316L ²⁶⁾	D 7 2	
Adapter/Process temperature		
Without adapter/-50 ... +150 °C		1
With adapter/-50 ... +200 °C ¹³⁾		2
With adapter/-50 ... +250 °C		3
With gas-tight leadthrough/-50 ... +150 °C		4
With gas-tight leadthrough/-50 ... +250 °C		5
Housing/Cable entry		
Aluminum IP66/IP67/IM20 x 1.5		A
Aluminum IP66/IP67/½" NPT		B

Level Measurement

Point level measurement

Vibrating switches / SITRANS LVL200

Selection and ordering data (continued)

	Article No.	Ord. Code
SITRANS LVL200 Vibrating point level switch, rigid extension design Detects level and material in liquids and slurries. Top mount, with extension options to 6 m (19.69 ft). Ideal for hazardous applications.	7ML5747- ● ● ● ● ● - ● ● ● ● ●	● ● ● ●
316L stainless steel (electropolished) IP66/IP67/M20 x 1.5		C
316L stainless steel (electropolished) IP66/IP67/1/2" NPT		D
Plastic single chamber IP66/IP67/M20 x 1.5		E
Plastic single chamber IP66/IP67/1/2" NPT		F
Stainless steel chamber (precision casting) IP66/IP67/M20 x 1.5		G
Stainless steel chamber (precision casting) IP66/IP67/1/2" NPT		H
Aluminum IP66/IP67/M20 x 1.5 Special HARTING plug HAN 7D (bent) according to Tier One (ZB7555)		V
NOTE: When selecting a Rigid Extension option, extension coating must match the process connection coating and the material and surface roughness type.		
Rigid Extension 316L		
80 ... 500 mm		A 0
501 ... 1 000 mm		A 1
1 001 ... 1 500 mm		A 2
1 501 ... 2 000 mm		A 3
2 001 ... 2 500 mm		A 4
2 501 ... 3 000 mm		A 5
3 001 ... 3 500 mm		A 6
3 501 ... 4 000 mm		A 7
Rigid Extension ECTFE coated		
80 ... 500 mm		B 0
501 ... 1 000 mm		B 1
1 001 ... 1 500 mm		B 2
1 501 ... 2 000 mm		B 3
2 001 ... 2 500 mm		B 4
2 501 ... 3 000 mm		B 5
Rigid Extension PFA coated		
80 ... 500 mm		C 0
501 ... 1 000 mm		C 1
1 001 ... 1 500 mm		C 2
1 501 ... 2 000 mm		C 3
2 001 ... 2 500 mm		C 4
2 501 ... 3 000 mm		C 5
3 001 ... 3 500 mm		C 6
3 501 ... 4 000 mm		C 7
Rigid Extension 316L Ra ≤ 0.8 µm		
80 ... 500 mm		D 0
501 ... 1 000 mm		D 1
1 001 ... 1 500 mm		D 2
1 501 ... 2 000 mm		D 3
2 001 ... 2 500 mm		D 4
2 501 ... 3 000 mm		D 5
3 001 ... 3 500 mm		D 6
3 501 ... 4 000 mm		D 7
Rigid Extension 316L Ra ≤ 0.3 µm		
80 ... 500 mm		E 0
501 ... 1 000 mm		E 1
1 001 ... 1 500 mm		E 2
1 501 ... 2 000 mm		E 3
2 001 ... 2 500 mm		E 4
2 501 ... 3 000 mm		E 5
3 001 ... 3 500 mm		E 6
3 501 ... 4 000 mm		E 7
Rigid Extension Enamelled version		
80 ... 250 mm		F 0
251 ... 500 mm		F 1

Selection and ordering data (continued)

	Article No.	Ord. Code
SITRANS LVL200 Vibrating point level switch, rigid extension design Detects level and material in liquids and slurries. Top mount, with extension options to 6 m (19.69 ft). Ideal for hazardous applications.	7ML5747- ● ● ● ● ● - ● ● ● ● ●	● ● ●
501 ... 750 mm		F 2
751 ... 1 000 mm		F 3
1 001 ... 1 250 mm		F 4
1 251 ... 1 500 mm		F 5
Rigid Extension Alloy C22 (2.4602)		
80 ... 500 mm		G 0
501 ... 1 000 mm		G 1
1 001 ... 1 500 mm		G 2
1 501 ... 2 000 mm		G 3
2 001 ... 2 500 mm		G 4
2 501 ... 3 000 mm		G 5
3 001 ... 3 500 mm		G 6
3 501 ... 4 000 mm		G 7
Rigid Extension Alloy 400 (2.4360)		
80 ... 500 mm		H 0
501 ... 1 000 mm		H 1
1 001 ... 1 500 mm		H 2
1 501 ... 2 000 mm		H 3
2 001 ... 2 500 mm		H 4
2 501 ... 3 000 mm		H 5

Selection and Ordering data	Order code
Further designs	
Please add "-Z" to Article No. and specify Order code(s).	
Switching status indication with colors red-green ¹²⁾	A21
Cleaning including Certificate (oil, grease, and silicone free)	W01
Enter the total insertion length in plain text description, max. 4 000 mm (157.48 inch)	Y01
Identification label (measurement loop) stainless steel: max. 40 characters, add in plain text. To add more than one line, use a coma "," for line break.	Y17
Identification label (measurement loop) foil: max. 40 characters add in plain text. To add more than one line, use a coma "," for line break.	Y18
NACE0175 to 3.1 Material Certificate for material (EN 10204 NACE MR 01 75) ⁸⁾ Note: not available with Process connection and Rigid extension coatings PFA, ECTFE, and Enamel. NACE not available with Hygienic process connections.	D07
Material Inspection certificate 3.1 of EN 10204	C05
2.2-Factory certificate for material (EN 10204) ⁸⁾	C15
Functional Safety (SIL 2). Device suitable for use in accordance with IEC 61508 and IEC 61511 ⁸⁾	C20
Dye penetration test, results confirmed via a 3.1 certificate/instrument (EN 10204) ⁸⁾	C13
X-ray test + 3.1 certificate/instrument ⁸⁾	C14
Positive material identification test + 3.1 certificate/instrument ⁸⁾	C16
Roughness test + 3.1 certificate/instrument ⁸⁾	C18
3.1-Inspection Certificate for instrument with test data (EN 10204)	C25
Quality and test plan	C26
Inspection certificate 3.1 (EN 10204) - device and pressure test ⁸⁾	C31

Level Measurement

Point level measurement

Vibrating switches / SITRANS LVL200

Selection and ordering data (continued)

Selection and Ordering data	Order code
Helium leak test + 3.1 certificate/instrument ⁸⁾	C32
Ferrite measuring accuracy to DIN 32514-1 + 3.1 certificate/instrument ⁸⁾	C60
Pressure test according to Norsok + 3.1 certificate/instrument ⁸⁾	C61
Factory declaration 2.1 (EN 10204) - certificate suitable for tropical regions with all attachment parts of metal	C65
Operating Instructions	
All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation	

Spare Parts and Accessories	Article No.
Electronics module SITRANS LVL200 Relay	7ML1830-1NC
Electronics module SITRANS LVL200 Contactless	7ML1930-6AA
NAMUR spare electronics module	A5E35817107
SITRANS SCSC single channel signal conditioner and remote test	7ML5760
SITRANS TCSC two channel signal conditioner and remote test	7ML5761
Lock fitting, unpressurized, G1" A/316L	7ML1930-1DQ
Lock fitting, unpressurized, 1" NPT/316L	7ML1930-1DR
Lock fitting, unpressurized, G1 ... 1/2" A/316L	7ML1930-1DS
Lock fitting, unpressurized, 1 ... 1/2" NPT/316L	7ML1930-1DT
Lock fitting, -1 ... 16 bar, G1" A/316L	7ML1930-1DU
Lock fitting, -1 ... 16 bar, 1" NPT/316L	7ML1930-1DV
Lock fitting, -1 ... 16 bar, G1 1/2" A/316L	7ML1930-1DW
Lock fitting, -1 ... 16 bar, 1 1/2" NPT/316L	7ML1930-1DX
Lock fitting, -1 ... 64 bar, G1" A/316L	7ML1930-1EA
Lock fitting, -1 ... 64 bar, 1" NPT/316L	7ML1930-1EB
Lock fitting, -1 ... 64 bar, G1 1/2" A/316L	7ML1930-1EC
Lock fitting, -1 ... 64 bar, 1 1/2" NPT/316L	7ML1930-1ED

- 1) Available only with Adapter/Process temperature options 1, 3, 4, and 5.
- 2) Available only with Housing/Cable entry option B.
- 3) Available only with Adapter/Process temperature options 1, 2, and 4.
- 4) Not available with Adapter/Process temperature options 2, 3, and 5.
- 5) Not available with Adapter/Process temperature options 2, 4, and 5.
- 6) Available only with Electronics options 4 and 6.
- 7) Available only with rigid extension options less than 3 001 mm.
- 8) Listed Certificates are not available with all configurations please contact factory for more information.
- 9) Not available with Housing/Protection/Cable option V.
- 10) Not available with PFA, ECTFE, and enamelled coating options.
- 11) Available only with some 316L extensions.
- 12) Available only with relay electronic options and non-hazardous Approval options.
- 13) Available only with Enamelled Process connection/Material options.
- 14) Not available with Approval options C, E, G, H, L, N, V, and W.
- 15) Not available with Approval options C, E, G, H, N, and V.
- 16) Only available with Aluminum Housing/Protection/Cable options and certain glands.
- 17) Not available with Stainless Steel Electropolish Housing/Protection/Cable options and certain glands.
- 18) Not available with Plastic or Stainless Steel Electropolish Housing/Protection/Cable options and certain glands.
- 19) Not available with Housing/Protection/Cable options D and V.
- 20) Not available with Housing/Protection/Cable options A, E, G, and V.
- 21) Not available with some Housing/Protection/Cable gland options.
- 22) Not available with Housing/Protection/Cable options A, C, and V.
- 23) Not available with Plastic Housing/Protection/Cable options.
- 24) Available only with Electronic option 4.
- 25) Not available with FM approval options.
- 26) Available only with Rigid extension options A0 ... A7.

Selection and ordering data (continued)

	Article No.	Ord. Code
SITRANS LVL200 Vibrating point level switch, high temperature and pressure design Detects level and material in liquids and slurries in extreme environments. Extension options to 3 m (9.84 ft).	7ML5748- ● ● ● ● ● - ● ● ● ● ●	● ● ●
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Version/Material		
Compact version/Inconel 718 (2.4668) ¹⁾²⁾	1	
With tube extension/316L and Inconel 718 (2.4668) ¹⁾³⁾	2	
With tube extension/Alloy C22 (2.4602) and Inconel 718 (2.4668) ⁴⁾	3	
Approvals		
Europe CE	A	
Ship approval	B	
Overfill protection WHG ⁷⁾	C	
ATEX II ½G, 2G Ex d IIC T6 ⁶⁾⁹⁾	D	
ATEX II 1G, ½G, 2G Ex ia IIC T6 ⁵⁾⁹⁾	F	
ATEX II 1G, ½G, 2G Ex ia IIC T6 + ship approval ⁵⁾⁹⁾¹⁰⁾	G	
ATEX II 1G, ½G, 2G Ex ia IIC T6 + Overfill protection (WHG) ⁶⁾⁷⁾⁹⁾	H	
ATEX II ½G, 2G Ex d IIC T6 + Overfill protection (WHG) ⁶⁾⁷⁾⁹⁾	J	
FM (NI) Class I, Div. 2, Groups A, B, C, D T6 ... T1 ⁹⁾¹¹⁾	N	
FM (NI) Class I, Div. 2, Groups A, B, C, D T6 ... T1 + Ship approval ⁶⁾⁹⁾	P	
FM (IS) Class I, Div. 1, Groups A, B, C, D Zone 0, 0/1, 1, AEx ia IIC T6 ... T1 Ga, Ga/Gb, Gb ⁹⁾¹²⁾	Q	
FM (XP) Class I, Div. 1, Groups A, B, C, D T6 ... T1, Zone 0/1, 1, AEx d IIC T6 ... T1 Ga/Gb, Gb ⁶⁾⁹⁾	R	
FM (XP) Class I, Div. 1, Groups A, B, C, D T6 ... T1, Zone 0/1, 1, AEx d IIC T6 ... T1 Ga/Gb, Gb + Ship approval ⁶⁾⁹⁾	S	
IEC Ex d IIC T6 ⁶⁾⁹⁾	E	
IEC Ex ia IIC T6 + Ship approval ⁵⁾⁹⁾¹⁰⁾	U	
IEC Ex ia IIC T6 ⁵⁾⁹⁾	T	
cCSA _{US} (NI) Class I, Div. 2, Groups A, B, C, D, (DIP) Class II, III, Div. 1, Groups E, F, G ⁶⁾⁹⁾	V	
cCSA _{US} (NI) Class I, Div. 2, Groups A, B, C, D, (DIP) Class II, III, Div. 1, Groups E, F, G + Ship approval ⁶⁾⁹⁾	W	
cCSA _{US} (IS) Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G ⁵⁾⁹⁾¹²⁾	X	
cCSA _{US} (IS) Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G + Ship approval ⁵⁾⁹⁾¹³⁾	Y	
cCSA _{US} (XP) Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G ⁶⁾⁹⁾	K	
cCSA _{US} (XP) Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G + Ship approval ⁶⁾⁹⁾	L	
GOST-R/EAC Ga/Gb Ex ia IIC T6 ... T1 X, 0Ex ia IIC T6 ... T1 Ga, 1Ex ia IIC T6 ... T1 Gb X ⁵⁾⁹⁾	Z	J 1 A
GOST-R/EAC 1Ex db IIC T6 ... T1 Gb, Ga/Gb Ex db IIC T6 ... T1 ⁶⁾⁹⁾	Z	J 1 B
Process connection		
Thread G1 PN 100, DIN 3852-A/316L	A	0
Thread G1 PN 160, DIN 3852-A/Inconel 718 (2.4668)	A	1
Thread 1" NPT PN 100, ASME B1.20.1/316L	A	2
Thread 1" NPT PN 160, ASME B1.20.1/ Inconel 718 (2.4668)	A	3
Flange DN 50 PN 40 Form C, DIN 2501/316/316	A	4
Flange DN 50 PN 40 Form C, DIN 2501/316/316L, with Alloy C22 (2.4602) coating	A	5
Flange DN 50 PN 40 Form N, DIN 2501/316/316L	A	6
Flange DN 50 PN 40 Form V13, DIN 2501/316/316L	A	7
Flange DN 50 PN 40 Form V13, DIN 2501/Alloy C22 (2.4602) solid	A	8
Flange DN 50 PN 40 Form V13, DIN 2501/316/316L, with Alloy C22 (2.4602) coating	B	0
Flange DN 50 PN 64 Form E, DIN 2501/316/316L	B	1
Flange DN 50 PN 100 Form C, DIN 2501/316/316L	B	2
Flange DN 50 PN 100 Form F, DIN 2501/316/316L	B	3
Flange DN 50 PN 100 Form V13, DIN 2501/316/316L	B	4
Flange DN 50 PN 160 Form C, DIN 2501/316/316L	B	5
Flange DN 50 PN 160 Form F, DIN 2501/316/316L	B	6
Flange DN 65 PN 16 Form C, DIN 2501/316/316L	B	7
Flange DN 65 PN 40 Form C, DIN 2501/316/316L	B	8
Flange DN 65 PN 100 Form C, DIN 2501/316/316L	C	0
Flange DN 80 PN 40 Form C, DIN 2501/316/316L	C	1

Level Measurement

Point level measurement

Vibrating switches / SITRANS LVL200

Selection and ordering data (continued)

	Article No.	Ord. Code
SITRANS LVL200 Vibrating point level switch, high temperature and pressure design Detects level and material in liquids and slurries in extreme environments. Extension options to 3 m (9.84 ft).	7ML5748-●●●●●-●●●●●	●●●●●
Flange DN 80 PN 100 Form C, DIN 2501/316/316L		C 2
Flange DN 80 PN 160 Form F, DIN 2501/316/316L		C 3
Flange DN 80 PN 160 Form L, DIN 2501/316/316L		C 4
Flange DN 80 PN 250 Form L, DIN 2501/316/316L		C 5
Flange DN 80 PN 250 Form L, DIN 2501/Alloy C22 (2.4602) solid		C 6
Flange DN 100 PN 16 Form C, DIN 2501/316/316L		C 7
Flange DN 100 PN 40 Form C, DIN 2501/316/316L		C 8
Flange DN 100 PN 100 Form E, DIN 2501/316/316L		D 0
Flange DN 100 PN 160 Form L, DIN 2501/316/316L		D 1
Flange DN 125 PN 16 Form C, DIN 2501/316/316L		D 2
Flange DN 125 PN 40 Form C, DIN 2501/316/316L		D 3
Flange DN 150 PN 16 Form C, DIN 2501/316/316L		D 4
Flange DN 150 PN 16 Form C, DIN 2501/316/316L, with Alloy C22 (2.4602) coating		D 5
Flange DN 150 PN 40 Form C, DIN 2501/316/316L		D 6
Flange DN 150 PN 160 Form L, DIN 2501/316/316L		D 7
Flange DN 200 PN 16 Form C, DIN 2501/316/316L		D 8
Flange DN 200 PN 64 Form C, DIN 2501/316/316L		E 0
Flange DN 250 PN 16 Form C, DIN 2501/316/316L		E 1
Flange DN 250 PN 64 Form C, DIN 2501/316/316L		E 2
Flange DN 50 PN 40 Form B1, EN 1092-1/1.4435		E 3
Flange DN 50 PN 40 Form B1, EN 1092-1/316/316L		E 4
Flange DN 50 PN 40 Form B1, EN 1092-1/316/316L, with Alloy C22 (2.4602) coating		E 5
Flange DN 50 PN 40 Form B2, EN 1092-1/316/316L		E 6
Flange DN 50 PN 40 Form C, EN 1092-1/316/316L		E 7
Flange DN 50 PN 40 Form D, EN 1092-1/316/316L		E 8
Flange DN 50 PN 40 Form E, EN 1092-1/316/316L		F 0
Flange DN 50 PN 63 Form B2, EN 1092-1/316/316L		F 1
Flange DN 50 PN 63 Form B2, EN 1092-1/316/316L, with Alloy C22 (2.4602) coating		F 2
Flange DN 50 PN 63 Form C, EN 1092-1/316/316L		F 3
Flange DN 50 PN 63 Form D, EN 1092-1/316/316L		F 4
Flange DN 50 PN 100 Form B1, EN 1092-01/316/316L		F 5
Flange DN 50 PN 100 Form C, EN 1092-1/316/316L		F 6
Flange DN 50 PN 160 Form B1, EN 1092-1/316/316L		F 7
Flange DN 50 PN 160 Form B2, EN 1092-1/316/316L		F 8
Flange DN 50 PN 250 Form B1, EN 1092-1/316/316L		G 0
Flange DN 50 PN 250 Form B2, EN 1092-1/316/316L		G 1
Flange DN 65 PN 40 Form B1, EN 1092-1/316/316L		G 2
Flange DN 65 PN 63 Form C, EN 1092-1/316/316L		G 3
Flange DN 80 PN 40 Form B1, EN 1092-1/316/316L		G 4
Flange DN 80 PN 40 Form B2, EN 1092-1/316/316L		G 5
Flange DN 80 PN 40 Form C, EN 1092-1/316/316L		G 6
Flange DN 80 PN 40 Form D, EN 1092-1/316/316L		G 7
Flange DN 80 PN 63 Form B2, EN 1092-1/316/316L		G 8
Flange DN 80 PN 160 Form B2, EN 1092-1/316/316L		H 0
Flange DN 80 PN 250 Form B1, EN 1092-1/316/316L		H 1
Flange DN 100 PN 16 Form D, EN 1092-1/316/316L		H 2
Flange DN 100 PN 40 Form B1, EN 1092-1/316/316L		H 3
Flange DN 100 PN 40 Form B2, EN 1092-1/316/316L		H 4
Flange DN 100 PN 40 Form C, EN 1092-1/316/316L		H 5
Flange DN 100 PN 40 Form D, EN 1092-1/316/316L		H 6
Flange DN 100 PN 160 Form B2, EN 1092-1/316/316L		H 7
Flange DN 125 PN 63 Form C, EN 1092-1/316/316L		H 8
Flange DN 125 PN 160 Form B2, EN 1092-1/316/316L		K 0
Flange DN 150 PN 40 Form B1, EN 1092-1/316/316L		K 1
Flange DN 150 PN 40 Form C, EN 1092-1/316/316L		K 2
Flange DN 150 PN 40 Form D, EN 1092-1/316/316L		K 3
Flange DN 40 PN 100, GOST 12815-80.7/316/316L		K 4

Selection and ordering data (continued)

SITRANS LVL200 Vibrating point level switch, high temperature and pressure design Detects level and material in liquids and slurries in extreme environments. Extension options to 3 m (9.84 ft).	Article No. 7ML5748-●●●●●-●●●●●	Ord. Code ●●●●●
Flange DN 50 PN 100, GOST 12815-80.7/316/316L		K 5
Flange DN 80 PN 100, GOST 12815-80.7/316/316L		K 6
Flange DN 100 PN 100, GOST 12815-80.7/316/316L		K 7
Flange 1½" 150 lb RJF, ASME B16.5/316/316L		K 8
Flange 1½" 300 lb RJF, ASME B16.5/316/316L		L 1
Flange 1½" 1 500 lb RJF, ASME B16.5/316/316L		L 2
Flange 2" 150 lb RF, ASME B16.5/316/316L		L 3
Flange 2" 150 lb RF, ASME B16.5/Alloy C22 (2.4602) solid		L 4
Flange 2" 300 lb RF, ASME B16.5/316/316L		L 5
Flange 2" 300 lb RF, ASME B16.5/Alloy C22 (2.4602) solid		L 6
Flange 2" 300 lb RF, ASME B16.5/316/316L, with Alloy C22 (2.4602) coating		L 7
Flange 2" 300 lb ST (small tongue), ASME B16.5/316/316L		L 8
Flange 2" 300 lb RJF, ASME B16.5/316/316L		M 1
Flange 2" 300 lb LM (large male), ASME B16.5/316/316L		M 2
Flange 2" 300 lb SG, ASME B16.5/316/316L		M 3
Flange 2" 300 lb LG, ASME B16.5/316/316L		M 4
Flange 2" 600 lb RF, ASME B16.5/316/316L		M 5
Flange 2" 600 lb RF, ASME B16.5/316/316L, with Alloy C22 (2.4602) coating		M 6
Flange 2" 600 lb RJF, ASME B16.5/316/316L		M 7
Flange 2" 900 lb RF, ASME B16.5/316/316L		M 8
Flange 2" 900 lb RJF, ASME B16.5/316/316L		N 1
Flange 2" 1 500 lb RF, ASME B16.5/316/316L		N 2
Flange 2" 1 500 lb RJF, ASME B16.5/316/316L		N 3
Flange 2" 1 500 lb LT, ASME B16.5/Alloy C22 (2.4602) solid		N 4
Flange 2" 1 500 lb LM, ASME B16.5/316/316L		N 5
Flange 2" 2 500 lb RJF, ASME B16.5/316/316L		N 6
Flange 2½" 150 lb RF, ASME B16.5/316/316L		N 7
Flange 2½" 300 lb RF, ASME B16.5/316/316L		N 8
Flange 2½" 600 lb RF, ASME B16.5/316/316L		P 1
Flange 2½" 900 lb RF, ASME B16.5/316/316L		P 2
Flange 2½" 2 500 lb RJF, ASME B16.5/316/316L		P 3
Flange 3" 150 lb RF, ASME B16.5/316/316L		P 4
Flange 3" 150 lb RF, ASME B16.5/Alloy C22 (2.4602) solid		P 5
Flange 3" 300 lb RF, ASME B16.5/316/316L		P 6
Flange 3" 300 lb RJF, ASME B16.5/316/316L		P 7
Flange 3" 300 lb LT, ASME B16.5/316/316L		P 8
Flange 3" 600 lb RF, ASME B16.5/316/316L		R 1
Flange 3" 600 lb RF, ASME B16.5/Alloy C22 (2.4602) solid		R 2
Flange 3" 600 lb RF, ASME B16.5/316/316L, with Alloy C22 (2.4602) coating		R 3
Flange 3" 600 lb RJF, ASME B16.5/316/316L		R 4
Flange 3" 900 lb RF, ASME B16.5/316/316L		R 5
Flange 3" 900 lb RJF, ASME B16.5/316/316L		R 6
Flange 3" 1 500 lb RF, ASME B16.5/316/316L		R 7
Flange 3" 1 500 lb RJF, ASME B16.5/316/316L		R 8
Flange 3" 2 500 lb RF, ASME B16.5/316/316L		S 1
Flange 3" 2 500 lb RJF, ASME B16.5/316/316L		S 2
Flange 4" 150 lb RF, ASME B16.5/316/316L		S 3
Flange 4" 150 lb RF, ASME B16.5/Alloy C22 (2.4602) solid		S 4
Flange 4" 150 lb RJF, ASME B16.5/316/316L		S 5
Flange 4" 300 lb RF, ASME B16.5/316/316L		S 6
Flange 4" 300 lb RF, ASME B16.5/Alloy C22 (2.4602) solid		S 7
Flange 4" 300 lb LT, ASME B16.5/316/316L		S 8
Flange 4" 600 lb RF, ASME B16.5/316/316L		T 1
Flange 4" 600 lb RF, ASME B16.5/Alloy C22 (2.4602) solid		T 2
Flange 4" 600 lb RJF, ASME B16.5/316/316L		T 3
Flange 4" 900 lb RF, ASME B16.5/316/316L		T 4
Flange 4" 900 lb RJF, ASME B16.5/316/316L		T 5

Level Measurement

Point level measurement

Vibrating switches / SITRANS LVL200

Selection and ordering data (continued)

	Article No.	Ord. Code
SITRANS LVL200 Vibrating point level switch, high temperature and pressure design Detects level and material in liquids and slurries in extreme environments. Extension options to 3 m (9.84 ft).	7ML5748- ● ● ● ● ● - ● ● ● ● ●	● ● ●
Flange 4" 900 lb LT, ASME B16.5/316/316L	T	6
Flange 4" 1 500 lb RF, ASME B16.5/316/316L	T	7
Flange 4" 1 500 lb RJF, ASME B16.5/316/316L	T	8
Flange 4" 1 500 lb LT, ASME B16.5/316/316L	U	1
Flange 5" 150 lb RF, ASME B16.5/316/316L	U	2
Flange 5" 300 lb RF, ASME B16.5/316/316L	U	3
Flange 5" 600 lb RJF, ASME B16.5/316/316L	U	4
Flange 6" 150 lb RF, ASME B16.5/316/316L	U	5
Flange 6" 300 lb RF, ASME B16.5/316/316L	U	6
Flange 6" 300 lb LT, ASME B16.5/316/316L	U	7
Flange DN 50 30K RF, JIS/316/316L	U	8
Flange DN 50 40K RF, JIS/316/316L	V	1
Flange DN 65 40 K RF, JIS/316/316L	V	2
Mobrey flange PN 16 Form A/316/316L	V	3
Mobrey flange PN 16 Form E/316/316L	V	4
Thread R1 PN 160, EN 10226-1/Inconel 718 (2.4668) ¹⁴⁾	W	1
Thread R1 PN 100, EN 10226-1/316L ¹⁵⁾	W	2
Gas-tight seal/Process temperature		
With gas-tight seal/-196 ... +450 °C (-321 ... +842 °F)		1
Without/-196 ... +450 °C (-321 ... +842 °F)		2
Electronics		
Relay (2 x SPDT) 20 ... 72 V DC/20 ... 253 V AC (5A)		1
Transistor (NPN/PNP) 9.6 ... 55 V DC		2
Two-wire (8/16 mA) 9.6 ... 35 V DC		3
Relay (2 x SPDT) 20 ... 72 V DC/20 ... 253 V AC (5A), with SIL qualification		4
Transistor (NPN/PNP) 9.6 ... 55 V DC, with SIL qualification		5
Two-wire (8/16 mA) 9.6 ... 35 V DC, with SIL qualification		6
Housing/Cable entry		
Plastic single chamber/IP66/IP67/M20 x 1.5 gland PA black (ø5 ... 9 mm)		A
Plastic single chamber/IP66/IP67/½" NPT gland PA black (ø5 ... 9 mm)		B
Aluminum IP66/IP67/M20 x 1.5 gland PA black (ø5 ... 9 mm)		C
Aluminum IP66/IP67/½" NPT gland PA black (ø5 ... 9 mm)		D
Stainless steel single chamber (precision casting)/ IP66/IP67/M20 x 1.5		E
Stainless steel single chamber (precision casting)/ IP66/IP67/½" NPT gland PA black (ø5 ... 9 mm)		F
Stainless steel single chamber (electropolished)/ IP66/IP67/M20 x 1.5 gland PA black (ø5 ... 9 mm)		G
Stainless steel single chamber (electropolished)/ IP66/IP67/½" NPT gland PA black (ø5 ... 9 mm)		H
Aluminium IP66/IP67/M20 x 1.5 blind plug		J
Aluminium IP66/IP67/½" NPT blind plug		K
Stainless steel single chamber (precision casting)/IP66/IP67/M20 x 1.5 blind plug		L
Stainless steel single chamber (precision casting)/ IP66/IP67/½" NPT blind plug		M
Stainless steel single chamber (electropolished)/ IP66/IP67/M20 x 1.5 blind plug		N
Stainless steel single chamber (electropolished)/ IP66/IP67/½" NPT blind plug		P
Rigid Extension Compact		
Compact version, 77 mm		C 1
Rigid Extension 316L		
200 ... 500 mm		A 0
501 ... 1 000 mm		A 1
1 001 ... 1 500 mm		A 2
1 501 ... 2 000 mm		A 3
2 001 ... 2 500 mm		A 4
2 501 ... 3 000 mm		A 5
Rigid Extension Alloy C22		
200 ... 500 mm		B 0
501 ... 1 000 mm		B 1

Selection and ordering data (continued)

	Article No.	Ord. Code
SITRANS LVL200 Vibrating point level switch, high temperature and pressure design Detects level and material in liquids and slurries in extreme environments. Extension options to 3 m (9.84 ft).	7ML5748- ● ● ● ● ● - ● ● ● ● ●	● ● ●
1 001 ... 1 500 mm		B 2
1 501 ... 2 000 mm		B 3
2 001 ... 2 500 mm		B 4
2 501 ... 3 000 mm		B 5

Selection and Ordering data	Order code
Further designs	
Please add "-Z" to Article No. and specify Order code(s).	
Cleaning including Certificate(oil, grease, and silicone free).	W01
Enter the total insertion length in plain text description.	Y01
Identification label (measurement loop) stainless steel.	Y17
Identification Label (measurement loop) foil.	Y18
Output switching delay (1 ... 60 s)/default is 1 s	Y36
NACE0175 to 3.1 Material Certificate for material (EN 10204 NACE MR 0175) Note: not available with some Process connection options.	D07
Material Inspection 3.1-Inspection certificate for material (EN 10204)	C05
Acceptance test Certificate 2.2 for material (EN 10204)	C15
Dye penetration test, results confirmed via a 3.1 certificate/instrument (EN 10204)	C13
3.1-Inspection certificate for instrument with test data (EN 10204)	C25
Quality and test plan	C26
Inspection certificate 3.1 (EN 10204) - device and pressure test	C31
Helium leak test + 3.1 certificate/instrument	C32

Spare Parts and Accessories	Article No.
SITRANS SCSC single channel signal conditioner and remote test	7ML5760
SITRANS TCSC two channel signal conditioner and remote test	7ML5761
Operating Instructions	
All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation	

- 1) Not available with Process Connection options A0 and A2.
- 2) Available only with Rigid extension option C1.
- 3) Available only with 316L Process Connection and Rigid extension options.
- 4) Available only with Alloy C22 Rigid extension options.
- 5) Available only with Electronic options 3 and 6.
- 6) Available only with Housing/Cable entry options J, K, L, M.
- 7) Available only with Electronic option 6.
- 8) Available only with Electronic options 1, 2, and 4.
- 9) Available only with Gas tight seal/Process temperature option 1.
- 10) Not available with Housing/Cable entry options G, H, N, P.
- 11) Available only with Housing/Cable entry options J, K, L, M, N, P.
- 12) Not available with Housing/Cable entry options A and B.
- 13) Not available with Housing/Cable entry options A, B, G, H, N, P.
- 14) Available only with Version/material option 1.
- 15) Available only with Version/material option 2.

Level Measurement

Point level measurement

Vibrating switches / SITRANS LVL200

Selection and ordering data (continued)

		Article No.									
SITRANS SCSC, single channel, signal conditioner Provides power and relay output for one LVL200 vibrating switch, 8/16 mA electronics design. Provides remote test of any LVL200 device.		7ML5760- ● ● A ● 1 - ● ● ● ●									
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.											
Approvals											
For Ex-free area		1	A								
ATEX II (1) G/D [Ex ia Ga/Da] IIC/IIIC, I (M1) [Ex ia Ma] I		1	D								
ATEX II (1) G/D (Ex ia Ga/Da) IIC/IIIC, I (M1) (Ex ia Ma) I + WHG		1	E								
IEC [Ex ia Ga] IIC, [Ex ia Da] IIIC, [Ex ia Ma] I		1	H								
IEC (Ex ia Ga) IIC, (Ex ia Da) IIIC, (Ex ia Ma) I + WHG		1	J								
Ex-free area (incl. EAC approval)		2	A								
SIL qualification											
Without						1					
With						2					
Version											
Single-channel (8/16 mA) for level detection									1		
Single channel (8/16 mA), level detection with fail safe relay									2		
Housing/cable entry											
Plastic/IP20										A	
Terminal block connection											
Detachable 2.5 mm ² / Ex sensor: 2 x blue; output and operating voltage: 2 x black											A
Detachable 2.5 mm ² / sensor: 2 x black; output and operating voltage: 2 x black											B
Language											
English											0
German											1

Selection and Ordering data

Operating Instructions

All literature is available to download for free, in a range of languages, at

<http://www.siemens.com/processinstrumentation/documentation>

		Article No.									
SITRANS TCSC, dual channel, signal conditioner Provides power and relay output for two LVL200 vibrating switches, 8/16 mA electronics design. Provides remote test of any LVL200 device.		7ML5761- ● ● A ● 1 - ● ● ● ●									
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.											
Approvals											
For Ex-free area ¹⁾		1	A								
ATEX II (1) G/D [Ex ia Ga/Da] IIC/IIIC, I (M1) [Ex ia Ma] I ²⁾		1	D								
ATEX II (1) G/D (Ex ia Ga/Da) IIC/IIIC, I (M1) (Ex ia Ma) I + WHG		1	E								
IEC [Ex ia Ga] IIC, [Ex ia Da] IIIC, [Ex ia Ma] I ²⁾		1	H								
IEC (Ex ia Ga) IIC, (Ex ia Da) IIIC, (Ex ia Ma) I + WHG		1	J								
Ex-free area (incl. EAC approval)		2	A								
SIL qualification											
Without						1					
With						2					
Version											
Double-channel (8/16 mA) for level detection									1		
Housing/cable entry											
Plastic/IP20										A	
Terminal block connection											
Detachable 2.5 mm ² / Ex sensor: 2 x blue; output and operating voltage: 2 x black											A
Detachable 2.5 mm ² / sensor: 2 x black; output and operating voltage: 2 x black											B
Language											
English											0
German											1

Selection and ordering data (continued)

Selection and Ordering data	Order code
Operating Instructions	
All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation	

¹⁾ Available only with terminal block connection option B.

²⁾ Available only with terminal block connection option A.

Technical specifications

SITRANS LVL200	
Mode of operation	Vibrating point level switch
Measuring principle	Vibrating point level switch
Input	
Measured variable	High and low and demand (via mode switch)
Output	
Output options	<ul style="list-style-type: none"> Relay output (DPDT), 2 floating SPDTs Contactless electronic switch 2-wire Namur signal output Transistor (NPN/PNP) 10 ... 55 V DC 8/16 mA
Measuring accuracy	
Repeatability	0.1 mm (0.004 inch)
Hysteresis	Approx. 2 mm (0.08 inch) with vertical installation
Switching delay	<ul style="list-style-type: none"> Standard, Extended: approx. 500 ms (on/off) High temperature: approx. 1 s (optionally adjustable at factory)
Frequency	<ul style="list-style-type: none"> Standard, Extended: Approx. 1 200 Hz High temperature: 1400 Hz
Rated operating conditions	
Installation conditions	
• Location	Indoor/outdoor
Ambient conditions	
• Ambient temperature	-40 ... +70 °C (-40 ... +158 °F)
• Storage temperature	-40 ... +80 °C (-40 ... +176 °F)
• Installation category	III
• Pollution degree	2
Medium conditions	
• Temperature	
- LVL200S Standard	-50 ... +150 °C (-58 ... +302 °F)
- LVL200S High temperature option	-50 ... +250 °C (-58 ... +482 °F)
- LVL200E Standard: with 316L/Alloy C22	-50 ... +150 °C (-58 ... +302 °F)
- LVL200E High temperature option with 316L/Alloy C22	-50 ... +250 °C (-58 ... +482 °F)
- LVL200H High temperature	-196 ... +450 °C (-321 ... +842 °F)

Technical specifications (continued)

SITRANS LVL200	
Pressure (vessel)	<ul style="list-style-type: none"> Standard, Extended: -1 ... 64 bar g (-14.5 ... 928 psi g) High temperature: instrument version up to 160 bar (2 320 psi g): -1 ... 160 bar/-100 ... 16 000 kPa (-14.5 ... 2 320 psi g) <p>Note: The process pressure is dependent on configuration, including process fitting, e.g. flange</p>
Density	0.7 ... 2.5 g/cm ³ (0.025 ... 0.09 lb/in ³); 0.5 ... 2.5 g/cm ³ (0.018 ... 0.09 lb/in ³) by switching over Density optionally starts at 0.47 cm ³ (0.017 lb/in ³)
Design	
Material	
• Enclosure	<ul style="list-style-type: none"> Aluminum die-cast AISi10Mg, powder-coated, basis: Polyester Stainless steel housing, electropolished 316L Stainless steel housing, precision casting 316L Plastic housing, plastic PBT (Polyester)
• Tuning fork	316L (1.4404 or 1.4435), Alloy C22
• Extension tube [ø 21.3 mm (0.839 inch)]	316L (1.4404 or 1.4435), Alloy C22
• Process connection: threaded	<ul style="list-style-type: none"> Standard, Extended: 316L (1.4404 or 1.4435), Alloy C22 High temperature: Inconel 718
• Process connection: flange	316L (1.4404 or 1.4435), 316L with Alloy C22, ECTFE, or PFA coating
• Process seal	Klingsil C-4400
Process connection	
• Pipe thread, cylindrical (ISO 228 T1)	G ¾" A, G 1" A
• Pipe thread, tapered	¾" NPT, 1" NPT, 1½" NPT
• Flanges	DIN from DN 25, ASME from 1"
• Hygienic fittings	Bolting DN 40 PN 40, 1, 1½, 2, 2½" Tri-Clamp PN 10, conus DN 25 PN 40, Tuchenhagen Varivent DN 50 PN 10, SMS
Degree of protection	Type 4X/NEMA 4X/IP66/IP67
Conduit entry	<ul style="list-style-type: none"> 1 x M20 x 1.5 (cable: ø 5 ... 9 mm), 1 x blind stopper M20 x 1.5; attached 1 x M20 x 1.5 cable entry 1 x ½" NPT cable entry, 1 x blind stopper ½" NPT, 1 x ½" NPT cable entry 1 x M12 x 1; 1 x blind stopper M20 x 1.5
Weight	
• Device weight (dependent on process fitting)	Approx. 0.8 ... 4 kg (0.18 ... 8.82 lb)
• Tube extension (extended version)	Approx. 920 g/m (10 oz/ft)

Level Measurement

Point level measurement

Vibrating switches / SITRANS LVL200

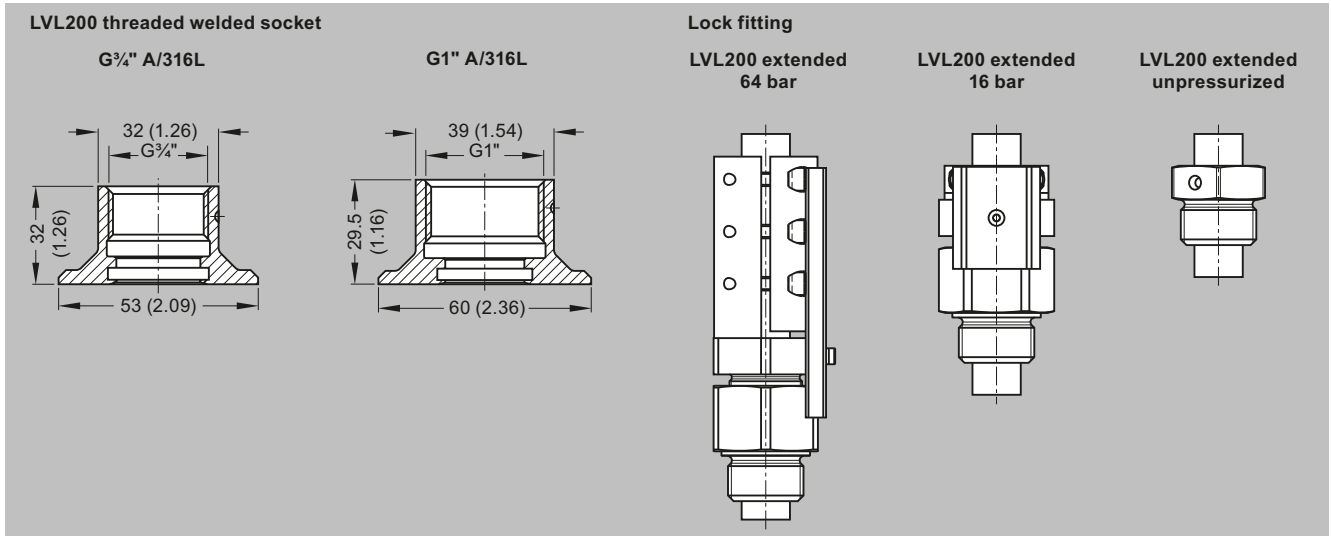
Technical specifications (continued)

SITRANS LVL200	
Power supply	
Supply voltage	
• Relay DPDT	20 ... 253 V AC, 50/60 Hz, 20 ... 72 V DC
• Contactless	20 ... 253 V AC, 50/60 Hz, 20 ... 253 V DC
• 2-wire NAMUR	
Operating voltage (characteristics according to standard) for connection to an amplifier according to NAMUR	IEC 60947-5-6, approx. 8.2 V Off-load voltage U_o , approx. 8.2 V Short-circuit current I_{sc} approx. 8.2 mA
Operating voltage 8/16 mA (via the signal conditioning instrument)	
• Non-Ex instrument	12 ... 36 V DC
• Ex-d instrument (ATEX, FM, CSA)	12 ... 36 V DC
• Ex-ia instrument (ATEX)	12 ... 29 V DC
• Ex-ia instrument (FM, CSA)	12 ... 31 V DC
Power consumption	
• Relay DPDT	• Standard, Extended: 1 ... 8 VA (AC), approx. 1.3 W (DC)
• Contactless	• High temperature: 3 VA (AC), 1 W (DC)
	1 ... 8 VA (AC), approx. 1.3 W (DC)
	Domestic current requirement approx. 3 mA (via load circuit)
	Load current
	• Min. 10 mA
	• Max. 400 mA [with $I > 300$ mA the ambient temperature can be max. 60 °C (140 °F)]
	• Max. 4 A up to 40 ms (not WHG specified)
• 8/16 mA, two-wire output	Output signal
	• Empty (uncovered)
	- 8 mA
	• Full (covered)
	- 16 mA
	• Fault message
	- < 1.8 mA
	Possible signal conditioning instruments: SITRANS SCSC, SITRANS TCSC
• 2-wire Namur	Current consumption
	• Falling characteristics ≥ 2.6 mA uncovered/ ≤ 0.6 mA covered
	• ≤ 0.6 mA uncovered/ ≥ 2.6 mA covered
	• Failure message ≤ 0.6 mA
• Transistor (NPN/PNP) 10 ... 55 V DC	Output
	• Floating transistor output, permanently shortcircuit-proof
	Load current
	• < 400 mA
	Voltage loss
	• < 1 V
	Switching voltage
	• < 55 V DC
	Blocking current
	• < 10 μ A

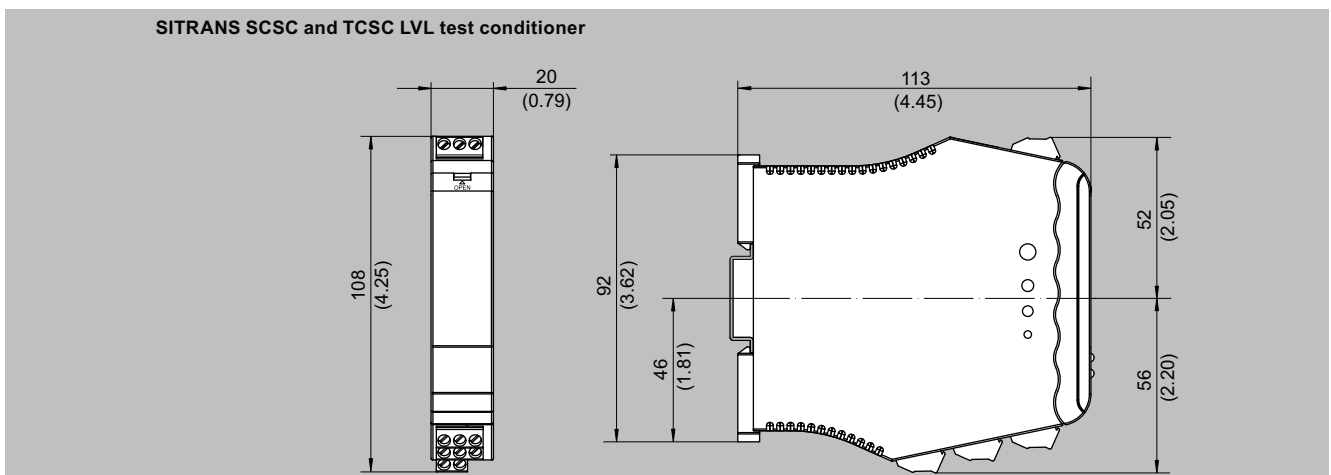
Technical specifications (continued)

SITRANS LVL200	
Certificates and approvals	
	<ul style="list-style-type: none"> • CE, CSA • Overfill Protection WHG and VLAREM II • FM (Non-Incendive) Class I, Div. 2, Groups A, B, C, D • FM (Explosion-Proof) Class I, Div. 1, Groups A, B, C, D; (Dust Ignition-Proof) Class II, III, Div. 1, Groups E, F, G1 • IECEx d IIC T6 ... T2 Ga/Gb EHEDG • ATEX II 1/2G, 2G EEx d IIC T6 • ATEX II 1G, 1/2G, 2G EEx ia IIC T6 • Shipping approvals • BR-Ex d IIC T6 ... T2 • FDA, 3A, EHEDG • SIL/IEC61508 Declaration of Conformity [SIL-2 (min/max detection)]
	Please see configuration section below for full list of approvals.

Options



SITRANS LVL200 welded socket and lock fitting, dimensions in mm (inch)



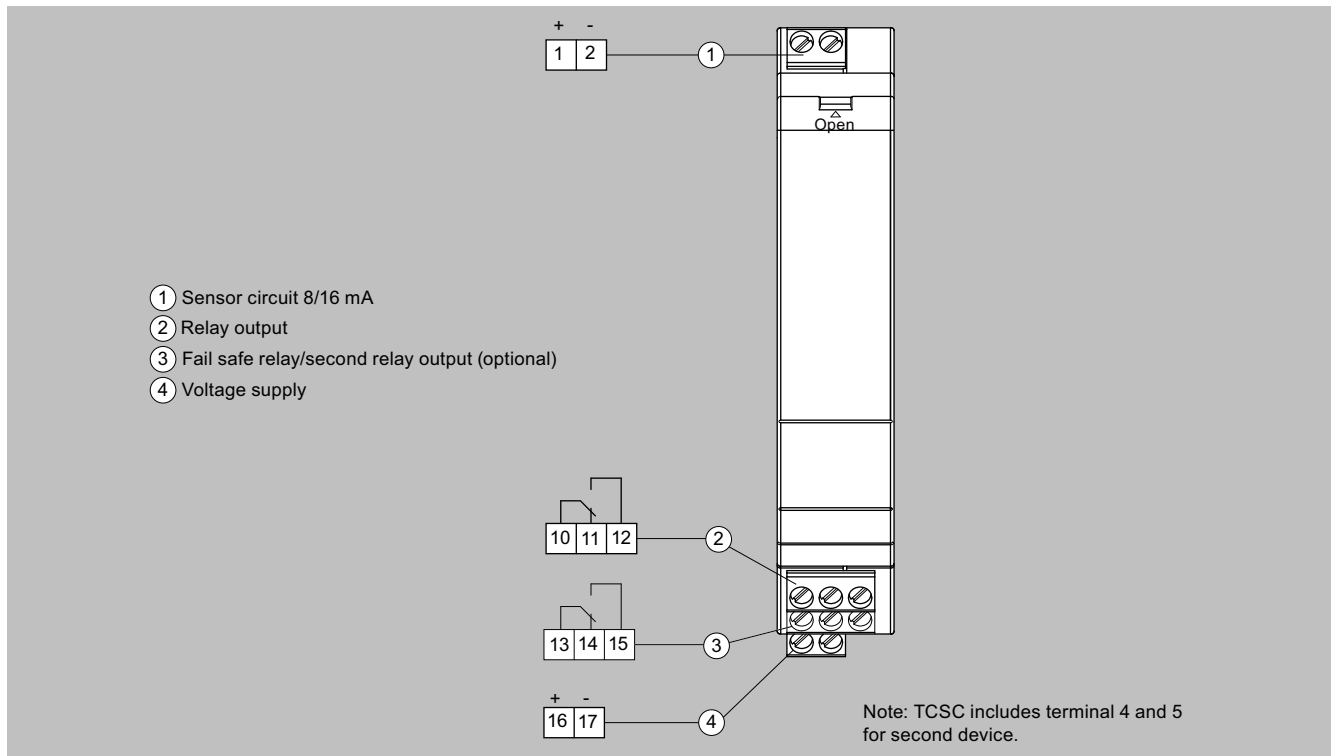
SITRANS SCSC and SITRANS TCSC LVL Test Conditioners, dimensions in mm (inch)

Level Measurement

Point level measurement

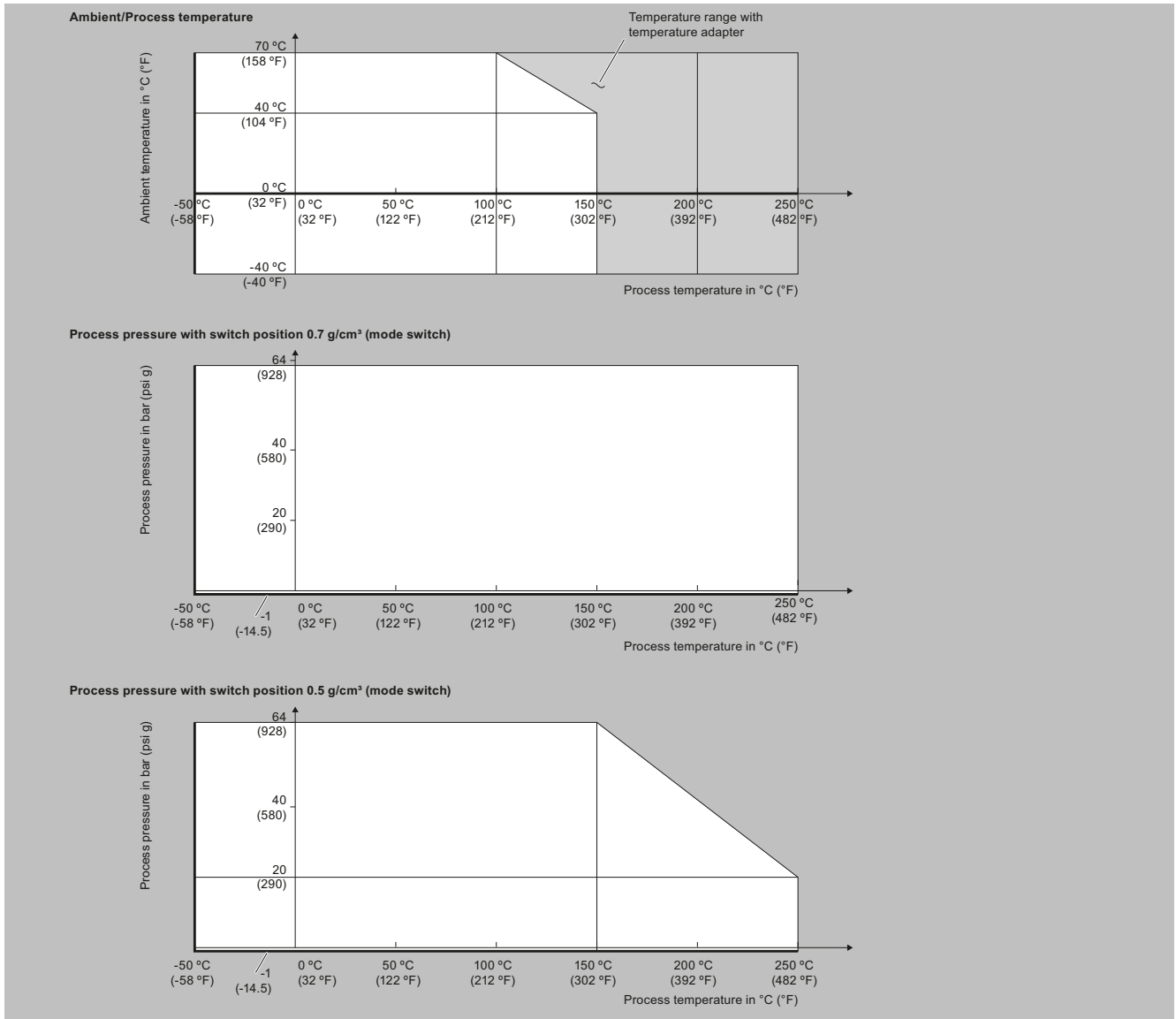
Vibrating switches / SITRANS LVL200

Options (continued)



SITRANS SCSC and SITRANS TCSC LVL Test Conditioner connections

Characteristic curves



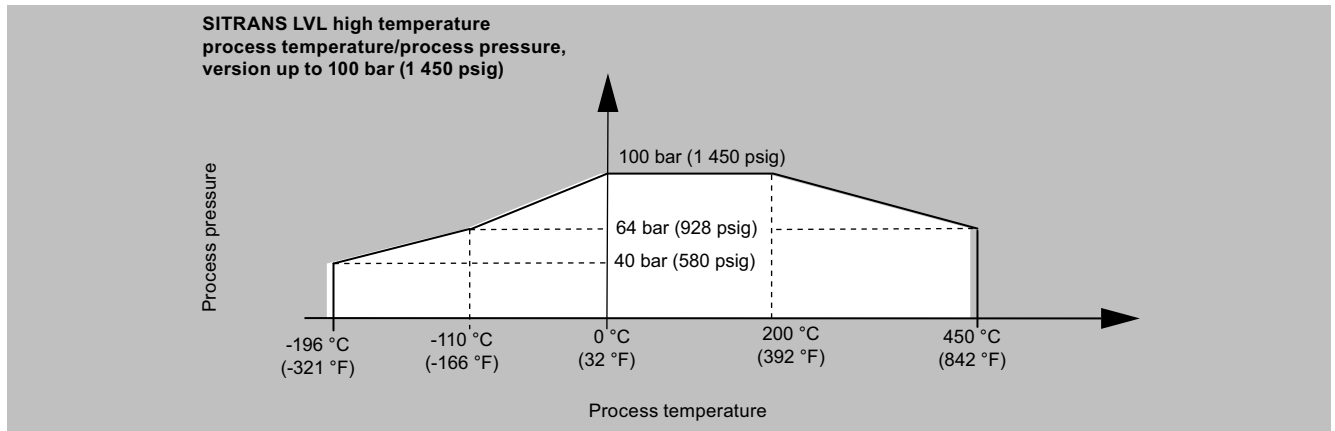
SITRANS LVL200 process pressure/process temperature/ambient temperature derating curves

Level Measurement

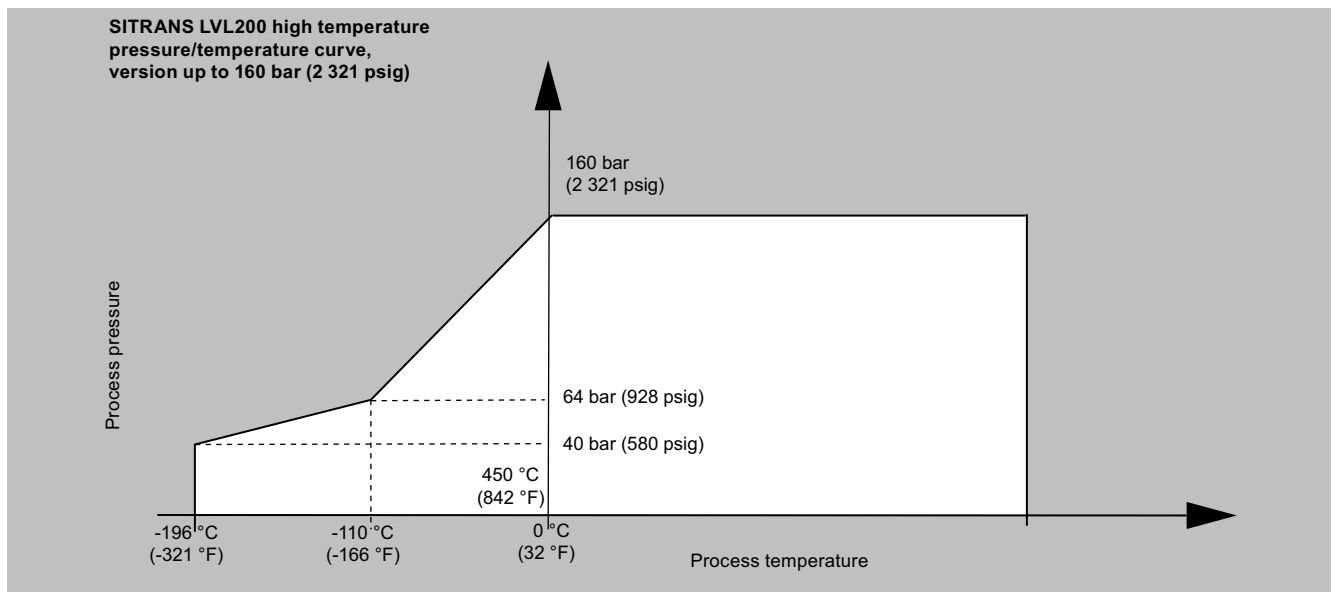
Point level measurement

Vibrating switches / SITRANS LVL200

Characteristic curves (continued)

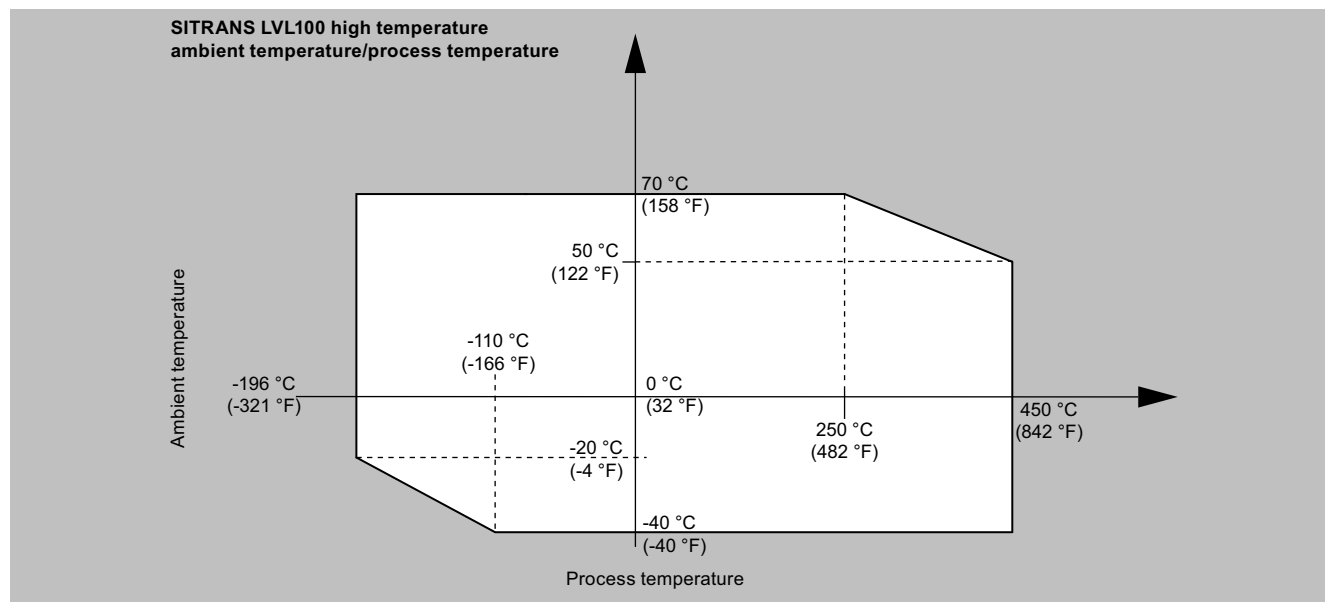


SITRANS LVL200 high temperature process temperature/process pressure curve, version up to 100 bar (1 450 psig)



SITRANS LVL200 high temperature pressure/temperature curve, version up to 160 bar (2 321 psig)

Characteristic curves (continued)



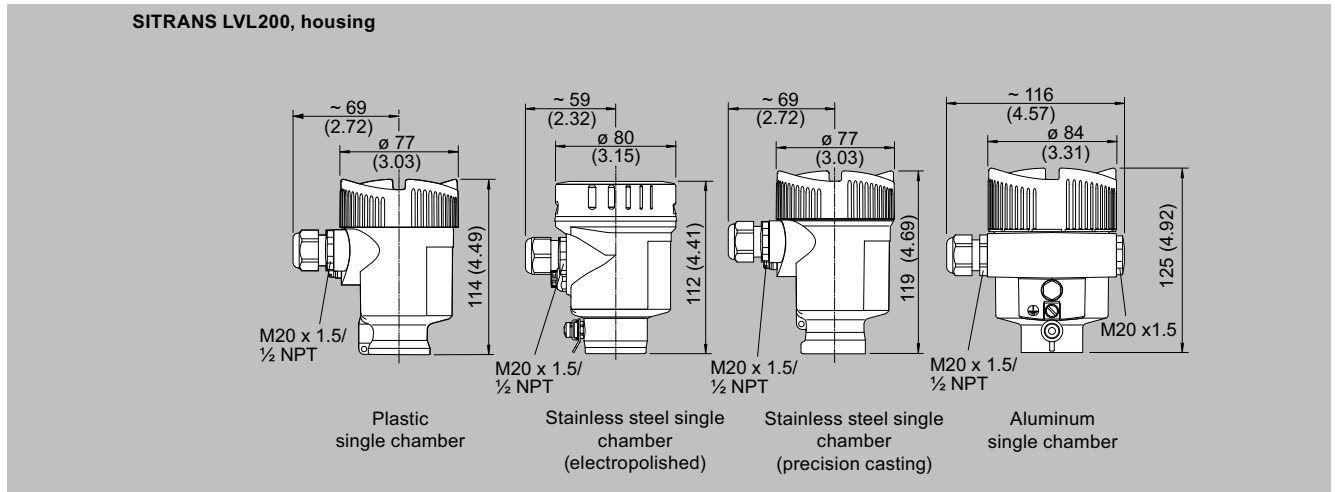
SITRANS LVL200 high temperature ambient temperature/process temperature

Level Measurement

Point level measurement

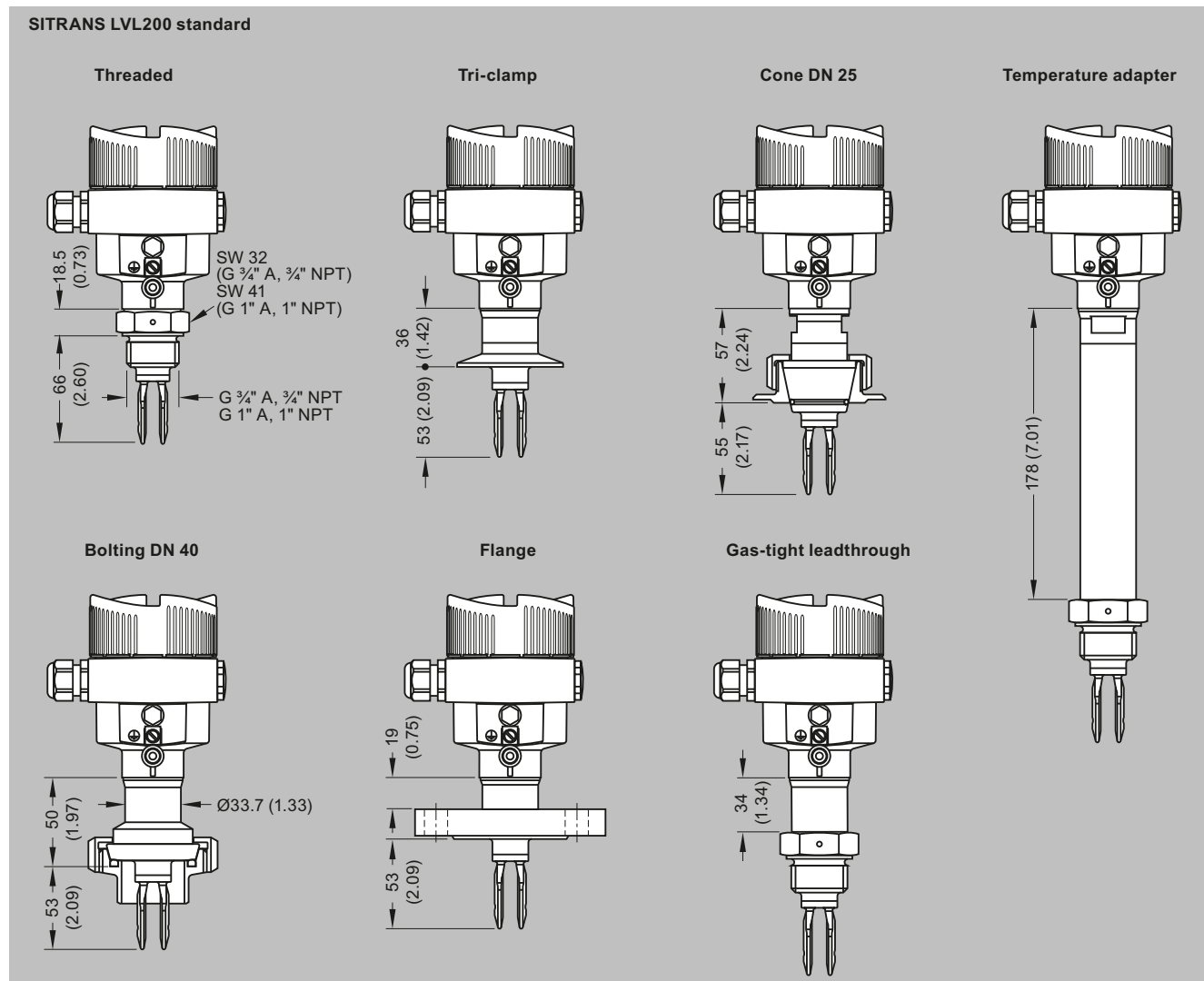
Vibrating switches / SITRANS LVL200

Dimensional drawings



SITRANS LVL200 housing, dimensions in mm (inch)

Dimensional drawings (continued)



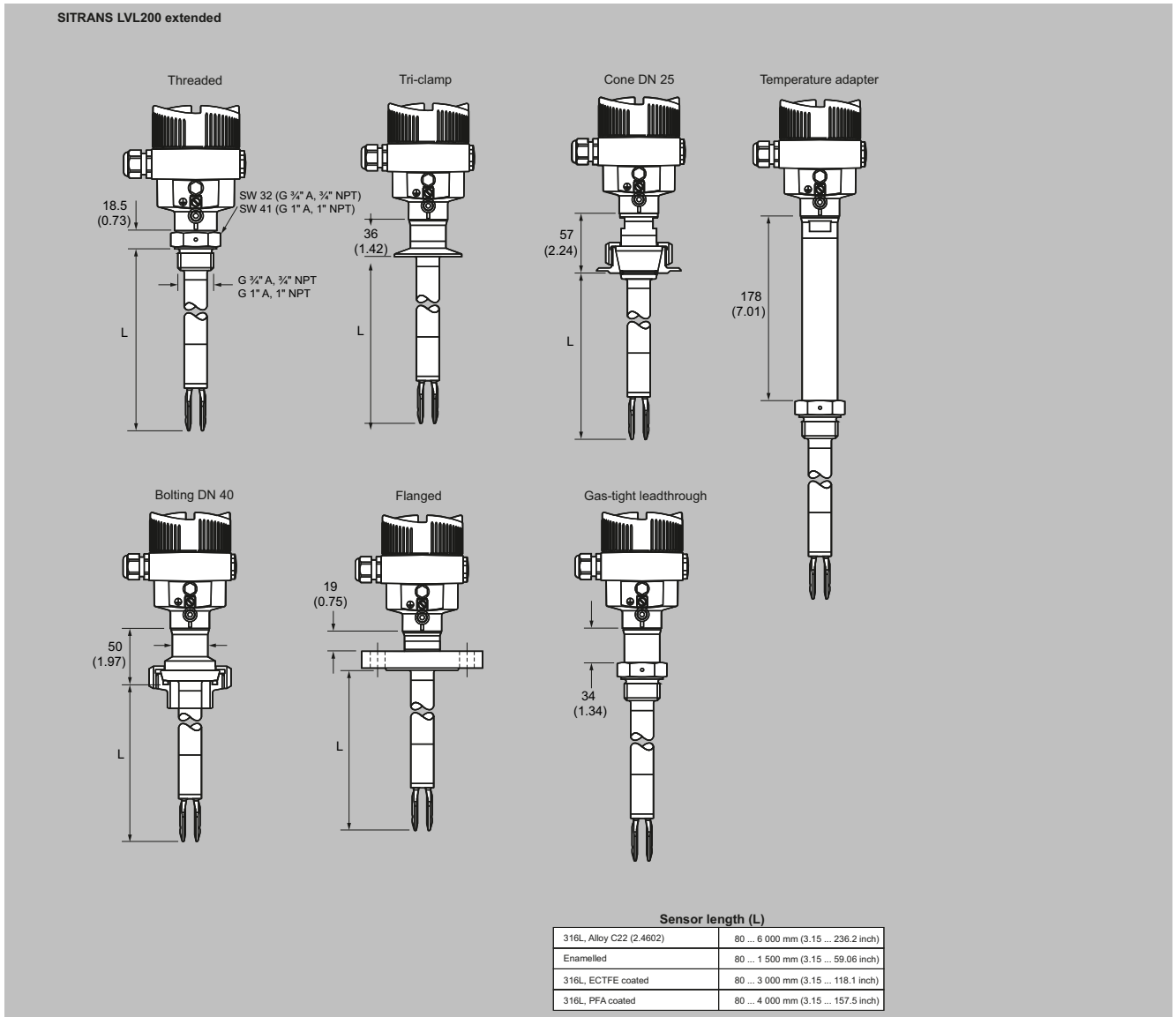
SITRANS LVL200 (standard), dimensions in mm (inch)

Level Measurement

Point level measurement

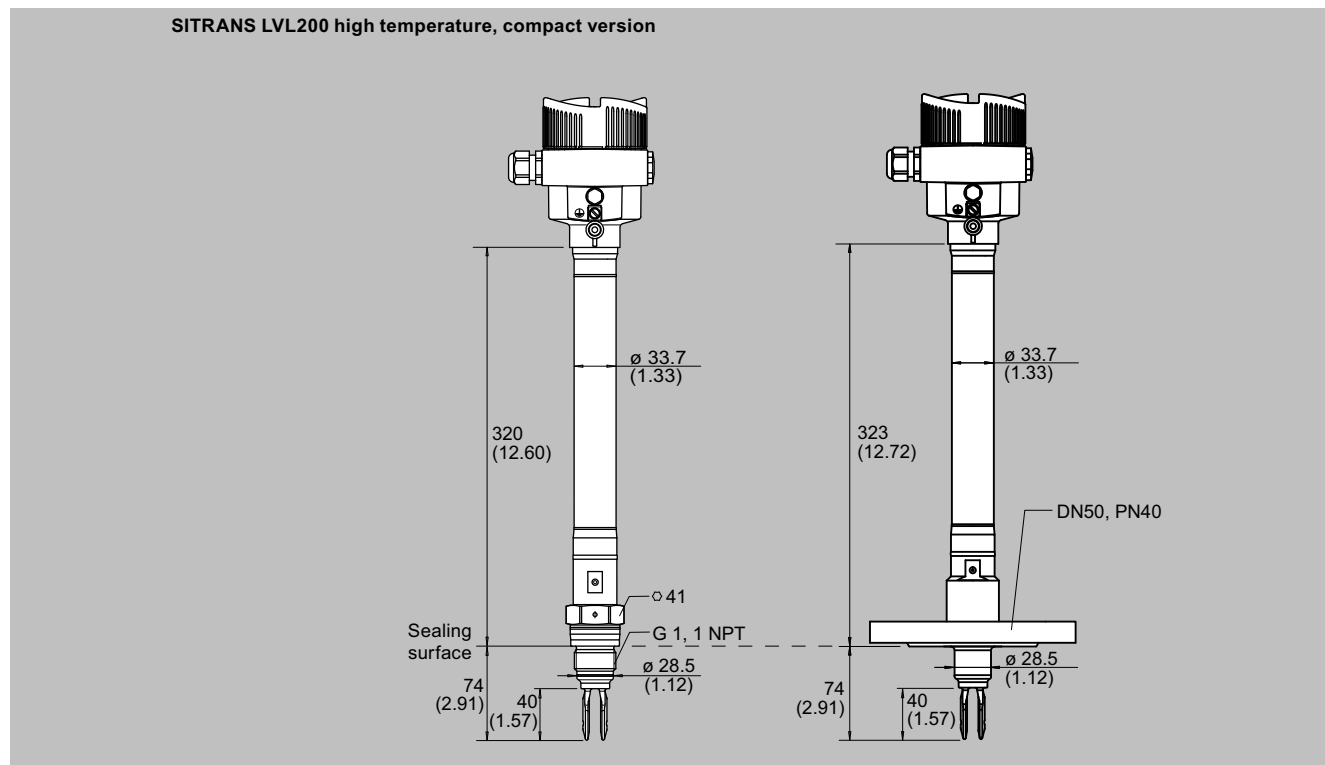
Vibrating switches / SITRANS LVL200

Dimensional drawings (continued)



SITRANS LVL200 (extended), dimensions in mm (inch)

Dimensional drawings (continued)



SITRANS LVL200 high temperature, compact version, dimensions in mm (inch)

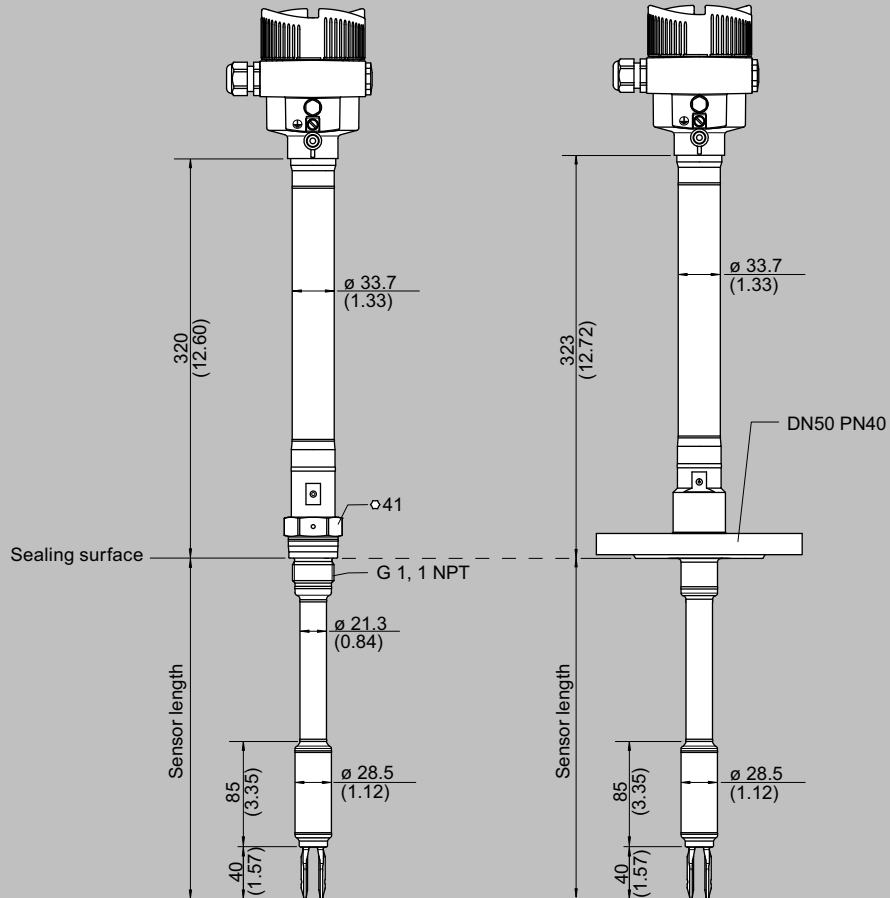
Level Measurement

Point level measurement

Vibrating switches / SITRANS LVL200

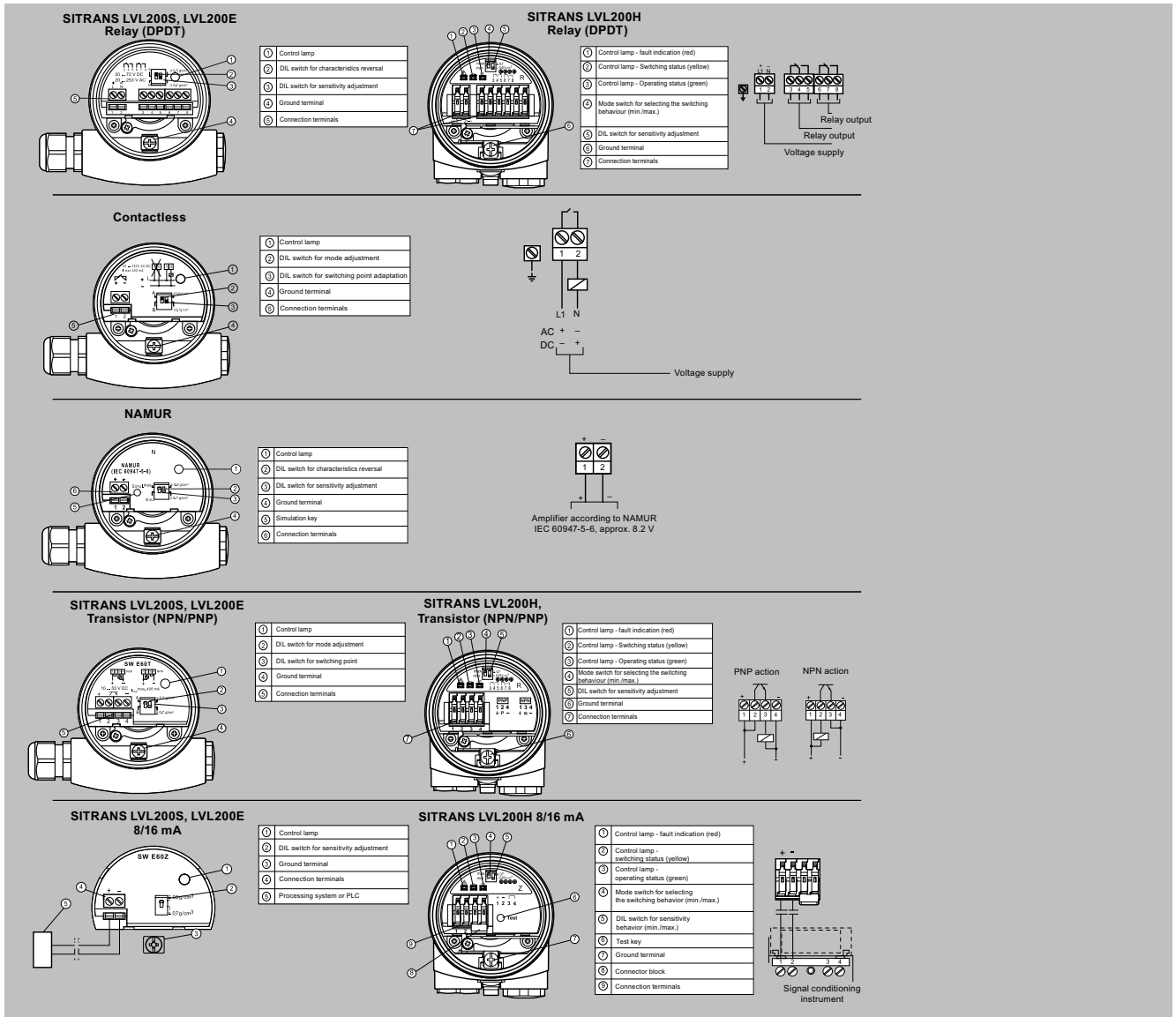
Dimensional drawings (continued)

SITRANS LVL200 high temperature, tube version



SITRANS LVL200 high temperature, tube version, dimensions in mm (inch)

Circuit diagrams



SITRANS LVL200 connections

Level Measurement

Point level measurement

Vibrating switches / SITRANS LVS100

Overview



SITRANS LVS100 is a vibrating point level switch for material detection in bulk solids.

Benefits

- High resistance to mechanical forces
- Sliding sleeve options for adjustable insertion length and ease of cleaning
- Rotatable enclosure for ease of installation and wiring
- Suitable for point level detection of materials starting at a bulk density of 30 g/l (1.9 lb/ft³)
- Customer desired extensions up to 4 000 mm (157.48 inch)

Application

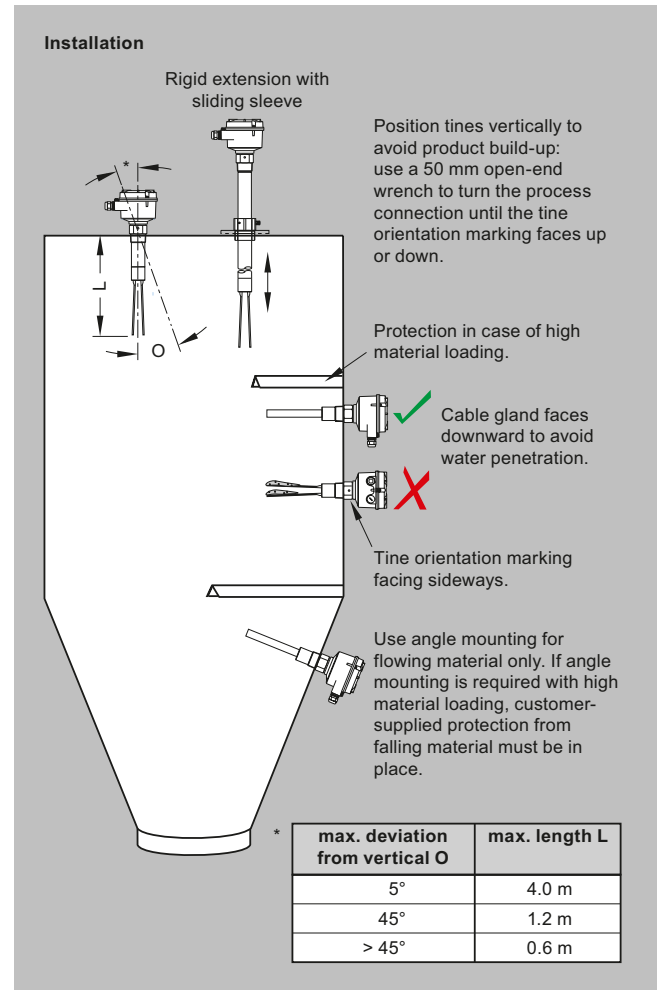
SITRANS LVS100 detects high, low or demand levels of dry bulk solids in bins, silos or hoppers.

SITRANS LVS100 has a compact design and can be top, side, or angle mounted. The vibrating fork design ensures the tines are kept clean. The unique design of the fork and crystal assembly eliminates false high level readings even if tines become damaged.

A signal from the electronic circuit excites a crystal in the probe causing the fork to vibrate. If the fork is covered by material, the change in vibration is detected by the electronic circuitry which causes the relay to change state after a one second delay. When the fork is free from material pressure, full vibration resumes and the relay reverts to its normal condition.

- Key Applications: dry bulk solids in bins, silos, hoppers

Configuration



SITRANS LVS100 installation, dimensions in mm (inch)

Selection and ordering data

	Article No.										
SITRANS LVS100 Vibrating fork point level switch Level and material detection for dry bulk solids. Extension options to 4 m (13.12 ft).	7	M	L	5	7	3	5	-	0	A	0
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.											
Input Voltage											
DPDT Relay: 19 ... 230 V AC, 19 ... 40 V DC										1	
DPDT Relay: 19 ... 230 V AC, 19 ... 40 V DC (stocked version) ¹⁾³⁾										2	
Process temperature											
Up to 150 °C (302 °F)										A	
Process connection											
Threaded											
R 1½" [(BSPT), EN 10226]											A
1¼" NPT [(Taper), ANSI/ASME B1.20.1]											B
R 1½" [(BSPT), EN 10226] DIN 2999 thread, sliding sleeve [min. length 500 mm (19.69 inch)] ²⁾											C
1½" NPT [(Taper), ANSI/ASME B1.20.1], sliding sleeve [min. length 500 mm (19.69 inch)] ²⁾											D
Extension length											
Stainless steel 316L (1.4404)											
Standard length, 170 mm (6.69 inch)									1	1	
Add Order code Y01 and plain text: "Insertion length ... mm"											
Stainless steel 304 (1.4301)											
230 ... 500 mm (9.05 ... 19.69 inch)										1	2
501 ... 1 000 mm (19.72 ... 39.37 inch)										1	3
1 001 ... 1 500 mm (39.41 ... 59.06 inch)										1	4
1 501 ... 2 000 mm (59.09 ... 78.74 inch)										1	5
2 001 ... 2 500 mm (78.78 ... 98.43 inch)										1	6
2 501 ... 3 000 mm (98.46 ... 118.11 inch)										1	7
3 001 ... 3 500 mm (118.15 ... 137.80 inch)										1	8
3 501 ... 4 000 mm (137.83 ... 157.48 inch)										2	0
Approvals											
CSA/FM General Purpose, CE, RCM											A
CSA/FM Class II, Div. 1, Groups E, F, G, Class III, ATEX II ½ D, RCM											B
IEC-Ex Ex t IIIC T- Da/Db IP6X											C
EAC Ex ta/tb IIIC Da/Db											D

1) Only available with the following configurations 7ML5735-2AA11-0AA0 or 7ML5735-2AB11-0AA0.

2) Not available with extension length options 11 and 12.

3) Input voltage 2 not allowed with extension length 16, 17, 18 or 20.

Selection and Ordering data	Order code
Further Designs	
Please add "-Z" to Art. No. and specify Order code(s).	
Total insertion length: Enter the total insertion length in plain text description, max. (50 mm increments)	Y01
Signal bulb inserted in M20 cable gland ¹⁾	A20
Factory test certificate - M to DIN 55350, Part 18	C11

1) Available only with Approval option A.

Spare Parts	Article No.
Operating Instructions	
All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation	
Spare Parts	
Replacement Electronics Module LVS100 DPDT Relay (19 ... 253 V AC, 19 ... 55 V DC)	7ML1830-1NS
R 1½" [(BSPT), EN 10226] DIN 2999 thread, sliding sleeve	7ML1830-1NT
1½" NPT [(Taper), ANSI/ASME B1.20.1], sliding sleeve [min. length 500 mm (19.69 inch)]	7ML1830-1NU

Level Measurement

Point level measurement

Vibrating switches / SITRANS LVS100

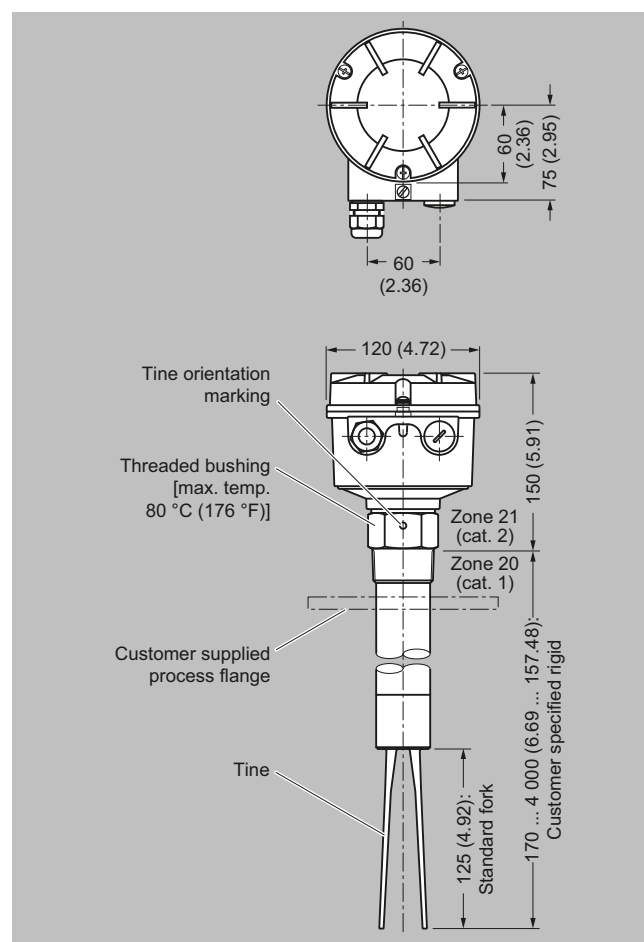
Technical specifications

SITRANS LVS100	
Mode of Operation	
Measuring principle	Vibrating point level switch
Input	
Measured variable	High, low and demand
Measuring frequency	200 Hz
Output	
Relays	DPDT relay
Relay delay	From loss of vibration: approximately 1 second From resumption of vibration: approximately 1 ... 2 s
Signal delay	Probe uncovered to covered: approximately 1 s Probe covered to uncovered: approximately 1 ... 2 s
Relay fail-safe	High or low, switch selectable
Alarm output	Relay 8 A at 250 V AC, non-inductive Relay 5 A at 30 V DC, non-inductive
Sensitivity	High or low, switch selectable
Rated operating conditions	
Installation conditions	
• Location	Indoor/outdoor
Ambient conditions	
• Ambient temperature	-40 ... +60 °C (-40 ... +140 °F)
• Storage temperature	-40 ... +80 °C (-40 ... +176 °F)
• Installation category	III
• Pollution degree	2
Medium conditions	
• Process temperature	-40 ... +150 °C (-40 ... +302 °F)
• Max. threaded bushing temperature	80 °C (176 °F)
• Max. enclosure surface temperature (Category 2D)	90 °C (194 °F)
• Max. extension surface temperature (Category 1D)	150 °C (302 °F)
• Pressure (vessel)	Max. 10 bar g (145 psi g) European Pressure Directive 2014/68/EU: Category 1
Minimum material density	Approx. 30 g/l (1.9 lb/ft ³)
Design	
Material	
• Enclosure	Epoxy coated aluminum
Process connection	<ul style="list-style-type: none"> Thread 1 1/4" NPT [(Taper), ANSI/ASME B1.20.1], R 1 1/2" [(BSPT), EN 10226] Thread R 1 1/2" [(BSPT), EN 10226], 1/2" NPT [(Taper), ANSI/ASME B1.20.1], sliding sleeve [min. length 500 mm (19.69 inch)] Thread material: stainless steel 304 (1.4301) or 316L (1.4404) depending on configuration
Tine material	Stainless steel 316L (1.4404)
Degree of protection	IP66/Type 4/NEMA 4
Conduit entry	2 x M20 x 1.5 or 2 x 1/2" NPT (For FM and CSA approved versions only.)
Weight	Standard version, no extensions: approx. 1.7 kg (3.7 lb)
Power supply	<ul style="list-style-type: none"> 19 ... 230 V AC, +10 %, 50 ... 60 Hz, 8 VA 19 ... 40 V DC, +10 %, 1.5 W

Technical specifications (continued)

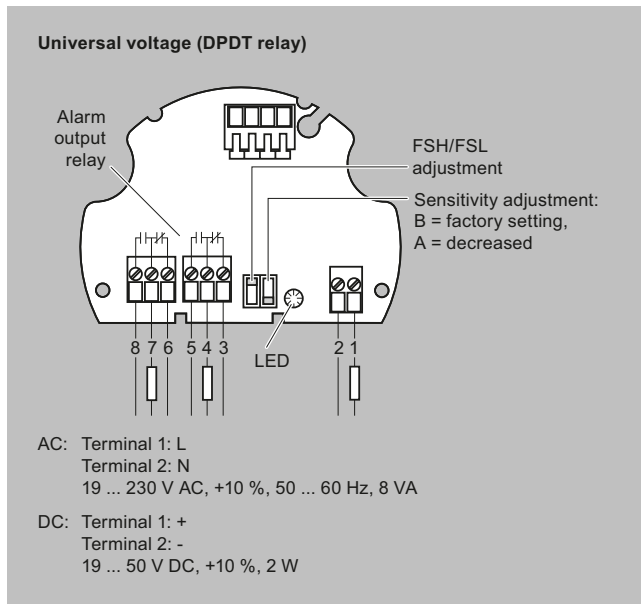
SITRANS LVS100	
Certificates and approvals	<ul style="list-style-type: none"> • CSA/FM General Purpose • CE • CSA/FM Dust Ignition Proof • RCM • ATEX II 1/2 D • IECEx

Dimensional drawings



SITRANS LVS100, dimensions in mm (inch)

Circuit diagrams



SITRANS LVS100 connections

Level Measurement

Point level measurement

Vibrating switches / SITRANS LVS200

Overview



SITRANS LVS200 is a vibrating point level switch for high, low, or demand level detection of bulk solids.

Benefits

- High resistance to mechanical forces
- Strong vibration resistance to high bulk material loads
- Rotatable enclosure for convenient wiring
- Suitable for low density material: standard version, 20 g/l (1.3 lb/ft³); liquid/solid interface version, 50 g/l (3 lb/ft³) and low density option min. 5 g/l (0.3 lb/ft³)
- Customer desired extensions up to 20 000 mm (787 inch)
- Optional detection of solids within liquid
- Durable short fork option with 165 mm (6.5 inch) insertion length

Application

The standard LVS200 detects high, low, or demand levels of dry bulk solids in bins, silos, or hoppers. The liquid/solid interface version can also detect settled solids within liquids or solids within confined spaces such as feed pipes. It is designed to ignore liquids in order to detect the interface between a solid and a liquid.

A pipe extension version is available with either the standard or liquid/solid interface electronics and fork, separated by a customer supplied 1 inch pipe.

SITRANS LVS200 has an optional 4 to 20 mA output for monitoring buildup on the fork to determine when preventative maintenance should be performed in sticky applications.

The LVS200 has a compact design and can be top, side or angle mounted. The vibrating fork design ensures the tines are kept clean. The unique design of the fork and crystal assembly eliminates false high level readings even if tines become damaged.

A signal from the electronic circuit excites a crystal in the probe causing the fork to vibrate. If the fork is covered by material, the change in vibration is detected by the electronic circuitry which causes the relay to change state after a one second delay. When the fork is free from material pressure, full vibration resumes and the relay reverts to its normal condition.

- Key Applications: dry bulk solids in bins, silos, hoppers or settled solids within liquids (interface version)

Selection and ordering data

	Article No.											
SITRANS LVS200 Vibrating fork point level switch, standard design	7	M	L	5	7	3	1	-	•	•	A	0
Level and material detection in dry bulk solids. Extension options to 4 m (13.12 ft). With advanced testing, output, and durability options, including low bulk densities.												
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.												
Power supply												
19 ... 230 V AC, 19 ... 55 V DC, one relay output (SPDT) ¹⁾	1											
19 ... 230 V AC, 19 ... 55 V DC, two relay outputs (DPDT) ¹⁾	2											
18 ... 50 V DC PNP ¹⁾	3											
19 ... 230 V AC/DC without contact, 2-wire loop powered ¹⁾	4											
7 ... 9 V DC (requires NAMUR switch amplifier) NAMUR IEC 60947-5-6, 2-wire ²⁾	5											
8/16 mA or 4 ... 20 mA; 12.5 ... 35 V DC, 2-wire ³⁾	6											
19 ... 230 V AC, 19 ... 55 V DC, one relay output (SPDT) basic version ⁴⁾⁵⁾	7											
Process temperature												
Without temperature isolator										A		
With temperature isolator										B		
Separated enclosure - cable length 1.5 m (4.92 ft) [max. temperature process 150 °C (302 °F)/max. temperature electronics 60 °C (140 °F)]										C		
Separated enclosure - cable length 4.0 m (13.12 ft) [max. temperature process 150 °C (302 °F)/max. temperature electronics 60 °C (140 °F)]										D		
Process connection												
Threaded												
R 1½" [(BSPT), EN 10226]										A		
1½" NPT [(Taper), ANSI/ASME B1.20.1]										B		
G 2" [(BSPP), EN ISO 228-1], sliding sleeve [min. length 500 mm (19.69 inch)] ⁶⁾										C		
2" NPT [(Taper), ANSI/ASME B1.20.1], sliding sleeve [min. length 500 mm (19.69 inch)] ⁶⁾										D		
Flanged												
DN 100 PN 6, EN 1092-1, flat face ⁷⁾										E		
DN 100 PN 16, EN 1092-1, flat face										F		
2" ASME 150 lb B16.5, raised face										G		
3" ASME 150 lb B16.5, raised face										H		
4" ASME 150 lb B16.5, raised face										J		
2" Tri-clamp (DN 50) ISO 2852										K		
Extension length												
Stainless steel 304 (1.4301)												
Standard length, 235 mm (9.25 inch)										1	1	
Add Order code Y01 and plain text: "Insertion length ... mm"												
300 ... 500 mm (11.81 ... 19.69 inch)										1	2	
501 ... 750 mm (19.72 ... 29.53 inch)										1	3	
751 ... 1 000 mm (29.57 ... 39.37 inch)										1	4	
1 001 ... 1 250 mm (39.41 ... 49.21 inch)										1	5	
1 251 ... 1 500 mm (49.25 ... 59.06 inch)										1	6	
1 501 ... 1 750 mm (59.09 ... 68.90 inch)										1	7	
1 751 ... 2 000 mm (68.94 ... 78.74 inch)										1	8	
2 001 ... 2 250 mm (78.78 ... 88.58 inch)										2	1	
2 251 ... 2 500 mm (88.62 ... 98.43 inch)										2	2	
2 501 ... 2 750 mm (98.46 ... 108.27 inch)										2	3	
2 751 ... 3 000 mm (108.31 ... 118.11 inch)										2	4	
3 001 ... 3 250 mm (118.15 ... 127.95 inch)										2	5	
3 251 ... 3 500 mm (127.99 ... 137.80 inch)										2	6	
3 501 ... 3 750 mm (137.83 ... 147.64 inch)										2	7	
3 751 ... 4 000 mm (147.68 ... 157.48 inch)										2	8	
Stainless steel 316L (1.4404)												
Standard length, 235 mm (9.25 inch)										3	1	
Add Order code Y01 and plain text: "Insertion length ... mm"												
300 ... 500 mm (11.81 ... 19.69 inch)										3	2	
501 ... 750 mm (19.72 ... 29.53 inch)										3	3	

Level Measurement

Point level measurement

Vibrating switches / SITRANS LVS200

Selection and ordering data (continued)

	Article No.											
SITRANS LVS200 Vibrating fork point level switch, standard design	7	M	L	5	7	3	1	-	•	•	A	0
Level and material detection in dry bulk solids. Extension options to 4 m (13.12 ft). With advanced testing, output, and durability options, including low bulk densities.												
751 ... 1 000 mm (29.57 ... 39.37 inch)						3	4					
1 001 ... 1 250 mm (39.41 ... 49.21 inch)						3	5					
1 251 ... 1 500 mm (49.25 ... 59.06 inch)						3	6					
1 501 ... 1 750 mm (59.09 ... 68.90 inch)						3	7					
1 751 ... 2 000 mm (68.94 ... 78.74 inch)						3	8					
2 001 ... 2 250 mm (78.78 ... 88.58 inch)						4	1					
2 251 ... 2 500 mm (88.62 ... 98.43 inch)						4	2					
2 501 ... 2 750 mm (98.46 ... 108.27 inch)						4	3					
2 751 ... 3 000 mm (108.31 ... 118.11 inch)						4	4					
3 001 ... 3 250 mm (118.15 ... 127.95 inch)						4	5					
3 251 ... 3 500 mm (127.99 ... 137.80 inch)						4	6					
3 501 ... 3 750 mm (137.83 ... 147.64 inch)						4	7					
3 751 ... 4 000 mm (147.68 ... 157.48 inch)						4	8					
Material process connection/extension												
Stainless steel threads 304 (1.4301), flanges 321 (1.4541), Tri-clamp 304 (1.4301) ⁸⁾										1		
Stainless steel 316L (1.4404) ⁹⁾										2		
Approvals												
CSA/FM Dust Ignition Proof, RCM											A	
ATEX II ½ D, RCM											B	
CSA/FM General Purpose, RCM, CE											C	
CE, RCM											D	
CSA/FM IS Class I, II, III Div. 1, Groups A, B, C, D, E, F, G, FM Class I, Aex ia IIC, CSA Class I, Ex ia IIC, RCM											E	
ATEX II 1G and ½G Eex ia IIC; ATEX II 1D and ½D, RCM											F	
IEC-Ex t IIIC Da/Db											G	
EAC Ex ta/tb IIIC Da/Db, Ex ta IIIC Da											H	
EAC Ex Ga/Gb Ex ia IIC, 0Ex ia IIC Ga; Ex ta/tb IIIC Da/Db, Ex ta IIIC Da											J	

1) Available with Approval options A ... D, G only.

2) Available with Approval options D, E, F only.

3) Available with Approval options B, D, G only.

4) Available with configurations 7ML5731-7AA11-1BA0 or 7ML5731-7AB11-1AA0 only.

5) Basic version is cost effective and offers fast delivery.

6) Not available with extension length options 11, 12, 31, 32.

7) Max. 6 bar (87 psi).

8) Available with option extension length 11 ... 28.

9) Available with option extension length 31 ... 48.

Selection and Ordering data	Order code
Further Designs	
Please add "-Z" to Article No. and specify Order code(s).	
Factory test certificate - M to DIN 55350, Part 18	C11
Total insertion length: Enter the total insertion length in plain text description, max. 4 000 mm (157.48 inch)	Y01
Stainless steel tag [100 x 45 mm (3.94 x 1.77 inch)]: Measuring-point number/identification (max. 27 characters); specify in plain text	Y14
Enhanced sensitivity > 5 g/l via electronics and increased insertion length of 25 mm (0.98 inch) ³⁾	K05
Enhanced sensitivity < 5 g/l via electronics, increased insertion length of 25 mm (0.98 inch), and increased aluminum fork width ¹⁾³⁾	G01
Signal bulb inserted in M20 cable gland ²⁾	A20
NAMUR 8/16 mA switch amplifiers available, contact factory for pricing	

Selection and ordering data (continued)

Spare Parts	Article No.
Operating Instructions	
All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation	
Spare Parts	
Replacement Electronics Module (125 Hz) [19 ... 230 V AC, 19 ... 55 V DC, one relay output (SPDT)]	7ML1830-1KL
Replacement Electronics Module (125 Hz) [19 ... 230 V AC, 19 ... 55 V DC, two relay output (DPDT)]	A5E35525363
Sliding sleeve, 2" BSP (ISO 228)	7ML1830-1JM
Sliding sleeve, 2" NPT (ASME B1.20.1)	7ML1830-1JN
Namur Isolator switch amplifier relay output KFD2-SR2-Ex1.W	A5E35667901
SITRANS LVS200, standard, power supply 7, process temperature A, process connection A, extension length 11, material process connection/extension 1, and approval B	7ML5731-7AA11-1-BA0
SITRANS LVS200, standard, power supply 7, process temperature A, process connection B, extension length 11, material process connection/extension 1, and approval A	7ML5731-7AB11-1-AA0

1) Available only with Power supply option 1 and Approval options C, D and with Process connection flange options E ... J.

2) Available with Approval option D only.

3) K05 and G01 are not available together.

SITRANS LVS200 Vibrating fork point level switch, short fork and interface design Level and material detection in dry bulk solids or solids interface within a liquid. Extension options to 4 m (13.12 ft). With advanced testing, output, and durability options.	Article No.
7ML5732- ● ● ● ● ● - ● ● A 0	
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	
Power supply	
19 ... 230 V AC, 19 ... 55 V DC, one relay output (SPDT) ⁶⁾	1
19 ... 230 V AC, 19 ... 55 V DC, two relay outputs (DPDT) ⁶⁾	2
18 ... 50 V DC PNP ⁶⁾	3
19 ... 230 V AC/DC without contact, 2-wire loop powered ⁶⁾	4
8/16 mA or 4 ... 20 mA; 12.5 ... 35 V DC, 2-wire ¹⁾	5
Process temperature	
Without temperature isolator	A
With temperature isolator	B
Separated enclosure - cable length 1.5 m (4.92 ft) [max. temperature process 150 °C (302 °F)/max. temperature electronics 60 °C (140 °F)]	C
Separated enclosure - cable length 4.0 m (13.12 ft) [max. temperature process 150 °C (302 °F)/max. temperature electronics 60 °C (140 °F)]	D
Process connection	
Threaded	
R 1½" [(BSPT), EN 10226]	A
1½" NPT [(Taper), ANSI/ASME B1.20.1]	B
G 2" [(BSPP), EN ISO 228-1], sliding sleeve [min. length 500 mm (19.69 inch)] ²⁾	C
2" NPT [(Taper), ANSI/ASME B1.20.1], sliding sleeve [min. length 500 mm (19.69 inch)] ²⁾	D
Flanged	
DN 100 PN 6, EN 1092-1, flat face ³⁾	E
DN 100 PN 16, EN 1092-1, flat face	F
2" ASME 150 lb B16.5, raised face	G
3" ASME 150 lb B16.5, raised face	H
4" ASME 150 lb B16.5, raised face	J
2" Tri-clamp (DN 50) ISO 2852	K
Extension length	
Stainless steel 304 (1.4301)	
Standard length, 165 mm (6.50 inch)	1 1

Level Measurement

Point level measurement

Vibrating switches / SITRANS LVS200

Selection and ordering data (continued)

		Article No.	
SITRANS LVS200 Vibrating fork point level switch, short fork and interface design		7ML5732- ● ● ● ● ● - ● ● A 0	
Level and material detection in dry bulk solids or solids interface within a liquid. Extension options to 4 m (13.12 ft). With advanced testing, output, and durability options.			
Add Order code Y01 and plain text: "Insertion length ... mm"			
200 ... 500 mm (7.87 ... 19.69 inch)		1	2
501 ... 750 mm (19.72 ... 29.53 inch)		1	3
751 ... 1 000 mm (29.57 ... 39.37 inch)		1	4
1 001 ... 1 250 mm (39.41 ... 49.21 inch)		1	5
1 251 ... 1 500 mm (49.25 ... 59.06 inch)		1	6
1 501 ... 1 750 mm (59.09 ... 68.90 inch)		1	7
1 751 ... 2 000 mm (68.94 ... 78.74 inch)		1	8
2 001 ... 2 250 mm (78.78 ... 88.58 inch)		2	1
2 251 ... 2 500 mm (88.62 ... 98.43 inch)		2	2
2 501 ... 2 750 mm (98.46 ... 108.27 inch)		2	3
2 751 ... 3 000 mm (108.31 ... 118.11 inch)		2	4
3 001 ... 3 250 mm (118.15 ... 127.95 inch)		2	5
3 251 ... 3 500 mm (127.99 ... 137.80 inch)		2	6
3 501 ... 3 750 mm (137.83 ... 147.64 inch)		2	7
3 751 ... 4 000 mm (147.68 ... 157.48 inch)		2	8
Stainless steel 316L (1.4404)			
Standard length, 165 mm (6.50 inch)		3	1
Add Order code Y01 and plain text: "Insertion length ... mm"			
200 ... 500 mm (7.87 ... 19.69 inch)		3	2
501 ... 750 mm (19.72 ... 29.53 inch)		3	3
751 ... 1 000 mm (29.57 ... 39.37 inch)		3	4
1 001 ... 1 250 mm (39.41 ... 49.21 inch)		3	5
1 251 ... 1 500 mm (49.25 ... 59.06 inch)		3	6
1 501 ... 1 750 mm (59.09 ... 68.90 inch)		3	7
1 751 ... 2 000 mm (68.94 ... 78.74 inch)		3	8
2 001 ... 2 250 mm (78.78 ... 88.58 inch)		4	1
2 251 ... 2 500 mm (88.62 ... 98.43 inch)		4	2
2 501 ... 2 750 mm (98.46 ... 108.27 inch)		4	3
2 751 ... 3 000 mm (108.31 ... 118.11 inch)		4	4
3 001 ... 3 250 mm (118.15 ... 127.95 inch)		4	5
3 251 ... 3 500 mm (127.99 ... 137.80 inch)		4	6
3 501 ... 3 750 mm (137.83 ... 147.64 inch)		4	7
3 751 ... 4 000 mm (147.68 ... 157.48 inch)		4	8
Material process connection/extension			
Stainless steel threads 304 (1.4301), flanges 321 (1.4541), Tri-clamp 304 (1.4301) ⁴⁾			1
Stainless steel 316L (1.4404) ⁵⁾			2
Approvals			
CSA/FM Dust Ignition Proof, RCM			A
ATEX II ½ D, RCM			B
CSA/FM General Purpose, RCM, CE			C
CE, RCM			D
IEC-Ex t IIIC Da/Db			E
ATEX II 1G and ½G Ex ia IIC; ATEX II 1D and ½D, CE, RCM			F
EAC Ex ta/tb IIIC Da/Db, Ex ta IIIC Da			G
EAC Ex Ga/Gb Ex ia IIC, 0Ex ia IIC Ga; Ex ta/tb IIIC Da/Db, Ex ta IIIC Da			H

1) Available with Approval options B, D, E only.

2) Not available with Extension length options 11, 12, 31, 32.

3) Max. 6 bar (87 psi).

4) Available with Extension length options 11 ... 28.

5) Available with Extension length options 31 ... 48.

6) Power supply options 1, 2, 3, 4 not allowed with Approvals options F and H.

Selection and ordering data (continued)

Selection and Ordering data	Order code
Further Designs	
Please add "-Z" to Article No. and specify Order code(s).	
Factory test certificate - M to DIN 55350, Part 18	C11
Total insertion length: Enter the total insertion length in plain text description, max. 4 000 mm (147.48 inch)	Y01
Stainless steel tag [100 x 45 mm (3.94 x 1.77 inch)]: Measuring-point number/identification (max. 27 characters); specify in plain text	Y14
Signal bulb inserted in M20 cable gland ¹⁾³⁾	A20
Note: G02 must be ordered for solids/liquids interface detection.	
Adjustable sensitivity (by potentiometer) for solids/liquids interface detection ¹⁾²⁾⁴⁾	G02

Spare Parts	Article No.
Operating Instructions	
Note: the Operating Instructions should be ordered as a separate line on the order. All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation	
Spare Parts	
Replacement Electronics Module (125 Hz) [19 ... 230 V AC, 19 ... 55 V DC, two relay output (DPDT)]	A5E35525363
Replacement Electronics Module (350 Hz) [19 ... 230 V AC, 19 ... 55 V DC, one relay output (SPDT)]	7ML1830-1KM
Sliding sleeve, 2" BSP (ISO 228)	7ML1830-1JM
Sliding sleeve, 2" NPT (ASME B1.20.1)	7ML1830-1JN

¹⁾ Available with Approval option D only.

²⁾ Available with Power supply option 1 only.

³⁾ A20 not allowed with Power supply options 4 or 5.

⁴⁾ G02 not allowed with Process temperature options C or D.

	Article No.
SITRANS LVS200 Vibrating fork point level switch, pipe extension design Level and material detection in dry bulk solids. Requires customer supplied pipe extension with insertion to 3.8 m (12.47 ft). With advanced testing, output, and durability options.	7ML5733- ● ● ● ● ● - ● ● A 0
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	
Power supply	
19 ... 230 V AC, 19 ... 55 V DC, one relay output (SPDT) ¹⁾	1
19 ... 230 V AC, 19 ... 55 V DC, two relay outputs (DPDT) ¹⁾	2
18 ... 50 V DC PNP ¹⁾	3
19 ... 230 V AC/DC without contact, 2-wire loop powered ¹⁾	4
7 ... 9 V DC (requires NAMUR switch amplifier) NAMUR IEC 60947-5-6, 2-wire ²⁾	5
8/16 mA or 4 ... 20 mA; 12.5 ... 35 V DC, 2-wire ³⁾	6
Process temperature	
Up to 150 °C (302 °F)	A
Process connection	
Threaded	
R 1½" [(BSPT), EN 10226]	A
1½" NPT [(Taper), ANSI/ASME B1.20.1]	B
Flanged	
DN 100 PN 6, EN 1092-1, flat face ⁴⁾	C
DN 100 PN 16, EN 1092-1, flat face	D
2" ASME 150 lb B16.5, raised face	E
3" ASME 150 lb B16.5, raised face	F

Level Measurement

Point level measurement

Vibrating switches / SITRANS LVS200

Selection and ordering data (continued)

	Article No.											
SITRANS LVS200 Vibrating fork point level switch, pipe extension design Level and material detection in dry bulk solids. Requires customer supplied pipe extension with insertion to 3.8 m (12.47 ft). With advanced testing, output, and durability options.	7	M	L	5	7	3	3	-	•	•	A	0
4" ASME 150 lb B16.5, raised face											G	
2" Tri-clamp (DN 50) ISO 2852											K	
Process connection material												
Stainless steel threads 304 (1.4301), flanges 321(1.4541), Tri-clamp 304 (1.4301)												1
Stainless steel 316L (1.4404)												2
Extension length												
Customer supplied 1" pipe extension Length: 300 ... 3 800 mm (11.81 ... 149.61 inch)												1
Application type												
Dry bulk solids (125 Hz)												1
Liquids/solids interface (350 Hz)												2
Approvals												
CSA/FM Dust Ignition Proof, RCM												A
ATEX II ½D, RCM												B
CSA/FM General Purpose, RCM, CE												C
CE, RCM												D
CSA/FM IS Class I, II, III Div. 1, Groups A, B, C, D, E, F, G, FM Class I, Aex ia IIC, CSA Class I, Ex ia IIC, RCM												E
ATEX II 1G and ½G Ex ia IIC; ATEX II 1D and ½D, RCM												F
IEC-Ex t IIIIC Da/Db												G
EAC Ex ta/tb IIIIC Da/Db, Ex ta IIIIC Da												H
EAC Ex Ga/Gb Ex ia IIC, OEx ia IIC Ga; Ex ta/tb IIIIC Da/Db, Ex ta IIIIC Da												J

- 1) Available with Approval options A, B, C, D, G only.
- 2) Available with Approval options D, E, F, J and application type 1 only.
- 3) Available with Approval options B, D, F, G, H only.
- 4) Max. 6 bar (87 psi).

Selection and Ordering data	Order code
Further Designs	
Please add "-Z" to Article No. and specify Order code(s).	
Factory test certificate - M to DIN 55350, Part 18	C11
Total insertion length: Enter the total insertion length in plain text description, max. 3 800 mm (149.61 inch)	Y01
Stainless steel tag [100 x 45 mm (3.94 x 1.77 inch)]: Measuring-point number/identification (max. 27 characters); specify in plain text	Y14
Enhanced sensitivity > 5 g/l via electronics and increased insertion length of 25 mm (0.98 inch) ⁵⁾	K05
Enhanced sensitivity < 5 g/l via electronics, increased insertion length of 25 mm (0.98 inch) and increased aluminum fork width ¹⁾⁴⁾⁵⁾	G01
Adjustable sensitivity (by potentiometer) for solids/liquids interface detection ²⁾³⁾⁴⁾	G02
Signal bulb inserted in M20 cable gland ²⁾⁶⁾	A20

Spare Parts	Article No.
Operating Instructions	
Note: the Operating Instructions should be ordered as a separate line on the order. All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation	
Spare Parts	
Replacement Electronics Module (125 Hz) [19 ... 230 V AC, 19 ... 55 V DC, one relay output (SPDT)]	7ML1830-1KL
Replacement Electronics Module (125 Hz) [19 ... 230 V AC, 19 ... 55 V DC, two relay output (DPDT)]	A5E35525363

Selection and ordering data (continued)

Spare Parts	Article No.
Replacement Electronics Module (350 Hz) [19 ... 230 V AC, 19 ... 55 V DC, one relay output (SPDT)]	7ML1830-1KM
NAMUR Isolated switch amplifier Relay output KFD2-SR2-Ex1.W	A5E35667901

- 1) Available only with Power supply option 1 and Approvals options C, D, and with Process connection flange options C ... G.
 2) Available with Approval options D only.
 3) Available with Power supply option 1 only and Application type option 2.
 4) Not available with option K05.
 5) Available with Application type option 1 only.
 6) A20 not allowed with Power supply options 4, 5, and 6.

	Article No.																							
SITRANS LVS200 Vibrating fork point level switch, cable extended design Level and material detection in dry bulk solids. Extension options to 20 m (65.62 ft). With advanced testing, output, and durability options. Measures bulk densities less than 5 g/l (0.3 lb/ft³).	7ML5734-	●	●	●	●	●	-	●	●	A	0													
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.																								
Power supply																								
19 ... 230 V AC, 19 ... 55 V DC, one relay output (SPDT) ¹⁾																					1			
19 ... 230 V AC, 19 ... 55 V DC, two relay outputs (DPDT) ¹⁾																						2		
18 ... 50 V DC PNP ¹⁾																						3		
19 ... 230 V AC/DC without contact, 2-wire loop powered ¹⁾																						4		
7 ... 9 V DC (requires NAMUR switch amplifier) NAMUR IEC 60947-5-6, 2-wire ²⁾⁵⁾																						5		
8/16 mA or 4 ... 20 mA; 12.5 ... 35 V DC, 2-wire ³⁾																						6		
Process temperature																								
Up to 80 °C (176 °F)																						A		
Process connection																								
Threaded																								
R 1½" [(BSPT), EN 10226] (1.4301/304)																						A		
1½" NPT [(Taper), ANSI/ASME B1.20.1] (1.4301/304)																						B		
Flanged																								
DN 100 PN 6, EN 1092-1 (1.4541/321), flat face ⁴⁾																						C		
DN 100 PN 16, EN 1092-1 (1.4541/321), flat face																						D		
2" ASME 150 lb B16.5 (1.4541/321), raised face																						E		
3" ASME 150 lb B16.5 (1.4541/321), raised face																						F		
4" ASME 150 lb B16.5 (1.4541/321), raised face																						G		
Extension length																								
750 ... 1 000 mm (29.5 ... 39.4 inch) [max. length 20 000 mm (787.4 inch), not with Power supply option 5 (max. 10 000 mm, 393.7 inch)] ⁸⁾																							1	0
Add Order code Y01 and plain text: "Insertion length ... mm"																								
1 001 ... 2 000 mm (39.41 ... 78.74 inch)																							1	1
2 001 ... 3 000 mm (78.78 ... 118.11 inch)																							1	2
3 001 ... 4 000 mm (118.15 ... 157.48 inch)																							1	3
4 001 ... 5 000 mm (157.52 ... 196.85 inch)																							1	4
5 001 ... 6 000 mm (196.89 ... 236.22 inch)																							1	5
6 001 ... 7 000 mm (236.26 ... 275.59 inch)																							1	6
7 001 ... 8 000 mm (275.63 ... 314.96 inch) ⁵⁾																							1	7
8 001 ... 9 000 mm (315 ... 354.33 inch) ⁵⁾																							1	8
9 001 ... 10 000 mm (354.37 ... 393.70 inch) ⁵⁾																							2	0
10 001 ... 11 000 mm (393.74 ... 433.07 inch) ⁵⁾⁶⁾																							2	1
11 001 ... 12 000 mm (433.11 ... 472.44 inch) ⁵⁾⁶⁾																							2	2
12 001 ... 13 000 mm (472.48 ... 511.81 inch) ⁵⁾⁶⁾																							2	3
13 001 ... 14 000 mm (511.85 ... 551.18 inch) ⁵⁾⁶⁾																							2	4
14 001 ... 15 000 mm (551.22 ... 590.55 inch) ⁵⁾⁶⁾																							2	5
15 001 ... 16 000 mm (590.59 ... 629.92 inch) ⁵⁾⁶⁾																							2	6
16 001 ... 17 000 mm (629.96 ... 669.29 inch) ⁵⁾⁶⁾																							2	7
17 001 ... 18 000 mm (669.33 ... 708.66 inch) ⁵⁾⁶⁾																							2	8
18 001 ... 19 000 mm (708.70 ... 748.03 inch) ⁵⁾⁶⁾																							3	0
19 001 ... 20 000 mm (748.07 ... 787.40 inch) ⁵⁾⁶⁾																							3	1

Level Measurement

Point level measurement

Vibrating switches / SITRANS LVS200

Selection and ordering data (continued)

	Article No.
SITRANS LVS200 Vibrating fork point level switch, cable extended design Level and material detection in dry bulk solids. Extension options to 20 m (65.62 ft). With advanced testing, output, and durability options. Measures bulk densities less than 5 g/l (0.3 lb/ft³).	7ML5734- ● ● ● ● ● - ● ● A 0
Application type	
Dry bulk solids (125 Hz)	1
Liquids/solids interface detection, short insertion or heavier materials (350 Hz) ⁷⁾	2
Approvals	
CSA/FM Dust Ignition Proof, RCM	A
ATEX II ½D, RCM	B
CSA/FM General Purpose, RCM, CE	C
CE, RCM	D
CSA/FM IS Class I, II, III Div. 1, Groups A, B, C, D, E, F, G, FM Class I, Aex ia IIC, CSA Class I, Ex ia IIC, RCM	E
ATEX II 1G and ½G Ex ia IIC; ATEX II 1D and ½D, RCM ⁶⁾	F
IEC-Ex t IIIC Da/Db	G
EAC Ex ta/tb IIIC Da/Db, Ex ta IIIC Da	H
EAC Ex Ga/Gb Ex ia IIC, 0Ex ia IIC Ga; Ex ta/tb IIIC Da/Db, Ex ta IIIC Da	J

1) Available with Approval options A, B, C, D, G only.

2) Available with Approval options D, E, and F only. Not available with Application type option 2.

3) Available with Approval option D only.

4) Max. 6 bar (87 psi).

5) Not available with Application type option 2.

6) Not available with Power supply option 5.

7) Cable length is limited to 7 000 mm (275.59 inch).

8) Available with Power supply options 1 ... 4, and 6.

Selection and Ordering data	Order code
Further Designs	
Please add "-Z" to Article No. and specify Order code(s).	
Factory test certificate - M to DIN 55350, Part 18	C11
Enter the total insertion length in plain text description, max. 20 000 mm (787.40 inch)	Y01
Stainless steel tag [100 x 45 mm (3.94 x 1.77 inch)]: Measuring-point number/identification (max. 27 characters); specify in plain text	Y14
Enhanced sensitivity > 5 g/l via electronics and increased insertion length of 25 mm (0.98 inch) ⁵⁾	K05
Enhanced sensitivity < 5 g/l via electronics and increased insertion length of 25 mm (0.98 inch) and increased aluminum fork width ¹⁾⁴⁾	G01
Adjustable sensitivity (by potentiometer) for solids/liquids interface detection ²⁾³⁾⁴⁾	G02
Signal bulb inserted in M20 cable gland ²⁾⁶⁾	A20

Spare Parts	Article No.
Operating Instructions	
Note: the Operating Instructions should be ordered as a separate line on the order. All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation	
Spare Parts	
Replacement Electronics Module (125 Hz) [19 ... 230 V AC, 19 ... 55 V DC, one relay output (SPDT)]	7ML1830-1KL
Replacement Electronics Module (125 Hz) [19 ... 230 V AC, 19 ... 55 V DC, two relay output (DPDT)]	A5E35525363
Replacement Electronics Module (350 Hz) [19 ... 230 V AC, 19 ... 55 V DC, one relay output (SPDT)]	7ML1830-1KM
NAMUR Isolated switch amplifier Relay output KFD2-SR2-Ex1.W	A5E35667901

Selection and ordering data (continued)

- 1) Available only with Power supply option 1 and Approvals C, D, and with process connection flange options C ... G.
- 2) Available with Approval options D only.
- 3) Available with Power supply option 1 and Application type 2 option only.
- 4) Not available with option K05.
- 5) Available with Application type option 1 only.
- 6) A20 not allowed with Power supply options 4, 5, or 6.

Technical specifications

SITRANS LVS200	
Mode of operation	
Measuring principle	Vibrating point level switch
Input	
Measured variable	High, low, and demand
Measuring frequency	
• Standard	125 Hz
• Liquid/solid interface and short fork version	350 Hz
Output	
PNP	Open collector: Permanent load max. 0.4 A, short-circuit and overload protected Turn-on voltage: max. 50 V (reverse protection)
2-wire without contact	Load current: • Min. 10 mA • Max. 500 mA permanent • Max. 2A < 200 ms • Max. 5A < 50 ms Voltage drop on the electronic module: max. 7 V with closed electric circuit Cut-off current with open electric circuit: max. 5 mA
Relays	
• Version with 1 relay	SPDT relay
• Version with 2 relays	DPDT relay
Relay delay	<ul style="list-style-type: none"> • From loss of vibration: approximately 1 second • From resumption of vibration: approximately 1 ... 2 seconds
Signal delay	<ul style="list-style-type: none"> • Probe uncovered to covered: approximately 1 second • Probe covered to uncovered: approximately 1 ... 2 seconds
Relay fail-safe	High or low, switch selectable
Alarm output	<ul style="list-style-type: none"> • Relay 8 A at 250 V AC, non-inductive • Relay 5 A at 30 V DC, non-inductive
mA output	8/16 mA or 4 ... 20 mA
• Resolution	4 ... 20 mA ± 0.1 mA
Sensitivity	High or low, switch selectable
Rated operating conditions	
Installation conditions	
• Location	Indoor/outdoor
Ambient conditions	
• Ambient temperature	-40 ... +60 °C (-40 ... +140 °F)
• Storage temperature	-40 ... +80 °C (-40 ... +176 °F)
• Installation category	III
• Pollution degree	2
Medium conditions	

Technical specifications (continued)

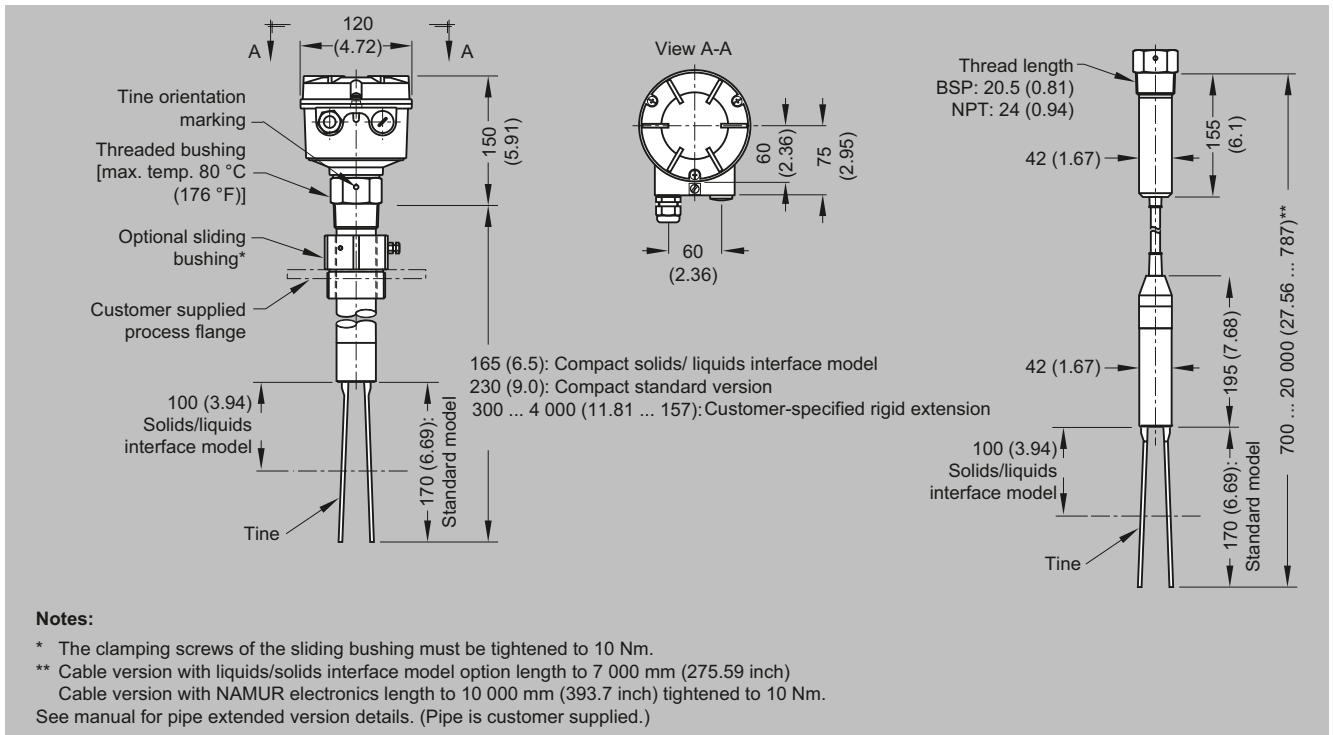
SITRANS LVS200	
• Process temperature	<ul style="list-style-type: none"> • All except CSA Class II, Group G: -40 ... +150 °C (-40 ... +302 °F) • CSA Class II, Group G: -40 ... +140 °C (-40 ... +284 °F), CSA temperature code T3B
• Max. threaded bushing temperature	80 °C (176 °F)
• Max. enclosure surface temperature (Category 2D)	90 °C (194 °F)
• Max. extension surface temperature (Category 1D)	150 °C (302 °F)
• Pressure (vessel)	Max. 30 bar g (435 psi g) European Pressure Directive 2014/68/EU: Category 1
• Minimum material density	<ul style="list-style-type: none"> • Standard version: approx. 20 g/l (1.2 lb/ft³) • Liquid/solid interface version: approx. 50 g/l (3 lb/ft³) • Optional low density version: approx. 5 g/l (0.3 lb/ft³)
Design	
Material	
• Enclosure	Epoxy coated aluminum
Process connection	<ul style="list-style-type: none"> • Thread 1½" NPT [(Taper), ANSI/ASME B1.20.1], R ½" [(BSPT), EN 10226], and flange options • Optional sliding bushing with 2" NPT [(Taper), ANSI/ASME B1.20.1] or BSP thread • Thread material: stainless steel 303 (1.4301)
Tine material	Stainless steel 316L (1.4404), PTFE-coated tines are available upon special request
Degree of protection	IP65/Type 4/NEMA 4
Conduit entry	2 x M20 x 1.5 or 2 x ½" NPT (For FM and CSA approved versions only.)
Weight	<ul style="list-style-type: none"> • Standard version, no extensions: approx. 2.0 kg (4.4 lb) • Solids/liquids version, no extensions: approx. 1.9 kg (4.2 lb)
Power supply	
	<ul style="list-style-type: none"> • 19 ... 230 V AC, +10 %, 50 ... 60 Hz, 8 VA • 19 ... 55 V DC, +10 %, 1.5 W
Certificates and approvals	
	<ul style="list-style-type: none"> • CSA/FM General Purpose • CE • CSA/FM Dust Ignition Proof • RCM • ATEX II 1/2 D • CSA/FM IS Class I, II, III Div. 1, Groups A, B, C, D, E, F, G, FM Class I, Aex ia IIC, CSA Class I, Ex ia IIC, available only with power supply options 5 and 6 • ATEX II 1G and 1/2 G Ex ia IIC; ATEX II 1D and 1/2 D, available only with power supply option 5

Level Measurement

Point level measurement

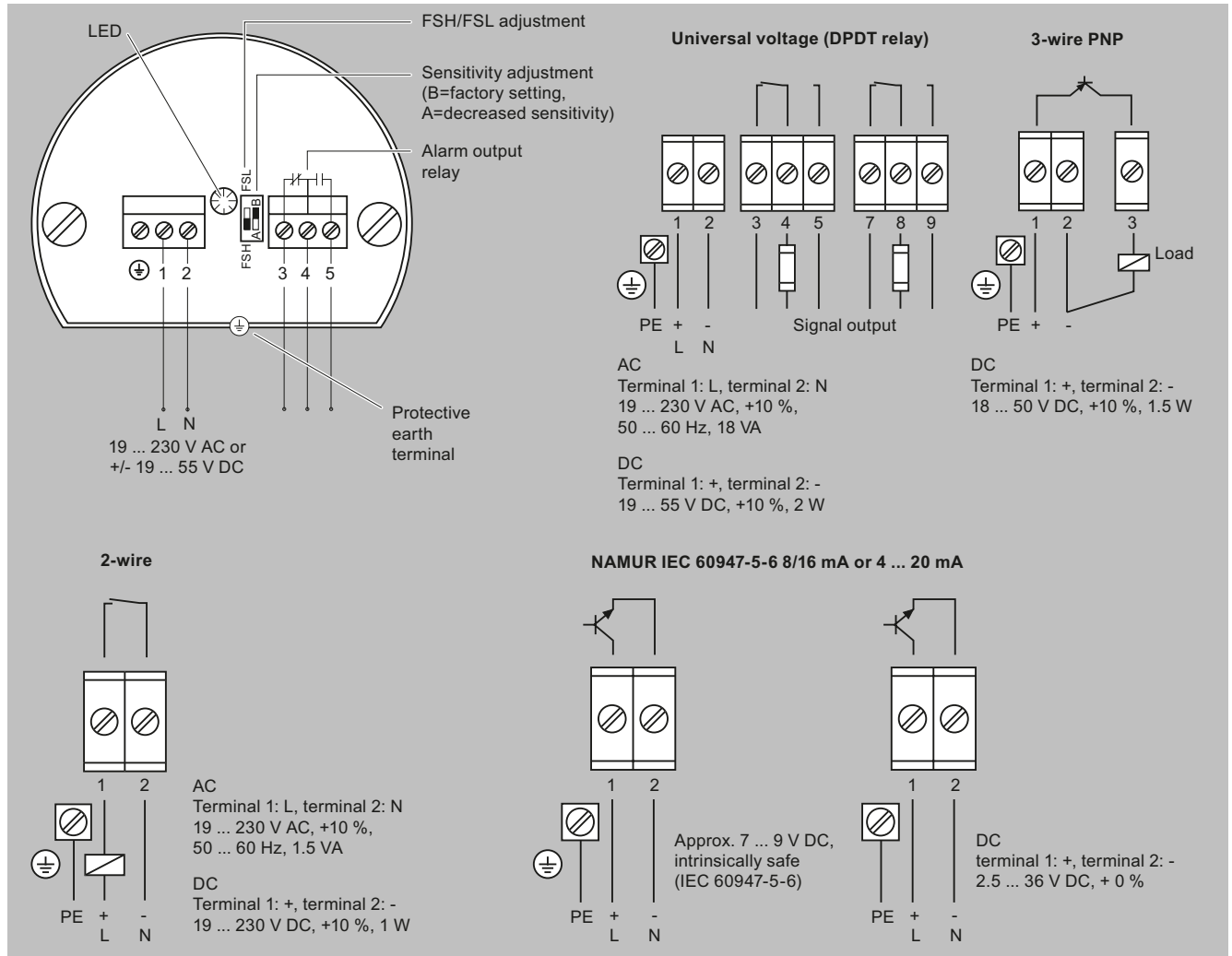
Vibrating switches / SITRANS LVS200

Dimensional drawings



SITRANS LVS200, dimensions in mm (inch)

Circuit diagrams



SITRANS LVS200 connections

Level Measurement

Point level measurement

Vibrating switches / SITRANS LVS300

Overview



SITRANS LVS300 is a vibrating rod point level switch for high, low, or demand level detection of bulk solids.

Benefits

- High resistance to mechanical forces.
- Adjustable sensitivity for varied applications including build-up.
- Rotatable enclosure for convenient wiring.
- Suitable for low density material: standard version, 20 g/l (1.3 lb/ft³).
- Customer desired extensions up to 4 000 mm (157 inch).
- 160 mm (6.3 inch) insertion length.
- Flexible, customer supplied, rods to 4 meters.
- Process connections starting at 1 inch.

Application

The standard LVS300 detects high, low, or demand levels of dry bulk solids in bins, silos, or hoppers.

A pipe extension version is available, separated by a customer supplied 1 inch pipe.

The LVS300 has a compact design and can be top, side or angle mounted. The vibrating rod design ensures the product will not be impacted by bridging of traditional forks in applications with buildup potential. A durable probe design ensures the product will withstand heavier materials without damage or bending.

A signal from the electronic circuit excites a crystal in the probe causing the rod to vibrate. If the rod is covered by material, the change in vibration is detected by the electronic circuitry which causes the output to change state after a one second delay. When the probe is free from material, full vibration resumes and the relay reverts to its normal condition.

- Key Applications: dry or bulk solids with buildup potential, in bins, silos, or hoppers, such as lime, molding sand, milk powder, flour, salt, and plastic granules.

Selection and ordering data

SITRANS LVS300 Vibrating rod point level switch, compact design Level and material detection in solids. Compact, with 160 mm (6.30 inch) insertion.	Article No. 7ML5736- ● ● ● ● ● - ● ●	
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Power supply		
Relays DPDT 21 ... 230 V AC 22 ... 45 V DC	1	
PNP 20 ... 40 V DC	2	
Process temperature		
Without temperature isolator [up to T _{process} = 150 °C (302 °F) at Tamb < 40 °C (104 °F)]		A
With temperature isolator [up to T _{process} = 150 °C (302 °F) at Tamb > 40 °C (104 °F)]		B
Process connection		
Threaded		
Thread G 1½" (BSPP) EN ISO 228-1		A
Thread G 1¼" (BSPP) EN ISO 228-1		B
Thread G 1" (BSPP) EN ISO 228-1		C
Thread NPT 1½" (Taper) ANSI B1.20.1		D
Thread NPT 1¼" (Taper) ANSI B1.20.1		E
Thread NPT 1" (Taper) ANSI B1.20.1		F
Tri-clamp 2" (DN50) ISO 2852		G
Flanged		
Flange DN 100 PN6, EN1092-1 ¹⁾		H
Flange DN 100 PN16, EN1092-1		J
2" ASME 150 lb B16.5		K
3" ASME 150 lb B16.5		L
4" ASME 150 lb B16.5		M
Extension length		
Standard length, 160 mm (6.3 inch)		1 1
Material process connection/extension		
Stainless steel threads 304 (1.4301), flanges 321 (1.4541), Tri-clamp 304 (1.4301)		1
Stainless steel 316 L (1.4404)		2
Approvals		
CE		A
ATEX II 1/2D Ex ta/tb IIIC TI Da/Db IP6X		B
FM _{US} and FM _C General Purpose		C
FM _{US} and FM _C DIP Class II, III Div. 1 Groups E, F, G		D

Selection and Ordering data	Order code
Further designs	
Please add "-Z" to Article No. and specify Order code(s).	
Stainless steel tag [(70 mm x 13 mm (2.76 x 0.51 inch)): Measuring-point number/identification (max. 27 characters) specify in plain text	Y14
Signal bulb inserted in M20 cable gland ²⁾	A20
Factory test certificate - M to DIN 55350, Part 18	C11
Operating Instructions	
All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation	

¹⁾ Max. 6 bar (87 psi).

²⁾ Available only with Approval option A.

SITRANS LVS300 Vibrating rod point level switch, pipe extended design Level and material detection in solids. Extension options up to 4 m (13.12 ft).	Article No. 7ML5737- ● ● ● ● ● - ● ●	
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Power supply		
Relays DPDT 21 ... 230 V AC 22 ... 45 V DC	1	
PNP 20 ... 40 V DC	2	

Level Measurement

Point level measurement

Vibrating switches / SITRANS LVS300

Selection and ordering data (continued)

SITRANS LVS300 Vibrating rod point level switch, pipe extended design Level and material detection in solids. Extension options up to 4 m (13.12 ft).	Article No.	
	7ML5737-	● ● ● ● ● - ● ●
Process temperature		
Without temperature isolator [up to T _{process} = 150 °C (302 °F) at Tamb < 40 °C (104 °F)]	A	
With temperature isolator [up to T _{process} = 150 °C (302 °F) at Tamb > 40 °C (104 °F)]	B	
Process connection		
Threaded		
Thread G 1½" (BSPP) EN ISO 228-1	A	
Thread G 1¼" (BSPP) EN ISO 228-1	B	
Thread G 1" (BSPP) EN ISO 228-1	C	
Thread NPT 1½" (Taper) ANSI B1.20.1	D	
Thread NPT 1¼" (Taper) ANSI B1.20.1	E	
Thread NPT 1" (Taper) ANSI B1.20.1	F	
Tri-clamp 2" (DN50) ISO 2852	G	
Flanged		
Flange DN 100 PN6, EN1092-1 ¹⁾	H	
Flange DN 100 PN16, EN1092-1	J	
2" ASME 150 lb B16.5	K	
3" ASME 150 lb B16.5	L	
4" ASME 150 lb B16.5	M	
Extension length		
Extension length Stainless steel threads 304 (1.4301), flanges 321 (1.4541)		
200 ... 500 mm (7.87 ... 19.69 inch)	1	2
501 ... 750 mm (19.72 ... 29.53 inch)	1	3
751 ... 1 000 mm (29.57 ... 39.37 inch)	1	4
1 001 ... 1 250 mm (39.41 ... 49.21 inch)	1	5
1 251 ... 1 500 mm (49.25 ... 59.06 inch)	1	6
1 501 ... 1 750 mm (59.09 ... 68.90 inch)	1	7
1 751 ... 2 000 mm (68.94 ... 78.74 inch)	1	8
2 001 ... 2 250 mm (78.78 ... 88.58 inch)	2	1
2 251 ... 2 500 mm (88.62 ... 98.43 inch)	2	2
2 501 ... 2 750 mm (98.46 ... 108.27 inch)	2	3
2 751 ... 3 000 mm (108.31 ... 118.11 inch)	2	4
3 001 ... 3 250 mm (118.15 ... 127.95 inch)	2	5
3 251 ... 3 500 mm (127.99 ... 137.80 inch)	2	6
3 501 ... 3 750 mm (137.83 ... 147.64 inch)	2	7
3 751 ... 4 000 mm (147.68 ... 157.48 inch)	2	8
Extension length Stainless steel 316 L (1.4404)		
200 ... 500 mm (7.87 ... 19.69 inch)	4	2
501 ... 750 mm (19.72 ... 29.53 inch)	4	3
751 ... 1 000 mm (29.57 ... 39.37 inch)	4	4
1 001 ... 1 250 mm (39.41 ... 49.21 inch)	4	5
1 251 ... 1 500 mm (49.25 ... 59.06 inch)	4	6
1 501 ... 1 750 mm (59.09 ... 68.90 inch)	4	7
1 751 ... 2 000 mm (68.94 ... 78.74 inch)	4	8
2 001 ... 2 250 mm (78.78 ... 88.58 inch)	5	1
2 251 ... 2 500 mm (88.62 ... 98.43 inch)	5	2
2 501 ... 2 750 mm (98.46 ... 108.27 inch)	5	3
2 751 ... 3 000 mm (108.31 ... 118.11 inch)	5	4
3 001 ... 3 250 mm (118.15 ... 127.95 inch)	5	5
3 251 ... 3 500 mm (127.99 ... 137.80 inch)	5	6
3 501 ... 3 750 mm (137.83 ... 147.64 inch)	5	7
3 751 ... 4 000 mm (147.68 ... 157.48 inch)	5	8
Material process connection/extension		
Stainless steel threads 304 (1.4301), flanges 321 (1.4541), Tri-clamp 304 (1.4301) ²⁾		1
Stainless steel 316 L (1.4404) ³⁾		2

Selection and ordering data (continued)

SITRANS LVS300 Vibrating rod point level switch, pipe extended design Level and material detection in solids. Extension options up to 4 m (13.12 ft).	Article No. 7ML5737- ● ● ● ● ● - ● ●
Approvals	
CE	A
ATEX II 1/2D Ex ta/tb IIIC T1 Da/Db IP6X	B
FM _{US} and FM _C General Purpose	C
FM _{US} and FM _C DIP Class II, III Div. 1, Groups E, F, G	D

Selection and Ordering data	Order code
Further designs	
Please add "-Z" to Article No. and specify Order code(s).	
Enter the total insertion length in plain text description, max. 4 000 mm (157.48 inch)	Y01
Stainless steel tag [(70 mm x 13 mm (2.76 x 0.51 inch))]: Measuring-point number/identification (max. 27 characters) specify in plain text	Y14
Signal bulb inserted in M20 cable gland ⁴⁾	A20
Sliding sleeve, for application without overpressure max. 150 °C (302 °F), min. length 501 mm (19.72 inch) ⁵⁾⁶⁾⁷⁾	P12
Sliding sleeve, for application with overpressure, max. 16 bar (232 psi), max. 150 °C (302 °F), min. length 501 mm (19.72 inch) ⁶⁾	P13
Factory test certificate - M to DIN 55350, Part 18	C11
Operating Instructions	
All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation	
Spare parts	
Replacement Electronics Modules are available. Contact factory for pricing.	

1) Max. 6 bar (87 psi).

2) Available with extension length 12.

3) Available with extension length 42.

4) Available only with Approval option A.

5) Available only with Approval options A and C.

6) Available only with Process connection options A, D, H, J, K, L, M, not available with extension length 12 and 42.

7) Available only with Material Process connection/extension option 1.

SITRANS LVS300 Vibrating rod point level switch, customer supplied tube Level and material detection in solids. Requires flexible, customer supplied, pipe extensions with insertion to 4 m (13.12 ft).	Article No. 7ML5738- ● ● ● ● ● - ● ●
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	
Power supply	
Relays DPDT 21 ... 230 V AC 22 ... 45 V DC	1
PNP 20 ... 40 V DC	2
Process temperature	
Without temperature isolator [up to T _{process} = 150 °C (302 °F) at Tamb < 40 °C (104 °F)]	A
Process connection	
Threaded	
Thread G 1½" (BSPP) EN ISO 228-1	A
Thread NPT 1½" (Taper) ANSI B1.20.1	D
Tri-clamp 2" (DN50) ISO 2852	G
Flanged	
Flange DN 100 PN6, EN1092-1 ¹⁾	H
Flange DN 100 PN16, EN1092-1	J
2" ASME 150 lb B16.5	K
3" ASME 150 lb B16.5	L
4" ASME 150 lb B16.5	M

Level Measurement

Point level measurement

Vibrating switches / SITRANS LVS300

Selection and ordering data (continued)

SITRANS LVS300 Vibrating rod point level switch, customer supplied tube	Article No.							
Level and material detection in solids. Requires flexible, customer supplied, pipe extensions with insertion to 4 m (13.12 ft).	7ML5738- ● ● ● ● ● - ● ●							
Extension length								
1 500 mm (59 inch), adjustable cable length					1	1		
4 000 mm (157 inch), adjustable cable length					1	2		
Material process connection/extension								
Stainless steel threads 304 (1.4301), flanges 321 (1.4541), Tri-clamp 304 (1.4301)							1	
Stainless steel 316 L (1.4404)							2	
Approvals								
CE								A
ATEX II 1/2D Ex ta/tb IIIC T1 Da/Db IP6X								B
FM _{US} and FM _C General Purpose								C
FM _{US} and FM _C DIP Class II, III Div.1, Groups E, F, G								D

Selection and Ordering data	Order code
Further designs	
Please add "-Z" to Article No. and specify Order code(s).	
Stainless steel tag [(70 mm x 13 mm (2.76 x 0.51 inch))]: Measuring-point number/identification (max. 27 characters) specify in plain text	Y14
Signal bulb inserted in M20 cable gland ²⁾	A20
Factory test certificate - M to DIN 55350, Part 18	C11
Operating Instructions	
All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation	
Spare parts	
Replacement Electronics Modules are available. Contact factory for pricing.	

¹⁾ Max. 6 bar (87 psi).

²⁾ Available only with Approval option A.

Technical specifications

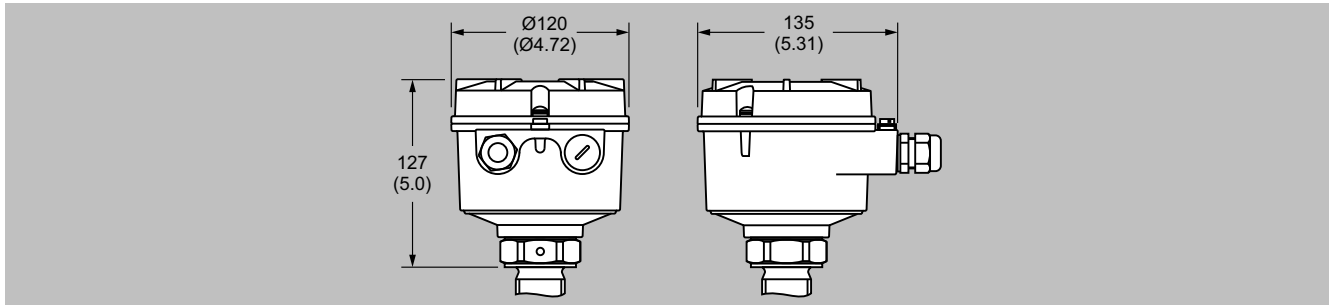
SITRANS LVS300	
Mode of operation	
Measuring principle	Vibrating point level switch
Input	
Measured variable	High, low, and demand
Measuring frequency	
• Standard	330 Hz
Output	
PNP	Open collector: Permanent load max. 0.4 A, short-circuit and overload protected (reverse protection)
Relay	DPDT relay
Signal delay	<ul style="list-style-type: none"> Probe uncovered to covered: approximately 1 second Probe covered to uncovered: approximately 1 ... 2 seconds
Relay fail-safe	High or low, switch selectable
Alarm output	<ul style="list-style-type: none"> Relay 8 A at 250 V AC, non-inductive Relay 5 A at 30 V DC, non-inductive
Sensitivity	Four sensitivity settings, switch selectable
Rated operating conditions	
Installation conditions	
• Location	Indoor/outdoor
Ambient conditions	
• Ambient temperature	-40 ... +60 °C (-40 ... +140 °F)
• Storage temperature	-40 ... +80 °C (-40 ... +176 °F)
• Installation category	II
• Pollution degree	2
Medium conditions	
• Process temperature	-40 ... +150 °C (-40 ... +302 °F)
• Pressure (vessel)	Max. 16 bar g (232 psi g) European Pressure Directive 2014/68/EU: Category 1
• Minimum material density	Approx. 20 g/l (1.2 lb/ft ³)
Design	
Material	
• Enclosure	Aluminum powder coat
Process connection	<ul style="list-style-type: none"> G 1", G 1 1/4", G 1 1/2" DIN 228; NPT 1", NPT 1 1/4", NPT 1 1/2" ANSI B 1.20.1 Flange: according to selection 1.4541 (321) or 1.4404 (316L) Tri-clamp: stainless steel 1.4301 (304) or 1.4404 (316L) 2" (DN 50) ISO 2852
Probe material	<ul style="list-style-type: none"> Oscillator material: stainless steel 1.4404 (316L) Stainless steel 1.4301 (304)/1.4541 (321) or 1.4404 (316L) (process connection and tube extension)
Degree of protection	IP67 (EN 60529), NEMA Type 4X
Conduit entry	2 x M20 x 1.5 or 2 x 1/2" NPT
Weight	<ul style="list-style-type: none"> Standard version: 1.3 kg (2.9 lb) +1.3 kg/m (+2.9 lb per 39.3 inch) extension Customer supplied pipe: 1.8 kg (4.0 lb) +1.3 kg/m (+2.9 lb per 39.3 inch) extension
Power supply	<ul style="list-style-type: none"> Relay DPDT 21 ... 230 V, 50 ... 60 Hz, ± 10 %* 22 VA, 22 ... 45 V DC, ± 10 %* 2W *incl. ± 10 % of EN 61010 3-wire PNP 20 ... 40 V DC, ± 10 %* *incl. ± 10 % of EN 61010
Certificates and approvals	CE, ATEX, FM

Level Measurement

Point level measurement

Vibrating switches / SITRANS LVS300

Dimensional drawings



SITRANS LVS300 enclosure, dimensions in mm (inch)

Compact version

Pipe extension

Pipe extension - customer mounted

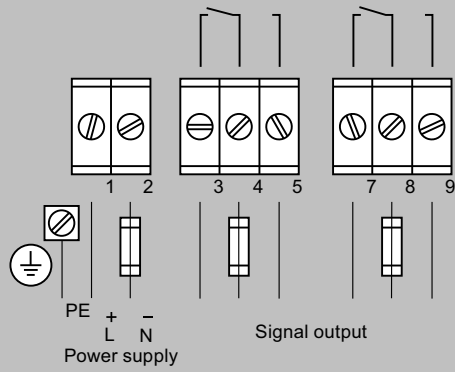
	Approval	Process connection	Thread on extension pipe
①	CE, ATEX	G 1½"	R 1"
	FM	NPT 1½"	NPT 1"
②	Approval	Thread on extension pipe	
	CE, ATEX	R 1"	
	FM	NPT 1"	
③	Approval	Process connection	Thread on extension pipe
	CE, ATEX	Flange DN	R 1"
		Flange ANSI	NPT 1"
FM	Flange DN	NPT 1"	

SITRANS LVS300, dimensions in mm (inch)

Circuit diagrams

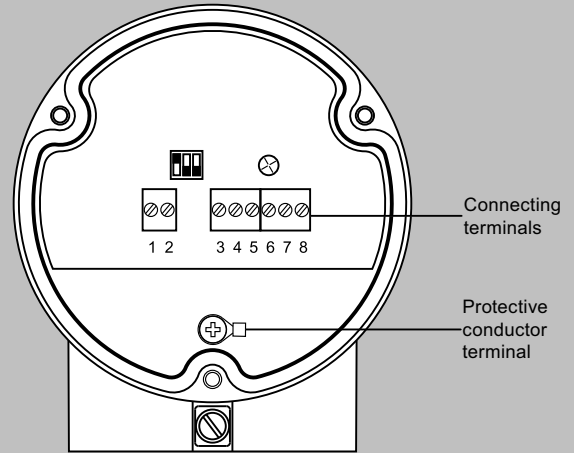
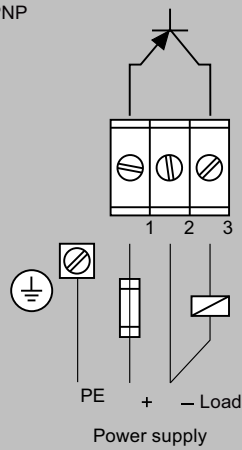
Universal voltage

Relay DPDT



3-wire

PNP



SITRANS LVS300 connections

Level Measurement

Point level measurement

Rotation paddle switches / SITRANS LPS200

Overview



SITRANS LPS200 is a rotary paddle switch for point level and material detection in bulk solids.

Benefits

- Proven paddle switch technology for bulk solids
- High integrity mechanical seal
- Universal power supply options available
- Unique friction clutch mechanism prevents damage from falling material
- Rotatable enclosure for convenient wiring
- Optional paddles for use with low density materials
- Small paddle makes for simple installation through existing process connection
- High temperature model and optional extension kit available
- Optional fail-safe configuration detects loss of rotation
- Functional Safety (SIL 2). Device suitable for use in accordance with IEC 61508 and IEC 61511

Application

The paddle switch technology detects full, empty, or demand conditions on materials such as grain, feed, cement, plastic granulate, and wood chips. The paddle switch can handle bulk densities as low as 15.06 g/l (0.94 lb/ft³) with the optional rectangular vane or 100 g/l (6.25 lb/ft³) with the standard measuring vane.

A low revolution geared motor with slip clutch drives a rotating measuring vane which senses the presence of material at the mounted level of the LPS200. As material comes into contact with the rotating paddle, rotation stops, which changes the microswitch state. When the paddle is no longer covered by material, rotation resumes and the relay reverts to its normal condition.

The LPS200 has a rugged design for use in harsh conditions in the solids industry. The sensitivity of the paddle can be adjusted for varying material properties like buildup on the vane.

The LPS200 comes in a variety of configurations including compact, extended and cable extension. It is equipped with a standard vane which is effective in most applications, but can be configured with a hinged or rectangular vane for increased sensitivity for light materials.

- Key Applications: bulk solids such as grain, feed, cement, plastic granulate, wood chips

Selection and ordering data

	Article No.	Ord. code
SITRANS LPS200 Rotary paddle point level switch, compact design Level detection in solids. Compact, side or top mount with extension options to 300 mm (11.81 inch).	7ML5725- ● ● ● ● ● - ● ● ● 0	● ● ●
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Process temperature		
Up to 80 °C (176 °F)	1	
Up to 150 °C (302 °F)	2	
Up to 250 °C (482 °F)	3	
Up to 600 °C (1 112 °F) ¹⁾²⁾	4	
Up to 80 °C (176 °F) basic version aluminum ¹⁾³⁾	5	
Up to 80 °C (176 °F) basic version stainless steel ¹⁾⁴⁾	6	
Power supply		
230 V AC, 1 rev/min.	A	
230 V AC, 5 rev/min.	C	
115 V AC, 1 rev/min.	E	
115 V AC, 5 rev/min.	G	
48 V AC, 1 rev/min.	J	
24 V AC, 1 rev/min.	K	
24 V DC, 1 rev/min.	L	
24 V DC, 5 rev/min.	N	
48 V AC, 5 rev/min.	Z	J 1 B
24 V AC, 5 rev/min.	Z	J 1 E
Universal Voltage, 1 rev/min.	Z	J 2 A
Universal Voltage, 1 rev/min., fail-safe	Z	J 2 B
Universal Voltage, 5 rev/min.	Z	J 2 C
Universal Voltage, 5 rev/min. fail-safe	Z	J 2 D
Process connection		
Threaded		
G 1¼" [(BSPP), EN ISO 228-1]	A	
G 1" [(BSPP), EN ISO 228-1]	B	
G 1½" [(BSPP), EN ISO 228-1]	C	
1" NPT [(Taper), ANSI/ASME B1.20.1]	D	
1¼" NPT [(Taper), ANSI/ASME B1.20.1]	E	
1½" NPT [(Taper), ANSI/ASME B1.20.1]	F	
Flanged		
DN 32 PN 6, EN 1092-1, flat face ⁵⁾	G	
DN 100 PN 6, EN 1092-1, flat face ⁵⁾	H	
DN 100 PN 16, EN 1092-1, flat face	J	
2" ASME 150 lb B16.5, raised face	K	
3" ASME 150 lb B16.5, raised face	L	
4" ASME 150 lb B16.5, raised face	M	
2" Tri-clamp (DN 50) ISO 2852 ⁶⁾	N	
Process pressure		
Up to 0.5 bar (7.25 psi)	1	
Up to 5 bar (72.5 psi)	2	
Up to 10 bar (145 psi)	3	
Process connection material		
Aluminum ⁷⁾		1
Stainless steel, threads 303 (1.4305), flanges 321 (1.4541), Tri-clamp 304 (1.4301)		2
Stainless steel 316L (1.4404) ⁸⁾		3
Extension length		
100 mm (3.94 inch) ⁹⁾		1
150 mm (5.91 inch)		2
200 mm (7.87 inch)		3
250 mm (9.84 inch)		4
300 mm (11.81 inch)		5
Measuring vane		
Boot shaped, 35 x 106 mm (1.38 x 4.17 inch) ¹⁰⁾		A
Hinged vane, 65 x 200 mm (2.56 x 7.87 inch) ¹⁰⁾¹¹⁾		B

Level Measurement

Point level measurement

Rotation paddle switches / SITRANS LPS200

Selection and ordering data (continued)

	Article No.	Ord. code
SITRANS LPS200 Rotary paddle point level switch, compact design Level detection in solids. Compact, side or top mount with extension options to 300 mm (11.81 inch).	7ML5725- ● ● ● ● ● - ● ● ● 0	● ● ●
Boot shaped, 28 x 98 mm (1.10 x 3.86 inch)		C
Rectangular, 50 x 150 mm (1.97 x 5.91 inch) ¹²⁾		D
Rectangular, 50 x 250 mm (1.97 x 9.84 inch) ¹²⁾		E
Rectangular, 98 x 150 mm (3.86 x 5.91 inch) ¹¹⁾¹²⁾		F
Rectangular, 98 x 250 mm (3.86 x 9.84 inch) ¹¹⁾¹²⁾		G
Rectangular, 50 x 98 mm (1.97 x 3.86 inch) ¹²⁾		H
Approvals		
CSA/FM Dust Ignition Proof, RCM		A
ATEX II ½ D, RCM		B
CSA/FM General Purpose, RCM, CE		C
CE, RCM		D
IEC Ex ta/tb IIIC		E
EAC Ex ta/tb IIIC Da/Db		F

Selection and Ordering data	Order code
Further Designs	
Please add "-Z" to Article No. and specify Order code(s).	
Heating of enclosure ¹³⁾¹⁴⁾	A35
Signal bulb inserted in M20 cable gland ¹³⁾	A20
Food grade materials (in contact with process), according to 1935/2004/EC, with FDA conform shaft sealing ¹⁵⁾	K01
Stainless steel tag [100 x 45 mm (3.94 x 1.77 inch)]: Measuring-point number/identification (max. 27 characters); specify in plain text	Y14
Functional Safety (SIL 2). Device suitable for use in accordance with IEC 61508 and IEC 61511 ¹⁷⁾¹⁸⁾	C20
Factory test certificate - M to DIN 55350, Part 18	C11

Spare Parts and Accessories	Article No.
Operating Instructions	
All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation	
Spare Parts	
Replacement vane, boot shape, 35 x 106 mm (1.38 x 4.17 inch)	7ML1830-1KH
Hinged vane, 98 x 200 mm (3.86 x 7.87 inch)	7ML1830-1KJ
Rigid extension kit	
(Includes spring coupling, rigid tube extension, and required pins)	
Extension: 500, 400, 300 mm (19.7, 15.8, 11.8 inch) ¹⁶⁾	7ML5711-0AA
Extension: 1 000, 900, 800, 700, 600 mm (39.4, 35.4, 31.5, 27.6, 23.6 inch) ¹⁶⁾	7ML5711-1AA
Extension: 1 500, 1 400, 1 300, 1 200, 1 100 mm (59.1, 55.1, 51.2, 47.2, 43.3 inch) ¹⁶⁾	7ML5711-2AA
Rope extension kit, 2 m (6.56 ft)	7ML1830-1KK
SITRANS LPS200, compact for up to 80 °C (176 °F), aluminum, with power supply E, process connection E, process pressure 1, process connection material 1, extension length 2, measuring vane A, and approval C	7ML5725-5EE11-2A-C0
SITRANS LPS200, compact for up to 80 °C (176 °F), stainless steel, with power supply Z (J2A), process connection C, process pressure 1, process connection material 2, extension length 2, measuring vane A, and approval B	7ML5725-6ZC12-2-AB0 J2A
SITRANS LPS200, compact for up to 80 °C (176 °F), stainless steel, with power supply Z (J2A), process connection E, process pressure 1, process connection material 2, extension length 2, measuring vane A, and approval A	7ML5725-6ZE12-2-A0 J2A

Selection and ordering data (continued)

- 1) Available with Approval options C and D only, up to 0.5 bar.
- 2) Not available with Process connections A, B, D, E, and G.
- 3) Only available with the following configurations 7ML5725-5AC11-2AD0 or 7ML5725-5EE11-2AC0.
- 4) Only available with the following configurations 7ML5725-6ZC12-2AB0 J2A or 7ML5725-6ZE12-2AA0 J2A.
- 5) Available with Process pressure options 1 and 2 only.
- 6) Available with Process temperature option 1 only.
- 7) Available with Process connection options A ... F only, Process pressure option 1 and Process temperature options 1 and 5 only.
- 8) Available with Process connection options C, F, H ... N and Measuring vane options A and B.
- 9) Available with Measuring vane options A, C, D, E, H only.
- 10) Add 16 mm (0.63 inch) to extension length.
- 11) Available with Extension lengths 2, 3, 4, 5.
- 12) Available with Process connection options H ... M only.
- 13) Available with Approval option D only.
- 14) Available only with Power supply options J2A, J2B, J2C, and J2D.
- 15) Available up to 250 °C (482 °F).
- 16) Pendulum shaft 500 mm/1 000 mm should be selected with 150 mm standard length 2 and vane A (35 x 106) to get to the desired lengths.
- 17) Available with Power supply options J2A and J2C only.
- 18) Available with Approval options A, B, C, D, and E only. Approvals A and C with FM only.

	Article No.	Ord. code
SITRANS LPS200 Rotary paddle point level switch, shaft protected design Level detection in aggressive solids. Compact, side or top mount, with enhanced shaft protection. Extension options to 300 mm (11.81 inch).	7ML5726- ● ● ● ● ● - ● ● ● ● ●	● ● ●
Process temperature		
Up to 80 °C (176 °F)	1	
Up to 150 °C (302 °F)	2	
Up to 250 °C (482 °F)	3	
Up to 600 °C (1 112 °F) ¹⁾²⁾	4	
Up to 80 °C (176 °F) basic version ³⁾	5	
Power supply		
230 V AC, 1 rev/min.	A	
230 V AC, 5 rev/min.	C	
115 V AC, 1 rev/min.	E	
115 V AC, 5 rev/min.	G	
48 V AC, 1 rev/min.	J	
24 V AC, 1 rev/min.	K	
24 V DC, 1 rev/min.	L	
24 V DC, 5 rev/min.	N	
48 V AC, 5 rev/min.	Z	J 1 B
24 V AC, 5 rev/min.	Z	J 1 E
Universal voltage, 1 rev/min.	Z	J 2 A
Universal voltage, 1 rev/min., fail-safe	Z	J 2 B
Universal voltage, 5 rev/min.	Z	J 2 C
Universal voltage, 5 rev/min., fail-safe	Z	J 2 D
Process connection		
Threaded		
G 1¼" [(BSPP), EN ISO 228-1]	A	
G 1½" [(BSPP), EN ISO 228-1]	B	
1¼" NPT [(Taper), ANSI/ASME B1.20.1]	C	
1½" NPT [(Taper), ANSI/ASME B1.20.1]	D	
Flanged		
DN 32 PN 6, EN 1092-1, flat face ⁴⁾	E	
DN 100 PN 6, EN 1092-1, flat face ⁴⁾	F	
DN 100 PN 16, EN 1092-1, flat face	G	
2" ASME 150 lb B16.5, raised face	H	
3" ASME 150 lb B16.5, raised face	J	
4" ASME 150 lb B16.5, raised face	K	
2" Tri-clamp (DN 50) ISO 2852 ⁵⁾	L	
Process pressure		
Up to 0.5 bar (7.25 psi)	1	
Up to 5 bar (72.5 psi)	2	
Up to 10 bar (145 psi)	3	

Level Measurement

Point level measurement

Rotation paddle switches / SITRANS LPS200

Selection and ordering data (continued)

	Article No.	Ord. code
SITRANS LPS200 Rotary paddle point level switch, shaft protected design Level detection in aggressive solids. Compact, side or top mount, with enhanced shaft protection. Extension options to 300 mm (11.81 inch).	7ML5726- ● ● ● ● ● - ● ● ● ● ●	● ● ●
Process connection material		
Aluminum ⁶⁾		1
Stainless steel, threads 303 (1.4305), flanges 321 (1.4541), Tri-clamp 304 (1.4301) ¹⁸⁾		2
Stainless steel 316L (1.4404) ⁷⁾		3
Extension length		
150 mm (5.91 inch) ⁸⁾		1
200 mm (7.87 inch)		2
250 mm (9.84 inch)		3
300 mm (11.81 inch)		4
Extension material (protection tube)		
Aluminum ⁹⁾		A
Stainless steel 303 (1.4305)		B
Stainless steel 316L (1.4404) ¹⁰⁾		C
Measuring vane		
Boot shaped, 35 x 106 mm (1.38 x 4.17 inch) ¹¹⁾		A
Hinged vane, 65 x 200 mm (2.56 x 7.87 inch) ¹¹⁾¹²⁾		B
Rectangular, 50 x 150 mm (1.97 x 5.91 inch) ¹³⁾		D
Rectangular, 50 x 250 mm (1.97 x 9.84 inch) ¹³⁾		E
Rectangular, 98 x 150 mm (3.86 x 5.91 inch) ¹²⁾¹³⁾		F
Rectangular, 98 x 250 mm (3.86 x 9.84 inch) ¹²⁾¹³⁾		G
Rectangular, 50 x 98 mm (1.97 x 3.86 inch) ¹³⁾		H
Approvals		
CSA/FM Dust Ignition Proof, RCM		1
ATEX II ½ D, RCM		2
CSA/FM General Purpose, RCM, CE		3
CE, RCM		4
IEC Ex ta/tb IIIC		5
EAC Ex ta/tb IIIC Da/Db		6

Selection and Ordering data	Order code
Further Designs	
Please add "-Z" to Article No. and specify Order code(s).	
Heating of enclosure ¹⁴⁾¹⁵⁾	A35
Signal bulb inserted in M20 cable gland ¹⁴⁾	A20
Food grade materials (in contact with process), according to 1935/2004/EC, with FDA conform shaft sealing ¹⁶⁾	K01
Stainless steel tag [100 x 45 mm (3.94 x 1.77 inch)]: Measuring-point number/identification (max. 27 characters); specify in plain text	Y14
Functional Safety (SIL 2). Device suitable for use in accordance with IEC 61508 and IEC 61511. ¹⁷⁾¹⁹⁾	C20
Factory test certificate - M to DIN 55350, Part 18	C11

Spare Parts	Article No.
Operating Instructions	
Note: The Operating Instructions should be ordered as a separate line on the order. All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation	
Spare Parts	
Replacement vane, boot shape, 35 x 106 mm (1.38 x 4.17 inch)	7ML1830-1KH
Hinged vane, 98 x 200 mm (3.86 x 7.87 inch)	7ML1830-1KJ

Selection and ordering data (continued)

Spare Parts	Article No.
SITRANS LPS200, extended for up to 80 °C (176 °F), power supply Z (J2A), process connection B, process pressure 1, process connection material 2, extension length 2, extension material B, measuring vane A, and approval 2	7ML5726-5ZB12-2B-A2 J2A
SITRANS LPS200, extended for up to 80 °C (176 °F), power supply Z (J2A), process connection C, process pressure 1, process connection material 2, extension length 2, extension material B, measuring vane A, and approval 1	7ML5726-5ZC12-2B-A1 J2A

- 1) Available with Approval options 3 and 4 only and up to max 0.5 bar.
- 2) Not available with Process connection options A, C, E.
- 3) Only available with the following configurations 7ML5726-5ZB12-2BA2 J2A or 7ML5726-5ZC12-2BA1 J2A.
- 4) Available with Process pressure options 1 and 2 only.
- 5) Available with Process temperature option 1 only.
- 6) Available with Process connection options A ... E only, available with process pressure option 1 only, and process temperature option 1 only.
- 7) Extension and vane will also change to 316L, only for Process connection options B, D, F ... L and vane A.
- 8) Available with Measuring vane options A, D, E, H only.
- 9) Available with Process pressure option 1 and process temperature option 1 only.
- 10) Available with Process connection options B, D, F ... L and vane A.
- 11) Add 16 mm (0.63 inch) to extension length.
- 12) Available with Extension length options 2 ... 4 only.
- 13) Available with Process connection options F, G, H, J, K only.
- 14) Available with Approval option 4 only.
- 15) Available only with Power supply options J2A, J2B, J2C, and J2D.
- 16) Available up to 250 °C (482 °F).
- 17) Available with Power supply options J2A and J2C only.
- 18) Available with Extension material Stainless steel, threads 303 option B only.
- 19) Available with Approval options 1, 2, 3, 4, and 5 only. Approvals 1 and 3 with FM only.

	Article No.	Ord. code
SITRANS LPS200 Rotary paddle point level switch, cable extension design Level detection in solids. Top mount, with extension options to 10 m (32.80 ft).	7ML5727- ● ● ● ● ● - ● ● ● 0	● ● ●
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Process temperature		
Up to 80 °C (176 °F)	1	
Up to 150 °C (302 °F)	2	
Up to 250 °C (482 °F)	3	
Up to 600 °C (1 112 °F) ¹⁾²⁾	4	
Up to 80 °C (176 °F) basic version ³⁾	5	
Power supply		
230 V AC, 1 rev/min.	A	
230 V AC, 5 rev/min.	C	
115 V AC, 1 rev/min.	E	
115 V AC, 5 rev/min.	G	
48 V AC, 1 rev/min.	J	
24 V AC, 1 rev/min.	K	
24 V DC, 1 rev/min.	L	
24 V DC, 5 rev/min.	N	
48 V AC, 5 rev/min.	Z	J 1 B
24 V AC, 5 rev/min.	Z	J 1 E
Universal voltage, 1 rev/min.	Z	J 2 A
Universal voltage, 1 rev/min., fail-safe	Z	J 2 B
Universal voltage, 5 rev/min.	Z	J 2 C
Universal voltage, 5 rev/min., fail-safe	Z	J 2 D
Process connection		
Threaded		
G 1¼" [(BSPP), EN ISO 228-1]	A	
G 1½" [(BSPP), EN ISO 228-1]	B	
1¼" NPT [(Taper), ANSI/ASME B1.20.1]	C	
1½" NPT [(Taper), ANSI/ASME B1.20.1]	D	
Flanged		
DN 32 PN 6, EN 1092-1, flat face ⁴⁾	E	
DN 100 PN 6, EN 1092-1, flat face ⁴⁾	F	

Level Measurement

Point level measurement

Rotation paddle switches / SITRANS LPS200

Selection and ordering data (continued)

	Article No.	Ord. code
SITRANS LPS200 Rotary paddle point level switch, cable extension design Level detection in solids. Top mount, with extension options to 10 m (32.80 ft).	7ML5727- ● ● ● ● ● - ● ● ● 0	● ● ●
DN 100 PN 16, EN 1092-1, flat face	G	
2" ASME 150 lb B16.5, raised face	H	
3" ASME 150 lb B16.5, raised face	J	
4" ASME 150 lb B16.5, raised face	K	
Process pressure		
Up to 0.5 bar (7.25 psi)	1	
Up to 5 bar (72.5 psi)	2	
Up to 10 bar (145 psi)	3	
Process connection material		
Aluminum ⁵⁾	1	
Stainless steel, threads 303 (1.4305), flanges 321 (1.4541)	2	
Cable extension length		
Standard cable length, 2 000 mm (78.74 inch)		0
Add Order code Y01 and plain text: "Insertion length ... mm"		
500 ... 1 000 mm (19.69 ... 39.37 inch)		1
Cable length 1 001 ... 2 000 mm (39.41 ... 78.74 inch)		2
Cable length 2 001 ... 3 000 mm (78.78 ... 118.11 inch)		3
Cable length 3 001 ... 4 000 mm (118.15 ... 157.48 inch)		4
Cable length 4 001 ... 5 000 mm (157.52 ... 196.85 inch)		5
Cable length 5 001 ... 6 000 mm (196.89 ... 236.22 inch)		6
Cable length 6 001 ... 7 000 mm (236.26 ... 275.59 inch)		7
Cable length 7 001 ... 10 000 mm (275.63 ... 393.70 inch)		8
Without extension ¹²⁾		9
		N 1 A
Measuring vane		
Boot shaped, 35 x 106 mm (1.38 x 4.17 inch) ⁶⁾		A
Hinged vane, 65 x 200 mm (2.56 x 7.87 inch) ⁶⁾		B
Boot shaped, 28 x 98 mm (1.10 x 3.86 inch) ⁷⁾		C
Rectangular, 50 x 150 mm (1.97 x 5.91 inch) ⁷⁾		D
Rectangular, 50 x 250 mm (1.97 x 9.84 inch) ⁷⁾		E
Rectangular, 98 x 150 mm (3.86 x 5.91 inch) ⁷⁾		F
Rectangular, 50 x 98 mm (1.97 x 3.86 inch) ⁷⁾		G
Approvals		
CSA/FM Dust Ignition Proof, RCM		A
ATEX II ½ D, RCM		B
CSA/FM General Purpose, RCM, CE		C
CE, RCM		D
IEC Ex ta/tb IIIC		E
EAC Ex ta/tb IIIC Da/Db		F

Selection and Ordering data	Order code
Further Designs	
Please add "-Z" to Article No. and specify Order code(s).	
Total insertion length:	Y01
Stainless steel tag [100 x 45 mm (3.94 x 1.77 inch)]:	Y14
Measuring-point number/identification (max. 27 characters); specify in plain text	
Reinforced cable (max. 28 kN pulling force) ⁸⁾	P01
Heating of enclosure ⁹⁾¹⁰⁾	A35
Signal bulb inserted in M20 cable gland ⁹⁾	A20
Food grade materials (in contact with process), according to 1935/2004/EC, with FDA conform shaft sealing ¹¹⁾	K01
Functional Safety (SIL 2). Device suitable for use in accordance with IEC 61508 and IEC 61511. ¹³⁾¹⁴⁾	C20
Factory test certificate - M to DIN 55350, Part 18	C11

Selection and ordering data (continued)

Spare Parts	Article No.
Operating Instructions	
Note: The Operating Instructions should be ordered as a separate line on the order. All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation	
Spare Parts	
Replacement vane, boot shape, 35 x 106 mm (1.38 x 4.17 inch)	7ML1830-1KH
Hinged vane, 98 x 200 mm (3.86 x 7.87 inch)	7ML1830-1KJ
SITRANS LPS200, cable extension for up to 80 °C (176 °F), power supply Z (J2A), process connection B, process pressure 1, process connection material 2, extension length 0, measuring vane A, and approval B	7ML5727-5ZB12-0-AB0 J2A
SITRANS LPS200, cable extension for up to 80 °C (176 °F), power supply Z (J2A), process connection C, process pressure 1, process connection material 2, extension length 0, measuring vane A, and approval A	7ML5727-5ZC12-0-AA0 J2A

- 1) Available with Approval options C and D up to max. 0.5 bar.
- 2) Not available with Process connections A, C, E.
- 3) Only available with the following configurations 7ML5727-5ZC12-0AA0 J2A or 7ML5727-5ZB12-0AB0 J2A.
- 4) Available with Process pressure options 1 and 2 only.
- 5) Available with Process connections A ... E only, Process pressure option 1 only and process temperature options 1 and 5 only.
- 6) Add 16 mm (0.63 inch) to extension length.
- 7) Available with Process connections F ... K only.
- 8) Available only for Process temperature up to 80 °C (176 °F) and Process connection material 2.
- 9) Available with Approval option D.
- 10) Available only with Power supply options J2A, J2B, J2C, and J2D.
- 11) Available up to 250 °C (482 °F).
- 12) Not available with P01 and available with Approval D, mounting kit for rope extension included.
- 13) Available with Power supply options J2A and J2C only.
- 14) Available with Approval options A, B, C, D, and E only. Approvals A and C with FM only.

	Article No.	Ord. code
SITRANS LPS200 Rotary paddle point level switch, angled extension design Level detection in aggressive applications. Bottom or side mount with enhanced shaft protection. Extension options to 300 mm (11.81 inch).	7ML5728- ● ● ● ● ● - ● ● ● 0	● ● ●
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Process temperature		
Up to 80 °C (176 °F)	1	
Up to 150 °C (302 °F)	2	
Up to 250 °C (482 °F)	3	
Power supply		
230 V AC, 1 rev/min.	A	
230 V AC, 5 rev/min.	C	
115 V AC, 1 rev/min.	E	
115 V AC, 5 rev/min.	G	
48 V AC, 1 rev/min.	J	
24 V AC, 1 rev/min.	K	
24 V DC, 1 rev/min.	L	
24 V DC, 5 rev/min.	N	
48 V AC, 5 rev/min.	Z	J 1 B
24 V AC, 5 rev/min.	Z	J 1 E
Universal voltage, 1 rev/min.	Z	J 2 A
Universal voltage, 1 rev/min., fail-safe	Z	J 2 B
Universal voltage, 5 rev/min.	Z	J 2 C
Universal voltage, 5 rev/min., fail-safe	Z	J 2 D
Process connection		
Flanged		
DN 100 PN 6, EN 1092-1, flat face ¹⁾	A	
DN 100 PN 16, EN 1092-1, flat face	B	
4" ASME 150 lb B16.5, raised face	C	

Level Measurement

Point level measurement

Rotation paddle switches / SITRANS LPS200

Selection and ordering data (continued)

	Article No.	Ord. code
SITRANS LPS200 Rotary paddle point level switch, angled extension design Level detection in aggressive applications. Bottom or side mount with enhanced shaft protection. Extension options to 300 mm (11.81 inch).	7ML5728- ● ● ● ● ● - ● ● ● 0	● ● ●
Process pressure		
Up to 0.5 bar (7.25 psi)	1	
Up to 5 bar (72.5 psi)	2	
Up to 10 bar (145 psi)	3	
Process connection material		
Stainless steel 303/321 (1.4305/1.4541)	1	
Extension length		
125 mm (4.92 inch)		1
150 mm (5.91 inch)		2
200 mm (7.87 inch)		3
250 mm (9.84 inch)		4
300 mm (11.81 inch)		5
Measuring vane		
Rectangular vane, 50 x 98 mm (1.97 x 3.86 inch)		A
Rectangular vane, 50 x 150 mm (1.97 x 5.91 inch)		B
Rectangular vane, 50 x 250 mm (1.97 x 9.84 inch)		C
Rectangular vane, 98 x 150 mm (3.86 x 5.91 inch)		D
Rectangular vane, 98 x 250 mm (3.86 x 9.84 inch)		E
Hinged vane, 65 x 200 mm (2.56 x 7.87 inch)		F
Approvals		
CSA/FM Dust Ignition Proof, RCM		A
ATEX II ½ D, RCM		B
CSA/FM General Purpose, RCM, CE		C
CE, RCM		D
IEC Ex ta/tb IIIC		E
EAC Ex ta/tb IIIC Da/Db		F

Selection and Ordering data	Order code
Further Designs	
Please add "-Z" to Article No. and specify Order code(s).	
Heating of enclosure ²⁾³⁾	A35
Signal bulb inserted in M20 cable gland ²⁾	A20
Food grade materials (in contact with process), according to 1935/2004/EC, with FDA conform shaft sealing ⁴⁾	K01
Stainless steel tag [100 x 45 mm (3.94 x 1.77 inch)]: Measuring-point number/identification (max. 27 characters); specify in plain text	Y14
Functional Safety (SIL 2). Device suitable for use in accordance with IEC 61508 and IEC 61511. ⁴⁾⁵⁾	C20
Factory test certificate - M to DIN 55350, Part 18	C11

Spare Parts	Article No.
Operating Instructions	
Note: The Operating Instructions should be ordered as a separate line on the order. All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation	
Spare Parts	
Replacement vane, boot shape, 35 x 106 mm (1.38 x 4.17 inch)	7ML1830-1KH
Hinged vane, 98 x 200 mm (3.86 x 7.87 inch)	7ML1830-1KJ

¹⁾ Available with Process pressure options 1 and 2 only.

²⁾ Available with Approval option D only.

³⁾ Available only with Power supply options J2A, J2B, J2C, and J2D.

Selection and ordering data (continued)

4) Available with Power supply options J2A and J2C only.

5) Available with Approval options A, B, C, D, and E only. Approvals A and C with FM only.

	Article No.	Ord. code
SITRANS LPS200 Rotary paddle point level switch, rigid extension design Level detection in solids. Top mount, with extension options to 4 m (13.12 ft).	7ML5730- ● ● ● ● ● - ● ● ● ● ●	● ● ●
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Process temperature		
Up to 80 °C (176 °F)	1	
Up to 150 °C (302 °F)	2	
Up to 250 °C (482 °F)	3	
Up to 600 °C (1 112 °F) ¹⁾²⁾	4	
Power supply		
230 V AC, 1 rev/min.	A	
230 V AC, 5 rev/min.	C	
115 V AC, 1 rev/min.	E	
115 V AC, 5 rev/min.	G	
48 V AC, 1 rev/min.	J	
24 V AC, 1 rev/min.	K	
24 V DC, 1 rev/min.	L	
24 V DC, 5 rev/min.	N	
48 V AC, 5 rev/min.	Z	J 1 B
24 V AC, 5 rev/min.	Z	J 1 E
Universal voltage, 1 rev/min.	Z	J 2 A
Universal voltage, 1 rev/min., fail-safe	Z	J 2 B
Universal voltage, 5 rev/min.	Z	J 2 C
Universal voltage, 5 rev/min., fail-safe	Z	J 2 D
Process connection		
Threaded		
G 1¼" [(BSPP), EN ISO 228-1]	A	
G 1½" [(BSPP), EN ISO 228-1]	B	
1¼" NPT [(Taper), ANSI/ASME B1.20.1]	C	
1½" NPT [(Taper), ANSI/ASME B1.20.1]	D	
Flanged		
DN 32 PN 6, EN 1092-1, flat face ³⁾	E	
DN 100 PN 6, EN 1092-1, flat face ³⁾	F	
DN 100 PN 16, EN 1092-1, flat face	G	
2" ASME 150 lb B16.5, raised face	H	
3" ASME 150 lb B16.5, raised face	J	
4" ASME 150 lb B16.5, raised face	K	
2" Tri-clamp (DN 50) ISO 2852 ⁴⁾	L	
Process pressure		
Up to 0.5 bar (7.25 psi)	1	
Up to 5 bar (72.5 psi)	2	
Up to 10 bar (145 psi)	3	
Process connection material		
Aluminum ⁵⁾		1
Stainless steel, threads 303 (1.4305), flanges 321 (1.4541), Tri-clamp 304 (1.4301)		2
Stainless steel 316L (1.4404) ⁶⁾		3
Extension material (protection tube)		
Aluminum ⁷⁾⁸⁾		0
Stainless steel 303 (1.4305) ⁹⁾		1
Stainless steel 316L (1.4404) ¹⁰⁾¹¹⁾¹²⁾		2
Extension length		
Aluminum		
250 ... 500 mm (9.84 ... 19.69 inch)		A
501 ... 750 mm (19.72 ... 29.53 inch)		B
751 ... 1 000 mm (29.57 ... 39.37 inch)		C
1 001 ... 1 250 mm (39.41 ... 42.21 inch)		D

Level Measurement

Point level measurement

Rotation paddle switches / SITRANS LPS200

Selection and ordering data (continued)

	Article No.	Ord. code
SITRANS LPS200 Rotary paddle point level switch, rigid extension design Level detection in solids. Top mount, with extension options to 4 m (13.12 ft).	7ML5730- ● ● ● ● ● - ● ● ● ● ●	● ● ●
1 251 ... 1 500 mm (49.25 ... 59.06 inch)		E
1 501 ... 1 750 mm (59.09 ... 68.90 inch)		F
1 751 ... 2 000 mm (68.94 ... 78.74 inch)		G
2 001 ... 2 250 mm (78.78 ... 88.58 inch)		H
2 251 ... 2 500 mm (88.62 ... 98.43 inch)		J
2 501 ... 2 750 mm (98.46 ... 108.27 inch)		K
2 751 ... 3 000 mm (108.31 ... 118.11 inch)		L
3 001 ... 3 250 mm (118.15 ... 127.95 inch)		M
3 251 ... 3 500 mm (127.99 ... 137.80 inch)		N
3 501 ... 3 750 mm (137.83 ... 147.64 inch)		P
3 751 ... 4 000 mm (147.67 ... 157.48 inch)		Q
Stainless steel 303 (1.4305)		
250 ... 500 mm (9.84 ... 19.69 inch)		R
501 ... 750 mm (19.72 ... 29.53 inch)		S
751 ... 1 000 mm (29.57 ... 39.37 inch)		T
1 001 ... 1 500 mm (39.41 ... 59.05 inch)		U
1 501 ... 2 000 mm (59.09 ... 78.74 inch)		V
2 001 ... 2 500 mm (78.78 ... 98.42 inch)		W
2 501 ... 3 000 mm (98.46 ... 118.11 inch)		X
3 001 ... 4 000 mm (118.15 ... 157.48 inch)		Y
Stainless steel 316L (1.4404)		
250 ... 500 mm (9.84 ... 19.69 inch)		Z
501 ... 750 mm (19.72 ... 29.53 inch)		Z
751 ... 1 000 mm (29.57 ... 39.37 inch)		Z
1 001 ... 1 500 mm (39.41 ... 59.05 inch)		Z
1 501 ... 2 000 mm (59.09 ... 78.74 inch)		Z
2 001 ... 2 500 mm (78.78 ... 98.42 inch)		Z
2 501 ... 3 000 mm (98.46 ... 118.11 inch)		Z
3 001 ... 4 000 mm (118.5 ... 157.48 inch)		Z
		P 1 A
		P 1 B
		P 1 C
		P 1 D
		P 1 E
		P 1 F
		P 1 G
		P 1 H
Measuring vane		
Boot shaped, 35 x 106 mm (1.34 x 4.17 inch) ¹²⁾		A
Hinged vane, 65 x 200 mm (2.56 x 7.87 inch) ¹²⁾		B
Rectangular, 50 x 150 mm (1.97 x 5.91 inch) ¹³⁾		C
Rectangular, 50 x 250 mm (1.97 x 9.84 inch) ¹³⁾		D
Rectangular, 98 x 150 mm (3.86 x 5.91 inch) ¹³⁾		E
Rectangular, 98 x 250 mm (3.86 x 9.84 inch) ¹³⁾		F
Rectangular, 50 x 98 mm (1.97 x 3.86 inch) ¹³⁾		G
Approvals		
CSA/FM Dust Ignition Proof, RCM		1
ATEX II ½ D, RCM		2
CSA/FM General Purpose, RCM, CE		3
CE, RCM		4
IEC Ex ta/tb IIIC		5
EAC Ex ta/tb IIIC Da/Db		6

Selection and Ordering data	Order code
Further Designs	
Please add "-Z" to Article No. and specify Order code(s).	
Total insertion length: Enter the total insertion length in plain text description, max. 4 000 mm (157.48 inch)	Y01
Stainless steel tag [100 x 45 mm (3.94 x 1.77 inch)]: Measuring-point number/identification (max. 27 characters); specify in plain text	Y14
Heating of enclosure ¹⁴⁾ ¹⁵⁾	A35
Signal bulb inserted in M20 cable gland ¹⁴⁾	A20

Selection and ordering data (continued)

Selection and Ordering data	Order code
Food grade materials (in contact with process), according to 1935/2004/EC, with FDA conform shaft sealing ¹⁶⁾¹⁷⁾	K01
Functional Safety (SIL 2). Device suitable for use in accordance with IEC 61508 and IEC 61511. ²⁰⁾²¹⁾	C20
Factory test certificate - M to DIN 55350, Part 18	C11
<u>Optional end of shaft seal for stability and ingress protection</u>	
Max. temperature 80 °C (176 °F)	P06
Max. temperature 150 °C (302 °F)	P07
Max. temperature 250 °C (482 °F)	P08
Max. temperature 600 °C (1 112 °F)	P09
Sliding sleeve: standard, max. pressure 0.5 bar ¹⁴⁾¹⁸⁾	P12
Sliding sleeve: pressure tight, for over-pressure application, dependent on pressure option ordered ¹⁹⁾	P13

Spare Parts	Article No.
Operating Instructions	
Note: The Operating Instructions should be ordered as a separate line on the order. All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation	
Spare Parts	
Replacement vane, boot shape, 35 x 106 mm (1.38 x 4.17 inch)	7ML1830-1KH
Hinged vane, 98 x 200 mm (3.86 x 7.87 inch)	7ML1830-1KJ

1) Available with Approval options 3 and 4, up to max 0.5 bar.

2) Not available with Process connections A, C, E.

3) Available with Process pressure options 1 and 2 only.

4) Available with Process temperature 1 only.

5) Available with Process connections A ... E only, with process pressure option 1 and process temperature option 1 only.

6) Available with Process connection options B, D, F ... L and measuring vane option A.

7) Available with Process pressure 1 and process temperature 1 only.

8) Available with Extension length options A ... Q only.

9) Available with Extension length options R ... Y only.

10) Available with Process connection options B, D, F ... L and Measuring vane A, Process connection material 3. Available only with Extension length options P1A ... P1H only.

11) Only available with Seal at tube end options P06 ... P09.

12) Add 16 mm (0.63 inch) to extension length.

13) Available with Process connections F, G, H, J, K only.

14) Available with Approval option 4 only.

15) Available only with Power supply options J2A, J2B, J2C, and J2D.

16) Available when ordered with Ingress protection seal options P06 ... P09 only.

17) Available up to 250 °C (482 °F).

18) Available with Process pressure option 1 only.

19) Available up to 250 °C (482 °F).

20) Available with Power supply options J2A and J2C only.

21) Available with Approval options 1, 2, 3, 4, and 5 only. Approvals 1 and 3 with FM only.

22) Internal probe construction is 1.4305, add seal option P09 to prevent ingress.

Level Measurement

Point level measurement

Rotation paddle switches / SITRANS LPS200

Technical specifications

SITRANS LPS200	
Mode of operation	
Measuring principle	Rotating point level switch
Input	
Measured variable	High and low and demand
Output	
Output signal	
• Alarm output	Microswitch 5 A at 250 V AC, non-inductive Microswitch SPDT contact 4 A at 30 V DC, non-inductive
• Pickup delay	Standard (1 rpm model): approx. 1.3 seconds Optional process applications (5 rpm model): approx. 0.26 seconds
Sensitivity	Adjustable via reset force of spring or geometry of measuring vane
Rated operating conditions	
Installation conditions	
• Location	Indoor/outdoor
Ambient conditions	
• Ambient temperature	-25 ... +60 °C (-13 ... +140 °F)
• Storage temperature	-40 ... +80 °C (-40 ... +176 °F)
• Installation category	III
• Pollution degree	2
Medium conditions	Bulk solids
• Temperature	
- Standard	-25 ... +80 °C (-13 ... +176 °F)
- Optional	-25 ... +600 °C (-13 ... +1 112 °F)
	Higher temperature version is available. Consult a local sales person for details. For more information, please visit http://www.automation.siemens.com/aspa_app .
• Pressure (vessel)	
- Standard	Max. 0.5 bar g (7.25 psi g)
- Optional	Max. 10 bar g (145 psi g)
• Minimum material density	
- Standard measuring vane	Can detect down to 100 g/l (6.25 lb/ft ³)
- Optional measuring vane	Can detect down to 15.06 g/l (0.94 lb/ft ³)
Design	
Material	
• Enclosure	Epoxy coated aluminum
• Process connection, measuring shaft and vane	Stainless steel or aluminum
Process connection	Thread NPT, BSP, and flange options
Degree of protection	IP65/Type 4/NEMA 4
Conduit entry	2 x M20 x 1.5 or 2 x ½" NPT (For FM and CSA approved versions only)
Power supply	
AC or DC versions	115 V AC, ± 15 %, 50 ... 60 Hz, 4 VA or 230 V AC, ± 15 %, 50 Hz, 6 VA, or 48 V AC, or 24 V AC, or 24 V DC, ± 15 %, 2.5 W
Universal voltage (DPDT replay)	24 V DC ± 15 % 50 ... 60 Hz, 22 ... 230 V AC, ± 10 %, max. 10 VA
Certificates and approvals	<ul style="list-style-type: none"> • CSA/FM General Purpose • CE • CSA/FM Dust Ignition Proof • ATEX II 1/2 D • RCM • IECex

Dimensional drawings

Standard model: compact version

Conduit connection M20 or 1/2" NPT

Ambient temperature -25 ... +60 °C (-13 ... +140 °F)

Zone 21 (Cat. 2)

Zone 20 (Cat. 1)

Process temperature -25 ... +80 °C (-13 ... +176 °F)

Thread length BSP: 20.5 (0.81) NPT: 24 (0.94)

Measuring vane

High temperature model: compact version

Thread length BSP: 20.5 (0.81) NPT: 24 (0.94)

Ambient temperature -25 ... +60 °C (-13 ... +140 °F)

Zone 21 (Cat. 2)

Zone 20 (Cat. 1)

Process temperature²⁾ -25 ... +600 °C (-13 ... +428 °F)

Optional process flange

Shaft protected option

Angle option

Rope option

Process temperature A

150/250 °C (302/482 °F)	200 (7.87)
350 °C (662 °F)	300 (11.81)
600 °C (1 112 °F)	400 (15.74)

L= Length

100 (3.94)
150 (5.91)
200 (7.87)
250 (9.84)
300 (11.81)

Measuring vanes

Standard

106 (4.17)

35 (1.38)

Hinged

Fold together to lead into mounting hole

Min. 37 (1.46)

Rectangular

A

B

Rectangular vane options

	A	B
50 (1.97)	98 (3.86)	
50 (1.97)	150 (5.90)	
50 (1.97)	250 (9.84)	
98 (3.86)	150 (5.90)	
98 (3.86)	250 (9.84)	

Notes

- For 35 x 106 mm boot shaped and 98 x 200 mm hinged measuring vanes, add 16 mm to extension length.
- For use with all approval options except CSA class II. See manual for more details.

For heavy material, only top mounting of paddle switch is recommended.
Compact LPS200 is recommended for side mounting on bins for low or intermediate material levels.

Vane

Vane	Completely covered with material		Covered up to 10 cm (3.93 inch) with material	
	Spring adjustment		Spring adjustment	
	Light	Central (factory setting)	Light	Central (factory setting)
Boot shaped 35 x 106 mm	200 g/l (12.5 lb/ft ²)	300 g/l (18.7 lb/ft ²)	100 g/l (6.2 lb/ft ²)	150 g/l (9.4 lb/ft ²)
Boot shaped 28 x 98 mm	300 g/l (18.7 lb/ft ²)	500 g/l (31.2 lb/ft ²)	150 g/l (9.4 lb/ft ²)	150 g/l (9.4 lb/ft ²)
Rectangular 50 x 98 mm	300 g/l (18.7 lb/ft ²)	500 g/l (31.2 lb/ft ²)	150 g/l (9.4 lb/ft ²)	250 g/l (15.6 lb/ft ²)
Rectangular 50 x 150 mm	80 g/l (5.0 lb/ft ²)	120 g/l (7.5 lb/ft ²)	40 g/l (2.5 lb/ft ²)	60 g/l (3.7 lb/ft ²)
Rectangular 50 x 250 mm	30 g/l (1.9 lb/ft ²)	50 g/l (3.1 lb/ft ²)	15 g/l (0.9 lb/ft ²)	25 g/l (1.6 lb/ft ²)
Rectangular 98 x 150 mm	30 g/l (1.9 lb/ft ²)	50 g/l (3.1 lb/ft ²)	15 g/l (0.9 lb/ft ²)	25 g/l (1.6 lb/ft ²)
Rectangular 98 x 250 mm	20 g/l (1.2 lb/ft ²)	30 g/l (1.9 lb/ft ²)	15 g/l (0.9 lb/ft ²)	15 g/l (0.9 lb/ft ²)
Hinged 98 x 200 mm	70 g/l (4.4 lb/ft ²)	100 g/l (6.2 lb/ft ²)	35 g/l (2.2 lb/ft ²)	50 g/l (3.1 lb/ft ²)

SITRANS LPS200, dimensions in mm (inch)

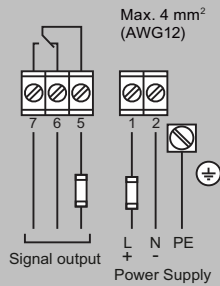
Level Measurement

Point level measurement

Rotation paddle switches / SITRANS LPS200

Circuit diagrams

AC or DC version



Power supply:

AC version:

24 V or 48 V or 115 V or 230 V 50/60 Hz max. 4 VA
All voltages $\pm 10\%$ ¹⁾
Supply voltage as selected.
External fuse: max 10 A, fast or slow, HBC, 250 V

DC version:

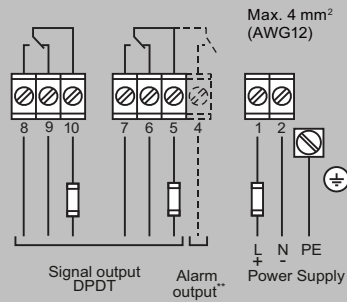
24 V DC $\pm 15\%$ ¹⁾ max. 2.5 W
External fuse: not required

¹⁾ Including $\pm 10\%$ of EN 61010

Signal output:

Micro switch, SPDT contact
max. 250 V AC, 5 A, non inductive
max. 30 V DC, 4 A, non inductive
External fuse: max 10 A, fast or slow, HBC, 250 V

Universal voltage (DPDT relay)*

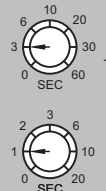


* See manual for universal voltage with SIL.

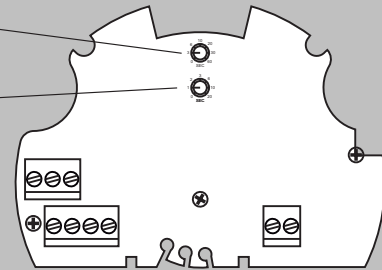
** With option Fail safe alarm (rotation control).
Contact open when de-energised.
Fail safe alarm switching and timing behaviour:
If the vane is not covered, the rotating vane shaft will send pulses at 20 second intervals.
In case of fault, the pulses are missed.
After 30 seconds, the alarm relay will open.

Signal output: delay

Sensor covered -> free
Factory setting = 3 sec



Sensor covered -> covered
Factory setting = 1 sec



SITRANS LPS200 connections

Overview



The Pointek ULS200 is an ultrasonic non-contacting switch with two switch points for level detection of bulk solids, liquids and slurries in a wide variety of industries; ideal for sticky materials.

Benefits

- 2 switch outputs for high-high, high, low, and low-low level alarms or pump up/pump down control
- Integral temperature compensation
- AC or DC power supply
- Electronics provided with fail-safe function
- Threaded and sanitary fitting clamp process connections
- Polycarbonate enclosure, Type 6/NEMA 6/IP67
- Easy, two-button programming

Application

The measuring range for bulk solids is max. 3 m (9.8 ft) and 5 m (16.4 ft) for liquids and slurries. Unlike invasive contacting devices, there is no material buildup on the sensor.

The level switch has a rugged design, combining the transducer and electronics in one durable device. It has no moving parts and is virtually maintenance-free.

The transducer, available in ETFE or PVDF copolymer, is inert to most chemicals. This means the device can be used in the chemical, petrochemical, water, and wastewater industries. A sanitary version of the ULS200, with an industry standard flange option, is easy to remove from the application for cleaning. It thus satisfies the prerequisites for use in the food, beverage, and pharmaceutical industries. The Pointek ULS200 delivers superior performance while reducing maintenance, downtime, and equipment replacement costs.

- Key Applications: liquids, slurries, fluid materials, plugged chute detection, chemical industry

Design

Installation

The Pointek ULS200 should be mounted in an area that is within the temperature range specified and that is suitable to the enclosure rating and materials of construction. The cover should be accessible to allow programming, wiring and display viewing.

It is advisable to keep the Pointek ULS200 away from high voltage or current runs, contactors and SCR control drives.

Locate the Pointek ULS200 so that it has a clear sound path perpendicular to the material surface. The sound path should not intersect the fill path, rough walls, seams, rungs etc.

Mounting and Interconnection

The Pointek ULS200 is available in three thread types: 2" NPT, R 2" (BSPT), EN 10226 or PF2 and can be fitted with the optional 75 mm (3 inch) flange adapter for mating to 3" ASME, DN 65, PN 10, and JIS 10K 3B sized flanges.

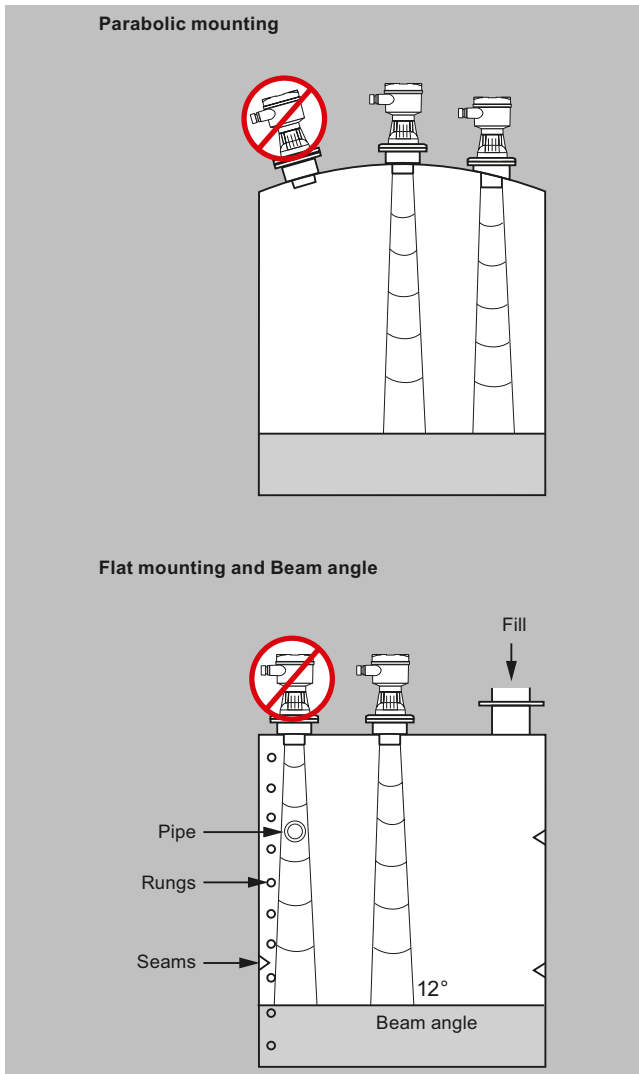
Separate cables and conduit may be required to conform to standard instrumentation wiring or electrical codes.

Level Measurement

Point level measurement

Ultrasonic non-contacting switch / Pointek ULS200

Configuration



Pointek ULS200 mounting

Selection and ordering data

	Article No.				
Pointek ULS200 Ultrasonic point level switch Non-contact, 5 m (16.4 ft) range, for bulk solids, liquids, and slurries.	7ML1510- ● ● ● 0 ●				
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.					
Power supply					
24 V DC, relay output	1				
24 V DC, transistor output	2				
100 ... 230 V AC, relay output	3				
Approvals					
CE, UKCA, RCM, CSA Class I, II, Div. 2 ¹⁾			J		
Ordinary Locations/General Purpose (Non-Ex), CE, UKCA, RCM, cCSA _{US} , FM			K		
Transducer/Process connection					
ETFE, 2" NPT [(Taper), ASME B1.20.1]				A	
EFTE, R 2" [(BSPT), EN 10226]				B	
EFTE, G 2" [(BSPP), EN ISO 228-1]				C	
PVDF copolymer, 2" NPT [(Taper), ASME B1.20.1]				E	
PVDF copolymer, R 2" [(BSPT), EN 10226]				F	
PVDF copolymer, G [(BSPP), EN ISO 228-1]				G	
PVDF copolymer, 4" sanitary mounting ²⁾				J	
Enclosure/cable inlet					
Polycarbonate					
• Cable inlet PG 13.5					1
• Cable inlet ½" NPT					2
Aluminum					
Aluminum housing, Cable inlet PG 13.5					3
Aluminum housing, Cable inlet 1/2" NPT					4

1) Available with Enclosure/cable inlet option 2 only.

2) Available with Approvals option K only.

Selection and ordering data	Order code
Further designs	
Please add "-Z" to Article No. and specify Order code(s)	
Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: Measuring-point number/identification (max. 27 characters) specify in plain text	Y15

Spare parts and accessories	Article No.
Operating Instructions	
All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation	
Accessories	
Tag, stainless steel, 12 x 45 mm (0.47 x 1.77 inch), one text line, suitable for enclosures	7ML1930-1AC
Universal Box Bracket Mounting Kit	7ML1830-1BK
3" ASME, DN 65 PN 10, JIS 10K 3B ETFE Flange adapter for 2" NPT	7ML1830-1BT
3" ASME, DN 65 PN 10, JIS 10K 3B ETFE Flange adapter for 2" BSPT	7ML1830-1BU
2" BSP nylon plastic locknut	7ML1830-1DQ
2" NPT nylon plastic locknut	7ML1830-1DT
4" sanitary mounting clamp	7ML1830-1BR
Spare Parts	
Polycarbonate Lid	7ML1830-1LG

Level Measurement

Point level measurement

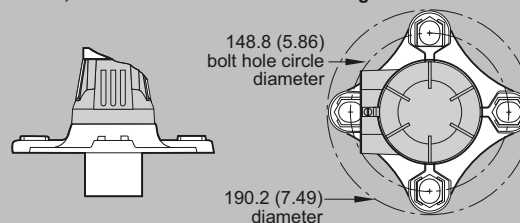
Ultrasonic non-contacting switch / Pointek ULS200

Technical specifications

Pointek ULS200	
Mode of operation	
Measuring principle	Ultrasonic level switch
Measuring range	
Measuring range in liquids	0.25 ... 5 m (0.8 ... 16.4 ft)
Measuring range in bulk solids	0.25 ... 3 m (0.8 ... 9.8 ft)
Output	
AC Version (relay)	2 SPDT Form C contacts, rated 5 A at 250 V AC or 30 V DC, resistive load; rated 1 A at 48 V DC resistive load
DC Version (relay)	2 SPDT Form C contacts, rated 5 A at 30 V DC, resistive load; rated 1 A at 48 V DC resistive load
DC Version (transistor)	2 switches, rated max. 100 mA, 48 V DC
Accuracy	
AC/DC version	
• Resolution	3 mm (0.1 inch)
• Repeatability	0.25 % of measuring range
Rated operation conditions	
Installation conditions	
• Location	Indoors/outdoors
• Beam angle	12°
Ambient conditions	
• Ambient temperature	-40 ... +60 °C (-40 ... +140 °F)
• Storage temperature	-40 ... +60 °C (-40 ... +140 °F)
• If mounted in metal threads	-20 ... +60 °C (-5 ... +140 °F)
Medium conditions	
• Process pressure	0.5 bar (7.25 psi) max.
Design	
Material	Polycarbonate with gasket
Weight	Approx. 1.5 kg (3.3 lb)
Transducer material	PVDF or ETFE copolymer
Threaded mounting	2" NPT [(Taper), ASME B1.20.1] R 2" [(BSPT), EN 10226] or G 2" [(BSPP), EN ISO 228-1]
• Optional flange adapter	For 3" ASME, DN 65, PN 10, and JIS 10 K3B
Sanitary mounting	4" sanitary fitting clamp
Power supply	
AC version	100 ... 230 V AC, ± 15 %, 50/60 Hz, max. 12 VA, 5 W
DC version	18 ... 30 V DC, 3 W
Displays and controls	
Display	LCD, three digits, 9 mm (0.35 inch) high, for display of distance between sensor face and material, multi-segment graphic for operating state
Memory	EEPROM, non-volatile
Programming	2 keys
Electronics/enclosure	
Connection	terminal block, max. 2.5 mm ² (14 AWG) solid/1.5 mm ² (16 AWG) stranded
Degree of protection	IP67/Type 6/NEMA 6
Cable inlet	2 x ½" NPT or 2 x PG 13.5
Certificates and approvals	CE, UKCA, cCSAus, FM

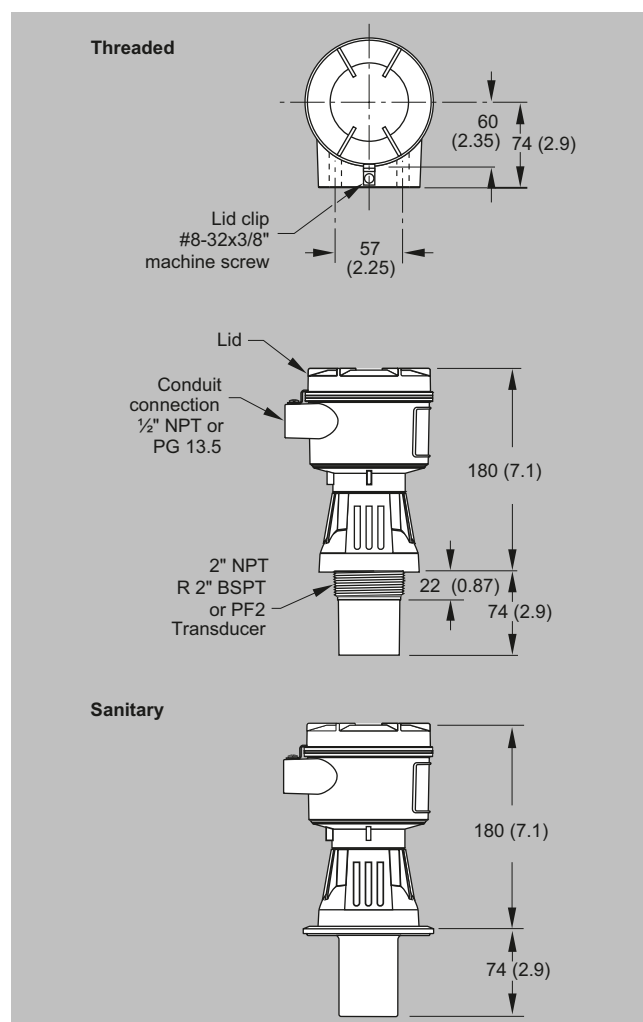
Options

Flange adapter for mating 2" NPT or 2" BSP process connections to 3" ASME, DN 65 PN 10 and JIS 10K 3B flanges



Pointek ULS200 optional flange adapter, dimensions in mm (inch)

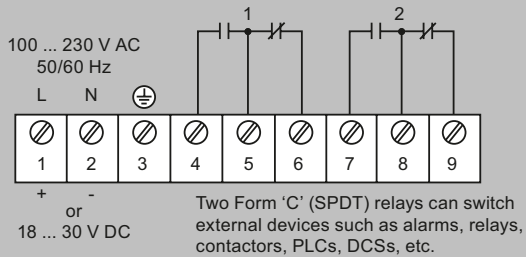
Dimensional drawings



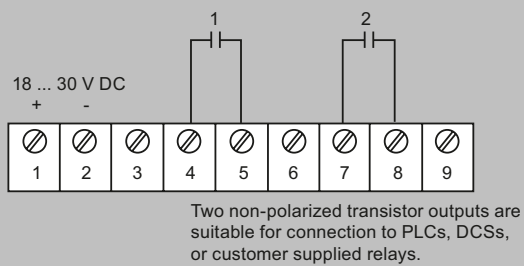
Pointek ULS200, dimensions in mm (inch)

Circuit diagrams

Relay output



Transistor output: DC version only



Pointek ULS200 connections

Level Measurement

Continuous level measurement

Controllers

Overview

After driving the market in ultrasonic level controllers for the past 40 years, Siemens has evolved its industry leading solutions to include control for 80 GHz radar sensors.

Siemens level controller portfolio provides high-accuracy open channel monitoring, flexible control for multiple-relay ultrasonics, and reliable controllers for long-range, high frequency radar.

Technical specifications

Controller Selection Guide

Criteria	SITRANS LT500	SITRANS LUT400	HydroRanger 200	MultiRanger 100/200
Range	Sensor dependent	0.3 ... 60 m (1 ... 196 ft), transducer and application dependent	15 m (50 ft) transducer and application dependent	15 m (50 ft) transducer and application dependent
Typical applications	Single or dual point, wet wells, reservoirs, flumes/weirs, chemical storage, liquid storage, hoppers, crusher bins, dry solids storage	Wet wells, reservoirs, flumes/weirs, chemical storage, liquid storage, hoppers, crusher bins, dry solids storage	Wet wells, flumes/weirs, bar screen control	Wet wells, flumes/weirs, bar screen control, hoppers, chemical storage, liquid storage, crusher bins, dry solids storage
Output	1, 3, 6 relays, two 4 ... 20 mA outputs (isolated)	4 ... 20 mA/HART 3 relays	6 relays standard, two 4 ... 20 mA outputs (isolated)	1 relay (option on MultiRanger 100) 3 relays standard 6 relays (option) Two 4 ... 20 mA outputs (isolated)
Communications	Options: <ul style="list-style-type: none"> • HART (additional 4 ... 20 mA output) • PROFIBUS PA • PROFIBUS DP • Modbus RTU • ProfiNet 	HART 7.0, USB, SIMATIC PDM	Built-in Modbus RTU/ASCII via RS 485 Options: <ul style="list-style-type: none"> • SIMATIC PDM • SmartLinx (PROFIBUS DP, DeviceNet) 	<ul style="list-style-type: none"> • Built-in Modbus RTU or ASCII via RS 485 Options: <ul style="list-style-type: none"> • SIMATIC PDM • SmartLinx (PROFIBUS DP, DeviceNet)
Power specifications	AC version: 100 ... 230 V AC \pm 15 %, 50/60 Hz, 36 VA/17 W DC version: 12 ... 30 V DC, 20 W	AC version: 100 ... 230 V AC \pm 15 %, 50/60 Hz, 36 VA Fuse: 5 x 20 mm, Slow Blow, 0.25 A, 250 V DC version: 10 ... 32 V DC, 10 W Fuse: 5 x 20 mm, Slow Blow, 1.6 A, 125 V	AC version: 100 ... 230 V AC \pm 15 %, 50/60 Hz, 36 VA/17 W DC version: 12 ... 30 V DC, 20 W	AC version: 100 ... 230 V AC \pm 15 %, 50/60 Hz, 36 VA/17 W DC version: 12 ... 30 V DC, 20 W
Approvals	CE, CSA _{US/IC} , UL Listed, FM, RCM	CE, CSA _{US/IC} , UL Listed, FM, RCM, LR, ABS, MCERTS	CE, CSA _{US/IC} , UL Listed, FM, RCM, MCERTS	CE, CSA _{US/IC} , UL Listed, FM, RCM

Overview



SITRANS LT500 is a versatile, single and multi-vessel level monitor/controller for virtually any application in a wide range of industries.

Benefits

- Easy to use HMI display with local four-button programming, menu-driven parameters, and Wizard support for key applications.
- English, German, French, Spanish, Chinese, Italian, Portuguese, Japanese, Danish, Dutch, Swedish, Finnish, Polish, and Russian texts on the HMI.
- Removable terminal blocks for ease of wiring.
- Digital input for back-up level override from point level device.
- Communication options for HART, Modbus RTU, PROFIBUS PA, PROFIBUS DP, and ProfiNet.
- Single or dual point level monitoring.
- Auto False-Echo Suppression for fixed obstruction avoidance.
- Up to 6 independent programmable relays for pump control, alarms, or remote totalization.
- Level, volume, and flow measurements in open channels, differential control, extended pump control, and alarm functions.
- Wall and panel mounting options.
- Remote configuration via EDD with SIMATIC PDM or SITRANS DTM

Application

SITRANS LT500 can be used with SITRANS LR110, LR120, Probe LU240 or any level device generating a mA signal. SITRANS LT500 offers true dual point monitoring and digital communications. SITRANS LT500 is low maintenance and economical. With its advanced control functions, it can operate pumps during lower cost time periods and manage pump rosters for efficiency.

SITRANS LT500 will monitor open channel flow and features advanced relay alarming and pump control functions as well as volume conversion.

- Key Applications: wet wells, flumes/weirs, bar screen control, hoppers, chemical storage, liquid storage, crusher bins, dry solids storage

Design

SITRANS LT500 is available in wall or panel mounting options.

Level Measurement

Continuous level measurement

Controllers / SITRANS LT500 - HydroRanger / MultiRanger

Selection and ordering data

SITRANS LT500		Article No.												
Continuous, non-contact, for liquids, slurries, and solids. Monitors level, volume, and volume flow, for virtually any application in a wide range of process industries.		7ML60	●	●	-	●	●	●	●	-	●	A	A	●
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.														
Product type														
HydroRanger				0										
MultiRanger				1										
Feature set														
Level, volume, and flow					3									
Sensor input type														
4 ... 20 mA input(s)							0							
Number of measurement points														
Single point version									A					
Dual point version									B					
Relay output														
1 relay (1 Form A), 250 V AC												A		
3 relays (2 Form A, 1 Form C), 250 V AC												B		
6 relays (4 Form A, 2 Form C), 250 V AC												C		
Mounting, enclosure design														
Wall mount, standard enclosure													0	
Wall mount, 4 entries, M20 cable glands included													1	
Panel mount													2	
Type of protection														
Ordinary Locations/General Purpose (Non-Ex), cCSA _{US} , FM, CE, UKCA, RCM													0	
Removable data storage														
Included, (8 GB micro SD)													1	
Input voltage														
10 ... 30 V DC														2
100 ... 230 V AC														3

Selection and ordering data	Order code
Further designs	
Please add "-Z" to Article No. and specify Order code(s).	
<i>Stainless steel tag [13 x 45 mm (0.5 x 1.75 inch)]; Tag (device parameter, max. 32 characters) plate stainless steel 304/1.4301</i>	Y15
Certificates	
Declaration of compliance 2.1 (EN 10204) - delivery meets order requirements	C19
Factory certificate 2.2 (EN 10204)	C14
Communication	
4 ... 20 mA, active output, with HART	F01
Modbus RTU	F04
PROFIBUS PA	F05
PROFIBUS DP	F06
ProfiNet	F07
Specials	
Special design	Y99
For customs, contact a local sales person. For more information please visit http://www.automation.siemens.com/aspa_app	

Selection and ordering data (continued)

Spare parts and accessories	Article No.
Operating Instructions	
All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation/documentation	
Optional equipment	
Tag, stainless steel, 12 x 45 mm, one text line, (max. 16 characters)	7ML1930-1AC
Barriers in a NEMA 4X/IP65 enclosure	A5E50255823
Barrier suitable for LR1xx & LU240 (STAHL: 9001/01-280-110-101)	A5E50113513
Sunshield, 304 Stainless steel	7ML1930-1GA
SITRANS RD100, loop powered display -see Chapter 7	7ML5741-.....
SITRANS RD150, remote digital display for 4 ... 20 mA and HART devices - see Chapter 7	7ML5742-.....
SITRANS RD200, universal input display with Modbus conversion - see Chapter 7	7ML5740-.....
SITRANS RD300, dual line display with totalizer and linearization curve and Modbus conversion - see Chapter 7	7ML5744-.....
Spare parts	
Replacement motherboard, single point, includes DC power module	A5E50113558
Replacement motherboard, dual point, includes DC power module	A5E50113557
Replacement motherboard, single point, includes AC power module	A5E50113542
Replacement motherboard, dual point, includes AC power module	A5E50113543
Replacement lid with 4 button HMI	A5E50113559
Replacement lid with 4 button HMI panel mount version	A5E50113560
Retrofit kit for wall mount to panel mount version	A5E50114010
Replacement SD card	A5E50113554
HART communications module	A5E50113564
PROFIBUS PA communications module	A5E50113568
Modbus RTU communications module	A5E50113565
PROFIBUS DP communications module	A5E50113567
ProfiNet communications module	A5E50113569

Level Measurement

Continuous level measurement

Controllers / SITRANS LT500 - HydroRanger / MultiRanger

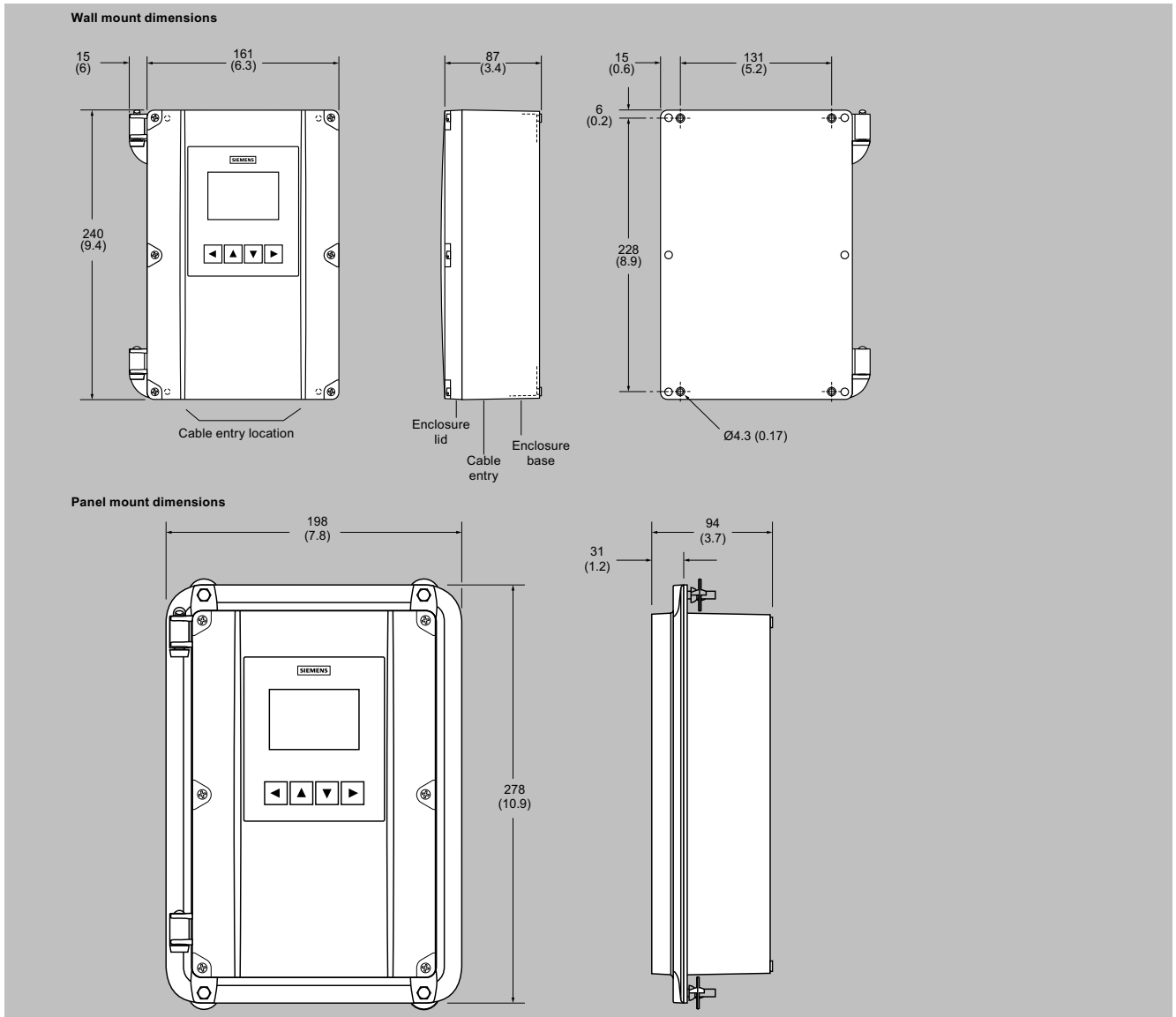
Technical specifications

SITRANS LT500 - HydroRanger / MultiRanger	
Mode of operation	Level, space, distance, volume, flow, head, difference, average, totalization
Sensor input	
Number of inputs	1 or 2
Terminal voltage	Max. 26 V, Min. 18 V (0 ... 22.6 mA)
Wiring	2 conductor, twisted, shielded, 0.5 ... 0.75 mm ² (22 ... 18 AWG)
Max. cable length	500 m (1 640.42 ft)
Sensor input communication	<ul style="list-style-type: none"> 4 ... 20 mA HART protocol, for supported sensors: SITRANS LR110, LR120, SITRANS Probe LU240
4 ... 20 mA sensor input	
• Resolution	0.025 % of full scale
• Accuracy	0.1 % of full scale
HART sensor input	Resolution, range, and accuracy are dependent on connected sensor
Digital input	
Quantity	2
Switching threshold, low	0 ... 0.5 V DC
Switching threshold, high	10 ... 50 V DC
Input current	Max. 3 mA
Bias voltage	24 V
Analog output	
Quantity	1 or 2
Range	0 ... 20 mA or 4 ... 20 mA isolated
• Max. load	750 Ω
• Resolution	0.1 % of range
Accuracy	±20 μA
Startup current	3.6 mA
Fail-safe	Programmable as high, low, last reliable, set value, or hold per NAMUR NE43
Wiring	2 conductor, twisted, shielded, 0.5 ... 0.75 mm ² (22 ... 18 AWG)
Relay output	
Quantity	Up to 6, 4 form A and 2 form C
Rating	5 A at 250 V AC, 5 A at 30 V DC, non-inductive
Durability	50 000 operations min. per relay (5 A at 30 V DC, resistive load)
Fail-safe	Programmable as energized, de-energized, or hold
Rated operating conditions	
Installation conditions	
• Location	Indoor/outdoor
• Installation category	II
• Pollution degree	4
Ambient conditions	
• Ambient temperature	-20 ... +50 °C (-4 ... +122 °F)
• Storage temperature	-20 ... +50 °C (-4 ... +122 °F)
Design	
Weight	
• Wall mount	1.22 kg (2.68 lb)
• Panel mount	1.35 kg (2.97 lb)
Enclosure	
• Material	Polycarbonate
• Degree of protection	
- Wall mount	IP65/Type 4X
- Panel mount	IP54/Type 3

Technical specifications (continued)

SITRANS LT500 - HydroRanger / MultiRanger	
Display and control	
LCD display	60 x 40 mm (2.36 x 1.57 inch) LCD, 240 x 160 pixels resolution
Menu navigation	4 push button keys
Update time	1 second or less
Memory	Program and parameters store in non-volatile Flash memory
Memory card	8 GB Industrial micro SD
Power supply	
AC version	100 ... 230 V AC, ±15 %, 50/60 Hz, 36 VA (17 W)
DC version	12 ... 30 V DC (20 W)
Certificates and approvals	<ul style="list-style-type: none"> CE, UKCA, RCM, EAC, FM, cCSA_{US}, cUL_{US}
Communication	
Service interface	USB 2.0 mini A cable
Optional Fieldbus	<ul style="list-style-type: none"> HART 7, with Active/Passive 4 ... 20 mA Modbus RTU PROFIBUS PA per profile 4.01 PROFIBUS DP ProfiNet
Remote configuraiton	<ul style="list-style-type: none"> EDD via SIMATIC PDM SITRANS DTM via PACTware

Dimensional drawings

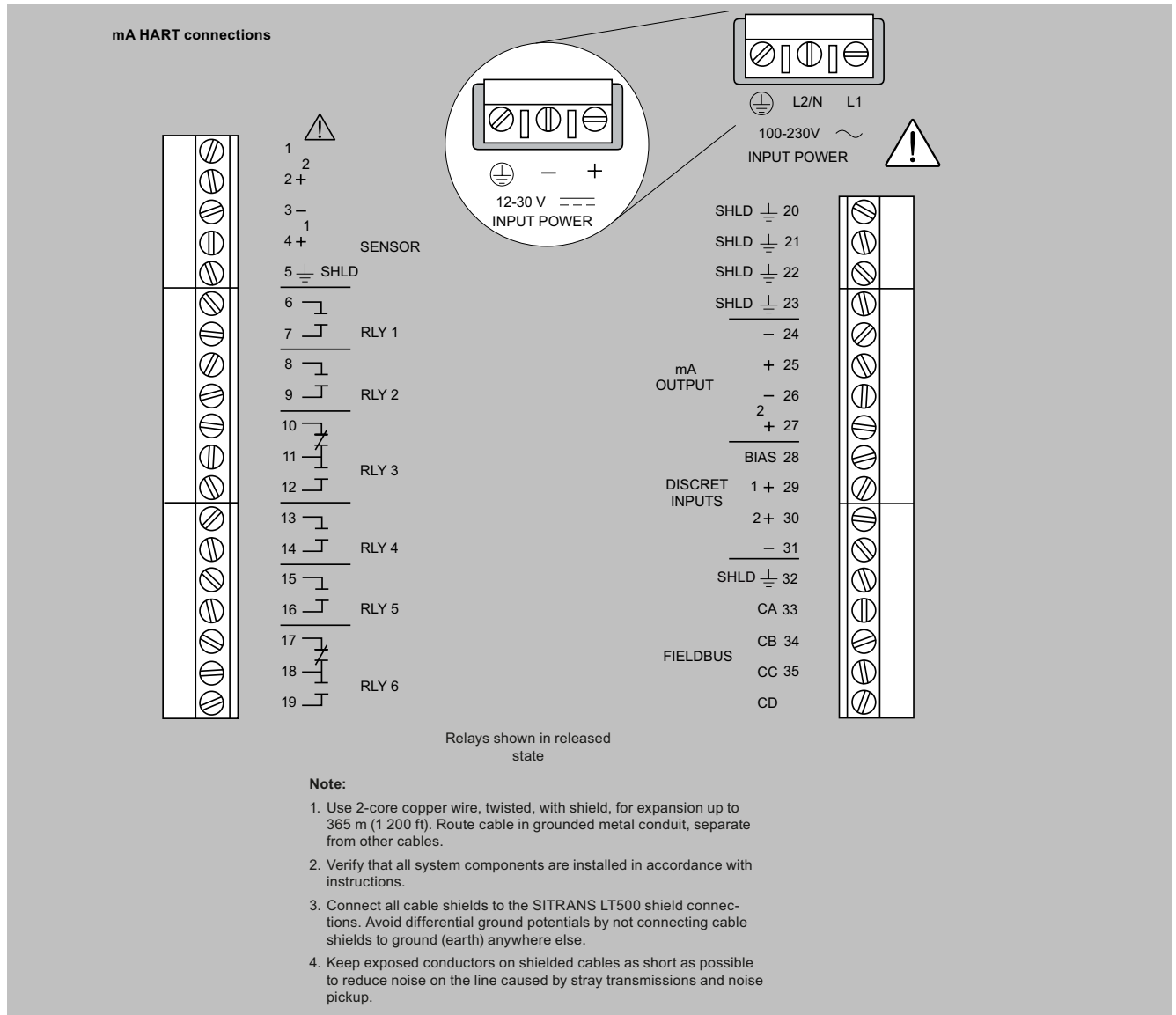


Level Measurement

Continuous level measurement

Controllers / SITRANS LT500 - HydroRanger / MultiRanger

Circuit diagrams



SITRANS LT500 connections

Overview



MultiRanger 200 HMI is a versatile short to medium-range ultrasonic single and multi-vessel level monitor/controller for virtually any application in a wide range of industries.

Benefits

- Easy to use HMI display with local four-button programming, menu-driven parameters, and Wizard support for key applications
- English, German, French, Spanish, Chinese, Italian, Portuguese, and Russian texts on the HMI
- Removable terminal blocks for ease of wiring
- Digital input for back-up level override from point level device
- Communication using built-in Modbus RTU via RS 485 and SIMATIC PDM configuration software
- Compatible with SmartLinx system: PROFIBUS DP, PROFINET (cyclic access of process values only), DeviceNet, Modbus TCP/IP, and EtherNet/IP
- Single or dual point level monitoring
- Auto False-Echo Suppression for fixed obstruction avoidance
- Differential amplifier transceiver for common mode noise reduction and improved signal-to-noise ratio
- Level, volume, and flow measurements in open channels, differential control, extended pump control, and alarm functions
- Wall and panel mounting options

Application

MultiRanger 200 HMI can be used with various materials, including, water, municipal waste, acids, woodchips, or on materials with high angles of repose. MultiRanger 200 HMI offers true dual point monitoring, digital communications with built-in Modbus RTU via RS 485, as well as compatibility with SIMATIC PDM, allowing PC configuration and set-up. MultiRanger 200 HMI features Sonic Intelligence advanced echo-processing software for increased reading reliability.

MultiRanger 200 HMI will monitor open channel flow and features more advanced relay alarming and pump control functions as well as volume conversion.

It is compatible with chemical-resistant EchoMax transducers that are approved for hostile environments.

- Key Applications: wet wells, flumes/weirs, bar screen control, hoppers, chemical storage, liquid storage, crusher bins, dry solids storage

Design

The MultiRanger 200 HMI is available in wall or panel mounting options.

Level Measurement

Continuous level measurement

Controllers / MultiRanger 200 HMI

Selection and ordering data

	Article No.
MultiRanger 200 Ultrasonic level controller Continuous, non-contact, 15 m (50 ft) range. Monitors level, volume, and open channel flow in liquids, slurries, and solids.	7ML5033- ● ● ● ● ● - ● ●
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	
Versions	
MultiRanger 200, level, volume, flow, and differential measurements	2
Mounting, enclosure design	
4 button HMI, Wall mount, standard enclosure	D
4 button HMI, Wall mount, 4 entries, 4 M20 cable glands included	E
4 button HMI, Panel Mount	F
Input voltage	
100 ... 230 V AC	A
12 ... 30 V DC	B
Number of measurement points	
Single point version	0
Dual point version	1
Data communications (SmartLinX)	
Without module	0
SmartLinX PROFIBUS DP V0 module	2
SmartLinX DeviceNet module	3
SmartLinX PROFIBUS DP V1 module	4
SmartLinX PROFINET module ²⁾	5
SmartLinX EtherNet/IP module	6
SmartLinX Modbus TCP/IP module	7
See SmartLinX product page for more information.	
Output relays	
6 relays (4 Form A, 2 Form C), 250 V AC	2
Approvals	
Ordinary Locations/General Purpose (Non-Ex), CE, UKCA, FM, cCSA _{US} , UL Listed, RCM, EAC, KC	A
CSA Class I, Div. 2, Groups A, B, C, and D; Class II, Div. 2, Groups F and G; Class III ¹⁾	B

¹⁾ Available with Mounting/Enclosure design options D or E.

²⁾ SmartLinX PROFINET module is certified per standard V2.2.4.

Selection and Ordering data	Order code
Further designs	
Please add "-Z" to Article No. and specify Order code(s).	
Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]; Measuring-point number/identification (max. 27 characters) specify in plain text	Y15
Declaration of compliance 2.1 (EN 10204) - delivery meets order requirements	C11

Spare parts and accessories	Article No.
Operating Instructions	
All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation	
Optional equipment	
Tag, stainless steel, 12 x 45 mm, one text line, suitable for enclosures	7ML1930-1AC
Sunshield, 304 Stainless steel	7ML1930-1GA
SITRANS RD100, loop powered display - see Chapter 7	7ML5741-...
SITRANS RD150, remote digital display for 4 ... 20 mA and HART devices - see Chapter 7	7ML5742-.....
SITRANS RD200, universal input display with Modbus conversion - see Chapter 7	7ML5740-...
SITRANS RD300, dual line display with totalizer and linearization curve and Modbus conversion - see Chapter 7	7ML5744-...

Selection and ordering data (continued)

Spare parts and accessories	Article No.
Spare parts	
Power Supply Board (100 ... 230 V AC)	7ML1830-1MD
Power Supply Board (12 ... 30 V DC)	7ML1830-1ME
Removable terminal blocks	A5E38824197
Spare lid with HMI, MultiRanger 200 HMI/HydroRanger 200 HMI, wall	A5E35778738
Spare lid with HMI, MultiRanger 200 HMI/HydroRanger 200 HMI, panel	A5E35778740
SmartLinx DeviceNet module	7ML1830-1HT
SmartLinx PROFIBUS DP V1 module	A5E35778741
Smartlinx PROFINET IO module	7ML1830-1PM
SmartLinx Modbus TCP/IP, EtherNet/IP module	7ML1830-1PN

Level Measurement

Continuous level measurement

Controllers / MultiRanger 200 HMI

Technical specifications

MultiRanger 200 HMI	
Mode of Operation	
Measuring principle	Ultrasonic level measurement
Measuring range	0.3 ... 15 m (1 ... 50 ft)
Measuring points	1 or 2
Input	
Analog	0 ... 20 mA or 4 ... 20 mA, from alternate device, scalable
Discrete	10 ... 50 V DC switching level Logical 0 ≤ 0.5 V DC Logical 1 = 10 ... 50 V DC max. 3 mA
Output	
EchoMax transducer	44 kHz
Ultrasonic transducer	Compatible transducers: ST-H and EchoMax series XPS-10, XPS-15/15F, and XRS-5
Relays	Rating 5 A at 250 V AC, non-inductive
mA output	0 ... 20 mA or 4 ... 20 mA
• Max. load	750 Ω, isolated
• Resolution	0.1 % of range
Accuracy	
Error in measurement	<ul style="list-style-type: none"> • 0.25 % of range or 6 mm (0.24 inch), whichever is greater • ± 4 mm (0.16 inch) in combination with an XRS-5 transducer on ranges 4 m (13 ft) or less
Resolution	0.1 % of measuring range ¹⁾ or 2 mm (0.08 inch), whichever is greater
Temperature compensation	<ul style="list-style-type: none"> • -50 ... +150 °C (-58 ... +302 °F) • Integral temperature sensor • External TS-3 temperature sensor (optional) • Programmable fixed temperature values
Rated operating conditions	
Installation conditions	
• Location	Indoor/outdoor
• Installation category	II
• Pollution degree	4
Ambient conditions	
• Ambient temperature (housing)	-20 ... +50 °C (-4 ... +122 °F)
• Storage temperature	-20 ... +50 °C (-4 ... +122 °F)
Design	
Weight	
• Wall mount	1.22 kg (2.68 lb)
• Panel mount	1.35 kg (2.97 lb)
Material (enclosure)	
Degree of protection (enclosure)	
• Wall mount	IP65/Type 4X/NEMA 4X
• Panel mount	IP54/Type 3/NEMA 3
Electrical connection	
• Transducer and mA output signal	2-core copper conductor, twisted, shielded, 0.5 ... 0.75 mm ² (22 ... 18 AWG), Belden 8760 or equivalent is acceptable
• Max. separation between transducer and transceiver	365 m (1 200 ft)
Displays and controls	
60 x 40 mm (2.36 x 1.57 inch) LCD 240 x 160 pixels resolution	
Power supply	
AC version	
100 ... 230 V AC ± 15 %, 50/60 Hz, 36 VA (17 W)	
DC version	
12 ... 30 V DC (20 W)	

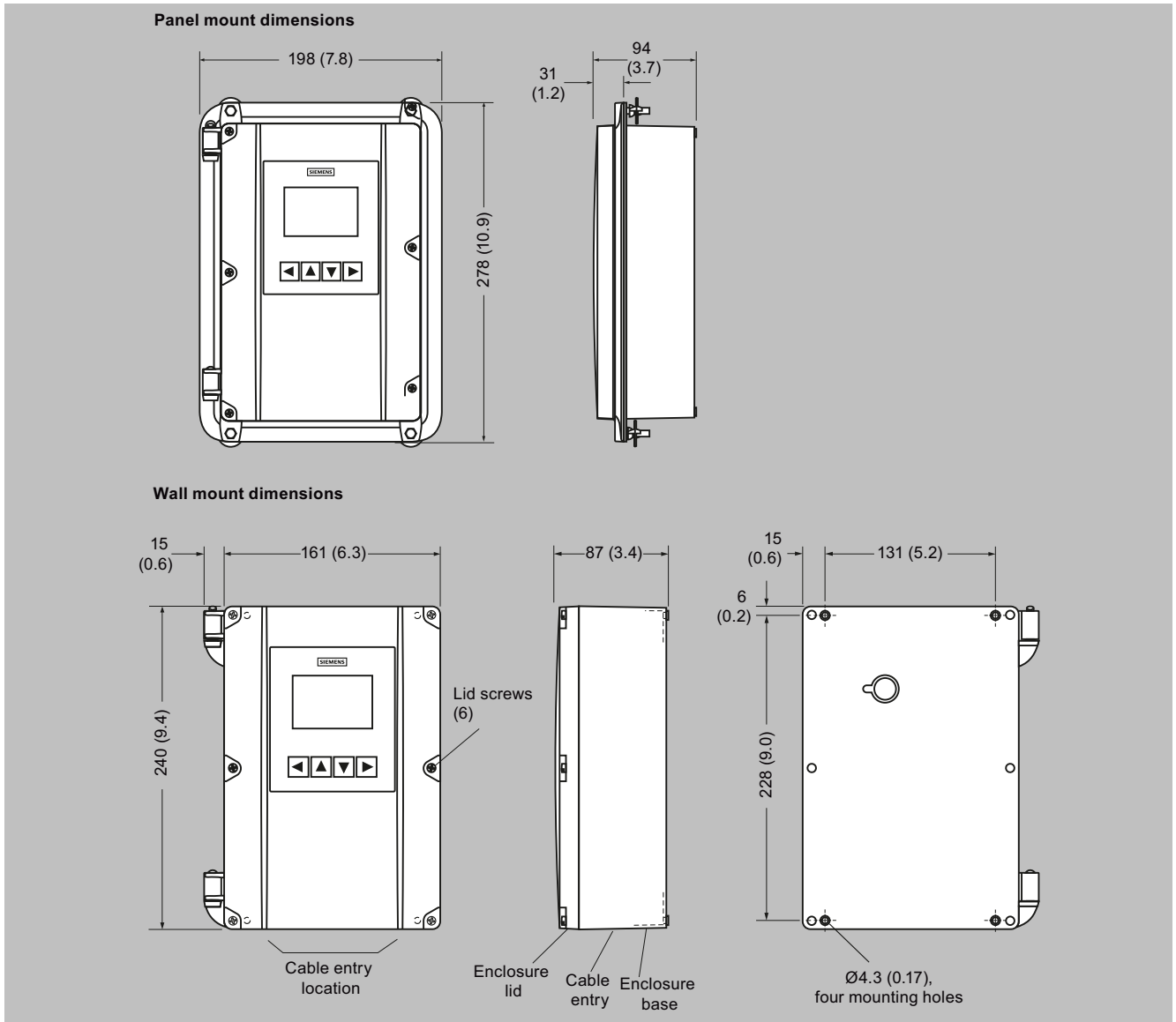
Technical specifications (continued)

MultiRanger 200 HMI	
Certificates and approvals	<ul style="list-style-type: none"> • CE, UKCA, RCM, EAC, KC²⁾ • FM, cCSA_{US}, UL listed • CSA Class I, Div. 2, Groups A, B, C, D, Class II, Div. 2, Groups F, G, Class III (wall mount only)
Communication	<ul style="list-style-type: none"> • RS 232 with Modbus RTU or ASCII via RJ-11 connector • RS 485 with Modbus RTU or ASCII via terminal strips • Optional: SmartLinx cards for <ul style="list-style-type: none"> - PROFIBUS DP-V1, PROFINET (cyclic access of process values only) - DeviceNet, Modbus TCP/IP, EtherNet/IP

¹⁾ Program range is defined as the empty distance to the face of the transducer plus any range extension

²⁾ EMC performance available on request

Dimensional drawings



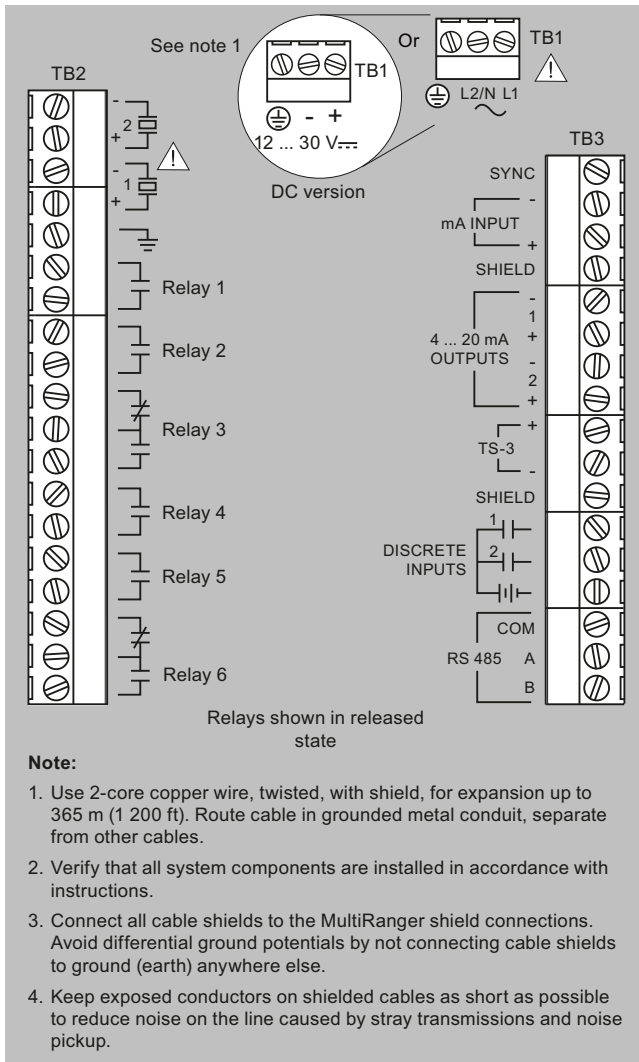
MultiRanger 200 HMI, dimensions in mm (inch)

Level Measurement

Continuous level measurement

Controllers / MultiRanger 200 HMI

Circuit diagrams



MultiRanger 200 HMI connections

Overview



MultiRanger is a versatile short to medium-range ultrasonic single and multi-vessel level monitor/controller for virtually any application in a wide range of industries.

Benefits

- Digital input for back-up level override from point level device
- Communication using built-in Modbus RTU via RS 485
- Compatible with SmartLinx communication options or SIMATIC PDM via RS 485
- Single or dual point level monitoring
- Auto False-Echo Suppression for fixed obstruction avoidance
- Differential amplifier transceiver for common mode noise reduction and improved signal-to-noise ratio
- MultiRanger 100: level measurements, simple pump control, and level alarm functions
- MultiRanger 200: level, volume, and flow measurements in open channels, differential control, extended pump control, and alarm functions
- Wall and panel mounting options

Application

MultiRanger can be used on different materials, including fuel oil, municipal waste, acids, woodchips, or on materials with high angles of repose. MultiRanger offers true dual point monitoring, digital communications with built-in Modbus RTU via RS 485, as well as compatibility with SIMATIC PDM, allowing PC configuration and setup. MultiRanger features Sonic Intelligence advanced echo-processing software for increased reading reliability.

MultiRanger 100 offers cost-effective level alarming, as well as on/off and alternating pump control. MultiRanger 200 will monitor open channel flow and features more advanced relay alarming and pump control functions as well as volume conversion.

It is compatible with chemical-resistant EchoMax transducers that can be used in hostile environments at temperatures as high as 145 °C (293 °F).

- Key Applications: wet wells, flumes/weirs, bar screen control, hoppers, chemical storage, liquid storage, crusher bins, dry solids storage

Design

The MultiRanger is available in wall or panel mounting options.

Level Measurement

Continuous level measurement

Controllers / MultiRanger 100/200

Selection and ordering data

	Article No.								
MultiRanger 200 Ultrasonic level controller Continuous, non-contact, 15 m (50 ft) range. Monitors level, volume, and open channel flow in liquids, slurries, and solids.	7ML5033-	●	●	●	●	●	-	●	●
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.									
Versions									
MultiRanger 100, level measurement only	1								
MultiRanger 200, level, volume, flow, and differential measurements	2								
Mounting, enclosure design									
Wall mount, standard enclosure				A					
Wall mount, 4 entries, 4 M20 cable glands included				B					
Panel mount (CE, UKCA, cCSA _{US} , FM, UL)				C					
Power supply									
100 ... 230 V AC				A					
12 ... 30 V DC				B					
Number of measurement points									
Single point version						0			
Dual point version						1			
Communication (SmartLinX)									
Without module							0		
SmartLinX PROFIBUS DP module							2		
SmartLinX DeviceNet module							3		
See SmartLinX product on page for more information.									
Output relays									
3 relays (2 Form A, 1 Form C), 250 V AC									1
6 relays (4 Form A, 2 Form C), 250 V AC									2
1 relay (1 Form A), 250 V AC (available on MultiRanger 100 model only)									3
Approvals									
Ordinary Locations/General Purpose (Non-Ex), CE, UKCA, FM, cCSA _{US} , UL Listed, RCM, EAC, KC									A
CSA Class I, Div. 2, Groups A, B, C, and D; Class II, Div. 2, Groups F and G; Class III ¹⁾									B
ATEX II 3D Ex tD A22 IP65 T75 °C; ATEX II 3D Ex tD A22 IP54 T75 °C; UKEX II 3D Ex tD A22 IP65 T75 °C; UKEX II 3D Ex tD A22 IP54 T75 °C; EAC Ex Ex tc IIIC T75 °C Dc X ²⁾									C

1) For wall mount applications only.

2) For standard enclosure wall mount, option A only.

Selection and Ordering data	Order code
Further designs	
Please add "-Z" to Article No. and specify Order code(s).	
Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: Measuring-point number/identification(max. 27 characters) specify in plain text	Y15

Spare parts and accessories	Article No.
Operating Instructions	
All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation	
Accessories	
Handheld programmer	A5E36563512
Tag, stainless steel, 12 x 45 mm (0.47 x 1.77 inch), one text line, suitable for enclosure	7ML1930-1AC
M20 cable gland kit (4 M20 cable glands, 4 M20 nuts, 4 washers)	7ML1930-1FV
Sunshield kit, 304 stainless steel	7ML1930-1GA
SITRANS RD100, loop powered display - see Chapter 7	7ML5741-...

Selection and ordering data (continued)

Spare parts and accessories	Article No.
SITRANS RD150, remote digital display for 4 ... 20 mA and HART devices - see Chapter 7	7ML5742-.....-....
SITRANS RD200, universal input display with Modbus conversion - see Chapter 7	7ML5740-...
SITRANS RD300, dual line display with totalizer and linearization curve and Modbus conversion - see Chapter 7	7ML5744-...
Spare parts	
Power Supply Board (100 ... 230 V AC)	7ML1830-1MD
Power Supply Board (12 ... 30 V DC)	7ML1830-1ME
MultiRanger 100/200/ HydroRanger 200 display, non-HMI	7ML1830-1MF
Removable terminal blocks	A5E38824197

Level Measurement

Continuous level measurement

Controllers / MultiRanger 100/200

Technical specifications

MultiRanger 100/200	
Mode of Operation	
Measuring principle	Ultrasonic level measurement
Measuring range	0.3 ... 15 m (1 ... 50 ft)
Measuring points	1 or 2
Input	
Analog (MultiRanger 200 only)	0 ... 20 mA or 4 ... 20 mA, from alternate device, scalable
Discrete	10 ... 50 V DC switching level Logical 0 = 0.5 V DC Logical 1 = 10 ... 50 V DC Max. 3 mA
Output	
EchoMax transducer	44 kHz
Ultrasonic transducer	Compatible transducers: ST-H and EchoMax series XPS-10, XPS 15/15F, and XRS-5
Relays	Rating 5 A at 250 V AC, non-inductive
<ul style="list-style-type: none"> Version with 1 relay (MultiRanger 100 only) Version with 3 relays Version with 6 relays 	1 SPST Form A 2 SPST Form A/1 SPDT Form C 4 SPST Form A/2 SPDT Form C
mA output	0 ... 20 mA or 4 ... 20 mA
<ul style="list-style-type: none"> Max. load Resolution 	750 Ω, isolated 0.1 % of range
Accuracy	
Error in measurement	0.25 % of range or 6 mm (0.24 inch), whichever is greater
Resolution	0.1 % of measuring range ¹⁾ or 2 mm (0.08 inch), whichever is greater
Temperature compensation	<ul style="list-style-type: none"> -50 ... +150 °C (-58 ... +302 °F) Integral temperature sensor External TS-3 temperature sensor (optional) Programmable fixed temperature values
Rated operating conditions	
Installation conditions	
<ul style="list-style-type: none"> Location Installation category Pollution degree 	Indoor/outdoor II 4
Ambient conditions	
<ul style="list-style-type: none"> Ambient temperature (housing) Storage temperature 	-20 ... +50 °C (-4 ... +122 °F) -20 ... +50 °C (-4 ... +122 °F)
Design	
Weight	
<ul style="list-style-type: none"> Wall mount Panel mount 	1.37 kg (3.02 lb) 1.50 kg (3.31 lb)
Material (enclosure)	
Polycarbonate	
Degree of protection (enclosure)	
<ul style="list-style-type: none"> Wall mount Panel mount 	IP65/Type 4X/NEMA 4X IP54/Type 3/NEMA 3
Electrical connection	
<ul style="list-style-type: none"> Transducer and mA output signal Max. separation between transducer and transceiver 	2-core copper conductor, twisted, shielded, 0.5 ... 0.75 mm ² (22 ... 18 AWG), Belden 8760 or equivalent is acceptable 365 m (1 200 ft)
Displays and controls	
100 x 40 mm (4 x 1.5 inch) multi-block LCD with backlighting	
Programming	
Programming using hand-held programmer, SIMATIC PDM or via PC with Dolphin Plus software	

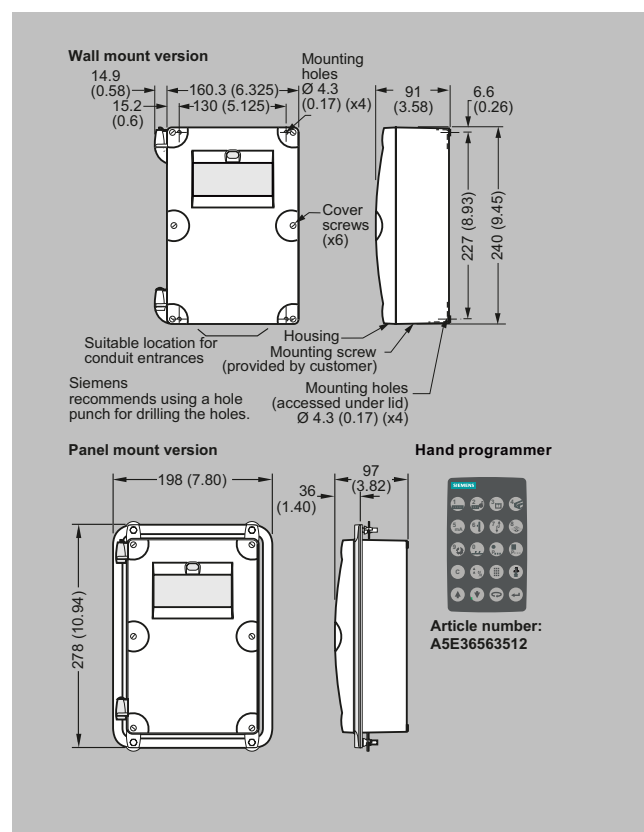
Technical specifications (continued)

MultiRanger 100/200	
Power supply	
AC version	100 ... 230 V AC ± 15 %, 50/60 Hz, 36 VA (17 W)
DC version	12 ... 30 V DC (20 W)
Certificates and approvals	
<ul style="list-style-type: none"> CE, UKCA, RCM, EAC, KC²⁾ Lloyd's Register of Shipping ABS Type Approval FM, cCSA_{US}, UL listed CSA Class I, Div. 2, Groups A, B, C, D, Class II, Div. 2, Groups F, G, Class III (wall mount only), ATEX II 3D, UKEX II 3D, EAC Ex 	
Communication	
<ul style="list-style-type: none"> RS 232 with Modbus RTU or ASCII via RJ-11 connector RS 485 with Modbus RTU or ASCII via terminal strips Optional: SmartLinx cards for <ul style="list-style-type: none"> PROFIBUS DP DeviceNet 	

¹⁾ Program range is defined as the empty distance to the face of the transducer plus any range extension

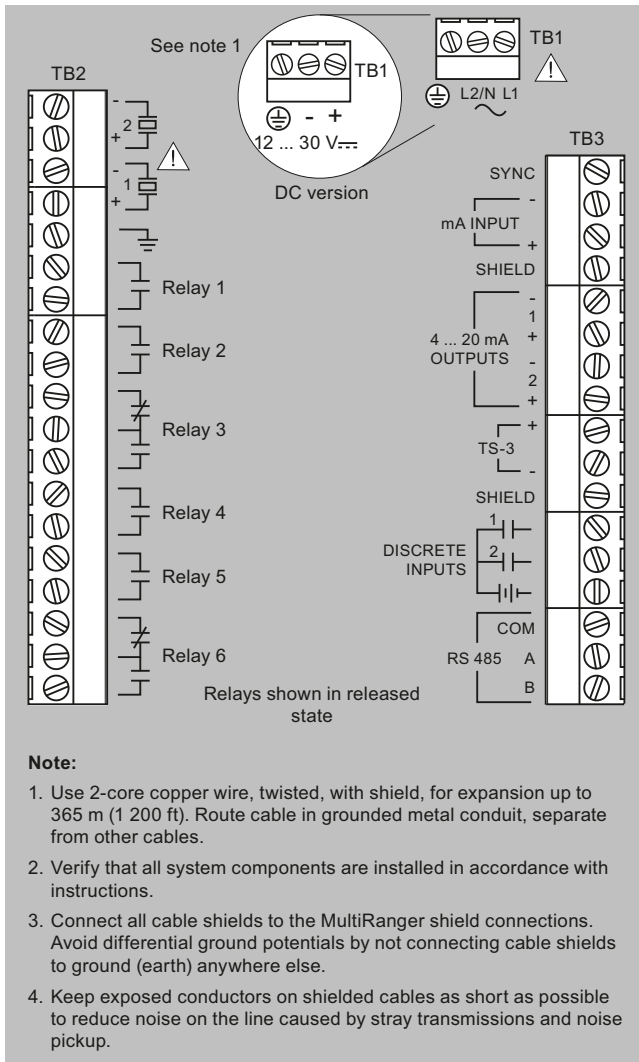
²⁾ EMC performance available on request

Dimensional drawings



MultiRanger 100/200, dimensions in mm (inch)

Circuit diagrams



MultiRanger 100/200 connections

Level Measurement

Continuous level measurement

Controllers / HydroRanger 200 HMI

Overview



HydroRanger 200 HMI is an ultrasonic level controller for up to six pumps and provides control, differential control, and open channel flow monitoring.

Benefits

- Easy to use HMI display with local four-button programming, menu-driven parameters, and Wizard support for key applications
- English, German, French, Spanish, Chinese, Italian, Portuguese, and Russian texts on the HMI
- Removable terminal blocks for ease of wiring
- Monitors wet wells, weirs, and flumes
- Communication using built-in Modbus RTU via RS 485 and SIMATIC PDM configuration software
- Compatible with SmartLinx system: PROFIBUS DP, PROFINET (cyclic access of process values only), DeviceNet, Modbus TCP/IP, and EtherNet/IP
- Single or dual point level monitoring
- 6 relays
- Auto False-Echo Suppression for fixed obstruction avoidance
- Anti-grease ring/tide mark buildup
- Differential amplifier transceiver for common mode noise rejection and improved signal-to-noise ratio
- Wall and panel mounting options

Application

For water authorities, municipal water, and wastewater plants, HydroRanger 200 HMI is an economical, low-maintenance solution delivering control efficiency and productivity needed to meet today's exacting standards. It offers single point monitoring with all models, and optional dual-point monitoring with 6 relay model. As well, it has digital communications with built-in Modbus RTU via RS 485.

The standard 6 relay HydroRanger 200 HMI will monitor open channel flow and features advanced relay alarming and pump control functions as well as volume conversion. It is compatible with SIMATIC PDM, allowing for PC configuration and set-up. Sonic Intelligence advanced echo-processing software provides increased reading reliability.

HydroRanger 200 HMI uses proven continuous ultrasonic echo ranging technology to monitor water and wastewater of any consistency up to 15 m (50 ft) in depth. Achievable resolution is 0.1 % with accuracy to 0.25 % of range. Unlike contacting devices, HydroRanger 200 HMI is immune to problems caused by suspended solids, harsh corrosives, grease or silt in the effluent, reducing downtime.

- Key Applications: wet wells, flumes/weirs, bar screen control

Selection and ordering data

	Article No.				
HydroRanger 100/200 Ultrasonic level controller Continuous, non-contact, 15 m (50 ft) range. Monitors level, volume, and open channel flow in liquids, slurries, and solids.	7ML5034- ● ● ● ● ●				
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.					
Mounting, enclosure design					
4 button HMI, Wall mount, standard enclosure	4				
4 button HMI, Wall mount, 4 entries, 4 M20 cable glands included	5				
4 button HMI, Panel Mount	6				
Input voltage					
100 ... 230 V AC			A		
12 ... 30 V DC			B		
Number of measurement points					
Single point model, 6 relays				A	
Dual point model, 6 relays				B	
Communication (SmartLinX)					
Without module					0
SmartLinX PROFIBUS DP-V0 module					2
SmartLinX DeviceNet module					3
SmartLinX PROFIBUS DP-V1 module					4
SmartLinX PROFINET module ²⁾					5
SmartLinX EtherNet/IP module					6
SmartLinX Modbus TCP/IP module					7
See SmartLinX product page for more information					
Approvals					
Ordinary Locations/General Purpose (Non-Ex), CE, UKCA, FM, cCSA _{US} , UL Listed, RCM, EAC, KC					1
CSA Class I, Div. 2, Groups A, B, C, and D; Class II, Div. 2, Groups F and G; Class III ¹⁾					2

¹⁾ Available with Mounting/Enclosure design options 4 or 5.

²⁾ SmartLinX PROFINET module is certified per standard V2.2.4.

Selection and Ordering data	Order code
Further designs	
Please add "-Z" to Article No. and specify Order code(s).	
Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: Measuring-point number/identification (max. 27 characters), specify in plain text	Y15
Declaration of compliance 2.1 (EN 10204) - delivery meets order requirements	C11

Spare parts and accessories	Article No.
Operating Instructions	
All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation	
Accessories	
Tag, stainless steel, 12 x 45 mm (0.47 x 1.77 inch), one text line, suitable for enclosure	7ML1930-1AC
Sunshield kit, 304 stainless steel	7ML1930-1GA
SITRANS RD100, loop powered display - see Chapter 7	7ML5741-...
SITRANS RD150, remote digital display for 4 ... 20 mA and HART devices - see Chapter 7	7ML5742-.....
SITRANS RD200, universal input display with Modbus conversion - see Chapter 7	7ML5740-...
SITRANS RD300, dual line display with totalizer and linearization curve and Modbus conversion - see Chapter 7	7ML5744-...
Spare parts	
Power Supply Board (100 ... 230 V AC)	7ML1830-1MD
Power Supply Board (12 ... 30 V DC)	7ML1830-1ME

Level Measurement

Continuous level measurement

Controllers / HydroRanger 200 HMI

Selection and ordering data (continued)

Spare parts and accessories	Article No.
Removable terminal blocks	A5E38824197
Spare lid with HMI, MultiRanger 200 HMI/HydroRanger 200 HMI, wall	A5E35778738
Spare lid with HMI, MultiRanger 200 HMI/HydroRanger 200 HMI, panel	A5E35778740
SmartLinx DeviceNet module	7ML1830-1HT
SmartLinx PROFIBUS DP-V1 module	A5E35778741
Smartlinx PROFINET IO module	7ML1830-1PM
SmartLinx Modbus TCP/IP, EtherNet/IP module	7ML1830-1PN

Technical specifications

HydroRanger 200 HMI	
Mode of Operation	
Measuring principle	Ultrasonic level measurement
Measuring range	0.3 ... 15 m (1 ... 50 ft), transducer dependent
Measuring points	1 or 2
Input	
Analog	0 ... 20 mA or 4 ... 20 mA, from alternate device, scalable (6 relay model)
Discrete	10 ... 50 V DC switching level Logical 0 \leq 0.5 V DC Logical 1 = 10 ... 50 V DC max. 3 mA
Output	
EchoMax transducer	44 kHz
Ultrasonic transducer	Compatible transducers: ST-H and EchoMax series XPS-10, XPS-15/15F, and XRS-5
Relays ¹⁾	Rating 5 A at 250 V AC, non-inductive
• Model with 6 relays	4 SPST Form A/2 SPDT Form
mA output	0 ... 20 mA or 4 ... 20 mA
• Max. load	750 Ω , isolated
• Resolution	0.1 % of range
Accuracy	
Error in measurement	<ul style="list-style-type: none"> • 0.25 % of range or 6 mm (0.24 inch), whichever is greater • \pm 4 mm (0.16 inch) in combination with an XRS-5 transducer on ranges 4 m (13 ft) or less
Resolution	0.1 % of measuring range or 2 mm (0.08 inch), whichever is greater ²⁾
Temperature compensation	<ul style="list-style-type: none"> • -50 ... +150 °C (-58 ... +302 °F) • Integral temperature sensor in transducer • External TS-3 temperature sensor (optional) • Programmable fixed temperature values
Rated operating conditions	
Installation conditions	
• Location	Indoor / outdoor
• Installation category	II
• Pollution degree	4
Ambient conditions	
• Ambient temperature (enclosure)	-20 ... +50 °C (-4 ... +122 °F)
• Storage temperature	-20 ... +50 °C (-4 ... +122 °F)
Design	
Weight	
• Wall mount	1.22 kg (2.68 lb)
• Panel mount	1.35 kg (2.97 lb)
Material (enclosure)	Polycarbonate
Degree of protection (enclosure)	
• Wall mount	IP65/Type 4X/NEMA 4X
• Panel mount	IP54/Type 3/NEMA 3
Cable	
• Transducer and mA output signal	2-core copper conductor, twisted, shielded, 300 Vrms, 0.82 mm ² (18 AWG), Belden 8760 or equivalent is acceptable
• Max. separation between transducer and transceiver	365 m (1 200 ft)
Displays and controls	60 x 40 mm (2.36 x 1.57 inch) LCD 240 x 160 pixels resolution
Power supply³⁾	
AC version	100 ... 230 V AC \pm 15 %, 50/60 Hz, 36 VA (17 W)
DC version	12 ... 30 V DC (20 W)

Technical specifications (continued)

HydroRanger 200 HMI	
Certificates and approvals	<ul style="list-style-type: none"> • CE, UKCA, RCM, EAC, KC⁴⁾ • FM, cCSA_{US}, UL listed • cCSA_{US} Class I, Div. 2, Groups A, B, C, D, Class II, Div. 2, Groups F, G, Class III (wall mount only) • MCERTS Class 2 approved for Open Channel Flow
Communication	<ul style="list-style-type: none"> • RS 232 with Modbus RTU or ASCII via RJ-11 connector • RS 485 with Modbus RTU or ASCII via terminal blocks • Optional: SmartLinx cards for <ul style="list-style-type: none"> - PROFIBUS DPV1, PROFINET (cyclic access of process values only) - DeviceNet, Modbus TCP/IP, EtherNet/IP

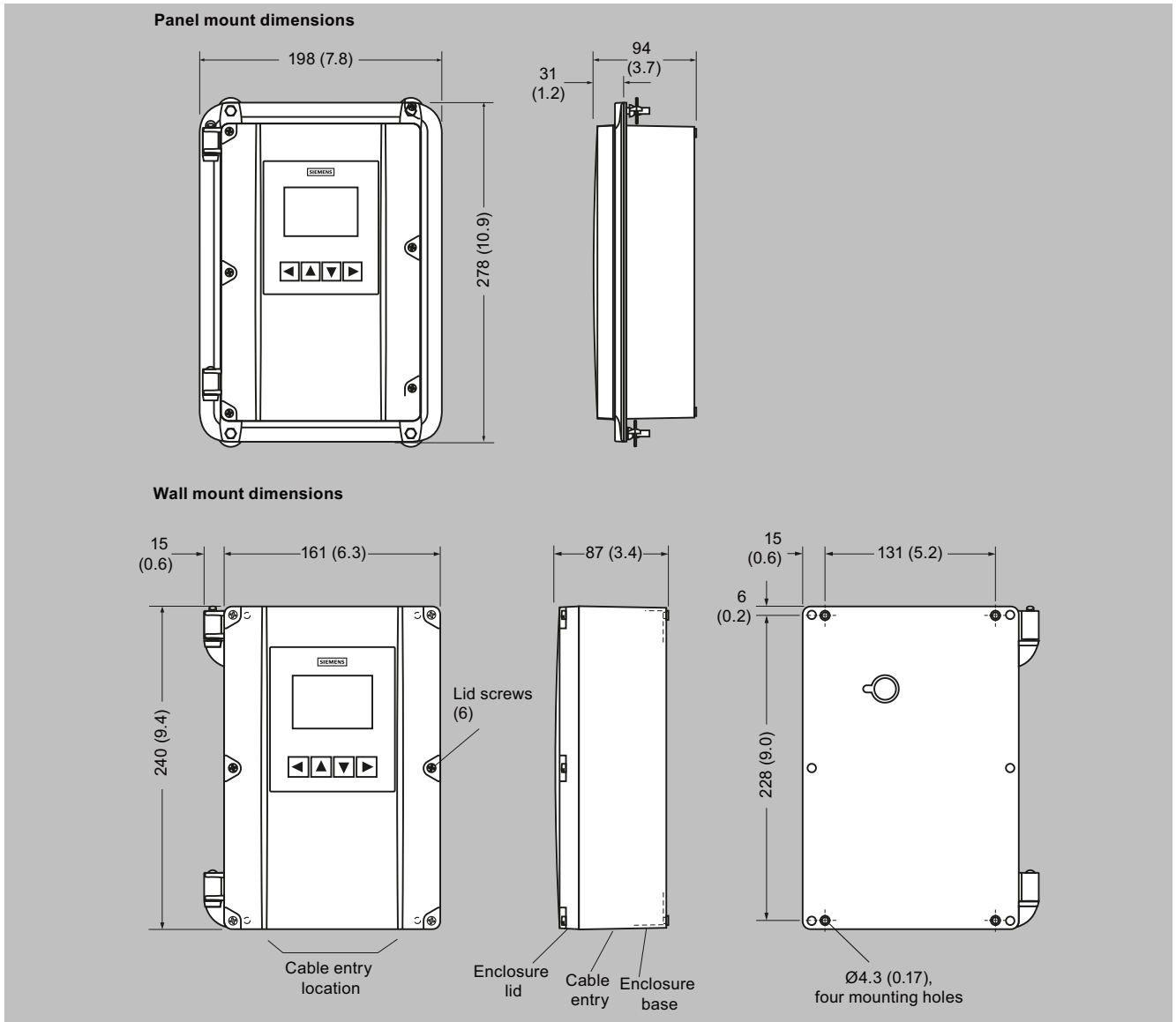
1) All relays certified for use with equipment that fails in a state at or under the rated maximums of the relays.²⁾ Program range is defined as the empty distance to the face of the transducer plus any range extension.³⁾ Maximum power consumption is listed ⁴⁾ EMC performance available upon request

Level Measurement

Continuous level measurement

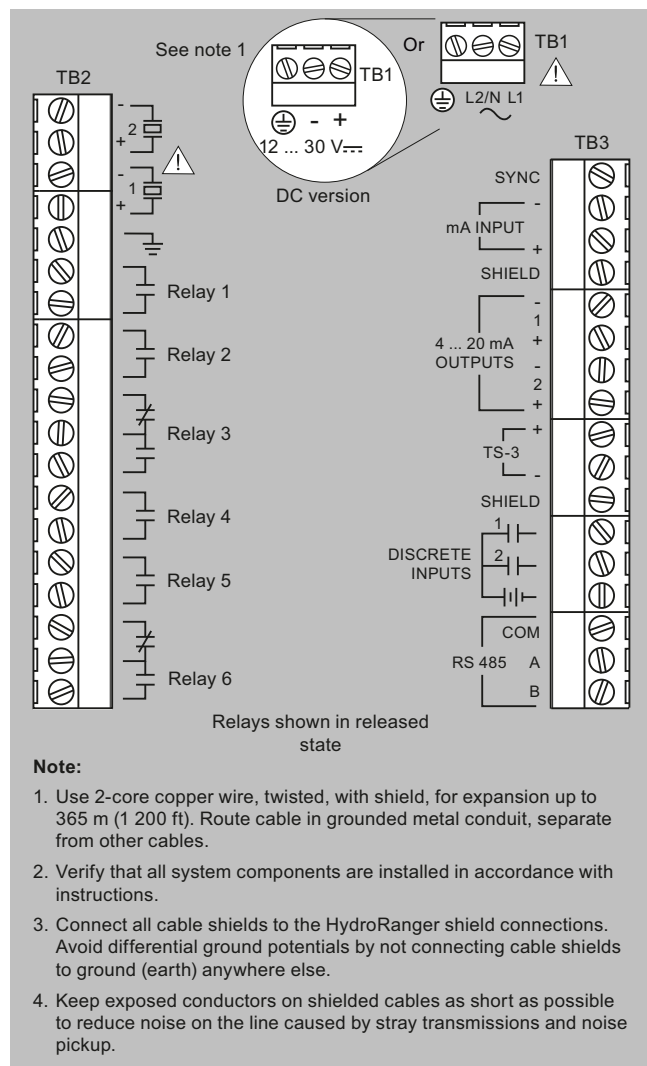
Controllers / HydroRanger 200 HMI

Dimensional drawings



HydroRanger 200 HMI, dimensions in mm (inch)

Circuit diagrams



HydroRanger 200 HMI connections

Level Measurement

Continuous level measurement

Controllers / HydroRanger 200

Overview



HydroRanger 200 is an ultrasonic level controller for up to six pumps and provides control, differential control, and open channel flow monitoring.

Benefits

- Monitors wet wells, weirs and flumes
- Digital communications with built-in Modbus RTU via RS 485
- Compatible with SmartLinX communication options or SIMATIC PDM via RS 485
- Single or dual point level monitoring
- 6 relay (standard), 1 or 3 relay (optional)
- Auto False-Echo Suppression for fixed obstruction avoidance
- Anti-grease ring/tide mark buildup
- Differential amplifier transceiver for common mode noise rejection and improved signal-to-noise ratio
- Wall and panel mounting options

Application

For water authorities, municipal water, and wastewater plants, HydroRanger 200 is an economical, low-maintenance solution delivering control efficiency and productivity needed to meet today's exacting standards. It offers single point monitoring with all models, and optional dual-point monitoring with 6 relay model. As well, it has digital communications with built-in Modbus RTU via RS 485.

The standard 6 relay HydroRanger 200 will monitor open channel flow and features more advanced relay alarming and pump control functions as well as volume conversion. It is compatible with SIMATIC PDM, allowing for PC configuration and setup. Sonic Intelligence advanced echo-processing software provides increased reading reliability. The optional 1 or 3 relay models provide accurate level measurement functions only; these two models do not provide open channel flow, differential level measurement or volume conversion functions.

HydroRanger 200 uses proven continuous ultrasonic echo ranging technology to monitor water and wastewater of any consistency up to 15 m (50 ft) in depth. Achievable resolution is 0.1 % with accuracy to 0.25 % of range. Unlike contacting devices, HydroRanger 200 is immune to problems caused by suspended solids, harsh corrosives, grease or silt in the effluent, reducing downtime.

- Key Applications: wet wells, flumes/weirs, bar screen control

Selection and ordering data

	Article No.				
HydroRanger 100/200 Ultrasonic level controller Continuous, non-contact, 15 m (50 ft) range. Monitors level, volume, and open channel flow in liquids, slurries, and solids.	7ML5034- ● ● ● ● ●				
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.					
Mounting					
Wall mount, standard enclosure	1				
Wall mount, 4 entries, 4 M20 cable glands included	2				
Panel mount ¹⁾	3				
Power supply					
100 ... 230 V AC			A		
12 ... 30 V DC			B		
Number of measurement points					
Single point model, 6 relays				A	
Dual point model, 6 relays				B	
Single point model, level only, 1 relay ²⁾				C	
Single point model, level only, 3 relays ²⁾				D	
Communication (SmartLinX)					
Without module					0
SmartLinX PROFIBUS DP module					2
SmartLinX DeviceNet module					3
See SmartLinX product on page for more information					
Approvals					
Ordinary Locations/General Purpose (Non-Ex), CE, UKCA, FM, cCSAus, UL Listed, RCM, EAC, KC					1
CSA Class I, Div. 2, Groups A, B, C, and D; Class II, Div. 2, Groups F and G; Class III, EAC Ex Ex tc IIIC T75 °C Dc X (for wall mount applications only)					2

¹⁾ Available with approval option 1 only.

²⁾ This model is level control only; no open channel flow, differential level, or volume conversion functions.

Selection and Ordering data	Order code
Further designs	
Please add "-Z" to Article No. and specify Order code(s).	
Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: Measuring-point number/identification (max. 27 characters) specify in plain text	Y15

Spare parts and accessories	Article No.
Operating Instructions	
All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation	
Accessories	
Handheld programmer	A5E36563512
Tag, stainless steel, 12 x 45 mm (0.47 x 1.77 inch), one text line, suitable for enclosure	7ML1930-1AC
Sunshield kit, 304 stainless steel	7ML1930-1GA
USB to RS 232 adapter	7ML1930-6AK
SITRANS RD100, loop powered display - see Chapter 7	7ML5741-...
SITRANS RD150, remote digital display for 4 ... 20 mA and HART devices - see Chapter 7	7ML5742-.....
SITRANS RD200, universal input display with Modbus conversion - see Chapter 7	7ML5740-...
SITRANS RD300, dual line display with totalizer and linearization curve and Modbus conversion - see Chapter 7	7ML5744-...
Spare parts	
Power Supply Board (100 ... 230 V AC)	7ML1830-1MD
Power Supply Board (12 ... 30 V DC)	7ML1830-1ME
MultiRanger 100/200/HydroRanger 200 display, non-HMI	7ML1830-1MF
Removable terminal blocks	A5E38824197

Level Measurement

Continuous level measurement

Controllers / HydroRanger 200

Technical specifications

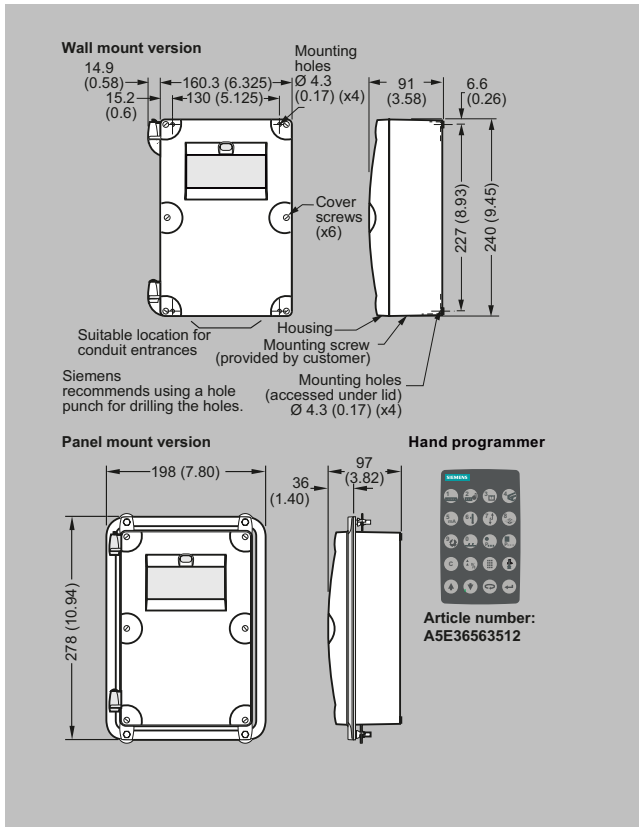
HydroRanger 200	
Mode of Operation	
Measuring principle	Ultrasonic level measurement
Measuring range	0.3 ... 15 m (1 ... 50 ft), transducer dependent
Measuring points	1 or 2
Input	
Analog	0 ... 20 mA or 4 ... 20 mA, from alternate device, scalable (6 relay model)
Discrete	10 ... 50 V DC switching level Logical 0 ≤ 0.5 V DC Logical 1 = 10 ... 50 V DC Max. 3 mA
Output	
EchoMax transducer	44 kHz
Ultrasonic transducer	Compatible transducers: ST-H and EchoMax series XPS-10, XPS 15/15F, and XRS-5
Relays ¹⁾	Rating 5 A at 250 V AC, non-inductive
• Model with 1 relay ²⁾	1 SPST Form A
• Model with 3 relays ²⁾	2 SPST Form A/1 SPDT Form C
• Model with 6 relays	4 SPST Form A/2 SPDT Form C
mA output	0 ... 20 mA or 4 ... 20 mA
• Max. load	750 Ω, isolated
• Resolution	0.1 % of range
Accuracy	
Error in measurement	0.25 % of range or 6 mm (0.24 inch), whichever is greater
Resolution	0.1 % of measuring range or 2 mm (0.08 inch), whichever is greater ³⁾
Temperature compensation	<ul style="list-style-type: none"> -50 ... +150 °C (-58 ... +302 °F) • Integral temperature sensor in transducer • External TS-3 temperature sensor (optional) • Programmable fixed temperature values
Rated operating conditions	
Installation conditions	
• Location	Indoor / outdoor
• Installation category	II
• Pollution degree	4
Ambient conditions	
• Ambient temperature (enclosure)	-20 ... +50 °C (-4 ... +122 °F)
• Storage temperature	-20 ... +50 °C (-4 ... +122 °F)
Design	
Weight	
• Wall mount	1.37 kg (3.02 lb)
• Panel mount	1.50 kg (3.31 lb)
Material (enclosure)	
Polycarbonate	
Degree of protection (enclosure)	
• Wall mount	IP65/Type 4X/NEMA 4X
• Panel mount	IP54/Type 3/NEMA 3
Cable	
• Transducer and mA output signal	2-core copper conductor, twisted, shielded, 300 Vrms, 0.82 mm ² (18 AWG), Belden 8 760 or equivalent is acceptable
• Max. separation between transducer and transceiver	365 m (1 200 ft)
Displays and controls	
100 x 40 mm (4 x 1.5 inch) multi-block LCD with backlighting	
Programming	
Programming using handheld programmer or via PC with SIMATIC PDM software	

Technical specifications (continued)

HydroRanger 200	
Power supply⁴⁾	
AC version	100 ... 230 V AC ± 15 %, 50/60 Hz, 36 VA (17 W)
DC version	12 ... 30 V DC (20 W)
Certificates and approvals	
<ul style="list-style-type: none"> • CE, UKCA, RCM, EAC, KC⁵⁾ • Lloyd's Register of Shipping • ABS Type Approval • FM, cCSA_{US}, UL listed • cCSA_{US} Class I, Div. 2, Groups A, B, C, D, Class II, Div. 2, Groups F, G, Class III, EAC Ex (wall mount only) • MCERTS Class 3 approved for Open Channel Flow 	
Communication	
<ul style="list-style-type: none"> • RS 232 with Modbus RTU or ASCII via RJ-11 connector • RS 485 with Modbus RTU or ASCII via terminal blocks • Optional: SmartLinx cards for <ul style="list-style-type: none"> - PROFIBUS DP - DeviceNet 	

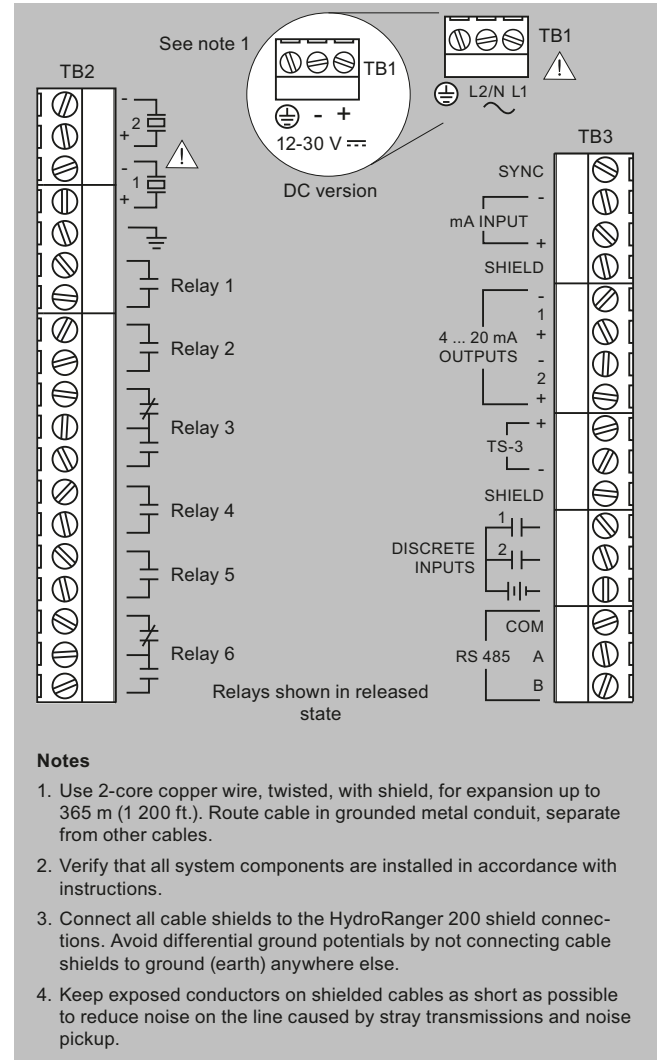
- 1) All relays certified for use with equipment that fails in a state at or under the rated maximums of the relays
- 2) This model is level control only; no open channel flow, differential level or volume conversion functions
- 3) Program range is defined as the empty distance to the face of the transducer plus any range extension
- 4) Maximum power consumption is listed
- 5) EMC performance available upon request

Dimensional drawings



HydroRanger 200, dimensions in mm (inch)

Circuit diagrams



HydroRanger 200 connections

Level Measurement

Continuous level measurement

Controllers / SITRANS LUT400 series

Overview



The SITRANS LUT400 series controllers are compact, single point, long-range ultrasonic controllers for continuous level or volume measurement of liquids, slurries, solids, and high accuracy monitoring of open channel flow.

Benefits

- Small 1/2 DIN enclosure [144 h x 144 d x 146 w mm (5.7 x 5.7 x 5.75 inch)] with standard universal mounting bracket for wall, pipe, and DIN rail, plus an optional panel mount
- Easy to use HMI display with local four-button programming, menu-driven parameters, and Wizard support for key applications
- English, German, French, Spanish, Chinese, Italian, Portuguese, and Russian texts on the HMI.
- Level, Volume, OCM Flow monitoring
- Three relays combined with a suite of pump, alarm, and relay control features
- HART Communications
- EDDs for SIMATIC PDM, AMS Device Manager, and Field Communicator 375/475, plus DTMs for FDTs (Field Device Tools)
- Web browser for local programming from an intuitive web-based interface
- Two discrete inputs for backup level override and pump interlock functions
- Echo profile and trend views from the local display
- Patented digital receiver for improved performance in electrically noisy applications (close proximity to VSDs)
- Real time clock with daylight savings time, supporting an integrated datalogger and energy saving algorithms for minimizing pump operation during high cost energy periods
- Removable terminal blocks for ease of wiring
- MCERTS Certified for Open Channel Flow

Application

The SITRANS LUT400 comes in three different models, depending on the application, level of performance and functionality required:

- SITRANS LUT420 Level Controller: Level or volume measurement of liquids, slurries, and solids, as well as basic pump control functions, and basic data logging capability
- SITRANS LUT430 Level, Pump and Flow Controller: Includes all features of the LUT420 plus a full suite of advanced pump control and alarm functionality, open channel flow monitoring, and basic flow data logging capability
- SITRANS LUT440 High Accuracy OCM: Our most featured, highest accuracy model. Includes all features of the LUT430, plus the industry's best accuracy (± 1 mm within 3 m), full suite of advanced control functionality, and enhanced flow logging capability
- Key Applications: wet wells, reservoirs, flumes/weirs, chemical storage, liquid storage, hoppers, crusher bins, dry solids storage

Selection and ordering data

		Article No.										
SITRANS LUT400 Series Ultrasonic level controller Continuous, non-contact, 60 m (197 ft) range. Monitors level, volume, and volume flow in liquids, slurries, and solids. With high accuracy volume flow and built in data logging.		7	M	L	5	0	5	0	-	0	0	0
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.												
Model												
SITRANS LUT420 - Level controller										A		
SITRANS LUT430 - Level, Pump & Flow controller										B		
Enclosure display options												
With display											A	
With remote panel mount display [Includes panel mount cable extension, 2.5 m (8.2 ft)]											B	
No display (blank lid provided)											C	
Note: Enclosure includes back-plate for wall and pipe mounting, and an integrated clip for DIN-rail mounting. DIN-rail mounting for standard TS35 x 7.5 and TS35 x 15 mm DIN-rail to IEC 60715, EN 60715												
Input voltage												
100 ... 230 V AC ± 15 %											1	
10 ... 32 V DC											2	
Cable inlet												
3 cable inlets, cable glands not supplied												1
3 cable inlets, 3 M20 plastic cable glands supplied												2
Number of measurement points												
Single point system (includes one transducer input, one mA output, and one external temperature sensor input)												1
Communications and I/O												
HART, 2 discrete inputs, 3 relays												D
Approvals												
Ordinary Locations/General Purpose (Non-Ex), CE, UKCA, FM, cCSA _{US} , UL, RCM, EAC, KC												A
Hazardous locations CSA Class I, II, III, Div. 2, Groups A, B, C, D, F, G												C

Selection and Ordering data	Order code
Further designs	
Please add "-Z" to Article No. and specify Order code(s).	
Declaration of compliance 2.1 (EN 10204) - delivery meets order requirements	C11
Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: Measuring-point number/identification (max. 27 characters) specify in plain text	Y15
Namur NE43 failsafe setting - device preset to failsafe < 3.6 mA	N07

Spare parts and accessories	Article No.
Operating Instructions	
All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation	
Accessories	
Tag, stainless steel, 12 x 45 mm (0.47 x 1.77 inch), one text line, suitable for enclosure	7ML1930-1AC
TS-3 Temperature Sensor	7ML1813-...
Panel mount cable extension, 2.5 m (8.2 ft)	7ML1930-1GF
Qty 3 cable glands and retaining nuts	7ML1930-1GB
USB cable, 2 m (6.56 ft) - Standard USB-A to USB-mini B	7ML1930-1GD
HART modem with USB interface	7MF4997-1DB
Sunshield, 304 stainless steel	7ML1930-1GE
SITRANS RD100, loop powered display - see Chapter 7	7ML5741-...

Level Measurement

Continuous level measurement

Controllers / SITRANS LUT400 series

Selection and ordering data (continued)

Spare parts and accessories	Article No.
SITRANS RD150, remote digital display for 4 ... 20 mA and HART devices - see Chapter 7	7ML5742-.....
SITRANS RD200, universal input display with Modbus conversion - see Chapter 7	7ML5740-...
SITRANS RD300, dual line display with totalizer and linearization curve and Modbus conversion - see Chapter 7	7ML5744-...
Spare parts	
Panel mount retrofit kit (convert standard unit with display to panel mount version)	7ML1830-1PA
Terminal block replacement kit (5 piece kit with one of each removable terminal)	7ML1830-1PB
Wall/Pipe mount plate	7ML1830-1PC
Enclosure (include blank label)	7ML1830-1PD
SITRANS LUT400 Lid (with Display)	7ML1830-1PE
SITRANS LUT400 Lid (blank)	7ML1830-1PF
Fuse - AC (0.25 A, 250 V, Slow Blow)	7ML1830-1PG
Fuse - DC (1.6 A, 125 V, Slow Blow)	7ML1830-1PH
Panel mount gasket and fastener kit	7ML1830-1PK
DIN-rail clip	7ML1830-1PL
LUT420, assembly, DC, board stack with cradle, general purpose	A5E42824483
LUT420, assembly, AC, board stack with cradle, general purpose	A5E42824562
LUT430, assembly, DC, board stack with cradle, general purpose	A5E42824564
LUT430, assembly, AC, board stack with cradle, general purpose	A5E42824568
LUT420, assembly, DC, board stack with cradle, hazardous	A5E42824561
LUT420, assembly, AC, board stack with cradle, hazardous	A5E42824563
LUT430, assembly, DC, board stack with cradle, hazardous	A5E42824565
LUT430, assembly, AC, board stack with cradle, hazardous	A5E42824570

	Article No.										
SITRANS LUT400 Series Ultrasonic level controller Continuous, non-contact, 60 m (197 ft) range. Monitors level, volume, and volume flow in liquids, slurries, and solids. With high accuracy volume flow and built in data logging.	7ML5050-	0	•	•	•	•	-	•	•	•	0
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.											
Model											
SITRANS LUT440 - High accuracy Open Channel Monitor ¹⁾											C
Enclosure display options											
With display											A
With remote panel mount display [includes panel mount cable extension, 2.5 m (8.2 ft)]											B
No display (blank lid provided)											C
Note: Enclosure includes back-plate for wall and pipe mounting, and an integrated clip for DIN-rail mounting. DIN-rail mounting for standard TS35 x 7.5 and TS35 x 15 mm DIN-rail to IEC 60715, EN 60715											
Input voltage											
100 ... 230 V AC ± 15 %											1
10 ... 32 V DC											2
Cable inlet											
3 cable inlets, cable glands not supplied											1
3 cable inlets, 3 M20 plastic cable glands supplied											2
Number of measurement points											
Single point system (includes one transducer input, one mA output, and one external temperature sensor input)											1
Communications and I/O											
HART, 2 discrete inputs, 3 relays											D

Selection and ordering data (continued)

	Article No.
SITRANS LUT400 Series Ultrasonic level controller Continuous, non-contact, 60 m (197 ft) range. Monitors level, volume, and volume flow in liquids, slurries, and solids. With high accuracy volume flow and built in data logging.	7ML5050- 0 ● ● ● ● - ● ● ● 0
Approvals Ordinary Locations/General Purpose (Non-Ex), CE, UKCA, FM, CCSAUS, UL, RCM, EAC, KC Hazardous locations CSA Class I, II, III, Div. 2, Groups A, B, C, D, F, G	A C

¹⁾ Compatible with all EchoMax Transducers. High accuracy OCM performance with the use of an XRS-5 transducer and TS-3 temperature sensor (each sold separately).

Selection and Ordering data	Order code
Further designs Please add "-Z" to Article No. and specify Order code(s). Declaration of compliance 2.1 (EN 10204) - delivery meets order requirements	C11
Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: Measuring-point number/identification (max. 27 characters) specify in plain text	Y15
Namur NE43 failsafe setting - device preset to failsafe < 3.6 mA	N07

Spare parts and accessories	Article No.
Operating Instructions All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation	
Accessories Tag, stainless steel, 12 x 45 mm (0.47 x 1.77 inch), one text line, suitable for enclosure	7ML1930-1AC
TS-3 Temperature Sensor	7ML1813-...
Panel mount cable extension 2.5 m (8.2 ft)	7ML1930-1GF
Qty 3 cable glands and retaining nuts	7ML1930-1GB
USB cable 2 m (6.56 ft) - Standard USB-A to USB-mini B	7ML1930-1GD
HART modem with USB interface	7MF4997-1DB
Sunshield, 304 stainless steel	7ML1930-1GE
SITRANS RD100, loop powered display - see Chapter 7	7ML5741-...
SITRANS RD150, remote digital display for 4 ... 20 mA and HART devices - see Chapter 7	7ML5742-.....
SITRANS RD200, universal input display with Modbus conversion - see Chapter 7	7ML5740-...
SITRANS RD300, dual line display with totalizer and linearization curve and Modbus conversion - see Chapter 7	7ML5744-...
Spare parts Panel mount retrofit kit (convert standard unit with display to panel mount version)	7ML1830-1PA
Terminal block replacement kit (5 piece kit with one of each removable terminal)	7ML1830-1PB
Wall/Pipe mount plate	7ML1830-1PC
Enclosure (include blank label)	7ML1830-1PD
SITRANS LUT400 Lid (with Display)	7ML1830-1PE
SITRANS LUT400 Lid (blank)	7ML1830-1PF
Fuse - AC (0.25 A, 250 V, Slow Blow)	7ML1830-1PG
Fuse - DC (1.6 A, 125 V, Slow Blow)	7ML1830-1PH
Panel mount gasket and fastener kit	7ML1830-1PK
DIN-rail clip	7ML1830-1PL
LUT440, assembly, DC, board stack with cradle, general purpose	A5E42847453

Level Measurement

Continuous level measurement

Controllers / SITRANS LUT400 series

Selection and ordering data (continued)

Spare parts and accessories	Article No.
LUT440, assembly, AC, board stack with cradle, general purpose	A5E42847455
LUT440, assembly, DC, board stack with cradle, hazardous	A5E42847454
LUT440, assembly, AC, board stack with cradle, hazardous	A5E42847456

Technical specifications

SITRANS LUT400 series	
Mode of Operation	Ultrasonic level, volume, pump, and open channel flow
Measuring range	0.3 ... 60 m (1 ... 196 ft), transducer dependent
Input	
Discrete	0 ... 50 V DC switching level Logical 0 ≤ 10 V DC Logical 1 = 10 ... 50 V DC Max. 3 mA
Output	
Transducer frequency	10 ... 52 kHz
Ultrasonic transducer	Compatible transducers: All EchoMax and ST-H series transducers
Relays	<ul style="list-style-type: none"> 1 SPDT Form C, NO or NC relay, rated 1A at 250 V AC, non-inductive and 3A at 30 V DC 2 SPST Form A, NO relays, rated 5A at 250 V AC, non-inductive and 3 A at 30 V DC
mA output	4 ... 20 mA, isolated
Max. load	600 Ω max. in ACTIVE mode, 750 Ω max. in PASSIVE mode
Resolution	0.1 % of range
Accuracy	
Error in measurement	<ul style="list-style-type: none"> Standard operation: ± 1 mm (0.04 inch) plus 0.17 % of measured distance High accuracy OCM: ± 1 mm (0.04 inch), within 3 m (9.84 ft) range
Resolution	<ul style="list-style-type: none"> Standard operation: 0.1 % of range or 2 mm (0.08 inch), whichever is greater High accuracy OCM: 0.6 mm (0.02 inch), within 3 m (9.84 ft) range
Temperature compensation	<ul style="list-style-type: none"> -40 ... +150 °C (-40 ... +300 °F) Integral temperature sensor in transducer External TS-3 temperature sensor (optional) Programmable fixed temperature values
Rated operating conditions	
Installation conditions	
• Location	Indoor/outdoor
• Installation category	II
• Pollution degree	4
Ambient conditions	
• Ambient temperature (enclosure)	-20 ... +50 °C (-4 ... +122 °F)
• Storage temperature	-20 ... +50 °C (-4 ... +122 °F)
Design	
Weight	
• Enclosure with display lid	1.3 kg (2.87 lb)
• Enclosure with blank lid	1.2 kg (2.65 lb)
Material (enclosure)	Polycarbonate
Degree of protection	
• Enclosure with display or blank lid	IP65/Type 4X/NEMA 4X
• Enclosure with blank lid and knock-out removed	IP20
Remote display lid	IP65/Type 3/NEMA 3

Technical specifications (continued)

SITRANS LUT400 series	
Cable	
Transducer and mA output signal	<ul style="list-style-type: none"> • Transducer, mA output: 2 copper conductors, twisted, with foil shield/drain wire, 300 V 0.5 ... 0.75 mm² (22 ... 18 AWG) • Relay/power to be copper conductors per local requirements to meet 250 V 5 A contact rating
Max. separation between transducer and transceiver	365 m (1 200 ft)
Displays and controls	
	60 x 40 mm (2.36 x 1.57 inch) removable LCD, 240 x 160 pixels resolution, operational up to 5 m from enclosure base
Programming	
• Primary	4 Local push buttons
• Secondary	<ul style="list-style-type: none"> • PC running SIMATIC PDM • PC running Emerson AMS Device Manager • PC running a web browser • PC running a Field Device Tool (FDT) • Field Communicator 375/475 (FC375/FC475)
Memory	
	<ul style="list-style-type: none"> • 512 kB flash EPROM • 1.5 MB flash for data logging
Power supply	
AC version	100 ... 230 V AC ± 15 %, 50/60 Hz, 36 VA Fuse: 5 x 20 mm, Slow Blow, 0.25 A, 250 V
DC version	10 ... 32 V DC, 10 W Fuse: 5 x 20 mm, Slow Blow, 1.6 A, 125 V
Certificates and approvals	
General	cCSA _{US} , CE, UKCA, FM, UL Listed, RCM, EAC, KC, MCERTS
Hazardous	
• Non-incendive (Canada)	CSA Class I, Div. 2, Groups A, B, C, D; Class II, Div. 2, Groups F, G; Class III
• Shipping	Lloyd's Register, ABS
Communication	HART 7.0, USB

Category	Feature	SITRANS LUT420 Level Controller	SITRANS LUT430 Level, pump and flow controller	SITRANS LUT440 High accuracy OCM controller
Operations	Level, space, and distance measurement	✓	✓	✓
	Open channel flow measurement		✓	✓
	Volume conversion	✓	✓	✓
Specifications	Compatible with EchoMax and ST-H transducers	✓	✓	✓
	Standard accuracy: ± 1 mm + 0.17 % of measured distance	✓	✓	✓
	High accuracy: ± 1 mm within 3 meters			✓
	Mounting options: wall or panel, pipe, DIN-rail	✓	✓	✓
Data logging and communications	HART communications	✓	✓	✓
	4 ... 20 mA output (active and passive)	✓	✓	✓
	Integrated datalogger for measurement value and alarms	✓	✓	✓

Level Measurement

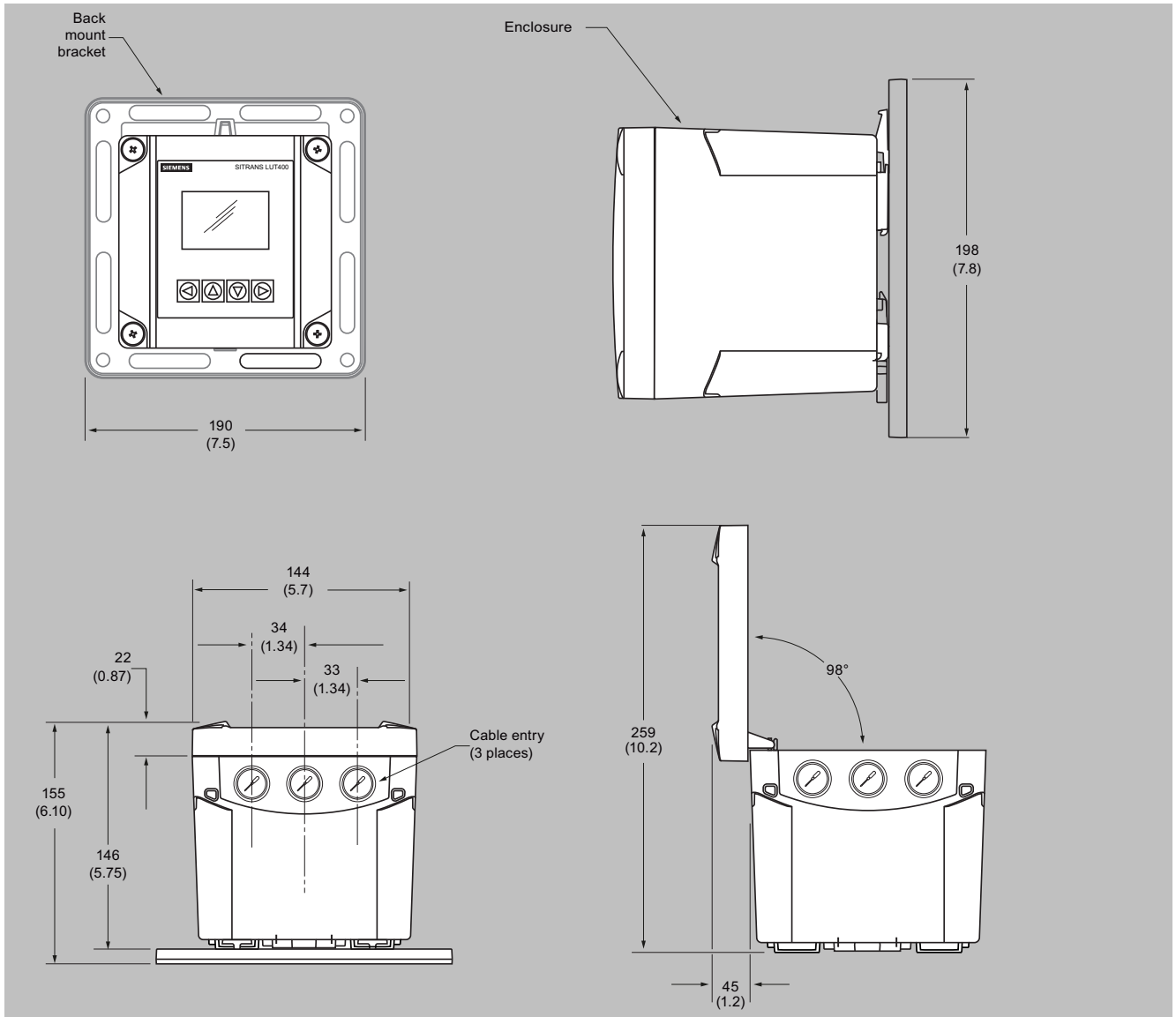
Continuous level measurement

Controllers / SITRANS LUT400 series

Technical specifications (continued)

Category	Feature	SITRANS LUT420 Level Controller	SITRANS LUT430 Level, pump and flow controller	SITRANS LUT440 High accuracy OCM controller
	Integrated datalogger for fixed rate flow logging		✓	✓
	Integrated datalogger for variable rate flow logging triggered by changes in flow condition			✓
	Daily data logging for maximum, minimum and average flow, daily totalized volume, and minimum and maximum temperature		✓	✓
Flow monitoring	High accuracy open channel flow measurement			✓
	9 digit daily and running flow totalizers		✓	✓
	High and low flowrate alarms		✓	✓
	External totalizer and sampler control		✓	✓
	MCERTS Class 1 Certification			✓
	MCERTS Class 2 Certification		✓	
Pump control	Energy saving algorithms for pump control		✓	✓
	Wall cling reduction	✓	✓	✓
	Pump run-on functionality		✓	✓
	Pump start and power resumption delays		✓	✓
	Alternate duty pump routines	✓	✓	✓
	Fixed duty and service ratio pump routines		✓	✓
	Pumped volume totalizer		✓	✓
	Submergence detection	✓	✓	✓
	Discrete input pump interlocks		✓	✓
	Time to spill calculation		✓	✓

Dimensional drawings



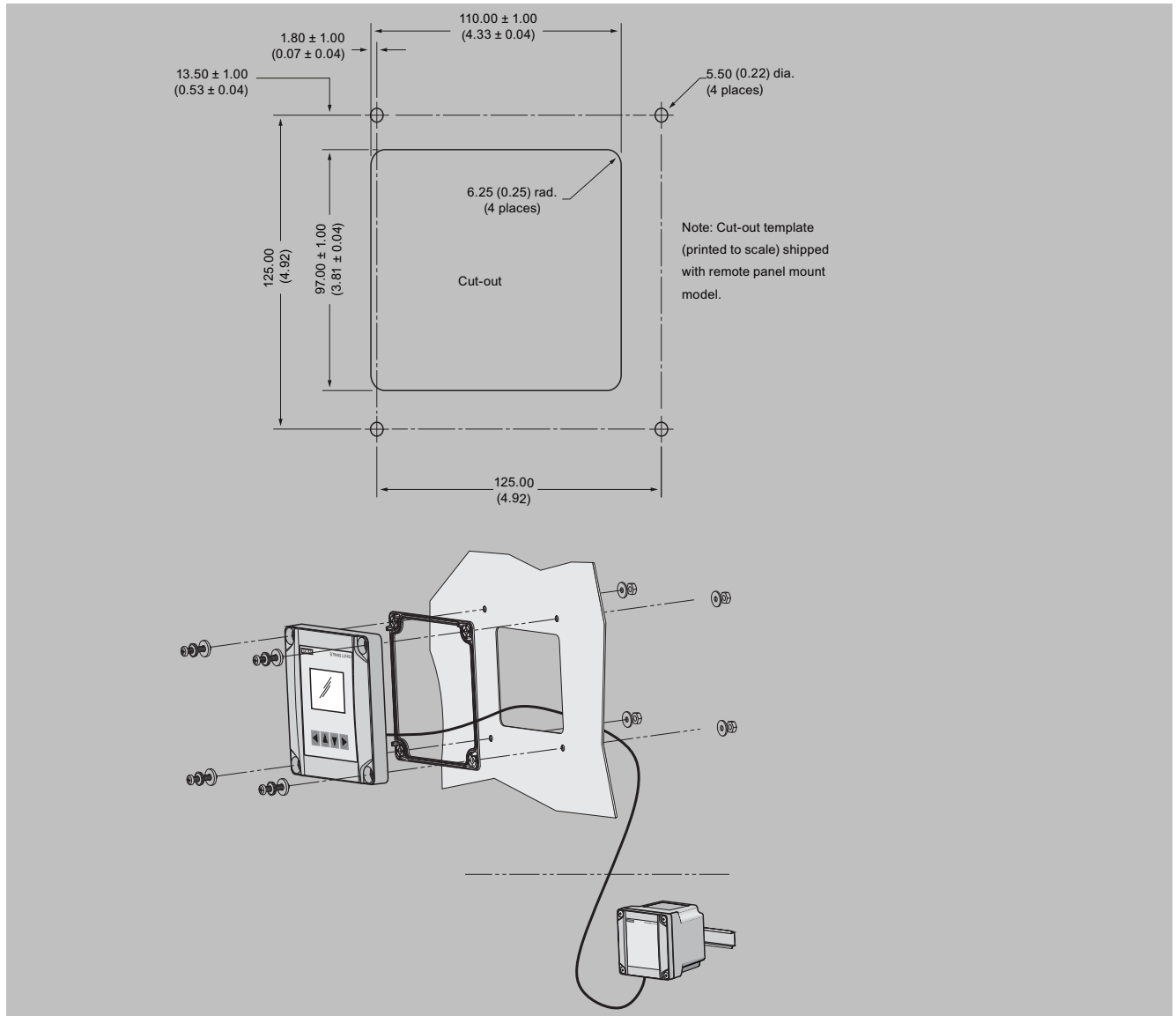
SITRANS LUT400, dimensions in mm (inch)

Level Measurement

Continuous level measurement

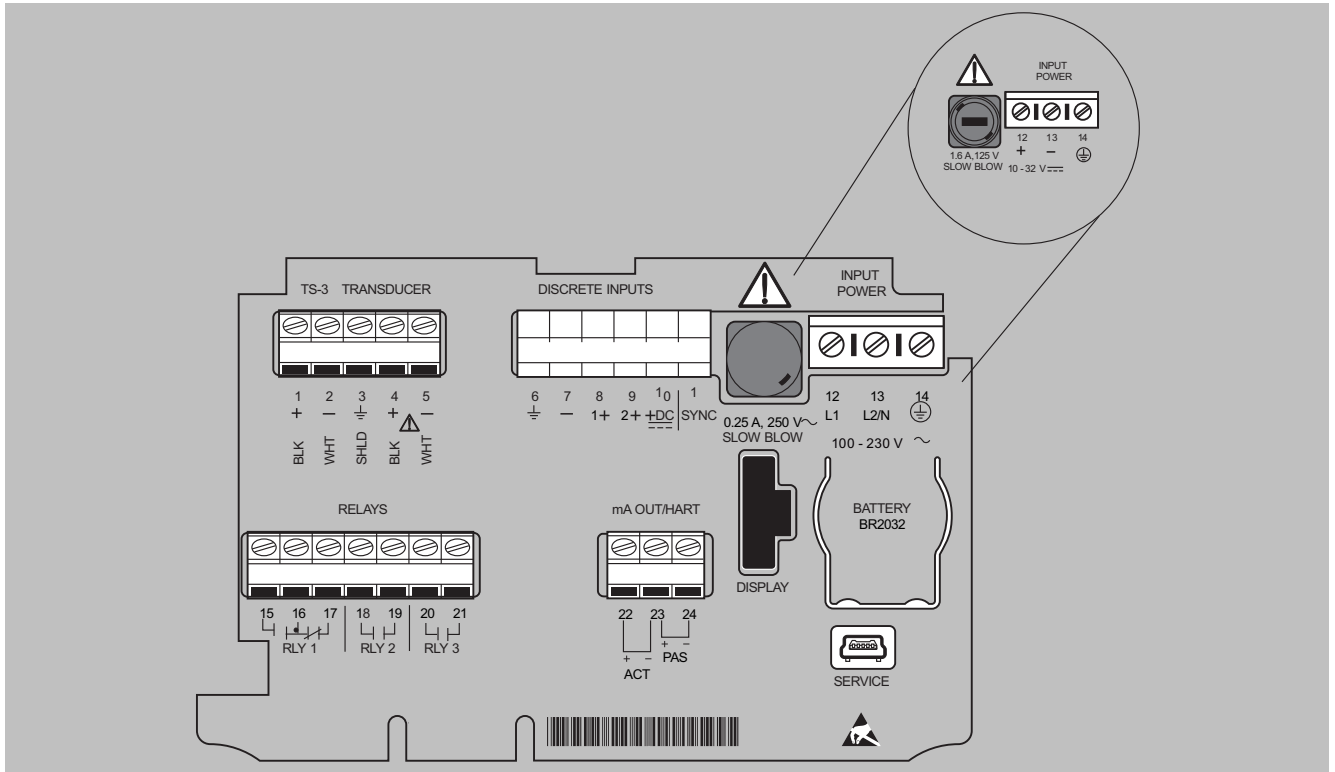
Controllers / SITRANS LUT400 series

Dimensional drawings (continued)



SITRANS LUT400, dimensions in mm (inch)

Circuit diagrams



SITRANS LUT400 connections

Level Measurement

Continuous level measurement

Ultrasonic

Overview

Introduction

Ultrasonic measurement is based on the speed of sound. Sound can be used as a measurement tool because there is a measurable time lapse between sound generation and the "hearing" of the sound. This time lapse is then converted into usable information. Ultrasonic sensing equipment generates a sound above 20 000 Hz and then interprets the time lapse of the returned echo. The transducer creates the sound and senses the echo and then a transceiver interprets the sound and converts it into information.

Siemens ultrasonic units include Sonic Intelligence, a signal processing technology. Using unique algorithms, Sonic Intelligence differentiates between true echoes from the material and false echoes from obstructions or electrical noise, providing intelligent processing of echo profiles.

Typical System

Ultrasonic level measurement requires two components: one to generate the sound and catch the echo (transducer) and one to interpret the data and derive a measurement (transceiver). Even though some ultrasonic instruments combine the components in one unit, the individual functionality remains distinct. The measurement output is communicated to the unit, PLCs or PCs for process control.

Principle of Operation

A piezoelectric crystal inside the transducer converts an electrical signal into sound energy, firing a burst into the air which travels to the target and then is reflected back to the transducer. The transducer then acts as a receiving device and converts the sonic energy back into an electrical signal contained in the transceiver. An electronic signal processor analyzes the return echo and calculates the distance between the transducer and the target. The time lapse between firing the sound burst and receiving the return echo is directly proportional to the distance between the transducer and the material in the vessel. This basic principle lies at the heart of the ultrasonic measurement technology and is illustrated in the equation:

$$\text{Distance} = (\text{Velocity of Sound} \times \text{Time})/2.$$

Mode of operation

Common Terms

Attenuation

Denotes a decrease in signal magnitude in transmission from one point to another. Attenuation may be expressed as a scalar ratio of the input magnitude to the output magnitude or in decibels.

Beam angle

The diameter of a conical boundary centered around the axis of transmission when the power (radiating perpendicular to the transducer face on the axis of transmission) is reduced by half (-3 dB).

Blanking distance

Specified zone extending downward from the transducer face in which received echoes are ignored by the transceiver. Blanking distance ignores echoes from ringing.

Echo confidence

The recognition of the validity of the echo as material level. A measure of echo reliability.

Ringing

The inherent nature of the transducer to continue vibrating after the transmit pulse has ceased; the decay of the transmit pulse.

Transducer/Transceiver

A transducer provides the initial ultrasonic pulse and receives its echo. An ultrasonic transducer amplifies the sound wave created by the piezoelectric crystal and transmits that sound wave to the face of the transducer while at the same time dampening the sound wave from the other sides of the crystal.

Transceivers analyze the echo from the transducer to determine the required measurement.

Technical specifications

Ultrasonic Transmitter Selection Guide

Criteria	SITRANS Probe LU	SITRANS Probe LU240	SITRANS LU150/LU180
Range	6 m (20 ft) or 12 m (40 ft)	0.2 ... 6 m (8 inch ... 20 ft) 0.2 ... 12 m (8 inch ... 40 ft)	0.25 ... 5 m (0.8 ... 16.4 ft)
Typical applications	Chemical storage vessels, filter beds, liquid storage vessels	Chemical storage vessels, filter beds, liquid storage vessels	Chemical storage vessels, filter beds, mud pits, liquid storage vessels, food applications
Output	HART model: 4 ... 20 mA/HART PROFIBUS PA model: PROFIBUS	4 ... 20 mA/HART	4 ... 20 mA loop powered
Communications	HART or PROFIBUS PA Options: SIMATIC PDM for remote configuration and diagnostics	HART, SIMATIC PDM	N/A
Power specifications	HART: 4 ... 20 mA, 24 V DC nominal, max. 550 Ω, 30 V DC PROFIBUS PA: 12, 13, 15, or 20 mA, dependent on programming	HART: 4 ... 20 mA, 10.5 ... 30 V DC	12 ... 30 V DC, 0.1 A surge, max. 600 Ω in the loop at 24 V DC
Approvals	CE, CSA _{USIC} , FM, RCM, ATEX, IECEx	FM, CSA _{USIC} , CE, RCM, ATEX, IECEx, FM, INMETRO, NEPSI, SABS	CE, CSA _{USIC} , FM, ATEX, RCM, NEPSI, IECEx



Handheld programmer selection guide

Level Measurement

Continuous level measurement

Ultrasonic / Ultrasonic transmitters

Overview

SITRANS LU150

- Application
 - General purpose, 2 wire, 4 to 20 mA loop powered transmitter is ideal for liquids, slurries, and bulk materials in open or closed vessels.
- Device description
 - Sanitary models available
 - Patented Sonic Intelligence echo processing
 - Integral temperature compensation

SITRANS LU180

- Application
 - Intrinsically safe (ATEX, CSA, FM, IECEx, NEPSI), 2 wire, 4 to 20 mA loop powered transmitter is ideal for liquids, slurries, and bulk materials in open or closed vessels to 5 meters (16.4 feet).
- Device description
 - Sanitary models available
 - Patented Sonic Intelligence echo processing
 - Integral temperature compensation

SITRANS Probe LU

- Application
 - 2-wire loop powered ultrasonic transmitter for level, volume and flow monitoring of liquids in open channels, storage vessels and simple process vessels.
- Device Description
 - Continuous level measurement up to 12 m (40 ft) range
 - Patented Sonic Intelligence signal processing
 - Auto False-Echo Suppression of false echoes

SITRANS Probe LU240

- Application
 - 2-wire loop powered ultrasonic transmitter for level, volume and flow monitoring of liquids in open channels, storage vessels, and simple process vessels.
- Device description
 - Continuous level measurement up to 12 m (40 ft) range
 - Next generation Process Intelligence signal processing
 - Fast and easy configuration with quick start wizards

The Probe

- Application
 - Compact level transmitter with integrated transducer for accurate level measurement for liquid applications.
- Device description
 - Simple, compact and competitively priced ultrasonic level transmitter in several versions for maximum versatility:
 - Three-wire system with 5 m model 24 V DC
 - Two-wire system with current loop

Overview



SITRANS LU150 is a short-range integrated ultrasonic level transmitter. This general purpose, 2-wire, 4 to 20 mA loop powered transmitter is ideal for liquids, slurries, and bulk materials in open or closed vessels to 5 m (16.4 ft).

Benefits

- Easy to install, program, and maintain
- Accurate and reliable
- Sanitary models available
- Patented Sonic Intelligence echo processing
- Integral temperature compensation

Application

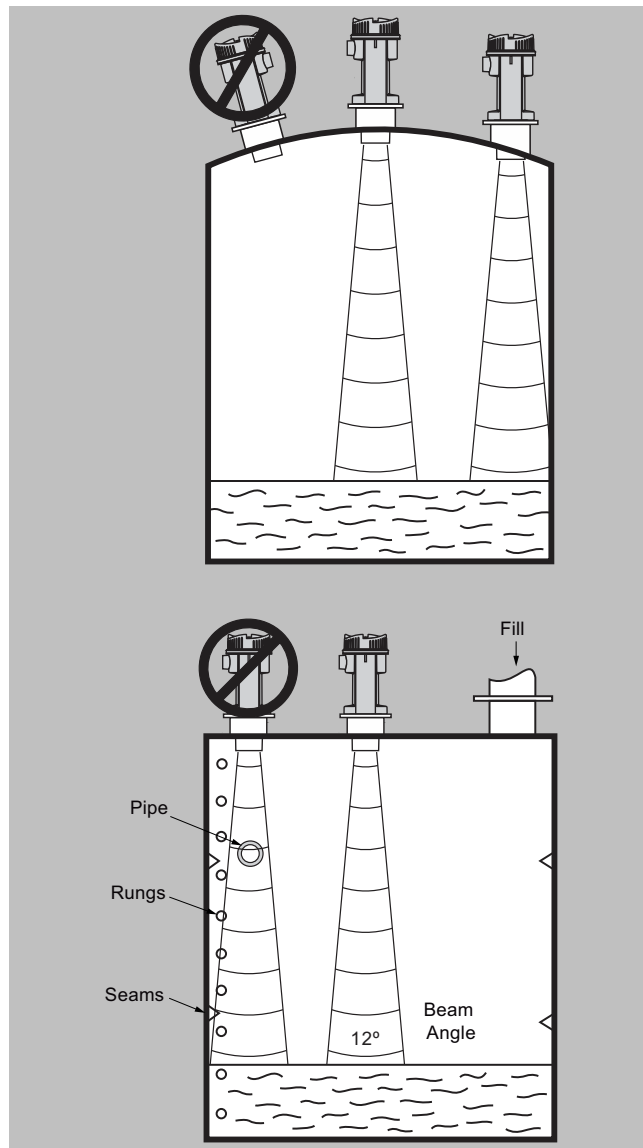
The transducer is available in PVDF copolymer, making the device suitable for use in a wide variety of applications.

SITRANS LU150 is easy to install and maintain, and can be quickly removed for cleaning as required by the food, beverage and pharmaceutical industries.

The reliability of the level data is based on the Sonic Intelligence echo processing algorithms. A filter discriminates between the true echo and false echoes from acoustic or electrical noises and agitator blades in motion. The ultrasonic pulse propagation time to the material and back is temperature-compensated and converted into distance for display, analog output.

- Key Applications: chemical storage vessels, filter beds, mud pits, liquid storage vessels, food applications

Configuration



SITRANS LU150 mounting

Level Measurement

Continuous level measurement

Ultrasonic / Ultrasonic transmitters / SITRANS LU150

Selection and ordering data

	Article No.			
SITRANS LU150 Ultrasonic level transmitter Continuous, non-contact, 5 m (16.4 ft) range. Monitors level in liquids and slurries. Basic level performance.	7ML5201- 0	●	●	0
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.				
Transducer/Process connection (PVDF)				
PVDF copolymer, 2" NPT [(Taper), ASME B1.20.1]			E	
PVDF copolymer, R 2" [(BSPT), EN 10226]			F	
PVDF copolymer, G 2" [(BSPP), EN ISO 228-1]			G	
PVDF copolymer, 4" Sanitary mounting			J	
Cable inlet				
M20 x 1.5 [General Purpose cable gland -20 ... +60 °C (-4 ... +140 °F) included]				B
1/2" NPT stainless steel entry (no cable gland included)				C

Selection and Ordering data	Order code
Further designs	
Please add "-Z" to Article No. and specify Order code(s).	
Stainless steel tag [13 x 45 mm (0.5 x 1.75 inch)]: Measuring-point number/identification (max. 20 characters) specify in plain text	Y15
Declaration of Compliance, EN 10204, 2.1, Delivery meets Order Requirements	C11

Accessories	Article No.
Operating Instructions	
All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation	
Accessories	
Tag, stainless steel, 12 x 45 mm (0.47 x 1.77 inch), one text line	7ML1930-1AC
Universal Box Bracket Mounting kit	7ML1830-1BK
Sanitary 4" mounting clamp	7ML1830-1BR
3" ASME, DN 65 PN 10, JIS 10K 3B ETFE Flange adapter for 2" NPT	7ML1830-1BT
3" ASME, DN 65 PN 10, JIS 10K 3B ETFE Flange adapter for 2" BSPT	7ML1830-1BU
2" BSP nylon plastic locknut	7ML1830-1DQ
2" NPT nylon plastic locknut	7ML1830-1DT
Cable Gland - General Purpose -20 ... +60 °C (-4 ... +140 °F)	A5E34457564

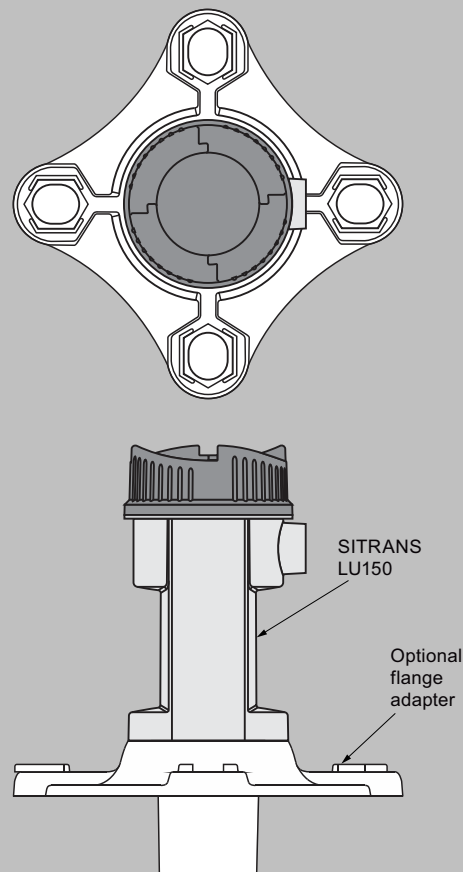
Technical specifications

SITRANS LU150	
Mode of Operation	
Measuring principle	Ultrasonic level measurement
Input	
Measuring range	0.25 ... 5 m (0.8 ... 16.4 ft)
Frequency	54 kHz
Output	
mA	4 ... 20 mA
• Span	Proportional/ inversely proportional
• Max. load	600 Ω in the loop at 24 V DC
Power supply	
Supply voltage	12 ... 30 V DC, 0.1 A surge
Max. power consumption	0.75 W (25 mA at 24 V DC)
Certificates and approvals	
	cCSAUs, CE, UKCA
Accuracy	
Error in measurement	0.25 % of measuring range (in air)
Resolution	3 mm (0.125 inch)
Temperature compensation	Built in
Echo processing	Sonic Intelligence
Rated operation conditions	
Beam angle	12°
Ambient temperature	
• Standard	-30 ... +60 °C (-22 ... +140 °F)
• Metallic mounting	-20 ... +60 °C (-4 ... +140 °F)
Storage temperature	
• Standard	-30 ... +60 °C (-22 ... +140 °F)
• Metallic mounting	-20 ... +60 °C (-4 ... +140 °F)
Max. static operating pressure	Normal atmospheric pressure
Design	
Weight	1.3 kg (2.9 lb)
Material	
• Electronics enclosure	PBT
• Transducer	PVDF copolymer
Degree of protection	IP68 / NEMA 6 / TYPE 6
Process connection	<ul style="list-style-type: none"> • 2" NPT [(Taper), ASME B1.20.1] • R 2" [(BSPT), EN 10226] • G 2" [(BSPP), EN ISO 228-1] • 4" sanitary
Flange adapter	3" Universal, (fits DN 65, PN 10 and 3" ASME)
Cable inlet	1 inlet for M20, optional 1/2" NPT

Options

SITRANS LU150, Flange Adapter

The SITRANS LU150 can be fitted with the optional 75 (3) flange adapter for mating to 3" ANSI, DIN 65 PN10 and JIS 10K3B flanges.



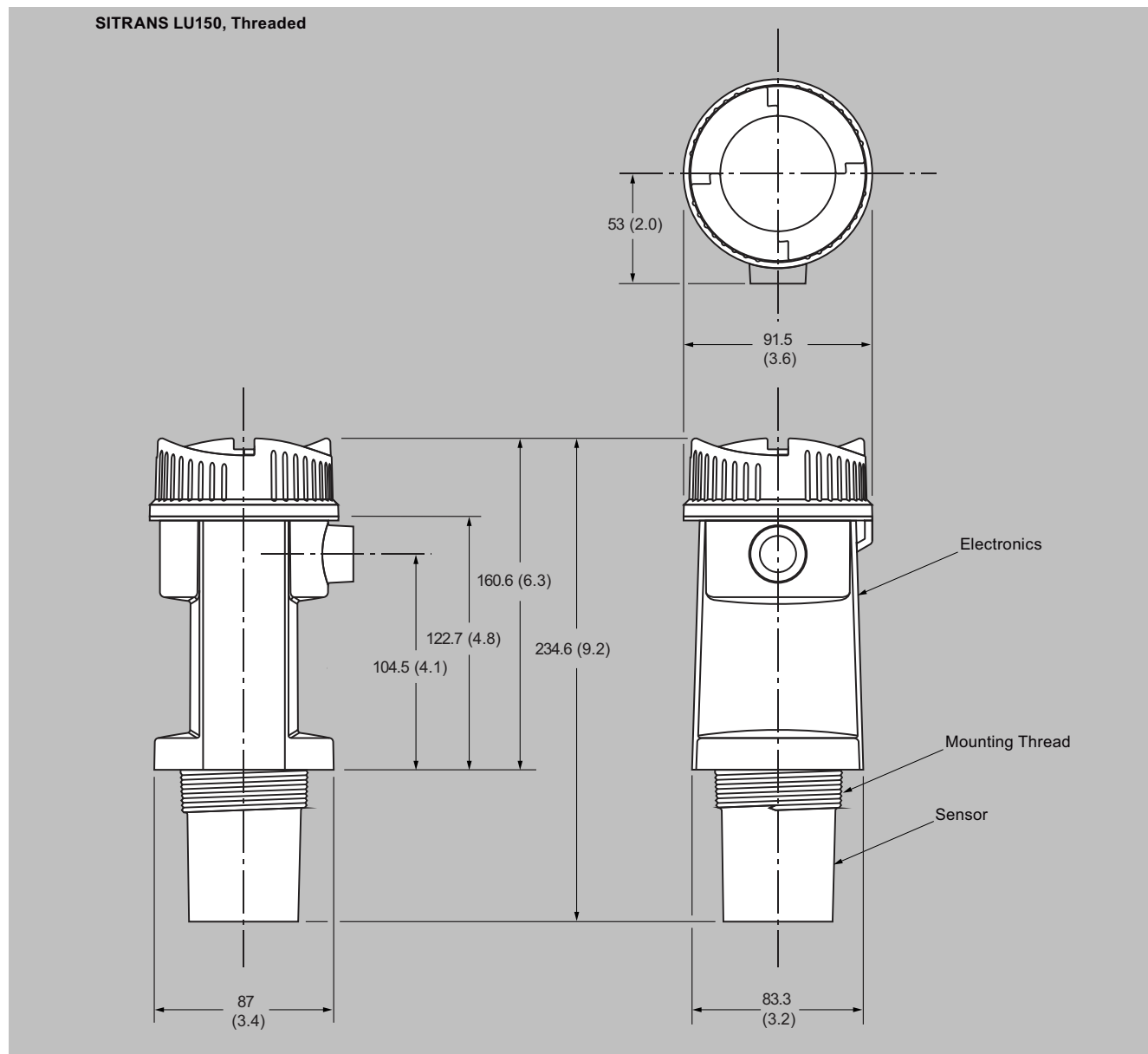
SITRANS LU150 optional flange adapter, dimensions in mm (inch)

Level Measurement

Continuous level measurement

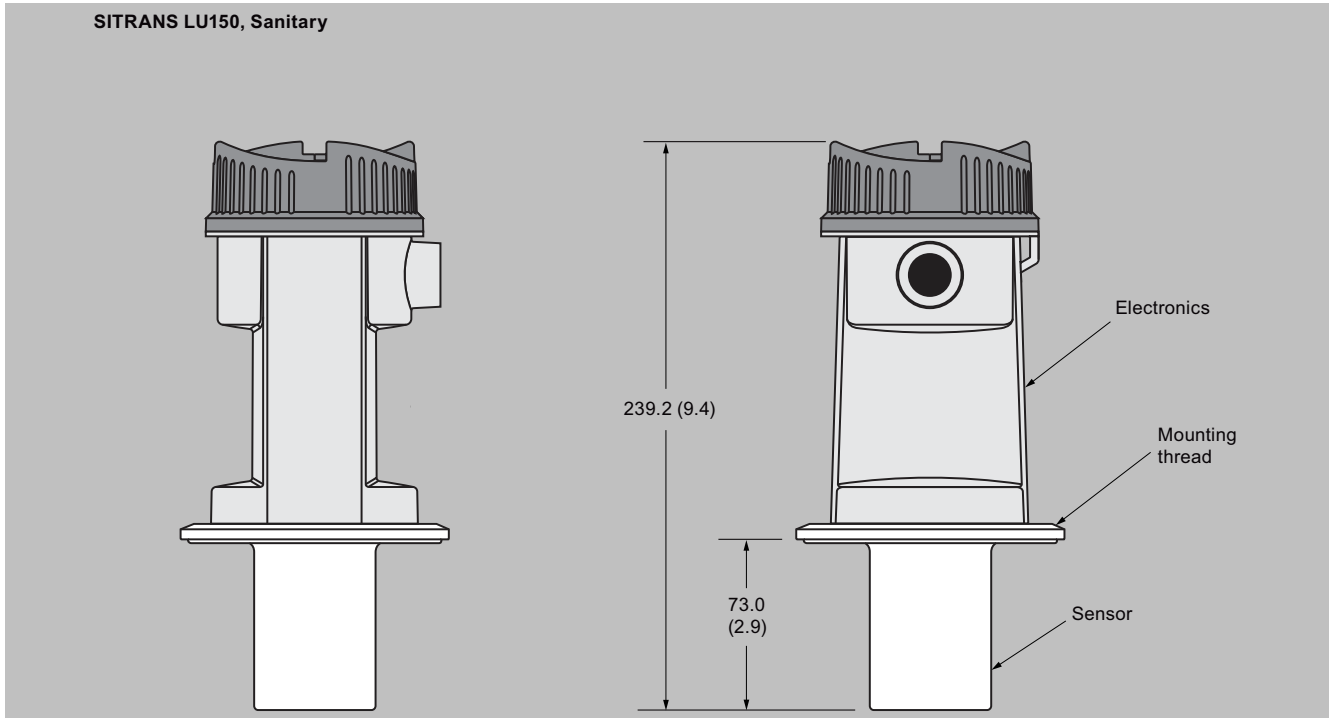
Ultrasonic / Ultrasonic transmitters / SITRANS LU150

Dimensional drawings



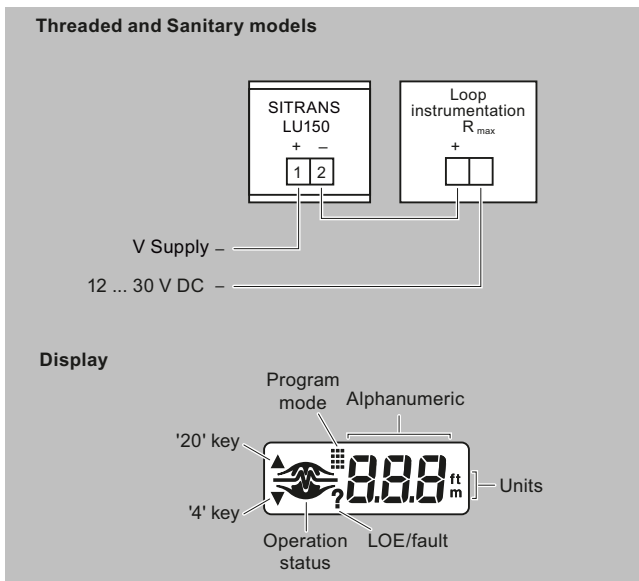
SITRANS LU150, dimensions in mm (inch)

Dimensional drawings (continued)



SITRANS LU150, dimensions in mm (inch)

Circuit diagrams



SITRANS LU150 connections

Level Measurement

Continuous level measurement

Ultrasonic / Ultrasonic transmitters / SITRANS LU180

Overview



SITRANS LU180 is a short-range integrated ultrasonic level transmitter. It is intrinsically safe (ATEX, UKEX, CSA, FM, IECEx, NEPSI), 2 wire, 4 to 20 mA loop-powered, ideal for liquids, slurries, and bulk materials in open or closed vessels to 5 meters (16.4 feet).

Benefits

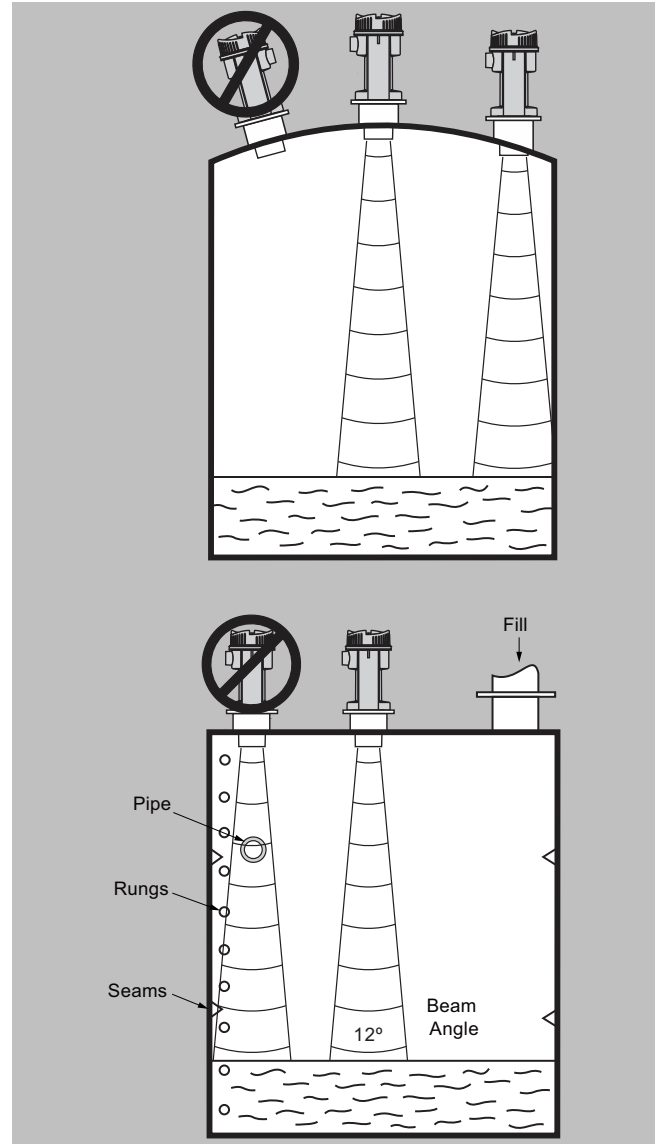
- Easy to install, program, and maintain
- Accurate and reliable
- Sanitary models available
- Patented Sonic Intelligence echo processing
- Integral temperature compensation

Application

The transducer is available in PVDF copolymer, making the device suitable for use in a wide variety of applications. SITRANS LU180 is easy to install and maintain, and can be quickly removed for cleaning as required by the food, beverage and pharmaceutical industries. The reliability of the level data is based on the Sonic Intelligence echo processing algorithms. A filter discriminates between the true echo and false echoes from acoustic or electrical noises and agitator blades in motion. The ultrasonic pulse propagation time to the material and back is temperature compensated and converted into distance for display, analog output.

- Key Applications: chemical storage vessels, filter beds, mud pits, liquid storage vessels, food applications

Configuration



SITRANS LU180 mounting

Selection and ordering data

	Article No.			
SITRANS LU180 Ultrasonic level transmitter Continuous, non-contact, 5 m (16.4 ft) range. Monitors level in liquids and slurries. Basic level performance for intrinsically safe applications.	7ML5202- 0	●	●	0
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.				
Transducer/Process connection				
PVDF copolymer, 2" NPT [(Taper), ANSI/ASME B1.20.1]		E		
PVDF copolymer, R 2" [(BSPT), EN 10226]		F		
PVDF copolymer, G 2" [(BSPP), EN ISO 228-1]		G		
PVDF copolymer, 4" Sanitary mounting		J		
Cable inlet				
M20 x 1.5 [General Purpose cable gland -20 ... +60 °C (-4 ... +140 °F) included]			B	
1/2" NPT stainless steel entry (no cable gland included)			C	

Selection and Ordering data	Order code
Further designs	
Please add "-Z" to Article No. and specify Order code(s).	
Stainless steel tag [13 x 45 mm (0.5 x 1.75 inch)]: Measuring-point number/identification (max. 20 characters) specify in plain text	Y15
Declaration of Compliance, EN 10204, 2.1, Delivery meets Order Requirements	C11

Accessories	Article No.
Operating Instructions	
All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation .	
Accessories	
Tag, stainless steel, 12 x 45 mm (0.47 x 1.77 inch), one text line	7ML1930-1AC
Universal box bracket mounting kit	7ML1830-1BK
Sanitary 4" mounting clamp	7ML1830-1BR
3" ASME, DN 65 PN 10, JIS 10K 3B ETFE Flange adapter for 2" NPT	7ML1830-1BT
3" ASME, DN 65 PN 10, JIS 10K 3B ETFE Flange adapter for 2" BSPT	7ML1830-1BU
2" BSP nylon plastic locknut	7ML1830-1DQ
2" NPT nylon plastic locknut	7ML1830-1DT
Cable Gland, General Purpose -20 ... +60 °C (-4 ... +140 °F)	A5E34457564

Level Measurement

Continuous level measurement

Ultrasonic / Ultrasonic transmitters / SITRANS LU180

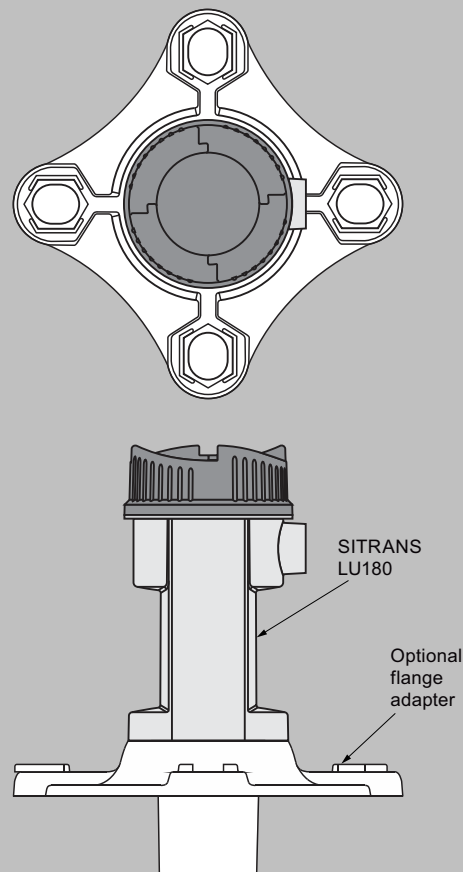
Technical specifications

SITRANS LU180	
Mode of operation	
Measuring principle	Ultrasonic level measurement
Input	
Measuring range	0.25 ... 5 m (0.8 ... 16.4 ft)
Frequency	54 kHz
Output	
mA	4 ... 20 mA
• Span	Proportional/ inversely proportional
• Max. load	600 Ω in the loop at 24 V DC
Power supply	
Supply voltage	12 ... 30 V DC, 0.1 A surge
Max. power consumption	0.75 W (25 mA at 24 V DC)
Certificates and approvals	CSA IS/ Class I, II, III, Div. 1, Groups: A, B, C, D, E, F, G T4 FM IS/ Class I, II, III, Div. 1, Groups: A, B, C, D, E, F, G T4 ATEX II 1G Ex ia IIC T4 Ga, Ta = -40 °C to +60 °C; UKEX II 1G Ex ia IIC T4 Ga, Ta = -40 °C to +60 °C; IECEx Ex ia IIC T4 Ga, Ta = -40 °C to +60 °C; NEPSI Ex ia IIC T4 Ga
Accuracy	
Error in measurement	0.25 % of measuring range (in air)
Resolution	3 mm (0.125 inch)
Temperature compensation	Built in
Echo processing	Sonic Intelligence
Rated operation conditions	
Beam angle	12°
Ambient temperature	
• Standard	-40 ... +60 °C (-40 ... +140 °F)
• Metallic mounting	-20 ... +60 °C (-4 ... +140 °F)
Storage temperature	
• Standard	-40 ... +60 °C (-40 ... +140 °F)
• Metallic mounting	-20 ... +60 °C (-4 ... +140 °F)
Max. static operating pressure	Normal atmospheric pressure
Design	
Weight	1.3 kg (2.9 lb)
Material	
• Electronics enclosure	PBT
• Transducer	PVDF copolymer
Degree of protection	IP68 / NEMA 6 / TYPE 6
Process connection	<ul style="list-style-type: none"> • 2" NPT [(Taper), ASME B1.20.1] • R 2" [(BSPT), EN 10226] • G 2" [(BSPP), EN ISO 228-1] • 4" sanitary
Flange adapter	3" Universal (fits DN 65, PN 10 and 3" ASME)
Cable inlet	1 inlet for M20, optional 1/2" NPT

Options

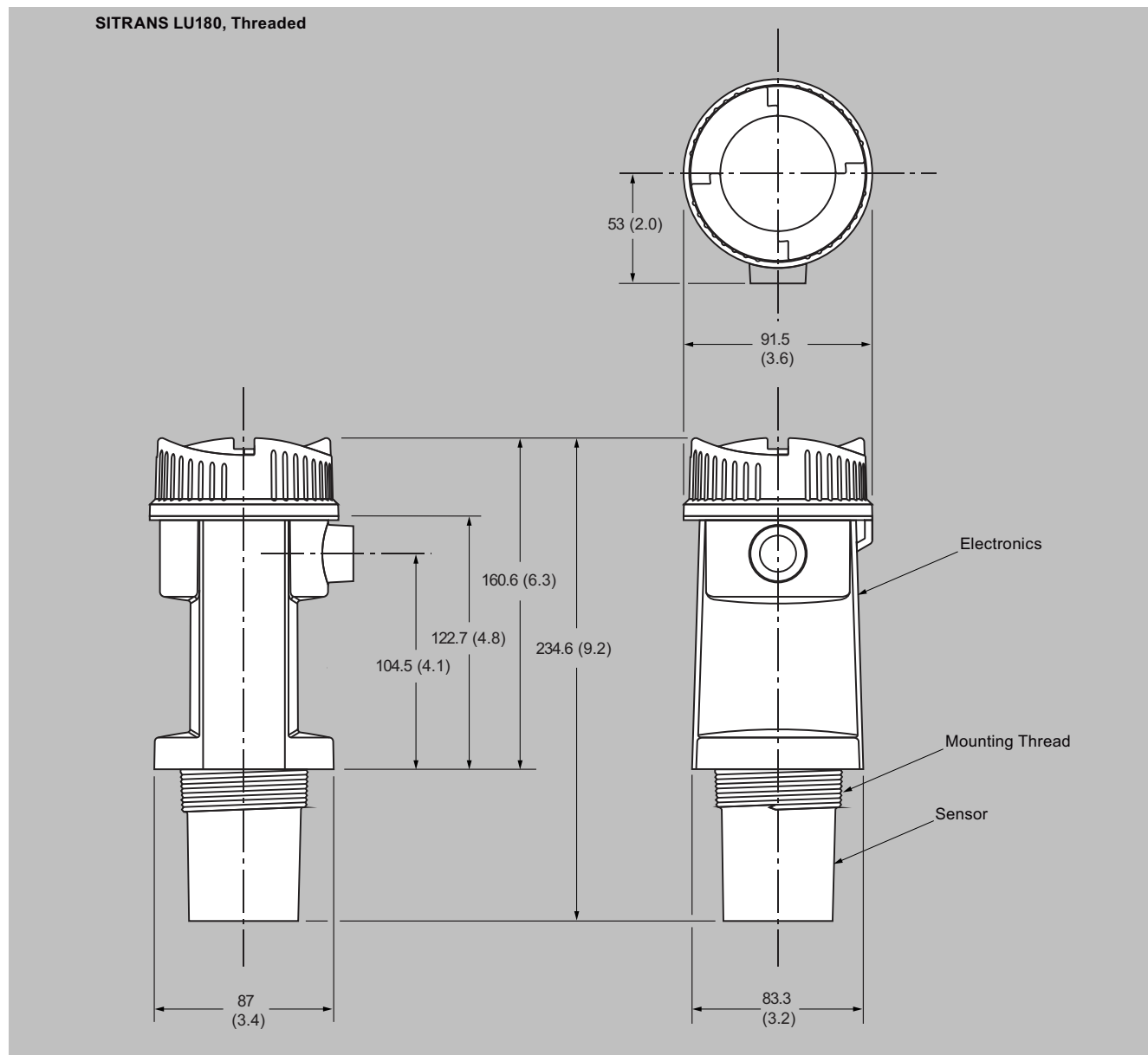
SITRANS LU180, Flange Adapter

The SITRANS LU180 can be fitted with the optional 75 (3) flange adapter for mating to 3" ASME, DIN 65 PN10 and JIS 10K3B flanges.



SITRANS LU180 optional flange adapter, dimensions in mm (inch)

Dimensional drawings



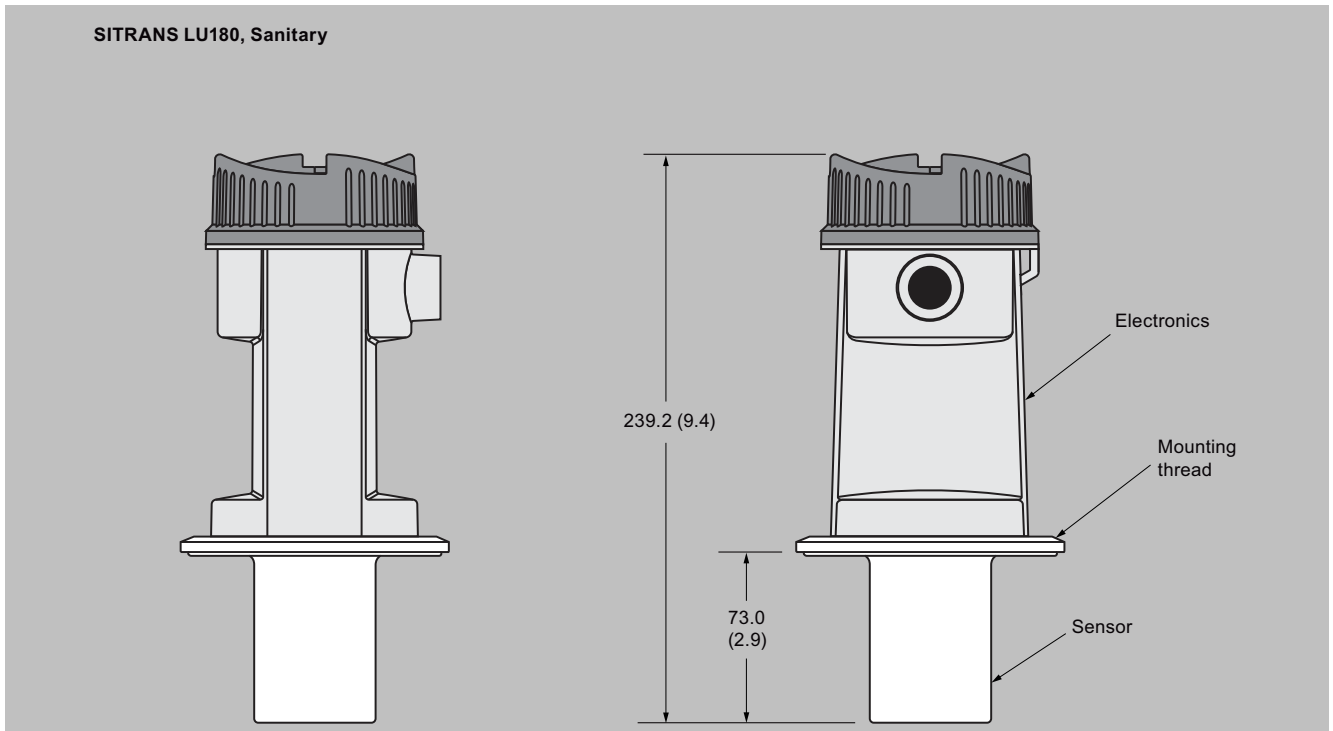
SITRANS LU180, dimensions in mm (inch)

Level Measurement

Continuous level measurement

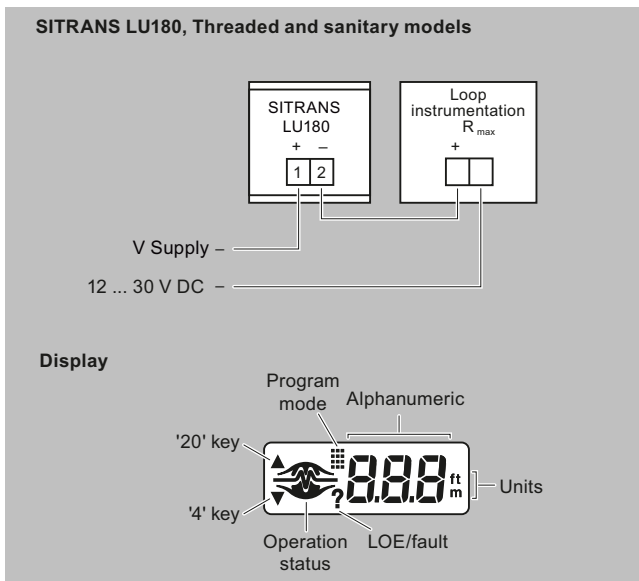
Ultrasonic / Ultrasonic transmitters / SITRANS LU180

Dimensional drawings (continued)



SITRANS LU180, dimensions in mm (inch)

Circuit diagrams



SITRANS LU180 connections

Overview



SITRANS Probe LU is a 2-wire loop powered ultrasonic transmitter for level, volume and flow monitoring of liquids in open channels, storage vessels, and simple process vessels.

Benefits

- Continuous level measurement up to 12 m (40 ft) range
- Easy installation and simple startup
- Programming using infrared Intrinsically Safe handheld programmer, SIMATIC PDM or HART Communicator
- Communication using HART or PROFIBUS PA
- ETFE or PVDF transducers for chemical compatibility
- Sonic Intelligence signal processing
- Auto False-Echo Suppression for fixed obstruction avoidance
- Level to volume or level to flow conversion

Application

The SITRANS Probe LU is ideal for level monitoring in the water and wastewater industry, chemical storage vessels, and small bulk hoppers.

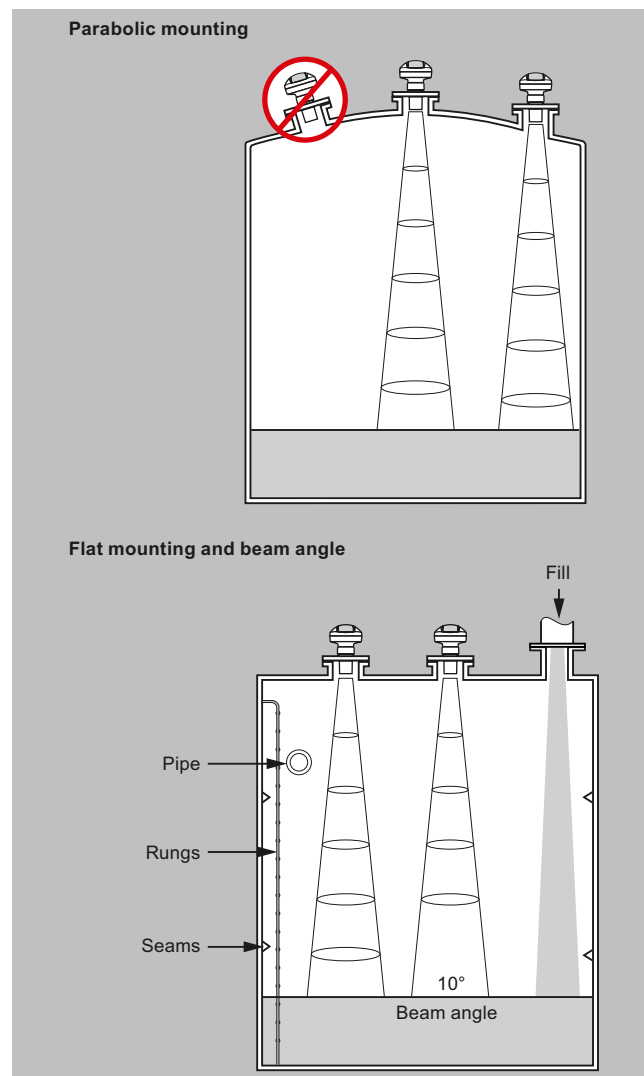
The range of SITRANS Probe LU is 6 or 12 m (20 or 40 ft). Using Sonic Intelligence, Auto False Echo Suppression for fixed obstruction avoidance, and accuracy of 0.15 % of range or 6 mm (0.25 inch), the Probe LU provides unmatched reliability.

The Probe LU offers two communications options: HART or PROFIBUS PA (Profile version 3.0, Class B).

The transducer on the Probe LU is available as ETFE or PVDF to suit the chemical conditions of your application. As well, for applications with varying material and process temperatures, the Probe LU incorporates an internal temperature sensor to compensate for temperature changes.

- Key Applications: chemical storage vessels, filter beds, liquid storage vessels

Configuration



SITRANS Probe LU mounting

Level Measurement

Continuous level measurement

Ultrasonic / Ultrasonic transmitters / SITRANS Probe LU

Selection and ordering data

		Article No.				
SITRANS Probe LU Ultrasonic level transmitter Continuous, non-contact, up to 12 m (40 ft) range. Monitors level and volume in liquids and slurries. With optional PROFIBUS PA.		7ML5221-	●	●	●	●
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.						
Enclosure/Cable Inlet						
Plastic (PBT), 1 x M20 x 1.5 and 1 x 1/2" NPT (no cable glands supplied)		0				
Plastic (PBT), 2 x M20 x 1.5 (includes 1 general purpose cable gland: 7ML1930-1AM)		1				
Plastic (PBT), 2 x 1/2" NPT (no cable glands supplied)		2				
Range/Transducer material						
6 m (20 ft), ETFE				A		
6 m (20 ft), PVDF Copolymer				B		
12 m (40 ft), ETFE				C		
12 m (40 ft), PVDF Copolymer				D		
Process connection						
2" NPT [(Taper), ASME B1.20.1]					A	
R 2" [(BSPT), EN 10226]					B	
G 2" [(BSPP), EN ISO 228-1]					C	
Communication/Output						
4 ... 20 mA, HART						1
PROFIBUS PA						2
Approvals						
Ordinary Locations/General Purpose (Non-Ex), FM, cCSA _{US} , CE, UKCA, RCM, KC						1
Non-incendive, FM Class I, Div. 2, Groups A, B, C, D T5 ¹⁾						4
Intrinsically Safe, CSA/FM Class I, Div. 1, Groups A, B, C, D; Class II, Div. 1, Groups E, F, G; Class III T4 ²⁾						5
ATEX 1G Ex ia IIC T4 Ga, Ta = -40°C to +80°C; UKEX 1G Ex ia IIC T4 Ga, Ta = -40°C to +80°C; INMETRO Ex ia IIC T4 Ga, IP67/IP68, -40°C ≤ Ta ≤ +80°C; KCs Ex ia IIC T4; RCM ²⁾						6
ATEX 1G Ex ia IIC T4 Ga, Ta = -40°C to +80°C; UKEX 1G Ex ia IIC T4 Ga, Ta = -40°C to +80°C; IECEX Ex ia IIC T4 Ga, Ta = -40°C to +80°C; INMETRO Ex ia IIC T4 Ga, IP67/IP68, -40°C ≤ Ta ≤ +80°C; KCs Ex ia IIC T4; RCM ³⁾						7
Intrinsically safe, CSA/FM Class I, Div. 1, Groups A, B, C, D; Class II, Div. 1, Groups E, F, G; Class III T4 ³⁾						8

1) Available with Enclosure/Cable Inlet option 2 only.

2) Available with Communication option 2 only.

3) Available with Communication option 1 only.

Selection and Ordering data	Order code
Further designs	
Please add "-Z" to Article No. and specify Order code(s).	
Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: Measuring-point number/identification (max. 27 characters) specify in plain text	Y15

Spare parts and accessories	Article No.
Operating Instructions for HART/mA device	
All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation	
Accessories	
Handheld programmer, Intrinsically Safe, EEx ia	7ML5830-2AH
Handheld programmer, General Purpose approvals	A5E36563512
Handheld programmer, Infrared, Intrinsically Safe, PROFIBUS PA	7ML5830-2AJ
HART modem with USB interface	7MF4997-1DB
2" BSP nylon plastic locknut	7ML1830-1DQ

Selection and ordering data (continued)

Spare parts and accessories	Article No.
2" NPT nylon plastic locknut	7ML1830-1DT
3" ASME, DN 65 PN 10, JIS 10K 3B ETFE Flange adapter for 2" NPT	7ML1830-1BT
3" ASME, DN 65 PN 10, JIS 10K 3B ETFE Flange adapter for 2" BSPT	7ML1830-1BU
One General Purpose polymeric cable gland M20 x 1.5, rated for -20 ... +80 °C (-4 ... +176 °F)	7ML1930-1AM
One metallic cable gland M20 x 1.5, rated -40 ... +80 °C (-40 ... +176 °F) for General Purpose or ATEX EEx e installations (available for HART only)	7ML1930-1AP
One metallic cable gland M20 x 1.5, rated -40 ... +80 °C (-40 ... +176 °F) with integrated shield connection (available for PROFIBUS PA)	7ML1930-1AQ
Universal box bracket, FMS-200	7ML1830-1BK
Probe LU rock guard and sunshield	7ML1930-1GH
SITRANS RD100, loop powered display -see Chapter 7	7ML5741-.....
SITRANS RD150, remote digital display for 4 ... 20 mA and HART devices - see Chapter 7	7ML5742-.....
SITRANS RD200, universal input display with Modbus conversion - see Chapter 7	7ML5740-.....
SITRANS RD300, dual line display with totalizer and linearization curve and Modbus conversion - see Chapter 7	7ML5744-.....
For applicable back up point level switch see point level measurement section.	
Spare Parts	
Plastic lid	7ML1830-1KB

Level Measurement

Continuous level measurement

Ultrasonic / Ultrasonic transmitters / SITRANS Probe LU

Technical specifications

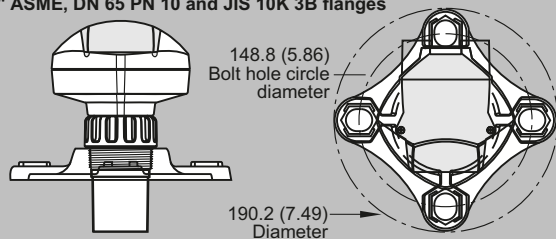
SITRANS Probe LU	
Mode of operation	
Measuring principle	Ultrasonic level measurement
Typical application	Level measurement in storage vessels and simple process vessels
Inputs	
Measuring range	
• 6 m (20 ft) model	0.25 ... 6 m (10 inch ... 20 ft)
• 12 m (40 ft) model	0.25 ... 12 m (10 inch ... 40 ft)
Frequency	54 kHz
Outputs	
mA/HART	
• Range	4 ... 20 mA
• Accuracy	± 0.02 mA
PROFIBUS PA	
	Profile 3, Class B
Performance	
Resolution	≤ 3 mm (0.12 inch)
Accuracy	± the greater of 0.15 % of range or 6 mm (0.24 inch)
Repeatability	≤ 3 mm (0.12 inch)
Blanking distance	0.25 m (10 inch)
Update time	≤ 5 s
• 4/20 mA/HART version	≤ 5 s at 4 mA
• PROFIBUS version	≤ 4 s at 15 mA current loop
Temperature compensation	Built-in to compensate over temperature range
Beam angle	10°
Rated operating conditions	
Ambient conditions	
• Location	Indoor/outdoor
• Ambient temperature	-40 ... +80 °C (-40 ... +176 °F)
• Storage temperature	-40 ... +80 °C (-40 ... +176 °F)
• Relative humidity/ingress protection	Suitable for outdoor
• Installation category	I
• Pollution degree	4
Medium conditions	
• Temperature at flange or threads	-40 ... +85 °C (-40 ... +185 °F)
• Pressure (vessel)	0.5 bar g (7.25 psi g)
Design	
Material (enclosure)	PBT (Polybutylene Terephthalate)
Degree of protection	Type 4X/NEMA 4X, Type 6/NEMA 6/IP67/IP68 enclosure
Weight	2.1 kg (4.6 lb)
Cable inlet	2 x M20 x 1.5 cable gland or 2 x ½" NPT thread or 1 x M20 x 1.5 and 1 x ½" NPT
Material (transducer)	Buna-N seal with ETFE (Ethylene Tetrafluoroethylene) or PVDF (Polyvinylidene Fluoride)
Process connection	
Threaded connection	
	2" NPT [(Taper), ASME B1.20.1] R 2" [(BSPT), EN 10226] or G 2" [(BSPP), EN ISO 228-1]
Flange connection	
	3 inch (80 mm) universal flange
Other connection	
	FMS 200 mounting bracket (see FMS mounting bracket product page for more information) or customer supplied mount.

Technical specifications (continued)

SITRANS Probe LU	
Display and Controls	
Interface	Local: LCD display with bar graph Remote: Available via HART or PROFIBUS PA
Configuration	Using Siemens SIMATIC PDM (PC) or HART handheld communicator or Siemens infrared handheld programmer
Memory	Non-volatile EEPROM
Power supply	
4 ... 20 mA/HART	Nominal 24 V DC with 550 Ω maximum; maximum 30 V DC 4 ... 20 mA
PROFIBUS PA	12, 13, 15, or 20 mA depending on programming (General Purpose or Intrinsically Safe version) per IEC 61158-2
Certificates and Approvals	
General	
Marine (only applies to HART communication option)	cCSA _{US} , FM, CE, UKCA, RCM • Lloyd's Register of Shipping • ABS Type Approval
Hazardous	
• Intrinsically Safe (Europe)	ATEX II 1G Ex ia IIC T4 Ga
• Intrinsically Safe (UK)	UKEX II 1G Ex ia IIC T4 Ga
• Intrinsically Safe (USA/Canada)	CSA/FM, Class I, Div. 1, Groups A, B, C, D; Class II, Div. 1, Groups E, F, G; Class III T4
• Intrinsically Safe (International)	SIR 13.0008X Ex ia IIC T4 Ga
• Intrinsically Safe (Brazil)	INMETRO Ex ia IIC T4 Ga
• Non-incendive (USA)	FM Class I, Div. 2, Groups A, B, C, D T4
Handheld Programmer	
Intrinsically Safe Siemens handheld programmer	Infrared receiver
• Approvals for handheld programmer	IS model: ATEX II 1 GD Ex ia op is IIC T4 Ga, ATEX II 1 GD Ex ia op is IIC T135°C Da, Ta = -20 ... +50°C; UKEX II 1 GD Ex ia op is IIC T4 Ga, UKEX II 1 GD Ex ia op is IIC T135°C Da, Ta = -20 ... +50°C; CSA/FM Class I, II, III, Div. 1, Groups A, B, C, D, E, G, T6, Ta = 50°C; IECEx SIR 09.0073
Ambient temperature	-20 ... 50 °C (-5 ... 122 °F)
Interface	Proprietary infrared pulse signal
Power	3 V lithium battery (non-replaceable)

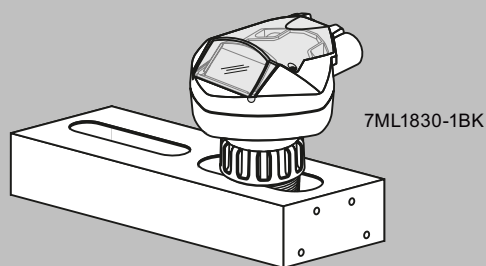
Options

Flange adapter for mating 2" NPT or 2" BSP process connections to 3" ASME, DN 65 PN 10 and JIS 10K 3B flanges



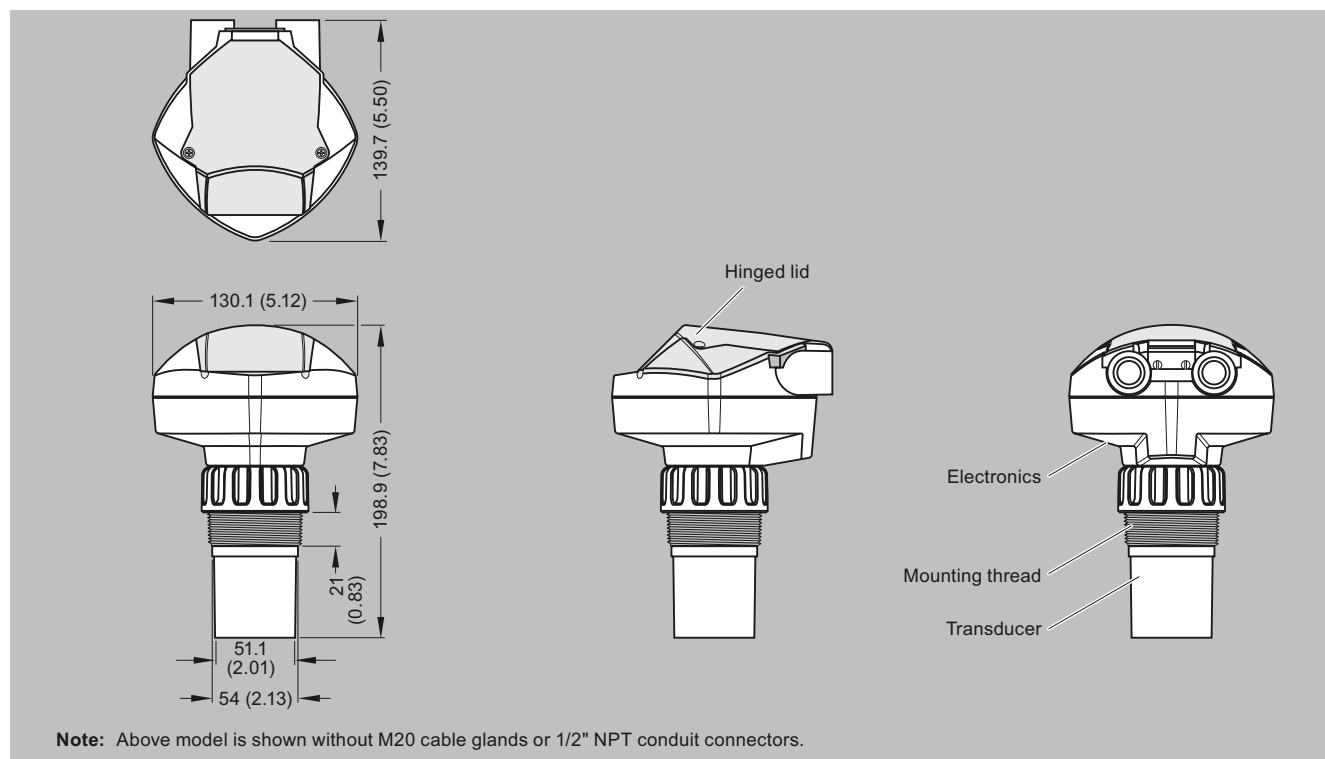
SITRANS Probe LU optional flange adapter, dimensions in mm (inch)

SITRANS Probe LU with FMS 200 universal box bracket



SITRANS Probe LU with optional mounting bracket

Dimensional drawings



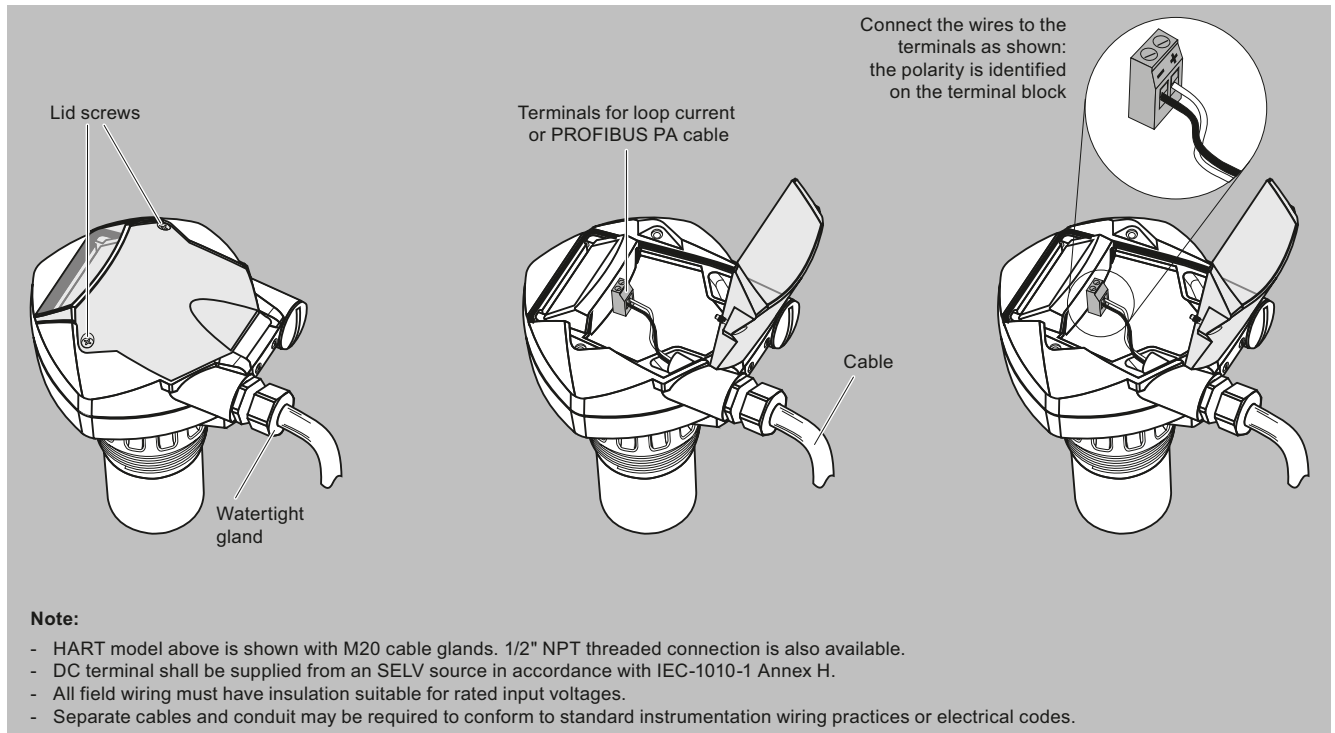
SITRANS Probe LU, dimensions in mm (inch)

Level Measurement

Continuous level measurement

Ultrasonic / Ultrasonic transmitters / SITRANS Probe LU

Circuit diagrams



SITRANS Probe LU connections

Overview



SITRANS Probe LU240 ultrasonic level transmitter, ideal for level, volume, and volume flow measurements. It works with liquids, slurries, and bulk materials up to 12 m (40 ft).

Benefits

- Continuous level measurement up to 12 m (40 ft) range
- Easy installation and simple startup
- Programming using 4-button HMI or SIMATIC PDM
- Communication using HART
- ETFE or PVDF transducers for chemical compatibility
- Process Intelligence signal processing
- Auto False Echo Suppression for fixed obstruction avoidance
- Low power and current startup
- Optional Bluetooth configuration and monitoring via SITRANS mobile IQ

Application

SITRANS Probe LU240 is ideal for level monitoring in the water and wastewater industry, chemical storage vessels, and small bulk hoppers.

The range of SITRANS Probe LU240 is 3, 6, or 12 m (10, 20, or 40 ft). Probe LU240 provides unmatched reliability, using Process Intelligence, Auto False Echo Suppression for fixed obstruction avoidance, and accuracy of 0.15 % of range or 6 mm (0.25 inch) (on 6 m and 12 m models only).

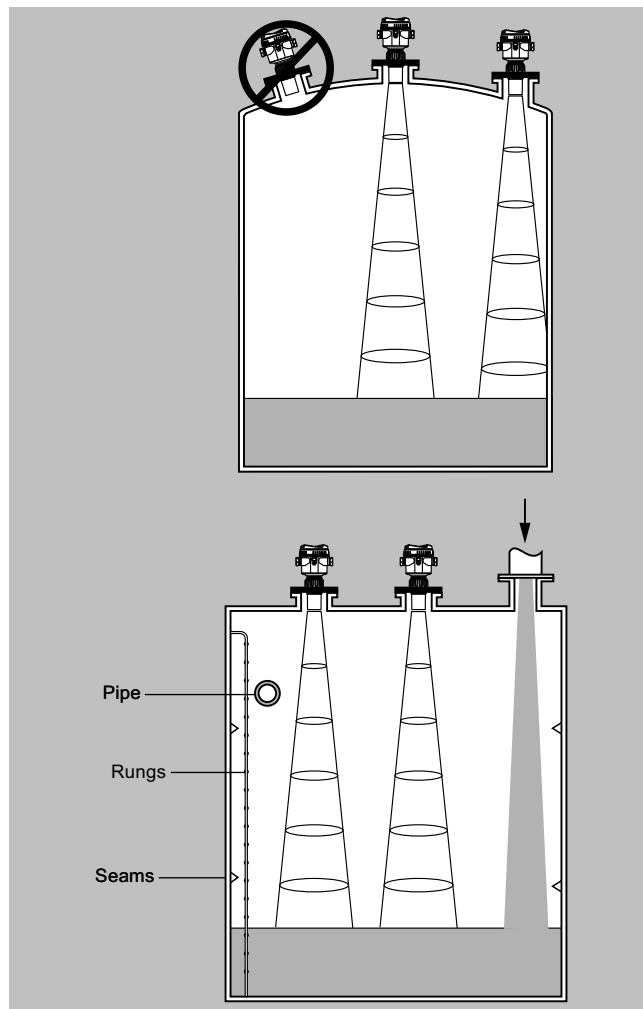
SITRANS Probe LU240 offers HART communication on certain models and mA output on all models.

SITRANS mobile IQ is a Bluetooth app that provides an intuitive interface to quickly configure, set up, and monitor SITRANS Probe LU240 series (available for Android, Apple, and Windows devices). For more information: <http://www.siemens.com/mobileIQ>.

The transducer on the Probe LU240 is available as ETFE or PVDF to suit the chemical conditions of your application. As well, for applications with varying material and process temperatures, Probe LU240 incorporates an internal temperature sensor to compensate for temperature changes.

- Key Applications: chemical storage vessels, filter beds, liquid storage vessels

Configuration



SITRANS Probe LU240 mounting

Level Measurement

Continuous level measurement

Ultrasonic / Ultrasonic transmitters / SITRANS Probe LU240

Selection and ordering data

		Article No.										
SITRANS Probe LU240 Ultrasonic level transmitter Continuous, non-contact, up to 12 m (40 ft) range. Monitors level, volume, and volume flow (model dependent) in liquids, slurries, and solids. With easy to use quick start wizards.		7	M	L	5	1	0	0	0	0	0	0
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.												
Communications												
HART (4 ... 20 mA) level, volume, volume flow ⁴⁾		0										
4 ... 20 mA level ⁵⁾		7										
Ingress protection												
IP66, IP68, Type 4X, 6		1										
Measurement range/wetted parts												
200 ... 3 000 mm (7.87 ... 118.11 inch), PVDF Copolymer		B										
200 ... 3 000 mm (7.87 ... 118.11 inch), ETFE		C										
200 ... 6 000 mm (7.87 ... 236.22 inch), PVDF Copolymer		D										
200 ... 6 000 mm (7.87 ... 236.22 inch), ETFE		E										
200 ... 12 000 mm (7.87 ... 472.44 inch), PVDF Copolymer		G										
200 ... 12 000 mm (7.87 ... 472.44 inch), ETFE		H										
Process connection												
2" NPT [(Taper), ASME B1.20.1]		D										
R 2" [(BSPT), EN 10226]		E										
G 2" [(BSPP), EN ISO 228-1]		F										
Non-wetted parts												
Plastic (PBT/PC material)		7										
Type of protection												
Ordinary Locations/General Purpose (Non-Ex), cCSA _{US} , CE, UKCA, KC, RCM, EAC		A										
Ordinary Locations/General Purpose (Non-Ex), cCSA _{US} , FM, CE, UKCA, KC, RCM, EAC ¹⁾		B										
Ex i (ia) (Ex-Zone 0/Div. 1)/IS, FM NI (Class I, Div. 2) ²⁾		C										
Electrical connections/cable entries												
2 x M20 x 1.5 (one general purpose Polyamide cable gland and one Polyamide blocking plug provided)		F										
1 x 1/2" NPT (no gland cable provided)		K										
For custom electrical connections/cable entries, contact a local sales person. For more information please visit: http://www.automation.siemens.com/aspa_app												
Local HMI												
Without display (blind lid of PBT/PC material)		0										
With display (blind lid of PBT/PC material)		1										
With display (clear lid of PC material)		3										

Selection and Ordering data	Order code
Further designs	
Please add "-Z" to Article No. and specify Order code(s).	
Stainless steel tag [13 x 45 mm (0.5 x 1.75 inch)]: Measuring-point number/identification (max. 32 characters) specify in plain text	Y15
Certificates	
Declaration of compliance 2.1 (EN 10204) - delivery meets order requirements	C19
Certificate EN 10204-2.2	C14
Wireless communication	
Bluetooth ⁶⁾	F50
Approvals ³⁾	
ATEX II 1G Ex ia IIC T4 Ga, Ta = -40 °C to +80 °C; UKEX II 1G Ex ia IIC T4 Ga, Ta = -40 °C to +80 °C; IECEX Ex ia IIC T4 Ga, Ta = -40 °C to +80 °C; EAC Ex 0Ex ia IIC T4 Ga, IP67/IP68; SABS Ex ia IIC T4 Ga, Ta = -40 °C to +80 °C	E31
FM non-incendive - Class I, Div. 2, Groups A, B, C, D T5 (Ta = 80 °C), T6 (Ta = 40 °C) ¹⁾	E32
NEPSI, KCs, IECEX - Ex ia IIC T4 Ga	E33

Selection and ordering data (continued)

Selection and Ordering data	Order code
cCSA _{US} , KCS, FM - Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G, T4, INMETRO, IECEx - Ex ia IIC T4 Ga ¹⁾ For customs, contact a local sales person. For more information please visit http://www.automation.siemens.com/asp_app .	E34

Spare parts and accessories	Article No.
Operating Instructions	
All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation	
Accessories	
Tag, stainless steel, 12 x 45 mm, one text line (max. 16 characters)	7ML1930-1AC
Stainless steel FMS200 universal box bracket mounting kit	7ML1830-1BK
3" ASME/DIN Universal mounting adapter, 2" NPT, ETFE	7ML1830-1BT
3" ASME/DIN Universal mounting adapter, 2" BSP, ETFE	7ML1830-1BU
2" NPT nylon plastic locknut	7ML1830-1DT
2" BSP nylon plastic locknut	7ML1830-1DQ
Over-voltage protection up to 6 kV (external), M20 x 1.5	7MF7903-7AB
Over-voltage protection up to 6 kV (external), ½" NPT	7MF7903-7AC
Cable Gland Polyamide - General Purpose (-20 ... +60 °C)	A5E34457564
Bluetooth kit	A5E50514198
SITRANS LT500, a versatile, single and multi-vessel level monitor/controller for virtually any application in a wide range of industries.	7ML60.....-.....
Spare Parts	
Spare lid, clear	A5E44267491
Spare lid, blind	A5E44267497
Spare o-ring for lid	A5E44267501
Spare segmented display and 4-button HMI	A5E44809382

- 1) Available only with Electrical connections/cable entries option K only.
- 2) Available only with order codes E31, E32, E33, and E34.
- 3) Order codes E31, E32, E33, E34 only available with Type of protection option C.
- 4) Available only with Measurement range/wetted parts options D, E, G, and H.
- 5) Available only with Measurement range/wetted parts options B and C.
- 6) Available only with Type of protection options A and B.

Level Measurement

Continuous level measurement

Ultrasonic / Ultrasonic transmitters / SITRANS Probe LU240

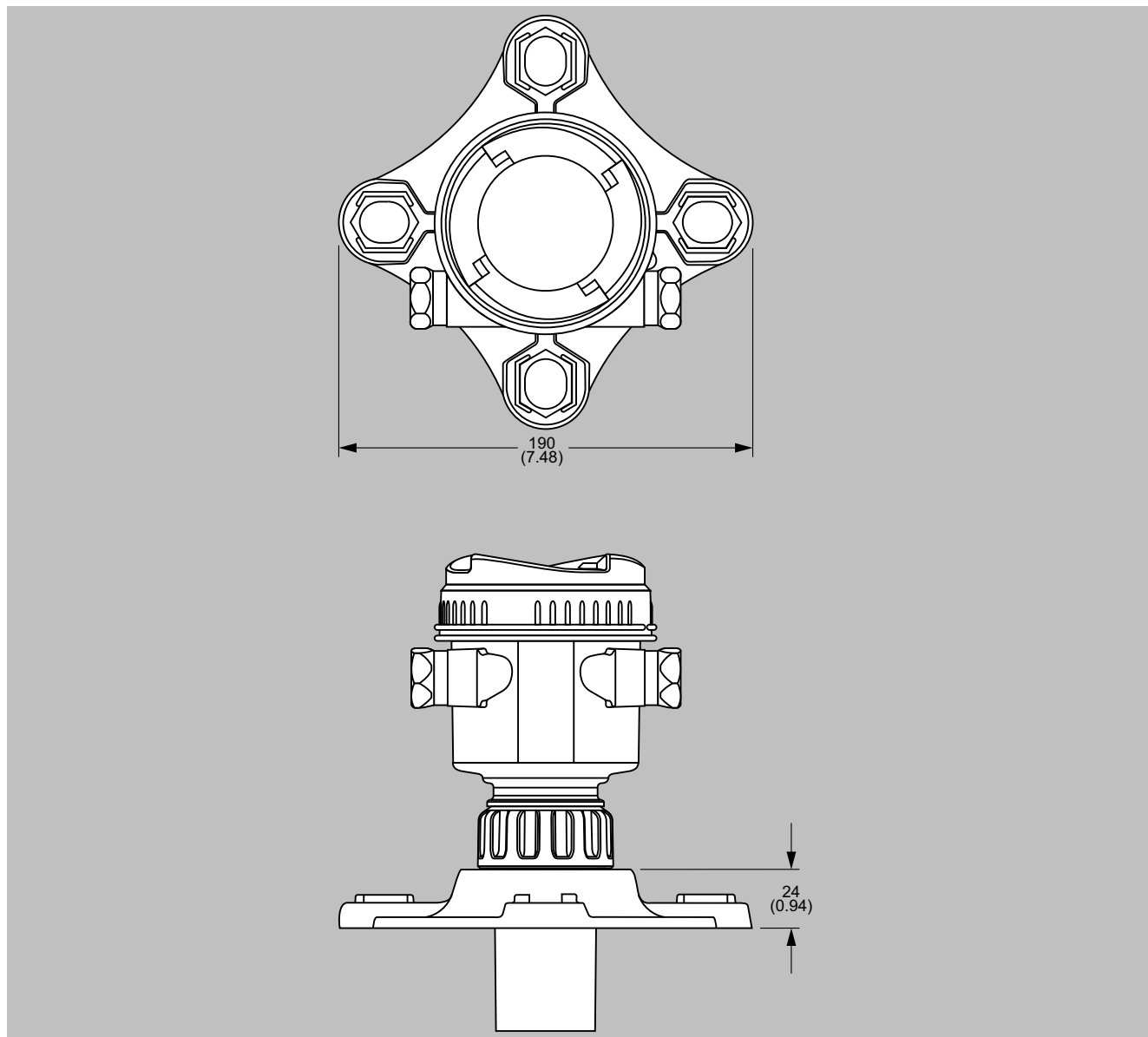
Technical specifications

SITRANS Probe LU240	
Mode of operation	
Measuring principle	Ultrasonic level measurement
Typical application	Level measurement in storage vessels and simple process vessels
Inputs	
Measuring range	
• 3 m (10 ft)	0.2 ... 3 m (8 inch ... 10 ft)
• 6 m (20 ft) model	0.2 ... 6 m (8 inch ... 20 ft)
• 12 m (40 ft) model	0.2 ... 12 m (8 inch ... 40 ft)
Frequency	54 kHz
Outputs	
mA/HART	
• Range	4 ... 20 mA
• Accuracy	± 0.0096 mA
• HART version	7
• Startup current	3.6 mA
• Fail-safe	Programmable as high, low, or hold (loss of echo) per NAMUR NE43
Performance	
Resolution	≤ 3 mm (0.12 inch)
Accuracy	
3 m (10 ft) version	10 mm (0.39 inch)
6 m (20 ft), 12 m (40 ft) version	<ul style="list-style-type: none"> ± the greater of 0.15 % of range or 6 mm (0.25 inch) [valid from 0.25 m (0.82 ft)] ± 2 mm (0.08 inch) on ranges 4 m (13 ft) or less
Non-repeatability	≤ 3 mm (0.12 inch)
Blanking distance	0.2 m (0.66 ft)
Update time	≤ 4 s
Temperature compensation	Built-in to compensate over temperature range
Beam angle	10°
Rated operating conditions	
Ambient conditions	
• Location	Indoor/outdoor
• Ambient temperature	<ul style="list-style-type: none"> Storage: -40 ... +85 °C (-40 ... +185 °F) Operating: -40 ... +80 °C (-40 ... +176 °F)
• Relative humidity/ingress protection	Suitable for outdoor
• Installation category	I
• Pollution degree	4
Medium conditions	
• Temperature at flange or threads	-40 ... +85 °C (-40 ... +185 °F)
• Pressure (vessel)	0.5 bar g (7.25 psi g)
Display	-20 ... +80 °C (-4 ... +176 °F)
Design	
Material (enclosure)	PBT (Polybutylene Terephthalate)
Degree of protection	Type 4X, Type 6, IP66, IP68
Weight	0.93 kg (2.1 lb)
Cable inlet	2 x M20 x 1.5 cable gland or 1 x ½" NPT thread
Material (transducer)	ETFE (Ethylene Tetrafluoroethylene) or PVDF (Polyvinylidene Fluoride) Buna-N seal
Process connection	
Threaded connection	2" NPT [(Taper), ASME B1.20.1] R 2" [(BSPT), EN 10226] or G 2" [(BSPP), EN ISO 228-1]
Flange connection	3 inch (80 mm) universal flange

Technical specifications (continued)

SITRANS Probe LU240	
Other connection	FMS 200 mounting bracket (see FMS mounting bracket product page for more information) or customer supplied mount.
Display and Controls	
Interface	Local: LCD display Remote: Available via HART or Bluetooth
Configuration	4-button HMI
Memory	Non-volatile EEPROM, no battery required
Power supply	
4 ... 20 mA/HART	10.5 ... 30 V DC
Certificates and Approvals	
General	FM, cCSA _{US} , CE, UKCA, RCM, EAC, KC, VLAREM II
Hazardous	
• Intrinsically Safe	
- Europe	ATEX II 1G Ex ia IIC T4 Ga
- UK	UKEX II 1G Ex ia IIC T4 Ga
- International	IECEx SIR 18.0013X Ex ia IIC T4 Ga
- USA/Canada	FM/cCSA _{US} Class I, Div. 1, Groups A, B, C, D, Class II, Div. 1, Groups E, F, G, Class III T4
- Brazil	INMETRO Ex ia IIC T4 Ga
- China	NEPSI Ex ia IIC T4 Ga
- South Africa	SABS Ex ia IIC T4 Ga
- Russia	EAC Ex 1G Ex ia IIC T4 Ga
- Korea	KCs Ex ia IIC T4
• Non-incendive	
- USA	FM, Class I, Div. 2, Groups A, B, C, D Tx
Metrological	MCERTS, CPA, Kazakhstan pattern approval
Radio (Bluetooth)	USA, Canada, EU, China

Options



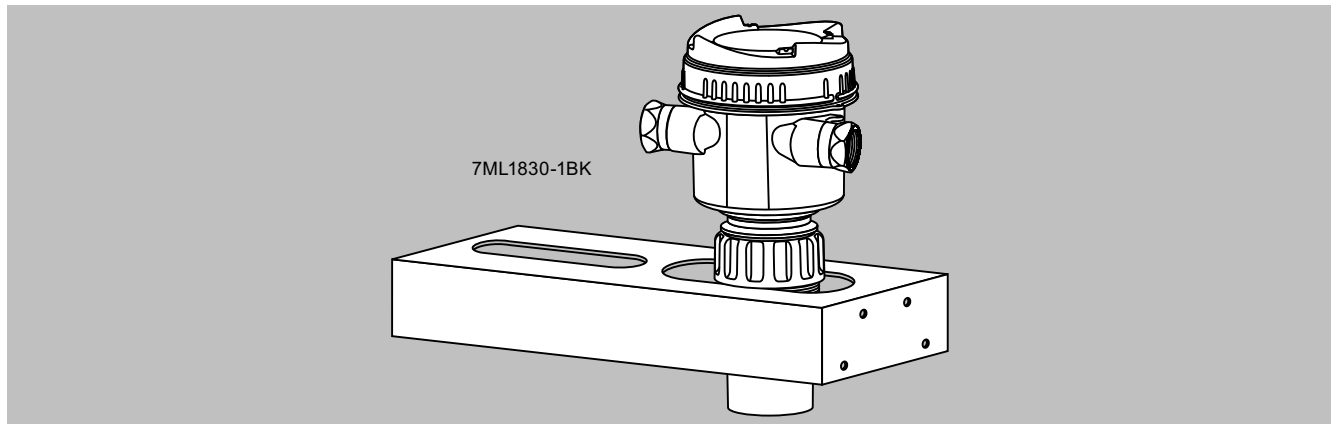
SITRANS Probe LU240 optional flange adapter, dimensions in mm (inch)

Level Measurement

Continuous level measurement

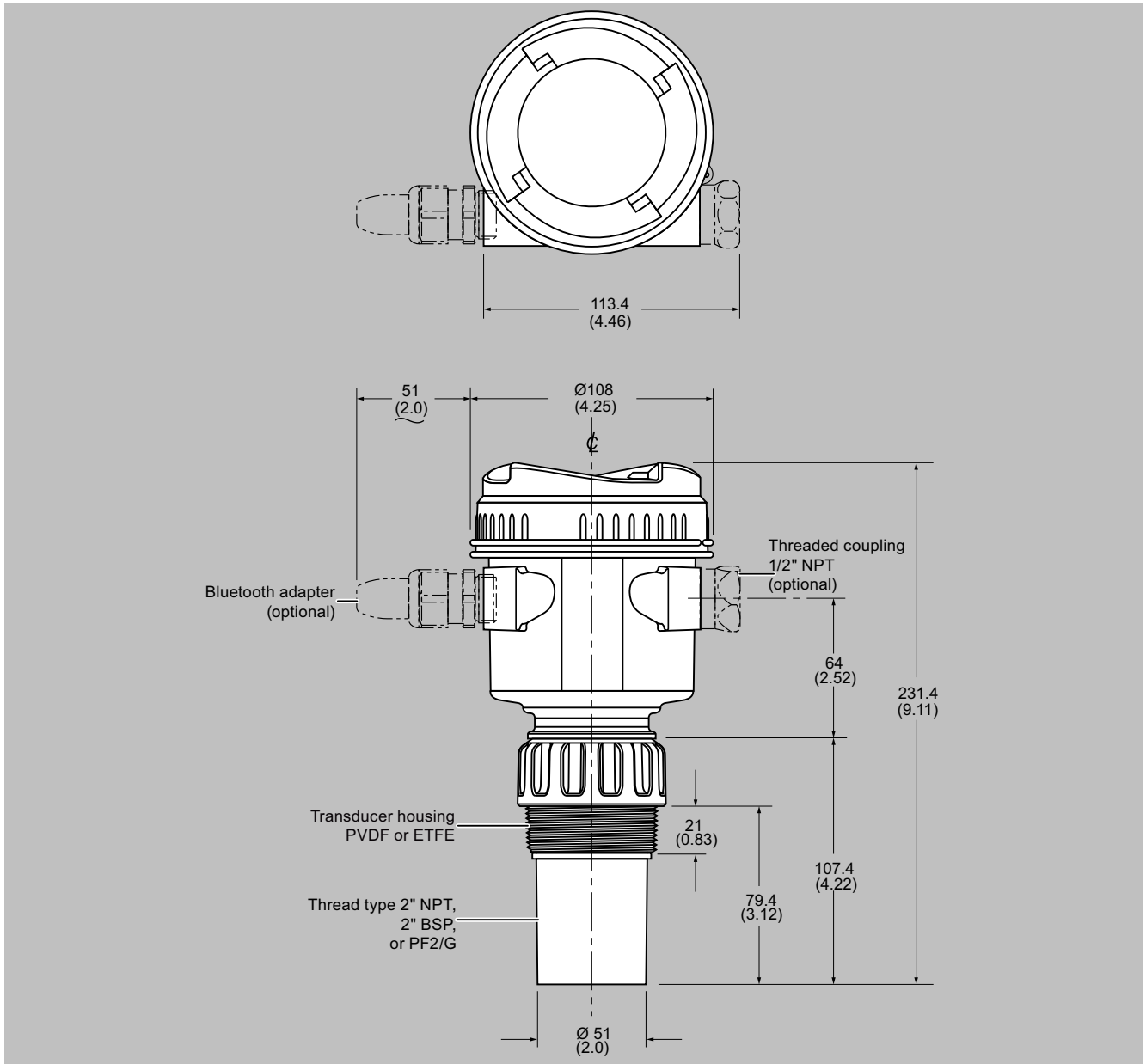
Ultrasonic / Ultrasonic transmitters / SITRANS Probe LU240

Options (continued)



SITRANS Probe LU240 with optional FMS 200 universal box bracket

Dimensional drawings



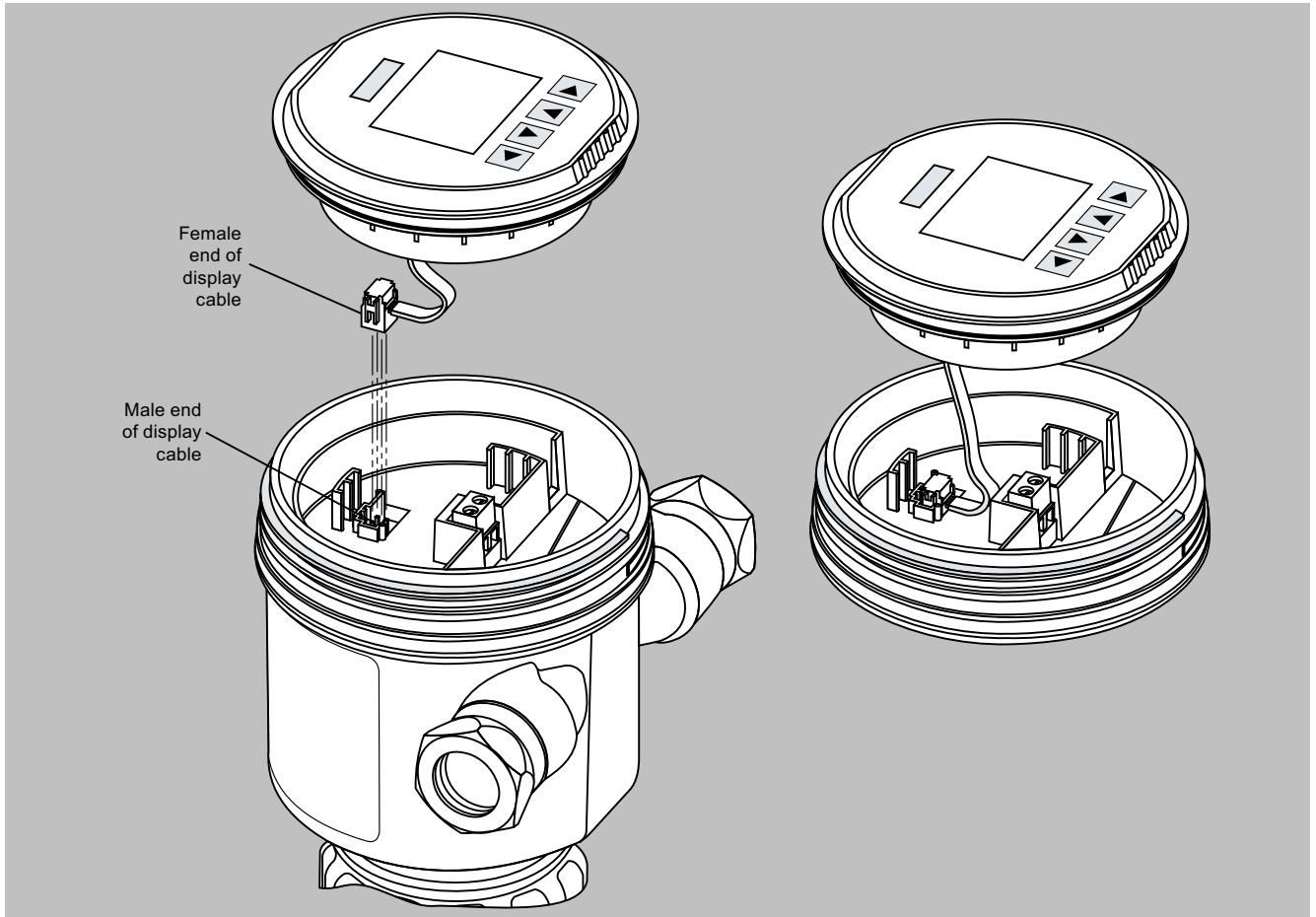
SITRANS Probe LU240 with optional Bluetooth adapter, dimensions in mm (inch)

Level Measurement

Continuous level measurement

Ultrasonic / Ultrasonic transmitters / SITRANS Probe LU240

Circuit diagrams



SITRANS Probe LU240 connections

Overview



The Probe is a short-range integrated ultrasonic level transmitter, ideal for liquids and slurries in open or closed vessels.

Benefits

- Easy to install, program, and maintain
- Accurate and reliable
- Sanitary models available
- Sonic Intelligence echo processing
- Integral temperature compensation

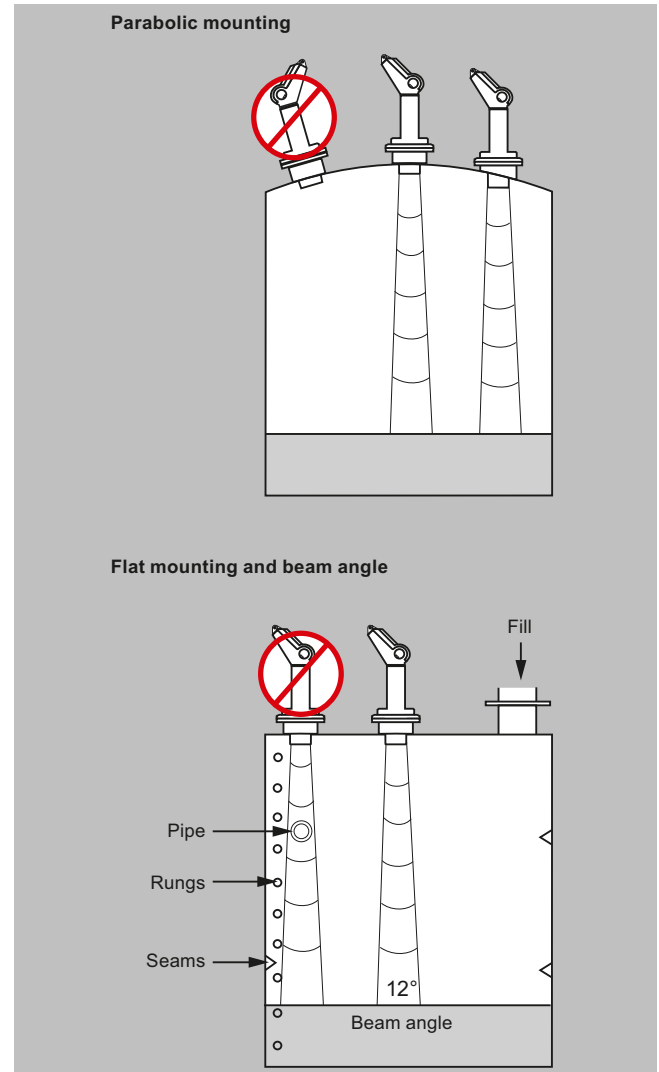
Application

The transducer is available in PVDF copolymer, making the device suitable for use in a wide variety of applications. The Probe is easy to install and maintain, and can be quickly removed for cleaning as required by the food, beverage and pharmaceutical industries.

The reliability of the level data is based on the Sonic Intelligence echo processing algorithms. A filter discriminates between the true echo and false echoes from acoustic or electrical noises and agitator blades in motion. The ultrasonic pulse propagation time to the material and back is temperature-compensated and converted into distance for display, analog output and relay actuation.

- Key Applications: chemical storage vessels, filter beds, mud pits, liquid storage vessels, food applications

Configuration



The Probe mounting

Level Measurement

Continuous level measurement

Ultrasonic / Ultrasonic transmitters / The Probe

Selection and ordering data

	Article No.
The Probe Ultrasonic level transmitter Continuous, non-contact, 5 m (16.4 ft) range. Monitors level for liquids and slurries. With 3-wire relay output.	7ML1201- ● ● ● 0 0
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	
Measuring range 5 m (16.40 ft)	1
Transducer/Process connection PVDF copolymer, 2" NPT [(Taper), ASME B1.20.1] PVDF copolymer, R 2" [(BSPT), EN 10226] PVDF copolymer, G 2" [(BSPP), EN ISO 228-1] PVDF copolymer, 4" Sanitary mounting	E F G J
Model/Approval 3-wire, 24 V DC, CE, UKCA, RCM, CSA, FM	E

Selection and Ordering data	Order code
Further designs Please add "-Z" to Article No. and specify Order code(s). Acrylic coated, stainless steel tag [13 x 45 mm (0.5 x 1.75 inch)]: Measuring-point number/identification (max. 20 characters) specify in plain text	Y17

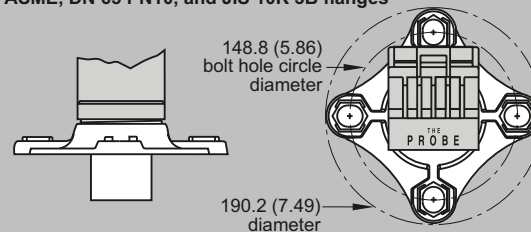
Selection and ordering data	Article No.
Operating Instructions All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation	
Accessories Universal Box Bracket Mounting kit Sanitary 4" mounting clamp 3" ASME, DN 65 PN 10, JIS 10K 3B ETFE Flange adapter for 2" NPT 3" ASME, DN 65 PN 10, JIS 10K 3B ETFE Flange adapter for 2" BSPT 2" NPT nylon plastic locknut 2" BSP nylon plastic locknut Plastic M20 cable gland with metal locknut SITRANS RD100, loop powered display - see Chapter 7 SITRANS RD150, remote digital display for 4 ... 20 mA and HART devices - see Chapter 7 SITRANS RD200, universal input display with Modbus conversion - see Chapter 7 SITRANS RD300, dual line display with totalizer and linearization curve and Modbus conversion - see Chapter 7 For applicable back up point level switch see point level measurement section.	7ML1830-1BK 7ML1830-1BR 7ML1830-1BT 7ML1830-1BU 7ML1830-1DT 7ML1830-1DQ 7ML1930-1DB 7ML5741-..... 7ML5742-..... 7ML5740-..... 7ML5744-.....

Technical specifications

The Probe	
	3-wire version
Mode of operation	
Measuring principle	Ultrasonic level measurement
Input	
Measuring range	0.25 ... 5 m (0.8 ... 16.4 ft)
Frequency	54 kHz
Output	
mA	4 ... 20 mA
• Span	Proportional/ inversely proportional
• Max. load	750 Ω at 24 V DC
Relay	For level alarm or fault
Power supply	
Supply voltage	18 ... 30 V DC, max. 0.2 A
Max. power consumption	5 W (200 mA at 24 V DC)
Certificates and approvals	CE, UKCA, RCM, cCSA _{US} , FM
Accuracy	
Error in measurement	0.25 % of measuring range (in air)
Resolution	3 mm (0.125 inch)
Temperature compensation	Built in
Echo processing	Sonic Intelligence
Rated operation conditions	
Beam angle	12°
Ambient temperature	
• Standard	-40 ... +60 °C (-40 ... +140 °F)
• Metallic mounting	-20 ... +60 °C (-4 ... +140 °F)
Storage temperature	
• Standard	-40 ... +60 °C (-40 ... +140 °F)
• Metallic mounting	-20 ... +60 °C (-4 ... +140 °F)
Max. static operating pressure	Normal atmospheric pressure
Degree of protection	IP65
Design	
Weight	
• Without flange adapter	1.5 kg (3.3 lb)
• With flange adapter	1.7 kg (3.7 lb)
Material	
• Electronics enclosure	PVC
• Transducer	PVDF copolymer
Degree of protection	IP65
Process connection	<ul style="list-style-type: none"> • 2" NPT [(Taper), ASME B1.20.1] • R 2" [(BSPT), EN 10226] • G 2" [(BSPP), EN ISO 228-1] • 4" sanitary
Flange adapter	3" Universal (fits DN 65, PN 10 and 3" ASME)
Cable inlet	2 inlets for PG 16 or ½" NPT cable glands

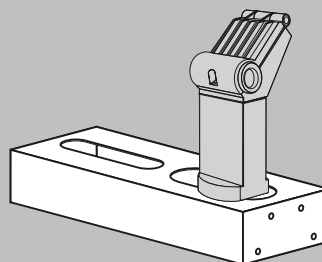
Options

Flange adapter for mating 2" NPT or 2" BSP process connections to 3" ASME, DN 65 PN10, and JIS 10K 3B flanges



The Probe optional flange adapter, dimensions in mm (inch)

The Probe with FMS 200 mounting bracket



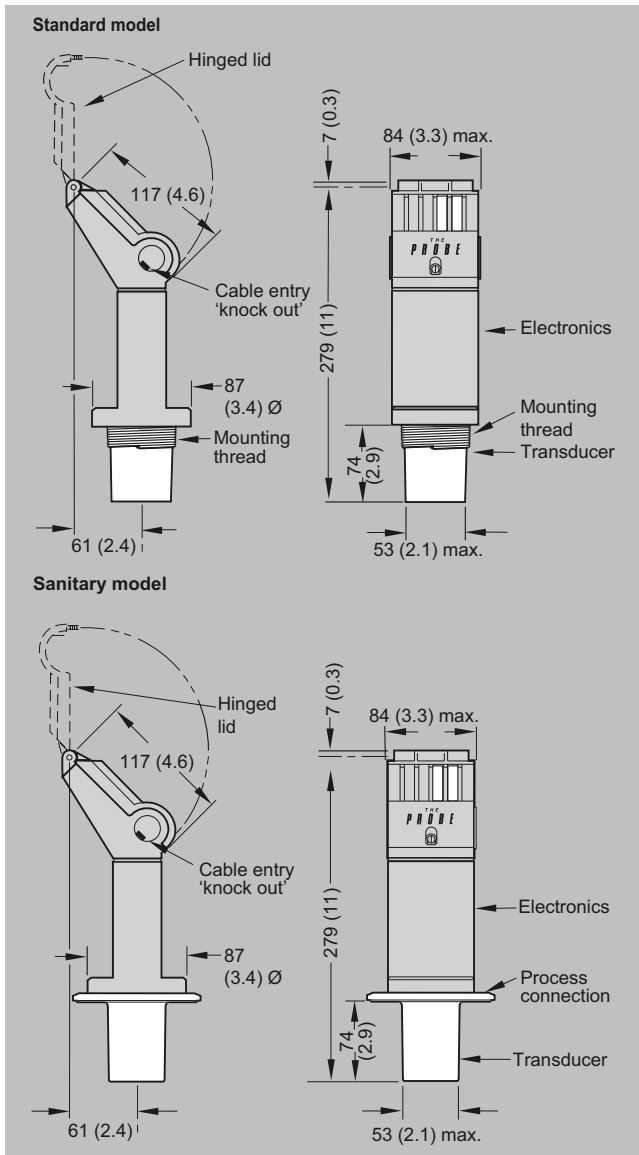
The Probe with optional mounting bracket

Level Measurement

Continuous level measurement

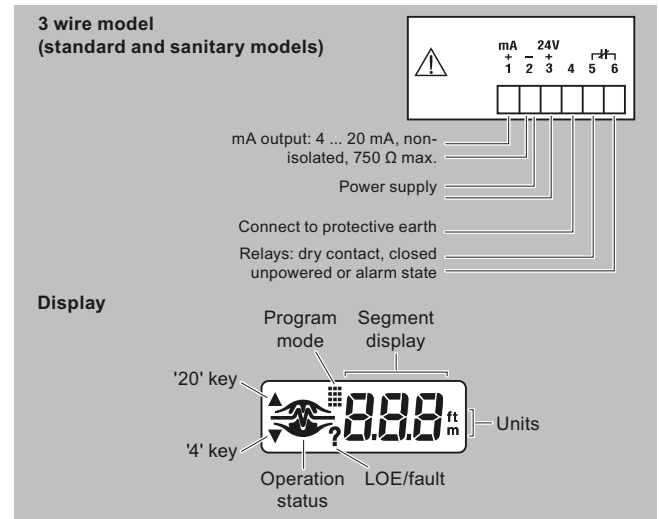
Ultrasonic / Ultrasonic transmitters / The Probe

Dimensional drawings



The Probe, dimensions in mm (inch)

Circuit diagrams



The Probe connections

Overview

Ultrasonic Transducers

Ultrasonic measuring systems are the cost-effective choice for monitoring and control in short- to long-range applications for liquids, slurries, and solids in a wide range of industries. Transducers are impervious to dust, moisture, corrosion, vibration, flooding, and extreme temperature. They are easy to install and virtually maintenance-free. Choose from a wide selection of models designed for short or long range applications on liquids or solids.

Technical specifications

EchoMax Transducers	Liquids		Liquids and Solids Standard		
	XRS-5	ST-H	XPS-10	XPS-15	XPS-30
Max. range¹⁾	8 m (26 ft)	10 m (33 ft)	10 m (33 ft)	15 m (50 ft)	30 m (100 ft)
Min. range	0.3 m (1 ft)	0.3 m (1 ft)	0.3 m (1 ft)	0.3 m (1 ft)	0.6 m (2 ft)
Max. temperature	65 °C (149 °F)	73 °C (164 °F)	95 °C (203 °F)	95 °C (203 °F)	95 °C (203 °F)
Min. temperature	-20 °C (-4 °F)	-40 °C (-40 °F)	-40 °C (-40 °F)	-40 °C (-40 °F)	-40 °C (-40 °F)
Typical Applications	Wet wells and open channels	Chemical storage and liquid tanks	Dusty solids and slurries	Deep wet wells and solids	Powders, pellets and solids
Frequency	44 kHz	44 kHz	44 kHz	44 kHz	30 kHz
Beam angle (-3dB)	10°	12°	12°	6°	6°
Thread size	R 1" [(BSPT), EN 10226] 1" NPT	1" and 2" NPT R 2" [(BSPT), EN 10226] 2" [(BSPP), EN ISO 228-1]	R 1" [(BSPT), EN 10226] 1" NPT	R 1" [(BSPT), EN 10226] 1" NPT	R 1.5" [(BSPT), EN 10226] Universal thread 1.5" NPT
Enclosure	<ul style="list-style-type: none"> PVDF Copolymer CSM Option: Flange with PTFE facing 	<ul style="list-style-type: none"> ETFE Option: PVDF 	<ul style="list-style-type: none"> PVDF Option: foam facing Flange with PTFE facing 	<ul style="list-style-type: none"> PVDF Option: foam facing Flange with PTFE facing 	<ul style="list-style-type: none"> PVDF Option: foam facing Flange with PTFE facing
Compatible with:					
SITRANS LUT400	•	•	•	•	•
HydroRanger 200	•	•	•	•	
MultiRanger 100/200	•	•	•	•	

¹⁾ Max range is rated for measurement of liquids, recommended range for solids is 50 % of maximum. Application conditions such as extreme dust or angle of repose may reduce the usable maximum range. Consult a local sales person for more details.

Level Measurement

Continuous level measurement

Ultrasonic / Ultrasonic transducers / ST-H

Overview



ST-H transducers use ultrasonic technology to measure level in chemical storage and liquid tanks.

Benefits

- Can be mounted on a narrow standpipe
- Immune to corrosive and harsh environments
- Integral temperature sensor

Application

The narrow design of the ST-H allows the transducer to be mounted on a narrow standpipe. When mounted correctly, it is completely protected from the process and can even be used in harsh, corrosive environments.

During operation, the ultrasonic transducer emits acoustic pulses in a narrow beam perpendicular to the transducer face. The level transceiver measures the propagation time between pulse emission and reception of the echo to calculate the distance from the transducer to the material. Variations in sound velocity due to changes in temperature within the permissible range are automatically compensated by the integral temperature sensor.

- Key Applications: chemical storage, liquid tanks

Selection and ordering data

	Article No.				
ST-H Ultrasonic level transducer Continuous, non-contact, 0.3 m (1 ft) range, for liquids.	7ML1100-	●	●	A	● 0
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.					
Process connection					
ETFE, 2" NPT [(Taper), ASME B1.20.1]	0				
ETFE, R 2" [(BSPT), EN 10226]	1				
ETFE, G 2" [(BSPP), EN ISO 228-1]	2				
PVDF copolymer, 2" NPT [(Taper), ASME B1.20.1]	3				
PVDF copolymer, R 2" [(BSPT), EN 10226]	4				
PVDF copolymer, G 2" [(BSPP), EN ISO 228-1]	5				
Cable length					
5 m (16.40 ft)			A		
10 m (32.81 ft)			B		
30 m (98.43 ft)			C		
50 m (164.04 ft)			D		
100 m (328.08 ft)			E		
Approvals					
CE, UKCA, FM Class I, II, Div. 1, Groups C, D, E, F, G T4A ³⁾					2
CSA Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G T3;					3
ATEX II 2G Ex mb IIC T5 Gb, Ta = -20°C to +60°C;					
UKEX II 2G Ex mb IIC T5 Gb, Ta = -20°C to +60°C;					
INMETRO Ex mb IIC T5 Gb, -20 °C ≤ Ta ≤ +60 °C;					
RCM, KC ¹⁾					
ATEX II 2G Ex mb IIC T5 Gb, Ta = -20°C to +60°C;					4
UKEX II 2G Ex mb IIC T5 Gb, Ta = -20°C to +60°C;					
INMETRO Ex mb IIC T5 Gb, -20 °C ≤ Ta ≤ +60 °C;					
CE, UKCA, RCM, KC ²⁾					

1) Available with Process connection options 0 ... 2 only.

2) Available with Process connection options 3 ... 5 only.

3) Not suitable for Ketone, Hexane, Ester or Ethyl Acetate atmospheres.

Selection and Ordering data	Order code
Further designs	
Please add "-Z" to Article No. and specify Order code(s).	
Acrylic coated, stainless steel tag [13 x 45 mm (0.5 x 1.75 inch)]: Measuring-point number/identification (max. 16 characters) specify in plain text	Y17

Accessories	Article No.
Operating Instructions	
All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation	
Accessories	
Universal box bracket, mounting kit	7ML1830-1BK
3" ASME, DN 65 PN 10, JIS 10K 3B ETFE flange adapter for 2" NPT	7ML1830-1BT
3" ASME, DN 65 PN 10, JIS 10K 3B ETFE flange adapter for 2" BSPT	7ML1830-1BU
Easy Aimer 2, aluminum, NPT with ¾" x 1" PVC coupling	7ML1830-1AQ
Easy Aimer 2, aluminum with M20 adapter and 1" and 1½" BSPT aluminum couplings	7ML1830-1AX
Easy Aimer 304, NPT with 1" stainless steel coupling	7ML1830-1AU
Easy Aimer 304, with M20 adapter and 1" and 1½" BSPT 304 stainless steel couplings	7ML1830-1GN
Plastic adapter 1" NPT	7ML1930-1FX
Plastic adapter 1" NPT/M20	7ML1830-1EF

Level Measurement

Continuous level measurement

Ultrasonic / Ultrasonic transducers / ST-H

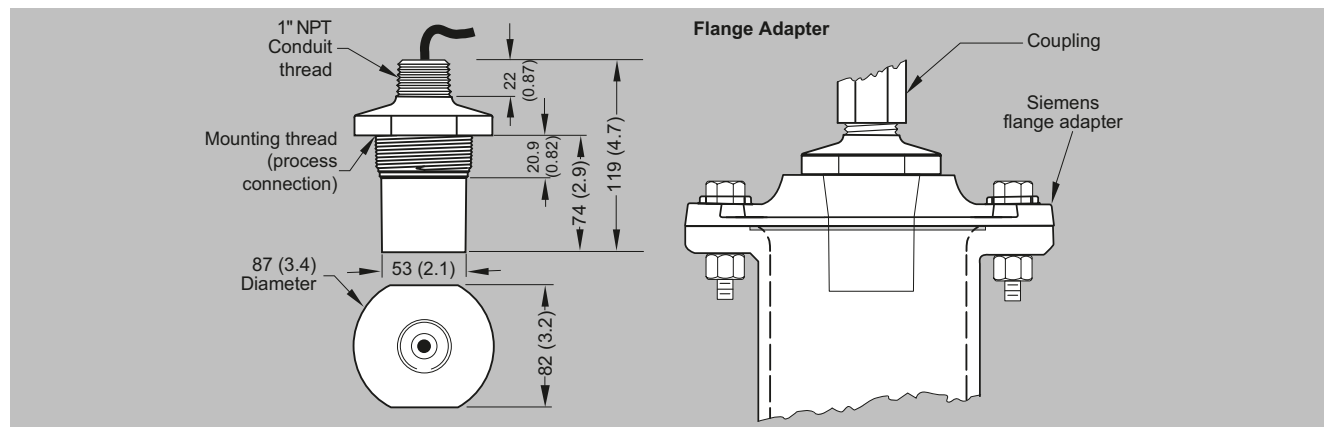
Technical specifications

ST-H	
Mode of operation	
Measuring principle	Ultrasonic transducer
Input	
Measuring range	0.3 ... 10 m (1 ... 33 ft)
Output	
Frequency	44 kHz
Beam angle	12°
Accuracy	
Temperature compensation	Compensated by integral temperature sensor
Rated operating conditions	
Pressure	Normal atmospheric pressure
Ambient conditions	
Ambient temperature	-20 ... +60 °C (-5 ... +140 °F) (ATEX and UKEX approved model) -40 ... +73 °C (-40 ... +163 °F) (CSA/FM approved model)
Storage temperature	-20 ... +60 °C (-5 ... +140 °F)
Design	
Weight ¹⁾	1.4 kg (3 lb)
Material (enclosure)	Base and lid made of ETFE or PVDF (epoxy fitted joint) ²⁾
Process connection	2" NPT [(Taper), ASME B1.20.1], R 2" [(BSPT), EN 10226] or G 2" [(BSPP), EN ISO 228-1]
Degree of protection	IP68
Cable connection	2-core shielded/twisted, 0.519 mm ² (20 AWG), PVC sheath
Cable (max. length)	365 m (1 200 ft) with RG 62 A/U coaxial cable
Options	
Flange adapter	3" Universal (fits DN 65, PN 10 and 3" ASME)
Certificates and approvals	
CE, UKCA, RCM, KC, CSA Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G T3 (ETFE only); FM Class I, II, Div. 1, Groups C, D, E, F, G T4A; ATEX II 2G Ex mb IIC T5 Gb; UKEX II 2G Ex mb IIC T5 Gb; INMETRO Ex mb IIC T5 Gb	

1) Approximate shipping weight of transducer with standard cable length

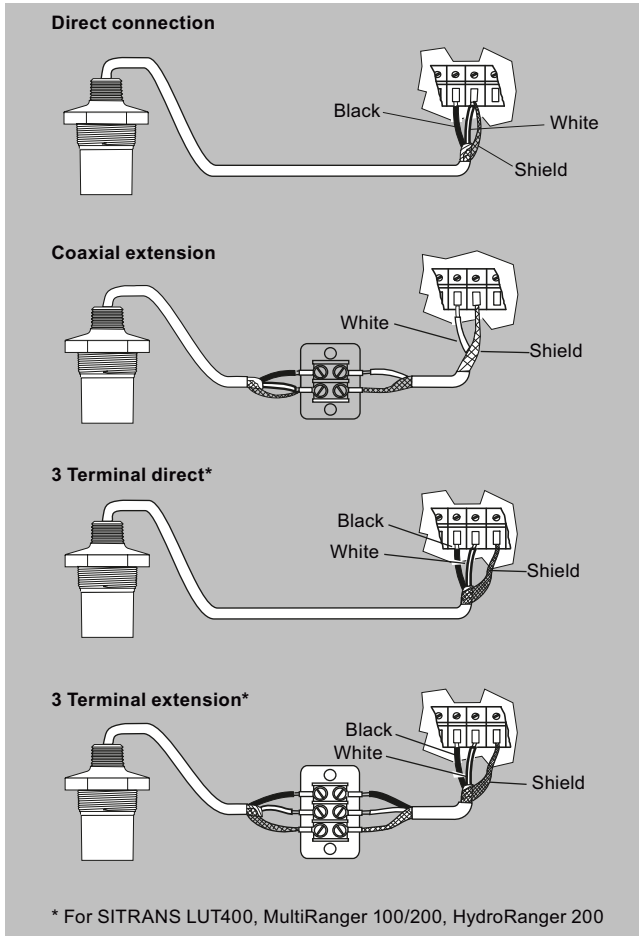
2) When measuring chemicals, check compatibility of ETFE or PVDF and epoxy, or mount joint external to process.

Dimensional drawings



ST-H ultrasonic transducer, dimensions in mm (inch)

Circuit diagrams



ST-H ultrasonic transducer connections

Level Measurement

Continuous level measurement

Ultrasonic / Ultrasonic transducers / EchoMax XRS-5

Overview



EchoMax XRS-5 ultrasonic transducer provides reliable, continuous level monitoring of liquids and slurries in narrow lift stations/wet wells, flumes, weirs and filter beds using a beam angle of just 10° and a CSM rubber face.

Benefits

- Narrow beam angle of only 10°
- Chemically resistant PVDF copolymer enclosure and CSM rubber face
- Measuring range: 8 m (26 ft) for measurement of liquids and slurries
- Fully submersible: IP68 degree of protection
- Easy installation with 1" NPT or R 1" BSPT connection

Application

The XRS-5 is non-contacting with a measuring range from 0.3 to 8 m (1 to 26 ft). Advanced echo processing ensures reliable data even in conditions with obstructions, turbulence, and foam.

The hermetically sealed CSM rubber face and the PVDF copolymer enclosure are designed for maximum resistance to methane, salt water, caustics, and harsh chemicals common to wastewater installations. With an IP68 degree of protection, this rugged sensor is fully submersible in the event of flood conditions. Use a submergence shield if full submergence is possible in the application. A submergence shield will maintain a high level reading output during submerged conditions.

The low-cost XRS-5 transducer is compatible with a full range of Siemens controllers, from a basic system for high/low alarm or simple pump control, up to advanced control systems with communications, telemetry and SCADA integration capabilities.

- Key Applications: wet wells, flumes, weirs, filter beds

Selection and ordering data

	Article No.								
EchoMax XRS-5 Ultrasonic level transducer Continuous, non-contact, 8 m (26 ft) range, for liquids and slurries.	7ML1106-●●●●0-0●								
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.									
Process connection									
1" NPT [(Taper), ASME B1.20.1]	1								
R 1" [(BSPT), EN 10226]	2								
Cable length									
5 m (16.40 ft)			A						
10 m (32.81 ft)			B						
30 m (98.43 ft)			C						
Facing									
Standard (CSM rubber)					A				
PTFE (flange versions)					B				
Approvals									
CSA Class I, Div. 2, Groups A, B, C, D; CSA Class II, Div. 1, Groups E, F, G; FM Class I, Zone 1, AEx m IIC, T6; FM Class II, III, Div. 1, Groups E, F, G T6; ATEX II 2GD Ex mb IIC T6 Gb, Ta = -20°C to +65°C; ATEX II 2GD Ex tb IIIC T85°C Db; UKEX II 2GD Ex mb IIC T6 Gb, Ta = -20°C to +65°C; UKEX II 2GD Ex tb IIIC T85°C Db; IECEX Ex mb IIC T6 Gb, Ta = -20°C to +65°C; IECEX Ex tb IIIC T85°C Db; INMETRO Ex mb IIC T6 Gb, IP66/IP68, -20°C ≤ Ta ≤ +65°C; INMETRO Ex tb IIIC T85°C Db, IP66/IP68; CE, UKCA, RCM, KC					2				
Mounting flange (flush mount)									
None									A
3" ASME, 150 lb, flat faced									B
4" ASME, 150 lb, flat faced									C
6" ASME, 150 lb, flat faced									D
DN 80, PN 10/16, Type A, flat faced									J
DN 100, PN 10/16, Type A, flat faced									K
DN 150, PN 10/16, Type A, flat faced									L
JIS10K 3B style									Q
JIS10K 4B style									R
JIS10K 6B style									S
Note: flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1, or JIS B 2220 standard.									

Selection and Ordering data	Order code
Further designs	
Please add "-Z" to Article No. and specify Order code(s).	
Acrylic coated, stainless steel tag [13 x 45 mm (0.5 x 1.75 inch)]: Measuring-point number/identification (max. 16 characters) specify in plain text	Y17

Selection and ordering data	Article No.
Accessories	
Tag, stainless steel with hole, 12 x 45 mm (0.47 x 1.77 inch), one text line for fastening on sensors	7ML1930-1BJ
Submergence shield kit	7ML1830-1BH
Easy Aimer 2, aluminum, NPT with ¾" x 1" PVC coupling	7ML1830-1AQ
Easy Aimer 2, aluminum with M20 adapter and 1" and 1½" BSPT aluminum couplings	7ML1830-1AX
Easy Aimer 304, NPT with 1" stainless steel coupling	7ML1830-1AU
Easy Aimer 304, with M20 adapter and 1" and 1½" BSPT 304 stainless steel couplings	7ML1830-1GN
FMS-200 universal box bracket, mounting kit	7ML1830-1BK
FMS-210 channel bracket, wall mount	7ML1830-1BL

Level Measurement

Continuous level measurement

Ultrasonic / Ultrasonic transducers / EchoMax XRS-5

Selection and ordering data (continued)

Selection and ordering data	Article No.
FMS-220 extended channel bracket, wall mount	7ML1830-1BM
FMS-310 channel bracket, floor mount	7ML1830-1BN
FMS-320 extended channel bracket, floor mount	7ML1830-1BP
FMS-350 bridge channel bracket, floor mount (see Mounting Brackets catalog page for more information)	7ML1830-1BQ
1" NPT locknut, plastic	7ML1830-1DS
1" BSP locknut, plastic	7ML1830-1DR
1" BSP locknut, flanged, plastic	7ML1830-1DN
Plastic adapter 1" BSP - 20 mm	7ML1830-1EA
Plastic adapter 1" NPT	7ML1930-1FX
Plastic adapter 1" NPT/M20	7ML1830-1EF
Operating Instructions	
All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation	

Selection and ordering data	Article No.
EchoMax XRS-5C Ultrasonic level transducer Continuous, non-contact, 8 m (26 ft) range, for liquids and slurries.	7ML1105- ● ● ● ● 1 - 0 ●
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	
Process connection	
1" NPT [(Taper), ASME B1.20.1]	1
Cable length	
5 m (16.40 ft)	A
10 m (32.81 ft)	B
30 m (98.43 ft)	C
Facing	
Standard (CSM rubber)	A
PTFE (flange versions)	B
Approvals	
CSA Class I Div. 1, Groups A, B, C, D; Class II Div. 1, Groups E, F, G; Class III	1
Mounting flange (flush mount)	
None	A
3" ASME, 150 lb, flat faced	B
4" ASME, 150 lb, flat faced	C
6" ASME, 150 lb, flat faced	D
Note: flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1, or JIS B 2220 standard.	
Operating Instructions	
All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation	

Selection and Ordering data	Order code
Further designs	
Please add "-Z" to Article No. and specify Order code(s).	
Acrylic coated, stainless steel tag [13 x 45 mm (0.5 x 1.75 inch)]: Measuring-point number/identification (max. 16 characters) specify in plain text	Y17

Selection and ordering data	Article No.
Accessories	
Submergence shield kit	7ML1830-1BH
Easy Aimer 2, aluminum, NPT with ¾" x 1" PVC coupling	7ML1830-1AQ
Easy Aimer 304, NPT with 1" stainless steel coupling	7ML1830-1AU
FMS-200 universal box bracket, mounting kit	7ML1830-1BK
FMS-210 channel bracket, wall mount	7ML1830-1BL

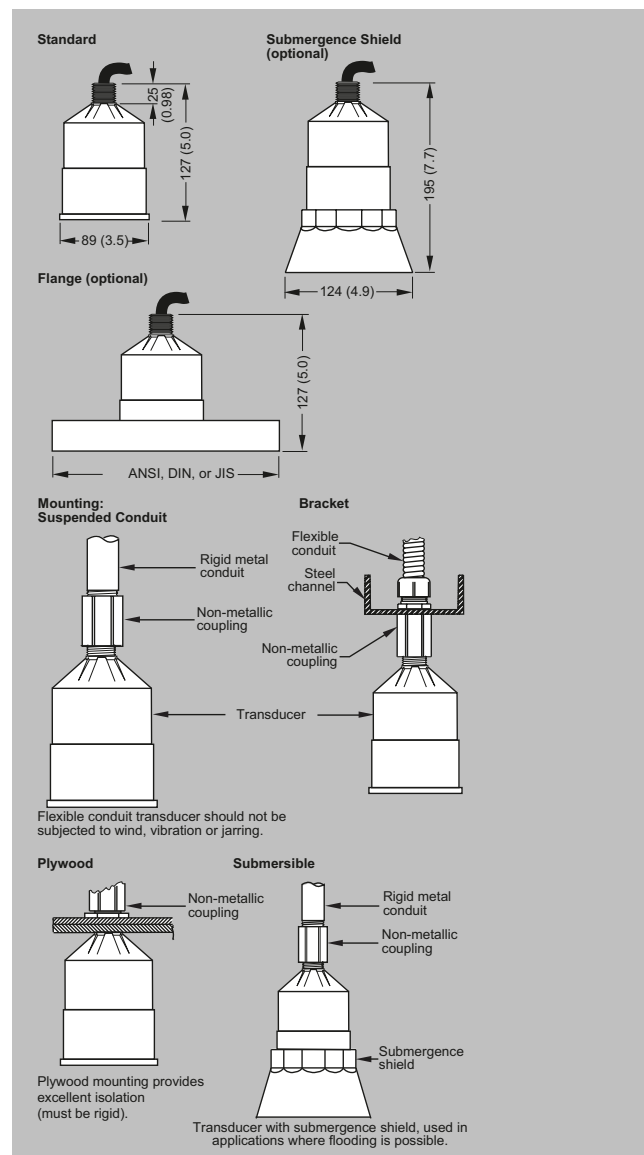
Selection and ordering data (continued)

Selection and ordering data	Article No.
FMS-220 extended channel bracket, wall mount	7ML1830-1BM
FMS-310 channel bracket, floor mount	7ML1830-1BN
FMS-320 extended channel bracket, floor mount	7ML1830-1BP
FMS-350 bridge channel bracket, floor mount (see Mounting Brackets catalog page for more information)	7ML1830-1BQ

Technical specifications

EchoMax XRS-5	
Mode of operation	
Measuring principle	Ultrasonic transducer
Input	
Measuring range	0.3 ... 8 m (1 ... 26 ft), dependent on application
Output	
Frequency	44 kHz
Beam angle	10°
Accuracy	
Temperature error	Compensated by integral temperature sensor
Rated operating conditions	
Vessel pressure	Normal atmospheric pressure
Ambient Conditions	
• Ambient temperature	-20 ... +65 °C (-4 ... +149 °F)
• Storage temperature	-20 ... +65 °C (-4 ... +149 °F)
Design	
Weight (approximate shipping weight of sensor with standard cable length)	1.2 kg (2.6 lb)
Material (enclosure)	PVDF copolymer enclosure and CSM face
Process connection	1" NPT [(Taper), ANSI/ASME B1.20.1] or R 1" [(BSPT), EN 10226]
Degree of protection	IP65/IP68
Cable connection	2-core shielded/twisted, 0.5 mm ² (20 AWG), PVC sheath
Cable (max. length)	<ul style="list-style-type: none"> • 365 m (1 200 ft) with RG 62 A/U coaxial cable • 365 m (1 200 ft) with 2-core twisted pair, foil shield, 0.5 mm² (20 AWG), PVC sheath, only for MultiRanger 100/200
Options	
Flange version	Factory flange with PTFE face for ASME, EN or JIS configuration
Submergence shield	For applications with flooding possible
Certificates and approvals	CE, UKCA, RCM, KC CSA Class I, Div. 2, Groups A, B, C, D, Class II, Div. 1 Groups E, F, G FM Class I, Zone 1, AEx m IIC, T6 Class II, III, Div. 1, Groups E, F, G T6 ATEX II 2GD / UKEX II 2GD / IECEx / INMETRO Ex mb IIC T6 Gb, Ex tb IIIC T85°C Db

Dimensional drawings



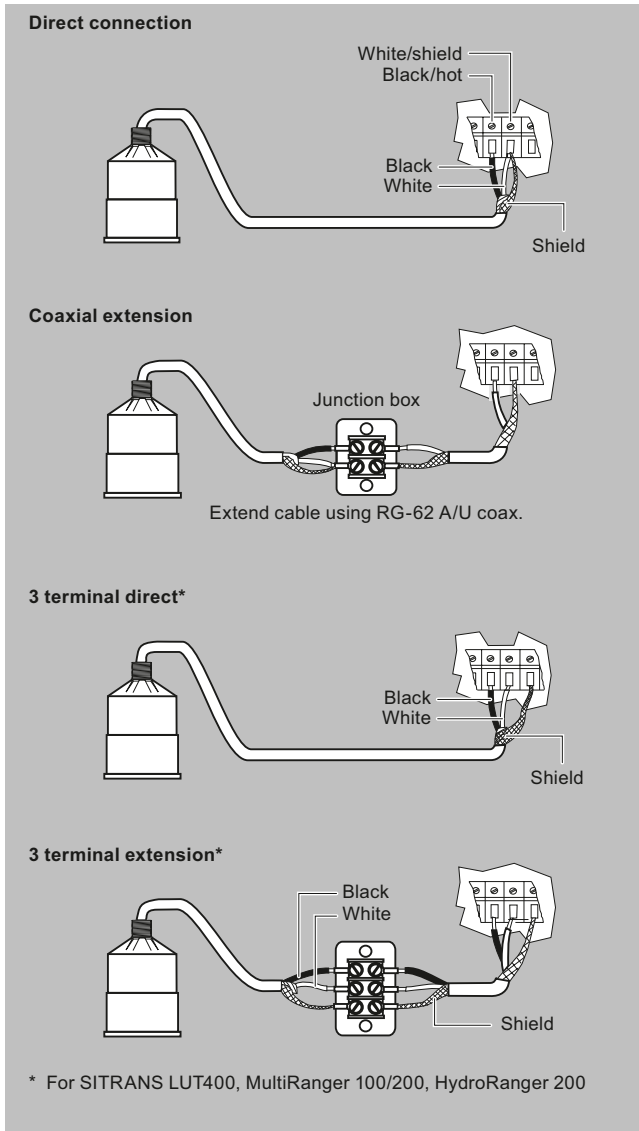
XRS-5 ultrasonic transducer, dimensions in mm (inch)

Level Measurement

Continuous level measurement

Ultrasonic / Ultrasonic transducers / EchoMax XRS-5

Circuit diagrams



XRS-5 ultrasonic transducer connections

Overview

EchoMax XPS transducers use ultrasonic technology to measure level in a wide range of liquids and solids.

Benefits

- Integral temperature compensation
- Low ringing effect reduces blanking distance
- Optional foam facing for dusty applications
- Self-cleaning and low-maintenance
- Chemically resistant
- Hermetically sealed

Application

XPS transducers can be fully immersed, are resistant to steam and corrosive chemicals, and can be installed without flanges.

The XPS series offers versions for various measuring ranges up to 30 m (100 ft) and up to a max. temperature of 95 °C (203 °F).

During operation, the EchoMax transducers emit acoustic pulses in a narrow beam. The level monitor measures the propagation time between pulse emission and its reflection (echo) to calculate the distance.

Level Measurement

Continuous level measurement

Ultrasonic / Ultrasonic transducers / EchoMax XPS

Selection and ordering data

	Article No.				
EchoMax XPS-10 Ultrasonic level transducer Continuous, non-contact, 10 m (32.80 ft), for liquids and solids.	7ML1115-	●	●	●	● 0
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.					
Mounting thread and facing					
1" NPT [(Taper), ASME B1.20.1]	0				
1" NPT [(Taper), ASME B1.20.1] with foam facing ¹⁾	1				
1" NPT [(Taper), ASME B1.20.1] with PTFE facing ²⁾	2				
R 1" [(BSPT), EN 10226]	3				
R 1" [(BSPT), EN 10226] with foam facing ¹⁾	4				
R 1" [(BSPT), EN 10226] with PTFE facing ²⁾	5				
Cable length					
5 m (16.40 ft)			B		
10 m (32.81 ft)			C		
30 m (98.43 ft)			E		
50 m (164.04 ft)			F		
100 m (328.08 ft)			K		
Mounting flange					
None				A	
3" ASME, 150 lb, flat faced				C	
4" ASME, 150 lb, flat faced				D	
6" ASME, 150 lb, flat faced				E	
8" ASME, 150 lb, flat faced				F	
DN 80, PN 10/16, Type A, flat faced				G	
DN 100, PN 10/16, Type A, flat faced				J	
DN 150, PN 10/16, Type A, flat faced				L	
JIS10K3B Style				M	
JIS10K4B Style				P	
JIS10K6B Style				R	
(Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1, or JIS B 2220 standard.)					
Approvals					
ATEX II 2GD Ex mb IIC T4 Gb, ATEX II 2GD Ex tb IIIC T135°C Db, Ta = -40°C to +95°C; UKEX II 2GD Ex mb IIC T4 Gb, UKEX II 2GD Ex tb IIIC T135°C Db, Ta = -40°C to +95°C; IECEx SIR 13.0009X Ex mb IIC T4 Gb, IECEx SIR 13.0009X Ex tb IIIC T135°C Db, Ta = -40°C to +95°C; FM Class I, Div. 2, Groups A, B, C, D; FM Class II, Div. 1, Groups E, F, G; FM Class III					3
CSA Class I, Div. 1, Groups A, B, C, D, Class II, Div. 1, Groups E, F, G, Class III ³⁾					4

¹⁾ Not available with flanged versions.

²⁾ Available with flanged versions only.

³⁾ Valid with mounting thread and facing options 0 ... 2 only.

Selection and Ordering data	Order code
Further designs	
Please add "-Z" to Article No. and specify Order code(s).	
Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: Measuring point number/identification (max. 27 characters) specify in plain text	Y15

Selection and ordering data (continued)

Selection and ordering data	Article No.
Operating Instructions	
All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation	
Accessories	
Tag, stainless steel with hole, 12 x 45 mm (0.47 x 1.77 inch), one text line for fastening on sensors	7ML1930-1BJ
Submergence shield kit	7ML1830-1BH
Easy Aimer 2, aluminum, NPT with ¾" x 1" PVC coupling	7ML1830-1AQ
Easy Aimer 2, aluminum with M20 adapter and 1" and 1½" BSPT aluminum couplings	7ML1830-1AX
Easy Aimer 304, NPT with 1" stainless steel coupling	7ML1830-1AU
Easy Aimer 304, with M20 adapter and 1" and 1½" BSPT 304 stainless steel couplings	7ML1830-1GN
Universal box bracket, mounting kit	7ML1830-1BK
Channel bracket, wall mount	7ML1830-1BL
Extended channel bracket, wall mount	7ML1830-1BM
Channel bracket, floor mount	7ML1830-1BN
Extended channel bracket, floor mount	7ML1830-1BP
Bridge channel bracket, floor mount (see Mounting Brackets catalog page for more information)	7ML1830-1BQ
1" NPT locknut, plastic	7ML1830-1DS
1" BSP locknut, plastic	7ML1830-1DR
1" BSP locknut, flanged, plastic	7ML1830-1DN
Plastic adapter 1" BSP - 20 mm	7ML1830-1EA
Plastic adapter 1" NPT	7ML1930-1FX
Plastic adapter 1" NPT/M20	7ML1830-1EF

	Article No.				
EchoMax XPS-15 Ultrasonic level transducer Continuous, non-contact, 15 m (49.21 ft), for liquids and solids.	7ML1118-	●	●	●	● 0
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.					
Mounting thread and facing					
1" NPT [(Taper), ASME B1.20.1]					0
1" NPT [(Taper), ASME B1.20.1] with foam facing ¹⁾					1
1" NPT [(Taper), ASME B1.20.1] with PTFE facing ²⁾					2
R 1" [(BSPT), EN 10226]					3
R 1" [(BSPT), EN 10226] with foam facing ¹⁾					4
R 1" [(BSPT), EN 10226] with PTFE facing ²⁾					5
Cable length					
5 m (16.40 ft)				B	
10 m (32.81 ft)				C	
30 m (98.43 ft)				E	
50 m (164.04 ft)				F	
100 m (328.08 ft)				K	
Mounting flange					
None				A	
6" ASME, 150 lb, flat faced				D	
8" ASME, 150 lb, flat faced				E	
DN 150, PN 10/16, Type A, flat faced				J	
DN 200, PN 10, Type A, flat faced				K	
JIS10K 6B				N	
JIS10K 8B				P	
(Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1, or JIS B 2220 standard.)					

Level Measurement

Continuous level measurement

Ultrasonic / Ultrasonic transducers / EchoMax XPS

Selection and ordering data (continued)

Selection and ordering data	Article No.
EchoMax XPS-15 Ultrasonic level transducer Continuous, non-contact, 15 m (49.21 ft), for liquids and solids.	7ML1118- ● ● ● ● 0
Approvals ATEX II 2GD Ex mb IIC T4 Gb, ATEX II 2GD Ex tb IIIC T135°C Db, Ta = -40°C to +95°C; UKEX II 2GD Ex mb IIC T4 Gb, UKEX II 2GD Ex tb IIIC T135°C Db, Ta = -40°C to +95°C; IECEx SIR 13.0009X Ex mb IIC T4 Gb IECEx SIR 13.0009X Ex tb IIIC T135°C Db, Ta = -40°C to +95°C; FM Class I, Div. 2, Groups A, B, C, D; FM Class II, Div. 1, Groups E, F, G; FM Class III CSA Class I, Div. 1, Groups A, B, C, D, Class II, Div. 1, Groups E, F, G, Class III ³⁾	3 4

- 1) Not available with flanged versions.
- 2) Available with flanged versions only.
- 3) Available with mounting options 0 ... 2 only.

Selection and Ordering data	Order code
Further designs Please add "-Z" to Article No. and specify Order code(s). Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: Measuring point number/ identification (max. 27 characters) specify in plain text	Y15

Selection and ordering data	Article No.
Operating Instructions All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation	
Accessories Tag, stainless steel with hole, 12 x 45 mm (0.47 x 1.77 inch), one text line for fastening on sensors	7ML1930-1BJ
Submergence shield kit	7ML1830-1BJ
Universal box bracket, mounting kit	7ML1830-1BK
Channel bracket, wall mount	7ML1830-1BL
Extended channel bracket, wall mount	7ML1830-1BM
Channel bracket, floor mount	7ML1830-1BN
Extended channel bracket, floor mount	7ML1830-1BP
Bridge channel bracket, floor mount (see Mounting Brackets catalog page for more information)	7ML1830-1BQ
1" NPT locknut, plastic	7ML1830-1DS
1" BSP locknut, plastic	7ML1830-1DR
1" BSP locknut, flanged, plastic	7ML1830-1DN
Easy Aimer 2, aluminum, NPT with 3/4" x 1" PVC coupling	7ML1830-1AQ
Easy Aimer 2, aluminum with M20 adapter and 1" and 1 1/2" BSPT aluminum couplings	7ML1830-1AX
Easy Aimer 304, NPT with 1" stainless steel coupling	7ML1830-1AU
Easy Aimer 304, with M20 adapter and 1" and 1 1/2" BSPT 304 stainless steel couplings	7ML1830-1GN
Plastic adapter 1" BSP - 20 mm	7ML1830-1EA
Plastic adapter 1" NPT	7ML1930-1FX
Plastic adapter 1" NPT/M20	7ML1830-1EF

Selection and ordering data (continued)

		Article No.					
EchoMax XPS-15F Ultrasonic level transducer Continuous, non-contact, 15 m (49.21 ft), for liquids and solids.		7ML1171-	●	●	●	●	0
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.							
Mounting thread and facing							
1" NPT [(Taper), ASME B1.20.1]		1					
Cable length							
5 m (16.40 ft)				B			
10 m (32.81 ft)				C			
30 m (98.43 ft)				D			
50 m (164.04 ft)				E			
100 m (328.08 ft)				F			
Mounting flange, flush mount							
None					A		
6" ASME, 150 lb, flat faced					B		
8" ASME, 150 lb, flat faced					C		
(Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5, or EN 1092-1, or JIS B 2220 standard.)							
Approvals							
FM Class I, Div. 1, Groups A, B, C, and D, Class II Div. 1, Groups E, F, and G, Class III						1	

Selection and Ordering data	Order code
Further designs	
Please add "-Z" to Article No. and specify Order code(s).	
Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: Measuring point number/ identification (max. 27 characters) specify in plain text	Y15

Selection and ordering data	Article No.
Operating Instructions	
All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation	
Accessories	
Tag, stainless steel with hole, 12 x 45 mm (0.47 x 1.77 inch), one text line for fastening on sensors	7ML1930-1BJ
Submergence shield kit	7ML1830-1BJ
Universal box bracket, mounting kit	7ML1830-1BK
Channel bracket, wall mount	7ML1830-1BL
Extended channel bracket, wall mount	7ML1830-1BM
Channel bracket, floor mount	7ML1830-1BN
Extended channel bracket, floor mount	7ML1830-1BP
Bridge channel bracket, floor mount (see Mounting Brackets catalog page for more information)	7ML1830-1BQ
1" NPT locknut, plastic	7ML1830-1DS
Easy Aimer 2, aluminum, NPT with 3/4" x 1" PVC coupling	7ML1830-1AQ
Easy Aimer 304, NPT with 1" stainless steel coupling	7ML1830-1AU

		Article No.					
EchoMax XPS-30 Ultrasonic level transducer Continuous, non-contact, 30 m (98.42 ft) for liquids and solids.		7ML1123-	●	●	●	●	0
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.							
Mounting thread and facing							
1½" universal thread		0					
1½" universal thread, foam facing ¹⁾		1					
1½" universal thread, PTFE facing ²⁾		2					
Cable length							
5 m (16.40 ft)				B			
10 m (32.81 ft)				C			

Level Measurement

Continuous level measurement

Ultrasonic / Ultrasonic transducers / EchoMax XPS

Selection and ordering data (continued)

	Article No.				
EchoMax XPS-30 Ultrasonic level transducer Continuous, non-contact, 30 m (98.42 ft) for liquids and solids.	7ML1123-	●	●	●	0
30 m (98.43 ft)			E		
50 m (164.04 ft)			F		
100 m (328.08 ft)			K		
Mounting flange					
None				A	
6" ASME, 150 lb, flat faced				D	
8" ASME, 150 lb, flat faced				E	
DN 150, PN 10/16, Type A, flat faced				J	
DN 200, PN 10, Type A, flat faced				K	
JIS10K 6B				N	
JIS10K 8B				P	
(Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1, or JIS B 2220 standard.)					
Approvals					
ATEX II 1D, 2G Ex mb IIC T4 Gb, ATEX II 1D, 2G Ex tb IIIC T135°C Da, Ta = -40°C to +95°C; UKEX II 1D, 2G Ex mb IIC T4 Gb, UKEX II 1D, 2G Ex tb IIIC T135°C Da, Ta = -40°C to +95°C; IECEX SIR 13.0009X Ex mb IIC T4 Gb, IECEX SIR 13.0009X Ex tb IIIC T135°C Da, Ta = -40°C to +95°C					5

- 1) Not available with flanged versions.
- 2) Available with flanged versions only.

Selection and Ordering data	Order code
Further designs	
Please add "-Z" to Article No. and specify Order code(s).	
Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: measuring-point number/identification (max. 27 characters) specify in plain text	Y15

Selection and ordering data	Article No.
Operating Instructions	
All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation	
Accessories	
Tag, stainless steel with hole, 12 x 45 mm (0.47 x 1.77 inch), one text line for fastening on sensors	7ML1930-1BJ
1½" BSPT locknut, plastic	7ML1830-1DP
Easy Aimer 2, aluminum, NPT with 1½" galvanized coupling	7ML1830-1AN
Easy Aimer 304, NPT with 1½" stainless steel coupling	7ML1830-1AT
Easy Aimer 2, aluminum with M20 adapter and 1" and 1½" BSPT aluminum couplings	7ML1830-1AX
Easy Aimer 304, with M20 adapter and 1" and 1½" BSPT 304 stainless steel couplings	7ML1830-1GN
Adapter 1½" BSP	7ML1830-1EB

	Article No.				
EchoMax XPS-30C Ultrasonic level transducer Continuous, non-contact, 30 m (98.42 ft) for liquids and solids.	7ML1155-	●	●	●	1
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.					
Mounting thread and facing					
1½" universal thread			0		
1½" universal thread, foam facing ¹⁾			1		
1½" universal thread, PTFE facing ²⁾			2		

Selection and ordering data (continued)

	Article No.					
EchoMax XPS-30C Ultrasonic level transducer Continuous, non-contact, 30 m (98.42 ft) for liquids and solids.	7ML1155-	●	●	●	●	1
Cable length						
5 m (16.40 ft)			B			
10 m (32.81 ft)			C			
30 m (98.43 ft)			E			
50 m (164.04 ft)			F			
100 m (328.08 ft)			K			
Mounting flange						
None				A		
6" ASME, 150 lb, flat faced				D		
8" ASME, 150 lb, flat faced				E		
DN 150, PN 10/16, Type A, flat faced				J		
DN 200, PN 10, Type A, flat faced				K		
JIS10K 6B				N		
JIS10K 8B				P		
(Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1, or JIS B 2220 standard.)						
Approvals						
CSA, Class I, Div. 2, Groups A, B, C, D; Class II, Div. 1, Groups E, F, G; Class III						4

1) Not available with flanged version.

2) Available for flanged versions only.

Selection and Ordering data	Order code
Further designs	
Please add "-Z" to Article No. and specify Order code(s).	
Stainless steel tag [69 mm x 50 mm (2.71 x 1.97 inch)]: Measuring-point number/identification (max. 27 characters) specify in plain text	Y15

Selection and ordering data	Article No.
Operating Instructions	
All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation	
Accessories	
Easy Aimer 2, aluminum, NPT with 1½" galvanized coupling	7ML1830-1AN
Easy Aimer 304, NPT with 1½" stainless steel coupling	7ML1830-1AT
1½" BSPT locknut, plastic	7ML1830-1DP
Adapter 1½" BSP	7ML1830-1EB

Level Measurement

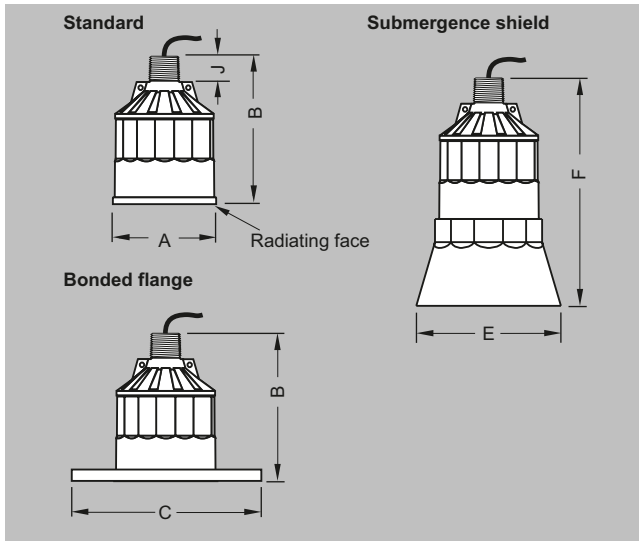
Continuous level measurement

Ultrasonic / Ultrasonic transducers / EchoMax XPS

Technical specifications

Input	XPS-10	XPS-15 (standard and F models)	XPS-30
Measuring range ¹⁾	0.3 ... 10 m (1 ... 33 ft)	Standard: 0.3 ... 15 m (1 ... 50 ft) XPS-15F: 0.45 ... 15 m (1.5 ... 50 ft)	0.6 ... 30 m (2 ... 100 ft)
Output			
Frequency	44 kHz	44 kHz	30 kHz
Beam angle	12°	6°	6°
Environmental			
Location	Indoors/outdoors	Indoors/outdoors	Indoors/outdoors
Ambient temperature	-40 ... +95 °C (-40 ... +203 °F)	Standard: -40 ... +95 °C (-40 ... +203 °F) XPS-15F: -20 ... +95 °C (-4 ... +203 °F)	-40 ... +95 °C (-40 ... +203 °F)
Storage temperature	-40 ... +95 °C (-40 ... +203 °F)	Standard: -40 ... +95 °C (-40 ... +203 °F) XPS-15F: -20 ... +95 °C (-4 ... +203 °F)	-40 ... +95 °C (-40 ... +203 °F)
Pollution degree	4	4	4
Pressure	8 bar g (120 psi g) Flanged: 0.5 bar g (7.25 psi g)	8 bar g (120 psi g) Flanged: 0.5 bar g (7.25 psi g)	0.5 bar g (7.25 psi g) Flanged: 0.5 bar g (7.25 psi g)
Design			
Weight	0.8 kg (1.8 lb)	1.3 kg (2.8 lb) Flanged: 2 kg (4.4 lb)	4.3 kg (9.5 lb)
Power supply	Operation of transducer only with approved Siemens controllers	Operation of transducer only with approved Siemens controllers	Operation of transducer only with approved Siemens controllers
Material	Standard: PVDF Flanged: PVDF with CPVC flange Option: PTFE face with CPVC flange	Standard: PVDF Flanged: PVDF with CPVC flange Option: PTFE face with CPVC flange	Standard: PVDF Flanged: PVDF with CPVC flange Option: PTFE face with CPVC flange
Color	Blue	Standard: Blue XPS-15F: Gray	Blue
Process connection	1" NPT or 1" BSPT	Standard: 1" NPT or 1" BSPT XPS-15F: 1" NPT	1.5" universal thread (NPT or BSPT)
Degree of protection	IP66/68	IP66/68	IP66/68
Cable	2-wire twisted pair/braided and foil shielded 0.5 mm ² (20 AWG) PVC jacket	2-wire twisted pair/braided and foil shielded 0.5 mm ² (20 AWG) PVC jacket	2-wire twisted pair/braided and foil shielded 0.5 mm ² (20 AWG) PVC jacket
Separation	Max. 365 m (1 200 ft)	Max. 365 m (1 200 ft)	Max. 365 m (1 200 ft)
Certificates and approvals	Standard: CE, UKCA, CSA, FM, ATEX, UKEX, IECEx	Standard: CE, UKCA, CSA, FM, ATEX, UKEX, IECEx XPS-15F: FM Class I, Div. 1, Groups A, B, C, and D, Class II Div. 1, Groups E, F, and G, Class III	CE, UKCA, CSA, FM, ATEX, UKEX, IECEx

Dimensional drawings



XPS ultrasonic transducer

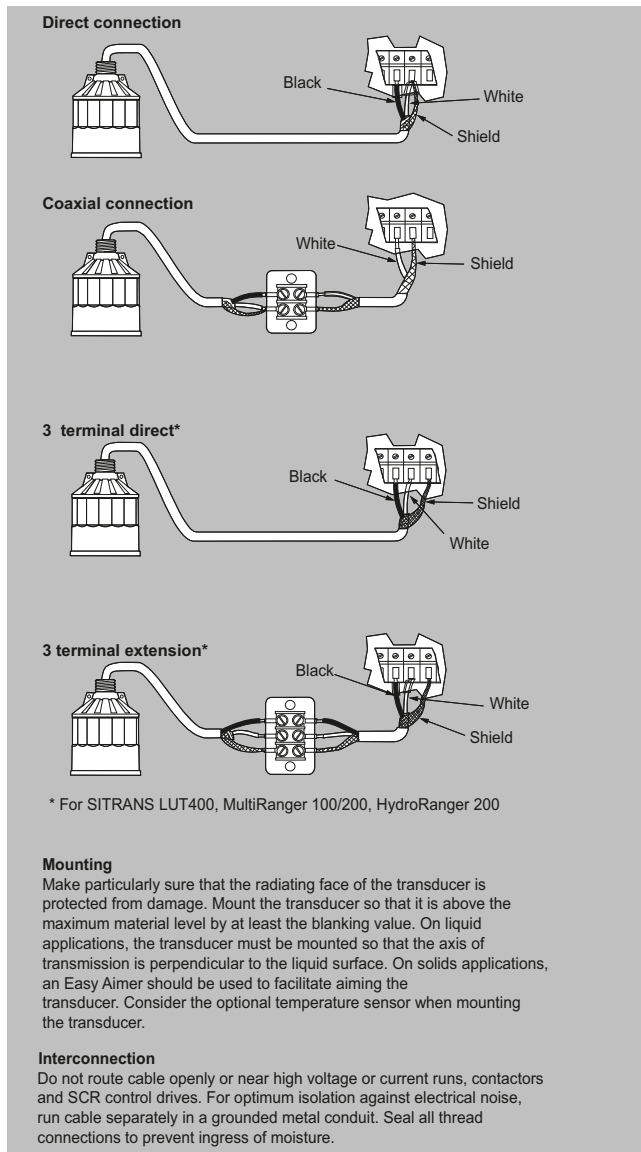
Version			
Dimension	XPS-10	XPS-15	XPS-30
A	88 mm (3.464 inch)	121 mm (4.764 inch)	175 mm (6.890 inch)
B	122 mm (4.803 inch)	132 mm (5.197 inch)	198 mm (7.795 inch)
C	According to ASME, DIN, and JIS	According to ASME, DIN, and JIS	According to ASME, DIN, and JIS
E	124 mm (4.882 inch)	158 mm (6.220 inch)	n/a
F	152 mm (5.984 inch)	198 mm (7.795 inch)	n/a
J	28 mm (1.1 inch)	28 mm (1.1 inch)	28 mm (1.1 inch)

Level Measurement

Continuous level measurement

Ultrasonic / Ultrasonic transducers / EchoMax XPS

Circuit diagrams



XPS ultrasonic transducer connections

Overview

Accessories for ultrasonic transducers

- EA aiming devices
- FMS mounting brackets
- TS-3 temperature sensor

Level Measurement

Continuous level measurement

Ultrasonic / Accessories for level sensors / EA aiming devices

Application

EA 304 aiming device

The Easy Aimer 304 flange is a stainless steel aiming device for alignment of Siemens level sensors used for level measurement of bulk solids.

The sensor must be mounted aimed towards the low level draw point in the silo. The sensor can be rotated through 360° and angled at 0 to 27° off vertical. It must be mounted using an access plate with welded studs or a flange in order to isolate the mounting holes from the pressurized environment. When installed properly, the EA 304 aiming device is capable of withstanding pressures up to 0.5 bar (Europe) or 15 psi (North America). It can even be used in corrosive and aggressive environments.

EA 2 aiming device

The Easy Aimer 2 flange is a cast aluminum aiming device for alignment of Siemens level sensors.

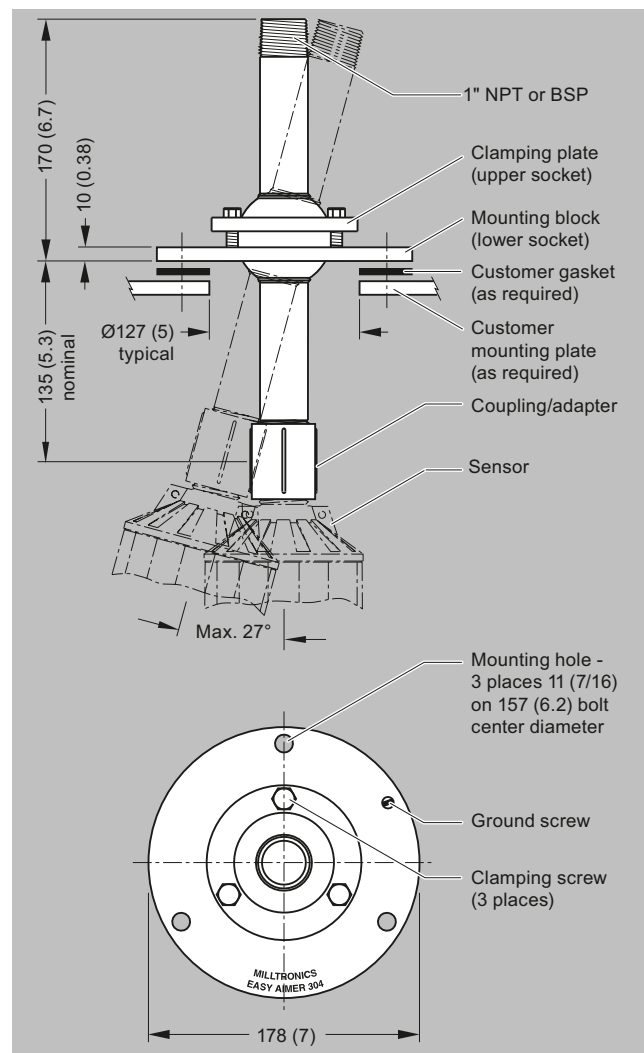
The flange has graduated adjustments and an adjustable insertion length. When used for applications with bulk solids, the sensor is mounted so that it is aimed towards the lower level draw point in the silo. The sensor can be rotated through 360° and angled at 0 to 20° off vertical. It must be mounted using an access plate with welded studs or a flange in order to isolate the mounting holes from the pressurized environment. When installed properly, the EA 2 aiming device is capable of withstanding pressures up to 0.5 bar (Europe) or 15 psi (North America). It can even be used in corrosive and aggressive environments.

Selection and ordering data

	Article No.
Easy aimer Used on solids applications to aim level sensors for optimal performance. Available in a 304 stainless steel model, or a cast aluminum model.	
Easy Aimer 2, aluminum with M20 adapter and 1" and 1½" BSPT aluminum couplings	7ML1830-1AX
Easy Aimer 304, with M20 adapter and 1" and 1½" BSPT 304 stainless steel couplings	7ML1830-1GN
Easy Aimer 2, aluminum, BSPT conduit	7ML1830-1AL
Easy Aimer 2, aluminum, NPT with 1½" galvanized coupling ¹⁾	7ML1830-1AN
Easy Aimer 2, aluminum, NPT with 1" galvanized coupling	7ML1830-1AP
Easy Aimer 2, aluminum, NPT with ¾" x 1" PVC coupling	7ML1830-1AQ
Easy Aimer 304, BSPT conduit	7ML1830-1AS
Easy Aimer 304, NPT with 1½" stainless steel coupling ¹⁾	7ML1830-1AT
Easy Aimer 304, NPT with 1" stainless steel coupling	7ML1830-1AU
Operating Instructions	
All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation	

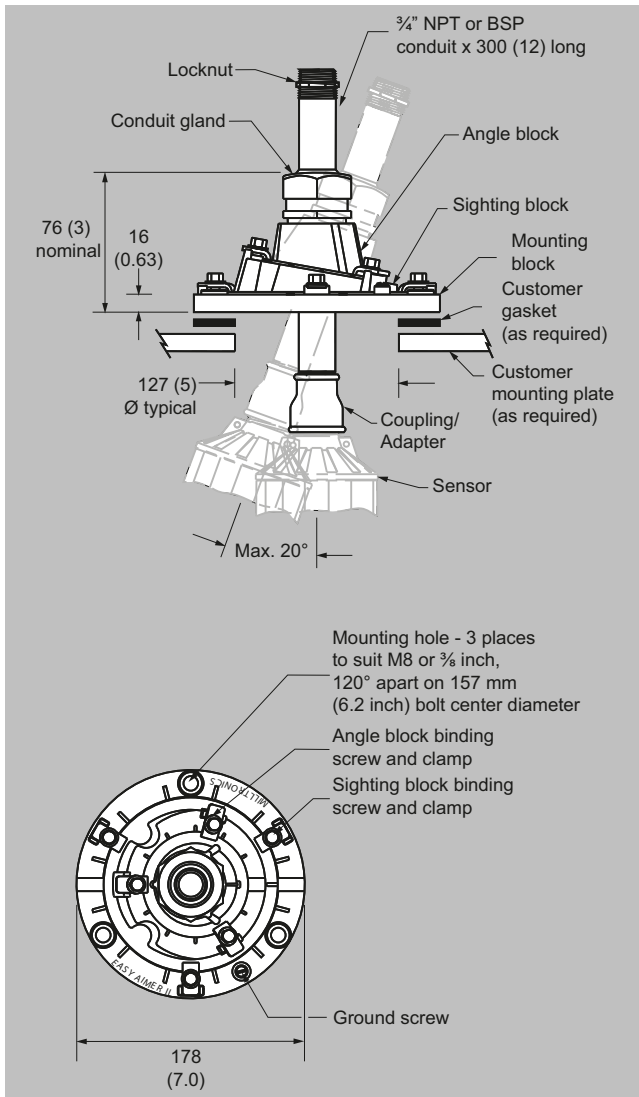
¹⁾ For use with XPS-30 transducers only.

Dimensional drawings



EA 304 aiming device, dimensions in mm (inch)

Dimensional drawings (continued)



EA 2 aiming device, dimensions in mm (inch)

Level Measurement

Continuous level measurement

Ultrasonic / Accessories for level sensors / FMS mounting brackets

Application

Siemens mounting brackets permit simple, fast installation of ultrasonic transducers. These rugged, high quality mounting brackets are constructed of 304 (1.4301) stainless steel and are suitable for use indoors and outdoors. They adjust to fit almost any application, saving you the time and expense of building custom brackets. Each kit includes all mounting parts.

FMS-200 **universal box bracket system**

Mounting of units with 1 inch or 2 inch threaded connection.

Distance from sensor to wall or beam: 20 ... 31 cm (8 ... 12 inch).

The unique box design also acts as a sun shield for transducers with 1 inch threaded connections.

FMS-210 **wall mounting set**

Mounting of transducers with 1 inch threaded connection.

Distance from transducer to wall or beam: 12 ... 48 cm (5 ... 19 inch).

FMS-220 **extended wall mounting set**

Mounting of transducers with 1 inch threaded connection.

Distance from transducer to wall or beam: 32 ... 98 cm (13 ... 39 inch).

FMS-310 **floor mounting set**

Mounting of transducers with 1 inch threaded connection.

Distance from transducer to floor: 20 ... 48 cm (8 ... 19 inch).

Distance from mounting support: 5 ... 57 cm (2 ... 22 inch).

FMS-320 **extended floor mounting set**

Mounting of transducers with 1 inch threaded connection.

Distance from transducer to floor: 20 ... 48 cm (8 ... 19 inch).

Distance from mounting support: 41 ... 108 cm (16 ... 43 inch).

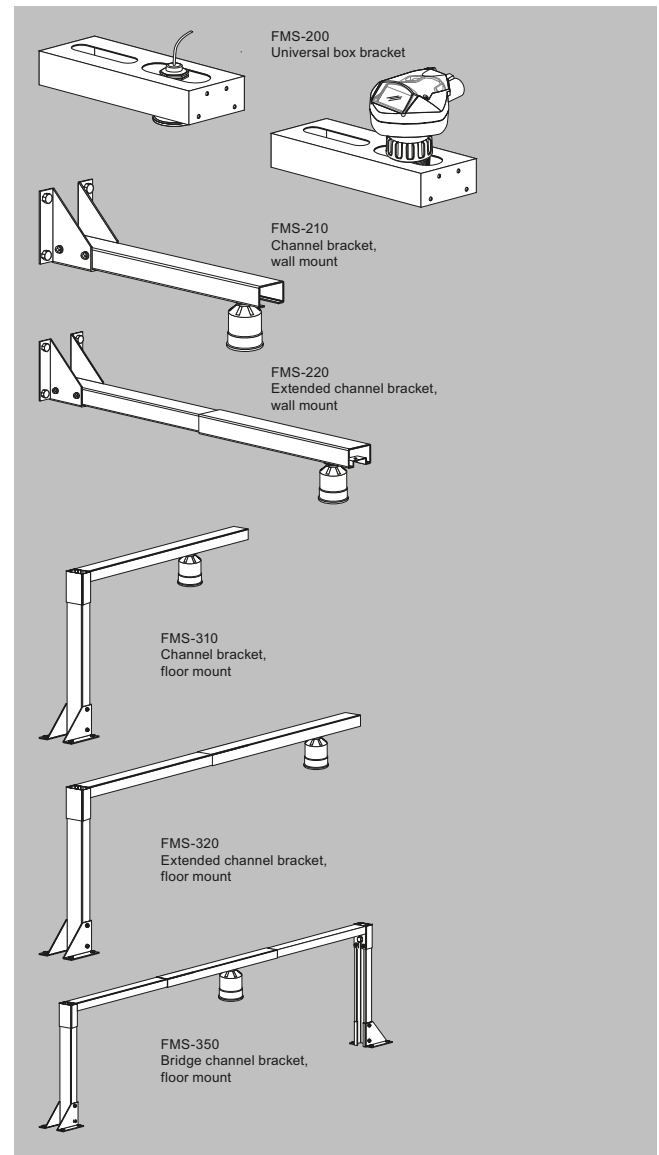
FMS-350 **floor mounting set, bridge**

Mounting of transducers with 1 inch threaded connection.

Distance from transducer to floor: 20 ... 48 cm (8 ... 19 inch), anywhere along the complete width of the bridge [166 cm (65 inch)].

This kit is particularly suitable for measurements on open channels (OCM) by providing a very stable mount for the transducer above a flume or weir.

Integration



FMS mounting brackets

Selection and ordering data

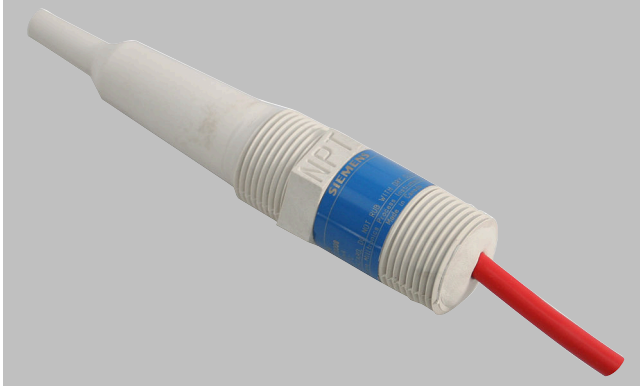
Selection and Ordering data	Article No.
Mounting brackets for XPS-10 sensors	
FMS-200 universal box bracket set	7ML1830-1BK
FMS-210 wall mounting set	7ML1830-1BL
FMS-220 extended wall mounting set	7ML1830-1BM
FMS-310 floor mounting set	7ML1830-1BN
FMS-320 extended floor mounting set	7ML1830-1BP
FMS-350 floor mounting set, bridge	7ML1830-1BQ
Additional Operating Instructions	
FMS-200	7ML1998BK61
FMS-210	7ML1998BL61
FMS-220	7ML1998BM61
FMS-310	7ML1998BN61
FMS-320	7ML1998BP61
FMS-350	7ML1998BQ61
<p>Note: The Operating Instructions should be ordered as a separate line item on the order.</p> <p>All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation</p>	

Level Measurement

Continuous level measurement

Ultrasonic / Accessories for level sensors / TS-3 temperature sensor

Overview



The TS-3 temperature sensor provides an input signal for temperature compensation of specific Siemens ultrasonic level controllers.

Benefits

- Chemically resistant ETFE enclosure
- Fast response time
- Approved for use in potentially explosive atmospheres

Application

Temperature compensation is essential in applications where temperature variations of the sound medium are expected.

By installing the temperature sensor close to the sound path of the associated ultrasonic transducer, a signal representative of the sound medium's ambient temperature is obtained. The temperature sensor should not be mounted in direct sunlight.

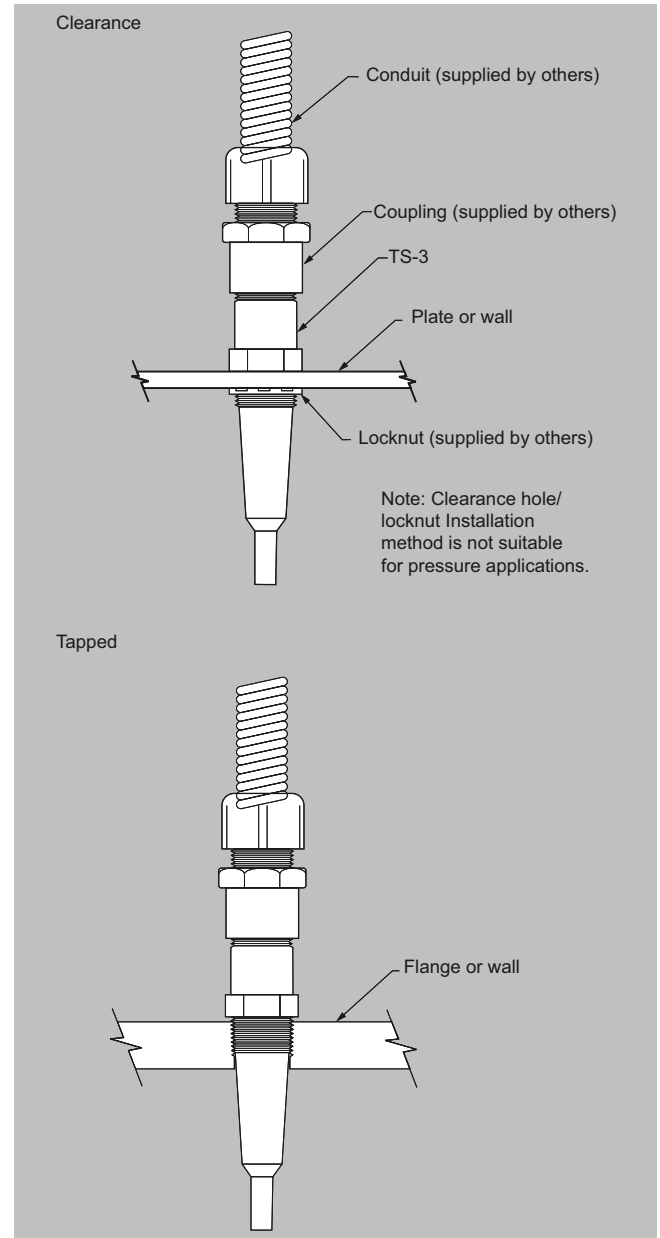
The TS-3 is used in conjunction with ultrasonic transducers that do not have an integral temperature sensor. It is also recommended in cases where the integral temperature sensor of the transducer cannot be used.

The following conditions are typical for use of the TS-3 sensor: where a fast reaction to temperature variations is required, where a flanged ultrasonic transducer is used, or where high temperatures are encountered.

The TS-3 is not compatible with devices using the TS-2 or LTS-1 temperature sensors. Refer to the associated controller manual for more details.

- Key Applications: for use in applications where temperature sensor measurement from transducer does not accurately represent vessel temperature. Used for applications requiring quick temperature response (open channel monitoring).

Design



TS-3 temperature sensor

Selection and ordering data

	Article No.				
TS-3 Temperature sensor Continuous, non-contact, sensor for use with ultrasonic level controllers.	7ML1813-	●	●	B	●
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.					
Cable length					
1 m (3.28 ft)	1				
5 m (16.40 ft)	2				
10 m (32.81 ft)	3				
30 m (98.43 ft)	4				
50 m (164.04 ft)	5				
70 m (229.66 ft)	6				
90 m (295.28 ft)	7				
Process connection					
¾" NPT [(Taper), ASME B1.20.1]			A		
R ¾" [(BSPT), EN 10226]			B		
Approvals					
CSA, FM					3
CE, UKCA, ATEX, UKEX, IECEx					4

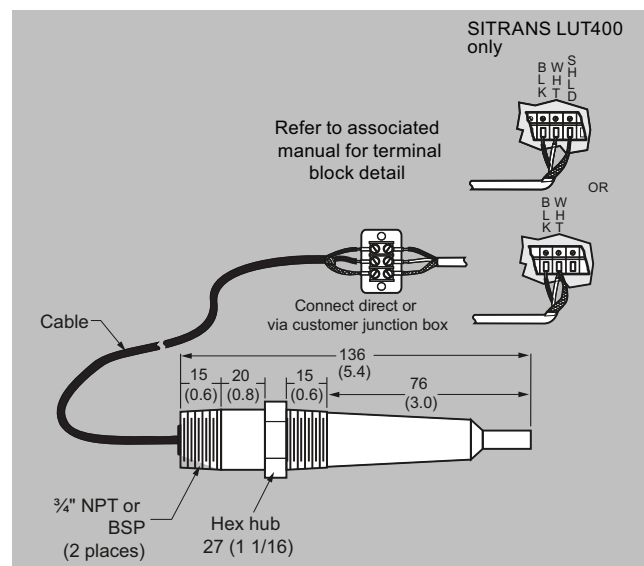
Accessories	Article No.
Operating Instructions	
All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation	
Accessories	
¾" NPT locknut, aluminum	7ML1930-1BE
Tag, stainless steel with hole, 12 x 45 mm (0.47 x 1.77 inch) for fastening on sensors	7ML1930-1BJ

Technical specifications

TS-3 temperature sensor	
Mode of operation	
Measuring principle	Temperature sensor
Input	
Measuring range	-40 ... +100 °C (-40 ... +212 °F)
Output	
Response time	
• Forced circulation (temperature variation: 63 %)	55 s
• Flange, forced circulation	90 s
• Natural convection	150 s
Rated operating conditions	
Installation instructions	Mounted indoors/outdoors, but not exposed to direct sunlight
Pressure	Max. 4 bar (60 psi/400 kPa)
Design	
Material (enclosure)	ETFE ¹⁾
Cable connection	2-core, 0.5 mm ² (20 AWG), shielded, silicone sheath
Process connection	¾" NPT [(Taper), ASME B1.20.1] R ¾" [(BSPT), EN 10226], totally encapsulated
Certificates and approvals	CE, UKCA, ATEX, UKEX, IECEx, CSA, FM

¹⁾ ETFE is a fluoropolymer inert to most chemicals. For exposure to specific environments, check the chemical compatibility charts before installing the TS-3 in your application.

Dimensional drawings



TS-3 temperature sensor, dimensions in mm (inch)

Level Measurement

Continuous level measurement

Radar level transmitters

Overview

Radar measurement technology is non-contacting and low maintenance. Because microwaves require no carrier medium, they are virtually unaffected by the process atmosphere (vapor, pressure, dust, or temperature extremes). Siemens offers a variety of models to meet the specific needs of your application.

SITRANS LR100 is a 2-wire loop powered radar transmitter for continuous level measurement of liquids and slurries to a range of 8 m (26 ft).

SITRANS LR110 is a compact radar transmitter for continuous level measurement of liquids, slurries, and solids to a range of 15 m (49.2 ft).

SITRANS LR120 is a compact radar transmitter for continuous level measurement of liquids and solids to a range of 30 m (98.4 ft).

SITRANS LR140 is a 2-wire loop powered radar transmitter for continuous level measurement of liquids and slurries to a range of 8 m (26 ft).

SITRANS LR150 is a compact radar transmitter for continuous level measurement of liquids, slurries, and solids to a range of 15 m (49.2 ft), with optional HMI.

SITRANS LR200 is a 2-wire, 6 GHz pulse radar level transmitter for continuous monitoring of liquids and slurries in process vessels including high temperature, pressure, agitation, and turbulence, to a range of 20 m (65 ft).

SITRANS LR250 is a 2-wire, 25 GHz pulse radar level transmitter for continuous monitoring of liquids and slurries in storage and process vessels including high temperature and pressure, corrosive or aggressive materials, to a range of 20 m (66 ft). Ideal for small vessels and low dielectric media.

SITRANS LR460 is a 4-wire, 24 GHz FMCW radar level transmitter with extremely high signal to noise ratio and advanced signal processing for continuous monitoring of solids, up to 100 m (328 ft). It is ideal for measurement in extreme dust and high temperature applications.

SITRANS LR560 2-wire, 78 GHz FMCW radar level transmitter for continuous monitoring of solids and liquids, to a range of 100 m (328 ft). It is easy to install, plug and play, and there is virtually no maintenance.

Auto False-Echo Suppression

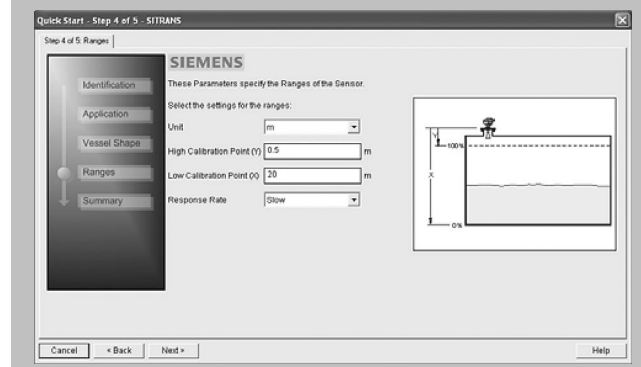
SITRANS LR instruments offer the unique advantage of Process Intelligence signal processing technology. This in-depth knowledge and experience is built into the software's advanced algorithms to provide intelligent processing of echo profiles. The result is repeatable, fast and reliable measurement.

A special feature of SITRANS radar devices is Auto False-Echo Suppression, an echo processing technique that automatically detects and suppresses false echoes from vessel obstructions. You can implement this feature using two parameters on the local interface or SIMATIC PDM communicating over HART or PROFIBUS PA.

Overview (continued)



Local display interface – graphically displays echo profiles and diagnostic information (available with LR200, LR250, and LR560)
Quick to configure – Quick Start Wizard via SIMATIC PDM guides you during setup



Mode of operation

Principle of Operation

Radar measurement technology measures the time of flight from the transmitted signal to the return signal. From this time, distance measurement and level are determined.

Unlike ultrasonic measurement, radar technology does not require a carrier medium and travels at the speed of light (300 000 000 m/s). Most industrial radar devices operate from 6 to 78 GHz.

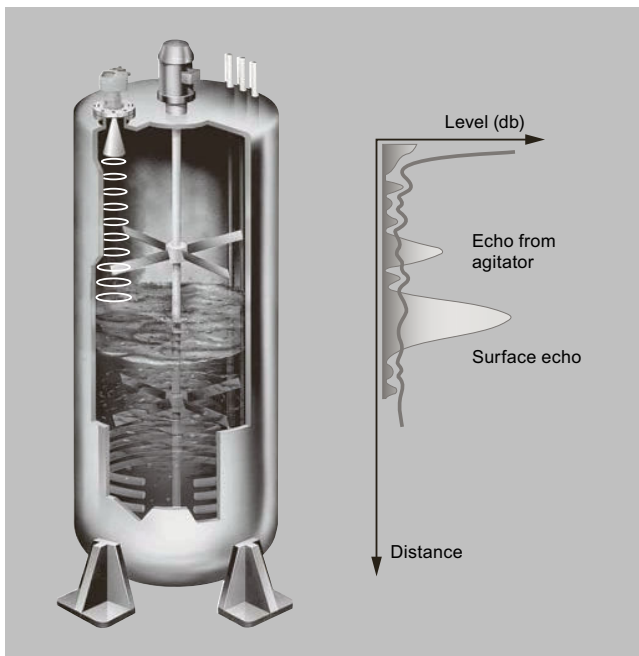
Siemens offers pulse radar transmitters (SITRANS LR200, SITRANS LR250) and FMCW (Frequency Modulated Continuous Wave) radar transmitters (SITRANS LR100, SITRANS LR110, SITRANS LR120, SITRANS LR140, SITRANS LR150, SITRANS LR460, SITRANS LR560).

Pulse radar emits a microwave pulse from the antenna at a fixed repetition rate that reflects off the interface between the two materials with different dielectric constants (the atmosphere and the material being monitored).

The echo is detected by a receiver and the transmit time is used to calculate level.

Reflected echoes are digitally converted to an echo profile. The profile is analyzed to determine the distance from the material surface to the reference point on the instrument.

FMCW (Frequency Modulated Continuous Wave) radar devices send microwaves to the surface of the material. The wave frequency is modulated continuously. At the same time, the receiver is also receiving continuously and the difference in frequency between the transmitter and the receiver is directly proportional to the distance to the material.



Radar operation in a reactor vessel

Level Measurement

Continuous level measurement

Radar level transmitters

Technical specifications

Radar Selection Guide

Criteria	SITRANS LR100	SITRANS LR110	SITRANS LR120	SITRANS LR140	SITRANS LR150	SITRANS LR200	SITRANS LR250	SITRANS LR460	SITRANS LR560
Typical industries	Chemicals, petrochemicals, mining, food and beverage	Chemicals, petrochemicals, mining, food and beverage	Chemicals, petrochemicals, mining, food and beverage	Chemicals, petrochemicals, mining, food and beverage	Chemicals, petrochemicals, mining, food and beverage	Chemicals, petrochemicals, aluminum, wastewater	Chemicals, petrochemicals, oil and gas, mining, marine, food and beverage, pharmaceutical	Cement, power generation, food processing, mineral processing, mining	Cement, chemical, power generation, grain, food processing, mineral processing, mining
Typical applications	Liquid storage vessels, non-intrusively through plastic tanks, chemicals, aggregates	Liquid storage vessels, non-intrusively through plastic tanks, chemicals, aggregates	Liquid storage vessels, non-intrusively through plastic tanks, chemicals, aggregates	Liquid storage vessels, non-intrusively through plastic tanks, chemicals, aggregates	Liquid storage vessels, non-intrusively through plastic tanks, chemicals, aggregates	Liquids, process vessels with agitators, buildup, high temperatures	Liquids, storage and process vessels with agitators, vaporous liquids, high temperatures, low dielectric media, crude oil produced water	Cement, fly ash, grain, coal, flour, plastics	Cement, fly ash, chemical fertilizer, grain, coal, flour, plastics, environmental water level monitoring
Range	0 ... 8 m (0 ... 26 ft)	0 ... 15 m (0 ... 49.2 ft)	0 ... 30 m (0 ... 98.4 ft)	8 m (26.2 ft)	15 m (49.2 ft)	0.4 ... 20 m (1.3 ... 65 ft)	50 mm (2 inch) from end of horn to 20 m (65 ft), horn dependent	100 m (328 ft)	40 m (131 ft) 100 m (328 ft)
Frequency	80 GHz nominal	80 GHz nominal	80 GHz nominal	80 GHz nominal	80 GHz nominal	6.3 GHz	K-band (25.0 GHz)	24 ... 25 GHz FMCW	78 ... 79 GHz
Performance accuracy	± 5 mm	± 2 mm	± 2 mm	5 mm	2 mm	0.1 % of range or 10 mm (0.4 inch)	≤ 3 mm (0.118 inch)	0.25 %	5 mm (0.2 inch)
Temperature	Ambient: -40 ... +60 °C (-40 ... +140 °F) Process: -40 ... +60 °C (-40 ... +140 °F)	Ambient: -40 ... +80 °C (-40 ... +176 °F) Process: -40 ... +80 °C (-40 ... +176 °F)	Ambient: -40 ... +80 °C (-40 ... +176 °F) Process: -40 ... +80 °C (-40 ... +176 °F)	Ambient: -40 ... +60 °C (-40 ... +140 °F) Process: -40 ... +60 °C (-40 ... +140 °F)	Ambient: -40 ... +70 °C (-40 ... +158 °F) Process: -40 ... +80 °C (-40 ... +176 °F)	Ambient: -40 ... +80 °C (-40 ... +176 °F) Process: -40 ... +200 °C (-40 ... +392 °F), dependent on antenna type	Ambient: -40 ... +80 °C (-40 ... +176 °F) Process: -40 ... +200 °C (-40 ... +392 °F), dependent on antenna type	Ambient: 65 °C (149 °F) Process: 200 °C (392 °F)	Ambient: -40 ... +80 °C (-40 ... +176 °F) Process: -40 ... +100 °C (-40 ... +212 °F) Optional: 200 °C (392 °F)
Output/communications/remote configuration and diagnostics	<ul style="list-style-type: none"> 4 ... 20 mA SITRANS mobile IQ 	<ul style="list-style-type: none"> 4 ... 20 mA/HART Modbus RTU SITRANS mobile IQ SIMATIC PDM AMS SITRANS DTM/FDT for PACTware, Fieldcare 	<ul style="list-style-type: none"> 4 ... 20 mA/HART Modbus RTU SITRANS mobile IQ SIMATIC PDM AMS SITRANS DTM/FDT for PACTware, Fieldcare 	<ul style="list-style-type: none"> 4 ... 20 mA SITRANS mobile IQ 	<ul style="list-style-type: none"> 4 ... 20 mA/HART SITRANS mobile IQ SIMATIC PDM AMS SITRANS DTM/FDT for PACTware, Fieldcare 	<ul style="list-style-type: none"> 4 ... 20 mA/HART PROFIBUS PA SIMATIC PDM AMS SITRANS DTM/FDT for PACTware, Fieldcare, etc. 	<ul style="list-style-type: none"> 4 ... 20 mA/HART PROFIBUS PA FOUNDATION Fieldbus SIMATIC PDM AMS SITRANS DTM/FDT for PACTware, Fieldcare, etc. 	<ul style="list-style-type: none"> 4 ... 20 mA/HART PROFIBUS PA SIMATIC PDM AMS SITRANS DTM/FDT for PACTware, Fieldcare, etc. 	<ul style="list-style-type: none"> 4 ... 20 mA/HART PROFIBUS PA SIMATIC PDM AMS SITRANS DTM/FDT for PACTware, Fieldcare, etc.
Power	<ul style="list-style-type: none"> 12 ... 35 V DC Loop powered 	HART: <ul style="list-style-type: none"> 12 ... 35 V DC Modbus: <ul style="list-style-type: none"> 8 ... 30 V DC Loop powered 	HART: <ul style="list-style-type: none"> 12 ... 35 V DC Modbus: <ul style="list-style-type: none"> 12 ... 35 V DC Loop powered 	<ul style="list-style-type: none"> 12 ... 35 V DC Loop powered 	HART: <ul style="list-style-type: none"> 12 ... 35 V DC Modbus: <ul style="list-style-type: none"> Loop powered 	<ul style="list-style-type: none"> 24 V DC nominal Loop powered 	<ul style="list-style-type: none"> 24 V DC nominal Loop powered 	<ul style="list-style-type: none"> 100 ... 230 V AC, ± 15 %, 50/60 Hz, 6 W 24 V DC, +25/-20 %, 6 W 	<ul style="list-style-type: none"> 24 V DC nominal Loop powered
Approvals	General Purpose CE, CSA, FM, RCM	Hazardous ATEX, IECEx, CE, CSA, FM, RCM	Hazardous ATEX, IECEx, CE, CSA, FM, RCM	General purpose CE, CSA, FM, RCM	Hazardous ATEX, IECEx, CE, CSA, FM, RCM	CE, RCM, Lloyds Register of Shipping, ABS, FCC, Industry Canada, RED ATEX, CSA, FM, INMETRO, EAC, IECEx, ANZEx, TIIS, NEPSI	CE, RCM, Lloyds Register of Shipping, ABS, BV, FCC, Industry Canada, RED ATEX, CSA, FM, INMETRO, EAC, IECEx, TIIS, NEPSI Functional safety SIL-2, EHEDG, 3-A, USP Class VI	CE, RCM, FCC, Industry Canada, RED ATEX, CSA, FM, INMETRO, IECEx, EAC	CE, RCM, FCC, Industry Canada, RED ATEX, CSA, FM, INMETRO, IECEx, NEPSI, EAC

Overview



SITRANS LR100 is a 2 wire loop powered radar transmitter for continuous level measurement of liquids and slurries to a range of 8 m (26 ft).

Benefits

- Bluetooth connectivity for easy setup with SITRANS mobile IQ
- Chemically resistant PVDF enclosure
- W band FMCW radar yields narrow beam with small antenna for superior performance in short range applications
- Approved for open air applications outside of a tank
- Compact design fits in limited space installations

Application

SITRANS LR100 is a W band FMCW radar level transmitter, packaged in a hermetically sealed PVDF enclosure for years of trouble-free reliable measurement service.

4 to 20 mA loop powered, it provides accurate level measurement to ranges of 8 m (26 ft). Measurement is possible non-intrusively through plastic vessel tops for easy installation. Programming is convenient using the Bluetooth connection and SITRANS mobile IQ application on your smart device.

Level Measurement

Continuous level measurement

Radar level transmitters / SITRANS LR100

Selection and ordering data

SITRANS LR100 Radar level transmitter Continuous, non-contact, 8 m (26 ft) range, for liquids and slurries, 8 m (26 ft) integrated cable connection.		Article No.
		7ML530 7 - 1 A ● 0 6 - 0 A A 0
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Process connection		
1-½" NPT [(Taper), ASME B1.20.1]/electrical connection 1" NPT		A
R 1-½" [(BSPT), EN 10226]/electrical connection 1" BSPT		B
G 1-½" [(BSPP), EN ISO 228-1]/electrical connection 1" BSPT		C

Selection and Ordering data	Order code
Further designs	
Please add "-Z" to Article No. and specify Order code(s).	
Tag (device parameter, max. 32 characters) plate stainless steel 304/1.4301	Y15

Accessories	Article No.
Operating Instructions	
All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation	
Accessories	
Easy Aimer 2, aluminum, NPT with ¾" x 1" PVC coupling	7ML1830-1AQ
Easy Aimer 2, aluminum with M20 adapter and 1" and 1½" BSPT aluminum couplings	7ML1830-1AX
Easy Aimer 304, NPT with 1" stainless steel coupling	7ML1830-1AU
Easy Aimer 304, with M20 adapter and 1" and 1½" BSPT 304 stainless steel couplings	7ML1830-1GN
Bracket, 316L stainless steel, 1 inch mount, 80 mm (3.1 inch) offset	A5E50507509
Bracket, 316L stainless steel, 1 inch mount, 200 mm (7.9 inch) offset	A5E50507511
Bracket, 316 L stainless steel, 1.5 inch mount, 80 mm (3.1 inch) offset	A5E50507514
Bracket, 316 L stainless steel, 1.5 inch mount, 200 mm (7.9 inch) offset	A5E50507516
FMS-200 universal box bracket, mounting kit	7ML1830-1BK
FMS-210 channel bracket, wall mount	7ML1830-1BL
FMS-220 extended channel bracket, wall mount	7ML1830-1BM
FMS-310 channel bracket, floor mount	7ML1830-1BN
FMS-320 extended channel bracket, floor mount	7ML1830-1BP
FMS-350 bridge channel bracket, floor mount (see Mounting Brackets catalog page for more information)	7ML1830-1BQ
1" NPT locknut, plastic	7ML1830-1DS
1" BSP locknut, plastic	7ML1830-1DR
1-½" BSP locknut, plastic	7ML1830-1DP
Plastic adapter 1" BSP - 20 mm	7ML1830-1EA
Plastic adapter 1" NPT	7ML1930-1FX
Plastic adapter 1" NPT/M20	7ML1830-1EF
SIMATIC RTU3010C compact, remote data manager with alarming	6NH3112-0BA00-0-XX0
SIMATIC RTU3030C compact, remote data manager with alarming	6NH3112-3BA00-0-XX0
SITRANS RD100, loop powered display - see Chapter 7	7ML5741-.....-
SITRANS RD150, remote digital display for 4 to 20 mA and HART devices - see Chapter 7	7ML5742-.....-
SITRANS RD200, universal input display with Modbus conversion - see Chapter 7	7ML5740-.....-
SITRANS RD300, dual line display with totalizer and linearization curve and Modbus conversion - see Chapter 7	7ML5744-.....-

Selection and ordering data (continued)

Accessories	Article No.
For applicable back up point level switch - see point level measurement section	

Technical specifications

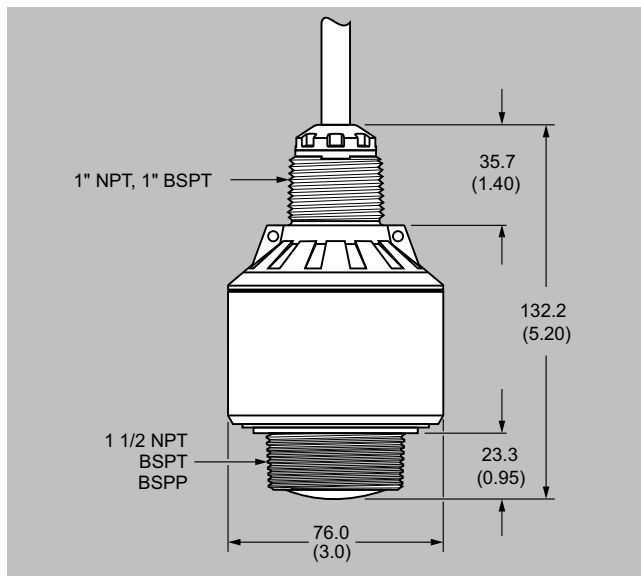
SITRANS LR100	
Mode of operation	
Measuring principle	W band FMCW radar
Measuring range	0 ... 8 m (0 ... 26 ft)
Frequency	80 GHz nominal
Beam angle	8°
Power Supply	
Voltage	12 ... 35 V DC
Current	4 ... 20 mA
Accuracy	± 5 mm
Rated operating conditions	
Vessel pressure	-1 ... +3 bar (14.50 ... 43.51 psi g)
Ambient temperature	-40 ... +60 °C (-40 ... +140 °F)
Process temperature	-40 ... +60 °C (-40 ... +140 °F)
Storage temperature	-40 ... +80 °C (-40 ... +176 °F)
Design	
Weight	0.5 kg (1.1 lb), plus 0.1 kg/m (0.2 lb/ft) cable length
Material (enclosure)	PVDF
Process connection	1-½" NPT, 1-½" BSPT, or 1-½" BSPP
Degree of protection	IP66/IP68
Cable connection	<ul style="list-style-type: none"> 8 m (26 ft) long, 2 conductor, twisted with shield 18 AWG, PVC jacket 1" NPT or 1" BSPT threaded connection
Certificates and approvals	
General	Ordinary locations, CE, cFM _{US} , cCSA _{US} , RCM, EAC
Radio	CE, FCC, IC, Anatel, ICASA, NCC, KC, CITC, RCM, WPC, Telec, NBTC, MCMC
Canadian Registration Number (CRN)	
• British Columbia	OF22218.51
• Alberta	OF20596.2
• Saskatchewan	OF2002.3
• Manitoba	OF7032.4
• Ontario	OF22218.5
• Quebec	OF05183.6
• New Brunswick	OF1490.07
• Nova Scotia	OF1490.08
• Prince Edward Island	OF1490.09
• Newfoundland and Labrador	OF1490.0
• Yukon	OF1490.0Y
• Northwest Territories	OF1490.0T
• Nunavut	OF1490.0N
Programming	
SITRANS mobile IQ App	<p>SITRANS mobile IQ is a Bluetooth app that provides an intuitive interface to quickly configure, set up and monitor SITRANS LR100 series.</p> <p>For more information: http://www.siemens.com/mobileIQ</p>

Level Measurement

Continuous level measurement

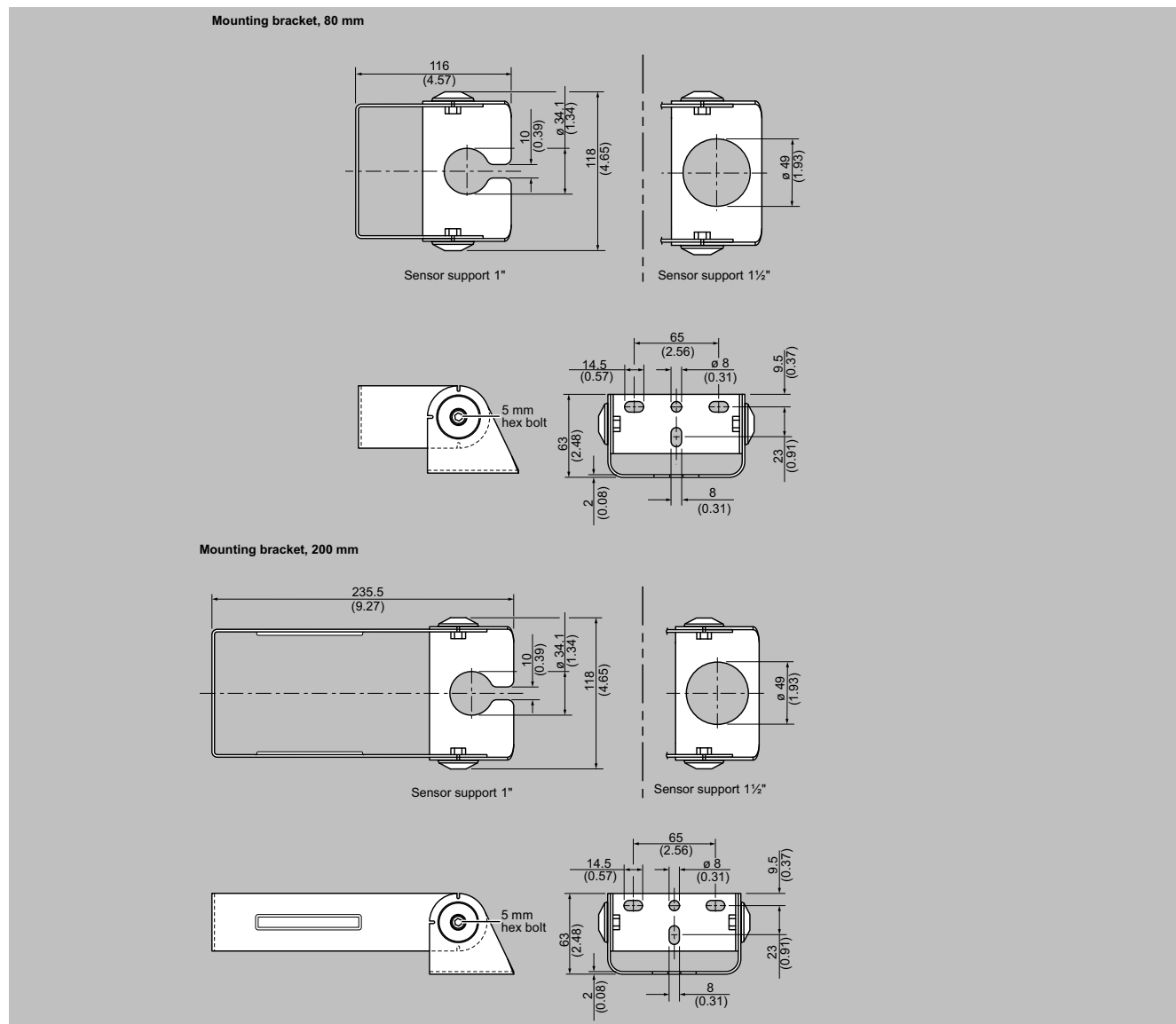
Radar level transmitters / SITRANS LR100

Dimensional drawings



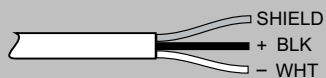
SITRANS LR100, dimensions in mm (inch)

Dimensional drawings (continued)



SITRANS LR100 mounting brackets, dimensions in mm (inch)

Circuit diagrams



12 ... 35 V DC
4 ... 20 mA
Loop powered

SITRANS LR100 connections

Level Measurement

Continuous level measurement

Radar level transmitters / SITRANS LR110

Overview



SITRANS LR110 is a compact radar transmitter for continuous level measurement of liquids, slurries, or solids to a range of 15 m (49.2 ft).

Benefits

- Bluetooth connectivity for easy setup with SITRANS mobile IQ.
- Chemically resistant PVDF enclosure.
- HART 7.0 or Modbus RTU communication for intelligent integration into your application.
- W band FMCW radar yields narrow beam with small antenna for superior performance in short range applications.
- Approved for open air applications outside of a tank.
- 2 mm accuracy and zero near range distance yields optimum inventory management capability.
- Compact design fits in limited space installations.
- Hazardous area variants available for safe use in explosive gas or dust environments.

Application

SITRANS LR110 is a W band FMCW radar level transmitter, packaged in a hermetically sealed PVDF enclosure for years of trouble-free reliable measurement service.

4 to 20 mA loop powered with HART [optional 4-wire Modbus RTU], providing accurate level measurement to ranges of 15 m (49.2 ft). Measurement is possible non-intrusively through plastic vessel tops for easy installation. Programming is convenient using the Bluetooth connection and SITRANS mobile IQ application on your smart device.

Selection and ordering data

	Article No.										
SITRANS LR110 Radar level transmitter Continuous, non-contact, 15 m (49.2 ft) range, for liquids, slurries, or solids, integrated cable connection	7	M	L	5	3	1	0	6	0	A	0
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.											
Communications											
HART (4 ... 20 mA)									0		
Modbus RTU ⁽⁴⁾⁽⁶⁾									3		
Bluetooth function											
Without									0		
With									1		
Cable length											
5 m										A	
10 m										B	
30 m										C	
50 m										D	
100 m										E	
Process connection											
1-½" NPT [(Taper), ASME B1.20.1]/electrical connection 1" NPT										A	
R 1-½" [(BSPT), EN 10226]/electrical connection 1" BSPT										B	
G 1-½" [(BSPP), EN ISO 228-1]/electrical connection 1" BSPT										C	
Type of protection											
Non-Ex (ordinary locations) CE, cFM _{US} , cCSA _{US} , RCM ⁽²⁾											A
Ex i (ia) (Gas Ex-Zone 0/Class 1, Div. 1) Dust											B
Ex-Zone 20, 21, Class II & III Div. 1 ⁽¹⁾											B
Ex i (ia) (Gas Ex-Zone 0/Class 1, Div. 1) Dust											G
Ex-Zone 20, 21, Class II & III Div. 1 ⁽¹⁾⁽³⁾											G

Selection and Ordering data	Order code
Further designs	
Please add "-Z" to Article No. and specify Order code(s).	
Tag (device parameter, max. 32 characters) plate stainless steel 304/1.4301	Y15
Inspection certificate 3.1 (EN 10204) - device with test data	C25
cFM _{US} , cCSA _{US} , ATEX, UKEX, IECEx	E49
INMETRO, IA MASC	E25
NEPSI, CCOE	E27
ATEX, IECEx	E47
CSA-Japan-Ex	E29
EACEx ⁽⁵⁾	E24
WHG and VLAREM II	E61

Accessories	Article No.
Operating Instructions	
All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation	
Accessories	
Easy Aimer 2, aluminum, NPT with ¾" x 1" PVC coupling	7ML1830-1AQ
Easy Aimer 2, aluminum with M20 adapter and 1" and 1½" BSPT aluminum couplings	7ML1830-1AX
Easy Aimer 304, NPT with 1" stainless steel coupling	7ML1830-1AU
Easy Aimer 304, with M20 adapter and 1" and 1½" BSPT 304 stainless steel couplings	7ML1830-1GN
Bracket, 316L Stainless steel, 1 inch mount, 80 mm (3.1 inch) offset	A5E50507509

Level Measurement

Continuous level measurement

Radar level transmitters / SITRANS LR110

Selection and ordering data (continued)

Accessories	Article No.
Bracket, 316L Stainless steel, 1 inch mount, 200 mm (7.9 inch) offset	A5E50507511
Bracket, 316L Stainless steel, 1.5 inch mount, 80 mm (3.1 inch) offset	A5E50507514
Bracket, 316L Stainless steel, 1.5 inch mount, 200 mm (7.9 inch) offset	A5E50507516
FMS-200 universal box bracket, mounting kit	7ML1830-1BK
FMS-210 channel bracket, wall mount	7ML1830-1BL
FMS-220 extended channel bracket, wall mount	7ML1830-1BM
FMS-310 channel bracket, floor mount	7ML1830-1BN
FMS-320 extended channel bracket, floor mount	7ML1830-1BP
FMS-350 bridge channel bracket, floor mount (see Mounting Brackets catalog page for more information)	7ML1830-1BQ
1" NPT locknut, plastic	7ML1830-1DS
1" BSP locknut, plastic	7ML1830-1DR
1-½ BSP locknut, plastic	7ML1830-1DP
Plastic adapter 1" BSP - 20 mm	7ML1830-1EA
Plastic adapter 1" NPT	7ML1930-1FX
Plastic adapter 1" NPT/M20	7ML1830-1EF
SIMATIC RTU3010C compact, remote data manager with alarming	6NH3112-0BA00-0-XX0
SIMATIC RTU3030C compact, remote data manager with alarming	6NH3112-3BA00-0-XX0
Intrinsically Safe barrier	7NG4124-1AA00
SITRANS RD100, loop powered display - see Chapter 7	7ML5741-.....
SITRANS RD150, remote digital display for 4 to 20 mA and HART devices - see Chapter 7	7ML5742-.....
SITRANS RD200, universal input display with Modbus conversion - see Chapter 7	7ML5740-.....
SITRANS RD300, dual line display with totalizer and linearization curve and Modbus conversion - see Chapter 7	7ML5744-.....
SITRANS LT500, a versatile, single and multi-vessel level monitor/controller for virtually any application in a wide range of industries.	7ML60-.....
For applicable back up point level switch - see point level measurement section	

¹⁾ Must be ordered in combination with order codes E49, E25, E27, E47, E29, or E24.

²⁾ Not available in combination with order codes E49, E25, E27, E47, E29, or E24.

³⁾ When ordered in combination with NPT thread types, this option is available with any order code. When ordered in combination with BSPP or BSPT thread types, this option is only available with order codes E49, E25, E27, E47, E29.

⁴⁾ Available only with Type of protection options A and G.

⁵⁾ Available only with Type of protection option B.

⁶⁾ Available only with Bluetooth option 1.

Technical specifications

SITRANS LR110	
Mode of operation	
Measuring principle	W band FMCW radar
Measuring range	0 ... 15 m (0 ... 49.2 ft)
Frequency	80 GHz nominal
Beam angle	8°
Power Supply	
HART	
• Voltage	12 ... 35 V DC
• Current	4 ... 20 mA
Modbus	
• Voltage	8 ... 30 V DC
• Current	38 mA at 8 V DC/17 mA at 30 V DC
Communications	
4 ... 20 mA	HART 7.0
Modbus (4-wire option)	RTU
Accuracy	
	± 2 mm (range 0.25 ... 015 m), ± 10 mm (range 0 ... 0.25 m)
Rated operating conditions	
Vessel pressure	-1 ... +3 bar (14.50 ... 43.51 psi g)
Ambient temperature	-40 ... +80 °C (-40 ... +176 °F)
Process temperature	-40 ... +80 °C (-40 ... +176 °F)
Storage temperature	-40 ... +80 °C (-40 ... +176 °F)
Design	
Weight	0.5 kg (1.1 lb), plus 0.1 kg/m (0.2 lb/ft) cable length
Material (enclosure)	PVDF
Process connection	1-½" NPT, 1-½" BSPT or 1-½" BSPP
Degree of protection	IP66/IP68
Cable connection	1" NPT or 1" BSPT threaded connection
• HART	Length options: 5 ... 100 m (16.4 ... 328.1 ft), 2 conductor, twisted with shield 18 AWG, PVC jacket
• Modbus version	Length options: 5 ... 100 m (16.4 ... 328.1 ft), 4 conductor, twisted pairs, 22 AWG, polyurethane jacket
Certificates and approvals	
Radio	CE, cFMUS, cCSAUS, ATEX, IECEx, EACEx, CSA- Japan-Ex, RCM, INMETRO, NEPSI, CCOE, PESO, FDA(EG)1935/2004
Marine	CE, UKCA, FCC, IC, ANATEL, ICASA, NCC, KC, CITC, RCM, WPC, Telec, NBTC, MCMC, ACB
Water monitoring, flow	CE, FCC, IC, Anatel, ICASA, NCC, KC, CITC, RCM, WPC, Telec, NBTC, MCMC
Canadian Registration Number (CRN)	MCERTS Class 1
• British Columbia	0F22218.51
• Alberta	0F20596.2
• Saskatchewan	0F2002.3
• Manitoba	0F7032.4
• Ontario	0F22218.5
• Quebec	0F05183.6
• New Brunswick	0F1490.07
• Nova Scotia	0F1490.08
• Prince Edward Island	0F1490.09
• Newfoundland and Labrador	0F1490.0
• Yukon	0F1490.0Y
• Northwest Territories	0F1490.0T
• Nunavut	0F1490.0N

Technical specifications (continued)

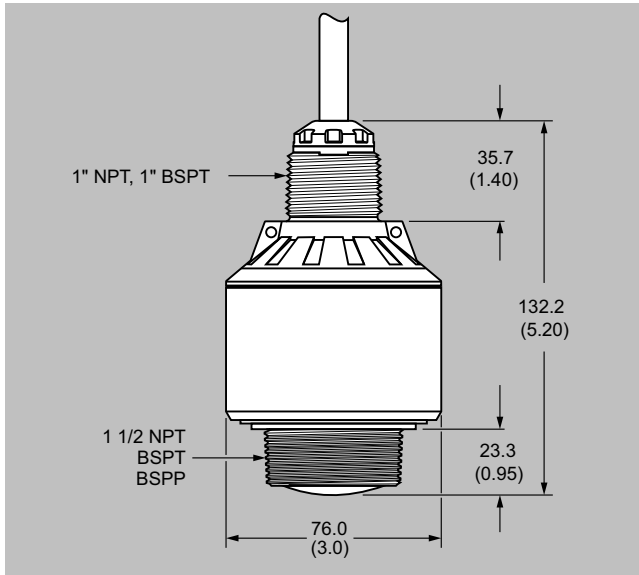
SITRANS LR110	
Programming	
SITRANS mobile IQ App	SITRANS mobile IQ is a Bluetooth app that provides an intuitive interface to quickly configure, set up and monitor SITRANS LR100 series. For more information: http://www.siemens.com/mobileIQ
SIMATIC PDM	SIMATIC PDM allows for remote PC configuration and diagnostics (for installation on a network).
SITRANS DTM	

Level Measurement

Continuous level measurement

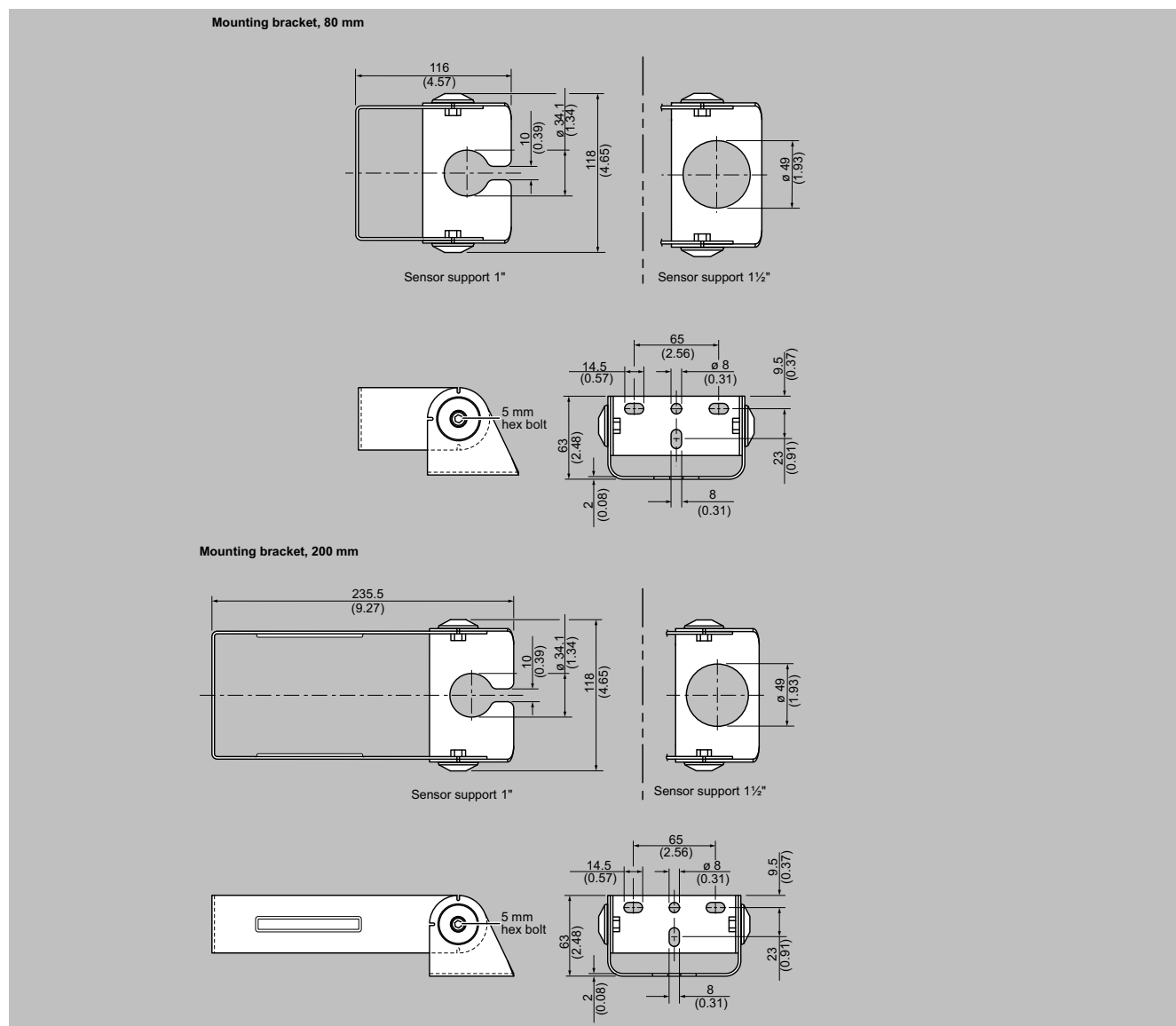
Radar level transmitters / SITRANS LR110

Dimensional drawings



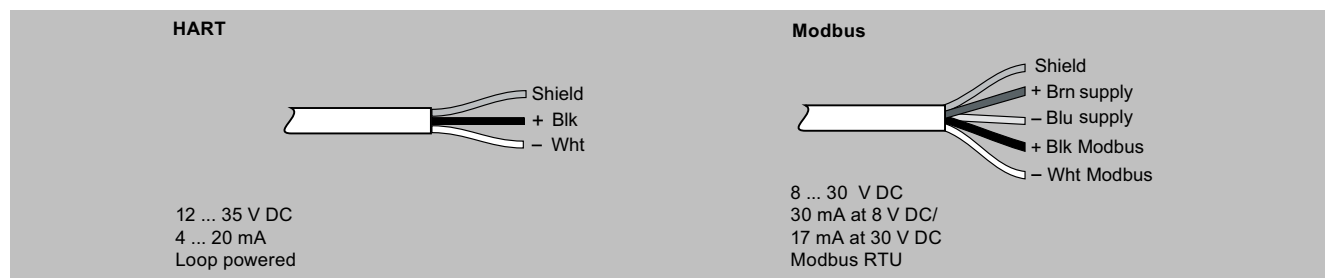
SITRANS LR110, dimensions in mm (inch)

Dimensional drawings (continued)



SITRANS LR110 mounting brackets, dimensions in mm (inch)

Circuit diagrams



SITRANS LR110 connections

Level Measurement

Continuous level measurement

Radar level transmitters / SITRANS LR120

Overview



SITRANS LR120 is a compact radar transmitter for continuous level measurement of liquids and solids to a range of 30 m (98.4 ft).

Benefits

- Bluetooth connectivity for easy setup with SITRANS mobile IQ.
- Chemically resistant PVDF enclosure.
- HART 7.0 or Modbus RTU communication for intelligent integration into your application.
- W band FMCW radar yields narrow beam with small antenna for superior performance in applications with obstructions.
- Approved for open air applications outside of a tank.
- 2 mm accuracy and zero near range distance yields optimum inventory management capability.
- Submergence shield accessory prevents build up on sensor during flooding conditions.
- Hazardous area variants available for safe use in explosive gas or dust environments.

Application

SITRANS LR120 is a W band FMCW radar level transmitter, packaged in a hermetically sealed PVDF enclosure for years of trouble-free reliable measurement service.

4 to 20 mA loop powered with HART [optional 4-wire Modbus RTU], providing accurate level measurement to ranges of 30 m (98.4 ft). Its long range, narrow beam make LR120 suitable for wet wells with obstructions or solids level measurement, for example aggregates or plastic pellets. Programming is convenient using the Bluetooth connection and SITRANS mobile IQ application on your smart device.

Selection and ordering data

	Article No.																		
SITRANS LR120 Radar level transmitter Continuous, non-contact, 30 m (98.4 ft) range, for liquids, slurries, and solids, integrated cable connection	7	M	L	5	3	1	0	-	0	●	●	A	0	6	-	0	●	●	0
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.																			
Communications																			
HART (4 ... 20 mA)																			0
Modbus RTU ⁽⁴⁾⁽⁶⁾																			3
Bluetooth function																			
Without																			0
With																			1
Cable length																			
5 m																			
10 m													A						
30 m													B						
50 m													C						
100 m													D						
													E						
Type of protection																			
Non Ex (ordinary locations) <small>cFMUS, cCSAUS, CE, RCM²⁾</small>																			A
Ex i (ia) (Gas Ex-Zone 0/Class I, Div. 1) Dust Ex-Zone 20, 21, Class II & III Div. 1 ¹⁾																			B
Ex ib mb, Ex ta, ta/tb, Zone 1, 1/2, Zone 20, 21, 22, (Class I, Div. 2), Class II & III, Div. 1 ¹⁾⁽³⁾																			G
Electrical connection of the cable entry																			
1" BSPT																			H
1" NPT																			P

Selection and ordering data	Order Code
Further designs	
Please add "-Z" to Article No. and specify Order code(s).	
Tag (device parameter, max. 32 characters) plate stainless steel 304/1.4301	Y15
Inspection certificate 3.1 (EN 10204) - device with test data	C25
CFMUS, cCSAUS, ATEX, IECEx	E49
INMETRO, IA MASC	E25
NEPSI, CCOE	E27
ATEX, IECEx	E47
CSA-Japan-Ex	E29
EACEx ⁵⁾	E24
WHG and VLAREM II	E61

Accessories	Article No.
Operating Instructions	
All literature is available to download for free, in a range of languages, http://www.siemens.com/processinstrumentation/documentation	
Accessories	
Submergence shield kit	A5E49069764
Easy Aimer 2, aluminum, NPT with ¾" x 1" PVC coupling	7ML1830-1AQ
Easy Aimer 2, aluminum with M20 adapter and 1" and 1½" BSPT aluminum couplings	7ML1830-1AX
Easy Aimer 304, NPT with 1" stainless steel coupling	7ML1830-1AU
Easy Aimer 304, with M20 adapter and 1" and 1½" BSPT 304 stainless steel couplings	7ML1830-1GN
Bracket, 316L Stainless steel, 1 inch mount, 80 mm (3.1 inch) offset	A5E50507509
Bracket, 316L Stainless steel, 1 inch mount, 200 mm (7.9 inch) offset	A5E50507511
Bracket, 316L Stainless steel, 1.5 inch mount, 80 mm (3.1 inch) offset	A5E50507514

Level Measurement

Continuous level measurement

Radar level transmitters / SITRANS LR120

Selection and ordering data (continued)

Accessories	Article No.
Bracket, 316L Stainless steel, 1.5 inch mount, 200 mm (7.9 inch) offset	A5E50507516
FMS-200 universal box bracket, mounting kit	7ML1830-1BK
FMS-210 channel bracket, wall mount	7ML1830-1BL
FMS-220 extended channel bracket, wall mount	7ML1830-1BM
FMS-310 channel bracket, floor mount	7ML1830-1BN
FMS-320 extended channel bracket, floor mount	7ML1830-1BP
FMS-350 bridge channel bracket, floor mount (see Mounting Brackets catalog page for more information)	7ML1830-1BQ
1" NPT locknut, plastic	7ML1830-1DS
1" BSP locknut, plastic	7ML1830-1DR
Plastic adapter 1" BSP - 20 mm	7ML1830-1EA
Plastic adapter 1" NPT	7ML1930-1FX
Plastic adapter 1" NPT/M20	7ML1830-1EF
SIMATIC RTU3010C compact, remote data manager with alarming	6NH3112-0BA00-0-XX0
SIMATIC RTU3030C compact, remote data manager with alarming	6NH3112-3BA00-0-XX0
Intrinsically Safe barrier	7NG4124-1AA00
SITRANS RD100, loop powered display - see Chapter 7	7ML5741-.....-
SITRANS RD150, remote digital display for 4 to 20 mA and HART devices - see Chapter 7	7ML5742-.....-
SITRANS RD200, universal input display with Modbus conversion - see Chapter 7	7ML5740-.....-
SITRANS RD300, dual line display with totalizer and linearization curve and Modbus conversion - see Chapter 7	7ML5744-.....-
SITRANS LT500, a versatile, single and multi-vessel level monitor/controller for virtually any application in a wide range of industries.	7ML60-.....-
For applicable back up point level switch - see point level measurement section	

¹⁾ Must be ordered in combination with order codes E49, E25, E27, E47, E29, or E24.

²⁾ Not available in combination with order codes E49, E25, E27, E47, E29, or E24

³⁾ When ordered in combination with NPT thread types, this option is available with any order code. When ordered in combination with BSPP or BSPT thread types, this option is only available with order codes E49, E25, E27 or E47, E29

⁴⁾ Available only with Type of protection options A and G.

⁵⁾ Available only with Type of protection option B.

⁶⁾ Available only with Bluetooth option 1.

Technical specifications

SITRANS LR120	
Mode of operation	
Measuring principle	W band FMCW radar
Measuring range	0 ... 30 m (0 ... 98.4 ft)
Frequency	80 GHz nominal
Beam angle	4°
Power Supply	
HART	
• Voltage	12 ... 35 V DC
• Current	4 ... 20 mA
Modbus	
• Voltage	8 ... 30 V DC
• Current	38 mA at 8 V DC/17 mA at 30 V DC
Communications	
4 ... 20 mA	HART 7.0
Modbus (4-wire option)	RTU
Accuracy	
	± 2 mm (range 0.25 ... 30 m), ± 10 mm (range 0 ... 0.25 m)
Rated operating conditions	
Vessel pressure	-1 ... +3 bar (14.50 ... 43.51 psi g)
Ambient temperature	-40 ... +80 °C (-40 ... +176 °F)
Process temperature	-40 ... +80 °C (-40 ... +176 °F)
Storage temperature	-40 ... +80 °C (-40 ... +176 °F)
Design	
Weight	0.7 kg (1.5 lb), plus 0.1 kg/m (0.2 lb/ft) cable length
Material	
• Enclosure	PVDF
• Submergence shield	<ul style="list-style-type: none"> • Polypropylene • Silicone O-ring
Degree of protection	IP66/IP68
Cable connection	
• HART	1" NPT or 1" BSPT threaded connection Length options: 5 ... 100 m (16.4 ... 328.1 ft), 2 conductor, twisted with shield 18 AWG, PVC jacket
• Modbus version	Length options: 5 ... 100 m (16.4 ... 328.1 ft), 4 conductor, twisted pairs, 22 AWG, polyurethane jacket
Certificates and approvals	
	CE, cFMUS, cCSAUS, ATEX, IECEx, EACEx, CSA- Japan-Ex, RCM, INMETRO, NEPSI, CCOE, PESO, FDA(EG)1935/2004
Radio	CE, FCC, IC, Anatel, ICASA, NCC, KC, CITC, RCM, WPC, Telec, NBTC, MCMC
Marine	ABS, CCS, DNV-GL, LR, NK, RINA
Canadian Registration Number (CRN)	
• British Columbia	OF22218.51
• Alberta	OF20596.2
• Saskatchewan	OF2002.3
• Manitoba	OF7032.4
• Ontario	OF22218.5
• Quebec	OF05183.6
• New Brunswick	OF1490.07
• Nova Scotia	OF1490.08
• Prince Edward Island	OF1490.09
• Newfoundland and Labrador	OF1490.0
• Yukon	OF1490.OY
• Northwest Territories	OF1490.OT
• Nunavut	OF1490.ON

Technical specifications (continued)

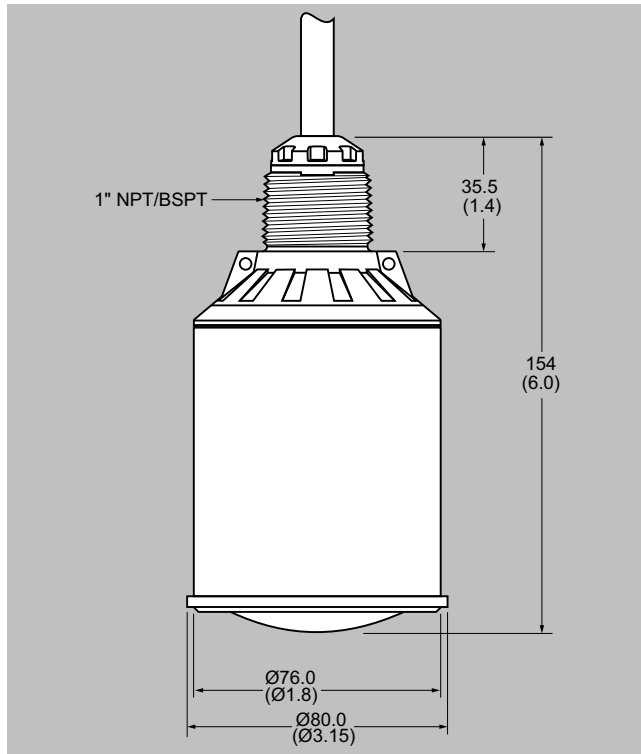
SITRANS LR120	
Programming	
SITRANS mobile IQ app	SITRANS mobile IQ is a Bluetooth app that provides an intuitive interface to quickly configure, set up and monitor SITRANS LR100 series. For more information: http://www.siemens.com/mobileIQ
SIMATIC PDM	SIMATIC PDM allows for remote PC configuration and diagnostics (for installation on a network).
SITRANS DTM	

Level Measurement

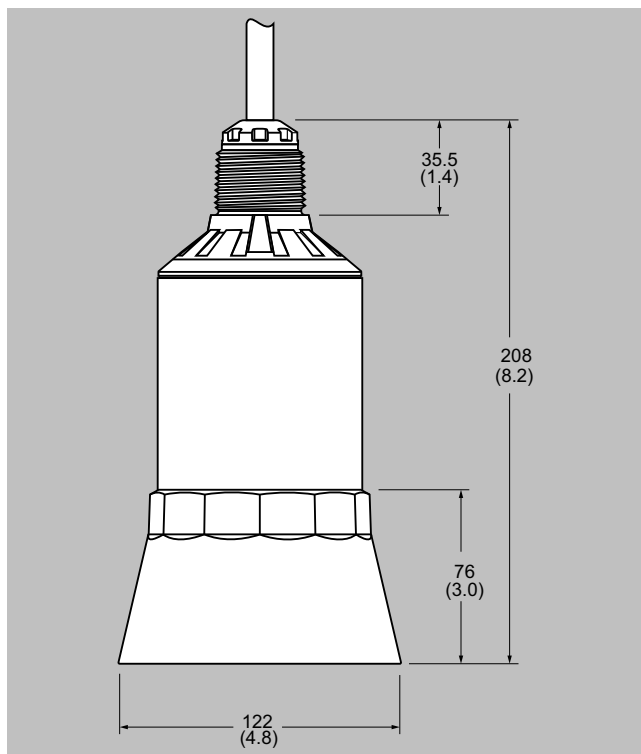
Continuous level measurement

Radar level transmitters / SITRANS LR120

Dimensional drawings

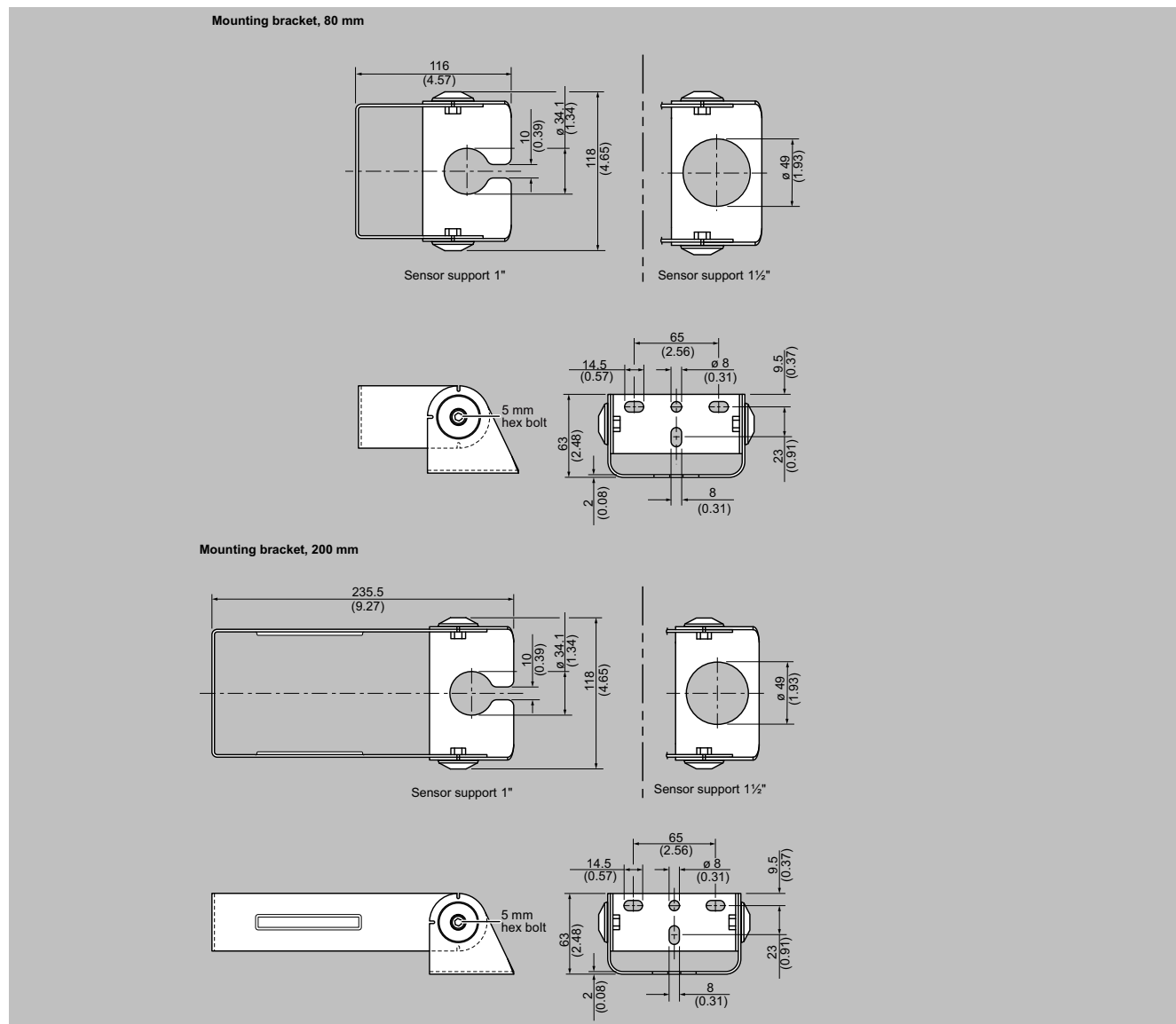


SITRANS LR120, dimensions in mm (inch)



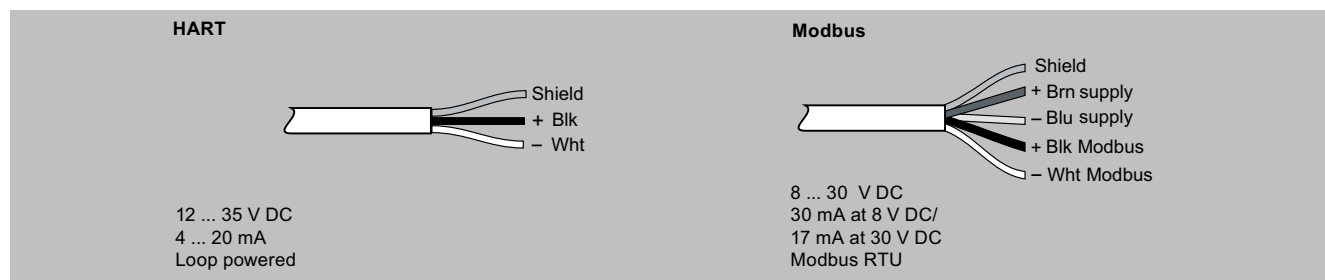
SITRANS LR120 Submergence shield accessory, dimensions in mm (inch)

Dimensional drawings (continued)



SITRANS LR120 mounting brackets, dimensions in mm (inch)

Circuit diagrams



SITRANS LR120 connections

Level Measurement

Continuous level measurement

Radar level transmitters / SITRANS LR140

Overview



SITRANS LR140 is a 2 wire loop powered radar transmitter for continuous level measurement of liquids and slurries to a range of 8 m (26 ft).

Benefits

- Bluetooth connectivity for easy setup with SITRANS mobile IQ.
- Chemically resistant PVDF sensor.
- W band FMCW radar yields narrow beam with small antenna for superior performance in short range applications.
- Approved for open air applications outside of a tank.
- Compact design fits in limited space installations.

Application

SITRANS LR140 is a W band FMCW radar level transmitter, packaged in a chemically resistant enclosure with PVDF sensor for years of trouble-free reliable measurement service.

4 to 20 mA loop powered, it provides accurate level measurement to ranges of 8 m (26 ft). Measurement is possible, non-intrusively, through plastic vessel tops for easy installation. Programming is convenient using the Bluetooth connection and SITRANS mobile IQ application on your smart device.

Selection and ordering data

	Article No.
SITRANS LR140 Radar level transmitter Non-contact, 8 m (26.2 ft) range, for liquids and solids.	7ML533 7 - 1 A ● 0 7 - 4 A ● 0
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	
Process connection	
1-½" NPT	A
R 1-½" (BSPT)	B
G 1-½" (BSPP)	C
Electrical connections/Cable entry	
M20	F
½" NPT	K

Selection and Ordering data	Order code
Further designs	
Please add "-Z" to Article No. and specify Order code(s).	
Tag (device parameter, max. 32 characters) plate stainless steel 304/1.4301	Y15

Accessories	Article No.
Operating Instructions	
All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation	
Accessories	
Bracket, 316L Stainless steel, 1 inch mount, 80 mm (3.1 inch) offset	A5E50507509
Bracket, 316L Stainless steel, 1 inch mount, 200 mm (7.9 inch) offset	A5E50507511
Bracket, 316L Stainless steel, 1.5 inch mount, 80 mm (3.1 inch) offset	A5E50507514
Bracket, 316L Stainless steel, 1.5 inch mount, 200 mm (7.9 inch) offset	A5E50507516
SITRANS LR140/LR150 Blind lid with o-ring	A5E50822955
Flat gasket, FKM, for G1.5 inch sensor	A5E50822967
1-½ BSP locknut, plastic	7ML1830-1DP
SIMATIC RTU3010C compact, remote data manager with alarming	6NH3112-0BA00-0-XX0
SIMATIC RTU3030C compact, remote data manager with alarming	6NH3112-3BA00-0-XX0
SITRANS RD100, loop powered display - see Chapter 7	7ML5741-.....-
SITRANS RD150, remote digital display for 4 to 20 mA and HART devices - see Chapter 7	7ML5742-.....-
SITRANS RD200, universal input display with Modbus conversion - see Chapter 7	7ML5740-.....-
SITRANS RD300, dual line display with totalizer and linearization curve and Modbus conversion - see Chapter 7	7ML5744-.....-
For applicable back up point level switch - see point level measurement section	

Level Measurement

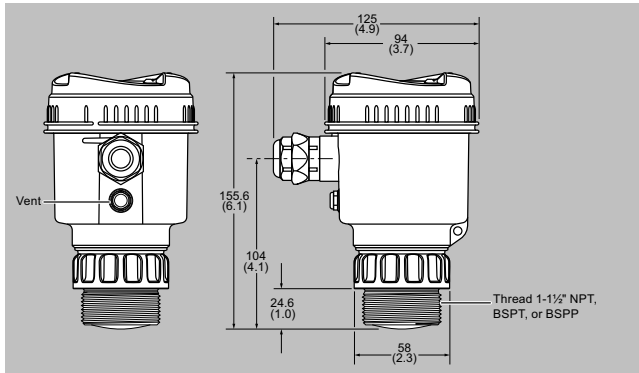
Continuous level measurement

Radar level transmitters / SITRANS LR140

Technical specifications

SITRANS LR140	
Mode of operation	
Measuring principle	W band FMCW radar
Measuring range	0 ... 8 m (0 ... 26 ft)
Frequency	80 GHz nominal
Beam angle	8°
Power Supply	
Voltage	12 ... 35 V DC
Current	4 ... 20 mA
Accuracy	
± 5 mm	
Rated operating conditions	
Vessel pressure	-1 ... +3 bar (14.50 ... 43.51 psi g)
Ambient temperature	-40 ... +60 °C (-40 ... +140 °F)
Process temperature	-40 ... +60 °C (-40 ... +140 °F)
Storage temperature	-40 ... +80 °C (-40 ... +176 °F)
Design	
Weight	0.5 kg (1.1 lb)
Material (sensor)	PVDF
Material (enclosure)	PBT
Process connection	1-½" NPT, 1-½" BSPT, or 1-½" BSPP
Degree of protection	IP66/IP67
Certificates and approvals	
General	CE, cFIM _{US} , cCSA _{US} , RCM, EAC
Radio	CE, FCC, IC, Anatel, ICASA, NCC, KC, CITC, RCM, WPC, Telec, NBTC, MCMC
Canadian Registration Number (CRN)	
British Columbia	OF22218.51
Alberta	OF20596.2
Saskatchewan	OF2002.3
Manitoba	OF7032.4
Ontario	OF22218.5
New Brunswick	OF05183.6
Nova Scotia	OF1490.07
Prince Edward Island	OF1490.08
Newfoundland and Labrador	OF1490.09
Yukon	OF1490.0
Northwest Territories	OF1490.0Y
Nunavut	OF1490.0T
Programming	
SITRANS mobile IQ App	OF1490.ON SITRANS mobile IQ is a Bluetooth app that provides an intuitive interface to quickly configure, set up and monitor SITRANS LR100 series. For more information: http://www.siemens.com/mobileIQ

Dimensional drawings



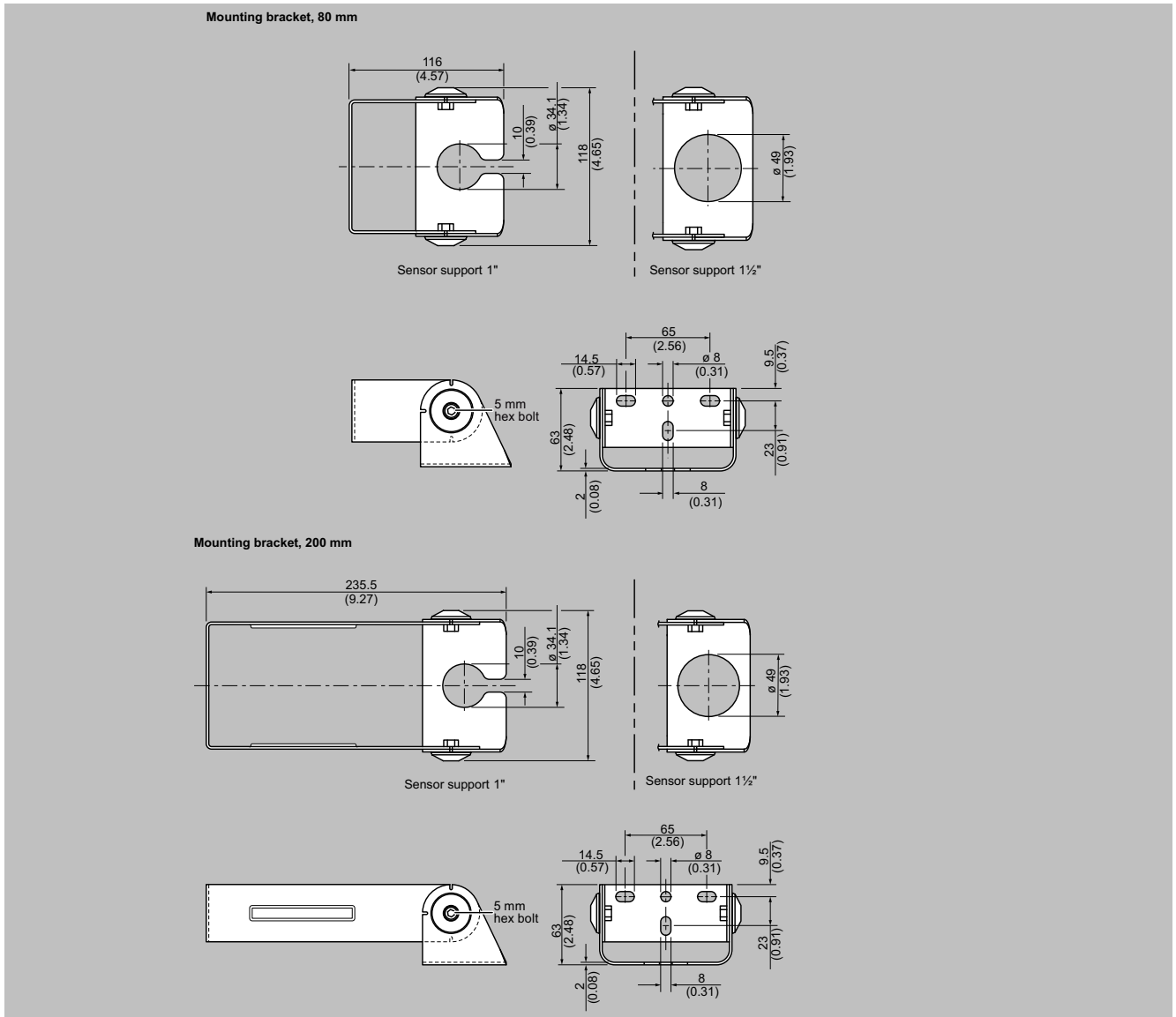
SITRANS LR140, dimensions in mm (inch)

Level Measurement

Continuous level measurement

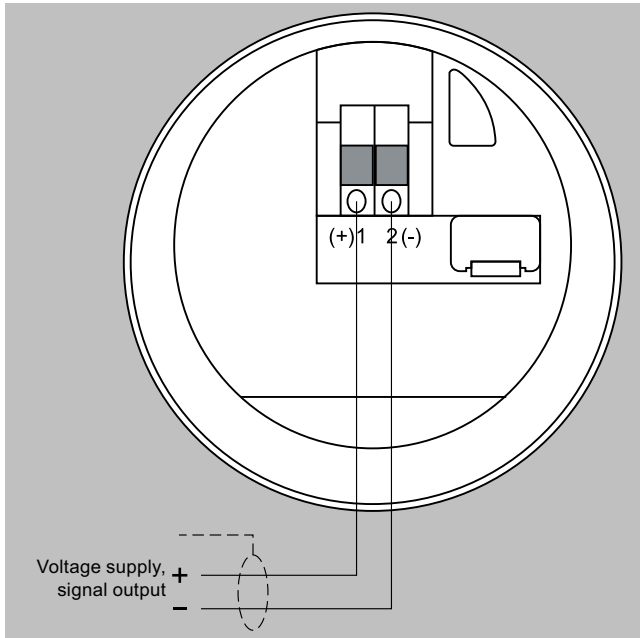
Radar level transmitters / SITRANS LR140

Dimensional drawings (continued)



SITRANS LR140 mounting brackets, dimensions in mm (inch)

Circuit diagrams



SITRANS LR140 connections

Level Measurement

Continuous level measurement

Radar level transmitters / SITRANS LR150

Overview



SITRANS LR150 is a compact radar transmitter for continuous level measurement of liquids, slurries, and solids to a range of 15 m (49.2 ft).

Benefits

- Bluetooth connectivity for easy setup with SITRANS mobile IQ.
- Optional HMI with pushbutton programming and local diagnostic data.
- Chemically resistant PVDF sensor.
- HART 7.0 communication for intelligent integration into your application.
- W band FMCW radar yields narrow beam with small antenna for superior performance in short range applications.
- Approved for open air applications outside of a tank.
- 2 mm accuracy and zero near range distance yields optimum inventory management capability.
- Compact design fits in limited space installations.
- Hazardous area variants available for safe use in explosive gas or dust environments (pending).

Application

SITRANS LR150 is a W band FMCW radar level transmitter, with a chemically resistant PVDF sensor, for years of trouble-free, reliable measurement service.

4 to 20 mA loop powered with HART, providing accurate level measurement to ranges of 15 m (49.2 ft). Measurement is possible, non-intrusively, through plastic vessel tops for easy installation. Programming is convenient using the Bluetooth connection and SITRANS mobile IQ application on your smart device or locally with an optional HMI.

Selection and ordering data

	Article No.
SITRANS LR150 Radar level transmitter Non-contact, HART, 15 m (49.2 ft) range, for liquids and solids.	7ML534 0 - ● A ● 0 7 - 4 ● ● ●
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	
Bluetooth function	
Without	0
With	1
Process connection	
1-½" NPT	A
R 1-½" (BSPT)	B
G 1-½" (BSPP)	C
Type of protection	
Non Ex (ordinary locations) ²⁾	A
Ex i (ia) (Gas Ex-Zone 0/Class 1, Div. 1 & Div. 2) ¹⁾	C
Electrical connections/cable entry	
M20	F
½" NPT	K
Local HMI	
Without display (closed lid of PBT/PC material)	0
With display (closed lid of PBT/PC material)	1
With display (clear lid with plastic window of PC material)	3

Selection and Ordering data	Order code
Further designs	
Please add "-Z" to Article No. and specify Order code(s).	
Tag (device parameter, max. 32 characters) plate stainless steel 304/1.4301	Y15
Inspection certificate 3.1 (EN 10204) - device with test data	C25
INMETRO, IA MASC	E25
NEPSI, CCOE	E27
EACEx	E24
ATEX, IECEX, cFM _{US} , cCSA _{US}	E49
CSA-Japan-Ex	E29
WHG and VLAREM II	E61

Accessories	Article No.
Operating Instructions	
All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation	
Accessories	
Bracket, 316L Stainless steel, 1 inch mount, 80 mm (3.1 inch) offset	A5E50507509
Bracket, 316L Stainless steel, 1 inch mount, 200 mm (7.9 inch) offset	A5E50507511
Bracket, 316L Stainless steel, 1.5 inch mount, 80 mm (3.1 inch) offset	A5E50507514
Bracket, 316L Stainless steel, 1.5 inch mount, 200 mm (7.9 inch) offset	A5E50507516
SITRANS LR150 HMI with connection cable	A5E50812988
SITRANS LR140/LR150 Blind lid with o-ring	A5E50822955
SITRANS LR150 clear lid with o-ring	A5E50822960
Flat gasket, FKM, for G1.5 inch sensor	A5E50822967
1-½ BSP locknut, plastic	7ML1830-1DP
SIMATIC RTU3030C compact, remote data manager with alarming	6NH3112-3BA00-0-XX0
Intrinsically Safe barrier	7NG4124-1AA00

Level Measurement

Continuous level measurement

Radar level transmitters / SITRANS LR150

Selection and ordering data (continued)

Accessories	Article No.
SITRANS RD100, loop powered display - see Chapter 7	7ML5741-.....-
SITRANS RD150, remote digital display for 4 to 20 mA and HART devices - see Chapter 7	7ML5742-.....-....
SITRANS RD200, universal input display with Modbus conversion - see Chapter 7	7ML5740-.....-..
SITRANS RD300, dual line display with totalizer and linearization curve and Modbus conversion- see Chapter 7	7ML5744-.....-..
For applicable back up point level switch -see point level measurement section	

¹⁾ Must be ordered in combination with order code E24, E25, E27, E49. or E29.

²⁾ Not available with order code E24, E25, E27, E49. or E29.

Level Measurement

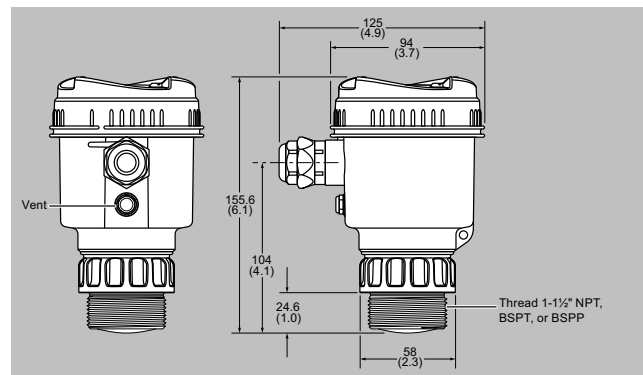
Continuous level measurement

Radar level transmitters / SITRANS LR150

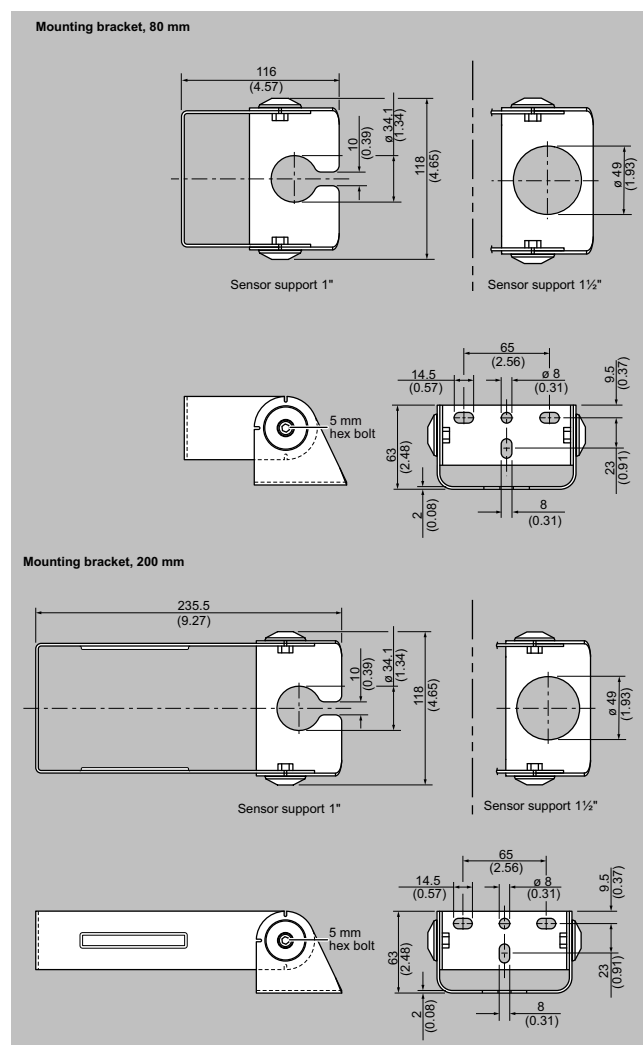
Technical specifications

SITRANS LR150	
Mode of operation	
Measuring principle	W band FMCW radar
Measuring range	0 ... 15 m (0 ... 49.2 ft)
Frequency	80 GHz nominal
Beam angle	8°
Power Supply	
HART	
• Voltage	12 ... 35 V DC
• Current	4 ... 20 mA
Communications	
4 ... 20 mA	HART 7.0
Accuracy	± 2 mm
Rated operating conditions	
Vessel pressure	-1 ... +3 bar (14.50 ... 43.51 psi g)
Ambient temperature	-40 ... +70 °C (-40 ... +158 °F)
Process temperature	-40 ... +80 °C (-40 ... +176 °F)
Storage temperature	-40 ... +80 °C (-40 ... +176 °F)
Design	
Weight	0.5 kg (1.1 lb)
Material (sensor)	PVDF
Material (enclosure)	PBT
Process connection	1-½" NPT, 1-½" BSPT or 1-½" BSPP
Degree of protection	IP66/IP67
Cable inlet	M20 or ½" NPT
Certificates and approvals	
	CE, ATEX, IECEx, cFM _{US} , cCSA _{US} , EAC, NEPSI, FDA/EG 1935/2004
Radio	CE, FCC, IC, Anatel, ICASA, NCC, KC, CITC, RCM, WPC, Telec, NBTC, MCMC
Water monitoring, flow	MCERTS Class 1
Canadian Registration Number (CRN)	
British Columbia	0F22218.51
Alberta	0F20596.2
Saskatchewan	0F2002.3
Manitoba	0F7032.4
Ontario	0F22218.5
New Brunswick	0F05183.6
Nova Scotia	0F1490.07
Prince Edward Island	0F1490.08
Newfoundland and Labrador	0F1490.09
Yukon	0F1490.0
Northwest Territories	0F1490.0Y
Nunavut	0F1490.0T
Programming	
SITRANS mobile IQ App	SITRANS mobile IQ is a Bluetooth app that provides an intuitive interface to quickly configure, set up and monitor SITRANS LR100 series (available for Android, Apple and Windows devices). For more information: http://www.siemens.com/mobileIQ
Optional HMI	4 button with display of variables and diagnostic data
SIMATIC PDM	SIMATIC PDM allows for remote PC configuration and diagnostics (for installation on a network).
SITRANS DTM	

Dimensional drawings



SITRANS LR150, dimensions in mm (inch)



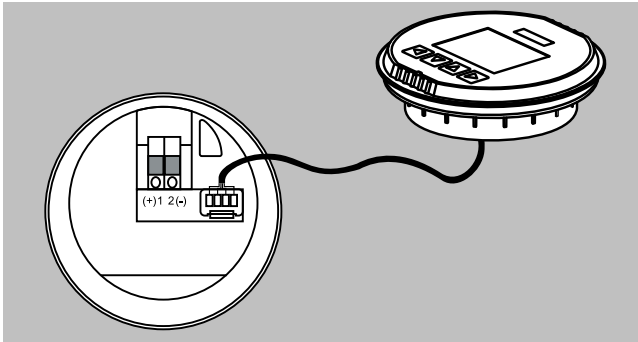
SITRANS LR150 mounting brackets, dimensions in mm (inch)

Level Measurement

Continuous level measurement

Radar level transmitters / SITRANS LR150

Circuit diagrams



SITRANS LR150 connections

Overview



SITRANS LR200 is a 2-wire, 6 GHz pulse radar level transmitter for continuous monitoring of liquids and slurries in process vessels including high temperature, pressure, agitation, and turbulence to a range of 20 m (65 ft).

Benefits

- Graphical local user interface (LUI) makes operation simple with plug-and-play setup using the intuitive Quick Start Wizard
- LUI displays echo profiles for diagnostic support
- Communication using HART or PROFIBUS PA
- Process Intelligence signal processing for improved measurement reliability and Auto False-Echo Suppression of fixed obstructions
- Programming using infrared Intrinsically Safe handheld programmer or SIMATIC PDM

Application

SITRANS LR200's unique design allows safe and simple programming using the Intrinsically Safe handheld programmer without having to open the instrument's lid. It also features a built-in alpha-numeric display in four languages.

The SITRANS LR200 has a standard Uni-Construction polypropylene rod antenna that offers excellent chemical resistance and is hermetically sealed. The Uni-Construction antenna features an internal, integrated shield that eliminates vessel nozzle interference.

Startup is easy with as few as two parameters for basic operation. Installation is simplified as the electronics are mounted on a rotating head that swivels, allowing the instrument to line up with conduit or wiring connections or simply to adjust the position for easy viewing. SITRANS LR200 features Process Intelligence signal-processing technology for superior reliability.

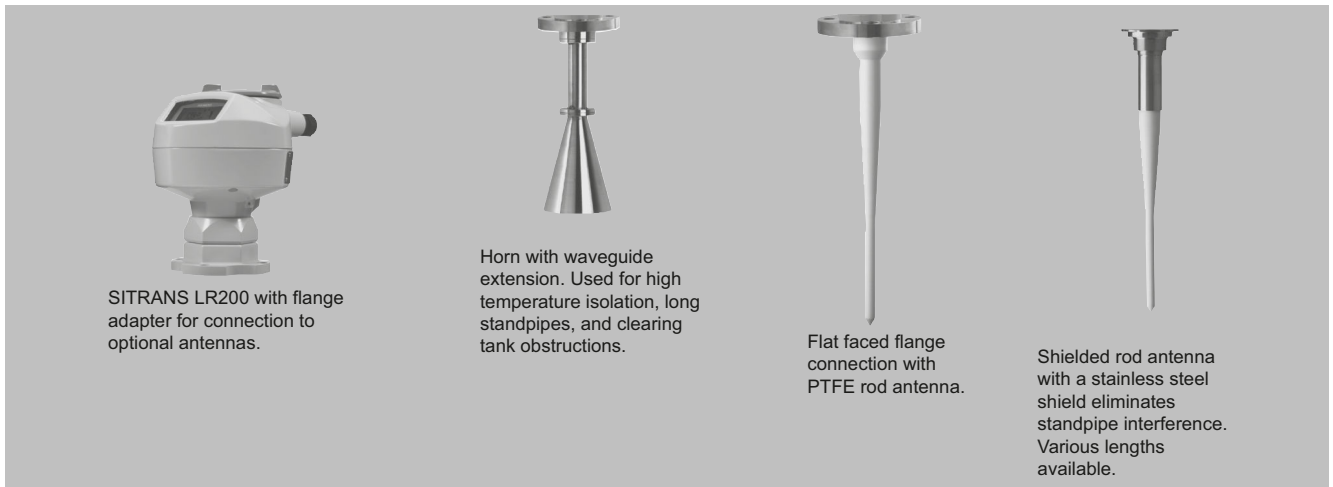
- Key Applications: liquid process vessels with agitators, vaporous liquids, high temperatures, asphalt

Level Measurement

Continuous level measurement

Radar level transmitters / SITRANS LR200

Integration



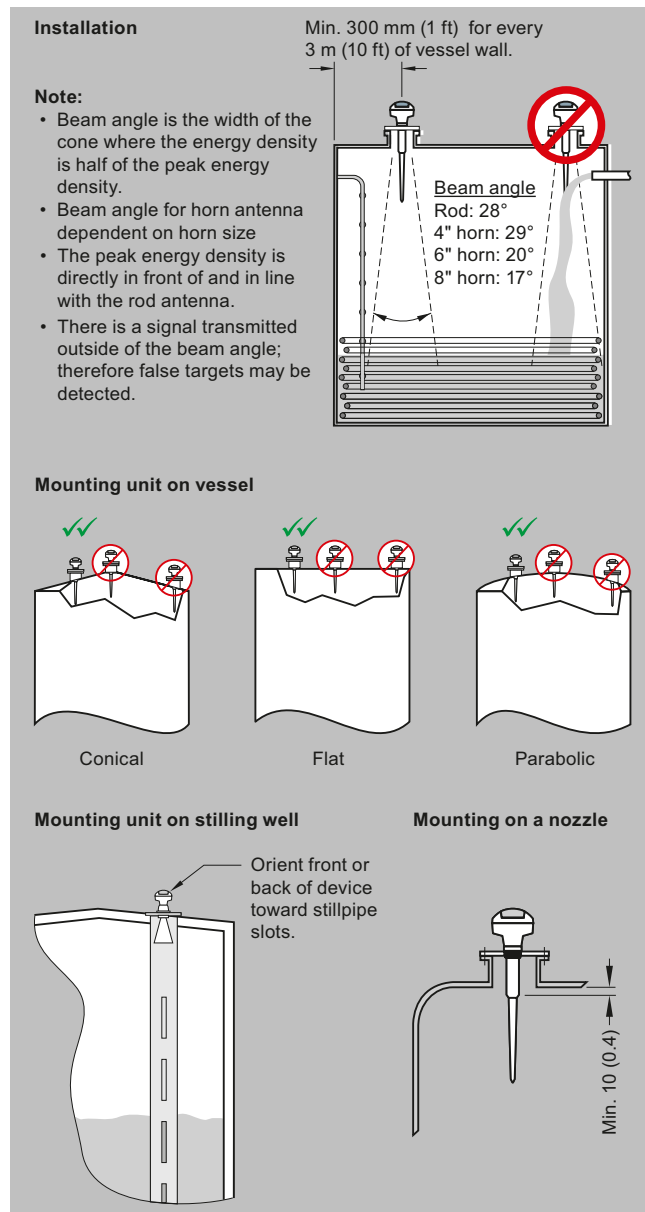
Antenna configurations for SITRANS LR200

Antenna types	Flat Faced Flange with Rod	Shielded Rod	Horn (4", 6", 8" sizes available)
Connection type	Flat faced flange nominal pipe sizes 50, 80, 100, 150 mm (2, 3, 4, 6 inch)	Threaded 2" NPT, R 2" (BSPT), G 2" (BSPP) or flat faced flange nominal pipe sizes 80, 100 mm (3, 4 inch)	Flat faced flange nominal pipe sizes 50, 80, 100, 150 mm (2, 3, 4, 6 inch)
Wetted parts	PTFE	PTFE, 316L stainless steel, FKM O-ring	316L stainless steel PTFE, FKM O-ring
Extensions	50 or 100 mm (2 or 4 inch) PTFE or UHMW-PE	100, 150, 200 or 250 mm (4, 6, 8 or 10 inch) standard shield length	Use waveguide for extensions to 6 m (20 ft) long
Dielectric constant	> 3	> 3	> 3
Insertion length (max.)	41 cm (16.3 inch)	Variable	Variable with extension
Purging option (liquid or gas)	No	No	Yes
Sliding waveguide option for digesters ¹⁾	Yes	No	Yes
Weight ²⁾	6.5 kg (14.3 lb)	5.0 kg (11 lb)	7.5 kg (16.5 lb)

¹⁾ Maximum pressure 0.5 bar g at 60 °C (7.25 psi g at 140 °F)

²⁾ Not including extensions, includes SITRANS LR200 and smallest process connection

Configuration



SITRANS LR200 installation, dimensions in mm (inch)

Level Measurement

Continuous level measurement

Radar level transmitters / SITRANS LR200

Selection and ordering data

	Article No.				
SITRANS LR200 Radar level transmitter with polypropylene rod Continuous, non-contact, 20 m (66 ft) range, for liquids and slurries.	7ML5422- ● ● ● ● 0				
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.					
Enclosure/Cable inlet					
Aluminum, epoxy painted					
2 x 1/2" NPT	2				
2 x M20 x 1.5	3				
Polypropylene antenna type - (Max. 3 Bar pressure and 80 °C)					
1 1/2" NPT [(Taper), ASME B1.20.1], c/w integral 100 mm shield			A		
R 1 1/2" [(BSPT), EN 10226], c/w integral 100 mm shield			B		
G 1 1/2" [(BSPP), EN ISO 228-1], c/w integral 100 mm shield			C		
1 1/2" NPT [(Taper), ASME B1.20.1], c/w integral 250 mm shield			D		
R 1 1/2" [(BSPT), EN 10226], c/w integral 250 mm shield			E		
G 1 1/2" [(BSPP), EN ISO 228-1], c/w integral 250 mm shield			F		
Approvals					
Ordinary Locations/General Purpose (Non-Ex), CE, UKCA, RED, RCM				A	
General Purpose, CSA, FM, Industry Canada, FCC Ordinary Locations/General Purpose (Non-Ex), CSA, FM, IC, FCC				B	
Intrinsically Safe, CSA Class I, II, Div. 1, Groups A, B, C, D, E, F, G, Industry Canada				C	
Intrinsically Safe, FM Class I, II, Div. 1, Groups A, B, C, D, E, F, G, FCC				D	
Intrinsically Safe: ATEX II 1G Ex ia IIC T4 Ga; UKEX II 1G Ex ia IIC T4 Ga; IECEX Ex ia IIC T4 Ga; INMETRO Ex ia IIC T4 Ga, IP67/IP68; EAC Ex 0Ex ia IIC T4 Ga X; CE, UKCA, RED, RCM, EAC				E	
Non incensive, FM Class I, Div. 2, Groups A, B, C, D, FCC ¹⁾				F	
Increased Safety: ATEX II 1/2G Ex eb mb ia IIC T4 Ga/Gb; UKEX II 1/2G Ex eb mb ia IIC T4 Ga/Gb; CE, UKCA, RED, RCM, EAC ²⁾³⁾				G	
Flameproof: ATEX II 1/2G Ex db mb ia IIC T4 Ga/Gb; UKEX II 1/2G Ex db mb ia IIC T4 Ga/Gb; CE, UKCA, RED, RCM, EAC ³⁾				H	
Explosion Proof, CSA/FM Class I, II, III, Groups A, B, C, D, E, F, G, Industry Canada, FCC ¹⁾³⁾				J	
Communication/Output					
PROFIBUS PA					2
4 ... 20 mA, HART, start-up at < 3.6 mA					3

1) Available with enclosure option 2 only.

2) Available with enclosure option 3 only.

3) Available with communication option 3 only.

Selection and Ordering data	Order code
Further designs	
Please add "-Z" to Article No. and specify Order code(s).	
Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: Measuring-point number/identification (max. 27 characters); specify in plain text	Y15
Manufacturer's test certificate: M to DIN 55350, Part 18 and to ISO 9000	C11
Namur NE43 compliant, device preset to failsafe < 3.6 mA ¹⁾	N07

Accessories	Article No.
Operating Instructions	
All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation	
Accessories	Article No.
Handheld programmer, Intrinsically safe, EEx ia	7ML1930-1BK
HART modem with USB interface	7MF4997-1DB

Selection and ordering data (continued)

Accessories	Article No.
One metallic cable gland M20 x 1.5, rated -40 ... +80 °C (-40 ... +176 °F), HART ²⁾	7ML1930-1AP
One metallic cable gland M20 x 1.5, rated -40 ... +80 °C (-40 ... +176 °F), PROFIBUS PA ²⁾	7ML1930-1AQ
One general purpose polymeric cable gland M20 x 1.5, rated -20 ... + 80 °C (-40 ... +176 °F)	7ML1930-1AM
SITRANS RD100, loop powered display - see Chapter 7	7ML5741-.....
SITRANS RD150, remote digital display for 4 ... 20 mA and HART devices - see Chapter 7	7ML5742-.....
SITRANS RD200, universal input display with Modbus conversion - see Chapter 7	7ML5740-.....
SITRANS RD300, dual line display with totalizer and linearization curve and Modbus conversion - see Chapter 7	7ML5744-.....
For applicable back up point level switch - see point level measurement section	

1) Available with communication option 3 only.

2) Product shipped with plastic cable gland, rated to -20 °C. If -40 °C rating required, then metallic cable gland is recommended.

SITRANS LR200 Radar level transmitter with PTFE rod Continuous, non-contact, 20 m (66 ft) range, for liquids and slurries.		Article No.	
		7ML5423-	● ● ● ● ● - ● ● ● ●
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.			
Antenna material (uses antenna adapter)			
PTFE, uses antenna adapter and additional process connection below		1	
Process connection (refer to LR200 Pressure/Temperature curves)			
Flanges (316L stainless steel)			
DN 50 PN 16, Type A, flat faced		A	A
DN 80 PN 16, Type A, flat faced		B	A
DN 100 PN 16, Type A, flat faced		C	A
DN 150 PN 16, Type A, flat faced		D	A
2" ASME 150 lb, flat faced		F	B
3" ASME 150 lb, flat faced		G	B
4" ASME 150 lb, flat faced		H	B
6" ASME 150 lb, flat faced		J	B
DN 50 PN 40, flat faced		A	C
DN 80 PN 40, flat faced		B	C
DN 100 PN 40, flat faced		C	C
DN 150 PN 40, flat faced		D	C
2" ASME 300 lb, flat faced, available with Pressure rating option 1 only due to flange hole spacing		F	D
3" ASME 300 lb, flat faced		G	D
4" ASME 300 lb, flat faced		H	D
6" ASME 300 lb, flat faced		J	D
JIS DN 50 10K		A	E
JIS DN 80 10K		B	E
JIS DN 100 10K		C	E
JIS DN 150 10K		D	E
(Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5, or EN 1092-1, or JIS B 2220 standard.)			
Threaded connection (316L stainless steel)			
1½" NPT [(Taper), ASME B1.20.1]		L	A
2" NPT [(Taper), ASME B1.20.1]		M	A
R 1½" [(BSPT), EN 10226]		L	C
R 2" [(BSPT), EN 10226]		M	C
G 1½" [(BSPP), EN ISO 228-1]		L	E
G 2" [(BSPP), EN ISO 228-1]		M	E
Antenna extensions or inactive shield length			
No antenna extension			0
50 mm (2 inch) extension, PTFE			1

Level Measurement

Continuous level measurement

Radar level transmitters / SITRANS LR200

Selection and ordering data (continued)

	Article No.
SITRANS LR200 Radar level transmitter with PTFE rod Continuous, non-contact, 20 m (66 ft) range, for liquids and slurries.	7ML5423- ● ● ● ● ● - ● ● ● ●
100 mm (4 inch) extension, PTFE	2
100 mm (4 inch) extension, 316L stainless steel shield ¹⁾	3
150 mm (6 inch) extension, 316L stainless steel shield ¹⁾	4
200 mm (8 inch) extension, 316L stainless steel shield ¹⁾	5
250 mm (10 inch) extension, 316L stainless steel shield ¹⁾	6
Process seal/gasket	
Integral Gasket, for flat faced flange process connections only, not for Antenna extension options 3 ... 6	0
FKM O-ring, not available for combination of flat faced flanges with Antenna extension options 0, 1 or 2	1
Enclosure/Cable inlet	
Aluminum, Epoxy painted	
2 x ½" NPT	2
2 x M20 x 1.5	3
Communication/Output	
PROFIBUS PA	B
4 ... 20 mA, HART, start-up at < 3.6 mA	C
Approvals	
Ordinary Locations/General Purpose (Non-Ex), CE, UKCA, RED, RCM	A
General Purpose, CSA Ordinary Locations/General Purpose (Non-Ex), CSA, FM, IC, FCC	B
Intrinsically Safe, CSA Class I, II, Div. 1, Groups A, B, C, D, E, F, G, Industry Canada	C
Intrinsically Safe, FM Class I, II, Div. 1, Groups A, B, C, D, E, F, G, FCC	D
Intrinsically Safe:	E
ATEX II 1G Ex ia IIC T4 Ga;	
UKEX II 1G Ex ia IIC T4 Ga;	
IECEX Ex ia IIC T4 Ga;	
INMETRO Ex ia IIC T4 Ga, IP67/IP68;	
EAC Ex 0Ex ia IIC T4 Ga X;	
CE, UKCA, RED, RCM, EAC	
Non incandive, FM Class I, Div. 2, Groups A, B, C, D, FCC ²⁾	F
Increased Safety:	G
ATEX II 1/2G Ex eb mb ia IIC T4 Ga/Gb;	
UKEX II 1/2G Ex eb mb ia IIC T4 Ga/Gb;	
CE, UKCA, RED, RCM, EAC ²⁾³⁾	
Flameproof:	H
ATEX II 1/2G Ex db mb ia IIC T4 Ga/Gb;	
UKEX II 1/2G Ex db mb ia IIC T4 Ga/Gb;	
CE, UKCA, RED, RCM, EAC ³⁾	
Explosion Proof, CSA/FM Class I, II, III, Groups A, B, C, D, E, F, G, Industry Canada, FCC ²⁾⁴⁾	J
Pressure rating	
Rating per Pressure/Temperature curves in manual	0
0.5 bar g (7.25 psi g) maximum	1

1) Available with process connection options BA, CA, DA, GB, HB, JB, BC, CC, DC, GD, HD, JD, BE, CE, DE, MA, MC, ME only.

2) Available with enclosure option 2 only.

3) Available with enclosure option 3 only.

4) Available with communication option C only.

Selection and Ordering data	Order code
Further designs	
Please add "-Z" to Article No. and specify Order code(s).	
Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: Meas- uring-point number/identification (max. 27 characters); specify in plain text	Y15
Manufacturer's test certificate: M to DIN 55350, Part 18 and to ISO 9000	C11
Material inspection Certificate Type 3.1 per EN 10204	C12
Namur NE43 compliant, device preset to failsafe < 3.6 mA ³⁾	N07

Selection and ordering data (continued)

Accessories	Article No.
Operating Instructions	
All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation	
Accessories	
Handheld programmer, Intrinsically safe, EEx ia	7ML1930-1BK
Antenna, rod, PTFE	7ML1830-1HC
Antenna extension, 50 mm (2 inch), PTFE	7ML1830-1CH
Antenna extension, 100 mm (4 inch), PTFE	7ML1830-1CG
HART modem with USB interface	7MF4997-1DB
Metallic cable gland M20 x 1.5, rated -40 °C (-40 °F) ... 80 °C (176 °F), HART (two are required)	7ML1930-1AP
Metallic cable gland M20 x 1.5, rated -40 °C (-40 °F) ... 80 °C (176 °F), PROFIBUS PA (two required)	7ML1930-1AQ
One General Purpose polymeric cable gland M20 x 1.5, rating for -20 °C (-4 °F) ... + 80 °C (176 °F)	7ML1930-1AM
SITRANS RD100, loop powered display - see Chapter 7	7ML5741-.....
SITRANS RD150, remote digital display for 4 ... 20 mA and HART devices - see Chapter 7	7ML5742-.....
SITRANS RD200, universal input display with Modbus conversion - see Chapter 7	7ML5740-.....
SITRANS RD300, dual line display with totalizer and linearization curve and Modbus conversion - see Chapter 7	7ML5744-.....
For applicable back up point level switch - see point level measurement section	

SITRANS LR200 Radar level transmitter with horn Continuous, non-contact, 20 m (66 ft) range, for liquids and slurries.		Article No. 7ML5425- ● ● ● ● ● - ● ● ● ●	
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.			
Antenna material (uses antenna adapter)			
316L stainless steel with PTFE cone emitter	0		
316L stainless steel with PTFE cone emitter and purge connection with 1/8" NPT inlet ¹⁾	1		
Process connection (refer to LR200 Pressure/Temperature curves)			
Flanges (316L stainless steel)			
DN 50 PN 16 EN 1092-1 Type A flat faced ¹⁾		A	A
DN 80 PN 16 EN 1092-1 Type A flat faced		B	A
DN 100 PN 16 EN 1092-1 Type A flat faced		C	A
DN 150 PN 16 EN 1092-1 Type A flat faced		D	A
DN 200 PN 16 EN 1092-1 Type A flat faced		E	A
DN 80 PN 10/16 DIN EN 1092-1 Type B1 raised face ²⁾		B	F
DN 100 PN 10/16 DIN EN 1092-1 Type B1 raised face ³⁾		C	F
DN 150 PN 10/16 DIN EN 1092-1 Type B1 raised face ³⁾		D	F
DN 200 PN 16 DIN EN 1092-1 Type B1 raised face ³⁾		E	F
2" ASME 150 lb, flat faced ¹⁾		F	B
3" ASME 150 lb, flat faced		G	B
4" ASME 150 lb, flat faced		H	B
6" ASME 150 lb, flat faced		J	B
8" ASME 150 lb, flat faced		K	B
DN 50 PN 40, flat faced ³⁾		A	C
DN 80 PN 40, flat faced ³⁾		B	C
DN 100 PN 40, flat faced ³⁾		C	C
DN 80 PN 25/40 DIN EN 1092-1 Type B1 raised face ³⁾		C	G
DN 100 PN 25/40 DIN EN 1092-1 Type B1 raised face ³⁾		D	G
DN 150 PN 25/40 DIN EN 1092-1 Type B1 raised face ³⁾		E	G
2" ASME 300 lb, flat faced ¹⁾³⁾		F	D
3" ASME 300 lb, flat faced ³⁾		G	D

Level Measurement

Continuous level measurement

Radar level transmitters / SITRANS LR200

Selection and ordering data (continued)

	Article No.									
SITRANS LR200 Radar level transmitter with horn Continuous, non-contact, 20 m (66 ft) range, for liquids and slurries.	7	M	L	5	4	2	5	-		
4" ASME 300 lb, flat faced ³⁾										
JIS DN 50 10K ¹⁾										
JIS DN 80 10K										
JIS DN 100 10K										
JIS DN 150 10K										
JIS DN 200 10K										
(Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5, or EN 1092-1, or JIS B 2220 standard.)										
Communication/Output										
PROFIBUS PA										1
4 ... 20 mA, HART, start-up at < 3.6 mA										2
Process seal/gasket										
FKM (-40 ... +200 °C)										0
Enclosure/Cable inlet										
Aluminum, Epoxy painted										
2 x ½" NPT										2
2 x M20 x 1.5										3
Horn size/Waveguide options										
80 mm (3 inch) horn ³⁾										B
100 mm (4 inch) horn ⁴⁾										C
150 mm (6 inch) horn										D
200 mm (8 inch) horn										E
100 mm (4 inch) horn with 100 mm (4 inch) waveguide extension ⁴⁾										F
100 mm (4 inch) horn with 150 mm (6 inch) waveguide extension ⁴⁾										G
100 mm (4 inch) horn with 200 mm (8 inch) waveguide extension ⁴⁾										H
100 mm (4 inch) horn with 250 mm (10 inch) waveguide extension ⁴⁾										J
150 mm (6 inch) horn with 100 mm (4 inch) waveguide extension										K
150 mm (6 inch) horn with 150 mm (6 inch) waveguide extension										L
150 mm (6 inch) horn with 200 mm (8 inch) waveguide extension										M
150 mm (6 inch) horn with 250 mm (10 inch) waveguide extension										N
200 mm (8 inch) horn with 100 mm (4 inch) waveguide extension										P
200 mm (8 inch) horn with 150 mm (6 inch) waveguide extension										Q
200 mm (8 inch) horn with 200 mm (8 inch) waveguide extension										R
200 mm (8 inch) horn with 250 mm (10 inch) waveguide extension										S
Approvals										
Ordinary Locations/General Purpose (Non-Ex), CE, UKCA, RED, RCM										A
Ordinary Locations/General Purpose (Non-Ex), CSA, FM, IC, FCC										B
Intrinsically Safe, CSA Class I, II, Div. 1, Groups A, B, C, D, E, F, G, Industry Canada										C
Intrinsically Safe, FM Class I, II, Div. 1, Groups A, B, C, D, E, F, G, FCC										D
Intrinsically Safe: ATEX II 1G Ex ia IIC T4 Ga; UKEX II 1G Ex ia IIC T4 Ga; IECEX Ex ia IIC T4 Ga; INMETRO Ex ia IIC T4 Ga, IP67/IP68; EAC Ex 0Ex ia IIC T4 Ga X; CE, UKCA, RED, RCM, EAC										E
Non incendive, FM Class I, Div. 2, Groups A, B, C, D, FCC ⁴⁾										F
Increased Safety: ATEX II 1/2G Ex eb mb ia IIC T4 Ga/Gb; UKEX II 1/2G Ex eb mb ia IIC T4 Ga/Gb; CE, UKCA, RED, RCM, EAC ²⁾³⁾										G
Flameproof: ATEX II 1/2G Ex db mb ia IIC T4 Ga/Gb; UKEX II 1/2G Ex db mb ia IIC T4 Ga/Gb; CE, UKCA, RED, RCM, EAC ³⁾										H
Explosion Proof, CSA/FM Class I, II, III, Groups A, B, C, D, E, F, G, Industry Canada, FCC ⁵⁾⁷⁾										J
Pressure rating										
Rating per Pressure/Temperature curves in manual										0
0.5 bar g (7.25 psi g) maximum										1

1) Available with pressure rating option 1 only.

2) Available with Antenna Material options 0 and 1 only.

3) For stillpipe applications only.

4) Available with enclosure option 2 only.

Selection and ordering data (continued)


- 5) Available with enclosure option 3 only.
 6) Available with communication option 2 only.
 7) Available with Communication/Output option 2 only.

Selection and Ordering data	Order code
Further designs	
Please add "-Z" to Article No. and specify Order code(s).	
Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: Measuring-point number/identification (max. 27 characters); specify in plain text	Y15
Manufacturer's test certificate: M to DIN 55350, Part 18 and to ISO 9000	C11
Material inspection Certificate Type 3.1 per EN 10204	C12
Namur NE43 compliant, device preset to failsafe < 3.6 mA ¹⁾	N07

Accessories	Article No.
Operating Instructions	
All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation	
Accessories	Article No.
Handheld programmer, Intrinsically safe, EEx ia	7ML1930-1BK
HART modem with USB interface	7MF4997-1DB
One metallic cable gland M20 x 1.5, rated -40 ... +80 °C (-40 ... +176 °F), HART ²⁾	7ML1930-1AP
One metallic cable gland M20 x 1.5, rated -40 ... +80 °C (-40 ... +176 °F), PROFIBUS PA ³⁾	7ML1930-1AQ
One general purpose polymeric cable gland M20 x 1.5, rated -40 ... +80 °C (-40 ... +176 °F)	7ML1930-1AM
SITRANS RD100, loop powered display - see Chapter 7	7ML5741-.....
SITRANS RD150, remote digital display for 4 ... 20 mA and HART devices - see Chapter 7	7ML5742-.....
SITRANS RD200, universal input display with Modbus conversion - see Chapter 7	7ML5740-.....
SITRANS RD300, dual line display with totalizer and linearization curve and Modbus conversion - see Chapter 7	7ML5744-.....
For applicable back up point level switch - see point level measurement section	

- 1) Available with communication option 2 only.
 2) Product shipped with plastic cable gland, rated to -20 °C. If -40 °C rating required, then metallic cable gland is recommended.
 3) Available with enclosure option 2 only.

SITRANS LR200 Specials




	Order No.
SITRANS LR200 PROFIBUS PA aluminum enclosure kit with electronics and covers (7ML5423, 7ML5424, 7ML5425), calibrated for use with standard rod antenna	
SITRANS LR200 aluminum enclosure with board stack, LUI display, 5.8 GHz, M20 cable inlet, approval option E, with PROFIBUS PA communication, no process connection.	A5E01483420
SITRANS LR200 aluminum enclosure with board stack, LUI display, 5.8 GHz, M20 cable inlet, approval option A, with PROFIBUS PA communication, no process connection.	A5E01483440
SITRANS LR200 aluminum enclosure with board stack, LUI display, 6.3 GHz, M20 cable inlet, approval option C, with PROFIBUS PA communication, no process connection.	A5E01483456
SITRANS LR200 aluminum enclosure with board stack, LUI display, 6.3 GHz, NPT cable inlet, approval option C, with PROFIBUS PA communication, no process connection.	A5E01483547

Level Measurement





Continuous level measurement

Radar level transmitters / SITRANS LR200

Selection and ordering data (continued)

	Order No.
SITRANS LR200 aluminum enclosure with board stack, LUI display, 5.8 GHz, NPT cable inlet, approval option E, with PROFIBUS PA communication, no process connection.	A5E01483559
SITRANS LR200 HART aluminum enclosure kit with electronics and covers (7ML5423, 7ML5424, 7ML5425), calibrated for use with standard rod antenna	
SITRANS LR200 aluminum enclosure with board stack, LUI display, 5.8 GHz, M20 cable inlet, approval option A, with HART communication start-up at < 3.6 mA, no process connection.	A5E02956419
SITRANS LR200 aluminum enclosure with board stack, LUI display, 5.8 GHz, M20 cable inlet, approval option E, with HART communication start-up at < 3.6 mA, no process connection.	A5E02956420
SITRANS LR200 aluminum enclosure with board stack, LUI display, 5.8 GHz, M20 cable inlet, approval option G, with HART communication start-up at < 3.6 mA, no process connection.	A5E02956421
SITRANS LR200 aluminum enclosure with board stack, LUI display, 5.8 GHz, M20 cable inlet, approval option H, with HART communication start-up at < 3.6 mA, no process connection.	A5E02956422
SITRANS LR200 aluminum enclosure with board stack, LUI display, 5.8 GHz, NPT cable inlet, approval option A, with HART communication start-up at < 3.6 mA, no process connection.	A5E03617085
SITRANS LR200 aluminum enclosure with board stack, LUI display, 6.3 GHz, NPT cable inlet, approval option B, with HART communication start-up at < 3.6 mA, no process connection.	A5E03617086
SITRANS LR200 aluminum enclosure with board stack, LUI display, 5.8 GHz, NPT cable inlet, approval option C, with HART communication start-up at < 3.6 mA, no process connection.	A5E03617087
SITRANS LR200 aluminum enclosure with board stack, LUI display, 6.3 GHz, NPT cable inlet, approval option E, with HART communication start-up at < 3.6 mA, no process connection.	A5E03617088
Sun shield for SITRANS LR200 enclosure, stainless steel	A5E39142556
	
SITRANS LR200 horn antenna kits with mounting screws (no emitter supplied)	
80 mm (3 inch) horn antenna kit	PBD-25500K02A
100 mm (4 inch) horn antenna kit	PBD-25500K03A
150 mm (6 inch) horn antenna kit	PBD-25500K05A
SITRANS LR200 Extension Kits for Horn Antenna with mounting screw	
100 mm (4 inch) extension kit for horn antenna	PBD-25501K0100A
150 mm (6 inch) extension kit for horn antenna	PBD-25501K0150A
200 mm (8 inch) extension kit for horn antenna	PBD-25501K0200A
250 mm (10 inch) extension kit for horn antenna	PBD-25501K0250A
500 mm (20 inch) extension kit for horn antenna	PBD-25501K0500A
1 000 mm (40 inch) extension kit for horn antenna	PBD-25501K1000A

Selection and ordering data (continued)



	Order No.
SITRANS LR200 flanged rod antenna kit with 316L stainless steel flat faced flanges	
Flanged PTFE rod antenna kit, 2" ASME, 150 lb. See drawing 51003 on http://www.siemens.com/radar . ^{1,4)}	PBD-51003K020AAAA
Flanged PTFE rod antenna kit, DN 50 PN16. See drawing 51003 on http://www.siemens.com/radar . ^{1,4)}	PBD-51003K050AJAA
Flanged PTFE rod antenna kit, JIS 10K DN 50. See drawing 51003 on http://www.siemens.com/radar . ^{1,4)}	PBD-51003K050AOAA
SITRANS LR200 PTFE rod antenna kit with 316L stainless steel 1½" pipe thread process connection	
PTFE rod antenna kit, R 1½" (BSPT), EN 10226 316L stainless steel process connection, FKM O-ring. See drawing 51004 on http://www.siemens.com/radar . ⁴⁾	PBD-51004K2AAA
PTFE rod antenna kit, 1½" G 316L stainless steel process connection, FKM O-ring. See drawing 51004 on http://www.siemens.com/radar . ⁴⁾	PBD-51004K3AAA
SITRANS LR200 PTFE rod antenna kit with 316L stainless steel 2" pipe thread process connection	
PTFE rod antenna kit, 2" NPT 316L stainless steel process connection, FKM O-ring. See drawing 51005 on http://www.siemens.com/radar . ⁴⁾	PBD-51005K1AAA
PTFE rod antenna kit, R 2" (BSPT), EN 10226 316L stainless steel process connection, FKM O-ring. See drawing 51005 on http://www.siemens.com/radar . ⁴⁾	PBD-51005K2AAA
PTFE rod antenna kit, 2" G 316L stainless steel process connection, FKM O-ring. See drawing 51005 on http://www.siemens.com/radar . ⁴⁾	PBD-51005K3AAA
SITRANS LR200 PTFE rod antenna kit (100 mm shield) with 316L stainless steel 2" pipe thread process connection	
PTFE rod antenna shielded kit, 2" NPT 316L stainless steel process connection, FKM O-ring, 100 mm 316L stainless steel shield. See drawing 51002 on http://www.siemens.com/radar . ^{3,4)}	PBD-51002K0100AAA
PTFE rod antenna shielded kit, R 2" (BSPT), EN 10226 316L stainless steel process connection, FKM O-ring, 100 mm 316L stainless steel shield. See drawing 51002 on http://www.siemens.com/radar . ^{3,4)}	PBD-51002K0100BAA
PTFE rod antenna shielded kit, 2" G 316L stainless steel process connection, FKM O-ring, 100 mm 316L stainless steel shield. See drawing 51002 on http://www.siemens.com/radar . ^{3,4)}	PBD-51002K0100CAA

Level Measurement

Continuous level measurement

Radar level transmitters / SITRANS LR200

Selection and ordering data (continued)

	Order No.
SITRANS LR200 horn antenna kit with 316L stainless steel flat faced flange, with PTFE emitter (without waveguide)	
Horn antenna kit, 2" ASME 316L stainless steel flange 3" horn, PTFE emitter ¹⁾⁴⁾	PBD-51006K020AAAA
Horn antenna kit, 2" ASME 316L stainless steel flange 4" horn, PTFE emitter ¹⁾²⁾	PBD-51006K020AABA
Horn antenna kit, 2" ASME 316L stainless steel flange 6" horn, PTFE emitter ¹⁾²⁾	PBD-51006K020AACA
Horn antenna kit, 2" ASME 316L stainless steel flange 8" horn, PTFE emitter ¹⁾²⁾	PBD-51006K020AADA
Horn antenna kit, DN 50 PN 16 316L stainless steel flange 80 mm horn, PTFE emitter ¹⁾²⁾	PBD-51006K050AJAA
Horn antenna kit, DN 50 PN 16 316L stainless steel flange 100 mm horn, PTFE emitter ¹⁾²⁾	PBD-51006K050AJBA
Horn antenna kit, DN 50 PN 16 316L stainless steel flange 150 mm horn, PTFE emitter ¹⁾²⁾	PBD-51006K050AJCA
Horn antenna kit, DN 50 PN 16 316L stainless steel flange 200 mm horn, PTFE emitter ¹⁾²⁾	PBD-51006K050AJDA
SITRANS LR200 PTFE flanged rod antenna kit with 316L stainless steel shield and 316L stainless steel flat faced flange	
PTFE shielded rod antenna kit, flanged, 3" ASME 150 lb 316L stainless steel flange, 100 mm 316L stainless steel shield. ¹⁾⁴⁾	PBD-51014K0100AAA
PTFE shielded rod antenna kit, flanged, DN 80 PN 16 316L stainless steel flange, 100 mm 316L stainless steel shield. ¹⁾⁴⁾	PBD-51014K0100EJA
PTFE shielded rod antenna kit, flanged, 3" ASME 150 lb 316L stainless steel flange, 150 mm 316L stainless steel shield. ¹⁾⁴⁾	PBD-51014K0150AAA
PTFE shielded rod antenna kit, flanged, DN 80 PN 16 316L stainless steel flange, 150 mm 316L stainless steel shield. ¹⁾⁴⁾	PBD-51014K0150EJA
PTFE shielded rod antenna kit, flanged, 3" ASME 150 lb 316L stainless steel flange, 200 mm 316L stainless steel shield. ¹⁾⁴⁾	PBD-51014K0200AAA
PTFE shielded rod antenna kit, flanged, DN 80 PN 16 316L stainless steel flange, 200 mm 316L stainless steel shield. ¹⁾⁴⁾	PBD-51014K0200EJA
PTFE shielded rod antenna kit, flanged, 3" ASME 150 lb 316L stainless steel flange, 250 mm 316L stainless steel shield. ¹⁾⁴⁾	PBD-51014K0250AAA
PTFE shielded rod antenna kit, flanged, DN 80 PN 16 316L stainless steel flange, 250 mm 316L stainless steel shield. ¹⁾⁴⁾	PBD-51014K0250EJA
PTFE paste	
Kit, PTFE paste, Tube, 250 mL	PBD-51036065
Cable gland	
One metallic cable gland M20 x 1.5, rated -40 ... +80 °C (-40 ... +176 °F), HART	7ML1930-1AP
One metallic cable gland M20 x 1.5, rated -40 ... +80 °C (-40 ... +176 °F), PROFIBUS PA	7ML1930-1AQ

¹⁾ Available in flange sizes including ASME, DIN and JIS. Please consult a local sales person for details.

²⁾ Available with no pressure rating. Please consult a local sales person for details.

³⁾ Available in other shield lengths. Please consult a local sales person for details.

⁴⁾ Available with Pressure rating. Please consult a local sales person for details.

Customers interested in a custom designed device should consult a local sales person. For more information, please visit http://www.automation.siemens.com/aspa_app.

Technical specifications

SITRANS LR200	
Mode of operation	
Measuring principle	Radar level measurement
Frequency	C-band, approx. 6 GHz
Measuring range	0.3 ... 20 m (1.0 ... 65 ft)
Output	
Analog output	4 ... 20 mA
Accuracy	± 0.02 mA
Span	Proportional or inversely proportional
Communications	HART Optional: PROFIBUS PA (Profile 3.0, Class B)
Fail-safe	Programmable as high, low or hold (Loss of Echo)
Performance (according to reference conditions IEC60770-1)	
From end of antenna to 600 mm	40 mm (1.57 inch)
Remainder of range	10 mm (0.4 inch) or 0.1 % of span (whichever is greater)
Rated operating conditions	
Installation conditions	
• Location	Indoor/outdoor
Ambient conditions (enclosure)	
• Ambient temperature	-40 ... +80 °C (-40 ... +176 °F)
• Storage temperature	-40 ... +80 °C (-40 ... +176 °F)
• Installation category	I
• Pollution degree	4
Medium conditions	
Dielectric constant ϵ_r	$\epsilon_r > 1.6$ (for $\epsilon_r < 3$, use stillpipe)
Vessel temperature and pressure	Varies with connection type; see Pressure/Temperature curves for more information
Design	
Enclosure	
• Material	Aluminum, polyester powder coated
• Cable inlet	2 x M20 x 1.5 or 2 x ½" NPT
Degree of protection	Type 4X/NEMA 4X, Type 6/ NEMA 6, IP67, IP68
Weight	< 2.82 kg (6.21 lb) (polypropylene rod antenna)
Display (local)	Multi-segment alphanumeric liquid crystal with bar graph (representing level) available in four languages
Antenna	
• Material	Polypropylene rod, hermetically sealed construction, optional PTFE
• Dimensions	Standard 100 mm (4 inch) shield for maximum 100 mm (4 inch) nozzle, or optional 250 mm (10 inch) long shield
• Optional rods and horn	Refer to SITRANS LR200 Antennas for optional rods and horns
Process connections	
• Process connection	1½" NPT [(Taper), ASME B1.20.1] R 1½" [(BSPT), EN 10226], or G 1½" [(BSPP), EN ISO 228-1] (polypropylene rod antenna)
• Flange connection	Refer to SITRANS LR200 Antennas for more connections
Power supply	
4 ... 20 mA/HART	
• General Purpose, Non-incendive, Intrinsically Safe	Nominal 24 V DC (max. 30 V DC) with max. 550 Ω

Technical specifications (continued)

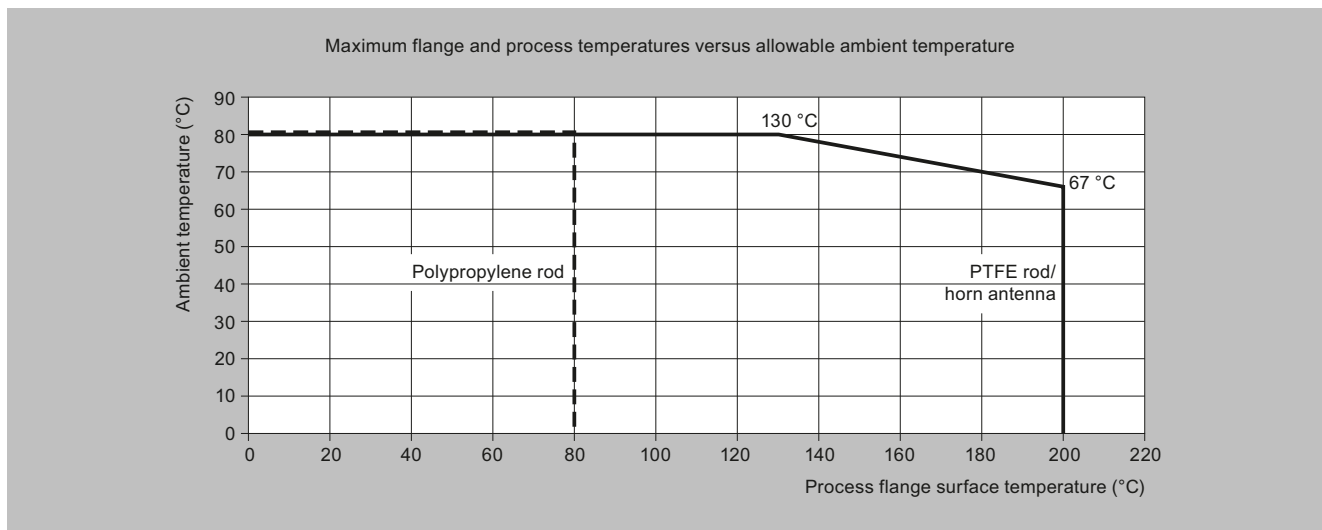
SITRANS LR200	
• Flame proof, Increased safety, Explosion proof	Nominal 24 V DC (max. 30 V DC) with max. 250 Ω
PROFIBUS PA	• 10.5 mA • Per IEC 61158-2
Certificates and approvals	
General	CSA _{US/IC} , CE, FM, RCM
Marine	• Lloyd's Register of Shipping • ABS Type Approval
Radio	FCC, Industry Canada, and European (RED), RCM
Hazardous	
• Intrinsically Safe (Brazil)	INMETRO Ex ia IIC T4 Ga
• Explosion Proof (Canada/USA)	CSA/FM, Class I, Div. 1, Groups A, B, C, D; Class II, Div. 1, Groups E, F, G; Class III, T4
• Intrinsically Safe (Canada/USA)	CSA/FM, Class I, Div. 1, Groups A, B, C, D; Class II, Div. 1, Groups E, F, G; Class III, T4
• Non-incendive (USA)	FM, Class I, Div. 2, Groups A, B, C, D, T5
• Flame Proof/Increased Safety (China)	NEPSI Ex d mb ia IIC T4/ Ex e mb ia IIC T4
• Flame Proof (Europe)	ATEX II 1/2 G Ex d mb ia IIC T4 Ga/Gb
• Flame Proof (UK)	UKEX II 1/2 G Ex d mb ia IIC T4 Ga/Gb
• Increased Safety (Europe)	ATEX II 1/2 G Ex e mb ia IIC T4 Ga/Gb
• Increased Safety (UK)	UKEX II 1/2 G Ex e mb ia IIC T4 Ga/Gb
• Intrinsically Safe (Europe)	ATEX II 1G Ex ia IIC T4 Ga
• Intrinsically Safe (UK)	UKEX II 1G Ex ia IIC T4 Ga
• Intrinsically Safe (International)	IECEX Ex ia IIC T4
• Intrinsically Safe (Russia/Kazakhstan)	EAC Ex ia
Programming	
Intrinsically Safe Siemens handheld programmer	Infrared receiver
• Approvals for handheld programmer	IS model: ATEX II 1 GD Ex ia op is IIC T4 Ga, ATEX II 1 GD Ex ia op is IIC T135°C Da, Ta = -20°C to +50°C; UKEX II 1 GD Ex ia op is IIC T4 Ga, UKEX II 1 GD Ex ia op is IIC T135°C Da, Ta = -20°C to +50°C; CSA/FM Class I, II, III, Div. 1, Groups A, B, C, D, E, G, T6, Ta = 50°C; IECEX SIR 09.0073
Handheld communicator	HART communicator 375
PC	• SIMATIC PDM • AMS • SITRANS DTM (for connecting to FDT such as PACTware or Fieldcare)
Display (local)	Multi-segment alphanumeric liquid crystal with bar graph (representing level) available in four languages

Level Measurement

Continuous level measurement

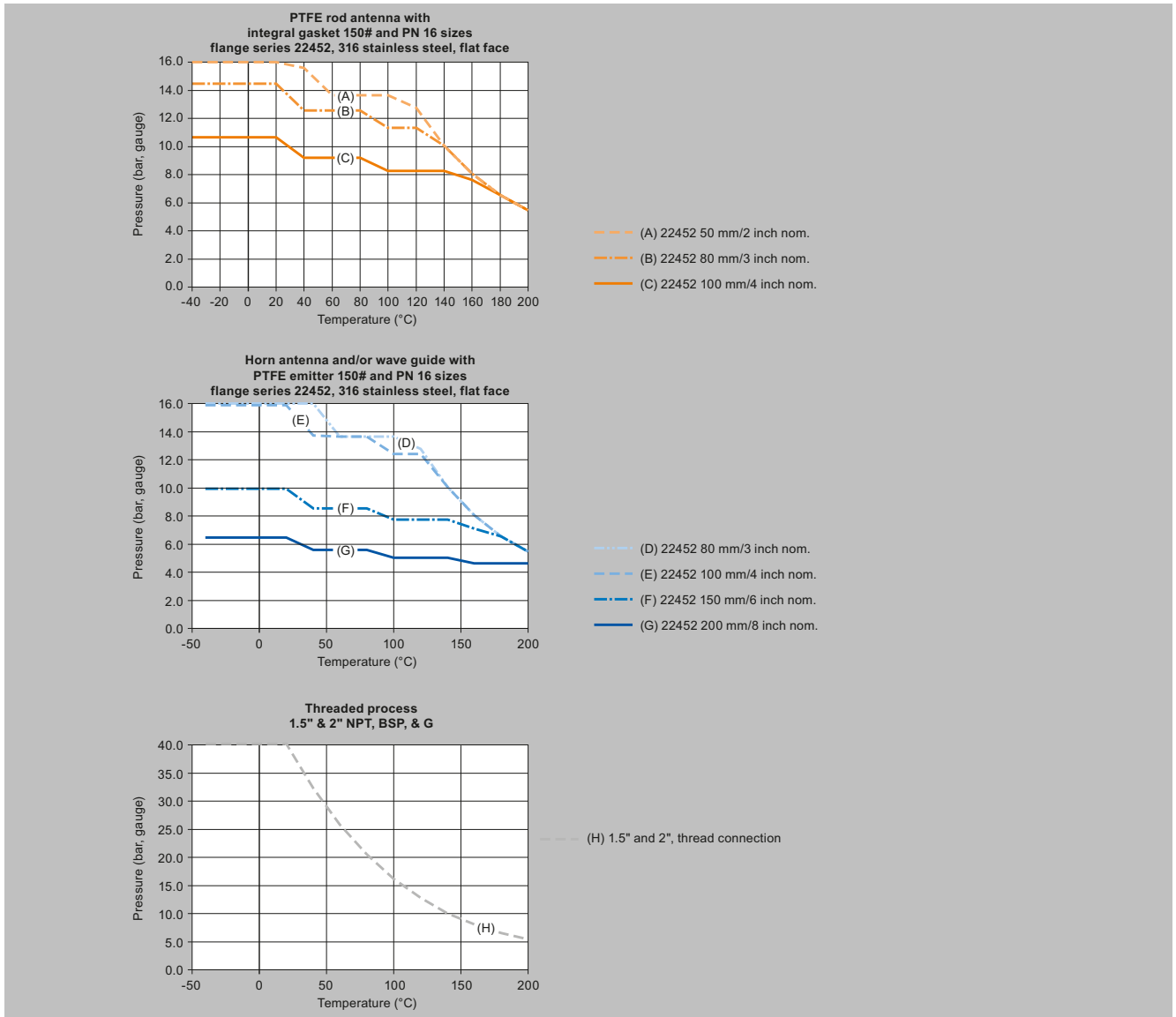
Radar level transmitters / SITRANS LR200

Characteristic curves



SITRANS LR200 ambient/process flange surface temperature curve

Characteristic curves (continued)



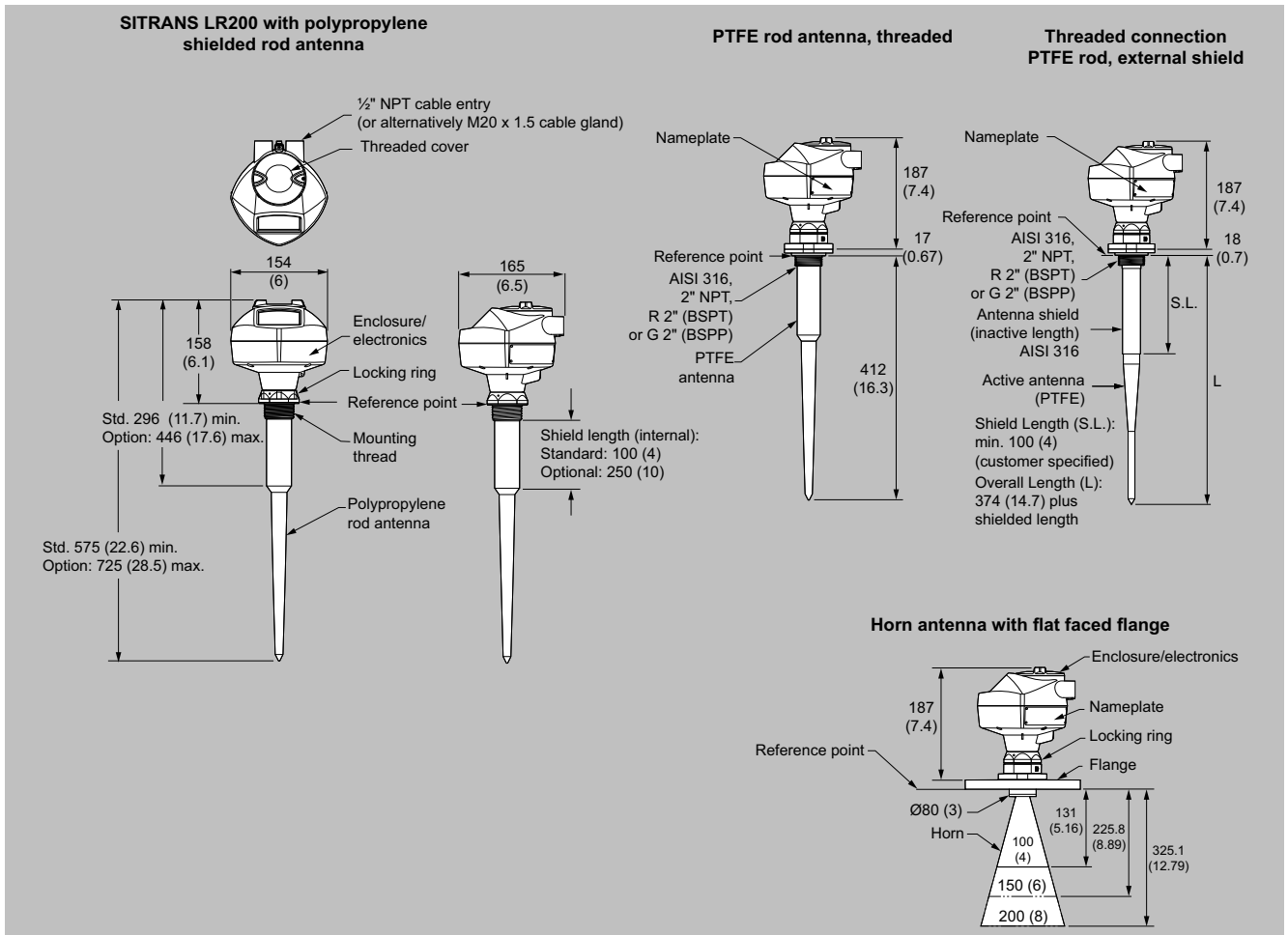
SITRANS LR200 process pressure/temperature derating curves

Level Measurement

Continuous level measurement

Radar level transmitters / SITRANS LR200

Dimensional drawings



SITRANS LR200, dimensions in mm (inch)

Circuit diagrams

Connect the wires to the terminals as shown: the polarity is identified on the terminal block.

Gland may or may not be provided, depending on approval option.

Shield for HART and PROFIBUS PA intrinsically safe versions only.

Hand programmer

SIEMENS

1	2	3	4
5	6	7	8
9	0	.	/+
C	Home	Print	Copy
←	↑	↓	→

Part number:
7ML1930-1BK

Notes:

1. DC terminal shall be supplied from an SELV source in accordance with IEC 61010-1 Annex H.
2. All field wiring must have insulation suitable for rated input voltages.
3. Use shielded twisted pair cable (14 ... 22 AWG) for HART version.
4. Separate cables and conduit may be required to conform to standard instrumentation wiring practices or electrical codes.

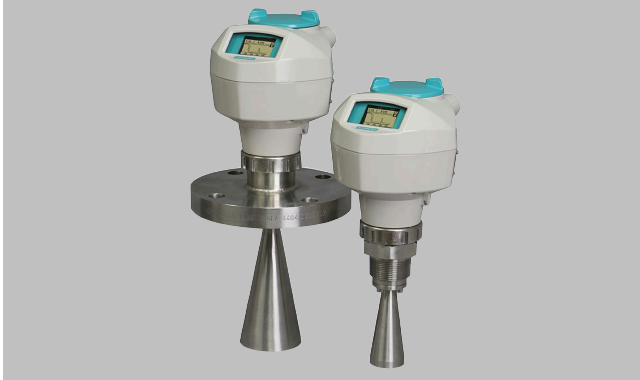
SITRANS LR200 connections

Level Measurement

Continuous level measurement

Radar level transmitters / SITRANS LR250 Horn Antenna

Overview



SITRANS LR250 is a 2-wire, 25 GHz pulse radar level transmitter for continuous monitoring of liquids and slurries in storage and process vessels including high temperature and pressure, to a range of 20 m (66 ft).

Benefits

- Graphical local user interface (LUI) makes operation simple with plug-and-play setup using the intuitive Quick Start Wizard
- LUI displays echo profiles for diagnostic support
- 25 GHz high frequency allows for small antennas for easy mounting in nozzles
- Insensitive to mounting location and obstructions, and less sensitive to nozzle interference
- Short blanking distance for improved minimum measuring range to 50 mm (2 inch) from the end of the antenna
- Communication using HART or PROFIBUS PA
- Process Intelligence signal processing for improved measurement reliability and Auto False-Echo Suppression of fixed obstructions
- Programming using infrared Intrinsically Safe handheld programmer or over a network using SIMATIC PDM, Emerson AMS, or Field Device Tools such as PACTware or Fieldcare via SITRANS DTM
- Functional Safety (SIL 2). Device suitable for use in accordance with IEC 61508 and IEC 61511
- 3 mm (0.118 inch) accuracy in accordance with IEC 60770-1
- Suitable for API 2350

Application

SITRANS LR250 includes a graphical local user interface (LUI) that improves setup and operation by including an intuitive Quick Start Wizard, and echo profile displays for diagnostic support. Startup is easy using the Quick Start wizard with a few parameters required for basic operation.

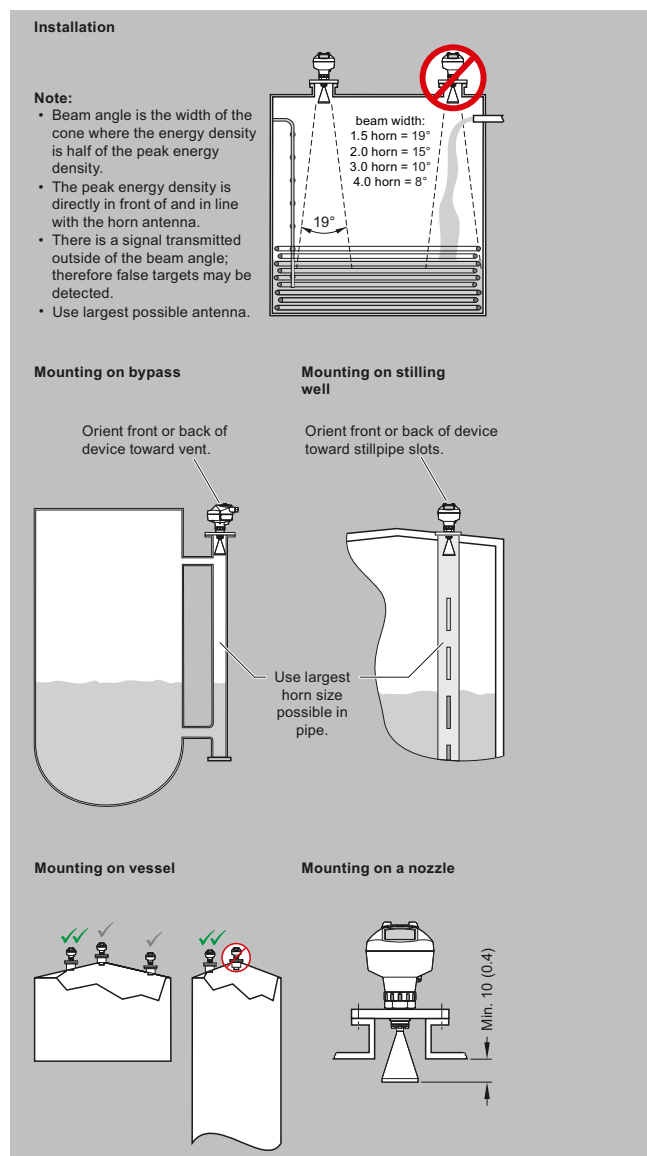
The 25 GHz frequency creates a narrow, focused beam allowing for smaller horn antenna options and decreasing sensitivity to obstructions.

SITRANS LR250's unique design allows safe and simple programming using the Intrinsically Safe handheld programmer without having to open the instrument's lid.

SITRANS LR250 measures superbly on low dielectric media, and in small vessels, as well as tall and narrow vessels.

- Key Applications: liquid bulk storage tanks, process vessels, vaporous liquids, high temperatures, low dielectric media and applications with functional safety requirements

Configuration



SITRANS LR250 installation, dimensions in mm (inch)

Level Measurement

Continuous level measurement

Radar level transmitters / SITRANS LR250 Horn Antenna

Selection and ordering data

		Article No.	
SITRANS LR250 Radar level transmitter Continuous, non-contact, 20 m (66 ft) range, for liquids and slurries.		7ML5431- ● ● ● ● 0 - ● ● ● ●	
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.			
Process Connection and Antenna Material			
316L (1.4435 or 1.4404) stainless steel, PTFE emitter, FKM seal ¹⁾		0	
316L (1.4435 or 1.4404) stainless steel, PTFE emitter, FFKM seal ¹⁾		1	
Process Connection Type			
Threaded connection 316L			
1½" NPT (ASME B1.20.1) (tapered thread) ³⁾		A	A
R 1½" [(BSPT), EN 10226-1] (tapered thread) ³⁾		A	B
G 1½" [(BSPP), EN ISO 228-1] (parallel thread) ³⁾		A	C
2" NPT (ASME B1.20.1) (tapered thread) ⁴⁾		A	D
R 2" [(BSPT), EN 10226-1] (tapered thread) ⁴⁾		A	E
G 2" [(BSPP), EN ISO 228-1] (parallel thread) ⁴⁾		A	F
3" NPT (ASME B1.20.1) (tapered thread) ⁴⁾		A	G
R 3" [(BSPT), EN 10226-1] (tapered thread) ⁴⁾		A	H
G 3" [(BSPP), EN ISO 228-1] (parallel thread) ⁴⁾		A	J
Flanged connection 316L			
2" Class 150 ASME B16.5, raised face ⁴⁾		B	D
3" Class 150 ASME B16.5, raised face ⁴⁾		B	E
4" Class 150 ASME B16.5, raised face ⁴⁾		B	F
2" Class 300 ASME B16.5, raised face ⁴⁾		C	D
3" Class 300 ASME B16.5, raised face ⁴⁾		C	E
4" Class 300 ASME B16.5, raised face ⁴⁾		C	F
50A 10K JIS B 2220 flat face ⁴⁾		F	A
80A 10K JIS B 2220 flat face ⁴⁾		F	B
100A 10K JIS B 2220 flat face ⁴⁾		F	C
DN 50 PN 16 EN 1092-1 Type B1 raised face ⁴⁾		G	A
DN 80 PN 16 EN 1092-1 Type B1 raised face ⁴⁾		G	B
DN 100 PN 16 EN 1092-1 Type B1 raised face ⁴⁾		G	C
DN 150 PN 16 EN 1092-1 Type B1 raised face ⁴⁾		G	D
DN 50 PN 40 EN 1092-1 Type B1 raised face ⁴⁾		H	A
DN 80 PN 40 EN 1092-1 Type B1 raised face ⁴⁾		H	B
DN 100 PN 40 EN 1092-1 Type B1 raised face ⁴⁾		H	C
DN 150 PN 40 EN 1092-1 Type B1 raised face ⁴⁾		H	D
Communication/Output			
PROFIBUS PA ⁵⁾			1
4 ... 20 mA, HART, start-up at < 3.6 mA			2
Enclosure/Cable inlet			
Aluminum, Epoxy painted			
2 x ½" NPT			0
2 x M20 x 1.5			1
Antenna			
1½" horn			A
2" horn (fits 2" ASME or DN 50 nozzles)			B
3" horn (fits 3" ASME or DN 80 nozzles)			C
4" horn (fits 4" ASME or DN 100 nozzles)			D
1½" horn with 100 mm extension			E
2" horn with 100 mm extension			F
3" horn with 100 mm extension			G
4" horn with 100 mm extension			H
Approvals			
Ordinary Locations/General Purpose (Non-Ex), CE, UKCA, CSA, FM, FCC, RED, RCM			A
Intrinsically Safe: CSA/FM Class I, Div. 1, Groups A, B, C, D, Class II, Div. 1, Groups E, F, G, Class III T4			B
FCC, Industry Canada			

Selection and ordering data (continued)

	Article No.
SITRANS LR250 Radar level transmitter Continuous, non-contact, 20 m (66 ft) range, for liquids and slurries.	7ML5431- ● ● ● ● 0 - ● ● ● ●
Intrinsically Safe: ATEX II 1G Ex ia IIC T4 Ga, ATEX II 1D Ex ia ta IIIC T100°C Da; UKEX II 1G Ex ia IIC T4 Ga, UKEX II 1D Ex ia ta IIIC T100°C Da; IECEX Ex ia IIC T4 Ga, IECEX 1D Ex ia ta IIIC T100°C Da; INMETRO Ex ia IIC T4 Ga, INMETRO Ex ia ta IIIC T100°C Da, IP67/IP68; EAC Ex 0Ex ia IIC T4 Ga X, EAC Ex 0Ex ia ta IIIC T100°C Da X; CE, UKCA, RED, RCM	C
Non-incendive: CSA/FM Class I, Div. 2, Groups A, B, C, D T5, FCC, Industry Canada	D
Increased Safety / Non Sparking: ATEX II 3G Ex ec IIC T4 Gc; UKEX II 3G Ex ec IIC T4 Gc; EAC Ex 2Ex nA IIC T4 Gc X; CE, UKCA, RED, RCM	E
Increased Safety: ATEX II 1/2 GD, 1D, 2D, Ex eb mb ia IIC T4 Ga/Gb; UKEX II 1/2 GD, 1D, 2D, Ex eb mb ia IIC T4 Ga/Gb; IECEX Ex eb ia mb IIC T4 Ga/Gb; INMETRO Ex e ia mb IIC T4 Ga/Gb, INMETRO Ex ia ta IIIC T100°C Da, IP67/IP68; EAC Ex Ga/Gb Ex ia/le+mb IIC T4 X; CE, UKCA, RED, RCM ⁶⁾	F
Flameproof: ATEX II 1/2 GD, 1D, 2D, Ex db mb ia IIC T4 Ga/Gb; ATEX II 1/2 GD, 1D, 2D, Ex ia ta IIIC T100°C Da; UKEX II 1/2 GD, 1D, 2D, Ex db mb ia IIC T4 Ga/Gb; UKEX II 1/2 GD, 1D, 2D, Ex ia ta IIIC T100°C Da; IECEX Ex db mb ia IIC T4 Ga/Gb, IECEX Ex ia ta IIIC T100°C Da; INMETRO Ex d ia mb IIC T4 Ga/Gb, INMETRO Ex ia ta IIIC T100°C Da, IP67/IP68; EAC Ex Ga/Gb Ex ia/db+mb IIC T4 X, EAC Ex Ex ia ta IIIC T100°C Da; CE, UKCA, RED, RCM ⁶⁾	G
Explosion proof: CSA/FM Class I, II, and III, Div. 1, Groups A, B, C, D, E, F, G, FCC, Industry Canada ⁶⁾	H
Non Sparking: NEPSI Ex nA IIC T4 Gc	K
Intrinsically Safe: NEPSI Ex ia IIC T4 Ga, Ex iaD tD A20 IP67 T100 °C	L
Flameproof: NEPSI Ex d ia mb IIC T4 Ga/Gb, Ex iaD tD A20 IP67 T100 °C ⁶⁾	M
Increased Safety: NEPSI Ex e ia mb IIC T4 Ga/Gb, Ex iaD tD A20 IP67 T100 °C ⁶⁾	N
Pressure rating	
Rating per Pressure/Temperature curves in manual	0
0.5 bar g (7.25 psi g) maximum ⁷⁾	1

- 1) Available with process connection options AA ... HD and Antenna Versions A ... H only.
- 2) Available with process connection options JA ... MH and Antenna Versions J ... P only.
- 3) Not available with Antenna options B, C, D, F, G, H.
- 4) Not available with Antenna options A and E.
- 5) Available with Approval options A, B, C, D, K, and L.
- 6) Available only with Communications option 2.
- 7) Available with Process Connection and Antenna Material 0, 1, 2, and 3 only.

Selection and Ordering data	Order code
Further designs	
Please add "-Z" to Article No. and specify Order code(s).	
Plug M12 with mating Connector ¹⁾²⁾³⁾	A50
Plug 7/8" with mating Connector ²⁾³⁾⁴⁾	A55
Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: Measuring-point number/identification (max. 27 characters); specify in plain text	Y15
Manufacturer's Test Certificate: M to DIN 55350, Part 18 and to ISO 9000	C11

Level Measurement

Continuous level measurement

Radar level transmitters / SITRANS LR250 Horn Antenna


Selection and ordering data (continued)

Selection and Ordering data	Order code
Material inspection certificate 3.1 of EN 10204	C12
Functional Safety (SIL 2). Device suitable for use in accordance with IEC 61508 and IEC 61511 ³⁾⁵⁾	C20
Namur NE43 compliant, device preset to failsafe < 3.6 mA ⁵⁾	N07




Accessories	Article No.
Operating Instructions	
All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation	
Accessories	
Handheld programmer, Intrinsically safe, EEx ia	7ML1930-1BK
HART modem with USB interface	7MF4997-1DB
One metallic cable gland M20 x 1.5, rated -40 ... +80 °C (-40 ... +176 °F), HART (two are required)	7ML1930-1AP
One metallic cable gland M20 x 1.5, rated -40 ... +80 °C (-40 ... +176 °F), PROFIBUS PA (two are required) ⁶⁾	7ML1930-1AQ
FDA approved FKM O-ring for 2" G (BSPP) process connections -28 ... +80 °C (-28 ... +176 °F)	7ML1830-3AN
SITRANS RD100, loop powered display -see Chapter 7	7ML5741-.....
SITRANS RD150, remote digital display for 4 ... 20 mA and HART devices - see Chapter 7	7ML5742-.....
SITRANS RD200, universal input display with Modbus conversion - see Chapter 7	7ML5740-.....
SITRANS RD300, dual line display with totalizer and linearization curve and Modbus conversion - see Chapter 7	7ML5744-.....
For applicable back up point level switch - see point level measurement section	

- 1) Available with enclosure option 1 only.
- 2) To be used with communication options 1 and 3 only. Connector has IP67 rating.
- 3) Available with approval options A and B. Available with approval option C for use on intrinsically safe applications only. Not rated for dust Ex.
- 4) Available with enclosure option 0 only.
- 5) Applicable to communication option 2 only.
- 6) For use with communication options 1 and 3 only.

Selection and Ordering Data

SITRANS LR250 Spare parts	
SITRANS LR250 horn version enclosures (PROFIBUS PA models)	
SITRANS LR250 horn version enclosure with board stack, NPT cable inlet, approval option A, with PROFIBUS PA communication, no process connection	A5E01156836
SITRANS LR250 horn version enclosure with board stack, M20 cable inlet, approval option A, with PROFIBUS PA communication, no process connection	A5E01156838
SITRANS LR250 horn version enclosure with board stack, M20 cable inlet, approval option B, with PROFIBUS PA communication, no process connection	A5E01156841
SITRANS LR250 horn version enclosure with board stack, NPT cable inlet, approval option C, with PROFIBUS PA communication, no process connection	A5E01156843

Selection and ordering data (continued)

SITRANS LR250 Spare parts	
SITRANS LR250 horn version enclosure with board stack, M20 cable inlet, approval option C, with PROFIBUS PA communication, no process connection	A5E01156844
SITRANS LR250 horn version enclosure with board stack, NPT cable inlet, approval option D, with PROFIBUS communication, no process connection	A5E01156846
SITRANS LR250 horn version enclosure with board stack, M20 cable inlet, approval option D, with PROFIBUS PA communication, no process connection	A5E01156848
SITRANS LR250 horn version enclosures (< 3.6 mA start-up HART)	
SITRANS LR250 horn version enclosure with board stack, M20 cable inlet, approval option A, with HART communication start-up at < 3.6 mA, no process connection	A5E02956317
SITRANS LR250 horn version enclosure with board stack, M20 cable inlet, approval option C, with HART communication start-up at < 3.6 mA, no process connection	A5E02956319
SITRANS LR250 horn version enclosure with board stack, M20 cable inlet, approval option E, with HART communication start-up at < 3.6 mA, no process connection	A5E02956320
SITRANS LR250 horn version enclosure with board stack, M20 cable inlet, approval option F, with HART communication start-up at < 3.6 mA, no process connection	A5E02956322
SITRANS LR250 horn version enclosure with board stack, M20 cable inlet, approval option G, with HART communication start-up at < 3.6 mA, no process connection	A5E02956323
LR250 horn version enclosure with board stack, NPT cable inlet, approval option A, with HART communication start-up at < 3.6 mA, no process connection	A5E03441096
LR250 horn version enclosure with board stack, NPT cable inlet, approval option B, with HART communication start-up at < 3.6 mA, no process connection	A5E03441097
LR250 horn version enclosure with board stack, NPT cable inlet, approval option H, with HART communication start-up at < 3.6 mA, no process connection	A5E03441099
Sun shield for SITRANS LR250 enclosure, stainless steel	
	A5E39142556
SITRANS LR250 horn antenna and extension kits	
38 mm (1.5 inch) horn antenna kit, 1.5 inch Process Connections only	A5E01151539
100 mm (4 inch) horn antenna extension kit, 1.5 inch process connections only	A5E01151553
50 mm (2 inch) stainless steel 316L horn antenna kit	A5E01151569
75 mm (3 inch) stainless steel 316L horn antenna kit	A5E01151571
100 mm (4 inch) stainless steel 316L horn antenna kit	A5E01151573
100 mm (4 inch) horn antenna extension kit, 50 mm (2 inch), 75 mm (3 inch), and 100 mm (4 inch) process connection	A5E01151577
5 Dupont 1Gr Polyback, PTFE grease kit	A5E01151626
SITRANS LR250 lid with O-ring	A5E02465410
Ex-proof plugs	
Ex-proof plugs kit, 1/2" NPT, qty 5	A5E39979991
Ex-proof plugs kit, M20, qty 5	A5E39979992
Emitter kit for SITRANS LR250 horn antenna	
Emitter kit for horn antenna	A5E39242718

Level Measurement

Continuous level measurement

Radar level transmitters / SITRANS LR250 Horn Antenna

Selection and ordering data (continued)

For special requests please consult a local sales person. For more information, please visit http://www.automation.siemens.com/aspa_app.

Technical specifications

SITRANS LR250 Horn Antenna	
Mode of operation	
Measuring principle	Radar level measurement
Frequency	K-band (25.0 GHz)
Minimum measuring range	50 mm (2 inch) from end of antenna
Maximum measuring range	20 m (65 ft), antenna dependent
Output	
HART	Version 5.1
• Analog output	4 ... 20 mA
• Accuracy	± 0.02 mA
• Fail-safe	<ul style="list-style-type: none"> Programmable as high low or hold (loss of echo) NE 43 programmable
PROFIBUS PA	Profile 3.01
• Function blocks	2 Analog Input (AI)
Performance (according to reference conditions IEC60770-1)	
Maximum measured error	3 mm (0.118 inch)
Influence of ambient temperature	< 0.003 %/K
Rated operating conditions	
Installation conditions	
• Location	Indoor/outdoor
Ambient conditions (enclosure)	
• Ambient temperature	-40 ... +80 °C (-40 ... +176 °F)
• Storage temperature	-40 ... +80 °C (-40 ... +176 °F)
• Installation category	I
• Pollution degree	4
Medium conditions	
Dielectric constant ϵ_r	> 1.6, antenna and application dependent
Process temperature	-40 ... +200 °C (-40 ... +392 °F) (at process connection with FKM O-ring) -20 ... +200 °C (-4 ... +392 °F) (at process connection with FFKM O-ring)
Process pressure	Up to 40 bar g (580 psi g), process connection and temperature dependent. See Pressure/Temperature curves for more information
Design	
Enclosure	
• Material	Aluminum, polyester powder-coated
• Cable inlet	2 x M20 x 1.5 or 2 x 1/2" NPT
Degree of protection	Type 4X/NEMA 4X, Type 6/NEMA 6, IP67, IP68
Weight	< 3 kg (6.6 lb) 3.75 mm (1/2 inch) threaded connection with 1/2" horn antenna
Display (local)	Graphic local user interface including quick start wizard and echo profile display
Antenna	
• Material	316L stainless steel
• Dimensions (nominal horn sizes)	Standard 1.5 inch (40 mm), 2 inch (48 mm), 3 inch (75 mm), 4 inch (95 mm) horn, and optional 100 mm (4 inch) horn extension
Process connections	
• Process connection	1 1/2", 2" or 3" NPT [(Taper), ASME B1.20.1] R 1 1/2", 2" or 3" [(BSPT), EN 10226] G 1 1/2", 2" or 3" [(BSPP), EN ISO 228-1]
• Flange connection	2", 3", 4" (ASME 150, 300 lb), 50, 80, 100 mm (PN 16, 40, JIS 10K)

Technical specifications (continued)

SITRANS LR250 Horn Antenna	
Power supply	
4 ... 20 mA/HART	Nominal 24 V DC (max. 30 V DC) with max. 550 Ω
PROFIBUS PA	<ul style="list-style-type: none"> 15 mA Per IEC 61158-2
Certificates and approvals	
General	cCSAUs, CE, UKCA, FM, RCM
Radio	FCC, Industry Canada, RED, RCM
Hazardous	
• Explosion Proof (Brazil)	INMETRO Ex d ia mb IIC T4 Ga/Gb, Ex ia ta IIIC T100 °C Da
• Increased Safety (Brazil)	INMETRO Ex e ia mb IIC T4 Ga/Gb, Ex ia ta IIIC T100 °C Da
• Intrinsically Safe (Brazil)	INMETRO Ex ia IIC T4 Ga, Ex ia ta IIIC T100 °C Da
• Explosion Proof (Canada/USA)	CSA/FM Class I, Div. 1, Groups A, B, C, D; Class II, Div. 1, Groups E, F, G; Class III T4
• Intrinsically Safe (Canada/USA)	CSA/FM Class I, Div. 1, Groups A, B, C, D; Class II, Div. 1, Groups E, F, G; Class III T4
• Non-incendive (Canada/USA)	CSA/FM Class I, Div. 2, Groups A, B, C, D T5
• Flame Proof/Increased Safety (China)	NEPSI Ex d ia mb IIC T4 Ga/Gb, Ex e ia mb IIC T4 Ga/Gb, Ex iaD tD A20 IP67 T100 °C
• Intrinsically Safe (China)	NEPSI Ex ia IIC T4 Ga, Ex iaD tD A20 IP67 T100 °C
• Non-sparking (China)	NEPSI Ex nA IIC T4 Gc
• Intrinsically Safe (EU)	ATEX II 1G Ex ia IIC T4 Ga, ATEX II 1D Ex ia ta IIIC T100°C Da;
• Intrinsically Safe (UK)	UKEX II 1G Ex ia IIC T4 Ga, UKEX II 1D Ex ia ta IIIC T100°C Da;
• Intrinsically Safe (International)	IECEx Ex ia IIC T4 Ga, IECEx Ex ia ta IIIC T100°C Da;
• Increased Safety - Zone 2 (EU)	ATEX II 3G Ex ec IIC T4 Gc;
• Increased Safety - Zone 2 (UK)	UKEX II 3G Ex ec IIC T4 Gc;
• Non-sparking (EAC)	EAC Ex 2Ex nA IIC T4 Gc;
• Flameproof (EU)	ATEX II 1/2 GD, 1D, 2D, Ex db mb ia IIC Ga/Gb, Ex ia ta IIIC T100°C Da;
• Flameproof (UK)	UKEX II 1/2 GD, 1D, 2D, Ex db mb ia IIC Ga/Gb, Ex ia ta IIIC T100°C Da;
• Flameproof (International)	IECEx Ex db mb ia IIC T4 Ga/Gb, Ex ia ta IIIC T100°C Da;
• Increased Safety - Zone 1 (EU)	ATEX II 1/2 GD, 1D, 2D, Ex eb mb ia IIC T4 Ga/Gb, Ex ia ta IIIC T100°C Da;
• Increased Safety - Zone 1 (UK)	UKEX II 1/2 GD, 1D, 2D, Ex eb mb ia IIC T4 Ga/Gb, Ex ia ta IIIC T100°C Da;
• Increased Safety - Zone 1 (International)	IECEx Ex eb mb ia IIC T4 Ga/Gb, Ex ia ta IIIC T100°C Da
• Explosion Proof (Russia/Kazakhstan)	EAC Ex d
• Increased Safety (Russia/Kazakhstan)	EAC Ex e
• Intrinsically Safe (Russia/Kazakhstan)	EAC Ex ia
• Marine	<ul style="list-style-type: none"> Lloyd's Register of Shipping ABS Type Approval Bureau Veritas
• Functional Safety	SIL-2 suitable in accordance with IEC 61508/61511

Technical specifications (continued)

SITRANS LR250 Horn Antenna

Programming

Intrinsically Safe Siemens handheld programmer

- Approvals for handheld programmer

Infrared receiver

IS model:

ATEX II 1 GD Ex ia op is IIC T4 Ga
 ATEX II 1 GD Ex ia op is IIIC T135°C Da
 UKEX II 1 GD Ex ia op is IIC T4 Ga
 UKEX II 1 GD Ex ia op is IIIC T135°C Da
 Ta = -20 ... +50°C
 CSA/FM Class I, II, III, Div. 1, Groups A, B, C, D, E, G, T6
 Ta = 50°C
 IECEx SIR 09.0073

Handheld communicator

HART communicator 375/475

PC

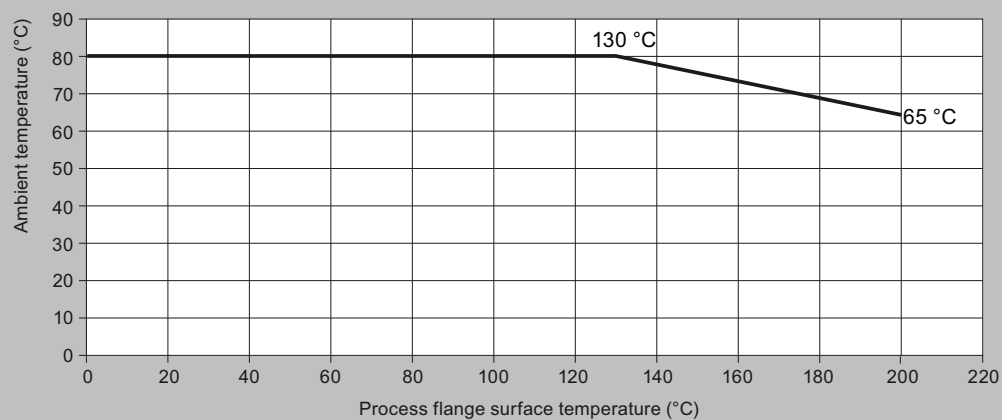
- SIMATIC PDM
- Emerson AMS
- SITRANS DTM (for connection into FDT such as PACTware or Fieldcare)

Display (local)

Graphic local user interface including quick start wizard and echo profile displays

Characteristic curves

Maximum flange and process temperatures versus allowable ambient temperature



SITRANS LR250 ambient/process flange surface temperature curve

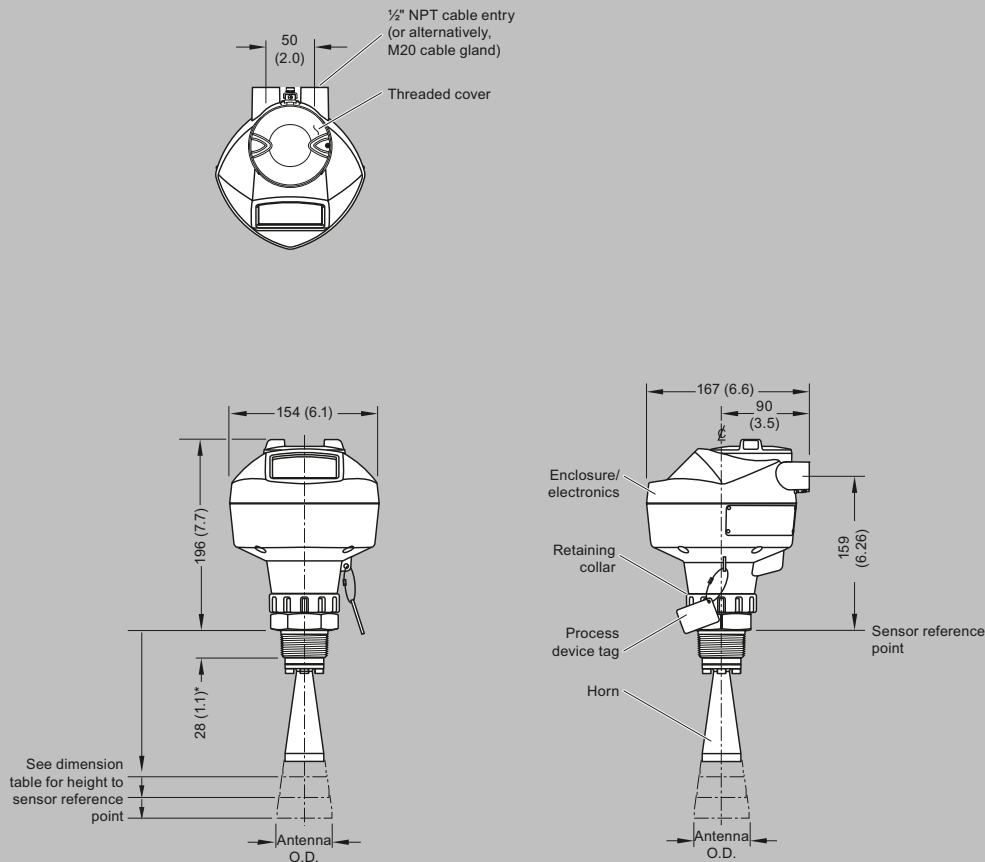
Level Measurement

Continuous level measurement

Radar level transmitters / SITRANS LR250 Horn Antenna

Dimensional drawings

Threaded Horn Antenna



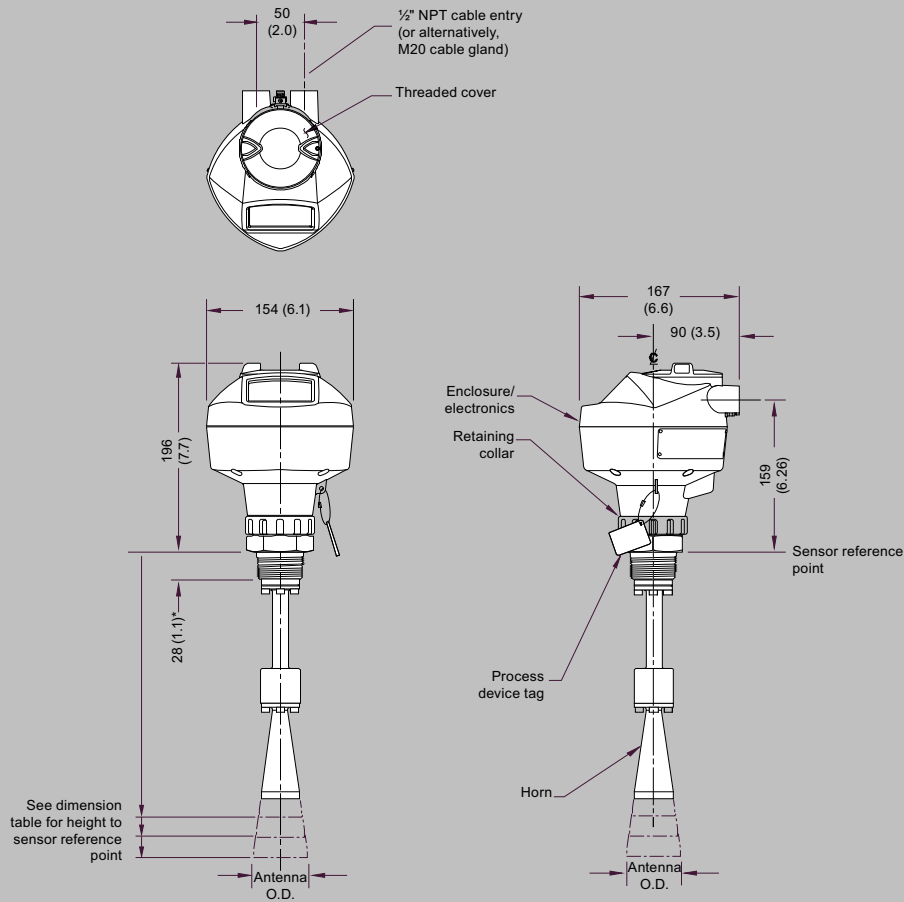
*28 mm (1.1) for 1.5 inch and 2 inch, 42 mm (1.65) for 3 inch

Antenna Type	Antenna O.D.	Height to sensor reference point			Beam angle	Measurement range
		1-1/2" threaded connection	2" threaded connection	3" threaded connection		
1.5" horn	39.8 (1.57)	135 (5.3)	N/A	N/A	19 degrees	10 m (32.8 ft)
2" horn	47.8 (1.88)	N/A	166 (6.55)	180 (7.09)	15 degrees	20 m (65.6 ft)
3" horn	74.8 (2.94)	N/A	199 (7.85)	213 (8.39)	10 degrees	20 m (65.6 ft)
4" horn	94.8 (3.73)	N/A	254 (10)	268 (10.55)	8 degrees	20 m (65.6 ft)

SITRANS LR250 Threaded Horn Antenna, dimensions in mm (inch)

Dimensional drawings (continued)

Threaded Horn Antenna with Extension



*28 mm (1.1) for 1.5 inch and 2 inch, 42 mm (1.65) for 3 inch

Antenna Type	Antenna O.D.	Height to sensor reference point			Beam angle	Measurement range
		1-1/2" threaded connection	2" threaded connection	3" threaded connection		
1.5" horn	39.8 (1.57)	235 (9.3)	N/A	N/A	19 degrees	10 m (32.8 ft)
2" horn	47.8 (1.88)	N/A	266 (10.47)	280 (11.02)	15 degrees	20 m (65.6 ft)
3" horn	74.8 (2.94)	N/A	299 (11.77)	313 (12.32)	10 degrees	20 m (65.6 ft)
4" horn	94.8 (3.73)	N/A	354 (13.94)	368 (14.49)	8 degrees	20 m (65.6 ft)

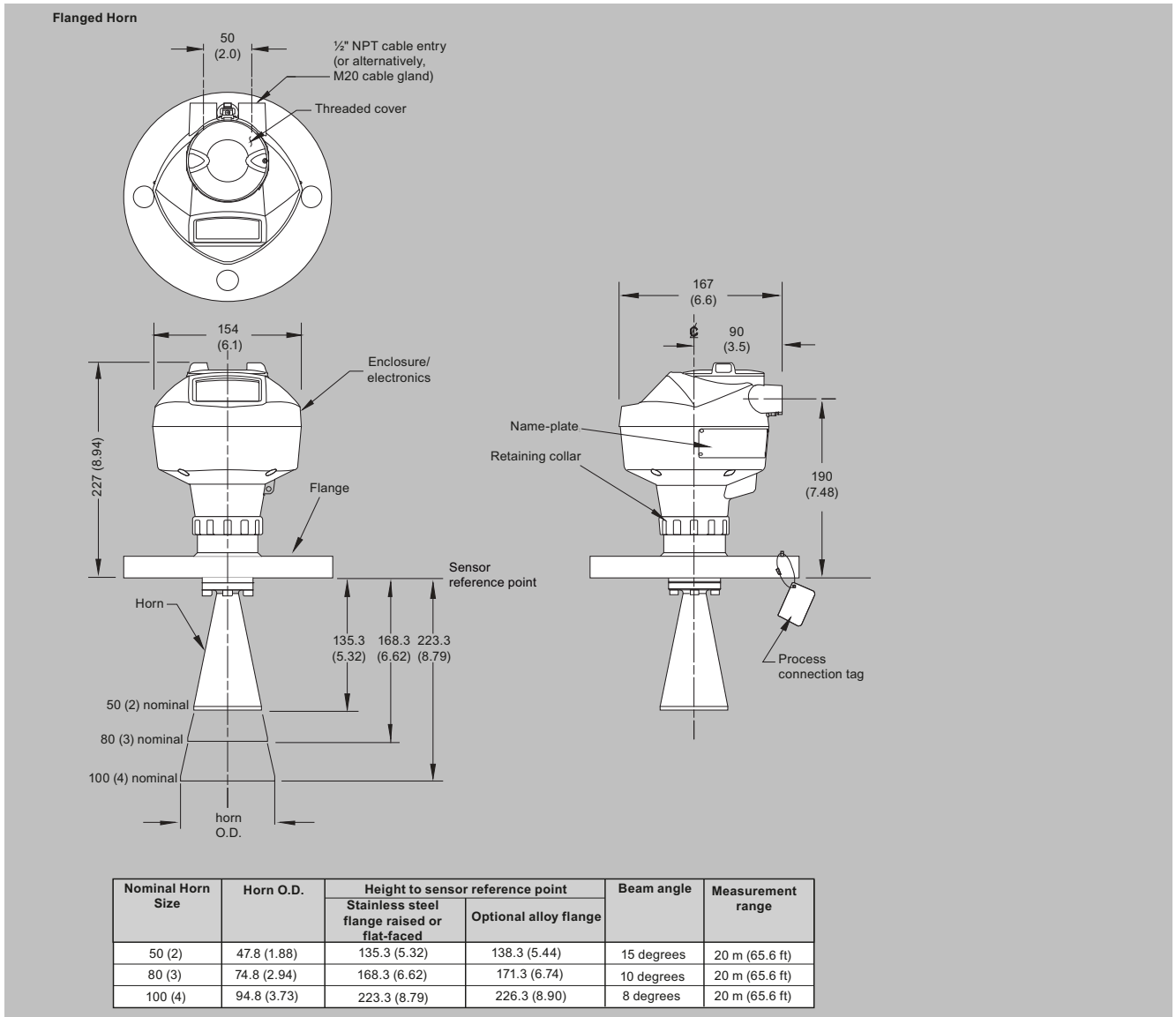
SITRANS LR250 Threaded Horn Antenna with extension, dimensions in mm (inch)

Level Measurement

Continuous level measurement

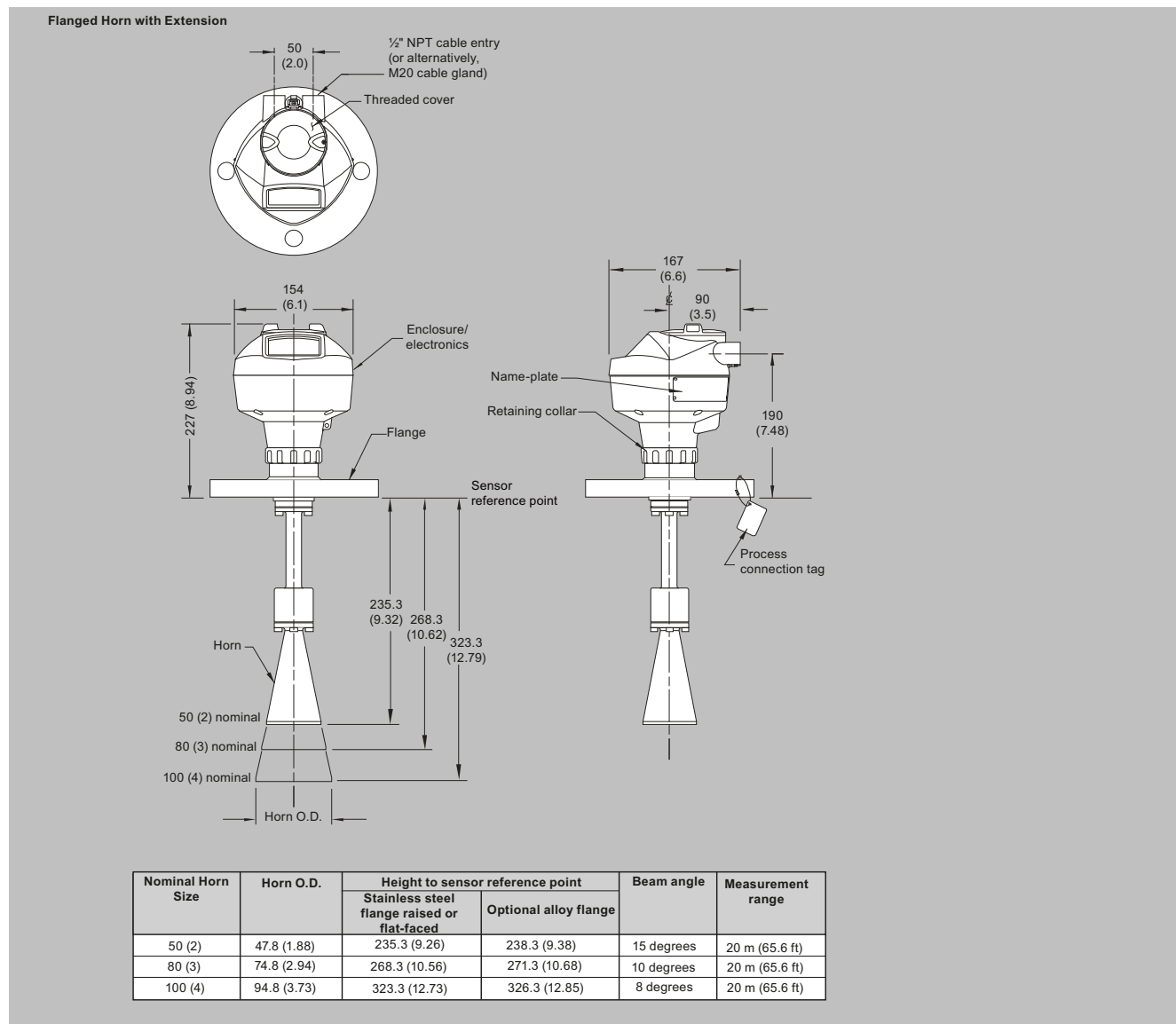
Radar level transmitters / SITRANS LR250 Horn Antenna

Dimensional drawings (continued)



SITRANS LR250 Flanged Horn Antenna, dimensions in mm (inch)

Dimensional drawings (continued)



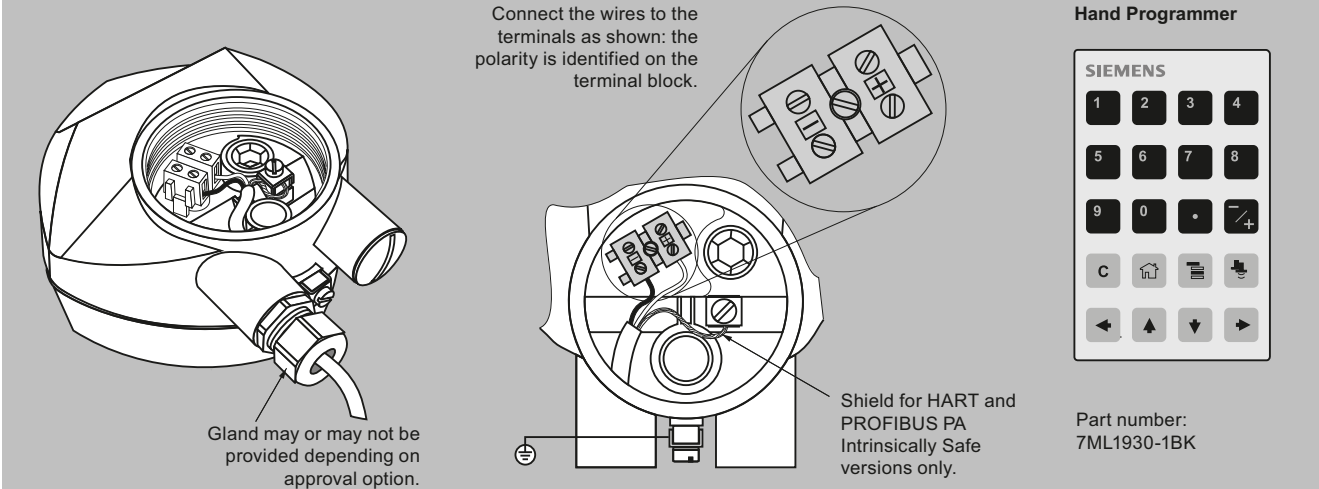
SITRANS LR250 Flanged Horn Antenna with extension, dimensions in mm (inch)

Level Measurement

Continuous level measurement

Radar level transmitters / SITRANS LR250 Horn Antenna

Circuit diagrams



Connect the wires to the terminals as shown: the polarity is identified on the terminal block.

Gland may or may not be provided depending on approval option.

Shield for HART and PROFIBUS PA Intrinsically Safe versions only.

Hand Programmer

SIEMENS

1	2	3	4
5	6	7	8
9	0	.	+/-
C	Home	List	Print
←	↑	↓	→

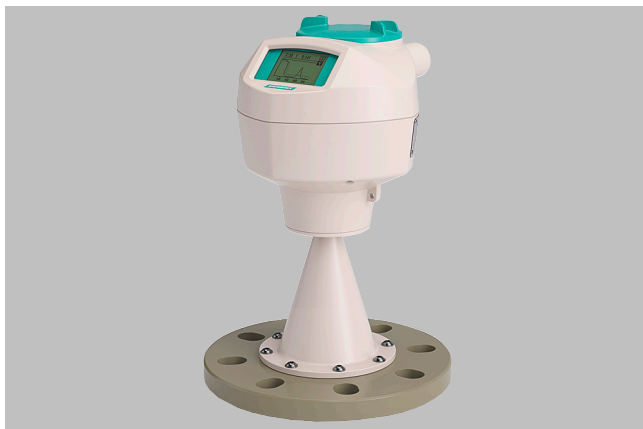
Part number:
7ML1930-1BK

Notes:

1. DC terminal shall be supplied from a source providing electrical isolation between the input and output, to meet the applicable safety requirements of IEC 61010-1.
2. All field wiring must have insulation suitable for rated input voltages.
3. Use shielded twisted pair cable (14 ... 22 AWG) for HART version.
4. Separate cables and conduit may be required to conform to standard instrumentation wiring practices or electrical codes.

SITRANS LR250 connections

Overview



SITRANS LR250 Polypropylene lens antenna is a 25 GHz pulse radar level transmitter for continuous monitoring of liquids and slurries in storage and process vessels including corrosive materials to a range of 20 m (65.6 ft).

Benefits

- For use in chemical environments where aggressive and corrosive materials are present.
- Graphical local user interface (LUI) makes operation simple with plug-and-play setup using the intuitive Quick Start Wizard
- LUI displays echo profiles for diagnostic support
- Communication using HART or PROFIBUS PA
- Process Intelligence signal processing for improved measurement reliability and Auto False-Echo Suppression of fixed obstructions
- Programming using infrared, Intrinsically Safe, handheld programmer or over a network using SIMATIC PDM, Emerson AMS, or Field Device Tools such as PACTware or Fieldcare via SITRANS DTM
- 3 mm (0.118 inch) accuracy in accordance with IEC 60770-1

Application

SITRANS LR250 includes a graphical local user interface (LUI) that improves setup and operation by including an intuitive Quick Start Wizard, and echo profile displays for diagnostic support. Startup is easy using the Quick Start wizard with a few parameters required for basic operation.

SITRANS LR250's unique design allows safe and simple programming using the Intrinsically Safe handheld programmer without having to open the instrument's lid.

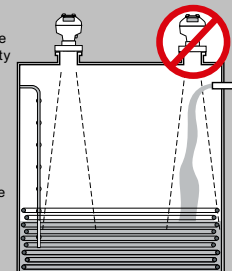
- Key Applications: liquid bulk storage tanks, process vessels with agitators, vaporous liquids, corrosive and aggressive materials.

Configuration

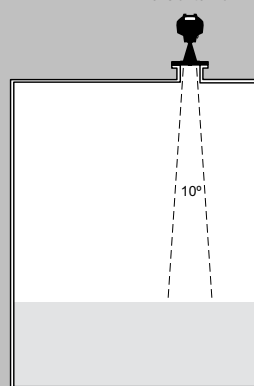
Installation of SITRANS LR250 Level Probing Radar

Note:

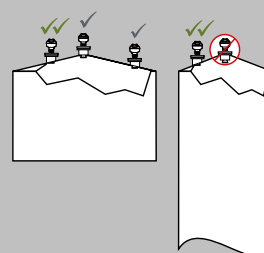
- Beam angle is the width of the cone where the energy density is half of the peak energy density.
- The peak energy density is directly in front of and in line with the antenna.
- There is a signal transmitted outside of the beam angle; therefore false targets may be detected.



Polypropylene lens antenna



Mounting on vessel



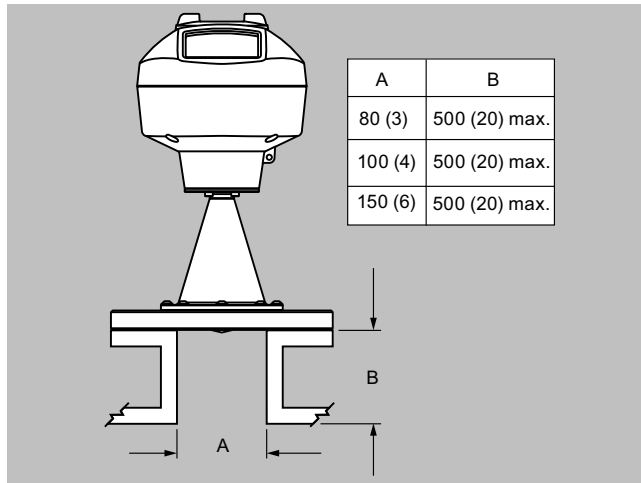
SITRANS LR250 Polypropylene lens antenna installation

Level Measurement

Continuous level measurement

Radar level transmitters / SITRANS LR250 Polypropylene Lens Antenna

Configuration (continued)



SITRANS LR250 Polypropylene lens antenna, mounting on a nozzle, dimensions in mm (inch)

Selection and ordering data

SITRANS LR250 Radar level transmitter Continuous, non-contact, 20 m (66 ft) range, for liquids and slurries.	Article No. 7ML5431- ● ● ● ● 0 - ● ● ● ●
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	
Process Connection and Antenna Material Painted aluminum 3" horn antenna ¹⁾	5
Process Connection Type <u>Engineered polymer flange connections</u>	
Without flange, without mounting bracket, no polypropylene lens	Q A
Without flange, with mounting bracket, no polypropylene lens	Q B
<u>Universal polymeric flange, flat face, with polypropylene lens, FKM seal</u>	
DN80 PN16, ANSI 3", 150 lb, DN80 PN16/10K	Q C
DN100 PN16, ANSI 4", 150 lb, DN100 PN16/10K	Q D
DN150 PN16, ANSI 6", 150 lb, DN150 PN16/10K	Q E
Communication/Output	
PROFIBUS PA	1
4 ... 20 mA, HART, start-up at < 3.6 mA	2
Enclosure/Cable inlet <u>Aluminum, Epoxy painted</u>	
2 x 1/2" NPT	0
2 x M20 x 1.5	1
Antenna 3 inch (80 mm) polypropylene lens antenna	S
Approvals	
Ordinary Locations/General Purpose (Non-Ex), CE, UKCA, CSA, FM, FCC, RED, RCM	A
Intrinsically Safe: CSA/FM Class I, Div. 1, Groups A, B, C, D, Class II, Div. 1, Groups E, F, G, Class III T4 FCC, Industry Canada	B
Intrinsically Safe: ATEX II 1G Ex ia IIC T4 Ga, ATEX II 1D Ex ia ta IIIC T100°C Da; UKEX II 1G Ex ia IIC T4 Ga, UKEX II 1D Ex ia ta IIIC T100°C Da; IECEX Ex ia IIC T4 Ga, IECEX 1D Ex ia ta IIIC T100°C Da; INMETRO Ex ia IIC T4 Ga, INMETRO Ex ia ta IIIC T100°C Da, IP67/IP68; EAC Ex 0Ex ia IIC T4 Ga X, EAC Ex 0Ex ia ta IIIC T100°C Da X; CE, UKCA, RED, RCM	C
Non-incendive: CSA/FM Class I, Div. 2, Groups A, B, C, D T5, FCC, Industry Canada	D
Increased Safety / Non Sparking: ATEX II 3G Ex ec IIC T4 Gc; UKEX II 3G Ex ec IIC T4 Gc; EAC Ex 2Ex nA IIC T4 Gc X; CE, UKCA, RED, RCM	E
Increased Safety: ATEX II 1/2 GD, 1D, 2D, Ex eb mb ia IIC T4 Ga/Gb; UKEX II 1/2 GD, 1D, 2D, Ex eb mb ia IIC T4 Ga/Gb; IECEX Ex eb ia mb IIC T4 Ga/Gb; INMETRO Ex e ia mb IIC T4 Ga/Gb, INMETRO Ex ia ta IIIC T100°C Da, IP67/IP68; EAC Ex Ga/Gb Ex ia/le+mb IIC T4 X; CE, UKCA, RED, RCM ²⁾	F
Flameproof: ATEX II 1/2 GD, 1D, 2D, Ex db mb ia IIC T4 Ga/Gb; ATEX II 1/2 GD, 1D, 2D, Ex ia ta IIIC T100°C Da; UKEX II 1/2 GD, 1D, 2D, Ex db mb ia IIC T4 Ga/Gb; UKEX II 1/2 GD, 1D, 2D, Ex ia ta IIIC T100°C Da; IECEX Ex db mb ia IIC T4 Ga/Gb, IECEX Ex ia ta IIIC T100°C Da; INMETRO Ex d ia mb IIC T4 Ga/Gb, INMETRO Ex ia ta IIIC T100°C Da, IP67/IP68; EAC Ex Ga/Gb Ex ia/db+mb IIC T4 X, EAC Ex Ex ia ta IIIC T100°C Da; CE, UKCA, RED, RCM ²⁾	G
Explosion proof: CSA/FM Class I, II and III, Div. 1, Groups A, B, C, D, E, F, G, FCC, Industry Canada ²⁾	H

Level Measurement

Continuous level measurement

Radar level transmitters / SITRANS LR250 Polypropylene Lens Antenna

Selection and ordering data (continued)

	Article No.
SITRANS LR250 Radar level transmitter Continuous, non-contact, 20 m (66 ft) range, for liquids and slurries.	7ML5431- ● ● ● ● 0 - ● ● ● ●
Non Sparking: NEPSI Ex nA IIC T4 Gc	K
Intrinsically Safe: NEPSI Ex ia IIC T4 Ga, Ex iaD 20 T90 IP67 DIP A20 T _A 90 °C	L
Flameproof: NEPSI Ex d ia mb IIC T4 Ga/Gb, Ex iaD 20 T90 IP67 DIP A20 T _A 90 °C ⁽²⁾	M
Increased Safety: NEPSI Ex e ia mb IIC T4 Ga/Gb, Ex iaD 20 T90 IP67 DIP A20 T _A 90 °C ⁽²⁾	N
Pressure rating	
0.5 bar (7.25 psi g) max.	1
Rating per Pressure/Temperature curves in manual ⁽³⁾	2

Selection and Ordering data	Order code
Further designs	
Please add "-Z" to Article No. and specify Order code(s).	
Plug M12, incl. cable socket, IP68 ⁽⁴⁾⁽⁵⁾⁽⁶⁾	A50
Plug 7/8", incl. cable socket, IP68 ⁽⁵⁾⁽⁶⁾⁽⁷⁾	A55
Long tag (device parameter, max. 27 characters) plate stainless steel 304/1.4301	Y15
Factory test certificate - M to DIN 55350, Part 18	C11
Inspection certificate 3.1 (EN 10204) - material of pressure-containing and wetted parts	C12
Namur NE43 compliant: device preset to failsafe < 3.6 mA ⁽²⁾	N07

Accessories	Article No.
Operating Instructions	
All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation	
Accessories	
Mounting bracket suitable for wall or ceiling mounting, for aluminum painted horn versions only	A5E46342367
Polypropylene lens replacement kit, polypropylene lens antenna and polymeric flange versions	A5E46342366
One metallic cable gland M20 x 1.5, rated -40 ... +80 °C (-40 ... +176 °F), HART ⁽⁹⁾	7ML1930-1AP
One metallic cable gland M20 x 1.5, rated -40 ... +80 °C (-40 ... +176 °F), PROFIBUS PA	7ML1930-1AQ
Handheld programmer, Intrinsically safe, EEx ia	7ML1930-1BK
HART modem with USB interface	7MF4997-1DB
FDA approved FKM o-ring for 2" G (BSPP) process connec- tions -28 ... +80 °C (-28 ... +176 °F)	7ML1830-3AN
SITRANS RD100, loop powered display -see Chapter 7	7ML5741-.....
SITRANS RD150, remote digital display for 4 ... 20 mA and HART devices - see Chapter 7	7ML5742-.....
SITRANS RD200, universal input display with Modbus con- version - see Chapter 7	7ML5740-.....
SITRANS RD300, dual line display with totalizer and linear- ization curve and Modbus conversion - see Chapter 7	7ML5744-.....
For applicable back up point level switch - see point level measurement section	

1) Available only with Process connection options QA ... QE and Antenna option S.

2) Available only with Communication option 2 and Process connection and antenna material option 4.

3) Available only with Process connection and Antenna material option 5 and Process connection type option QC.

4) Available only with Enclosure option 1.

5) Available only with Communication options 1 and 3.

6) Available only with Approval options A, B, C, and L.

7) Available only with Enclosure option 0.

8) Available only with Approval options A, B, C, D, E, K, and L.

9) Product shipped with plastic cable gland, rated to -20 °C (-4 °F). If -40 °C (-40 °F) rating required, then metallic cable gland is recommended.

Selection and ordering data (continued)

SITRANS LR250 Polypropylene Lens Antenna and Threaded PVDF Specials	
	Article No.
SITRANS LR250 threaded PVDF antenna version enclosures (PROFIBUS PA models)	
SITRANS LR250 threaded PVDF antenna version enclosure with board stack, M20 cable inlet, approval option A, with PROFIBUS PA communication, no process connection	A5E03588171
SITRANS LR250 threaded PVDF antenna version enclosure with board stack, NPT cable inlet, approval option A, with PROFIBUS PA communication, no process connection	A5E03588253
SITRANS LR250 threaded PVDF antenna version enclosure with board stack, NPT cable inlet, approval option B, with PROFIBUS PA communication, no process connection	A5E03588512
SITRANS LR250 threaded PVDF antenna version enclosure with board stack, M20 cable inlet, approval option C, with PROFIBUS PA communication, no process connection	A5E03589260
SITRANS LR250 threaded PVDF antenna version enclosure with board stack, NPT cable inlet, approval option D, with PROFIBUS PA communication, no process connection	A5E03589262
SITRANS LR250 threaded PVDF antenna version enclosure with board stack, M20 cable inlet, approval option E, with PROFIBUS PA communication, no process connection	A5E03589264
SITRANS LR250 threaded PVDF antenna version enclosures (FOUNDATION Fieldbus models)	
SITRANS LR250 threaded PVDF antenna version enclosures (< 3.6 mA start-up HART models)	
SITRANS LR250 enclosure with board stack, M20 cable inlet, approval option A, with HART communication start-up at < 3.6 mA, no process connection	A5E03569747
SITRANS LR250 enclosure with board stack, NPT cable inlet, approval option A, with HART communication start-up at < 3.6 mA, no process connection	A5E03586807
SITRANS LR250 enclosure with board stack, NPT cable inlet, approval option B, with HART communication start-up at < 3.6 mA, no process connection	A5E03586854
SITRANS LR250 enclosure with board stack, M20 cable inlet, approval option C, with HART communication start-up at < 3.6 mA, no process connection	A5E03586887
SITRANS LR250 enclosure with board stack, NPT cable inlet, approval option D, with HART communication start-up at < 3.6 mA, no process connection	A5E03586961
SITRANS LR250 enclosure with board stack, M20 cable inlet, approval option E, with HART communication start-up at < 3.6 mA, no process connection	A5E03587012
SITRANS LR250 enclosure with board stack, M20 cable inlet, approval option F, with HART communication start-up at < 3.6 mA, no process connection	A5E03587132
SITRANS LR250 enclosure with board stack, M20 cable inlet, approval option G, with HART communication start-up at < 3.6 mA, no process connection	A5E03587223
SITRANS LR250 enclosure with board stack, NPT cable inlet, approval option H, with HART communication start-up at < 3.6 mA, no process connection	A5E03588125
SITRANS LR250 threaded PVDF antenna kits	
Antenna kit 2" NPT threaded PVDF	A5E03528941
Antenna kit 2" R (BSPT) threaded PVDF	A5E03528943
Antenna kit 2" G (BSPP) threaded PVDF	A5E03528947
Kit of hardware parts for LR250 threaded PVDF antenna: consists of O-rings, screws, wavewasher, and loctite	A5E03528948
Ex-proof plugs	
Ex-proof plugs kit, 1/2" NPT, qty 5	A5E39979991
Ex-proof plugs kit, M20, qty 5	A5E39979992

Level Measurement

Continuous level measurement

Radar level transmitters / SITRANS LR250 Polypropylene Lens Antenna

Technical specifications

SITRANS LR250 Polypropylene Lens Antenna	
Mode of operation	
Measuring principle	Radar level measurement
Frequency	K-band (25.0 GHz)
Minimum measuring range	50 mm (2 inch) from end of antenna
Maximum measuring range	20 m (66 ft)
Output	
HART	Version 5.1
• Analog output	4 ... 20 mA
• Accuracy	± 0.02 mA
• Fail-safe	<ul style="list-style-type: none"> Programmable as high, low or, hold (loss of echo) NE 43 programmable
PROFIBUS PA	Profile 3.1
• Function blocks	2 Analog Input (AI)
Performance (according to reference conditions IEC 60770-1)	
Maximum measured error	<ul style="list-style-type: none"> > 500 mm from sensor reference point: 3 mm (0.118 inch) < 500 mm from sensor reference point: 25 mm (1 inch)
Influence of ambient temperature	< 0.003 %/K
Rated operating conditions	
Installation conditions	
• Location	Indoor/outdoor
Ambient conditions (enclosure)	
• Ambient temperature	-40 ... +80 °C (-40 ... +176 °F)
• Storage temperature	-40 ... +80 °C (-40 ... +176 °F)
• Installation category	I
• Pollution degree	4
Medium conditions	
Dielectric constant ϵ_r	> 1.6
Process temperature	-40 ... +80 °C (-40 ... +176 °F) at process connection
Process pressure	Up to 5 bar g (72 psi g) temperature dependent.
Design	
Enclosure	
• Material	Aluminum, polyester powder-coated
• Cable inlet	2 x M20 x 1.5 or 2 x ½" NPT
Degree of protection	Type 4X/NEMA 4X, Type 6/NEMA 6, IP67, IP68
Weight	Polypropylene lens antenna with 3 inch (80 mm) polypropylene flange <ul style="list-style-type: none"> Approximately 3.4 kg (7.5 lb)
Display (local)	Graphic local user interface including quick start wizard and echo profile display
Polypropylene lens antenna	
• Materials	<ul style="list-style-type: none"> Polyester powder coated exterior 3 inch cast aluminum Polypropylene lens FKM seal
• Process connections	
- Material	Polypropylene
- Dimensions	Universal flange: 3 inch (80 mm), 4 inch (100 mm), 6 inch (150 mm)

Technical specifications (continued)

SITRANS LR250 Polypropylene Lens Antenna	
Power supply	
4 ... 20 mA/HART	Nominal 24 V DC (max. 30 V DC) with max. 550 Ω
PROFIBUS PA	<ul style="list-style-type: none"> 15 mA per IEC 61158-2
Certificates and approvals	
General	cCSA _{US} , CE, UKCA, FM, RCM
Radio	FCC, Industry Canada, RED, RCM
Hazardous	
• Explosion Proof (Brazil)	INMETRO Ex d ia mb IIC T4 Ga/Gb, Ex ia ta IIIC T100 °C Da
• Increased Safety (Brazil)	INMETRO Ex e ia mb IIC T4 Ga/Gb, Ex ia ta IIIC T100 °C Da
• Intrinsically Safe (Brazil)	INMETRO Ex ia IIC T4 Ga, Ex ia ta IIIC T100 °C Da
• Explosion Proof (Canada/USA)	CSA/FM Class I, Div. 1, Groups A, B, C, D; Class II, Div. 1, Groups E, F, G; Class III T4
• Intrinsically Safe (Canada/USA)	CSA/FM Class I, Div. 1, Groups A, B, C, D; Class II, Div. 1, Groups E, F, G; Class III T4
• Non-incendive (Canada/USA)	CSA/FM Class I, Div. 2, Groups A, B, C, D T5
• Flame Proof/Increased Safety (China)	Ex d ia mb IIC T4 Ga/Gb, Ex e ia mb IIC T4 Ga/Gb, Ex iaD 20 T90 IP67 DIP A20 T _A 90 °C
• Intrinsically Safe (China)	Ex ia IIC T4 Ga, Ex iaD 20 T90 IP67 DIP A20 T _A 90 °C
• Non-sparking (China)	NEPSI Ex nA IIC T4 Gc
• Intrinsically Safe (EU)	ATEX II 1G Ex ia IIC T4 Ga, ATEX II 1D Ex ia ta IIIC T100 °C Da;
• Intrinsically Safe (UK)	UKEX II 1G Ex ia IIC T4 Ga, UKEX II 1D Ex ia ta IIIC T100 °C Da;
• Intrinsically Safe (International)	IECEX Ex ia IIC T4 Ga, IECEX Ex ia ta IIIC T100 °C Da;
• Increased Safety - Zone 2 (EU)	ATEX II 3G Ex ec IIC T4 Gc;
• Increased Safety - Zone 2 (UK)	UKEX II 3G Ex ec IIC T4 Gc;
• Non-sparking (EAC)	EAC Ex 2Ex nA IIC T4 Gc;
• Flameproof (EU)	ATEX II 1/2 GD, 1D, 2D, Ex db mb ia IIC Ga/Gb, Ex ia ta IIIC T100 °C Da;
• Flameproof (UK)	UKEX II 1/2 GD, 1D, 2D, Ex db mb ia IIC Ga/Gb, Ex ia ta IIIC T100 °C Da
• Flameproof (International)	IECEX Ex db mb ia IIC T4 Ga/Gb, Ex ia ta IIIC T100 °C Da;
• Increased Safety - Zone 1 (EU)	ATEX II 1/2 GD, 1D, 2D, Ex eb mb ia IIC T4 Ga/Gb, Ex ia ta IIIC T100 °C Da;
• Increased Safety - Zone 1 (UK)	UKEX II 1/2 GD, 1D, 2D, Ex eb mb ia IIC T4 Ga/Gb, Ex ia ta IIIC T100 °C Da;
• Increased Safety - Zone 1 (International)	IECEX Ex eb mb ia IIC T4 Ga/Gb, Ex ia ta IIIC T100 °C Da
• Explosion Proof (Russia/Kazakhstan)	EAC Ex d
• Increased Safety (Russia/Kazakhstan)	EAC Ex e
• Intrinsically Safe (Russia/Kazakhstan)	EAC Ex ia
• Marine	<ul style="list-style-type: none"> Lloyd's Register of Shipping ABS Type Approval Bureau Veritas

Technical specifications (continued)

SITRANS LR250 Polypropylene Lens Antenna

Programming

Intrinsically Safe Siemens handheld programmer

- Approvals for handheld programmer

Handheld communicator

PC

Display (local)

Infrared receiver

IS model:

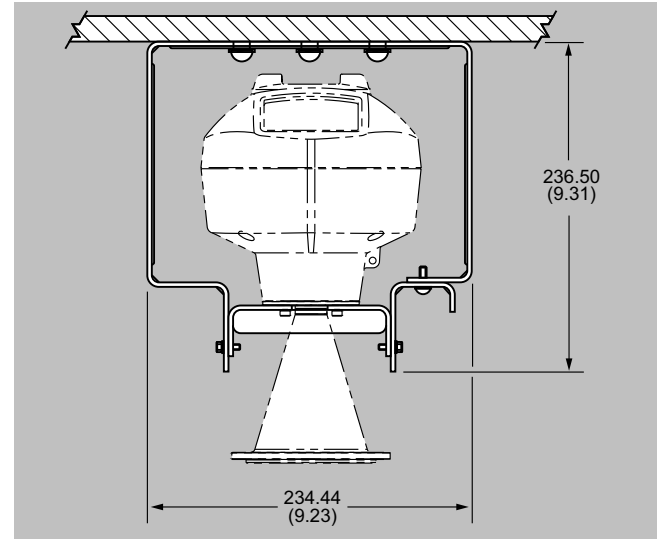
ATEX II 1 GD Ex ia op is IIC T4 Ga
 ATEX II 1 GD Ex ia op is IIIC T135°C Da
 UKEX II 1 GD Ex ia op is IIC T4 Ga
 UKEX II 1 GD Ex ia op is IIIC T135°C Da
 Ta = -20 ... +50°C
 CSA/IFM Class I, II, III, Div. 1, Groups A, B, C,
 D, E, G, T6
 Ta = 50°C
 IECEx SIR 09.0073

HART communicator 375/475

- SIMATIC PDM
- Emerson AMS
- SITRANS DTM (for connection into FDT, such as PACTware or Fieldcare)

Graphic local user interface including quick start wizard and echo profile displays.

Options



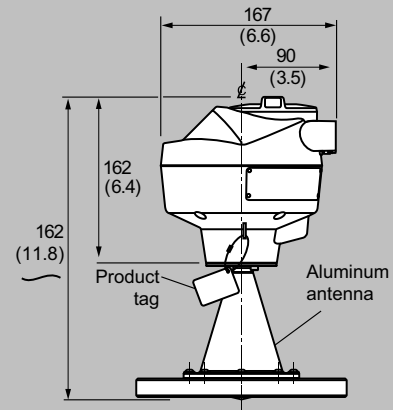
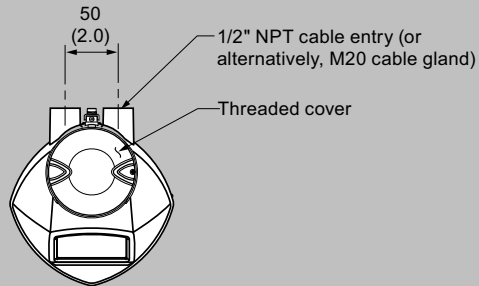
SITRANS LR250 Polypropylene lens antenna, wall/ceiling mount

Level Measurement

Continuous level measurement

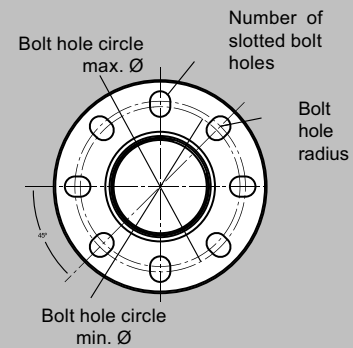
Radar level transmitters / SITRANS LR250 Polypropylene Lens Antenna

Dimensional drawings



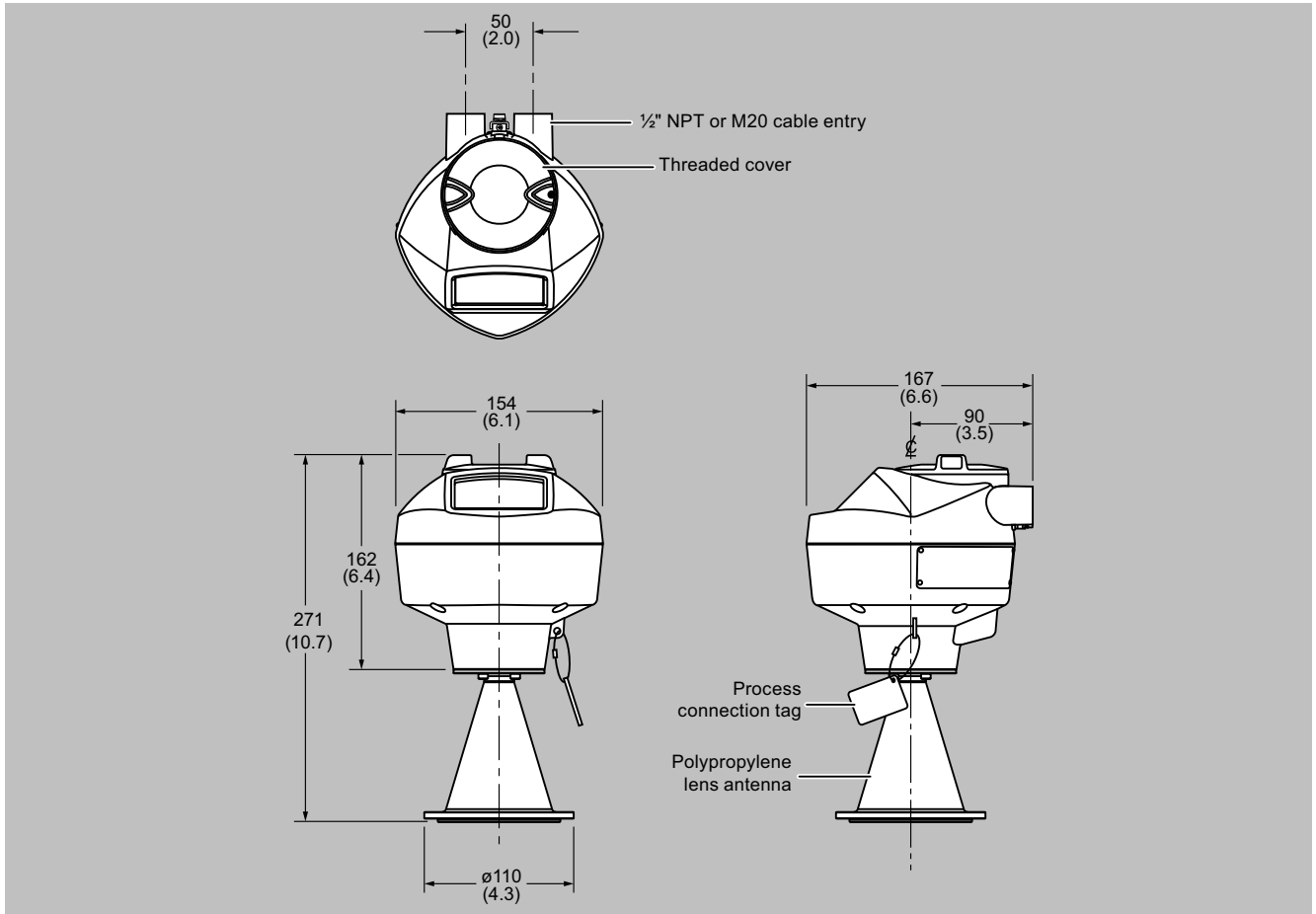
Nominal pipe size	OD ± 1	B.C.D. max. for slotted holes (bmax.) ± 0.75	B.C.D. min. for slotted holes (bmin.) ± 0.75	Bolt hole radius ± 0.25	Number of slotted holes
3	200	160	150	R 9.5	8
4	229	191	175	R 9.5	8
6	285	242	240	R 11.5	8

Polypropylene Flange



SITRANS LR250 Polypropylene lens antenna, dimensions in mm (inch)

Dimensional drawings (continued)



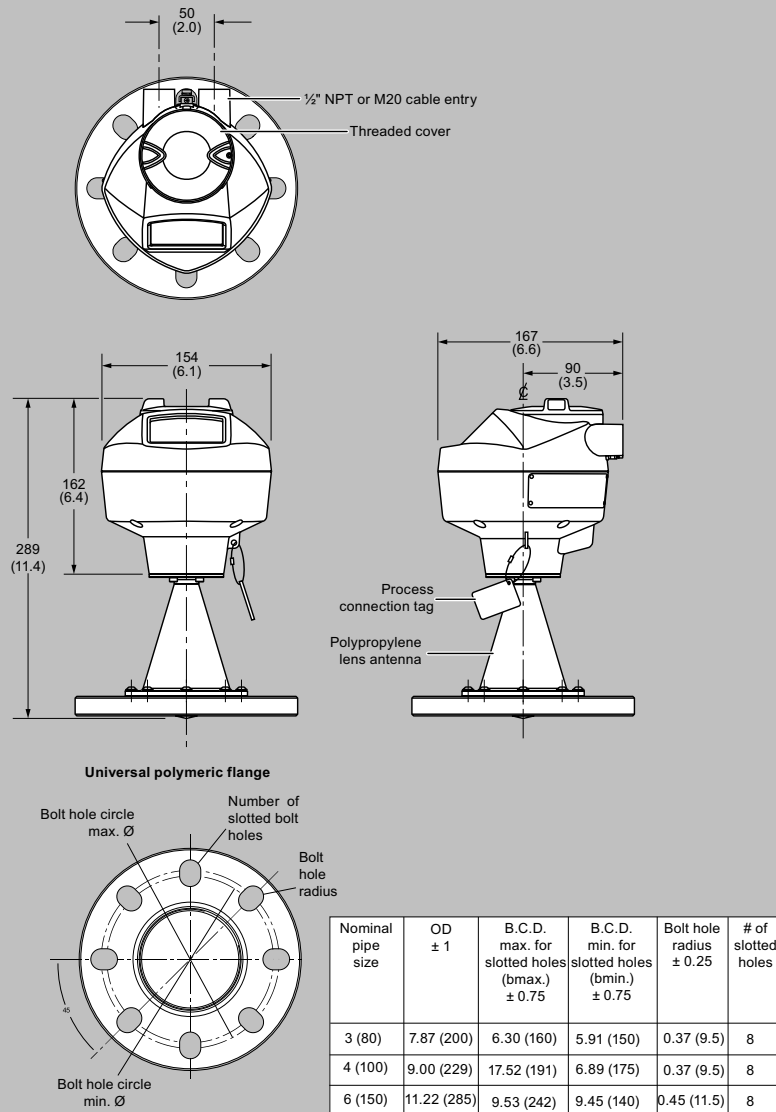
SITRANS LR250 Polypropylene lens antenna, dimensions in mm (inch)

Level Measurement

Continuous level measurement

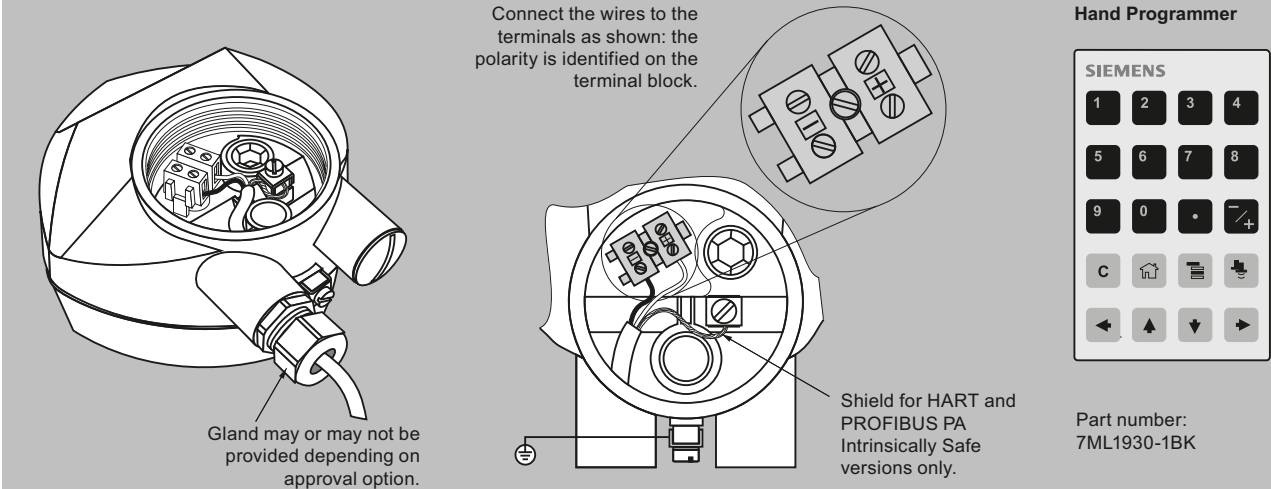
Radar level transmitters / SITRANS LR250 Polypropylene Lens Antenna

Dimensional drawings (continued)



SITRANS LR250 Polypropylene lens antenna with universal polymeric flange, dimensions in mm (inch)

Circuit diagrams



Connect the wires to the terminals as shown: the polarity is identified on the terminal block.

Gland may or may not be provided depending on approval option.

Shield for HART and PROFIBUS PA Intrinsically Safe versions only.

Hand Programmer

SIEMENS

1	2	3	4
5	6	7	8
9	0	.	/+
C	↑	↓	→

Part number:
7ML1930-1BK

Notes:

1. DC terminal shall be supplied from a source providing electrical isolation between the input and output, to meet the applicable safety requirements of IEC 61010-1.
2. All field wiring must have insulation suitable for rated input voltages.
3. Use shielded twisted pair cable (14 ... 22 AWG) for HART version.
4. Separate cables and conduit may be required to conform to standard instrumentation wiring practices or electrical codes.

SITRANS LR250 connections

Level Measurement

Continuous level measurement

Radar level transmitters / SITRANS LR250 Flanged Encapsulated Antenna

Overview



SITRANS LR250 with flanged encapsulated antenna is a 2-wire, 25 GHz pulse radar level transmitter for continuous monitoring of liquids and slurries in storage and process vessels including corrosives or aggressive materials, to a range of 20 m (66 ft) (antenna dependent).

Benefits

- Fully encapsulated horn antenna design with FDA approved TFM 1600 PTFE lens for use in chemical and sanitary environments where aggressive and corrosive materials are used
- Cost effective replacement for transmitters made of exotic materials
- Graphical local user interface (LUI) makes operation simple with plug-and-play setup using the intuitive Quick Start Wizard
- LUI displays echo profiles for diagnostic support
- 25 GHz high frequency and 50 mm (2 inch) process connection/antenna allow for easy mounting
- Insensitive to mounting location and obstructions, and less sensitive to nozzle interference
- Short blanking distance for improved minimum measuring range to 50 mm (2 inch) from the end of the antenna
- Communication using HART, PROFIBUS PA
- Process Intelligence signal processing for improved measurement reliability and Auto False-Echo Suppression of fixed obstructions
- Programming using infrared Intrinsically Safe handheld programmer or over a network using SIMATIC PDM, Emerson AMS, or Field Device Tools such as PACTware or Fieldcare via SITRANS DTM
- Functional Safety (SIL 2). Device suitable for use in accordance with IEC 61508 and IEC 61511
- Suitable for API 2350

Application

SITRANS LR250 includes a graphical local user interface (LUI) that improves setup and operation by including an intuitive Quick Start Wizard, and echo profile displays for diagnostic support. Startup is easy using Quick Start Wizard with a few parameters required for basic operation.

The 25 GHz frequency creates a narrow, focused beam allowing for smaller antenna options and decreasing sensitivity to obstructions. SITRANS LR250's unique design allows safe and simple programming using the Intrinsically Safe handheld programmer without having to open the instrument's lid.

SITRANS LR250 measures superbly in small vessels and in tanks/vessels up to 20 m (66 ft) on materials with $dk > 1.6$.

- Key Applications: liquid bulk storage tanks, process vessels with agitators, vaporous liquids, temperatures to 170 °C (338 °F), corrosive and aggressive materials and applications where ease of cleaning is required such as food or fine chemicals

Configuration

Installation

Note:

- Beam angle is the width of the cone where the energy density is half of the peak energy density.
- The peak energy density is directly in front of and in line with the antenna.
- There is a signal transmitted outside of the beam angle; therefore false targets may be detected.

Mounting on bypass **Mounting on stilling well**

Orient front or back of device toward vent.

Orient front or back of device toward stillpipe slots.

Mounting on vessel **Mounting on a nozzle**

A	B*
∅ 50 (2)	500 (20) max.
∅ 80 (3)	500 (20) max.
∅ 100 (4)	500 (20) max.
∅ 150 (6)	500 (20) max.

*Reference conditions

SITRANS LR250 Flanged Encapsulated Antenna installation, dimensions in mm (inch)

Level Measurement

Continuous level measurement

Radar level transmitters / SITRANS LR250 Flanged Encapsulated Antenna

Selection and ordering data

	Article No.																					
SITRANS LR250 Radar level transmitter with encapsulated horn and PTFE lens	7	M	L	5	4	3	2	1	0	-	0	0	0	0	0	0	0	0	0	0		
Continuous, non-contact, 20 m (66 ft) range, for liquids and slurries in the chemical industry.																						
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.																						
Process Connection Material																						
Stainless steel 1.4404/1.4435	0																					
Process Connection Type																						
Flanged Process Connection Types (stainless steel 1.4404/1.4435)																						
2" Class 150 ASME B16.5 raised face ¹⁾																				B	F	
3" Class 150 ASME B16.5 raised face																					B	G
4" Class 150 ASME B16.5 raised face																					B	H
6" Class 150 ASME B16.5 raised face																					B	J
50A 10K JIS B 2220 raised face ¹⁾																					F	D
80A 10K JIS B 2220 raised face																					F	E
100A 10K JIS B 2220 raised face																					F	F
150A 10K JIS B 2220 raised face																					F	G
DN 50 PN 10/16 EN 1092-1 type B1 raised face ¹⁾																					G	A
DN 80 PN 10/16 EN 1092-1 type B1 raised face																					G	B
DN 100 PN 10/16 EN 1092-1 type B1 raised face																					G	C
DN 150 PN 10/16 EN 1092-1 type B1 raised face																					G	D
Communication/Output																						
PROFIBUS PA																						1
4 ... 20 mA, HART, start-up at < 3.6 mA																						2
Enclosure/Cable inlet																						
Aluminum, Epoxy painted																						
2 x ½" NPT																						0
2 x M20 x 1.5																						1
Antenna lens material																						
TFM 1600 PTFE Flush Lens																						A
Approvals																						
Ordinary Locations/General Purpose (Non-Ex), CE, UKCA, CSA, FM, FCC, RED, RCM																						A
Intrinsically Safe: CSA/FM Class I, Div. 1, Groups A, B, C, D, Class II, Div. 1, Groups E, F, G, Class III T4																						B
FCC, Industry Canada																						C
Intrinsically Safe: ATEX II 1G Ex ia IIC T4 Ga, ATEX II 1D Ex ia ta IIIC T100°C Da; UKEX II 1G Ex ia IIC T4 Ga, UKEX II 1D Ex ia ta IIIC T100°C Da; IECEX Ex ia IIC T4 Ga, IECEX 1D Ex ia ta IIIC T100°C Da; INMETRO Ex ia IIC T4 Ga, INMETRO Ex ia ta IIIC T100°C Da, IP67/IP68; EAC Ex 0Ex ia IIC T4 Ga X, EAC Ex 0Ex ia ta IIIC T100°C Da X; CE, UKCA, RED, RCM																						D
Non-incendive: CSA/FM Class I, Div. 2, Groups A, B, C, D T5, FCC, Industry Canada																						E
Increased Safety / Non Sparking: ATEX II 3G Ex ec IIC T4 Gc; UKEX II 3G Ex ec IIC T4 Gc; EAC Ex 2Ex nA IIC T4 Gc X; CE, UKCA, RED, RCM																						E

Selection and ordering data (continued)

		Article No.										
SITRANS LR250 Radar level transmitter with encapsulated horn and PTFE lens		7ML5432- ● ● ● ● 0 - ● ● ● ●										
Continuous, non-contact, 20 m (66 ft) range, for liquids and slurries in the chemical industry.												
Increased Safety: ATEX II 1/2 GD, 1D, 2D, Ex eb mb ia IIC T4 Ga/Gb; UKEX II 1/2 GD, 1D, 2D, Ex eb mb ia IIC T4 Ga/Gb; IECEx Ex eb ia mb IIC T4 Ga/Gb; INMETRO Ex e ia mb IIC T4 Ga/Gb, INMETRO Ex ia ta IIIC T100°C Da, IP67/IP68; EAC Ex Ga/Gb Ex ia/e+mb IIC T4 X; CE, UKCA, RED, RCM ²⁾												F
Flameproof: ATEX II 1/2 GD, 1D, 2D, Ex db mb ia IIC T4 Ga/Gb; ATEX II 1/2 GD, 1D, 2D, Ex ia ta IIIC T100°C Da; UKEX II 1/2 GD, 1D, 2D, Ex db mb ia IIC T4 Ga/Gb; UKEX II 1/2 GD, 1D, 2D, Ex ia ta IIIC T100°C Da; IECEx Ex db mb ia IIC T4 Ga/Gb, IECEx Ex ia ta IIIC T100°C Da; INMETRO Ex d ia mb IIC T4 Ga/Gb, INMETRO Ex ia ta IIIC T100°C Da, IP67/IP68; EAC Ex Ga/Gb Ex ia/db+mb IIC T4 X, EAC Ex Ex ia ta IIIC T100°C Da; CE, UKCA, RED, RCM ²⁾												G
Explosion proof: CSA/FM Class I, II and III, Div. 1, Groups A, B, C, D, E, F, G, FCC, Industry Canada ²⁾												H
Non Sparking: NEPSI Ex nA IIC T4 Gc												K
Intrinsically Safe: NEPSI Ex ia IIC T4 Ga, Ex iaD tD A20 IP67 T100 °C												L
Flameproof: NEPSI Ex d ia mb IIC T4 Ga/Gb, Ex iaD tD A20 IP67 T100 °C ²⁾												M
Increased Safety: NEPSI Ex e ia mb IIC T4 Ga/Gb, Ex iaD tD A20 IP67 T100 °C ²⁾												N
Pressure rating												
Rating per Pressure/Temperature curves in instruction manual												0

- 1) Maximum range 10 m (32.8 ft), dk > 3 [20 m (66 ft)] and dk > 1.6 when mounted in stillpipe].
 2) Applicable with communication option 2 only.

Selection and Ordering data	Order code
Further designs	
Please add "-Z" to Article No. and specify Order code(s).	
Plug M12 with mating Connector ¹⁾²⁾³⁾	A50
Plug 7/8" with mating Connector ²⁾³⁾⁴⁾	A55
Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: Measuring-point number/identification (max. 27 characters); specify in plain text	Y15
Manufacturer's test certificate: M to DIN 55350, Part 18 and to ISO 9000	C11
Material inspection Certificate Type 3.1 per EN 10204	C12
Functional Safety (SIL 2). Device suitable for use in accordance with IEC 61508 and IEC 61511 ⁵⁾⁶⁾	C20
Namur NE43 compliant, device preset to failsafe < 3.6 mA ⁵⁾	N07

Accessories	Article No.
Operating Instructions	
All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation	
Accessories	
Handheld programmer, Intrinsically safe, EEx ia	7ML1930-1BK
HART modem with USB interface	7MF4997-1DB

Level Measurement

Continuous level measurement



Radar level transmitters / SITRANS LR250 Flanged Encapsulated Antenna

Selection and ordering data (continued)

Accessories	Article No.
One metallic cable gland M20 x 1.5, rated -40 ... +80 °C (-40 ... +176 °F), HART (2 are required) ⁶⁾	7ML1930-1AP
One metallic cable gland M20 x 1.5, rated -40 ... +80 °C (-40 ... +176 °F), PROFIBUS PA (2 are required) ²⁾	7ML1930-1AQ
SITRANS RD100, loop powered display - see Chapter 7	7ML5741-.....
SITRANS RD150, remote digital display for 4 ... 20 mA and HART devices - see Chapter 7	7ML5742-.....
SITRANS RD200, universal input display with Modbus conversion - see Chapter 7	7ML5740-.....
SITRANS RD300, dual line display with totalizer and linearization curve and Modbus conversion - see Chapter 7	7ML5744-.....
For applicable back up point level switch - see point level measurement section	

- 1) Available with enclosure option 1 only.
- 2) Available with communication options 1 and 3 only.
- 3) Available with approval options A, B, C, and L only.
- 4) Available with enclosure option 0 only.
- 5) Applicable with communication option 2 only.
- 6) Available with approval options A, B, C, D, E, K, and L only.

SITRANS LR250 flanged encapsulated Specials

SITRANS LR250 flanged encapsulated antenna version enclosures (PROFIBUS PA models)	
SITRANS LR250 flanged encapsulated antenna version (7ML5432) enclosure with board stack, M20 cable inlet, approval option A, with PROFIBUS PA communication, no process connection	A5E32462853
SITRANS LR250 flanged encapsulated antenna version (7ML5432) enclosure with board stack, NPT cable inlet, approval option A, with PROFIBUS PA communication, no process connection	A5E32462854
SITRANS LR250 flanged encapsulated antenna version (7ML5432) enclosure with board stack, NPT cable inlet, approval option B, with PROFIBUS PA communication, no process connection	A5E32462855
SITRANS LR250 flanged encapsulated antenna version (7ML5432) enclosure with board stack, M20 cable inlet, approval option C, with PROFIBUS PA communication, no process connection	A5E32462856
SITRANS LR250 flanged encapsulated antenna version (7ML5432) enclosure with board stack, NPT cable inlet, approval option D, with PROFIBUS PA communication, no process connection	A5E32462857
SITRANS LR250 flanged encapsulated antenna version (7ML5432) enclosure with board stack, M20 cable inlet, approval option E, with PROFIBUS PA communication, no process connection	A5E32462858
SITRANS LR250 flanged encapsulated antenna version enclosures (< 3.6 mA start-up HART models)	
SITRANS LR250 flanged encapsulated antenna version (7ML5432) enclosure with board stack, M20 cable inlet, approval option A, with HART communication start-up at < 3.6 mA, no process connection	A5E32462865

Selection and ordering data (continued)

SITRANS LR250 flanged encapsulated Specials	
SITRANS LR250 flanged encapsulated antenna version (7ML5432) enclosure with board stack, NPT cable inlet, approval option A, with HART communication start-up at < 3.6 mA, no process connection	A5E32462866
SITRANS LR250 flanged encapsulated antenna version (7ML5432) enclosure with board stack, NPT cable inlet, approval option B, with HART communication start-up at < 3.6 mA, no process connection	A5E32462867
SITRANS LR250 flanged encapsulated antenna version (7ML5432) enclosure with board stack, M20 cable inlet, approval option C, with HART communication start-up at < 3.6 mA, no process connection	A5E32462868
SITRANS LR250 flanged encapsulated antenna version (7ML5432) enclosure with board stack, NPT cable inlet, approval option D, with HART communication start-up at < 3.6 mA, no process connection	A5E32462869
SITRANS LR250 flanged encapsulated antenna version (7ML5432) enclosure with board stack, M20 cable inlet, approval option E, with HART communication start-up at < 3.6 mA, no process connection	A5E32462830
SITRANS LR250 flanged encapsulated antenna version (7ML5432) enclosure with board stack, M20 cable inlet, approval option F, with HART communication start-up at < 3.6 mA, no process connection	A5E32462831
SITRANS LR250 flanged encapsulated antenna version (7ML5432) enclosure with board stack, M20 cable inlet, approval option G, with HART communication start-up at < 3.6 mA, no process connection	A5E32462832
SITRANS LR250 flanged encapsulated antenna version (7ML5432) enclosure with board stack, NPT cable inlet, approval option H, with HART communication start-up at < 3.6 mA, no process connection	A5E32462833
SITRANS LR250 flanged encapsulated antenna lens kits	
Replacement TFM 1600 Lens and Spring Washer Kit for 2 inch Class 150 ASME B16.5 raised faced	A5E32462817
Replacement TFM 1600 Lens and Spring Washer Kit for 3 inch Class 150 ASME B16.5 raised faced	A5E32462819
Replacement TFM 1600 Lens and Spring Washer Kit for 4 inch Class 150 ASME B16.5 raised faced	A5E32462820
Replacement TFM 1600 Lens and Spring Washer Kit for 6 inch Class 150 ASME B16.5 raised faced	A5E32462821
Replacement TFM 1600 Lens and Spring Washer Kit for 50A 10K JIS B 2220 raised Face	A5E32462822
Replacement TFM 1600 Lens and Spring Washer Kit for 80A 10K JIS B 2220 raised Face	A5E32462823
Replacement TFM 1600 Lens and Spring Washer Kit for 100A 10K JIS B 2220 raised Face	A5E32462824
Replacement TFM 1600 Lens and Spring Washer Kit for 150A 10K JIS B 2220 raised Face	A5E32462825
Replacement TFM 1600 Lens and Spring Washer Kit for DN50 PN10/16 EN 1092-1 type B1 raised face	A5E32462826
Replacement TFM 1600 Lens and Spring Washer Kit for DN80 PN10/16 EN 1092-1 type B1 raised face	A5E32462827
Replacement TFM 1600 Lens and Spring Washer Kit for DN100 PN10/16 EN 1092-1 type B1 raised face	A5E32462828
Replacement TFM 1600 Lens and Spring Washer Kit for DN150 PN10/16 EN 1092-1 type B1 raised face	A5E32462829
Ex-proof plugs	
Ex-proof plugs kit, 1/2" NPT, qty 5	A5E39979991
Ex-proof plugs kit, M20, qty 5	A5E39979992

Level Measurement

Continuous level measurement

Radar level transmitters / SITRANS LR250 Flanged Encapsulated Antenna

Technical specifications

SITRANS LR250 Flanged Encapsulated Antenna	
Mode of operation	
Measuring principle	Radar level measurement
Frequency	K-band (25.0 GHz)
Minimum measuring range	50 mm (2 inch) from end of antenna
Maximum measuring range	20 m (66 ft)
Output	
HART	Version 5.1
• Analog output	4 ... 20 mA
• Accuracy	± 0.02 mA
• Fail-safe	<ul style="list-style-type: none"> Programmable as high low or hold (loss of echo) NE 43 programmable
PROFIBUS PA	Profile 3.01
• Function blocks	2 Analog Input (AI)
Performance (according to reference conditions IEC60770-1)	
Maximum measured error	<ul style="list-style-type: none"> > 500 mm from sensor reference point: 3 mm (0.118 inch) < 500 mm from sensor reference point: 25 mm (1 inch)
Influence of ambient temperature	< 0.003 %/K
Rated operating conditions	
Installation conditions	
• Location	Indoor/outdoor
Ambient conditions (enclosure)	
• Ambient temperature	-40 ... +80 °C (-40 ... +176 °F)
• Storage temperature	-40 ... +80 °C (-40 ... +176 °F)
• Installation category	I
• Pollution degree	4
Medium conditions	
Dielectric constant ϵ_r	≥ 1.6 (antenna dependent)
Process temperature	-40 ... +170 °C (-40 ... +338 °F) at process connection
Process pressure	See LR250 Flanged Encapsulated Antenna Pressure/Temperature curves for more information.
Design	
Enclosure	
• Material	Aluminum, polyester powder-coated
• Cable inlet	2 x M20 x 1.5 or 2 x ½" NPT
Degree of protection	Type 4X/NEMA 4X, Type 6/NEMA 6, IP67, IP68
Weight (dependent on process connection)	<ul style="list-style-type: none"> Approx. 7 kg (15.43 lb) for 2" Class 150 ASME B16.5 raised face flange (smallest size) Approx. 17.7 kg (39.02 lb) for 6" Class 150 ASME B16.5 raised face flange (largest size)
Display (local)	Graphic local user interface including quick start wizard and echo profile display
Antenna	
• Material	Stainless Steel 316L (1.4435 or 1.4404) and TFM 1600 PTFE Lens (lens is the only wetted part)
• Dimensions (nominal sizes)	48 mm (2 inch), 80 mm (3 inch), 100 mm (4 inch), 150 mm (6 inch)
Process connections	
Flanged connection	Raised Face <ul style="list-style-type: none"> 2, 3, 4, 6" Class 150 ASME B16.5 50A, 80A, 100A, 150A 10K JIS B 2220 DN 50, DN 80, DN 100 & DN 150 PN 10/16 EN 1092-1 type B1

Technical specifications (continued)

SITRANS LR250 Flanged Encapsulated Antenna	
Power supply	
4 ... 20 mA/HART	Nominal 24 V DC (max. 30 V DC) with max. 550 Ω
PROFIBUS PA	<ul style="list-style-type: none"> 15 mA Per IEC 61158-2
Certificates and approvals	
General	cCSA _{US} , CE, UKCA, FM, RCM
Radio	FCC, Industry Canada, RED, RCM
Hazardous	
• Explosion Proof (Brazil)	INMETRO Ex d ia mb IIC T4 Ga/Gb, Ex ia ta IIIC T100 °C Da
• Increased Safety (Brazil)	INMETRO Ex e ia mb IIC T4 Ga/Gb, Ex ia ta IIIC T100 °C Da
• Intrinsically Safe (Brazil)	INMETRO Ex ia IIC T4 Ga, Ex ia ta IIIC T100 °C Da
• Explosion Proof (Canada/USA)	CSA/FM Class I, Div. 1, Groups A, B, C, D; Class II, Div. 1, Groups E, F, G; Class III T4
• Intrinsically Safe (Canada/USA)	CSA/FM Class I, Div. 1, Groups A, B, C, D; Class II, Div. 1, Groups E, F, G; Class III T4
• Non-incendive (Canada/USA)	CSA/FM Class I, Div. 2, Groups A, B, C, D T5
• Flame Proof/Increased Safety (China)	NEPSI Ex d ia mb IIC T4 Ga/Gb, Ex e ia mb IIC T4 Ga/Gb, Ex iaD tD A20 IP67 T100 °C
• Intrinsically Safe (China)	NEPSI Ex ia IIC T4 Ga, Ex iaD tD A20 IP67 T100 °C
• Non-sparking (China)	NEPSI Ex nA IIC T4 Gc
• Intrinsically Safe (EU)	ATEX II 1G Ex ia IIC T4 Ga, ATEX II 1D Ex ia ta IIIC T100°C Da;
• Intrinsically Safe (UK)	UKEX II 1G Ex ia IIC T4 Ga, UKEX II 1D Ex ia ta IIIC T100°C Da;
• Intrinsically Safe (International)	IECEX Ex ia IIC T4 Ga, IECEX Ex ia ta IIIC T100°C Da
• Increased Safety - Zone 2 (EU)	ATEX II 3G Ex ec IIC T4 Gc;
• Increased Safety - Zone 2 (UK)	UKEX II 3G Ex ec IIC T4 Gc;
• Non-sparking (EAC)	EAC Ex 2Ex nA IIC T4 Gc;
• Flameproof (EU)	ATEX II 1/2 GD, 1D, 2D, Ex db mb ia IIC T4 Ga/Gb, Ex ia ta IIIC T100°C Da;
• Flameproof (UK)	UKEX II 1/2 GD, 1D, 2D, Ex db mb ia IIC T4 Ga/Gb, Ex ia ta IIIC T100°C Da;
• Flameproof (International)	IECEX Ex db mb ia IIC T4 Ga/Gb, Ex ia ta IIIC T100°C Da;
• Increased Safety - Zone 1 (EU)	ATEX II 1/2 GD, 1D, 2D, Ex eb mb ia IIC T4 Ga/Gb, Ex ia ta IIIC T100°C Da;
• Increased Safety - Zone 1 (UK)	UKEX II 1/2 GD, 1D, 2D, Ex eb mb ia IIC T4 Ga/Gb, Ex ia ta IIIC T100°C Da;
• Increased Safety - Zone 1 (International)	IECEX Ex eb mb ia IIC T4 Ga/Gb, Ex ia ta IIIC T100°C Da
• Explosion Proof (Russia/Kazakhstan)	EAC Ex d
• Increased Safety (Russia/Kazakhstan)	EAC Ex e
• Intrinsically Safe (Russia/Kazakhstan)	EAC Ex ia
• Marine	<ul style="list-style-type: none"> Lloyd's Register of Shipping ABS Type Approval Bureau Veritas
• Functional Safety	SIL-2 suitable in accordance with IEC 61508/61511

Technical specifications (continued)

SITRANS LR250 Flanged Encapsulated Antenna

Programming

Intrinsically Safe Siemens handheld programmer

- Approvals for handheld-programmer

Infrared receiver

IS model: ATEX II 1 GD Ex ia op is IIC T4 Ga
 ATEX II 1 GD Ex ia op is IIIC T135°C Da
 UKEX II 1 GD Ex ia op is IIC T4 Ga
 UKEX II 1 GD Ex ia op is IIIC T135°C Da
 Ta = -20 ... +50°C
 CSA/FM Class I, II, III, Div. 1,
 Groups A, B, C, D, E, G, T6
 Ta = 50°C
 IECEx SIR 09.0073

Handheld communicator

HART communicator 375/475

PC

- SIMATIC PDM
- Emerson AMS
- SITRANS DTM (for connection into FDT such as PACTware or Fieldcare)

Display (local)

Graphic local user interface including quick start wizard and echo profile displays

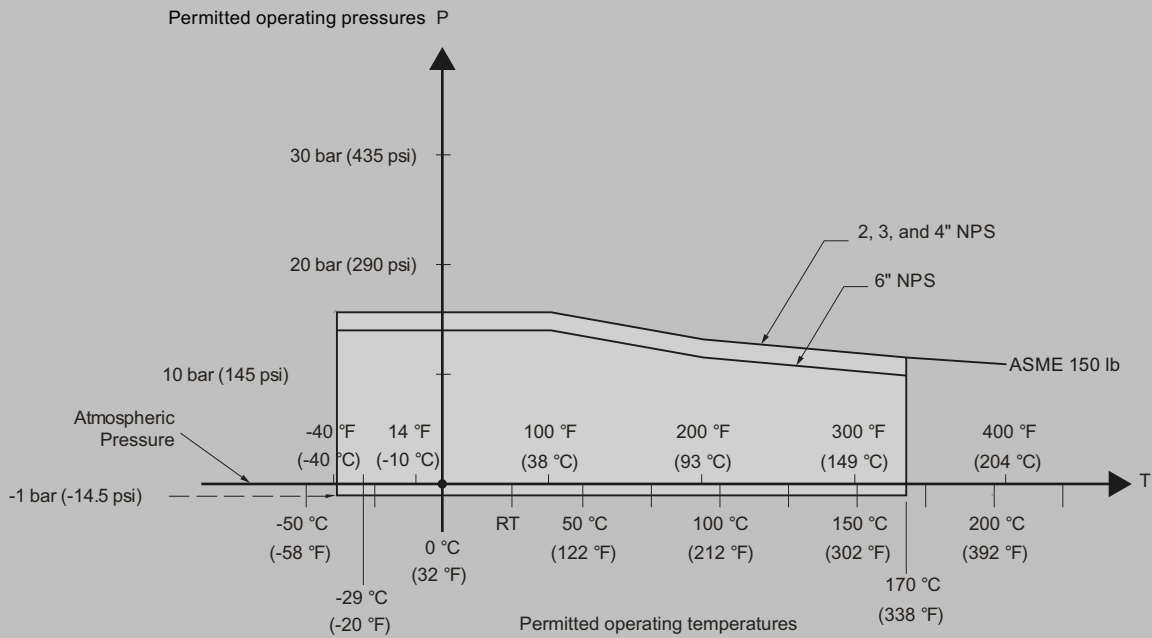
Level Measurement

Continuous level measurement

Radar level transmitters / SITRANS LR250 Flanged Encapsulated Antenna

Characteristic curves

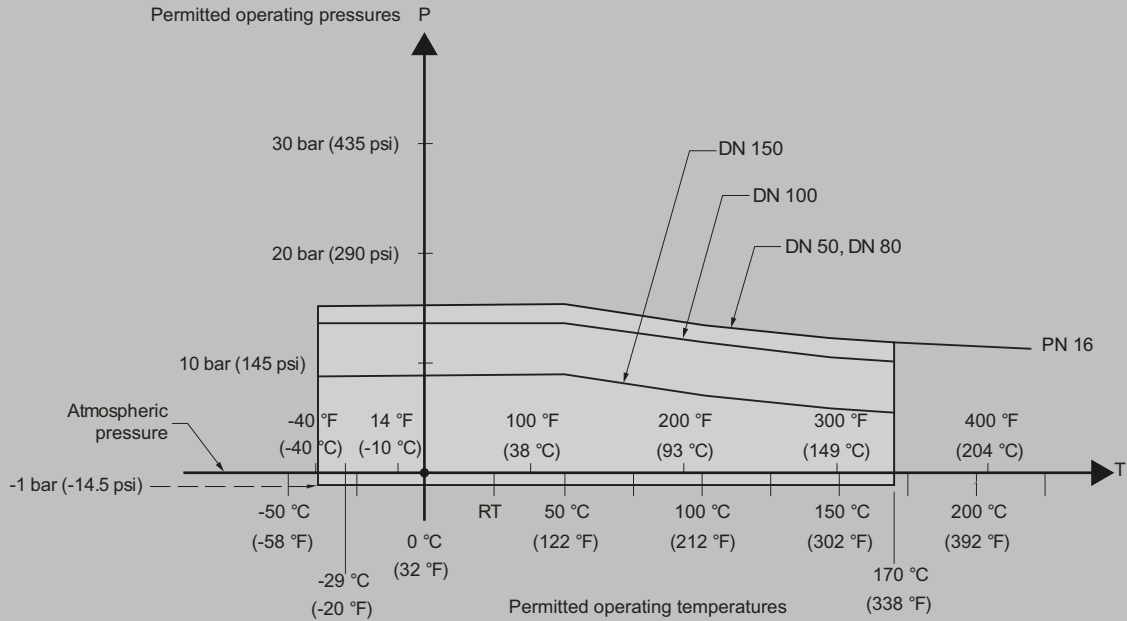
Pressure/ temperature curve
LR250 Flanged Encapsulated Antenna
ASME flanged process connections
(7ML5432)



SITRANS LR250 Flanged Encapsulated Antenna pressure/temperature curve

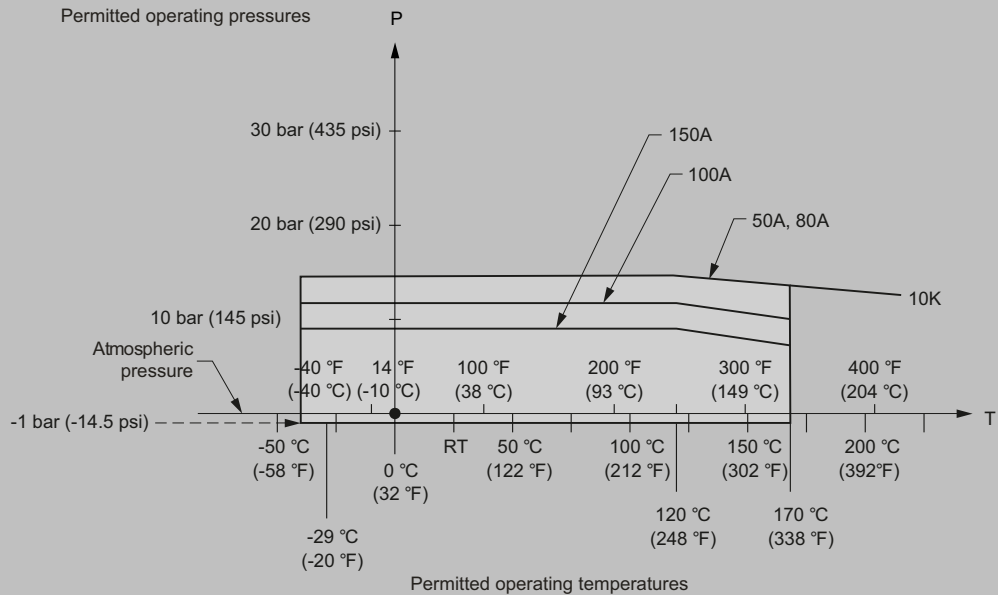
Characteristic curves (continued)

Pressure/ temperature curve
LR250 Flanged Encapsulated Antenna
EN 1092-1 flanged process connections
(7ML5432)



SITRANS LR250 Flanged Encapsulated Antenna pressure/temperature curve

Pressure/ temperature curve
LR250 Flanged Encapsulated Antenna
JIS B 2220 flanged process connections
(7ML5432)



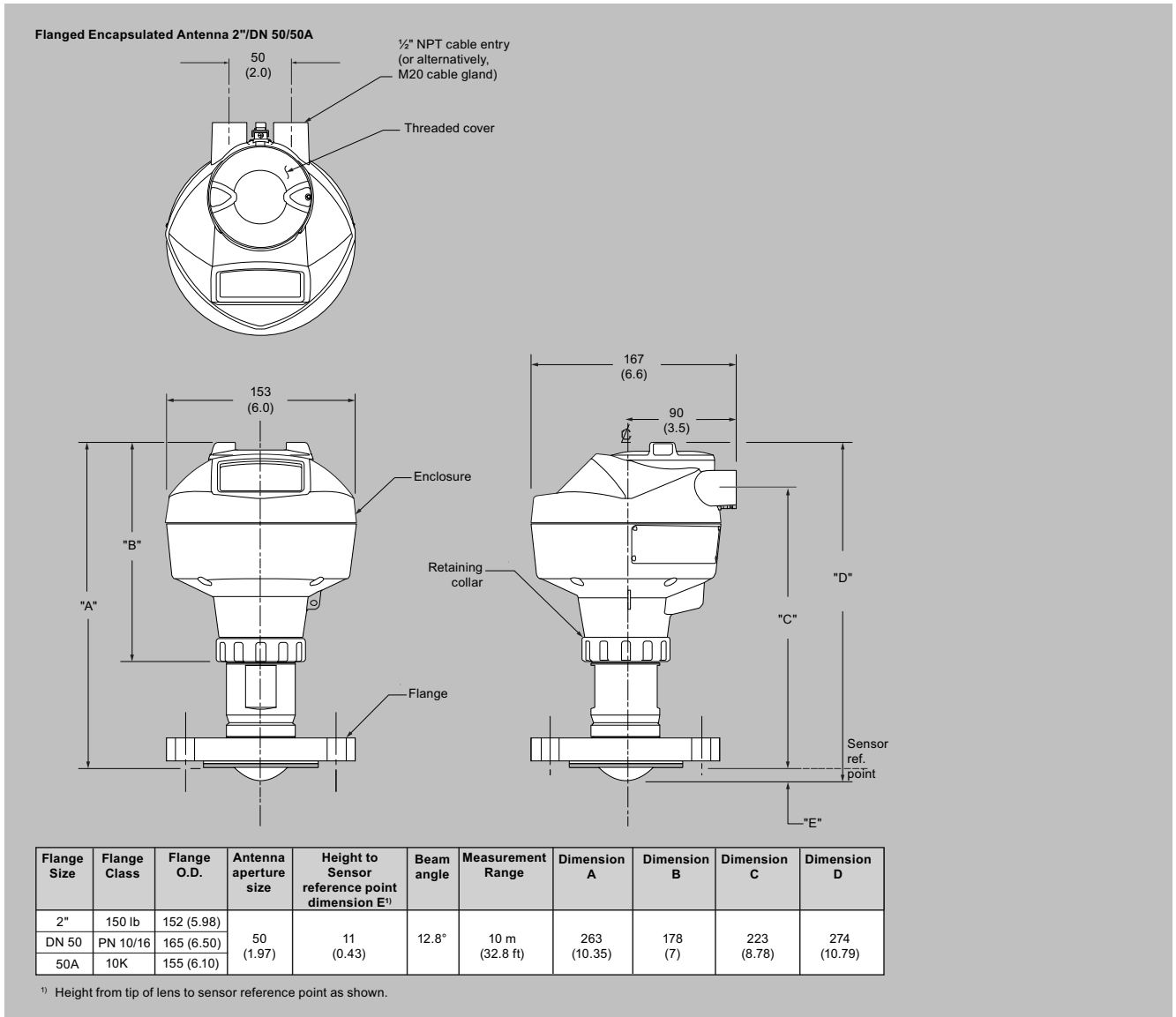
SITRANS LR250 Flanged Encapsulated Antenna pressure/temperature curve

Level Measurement

Continuous level measurement

Radar level transmitters / SITRANS LR250 Flanged Encapsulated Antenna

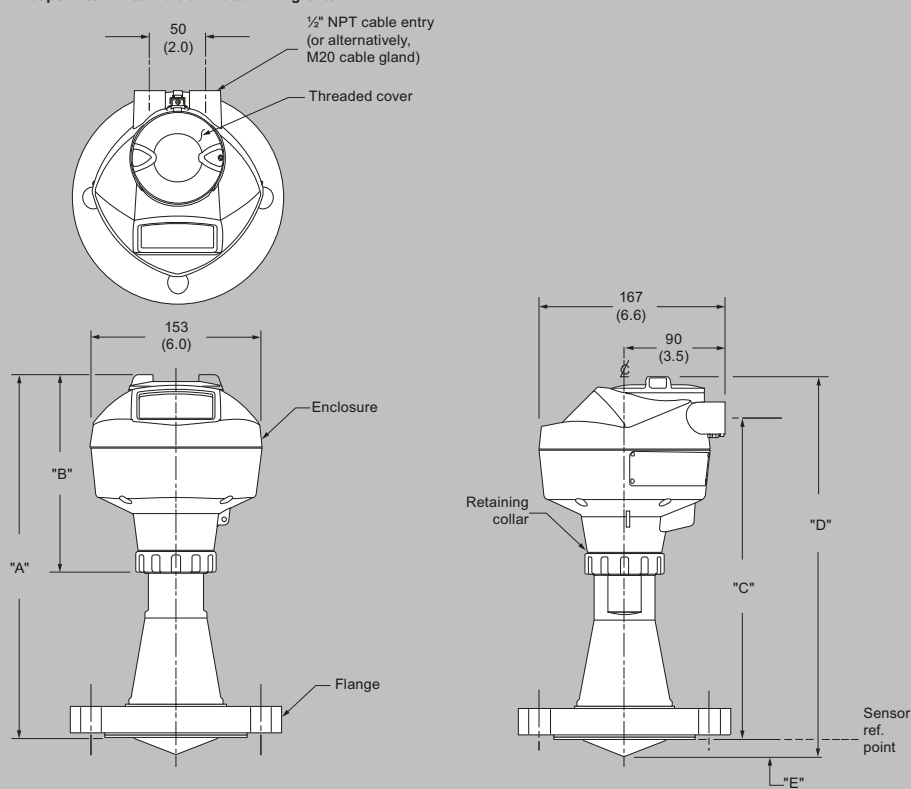
Dimensional drawings



SITRANS LR250 Flanged Encapsulated Antenna, dimensions in mm (inch)

Dimensional drawings (continued)

Flanged Encapsulated Antenna 3"/DN 50/80A or greater



Flange Size	Flange Class	Flange O.D.	Antenna aperture size	Height to Sensor reference point dimension E ¹⁾	Beam angle	Measurement Range	Dimension A	Dimension B	Dimension C	Dimension D
3"	150 lb	190 (7.48)	75 (2.95)	15 (0.59)	9.6°	20 m (65.6 ft)	328 (12.91)	178 (7)	288 (11.34)	343 (13.54)
DN 80	PN 10/16	200 (7.87)								
80A	10K	185 (7.28)								
4"	150 lb	230 (9.06)	75 (2.95)	13 (0.51)	9.6°	20 m (65.6 ft)	328 (12.91)	178 (7)	288 (11.34)	343 (13.50)
DN 100	PN 10/16	220 (8.66)								
100A	10K	210 (8.27)								
6"	150 lb	280 (11.02)	75 (2.95)	15 (0.59)	9.6°	20 m (65.6 ft)	333 (13.11)	178 (7)	293 (11.54)	348 (13.70)
DN 150	PN 10/16	285 (11.25)								
150A	10K	280 (11.02)								

¹⁾ Height from tip of lens to sensor reference point as shown.

SITRANS LR250 Flanged Encapsulated Antenna, dimensions in mm (inch)

Level Measurement

Continuous level measurement

Radar level transmitters / SITRANS LR250 Flanged Encapsulated Antenna

Circuit diagrams

Connect the wires to the terminals as shown: the polarity is identified on the terminal block.

Gland may or may not be provided depending on approval option.

Shield for HART and PROFIBUS PA Intrinsically Safe versions only.

Hand Programmer

SIEMENS

1	2	3	4
5	6	7	8
9	0	.	/+
C	↑	↓	↔

Part number:
7ML1930-1BK

Notes:

1. DC terminal shall be supplied from a source providing electrical isolation between the input and output, to meet the applicable safety requirements of IEC 61010-1.
2. All field wiring must have insulation suitable for rated input voltages.
3. Use shielded twisted pair cable (14 ... 22 AWG) for HART version.
4. Separate cables and conduit may be required to conform to standard instrumentation wiring practices or electrical codes.

SITRANS LR250 connections

Overview



The SITRANS LR250 Hygienic Encapsulated Antenna is a 2-wire 25 GHz pulse radar level transmitter with sanitary and hygienic approvals for continuous monitoring of liquids, slurries, and pastes within the food, beverage, chemical, and pharmaceutical industries to a range of 20 m (66 ft) (antenna dependent).

Picture shown with accessories sold separately.

Benefits

- Fully encapsulated horn antenna design with FDA approved and USP Class VI compliant, TFM 1600 PTFE lens
- $0.8 \mu\text{Ra}$ surface finish for maximum cleanability and hygiene requirements commonly required in sanitary environments
- Chemically resistant TFM 1600 PTFE lens is also suitable for aggressive or corrosive materials
- Approved device in accordance with 3-A, EHEDG EL Class I and/or EHEDG EL Aseptic Class I
- Cost effective replacement for transmitters made of exotic materials
- Graphical local user interface (LUI) makes operation simple with plug-and-play set-up using the intuitive Quick Start Wizard
- Industry standard process connections including ISO 2852, DIN 11851, DIN 11864-1, DIN 11864-2, DIN 11864-3, and Tuchenhaugen Varivent Type F and N
- LUI displays echo profiles for diagnostic support
- 25 GHz high frequency and 2 inch (50 mm) process connection/antenna allow for easy mounting
- Insensitive to mounting location and obstructions, and less sensitive to nozzle interference
- Communication using HART or PROFIBUS PA
- Process Intelligence signal processing for improved measurement reliability and Auto False-Echo Suppression of fixed obstructions
- Programming using infrared Intrinsically Safe handheld programmer or over a network using SIMATIC PDM, Emerson AMS, or Field Device Tools, such as PACTware or Fieldcare via SITRANS DTM.
- Functional Safety (SIL 2). Device suitable for use in accordance with IEC 61508 and IEC 61511

Application

SITRANS LR250 includes a graphical local user interface (LUI) that improves set-up and operation by including an intuitive Quick Start Wizard, and echo profile displays for diagnostic support. Startup is easy using the Quick Start wizard with few parameters required for basic operation.

The 25 GHz frequency creates a narrow, focused beam allowing for smaller antenna options and decreasing sensitivity to obstructions. SITRANS LR250's unique design allows safe and simple programming using the Intrinsically Safe handheld programmer without having to open the instrument's lid.

SITRANS LR250 measures superbly in small vessels and in tanks/vessels up to 20 m (66 ft) on materials with $dk > 1.6$.

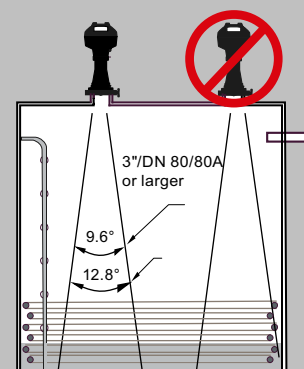
- Key Applications: applications within the food, beverage, chemical and pharmaceutical industries where sanitary, aseptic, or hygienic approvals are required or easy install/clean flush antennas are preferable, such as ice cream, fruit juice, milk, beer, and pharmaceutical or chemical additives and ingredients.

Configuration

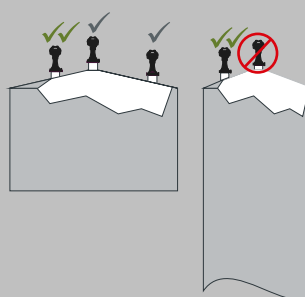
Installation

Note:

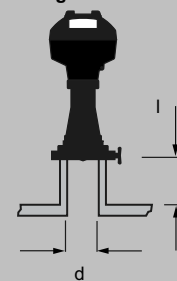
- Beam angle is the width of the cone where the energy density is half of the peak energy density.
- The peak energy density is directly in front of and in line with the antenna.
- There is a signal transmitted outside of the beam angle; therefore false targets may be detected.



Mounting on vessel



Mounting on a nozzle



Nozzles should be maximum l/d ratio 1:1 (Eg. 50 mm length, 50 mm diameter)

LR250 Hygienic Encapsulated Antenna, dimensions in mm (inch)

Level Measurement

Continuous level measurement

Radar level transmitters / SITRANS LR250 Hygienic Encapsulated Antenna

Selection and ordering data

		Article No.											
SITRANS LR250 Radar level transmitter with encapsulated horn and PTFE lens Continuous, non-contact, 20 m (66 ft) range, for liquids, solids, and slurries. For use in hygienic applications.		7	M	L	5	4	3	3	0	-	A		
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.													
Hygienic/Sanitary Approvals													
EHEDG EL Class 1 ¹⁾												1	
EHEDG EL Aseptic Class 1 ¹⁾												2	
3-A (Tuchenhagen connections only - FC ... FF) ²⁾³⁾												3	
EHEDG EL Class I & 3-A (excludes Tuchenhagen connections) ²⁾⁴⁾												4	
Process Connection Types (all types have TFM1600 PTFE lens)													
<u>316L st/st [1.4435 or 1.4404]</u>													
2" Sanitary Clamp according to ISO 2852 ⁵⁾												A	A
3" Sanitary Clamp according to ISO 2852												A	B
4" Sanitary Clamp according to ISO 2852												A	C
<u>316L st/st (1.4435 or 1.4404) & 304L st/st (1.4301)</u>													
DN 50 Aseptic/Hygienic nozzle/ slotted nut (instrument side) to DIN 11864-1 [Form A] ⁵⁾												B	A
DN 80 Aseptic/Hygienic nozzle/ slotted nut (instrument side) to DIN 11864-1 [Form A]												B	B
DN 100 Aseptic/Hygienic nozzle/ slotted nut (instrument side) to DIN 11864-1 [Form A]												B	C
<u>316L st/st [1.4435 or 1.4404]</u>													
DN 50 Aseptic/Hygienic flanged to DIN 11864-2 [Form A] ⁵⁾												C	A
DN 80 Aseptic/Hygienic flanged to DIN 11864-2 [Form A]												C	B
DN 100 Aseptic/Hygienic flanged to DIN 11864-2 [Form A]												C	C
<u>316L st/st [1.4435 or 1.4404]</u>													
DN 50 Aseptic/Hygienic Clamp according to DIN 11864-3 [Form A] ⁵⁾												D	A
DN 80 Aseptic/Hygienic Clamp according to DIN 11864-3 [Form A]												D	B
DN 100 Aseptic/Hygienic Clamp according to DIN 11864-3 [Form A]												D	C
<u>316L st/st (1.4435 or 1.4404) & 304L st/st (1.4301)</u>													
DN 50 Hygienic nozzle/ slotted nut (instrument side) to DIN 11851 ⁵⁾												E	A
DN 80 Hygienic nozzle/ slotted nut (instrument side) to DIN 11851												E	B
DN 100 Hygienic nozzle/ slotted nut (instrument side) to DIN 11851												E	C
<u>316L st/st [1.4435 or 1.4404]</u>													
Type F (50 mm) Tuchenhagen Varivent (EHEDG only) ⁵⁾												F	A
Type N (68 mm) Tuchenhagen Varivent (EHEDG only) ⁵⁾												F	B
Type F (50 mm) Tuchenhagen Varivent [3-A only & EPDM process seal -40 ... 120 °C (-40 ... 248 °F)] ⁵⁾												F	C
Type N (68 mm) Tuchenhagen Varivent [3-A only & EPDM process seal -40 ... 120 °C (-40 ... 248 °F)] ⁵⁾												F	D
Type F (50 mm) Tuchenhagen Varivent [3-A only & FKM process seal -20 ... 170 °C (-4 ... 338 °F)] ⁵⁾												F	E
Type N (68 mm) Tuchenhagen Varivent [3-A only & FKM process seal -20 ... 170 °C (-4 ... 338 °F)] ⁵⁾												F	F
Communication													
PROFIBUS PA													1
4 ... 20 mA HART, start-up at < 3.6 mA													2
Enclosure													
Aluminum, Epoxy paint, 2 X ½" NPT													0
Aluminum, Epoxy paint, 2 X M20 x 1.5													1
Approvals													
Ordinary Locations/General Purpose (Non-Ex), CE, UKCA, CSA, FM, FCC, RED, RCM													A
Intrinsically Safe: CSA/FM Class I, Div. 1, Groups A, B, C, D, Class II, Div. 1, Groups E, F, G, Class III T4 FCC, Industry Canada													B

Selection and ordering data (continued)

	Article No.
SITRANS LR250 Radar level transmitter with encapsulated horn and PTFE lens Continuous, non-contact, 20 m (66 ft) range, for liquids, solids, and slurries. For use in hygienic applications.	7ML5433- ● ● ● ● 0 - ● A ● ●
Intrinsically Safe: ATEX II 1G Ex ia IIC T4 Ga, ATEX II 1D Ex ia ta IIIC T100°C Da; UKEX II 1G Ex ia IIC T4 Ga, UKEX II 1D Ex ia ta IIIC T100°C Da; IECEx Ex ia IIC T4 Ga, IECEx 1D Ex ia ta IIIC T100°C Da; INMETRO Ex ia IIC T4 Ga, INMETRO Ex ia ta IIIC T100°C Da, IP67/IP68; EAC Ex 0Ex ia IIC T4 Ga X, EAC Ex 0Ex ia ta IIIC T100°C Da X; CE, UKCA, RED, RCM	C
Non-incendive: CSA/FM Class I, Div. 2, Groups A, B, C, D T5, FCC, Industry Canada	D
Increased Safety / Non Sparking: ATEX II 3G Ex ec IIC T4 Gc; UKEX II 3G Ex ec IIC T4 Gc; EAC Ex 2Ex nA IIC T4 Gc X; CE, UKCA, RED, RCM	E
Increased Safety: ATEX II 1/2 GD, 1D, 2D, Ex eb mb ia IIC T4 Ga/Gb; UKEX II 1/2 GD, 1D, 2D, Ex eb mb ia IIC T4 Ga/Gb; IECEx Ex eb ia mb IIC T4 Ga/Gb; INMETRO Ex e ia mb IIC T4 Ga/Gb, INMETRO Ex ia ta IIIC T100°C Da, IP67/IP68; EAC Ex Ga/Gb Ex ia/e+mb IIC T4 X; CE, UKCA, RED, RCM ⁶⁾	F
Flameproof: ATEX II 1/2 GD, 1D, 2D, Ex db mb ia IIC T4 Ga/Gb; ATEX II 1/2 GD, 1D, 2D, Ex ia ta IIIC T100°C Da; UKEX II 1/2 GD, 1D, 2D, Ex db mb ia IIC T4 Ga/Gb; UKEX II 1/2 GD, 1D, 2D, Ex ia ta IIIC T100°C Da; IECEx Ex db mb ia IIC T4 Ga/Gb, IECEx Ex ia ta IIIC T100°C Da; INMETRO Ex d ia mb IIC T4 Ga/Gb, INMETRO Ex ia ta IIIC T100°C Da, IP67/IP68; EAC Ex Ga/Gb Ex ia/db+mb IIC T4 X, EAC Ex Ex ia ta IIIC T100°C Da; CE, UKCA, RED, RCM ⁶⁾	G
Explosion proof: CSA/FM Class I, II and III, Div. 1, Groups A, B, C, D, E, F, G, FCC, Industry Canada ⁹⁾	H
Non Sparking: NEPSI Ex nA IIC T4 Gc	K
Intrinsically Safe: NEPSI Ex ia IIC T4 Ga, Ex iaD tD A20 IP67 T100 °C	L
Flameproof: NEPSI Ex d ia mb IIC T4 Ga/Gb, Ex iaD tD A20 IP67 T100 °C ⁶⁾	M
Increased Safety: NEPSI Ex e ia mb IIC T4 Ga/Gb, Ex iaD tD A20 IP67 T100 °C ⁶⁾	N
Pressure Rating Rating per pressure/temperature curves in instruction manual	0

Selection and Ordering data	Order code
Further designs Please add "-Z" to Article No. and specify Order code(s). <u>Electrical Connection cable entry:</u>	
Plug M12 (IP 67 rating) with mating connector ²⁾⁷⁾⁸⁾	A50
Plug 7/8" (IP 67 rating) with mating connector ²⁾⁸⁾⁹⁾	A55
<u>Test Certificates</u>	
Manufacturer's Test Certificate M to DIN 55350, Part 18 and to ISO 9000	C11
Material inspection Certificate 3.1 of EN 10204	C12
<u>Functional Safety</u>	

Level Measurement

Continuous level measurement

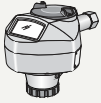

Radar level transmitters / SITRANS LR250 Hygienic Encapsulated Antenna

Selection and ordering data (continued)

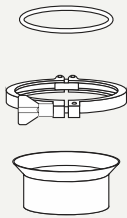
Selection and Ordering data	Order code
Functional Safety (SIL 2). Device suitable for use in accordance with IEC 61508 and IEC 61511 ⁶⁾ ¹⁰⁾	C20
Namur	
Namur NE43 compliant, device preset to failsafe < 3.6 mA ⁶⁾	N07
Tagging	
Stainless steel tag [69 mm x 50 mm (2.71 x 1.97 inch)]	
Measuring-point number / identification (max. 27 characters) specify in plain text	Y15

Accessories	Article No.
Operating Instructions	
All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation	
Accessories	
Handheld programmer, Intrinsically safe, EEx ia (LUI enabled)	7ML1930-1BK
HART modem with USB interface	7MF4997-1DB
One metallic cable gland M20 x 1.5, rated -40 ... +80 °C (-40 ... +176 °F), HART (two are required) ⁶⁾	7ML1930-1AP
One metallic cable gland M20 x 1.5, rated -40 ... +80 °C (-40 ... +176 °F), PROFIBUS PA (two are required) ⁸⁾	7ML1930-1AQ
SITRANS RD100, loop powered display -see Chapter 7	7ML5741-.....
SITRANS RD150, remote digital display for 4 ... 20 mA and HART devices - see Chapter 7	7ML5742-.....
SITRANS RD200, universal input display with Modbus conversion - see Chapter 7	7ML5740-.....
SITRANS RD300, dual line display with totalizer and linearization curve and Modbus conversion - see Chapter 7	7ML5744-.....
For applicable back up point level switch - see point level measurement section	

- 1) Available with Process connection options AA ... FB & FF only.
- 2) Available with Approval options A, B, C, L only.
- 3) Available with Process connections FC ... FF only.
- 4) Available with Process connection options AA ... EC & FF only.
- 5) Max. range 10 m (32.8 ft), dk > 3 [20 m (66 ft) and dk > 1.6 if installed in a stillpipe].
- 6) Applicable with Communication option 2 only.
- 7) Available with Enclosure option 1 only.
- 8) Available with Communication options 1 and 3 only.
- 9) Available with Enclosure option 0 only.
- 10) Available with Approval options A, B, C, D, E, K, L only.

SITRANS LR250 hygienic encapsulated Specials	Order code
For "Electronics Head only" follow the standard configuration and choose YY option on positions 9 and 10 of the full part number. For example: 7ML5433-1YY20-1AA0 will order an electronics head for the following: EHEDG EL Class 1 approval, 4 ... 20 mA HART, M20 cable entries, General purpose Haz Loc approval, pressure rating as per manual.	
Spare Lens Kits (Lens and O-ring)	
Kit, 2 inch, ISO 2852, HEA, Lens, silicone secondary O-ring	A5E32572731
Kit, 3 inch, ISO 2852, HEA, Lens, silicone secondary O-ring	A5E32572745
Kit, 4 inch, ISO 2852, HEA, Lens, silicone secondary O-ring	A5E32572747

Selection and ordering data (continued)

SITRANS LR250 hygienic encapsulated Specials	Order code
Kit, DN 50, DIN 11851, HEA, Lens, silicone secondary O-ring	A5E32572758
Kit, DN 80, DIN 11851, HEA, Lens, silicone secondary O-ring	A5E32572770
Kit, DN 100, DIN 11851, HEA, Lens, silicone secondary O-ring	A5E32572772
Kit, DN 50, DIN 11864-1, HEA, Lens, silicone secondary O-ring	A5E32572773
Kit, DN 80, DIN 11864-1, HEA, Lens, silicone secondary O-ring	A5E32572779
Kit, DN 100, DIN 11864-1, HEA, Lens, silicone secondary O-ring	A5E32572782
Kit, DN 50, DIN 11864-2/3, HEA, Lens, silicone secondary O-ring	A5E32572785
Kit, DN 80, DIN11864-2/3, HEA, Lens, silicone secondary O-ring	A5E32572790
Kit, DN 100, DIN11864-2/3, HEA, Lens, silicone secondary O-ring	A5E32572791
Kit, Tuchenhausen, Type F, HEA, Lens, silicone secondary O-ring	A5E32572794
Kit, Tuchenhausen, Type N, HEA, Lens, silicone secondary O-ring	A5E32572795
Accessories (customer side process connection and FKM and EPDM seal for each size and type)	
Kit DN50 DIN11864-1 GS Form A tank connection, EPDM Seal Class II	A5E32910638
Kit, DN80 DIN11864-1 GS Form A tank connection, EPDM Seal Class II	A5E32910649
Kit, DN100 DIN11864-1 GS Form A tank connection, EPDM Seal Class II	A5E32910657
Kit DN50 DIN11864-1 GS Form A tank connection, FKM Seal Class I	A5E32910658
Kit, DN80 DIN11864-1 GS Form A tank connection, FKM Seal Class I	A5E32910671
Kit, DN100 DIN11864-1 GS Form A tank connection, FKM Seal Class I	A5E32910681
Kit 2" ISO2852 tank connection, Clamp, Cleanable EPDM Seal Class II	A5E32910686
Kit 3" ISO2852 tank connection, Clamp, Cleanable EPDM Seal Class II	A5E32910697
Kit 4" ISO2852 tank connection, Clamp, Cleanable EPDM Seal Class II	A5E32910708
Kit 2" ISO2852 tank connection, Clamp, Cleanable FKM Seal	A5E32910718
Kit 3" ISO2852 tank connection, Clamp, Cleanable FKM Seal	A5E32910723
Kit 4" ISO2852 tank connection, Clamp, Cleanable FKM Seal	A5E32910734
Kit DN50 DIN11851 SC Tank connection, EPDM Seal Class II ¹⁾	A5E32910746
Kit DN80 DIN11851 SC Tank connection, EPDM Seal Class II ¹⁾	A5E32910771
Kit DN100 DIN11851 SC Tank connection, EPDM Seal Class II ¹⁾	A5E32910780
Kit DN50 DIN11851 SC Tank connection, FKM Seal Class II	A5E32910784
Kit DN80 DIN11851 SC Tank connection, FKM Seal Class II	A5E32910789
Kit DN100 DIN11851 SC Tank connection, FKM Seal Class II	A5E32910790
Kit DN50 DIN11864-2 Form A tank connection, M8 Hardware (nut/bolt/washer), EPDM Seal Class II	A5E32910791
Kit DN80 DIN11864-2 Form A tank connection, M10 Hardware (nut/bolt/washer), EPDM Seal Class II	A5E32910793
Kit DN100 DIN11864-2 Form A tank connection, M10 Hardware (nut/bolt/washer), EPDM Seal Class II	A5E32910799
Kit DN50 DIN11864-2 Form A tank connection, M8 Hardware (nut/bolt/washer), FKM Seal Class I	A5E32910805

Level Measurement

Continuous level measurement

Radars level transmitters / SITRANS LR250 Hygienic Encapsulated Antenna

Selection and ordering data (continued)

SITRANS LR250 hygienic encapsulated Specials	Order code
Kit DN80 DIN11864-2 Form A tank connection, M10 Hardware (nut/bolt/washer), FKM Seal Class I	A5E32910809
Kit DN100 DIN11864-2 Form A tank connection, M10 Hardware (nut/bolt/washer), FKM Seal Class I	A5E32910812
Kit DN50 DIN11864-3 Form A tank connection, Clamp, EPDM Seal Class II	A5E32910813
Kit DN80 DIN11864-3 Form A tank connection, Clamp, EPDM Seal Class II	A5E32910814
Kit DN100 DIN11864-3 Form A tank connection, Clamp, EPDM Seal Class II	A5E32910815
Kit DN50 DIN11864-3 Form A tank connection, Clamp, FKM Seal Class I	A5E32910816
Kit DN80 DIN11864-3 Form A tank connection, Clamp, FKM Seal Class I	A5E32910817
Kit DN100 DIN11864-3 Form A tank connection, Clamp, FKM Seal Class I	A5E32910818
Kit Type F, Tuchenhausen, Clamp, EPDM Seal Class II (EHEDG only) - no tank connection	A5E33489537
Kit Type N, Tuchenhausen, Clamp, EPDM Seal Class II (EHEDG only) - no tank connection	A5E33489543
Kit Type F, Tuchenhausen, Clamp, FKM Seal Class I (EHEDG only) - no tank connection	A5E33489828
Kit Type N, Tuchenhausen, Clamp, FKM Seal Class I (EHEDG only) - no tank connection	A5E33489830
Ex-proof plugs	
Ex-proof plugs kit, 1/2" NPT, qty 5	A5E39979991
Ex-proof plugs kit, M20, qty 5	A5E39979992

¹⁾ Class II for low fat applications when EPDM seal used on DIN11851

Technical specifications

SITRANS LR250 Hygienic Encapsulated Antenna	
Mode of Operation	
Measuring principle	Radar level measurement
Frequency	K-band (25.0 GHz)
Minimum measuring range	50 mm (2 inch) from end of antenna
Maximum measuring range	20 m (66 ft)
Output	
HART	Version 5.1
• Analog output	4 ... 20 mA
• Accuracy	± 0.02 mA
• Fail-safe	<ul style="list-style-type: none"> • Programmable as high low or hold (loss of echo) • NE 43 programmable
PROFIBUS PA	Profile 3.01
• Function blocks	2 Analog Input (AI)
Performance (according to reference conditions IEC60770-1)	
Maximum measured error	<ul style="list-style-type: none"> • > 500 mm from sensor reference point: 3 mm (0.118 inch) • < 500 mm from sensor reference point: 25 mm (1 inch)
Influence of ambient temperature	< 0.003 %/K
Rated operating conditions	
Installation conditions	
• Location	Indoor/outdoor
Ambient conditions (enclosure)	
• Ambient temperature	-40 ... +80 °C (-40 ... +176 °F)
• Storage temperature	-40 ... +80 °C (-40 ... +176 °F)
• Installation category	I
• Pollution degree	4
Medium conditions	
Dielectric constant ϵ_r	≥ 1.6 (antenna dependent)
Process temperature	-40 ... +170 °C (-40 ... +338 °F) at process connection
Process pressure	See Pressure/Temperature curves for more information
Design	
Enclosure	
• Material	Aluminum, polyester powder coated
• Cable inlet	2 x M20 x 1.5 or 2 x ½" NPT
Degree of protection	Type 4X/NEMA 4X, Type 6/NEMA 6, IP67, IP68
Weight (dependent on process connection)	<ul style="list-style-type: none"> • Approx. 4.7 kg (10.4 lb) for 2" ISO 2852 (smallest size) • Approx. 7.9 kg (17.4 lb) for DN 100 DIN 11864-2 (largest size)
Display (local)	Graphic local user interface including quick start wizard and echo profile display
Antenna	
• Material	Stainless steel 316L (1.4435 or 1.4404) and TFM 1600 PTFE Lens (lens is the only wetted part)
• Lens surface finish (R_a)	0.8 µm

Technical specifications (continued)

SITRANS LR250 Hygienic Encapsulated Antenna	
Process connections	
Hygienic/Sanitary connections	<ul style="list-style-type: none"> • 2", 3" & 4" Sanitary Clamp according to ISO 2852 • DN 50, DN 80 & DN 100 Aseptic/Hygienic threaded to DIN 11864-1 [Form A] • DN 50, DN 80 & DN 100 Aseptic/Hygienic flanged to DIN 11864-2 [Form A] • DN 50, DN 80 & DN 100 Aseptic/Hygienic Clamp according to DIN 11864-3 [Form A] • DN 50, DN 80 & DN 100 Hygienic Union according to DIN 11851 • Type F (50 mm) & Type N (68 mm) Tuchenhagen Varivent
Power supply	
4 ... 20 mA/HART	Nominal 24 V DC (max. 30 V DC) with max. 550 Ω
PROFIBUS PA	<ul style="list-style-type: none"> • 15 mA • Per IEC 61158-2
Certificates and approvals	
General	cCSAus, CE, UKCA, FM, RCM
Radio	FCC, Industry Canada, RED, RCM
Hazardous	
• Explosion Proof (Brazil)	INMETRO Ex d ia mb IIC T4 Ga/Gb, Ex ia ta IIIC T100 °C Da
• Increased Safety (Brazil)	INMETRO Ex e ia mb IIC T4 Ga/Gb, Ex ia ta IIIC T100 °C Da
• Intrinsically Safe (Brazil)	INMETRO Ex ia IIC T4 Ga, Ex ia ta IIIC T100 °C Da
• Explosion Proof (Canada/USA)	CSA/FM Class I, Div. 1, Groups A, B, C, D; Class II, Div. 1, Groups E, F, G; Class III T4
• Intrinsically Safe (Canada/USA)	CSA/FM Class I, Div. 1, Groups A, B, C, D; Class II, Div. 1, Groups E, F, G; Class III T4
• Non-incendive (Canada/USA)	CSA/FM Class I, Div. 2, Groups A, B, C, D T5
• Flame Proof/Increased Safety (China)	NEPSI Ex d ia mb IIC T4 Ga/Gb, Ex e ia mb IIC T4 Ga/Gb, Ex iaD tD A20 IP67 T100 °C
• Intrinsically Safe (China)	NEPSI Ex ia IIC T4 Ga, Ex iaD tD A20 IP67 T100 °C
• Non-sparking (China)	NEPSI Ex nA IIC T4 Gc
• Intrinsically Safe (EU)	ATEX II 1G Ex ia IIC T4 Ga, ATEX II 1D Ex ia ta IIIC T100°C Da;
• Intrinsically Safe (UK)	UKEX II 1G Ex ia IIC T4 Ga, UKEX II 1D Ex ia ta IIIC T100°C Da;
• Intrinsically Safe (International)	IECEX Ex ia IIC T4 Ga, IECEX Ex ia ta IIIC T100°C Da;
• Increased Safety - Zone 2 (EU)	ATEX II 3G Ex ec IIC T4 Gc;
• Increased Safety - Zone 2 (UK)	UKEX II 3G Ex ec IIC T4 Gc;
• Non-sparking (EAC)	EAC Ex 2Ex nA IIC T4 Gc;
• Flameproof (EU)	ATEX II 1/2 GD, 1D, 2D, Ex db mb ia IIC Ga/Gb, Ex ia ta IIIC T100°C Da;
• Flameproof (UK)	UKEX II 1/2 GD, 1D, 2D, Ex db mb ia IIC Ga/Gb, Ex ia ta IIIC T100°C Da;
• Flameproof (International)	IECEX Ex db mb ia IIC T4 Ga/Gb, Ex ia ta IIIC T100°C Da;
• Increased Safety - Zone 1 (EU)	ATEX II 1/2 GD, 1D, 2D, Ex eb mb ia IIC T4 Ga/Gb, Ex ia ta IIIC T100°C Da;
• Increased Safety - Zone 1 (UK)	UKEX II 1/2 GD, 1D, 2D, Ex eb mb ia IIC T4 Ga/Gb, Ex ia ta IIIC T100°C Da;
• Increased Safety - Zone 1 (International)	IECEX Ex eb mb ia IIC T4 Ga/Gb, Ex ia ta IIIC T100°C Da
• Explosion Proof (Russia/Kazakhstan)	EAC Ex d
• Increased Safety (Russia/Kazakhstan)	EAC Ex e

Level Measurement

Continuous level measurement

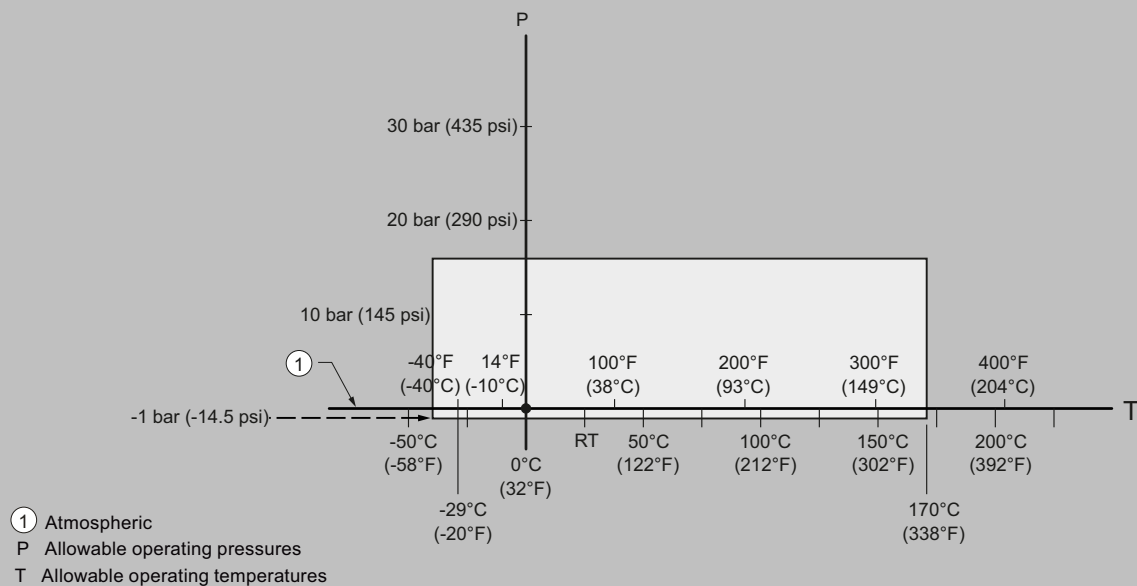
Radar level transmitters / SITRANS LR250 Hygienic Encapsulated Antenna

Technical specifications (continued)

SITRANS LR250 Hygienic Encapsulated Antenna	
<ul style="list-style-type: none"> Intrinsically Safe (Russia/Kazakhstan) 	EAC Ex ia
Hygienic/Sanitary	EHEDG EL Class I EHEDG EL Aseptic Class I
Programming	
Intrinsically Safe Siemens handheld programmer	Infrared receiver
<ul style="list-style-type: none"> Approvals for handheld programmer 	IS model: ATEX II 1 GD Ex ia op is IIC T4 Ga ATEX II 1 GD Ex ia op is IIIC T135°C Da UKEX II 1 GD Ex ia op is IIC T4 Ga UKEX II 1 GD Ex ia op is IIIC T135°C Da Ta = -20 ... +50°C CSA/FM Class I, II, III, Div. 1, Groups A, B, C, D, E, G, T6 Ta = 50°C IECEx SIR 09.0073
Handheld communicator	HART communicator 375/475
PC	<ul style="list-style-type: none"> SIMATIC PDM Emerson AMS SITRANS DTM (for connection into FDT, such as PACTware or Fieldcare)
Display (local)	Graphic local user interface including quick start wizard and echo profile displays

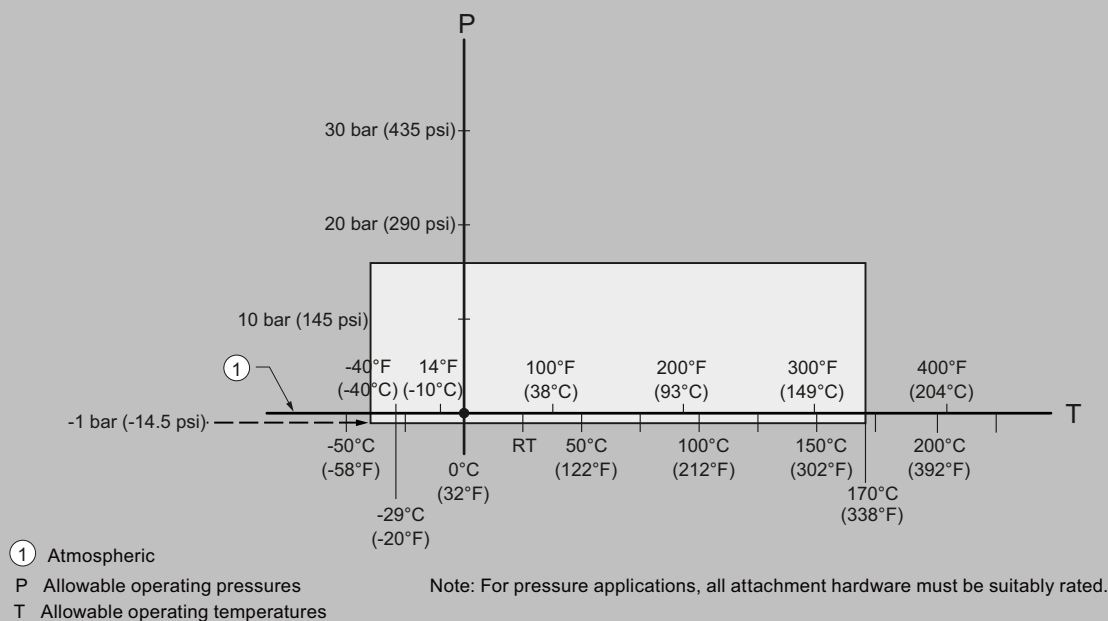
Characteristic curves

DIN 11851 Sanitary/Hygienic nozzle/slotted nut: DN 50, DN 80, and DN 100
 DIN 11864-1 Aseptic/Hygienic nozzle/slotted nut: DN 50, DN 80, and DN 100



SITRANS LR250 Hygienic Encapsulated Antenna, process pressure/temperature rating curve

DIN 11864-2 Aseptic/Hygienic flanged: DN 50, DN 80, and DN 100



SITRANS LR250 Hygienic Encapsulated Antenna, process pressure/temperature rating curve

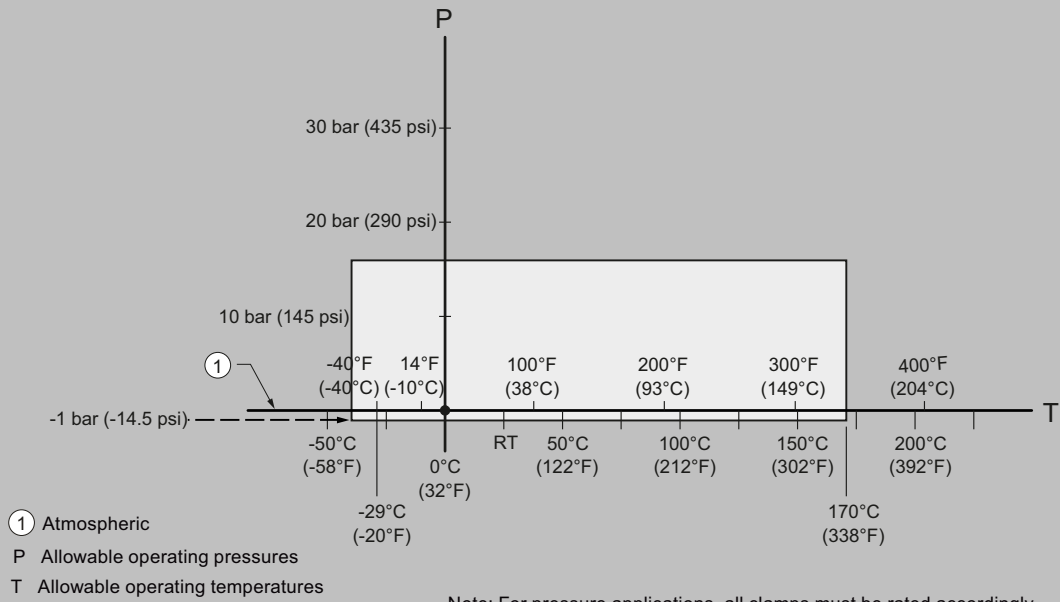
Level Measurement

Continuous level measurement

Radar level transmitters / SITRANS LR250 Hygienic Encapsulated Antenna

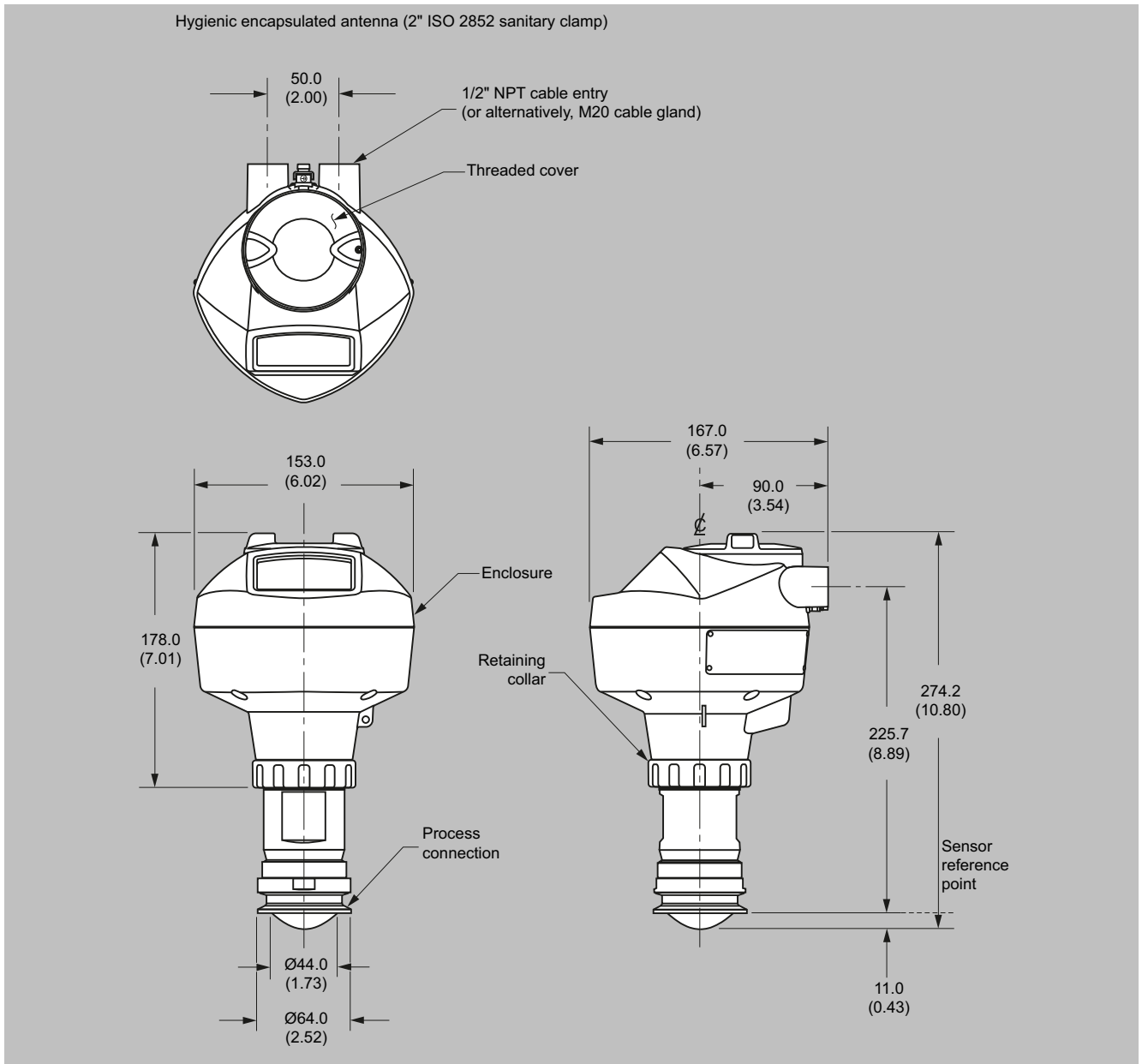
Characteristic curves (continued)

DIN 11864-3 Aseptic/Hygienic clamp: DN 50, DN 80, and DN 100
 ISO 2852 Sanitary/Hygienic clamp: 2", 3", and 4"
 Tuchenhausen Varivent face seal clamp: Type N (68 mm) and Type F (50 mm)



SITRANS LR250 Hygienic Encapsulated Antenna, process pressure/temperature rating curve

Dimensional drawings



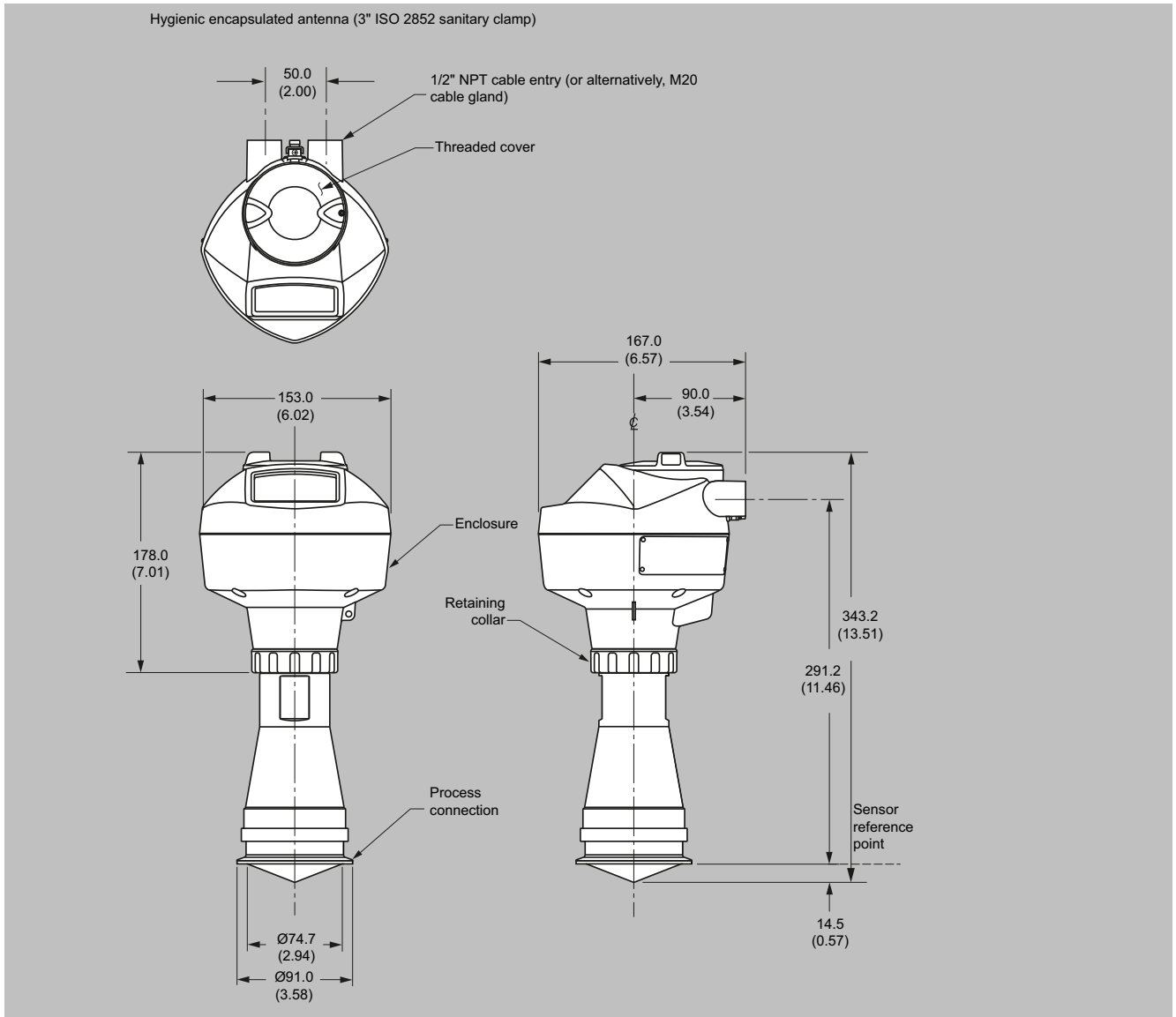
SITRANS LR250 Hygienic Encapsulated Antenna (2" ISO 2852 sanitary clamp), dimensions in mm (inch)

Level Measurement

Continuous level measurement

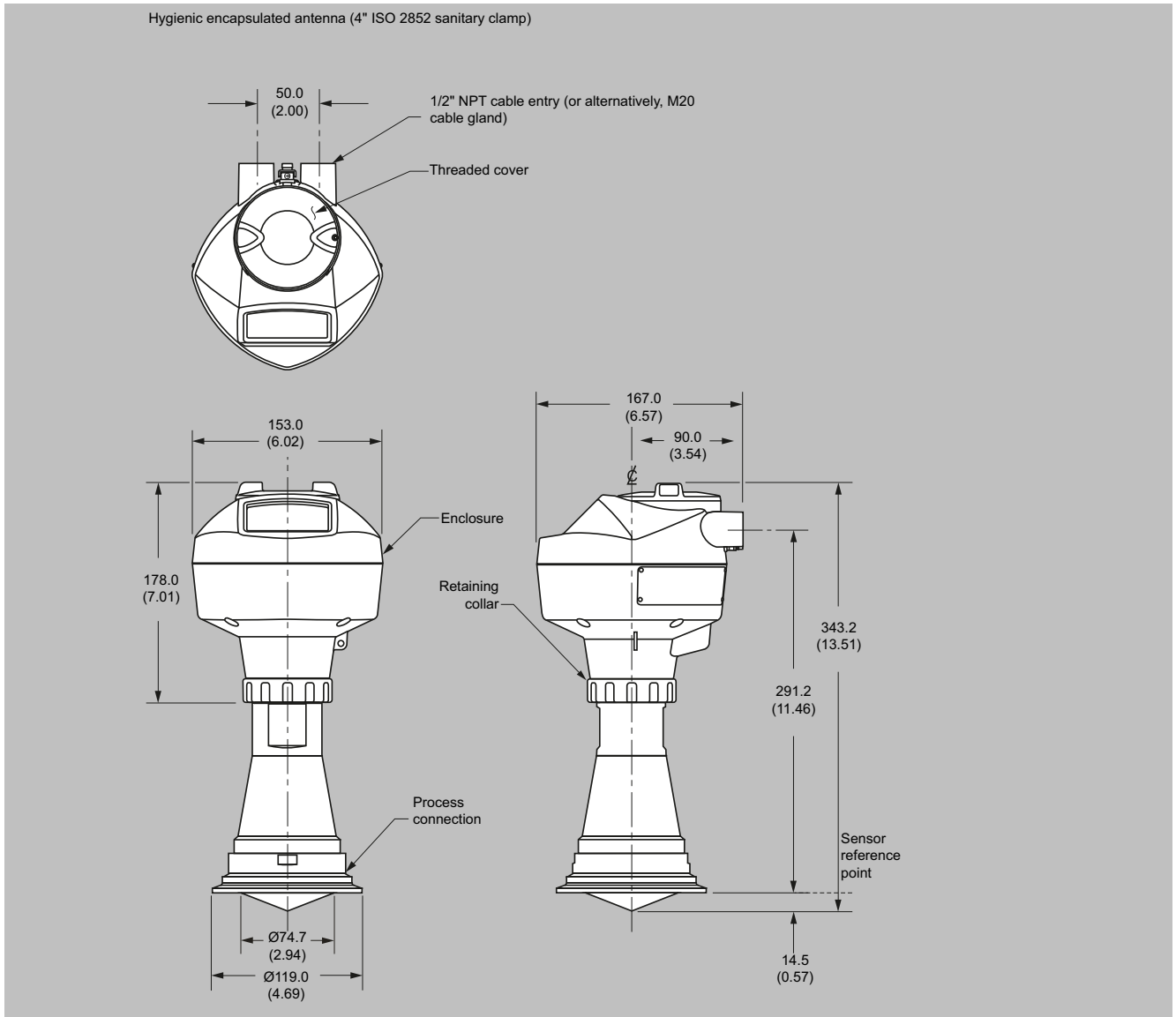
Radar level transmitters / SITRANS LR250 Hygienic Encapsulated Antenna

Dimensional drawings (continued)



SITRANS LR250 Hygienic Encapsulated Antenna (3" ISO 2852 sanitary clamp), dimensions in mm (inch)

Dimensional drawings (continued)



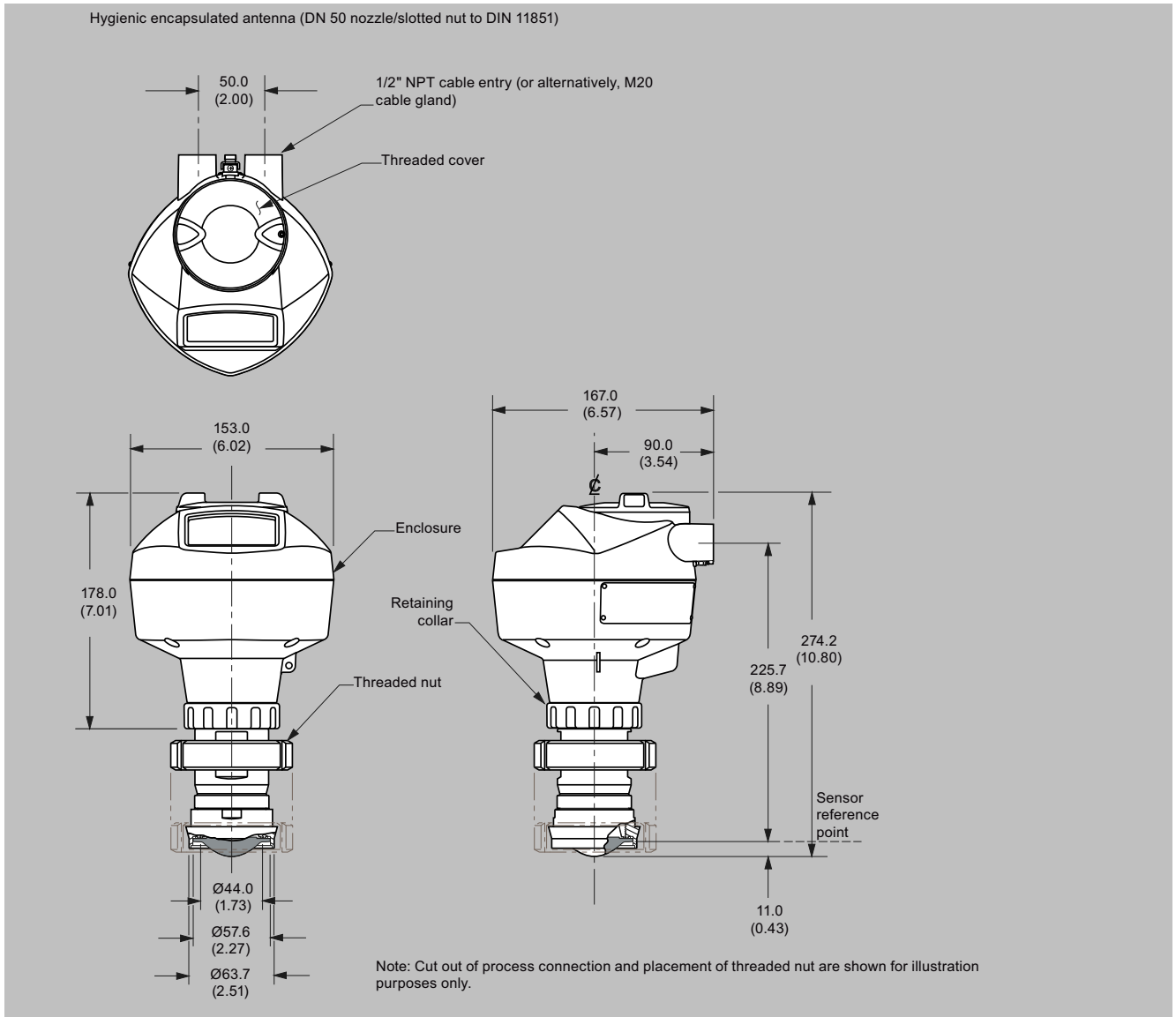
SITRANS LR250 Hygienic Encapsulated Antenna (4" ISO 2852 sanitary clamp), dimensions in mm (inch)

Level Measurement

Continuous level measurement

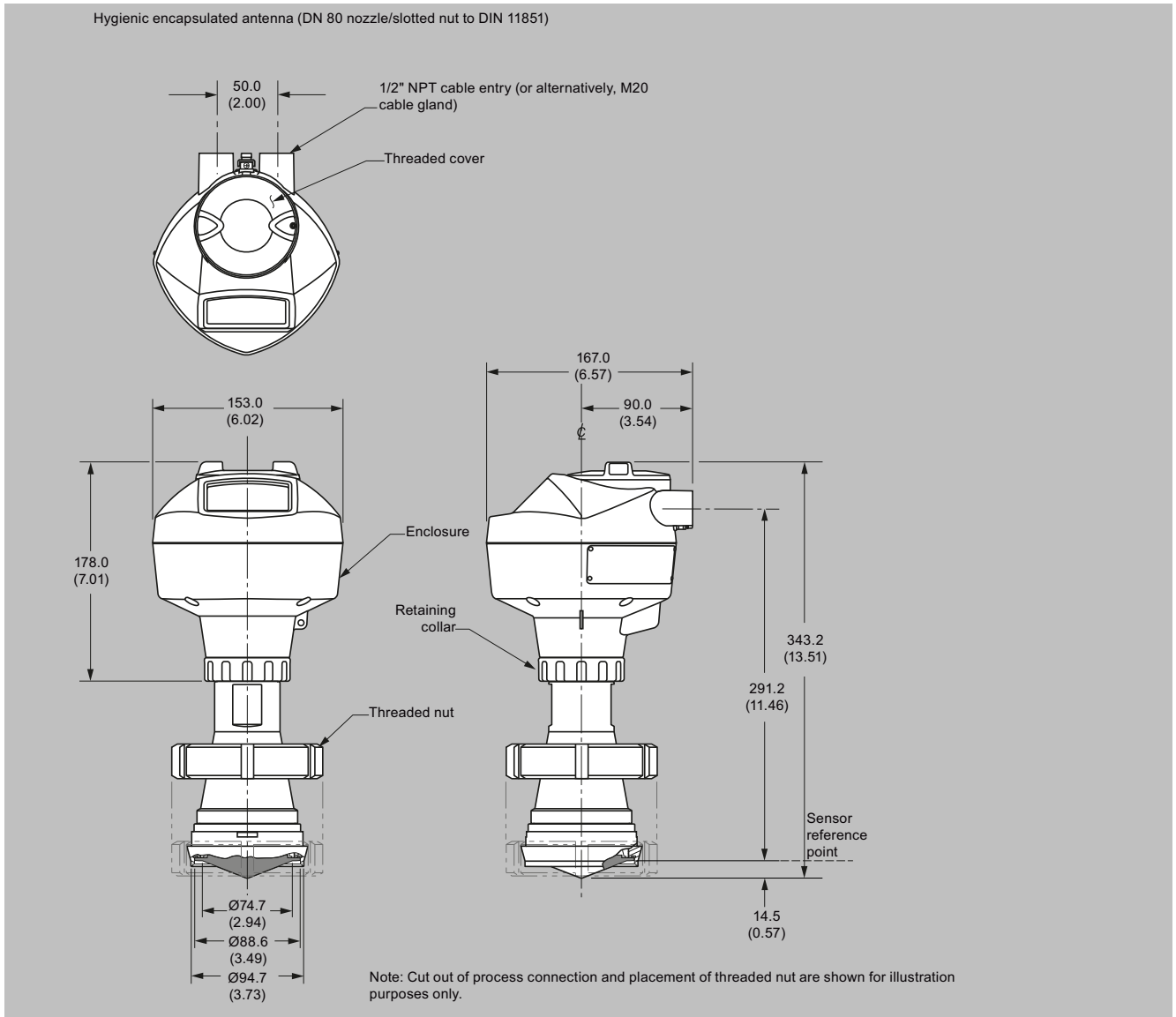
Radar level transmitters / SITRANS LR250 Hygienic Encapsulated Antenna

Dimensional drawings (continued)



SITRANS LR250 Hygienic Encapsulated Antenna (DN 50 nozzle/slotted nut to DIN 11851), dimensions in mm (inch)

Dimensional drawings (continued)



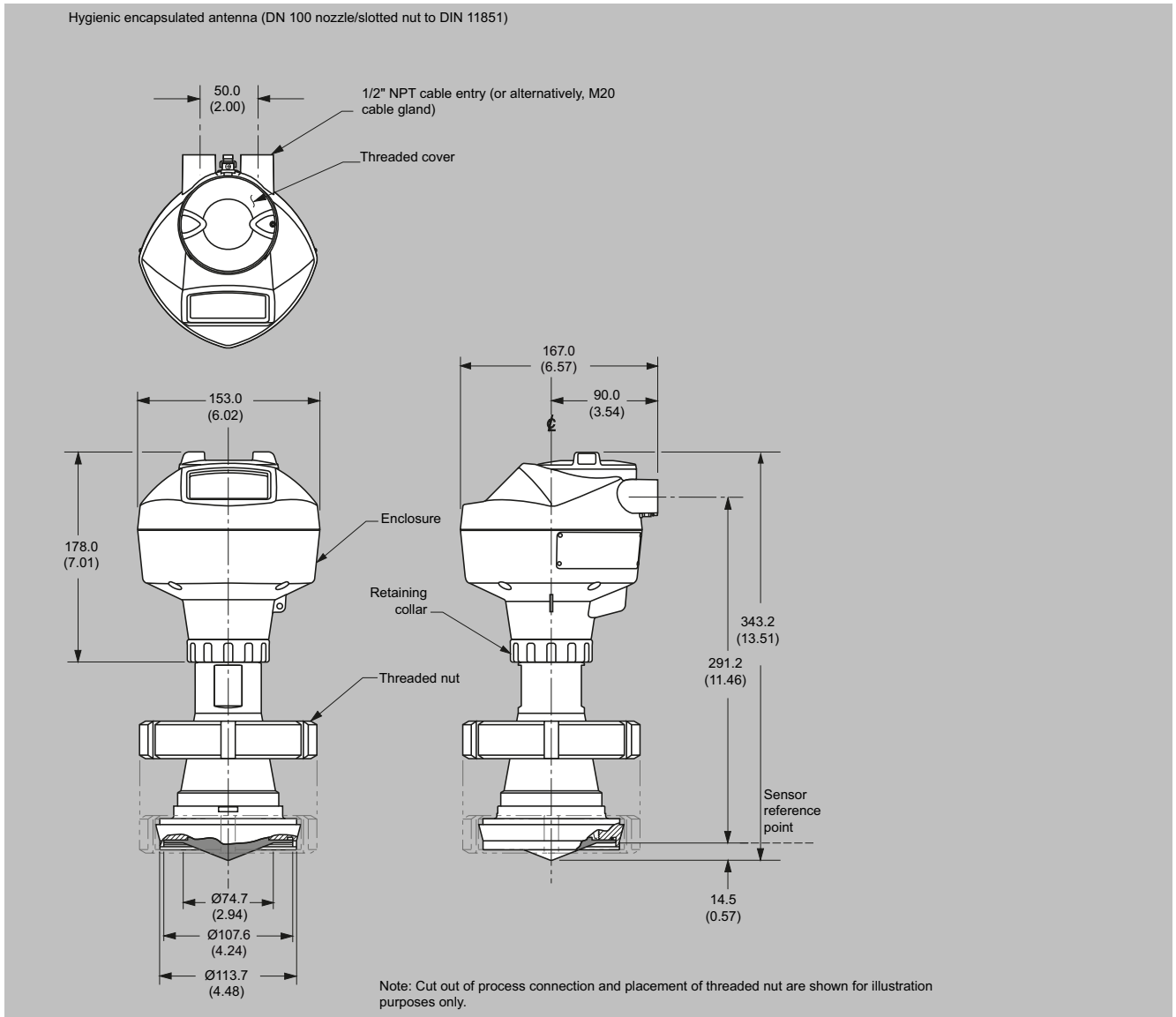
SITRANS LR250 Hygienic Encapsulated Antenna (DN 80 nozzle/slotted nut to DIN 11851), dimensions in mm (inch)

Level Measurement

Continuous level measurement

Radar level transmitters / SITRANS LR250 Hygienic Encapsulated Antenna

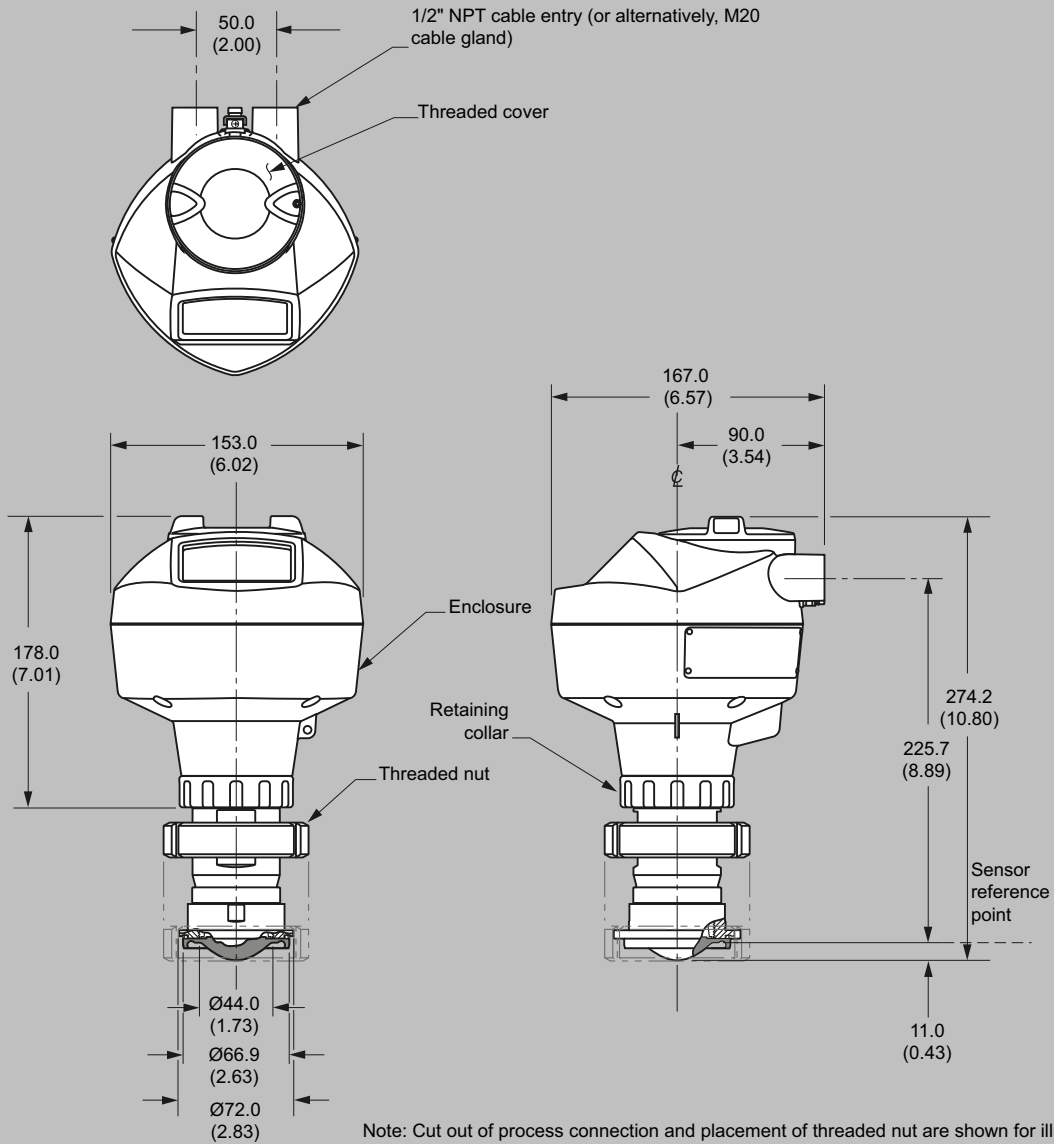
Dimensional drawings (continued)



SITRANS LR250 Hygienic Encapsulated Antenna (DN 100 nozzle/slotted nut to DIN 11851), dimensions in mm (inch)

Dimensional drawings (continued)

Hygienic encapsulated antenna (DN 50 aseptic clamp to DIN 11864-1)



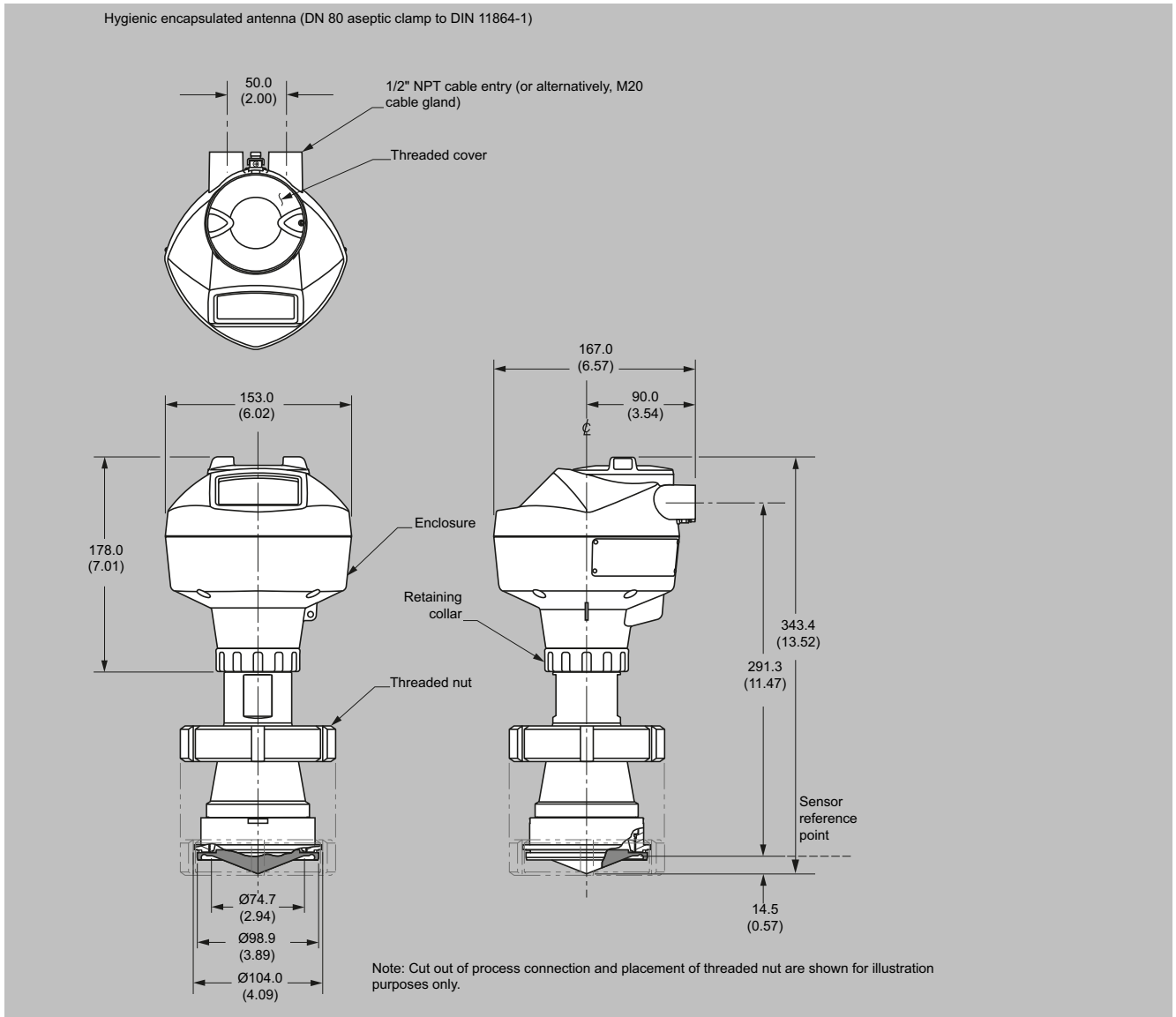
SITRANS LR250 Hygienic Encapsulated Antenna (DN 50 aseptic clamp to DIN 11864-1), dimensions in mm (inch)

Level Measurement

Continuous level measurement

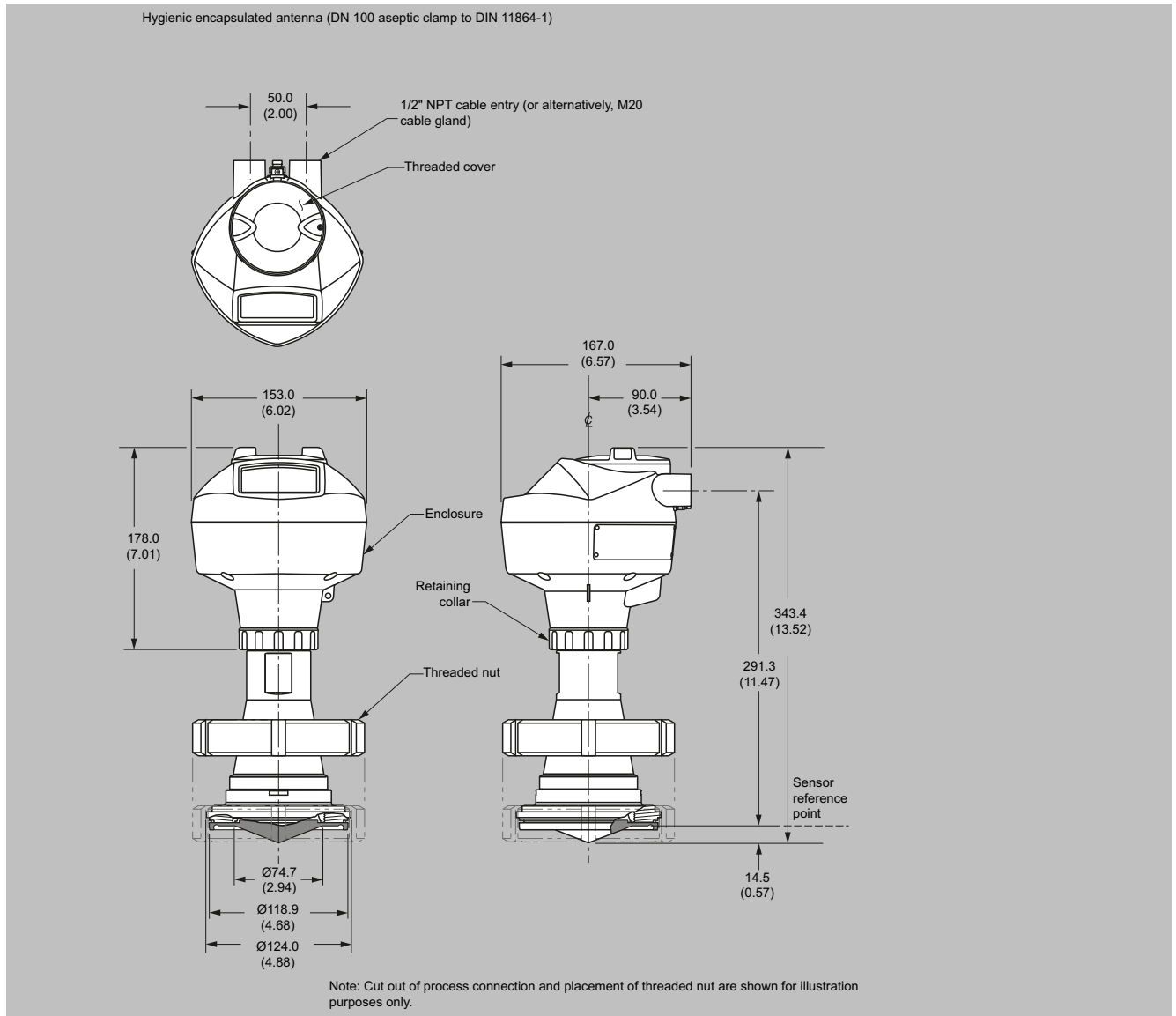
Radar level transmitters / SITRANS LR250 Hygienic Encapsulated Antenna

Dimensional drawings (continued)



SITRANS LR250 Hygienic Encapsulated Antenna (DN 80 aseptic clamp to DIN 11864-1), dimensions in mm (inch)

Dimensional drawings (continued)



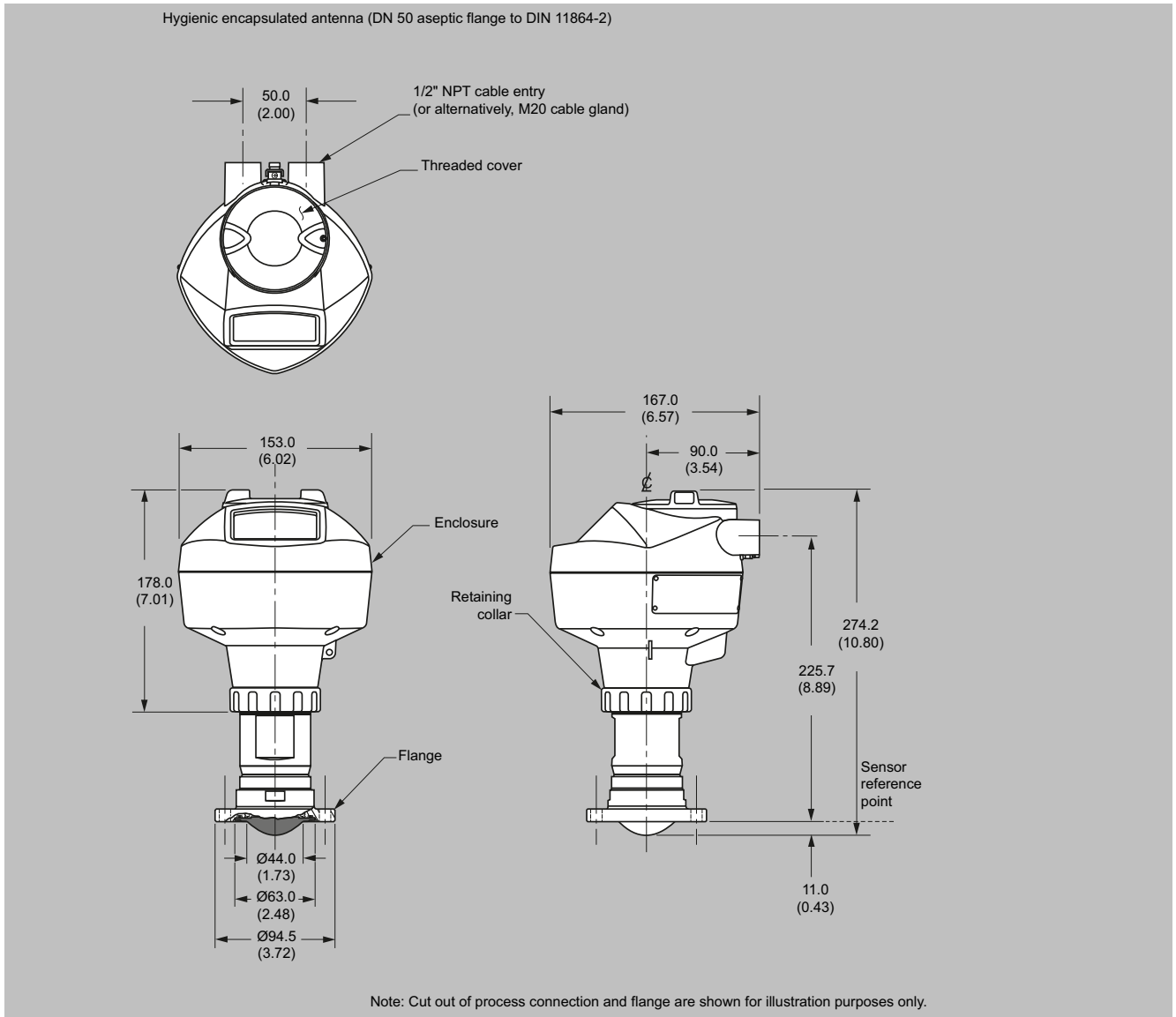
SITRANS LR250 Hygienic Encapsulated Antenna (DN 100 aseptic clamp to DIN 11864-1), dimensions in mm (inch)

Level Measurement

Continuous level measurement

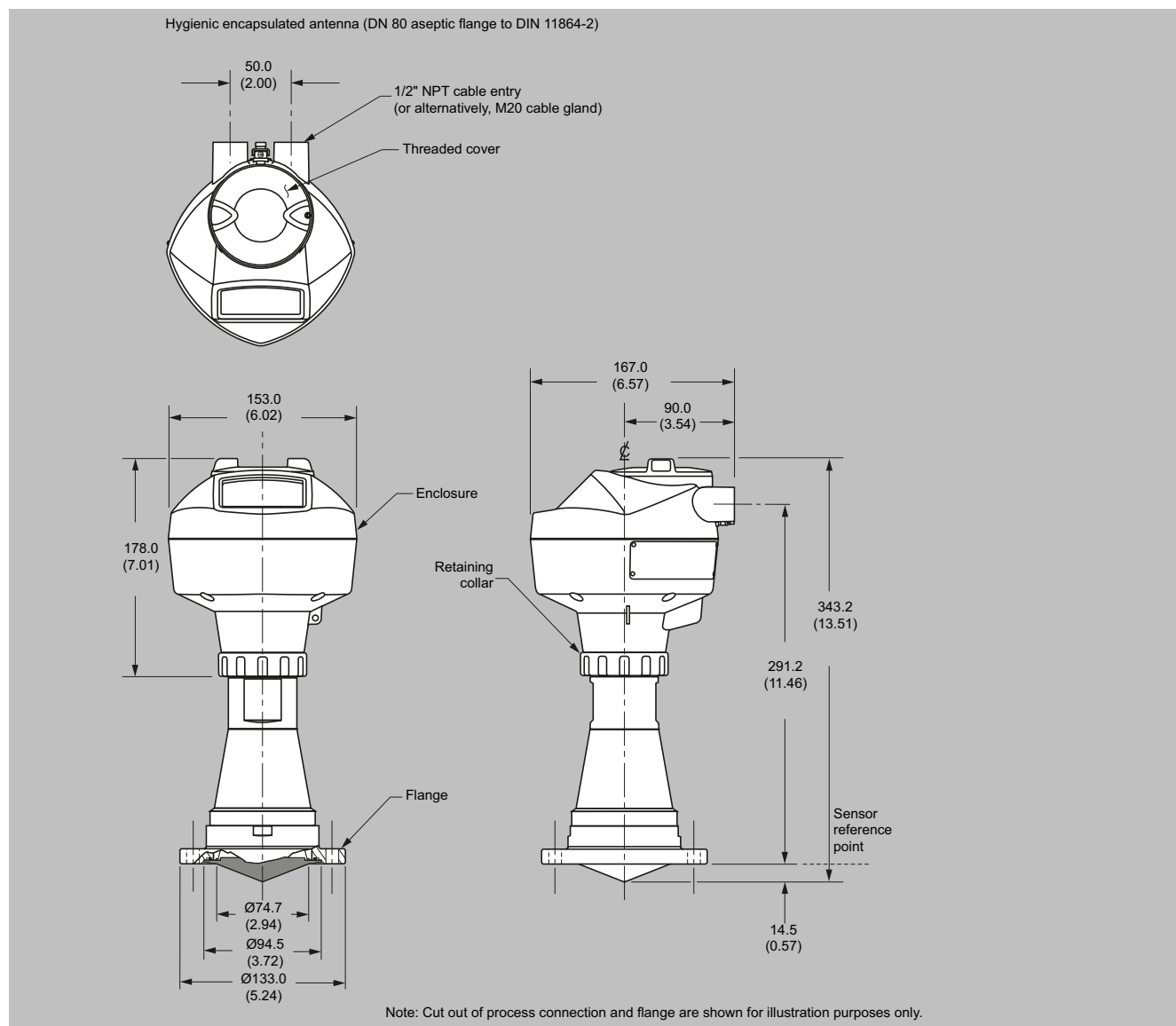
Radar level transmitters / SITRANS LR250 Hygienic Encapsulated Antenna

Dimensional drawings (continued)



SITRANS LR250 Hygienic Encapsulated Antenna (DN 50 aseptic flange to DIN 11864-2), dimensions in mm (inch)

Dimensional drawings (continued)



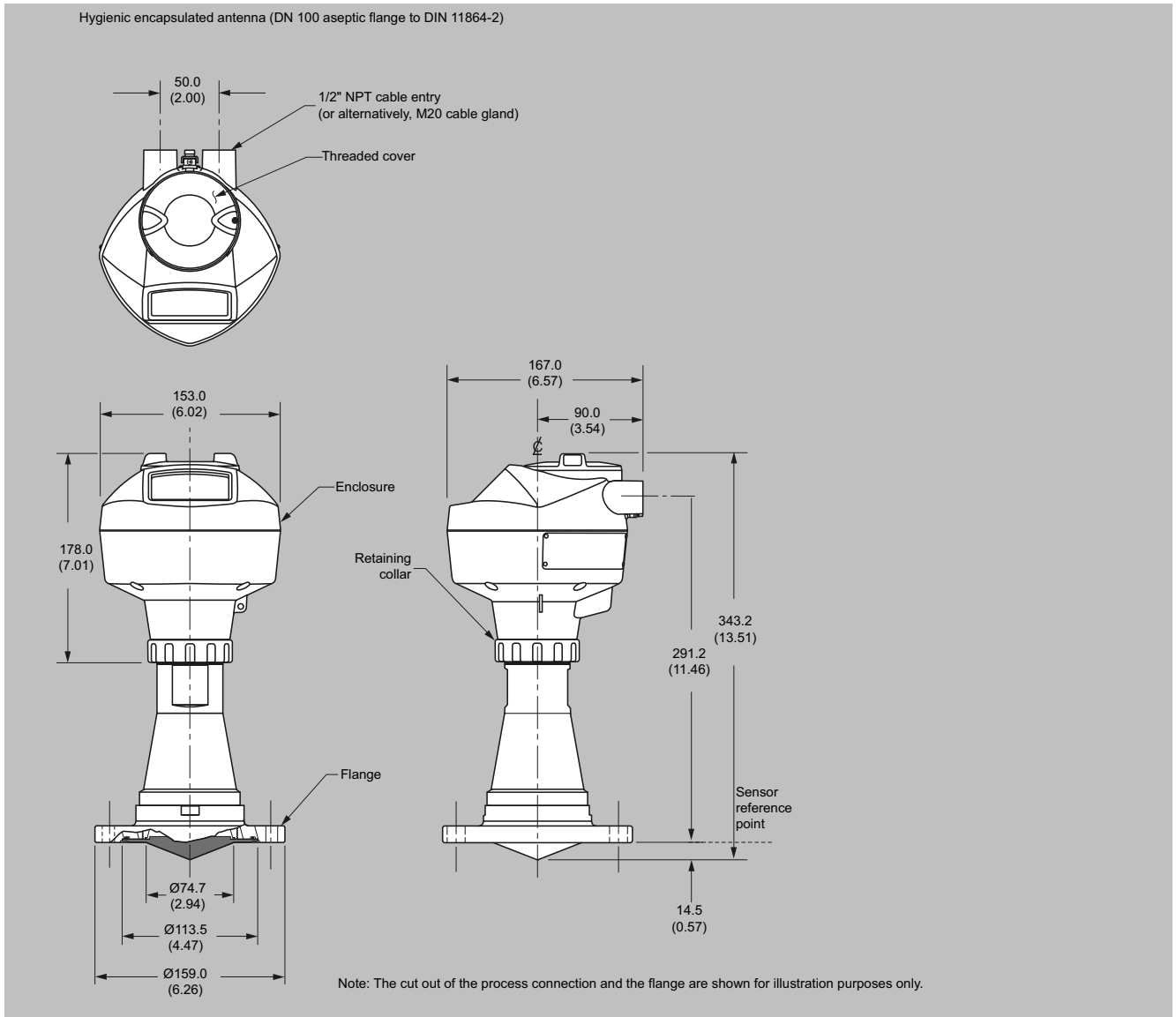
SITRANS LR250 Hygienic Encapsulated Antenna (DN 80 aseptic flange to DIN 11864-2), dimensions in mm (inch)

Level Measurement

Continuous level measurement

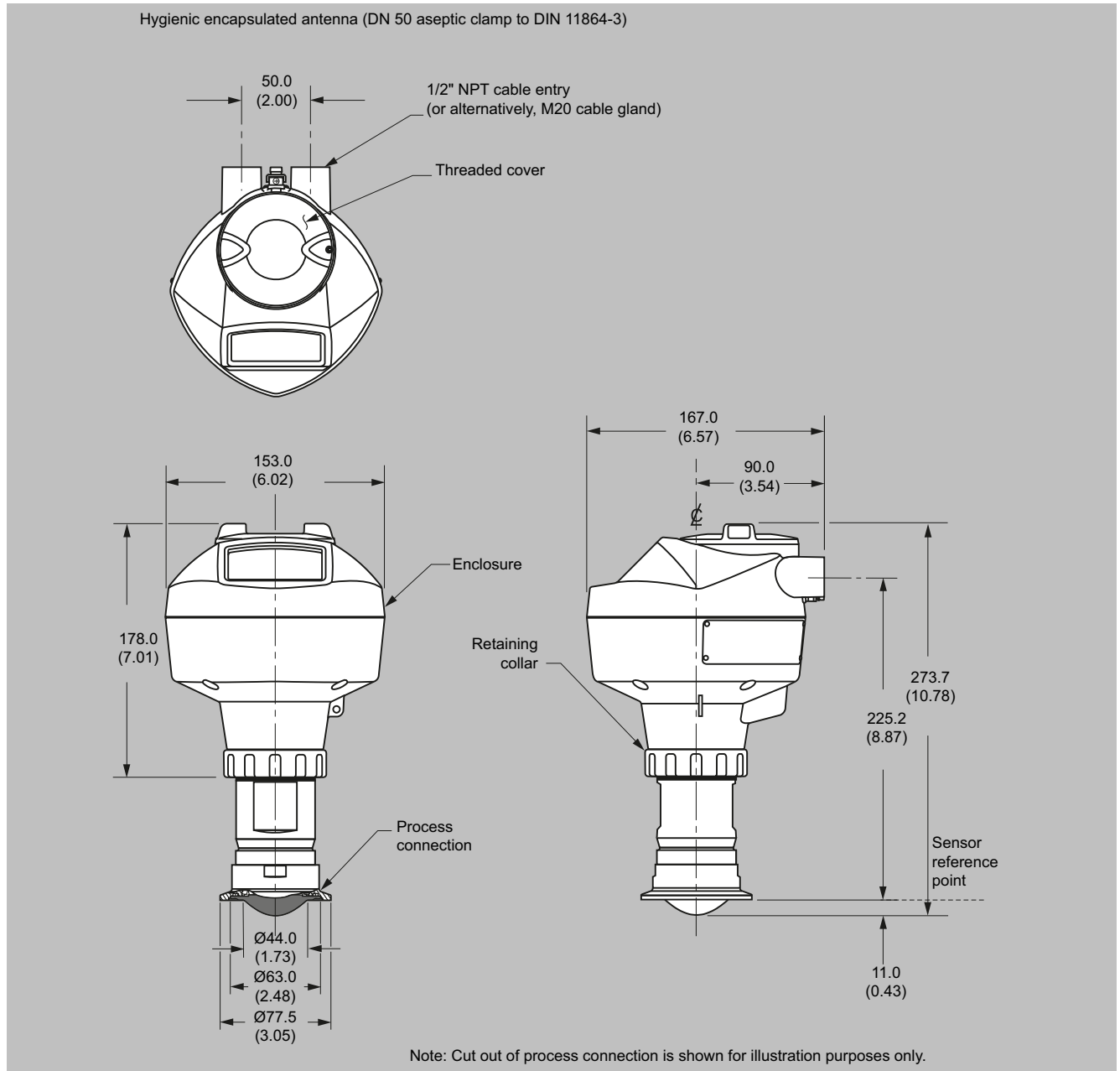
Radar level transmitters / SITRANS LR250 Hygienic Encapsulated Antenna

Dimensional drawings (continued)



SITRANS LR250 Hygienic Encapsulated Antenna (DN 100 aseptic flange to DIN 11864-2), dimensions in mm (inch)

Dimensional drawings (continued)



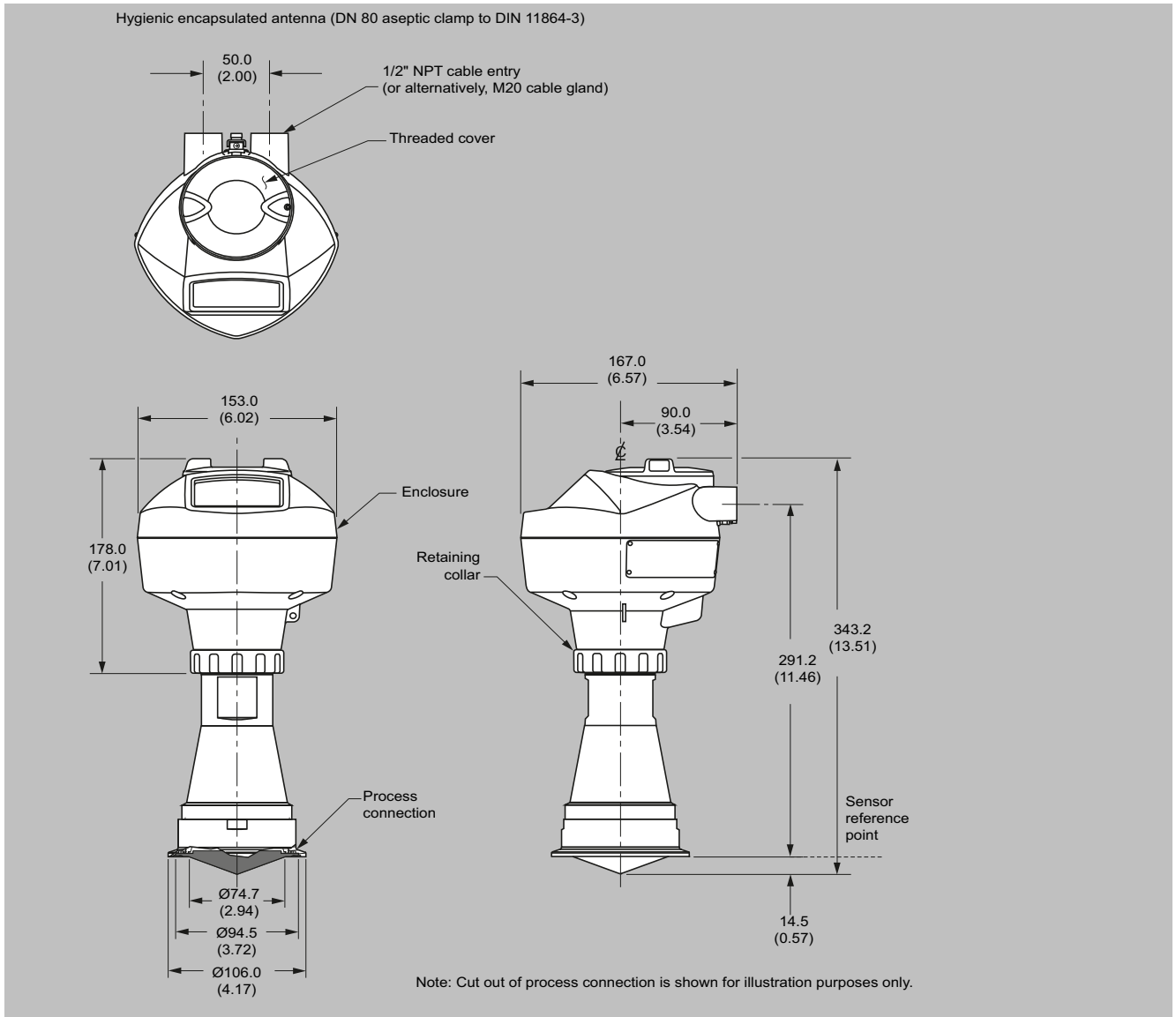
SITRANS LR250 Hygienic Encapsulated Antenna (DN 50 aseptic clamp to DIN 11864-3), dimensions in mm (inch)

Level Measurement

Continuous level measurement

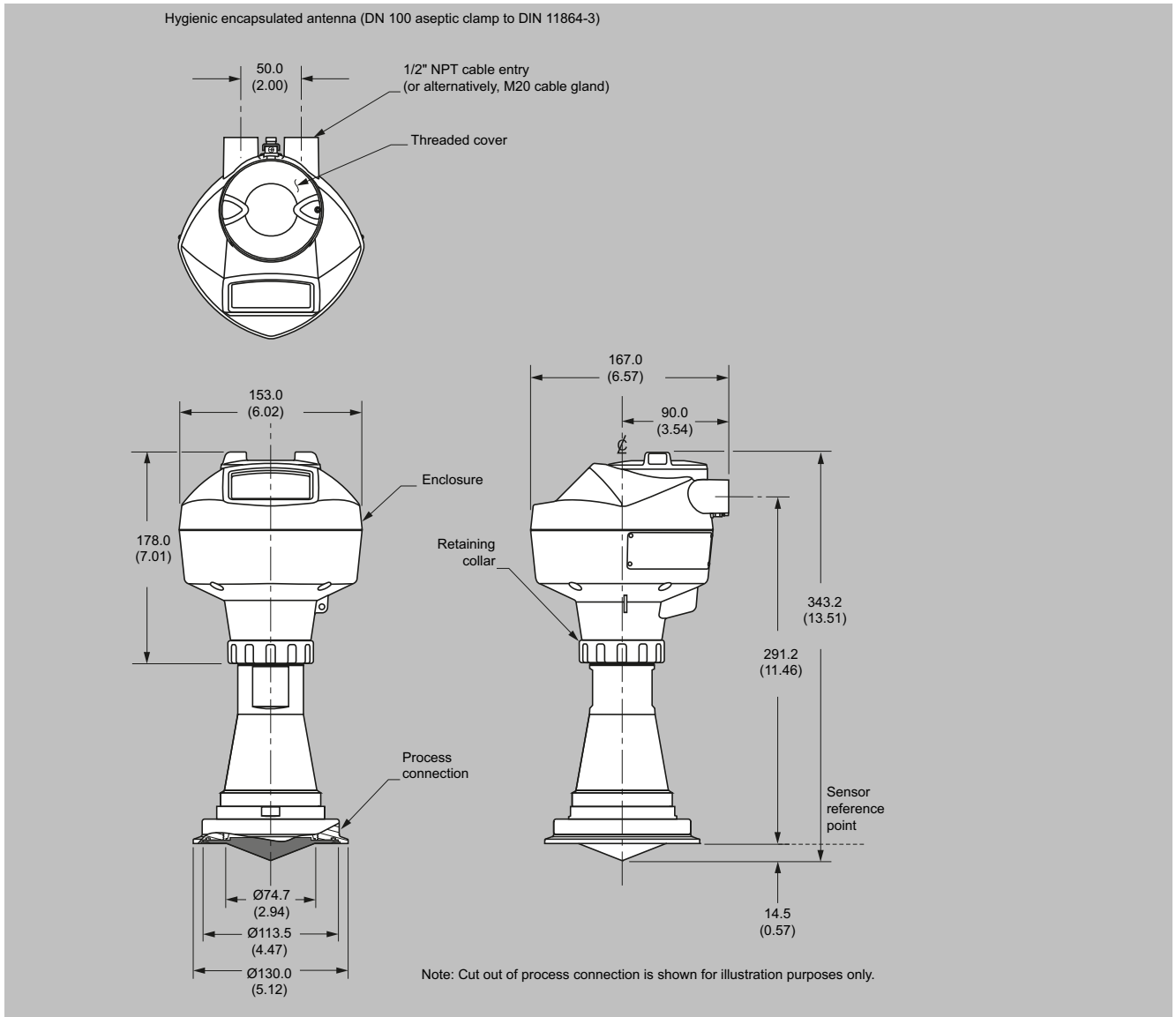
Radar level transmitters / SITRANS LR250 Hygienic Encapsulated Antenna

Dimensional drawings (continued)



SITRANS LR250 Hygienic Encapsulated Antenna (DN 80 aseptic clamp to DIN 11864-3), dimensions in mm (inch)

Dimensional drawings (continued)



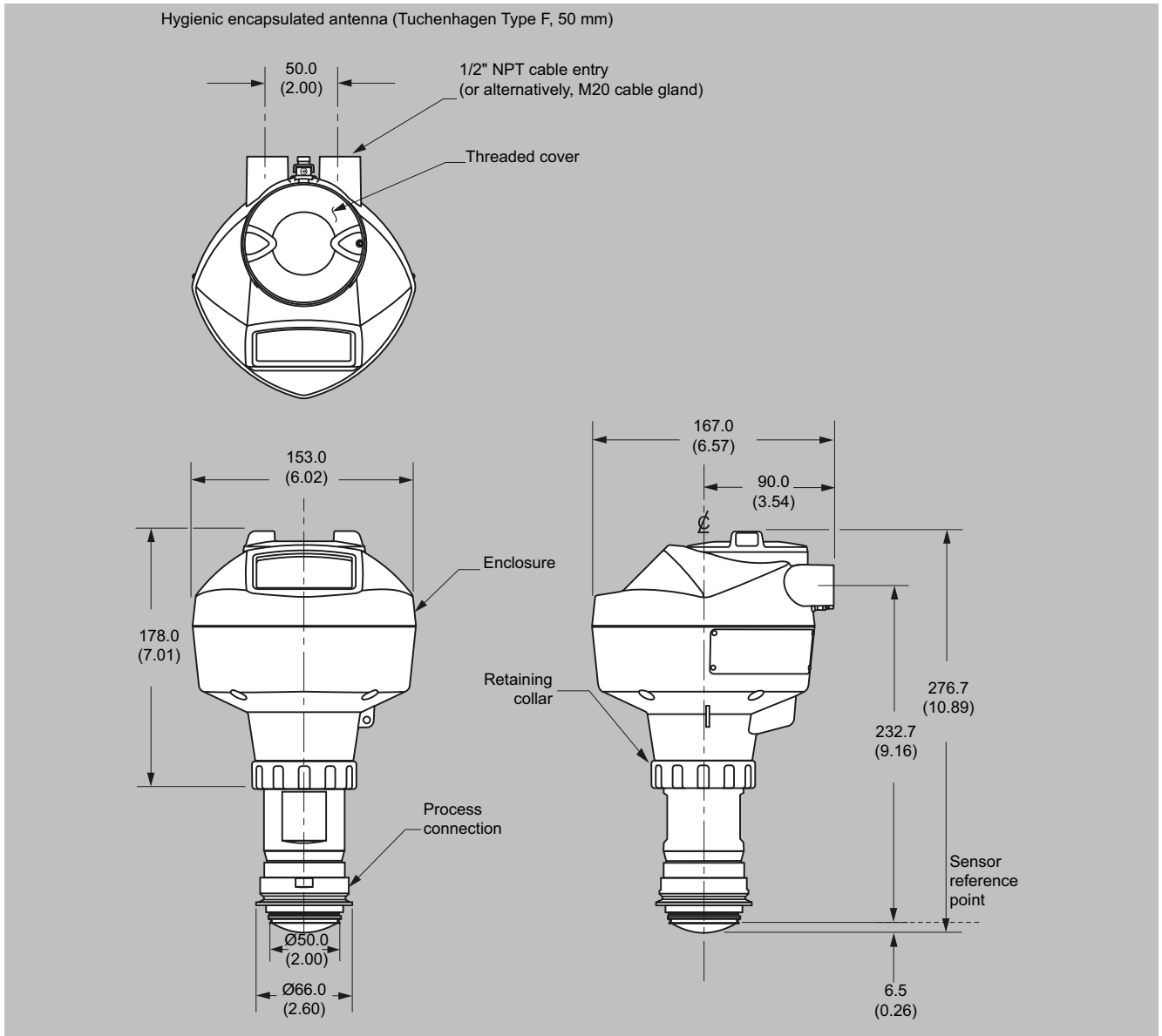
SITRANS LR250 Hygienic Encapsulated Antenna (DN 100 aseptic clamp to DIN 11864-3), dimensions in mm (inch)

Level Measurement

Continuous level measurement

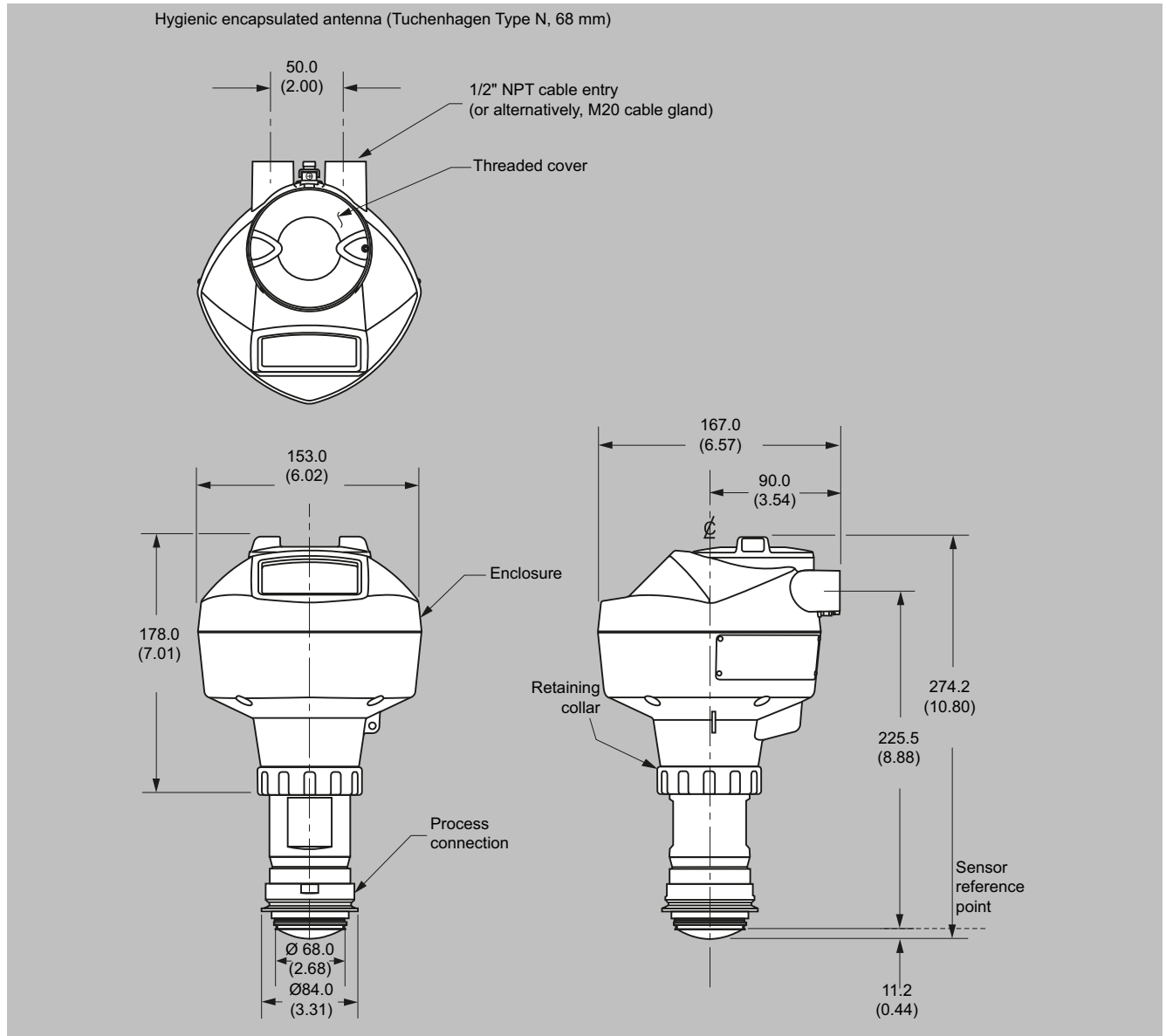
Radar level transmitters / SITRANS LR250 Hygienic Encapsulated Antenna

Dimensional drawings (continued)



SITRANS LR250 Hygienic Encapsulated Antenna (Tuchenhagen Type F), dimensions in mm (inch)

Dimensional drawings (continued)



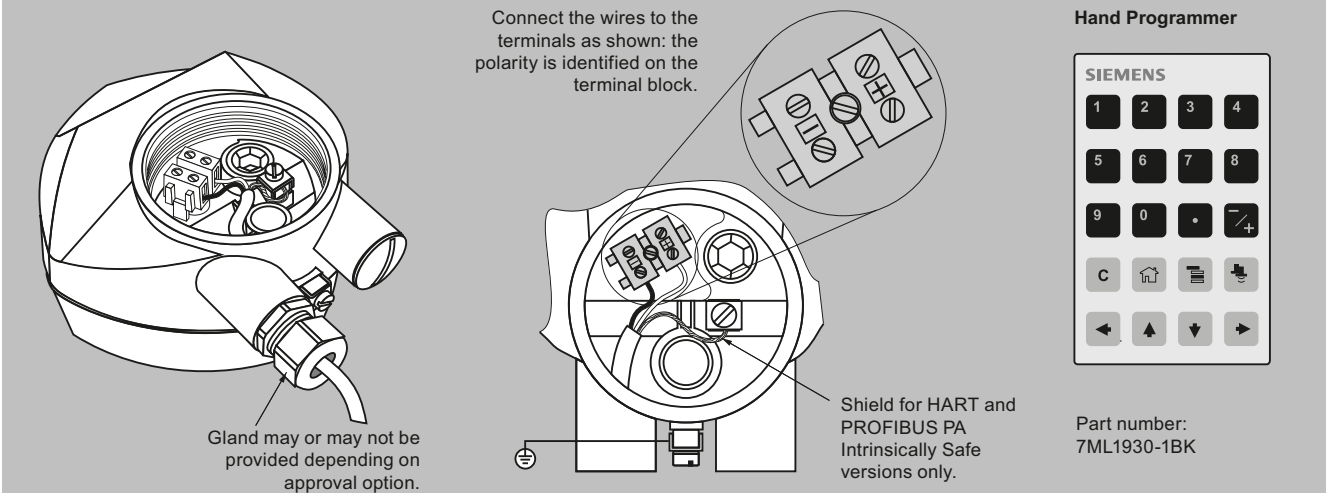
SITRANS LR250 Hygienic Encapsulated Antenna (Tuchenhagen Type N), dimensions in mm (inch)

Level Measurement

Continuous level measurement

Radar level transmitters / SITRANS LR250 Hygienic Encapsulated Antenna

Circuit diagrams



Connect the wires to the terminals as shown: the polarity is identified on the terminal block.

Gland may or may not be provided depending on approval option.

Shield for HART and PROFIBUS PA Intrinsically Safe versions only.

Hand Programmer

SIEMENS

1	2	3	4
5	6	7	8
9	0	.	/+
C	↑	↓	→

Part number:
7ML1930-1BK

Notes:

1. DC terminal shall be supplied from a source providing electrical isolation between the input and output, to meet the applicable safety requirements of IEC 61010-1.
2. All field wiring must have insulation suitable for rated input voltages.
3. Use shielded twisted pair cable (14 ... 22 AWG) for HART version.
4. Separate cables and conduit may be required to conform to standard instrumentation wiring practices or electrical codes.

SITRANS LR250 connections

Overview



The SITRANS LR460 is a 4-wire, 24 GHz FMCW radar level transmitter with extremely high signal-to-noise ratio and advanced signal processing for continuous monitoring of solids up to 100 m (328 ft). It is ideal for measurement in extreme dust and high temperature.

Benefits

- Process Intelligence for advanced signal processing and quick and easy adjustment
- Self-guided quick start wizard for plug and play startup
- 24 GHz provides superior reflective properties on solids surfaces
- 100 m (328 ft) range for long-range and difficult applications
- Easy Aimer optimizes signal quality on sloped surfaces
- Programming using infrared Intrinsicly Safe handheld programmer or with SIMATIC PDM or HART handheld device

Application

SITRANS LR460 provides excellent results even during conditions of extreme dust. The integral Easy Aimer included on the SITRANS LR460 allows for easy positioning for optimum measurement on solids.

Process Intelligence onboard SITRANS LR460 means advanced signal processing is harnessed for reliable operation on both simple and difficult solids application.

SITRANS LR460 features a robust enclosure, flange and horn components. It is virtually unaffected by atmospheric or temperature conditions within the vessel.

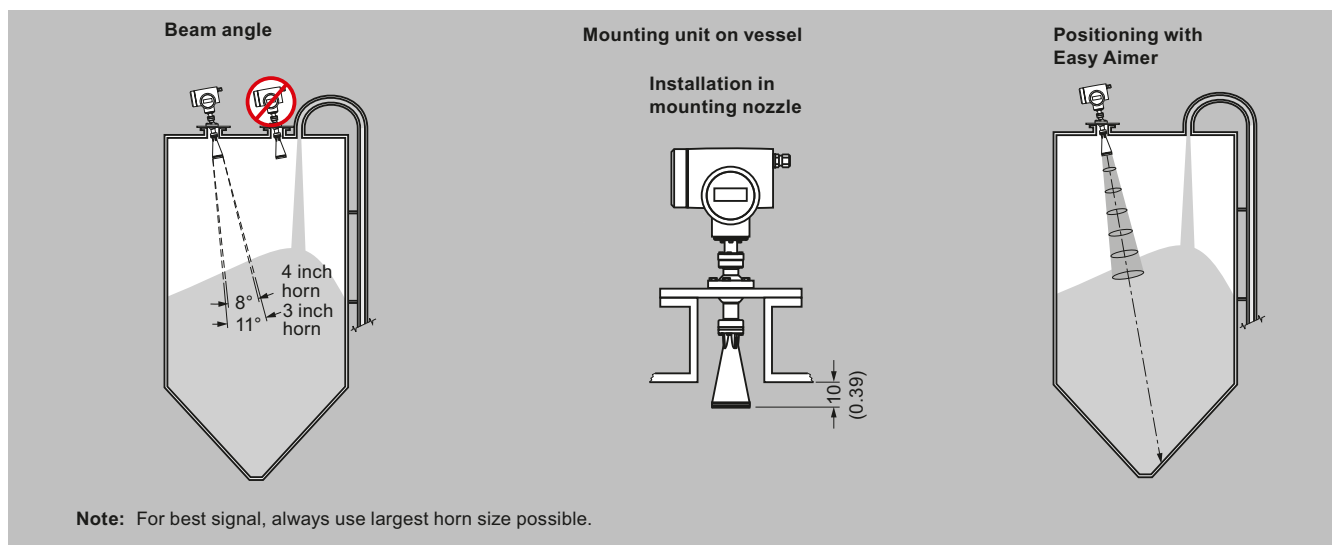
An optional dust cap is available for sticky solids. Optional air purging is also available for extremely sticky applications.

Safe on-site local programming is simple using the Intrinsicly Safe handheld programmer. SIMATIC PDM can be used for easy remote programming using HART or PROFIBUS PA.

The characteristics of 24 GHz and high signal-to-noise ratio contribute to exceptional signal reflection, regardless of the dielectric value of the medium.

- Key Applications: long-range dusty applications, cement powder, fly-ash, coal, flour, grain, plastics

Configuration



SITRANS LR460 installation, dimensions in mm (inch)

Level Measurement

Continuous level measurement

Radar level transmitters / SITRANS LR460

Selection and ordering data

		Article No.									
SITRANS LR460 Radar level transmitter with horn		7	M	L	5	4	2	6	-	0	0
Continuous, non-contact, 100 m (328 ft) range, for challenging solids applications.		0	0	0	0	0	0	0	0	0	0
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.											
Process connection											
Universal, flat faced, 0,5 bar g (7.25 psi g) maximum with integral Easy Aimer ball											
3 inch (80 mm)										A	
4 inch (100 mm)										B	
6 inch (150 mm)										C	
Antenna											
3" horn antenna, fits 80 mm (3 inch) nozzles										A	
3" horn antenna, fits 80 mm (3 inch) nozzles with 100 mm extension										B	
3" horn antenna, fits 80 mm (3 inch) nozzles with 200 mm extension										C	
3" horn antenna, fits 80 mm (3 inch) nozzles with 500 mm extension ¹⁾										D	
3" horn antenna, fits 80 mm (3 inch) nozzles with 1 000 mm extension ¹⁾										E	
4" horn antenna, fits 100 mm (4 inch) nozzles										F	
4" horn antenna, fits 100 mm (4 inch) nozzles with 100 mm extension										G	
4" horn antenna, fits 100 mm (4 inch) nozzles with 200 mm extension										H	
4" horn antenna, fits 100 mm (4 inch) nozzles with 500 mm extension ¹⁾										J	
4" horn antenna, fits 100 mm (4 inch) nozzles with 1 000 mm extension ¹⁾										K	
Purge (self-cleaning) connection											
No purge connection									0		
Purge connection									1		
Output/Communication											
4 ... 20 mA, HART										0	
PROFIBUS PA										1	
Power supply/cable inlet											
100 ... 230 V AC											
• 2 x M20 x 1.5											A
• 2 x ½" NPT											B
24 V DC											
• 2 x M20 x 1.5											C
• 2 x ½" NPT											D
Approvals											
Ordinary Locations/General Purpose (Non-Ex), cCSA _{US} , FM, IC, FCC, CE, UKCA, RED, RCM											A
CSA/FM Class II, Div. 1, Groups E, F, and G, Class III											B
ATEX II 1 D Ex ta IIIC T ₂₀₀ 85°C Da;											C
UKEX II 1 D Ex ta IIIC T ₂₀₀ 85°C Da;											
IECEX SIR 06.0058X,											
IECEX Ex ta IIIC T ₂₀₀ 85°C Da;											
INMETRO DNV 12.0089 X,											
INMETRO Ex ta IIIC T ₂₀₀ 85°C Da;											
EAC Ex Ex ta IIIC T85°C Da X;											
CE, UKCA, RED											

¹⁾ Available with Purge option 0 only.

Selection and Ordering data	Order code
Further designs	
Please add "-Z" to Article No. and specify Order code(s).	
Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: Measuring-point number/identification (max. 27 characters); specify in plain text	Y15
Manufacturer's test certificate: M to DIN 55350, Part 18 and to ISO 9000	C11
For applicable back up point level switch - see point level measurement section	

Selection and ordering data (continued)

Accessories	Article No.
Operating Instructions	
All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation	
Accessories	
Handheld programmer, Infra-red, Intrinsically Safe, EEx ia	7ML5830-2AJ
Dust cap, PTFE, for 3 inch/80 mm horn	7ML1930-1BL
Dust cap, PTFE, for 4 inch/100 mm horn	7ML1930-1BM
HART modem with USB interface	7MF4997-1DB
One metallic cable gland M20 x 1.5, rated -40 ... +80 °C (-40 ... +176 °F), HART ¹⁾	7ML1930-1AP
One metallic cable gland M20 x 1.5, rated -40 ... +80 °C (-40 ... +176 °F), PROFIBUS PA ¹⁾	7ML1930-1AQ
SITRANS RD100, loop powered display - see Chapter 7	7ML5741-.....
SITRANS RD150, remote digital display for 4 ... 20 mA and HART devices - see Chapter 7	7ML5742-.....
SITRANS RD200, universal input display with Modbus conversion - see Chapter 7	7ML5740-.....
SITRANS RD300, dual line display with totalizer and linearization curve and Modbus conversion - see Chapter 7	7ML5744-.....
For applicable back up point level switch - see point level measurement section	

¹⁾ Product shipped with plastic cable gland, rated to -20 °C. If -40 °C rating required, then metallic cable gland is recommended.


SITRANS LR460 Specials	Article No.
Process connection part kits - non-pressure-rated	
SITRANS LR460, 100 mm extension for horn antenna, no purge ¹⁾	A5E01087872
SITRANS LR460, 200 mm extension for horn antenna, no purge ¹⁾	A5E01091262
SITRANS LR460, 100 mm extension for horn antenna with purge ¹⁾	A5E01261979
SITRANS LR460, 200 mm extension for horn antenna with purge ¹⁾	A5E01261981
SITRANS LR460, horn 2", no purge, no emitter ¹⁾	A5E02083905
SITRANS LR460, horn 3", no purge, no emitter ¹⁾	A5E01623511
SITRANS LR460, horn 4", no purge, no emitter ¹⁾	A5E01623512
SITRANS LR460, horn 2", with purge, no emitter ¹⁾	A5E02083906
SITRANS LR460, horn 3", with purge, no emitter ¹⁾	A5E01623513
SITRANS LR460, horn 4", with purge, no emitter ¹⁾	A5E01623514
SITRANS LR460, 3" universal flat faced flange ¹⁾	A5E02303897
SITRANS LR460, 4" universal flat faced flange ¹⁾	A5E01259467
SITRANS LR460, 6" universal flat faced flange ¹⁾	A5E01261834
SITRANS LR460 O-Rings for Easy Aimer ¹⁾	A5E01261836
Kit, Emitter for LR460 ¹⁾	A5E02360694
Purge conversion kit - non-pressure-rated (no flange or extension included)	
SITRANS LR460 purge conversion, 2" horn ¹⁾	A5E02083914
SITRANS LR460 purge conversion, 3" horn ¹⁾	A5E02083915
SITRANS LR460 purge conversion, 4" horn ¹⁾	A5E02083916

Level Measurement

Continuous level measurement

Radar level transmitters / SITRANS LR460

Selection and ordering data (continued)

SITRANS LR460 Specials	Article No.
Enclosure with electronics (LR460)	
SITRANS LR460 enclosure with board stack, HART communication, AC power, M20 cable inlet, approval option A, no process connection	A5E02182085
SITRANS LR460 enclosure with board stack, PROFIBUS PA communication, AC power, M20 cable inlet, approval option A, no process connection	A5E02212422
SITRANS LR460 enclosure with board stack, HART communication, AC power, NPT cable inlet, approval option A, no process connection	A5E02212423
SITRANS LR460 enclosure with board stack, PROFIBUS PA communication, AC power, NPT cable inlet, approval option A, no process connection	A5E02212424
SITRANS LR460 enclosure with board stack, HART communication, DC power, M20 cable inlet, approval option A, no process connection	A5E02212425
SITRANS LR460 enclosure with board stack, PROFIBUS PA communication, DC power, M20 cable inlet, approval option A, no process connection	A5E02212426
SITRANS LR460 enclosure with board stack, HART communication, DC power, NPT cable inlet, approval option A, no process connection	A5E02212428
SITRANS LR460 enclosure with board stack, PROFIBUS PA communication, DC power, NPT cable inlet, approval option A, no process connection	A5E02212429

¹⁾ Available with no pressure rating, 0.5 bar g maximum. Customers interested in a custom designed device should consult a local sales person. For more information, please visit http://www.automation.siemens.com/aspa_app.

Technical specifications

SITRANS LR460	
Mode of operation	
Measuring principle	FMCW radar level measurement
Frequency	24.2 ... 25.2 GHz FMCW
Measuring range	0.35 ... 100 m (1.15 ... 328.08 ft)
Output	
Analog output (HART)	
• Signal range	Optically isolated
• Load	Max. 600 Ω
• Fail-safe	mA signal programmable as high, low or hold (LOE)
Communication	HART, optional PROFIBUS PA
Digital output	Relay, NC or NO function, max. 50 V DC, max. 200 mA, rating 5 W
PROFIBUS PA protocol	Layer 1 and 2, Class A, Profile 3.01
Performance (Reference conditions according to IEC 60770-1)	
Non-linearity	Greater of 25 mm (1 inch) or 0.25 % of span (including hysteresis and non-repeatability), over the full ambient temperature range
Non-repeatability	≤ 10 mm (0.4 inch)
Rated operating conditions	
Amb. temperature for enclosure	-40 ... +65 °C (-40 ... +149 °F)
Storage temperature	-40 ... +65 °C (-40 ... +149 °F)
Location	Indoor/outdoor
Installation category	II
Pollution degree	4
Medium conditions	
Dielectric constant	$\epsilon_r > 1.4$
Process temperature range	-40 ... +200 °C (-40 ... +392 °F)
Vessel pressure	0.5 bar g (7.25 psi g) maximum
Design	
Weight	Approx. 6.1 kg (13.4 lb) with 3 inch universal flange
Materials	
• Enclosure	Die-cast aluminum, painted
• Degree of protection	IP67/Type 4X/NEMA 4X/Type 6/NEMA 6
• Cable inlet	2 x M20 x 1.5 or ½" NPT
Process connections	
• Universal flanges, 304 stainless steel, flat faced, with integral Easy Aimer	3 inch/80 mm, 4 inch/100 mm, 6 inch/150 mm (mates with flange EN 1092-1, ASME B16.5, or JIS B2238 bolt pattern), 0.5 bar g (7.25 psi g) max. pressure
Programming	
Intrinsically Safe Siemens handheld programmer (ordered separately)	Infrared receiver
• Approvals for handheld programmer	IS model: ATEX II 1 GD Ex ia op is IIC T4 Ga, ATEX II 1 GD Ex ia op is IIIC T135°C Da; UKEX II 1 GD Ex ia op is IIC T4 Ga, UKEX II 1 GD Ex ia op is IIIC T135°C Da CSA/FM Class I, Div. 1, Groups A, B, C, D T6 at max. ambient temperature of 40°C (104°F)
Handheld communicator	HART Communicator 375
PC	SIMATIC PDM
Display (local)	Alphanumeric LCD for readout and entry
Power supply	
	100 ... 230 V AC ± 15 % (50/60 Hz), 6 W (12 VA) or 24 V DC +25/-20 %, 6 W (optional)
Certificates and approvals	
General	cCSA _{US} , CE, UKCA, FM, RCM
Radio	European Radio (RED), Industry Canada, FCC, RCM

Technical specifications (continued)

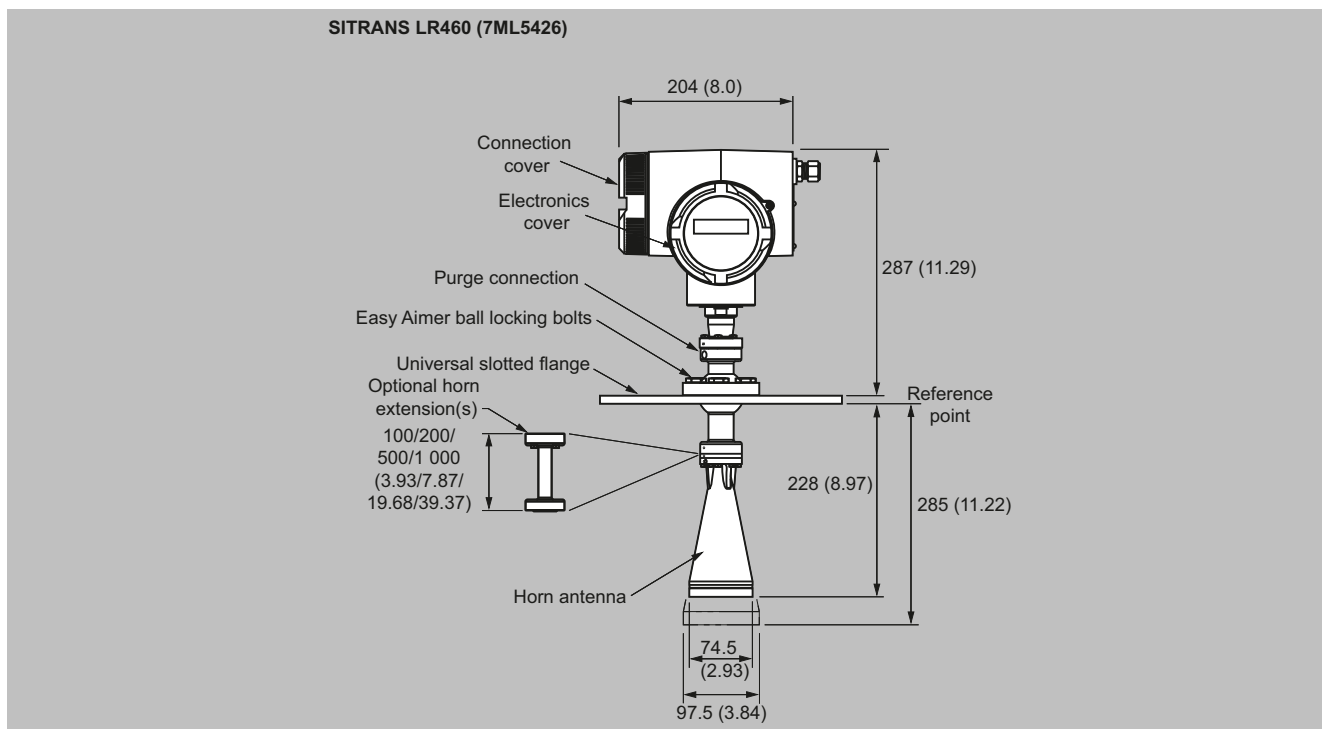
SITRANS LR460	
Hazardous Areas	ATEX II 1 D Ex ta IIIC T ₂₀₀ 85°C Da; UKEX II 1 D Ex ta IIIC T ₂₀₀ 85°C Da; IECEx Ex ta IIIC T ₂₀₀ 85°C Da; INMETRO Ex ta IIIC T ₂₀₀ 85°C Da; EAC Ex Ex ta IIIC T85°C Da X
Optional equipment	
Dust cap	PTFE
Air purge connection	1/8" NPT

Level Measurement

Continuous level measurement

Radar level transmitters / SITRANS LR460

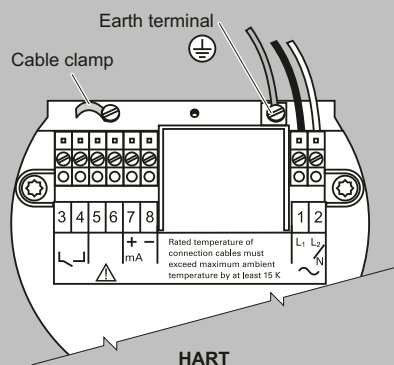
Dimensional drawings



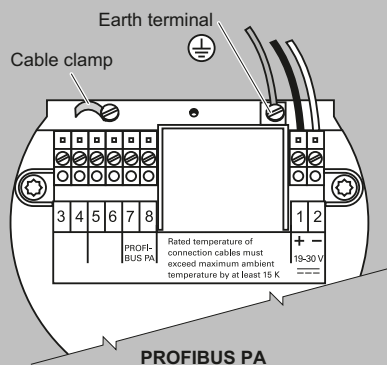
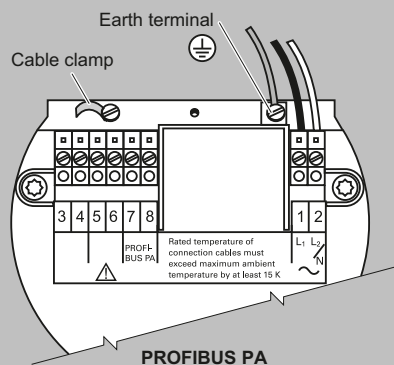
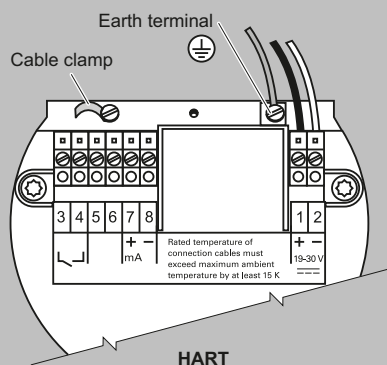
SITRANS LR460, dimensions in mm (inch)

Circuit diagrams

AC version



DC version



Hand programmer



SITRANS LR460

Part number:
7ML5830-2AJ

Notes

- Recommended torque on terminal clamping screws, 0.5 ... 0.6 Nm
- 4 ... 20 mA, PROFIBUS PA, DC input circuits, 14 ... 20 AWG, shielded copper wire
- AC input circuit, min. 14 AWG copper wire
- All field wiring must have insulation suitable for at least 250 V
- The equipment must be protected by a 15 A fuse or circuit breaker in the building installation

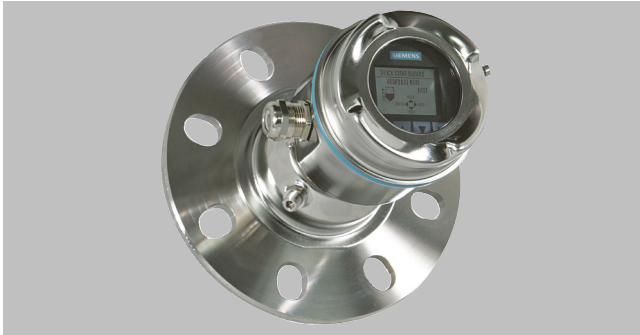
SITRANS LR460 connections

Level Measurement

Continuous level measurement

Radar level transmitters / SITRANS LR560

Overview



SITRANS LR560 2-wire, 78 GHz FMCW radar level transmitter for continuous monitoring of solids and liquids to a range of 100 m (328 ft).

Benefits

- Rugged stainless steel design for industrial applications
- 78 GHz high frequency provides very narrow beam, virtually no mounting nozzle noise, and optimal reflection from sloped solids
- Aimer option to direct beam to area of interest, such as draw point of cone
- Lens antenna is highly resistant to product buildup
- Air purge connection is included for self-cleaning of extremely sticky solids
- Local display interface (LDI) allows local programming and diagnostics

Application

SITRANS LR560's plug and play performance is ideal for most solids applications and long range liquid applications, including those with extreme dust and high temperatures to 200 °C (392 °F). Unique design allows safe and simple programming using the Intrinsically Safe handheld programmer without having to open the instrument's lid.

SITRANS LR560 includes an optional graphical local display interface (LDI) that improves setup and operation using an intuitive Quick Start Wizard, and echo profile display for diagnostic support. Start-up is easy using the Quick Start wizard with a few parameters required for basic operation.

SITRANS LR560 measures practically any solids material to a range of 100 m (328 ft).

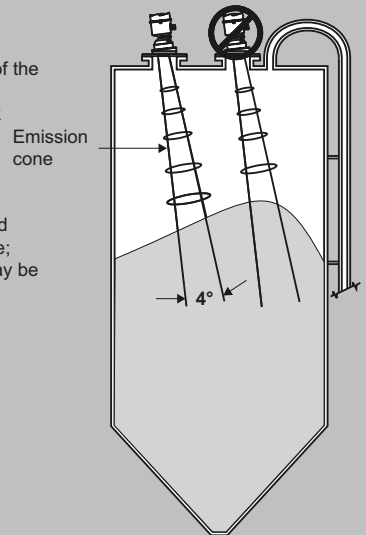
- Key Applications: cement powder, plastic powder/pellets, grain, coal, wood powder, fly ash

Configuration

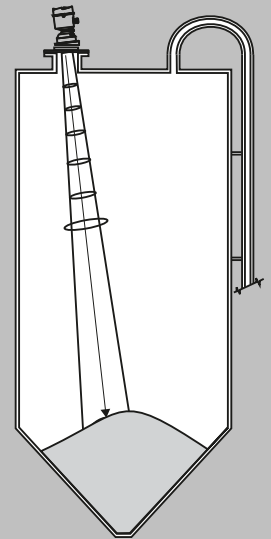
Installation

Note:

- Beam angle is the width of the cone where the energy density is half of the peak energy density
- The peak energy density is directly in front of and in line with the antenna
- There is signal transmitted outside of the beam angle; therefore false targets may be detected



Aiming will assist in measuring material in the cone



SITRANS LR560 installation, dimensions in mm (inch)

Selection and ordering data

		Article No.												
SITRANS LR560 Radar level transmitter with flush lens antenna Continuous, non-contact, 100 m (328 ft) range, for general solids applications. Order handheld programmer separately		7	M	L	5	4	4	0	0	-	•	•	•	•
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.														
Measurement and process temperature range														
40 m (131 ft) max range, -40 ... +100 °C		0												
100 m (328 ft) max range, -40 ... +200 °C		1												
Process connection														
<u>Universal flat-faced flange fits ANSI/DIN/JIS flanges</u>														
80 mm/3 inch, 304 stainless steel		A												
100 mm/4 inch, 304 stainless steel		B												
150 mm/6 inch, 304 stainless steel		C												
80 mm/3 inch, 316L stainless steel		D												
100 mm/4 inch, 316L stainless steel		E												
150 mm/6 inch, 316L stainless steel		F												
80 mm/3 inch, painted aluminum, with integral aimer ¹⁾		G												
100 mm/4 inch, painted aluminum, with integral aimer ¹⁾		H												
150 mm/6 inch, painted aluminum, with integral aimer ¹⁾		J												
Enclosure (with cable inlet)														
Stainless steel, 1 x ½" NPT		A												
Stainless steel, 1 x M20 x 1.5 (plastic gland included)		B												
Pressure rating														
0.5 bar g (7.5 psi g) maximum		0												
3 bar g (40 psi g) maximum		1												
Output/communication														
4 ... 20 mA, HART		A												
PROFIBUS PA		B												
Approvals														
General Purpose, FM, CSA _{USC} , Industry Canada, FCC, CE, RED, RCM		A												
CSA/FM Class I, Div. 2, Groups A, B, C, D, Class II, Div. 1, Groups E, F, G, Class III, Industry Canada, FCC		B												
ATEX II 3G Ex nA/nL, 1D, ½D, 2D Ex ta, INMETRO, CE, RED, RCM		C												
Local display interface														
Without		1												
With		2												

¹⁾ Rated to 120 °C max. when used with Pressure rating option 1.

Selection and Ordering data	Order code
Further designs	
Please add "-Z" to Article No. and specify Order code(s).	
Plug M12 with mating connector ¹⁾²⁾³⁾	A50
Plug 7/8" with mating connector ¹⁾³⁾⁴⁾	A55
Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: Measuring-point number/identification (max. 27 characters); specify in plain text	Y15
Manufacturer's test certificate: M to DIN 55350, Part 18 and to ISO 9000	C11
Material inspection Certificate Type 3.1 per EN 10204 ⁵⁾	C12
NAMUR NE43 compliant, device preset to failsafe < 3.6 mA ⁶⁾	N07

Level Measurement

Continuous level measurement

Radar level transmitters / SITRANS LR560

Selection and ordering data (continued)

Accessories	Article No.
Operating Instructions	
All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation	
Accessories	
Hand Programmer, Intrinsically safe	7ML1930-1BK
Local display interface	7ML1930-1FJ
Sun Shield Cover, 304 stainless steel	7ML1930-1FK
Housing lid with window	7ML1930-1FL
One metallic cable gland M20 x 1.5, rated -40 ... +80 °C (-40 ... +176 °F), HART ⁷⁾	7ML1930-1AP
One metallic cable gland M20 x 1.5, rated -40 ... +80 °C (-40 ... +176 °F), PROFIBUS PA ⁷⁾	7ML1930-1AQ
SITRANS RD100, loop powered display - see Chapter 7	7ML5741-.....
SITRANS RD150, remote digital display for 4 ... 20 mA and HART devices - see Chapter 7	7ML5742-.....
SITRANS RD200, universal input display with Modbus conversion - see Chapter 7	7ML5740-.....
SITRANS RD300, dual line display with totalizer and linearization curve and Modbus conversion - see Chapter 7	7ML5744-.....
For applicable back up point level switch - see point level measurement section	

1) Available with Approval option A only.

2) Available with Enclosure option B only.

3) Available with Output/communication options B and C only.

4) Only available with enclosure option A (NPT thread).

5) Available with Pressure rating option 1 only.

6) Available with Output/communication option A only.

7) Product shipped with plastic cable gland, rated to -20 °C. If -40 °C rating required, then metallic cable gland is recommended.

SITRANS LR560 Specials	Article No.
SITRANS LR560 Electronics Modules	
SITRANS LR560 Electronics Module, HART, 100 m range, compatible with 7ML54401XX00XAXX, no enclosure or process connection included.	7ML1830-3AC
SITRANS LR560 Electronics Module, PROFIBUS PA, 100 m range, compatible with 7ML54401XX00XBXX, no enclosure or process connection included.	7ML1830-3AH
SITRANS LR560 Electronics Module, HART, 40 m range, compatible with 7ML54400XX00XAXX, no enclosure or process connection included.	7ML1830-3AK
SITRANS LR560 Electronics Module, PROFIBUS PA, 40 m range, compatible with 7ML54400XX00XBXX, no enclosure or process connection included.	7ML1830-3AL
SITRANS LR560 Miscellaneous Spare Kits	
Kit, lid gasket, EPDM	7ML1830-3AA
Kit, wrench for 4 inch and 6 inch Aimers	7ML1830-3AB
Kit, O-rings for 3 inch Aimer	7ML1830-3AD
Kit, O-rings for 4 inch Aimer	7ML1830-3AE
Kit, O-rings for 6 inch Aimer	7ML1830-3AF
Kit, lid screw and purge plug set with hex keys	7ML1830-3AG
Kit, lid, no Window	7ML1830-3AP

Customers interested in a custom designed device should consult a local sales person. For more information, please visit http://www.automation.siemens.com/aspa_app.

Technical specifications

SITRANS LR560	
Mode of operation	
Measuring principle	Radar level measurement
Frequency	78 GHz FMCW
Minimum detectable distance	400 mm (15.75 inch) from sensor reference point
Maximum measuring range ¹⁾	<ul style="list-style-type: none"> • 40 m (131 ft) version • 100 m (328 ft) version
Output	
Analog output	4 ... 20 mA
Communications	<ul style="list-style-type: none"> • HART • Optional: PROFIBUS PA
Fail-safe	<ul style="list-style-type: none"> • Programmable as high, low or hold (Loss of Echo) • NE43 programmable
Performance (according to reference conditions IEC60770-1)	
Maximum measured error (including hysteresis and non-repeatability) ²⁾	5 mm (0.2 inch)
Rated operating conditions (according to reference conditions IEC60770-1)	
Installation conditions	
• Location	Indoor/outdoor
Ambient conditions (enclosure)	
• Ambient temperature	-40 ... +80 °C (-40 ... +176 °F)
• Storage temperature	-40 ... +80 °C (-40 ... +176 °F)
• Installation category	I
• Pollution degree	4
Medium conditions	
Dielectric constant ϵ_r	> 1.6
Process temperature and pressure	See chart below
Design	
Enclosure	
• Construction	316L/1.4404 stainless steel
• Conduit entry	M20 x 1.5, or ½" NPT via adapter
• Purge inlet	1/8" NPT, 30 cfm at max. 100 psi
• Lens material	<ul style="list-style-type: none"> • 40 m version: PEI • 100 m version: PEEK <p>Damage to lens could result from continuous purging/cleaning (due to abrasive solids). Recommended to purge/clean only a few seconds every hour.</p>
• Degree of protection	Type 4X/NEMA 4X, Type 6/NEMA 6, IP68
• Weight	3.15 kg (6.94 lb) including 3 inch flange
• Optional local display interface	Graphic LCD, with bar graph representing level
Process connections	
• Universal flat-faced flanges ³⁾	<ul style="list-style-type: none"> • 3, 4, 6 inch/80, 100, 150 mm, 304 stainless steel • 3, 4, 6 inch/80, 100, 150 mm, 316L/1.4404 or 316L/1.4435 stainless steel
• Aimer flanges ³⁾	3, 4, 6 inch/80, 100, 150 mm, polyurethane powder-coated cast aluminum
Power supply	
4 ... 20 mA/HART	Nominal 24 V DC (max. 30 V DC) with max. 550 Ω
PROFIBUS PA	13.5 mA 9 ... 32 V DC, per IEC 61158-2
Certificates and approvals	
General	cCSA _{US} , CE, UKCA, FM
Radio	Europe (RED), FCC, Industry Canada, RCM

Level Measurement

Continuous level measurement

Radar level transmitters / SITRANS LR560

Technical specifications (continued)

SITRANS LR560	
Hazardous	
<ul style="list-style-type: none"> Europe / UK / International 	ATEX II 1 D 1/2 D 2 D Ex ta IIIC T139°C Da, ATEX II 3 G Ex ic IIC T4 Gc, ATEX II 3 G Ex ec IIC T4 Gc; UKEX II 1D 1/2D 2D Ex ta IIIC T139°C Da, UKEX II 3G Ex ic IIC T4 Gc, UKEX II 3G Ex ec IIC T4 Gc; IECEx SIR 09.0149X, IECEx Ex ec IIC T4 Gc, IECEx Ex ic IIC T4 Gc, IECEx Ex ta IIIC T139°C Da, IP68;
<ul style="list-style-type: none"> US/Canada 	FM/CSA Class II, Div. 1, Groups E, F, G Class III T4 FM/CSA Class I, Div. 2, Groups A, B, C, D, T4
<ul style="list-style-type: none"> China 	NEPSI Ex nA II T4 Ex nL IIC T4 DIP A20 TA, T139 °C
<ul style="list-style-type: none"> Brazil 	INMETRO Ex nA IIC T4 Gc, Ex ta IIIC T139°C Da
Programming	
Intrinsically Safe Siemens handheld programmer	Infrared receiver
<ul style="list-style-type: none"> Approvals for handheld programmer 	IS model: ATEX II 1 GD Ex ia op is IIC T4 Ga, ATEX II 1 GD Ex ia op is IIIC T135°C Da, Ta = -20°C to +50°C; UKEX II 1 GD Ex ia op is IIC T4 Ga, UKEX II 1 GD Ex ia op is IIIC T135°C Da, Ta = -20°C to +50°C
Handheld communicator	HART communicator 375/475
PC	SIMATIC PDM, AMS, PACTware
Display (local)	Graphic local user interface including quick start wizard and echo profile displays

1) From sensor reference point

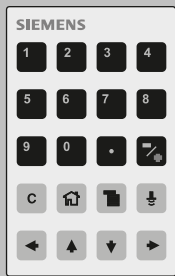
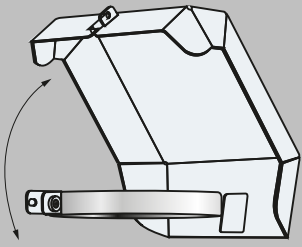
2) Under severe EMI/EMC environments per IEC61326-1 or NAMUR NE21, the device error may increase to a maximum of 25 mm (1 inch)

3) Universal flange mates with EN 1092-1 (PN16)/ASME B16.5 (150 lb)/JIS 2220 (10K) bolt hole pattern.

Process temperature and pressure

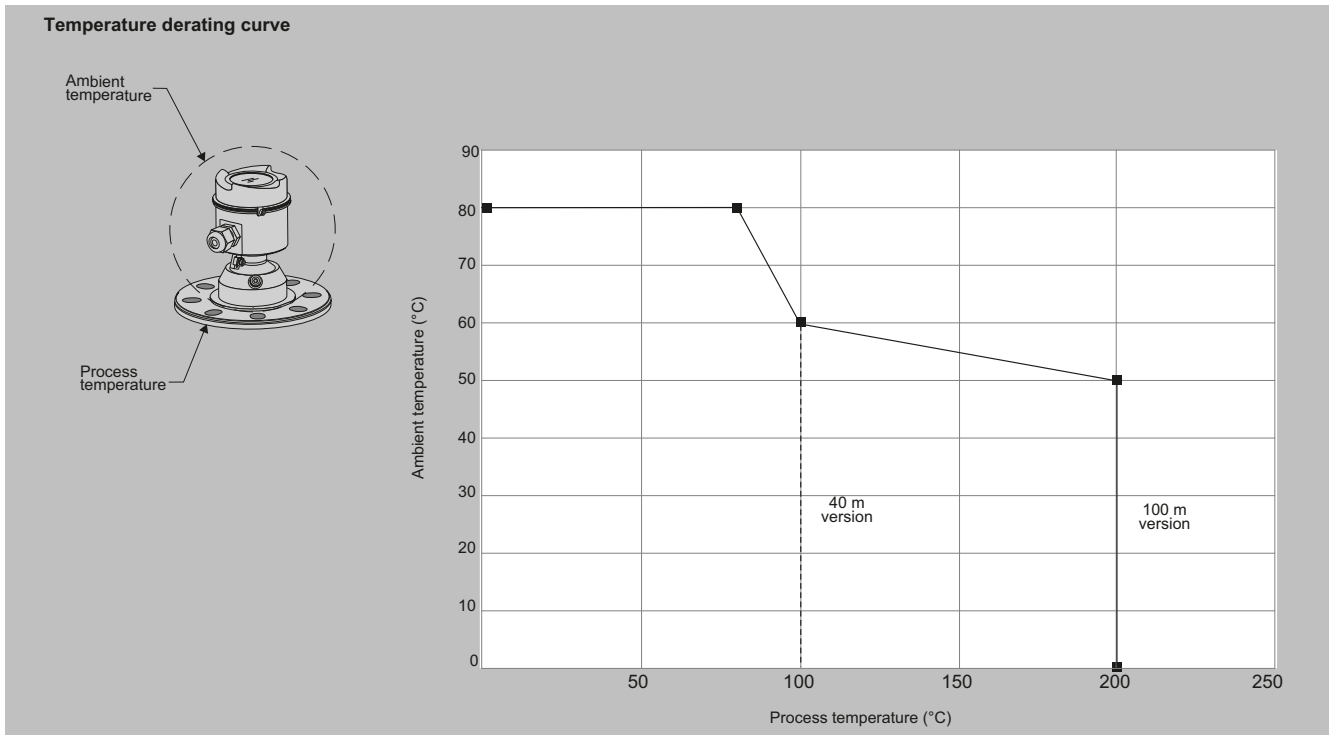
Version	Stainless steel -1 ... 0.5 bar -1 ... 3.0 bar	Aimer flange: -1 ... 0.5 bar	Aimer flange: -1 ... 3.0 bar
40 m	-40 ... +100 °C (-40 ... +212 °F)	-40 ... +100 °C (-40 ... +212 °F)	-40 ... +100 °C (-40 ... +212 °F)
100 m	-40 ... +200 °C (-40 ... +392 °F)	-40 ... +200 °C (-40 ... +392 °F)	-40 ... +120 °C (-40 ... +248 °F)

Options

Handheld programmer Article number: 7ML1930-1BK 	Sun shield cover (304 stainless steel) Article number: 7ML1930-1FK 
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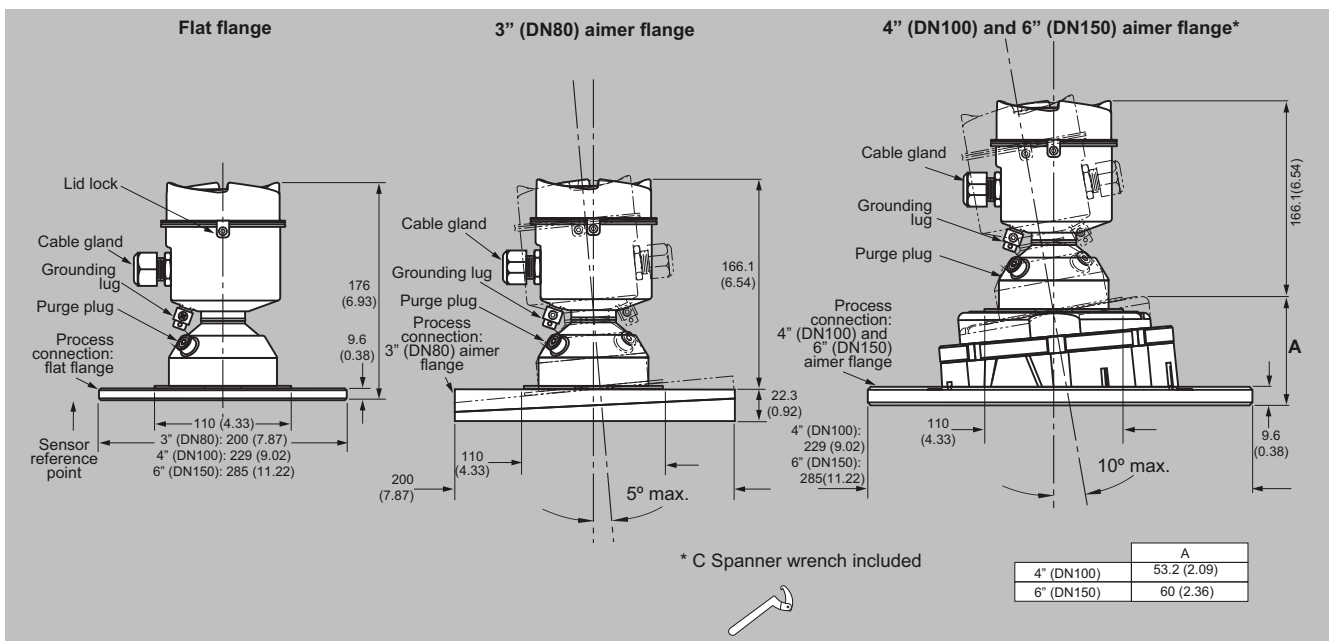
SITRANS LR560 handheld programmer and sun shield cover

Characteristic curves



SITRANS LR560 temperature derating curve

Dimensional drawings



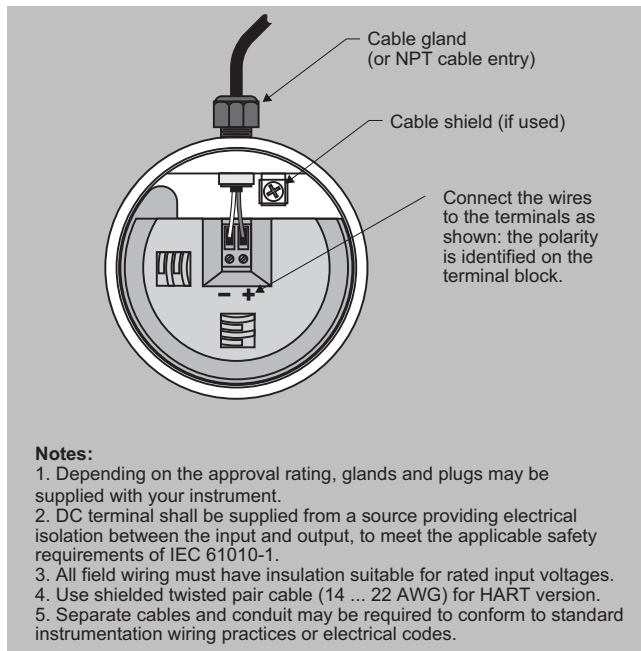
SITRANS LR560, dimensions in mm (inch)

Level Measurement

Continuous level measurement

Radar level transmitters / SITRANS LR560

Circuit diagrams



SITRANS LR560 connections

Overview

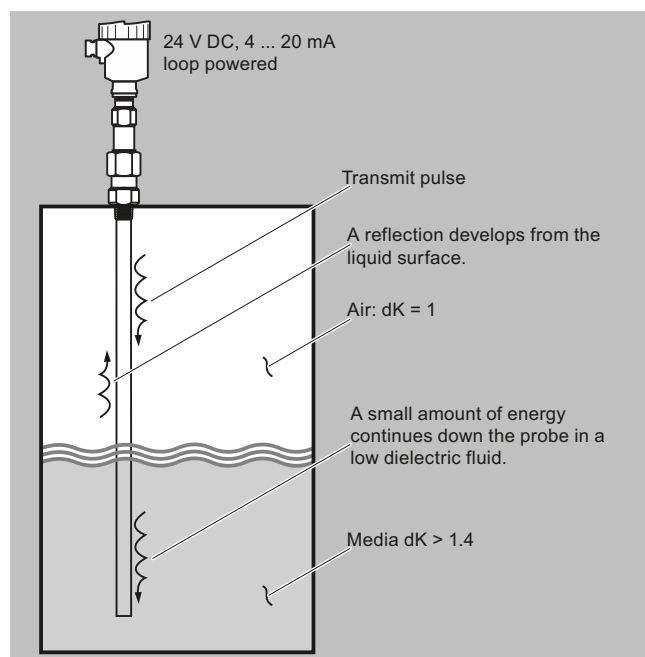
Introduction

Guided Wave Radar transmitters use TDR (time domain reflectometry).

Time Domain Reflectometry (TDR)

TDR uses pulses of electromagnetic (EM) energy to measure distances or levels. When a pulse reaches a dielectric discontinuity (created by media surface), part of the energy is reflected. The greater the dielectric difference, the greater the amplitude (strength) of the reflection.

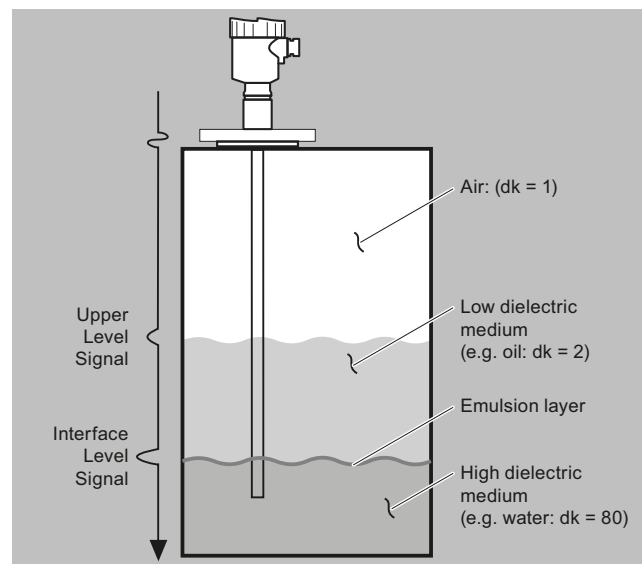
The SITRANS LG includes a transmitter and waveguide that has a characteristic impedance in air and is used as a probe. When part of the probe is immersed in a material other than air, there is lower impedance due to the increase in the dielectric. When an EM pulse is sent down the probe and meets the dielectric discontinuity, a reflection is generated.



Mode of operation

Interface Detection

The SITRANS LG, is a transmitter capable of measuring both an upper level and an interface level. The upper liquid must have a dielectric constant between 1.6 and 10 and the two liquids have a difference in dielectric constants greater than 10. A typical application would be oil over water, with the upper layer of oil being non-conductive with a dielectric constant of approximately 2 and the lower layer of water being very conductive with a dielectric constant of approximately 80. This interface measurement can only be accomplished when the dielectric constant of the upper medium is lower than the dielectric constant of the lower medium.



Level Measurement

Continuous level measurement

Guided wave radar transmitters / SITRANS LG series

Overview



The Siemens SITRANS LG series are guided wave radar transmitters for level, level/interface, and volume measurement of liquids and solids. The SITRANS LG product line can handle changes in process conditions, high temperatures and pressures, and steam.

Benefits

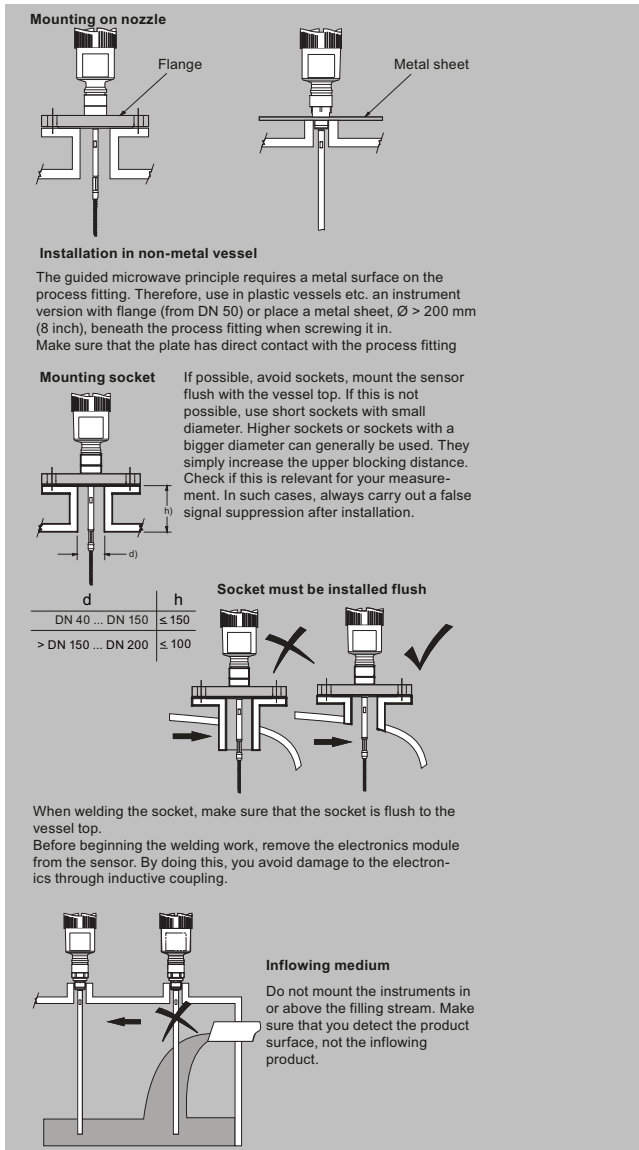
- High accuracy to +/- 2 mm
- Advanced Diagnostics available for high degree of safety
- Simple menu driven display offers ease of setup
- Large range of options offers reliability in most continuous level measurement applications
- Ease of maintenance through module design and field replaceable and adjustable probe options
- Perfect solution for wide range of applications from storage to interface with options for extreme pressure and temperature conditions
- Universally applicable in liquids, interface, slurries and solids
- Highly immune to buildup using auto learn function
- Ability to measure in loss of echo situations with probe end tracking
- Suitable for API 2350
- Convenient access using USB and remote interface accessories

Application

The SITRANS LG series comes in four different models, depending on the applications, level of performance, and functionality required:

- SITRANS LG240 offers configuration options for your hygienic and corrosive application requirements
- SITRANS LG250 Highly flexible solution for liquid level and interface applications. Extremely versatile offering solutions for storage, separation of materials or difficult ammonia applications
- SITRANS LG260 Ideal for measuring level in medium range solids applications including; grains, plastics, and cement
- SITRANS LG270 offers configuration options for extreme conditions including high temperature and high pressure applications such as: harsh applications found in chemical, HPI and energy industries for example, LPG gas tanks, steam boilers and distillation columns

Configuration



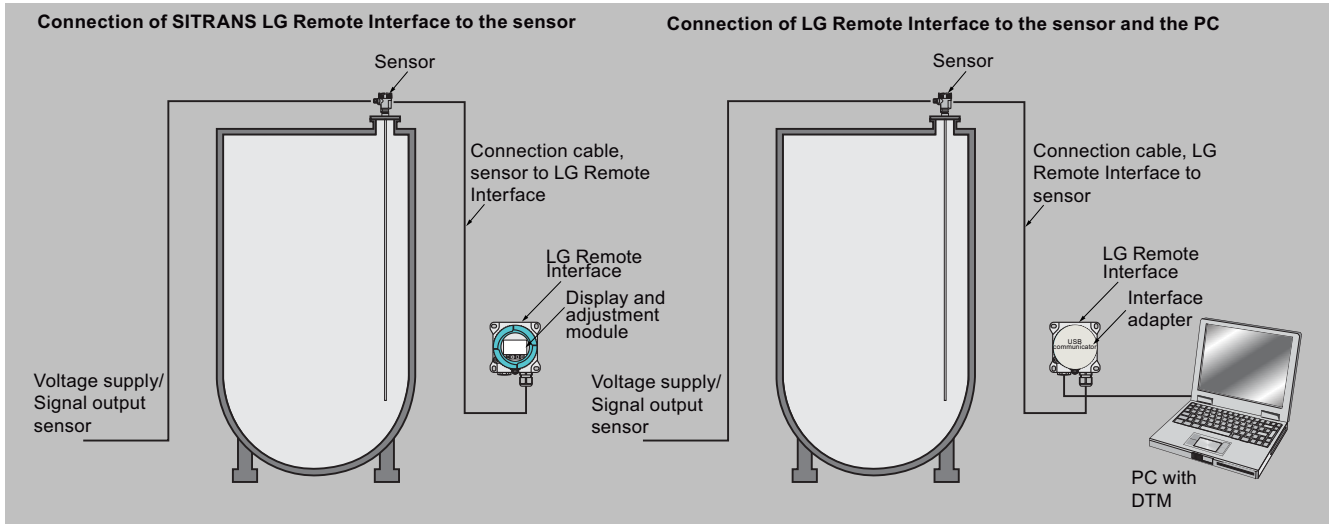
SITRANS LG Series installation

Level Measurement

Continuous level measurement

Guided wave radar transmitters / SITRANS LG series

Configuration (continued)



SITRANS LG Remote Interface installation

Selection and ordering data

	Article No.	Order Code
SITRANS LG240 Guided radar level transmitter Continuous, contact, 32 m (105 ft) range. Monitors level and interface in aggressive liquids. Ideal for hygienic applications.	7ML5880- ● ● ● ● ● - ● ● ● ● ●	● ● ●
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Approvals		
General purpose (CSA, FM, CE)	0	A
Overfill protection (WHG; VLAREM) ¹¹⁾	0	C
ATEX II 1G, ½G, 2G Ex ia IIC T6 ¹⁴⁾	0	E
ATEX II 1G, ½G, 2G Ex ia IIC + Overfill (WHG; VLAREM) ¹¹⁾	0	F
ATEX II 1G, ½G 2G Ex ia IIC + ATEX II 1D, ½D, 2D IP6x ¹¹⁾¹⁵⁾¹⁷⁾	0	H
ATEX II ½G, 2G Ex d ia IIC T6 ⁹⁾¹³⁾¹⁶⁾	0	J
ATEX II ½G, 2G Ex d ia IIC + ATEX II ½D, 2D IP6x ³⁾¹³⁾¹⁶⁾¹⁷⁾	0	K
ATEX II 1D, ½D, 2D IP6x ¹¹⁾¹⁷⁾¹⁸⁾	0	N
ATEX II 1G, II ½G, II 2G Ex ia IIC T6 ... T1 Ga, Ga/Gb, Gb /IEC Ex ia IIC T6 ... T1 Ga, Ga/Gb, Gb ¹¹⁾¹⁴⁾	0	W
IEC Ex ia IIC T6 ¹⁴⁾	0	P
IEC Ex ia IIC T6 + IEC IP6x T tD ¹¹⁾¹⁵⁾¹⁷⁾	0	Q
IEC Ex d ia IIC T6 ³⁾¹³⁾¹⁶⁾	0	R
IEC Ex d ia IIC T6 + IEC IP6x T tD ³⁾¹³⁾¹⁶⁾	0	S
FM (NI) Class I, Div. 2, Groups A, B, C, D2 ⁹⁾¹²⁾¹⁶⁾	1	A
FM (IS) Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G ⁹⁾¹⁵⁾	1	B
FM (XP-AIS) Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G ³⁾¹³⁾¹⁶⁾	1	C
CSA (NI) Class I, Div. 2, Groups A, B, C, D; (DIP) Class II, III, Div. 1, Groups E, F, G ¹¹⁾¹⁷⁾	1	E
CSA (IS) Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G ¹⁴⁾	1	F
CSA (XP-IS) Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G ³⁾¹³⁾¹⁶⁾	1	G
NEPSI Ex ia IIC T6 ¹⁴⁾	2	A
NEPSI Ex ia IIC T6 + DIP A20/21 TA T* ¹¹⁾¹⁵⁾	2	B
NEPSI Ex d ia IIC T6 ⁹⁾¹⁰⁾¹³⁾¹⁶⁾	2	C
NEPSI Ex d ia IIC T6 + DIP A20/21 TA T* ⁹⁾¹⁰⁾¹³⁾¹⁶⁾	2	D
NEPSI DIP A20/21 TA T* ¹¹⁾¹⁶⁾	2	G
INMETRO Ex ia IIC T6 ... T1 ¹⁴⁾	3	A
INMETRO Ex t IIIC T* IP6X, Da, Da/Db, Da/Dc, Db + Ex ia IIC T6, Ga, Ga/Gb ¹¹⁾¹⁰⁾¹⁵⁾	3	B
INMETRO Ex d ia IIC T6 ... T1 ⁹⁾¹⁰⁾¹³⁾¹⁶⁾	3	C
INMETRO Ex t IIIC T* IP6X, Da, Da/Db, Da/Dc, Db + Ex d ia IIC T6 Ga/Gb ⁹⁾¹⁰⁾¹³⁾¹⁶⁾	3	D
INMETRO Ex t IIIC T* IP6X, Da, Da/Db, Da/Dc, Db ¹¹⁾¹⁰⁾¹³⁾¹⁶⁾	3	G
Korea KC ex free area	6	A
GOST-R/EAC 0 Ex ia IIC T1 ... T6 X ¹⁴⁾	5	A
GOST-R/EAC 0 Ex ia IIC T1 ... T6 X + Ex t IIIC T ... IP66 ¹¹⁾¹⁵⁾	5	B
GOST-R/EAC 1 Ex d ia IIC T1 ... T6 X ⁹⁾¹⁰⁾¹³⁾¹⁶⁾	5	C
GOST-R/EAC 1 Ex d ia IIC T1 ... T6 X + Ex t IIIC T ... IP66 ⁹⁾¹⁰⁾¹³⁾¹⁶⁾	5	D
Note: Version/Material, Process fitting/Material, and Length options are available only with options of corresponding type.		
Probe version/Material		
Probe cable ø 4 mm (0.16 inch) with gravity weight/PFA ¹⁷⁾		A
Probe exchangeable rod ø 8 mm (0.31 inch)/1.4435 (Basle standard) ¹⁷⁾		B
Probe exchangeable rod ø 8 mm (0.31 inch)/ 1.4435 (Basle standard) can be autoclaved ¹⁷⁾		C
Probe rod ø 10 mm (0.39 inch)/PFA ¹⁷⁾		D
Probe exchangeable rod (ø 8 mm) /1.4435 (BN2), electropolished (Ra < 0.38 µm) ¹⁷⁾		E
Process fitting/Material		
Clamp 2" PN 16 (ø 64 mm) DIN 32676, ISO2852/1.4435 (BN2)	0	0
Clamp 2" PN 16 (ø 64 mm) DIN 32676, ISO2852/PTFE-TFM 1600	0	1
Clamp 2 1/2" PN 10 (ø 77.5 mm) DIN 32676, ISO2852/1.4435 (BN2)	0	2
Clamp 2 1/2" PN 10 (ø 77.5 mm) DIN 32676, ISO2852/PTFE-TFM 1600	0	3
Clamp 3" PN 10 (ø 91 mm) D N 32676, ISO2852/1.4435 (BN2)	0	4
Clamp 3" PN 10 (ø 91 mm) DIN 32676, ISO2852/PTFE-TFM 1600	0	5
Clamp 4" PN 6 (ø 119 mm) DIN 32676, ISO2852/1.4435(BN2)	0	6
Clamp 4" PN 6 (ø 119 mm) DIN 32676, ISO2852/PTFE-TFM 1600	0	7
Clamp 1½" PN 16 (ø 50.5 mm) DIN 32676, ISO2852/1.4435 (BN2)	4	0
Bolting DN 32, PN 40 DIN 11851/1.4435(BN2)	0	8
Bolting DN 32, PN 40 DIN 11851/PTFE-TFM 1600	1	0

Level Measurement

Continuous level measurement

Guided wave radar transmitters / SITRANS LG series

Selection and ordering data (continued)

	Article No.										Order Code			
	7	M	L	5	8	8	8	0	-	0	0	0	0	0
SITRANS LG240 Guided radar level transmitter														
Continuous, contact, 32 m (105 ft) range. Monitors level and interface in aggressive liquids. Ideal for hygienic applications.														
Bolting DN 40, PN 40 DIN 11851/1.4435 (BN2)										1	1			
Bolting DN 40, PN 40 DIN 11851/PTFE-TFM 1600										1	2			
Bolting DN 50, PN 25 DIN 11851/1.4435(BN2)										1	3			
Bolting DN 50, PN 25 DIN 11851/PTFE-TFM 1600										1	4			
Bolting DN 65, PN 25 DIN 11851/PTFE-TFM 1600										1	5			
Flange DN 25, PN 40 Form C, DIN 2501/PTFE-TFM 1600										2	0			
Flange DN 40, PN 40 Form C, DIN 2501/PTFE-TFM 1600										2	1			
Flange DN 50, PN 40 Form C, DIN 2501/PTFE-TFM 1600										2	2			
Flange DN 50, PN 40 Form V13, DIN 2513/PTFE-TFM 1600										2	3			
Flange DN 65, PN 40 Form C, DIN 2513/PTFE-TFM 1600										2	4			
Flange DN 80, PN 40 Form C, DIN 2501/PTFE-TFM 1600										2	5			
Flange DN 100, PN 16 Form C, DIN 2501/PTFE-TFM 1600										2	6			
Flange DN 80, PN 40 EN 1092-1 Form B1/PTFE-TFM 1600										2	7			
Flange DN 100, PN 40 EN 1092-1 Form B1/PTFE-TFM 1600										2	8			
Flange 2" 150 lb RF, ASME B16.5/PTFE-TFM 1600										3	0			
Flange 2" 300 lb RF, ASME B16.5/PTFE-TFM 1600										3	1			
Flange 3" 150 lb RF, ASME B16.5/PTFE-TFM 1600										3	2			
Flange 4" 150 lb RF, ASME B16.5/PTFE-TFM 1600										3	3			
Note: The pressure limit for all PTFE coated versions is 16 bar (per manual).														
Electronics														
Two-wire 4 ... 20 mA/HART													0	
Four-wire Modbus ³⁾¹³⁾													1	
Two-wire 4 ... 20 mA/HART with SIL qualification ⁹⁾													2	
Four-wire 4 ... 20 mA/HART; 90 ... 253 V AC; 50/60 Hz ³⁾¹³⁾													3	
Four-wire 4 ... 20 mA/HART; 9.6 ... 48 V DC; 20 ... 42 V AC ³⁾¹³⁾													4	
PROFIBUS PA ⁹⁾													5	
FOUNDATION Fieldbus ⁹⁾													6	
Seal/Process temperature														
Without glass seal/-40 ... +150 °C (-40 ... +302 °F) ²⁾														A
FFKM (Kalrez 6221)/-20 ... 150 °C (-4 ... +302 °F) ⁴⁾														B
EPDM (Freudenberg 70 EPDM 291)/-20 ... 130 °C (-4 ... +266 °F) ⁴⁾														C
Housing/Protection/Cable														
Note: for installation of remote display, 7ML5840, with LG two chamber housing options, contact PVC														
Plastic IP66/IP67 M20 x 1.5/blind stopper														A
Plastic IP66/IP67 1/2" NPT/blind stopper														B
Aluminum/IP66/IP68 (0.2 bar) M20 x 1.5/blind stopper														C
Aluminum/IP66/IP68 (0.2 bar) 1/2" NPT/blind stopper														D
Aluminum double chamber/IP66/IP68 (0.2 bar) M20 x 1.5/blind stopper														E
Aluminum double chamber/IP66/IP68 (0.2 bar) 1/2" NPT/blind stopper														F
Stainless steel (precision casting) 316L/IP66/IP68 (0.2 bar) M20 x 1.5/blind stopper														G
Stainless steel (precision casting) 316L/IP66/IP68 (0.2 bar) 1/2" NPT/blind stopper														H
Stainless steel (electropolished) 316L/IP66/IP68 (0.2 bar) M20 x 1.5/blind stopper														J
Stainless steel (electropolished) 316L/IP66/IP68 (0.2 bar) 1/2" NPT/blind stopper														K
Stainless steel double chamber/IP66/IP68 (0.2 bar) M20 x 1.5/blind stopper														L
Stainless steel double chamber/IP66/IP68 (0.2 bar) 1/2" NPT/blind stopper														M
Aluminum/IP66/IP68 (0.2 bar) M20 x 1.5/cable gland stainless steel														N
Aluminum double chamber/IP66/IP68 (0.2 bar) M20 x 1.5/cable gland stainless steel														P
Stainless steel (precision casting) 316L/IP66/IP68 (0.2 bar) M20 x 1.5/cable gland stainless steel														Q
Stainless steel (electropolished) 316L/IP66/IP68 (0.2 bar) M20 x 1.5/cable gland stainless steel														R
Aluminum single chamber / IP66/IP68 (0.2 bar) M20 x 1.5/cable gland brass nickel-plated														W
Aluminum double chamber / IP66/IP68 (0.2 bar) M20 x 1.5/cable gland brass nickel-plated														X
Stainless steel single chamber (precision casting) / IP66/IP68 (0.2 bar) M20 x 1.5/ cable gland brass nickel-plated														Y

Selection and ordering data (continued)

	Article No.	Order Code
SITRANS LG240 Guided radar level transmitter Continuous, contact, 32 m (105 ft) range. Monitors level and interface in aggressive liquids. Ideal for hygienic applications.	7ML5880- ● ● ● ● ● - ● ● ● ●	● ● ●
Stainless steel double chamber / IP66/IP68 (0.2 bar) M20 x 1.5/cable gland brass nickel-plated		S
Remote stainless steel single chamber housing, electropolished/IP66/IP67 with cable outlet IP68 (electronics separated by cable); M20 x 1.5/blind plug ¹⁰⁾		Z Q 2 A
Remote plastic single chamber housing /IP66/IP67 with cable outlet IP68 (electronics separated by cable); M20 x 1.5/blind plug ¹⁰⁾		Z Q 2 B
Lengths		
Rod ø 8 mm (0.31 inch)/1.4435 (Base standard 300 ... 4 000 mm)		
300 ... 1 000 mm (11.81 ... 39.37 inch) ⁶⁾		0
1 001 ... 2 000 mm (39.41 ... 78.74 inch) ⁶⁾		1
2 001 ... 3 000 mm (78.78 ... 118.11 inch) ⁶⁾		2
3 001 ... 4 000 mm (118.15 ... 157.48 inch) ⁶⁾		3
Rod ø 10 mm (0.24 inch)/PFA (300 ... 4 000 mm)		
300 mm (11.81 inch) ⁶⁾		9 R 1 A
500 mm (19.69 inch) ⁶⁾		9 R 1 B
300 ... 1 000 mm (11.81 ... 39.37 inch) ⁶⁾		9 R 1 C
1 001 ... 5 000 mm (39.41 ... 78.74 inch) ⁶⁾		9 R 1 D
2 001 ... 3 000 mm (78.78 ... 118.11 inch) ⁶⁾		9 R 1 E
3 001 ... 4 000 mm (118.15 ... 157.48 inch) ⁶⁾		9 R 1 F
Cable ø 4 mm (0.16 inch)/PFA (500 ... 32 000 mm)		
500 mm (9.69 inch)		9 R 1 G
501 ... 1 000 mm (19.72 ... 39.37 inch)		9 R 1 H
1 001 ... 2 000 mm (39.41 ... 78.74 inch)		9 R 1 J
2 001 ... 4 000 mm (78.78 ... 157.40 inch)		9 R 1 K
4 001 ... 5 000 mm (157.52 ... 196.85 inch)		9 R 1 L
5 001 ... 10 000 mm (196.89 ... 393.70 inch)		9 R 1 M
10 001 ... 15 000 mm (393.74 ... 590.55 inch)		9 R 1 N
15 001 ... 20 000 mm (590.59 ... 787.40 inch)		9 R 1 P
20 001 ... 25 000 mm (787.44 ... 984.25 inch)		9 R 1 Q
25 001 ... 32 000 mm (984.29 ... 1 259.52 inch)		9 R 1 R
Exchange, rod ø 8 mm (0.31 inch)/1.4435 (BN2), electropolished (Ra < 0.38 µm)		
300 ... 1 000 mm (11.81 ... 39.37 inch) ⁶⁾		9 R 2 A
1 001 ... 2 000 mm (39.41 ... 78.74 inch) ⁶⁾		9 R 2 B
2 001 ... 3 000 mm (78.78 ... 118.11 inch) ⁶⁾		9 R 2 C
3 001 ... 4 000 mm (118.15 ... 157.48 inch) ⁶⁾		9 R 2 D

Selection and Ordering data	Order code
Further designs (mandatory)	
Please add "-Z" to Article No. and specify Order code(s).	
Supplementary electronics	
Without	A00
Additional current output 4 ... 20 mA ¹⁰⁾	A01
Indicating/adjustment module	
Without	E00
Mounted	E01
Laterally mounted	E02
Language of display	
German	L00
English	L01

Level Measurement

Continuous level measurement

Guided wave radar transmitters / SITRANS LG series

Selection and ordering data (continued)

Selection and Ordering data	Order code
French	L02
Dutch	L03
Italian	L04
Spanish	L05
Portuguese	L06
Russian	L07
Chinese	L08
Japanese	L09
No language pre-set	L10
Operating instructions	
German	M00
English	M01
French	M02
Spanish	M03
Further designs (optional)	
Please add "-Z" to Article No. and specify Order code(s).	
Enter the total insertion length in plain text description	Y01
Enter the total length of rigid part (cable version only) range from 100 ... 1 000 mm	Y02
Cleaning included certificate: oil, grease and silicone free	W01
Remote electronic cable lengths: 2 m (6.6 ft). Only available with Housing options Q2A and Q2B	Y10
Remote electronic cable lengths: 5 m (16.4 ft). Only available with Housing options Q2A and Q2B	Y11
Remote electronic cable lengths: 10 m (32.8 ft). Only available with Housing options Q2A and Q2B	Y12
Identification label (measurement loop) stainless steel, 40 characters max, add in plain text. To add more than one line use a coma "," for line break.	Y17
Identification Label (measurement loop) foil, 40 characters max, add in plain text. To add more than one line use a coma "," for line break.	Y18
Material Inspection certificate 3.1 of EN 10204	C05
3.1-Inspection Certificate for instrument (EN 10204) ⁸⁾	C12
Inspection certificate 3.1 (EN 10204, NACE MR 0175) - material ⁸⁾¹⁹⁾	D07
Note: 316L probes include NACE MR 0175 and MR 0103, non 316L probes include MR 0175 only and plated flange designs are not available with NACE certificate.	
3.1-Inspection Certificate for instrument with test data (EN 10204) ⁸⁾	C25
2.2-Factory certificate for material (EN 10204) ⁸⁾	C15
Quality and test plan ⁸⁾	C26
Dye penetration test, results confirmed via a 3.1 certificate/instrument (EN 10204) ⁸⁾	C13
X-ray test + 3.1 certificate/instrument ⁸⁾	C14
Positive material identification test + 3.1 certificate/instrument ⁸⁾	C16
Roughness test + 3.1 certificate/instrument ⁸⁾	C18
Pressure test + 3.1 certificate/instrument ⁸⁾	C31
Helium leak test + 3.1 certificate/instrument ⁸⁾	C32
Ferrite measuring accuracy to DIN 32514-1 + 3.1 certificate/instrument ⁸⁾	C60
Pressure test according to NORSOK + 3.1 certificate/instrument ⁸⁾	C61
5 point calibration certificate (min. length 300 mm) ⁸⁾	C62

Selection and ordering data (continued)

Selection and Ordering data	Article No.
Operating Instructions	
All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation	
Accessories	
SITRANS LG series/SITRANS RD150 sensor display module	A5E34143449
SITRANS LG, two-wire 4 ... 20 mA/HART electronic	A5E35637821
SITRANS LG, USB communicator	A5E35192015
SITRANS LG, Mounting eye M12 x 20	PBD:51041448
SITRANS LG, Mounting spring	PBD:51041449
Siemens Intrinsically Safe Barrier (DC powered), ATEX II 1 G EEx ia	7NG4124-0AA00
SITRANS RD100, loop powered display -see Chapter 7	7ML5741-.....-
SITRANS RD150, remote digital display for 4 ... 20 mA and HART devices - see Chapter 7	7ML5742-.....-
SITRANS RD200, universal input display with Modbus conversion - see Chapter 7	7ML5740-.....-
SITRANS RD300, dual line display with totalizer and linearization curve and Modbus conversion - see Chapter 7	7ML5744-.....-
For applicable back up point level switch - see point level measurement section	

Note: some configuration options are not available. For restriction information see the online PIA configuration tool.

- 1) Some approvals are not available with Plastic and Stainless steel (electropolished) Housing/Protection/Cable options and certain glands.
- 2) Available only with Rod ø 10 mm/PFA and Cable ø 4 mm/PFA Length options.
- 3) Available only with Supplementary electronic option A00 and Indicating/adjustment module options E00, E01.
- 4) Not available with Remote Housing/Protection/Cable options Q2A and Q2B.
- 5) Not available with Electronic option 5.
- 6) Not available with Y02.
- 7) Available only with Electronic options 0, 2, and 6.
- 8) Listed Certificates are not available with all configurations, please contact factory for more information.
- 9) Available only with Supplementary electronic option A00.
- 10) Not available with Indicating/adjustment module option E02.
- 11) Available only with Electronics options 0, 2, and 5.
- 12) Some approvals are not available with Remote or Stainless steel (electropolished) Housing/Protection/Cable options and certain glands.
- 13) Available only with Double chamber, Metallic Housing/Protection/Cable options and certain glands.
- 14) Available only with Electronics options 0, 2, 5, 6.
- 15) Available only with Electronics options 0 and 2.
- 16) Available only with Electronics options 0 ... 4.
- 17) Not available with some Seal/Process Temperature options.
- 18) Available only with Electronic options 0, 2, 3, and 4.
- 19) Available only with 316L Probes. NACE is not available with coated, plated, or hygienic connections.

Note: Please consult manual for further detail.

	Article No.	Order Code
SITRANS LG250 Guided radar level transmitter Continuous, contact, 75 m (246 ft) range. Monitors level and interface in liquids.	7ML5881- ● ● ● ● ● - ● ● ● ● ●	● ● ●
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Approvals		
General purpose (CSA, FM, CE)	0	A
Shipping approval ⁽⁴⁾⁽⁶⁾⁽⁷⁾⁽⁸⁾⁽¹³⁾	0	B
Overfill protection (WHG; VLAREM) ⁽⁹⁾⁽¹⁰⁾⁽¹³⁾	0	C
ATEX II 1G, ½G, 2G Ex ia IIC T6 ⁽⁰⁾⁽¹³⁾	0	E
ATEX II 1G, ½G, 2G Ex ia IIC + Overfill (WHG; VLAREM) ⁽¹⁰⁾⁽¹³⁾	0	F
ATEX II 1G, ½G, 2G Ex ia IIC T6 + shipping approval ⁽⁴⁾⁽⁶⁾⁽⁷⁾⁽⁸⁾⁽¹³⁾	0	G
ATEX II 1G, ½G 2G Ex ia IIC + ATEX II 1D, ½D, 2D IP6x ⁽¹⁾⁽¹³⁾	0	H
ATEX II ½G, 2G Ex d ia IIC T6 ⁽²⁾⁽⁸⁾⁽¹¹⁾⁽¹²⁾⁽¹³⁾	0	J
ATEX II 1/2G, 2G Ex d ia IIC + ATEX II 1/2D, 2D IP6x ⁽²⁾⁽⁸⁾⁽¹¹⁾⁽¹²⁾⁽¹³⁾	0	K
ATEX II 1/2G, 2G Ex d IIC T6 ⁽¹⁾⁽¹¹⁾⁽¹⁴⁾	0	L
ATEX II 1/2G, 2G Ex d IIC + ATEX II 1/2D, 2D IP6x ⁽¹⁾⁽¹¹⁾⁽¹³⁾⁽¹⁴⁾	0	M

Level Measurement

Continuous level measurement

Guided wave radar transmitters / SITRANS LG series

Selection and ordering data (continued)

	Article No.	Order Code
SITRANS LG250 Guided radar level transmitter Continuous, contact, 75 m (246 ft) range. Monitors level and interface in liquids.	7ML5881- ● ● ● ● ● - ● ● ● ● ●	● ● ●
ATEX II 1D, 1/2D, 2D IP6x T ⁽¹⁾⁽¹³⁾⁽¹⁴⁾	0	N
ATEX II 1G, II 1/2G, II 2G Ex ia IIC T6...T1 Ga, Ga/Gb, Gb /IEC Ex ia IIC T6...T1 Ga, Ga/Gb, Gb ¹³⁾	0	W
ATEX II 1/2G, II 2G Ex db IIC T6 ... T1 Ga/Gb, Gb / IEC Ex db IIC T6 ... T1 Ga/Gb, Gb ⁽¹³⁾⁽¹⁴⁾⁽¹⁸⁾	1	K
ATEX II 1/2G, II 2G Ex d ia IIC T6 ... T1 Ga/Gb, Gb + Ship approval ⁽²⁾⁽⁶⁾⁽⁸⁾⁽¹¹⁾⁽¹²⁾⁽¹³⁾	7	A
ATEX II 1/2G, II 2G Ex db IIC T6 ... T1 Ga/Gb, Gb + Ship approval ⁽¹⁾⁽⁶⁾⁽⁸⁾⁽¹¹⁾⁽¹³⁾	7	B
ATEX II 1/2G, II 2G Ex db IIC T6 ... T1 Ga/Gb, Gb + Overfill protection (WHG, VLAREM) ⁽¹⁾⁽¹¹⁾⁽¹⁴⁾	7	P
IEC Ex ia IIC T6 ⁽¹⁰⁾⁽¹³⁾	0	P
IEC Ex ia IIC T6 + IEC IP6x T tD ⁽¹⁾⁽¹⁴⁾⁽¹⁵⁾	0	Q
IEC Ex d ia IIC T6 ⁽²⁾⁽⁸⁾⁽¹¹⁾⁽¹²⁾⁽¹³⁾	0	R
IEC Ex d ia IIC T6 + IEC IP6x T tD ⁽²⁾⁽⁸⁾⁽¹¹⁾⁽¹²⁾⁽¹³⁾⁽¹⁵⁾	0	S
IEC Ex d IIC T6 ⁽¹⁾⁽¹¹⁾⁽¹⁴⁾	0	T
IEC Ex d IIC T6 + IEC IP6x T tD ⁽¹⁾⁽¹¹⁾⁽¹⁴⁾	0	U
IEC Ex db IIC T6...T1 Ga/Gb, Gb + Ship approval ⁽¹⁾⁽⁶⁾⁽⁸⁾⁽¹¹⁾⁽¹³⁾⁽¹⁴⁾	7	C
IEC Ex ia IIC T6...T1 Ga, Ga/Gb, Gb + Ship approval ⁽⁶⁾⁽⁸⁾⁽¹³⁾⁽¹⁶⁾	7	D
IEC Ex d ia IIC T6...T1 Ga/Gb, Gb + Ship approval ⁽²⁾⁽⁶⁾⁽⁸⁾⁽¹¹⁾⁽¹³⁾⁽¹⁵⁾	7	E
FM (NI) Class I, Div. 2, Groups A, B, C, D ⁽³⁾⁽⁸⁾⁽¹³⁾⁽¹⁷⁾	1	A
FM (IS) Class I, II, III, Div. 1, Groups A, B, C, D, E, F ⁽⁵⁾⁽⁸⁾⁽¹³⁾	1	B
FM (XP-AIS) Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G ⁽²⁾⁽⁸⁾⁽¹¹⁾⁽¹²⁾⁽¹³⁾	1	C
FM (XP) Class I, Div. 1, Groups A, B, C, D ⁽²⁾⁽¹¹⁾⁽¹³⁾⁽¹⁴⁾	1	D
FM (NI) Class I, II, III, Div. 2, Groups A, B, C, D, F, G + Ship approval ⁽⁴⁾⁽⁶⁾⁽⁸⁾⁽¹³⁾⁽¹⁷⁾	7	F
FM (IS) Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G + Ship approval ⁽⁶⁾⁽⁸⁾⁽¹³⁾⁽¹⁶⁾	7	G
FM (XP-AIS) Class I, Div. 1, Groups A, B, C, D, + Ship approval ⁽⁶⁾⁽⁸⁾⁽¹¹⁾⁽¹³⁾⁽¹⁶⁾	7	H
FM (XP) Class I, Div. 1, Groups A, B, C, D + Ship approval ⁽²⁾⁽⁶⁾⁽⁸⁾⁽¹³⁾⁽¹⁴⁾	7	J
CSA (NI) Class I, Div. 2, Groups A, B, C, D (DIP) Class II, III, Div. 1, Groups E, F, G ⁽¹⁾	1	E
CSA (IS) Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G ⁽⁵⁾⁽¹³⁾	1	F
CSA (XP-IS) Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G ⁽²⁾⁽⁸⁾⁽¹¹⁾⁽¹²⁾⁽¹³⁾	1	G
CSA (XP) Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G ⁽⁸⁾⁽¹³⁾⁽¹⁴⁾⁽¹⁸⁾	1	H
CSA (NI) Class I, II, III Div. 2, Groups A, B, C, D, F, G + Ship approval ⁽¹⁾⁽⁶⁾⁽¹³⁾	7	K
CSA (IS) Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G + Ship approval ⁽⁶⁾⁽¹³⁾⁽¹⁶⁾	7	L
CSA (XP-IS) Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G + Ship approval ⁽⁶⁾⁽⁸⁾⁽¹¹⁾⁽³²⁾	7	M
CSA (XP) Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G + Ship approval ⁽⁶⁾⁽⁸⁾⁽¹³⁾⁽¹⁴⁾⁽¹⁸⁾	7	N
NEPSI Ex ia IIC T6 ⁽⁵⁾⁽¹³⁾	2	A
NEPSI Ex ia IIC T6 + DIP A20/21 TA T ^{(*)1)(13)}	2	B
NEPSI Ex d ia IIC T6 ⁽²⁾⁽⁸⁾⁽¹¹⁾⁽¹³⁾	2	C
NEPSI Ex d ia IIC T6 + DIP A20/21 TA T ^{(*)2)(8)(11)(13)}	2	D
NEPSI Ex d IIC T6 ⁽¹⁾⁽¹¹⁾⁽¹³⁾⁽¹⁴⁾	2	E
NEPSI Ex d IIC T6 + DIP A20/21 TA T ^{(*)1)(11)(13)(14)}	2	F
NEPSI DIP A20/21 TA T ^{(*)1)(13)(14)}	2	G
INMETRO Ex ia IIC T6 ... T1 ⁽⁵⁾⁽¹³⁾	3	A
INMETRO Ex t IIIC T* IP6X, Da, Da/Db, Da/Dc, Db + Ex ia IIC T6, Ga, Ga/Gb ⁽¹⁾⁽¹¹⁾⁽¹³⁾	3	B
INMETRO Ex d ia IIC T6 ... T1 ⁽²⁾⁽⁸⁾⁽¹¹⁾⁽¹³⁾	3	C
INMETRO Ex t IIIC T* IP6X, Da, Da/Db, Da/Dc, Db + Ex d ia IIC T6 Ga/Gb ⁽¹⁾⁽⁸⁾⁽¹¹⁾⁽¹³⁾	3	D

Selection and ordering data (continued)

	Article No.	Order Code
SITRANS LG250 Guided radar level transmitter Continuous, contact, 75 m (246 ft) range. Monitors level and interface in liquids.	7ML5881- ● ● ● ● ● - ● ● ● ● ●	● ● ●
INMETRO Ex d IIC T6 ... T1 ¹⁾¹¹⁾¹³⁾¹⁴⁾	3	E
INMETRO Ex t IIIC T* IP6X, Da, Da/Db, Da/Dc, Db + Ex d IIC T6 Ga/Gb ¹⁾¹¹⁾¹³⁾¹⁴⁾	3	F
INMETRO Ex t IIIC T* IP6X, Da, Da/Db, Da/Dc, Db ¹⁾¹¹⁾¹³⁾¹⁴⁾	3	G
KOSHA Ex d IIC T6 ... T1 – KE ¹⁾¹¹⁾¹³⁾¹⁴⁾	4	A
Korea KC ex free area	6	A
GOST-R/EAC 0 Ex ia IIC T1 ... T6 X ¹³⁾	5	A
GOST-R/EAC 0 Ex ia IIC T1 ... T6 X + Ex t IIIC T ... IP66 ¹⁾¹³⁾	5	B
GOST-R/EAC 1 Ex d ia IIC T1 ... T6 X ²⁾⁸⁾¹¹⁾¹³⁾	5	C
GOST-R/EAC 1 Ex d ia IIC T1 ... T6 X + Ex t IIIC T ... IP66 ²⁾⁸⁾¹¹⁾¹³⁾	5	D
GOST-R/EAC 1 Ex d IIC T1 ... T6 X ¹⁾¹¹⁾¹³⁾	5	E
GOST-R/EAC 0 Ex d IIC T1 ... T6 X + Ex t IIIC T ... IP66 ¹⁾¹¹⁾¹³⁾	5	F
GOST-R/EAC Ex t IIIC T ... IP66 ¹⁾¹³⁾	5	G
Note: Version/Material, Process fitting/Material, and Length options are available only with options of corresponding type.		
Probe version/Material		
Probe exchangeable cable ø 2 mm (0.08 inch) with gravity weight/316 ¹⁹⁾²⁰⁾		A
Probe exchangeable cable ø 2 mm (0.08 inch) center weight/316L ¹⁹⁾²⁰⁾		B
Probe exchangeable cable ø 4 mm (0.16 inch) with gravity weight/316L ¹⁹⁾²⁰⁾		C
Probe exchangeable cable ø 4 mm (0.16 inch) with center weight/316L ¹⁹⁾²⁰⁾		D
Probe exchangeable rod ø 8 mm (0.31 inch)/316L ¹⁹⁾		E
Probe exchangeable rod ø 12 mm (0.47 inch)/316L ¹⁹⁾		F
Probe coax version ø 21.3 mm (0.84 inch) with single hole/316L ¹⁹⁾²⁰⁾		G
Probe coax version ø 21.3 mm (0.84 inch) with multiple hole/316L ¹⁹⁾²⁰⁾		H
Probe coax version ø 42.2 mm (1.66 inch) with multiple hole/316L ¹⁹⁾²⁰⁾		K
Probe exchangeable cable ø 4 mm (0.16 inch) with gravity weight/Alloy C22 (2.4602) ⁹⁾		L
Probe exchangeable cable ø 4 mm (0.16 inch) with centre weight/Alloy C22 (2.4602) ⁹⁾		M
Probe exchangeable rod ø 8 mm (0.31 inch)/Alloy C22 (2.4602) ⁹⁾		N
Probe exchangeable rod ø 12 mm (0.47 inch)/Alloy C22 (2.4602) ⁹⁾		P
Probe coax version ø 21.3 mm (0.84 inch) with multiple hole/Alloy C22 (2.4602) ⁹⁾		Q
Probe coax version ø 42.2 mm (1.66 inch) with multiple hole/Alloy C22 (2.4602) ⁹⁾		R
Probe exchangeable rod ø 8 mm (0.31 inch)/ Duplex (1.4462) ⁹⁾		S
Exchangeable rod ø 12 mm (0.47 inch)/Alloy C22 and 400 (2.4360) ⁹⁾		T
Exchangeable coated cable ø 4 mm with uncoated centering weight/PFA and 316 ²⁾¹¹⁾²⁴⁾³⁰⁾³⁵⁻³⁶⁾		U
Process fitting/Material		
Thread G 3/4" (DIN 3852-A) PN 6/316L		0 0
Thread 3/4" NPT (ASME B1.20.1) PN 6/316L		0 1
Thread G 3/4" (DIN 3852-A) PN 40/316L		0 2
Thread 3/4" NPT (ASME B1.20.1) PN 40/316L		0 3
Thread G 3/4" (DIN 3852-A) PN 100 / 316L ²²⁾		0 4
Thread 3/4" NPT (ASME B1.20.1) PN 100/316L ²²⁾		0 5
Thread G 1" (DIN 3852-A) PN 40/316L		0 6
Thread 1" NPT (ASME B1.20.1) PN 40/316L		0 7
Thread G 1" (DIN 3852-A) PN 100/316L ²²⁾		0 8
Thread 1" NPT (ASME B1.20.1) PN 100/316L ²²⁾		1 0
Thread G 1 1/2" (DIN 3852-A) PN 40/316L		1 1
Thread 1 1/2" NPT (ASME B1.20.1) PN 40/316L		1 2
Thread G 1 1/2" (DIN 3852-A) PN 100/316L ²²⁾		1 3
Thread 1 1/2" NPT (ASME B1.20.1) PN 100/316L ²²⁾		1 4
Thread 2 NPT PN 40, ASME B1.20.1/316L ²³⁾²⁴⁾		1 5
Flange DN 25 PN 40 Form C, DIN 2501/316L		2 0
Flange DN 25 PN 40 Form F, DIN 2501/316L		2 1
Flange DN 40 PN 40 Form C, DIN 2501/316L		2 2
Flange DN 50 PN 40 Form C, DIN 2501/316L		2 3
Flange DN 50 PN 40 Form V13, DIN 2513/316L		2 4

Level Measurement

Continuous level measurement

Guided wave radar transmitters / SITRANS LG series

Selection and ordering data (continued)

SITRANS LG250 Guided radar level transmitter Continuous, contact, 75 m (246 ft) range. Monitors level and interface in liquids.	Article No. 7ML5881- ● ● ● ● ● - ● ● ● ●	Order Code ● ● ●
Flange DN 80 PN 40 Form C, DIN 2501/316L	2	5
Flange DN 80 PN 40 Form V13, DIN 2501/316L	2	6
Flange DN 100 PN 16 Form C, DIN 2501/316L	2	7
Flange DN 100 PN 16 Form V13, DIN 2501/316L	2	8
Flange DN 100 PN 40 Form C, DIN 2501/316L	3	0
Flange DN 100 PN 40 Form V13, DIN 2513/316L	3	1
Flange DN 150 PN 16 Form C, DIN 2501/316L	3	2
Flange DN 50 PN 40 EN 1092-1 Form B1/316L	3	3
Flange DN 80 PN 40 EN 1092-1 Form B1/316L	3	4
Flange 1" 150 lb RF, ASME B16.5/316L	3	5
Flange 1 1/2" 150 lb RF, ASME B16.5/316L	3	6
Flange 2" 150 lb RF, ASME B16.5/316L	3	7
Flange 2" 300 lb RF, ASME B16.5/316L	3	8
Flange 3" 150 lb RF, ASME B16.5/316L	4	0
Flange 3" 300 lb RF, ASME B16.5/316L	4	1
Flange 4" 150 lb RF, ASME B16.5/316L	4	2
Flange 4" 300 lb RF, ASME B16.5/316L	4	3
Flange 6" 150 lb RF, ASME B16.5/316L	4	4
Flange 6" 300 lb RF, ASME B16.5/316L	4	5
Thread G 3/4" PN 40, DIN 3852-A/Alloy C22 (2.4602) ³⁷⁾	4	6
Thread G 1" PN 40, DIN 3852-A/Alloy C22 (2.4602) ³⁷⁾	4	7
Thread G 1 1/2" PN 40, DIN 3852-A/Alloy C22 (2.4602)	4	8
Thread 1 1/2" NPT PN 40, ASME B1.20.1/Alloy C22 (2.4602)	5	0
Flange DN 50 PN 40 Form C, DIN 2501/ 316L with Alloy C22 (2.4602) coating	5	1
Flange DN 50 PN 40 Form B1, EN 1092-1/ 316L with Alloy C22 (2.4602) coating	5	2
Flange DN 80 PN 40 Form B1, EN 1092-1/ 316L with Alloy C22 (2.4602) coating	5	3
Flange DN 100 PN 40 Form B1, EN 1092-1/ 316L with Alloy C22 (2.4602) coating	5	4
Flange DN 150 PN 16 Form B1, EN 1092-1/ 316L with Alloy C22 (2.4602) coating	5	5
Flange DN 200 PN 16 Form B1, EN 1092-1/ 316L with Alloy C22 (2.4602) coating	5	6
Flange 2" 150 lb RF, ASME B16.5/316L with Alloy C22 (2.4602) coating	5	7
Flange 2" 300 lb RF, ASME B16.5/316L with Alloy C22 (2.4602) coating	5	8
Flange 3" 150 lb RF, ASME B16.5/316L with Alloy C22 (2.4602) coating	6	0
Flange 4" 150 lb RF, ASME B16.5/316L with Alloy C22 (2.4602) coating	6	1
Flange 4" 300 lb RF, ASME B16.5/316L with Alloy C22 (2.4602) coating	6	2
Flange 6" 150 lb RF, ASME B16.5/316L with Alloy C22 (2.4602) coating	6	3
Flange 6" 300 lb RF, ASME B16.5/316L with Alloy C22 (2.4602) coating	6	4
Thread G 3/4" (DIN 3852-A) PN 40/Duplex 1.4462	6	5
Flange DN 80 PN 40 Form F, DIN 2501/Duplex (1.4462)	6	6
Flange DN 50 PN 40 Form B1, EN 1092-1/ Duplex (1.4462)	6	7
Flange 1" 150 lb RF, ASME B16.5/Duplex (1.4462)	6	8
Flange 1 1/2" 150 lb RF, ASME B16.5/Duplex (1.4462)	7	0
Flange 2" 150 lb RF, ASME B16.5/Duplex (1.4462)	7	1
Flange 2" 300 lb RF, ASME B16.5/Duplex (1.4462)	7	2
Flange 2" 600 lb RF, ASME B16.5/Duplex (1.4462)	7	3
Flange 3" 150 lb RF, ASME B16.5/Duplex (1.4462)	7	4
Flange 3" 300 lb RF, ASME B16.5/Duplex (1.4462)	7	5
Flange 4" 150 lb RF, ASME B16.5/Duplex (1.4462)	7	6
Flange 4" 150 lb FF, ASME B16.5/Duplex (1.4462)	7	7
Flange 4" 300 lb RF, ASME B16.5/Duplex (1.4462)	7	8
Flange 4" 600 lb RF, ASME B16.5/Duplex (1.4462)	8	0
Thread 1 1/2" NPT PN 40, ASME B1.20.1/Alloy 400 (2.4360)	8	1
Flange 2" 150 lb RF, ASME B16.5/Alloy 400 (2.4360)	8	2
Flange 2" 300 lb RF, ASME B16.5/Alloy 400 (2.4360) solid	8	3
Flange 3" 150 lb RF, ASME B16.5/Alloy 400 (2.4360)	8	4
Flange 3" 300 lb RF, ASME B16.5/Alloy 400 (2.4360)	8	5
Flange 3" 300 lb RJF, ASME B16.5/Alloy 400 (2.4360)	8	6
Flange 4" 150 lb RF, ASME B16.5/Alloy 400 (2.4360)	8	7

Selection and ordering data (continued)

	Article No.										Order Code				
	7	M	L	5	8	8	-	•	•	•	•	•	•	•	•
SITRANS LG250 Guided radar level transmitter															
Continuous, contact, 75 m (246 ft) range. Monitors level and interface in liquids.															
Flange 4" 300 lb RF, ASME B16.5/Alloy 400 (2.4360)						8	8								
Flange DN 25 PN 40 Form C, DIN 2501/ Alloy C22 (2.4602) solid ³⁷⁾						9	0					L	1	A	
Flange DN 25 PN 40 Form B1, EN 1092-1/ Alloy C22 (2.4602) solid ³⁷⁾						9	0					L	1	B	
Flange DN 80 PN 40 Form B1, EN 1092-1/ Alloy C22 (2.4602) solid						9	0					L	1	C	
Flange 1" 150 lb RF, ASME B16.5/Alloy C22 (2.4602) solid ³⁷⁾						9	0					L	1	D	
Flange 1 1/2" 150 lb RF, ASME B16.5/Alloy C22 (2.4602) solid ³⁷⁾						9	0					L	1	E	
Flange 1 1/2" 300 lb RF, ASME B16.5/Alloy C22 (2.4602) solid ³⁷⁾						9	0					L	1	F	
Flange 2" 150 lb RF, ASME B16.5/ Alloy C22 (2.4602) solid						9	0					L	1	G	
Flange 2" 300 lb RF, ASME B16.5/ Alloy C22 (2.4602) solid						9	0					L	1	H	
Flange 2" 600 lb RF, ASME B16.5/ Alloy C22 (2.4602) solid						9	0					L	1	J	
Flange 2" 1 500 lb RJF, ASME B16.5/ Alloy C22 (2.4602) solid						9	0					L	1	K	
Flange 3" 150 lb RF, ASME B16.5/ Alloy C22 (2.4602) solid						9	0					L	1	L	
Flange 3" 300 lb RF, ASME B16.5/ Alloy C22 (2.4602) solid						9	0					L	1	M	
Flange 3" 300 lb RF, ASME B16.5/316L with Alloy C22 (2.4602) coating						9	0					L	1	N	
Flange 4" 150 lb RF, ASME B16.5/ Alloy C22 (2.4602) solid						9	0					L	1	P	
Flange 4" 150 lb FF, ASME B16.5/ Alloy C22 (2.4602) solid						9	0					L	1	Q	
Flange 4" 300 lb RF, ASME B16.5/ Alloy C22 (2.4602) solid						9	0					L	1	R	
Flange 4" 300 lb RJF, ASME B16.5/ Alloy C22 (2.4602) solid						9	0					L	1	S	
Flange 4" 300 lb LT, ASME B16.5/ Alloy C22 (2.4602) solid						9	0					L	1	T	
Flange 4" 600 lb RJF, ASME B16.5/ Alloy C22 (2.4602) solid						9	0					L	1	U	
Flange 6" 150 lb RF, ASME B16.5/ Alloy C22 (2.4602) solid						9	0					L	1	V	
Flange 2 1/2" 600 lb RF, Masoneilan/ Alloy C22 (2.4602) solid						9	0					L	1	W	
Flange 2" 600 lb RF, ASME B16.5/316/316 L ²⁴⁾						9	0					L	1	X	
Flange 3" 600 lb RF, ASME B16.5/316/316 L ²⁴⁾²⁵⁾						9	0					L	1	Y	
Flange 4" 600 lb RF, ASME B16.5/316/316 L ³¹⁾						9	0					L	2	A	
Thread R1 1/2 PN40, EN 10226-1/316 L ³⁸⁾						9	0					L	2	B	
Flange NPS 2" Class 1500 RF, ASME B16.5 / 316/316 L ³⁹⁾						9	0					L	2	C	
Electronics															
Two-wire 4 ... 20 mA/HART															0
Four-wire Modbus ²⁾⁸⁾¹¹⁾															1
Two-wire 4 ... 20 mA/HART with SIL qualification ⁹⁾¹⁰⁾															2
Four-wire 4 ... 20 mA/HART; 90 ... 253 V AC; 50/60Hz ²⁾⁸⁾¹¹⁾³⁴⁾															3
Four-wire 4 ... 20 mA/HART; 9.6 ... 48 V DC; 20 ... 42 V AC ²⁾⁸⁾¹¹⁾³⁴⁾															4
PROFIBUS PA ⁵⁾⁸⁾															5
FOUNDATION Fieldbus ⁵⁾⁸⁾															6
Seal/Second line of defense/Process temperature															
FKM (SHS FPM 70C3 GLT)/without glass seal/-40 ... +80 °C (-40 ... +176 °F)															A
FKM (SHS FPM 70C3 GLT)/without glass seal/-40 ... +150 °C (-40 ... +302 °F)															B
FKM (SHS FPM 70C3 GLT)/with glass seal/-40 ... +150 °C (-40 ... +302 °F) ²⁶⁾															C
FFKM (Kalrez 6375)/without/-20 ... 150 °C (-4 ... +302 °F)															D
FFKM (Kalrez 6375)/with/-20 ... +150 °C (-4 ... +302 °F) ⁵⁾															E
FFKM (Kalrez 6375)/with glass seal/-20 ... +200 °C (-4 ... +392 °F) ²⁶⁾															F
EPDM (A+P 75.5/KW75F)/without glass seal/ -40 ... +80 °C (-40 ... +176 °F)															G
EPDM (A+P 75.5/KW75F)/without glass seal/ -40 ... +150 °C (-40 ... +302 °F) ²⁶⁾															H
EPDM (A+P 75.5/KW75F)/with glass seal/-40 ... +150 °C (-40 ... +302 °F) ²⁶⁾															J
Silicone FEP coated (A+P FEP-O-SEAL)/without glass seal/-40 ... +80 °C (-40 ... +176 °F)															K
Silicone FEP coated (A+P FEP-O-SEAL)/without glass seal/-40 ... +150 °C (-40 ... +302 °F)															L

Level Measurement

Continuous level measurement

Guided wave radar transmitters / SITRANS LG series

Selection and ordering data (continued)

	Article No.	Order Code
SITRANS LG250 Guided radar level transmitter Continuous, contact, 75 m (246 ft) range. Monitors level and interface in liquids.	7ML5881- ● ● ● ● ● - ● ● ● ● ●	● ● ●
Silicone FEP coated (A+P FEP-O-SEAL)/with glass seal/-40 ... +150 °C (-40 ... +302 °F) ²⁶⁾		M
With borosilicate glass lead through for volatile substances, e.g. ammonia/with glass seal/-60 ... +150 °C (-76 ... +302 °F) ²⁶⁾		N
FFKM (Kalrez 6375)/without glass seal/-20 ... +200 °C (-4 ... +392 °F)		P
FKM (SHS FPM 70C3 GLT)/with glass seal/-40 ... 80 °C (-40 ... +176 °F) ²⁶⁾		Q
FFKM (Kalrez 6375)/without/-10 ... +150 °C		R
FFKM (Kalrez 6375)/without/-10 ... +200 °C		S
FFKM (Kalrez 6375)/with/-10 ... +150 °C		T
FFKM (Kalrez 6375)/with/-10 ... +200 °C		U
Housing/Protection/Cable		
Note: for installation of remote display, 7ML5840, with LG two chamber housing options, contact PVC		
Plastic IP66/IP67 M20 x 1.5/blind stopper ¹¹⁾¹⁵⁾		A
Plastic IP66/IP67 1/2" NPT/blind stopper ⁸⁾¹¹⁾		B
Plastic 2-chamber/IP66/IP67/M20 x 1.5/blind stopper		G
Plastic 2-chamber/IP66/IP67 /1/2" NPT/blind stopper		H
Aluminum/IP66/IP68 (0.2 bar) M20 x 1.5/ Blind stopper ⁸⁾¹¹⁾		C
Aluminum/IP66/IP68 (0.2 bar) 1/2" NPT/Blind stopper ⁸⁾¹¹⁾		D
Aluminum double chamber/IP66/IP68 (0.2 bar) M20 x 1.5 / Blind stopper		E
Aluminum double chamber/IP66/IP68 (0.2 bar) 1/2" NPT/Blind stopper		F
Stainless Steel (precision casting) 316L/ IP66/IP68 (0.2 bar) M20 x 1.5/Blind stopper ⁹⁾¹¹⁾		L
Stainless Steel (precision casting) 316L/ IP66/IP68 (0.2 bar) 1/2" NPT/Blind stopper ⁸⁾¹¹⁾		M
Stainless Steel (electropolished) 316L/IP66/IP68 (0.2 bar) M20 x 1.5/Blind stopper ⁸⁾¹¹⁾		N
Stainless Steel (electropolished) 316L/IP66/IP68 (0.2 bar) 1/2" NPT/Blind stopper ⁸⁾¹¹⁾		P
Stainless Steel double chamber/IP66/IP68 (0.2 bar) M20 x 1.5/Blind stopper		Q
Stainless Steel double chamber/IP66/IP68 (0.2 bar) 1/2" NPT/Blind stopper		R
Aluminum/IP66/IP68 (0.2 bar) M20 x 1.5/ Cable gland stainless steel ⁸⁾¹¹⁾		S
Aluminum double chamber/IP66/IP68 (0.2 bar) M20 x 1.5/Cable gland stainless steel		T
Stainless Steel (precision casting) 316L/ IP66/IP68 (0.2 bar) M20 x 1.5/Cable gland stainless steel ¹¹⁾²⁸⁾		U
Stainless Steel (electropolished) 316L/IP66/IP68 (0.2 bar) M20 x 1.5/Cable gland stainless steel ¹¹⁾²⁸⁾		V
Stainless steel single chamber (precision casting)/IP66/IP68 (0.2 bar) M20 x 1.5/ Cable gland brass nickel-plated		W
Aluminum single chamber/IP66/IP68 (0.2 bar) M20 x 1.5/Cable gland brass nickel-plated		X
Stainless steel single chamber (precision casting)/IP66/ IP68 (0.2 bar) M20 x 1.5/ Cable gland brass nickel-plated		Y
Stainless steel double chamber / IP66/ IP68 (0.2 bar) M20 x 1.5 / Cable gland brass nickel-plated		J
Aluminum single chamber/IP66/IP68 (0.2 bar) with M20 x 1.5/Plug connector Harting HAN 7D (straight)		Z
Aluminum single chamber/IP66/IP68 (0.2 bar) with M20 x 1.5/Special HARTING plug (bent) according to Tier One (ZB7555)		Z
Remote stainless steel single chamber housing, electropolished/IP66/IP67 with cable outlet IP68 (electronics separated by cable); M20 x 1.5/blind plug ¹¹⁾²⁷⁾		Z
Remote plastic single chamber housing /IP66/IP67 with cable outlet IP68 (electronics separated by cable); M20 x 1.5/blind plug ¹¹⁾²⁷⁾		Z
		Q 1 A
		Q 1 B
		Q 2 A
		Q 2 B
Lengths		
Rod ø 8 mm/316L		
300 ... 1 000 mm (11.81 ... 39.37 inch) ²⁹⁾		0
1 001 ... 2 000 mm (39.41 ... 78.74 inch) ²⁹⁾		1
2 001 ... 3 000 mm (78.78 ... 118.11 inch) ²⁹⁾		2
3 001 ... 4 000 mm (118.15 ... 157.48 inch) ²⁹⁾		3
4 001 ... 5 000 mm (157.52 ... 196.85 inch) ²⁹⁾		4
5 001 ... 6 000 mm (196.89 ... 236.22 inch) ²⁹⁾		5
Rod ø 8 mm/Duplex		

Selection and ordering data (continued)

	Article No.	Order Code
SITRANS LG250 Guided radar level transmitter Continuous, contact, 75 m (246 ft) range. Monitors level and interface in liquids.	7ML5881- ● ● ● ● ● - ● ● ● ●	● ● ●
300 ... 1 000 mm (11.81 ... 39.37 inch) ²⁹⁾		9 R 1 A
1 001 ... 2 000 mm (39.41 ... 78.74 inch) ²⁹⁾		9 R 1 B
2 001 ... 3 000 mm (78.78 ... 118.11 inch) ²⁹⁾		9 R 1 C
3 001 ... 4 000 mm (118.15 ... 157.48 inch) ²⁹⁾		9 R 1 D
4 001 ... 5 000 mm (157.52 ... 196.85 inch) ²⁹⁾		9 R 1 E
5 001 ... 6 000 mm (196.89 ... 236.22 inch) ²⁹⁾		9 R 1 F
Rod ø 8 mm or ø 12 mm / Alloy C22 and 400		
300 ... 1 000 mm (11.81 ... 39.37 inch) ²⁹⁾		9 R 1 J
1 001 ... 2 000 mm (39.41 ... 78.74 inch) ²⁹⁾		9 R 1 K
2 001 ... 3 000 mm (78.78 ... 118.11 inch) ²⁹⁾		9 R 1 L
3 001 ... 4 000 mm (118.15 ... 157.48 inch) ²⁹⁾		9 R 1 M
4 001 ... 5 000 mm (157.52 ... 196.85 inch) ²⁹⁾		9 R 1 N
5 001 ... 6 000 mm (196.89 ... 236.22 inch) ²⁹⁾		9 R 1 P
Rod ø 12 mm / 316L		
300 ... 1 000 mm (11.81 ... 39.37 inch) ²⁹⁾		9 R 2 A
1 001 ... 2 000 mm (39.41 ... 78.74 inch) ²⁹⁾		9 R 2 B
2 001 ... 3 000 mm (78.78 ... 118.11 inch) ²⁹⁾		9 R 2 C
3 001 ... 4 000 mm (118.15 ... 157.48 inch) ²⁹⁾		9 R 2 D
Cable lengths ø 2 or 4 mm / 316L		
501 ... 1 000 mm (19.72 ... 39.37 inch)		9 R 2 E
1 000 ... 5 000 mm (39.37 ... 196.85 inch)		9 R 2 F
5 001 ... 10 000 mm (196.89 ... 393.70 inch)		9 R 2 G
10 001 ... 15 000 mm (393.74 ... 590.55 inch)		9 R 2 H
15 001 ... 20 000 mm (590.59 ... 787.40 inch)		9 R 2 J
20 001 ... 25 000 mm (787.44 ... 984.25 inch)		9 R 2 K
25 001 ... 30 000 mm (984.29 ... 1 181.10 inch)		9 R 2 L
30 001 ... 35 000 mm (1 181.14 ... 1 377.95 inch)		9 R 2 M
35 001 ... 40 000 mm (1 377.99 ... 1 574.80 inch)		9 R 2 N
40 001 ... 45 000 mm (1 574.84 ... 1 771.65 inch)		9 R 2 P
45 001 ... 50 000 mm (1 771.69 ... 1 968.50 inch)		9 R 2 Q
50 001 ... 55 000 mm (1 968.54 ... 2 165.35 inch)		9 R 2 R
55 001 ... 60 000 mm (2 165.39 ... 2 362.20 inch)		9 R 2 S
60 001 ... 65 000 mm (2 362.24 ... 2 559.06 inch)		9 R 2 T
65 001 ... 70 000 mm (2 559.09 ... 2 755.91 inch)		9 R 2 U
70 001 ... 75 000 mm (2 755.94 ... 2 952.76 inch)		9 R 2 V
Cable Lengths ø 2 mm or ø 4 mm / Alloy C22		
501 ... 1 000 mm (19.72 ... 39.37 inch)		9 R 4 A
1 001 ... 5 000 mm (39.41 ... 196.85 inch)		9 R 4 B
5 001 ... 10 000 mm (196.89 ... 393.70 inch)		9 R 4 C
10 001 ... 15 000 mm (393.74 ... 590.55 inch)		9 R 4 D
15 001 ... 20 000 mm (590.59 ... 787.40 inch)		9 R 4 E
20 001 ... 25 000 mm (787.44 ... 984.25 inch)		9 R 4 F
25 001 ... 30 000 mm (984.29 ... 1 181.10 inch)		9 R 4 G
30 001 ... 35 000 mm (1 181.14 ... 1 377.95 inch)		9 R 4 H
35 001 ... 40 000 mm (1 377.99 ... 1 574.80 inch)		9 R 4 J
40 001 ... 45 000 mm (1 574.84 ... 1 771.65 inch)		9 R 4 K
45 001 ... 50 000 mm (1 771.69 ... 1 968.50 inch)		9 R 4 L
50 001 ... 55 000 mm (1 968.54 ... 2 165.35 inch)		9 R 4 M

Level Measurement

Continuous level measurement

Guided wave radar transmitters / SITRANS LG series

Selection and ordering data (continued)

	Article No.	Order Code			
SITRANS LG250 Guided radar level transmitter Continuous, contact, 75 m (246 ft) range. Monitors level and interface in liquids.	7ML5881- ● ● ● ● ● - ● ● ● ●	●	●	●	●
55 001 ... 60 000 mm (2 165.39 ... 2 362.20 inch)		9	R	4	N
60 001 ... 65 000 mm (2 362.24 ... 2 559.06 inch)		9	R	4	P
65 001 ... 70 000 mm (2 559.09 ... 2 755.91 inch)		9	R	4	Q
70 001 ... 75 000 mm (2 755.94 ... 2 952.76 inch)		9	R	4	R
<u>Coax ø 21.3 mm/316L</u>					
300 ... 1 000 mm (11.81 ... 39.37 inch) ²⁹⁾		9	R	3	A
1 001 ... 2 000 mm (39.41 ... 78.74 inch) ²⁹⁾		9	R	3	B
2 001 ... 3 000 mm (78.78 ... 118.11 inch) ²⁹⁾		9	R	3	C
3 001 ... 4 000 mm (118.15 ... 157.48 inch) ²⁹⁾		9	R	3	D
4 001 ... 5 000 mm (157.52 ... 196.85 inch) ²⁹⁾		9	R	3	E
5 001 ... 6 000 mm (196.89 ... 236.22 inch) ²⁹⁾		9	R	3	F
<u>Coax ø 21.3 mm/Alloy C22</u>					
300 ... 1 000 mm (11.81 ... 39.37 inch) ²⁹⁾		9	R	5	A
1 001 ... 2 000 mm (39.41 ... 78.74 inch) ²⁹⁾		9	R	5	B
2 001 ... 3 000 mm (78.78 ... 118.11 inch) ²⁹⁾		9	R	5	C
3 001 ... 4 000 mm (118.15 ... 157.48 inch) ²⁹⁾		9	R	5	D
4 001 ... 5 000 mm (157.52 ... 196.85 inch) ²⁹⁾		9	R	5	E
5 001 ... 6 000 mm (196.89 ... 236.22 inch) ²⁹⁾		9	R	5	F
<u>Coax ø 42.2 mm/316L</u>					
300 ... 1 000 mm (11.81 ... 39.37 inch) ²⁹⁾		9	R	3	G
1 001 ... 2 000 mm (39.41 ... 78.74 inch) ²⁹⁾		9	R	3	H
2 001 ... 3 000 mm (78.78 ... 118.11 inch) ²⁹⁾		9	R	3	J
3 001 ... 4 000 mm (118.15 ... 157.48 inch) ²⁹⁾		9	R	3	K
4 001 ... 5 000 mm (157.52 ... 196.85 inch) ²⁹⁾		9	R	3	L
5 001 ... 6 000 mm (196.89 ... 236.22 inch) ²⁹⁾		9	R	3	M
<u>Coax ø 42.2 mm/Alloy C22</u>					
300 ... 1 000 mm (11.81 ... 39.37 inch) ²⁹⁾		9	R	5	G
1 001 ... 2 000 mm (39.41 ... 78.74 inch) ²⁹⁾		9	R	5	H
2 001 ... 3 000 mm (78.78 ... 118.11 inch) ²⁹⁾		9	R	5	J
3 001 ... 4 000 mm (118.15 ... 157.48 inch) ²⁹⁾		9	R	5	K
4 001 ... 5 000 mm (157.52 ... 196.85 inch) ²⁹⁾		9	R	5	L
5 001 ... 6 000 mm (196.89 ... 236.22 inch) ²⁹⁾		9	R	5	M
<u>Cable lengths ø 4 mm PFA</u>					
300 ... 1 000 mm (12 ... 39.37 inch)		9	R	6	A
1 001 ... 2 000 mm (39.41 ... 78.74 inch)		9	R	6	B
2 001 ... 5 000 mm (78.77 ... 196.85 inch)		9	R	6	C
5 001 ... 10 000 mm (196.89 ... 393.70 inch)		9	R	6	D
10 001 ... 15 000 mm (393.74 ... 590.55 inch)		9	R	6	E
15 001 ... 20 000 mm (590.59 ... 787.40 inch)		9	R	6	F
20 001 ... 25 000 mm (787.44 ... 984.25 inch)		9	R	6	G
25 001 ... 32 000 mm (984.29 ... 1 259.84 inch)		9	R	6	H

Selection and Ordering data	Order code
Further designs (mandatory)	
Please add "-Z" to Article No. and specify Order code(s).	
Supplementary electronics	
Without	A00
Additional current output 4 ... 20 mA ¹¹⁾	A01
Dimensions centering weight (diameter/height)	
Without	B00
ø 40/30 mm	B01

Selection and ordering data (continued)

Selection and Ordering data	Order code
ø 45/30 mm (for 2 inch tubes)	B02
ø 75/30 mm (for 3 inch tubes)	B03
ø 95/30 mm (for 4 inch tubes)	B04
ø 40 mm/30 mm	B05
ø 1.57/1.18 inch (for 2 inch Schedule 160)	
ø 45 mm/30 mm (for 2 inch tubes)	B06
ø 1.77/1.18 inch (for 2 inch Schedule 40/80)	
ø 75 mm/30 mm (for 3 inch tubes)	B07
ø 2.95/1.18 inch (for 3 inch Schedule 10/40)	
ø 95 mm/30 mm (for 4 inch tubes)	B08
ø 3.74/1.18 inch (for 4 inch Schedule 80)	
Rod mounted	
Without Rod, applicable for coax or cable probe types only	C00
Mounted	C01
Not mounted	C02
Indicating/adjustment module	
Without	E00
Mounted	E01
Laterally mounted	E02
Language of display	
German	L00
English	L01
French	L02
Dutch	L03
Italian	L04
Spanish	L05
Portuguese	L06
Russian	L07
Chinese	L08
Japanese	L09
No language pre-set	L10
Operating instructions	
German	M00
English	M01
French	M02
Spanish	M03
Further designs (optional)	
Please add "-Z" to Article No. and specify Order code(s).	
Enter the total insertion length in plain text description	Y01
Enter the total length of rigid part (cable version only) range from 100 ... 1 000 mm	Y02
Remote electronic cable lengths: 2 m (6.6 ft). Only available with Housing options Q2A and Q2B	Y10
Remote electronic cable lengths: 5 m (16.4 ft). Only available with Housing options Q2A and Q2B	Y11
Remote electronic cable lengths: 10 m (32.8 ft). Only available with Housing options Q2A and Q2B	Y12
Identification Label (measurement loop) stainless steel, 40 characters max, add in plain text. To add more than one line use a coma "," for line break.	Y17
Identification Label (measurement loop) foil, 40 charac- ters max, add in plain text. To add more than one line use a coma "," for line break.	Y18

Level Measurement

Continuous level measurement

Guided wave radar transmitters / SITRANS LG series

Selection and ordering data (continued)

Selection and Ordering data	Order code
Material Inspection certificate 3.1 of EN 10204	C05
3.1-Inspection Certificate for instrument (EN 10204) ³⁰⁾	C12
Inspection certificate 3.1 (EN 10204, NACE MR 0175) - material ³⁰⁾³¹⁾	D07
Note: 316L probes include NACE MR 0175 and MR 0103, non 316L probes include MR 0175 only and plated flange designs are not available with NACE certificate.	
3.1-Inspection Certificate for instrument with test data (EN 10204) ³⁰⁾	C25
2.2-Factory certificate for material (EN 10204) ³⁰⁾	C15
Quality and test plan ³⁰⁾	C26
Dye penetration test, results confirmed via a 3.1 certificate/instrument (EN10204) ³⁰⁾	C13
X-ray test + 3.1 certificate/instrument ³⁰⁾	C14
Positive material identification test + 3.1 certificate/instrument ³⁰⁾	C16
Roughness test + 3.1 certificate/instrument ³⁰⁾	C18
Pressure test + 3.1 certificate/instrument ³⁰⁾	C31
Helium leak test + 3.1 certificate/instrument ³⁰⁾	C32
Pressure test according to NORSOK + 3.1 certificate/instrument ³⁰⁾	C61
5 point calibration certificate (min. length 500 mm) ³⁰⁾	C62
Pressure test (acc. to ASME B31.1), incl. 3.1 Inspection certificate ³⁰⁾	C63
Certificate suitable for tropical regions with, all attachment parts of metal (2.1 factory certificate)	C65

Accessories	Article No.
Operating Instructions	
All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation	
Accessories	
SITRANS LG series/SITRANS RD150 sensor display module	A5E34143449
SITRANS LG, two-wire 4 ... 20 mA/HART electronic	A5E35637821
SITRANS LG, USB communicator	A5E35192015
SITRANS LG, Mounting eye M8 x 20	A5E36653574
SITRANS LG, Mounting eye M12 x 20	PBD:51041448
SITRANS LG, Mounting spring	PBD:51041449
Siemens Intrinsically Safe Barrier (DC powered), ATEX II 1 G EEx ia	7NG4124-0AA00
SITRANS RD100, loop powered display -see Chapter 7	7ML5741-.....
SITRANS RD150, remote digital display for 4 ... 20 mA and HART devices - see Chapter 7	7ML5742-.....
SITRANS RD200, universal input display with Modbus conversion - see Chapter 7	7ML5740-.....
SITRANS RD300, dual line display with totalizer and linearization curve and Modbus conversion - see Chapter 7	7ML5744-.....
For applicable back up point level switch - see point level measurement section	

Note: some configuration options are not available. For restriction information see the online PIA configuration tool.

- 1) Not available with Plastic and Stainless steel (electropolished) Housing/Protection/Cable options and certain glands.
- 2) Available only with Metallic, Double chamber Housing/Protection/Cable options and certain glands.
- 3) Not available with Remote or Stainless steel (electropolished) Housing/Protection/Cable options and certain glands.
- 4) Not available with Stainless steel (electropolished) Housing/Protection/Cable options and certain glands.
- 5) Not available with certain glands.
- 6) Not available with Version/Material option K, L, M, N, P, Q, R, S, T, and U.
- 7) Not available with Length options 3, 4, 5, R2C, and R2D.
- 8) Available only with Supplementary electronic option A00.
- 9) Not available with Seal/Second line of defense/Process temperature option N.
- 10) Not available with Housing/Protection/Cable option Q1B.

Selection and ordering data (continued)

- 1¹⁾ Not available with Indicating/adjustment module option E02.
 1²⁾ Not available with Process fitting/Material options 00 and 01.
 1³⁾ Available only with Electronic options 0 ... 4.
 1⁴⁾ Available only with glass seal options.
 1⁵⁾ Available only with Seal/Second line of defense/Process temperature options C, D, E, F, H, J, M, N, Q.
 1⁶⁾ Not Available with Housing/Protection/Cable options W, X, Y, J, Q1A, and Q1B.
 1⁷⁾ Not Available with Seal/Second line of defense/Process temperature option P.
 1⁸⁾ Available only with Single chamber, Aluminum and Stainless steel (precision casting) Housing/Protection/Cable options.
 1⁹⁾ Available only with Dimensions centering weight option B00.
 2⁰⁾ Available only with Rod mounted option C00.
 2¹⁾ Not available with Dimensions centering weight option B00.
 2²⁾ Available only with Seal/Second line of defense/Process temperature option N.
 2³⁾ Not available with Version/Material options F, L, M, N, P, Q, R, S, and T.
 2⁴⁾ Not available with Seal/Process temperature options A, G, K, N, and Q.
 2⁵⁾ Available only with Version/Material options A ... K.
 2⁶⁾ Not available with Remote Housing/Protection/Cable options.
 2⁷⁾ Not available with some Seal/Process temperature options including glass.
 2⁸⁾ Not available with Supplementary electronics options.
 2⁹⁾ Not available with Y02.
 3⁰⁾ Listed Certificates are not available with all configurations, please contact factory for more information.
 3¹⁾ Available only with 316L Probes. NACE is not available with coated, plated, or hygienic connections.
 3²⁾ Available only with Housing/Protection/Cable options E, F, N, Q, R, T.
 3⁴⁾ Available only with Double chamber, Plastic and Metallic Housing/Protection/Cable options and certain glands.
 3⁵⁾ Available only with Approvals options OA (CE only) and 1D.
 3⁶⁾ Available only with ø 4 mm PFA Length options.
 3⁷⁾ Not available with Probe version/Material option P.
 3⁸⁾ Available only with Probe version/Material options G and H.
 3⁹⁾ Available only with Probe version/Material options A ... E and H.

Note: Please consult manual for further details.

	Article No.	Order Code
SITRANS LG260 Guided radar level transmitter Continuous, contact, 60 m (197 ft) range. Monitors level in solids.	7ML5882- ● ● ● ● - ● ● ● ●	● ● ●
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Approvals		
General purpose (CSA, FM, CE) ⁶⁾	0	A
Shipping approval ⁴⁾⁵⁾⁷⁾⁸⁾⁹⁾	0	B
Overfill protection (WHG; VLAREM) ⁵⁾⁸⁾	0	C
ATEX II 1G, 1/2G, 2G Ex ia IIC T6 ⁵⁾⁸⁾	0	E
ATEX II 1G, 1/2G, 2G Ex ia IIC + Overfill (WHG; VLAREM) ⁵⁾⁸⁾	0	F
ATEX II 1G, 1/2G, 2G Ex ia IIC T6 + shipping approval ⁴⁾⁵⁾⁷⁾⁸⁾⁹⁾¹⁰⁾	0	G
ATEX II 1G, 1/2G, 2G Ex ia IIC + II 1D, 1/2D, 1/3D, 2D IP66 ¹⁾⁵⁾⁸⁾	0	H
ATEX II 1/2G, 2G Ex d ia IIC T6 ²⁾⁵⁾⁸⁾⁹⁾¹⁰⁾	0	J
ATEX II 1/2G, 2G Ex d ia IIC + shipping approval ²⁾⁵⁾⁷⁾⁸⁾⁹⁾¹⁰⁾	0	L
ATEX II 1/2G, II 2G Ex db ia IIC T6 ... T1 Ga/Gb, Gb + II 1D, 1/2D, 1/3D, 2D Ext IIC T* Da, Da/Db, Da/Dc, Db ²⁾⁵⁾⁸⁾⁹⁾¹⁰⁾	0	M
ATEX II 1/2G, 2G Ex d IIC T6 ¹⁾⁸⁾¹⁰⁾¹¹⁾	0	N
ATEX II 1G, II 1/2G, II 2G Ex ia IIC T6...T1 Ga, Ga/Gb, Gb /IEC Ex ia IIC T6...T1 Ga, Ga/Gb, Gb ⁸⁾	0	W
ATEX II 1/2G, 2G Ex d IIC + shipping approval ¹⁾⁷⁾⁸⁾⁹⁾¹⁰⁾¹¹⁾	0	Q
ATEX II 1/2G, 2G Ex d IIC + II 1D, 1/2D, 1/3D, 2D IP66 ¹⁾⁸⁾¹⁰⁾¹¹⁾	0	R
ATEX II 1D, 1/2D, 2D IP6x T ¹⁾⁸⁾¹¹⁾	0	S
IEC Ex ia IIC T6 ⁵⁾⁸⁾	0	T
IEC Ex ia IIC T6...T1 Ga, Ga/Gb, Gb + Ex t IIC T ¹⁾⁸⁾¹¹⁾	0	U
IEC Ex d ia IIC T6 ²⁾⁵⁾⁸⁾⁹⁾¹⁰⁾	1	A
IEC Ex d ia IIC T6 + IEC IP6x T tD ²⁾⁵⁾⁸⁾⁹⁾¹⁰⁾	1	B
IEC Ex db IIC T6 ... T1 Ga/Gb, Gb ¹⁾⁸⁾¹⁰⁾¹¹⁾	1	C
IEC Ex db IIC T6 ... T1 Ga/Gb, Gb + IEC Ex t IIC T ⁸⁾¹⁰⁾¹¹⁾¹⁹⁾	1	D
FM (NI) Class I, Div. 2, Groups A, B, C, D ³⁾⁵⁾⁸⁾⁹⁾	1	F
FM (NI) Class I, Div. 2, Groups A, B, C, D + Ship approval ³⁾⁵⁾⁷⁾⁸⁾⁹⁾¹⁰⁾	1	G
FM (IS) Class I, II, III, Div. 1, Groups A, B, C, D, E, F ⁵⁾⁸⁾⁹⁾	1	H
FM (IS) Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G + shipping approval ⁴⁾⁵⁾⁷⁾⁸⁾⁹⁾¹⁰⁾	1	J
FM (XP-AIS) Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G ²⁾⁵⁾⁸⁾⁹⁾¹⁰⁾	1	K
FM (XP-AIS) Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G + shipping approval ²⁾⁵⁾⁷⁾⁸⁾⁹⁾¹⁰⁾	1	L
FM (XP) Class I, Div. 1, Groups A, B, C, D ⁸⁾¹⁰⁾¹⁹⁾	1	M
CSA (NI) Class I, Div. 2, Groups A, B, C, D; (DIP) Class II, III, Div. 1, Groups E, F, G ¹⁾⁵⁾¹⁰⁾	1	N

Level Measurement

Continuous level measurement

Guided wave radar transmitters / SITRANS LG series

Selection and ordering data (continued)

	Article No.	Order Code
SITRANS LG260 Guided radar level transmitter Continuous, contact, 60 m (197 ft) range. Monitors level in solids.	7ML5882- ● ● ● ● ● - ● ● ● ● ●	● ● ●
CSA (IS) Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G ⁵⁾⁸⁾	1 P	
CSA (XP-IS) Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G ²⁾⁵⁾⁸⁾⁹⁾¹⁰⁾	1 Q	
CSA (XP) Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G ⁸⁾⁹⁾¹⁰⁾¹¹⁾¹⁹⁾	1 R	
NEPSI Ex ia IIC T6 ⁵⁾⁸⁾	2 A	
NEPSI Ex ia IIC T6 + DIP A20/21 TA T* ¹⁾⁵⁾⁸⁾	2 B	
NERSI Ex d ia IIC T6 ²⁾⁵⁾⁸⁾⁹⁾¹⁰⁾	2 C	
NEPSI Ex d ia IIC T6 + DIP A20/21 TA T* ²⁾⁵⁾⁸⁾⁹⁾¹⁰⁾	2 D	
NEPSI Ex d IIC T6 ⁸⁾¹⁰⁾¹⁹⁾	2 E	
NEPSI Ex d IIC T6 + DIP A20/21 TA T* ⁸⁾¹⁰⁾¹⁹⁾	2 F	
NEPSI DIP A20/21 TA T* ¹⁾⁸⁾	2 G	
INMETRO Ex ia IIC T6 ... T10 ⁵⁾⁸⁾	3 A	
INMETRO Ex t IIIC T* IP6X, Da, Da/Db, Da/Dc, Db + Ex ia IIC T6, Ga, Ga/Gb ¹⁾⁵⁾⁸⁾¹⁰⁾	3 B	
INMETRO Ex d ia IIC T6 ... T1 ²⁾⁵⁾⁸⁾⁹⁾¹⁰⁾	3 C	
INMETRO Ex t IIIC T* IP6X, Da, Da/Db, Da/Dc, Db + Ex d ia IIC T6 Ga/Gb ²⁾⁵⁾⁸⁾⁹⁾¹⁰⁾	3 D	
INMETRO Ex d IIC T6 ... T1 ⁸⁾¹⁰⁾¹⁹⁾	3 E	
INMETRO Ex t IIIC T* IP6X, Da, Da/Db, Da/Dc, Db + Ex d IIC T6 Ga/Gb ⁸⁾¹⁰⁾¹⁹⁾	3 F	
INMETRO Ex t IIIC T* IP6X, Da, Da/Db, Da/Dc, Db ¹⁾⁵⁾⁸⁾¹⁰⁾	3 G	
KOSHA Ex d IIC T6 ... T1 – KE ⁸⁾¹⁰⁾¹⁹⁾	4 A	
Korea KC ex free area ⁸⁾	6 A	
GOST-R/EAC 0 Ex ia IIC T1 ... T6 X ⁸⁾	5 A	
GOST-R/EAC 0 Ex ia IIC T1 ... T6 X + Ex t IIIC T ... IP66 ¹⁾⁸⁾	5 B	
GOST-R/EAC 1 Ex d ia IIC T1 ... T6 X ²⁾⁸⁾⁹⁾¹⁰⁾	5 C	
GOST-R/EAC 1 Ex d ia IIC T1 ... T6 X + Ex t IIIC T ... IP66 ²⁾⁸⁾⁹⁾¹⁰⁾	5 D	
GOST-R/EAC 1 Ex d IIC T1 ... T6 X ⁸⁾¹⁰⁾¹⁹⁾	5 E	
GOST-R/EAC 0 Ex d IIC T1 ... T6 X + Ex t IIIC T ... IP66 ⁸⁾¹⁰⁾¹⁹⁾	5 F	
GOST-R/EAC Ex t IIIC T ... IP66 ¹⁾⁸⁾	5 G	
Note: Version/Material, Process fitting/Material, and Length options are available only with options of corresponding type.		
Probe version/Material		
Probe exchangeable cable ø 4 mm (0.16 inch) with gravity weight/316 ¹³⁾¹⁴⁾		A
Probe exchangeable cable ø 6 mm (0.24 inch) with gravity weight/316 ¹³⁾¹⁴⁾		B
Probe exchangeable cable ø 6 mm (0.24 inch) with gravity weight/PA coated ¹⁵⁾		C
Probe exchangeable cable ø 11 mm (0.43 inch) with gravity weight/PA coated ¹⁵⁾		D
Probe exchangeable rod ø 16 mm (0.63 inch)/316L ¹³⁾		E
Process fitting/Material		
Thread G 3/4" (DIN 3852-A) PN 40/316L		0 0
Thread 3/4" NPT (ASME B1.20.1) PN 40/316L		0 1
Thread G 1" (DIN 3852-A) PN 40/316L		0 2
Thread 1" NPT (ASME B1.20.1) PN 40/316L		0 3
Thread G 1 1/2" (DIN 3852-A) PN 40/316L		0 4
Thread 1 1/2" NPT (ASME B1.20.1) PN 40/316L		0 5
Thread G 2" (DIN 3852-A) PN 40/316L		0 6
Flange DN 50 PN 40 Form C, DIN 2501/316L		1 0
Flange DN 80 PN 40 Form C, DIN 2501/316L		1 2
Flange DN 100 PN 16 Form C, DIN 2501/316L		1 3
Flange DN 100 PN 40 Form C, DIN 2501/316L		1 4
Flange DN 150 PN 16 Form C, DIN 2501/316L		1 5
Flange DN 50 PN 40 EN 1092-1 Form B1/316L		1 6
Flange DN 80 PN 40 EN 1092-1 Form B1/316L		1 7
Flange DN 100 PN 16 EN 1092-1 Form B1/316L		1 8
Flange 2" 150 lb RF, ASME B16.5/316L		3 0
Flange 2" 300 lb RF, ASME B16.5/316L		3 2

Selection and ordering data (continued)

	Article No.										Order Code				
	7	M	L	5	8	8	2	-							
SITRANS LG260 Guided radar level transmitter															
Continuous, contact, 60 m (197 ft) range. Monitors level in solids.															
Flange 3" 150 lb RF, ASME B16.5/316L							3	3							
Flange 3" 300 lb RF, ASME B16.5/316L							3	4							
Flange 4" 150 lb RF, ASME B16.5/316L							3	5							
Flange 4" 300 lb RF, ASME B16.5/316L							3	6							
Flange 6" 150 lb RF, ASME B16.5/316L							3	7							
Electronics															
Two-wire 4 ... 20 mA/HART												0			
Four-wire Modbus ²⁾⁹⁾¹⁰⁾												1			
Two-wire 4 ... 20 mA/HART with SIL qualification ⁹⁾												2			
Four-wire 4 ... 20 mA/HART; 90 ... 253 V AC; 50/60 Hz ²⁾⁹⁾¹⁰⁾												3			
Four-wire 4 ... 20 mA/HART; 9.6 ... 48 V DC; 20 ... 42 V AC ²⁾⁹⁾¹⁰⁾												4			
PROFIBUS PA ⁹⁾												5			
FOUNDATION Fieldbus ⁹⁾												6			
Seal/Process temperature															
FKM (SHS FPM 70C3 GLT)/-40 ... +80 °C (-40 ... +176 °F) ¹⁶⁾													A		
FKM (SHS FPM 70C3 GLT)/-40 ... +150 °C (-40 ... +302 °F)													B		
FFKM (Kalrez 6375)/-20 ... +200 °C (-4 ... +392 °F)													C		
EPDM (A+P 70.10-02)/-40 ... +80 °C (-40 ... +176 °F) ¹⁶⁾													D		
EPDM (A+P 70.10-02)/-40 ... +150 °C (-40 ... +392 °F)													E		
Housing/Protection/Cable															
Note: for installation of remote display, 7ML5840, with LG two chamber housing options, contact PVC															
Plastic IP66/IP67 M20 x 1.5/blind stopper ⁹⁾¹⁰⁾													A		
Plastic IP66/IP67 1/2" NPT/blind stopper ⁹⁾¹⁰⁾													B		
Plastic 2-chamber/IP66/IP67/M20 x 1.5/blind stopper													C		
Plastic 2-chamber/IP66/IP67/ 1/2" NPT/blind stopper													D		
Aluminum/IP66/IP68 (0.2 bar) M20 x 1.5/blind stopper ⁹⁾¹⁰⁾													E		
Aluminum/IP66/IP68 (0.2 bar) 1/2" NPT/blind stopper ⁹⁾¹⁰⁾													F		
Aluminum double chamber/IP66/IP68 (0.2 bar) M20 x 1.5/blind stopper													G		
Aluminum double chamber/IP66/ IP68 (0.2 bar) 1/2" NPT/blind stopper													H		
Stainless Steel (precision casting) 316L/IP66/IP68 (0.2 bar) M20 x 1.5/blind stopper ⁹⁾¹⁰⁾													J		
Stainless steel (precision casting) 316L/IP66/IP68 (0.2 bar) 1/2" NPT/blind stopper ⁹⁾¹⁰⁾													K		
Stainless steel (electropolished) 316L/IP66/IP68 (0.2 bar) M20 x 1.5/blind stopper ⁹⁾¹⁰⁾													L		
Stainless steel (electropolished) 316L/IP66/IP68 (0.2 bar) 1/2" NPT/blind stopper ⁹⁾¹⁰⁾													M		
Stainless steel double chamber/IP66/IP68 (0.2 bar) M20 x 1.5/blind stopper													N		
Stainless steel double chamber/IP66/ IP68 (0.2 bar) 1/2" NPT/blind stopper													P		
Aluminum/IP66/IP68 (0.2 bar) M20 x 1.5/cable gland stainless steel ⁹⁾¹⁰⁾													Q		
Aluminum double chamber/IP66/IP68 (0.2 bar) M20 x 1.5/cable gland stainless steel													R		
Stainless steel (precision casting) 316L/ IP66/ IP68 (0.2 bar) M20 x 1.5/cable gland stainless steel ⁹⁾¹⁰⁾													S		
Stainless steel (electropolished) 316L/IP66/IP68 (0.2 bar) M20 x 1.5/cable gland stainless steel ⁹⁾¹⁰⁾													T		
Aluminum single chamber/IP66/IP68 (0.2 bar) M20 x 1.5/cable gland brass nickel-plated													W		
Aluminum double chamber/IP66/IP68 (0.2 bar) M20 x 1.5/cable gland brass nickel-plated													X		
Stainless steel single chamber (precision casting)/IP66/IP68 (0.2 bar) M20 x 1.5/cable gland brass nickel-plated													Y		
Stainless steel double chamber/IP66/IP68 (0.2 bar) M20 x 1.5/cable gland brass nickel-plated													U		
Remote stainless steel single chamber housing, electropolished/IP66/IP67 with cable outlet IP68 (electronics separated by cable); M20 x 1.5/blind plug ¹⁰⁾												Z	Q	2	A
Remote plastic single chamber housing /IP66/IP67 with cable outlet IP68 (electronics separated by cable); M20 x 1.5/blind plug ¹⁰⁾												Z	Q	2	B
Lengths															
Rod ø 16 mm/316L															
500 mm (19.69 inch)													0		
501 ... 1 000 mm (19.72 ... 39.37 inch)													1		
1 001 ... 2 000 mm (39.41 ... 78.74 inch)													2		
2 001 ... 3 000 mm (78.78 ... 118.11 inch)													3		

Level Measurement

Continuous level measurement

Guided wave radar transmitters / SITRANS LG series

Selection and ordering data (continued)

	Article No.	Order Code			
SITRANS LG260 Guided radar level transmitter Continuous, contact, 60 m (197 ft) range. Monitors level in solids.	7ML5882- ● ● ● ● ● - ● ● ● ●	●	●	●	●
3 001 ... 4 000 mm (118.15 ... 157.48 inch)				4	
4 001 ... 5 000 mm (157.52 ... 196.85 inch)				5	
5 001 ... 6 000 mm (196.89 ... 236.22 inch)				6	
<u>Cable lengths ø 4 mm/316</u>					
501 ... 1 000 mm (19.72 ... 39.37 inch)				9	R 2 E
1 001 ... 5 000 mm (39.41 ... 196.85 inch)				9	R 2 F
5 001 ... 10 000 mm (196.89 ... 393.70 inch)				9	R 2 G
10 001 ... 15 000 mm (393.74 ... 590.55 inch)				9	R 2 H
15 001 ... 20 000 mm (590.59 ... 787.40 inch)				9	R 2 J
20 001 ... 25 000 mm (787.44 ... 984.25 inch)				9	R 2 K
25 001 ... 30 000 mm (984.29 ... 1 181.10 inch)				9	R 2 L
30 001 ... 35 000 mm (1 181.14 ... 1 377.95 inch)				9	R 2 M
35 001 ... 40 000 mm (1 377.99 ... 1 574.80 inch)				9	R 2 N
40 001 ... 45 000 mm (1 574.84 ... 1 771.65 inch)				9	R 2 P
45 001 ... 50 000 mm (1 771.69 ... 1 968.50 inch)				9	R 2 Q
50 001 ... 55 000 mm (1 968.54 ... 2 165.35 inch)				9	R 2 R
55 001 ... 60 000 mm (2 165.39 ... 2 362.20 inch)				9	R 2 S
<u>Cable lengths ø 6 mm/316L</u>					
500 mm (19.69 inch)				9	R 4 A
501 ... 1 000 mm (19.72 ... 39.37 inch)				9	R 4 B
1 001 ... 5 000 mm (39.41 ... 196.85 inch)				9	R 4 C
5 001 ... 10 000 mm (196.89 ... 393.70 inch)				9	R 4 D
10 001 ... 15 000 mm (393.74 ... 590.55 inch)				9	R 4 E
15 001 ... 20 000 mm (590.59 ... 787.40 inch)				9	R 4 F
20 001 ... 25 000 mm (787.44 ... 984.25 inch)				9	R 4 G
25 001 ... 30 000 mm (984.29 ... 1 181.10 inch)				9	R 4 H
30 001 ... 35 000 mm (1 181.14 ... 1 377.95 inch)				9	R 4 J
35 001 ... 40 000 mm (1 377.99 ... 1 574.80 inch)				9	R 4 K
40 001 ... 45 000 mm (1 574.84 ... 1 771.65 inch)				9	R 4 L
45 001 ... 50 000 mm (1 771.69 ... 1 968.50 inch)				9	R 4 M
50 001 ... 55 000 mm (1 968.54 ... 2 165.35 inch)				9	R 4 N
55 001 ... 60 000 mm (2 165.39 ... 2 362.20 inch)				9	R 4 P
<u>Cable lengths ø 6 mm or ø 11 mm/PA coated</u>					
501 ... 1 000 mm (19.72 ... 39.37 inch)				9	R 6 A
1 001 ... 5 000 mm (39.41 ... 196.85 inch)				9	R 6 B
5 001 ... 10 000 mm (196.89 ... 393.70 inch)				9	R 6 C
10 001 ... 15 000 mm (393.74 ... 590.55 inch)				9	R 6 D
15 001 ... 20 000 mm (590.59 ... 787.40 inch)				9	R 6 E
20 001 ... 25 000 mm (787.44 ... 984.25 inch)				9	R 6 F
25 001 ... 30 000 mm (984.29 ... 1 181.10 inch)				9	R 6 G
30 001 ... 35 000 mm (1 181.14 ... 1 377.95 inch)				9	R 6 H
35 001 ... 40 000 mm (1 377.99 ... 1 574.80 inch)				9	R 6 J
40 001 ... 45 000 mm (1 574.84 ... 1 771.65 inch)				9	R 6 K
45 001 ... 50 000 mm (1 771.69 ... 1 968.50 inch)				9	R 6 L
50 001 ... 55 000 mm (1 968.54 ... 2 165.35 inch)				9	R 6 M

Selection and ordering data (continued)

	Article No.	Order Code
SITRANS LG260 Guided radar level transmitter Continuous, contact, 60 m (197 ft) range. Monitors level in solids.	7ML5882- ● ● ● ● ● - ● ● ● ●	● ● ●
55 001 ... 65 000 mm (2 165.39 ... 2 559.06 inch)		9 R 6 N

Selection and Ordering data	Order code
Further designs (mandatory)	
Please add "-Z" to Article No. and specify Order code(s).	
Supplementary electronics	
Without	A00
Additional current output 4 ... 20 mA ¹⁰⁾	A01
Rod mounted	
Without Rod, applicable for coax or cable probe types only	C00
Mounted	C01
Not mounted	C02
Indicating/adjustment module	
Without	E00
Mounted	E01
Laterally mounted	E02
Language of display	
German	L00
English	L01
French	L02
Dutch	L03
Italian	L04
Spanish	L05
Portuguese	L06
Russian	L07
Chinese	L08
Japanese	L09
No language pre-set	L10
Operating instructions	
German	M00
English	M01
French	M02
Spanish	M03

Selection and Ordering data	Order code
Further designs (optional)	
Please add "-Z" to Article No. and specify Order code(s).	
Enter the total insertion length in plain text description	Y01
Remote electronic cable lengths: 2 m (6.6 ft). Only available with Housing options Q2A and Q2B.	Y10
Remote electronic cable lengths: 5 m (16.4 ft). Only available with Housing options Q2A and Q2B.	Y11
Remote electronic cable lengths: 10 m (32.8 ft). Only available with Housing options Q2A and Q2B.	Y12
Identification Label (measurement loop) stainless steel, 40 characters max, add in plain text. To add more than one line use a coma "," for line break.	Y17
Identification Label (measurement loop) foil, 40 characters max, add in plain text. To add more than one line use a coma "," for line break.	Y18
Material Inspection certificate 3.1 of EN 10204	C05

Level Measurement

Continuous level measurement

Guided wave radar transmitters / SITRANS LG series

Selection and ordering data (continued)

Selection and Ordering data	Order code
3.1-Inspection Certificate for instrument (EN 10204) ¹⁷⁾	C12
Inspection certificate 3.1 (EN 10204, NACE MR 0175) - material. ¹⁷⁾¹⁸⁾ Note: 316L probes include NACE MR 0175 and MR 0103, non 316L probes include MR 0175 only and plated flange designs are not available with NACE certificate.	D07
3.1-Inspection Certificate for instrument with test data (EN 10204) ¹⁷⁾	C25
2.2-Factory certificate for material (EN 10204) ¹⁷⁾	C15
Quality and test plan ¹⁷⁾	C26
Dye penetration test, results confirmed via a 3.1 certificate/instrument (EN10204) ¹⁷⁾	C13
X-ray test + 3.1 certificate/instrument ¹⁷⁾	C14
Positive material identification test + 3.1 certificate/instrument ¹⁷⁾	C16
Roughness test + 3.1 certificate/instrument ¹⁷⁾	C18
Pressure test + 3.1 certificate/instrument ¹⁷⁾	C31
Helium leak test + 3.1 certificate/instrument ¹⁷⁾	C32
Pressure test according to NORSOK + 3.1 certificate/instrument ¹⁷⁾	C61
5 point calibration certificate (min. length 500 mm) ¹⁷⁾	C62

Accessories	Article No.
Operating Instructions	
All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation	
Accessories	
SITRANS LG series/SITRANS RD150 sensor display module	A5E34143449
SITRANS LG, two-wire 4 ... 20 mA/HART electronic	A5E35637821
SITRANS LG, USB communicator	A5E35192015
SITRANS LG, Mounting eye M12 x 20	PBD:51041448
SITRANS LG, Mounting spring	PBD:51041449
Siemens Intrinsically Safe Barrier (DC powered), ATEX II 1 G EEx ia	7NG4124-0AA00
SITRANS RD100, loop powered display -see Chapter 7	7ML5741-.....
SITRANS RD150, remote digital display for 4 ... 20 mA and HART devices - see Chapter 7	7ML5742-.....
SITRANS RD200, universal input display with Modbus conversion - see Chapter 7	7ML5740-.....
SITRANS RD300, dual line display with totalizer and linearization curve and Modbus conversion - see Chapter 7	7ML5744-.....
For applicable back up point level switch - see point level measurement section	

Note: some configuration options are not available. For restriction information see the online PIA configuration tool.

- 1) Not available with Plastic and Stainless steel (electropolished) Housing/Protection/Cable options and certain glands.
- 2) Available only with Double chamber, Metallic Housing/Protection/Cable options and certain glands.
- 3) Not available with Remote and Stainless steel (electropolished) Housing/Protection/Cable options and certain glands.
- 4) Not available with Stainless steel (electropolished) Housing/Protection/Cable options and certain glands.
- 5) Not available with Seal/Process temperature option C.
- 6) Not available with Housing/Protection/Cable options W, X, Y, and U.
- 7) Not available with Probe version/Material option E.
- 8) Available only with certain Electronics options.
- 9) Available only with Supplementary electronic option A00.
- 10) Not available with Indicating/adjustment module option E02.
- 11) Not available with Seal/Process temperature options B and E.
- 12) Available only with Seal/Process temperature option C.
- 13) Not available with Seal/Process temperature options A and D.
- 14) Available only with Rod mounted option C00.
- 15) Available only with Seal/Process temperature options A and D.
- 16) Not available with Housing/Protection/Cable options Q2A and Q2B.
- 17) Listed Certificates are not available with all configurations, please contact factory for more information.
- 18) Available only with 316L Probes. NACE is not available with coated, plated, or hygienic connections.

Selection and ordering data (continued)

¹⁹⁾ Available only with Single chamber, Aluminum and Stainless steel (precision casting) Housing/Protection/Cable options.

Note: Please consult manual for further details.

	Article No.	Order Code
SITRANS LG270 Guided radar level transmitter Continuous, contact, 60 m (197 ft) range. Monitors level and interface in liquids in extreme environments.	7ML5883- ● ● ● ● ● - ● ● ● ● ●	● ● ●
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Approvals		
General purpose (CSA, FM, CE) ³²⁾	0	A
Shipping approval ¹⁾²⁾³⁾⁴⁾⁵⁾	0	B
Overfill protection (WHG; VLAREM) ²⁾³⁾	0	C
ATEX II 1G, 1/2G, 2G Ex ia IIC T6 ²⁾³⁾²⁾	0	E
ATEX II 1G, 1/2G, 2G Ex ia IIC + Overfill (WHG; VLAREM) ²⁾³⁾	0	F
ATEX II 1G, 1/2G, 2G Ex ia IIC T6 + shipping approval ¹⁾²⁾³⁾⁴⁾⁵⁾	0	G
ATEX II 1G, 1/2G 2G Ex ia IIC + ATEX II 1D, 1/2D, 2D IP6x ²⁾⁷⁾	0	H
ATEX II 1/2G, 2G Ex d ia IIC T6 ²⁾⁵⁾⁶⁾⁸⁾³²⁾	0	J
ATEX II 1/2G, 2G Ex d ia IIC + shipping approval ¹⁾²⁾³⁾⁵⁾⁶⁾⁸⁾	0	L
ATEX II 1/2G, 2G Ex d ia IIC + ATEX II 1/2D, 2D IP6x ²⁾⁵⁾⁶⁾⁸⁾	0	M
ATEX II 1/2G, 2G Ex d IIC T6 ⁶⁾⁷⁾³⁾²⁾	0	N
ATEX II 1G, II 1/2G, II 2G Ex ia IIC T6 ... T1 Ga, Ga/Gb, Gb /IEC Ex ia IIC T6 ... T1 Ga, Ga/Gb, Gb ²⁾³⁾	0	W
ATEX II 1/2G, 2G Ex d IIC + ship approval ¹⁾²⁾³⁾⁵⁾⁶⁾⁷⁾	0	Q
ATEX II 1/2G, 2G Ex d IIC + ATEX II 1/2D, 2D IP6x ²⁾⁶⁾⁷⁾	0	R
ATEX II 1D, 1/2D, 2D IP6x T ²⁾⁷⁾	0	S
ATEX II 1/2G, II 2G Ex db IIC T6 ... T1 Ga/Gb, Gb + Overfill protection (WHG, VLAREM) ⁶⁾⁷⁾³⁾²⁾	7	P
IEC Ex ia IIC T6 ²⁾	0	T
IEC Ex ia IIC T6 + IEC IP6x T tD ²⁾⁷⁾³⁾²⁾	0	U
IEC Ex d ia IIC T6 ²⁾⁵⁾⁶⁾⁸⁾³⁾²⁾	1	A
IEC Ex d ia IIC T6 + IEC IP6x T tD ²⁾⁵⁾⁶⁾⁸⁾	1	B
IEC Ex d IIC T6 ³⁾⁶⁾⁷⁾	1	C
IEC Ex d IIC T6 + IEC IP6x T tD ²⁾³⁾⁶⁾⁷⁾	1	D
IEC Ex db IIC T6 ... T1 Ga/Gb, Gb + Ship approval ²⁾³⁾⁵⁾⁶⁾⁷⁾⁹⁾	7	C
IEC Ex ia IIC T6 ... T1 Ga, Ga/Gb, Gb + Ship approval ²⁾⁹⁾¹⁾²⁾	7	D
IEC Ex d ia IIC T6 ... T1 Ga/Gb, Gb + Ship approval ²⁾⁵⁾⁶⁾⁸⁾⁹⁾	7	E
FM (NI) Class I, Div. 2, Groups A, B, C, D ²⁾⁵⁾¹⁰⁾³⁾²⁾	1	F
FM (NI) Class I, Div. 2, Groups A, B, C, D + ship approval ¹⁾²⁾³⁾⁵⁾⁸⁾	1	G
FM (IS) Class I, II, III, Div. 1, Groups A, B, C, D, E, F ²⁾⁵⁾³⁾²⁾	1	H
FM (IS) Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G + ship approval ¹⁾²⁾³⁾⁴⁾⁵⁾	1	J
FM (XP-AIS) Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G ²⁾⁵⁾⁶⁾⁸⁾³⁾²⁾	1	K
FM (XP-AIS) Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G + shipping approval ¹⁾²⁾³⁾⁵⁾⁶⁾⁸⁾	1	L
FM (XP) Class I, Div. 1, Groups A, B, C, D ⁶⁾¹⁾³⁾²⁾	1	M
CSA (NI) Class I, Div. 2, Groups A, B, C, D; (DIP) Class II, III, Div. 1, Groups E, F, G ³⁾⁶⁾⁷⁾	1	N
CSA (IS) Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G ²⁾³⁾	1	P
CSA (XP-IS) Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G ²⁾³⁾⁵⁾⁶⁾⁸⁾	1	Q
CSA (XP) Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G ³⁾⁵⁾⁶⁾¹⁾¹⁾¹⁹⁾	1	R
CSA (NI) Class I, II, III Div. 2, Groups A, B, C, D, F, G + Ship approval ²⁾³⁾⁶⁾⁷⁾⁹⁾	7	K
CSA (IS) Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G + Ship approval ²⁾⁶⁾⁹⁾¹⁾²⁾	7	L
CSA (XP-IS) Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G + Ship approval ²⁾³⁾⁵⁾⁶⁾⁸⁾⁹⁾	7	M
NEPSI Ex ia IIC T6 ²⁾³⁾	2	A
NEPSI Ex ia IIC T6 + DIP A20/21 TA T* ²⁾⁵⁾⁷⁾	2	B
NEPSI Ex d ia IIC T6 ²⁾³⁾⁵⁾⁶⁾⁸⁾	2	C
NEPSI Ex d ia IIC T6 + DIP A20/21 TA T* ²⁾³⁾⁵⁾⁶⁾⁸⁾	2	D
NEPSI Ex d IIC T6 ²⁾³⁾⁶⁾¹⁾¹⁾	2	E
NEPSI Ex d IIC T6 + DIP A20/21 TA T* ²⁾³⁾⁶⁾¹⁾¹⁾	2	F
NEPSI DIP A20/21 TA T* ²⁾³⁾⁷⁾	2	G
INMETRO Ex ia IIC T6 ... T1 ²⁾³⁾²⁾	3	A
INMETRO Ex t IIIC T* IP6X, Da, Da/Db, Da/Dc, Db + Ex ia IIC T6, Ga, Ga/Gb ²⁾⁶⁾⁷⁾	3	B
INMETRO Ex d ia IIC T6 ... T1 ²⁾⁵⁾⁶⁾⁸⁾³⁾²⁾	3	C
INMETRO Ex t IIIC T* IP6X, Da, Da/Db, Da/Dc, Db + Ex d ia IIC T6 Ga/Gb ²⁾⁵⁾⁶⁾⁸⁾	3	D

Level Measurement

Continuous level measurement

Guided wave radar transmitters / SITRANS LG series

Selection and ordering data (continued)

	Article No.	Order Code									
SITRANS LG270 Guided radar level transmitter Continuous, contact, 60 m (197 ft) range. Monitors level and interface in liquids in extreme environments.	7ML5883-	●	●	●	●	●	-	●	●	●	●
INMETRO Ex d IIC T6 ... T1 ²⁾⁶⁾¹¹⁾³²⁾	3	E									
INMETRO Ex t IIIC T* IP6X, Da, Da/Db, Da/Dc, Db + Ex d IIC T6 Ga/Gb ²⁾⁶⁾¹¹⁾	3	F									
INMETRO Ex t IIIC T* IP6X, Da, Da/Db, Da/Dc, Db ²⁾⁶⁾⁷⁾	3	G									
KOSHA Ex d IIC T6 ... T1 – KE ²⁾³⁾⁶⁾¹¹⁾	4	A									
Korea KC ex free area ²⁾³²⁾	6	A									
GOST-R/EAC 0 Ex ia IIC T1 ... T6 X ²⁾¹³⁾	5	A									
GOST-R/EAC 0 Ex ia IIC T1 ... T6 X + Ex t IIIC T ... IP66 ²⁾⁷⁾	5	B									
GOST-R/EAC 1 Ex d ia IIC T1 ... T6 X ²⁾⁵⁾⁶⁾⁸⁾	5	C									
GOST-R/EAC 1 Ex d ia IIC T1 ... T6 X + Ex t IIIC T ... IP66 ²⁾⁵⁾⁶⁾⁸⁾	5	D									
GOST-R/EAC 1 Ex d IIC T1 ... T6 X ²⁾⁶⁾¹¹⁾	5	E									
GOST-R/EAC 0 Ex d IIC T1 ... T6 X + Ex t IIIC T ... IP66 ²⁾⁶⁾¹¹⁾	5	F									
GOST-R/EAC Ex t IIIC T ... IP66 ²⁾¹⁴⁾	5	G									
Note: Version/Material, Process fitting/Material, and Length options are available only with options of corresponding type.											
Version/Material											
Probe exchangeable cable ø 2 mm (0.08 inch) with gravity weight/316 ¹⁵⁾¹⁶⁾¹⁷⁾										A	
Probe exchangeable cable ø 2 mm (0.08 inch) center weight/316L ¹⁵⁾¹⁷⁾¹⁸⁾										B	
Probe exchangeable cable ø 4 mm (0.16 inch) with gravity weight/316L ¹⁵⁾¹⁶⁾¹⁷⁾										C	
Probe exchangeable cable ø 4 mm (0.16 inch) with center weight/316L ¹⁵⁾¹⁷⁾¹⁸⁾										D	
Probe exchangeable rod ø 16 mm (0.63 inch)/316L ¹⁶⁾¹⁹⁾²⁰⁾										E	
Probe coax version ø 42.2 mm (1.66 inch) with multiple hole/316L ¹⁶⁾¹⁷⁾²⁰⁾										F	
Probe coax version ø 42.2 mm (1.66 inch); multiple hole; reference distances/316L ¹⁶⁾¹⁷⁾²⁰⁾²¹⁾²⁶⁾										G	
Probe exchangeable cable ø 4 mm (0.16 inch) with gravity weight/Alloy C22 (2.4602) ²²⁾³⁰⁾										H	
Probe exchangeable rod ø 16 mm (0.63 inch)/Alloy C22 (2.4602) ²²⁾³⁰⁾										J	
Coax version ø 42.2 mm (1.66 inch) with multiple hole/Alloy C22 (2.4602) ²²⁾³⁰⁾										K	
Exchangeable rod, diameter 8 mm (0.32 inch)/316L ¹⁹⁾²³⁾										L	
Coax ø 21.3 mm (0.838 inch) with multiple hole/316L ²³⁾										M	
Process fitting/Material											
Thread G 1 1/2" (DIN 3852-A) PN 400/316L ²⁰⁾								0	0		
Thread 1 1/2" NPT (ASME B1.20.1) PN 400/316L ²⁰⁾								0	1		
Thread G1 1/2" PN 400, DIN 3852-A/Alloy C22 (2.4602)								0	2		
Thread 1 1/2" NPT PN 400, ASME B1.20.1/ Alloy C22 (2.4602)								0	3		
Flange DN 50 PN 40 Form C, DIN 2501/ 316L with Alloy C22 (2.4602) coating								0	4		
Flange DN 80 PN 40 Form C, DIN 2501/ 316L with Alloy C22 (2.4602) coating								0	5		
Flange DN 100 PN 16 Form C, DIN 2501/ 316L with Alloy C22 (2.4602) coating								0	6		
Flange DN 50 PN 40 Form B1, EN 1092-1/ 316L with Alloy C22 (2.4602) coating								0	7		
Flange DN 50 PN 63 Form B1, EN 1092-1/ 316L with Alloy C22								0	8		
Flange DN 50 PN 40 Form C, DIN 2501/316L								1	0		
Flange DN 50 PN 40 form V13, DIN 2513/316L								1	1		
Flange DN 65 PN 64 Form V13, DIN 2501/316L								1	2		
Flange DN 80 PN 40 Form C, DIN 2501/316L								1	3		
Flange DN 80 PN 40 Form V13, DIN 2501/316L								1	4		
Flange DN 80 PN 100 Form L, DIN 2501/316L ²⁰⁾								1	5		
Flange DN 100 PN 16 Form C, DIN 2501/316L								1	6		
Flange DN 100 PN 16 Form V13, DIN 2501/316L								1	7		
Flange DN 100 PN 40 Form C, DIN 2501/316L								1	8		
Flange DN 100 PN 40 Form V13, DIN 2513/316L								2	0		
Flange DN 150 PN 16 Form C, DIN 2501/316L								2	1		
Flange DN 50 PN 40 EN 1092-1 Form B1/316L								2	2		
Flange DN 100 PN 160 GOST 12815-80.7/316L ²⁰⁾								2	3		
Flange 2" 150 lb RF, ASME B16.5/316L with Alloy C22 (2.4602) coating								2	4		
Flange 2" 300 lb RF, ASME B16.5/316L with Alloy C22 (2.4602) coating								2	5		
Flange 2" 600 lb RF, ASME B16.5/316L with Alloy C22 (2.4602) coating								2	6		
Flange 3" 150 lb RF, ASME B16.5/316L with Alloy C22 (2.4602) coating								2	7		
Flange 3" 300 lb RF, ASME B16.5/316L with Alloy C22 (2.4602) coating								2	8		
Flange DN 80 PN 160 Form C, DIN 2501/316L ²⁰⁾								6	0		
Flange DN 80 PN 250 Form L, DIN 2501/316L ²⁰⁾								6	1		

Selection and ordering data (continued)

	Article No.	Order Code
SITRANS LG270 Guided radar level transmitter Continuous, contact, 60 m (197 ft) range. Monitors level and interface in liquids in extreme environments.	7ML5883- ● ● ● ● ● - ● ● ● ● ●	● ● ●
Flange DN 50 PN 160, EN 1092-1 Form B1/316L ²⁰⁾	6 2	
Flange DN 50 PN 160, EN 1092-1 Form B2/316L ²⁰⁾	6 3	
Flange DN 50 PN 32, EN 1092-1 Form B1/316L ²⁰⁾	6 4	
Flange DN 65 PN 250, EN 1092-1 Form B1/316L ²⁰⁾	6 5	
Flange DN 100 PN 160, EN 1092-1 Form B2/316L ²⁰⁾	6 6	
Flange DN 80 PN 63, EN 1092-1 Form B2/316L	6 7	
Flange 4" 600 lb RF, ASME B16.5/316L with Alloy C22 (2.4602) coating	6 8	
Flange 2" 150 lb RF, ASME B16.5/316L	3 0	
Flange 2" 300 lb RF, ASME B16.5/316L	3 1	
Flange 2" 600 lb RF, ASME B16.5/316L	3 2	
Flange 2" 1 500 lb RF, ASME B16.5/316L	3 3	
Flange 3" 150 lb RF, ASME B16.5/316L	3 4	
Flange 3" 300 lb RF, ASME B16.5/316L	3 5	
Flange 3" 600 lb RF, ASME B16.5/316L	3 6	
Flange 3" 900 lb RF, ASME B16.5/316L	3 7	
Flange 3" 2 500 lb RF, ASME B16.5/316L	3 8	
Flange 3 1/2" 600 lb RF, ASME B16.5/316L	4 0	
Flange 4" 150 lb RF, ASME B16.5/316L	4 1	
Flange 4" 300 lb RF, ASME B16.5/316L	4 2	
Flange 4" 600 lb RF, ASME B16.5/316L	4 3	
Flange 6" 150 lb RF, ASME B16.5/316L	4 4	
Flange 6" 300 lb RF, ASME B16.5/316L	4 5	
Flange 6" 600 lb RF, ASME B16.5/316L	4 6	
Flange 2" 150 lb Fisher special return/316L	4 7	
Flange 3" 900 lb RJF, ASME B16.5/ Alloy C22 (2.4602)	4 8	
Flange 2" 900 lb RF, ASME B16.5/316L	5 0	
Flange 3" 1 500 lb RF, ASME B16.5/316L	5 1	
Flange 4" 900 lb RF, ASME B16.5/316L	5 2	
Flange 4" 1 500 lb RF, ASME B16.5/316L	5 3	
Flange 4" 2 500 lb RJF, ASME B16.5/316L ²⁰⁾	5 4	
Flange 4" 1500 lb RJF, ASME B16.5/316L ²⁰⁾	5 5	
Flange 3" 600 lb RF, ASME B16.5/316L with Alloy C22 (2.4602) coating	5 6	
Flange 4" 150 lb RF, ASME B16.5/316L with Alloy C22 (2.4602) coating	5 7	
Flange 4" 300 lb RF, ASME B16.5/316L with Alloy C22 (2.4602) coating	5 8	
Flange 6" 150 lb RF, ASME B16.5/316L with Alloy C22 (2.4602) coating	7 0	
Flange DN 50 PN 40 Form C, DIN 2501/Alloy C22 (2.4602) solid	7 1	
Flange DN 100 PN 16 Form C, DIN 2501/C22 solid	7 2	
Flange DN 100 PN 40 Form N, DIN 2501/Alloy C22 (2.4602) solid	7 3	
Flange DN 50 PN 40 Form B1, EN 1092-1/Alloy C22 (2.4602) solid	7 4	
Flange 2" 150 lb RF, ASME B16.5/Alloy C22 (2.4602) solid	7 5	
Flange 2" 300 lb RF, ASME B16.5/Alloy C22 (2.4602) solid	7 6	
Flange 2" 600 lb RF, ASME B16.5/ Alloy C22 (2.4602) solid	7 7	
Flange 2" 900 lb RJF, ASME B16.5/ Alloy C22 (2.4602) solid	7 8	
Flange 2" 1 500 lb RJF, ASME B16.5/ Alloy C22 (2.4602) solid	8 0	
Flange 3" 150 lb RF, ASME B16.5/ Alloy C22 (2.4602) solid	8 1	
Flange 3" 300 lb RF, ASME B16.5/ Alloy C22 (2.4602) solid	8 2	
Flange 3" 600 lb RF, ASME B16.5/ Alloy C22 (2.4602) solid	8 3	
Flange 4" 150 lb RF, ASME B16.5/ Alloy C22 (2.4602) solid	8 4	
Flange 4" 300 lb RF, ASME B16.5/ Alloy C22 (2.4602) solid	8 5	
Flange 3" 600 lb RJF for R31, ASME B16.5/ Alloy C22 (2.4602) solid	8 6	
Flange 2" 2 500 lb RJF, ASME B16.5/ Alloy C22 (2.4602) solid	9 0	L 1 A

Level Measurement

Continuous level measurement

Guided wave radar transmitters / SITRANS LG series

Selection and ordering data (continued)

	Article No.										Order Code														
	7ML5883- ● ● ● ● ● - ● ● ● ● ●										● ● ●														
SITRANS LG270 Guided radar level transmitter																									
Continuous, contact, 60 m (197 ft) range. Monitors level and interface in liquids in extreme environments.																									
Flange 3" 1 500 lb RJF, ASME B16.5/ Alloy C22 (2.4602) solid											9	0									L	1	B		
Flange 3" 2 500 lb RJF, ASME B16.5/ Alloy C22 (2.4602) solid												9	0									L	1	C	
Flange 4" 600 lb RF, ASME B16.5/ Alloy C22 (2.4602) solid												9	0									L	1	D	
Flange 4" 600 lb RJF, ASME B16.5/ Alloy C22 (2.4602) solid												9	0									L	1	E	
Flange 4" 900 lb RF, ASME B16.5/ Alloy C22 (2.4602) solid												9	0									L	1	F	
Flange 4" 900 lb RJF, ASME B16.5/ Alloy C22 (2.4602) massiv												9	0									L	1	G	
Flange 4" 1 500 lb RJF, ASME B16.5/ Alloy C22 (2.4602) solid												9	0									L	1	H	
Flange 4" 2 500 lb RJF, ASME B16.5/ Alloy C22 (2.4602) solid												9	0									L	1	J	
Flange 8" 300 lb RF, ASME B16.5/ Alloy C22 (2.4602) solid												9	0									L	1	K	
Flange 3½" 600 lb Fisher type 249B and 259B/Alloy C22 (2.4602) solid												9	0									L	1	L	
Flange 2½" 300 lb RF, ASME B16.5/316/316L												9	0									L	2	A	
Flange 2½" 600 lb RF, ASME B16.5/316/316L												9	0									L	2	B	
Flange DN 50 PN 40 Form D, EN 1092-1/316/316L ²⁴⁾												9	0									L	2	C	
Flange 2½" 1 500 lb RF, ASME B16.5/316/316L												9	0									L	2	D	
Flange 2" 600 lb RF, ASME B16.5/316L (NORSOK) ³⁴⁾³⁵⁾												9	0									L	2	E	
Flange 3" 1500lb RJF, ASME B16.5 / 316/316L ³²⁾												9	0									L	2	F	
Thread G 1" (DIN 3852-A) PN 100/316L												9	0									L	3	C	
Thread 1" NPT, ASME B1.20.1/PN 100/316L												9	0									L	3	D	
Thread G 1½" (DIN 3852-A) PN 100/316L												9	0									L	3	E	
Thread 1½" NPT, ASME B1.20.1/PN 100/316L												9	0									L	3	F	
Thread 2" NPT, ASME B1.20.1/PN 100/316L												9	0									L	3	G	
Thread G ¾ PN100, DIN 3852-A/316L ³¹⁾												9	0									L	3	H	
Thread ¾ NPT PN100, ASME B1.20.1/31 ³¹⁾												9	0									L	3	J	
Electronics																									
Two-wire 4 ... 20 mA/HART																									0
Four-wire Modbus ⁵⁾⁶⁾⁸⁾																									1
Two-wire 4 ... 20 mA/HART with SIL qualification ⁵⁾																									2
Four-wire 4 ... 20 mA/HART; 90 ... 253 V AC; 50/60 Hz ⁵⁾⁶⁾⁸⁾																									3
Four-wire 4 ... 20 mA/HART; 9.6 ... 48 V DC; 20 ... 42 V AC ⁵⁾⁶⁾⁸⁾																									4
PROFIBUS PA ⁵⁾																									5
FOUNDATION Fieldbus ⁵⁾																									6
Seal/Second line of defense/Process temperature																									
Ceramic-graphite/with glass seal/ -196 ... +280 °C (-321 ... +536 °F)																									A
Ceramic-graphite/with glass seal/ -196 ... +450 °C (-321 ... +842 °F)																									B
Ceramic-graphite/with glass seal/ -196 ... +400 °C (-321 ... +752 °F) ²¹⁾																									C
PEEK-FFKM (Kalrez 6375) /with glass seal/ -20...+250 °C (-4 ... +482 °F) ²¹⁾																									D
Housing/Protection/Cable																									
Note: for installation of remote display, 7ML5840, with LG two chamber housing options, contact PVC																									
Plastic IP66/IP67 M20 x 1.5/blind stopper																									A
Plastic IP66/IP67 1/2" NPT/blind stopper																									B
Aluminum/IP66/IP68 (0.2 bar) M20 x 1.5/blind stopper																									C
Aluminum/IP66/IP68 (0.2 bar) 1/2" NPT/blind stopper																									D
Aluminum double chamber/IP66/IP68 (0.2 bar) M20 x 1.5/blind stopper																									E
Aluminum double chamber/IP66/IP68 (0.2 bar) 1/2" NPT/blind stopper																									F
Stainless steel (precision casting) 316L/IP66/IP68 (0.2 bar) M20 x 1.5/blind stopper																									L
Stainless steel (precision casting) 316L/IP66/IP68 (0.2 bar) 1/2" NPT/blind stopper																									M
Stainless steel (electropolished) 316L/IP66/IP68 (0.2 bar) M20 x 1.5/blind stopper																									N
Stainless steel (electropolished) 316L/IP66/IP68 (0.2 bar) 1/2" NPT/blind stopper																									P

Selection and ordering data (continued)

	Article No.					Order Code											
SITRANS LG270 Guided radar level transmitter Continuous, contact, 60 m (197 ft) range. Monitors level and interface in liquids in extreme environments.	7	M	L	S	8	-	•	•	•	•	•	•	•				
Stainless steel double chamber/IP66/IP68 (0.2 bar) M20 x 1.5/blind stopper													Q				
Stainless steel double chamber/IP66/IP68 (0.2 bar) 1/2" NPT/blind stopper													R				
Aluminum/IP66/IP68 (0.2 bar) M20 x 1.5/cable gland stainless steel													S				
Aluminum double chamber/IP66/IP68 (0.2 bar) M20 x 1.5/cable gland stainless steel													T				
Stainless steel (precision casting) 316L/IP66/IP68 (0.2 bar) M20 x 1.5/cable gland stainless steel													U				
Stainless steel (electropolished) 316L/IP66/IP68 (0.2 bar) M20 x 1.5/cable gland stainless steel													V				
Aluminum single chamber/IP66/IP68 (0.2 bar) M20 x 1.5/cable gland brass nickel-plated													W				
Aluminum double chamber/IP66/IP68 (0.2 bar) M20 x 1.5/cable gland brass nickel-plated													X				
Stainless steel single chamber (precision casting)/IP66/IP68 (0.2 bar) M20 x 1.5/cable gland brass nickel-plated													Y				
Stainless steel double chamber/IP66/IP68 (0.2 bar) M20 x 1.5/cable gland brass nickel-plated													J				
Remote stainless steel single chamber housing, electropolished/IP66/IP67 with cable outlet IP68 (electronics separated by cable); M20 x 1.5/blind plug ⁶⁾													Z	Q	2	A	
Remote plastic single chamber housing /IP66/IP67 with cable outlet IP68 (electronics separated by cable); M20 x 1.5/blind plug ⁶⁾													Z	Q	2	B	
Lengths																	
<u>Rod ø 16 mm/316L</u>																	
300 mm (11.81 inch) ²⁵⁾														0			
500 mm (19.69 inch) ²⁵⁾														1			
501 ... 1 000 mm (19.72 ... 39.37 inch) ²⁵⁾														2			
1 001 ... 2 000 mm (39.41 ... 78.74 inch) ²⁵⁾														3			
2 001 ... 3 000 mm (78.78 ... 118.11 inch) ²⁵⁾														4			
3 001 ... 4 000 mm (118.15 ... 157.48 inch) ²⁵⁾														5			
4 001 ... 5 000 mm (157.52 ... 196.85 inch) ²⁵⁾														6			
5 001 ... 6 000 mm (196.89 ... 236.22 inch) ²⁵⁾														7			
<u>Rod ø 16 mm/C22</u>																	
501 ... 1 000 mm (19.72 ... 39.37 inch) ²⁵⁾														9	R	1	A
1 001 ... 2 000 mm (39.41 ... 78.74 inch) ²⁵⁾														9	R	1	B
2 001 ... 3 000 mm (78.78 ... 118.11 inch) ²⁵⁾														9	R	1	C
3 001 ... 4 000 mm (118.15 ... 157.48 inch) ²⁵⁾														9	R	1	D
4 001 ... 5 000 mm (157.52 ... 196.85 inch) ²⁵⁾														9	R	1	E
5 001 ... 6 000 mm (196.89 ... 236.22 inch) ²⁵⁾														9	R	1	F
<u>Rod ø 8 mm/316L</u>																	
300 ... 1 000 mm (11.81 ... 39.37 inch)														9	R	1	H
1 001 ... 2 000 mm (39.41 ... 78.74 inch)														9	R	1	J
2 001 ... 3 000 mm (78.78 ... 118.11 inch)														9	R	1	K
3 001 ... 4 000 mm (118.15 ... 157.48 inch)														9	R	1	L
4 001 ... 5 000 mm (157.52 ... 196.85 inch)														9	R	1	M
5 001 ... 6 000 mm (196.89 ... 236.22 inch)														9	R	1	N
<u>Cable lengths ø 2 or 4 mm/316L</u>																	
501 ... 1 000 mm (19.72 ... 39.37 inch)														9	R	2	E
1 000 ... 5 000 mm (39.37 ... 196.85 inch)														9	R	2	F
5 001 ... 10 000 mm (196.89 ... 393.70 inch)														9	R	2	G
10 001 ... 15 000 mm (393.74 ... 590.55 inch)														9	R	2	H
15 001 ... 20 000 mm (590.59 ... 787.40 inch)														9	R	2	J
20 001 ... 25 000 mm (787.44 ... 984.25 inch)														9	R	2	K
25 001 ... 30 000 mm (984.29 ... 1 181.10 inch)														9	R	2	L
30 001 ... 35 000 mm (1 181.14 ... 1 377.95 inch)														9	R	2	M
35 001 ... 40 000 mm (1 377.99 ... 1 574.80 inch)														9	R	2	N
40 001 ... 45 000 mm (1 574.84 ... 1 771.65 inch)														9	R	2	P
45 001 ... 50 000 mm (1 771.69 ... 1 968.50 inch)														9	R	2	Q

Level Measurement

Continuous level measurement

Guided wave radar transmitters / SITRANS LG series

Selection and ordering data (continued)

	Article No.	Order Code			
SITRANS LG270 Guided radar level transmitter Continuous, contact, 60 m (197 ft) range. Monitors level and interface in liquids in extreme environments.	7ML5883- ● ● ● ● ● - ● ● ● ●	●	●	●	●
50 001 ... 55 000 mm (1 968.54 ... 2 165.35 inch)		9	R	2	R
55 001 ... 60 000 mm (2 165.39 ... 2 362.20 inch)		9	R	2	S
<u>Cable lengths ø 4 mm/C22</u>					
501 ... 1 000 m (19.72 ... 39.37 inch)		9	R	4	A
1 000 ... 5 000 mm (39.37 ... 196.85 inch)		9	R	4	B
5 001 ... 10 000 mm (196.89 ... 393.70 inch)		9	R	4	C
10 001 ... 15 000 mm (393.74 ... 590.55 inch)		9	R	4	D
15 001 ... 20 000 mm (590.59 ... 787.40 inch)		9	R	4	E
20 001 ... 25 000 mm (787.44 ... 984.25 inch)		9	R	4	F
25 001 ... 30 000 mm (984.29 ... 1 181.10 inch)		9	R	4	G
30 001 ... 35 000 mm (1 181.14 ... 1 377.95 inch)		9	R	4	H
35 001 ... 40 000 mm (1 377.99 ... 1 574.80 inch)		9	R	4	J
40 001 ... 45 000 mm (1 574.84 ... 1 771.65 inch)		9	R	4	K
45 001 ... 50 000 mm (1 771.69 ... 1 968.50 inch)		9	R	4	L
50 001 ... 55 000 mm (1 968.54 ... 2 165.35 inch)		9	R	4	M
55 001 ... 60 000 mm (2 165.39 ... 2 362.20 inch)		9	R	4	N
<u>Coax ø 42.2 mm/316L</u>					
300 ... 1 000 mm (11.81 ... 39.37 inch) ²⁵⁾		9	R	3	G
1 001 ... 2 000 mm (39.41 ... 78.74 inch) ²⁵⁾²⁶⁾		9	R	3	H
2 001 ... 3 000 mm (78.78 ... 118.11 inch) ²⁵⁾		9	R	3	J
3 001 ... 4 000 mm (118.15 ... 157.48 inch) ²⁵⁾		9	R	3	K
4 001 ... 5 000 mm (157.52 ... 196.85 inch) ²⁵⁾		9	R	3	L
5 001 ... 6 000 mm (196.89 ... 236.22 inch) ²⁵⁾		9	R	3	M
<u>Coax ø 42.2 mm/C22</u>					
300 ... 1 000 mm (11.81 ... 39.37 inch) ²⁵⁾		9	R	3	Q
1 001 ... 2 000 mm (39.41 ... 78.74 inch) ²⁵⁾²⁶⁾		9	R	3	R
2 001 ... 3 000 mm (78.78 ... 118.11 inch) ²⁵⁾		9	R	3	S
3 001 ... 4 000 mm (118.15 ... 157.48 inch) ²⁵⁾		9	R	3	T
4 001 ... 5 000 mm (157.52 ... 196.85 inch) ²⁵⁾		9	R	3	U
5 001 ... 6 000 mm (196.89 ... 236.22 inch) ²⁵⁾		9	R	3	V
<u>Coax ø 21.3 mm/316L</u>					
300 ... 1 000 mm (11.81 ... 39.37 inch)		9	R	5	A
1 001 ... 2 000 mm (39.41 ... 78.74 inch)		9	R	5	B
2 001 ... 3 000 mm (78.78 ... 118.11 inch)		9	R	5	C
3 001 ... 4 000 mm (118.15 ... 157.48 inch)		9	R	5	D
4 001 ... 5 000 mm (157.52 ... 196.85 inch)		9	R	5	E
5 001 ... 6 000 mm (196.89 ... 236.22 inch)		9	R	5	F

Selection and ordering data (continued)

Selection and Ordering data	Order code
Further designs (mandatory)	
Please add "-Z" to Article No. and specify Order code(s).	
Supplementary electronics	
Without	A00
Additional current output 4 ... 20 mA ⁶⁾	A01
Dimensions centering weight (diameter/height)	
Without	B00
ø 40/30 mm	B01
ø 45/30 mm (for 2 inch tubes)	B02
ø 75/30 mm (for 3 inch tubes)	B03
ø 95/30 mm (for 4 inch tubes)	B04
ø 40 mm/30 mm	B05
ø 1.57 inch/1.18 inch (for 2 inch Schedule 160)	
ø 45 mm/30 mm (for 2 inch tubes)	B06
ø 1.77 inch/1.18 inch (for 2 inch Schedule 40/80)	
ø 75 mm/30 mm (for 3 inch tubes)	B07
ø 2.95 inch/1.18 inch (for 3 inch Schedule 10/40)	
ø 95 mm/30 mm (for 4 inch tubes)	B08
ø 3.74 inch/1.18 inch (for 4 inch Schedule 80)	
Rod mounted	
Without Rod, applicable for coax or cable probe types only	C00
Mounted	C01
Not mounted	C02
Indicating/adjustment module	
Without	E00
Mounted	E01
Laterally mounted	E02
Language of display	
German	L00
English	L01
French	L02
Dutch	L03
Italian	L04
Spanish	L05
Portuguese	L06
Russian	L07
Chinese	L08
Japanese	L09
No language pre-set	L10
Operating instructions	
German	M00
English	M01
French	M02
Spanish	M03
Further designs (optional)	
Please add "-Z" to Article No. and specify Order code(s).	
Enter the total insertion length in plain text description	Y01
Y02 rigid part is 100 mm, only applicable for cable versions	Y02
Reference probe G length of reference distance = 260 mm/10.24 inches (note blanking 450 mm required with min. probe 1 000 mm)	Y05
Reference probe G length of reference distance = 500 mm/19.69 inches (note blanking 690 mm required with min. probe 1 250 mm)	Y06

Level Measurement

Continuous level measurement

Guided wave radar transmitters / SITRANS LG series

Selection and ordering data (continued)

Selection and Ordering data	Order code
Reference probe G length of reference distance = 750 mm/29.53 inches (note blanking 940 mm required with min. probe 1 500 mm)	Y07
Remote electronic cable lengths: 2 m (6.6 ft). Only available with Housing options Q2A and Q2B	Y10
Remote electronic cable lengths: 5 m (16.4 ft). Only available with Housing options Q2A and Q2B	Y11
Remote electronic cable lengths: 10 m (32.8 ft). Only available with Housing options Q2A and Q2B	Y12
Customer specific adjustment (unit value, 100 % distance from seal, 0 % distance from seal)	Y20
Cleaning included certificate: oil, grease and silicone free	W01
Identification Label (measurement loop) stainless steel, 40 characters max, add in plain text. To add more than one line use a coma "," for line break.	Y17
Identification Label (measurement loop) foil, 40 characters max, add in plain text. To add more than one line use a coma "," for line break.	Y18
Material Inspection certificate 3.1 of EN 10204	C05
3.1-Inspection Certificate for instrument (EN 10204) ²⁷⁾	C12
Inspection certificate 3.1 (EN 10204, NACE MR 0175) - material. ²⁷⁾	D07
Note: 316L probes include NACE MR 0175 and MR 0103, non 316L probes include MR 0175 only and plated flange designs are not available with NACE certificate.	
3.1-Inspection Certificate for instrument with test data (EN 10204) ²⁷⁾	C25
2.2-Factory certificate for material (EN 10204) ²⁷⁾	C15
Quality and test plan ²⁷⁾	C26
Dye penetration test, results confirmed via a 3.1 certificate/instrument (EN10204) ²⁷⁾	C13
X-ray test + 3.1 certificate/instrument ²⁷⁾	C14
Positive material identification test + 3.1 certificate/instrument ²⁷⁾	C16
Roughness test + 3.1 certificate/instrument ²⁷⁾	C18
Pressure test + 3.1 certificate/instrument ²⁷⁾	C31
Helium leak test + 3.1 certificate/instrument ²⁷⁾	C32
Pressure test according to NORSOK + 3.1 certificate/instrument ²⁷⁾³³⁾	C61
5 point calibration certificate (min. length 500 mm) ²⁷⁾	C62
Pressure test (acc. to ASME B31.1), incl. 3.1 Inspection certificate ²⁸⁾	C63
Certificate: Approval for steam boiler according to EN 12952-11, EN 12953-9 ²⁹⁾	C70

Selection and Ordering data	Article No.
Operating Instructions	
All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation	
Accessories	
SITRANS LG series/SITRANS RD150 sensor display module	A5E34143449
SITRANS LG, two-wire 4 ... 20 mA/HART electronic	A5E35637821
SITRANS LG, USB communicator	A5E35192015
SITRANS LG, Mounting eye M12 x 20	PBD:51041448
SITRANS LG, Mounting spring	PBD:51041449

Selection and ordering data (continued)

Selection and Ordering data	Article No.
Siemens Intrinsically Safe Barrier (DC powered), ATEX II 1 G EEx ia	7NG4124-0AA00
SITRANS RD100, loop powered display -see Chapter 7	7ML5741-.....-
SITRANS RD150, remote digital display for 4 ... 20 mA and HART devices - see Chapter 7	7ML5742-.....-...
SITRANS RD200, universal input display with Modbus conversion - see Chapter 7	7ML5740-.....-
SITRANS RD300, dual line display with totalizer and linearization curve and Modbus conversion - see Chapter 7	7ML5744-.....-
For applicable back up point level switch - see point level measurement section	

Note: some configuration options are not available. For restriction information see the online PIA configuration tool.

- 1) Not available with Version/Material options E, F, G, J, and K.
- 2) Available only with certain Electronic options.
- 3) Not available with Seal/Process temperature option D.
- 4) Not available with Stainless Steel (electropolished) Housing/Protection/Cable options and certain glands.
- 5) Available only with Supplementary electronic option A00.
- 6) Not available with Indicating/adjusting module E02.
- 7) Not available with Plastic and Stainless Steel (electropolished) Housing/Protection/Cable options and certain glands.
- 8) Available only with Double chamber, Metallic Housing/Protection/Cable options and certain glands.
- 9) Available only with Version/Material options A, B, C, D, and H.
- 10) Not available with Remote and Stainless Steel (electropolished) Housing/Protection/Cable options and certain glands.
- 11) Available only with Single chamber, Aluminum and Stainless steel (precision casting) Housing/Protection/Cable options.
- 12) Available only with Housing/Protection/Cable options N, P, V, and Q2A.
- 13) Not available with Housing/Protection/Cable options W, X, Y, and J.
- 14) Available only with Housing/Protection/Cable options C, E, L, Q.
- 15) Not available with Seal/Process temperature option C.
- 16) Available only with Dimensions centering weight option B00.
- 17) Available only with Rod mounted option C00.
- 18) Not available with Dimensions centering weight option B00.
- 19) Not available with Rod mounted option C00.
- 20) Not available with Seal/Process temperature options C and D.
- 21) Not available with Remote Housing/Protection/Cable options.
- 22) Not available with Seal/Process temperature options B and D.
- 23) Available only with Seal/Process temperature option D.
- 24) Available only with Seal/Process temperature options A, B, and C.
- 25) Not available with Order code Y02.
- 26) Accuracy is application dependent, please consult factory.
- 27) Listed Certificates are not available with all configurations, please contact factory for more information.
- 28) Available only with ASME Process fitting/Material options.
- 29) Available with Version/Material options G, L, M and Electronic options 2 and 6.
- 30) Available only with Alloy C22 Process fitting/Material options.
- 31) Available only with Version/Material option M.
- 32) Available only with some Version/Material options.
- 33) Available only with Process fitting options.
- 34) Available only with Seal/Second line of defense/Process temperature options A and B.
- 35) Available only with 316L probe Version/material options. Nace not available with coated, plated, or hygienic connections.

Note: Please consult manual for further details.

Selection and Ordering data	Article No.										
SITRANS LG Remote Interface	7ML5840-	●	●	●	●	●	-	●	●	●	0
Provides remote display and configuration for SITRANS LG series guided radar level transmitters.											
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.											
Note: for installation of remote display, 7ML5840, with LG two chamber housing options, contact PVC											
Approval											
For Ex-free area	0	A									
ATEX II 1G, 2G, Ex ia IIC T6 Ga, Gb	0	C									
ATEX II 2G, Ex d IIC T6 Gb ¹⁾	0	E									
IEC Ex ia IIC T6 Ga, Gb	0	F									
IEC Ex d IIC T6 Gb ¹⁾	0	G									
cCSA _{US} (NI) Class I, Div. 2, Groups A, B, C, D; (DIP) Class II, III, Div. 1, Groups E, F, G	0	H									
cCSA _{US} (IS) Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G	0	J									
cCSA _{US} (XP) Class I, Div. 1, Groups A, B, C, D ¹⁾	0	K									

Level Measurement

Continuous level measurement

Guided wave radar transmitters / SITRANS LG series

Selection and ordering data (continued)

Selection and Ordering data SITRANS LG Remote Interface Provides remote display and configuration for SITRANS LG series guided radar level transmitters.	Article No. 7ML5840- ● ● ● ● ● - ● ● ● ● 0									
INMETRO Ex ia IIC T6 Ga, Gb	0	L								
INMETRO Ex d IIC T6 Gb ¹⁾	0	M								
Shipping Approval (DNV/GL) ⁶⁾	0	N								
ATEX II 1G, 2G Ex ia IIC T6 Ga, Gb + Ship approval	0	P								
ATEX II 2G Ex db IIC T6 Gb + Ship approval ¹⁾	0	Q								
IEC Ex ia IIC T6 Ga, Gb + Ship approval	0	R								
IEC Ex db IIC T6 Gb + Ship approval ¹⁾	0	S								
cCSA _{US} (IS) Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G + Ship approval	0	T								
cCSA _{US} (XP) Class I, Div. 1, Groups A, B, C, D + Ship approval ¹⁾	0	U								
Electronics										
Digital (I ² C communication)			A							
Housing										
Plastic ²⁾⁴⁾					0					
Aluminum ³⁾⁵⁾					1					
Stainless Steel (precision casting) ³⁾⁵⁾					2					
Housing protection										
IP66/IP67 NEMA 4X						0				
IP66/IP68 NEMA 6P (0.2 bar)						1				
Cable entry										
M20 x 1.5/ Blind plug								3		
½" NPT/ Blind plug								5		
Display										
Without									A	
Mounted									B	
Mounting										
For wall mounting with Aluminum or stainless steel housing										A
For carrier rail and wall mounting with plastic housing										B
For carrier rail with Aluminum or stainless steel housing										C
For tube mounting (29 ... 60 mm) including mounting material										D
Certificates										
None										0
3.1 Certificate/Instrument with test data										1
Quality and Test plan										2

- 1) Available only with Housing options 1 and 2.
 2) Available only with Housing option 0.
 3) Available only with Housing option 1.
 4) Available only with Mounting options B and D.
 5) Not available with Mounting option B.
 6) Shipping approval is only available with housing options 0 and 1.

SITRANS LG Replacement Probes For use with SITRANS LG series guided radar level transmitters.	Article No. 7ML5841- ● ● ● ● ● - ● ● ● ● 0									
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.										
Instrument										
LG240 ⁴⁾					0					
LG250 ⁶⁾					1					
LG260 ⁷⁾					2					
LG270 ⁹⁾¹⁰⁾					3					
Probe Type³⁾										
Exchangeable cable ø 2 mm with gravity weight/316 ¹⁾¹¹⁾						A	A			
Exchangeable cable ø 2 mm center weight/316 ²⁾¹¹⁾						A	C			
Exchangeable cable ø 4 mm without weight/316 ¹⁾¹¹⁾						A	D			
Exchangeable cable ø 4 mm with gravity weight/316 ¹⁾¹¹⁾						A	E			
Exchangeable cable ø 4 mm with center weight/316 ²⁾¹¹⁾						A	G			
Exchangeable cable ø 6 mm with gravity weight/316 ¹⁾⁸⁾¹¹⁾						A	H			
Exchangeable rod ø 8 mm/316L ¹⁾						A	P			
Exchangeable rod ø 8 mm/1.4435 (acc. to Basle Standard) ¹⁾						A	Q			

Selection and ordering data (continued)

	Article No.									
	7	M	L	5	8	4	1	-	0	0
SITRANS LG Replacement Probes										
For use with SITRANS LG series guided radar level transmitters.										
Exchangeable rod ø 12 mm/316L ¹⁾							A	U		
Exchangeable rod ø 16 mm/316L ¹⁾							A	W		
Exchangeable coated cable ø4 mm with uncoated centering weight / PFA and 316 ¹⁾¹⁾²⁾							B	A		
Process fitting										
Thread less than or equal to 1½ inch									0	
Thread greater than or equal to 2 inch									1	
Flange less than DN 50 or 2 inch									2	
Flange greater or equal to DN 50 or 2 inch or hygienic fitting (not for safety ingold 25 x 46 mm)									3	
Dimension centering weight										
Without									0	
ø 40 mm/30 mm									1	
ø 45 mm/30 mm (for 2 inch tubes)									2	
ø 75 mm/30 mm (for 3 inch tubes)									3	
ø 95 mm/30 mm (for 4 inch tubes)									4	
ø 1.57 inch/1.18 inch (for 2 inch Schedule 160)									5	
ø 1.77 inch/1.18 inch (for 2 inch Schedule 40/80)									6	
ø 2.95 inch/1.18 inch (for 3 inch Schedule 10/40)									7	
ø 3.74 inch/1.18 inch (for 4 inch Schedule 80)									8	
Certificates										
Without									0	
2.2 Material certificate									1	
3.1 Material certificate									2	
Lengths										
<u>Rod ø 8 mm</u>										
300 ... 1 000 mm (11.81 ... 39.37 inch)										A A
1 001 ... 2 000 mm (39.41 ... 78.74 inch)										A B
2 001 ... 3 000 mm (78.78 ... 118.11 inch)										A C
3 001 ... 4 000 mm (118.15 ... 157.48 inch)										A D
4 001 ... 5 000 mm (157.52 ... 196.85 inch)										A E
5 001 ... 6 000 mm (196.89 ... 236.22 inch)										A F
<u>Rod ø 12 mm</u>										
300 ... 1 000 mm (11.81 ... 39.37 inch)										A G
1 001 ... 2 000 mm (39.41 ... 78.74 inch)										A H
2 001 ... 3 000 mm (78.78 ... 118.11 inch)										A J
3 001 ... 4 000 mm (118.15 ... 157.48 inch)										A K
4 001 ... 5 000 mm (157.52 ... 196.85 inch)										A L
5 001 ... 6 000 mm (196.89 ... 236.22 inch)										A M
<u>Rod ø 16 mm</u>										
300 ... 1 000 mm (11.81 ... 39.37 inch)										A N
1 001 ... 2 000 mm (39.41 ... 78.74 inch)										A P
2 001 ... 3 000 mm (78.78 ... 118.11 inch)										A Q
3 001 ... 4 000 mm (118.15 ... 157.48 inch)										A R
4 001 ... 5 000 mm (157.52 ... 196.85 inch)										A S
5 001 ... 6 000 mm (196.89 ... 236.22 inch)										A T
<u>Cable Lengths ø 2 mm and 4 mm/316</u>										
501 ... 1 000 mm (19.72 ... 39.37 inch)										A U
1 001 ... 5 000 mm (39.41 ... 196.85 inch)										A V
5 000 ... 10 000 mm (196.85 ... 393.70 inch)										A W
10 001 ... 15 000 mm (393.74 ... 590.55 inch)										A X
15 001 ... 20 000 mm (590.59 ... 787.40 inch)										A Y
20 001 ... 25 000 mm (787.44 ... 984.25 inch)										B A
25 001 ... 30 000 mm (984.29 ... 1 181.10 inch)										B B

Level Measurement

Continuous level measurement

Guided wave radar transmitters / SITRANS LG series

Selection and ordering data (continued)

SITRANS LG Replacement Probes For use with SITRANS LG series guided radar level transmitters.	Article No. 7ML5841- ● ● ● ● ● - ● ● ● 0											
30 001 ... 35 000 mm (1 181.14 ... 1 377.95 inch)											B	C
35 001 ... 40 000 mm (1 377.99 ... 1 574.80 inch)											B	D
40 001 ... 45 000 mm (1 574.84 ... 1 771.65 inch)											B	E
45 001 ... 50 000 mm (1 771.69 ... 1 968.50 inch)											B	F
50 001 ... 55 000 mm (1 968.54 ... 2 165.35 inch)											B	G
55 001 ... 60 000 mm (2 165.39 ... 2 362.20 inch)											B	H
60 001 ... 65 000 mm (2 362.24 ... 2 559.06 inch)											B	J
65 001 ... 70 000 mm (2 559.09 ... 2 755.91 inch)											B	K
70 001 ... 75 000 mm (2 755.94 ... 2 952.76 inch)											B	L
<u>Cable Lengths ø 6 mm/316</u>												
501 ... 1 000 mm (19.72 ... 39.37 inch)											B	M
1 001 ... 5 000 mm (39.41 ... 196.85 inch)											B	N
5 000 ... 10 000 mm (196.89 ... 393.70 inch)											B	P
10 001 ... 15 000 mm (393.74 ... 590.55 inch)											B	Q
15 001 ... 20 000 mm (590.59 ... 787.40 inch)											B	R
20 001 ... 25 000 mm (787.44 ... 984.25 inch)											B	S
25 001 ... 30 000 mm (984.29 ... 1 181.10 inch)											B	T
30 001 ... 35 000 mm (1 181.14 ... 1 377.95 inch)											B	U
35 001 ... 40 000 mm (1 377.99 ... 1 574.80 inch)											B	V
40 001 ... 45 000 mm (1 574.84 ... 1 771.65 inch)											B	W
45 001 ... 50 000 mm (1 771.69 ... 1 968.50 inch)											B	X
50 001 ... 55 000 mm (1 968.54 ... 2 165.35 inch)											B	Y
55 001 ... 60 000 mm (2 165.39 ... 2 362.20 inch)											C	A
60 001 ... 65 000 mm (2 362.24 ... 2 559.06 inch)											C	B
65 001 ... 70 000 mm (2 559.09 ... 2 755.91 inch)											C	C
70 001 ... 75 000 mm (2 755.94 ... 2 952.76 inch)											C	D
<u>Cable Lengths ø 4 mm/316</u>												
300 ... 1 000 mm (12 ... 39.37 inch)											D	A
1 001 ... 2 000 mm (39.41 ... 78.74 inch)											D	B
2 001 ... 5 000 mm (78.77 ... 196.85 inch)											D	C
5 001 ... 10 000 mm (196.89 ... 393.70 inch)											D	D
10 001 ... 15 000 mm (393.74 ... 590.55 inch)											D	E
15 001 ... 20 000 mm (590.59 ... 787.40 inch)											D	F
20 001 ... 25 000 mm (787.44 ... 984.25 inch)											D	G
25 001 ... 32 000 mm (984.29 ... 1 259.84 inch)											D	H

Selection and Ordering data	Order code
Further designs	
Please add "-Z" to Article No. and specify Order code(s).	
Enter the total insertion length in plain text description	Y01
Total length: Enter the total length of rigid part (range 100 ... 1 000 mm LG270 limited to 100 mm) (cable versions only)	Y02

- 1) Available only with Dimension centering weight option 0.
- 2) Available only with Dimension centering weight options 1 ... 8.
- 3) All Probe types are only available with corresponding Probe lengths.
- 4) Not available with Probe type options AH, AQ, and AW.
- 5) Available only with Process fitting options 2 and 3.
- 6) Not available with Probe type options AQ and AW.
- 7) Available only with Probe type options AE, AH, and AW.
- 8) Not available with Process fitting option 2.
- 9) Available only with Probe type options AA, AC, AE, AG, and AW.
- 10) Available only with Process fitting options 0 and 3.
- 11) Not available with certificate options 1 and 2.
- 12) Available only with Dimension centering weight options 1 ... 4.

Selection and ordering data (continued)

SITRANS LG Spacers For use with SITRANS LG series guided radar level transmitters.		Article No. 7ML5842- ● ● ● ● - 0 0 A A 0									
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.											
Instrument											
LG240 ¹⁾		0									
LG250 ²⁾		1									
LG260 ³⁾		2									
LG270 ³⁾		3									
Version/Material											
Cable ø 4 mm/ PFA ⁴⁾				A	A						
Rod ø 8 mm including fastening/ PEEK can be shortened ⁵⁾				A	B						
Rod ø 10 mm/ PFA ⁴⁾				A	C						
Rod ø 12 mm including fastening/ PEEK can be shortened ⁵⁾				A	D						
Rod ø 16 mm, cable with gravity weight, including fastening/ PEEK can be shortened ⁵⁾⁷⁾				A	E						
Cable ø 2 mm including fastening/ PEEK and 316L				A	F						
Rod ø 16 mm including fastening/ 1.4568 (AISI 631) flexible ⁸⁾				A	G						
Rod ø 8 mm including fastening/ PTFE can be shortened ⁵⁾				A	H						
Rod ø 12 mm including fastening/ 1.4568 (AISI 631) flexible ⁶⁾				A	G						
Tube diameter											
50 mm (2 inch) up to 100 mm (4 inch)										1	
49.2 mm (1.9 inch) up to 56.3 mm (2.2 inch)										2	
66.6 mm (2.6 inch) up to 84.9 mm (3.3 inch)										3	

1) Available only with Version/Material options AA and AC.

2) Available only with Version/Material options AB, AD, AE, AH and AJ.

3) Available only with Version/Material options AE and AG.

4) Available only with Tube Diameter option 1 and LG240.

5) Available only with Tube Diameter options 2 and 3 and LG250.

6) Available only with Tube Diameter option 1 and LG250.

7) Available only with Tube diameter option 1 and LG260 or LG270.

8) Available only with Tube Diameter options 2 and 3 and LG260 or LG270.

Level Measurement

Continuous level measurement

Guided wave radar transmitters / SITRANS LG series

Technical specifications

SITRANS LG series	
Mode of operation	
Measuring principle	Guided wave radar measurement
Measuring range	300 ... 75 000 mm (11.81 ... 2 952.75 inch)
Output	
mA analog output with HART digital signal	4 ... 20 mA/HART (SIL optional)
Output range	
• Analog	Current: minimum 3.8 mA, maximum 20.5 mA
• Startup current	≤ 10 mA for 5 ms after switching on, ≤ 3.6 mA
Diagnostic alarm	Failure signal current output (adjustable): last valid measured value, ≥ 21 mA, ≤ 3.6 mA
Digital communication	HART Version 7 x and multidrop compatible
Modbus	Modbus RTU, Modbus ASCII
PROFIBUS PA	PROFIBUS PA profile 3.02
FOUNDATION Fieldbus	FOUNDATION Fieldbus protocol Physical layer according to IEC 61158-2
Performance	
• Measuring cycle time	< 500 ms
• Step response time	≤ 3 s
• Temperature Effects	The measurement error from the process conditions is in the specified pressure and temperature range of below 1 %
Non-linearity	
• Coaxial	
• Single rod probes	
• Interface models	See manual for more details
Resolution and repeatability	Accuracy +/- 2 mm (0.08 inch)
Accuracy	
• Coaxial/rod/cable probes	+/- 2 mm (0.08 inch)
• Interface models	+/- 5 mm (0.197 inch) Note: Typical deviation, Interface measurement. See manual for full explanation.
Rated operating conditions	
Ambient temperature for enclosure	-40 ... +80 °C (-40 ... +176 °F)
Storage temperature	-40 ... +80 °C (-40 ... +176 °F)
LCD readable temperature range	-40 ... +80 °C (-40 ... +176 °F) with display heated option
Location	Indoor/outdoor
Installation category	II
Pollution degree	2
Relative Humidity	20 ... 85 %
Medium conditions	
Dielectric constant	dK ≥ 1.4 (configuration dependent) Note: for measurement below 1.4 use probe end tracking.
Process temperature range	-196 ... +450 °C (-321 ... +842 °F)
Vessel pressure	-1 ... +400 bar (-100 ... +40 000 kPa)
Design	
Instrument weight (dependent on process fitting) - see manual for further details	Approx. 0.8 ... 8 kg (0.176 ... 17.64 lb)
Materials	

Technical specifications (continued)

SITRANS LG series	
• Enclosure	<ul style="list-style-type: none"> Plastic housing plastic PBT (Polyester) Aluminum die-cast housing, aluminum die-cast AlSi10 mg, powder-coated- basis: polyester Stainless steel housing, precision casting 316L Stainless steel housing, electropolished 316L
• Degree of protection	<ul style="list-style-type: none"> Type 4/NEMA 4, IP65 Plastic housing IP66/IP67 Aluminum and stainless steel housings are IP66/68
• Cable inlet	2 x M20 x 1.5 or 2 x ½" NPT
Process connections	
• Pipe thread, cylindrical (ISO 228 T1)	G¾" A, G1" A, G1½" A according to DIN 3852-A
• American pipe thread, conical (ASME B1.20.1)	¾" NPT, 1" NPT, 1½" NPT
• Flanged	DIN from DN 25, ASME from 1"
• Hygienic	Hygienic fittings
Process seal instrument side	FKM (SHS FPM 70C3 GLT), FFKM (Kalrez 6375), EPDM (A+P 70.10-02), silicone FEP coated (A+P FEPO-SEAL) or Borosilicate glass GPC 540
Second line of defense (glass seal) (optional)	Borosilicate glass GPC 540 Note: The second line of defense is a second level of the process separation in the form of a gas-tight feedthrough in the lower part of the housing, preventing product from penetrating into the housing.
Programming	
Local	Four button, menu-driven data entry
Handheld communicator	Hart communicator
PC	SIMATIC PDM, AMS, PACTware
Power	
2-wire Hart version	9.6 ... 35 V DC
4-wire versions	9.6 ... 48 V DC, 20 ... 42 V AC, 50/60 Hz, and 90 ... 253 V AC, 50/60 Hz
Modbus	8 ... 30 V DC
PROFIBUS PA	9 ... 32 V DC
FOUNDATION Fieldbus	9 ... 32 V DC
	Note: see manual for specific power based on ordered options
Certificates and approvals	
Hazardous approvals:	ATEX, FM, CSA, IECEx Note: other regional approvals are available
Hygienic approvals:	EHEDG, FDA
Overfill protection	WHG, VlareM
Ship approval	ABS, CCS, GL, BV, LR

Industries	SITRANS LG240 Food, Beverage and Pharmaceutical	SITRANS LG250 Chemical/HPI/Power/General	SITRANS LG260 Cement, power generation, food, processing, mineral processing, mining	SITRANS LG270 Chemical/HPI/Power/General
Applications	Hygienic and corrosive applications	Liquids, storage and process vessels with agitators, vaporous liquids, interface	Cement, fly ash, grain, coal, flour, plastics	Aggressive applications in liquids, storage and process vessels with agitators, vaporous liquids, high temperatures and pressures, low dielectric media
Range	32 m	75 m	60 m	60 m
Performance	± 2 mm	± 2 mm	± 2 mm	± 2 mm

Level Measurement

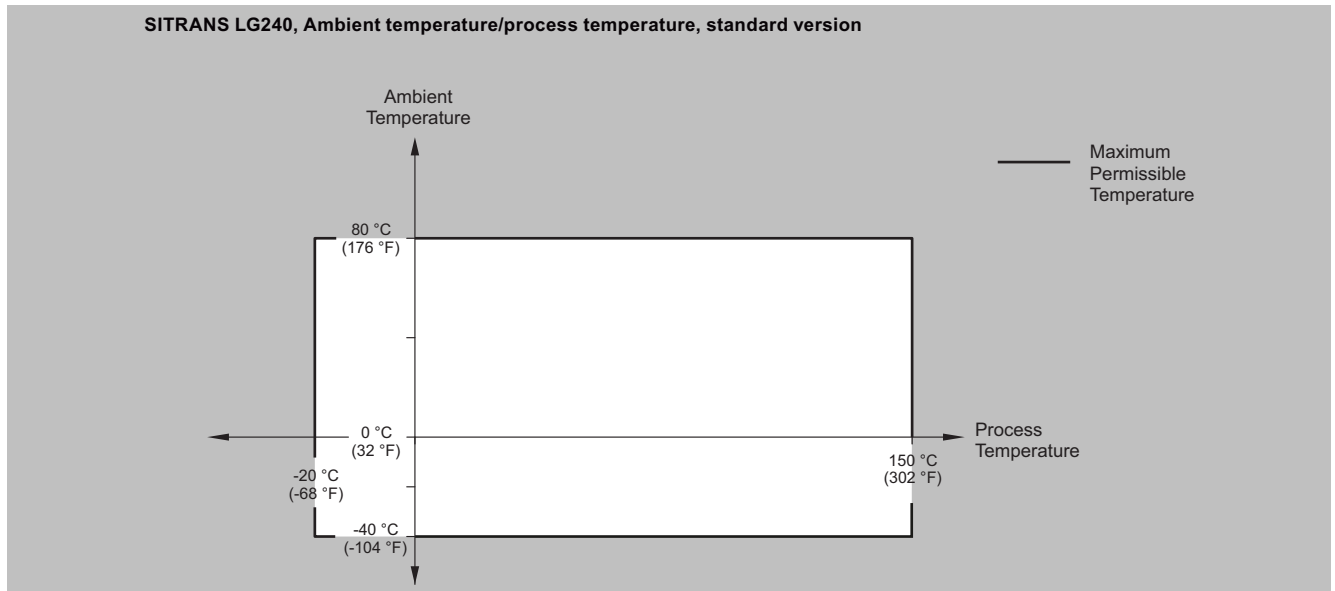
Continuous level measurement

Guided wave radar transmitters / SITRANS LG series

Technical specifications (continued)

Industries	SITRANS LG240 Food, Beverage and Pharmaceutical	SITRANS LG250 Chemical/HPI/Power/General	SITRANS LG260 Cement, power generation, food, processing, mineral processing, mining	SITRANS LG270 Chemical/HPI/Power/General
Temperature	-40 ... +150 °C (-40 ... +302 °F)	-40 ... +200 °C (-40 ... +392 °F)	-40 ... +200 °C (-40 ... +392 °F)	-196 ... +450 °C (-320.8 ... +842 °F)
Process pressure				
Standard version	-	-1 ... +40 bar/ -100 ... +4 000 kPa (-14.5 ... +580 psig), depending on the process fitting	-	-
With borosilicate glass lead-through	-	-1 ... +100 bar/ -100 ... +10 000 kPa (-14.5 ... +1 450 psig), depending on the process fitting	-	-
Communications	<ul style="list-style-type: none"> • 4 ... 20 mA/HART • Modbus: Modbus RTU, Modbus ASCII • PROFIBUS PA • FOUNDATION Fieldbus • SIMATIC PDM • DTM/FDT for PACTware • Fieldcare 	<ul style="list-style-type: none"> • 4 ... 20 mA/HART • Modbus: Modbus RTU, Modbus ASCII • PROFIBUS PA • FOUNDATION Fieldbus • SIMATIC PDM • DTM/FDT for PACTware • Fieldcare 	<ul style="list-style-type: none"> • 4 ... 20 mA/HART • Modbus: Modbus RTU, Modbus ASCII • PROFIBUS PA • FOUNDATION Fieldbus • SIMATIC PDM • DTM/FDT for PACTware • Fieldcare 	<ul style="list-style-type: none"> • 4 ... 20 mA/HART • Modbus: Modbus RTU, Modbus ASCII • PROFIBUS PA • FOUNDATION Fieldbus • SIMATIC PDM • DTM/FDT for PACTware • Fieldcare

Characteristic curves



SITRANS LG240, ambient temperature/process temperature curve

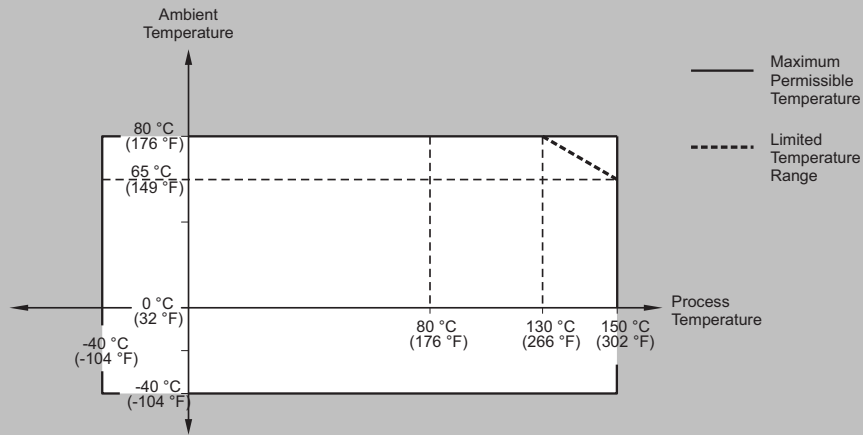
Level Measurement

Continuous level measurement

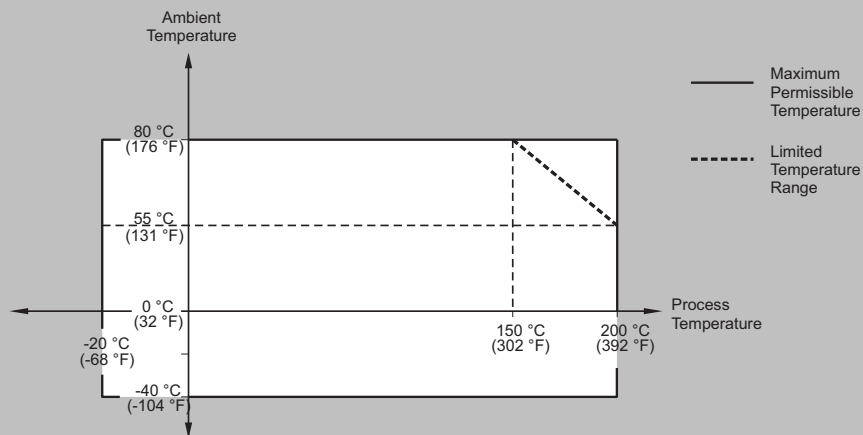
Guided wave radar transmitters / SITRANS LG series

Characteristic curves (continued)

SITRANS LG250, Ambient temperature/process temperature, standard version



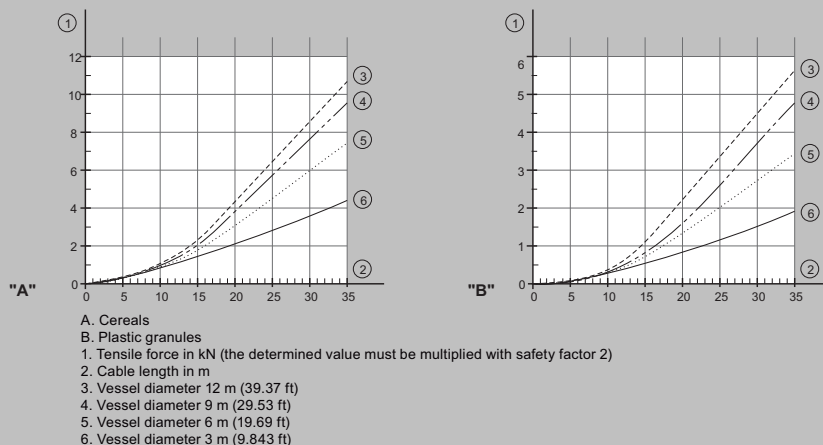
SITRANS LG250, Ambient temperature/process temperature, temperature adapter version



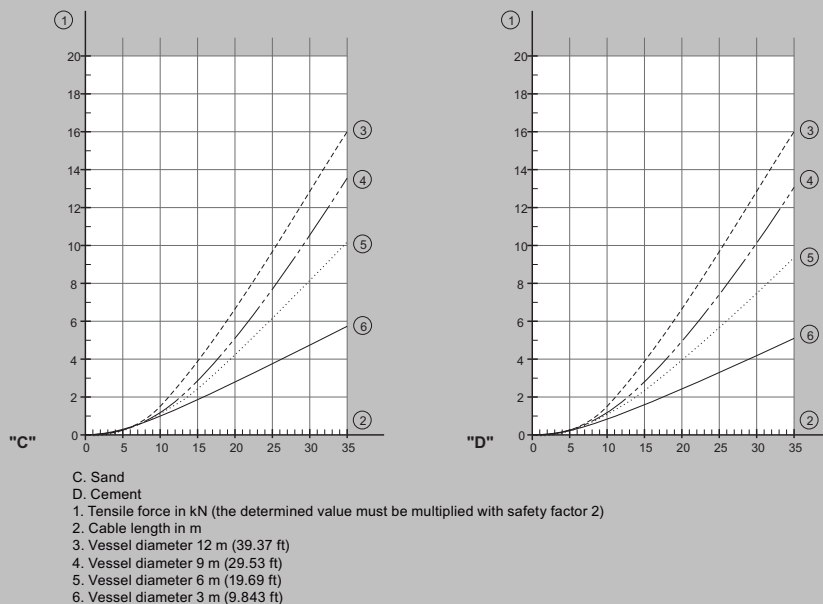
SITRANS LG250, ambient temperature/process temperature curves

Characteristic curves (continued)

SITRANS LG260, Maximum tensile load with cereals and plastic granules - cable: \varnothing 4 mm (0.157 inch)



SITRANS LG260, Maximum tensile load with sand and cement - cable: \varnothing 4 mm (0.157 inch)



SITRANS LG260, maximum tensile load curves

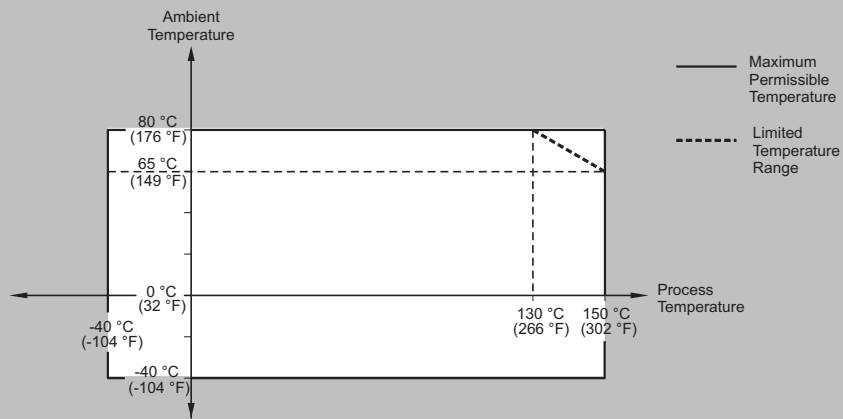
Level Measurement

Continuous level measurement

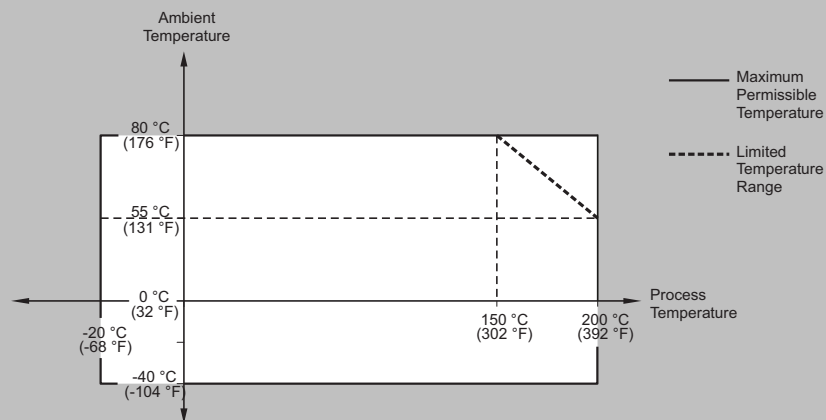
Guided wave radar transmitters / SITRANS LG series

Characteristic curves (continued)

SITRANS LG260, Ambient temperature/process temperature, standard version
 Cable version with \varnothing 4 mm (0.157 inch)
 Cable version, PA coated with \varnothing 6 mm (0.236 inch)



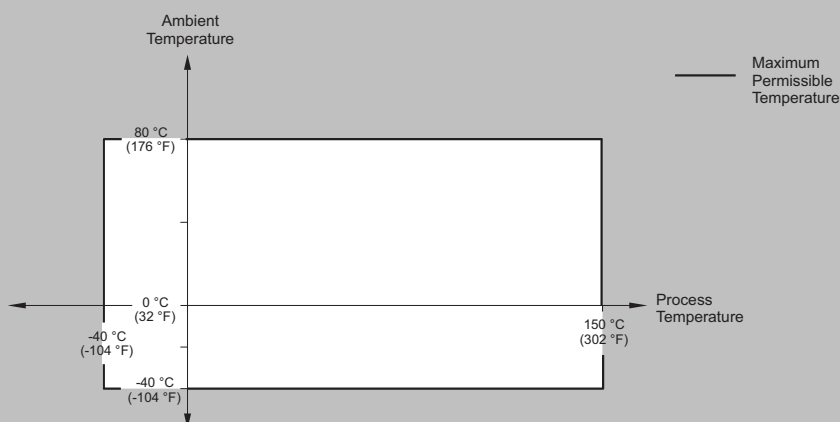
SITRANS LG260, Ambient temperature/process temperature, temperature adapter version
 Cable version with \varnothing 4 mm (0.157 inch)
 Cable version, PA coated with \varnothing 6 mm (0.236 inch)



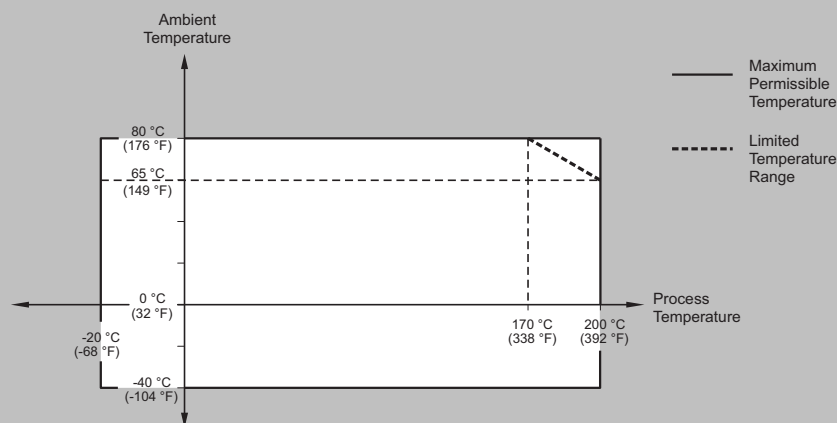
SITRANS LG260, ambient temperature/process temperature curves

Characteristic curves (continued)

SITRANS LG260, Ambient temperature/process temperature, standard version
Cable version with \varnothing 6 mm (0.236 inch)
Cable version, PA coated with \varnothing 11 mm (0.433 inch)



SITRANS LG260, Ambient temperature/process temperature, temperature adapter version
Cable version with \varnothing 6 mm (0.236 inch)
Cable version, PA coated with \varnothing 11 mm (0.433 inch)



SITRANS LG260, ambient temperature/process temperature curves

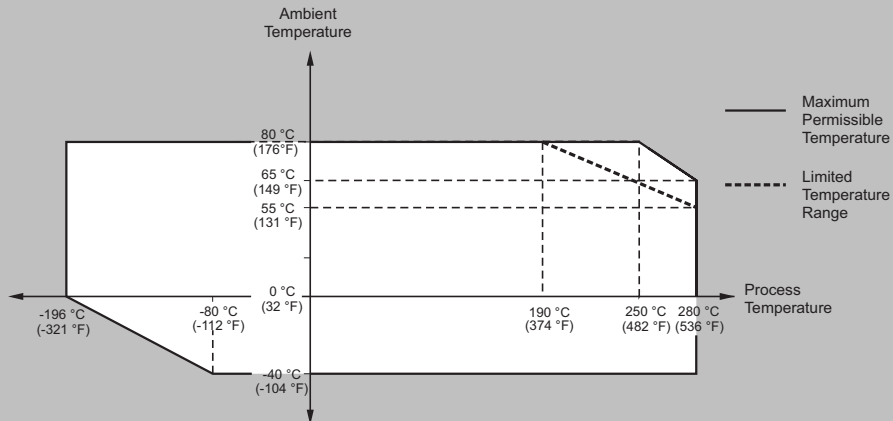
Level Measurement

Continuous level measurement

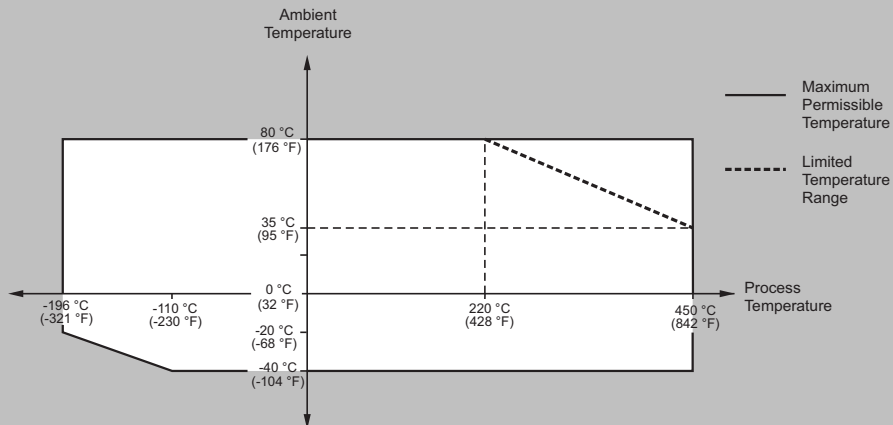
Guided wave radar transmitters / SITRANS LG series

Characteristic curves (continued)

SITRANS LG270, Ambient temperature/process temperature (-196 ... +280 °C/-321 ... +536 °F version)

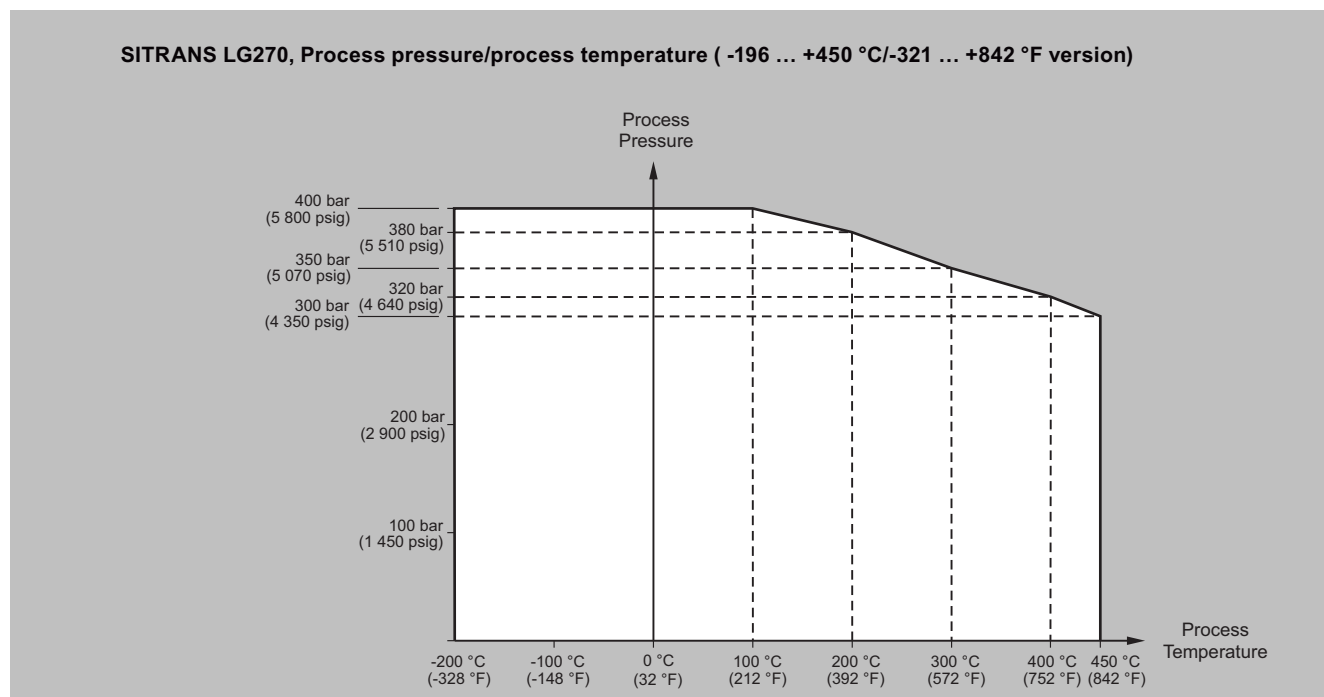


SITRANS LG270, Ambient temperature/process temperature (-196 ... +450 °C/-321 ... +842 °F version)



SITRANS LG270, ambient temperature/process temperature curves

Characteristic curves (continued)



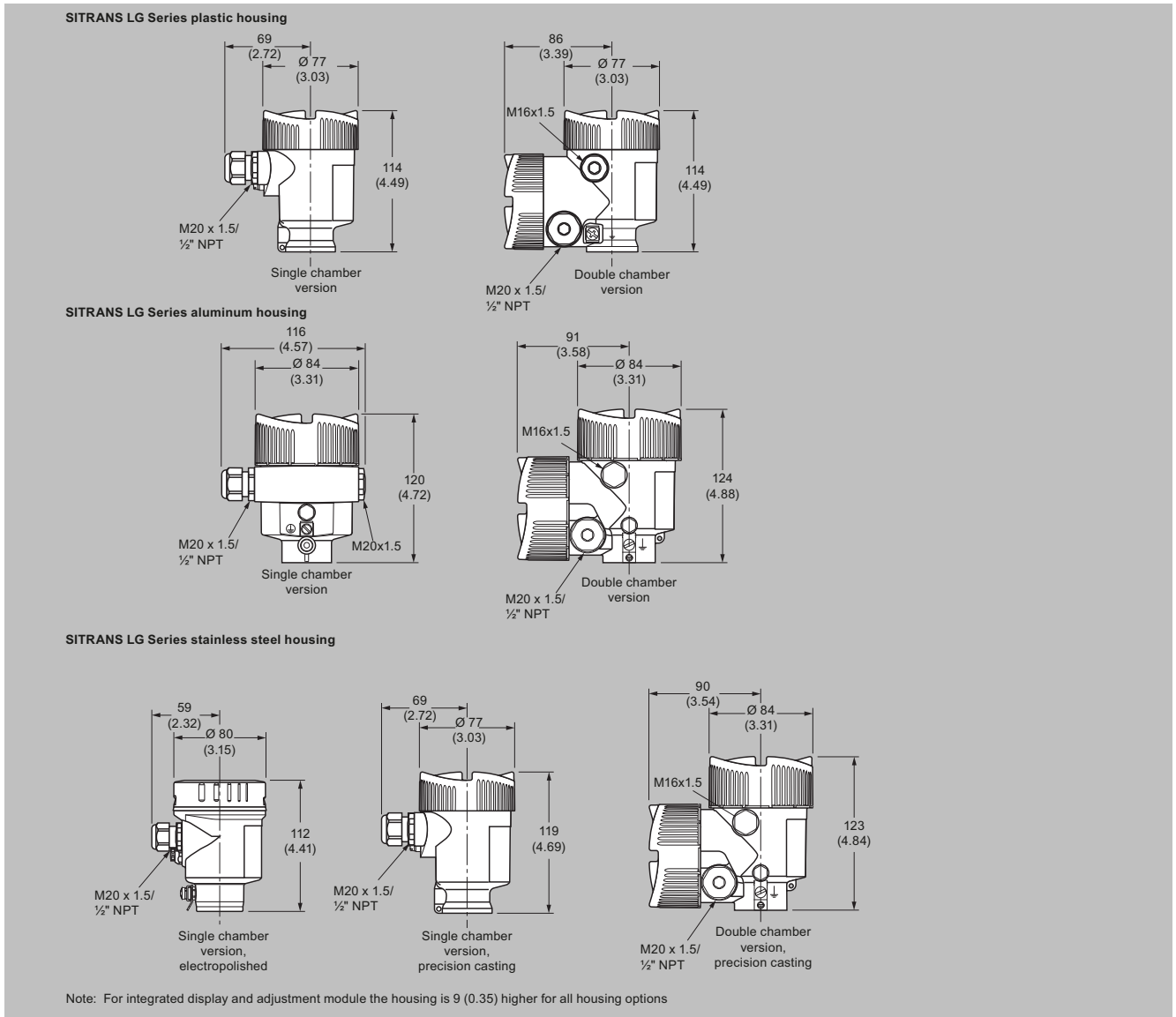
SITRANS LG270, process pressure/process temperature curve

Level Measurement

Continuous level measurement

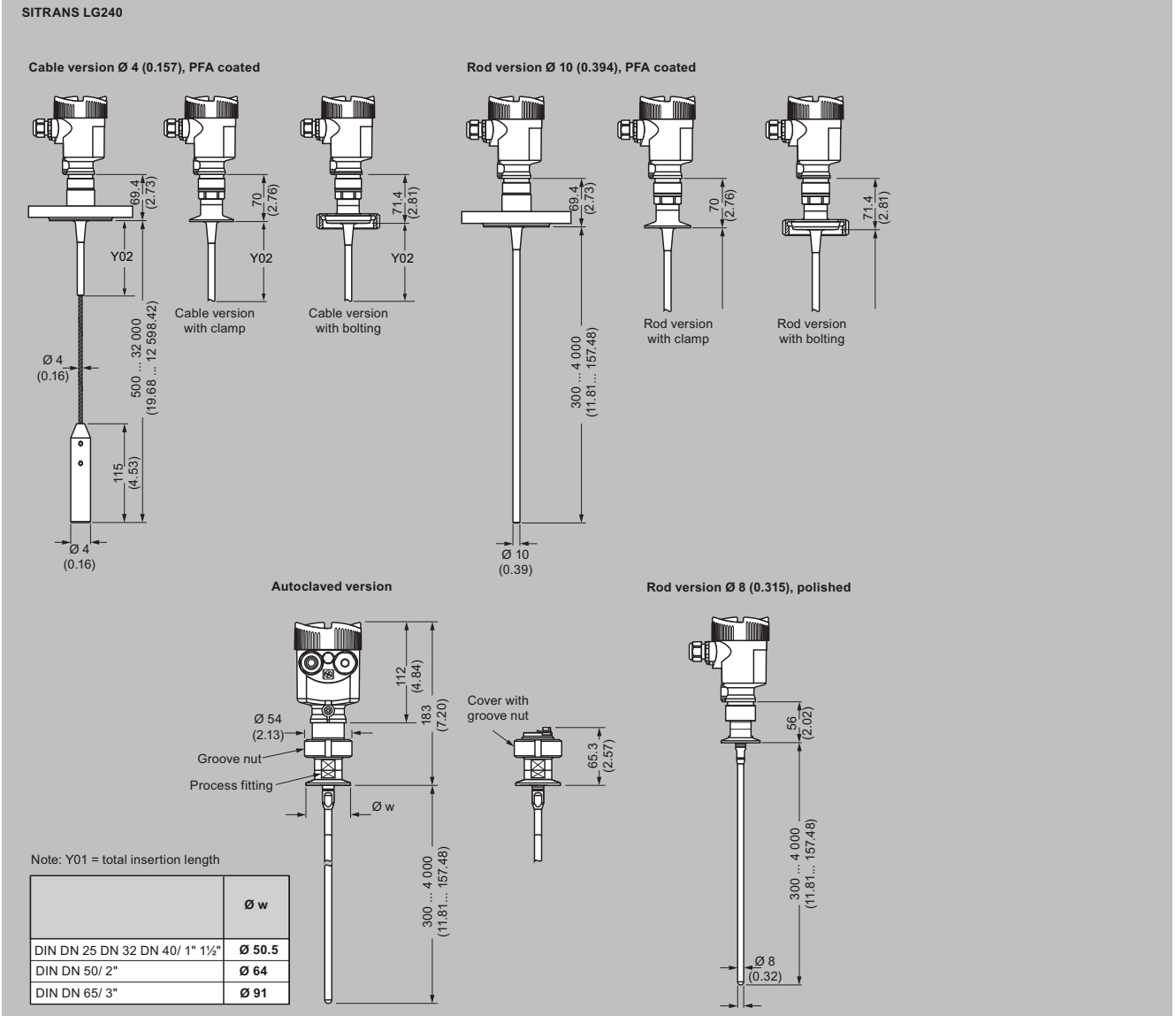
Guided wave radar transmitters / SITRANS LG series

Dimensional drawings



SITRANS LG series, dimensions in mm (inch)

Dimensional drawings (continued)



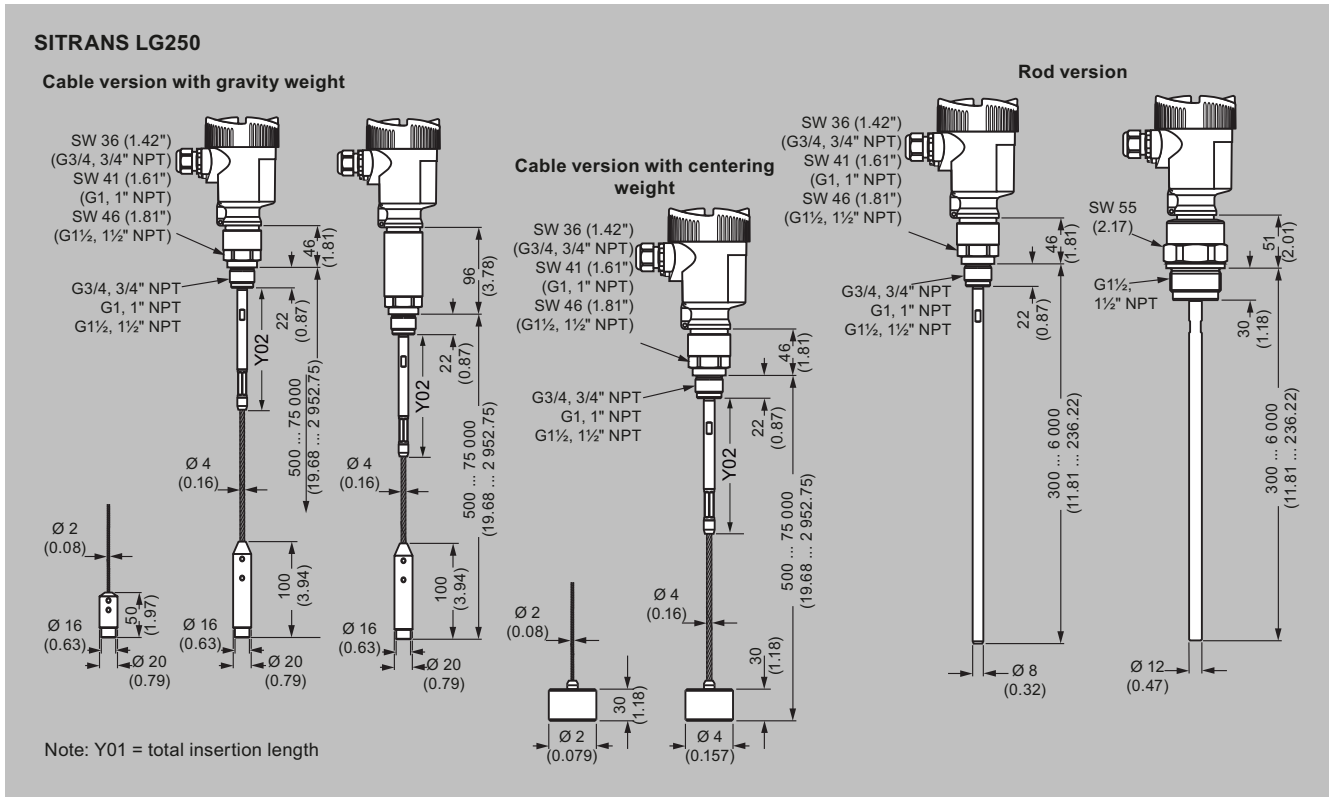
SITRANS LG240, dimensions in mm (inch)

Level Measurement

Continuous level measurement

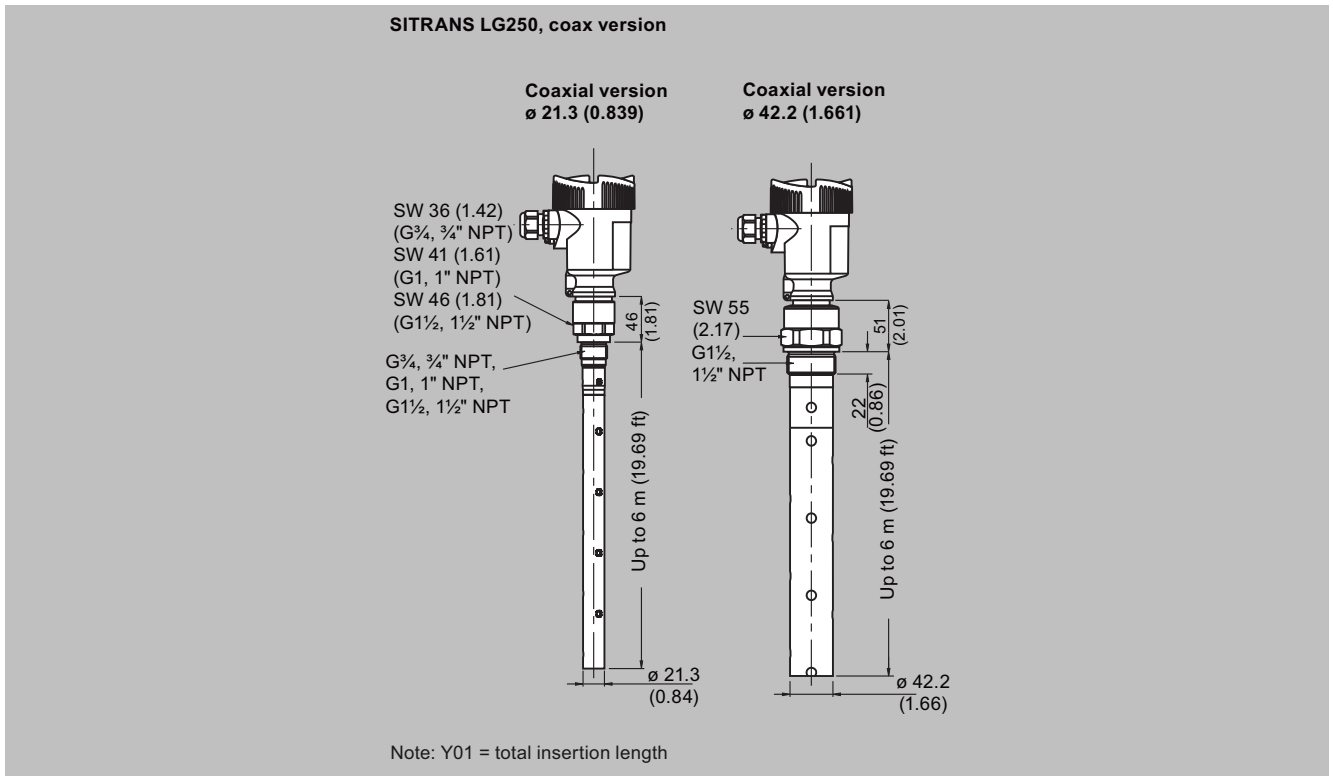
Guided wave radar transmitters / SITRANS LG series

Dimensional drawings (continued)



SITRANS LG250, dimensions in mm (inch)

Dimensional drawings (continued)



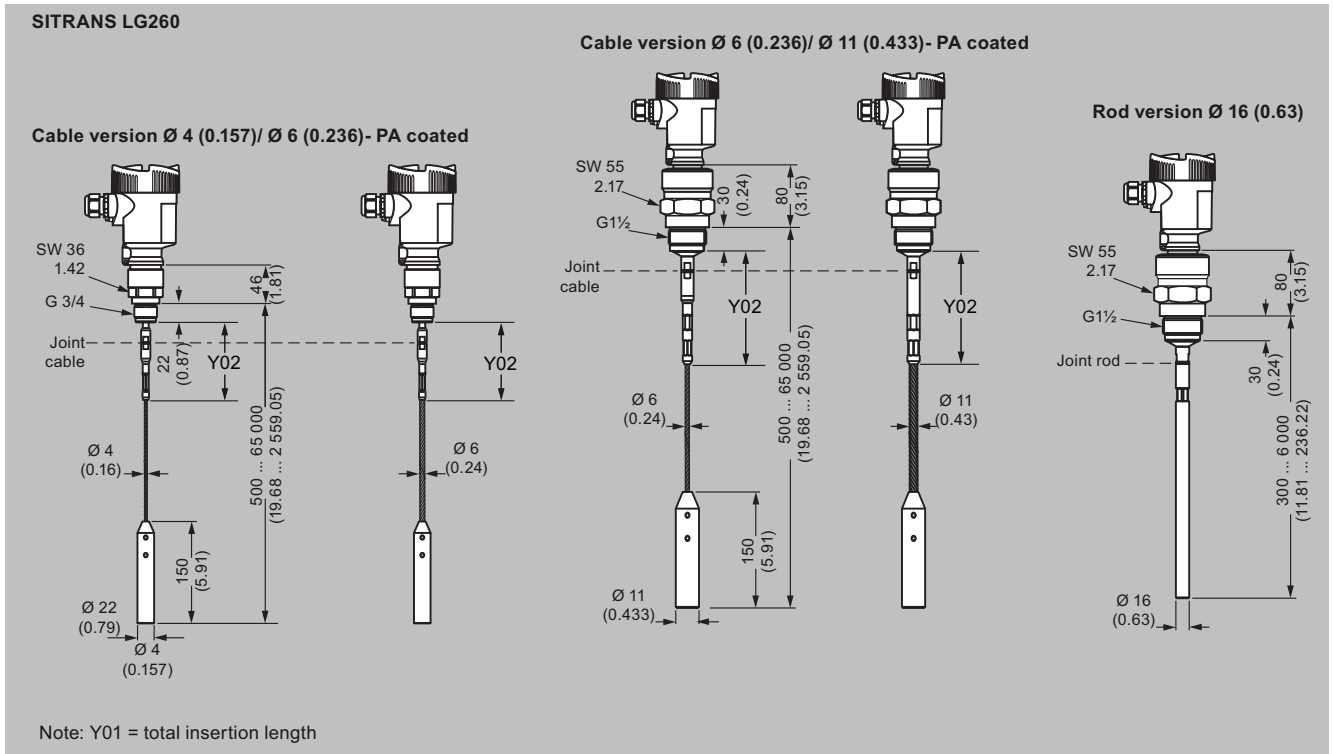
SITRANS LG250, dimensions in mm (inch)

Level Measurement

Continuous level measurement

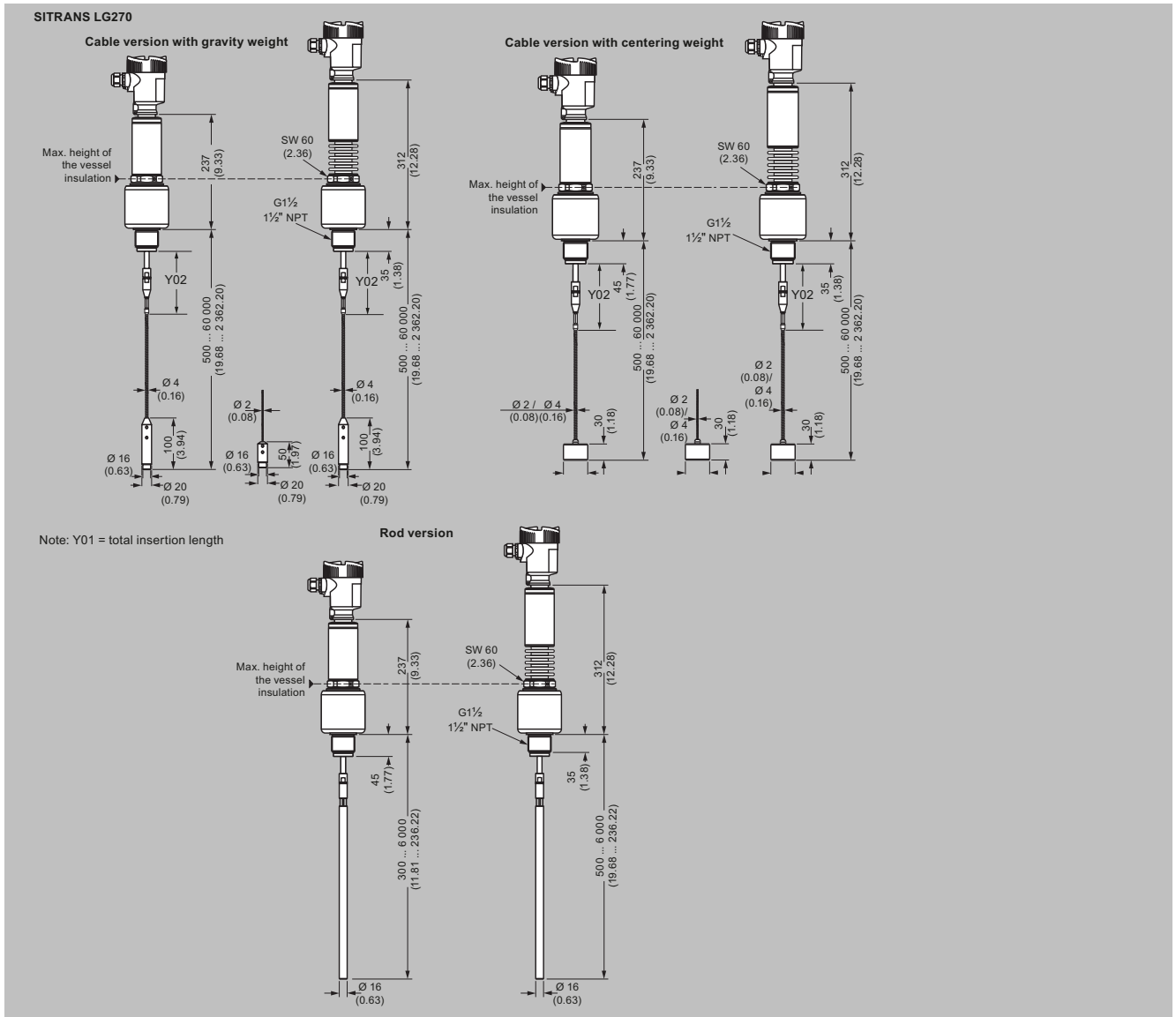
Guided wave radar transmitters / SITRANS LG series

Dimensional drawings (continued)



SITRANS LG260, dimensions in mm (inch)

Dimensional drawings (continued)



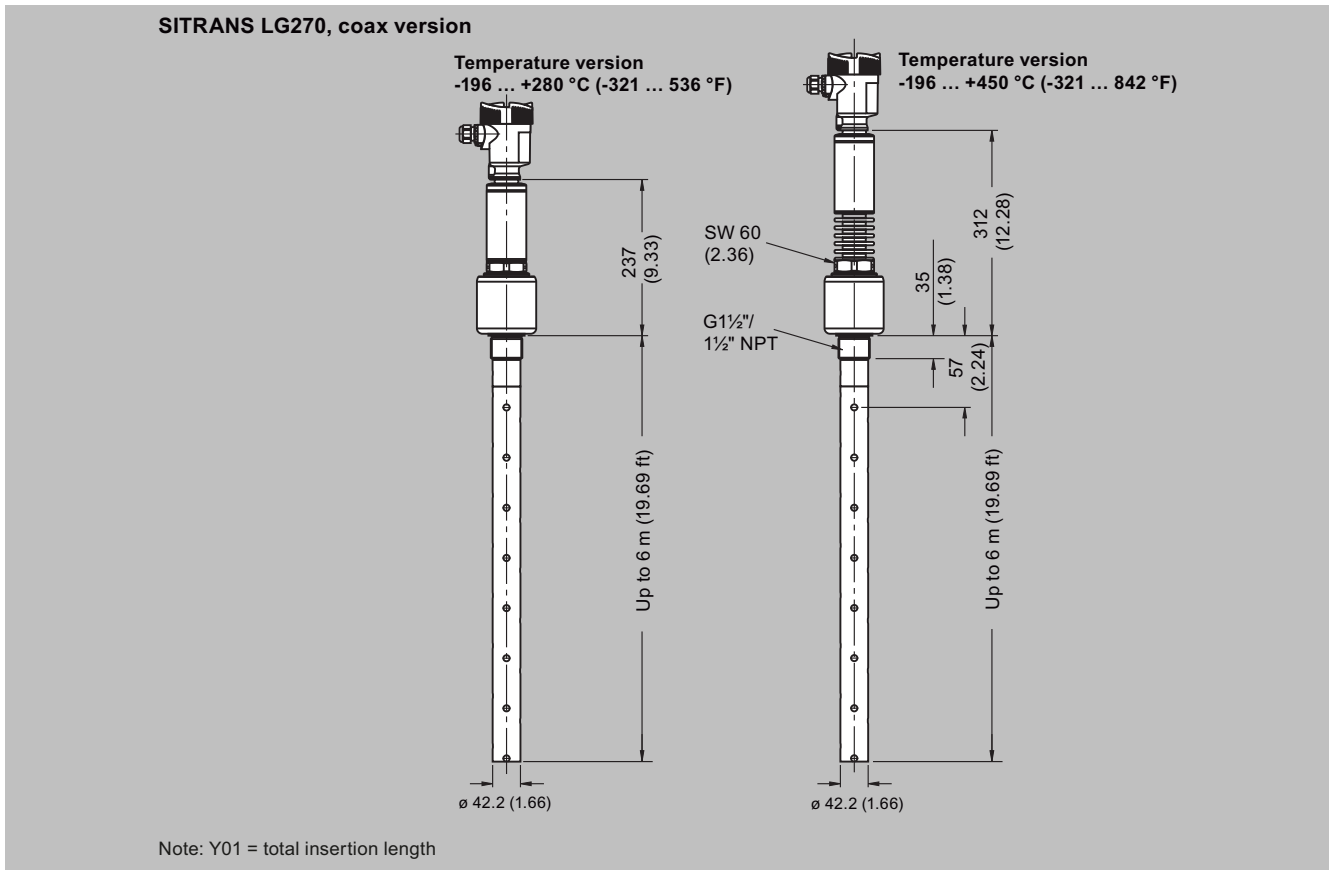
SITRANS LG270, dimensions in mm (inch)

Level Measurement

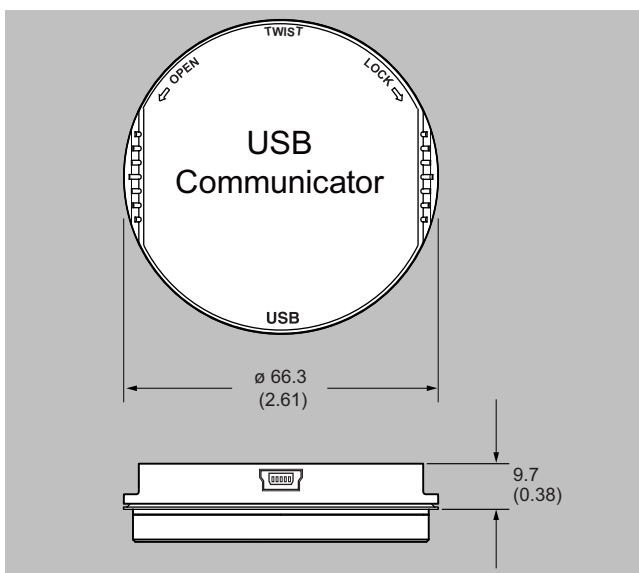
Continuous level measurement

Guided wave radar transmitters / SITRANS LG series

Dimensional drawings (continued)

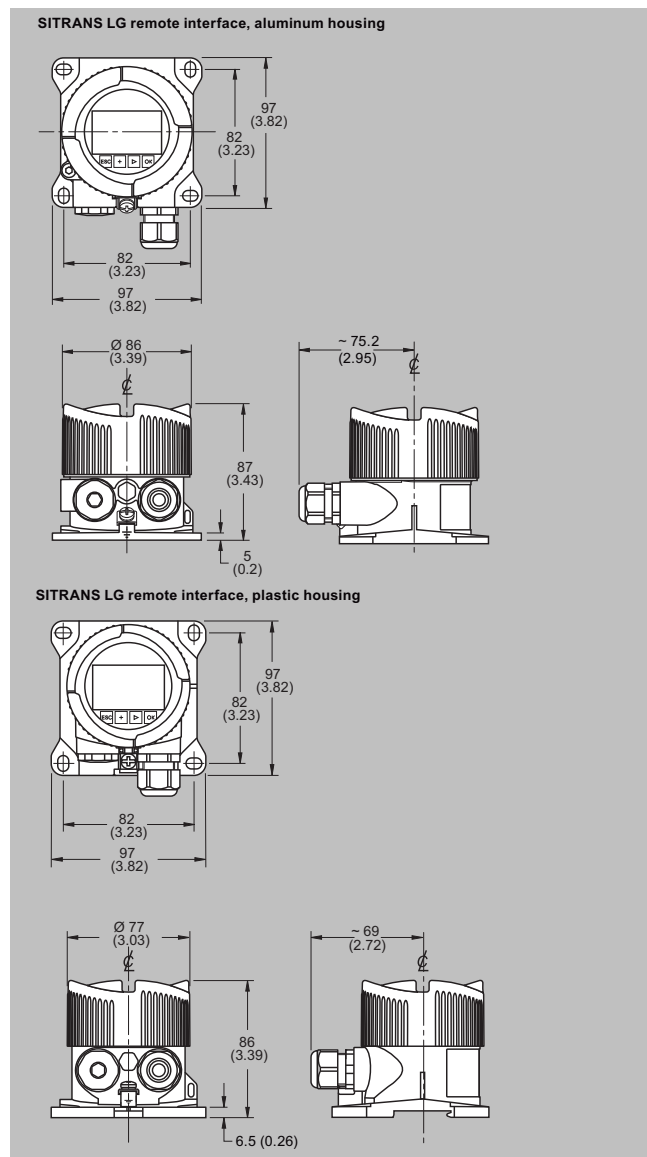


SITRANS LG270, dimensions in mm (inch)



SITRANS LG USB Communicator, dimensions in mm (inch)

Dimensional drawings (continued)



SITRANS LG remote interface, dimensions in mm (inch)

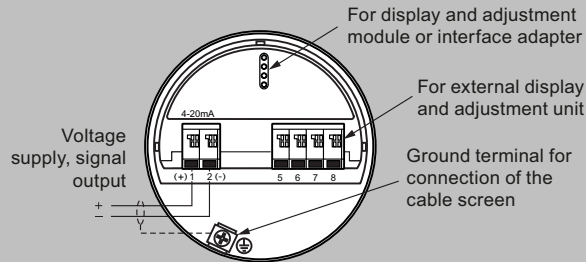
Level Measurement

Continuous level measurement

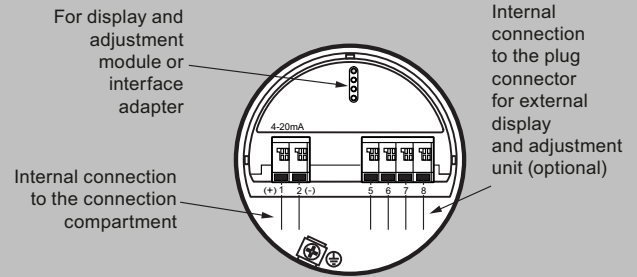
Guided wave radar transmitters / SITRANS LG series

Circuit diagrams

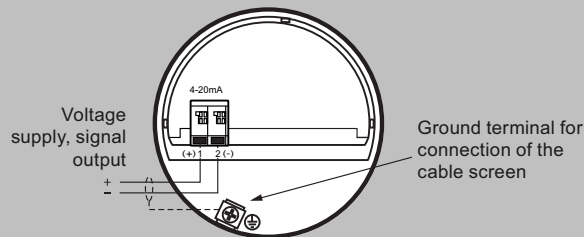
2-wire HART electronic option, electronics and connection compartment, single chamber housing



2-wire HART electronic option, electronics compartment, double chamber housing



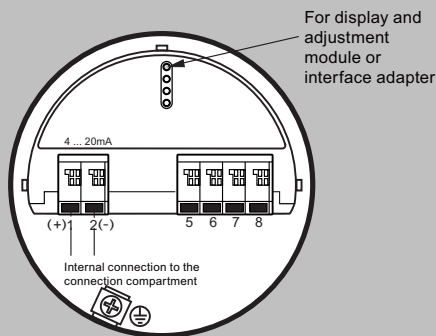
2-wire HART electronic option, connection compartment, Ex-d-ia double chamber housing



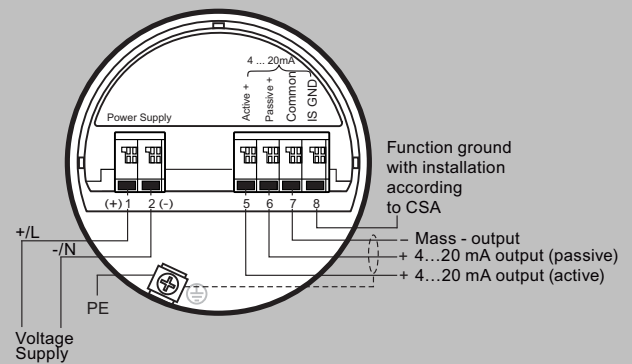
Note: All 2-wire HART connections and electronics are also available with SIL qualification.

SITRANS LG series connections

4-wire HART electronic option, electronics compartment, double chamber housing



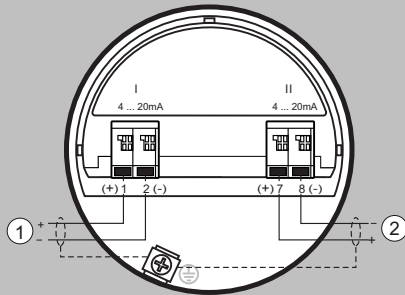
4-wire electronic option, connection compartment, double chamber housing with mains voltage



SITRANS LG series connections

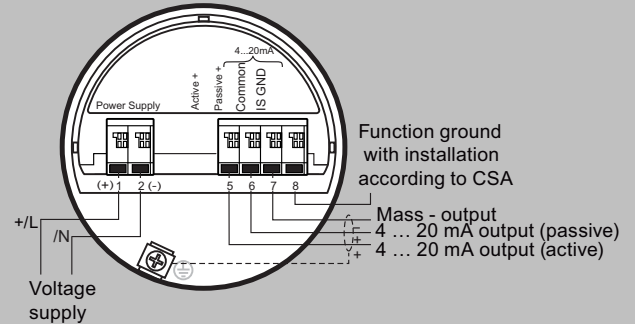
Circuit diagrams (continued)

Supplementary electronics



- ① First current output (I) - Voltage supply and signal output (HART)
- ② Second current output (II) - Voltage supply and signal output (without HART)

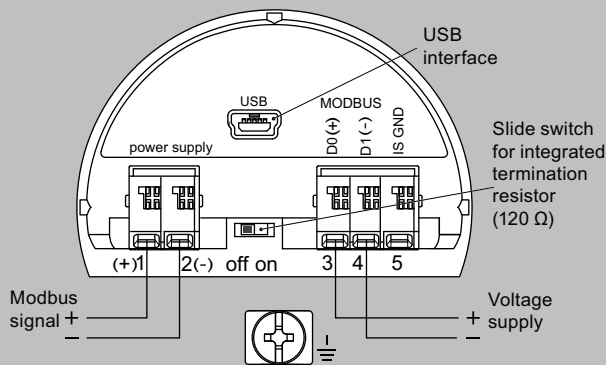
Connection compartment with low voltage



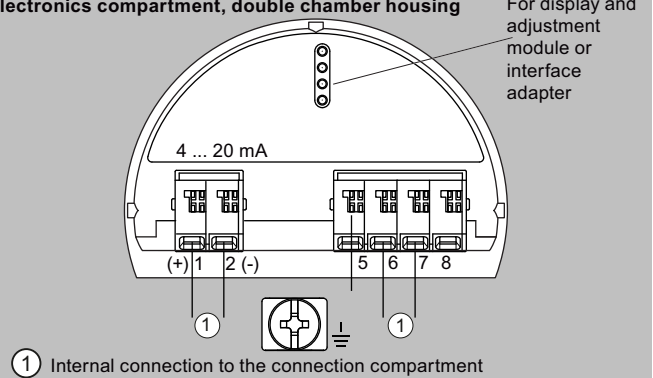
Function ground with installation according to CSA

SITRANS LG series connections

Modbus electronic option, connection compartment



Modbus electronic option, electronics compartment, double chamber housing



- ① Internal connection to the connection compartment

SITRANS LG series connections

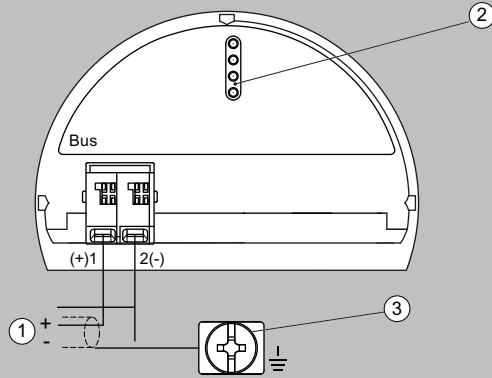
Level Measurement

Continuous level measurement

Guided wave radar transmitters / SITRANS LG series

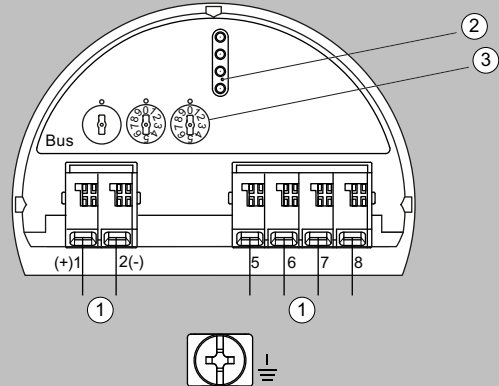
Circuit diagrams (continued)

PROFIBUS electronic option, connection compartment, double chamber housing



- ① Voltage supply, signal output
- ② For display and adjustment module or interface adapter
- ③ Ground terminal for connection of the cable screen

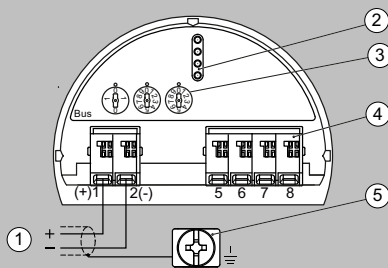
PROFIBUS electronic option, electronics compartment, double chamber housing



- ① Internal connection to the connection compartment
- ② Contact pins for the display and adjustment module or interface adapter
- ③ Selection switch for bus address

LG series connections

PROFIBUS electronic option, electronics and connection compartment, single chamber housing

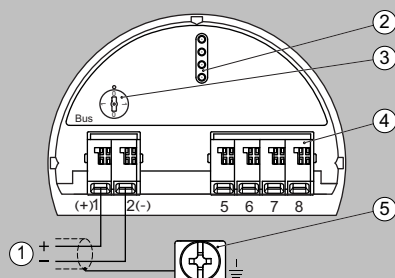


- ① Voltage supply, signal output
- ② For display and adjustment module or interface adapter
- ③ Selection switch for bus address
- ④ For external display and adjustment unit
- ⑤ Ground terminal for connection of the cable screen

LG series connections

Circuit diagrams (continued)

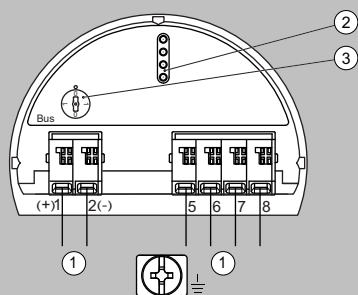
LG series, FOUNDATION Fieldbus electronic option, electronic and terminal compartment, single chamber housing



- ① Voltage supply, signal output
- ② Contact pins for the display and adjustment module or interface adapter
- ③ Simulation switch ("1" = mode for simulation release)
- ④ For external display and adjustment unit
- ⑤ Ground terminal for connection of the cable screen

LG series connections

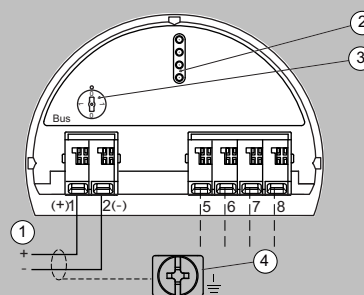
LG series, FOUNDATION Fieldbus electronic option, electronic compartment, double chamber housing



- ① Internal connection to the connection compartment
- ② Contact pins for the display and adjustment module or interface adapter
- ③ Simulation switch ("on" = simulation mode)

LG series connections

LG series, FOUNDATION Fieldbus electronic option, terminal compartment, double chamber housing



- ① Voltage supply, signal output
- ② For display and adjustment module or interface adapter
- ③ For external display and adjustment unit
- ④ Ground terminal for connection of the cable screen

Level Measurement

Continuous level measurement

Capacitance transmitters

Overview

SITRANS LC300

- Application
 - For liquids and solids applications, ideal for standard industrial applications in chemical, hydrocarbon processing, food and beverage and mining, aggregate, and cement industries
- Device description
 - Sophisticated, but easy-to-adjust microprocessor combined with field-proven probes
 - Active shield technology ensures measurements are unaffected by vapors, product deposits, dust, and condensation

Overview



SITRANS LC300 is an inverse frequency shift capacitance continuous level transmitter for liquid, interface, and solid applications. It is ideal for standard industrial applications in chemical, hydrocarbon processing, food and beverage, water, wastewater, mining, aggregate, and cement industries.

Benefits

- Active-Shield technology so measurement is unaffected by material buildup in active shield section
- Highly accurate and reliable PFA-lined probes
- Integrated local LCD display
- 2-wire (4 to 20 mA) current loop design
- Current signaling according to NAMUR NE 43
- Push-button calibration and programming
- Stilling well (ground tube) version for low dielectric media, agitated materials, and non-metallic vessels

Application

SITRANS LC300 is a 2-wire level measurement instrument combining a sophisticated, yet easy-to-adjust microprocessor with field-proven probes. It is available in four versions: rod, rod with stilling well, cable with PFA insulation, and cable without PFA insulation.

Materials with low or high dielectric properties are accurately measured and Active-Shield technology helps in ignoring the effects of buildup or condensation near vessel nozzle.

- Key Applications: conductive ($dK \geq 20$) and non-conductive ($dK < 20$) media including: liquids and solids in standard industrial processes, bulk solids applications involving dust, and chemical processes involving vapor

Probe Applications

Rod version	Conductive liquids, slurries or solids
Rod version with stilling well	<ul style="list-style-type: none"> • Conductive liquids or slurries in non-conductive tanks • Non-conductive liquids in non-conductive tanks • Tanks with agitation or turbulent liquids • Liquids with a dielectric constant below 2 • Non-linear tanks, such as parabolic or spherical tanks • Interface measurements
Cable version	Non-conductive solids or liquids
PFA coated cable version	Conductive or sticky liquids, slurries or solids

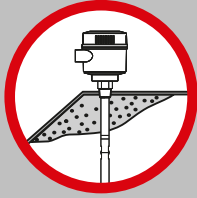
Level Measurement

Continuous level measurement

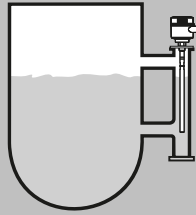
Capacitance transmitters / SITRANS LC300

Configuration

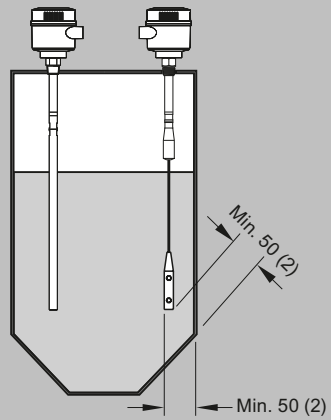
Installation



Build up of material in active shield area does not affect switch operation.



Mounting on a bypass



Install probe at least 50 (2) from tank wall.
Note angle of repose and adjust accordingly.

SITRANS LC300 installation, dimensions in mm (inch)

Selection and ordering data

		Article No.									
SITRANS LC300 Capacitance level transmitter, rod design		7	M	L	5	6	-	0	0	0	0
Continuous, contact, monitors level or interface in liquids or solids. Extension options up to 5 m (16.40 ft).											
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.											
Process connection											
Threaded, 316L stainless steel											
¾" NPT [(Taper), ASME B1.20.1]		0									A
1" NPT [(Taper), ASME B1.20.1]		0									B
1¼" NPT [(Taper), ASME B1.20.1]		0									C
1½" NPT [(Taper), ASME B1.20.1]		0									D
R ¾" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]		1									A
R 1" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]		1									B
R 1½" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]		1									D
G ¾" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]		3									A
G 1" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]		3									B
G 1½" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]		3									D
Welded flange, 316L stainless steel, raised face ¹⁾											
1" ASME, 150 lb		5									A
1" ASME, 300 lb		5									B
1" ASME, 600 lb		5									C
1½" ASME, 150 lb		5									D
1½" ASME, 300 lb		5									E
1½" ASME, 600 lb		5									F
2" ASME, 150 lb		5									G
2" ASME, 300 lb		5									H
2" ASME, 600 lb		5									J
3" ASME, 150 lb		5									K
3" ASME, 300 lb		5									L
3" ASME, 600 lb		5									M
4" ASME, 150 lb		5									N
4" ASME, 300 lb		5									P
4" ASME, 600 lb		5									Q
Welded flange, 316L stainless steel, Type A flat faced ¹⁾											
DN 25, PN 16		6									A
DN 25, PN 40		6									B
DN 40, PN 16		6									C
DN 40, PN 40		6									D
DN 50, PN 16		6									E
DN 50, PN 40		6									F
DN 80, PN 16		6									G
DN 80, PN 40		6									H
DN 100, PN 16		6									J
DN 100, PN 40		6									K
Sanitary, hastelloy, duplex or other custom process connections available. Please contact a local sales person for details. For more information, please visit http://www.automation.siemens.com/aspa_app .											
Probe Length											
(from flange face or including process thread)											
Add Order code Y01 and plain text: "Insertion length ... mm"											
300 ... 1 000 mm (11.81 ... 39.37 inch)											A
1 001 ... 2 000 mm (39.41 ... 78.74 inch)											B
2 001 ... 3 000 mm (78.78 ... 118.11 inch)											C
3 001 ... 4 000 mm (118.15 ... 157.48 inch)											D
4 001 ... 5 000 mm (157.52 ... 196.85 inch)											E
Bent probes also available. Please contact a local sales person for details. For more information, please visit http://www.automation.siemens.com/aspa_app .											
Thermal isolator											
Without thermal isolator											0
With thermal isolator [for process connection temperatures over 85 °C (185 °F)]											1

Level Measurement

Continuous level measurement

Capacitance transmitters / SITRANS LC300

Selection and ordering data (continued)

	Article No.									
SITRANS LC300 Capacitance level transmitter, rod design Continuous, contact, monitors level or interface in liquids or solids. Extension options up to 5 m (16.40 ft).	7	M	L	5	6	-	0	0	0	0
Wetted seals										
FKM							0			
FFKM [for process temperatures above -20 °C (-4 °F) ²⁾							1			
Probe material										
19 mm (0.75 inch) diameter 316L stainless steel, PFA lined rod								0		
Approvals										
General Safety (CSA, FM, CE, RCM)									A	
Dust Ignition Proof With IS Probe CE, RCM, ATEX II 1/2 D T100 °C									B	
Flame Proof Enclosure With IS Probe CE, RCM, ATEX II 1/2 G EEx d [ia] IIC T6 ... T1, ATEX II 1/2 D T100 °C									C	
Dust Ignition Proof With IS Probe CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4									D	
Explosion Proof Enclosure With IS Probe CSA/FM Class I, Div. 1, Groups A, B, C, D CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4									E	
Enclosure										
Aluminum epoxy coated 2 x ½" NPT via adapter - cable inlet, IP65										A
Aluminum epoxy coated 2 x M20 x 1.5 cable inlet, IP65										B
Aluminum epoxy coated 2 x ½" NPT via adapter - cable inlet, IP68										C
Aluminum epoxy coated 2 x M20 x 1.5 cable inlet, IP68										D
Stainless steel, contact local sales person for details. For more information, please visit http://www.automation.siemens.com/aspa_app .										

1) Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1 standard.

2) Not available with FM approvals.

Selection and Ordering data	Order code
Further designs	
Please add "-Z" to Article No. and specify Order code(s).	
Insertion length, specify in plain text: Y01: ... mm	Y01
Stainless steel tag [70 x 13 mm (2.75 x 0.5 inch)]: Measuring-point number/identification (max. 27 characters) specify in plain text	Y15
Manufacturer's Test Certificate: M to DIN 55350, Part 18 and to ISO 9000	C11
Material inspection Certificate Type 3.1 per EN 10204	C12
INMETRO ¹⁾	E34

Accessories	Article No.
Operating Instructions	
All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation	
Accessories	
Electronic transmitter kit (includes transmitter and driver)	7ML1830-1KN
SITRANS RD100, loop powered display - see Chapter 7	7ML5741-.....
SITRANS RD150, remote digital display for 4 ... 20 mA and HART devices - see Chapter 7	7ML5742-.....
SITRANS RD200, universal input display with Modbus conversion - see Chapter 7	7ML5740-.....
SITRANS RD300, dual line display with totalizer and linearization curve and Modbus conversion - see Chapter 7	7ML5744-.....
For applicable back up point level switch - see point level measurement section	

1) Available only with Approvals options A and B.

Selection and ordering data (continued)

	Article No.	
SITRANS LC300 Capacitance level transmitter, stilling well design	7ML5671- ● ● ● ● ● - ● ● ● 0	
Continuous, contact, monitors level or interface in liquids.		
Extension options up to 5 m (16.40 ft).		
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Process connection		
Threaded, 316L stainless steel		
1½" NPT [(Taper), ASME B1.20.1]	0	D
R 1½" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]	1	D
G 1½" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]	3	D
Welded flange, 316L stainless steel, raised face ¹⁾		
1½" ASME, 150 lb	5	D
1½" ASME, 300 lb	5	E
1½" ASME, 600 lb	5	F
2" ASME, 150 lb	5	G
2" ASME, 300 lb	5	H
2" ASME, 600 lb	5	J
3" ASME, 150 lb	5	K
3" ASME, 300 lb	5	L
3" ASME, 600 lb	5	M
4" ASME, 150 lb	5	N
4" ASME, 300 lb	5	P
4" ASME, 600 lb	5	Q
Welded flange, 316L stainless steel, Type A flat faced ¹⁾		
DN 40, PN 16	6	C
DN 40, PN 40	6	D
DN 50, PN 16	6	E
DN 50, PN 40	6	F
DN 80, PN 16	6	G
DN 80, PN 40	6	H
DN 100, PN 16	6	J
DN 100, PN 40	6	K
Sanitary, hastelloy, duplex or other custom process connections available. Please contact a local sales person for details. For more information, please visit http://www.automation.siemens.com/aspa_app .		
Probe Length (from flange face or including process thread)		
Add Order code Y01 and plain text: "Insertion length ... mm"		
300 ... 1 000 mm (11.81 ... 39.37 inch)		A
1 001 ... 2 000 mm (39.41 ... 78.74 inch)		B
2 001 ... 3 000 mm (78.78 ... 118.11 inch)		C
3 001 ... 4 000 mm (118.15 ... 157.48 inch)		D
4 001 ... 5 000 mm (157.52 ... 196.85 inch)		E
Thermal isolator		
Without thermal isolator		0
With thermal isolator [for process connection temperatures over 85 °C (185 °F)]		1
Wetted seals		
FKM		0
FFKM [for process temperatures above -20 °C (-4 °F)] ²⁾		1
Probe material		
35 mm (1.38 inch) diameter stilling well, with 19 mm (0.75 inch) diameter 316L stainless steel, PFA lined rod with PTFE spacers		1
Approvals		
General Safety (CSA, FM, CE, RCM)		A
Dust Ignition Proof With IS Probe CE, RCM, ATEX II 1/2 D T100 °C		B

Level Measurement

Continuous level measurement

Capacitance transmitters / SITRANS LC300

Selection and ordering data (continued)

	Article No.									
SITRANS LC300 Capacitance level transmitter, stilling well design Continuous, contact, monitors level or interface in liquids. Extension options up to 5 m (16.40 ft).	7	M	L	5	6	7	1	-	0	0
Flame Proof Enclosure With IS Probe CE, RCM, ATEX II 1/2 G EEx d [ia] IIC T6 ... T1, ATEX II 1/2 D T100 °C										C
Dust Ignition Proof With IS Probe CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4										D
Explosion Proof Enclosure With IS Probe CSA/FM Class I, Div. 1, Groups A, B, C, D CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4										E
Enclosure										
Aluminum epoxy coated 2 x 1/2" NPT via adapter - cable inlet, IP65										A
Aluminum epoxy coated 2 x M20 x 1.5 cable inlet, IP65										B
Aluminum epoxy coated 2 x 1/2" NPT via adapter - cable inlet, IP68										C
Aluminum epoxy coated 2 x M20 x 1.5 cable inlet, IP68										D
Stainless steel, please contact a local sales person for details. For more information, please visit http://www.automation.siemens.com/aspa_app .										

- 1) Flange bolting patterns and facings dimensionally correspond to the -applicable ASME B16.5 or EN 1092-1 standard.
- 2) Not available with FM approvals.

Selection and Ordering data	Order code
Further designs	
Please add "-Z" to Article No. and specify Order code(s).	
Insertion length, specify in plain text: Y01: ... mm	Y01
Stainless steel tag [70 x 13 mm (2.75 x 0.5 inch)]: Measuring-point number/identification (max. 27 characters) specify in plain text	Y15
Manufacturer's Test Certificate: M to DIN 55350, Part 18 and to ISO 9000	C11
Material inspection Certificate Type 3.1 per EN 10204	C12
INMMETRO ¹⁾	E34

Accessories	Article No.
Operating Instructions	
All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation	
Accessories	
Electronic transmitter kit (includes transmitter and driver)	7ML1830-1KN
SITRANS RD100, loop powered display - see Chapter 7	7ML5741-.....
SITRANS RD150, remote digital display for 4 ... 20 mA and HART devices - see Chapter 7	7ML5742-.....
SITRANS RD200, universal input display with Modbus conversion - see Chapter 7	7ML5740-.....
SITRANS RD300, dual line display with totalizer and linearization curve and Modbus conversion - see Chapter 7	7ML5744-.....
For applicable back up point level switch - see point level measurement section	

- 1) Available only with Approvals options A and B.

Selection and ordering data (continued)

		Article No.									
SITRANS LC300 Capacitance level transmitter, cable design		7ML5672- ● ● ● ● ● - ● ● ● ● 0									
Continuous, contact, monitors level or interface in liquids or solids. Extension options up to 25 m (82.02 ft).											
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.											
Process connection											
<u>Threaded, 316L stainless steel</u>											
1½" NPT [(Taper), ASME B1.20.1]		0	D								
R 1½" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]		1	D								
G 1½" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]		3	D								
<u>Welded flange, 316L stainless steel, raised face ¹⁾</u>											
1½" ASME, 150 lb		5	D								
1½" ASME, 300 lb		5	E								
1½" ASME, 600 lb		5	F								
2" ASME, 150 lb		5	G								
2" ASME, 300 lb		5	H								
2" ASME, 600 lb		5	J								
3" ASME, 150 lb		5	K								
3" ASME, 300 lb		5	L								
3" ASME, 600 lb		5	M								
4" ASME, 150 lb		5	N								
4" ASME, 300 lb		5	P								
4" ASME, 600 lb		5	Q								
<u>Welded flange, 316L stainless steel, Type A flat faced ¹⁾</u>											
DN 40, PN 16		6	C								
DN 40, PN 40		6	D								
DN 50, PN 16		6	E								
DN 50, PN 40		6	F								
DN 80, PN 16		6	G								
DN 80, PN 40		6	H								
DN 100, PN 16		6	J								
DN 100, PN 40		6	K								
Sanitary, hastelloy, duplex or other custom process connections available. Please contact a local sales person for details. For more information, please visit http://www.automation.siemens.com/aspa_app .											
Probe Length											
(from flange face or including process thread)											
<u>Add Order code Y01 and plain text: "Insertion length ... mm"</u>											
1 000 ... 2 000 mm (39.37 ... 78.74 inch)					A						
2 001 ... 4 000 mm (78.78 ... 157.48 inch)					B						
4 001 ... 6 000 mm (157.52 ... 236.22 inch)					C						
6 001 ... 8 000 mm (236.26 ... 314.96 inch)					D						
8 001 ... 10 000 mm (315.00 ... 393.70 inch)					E						
8 001 ... 10 000 mm (315.00 ... 393.70 inch)					F						
12 001 ... 14 000 mm (472.48 ... 551.18 inch)					G						
14 001 ... 16 000 mm (551.22 ... 629.92 inch) ²⁾					H						
16 001 ... 18 000 mm (629.96 ... 708.66 inch) ²⁾					J						
18 001 ... 20 000 mm (708.70 ... 787.40 inch) ²⁾					K						
20 001 ... 22 000 mm (787.44 ... 866.14 inch) ²⁾					L						
22 001 ... 24 000 mm (866.18 ... 944.88 inch) ²⁾					M						
24 001 ... 25 000 mm (944.92 ... 984.25 inch) ²⁾					N						
Thermal isolator											
Without thermal isolator					0						
With thermal isolator [for process connection temperatures over 85 °C (185 °F)]					1						
Wetted seals											
FKM					0						
FFKM [for process temperatures above -20 °C (-4 °F)] ³⁾					1						
Probe material											
Bare 316L stainless steel cable and 316L stainless steel cable weight, tinned copper crimp, PTFE backing ring, PEEK isolator and PFA lined active shield					0						

Level Measurement

Continuous level measurement

Capacitance transmitters / SITRANS LC300

Selection and ordering data (continued)

	Article No.										
SITRANS LC300 Capacitance level transmitter, cable design Continuous, contact, monitors level or interface in liquids or solids. Extension options up to 25 m (82.02 ft).	7	M	L	5	6	7	2	-			0
Approvals											
General Safety (CSA, FM, CE, RCM)											A
Dust Ignition Proof With IS Probe CE, RCM, ATEX II 1/2 D T100 °C											B
Flame Proof Enclosure With IS Probe CE, RCM, ATEX II 1/2 G EEx d [ia] IIC T6 ... T1, ATEX II 1/2 D T100 °C											C
Dust Ignition Proof With IS Probe CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4											D
Explosion Proof Enclosure With IS Probe CSA/FM Class I, Div. 1, Groups A, B, C, D CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4											E
Enclosure											
Aluminum epoxy coated 2 x 1/2" NPT via adapter - cable inlet, IP65											A
Aluminum epoxy coated 2 x M20 x 1.5 cable inlet, IP65											B
Aluminum epoxy coated 2 x 1/2" NPT via adapter - cable inlet, IP68											C
Aluminum epoxy coated 2 x M20 x 1.5 cable inlet, IP68											D
Stainless steel, please contact a local sales person for details. For more information, please visit http://www.automation.siemens.com/aspa_app .											

- 1) Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1 standard.
- 2) Cable lengths from 15 000 mm (590.55 inch) to 25 000 mm (984.25 inch) can be used in non-conductive media. Contact Factory for assistance.
- 3) Not available with FM approvals.

Selection and Ordering data	Order code
Further designs	
Please add "-Z" to Article No. and specify Order code(s).	
Insertion length, specify in plain text: Y01: ... mm	Y01
Stainless steel tag [70 x 13 mm (2.75 x 0.5 inch)]: Measuring-point number/identification (max. 27 characters) specify in plain text	Y15
Manufacturer's Test Certificate: M to DIN 55350, Part 18 and to ISO 9000	C11
Material inspection Certificate Type 3.1 per EN 10204	C12
INMETRO ¹⁾	E34

Accessories	Article No.
Operating Instructions	
All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation	
Accessories	
Electronic transmitter kit (includes transmitter and driver)	7ML1830-1KN
SITRANS RD100, loop powered display - see Chapter 7	7ML5741-.....-
SITRANS RD150, remote digital display for 4 ... 20 mA and HART devices - see Chapter 7	7ML5742-.....-
SITRANS RD200, universal input display with Modbus conversion - see Chapter 7	7ML5740-.....-
SITRANS RD300, dual line display with totalizer and linearization curve and Modbus conversion - see Chapter 7	7ML5744-.....-
For applicable back up point level switch - see point level measurement section	

- 1) Available only with Approvals options A and B.

Selection and ordering data (continued)

		Article No.									
SITRANS LC300 Capacitance level transmitter, PFA coated cable design Continuous, contact, monitors level or interface in liquids or solids. Extension options up to 25 m (82.02 ft).		7ML5673- ● ● ● ● ● - ● ● ● ●									
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.											
Process connection											
<u>Threaded, 316L stainless steel</u>											
1½" NPT [(Taper), ASME B1.20.1]		0	D								
R 1½" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]		1	D								
G 1½" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]		3	D								
<u>Welded flange, 316L stainless steel, raised face ¹⁾</u>											
1½" ASME, 150 lb		5	D								
1½" ASME, 300 lb		5	E								
1½" ASME, 600 lb		5	F								
2" ASME, 150 lb		5	G								
2" ASME, 300 lb		5	H								
2" ASME, 600 lb		5	J								
3" ASME, 150 lb		5	K								
3" ASME, 300 lb		5	L								
3" ASME, 600 lb		5	M								
4" ASME, 150 lb		5	N								
4" ASME, 300 lb		5	P								
4" ASME, 600 lb		5	Q								
<u>Welded flange, 316L stainless steel, Type A flat faced ¹⁾</u>											
DN 40, PN 16		6	C								
DN 40, PN 40		6	D								
DN 50, PN 16		6	E								
DN 50, PN 40		6	F								
DN 80, PN 16		6	G								
DN 80, PN 40		6	H								
DN 100, PN 16		6	J								
DN 100, PN 40		6	K								
Sanitary, hastelloy, duplex or other custom process connections available. Please contact a local sales person for details. For more information, please visit http://www.automation.siemens.com/aspa_app .											
Probe Length (from flange face or including process thread)											
<u>Add Order code Y01 and plain text: "Insertion length ... mm"</u>											
1 000 ... 2 000 mm (39.37 ... 78.74 inch)											A
2 001 ... 4 000 mm (78.78 ... 157.48 inch)											B
4 001 ... 6 000 mm (157.52 ... 236.22 inch)											C
6 001 ... 8 000 mm (236.26 ... 314.96 inch)											D
8 001 ... 10 000 mm (315.00 ... 393.70 inch)											E
10 001 ... 12 000 mm (393.74 ... 472.44 inch)											F
12 001 ... 14 000 mm (472.48 ... 551.18 inch)											G
14 001 ... 16 000 mm (551.22 ... 629.92 inch) ²⁾											H
16 001 ... 18 000 mm (629.96 ... 708.66 inch) ²⁾											J
18 001 ... 20 000 mm (708.70 ... 787.40 inch) ²⁾											K
20 001 ... 22 000 mm (787.44 ... 866.14 inch) ²⁾											L
22 001 ... 24 000 mm (866.18 ... 944.88 inch) ²⁾											M
24 001 ... 25 000 mm (944.92 ... 984.25 inch) ²⁾											N
Thermal isolator											
Without thermal isolator								0			
With thermal isolator [for process connection temperatures over 85 °C (185 °F)]								1			
Wetted seals											
FKM								0			
FFKM [for process temperatures above -20 °C (-4 °F)] ³⁾								1			
Probe material											
PFA coated cable and 316L stainless steel cable weight, PEEK isolator and PFA lined active shield										1	

Level Measurement

Continuous level measurement

Capacitance transmitters / SITRANS LC300

Selection and ordering data (continued)

	Article No.
SITRANS LC300 Capacitance level transmitter, PFA coated cable design Continuous, contact, monitors level or interface in liquids or solids. Extension options up to 25 m (82.02 ft).	7ML5673- ● ● ● ● ● - ● ● ● ●
Approvals	
General Safety (CSA, FM, CE, RCM)	A
Dust Ignition Proof With IS Probe CE, RCM, ATEX II 1/2 D T100 °C	B
Flame Proof Enclosure With IS Probe CE, RCM, ATEX II 1/2 G EEx d [ia] IIC T6 ... T1, ATEX II 1/2 D T100 °C	C
Dust Ignition Proof With IS Probe CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4	D
Explosion Proof Enclosure With IS Probe CSA/FM Class I, Div. 1, Groups A, B, C, D CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4	E
Enclosure	
Aluminum epoxy coated 2 x 1/2" NPT via adapter - cable inlet, IP65	A
Aluminum epoxy coated 2 x M20 x 1.5 cable inlet, IP65	B
Aluminum epoxy coated 2 x 1/2" NPT via adapter - cable inlet, IP68	C
Aluminum epoxy coated 2 x M20 x 1.5 cable inlet, IP68	D
Stainless steel, please contact a local sales person for details. For more information, please visit http://www.automation.siemens.com/aspa_app .	
Mounting eye	
Without Mounting eye	0
With mounting eye	1

1) Flange bolting patterns and facings dimensionally correspond to the -applicable ASME B16.5 or EN 1092-1 standard.

2) Cable lengths from 15 000 mm (590.55 inch) to 25 000 mm (984.25 inch) can be used in non-conductive media. Contact Factory for assistance.

3) Not available with FM approvals.

Selection and Ordering data	Order code
Further designs	
Please add "-Z" to Article No. and specify Order code(s).	
Insertion length, specify in plain text: Y01: ... mm	Y01
Stainless steel tag [70 x 13 mm (2.75 x 0.5 inch)]: Measuring-point number/identification (max. 27 characters) specify in plain text	Y15
Manufacturer's Test Certificate: M to DIN 55350, Part 18 and to ISO 9000	C11
Material inspection Certificate Type 3.1 per EN 10204	C12
INMETRO ¹⁾	E34

Accessories	Article No.
Operating Instructions	
All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation	
Accessories	
Electronic transmitter kit (includes transmitter and driver)	7ML1830-1KN
SITRANS RD100, loop powered display - see Chapter 7	7ML5741-.....
SITRANS RD150, remote digital display for 4 ... 20 mA and HART devices - see Chapter 7	7ML5742-.....
SITRANS RD200, universal input display with Modbus conversion - see Chapter 7	7ML5740-.....
SITRANS RD300, dual line display with totalizer and linearization curve and Modbus conversion - see Chapter 7	7ML5744-.....
For applicable back up point level switch - see point level measurement section	

1) Available only with Approvals options A and B.

Selection and ordering data (continued)

LC300 Specials¹⁾	
LC300 Cable Extensions, 316L stainless steel	
Kit, Stainless steel cable extension, 1 m, adjustable by customer	A5E01163688
Kit, Stainless steel cable extension, 3 m, adjustable by customer	A5E01163689
Kit, Stainless steel cable extension, 5 m, adjustable by customer	A5E01163690
Kit, Stainless steel cable extension, 10 m, adjustable by customer	A5E01163691
Kit, Stainless steel cable extension, 15 m, adjustable by customer	A5E01163693
Kit, Stainless steel cable extension, 20 m, adjustable by customer	A5E01163695
LC300 Cable Extensions, 316 stainless steel with PFA coating	
Kit, PFA cable extension, 1 m	A5E01163709
Kit, PFA cable extension, 3 m	A5E01163710
Kit, PFA cable extension, 5 m	A5E01163711
Kit, PFA cable extension, 10 m	A5E01163712
Kit, PFA cable extension, 15 m	A5E01163713
Kit, PFA cable extension, 20 m	A5E01163714
LC300 Mounting Eye	
Spare mounting eye (LC300 PFA versions only)	A5E01163717
LC300 Weight Kit, 316L stainless steel	
Kit, Spare stainless steel weight. To be used in any cable version of CLS300, or stainless steel cable version of LC300	A5E01163727

Customers interested in a custom designed device should consult a local sales person. For more information, please visit http://www.automation.siemens.com/aspa_app.

Level Measurement

Continuous level measurement

Capacitance transmitters / SITRANS LC300

Technical specifications

SITRANS LC300	
Input	
Measuring range	1.66 ... 3 300 pF
Span	Min. 3.3 pF
Output	
Loop current	Continuous signal 4 ... 20 mA/20 ... 4 mA according to NAMUR 43
Accuracy (transmitter)	
Temperature stability	0.25 % of actual capacitance value
Non-linearity and repeatability	< 0.4 % of full scale and actual measurement value
Accuracy	Deviation < 0.5 % of actual measurement value
Rated operating conditions¹⁾	
Ambient conditions	
• Ambient temperature	-40 ... +85 °C (-40 ... +185 °F) ²⁾³⁾
• Storage temperature	-40 ... +85 °C (-40 ... +185 °F)
• Installation category	I
• Pollution degree	4
• Ingress protection	Type 4/NEMA 4/IP65 (optional IP68)
Installation conditions	
• Location	Indoor/outdoor
• Process pressure	-1 ... +35 bar g (-14.6 ... +511 psi g)
• Process temperature	-40 ... +200 °C (-40 ... +392 °F) ⁴⁾
• Min. dielectric constant ϵ_r	1.5
• Min. difference in dielectric constant for interface measurement	5
Design	
Material	
• Enclosure	Aluminum, epoxy-coated
Probe diameter	
• Rod version	19 mm (0.75 inch) with PFA jacket
• Cable version	9 mm (0.35 inch) with PFA jacket, 6 mm (0.24 inch) without PFA jacket
Active shield length	
• Rod version	Threaded: 120 mm (4.72 inch) Flanged: 100 mm (3.94 inch)
• Cable version	Threaded: 125 mm (4.92 inch) Flanged: 105 mm (4.13 inch)
Process connection of probe	
• Threaded rod mounting	$\frac{3}{8}$ ", 1", 1 $\frac{1}{4}$ ", 1 $\frac{1}{2}$ " NPT [(Taper), ANSI/ASME B1.20.1] R $\frac{3}{8}$ ", 1", 1 $\frac{1}{2}$ " [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] G $\frac{3}{8}$ ", 1", 1 $\frac{1}{2}$ " [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]
• Threaded cable mounting	1 $\frac{1}{2}$ " NPT [(Taper), ANSI/ASME B1.20.1] R 1 $\frac{1}{2}$ " [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] G 1 $\frac{1}{2}$ " [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]
• Flange mounting	1 ... 4" ASME, DN 25 ... 100
Enclosure cable inlet	2 x $\frac{1}{2}$ " NPT or 2 x M20 x 1.5
Power supply	
	12 ... 30 V DC any polarity, 2-wire current loop circuit
User Interface	
Display	Local LCD, 4 digit, each 0 ... 9 and limited alpha characters
Safety	
Measurement current signaling	According to NAMUR NE 43, signal 3.8 ... 20.5 mA, fault \leq 3.6 or \geq 21 mA (22 mA)
Certificates and approvals	
General	CE, CSA _{USIC} , FM, RCM, KCC, EAC
Dust Ignition Proof (Intrinsically Safe probe circuit)	

Technical specifications (continued)

SITRANS LC300	
• Canada/USA	FM/CSA: Class II, Div. 1, Groups E, F, G Class III T4
• Europe	ATEX ½ D T100 °C
Flame Proof (Intrinsically Safe probe circuit)	
• Europe	ATEX II ½ G EEx d [ia] IIC T6 ... T1 ATEX II ½ D T100 °C
• Brazil	Ex d [ia Ga] IIC T6 ... T4 Gb Ex tb IIIC T85 °C ... T100 °C Db IP65/IP68
• Russia/Kazakhstan	EAC Ex
Explosion Proof (Intrinsically Safe probe circuit)	
• Canada/USA	Class I, Div. 1, Groups A, B, C, D Class II, Div. 1, Groups E, F, G Class III T4
Marine	ABS Type Approval, Lloyds Register
Overfill Protection	VLAREM II
Other	Pattern Approval (AQSIQ, China), CRN, PED

- 1) When operation is in areas classified as hazardous, observe restrictions according to relevant certificate. See also LC300 Pressure/Temperature curves.
- 2) Thermal isolator is used if process connection temperature exceeds 85 °C (185 °F)
- 3) Minimum voltage of 15 V DC is required for use at -40 °C (-40 °F)
- 4) Not suitable for steam environments

Design: Probe	Rod version	Stilling well version	Cable version
Length	Min. 300 mm (12 inch), max. 5 000 mm (197 inch)	Min. 300 mm (12 inch), max. 5 000 mm (197 inch)	Min. 1 000 mm (40 inch), max. 25 000 mm (984 inch)
Sensor wetted parts	PFA, 316L stainless steel	PFA, 316L stainless steel	316L stainless steel or 316L stainless steel with PFA insulation
O-ring seal material	FKM or FFKM	FKM or FFKM	FKM or FFKM
Thermal isolator	Optional	Optional	Optional
Options	N/A	N/A	Mounting eye for PFA insulated cable version

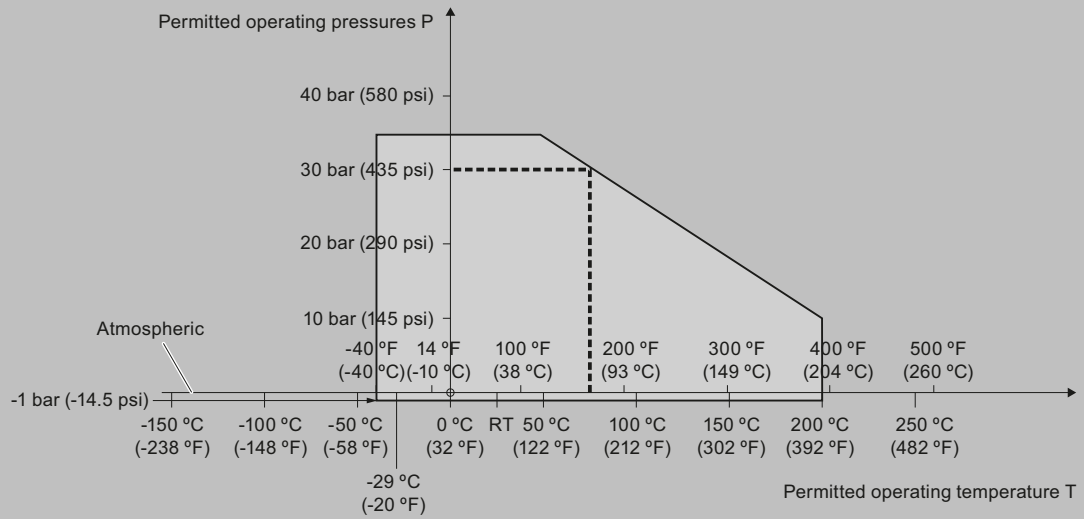
Level Measurement

Continuous level measurement

Capacitance transmitters / SITRANS LC300

Characteristic curves

Pressure/temperature curve
 LC300 standard, extended rod and cable probes
 Threaded process connections
 (7ML5670, 7ML5671, 7ML5672 and 7ML5673)

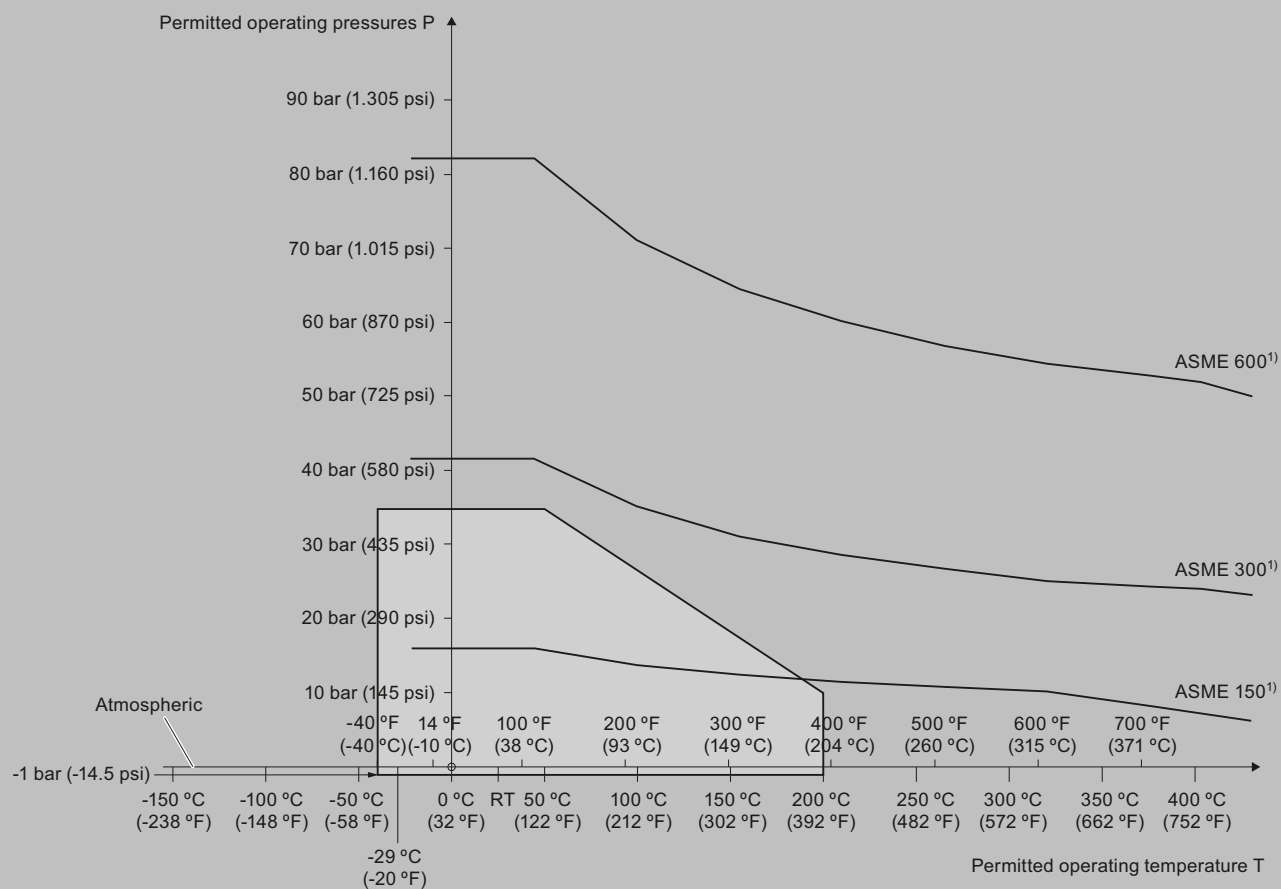


----- Example:
 Permitted operating pressure = 30 bar (435 psi) at 75 °C

SITRANS LC300 process pressure/temperature derating curves (7ML5670, 7ML5671, 7ML5672, and 7ML5673)

Characteristic curves (continued)

Pressure/temperature curve
 LC300 standard, extended rod and cable probes
 ASME flanged process connections
 (7ML5670, 7ML5671, 7ML5672 and 7ML5673)



¹⁾ The curve denotes the minimum allowable flange class for the shaded area below.

SITRANS LC300 process pressure/temperature derating curves (7ML5670, 7ML5671, 7ML5672, and 7ML5673)

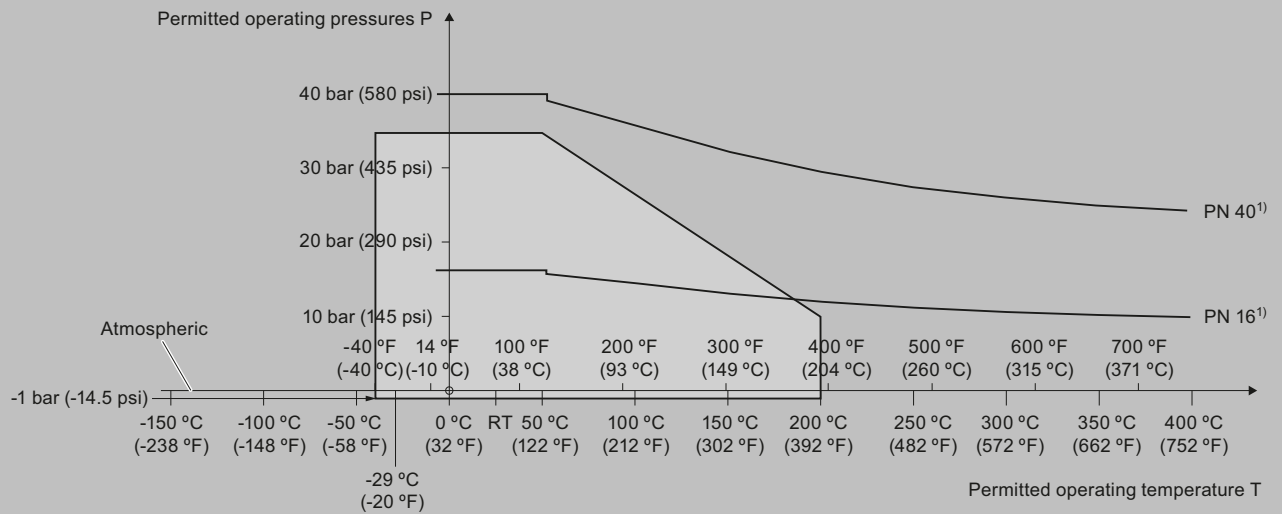
Level Measurement

Continuous level measurement

Capacitance transmitters / SITRANS LC300

Characteristic curves (continued)

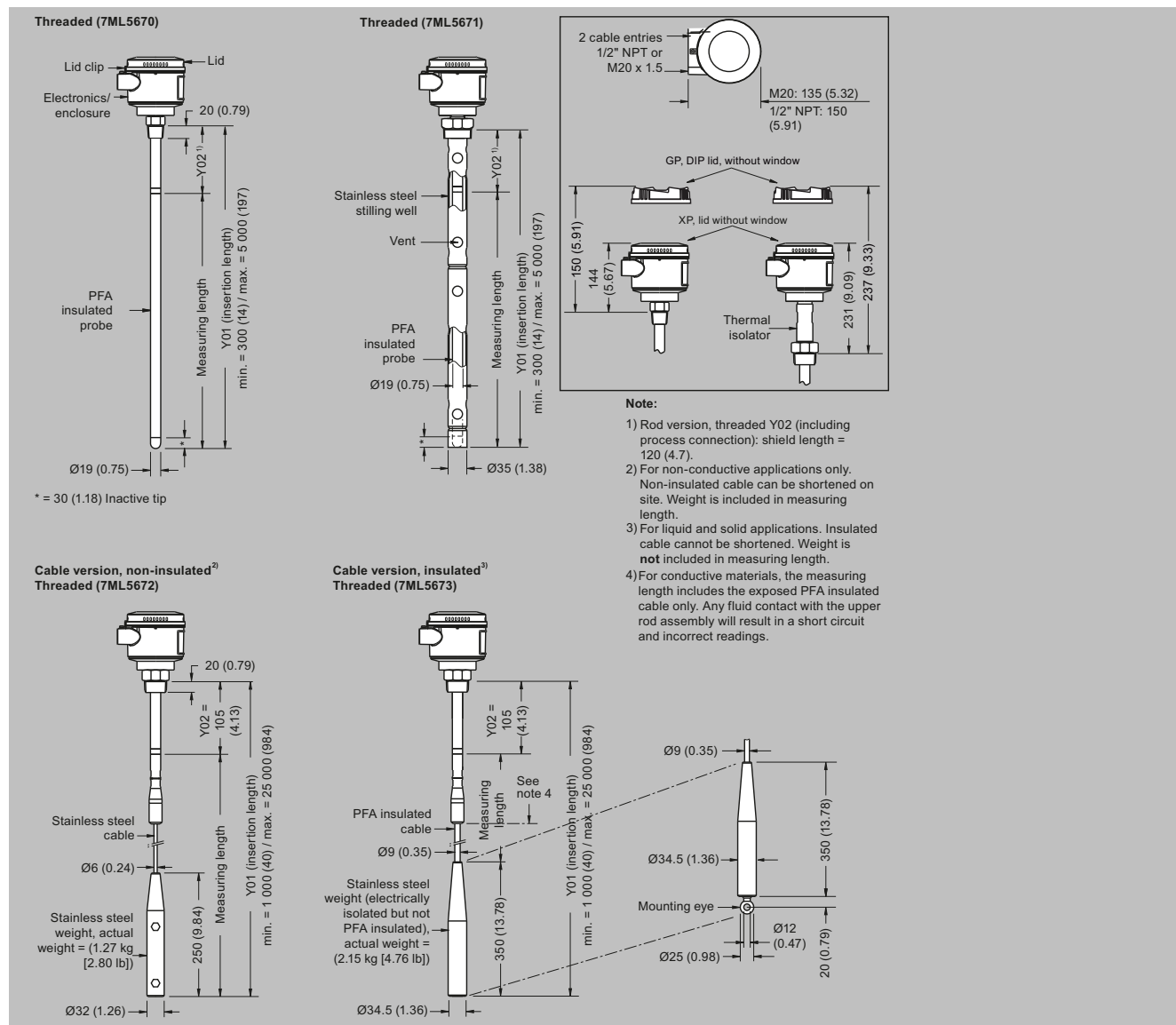
Pressure/temperature curve
 LC300 standard, extended rod and cable probes
 EN flanged process connections
 (7ML5670, 7ML5671, 7ML5672 and 7ML5673)



¹⁾ The curve denotes the minimum allowable flange class for the shaded area below.

SITRANS LC300 process pressure/temperature derating curves (7ML5670, 7ML5671, 7ML5672, and 7ML5673)

Dimensional drawings



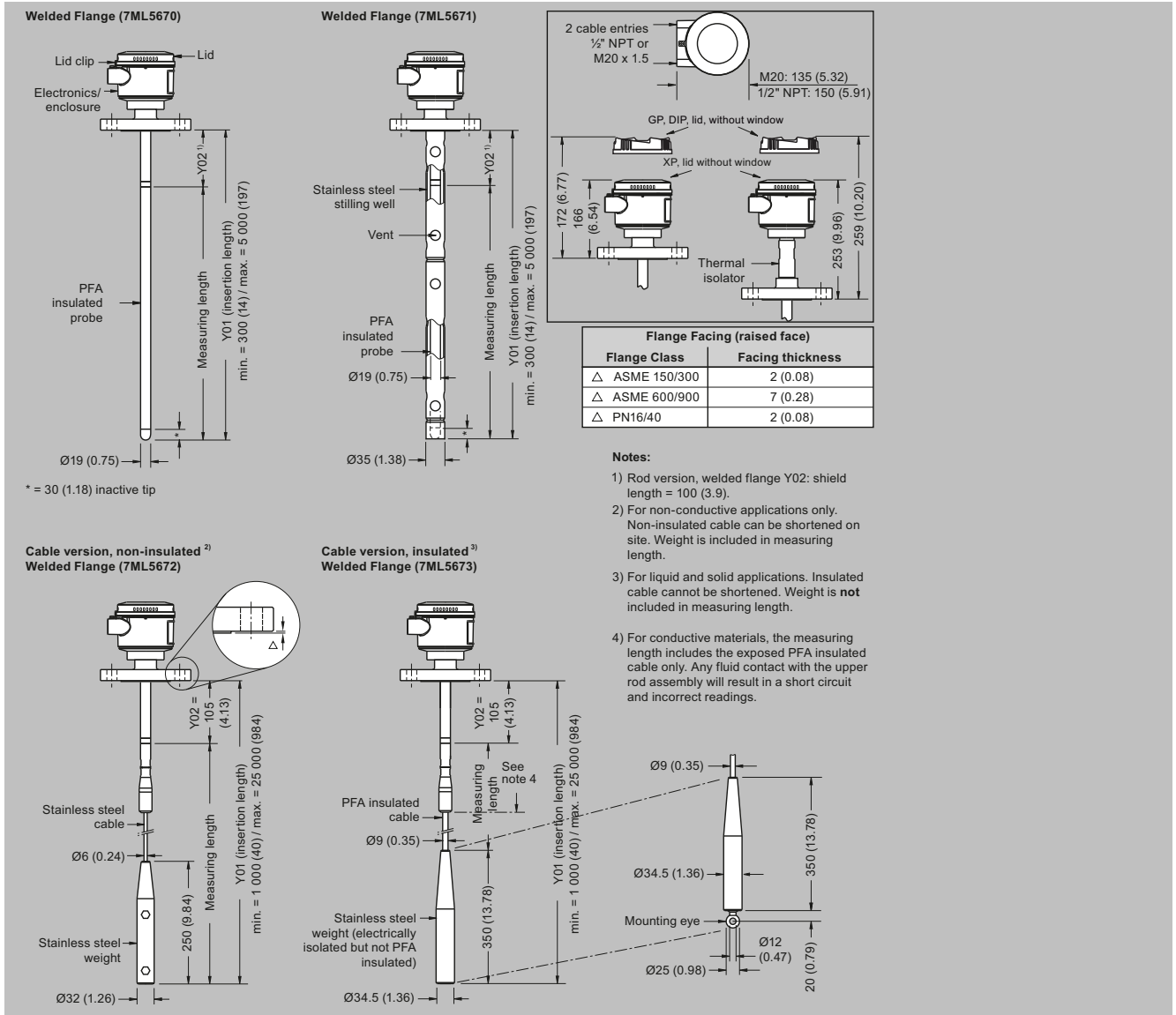
SITRANS LC300 threaded process connections, dimensions in mm (inch)

Level Measurement

Continuous level measurement

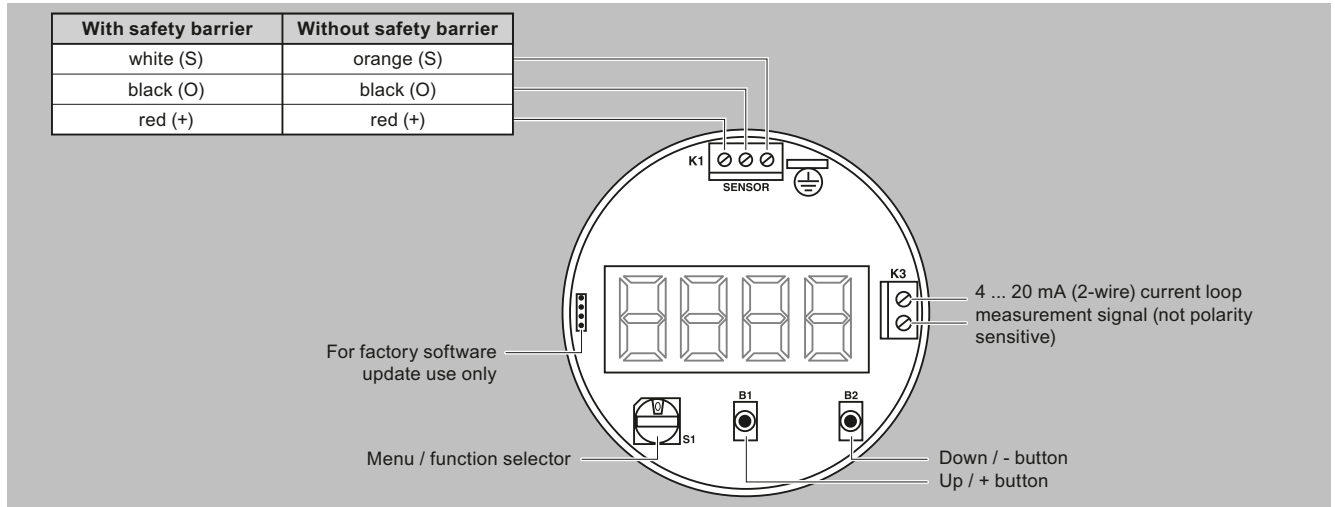
Capacitance transmitters / SITRANS LC300

Dimensional drawings (continued)



SITRANS LC300 flanged process connections, dimensions in mm (inch)

Circuit diagrams



Level Measurement

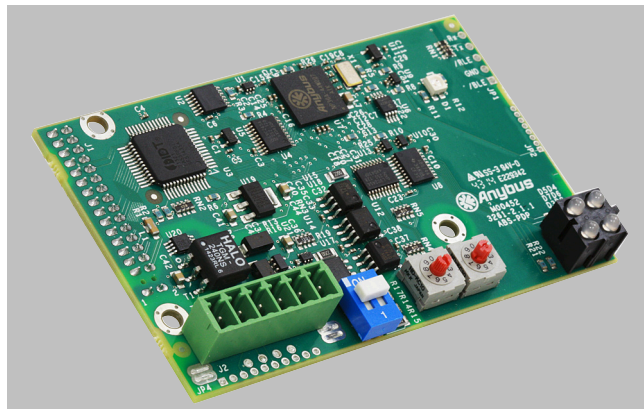
Communication

Overview

SmartLinx modules, Dolphin Plus software

- Description
 - Optional communication modules, SmartLinx, provide direct digital connection to popular industrial fieldbus systems
 - Dolphin Plus for quick and easy configuring, monitoring, tuning and diagnostics of Siemens devices

Overview



SmartLinX modules provide direct digital connection to popular industrial communications buses with true plug-and-play compatibility with products manufactured by Siemens.

Benefits

- Fast, easy installation
- Direct connection: no additional installation required
- Scalable application layer allows for optimized network bandwidth and memory requirements (for PROFIBUS DP-V0 and DeviceNet only)
- Modules available for PROFIBUS DP-V0, PROFIBUS DP-V1, PROFINET, DeviceNet, Modbus TCP/IP, and EtherNet/IP

Application

With the addition of a SmartLinX module, Siemens instruments can be connected to a variety of industrial communications networks. They're fast and easy to install, and can be added at any time. The module simply plugs into the socket on any SmartLinX enabled product. They require no secondary private buses or gateways and no separate wiring. There are no extra boxes to connect to your network so there's a minimum load on engineering and maintenance staff.

SmartLinX provides all data from the instrument, including measurement and status, and allows changes to operation parameters to be done over the bus or telemetry link. The user can select which data in the application layer to transfer over the bus. This selection saves bandwidth and memory and optimizes data throughput and speeds up the network, enabling you to connect more instruments to your network.

Selecting a communications module: PROFIBUS DP-V0 versus PROFIBUS DP-V1

The PROFIBUS DP-V1 card was added to MultiRanger 200 HMI and HydroRanger 200 HMI to provide acyclic communication and SIMATIC PDM support over PROFIBUS and PROFINET. For backward compatibility, the PROFIBUS DP-V0 card can also be used with MultiRanger 200 HMI and HydroRanger 200 HMI.

MultiRanger 100/200, HydroRanger 200, BW500/L, and SF500 are compatible only with the PROFIBUS DP-V0 module.

Selection and ordering data

Selection and Ordering data	Article No.
SmartLinX modules provide direct digital connection to popular industrial communications buses with true plug-and-play compatibility with products manufactured by Siemens.	
SmartLinX PROFIBUS DP-V0 module	7ML1830-1HR
SmartLinX PROFIBUS DP-V1 module	A5E35778741
SmartLinX DeviceNet module	7ML1830-1HT
SmartLinX PROFINET IO module ¹⁾	7ML1830-1PM
SmartLinX Modbus TCP/IP, EtherNet/IP module	7ML1830-1PN
Operating Instructions	
All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation	

¹⁾ SmartLinX PROFINET module is certified per standard V2.2.4.

Level Measurement Communication

SmartLinX module

Technical specifications

Module type	PROFIBUS DP-V0
Interface	RS 485 (PROFIBUS standard)
Transmission rate	All valid PROFIBUS DP rates from 9 600 Kbps ... 12 Mbps
Slave address	0 ... 99
Connection	Slave
SmartLinX module compatibility	<ul style="list-style-type: none"> • MultiRanger 200 HMI • MultiRanger 100/200 • HydroRanger 200 HMI • HydroRanger 200 • Milltronics BW500, BW500/L • Milltronics SF500

Module type	PROFIBUS DP-V1
Interface	RS 485 (PROFIBUS standard)
Transmission rate	All valid PROFIBUS DP rates from 9 600 Kbps ... 12 Mbps
Slave address	0 ... 99
Connection	Slave
SmartLinX module compatibility	<ul style="list-style-type: none"> • MultiRanger 200 HMI • HydroRanger 200 HMI

Module type	PROFINET IO module
Interface	RJ 45 female
Transmission rate	10/100 Mbits/s
Address	IP address through dip switches or via DCP or DHCP
Connection	Slave/server
SmartLinX module compatibility	<ul style="list-style-type: none"> • MultiRanger 200 HMI • HydroRanger 200 HMI • Milltronics BW500, BW500/L • Milltronics SF500

Module type	Modbus TCP/IP, EtherNet/IP
Interface	RJ 45 female
Transmission rate	10/100 Mbits/s
Address	IP address through dip switches or via DCP or DHCP
Connection	Slave/server
SmartLinX module compatibility	<ul style="list-style-type: none"> • MultiRanger 200 HMI • HydroRanger 200 HMI • Milltronics BW500, BW500/L • Milltronics SF500

Module type	DeviceNet
Interface	DeviceNet physical layer
Transmission rate	125, 250, 500
MAC address	0 ... 63
Connection	Slave (group 2)
SmartLinX module compatibility	<ul style="list-style-type: none"> • MultiRanger 200 HMI • MultiRanger 100/200 • HydroRanger 200 HMI • HydroRanger 200 • Milltronics BW500, BW500/L • Milltronics SF500

Positioners



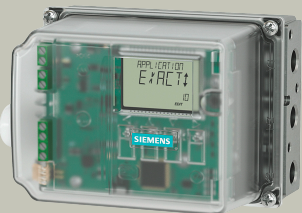


5/2	Product overview
5/3	SIPART PS2
5/34	SIPART PS100

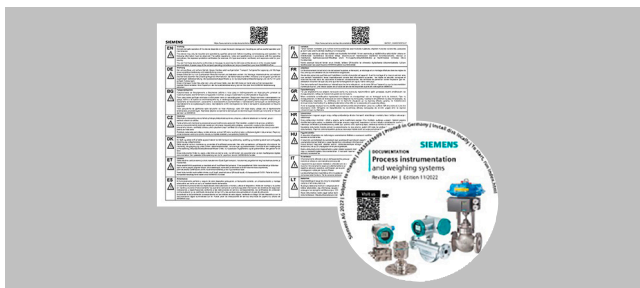
Positioners

Product overview

Overview

Positioners			
Type	Area of application	Device description	Software for parameterization
SIPART PS2 	Position control of pneumatic linear or part-turn actuators	In polycarbonate, aluminum or stainless steel enclosure <ul style="list-style-type: none"> • Connection: 4 ... 20 mA • HART, PROFIBUS PA, FOUNDATION Fieldbus • No explosion protection or intrinsically safe Ex i, Ex e, Ex t • Modularly extensible with limit switches, sensors, etc. • Digital inputs and outputs • Automatic commissioning • Diagnostic functions • Manual operation on the device 	SIMATIC PDM
SIPART PS2 (for hazardous areas) 	Position control of pneumatic linear or part-turn actuators	Same as above, but here in flameproof aluminum or stainless steel enclosure <ul style="list-style-type: none"> • Not Ex • Flameproof Ex d • Intrinsically safe Ex i, Ex e, Ex t • Flameproof and intrinsically safe Ex d + Ex i 	SIMATIC PDM
SIPART PS100 	Position control of pneumatic linear or part-turn actuators	In polycarbonate or aluminum enclosure <ul style="list-style-type: none"> • Connection: 4 ... 20 mA • HART • Digital inputs and outputs • Automatic commissioning at the push of a button • Manual operation on the device 	

Supplied product documentation on DVD and safety notes



The scope of delivery of the Siemens products for process instrumentation includes a multilingual instruction sheet with safety notes as well as a uniform **mini DVD – Process Instrumentation and Weighing Systems**. This DVD contains the most important manuals and certificates for the Siemens process instrumentation and weight measurement portfolio. The delivery may also contain product-specific or order-specific printed materials. For more information, refer to the Annex.

Overview



SIPART PS2 in polycarbonate enclosure with gauge block (optional)



SIPART PS2 in aluminum enclosure



SIPART PS2 in stainless steel enclosure with gauge block (optional)

Overview (continued)



SIPART PS2 in flameproof aluminum enclosure (Ex d) with gauge block (optional)



SIPART PS2 in flameproof stainless steel enclosure 316L with gauge block (optional)

SIPART PS2 positioners control the valve position according to set-point value specification on pneumatic valves. The valve can be verified with various intelligent online (during operation) and off-line (e.g. between batch processes) diagnostic functions. Diagnostic functions can be optionally expanded by pressure sensors.

Positioners

SIPART PS2

Benefits

SIPART PS2 positioners excel in their:

- Easy installation
- Automatic commissioning
- Simple operation and on-device configuration with local display or via SIMATIC PDM
- Very high control performance
- Minimal air consumption in stationary operation
- "Close tight" function for maximum torque on the process valve seat
- "Fast Open/Fast Close" function for defined approach of the end position with fast reaction to new setpoint specifications
- "Fail Safe" function: Secure depressurization SIL 2 in case of failure of electrical auxiliary power
- "Fail in place" function: Maintain current position on failure of electrical and/or pneumatic auxiliary power
- "Fail to Open" function: Pressurizing of the actuator in case of failure of electrical auxiliary power
- Numerous functions can be activated by simple configuring (e.g. characteristic curves and limits)
- One device variant for all applications: Linear actuators, part-turn actuators and cylinders
- Optional with internal or external contactless position feedback for external ambient conditions
- "Intelligent solenoid valve": Solenoid valve function and diagnostics in one device
- Extensive diagnostic functions:
 - Full Stroke Test
 - Multi Step Response Test
 - Valve Performance Test
 - Valve Signature, pressure sensor-aided
 - Partial Stroke Test, optionally pressure sensor-supported for performance and maintenance assessment of the valve
 - Leakage monitoring
- Can be operated with natural gas, carbon dioxide, nitrogen or noble gases

Application

The SIPART PS2 is used in the following industry sectors:

- Valve manufacturing
- Chemical industry
- Petrochemical industry
- Oil and gas
- Paper
- Water and wastewater
- Power supply
- Pharmaceuticals
- Food and beverages

The devices are available in variants for:

- 4 to 20 mA
- HART communication
- PROFIBUS PA communication
- FOUNDATION Fieldbus communication
- Single- and double-acting valves in various enclosure designs and various materials (polycarbonate, aluminum and stainless steel)
- Applications without explosion protection requirements
- Hazardous applications in the versions:
 - Device protection with intrinsic safety (Ex i) for use in Zone 1, 2, 21, 22 or Class I, II, III/Division 1/Groups A-G
 - Device dust ignition protection by enclosure (Ex t) for use in Zone 21, 22 or Class II, III/Division 1/Groups E-G
 - Device protection with increased security (Ex e) for use in Zone 2 or Class I, Division 2, Groups A-D
 - Device protection with flameproof enclosure (Ex d) for use in Zone 1 or Class I, Division 1, Groups A-D

Stainless steel enclosure for extreme ambient conditions

The SIPART PS2 is available in a stainless steel enclosure for use in particularly aggressive environments (e.g. offshore operation, chlorine plants). The device functionality is not different due to the enclosure variants.

Design

The SIPART PS2 digital positioner comprises the following components:

- Base plate with lid with/without inspection window, depending on the variant
- Electronics with screw-type terminals:
 - 4 to 20 mA
 - 4 to 20 mA with HART
 - PROFIBUS PA according to IEC 61158-2, bus-supplied
 - FOUNDATION Fieldbus (FF) according to IEC 61158-2, bus-supplied
- Position feedback via potentiometer or non-contacting sensor (NCS)
- Pneumatic block

The pneumatic connections for supply air and actuating pressure are located on the right side of the enclosure. A gauge block, venting gauge block, booster, VDI3847 interface or a safety solenoid valve can be connected there as options. The SIPART PS2 positioner is fitted to the linear or part-turn actuator using an appropriate mounting kit.

Optional expansion with modules and functions

Optionally, SIPART PS2 can be expanded with the following modules and functions:

Analog Output Module (AOM)

Analog position feedback 4 to 20 mA.

Digital I/O Module (DIO) with 3 digital outputs and 1 digital input

- Signaling of two limits of the travel or angle. The two limits can be assigned parameters independently as maximum or minimum values.
- Output of an alarm if the setpoint position of the final control element is not reached in automatic mode or if a device/valve fault occurs.
- 2nd digital input for alarm signals or for triggering safety reactions, e.g. hold position or approach safety position.

Inductive Limit Switches (ILS)

Via the inductive switches, 2 independent limits can be set and monitored as NAMUR signal (EN 60947-5-6). The module also contains an integrated fault indicator (see "Digital I/O Module (DIO)").

Mechanic Limit Switches (MLS)

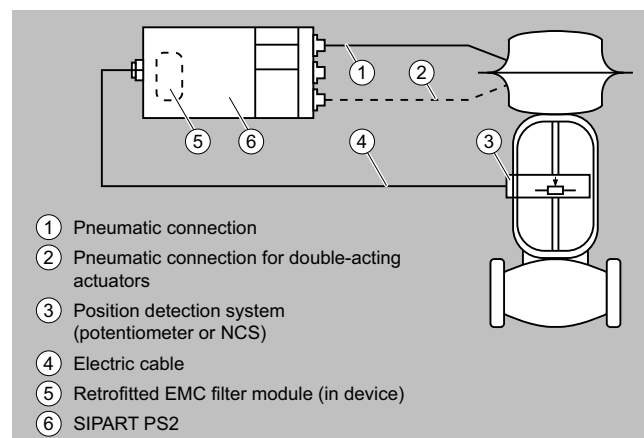
2 independent limits can be monitored via the mechanical switches. The module also contains an integrated fault indicator (see "Digital I/O Module (DIO)").

Valid for all modules described above:

- All signals are electrically isolated from one another and from the basic unit. The outputs indicate self-signaling faults. The modules are easy to retrofit.

Separate mounting of positioner and position detection

Separate mounting of the positioner and position detection can be implemented with SIPART PS2. Only measurement of the stroke or angle, for example, is carried out directly on the actuator. This means that the positioner can be installed at a distance in a protected area. Components are connected electrically via a cable and pneumatically via tubes or pipes. The system is often advantageous if the ambient conditions at the valve exceed the specified values for the positioner (e.g. strong vibrations, radiation, magnetism).

Design (continued)

Separate installation of the position detection and positioner SIPART PS2

Use for position detection

The following can be used for position detection:



SIPART PS2, NCS for strokes > 14 mm

- Non-contacting sensor (NCS)
- Position Transmitter
- Linear potentiometers
- Commercial sensors

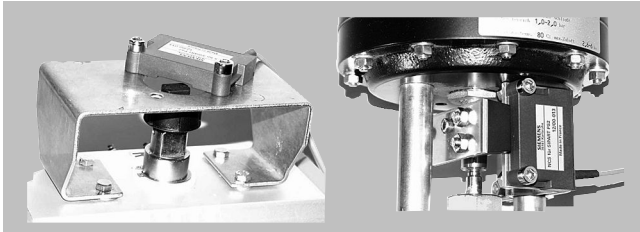
Non-contacting sensor (NCS)

For SIPART PS2

Positioners

SIPART PS2

Design (continued)



Left: NCS for part-turn actuator (6DR4004-.N.10) mounted on mounting console 6DR4004-1D to 4D
 Right: NCS for linear actuator (6DR4004-.N.20) mounted with actuator-specific/customer-specific mounting solution

Position Transmitter

With potentiometer, with NCS, with NCS and ILS or with NCS and MLS for SIPART PS2.
 Mounting takes place like with SIPART PS2.



Linear potentiometers

With 3K, 5K or 10 to 20 kΩ (e.g. pneumatic cylinder).

Commercial sensors

With 4 to 20 mA or 0 to 10 V (only with non-ex applications).

Function

Monitoring functions

The SIPART PS2 has comprehensive monitoring functions with which changes on the actuator and process valve can be detected and signaled depending on the set limit. This information provides important indications on the status of the valve.

Determined/monitored measuring data:

- Travel integral
- Number of changes in direction
- Alarm counter
- Self-adjusting dead zone
- Process valve end position (e.g. for detection of process valve seat wear or deposits)
- Operating hours (also according to temperature and position ranges) as well as min./max. temperature
- Operating cycles of piezoelectric valves in pneumatic block
- Process valve travel time
- Actuator leakages

At a glance with the Diagnostics Cockpit

With the Diagnostics Cockpit, the HART variants of the SIPART PS2 provide a straightforward way of getting started with the world of diagnostic capabilities. All relevant information on the valve, such as setpoint, actual value, control deviation, status of the diagnostic system, etc., is available at a glance. Additional facts and details are just a few mouse clicks away from the Diagnostics Cockpit.

Status monitoring with 3-stage alarm concept

The intelligent electropneumatic SIPART PS2 positioner is equipped with additional monitoring functions. The status alarms derived from these monitoring functions signal active faults of the valve with grading in the form of traffic light signaling. The status alarms are symbolized by a wrench in the colors green, yellow and red (in SIMATIC PDM and Maintenance Station):

- Maintenance required (green wrench)
 - Urgent maintenance demanded (yellow wrench)
 - Imminent danger of valve failure or general failure (red wrench)
- This allows users to put early measures into action before an acute process valve or actuator fault occurs which could result in a system shutdown. Early alarms indicate, for example, the onset of a diaphragm break in the actuator or progressive sluggishness of a valve. In this way, users can guarantee plant safety and availability with suitable maintenance strategies.

This 3-stage alarm hierarchy also allows early detection and signaling of static friction of a gland, wear of a process valve plug/seat, or deposits or coatings on the fittings.

These fault indications can be output either line-conducted over the alarm outputs of the positioner (maximum 3), or via communication over the HART or fieldbus interfaces. In this case, the HART, PROFIBUS and FOUNDATION Fieldbus variants of SIPART PS2 allow for differentiation of the various fault indications, as well as a trend representation and histogram function of all key process variables with regard to the valve.

The device's local display also displays the graded maintenance requirements, complete with identification of the source of the fault.

Maintenance required of control valves

The Full Stroke Test, Step Response Test, Multi Step Response Test and Valve Performance Test provide detailed information about the maintenance required of the valve. With the help of the HART communication system, you receive comprehensive test results and can identify the extent of the maintenance measures. In order to quantify the performance capability of valves, characteristic values such as step response times (T63, T86 or Txx), dead times, over-

Function (continued)

shoot, hysteresis, measurement deviations and non-linearity are determined.

Functional Safety according to SIL 2

In the variants 6DR5.1.-0....-Z C20, the positioner is suitable for use on single-acting valves with spring return that satisfy the special requirements in terms of functional safety up to SIL 2 according to IEC 61508 or IEC 61511. The positioner depressurizes the process valve actuator on demand/in the event of a fault (safe depressurizing) and puts the process valve in the preset safety position.

Valve Signature

With pressure sensor-aided Valve Signature, the characteristic curve of the valve can be recorded, saved in the device (max. 10 characteristic curves) and displayed in PDM, for example. The reference characteristic curve is recorded at the beginning directly during initialization. Based on the exportable data, friction values, spring characteristics, hysteresis, breakout pressures can be determined. If the test is regularly repeated, characteristic curves can be compared with one another and changes over time can be displayed as the basis for a predictive maintenance approach.

Partial Stroke Test

With the pressure sensor-aided Partial Stroke Test, the function of safety (open/close) valves can be checked reliably during operation. Up to 10 characteristic curves and important parameters are saved in the device. They can be displayed in PDM, for example. Recording of the reference characteristic curve takes place during operation and in settled state. Based on the exportable data, friction values, spring characteristics, hysteresis, breakout pressures can be determined. If the test is regularly repeated, characteristic curves can be compared with one another and changes over time can be displayed as the basis for a predictive maintenance approach.

Intelligent solenoid valve

The SIPART PS2 can (parameterizable) take on the function of a solenoid valve for open/close valves and also offers intelligent diagnostics for valves with the pressure sensor-aided Partial Stroke Test, for example. For devices without explosion protection and only in connection with the pressure sensor-aided diagnostics, SIPART PS2 can also be operated with 24 V, i.e. without additional wiring. All other devices must be supplied with 4 to 20 mA. SIPART PS2 takes on the function as "Intelligent solenoid valve" with additional pressure sensor-aided diagnostics and handles multiple tasks in one device:

- The positioner opens and closes the valve quickly and without control.
- In a safety scenario, during power failure, the SIPART PS2 drives the valve into the safety position "Functional Safety according to SIL 2".
- A pressure sensor-aided Partial Stroke Test can be performed automatically at regular intervals. This test keeps the valve in regular movement and prevents rusting of the valve due to corrosion or incrustation.

Solenoid valves on control valves normally cannot be tested during operation. They are therefore not necessary when using SIPART PS2 as the depressurizing is carried out on demand by SIPART PS2. This means that, on control valves, both the control function and the shut-off function can be carried out by a single device.

Configuring

The SIPART PS2 positioner contains the following configurations:

- Input current range 4 to 20 mA
- Rising or falling characteristic curve at the setpoint input
- Positioning speed limit (setpoint ramp)
- Split-range mode: Adjustable start-of-scale and full-scale values
- Response threshold (deadband); self-adjusting or fixed


Function (continued)

- Direction of action: Rising or falling output pressure with rising setpoint
- Limits of position range, start-of-scale/full-scale value
- Limits (alarms) of the process valve position: Minimum and maximum value
- Automatic tight closing stroke adjustment in accordance with the valve process characteristic curve
- Function of the digital inputs
- Function of alarm output, etc.

Positioners

SIPART PS2

Selection and ordering data

	Article No.	Order code
SIPART PS2 electropneumatic positioner	6DR5 ●●●-0●●●-0●●●●●●●●●	
		
Click the article number for online configuration in the PIA Life Cycle Portal.		
Version		
4 ... 20 mA	0	
4 ... 20 mA, HART	1	N ¹⁾
4 ... 20 mA (3-/4-wire)	1	N ¹⁾
PROFIBUS PA	5	
FOUNDATION Fieldbus	6	
Without electronics (for 19-inch remote variant)	9	
Actuator		
Single-acting	1	
Double-acting	2	
Enclosure		
Polycarbonate, glass-fiber reinforced ²⁾	0	
Stainless steel, without inspection window, 1.4581	2	
Aluminum, AISi12	3	
Type of protection (Ex)		
Without explosion protection		N
Increased safety (Ex e) ³⁾ , dust ignition protection by enclosure (Ex t) ³⁾		D
Intrinsic safety (Ex i)		E
SITRANS I200 output isolation amplifier sold separately (7NG4131-1AA00)		
Intrinsic safety (Ex i), increased safety (Ex e) ³⁾		F
SITRANS I200 output isolation amplifier sold separately (7NG4131-1AA00)		
Increased safety (Ex e) ³⁾		G
Intrinsic safety (Ex i), increased safety (Ex e) ³⁾ , dust ignition protection by enclosure (Ex t) ³⁾		K
SITRANS I200 output isolation amplifier sold separately (7NG4131-1AA00)		
Connection thread electric/pneumatic		
M20×1.5 / G¼		G
½-14 NPT / ¼-18 NPT		N
M20×1.5 / ¼-18 NPT		M
½-14 NPT / G¼		P
M12 device plug (A coding) for electronics ⁴⁾ / G¼ The M12 cable socket can be ordered separately with 6DR4004-5A.		R
M12 device plug (A coding) for electronics ⁴⁾ / ¼-18 NPT The M12 cable socket can be ordered separately with 6DR4004-5A.		S
Limit monitor		
Including 2nd cable gland		
None		0
Digital I/O Module (DIO), 1 digital input, 3 digital outputs (2 limits min. or max., 1 fault indicator). Device plug M12 optionally orderable with -Z D55.		1
Inductive Limit Switches (ILS), 2 inductive limit switches and 1 digital output (DQ) Device plug M12 optionally orderable with -Z D56.		2
Mechanic Limit Switches (MLS), 2 mechanical limit switches and 1 digital output (DQ). Not applicable for natural gas applications. Device plug M12 optionally orderable with -Z D57.		3
Internal NCS module for non-contacting position detection. The internal position detection via a potentiometer is not applied but can be ordered in addition with -Z K11.		9
		L 1 A
Option modules		
Including 2nd cable gland		
None		0
Analog Output Module (AOM), analog position feedback 4 ... 20 mA. Device plug M12 optionally orderable with -Z D53. SITRANS I100 isolating power supply sold separately (7NG4124-1AA00)		1

Selection and ordering data (continued)

	Article No.	Order code	
SIPART PS2 electropneumatic positioner	6DR5 ● ● ● - 0 ● ● ● ● - 0 ● ● ● ● ● ● ● ●		
Analog Input Module (AIM) to connect external position detection systems, e. g. NCS Sensor, Position Transmitter 6DR4004-1ES/2ES/3ES/4ES or other sensors. The internal position detection is not applied but can be ordered in addition with -Z K11. Device plug M12 optionally orderable with -Z D54. SITRANS I100 isolating power supply sold separately (7NG4124-1AA00)		2	
Analog Output Module (AOM) and Analog Input Module (AIM). The internal position detection via a potentiometer is not applied but can be ordered in addition with -Z K11. Device plug M12 is not available.		3	
Brief instructions			
English/German/Chinese		A	
French/Italian/Spanish		B	
Version			
Standard / Fail-safe			A
• Depressurizing the actuator in case of failure of electrical auxiliary power			
Fail in Place			F
• Maintain position in case of failure of electrical and/or pneumatical auxiliary power			
Fail to Open			G
• Pressurizing of the actuator in case of failure of electrical auxiliary power			
Gauge block			
None			0
With pressure gauges made of plastic IP31 (MPa, bar)			
• Block made of aluminum, single-acting, G $\frac{1}{4}$			1
• Block made of aluminum, double-acting, G $\frac{1}{4}$			2
With pressure gauges made of plastic IP31 (MPa / psi)			
• Block made of aluminum, single-acting, $\frac{1}{4}$ -18 NPT			3
• Block made of aluminum, double-acting, $\frac{1}{4}$ -18 NPT			4
With pressure gauges made of metal IP44 (MPa, bar, psi)			
• Block made of aluminum, single-acting, G $\frac{1}{4}$		9	R 1 A
• Block made of aluminum, double-acting, G $\frac{1}{4}$		9	R 2 A
• Block made of aluminum, single-acting, $\frac{1}{4}$ -18 NPT		9	R 1 B
• Block made of aluminum, double-acting, $\frac{1}{4}$ -18 NPT		9	R 2 B
With pressure gauges made of stainless steel IP54 (MPa, bar, psi)			
• Block made of stainless steel 316, single-acting, G $\frac{1}{4}$		9	R 1 C
• Block made of stainless steel 316, double-acting, G $\frac{1}{4}$		9	R 2 C
• Block made of stainless steel 316, single-acting, $\frac{1}{4}$ -18 NPT		9	R 1 D
• Block made of stainless steel 316, double-acting, $\frac{1}{4}$ -18 NPT		9	R 2 D
* Can be ordered on request		*	* * *
Pressure gauge block 316 with gauge IP65, 316L (MPa, bar, psi)			
Venting gauge block			
Depressurizing of Y2 on compressed air failure with pressure gauges made of metal IP44 (MPa, bar, psi). The double-acting actuator with springs moves into the safety position.			
• Block made of aluminum, double-acting, G $\frac{1}{4}$		9	R 2 E
• Block made of aluminum, double-acting, $\frac{1}{4}$ -18 NPT		9	R 2 F
Booster (Cv = 2)			
Aluminum with gauges made of metal IP44 (MPa, bar, psi)			
• Single-acting, G $\frac{1}{2}$		9	R 1 J
• Double-acting, G $\frac{1}{2}$		9	R 2 J
• Single-acting, $\frac{1}{2}$ -14 NPT		9	R 1 K
• Double-acting, $\frac{1}{2}$ -14 NPT		9	R 2 K

1) Explosion protection Ex i only available in connection with order option -Z P01/P02

2) Only for type of protection Ex i

3) Impact energy on inspection window max. 2 joule for aluminum enclosure 6DR5..3.

4) Device plug M12 mounted and electrically connected in versions 6DR50.., 6DR51.., 6DR55.. and 6DR56..

Positioners

SIPART PS2








Selection and ordering data (continued)

Options Add "-Z" to article number, specify order code and plain text	Order code
Stainless steel sound absorber Standard with stainless steel enclosures	A40
Functional safety (SIL 2) for 6DR5.1. only (single-acting positioner) Device suitable for use according to IEC 61508 and IEC 61511	C20
M12 device plug (D coding) The M12 cable socket can be ordered separately with 6DR4004-5D.	
Connected with Analog Output Module (AOM)	D53
Connected with Analog Input Module (AIM)	D54
Connected with Digital I/O Module (DIO)	D55
Connected with Inductive Limit Switches (ILS)	D56
Connected with Mechanic Limit Switches (MLS)	D57
Optimized control behavior for small actuators (< 200 cm³)	K10
Additional internal position detection by means of a potentiometer	K11
Pneumatic terminal strip made of stainless steel 316	K18
Interface according to VDI/VDE 3847 For single and double-acting, with CATS (Clean Air To Spring) only for single-acting. Not for flameproof enclosure.	K20
Operation with natural gas Device is optimized for natural gas operation and contains corrosion-protected, painted electronics and high-quality FVMQ elastomers. Exhaust air (natural gas) cannot be dissipated collectively.	K50
Permissible ambient temperature during operation -40 ... 80 °C (-40 ... +176 °F) For 6DR5..1., 6DR5..2., 6DR5..3.: Lid without inspection window	M40
Pressure sensor supported monitoring / diagnostics	
Monitoring of the device/custom min./max. supply pressure PZ. Hold position on demand. Messages according to NAMUR NE107.	P01
Monitoring of the device/custom min./max. supply pressure PZ. Hold position on demand. Valve Signature, Partial Stroke Test, monitoring of leakage and actuating pressure (triggered), actuating pressure limitation for single-acting actuators. Messages according to NAMUR NE107.	P02
Certificates	
EN 10204 certificate type 2.1	C35
DNV (Det Norske Veritas)	S10
LR (Lloyds Register)	S11
BV (Bureau Veritas)	S12
ABS (American Bureau of Shipping)	S14
KR (Korean Register of Shipping)	S15
CCS (China Classification Society)	S16
RINA (Registro Italiano Navale)	S17
TAG plate made of stainless steel, 3-line Text line 1: plain text from Y17 Text line 2: plain text from Y15 Text line 3: plain text from Y16	A20
Measuring point description Input field: Max. 16 characters for HART, max. 32 characters for PROFIBUS PA, FOUNDATION Fieldbus and 4 ... 20 mA; specify in plain text	Y15



Selection and ordering data (continued)

Options	Order code
Add "-Z" to article number, specify order code and plain text	
Measuring point text Input field: Max. 24 characters for HART, max. 32 characters for PROFIBUS PA, FOUNDATION Fieldbus and 4 ... 20 mA; specify in plain text	Y16
Measuring point number (TAG no.) Input field: Max. 32 characters; specify in plain text	Y17
Preset bus address Input field: Specify in plain text (for 6DR55.. and 6DR56.. only)	Y25
Customer-specific parameter setting Input field: Specify in plain text	Y30
Special design / Product Variant Request (PVR) Input field: Specify order number from PVR clarification in plain text	Y99
Examples:	
• Conformal coating / Tropicalization	VP001
• Gauge block with IP65 gauge	VP002
• SIPART PS2 for part-turn applications up to 180°	VP003
Creation of a "Product Variant Request" is a prerequisite	

Nameplate on SIPART PS2, tag plate made of stainless steel

<p>SIEMENS</p> <p>6DR5213-0K*90-0AA0 -Z P01;Y99;S10;S11;S12;S14;S15;S16 <FW> <HW> IP66, NEMA Type 4X, p = 1.4...7 bar AI = 4...20 mA, I_{max} = 100 mA U_{max} = 35 V  <option Y99></p>	    <p>R-R-549</p>  <p>PROCESS CONTROL EQUIPMENT</p>	<input type="checkbox"/> DIO <input type="checkbox"/> ILS <input type="checkbox"/> MLS <input checked="" type="checkbox"/> NCS <input type="checkbox"/> AIM <input type="checkbox"/> AOM	 <p>SIN: NTAG101234567</p>
		<p>Y25=0000</p>	

Y17:XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX


 Y15:YYYYYYYYYYYYYYYYYYYYYYYYYYYYYY 

Y16:ZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZ

Positioners

SIPART PS2

Selection and ordering data (continued)

	Article No.	Order code
SIPART PS2 electropneumatic positioner, in flameproof enclosure	6DR5 ● ● ● - 0 ● ● ● - 0 ● ● ● ● ● ● ● ● ● ●	
		
Click the article number for online configuration in the PIA Life Cycle Portal.		
Version		
4 ... 20 mA	0	
4 ... 20 mA, HART	1	
PROFIBUS PA	5	
FOUNDATION Fieldbus	6	
Actuator		
Single-acting	1	
Double-acting	2	
Enclosure		
Aluminum, flameproof, AISi12	5	
Stainless steel, 316L, flameproof, 1.4409	6	
Type of protection (Ex)		
Without explosion protection		N
Flameproof enclosure (Ex d), Dust ignition protection by enclosure (Ex t)		E
Intrinsic safety (Ex i), increased safety (Ex e)		F
SITRANS I200 output isolation amplifier sold separately (7NG4131-1AA00)		
Increased safety (Ex e)		G
Intrinsic safety (Ex i), increased safety (Ex e), dust ignition protection by enclosure (Ex t)		K
SITRANS I200 output isolation amplifier sold separately (7NG4131-1AA00)		
Flameproof enclosure (Ex d), dust ignition protection by enclosure (Ex t), Intrinsic safety (Ex i)		P
SITRANS I200 output isolation amplifier sold separately (7NG4131-1AA00)		
Connection thread electrical/pneumatic		
M20×1.5 / G¼		G
½-14 NPT / ¼-18 NPT		N
M20×1.5 / ¼-18 NPT		M
½-14 NPT / G¼		P
M25×1.5 / G¼		Q
Limit monitor		
None		0
Digital I/O Module (DIO), 1 digital input, 3 digital outputs (2 limits min. or max., 1 fault indicator).		1
Inductive Limit Switches (ILS), 2 inductive limit switches and 1 digital output (DQ).		2
Mechanic Limit Switches (MLS), 2 mechanical limit switches and 1 digital output (DQ). Not applicable for natural gas applications.		3
Internal NCS module for non-contacting position detection. The internal position detection via a potentiometer is not applied but can be ordered in addition with -Z K11.		9
		L 1 A
Option modules		
None		0
Analog Output Module (AOM), 4 ... 20 mA current module		1
SITRANS I100 isolating power supply sold separately (7NG4124-1AA00)		

Selection and ordering data (continued)

	Article No.	Order code
SIPART PS2 electropneumatic positioner, in flameproof enclosure	6DR5 ● ● ● - 0 ● ● ● ● - 0 ● ● ● ● ● ● ● ●	
Analog Input Module (AIM) to connect external position detection systems, e. g. NCS Sensor, Position Transmitter 6DR4004-1ES/2ES/3ES/4ES or other sensors. The internal position detection is not applied but can be ordered in addition with -Z K11.		2
Analog Output Module (AOM) and Analog Input Module (AIM). The internal position detection via a potentiometer is not applied but can be ordered in addition with -Z K11. SITRANS I100 isolating power supply sold separately (7NG4124-1AA00)		3
Brief instructions		A B
English/German/Chinese		A
French/Italian/Spanish		B
Version		A F G
Standard / Fail-safe		A
• Depressurizing the actuator in case of failure of electrical auxiliary power		
Fail in Place		F
• Maintain position in case of failure of electrical and/or pneumatical auxiliary power		
Fail to Open		G
• Pressurizing of the actuator in case of failure of electrical auxiliary power		
Gauge block		0
None		
With pressure gauges made of plastic IP31 (MPa, bar)		1
• Block made of aluminum, single-acting, G $\frac{1}{4}$		2
• Block made of aluminum, double-acting, G $\frac{1}{4}$		3
With pressure gauges made of plastic IP31 (MPa / psi)		4
• Block made of aluminum, single-acting, $\frac{1}{4}$ -18 NPT		
• Block made of aluminum, double-acting, $\frac{1}{4}$ -18 NPT		
With pressure gauges made of metal IP44 (MPa, bar, psi)		9
• Block made of aluminum, single-acting, G $\frac{1}{4}$		R 1 A
• Block made of aluminum, double-acting, G $\frac{1}{4}$		R 2 A
• Block made of aluminum, single-acting, $\frac{1}{4}$ -18 NPT		R 1 B
• Block made of aluminum, double-acting, $\frac{1}{4}$ -18 NPT		R 2 B
With pressure gauges made of stainless steel IP54 (MPa, bar, psi)		9
• Block made of stainless steel 316, single-acting, G $\frac{1}{4}$		R 1 C
• Block made of stainless steel 316, double-acting, G $\frac{1}{4}$		R 2 C
• Block made of stainless steel 316, single-acting, $\frac{1}{4}$ -18 NPT		R 1 D
• Block made of stainless steel 316, double-acting, $\frac{1}{4}$ -18 NPT		R 2 D
* Can be ordered on request		* * * *
Pressure gauge block 316 with gauge IP65, 316L (MPa, bar, psi)		
Venting gauge block		
Depressurizing of Y2 on compressed air failure with pressure gauges made of metal IP44 (MPa, bar, psi). The double-acting actuator with springs moves into the safety position.		
• Block made of aluminum, double-acting, G $\frac{1}{4}$		9 R 2 E
• Block made of aluminum, double-acting, $\frac{1}{4}$ -18 NPT		9 R 2 F
Booster (Cv = 2)		
Aluminum with gauges made of metal IP44 (MPa, bar, psi)		
• Single-acting, G $\frac{1}{2}$		9 R 1 P
• Double-acting, G $\frac{1}{2}$		9 R 2 P
• Single-acting, $\frac{1}{2}$ -14 NPT		9 R 1 Q
• Double-acting, $\frac{1}{2}$ -14 NPT		9 R 2 Q

Positioners

SIPART PS2

Selection and ordering data (continued)

Options Add "-Z" to article number, specify order code and plain text	Order code
Functional safety (SIL 2) only for 6DR5.1* (single-acting positioner) Device suitable for use according to IEC 61508 and IEC 61511.	C20
Optimized control behavior for small actuators (< 200 cm³)	K10
Additional internal position detection by means of a potentiometer	K11
Pneumatic terminal strip made of stainless steel 316	K18
Operation with natural gas Device is optimized for natural gas operation and contains corrosion-protected, painted electronics and high-quality FVMQ elastomers. Exhaust air (natural gas) can be dissipated collectively with the 6DR5..5*.	K50
Permissible ambient temperature during operation -40 ... 80 °C (-40 ... +176 °F) For 6DR5..1*, 6DR5..2*, 6DR5..3*: Lid without inspection window	M40
Pressure sensor supported monitoring/diagnostics Monitoring of the device/custom min./max. supply pressure PZ. Hold position on demand. Messages according to NAMUR NE107.	P01
Monitoring of the device/custom min./max. supply pressure PZ. Hold position on demand. Valve Signature, Partial Stroke Test, monitoring of leakage and actuating pressure (triggered), actuating pressure limitation for single-acting actuators. Messages according to NAMUR NE107.	P02
Certificates	
Explosion protection (Japan)	E29
EN 10204 certificate type 2.1	C35
DNV (Det Norske Veritas)	S10
LR (Lloyds Register)	S11
BV (Bureau Veritas)	S12
ABS (American Bureau of Shipping)	S14
KR (Korean Register of Shipping)	S15
CCS (China Classification Society)	S16
RINA (Registro Italiano Navale)	S17
TAG plate made of stainless steel, 3-line Text line 1: plain text from Y17 Text line 2: plain text from Y15 Text line 3: plain text from Y16	A20
Measuring point description Input field: Max. 16 characters for HART, max. 32 characters for PROFIBUS PA, FOUNDATION Fieldbus and 4 ... 20 mA; specify in plain text	Y15
Measuring point text Input field: Max. 24 characters for HART, max. 32 characters for PROFIBUS PA, FOUNDATION Fieldbus and 4 ... 20 mA; specify in plain text	Y16
Measuring point number (TAG no.) Input field: Max. 32 characters; specify in plain text	Y17
Preset bus address Input field: Specify in plain text (for 6DR55.. and 6DR56.. only)	Y25
Customer-specific parameter setting Input field: Specify in plain text	Y30

Selection and ordering data (continued)

Options Add "-Z" to article number, specify order code and plain text	Order code
Special design / Product Variant Request (PVR) Input field: Specify order number from PVR clarification in plain text Examples:	Y99
• Conformal coating / Tropicalization	VP001
• Gauge block with IP65 gauge	VP002
• SIPART PS2 for part-turn applications up to 180°	VP003
Creation of a "Product Variant Request" is a prerequisite.	

Accessories

Sensors and modules for remote variantsNCS sensor

NCS sensor For contact-free position detection (not for Ex d version)	Article No. 6DR4004-				
Click the article number for online configuration in the PIA Life Cycle Portal.					
Explosion protection Non-explosion-proof In type of protection (Ex)					
• Intrinsic safety					
• Non-sparking					
Cable length 6 m (19.68 ft) 20 m (65.67 ft) 40 m (131.23 ft)					
Actuator type Linear actuator for stroke ≤ 14 mm (0.55 inches) Mounting is actuator-specific and is not included in the scope of delivery as a mounting kit. Mounting kit 6DR4004-8V can be used on NAMUR actuators for this purpose. Linear actuator for strokes ≥ 14 ... 130 mm (0.55 ... 5.12 inches) Mounting is actuator-specific and is not included in the scope of delivery as a mounting kit. For mounting on NAMUR actuators and, depending on the stroke of the mounting kit 6DR4004-8V (2 ... 35mm) or in addition to the -8V, the long lever handle 6DR4004-8L (35 ... 120 mm) may be used. Part-turn actuator, magnet holder made of anodized aluminum A NAMUR mount is not included in the scope of delivery but can be ordered separately with 6DR4004-1D/-2D/-3D/-4D.					
					8
					6
					N
					P
					R
					2
					3
					4

Position Transmitter

- See technical specifications for explosion protection (ATEX / IECEx / FM / CSA / not Ex d).
- SIPART PS2 externally mounted in protected area.
- Requirement: SIPART PS2 with integrated Analog Input Module (AIM) as order option or retrofit with 6DR4004-6F/-8F.
- Variant with cable and cable socket M12 stainless steel 6DR4004-5D on request

	Article No.
Position Transmitter (potentiometer) In aluminum enclosure with potentiometer, without electronics, without pneumatic block, for separate mounting of position detection on actuator.	6DR4004-1ES
Position Transmitter (NCS) Aluminum enclosure with non-contacting position detection (NCS), without electronics, without pneumatic block, for separate mounting of position detection on actuator.	6DR4004-2ES
Position Transmitter (NCS, ILS) In aluminum enclosure with non-contacting position detection (NCS) and inductive limit switches (ILS), without electronics, without pneumatic block, for separate mounting of position detection on actuator.	6DR4004-3ES

Positioners

SIPART PS2

Selection and ordering data (continued)

	Article No.
Position Transmitter (NCS, MLS) In aluminum enclosure with non-contacting position detection (NCS) and mechanic limit switches (MLS), without electronics, without pneumatic block, for separate mounting of position detection on actuator.	6DR4004-4ES

Other accessories

	Article No.
Control unit for 3x SIPART PS2 4 ... 20 mA 19-inch control unit with 3x electronics, 2-wire, 4 ... 20 mA, for remote installation of the electronics for the SIPART PS2 6DR59* in a protected area (e.g. against radiation, dirt, temperature, etc.)	A5E00151560
Control unit for 5x SIPART PS2 PA 19-inch control unit including 5x PROFIBUS PA module, for remote installation of the electronics of the SIPART PS2 6DR59* in a protected area (e.g. against radiation, dirt, temperature, etc.), order 1x plug panel A5E00252845 or A5E00252830 separately.	A5E00250501
Control unit for 10x SIPART PS2xPA 19-inch control unit including 10x PROFIBUS PA module, for remote installation of the electronics of the SIPART PS2 6DR59* in a protected area (e.g. against radiation, dirt, temperature, etc.), order 2x plug panels A5E00252845 or A5E00252830 separately.	A5E00250502
Control unit for 15x SIPART PS2 PA 19-inch control unit including 15x PROFIBUS PA module, for remote installation of the electronics of the SIPART PS2 6DR59* in a protected area (e.g. against radiation, dirt, temperature, etc.), order 3x plug panels A5E00252845 or A5E00252830 separately.	A5E00250503
Plug panel for control unit (50) Connection panel (rear panel) for 19-inch PROFIBUS PA control unit with Burndy 50 plug (50 pins) to connect a max. of 5 units of SIPART PS2 w/o electronics module (6DR59*). The Burndy 50 cable socket is already included in the scope of delivery. Order in addition: 1x for A5E00250501, 2x for A5E00250502 and 3x for A5E00250503.	A5E00252845
Plug panel for control unit (50 + 8) Connection panel (rear panel) for 19-inch PROFIBUS PA control unit with Burndy 50 plug (50 pins) to connect a max. of 5 units of SIPART PS2 w/o electronics (6DR59*). Additional Burndy 8 plug (8 pins) to link communication between control units. The Burndy 50 cable socket is already included in the scope of delivery. Order in addition: 1x for A5E00250501, 2x for A5E00250502 and 3x for A5E00250503	A5E00252830
Analog Input Module (AIM) For connecting external position detection systems to the SIPART PS2, for example Position Transmitter 6DR4004-1ES/2ES/3ES/4ES, NCS sensor or others.	
<ul style="list-style-type: none"> • With explosion protection 	6DR4004-6F
<ul style="list-style-type: none"> • Without explosion protection 	6DR4004-8F
Digital I/O Module (DIO) 1 digital input, 3 digital outputs (2 limits min. or max., 1 fault indicator)	
<ul style="list-style-type: none"> • With explosion protection 	6DR4004-6A
<ul style="list-style-type: none"> • Without explosion protection 	6DR4004-8A
Inductive Limit Switches (ILS) 2 inductive limit switches and 1 digital output (DQ)	
<ul style="list-style-type: none"> • With explosion protection 	6DR4004-6G
<ul style="list-style-type: none"> • Without explosion protection 	6DR4004-8G

Selection and ordering data (continued)

	Article No.
Mechanic Limit Switches (MLS) 2 mechanical limit switches and 1 digital output (DQ). Not applicable for natural gas applications!	
• With explosion protection	6DR4004-6K
• Without explosion protection	6DR4004-8K
Analog Output Module (AOM) For analog position feedback 4 ... 20 mA	
• With explosion protection	6DR4004-6J
• Without explosion protection	6DR4004-8J
Internal NCS module For non-contacting position detection, for installation in the SIPART PS2	
• Without explosion protection	6DR4004-5L
• With explosion protection	6DR4004-5LE
Overvoltage protection	
Overvoltage protection up to 6 kV for 2-wire, M20 × 1.5	6DR4004-1LP
Overvoltage protection up to 6 kV for 3-wire, M20 × 1.5	6DR4004-2LP
Overvoltage protection up to 6 kV for 4-wire, M20 × 1.5	6DR4004-3LP
Overvoltage protection up to 6 kV for PA/FF, M20 × 1.5	6DR4004-4LP
Cable socket M12 stainless steel	
A-coding, for cable mounting (0.25 ... 0.5 mm ²). The cable socket can be connected to SIPART PS2 with M12 device plug.	6DR4004-5A
D-coding, for cable mounting (0.25 ... 0.5 mm ²). The cable socket can be connected to SIPART PS2 with M12 device plug.	6DR4004-5D
Gauge block	
With pressure gauges made of plastic IP31 (MPa, bar)	
• Block made of aluminum, single-acting, G ¹ / ₄	6DR4004-1M
• Block made of aluminum, double-acting, G ¹ / ₄	6DR4004-2M
With pressure gauges made of plastic IP31 (MPa, psi)	
• Block made of aluminum, single-acting, 1/4-18 NPT	6DR4004-1MN
• Block made of aluminum, double-acting, 1/4-18 NPT	6DR4004-2MN
With pressure gauges made of metal IP44 (MPa, bar, psi)	
• Block made of aluminum, single-acting, G ¹ / ₄	6DR4004-1P
• Block made of aluminum, double-acting, G ¹ / ₄	6DR4004-2P
• Block made of aluminum, single-acting, 1/4-18 NPT	6DR4004-1PN
• Block made of aluminum, double-acting, 1/4-18 NPT	6DR4004-2PN
With pressure gauges made of stainless steel IP54 (MPa, bar, psi)	
• Block made of stainless steel 316, single-acting, G ¹ / ₄	6DR4004-1Q
• Block made of stainless steel 316, double-acting, G ¹ / ₄	6DR4004-2Q
• Block made of stainless steel 316, single-acting, 1/4-18 NPT	6DR4004-1QN
• Block made of stainless steel 316, double-acting, 1/4-18 NPT	6DR4004-2QN
Gauge block 316 with gauge IP65, 316L (MPa, bar, psi)	Can be ordered on request

Positioners

SIPART PS2

Selection and ordering data (continued)

	Article No.
Venting gauge block Depressurizing of Y2 on compressed air failure with pressure gauges made of metal IP44 (MPa, bar, psi). The double-acting actuator with springs moves into the safety position.	
<ul style="list-style-type: none"> Block made of aluminum, double-acting, G$\frac{1}{4}$ 	6DR4004-2RE
<ul style="list-style-type: none"> Block made of aluminum, double-acting, $\frac{1}{4}$-18 NPT 	6DR4004-2RF
Booster (Cv = 2) Aluminum with gauges made of metal IP44 (MPa, bar, psi) For SIPART PS2 enclosure variants 6DR5..0/2/3. (non-flameproof enclosure)	
<ul style="list-style-type: none"> Single-acting, G$\frac{1}{2}$ 	6DR4004-1RJ
<ul style="list-style-type: none"> Double-acting, G$\frac{1}{2}$ 	6DR4004-2RJ
<ul style="list-style-type: none"> Single-acting, $\frac{1}{2}$-14 NPT 	6DR4004-1RK
<ul style="list-style-type: none"> Double-acting, $\frac{1}{2}$-14 NPT 	6DR4004-2RK
For SIPART PS2 enclosure variants 6DR5..5/6. (flameproof enclosure)	
<ul style="list-style-type: none"> Single-acting, G$\frac{1}{2}$ 	6DR4004-1RP
<ul style="list-style-type: none"> Double-acting, G$\frac{1}{2}$ 	6DR4004-2RP
<ul style="list-style-type: none"> Single-acting, $\frac{1}{2}$-14 NPT 	6DR4004-1RQ
<ul style="list-style-type: none"> Double-acting, $\frac{1}{2}$-14 NPT 	6DR4004-2RQ
Interface according to VDI/VDE 3847 For single- and double-acting, with CATS (Clean Air To Spring) only for single-acting, not for flameproof enclosures	6DR4004-5PB
Mounting kit for NAMUR part-turn actuators VDI/VDE 3845, with plastic coupling wheel, without mounting console	6DR4004-8D
VDI/VDE 3845, with stainless steel coupling, without mounting console	TGX:16300-1556
Console for mounting the SIPART PS2, NCS sensor or Position Transmitter on NAMUR part-turn actuators VDI/VDE 3845	
<ul style="list-style-type: none"> 80 × 30 × 20 mm (3.15 × 1.18 × 0.79 inches) 	6DR4004-1D
<ul style="list-style-type: none"> 80 × 30 × 30 mm (3.15 × 1.18 × 1.18 inches) 	6DR4004-2D
<ul style="list-style-type: none"> 130 × 30 × 30 mm (5.12 × 1.18 × 1.18 inches) 	6DR4004-3D
<ul style="list-style-type: none"> 130 × 30 × 50 mm (5.12 × 1.18 × 1.97 inches) 	6DR4004-4D
Mounting kit for other part-turn actuators The following mounting consoles can be used together with the NAMUR part-turn actuator mounting kit 6DR4004-8D.	
SPX (DEZURIK) Power Rac, sizes R1, R1A, R2 and R2A	TGX:16152-328
Masoneilan Camflex II	TGX:16152-350
Fisher 1051/1052/1061, sizes 30, 40, 60 to 70	TGX:16152-364
Fisher 1051/1052, size 33	TGX:16152-348
Mounting kit for NAMUR linear actuators NAMUR-linear actuator with short lever (2 ... 35 mm (0.08 ... 1.38 inches))	6DR4004-8V
Lever arm for strokes of 35 ... 130 mm (1.38 ... 5.12 inches) without NAMUR mounting bracket	6DR4004-8L
Reduced mounting kit (as for 6DR4004-8V but without fixing angle and U-bracket), with short lever with up to 35 mm (1.38 inches) stroke	6DR4004-8VK
Reduced mounting kit (as for 6DR4004-8V but without fixing angle and U-bracket), with long lever > 35 mm (1.38 inches) stroke	6DR4004-8VL

Selection and ordering data (continued)

	Article No.
Mounting console, stainless steel 316L Robust design to support extended loads like SIPART PS2 in a flameproof 316L stainless steel enclosure or as a variant with the booster. The console gets mounted and therefore supported by both stands of the actuator.	6DR4004-8R
Tapered roller made of stainless steel 316 for replacing the tapered roller made of plastic in the mounting kits 6DR4004-8V, -8VK, -8VL	6DR4004-3N
Terminal blocks made of stainless steel 316 for replacement of the aluminum terminal blocks in the 6DR4004-8V, -8VK and -8VL mounting kits	6DR4004-3M
Mounting kit for other linear actuators	
MASONEILAN type 87/88	TGX:16152-1210
MASONEILAN type 37/38, all sizes	TGX:16152-1215
Fisher type 657/667, sizes 30 ... 80	TGX:16152-900
Samson actuator type 3277 Yoke dimension = 101 mm (integrated connection without pipe), not for Ex d	6DR4004-8S
Pneumatic terminal strip made of stainless steel 316 As spare part or to replace the pneumatic terminal strip made of aluminum	
• Single-acting, G $\frac{1}{4}$	6DR4004-1R
• Double-acting, G $\frac{1}{4}$	6DR4004-2R
• Single-acting, $\frac{1}{4}$ -18 NPT	6DR4004-1RN
• Double-acting, $\frac{1}{4}$ -18 NPT	6DR4004-2RN
Connection block For safety solenoid valve with extended mounting flange according to NAMUR	
• For mounting according to IEC 534-6	6DR4004-1B
• For SAMSON actuator (integrated mounting) see above	6DR4004-1C
HART modem with USB interface	7MF4997-1DB
SIPART PS2 / PS100 demo case	6DR4004-5DE

Positioners

SIPART PS2

Technical specifications

SIPART PS2 (all device designs)	
Operating conditions	
Ambient conditions	For indoor and outdoor use
Ambient temperature	In hazardous areas, observe the maximum permissible ambient temperature according to the temperature class.
<ul style="list-style-type: none"> Permissible ambient temperature for operation¹⁾ Height Relative humidity 	-30 ... +80 °C (-22 ... +176 °F) Optional -40 ... +80 °C (-40 ... +176 °F) ≤ 2 000 m above mean sea level. At altitudes greater than > 2 000 m above mean sea level, use a suitable power supply. 0 ... 100%
Degree of protection ²⁾	IP66/Type NEMA 4X
Corrosion protection according to EN ISO 9227:2022 and EN ISO 12944:2017	
<ul style="list-style-type: none"> 6DR5..0 Polycarbonate enclosure 6DR5..3 Aluminum enclosure and 6DR5..5 Aluminum enclosure, flameproof 6DR5..2 Stainless steel enclosure and 6DR5..6 Stainless steel enclosure, flameproof 	C5-M medium durability C5-M medium durability C5-M high durability
Mounting position	Any. Electrical connections and exhaust opening not facing up in wet environment (outdoor/rain).
Vibration resistance	
<ul style="list-style-type: none"> Harmonic oscillations (sine) according to EN 60068-2-6/10.2008 Bumping (half-sine) according to EN 60068-2-27/02.2010 Noise (digitally controlled) according to EN 60068-2-64/04.2009 	3.5 mm (0.14"), 2 ... 27 Hz, 3 cycles/axis 98.1 m/s ² (321.84 ft/s ²), 27 ... 300 Hz, 3 cycles/axis 150 m/s ² (492 ft/s ²), 6 ms, 1 000 shocks/axis 10 ... 200 Hz; 1 (m/s ²)/Hz (3.28 (ft/s ²)/Hz) 200 ... 500 Hz; 0.3 (m/s ²)/Hz (0.98 (ft/s ²)/Hz) 4 hours/axis
<ul style="list-style-type: none"> Recommended continuous duty range of the complete valve 	≤ 30 m/s ² (98.4 ft/s ²) without resonance sharpness
Climatic class	
<ul style="list-style-type: none"> Storage Transport 	According to IEC EN 60721-3 1K23, -40 ... +80 °C (-40 ... +176 °F) 2K12, -40 ... +80 °C (-40 ... +176 °F)
Pneumatic data	
Auxiliary power (inlet air)	Compressed air, carbon dioxide (CO ₂), nitrogen (N ₂), noble gasses or natural gas
<ul style="list-style-type: none"> Pressure³⁾ 	1.4 ... 7 bar (20.3 ... 101.5 psi)
Air quality according to ISO 8573-1	
<ul style="list-style-type: none"> Solid particulate size and density Pressure dew point Oil content 	Class 3 Class 3 (min. 20 K (36 °F) below ambient temperature) Class 3
Unrestricted flow (DIN 1945)	
<ul style="list-style-type: none"> Inlet air (pressurize actuator)⁴⁾ 	
- 2 bar; 0.1 KV (29 psi; 0.116 CV)	4.1 Nm ³ /h (18.1 USgpm)
- 4 bar; 0.1 KV (58 psi; 0.116 CV)	7.1 Nm ³ /h (31.3 USgpm)
- 6 bar; 0.1 KV (87 psi; 0.116 CV)	9.8 Nm ³ /h (43.1 USgpm)
<ul style="list-style-type: none"> Exhaust air (depressurize actuator for all versions except fail in place)⁴⁾ 	
- 2 bar; 0.2 KV (29 psi; 0.232 CV)	8.2 Nm ³ /h (36.1 USgpm)
- 4 bar; 0.2 KV (58 psi; 0.232 CV)	13.7 Nm ³ /h (60.3 USgpm)
- 6 bar; 0.2 KV (87 psi; 0.232 CV)	19.2 Nm ³ /h (84.5 USgpm)
<ul style="list-style-type: none"> Exhaust air (depressurize actuator for fail in place version) 	
- 2 bar; 0.1 KV (29 psi; 0.116 CV)	4.3 Nm ³ /h (19.0 USgpm)
- 4 bar; 0.1 KV (58 psi; 0.116 CV)	7.3 Nm ³ /h (32.2 USgpm)
- 6 bar; 0.1 KV (87 psi; 0.116 CV)	9.8 Nm ³ /h (43.1 USgpm)
Restrictor ratio	Adjustable

Technical specifications (continued)

SIPART PS2 (all device designs)	
Typical auxiliary power consumption in the controlled state	0.01 Nm ³ /h (0.044 US gpm)
Sound pressure	L _{Aeq} < 75 dB L _{Amax} < 80 dB
Sound pressure with installed Siemens booster	L _{Aeq} < 95 dB L _{Amax} < 98 dB
Structural design	
Mode of operation	
<ul style="list-style-type: none"> Range of stroke (linear actuators) Angle of rotation range (part-turn actuators) 	3 ... 130 mm (0.12 ... 5.12 inches); higher range of stroke on request 30 ... 100° (up to 180° on request)
Mounting type	
<ul style="list-style-type: none"> On linear actuators On part-turn actuators 	Using mounting kit 6DR4004-8V and where necessary with an additional lever arm 6DR4004-8L on actuators according to IEC 60534-6-1 (NAMUR) with ribs, bars or flat face. Using mounting kit 6DR4004-8D or TGX:16300-1556 on actuators with mounting plane according to VDI/VDE 3845 and IEC 60534-6-2. The actuator-specific mounting console 6DR4004-1D ... 4D must be ordered separately, see the selection and ordering data.
Weight, positioner without option modules or accessories	
<ul style="list-style-type: none"> 6DR5..0 Glass-fiber reinforced polycarbonate enclosure 6DR5.11 Aluminum enclosure, only single-acting 6DR5..2 Stainless steel enclosure 6DR5..3 Aluminum enclosure 6DR5..5 Aluminum, flameproof 6DR5..6 Stainless steel enclosure, flameproof 	Approx. 0.9 kg (1.98 lbs) Approx. 1.3 kg (2.86 lbs) Approx. 3.9 kg (8.6 lbs) Approx. 1.6 kg (3.53 lbs) Approx. 5.2 kg (11.46 lbs) Approx. 8.4 kg (18.5 lbs)
Material	
Dimensions	
See "Dimensional drawings"	
Device designs	
<ul style="list-style-type: none"> In polycarbonate enclosure 6DR5..0 In aluminum enclosure 6DR5..1 In aluminum enclosures 6DR5..3 and 6DR5..5 In stainless steel enclosures 6DR5..2 and 6DR5..6 	Single-acting and double-acting Single-acting Single-acting and double-acting Single-acting and double-acting
Gauge block	
<ul style="list-style-type: none"> Degree of protection with: <ul style="list-style-type: none"> Pressure gauge made of plastic Gauge made of metal Pressure gauge made of stainless steel 316 	IP31 IP44 IP54
<ul style="list-style-type: none"> Vibration resistance 	According to EN 837-1
Connections, electrical	
<ul style="list-style-type: none"> Screw terminals Cable bushing Without explosion protection as well as with Ex i With explosion protection Ex d 	2.5 mm ² AWG30-14 M20x1.5 or 1/2-14 NPT Ex d-certified M20x1.5; 1/2-14 NPT or M25x1.5
Connections, pneumatic	
Internal thread G ¹ / ₄ or 1/8-18 NPT	
Controller	
Controller unit	
<ul style="list-style-type: none"> Five point controller 	Adaptive

Technical specifications (continued)

SIPART PS2 (all device designs)	
• Deadband	
- dEbA = Auto	Adaptive
- dEbA = 0.1 ... 10%	Can be set as fixed value
Analog-to-digital converter	
• Scan time	10 ms
• Resolution	≤ 0.05%
• Transmission error	≤ 0.2%
• Temperature influence effect	≤ 0.1%/10 K (≤ 0.1%/18 °F)
Certificates and approvals	
DoC compliance	The applicable directives and applied standards with their revision levels can be found in the Declaration of Conformity on the internet.
UL conformity	The SIPART PS2 has documented compliance with the safety requirements in the USA and Canada. These are UL classified, recognized and listed.
Explosion protection	You can find details on explosion protection in the compact operating instructions and the explosion protection certificates.

- 1) At ≤ -10 °C (≤ 14 °F), the refresh rate of the local display is limited. When using Analog Output Module (AOM), only T4 is permissible.
- 2) Max. impact energy 1 joule for enclosure with inspection window 6DR5..0 and 6DR5..1 or max. 2 joules for 6DR5..3.
- 3) The following applies to fail in place double-acting: 3 ... 7 bar (43.5 ... 101.5 psi)
- 4) When using Ex d versions (6DR5..5-... and 6DR5..6-...), values are reduced by approximately 20%.

SIPART PS2 with 4 ... 20 mA / HART	Electronics without explosion protection
Electrical specifications	
Current input I_w	
• Nominal signal range	4 ... 20 mA
• Test voltage	840 V DC, 1 s
• Digital input BIN1 (terminals 9/10; galvanically connected to basic device)	Suitable only for floating contact; max. contact load < 5 µA at 3 V
2-wire connection (terminals 6/8)	
6DR50.. and 6DR53..; 4 ... 20 mA 6DR51.. and 6DR52..; HART	
Minimum current to maintain operation	≥ 3.8 mA
Required load voltage U_b (corresponds to U_b at 20 mA)	
• 4 ... 20 mA (6DR50..)	
- Typical	6.36 V (= 318 Ω)
- Max.	6.48 V (= 324 Ω)
• 4 ... 20 mA (6DR53..)	
- Typical	7.9 V (= 395 Ω)
- Max.	8.4 V (= 420 Ω)
• HART (6DR51..)	
- Typical	6.6 V (= 330 Ω)
- Max.	6.72 V (= 336 Ω)
• HART (6DR52..)	
- Typical	-
- Max.	-
• Static destruction limit	± 40 mA
Effective internal capacitance C_i	
• 4 ... 20 mA	-
• HART	-

Technical specifications (continued)

SIPART PS2 with 4 ... 20 mA / HART	Electronics without explosion protection
Effective internal inductance L_i	
• 4 ... 20 mA	-
• HART	-
For connecting to circuits with the following peak values	-
3-4-wire connection (terminals 2/4 and 6/8)	
6DR53..; 4 ... 20 mA	
Load voltage at 20 mA	≤ 0.2 V (= 10 Ω)
Auxiliary power U_{Aux}	18 ... 35 V DC
Current consumption I_H	(U_{Aux} - 7.5 V)/2.4 kΩ [mA]
Effective internal capacitance C_i	-
Effective internal inductance L_i	-
For connecting to circuits with the following peak values	-
Galvanic isolation	between U_{Aux} and I_w
HART communication	
HART version	7
PC parameterization software	SIMATIC PDM; supports all device objects. The software is not included in the scope of delivery.

Pressure sensors
6DR51.. -Z P01/ -Z P02

Required load voltage U_b (corresponds to U_b at 20 mA)	max. 9.4 V (= 470 Ω)
Static destruction limit	± 30 V

SIPART PS2 with PROFIBUS PA/with FOUNDATION Fieldbus	Electronics without explosion protection
Electrical specifications	
Auxiliary power supply, bus circuit	
Bus voltage	9 ... 32 V
For connecting to circuits with the following peak values	
• Bus connection with FISCO supply unit	
• Bus connection with barrier	
Effective internal capacitance C_i	-
Effective internal inductance L_i	-
Current consumption	11.5 mA ± 10%
Additional fault current	0 mA
Safety shutdown can be activated with "jumper" (terminals 81/82)	
• Input resistance	> 20 kΩ
• Signal state "0" (shutdown active)	0 ... 4.5 V or unconnected
• Signal state "1" (shutdown not active)	13 ... 30 V
For connecting to power supply with the following peak values	
Effective internal capacitance and inductance	-
Digital input DI1 for PROFIBUS (terminals 9/10); electrically connected to the bus circuit)	Jumpered or connection to switching contact. Suitable only for floating contact; max. contact load < 5 µA at 3 V
Galvanic isolation	
• For basic device without explosion protection	Galvanic isolation between basic device and the input for safety shutdown, as well as the outputs of the option modules
Test voltage	840 V DC, 1 s

Positioners

SIPART PS2

Technical specifications (continued)

SIPART PS2 with PROFIBUS PA/with FOUNDATION Fieldbus	Electronics without explosion protection
PROFIBUS PA communication	
Communication	Layers 1 and 2 according to PROFIBUS PA, transmission technology according to IEC 61158-2; slave function; layer 7 (protocol layer) according to PROFIBUS DP, EN 50170 standard with the extended PROFIBUS functions (all data acyclic, manipulated variable, feedbacks and status also cyclic)
C2 connections	Four connections to master class 2 are supported; automatic connection setup 60 s after break in communication
Device profile	PROFIBUS PA profile B, version 3.02, more than 150 objects
Response time to master message	Typically 10 ms
Device address	126 (when delivered)
PC parameterization software	SIMATIC PDM; supports all device objects. The software is not included in the scope of delivery.
FOUNDATION Fieldbus communication	
Communications group and class	According to technical specification of the FOUNDATION Fieldbus for H1 communication
Function blocks/functions	Group 3, Class 31PS (Publisher Subscriber), 1 Resource Block (RB2), 1 Analog Output Function Block (AO), 1 PID Function Block (PID), 1 Transducer Block (Standard Advanced Positioner Valve), Link Active Scheduler (LAS) function
Execution times of the blocks	AO: 30 ms PID: 40 ms
Physical layer profile	123, 511
FF registration	Tested with ITK 6.x
Device address	22 (when delivered)

Option modules

Digital I/O Module (DIO)	Without explosion protection, suitable for Ex d 6DR4004-8A
3 digital output current circuits	<ul style="list-style-type: none"> Alarm output A1: Terminals 41 and 42 Alarm output A2: Terminals 51 and 52 Alarm output: Terminals 31 and 32
<ul style="list-style-type: none"> Auxiliary power U_{Aux} 	≤ 35 V and the current consumption is to be limited to < 25 mA
<ul style="list-style-type: none"> Signal state 	
- High (not addressed)	Conductive, $R = 1$ k Ω ¹⁾
- Low ²⁾ (addressed)	Blocked, $I_g < 60$ μ A
<ul style="list-style-type: none"> For connecting to circuits with the following peak values 	-
1 circuit	Digital input DI2: Terminals 11 and 12, terminals 21 and 22 (jumper)
<ul style="list-style-type: none"> Electrically connected to the basic device 	
- Signal state 0	Floating contact, open
- Signal state 1	Floating contact, closed
- Contact load	3 V, 5 μ A
<ul style="list-style-type: none"> Galvanically isolated from the basic device 	
- Signal state 0	≤ 4.5 V or open
- Signal state 1	≥ 13 V
- Natural resistance	≥ 25 k Ω
<ul style="list-style-type: none"> Static destruction limit 	± 35 V
Galvanic isolation	The three outputs, the DI2 input and the basic device are galvanically isolated from each other.

Technical specifications (continued)

- When using in the flameproof encapsulated enclosure, the current consumption must be restricted to 10 mA per output.
- The status is also Low if the basic device is faulty or without auxiliary power.

Analog Output Module (AOM)	Without explosion protection, suitable for Ex d 6DR4004-8J
DC output for position feedback	
1 current output: Terminals 61 and 62	2-wire connection
Nominal signal range	4 ... 20 mA, short-circuit-proof
Total operating range	3.6 ... 20.5 mA
Auxiliary power U_{Aux}	+12 ... +35 V
External load R_a [k Ω]	$\leq (U_{Aux} [V] - 12 V) / I$ [mA]
Transmission error	$\leq 0.3\%$
Temperature influence effect	$\leq 0.1\%/10$ K ($\leq 0.1\%/18$ °F)
Resolution	$\leq 0.1\%$
Residual ripple	$\leq 1\%$
For connecting to circuits with the following peak values	-
Galvanic isolation	Galvanically isolated from the alarm option and safely isolated from the basic device

Inductive Limit Switches (ILS)	Without explosion protection, suitable for Ex d 6DR4004-8G
Limit transmitter with Inductive Limit Switches (ILS) and fault indicator	
2 Inductive Limit Switches (ILS)	<ul style="list-style-type: none"> Digital output (limit transmitter) A1: Terminals 41 and 42 Digital output (limit transmitter) A2: Terminals 51 and 52
<ul style="list-style-type: none"> Connection 	2-wire system acc. to EN 60947-5-6 (NAMUR), for switching amplifier to be connected on load side
<ul style="list-style-type: none"> Signal state High (not addressed) 	> 2.1 mA
<ul style="list-style-type: none"> Signal state Low (addressed) 	< 1.2 mA
<ul style="list-style-type: none"> 2 Inductive Limit Switches (ILS) 	Type SJ2-SN
<ul style="list-style-type: none"> Function 	NC (normally closed) contact
<ul style="list-style-type: none"> Connecting to circuits with the following peak values 	Rated voltage 8 V current consumption: ≥ 3 mA (limit not addressed) ≤ 1 mA (limit addressed)
1 alarm output	Digital output: Terminals 31 and 32
<ul style="list-style-type: none"> Connection 	On switching amplifier according to EN 60947-5-6: (NAMUR), $U_{Aux} = 8.2$ V, $R_i = 1$ k Ω .
<ul style="list-style-type: none"> Signal state High (not addressed) 	$R = 1.1$ k Ω
<ul style="list-style-type: none"> Signal state Low (addressed) 	$R = 10$ k Ω
<ul style="list-style-type: none"> Auxiliary power U_{Aux} 	$U_{Aux} \leq DC$ 35 V $I \leq 20$ mA
<ul style="list-style-type: none"> Connecting to circuits with the following peak values 	-
Galvanic isolation	The 3 outputs are galvanically isolated from the basic device.

Mechanic Limit Switches (MLS)	With explosion protection Ex i 6DR4004-6K
Limit transmitter with mechanical switching contacts	
2 limit value contacts	<ul style="list-style-type: none"> Digital output A1: Terminals 41 and 42 Digital output A2: Terminals 51 and 52
For connecting to circuits with the following peak values:	

Technical specifications (continued)

Mechanic Limit Switches (MLS)	With explosion protection Ex i 6DR4004-6K
• Max. switching voltage AC/DC	$U_i = 30 \text{ V}$
• Max. switching current AC/DC	$I_i = 100 \text{ mA}$
• Max. switching capacity	$P_i = 750 \text{ mW}$
1 alarm output	Digital output: Terminals 31 and 32
• Connection	On switching amplifier according to EN 60947-5-6: (NAMUR), $U_{Aux} = 8.2 \text{ V}$, $R_i = 1 \text{ k}\Omega$
• Signal state High (not addressed)	$R = 991 \text{ k}\Omega$
• Signal state Low (addressed)	$R = 10 \text{ k}\Omega$
• Auxiliary power	$U_{Aux} \leq \text{DC } 35 \text{ V}$ $I \leq 20 \text{ mA}$
Galvanic isolation	The 3 outputs are galvanically isolated from the basic device

Analog Input Module (AIM)	Without explosion protection 6DR4004-8F
	The Analog Input Module (AIM) 6DR4004-8F and -8F is required for connecting a Non Contacting Sensor (NCS) or Position Transmitter 6DR4004-1ES through -4ES. Potentiometers of a different design with resistance values between 3 and 20 k Ω and 4 ... 20 mA and 0 ... 10 V signals can also be connected.
R-potentiometer	
• Peak values when powered by the basic unit with PA (6DR55) or with FF communication (6DR56)	$U_{max} = 5 \text{ V}$
• Peak values when supplied by other basic units (6DR50/1/2/3/9)	$U_{max} = 5 \text{ V}$
Signal 20 mA	
• Nominal signal range	0 ... 20 mA
• Internal load R_b	200 Ω
• Static destruction limit	40 mA
Signal 10 V	
• Nominal signal range	0 ... 10 V
• Internal resistance R_i	25 k Ω
• Static destruction limit	20 V
Supply and signal circuits	Electrically connected to the basic device

NCS sensor	Without explosion protection 6DR4004-8N*
Position range	
• Linear actuator 6DR4004-.N.20	3 ... 14 mm (0.12 ... 0.55")
• Linear actuator 6DR4004-.N.30	10 ... 130 mm (0.39 ... 5.12"); up to 200 mm (7.87") on request
• Part-turn actuator	30° ... 100°
Linearity for NCS sensor and internal NCS module 6DR4004-5L/-5LE (after correction by means of positioner)	$\pm 1 \%$
Hysteresis for NCS sensor and NCS module 6DR4004-5L/-5LE	$\pm 0.2 \%$
Temperature influence (range: Rotation angle 120° or stroke 14 mm)	$\leq 0.1\%/10 \text{ K}$ ($\leq 0.1\%/18 \text{ }^\circ\text{F}$) for -20 ... +90 °C (-4 ... +194 °F) $\leq 0.2\%/10 \text{ K}$ ($\leq 0.2\%/18 \text{ }^\circ\text{F}$) for -40 ... -20 °C (-40 ... -4 °F)
Climatic class	According to IEC EN 60721-3
• Storage	1K23, -40 ... +90 °C (-40 ... +194 °F)
• Transport	2K12, -40 ... +90 °C (-40 ... +194 °F)
Continuous working temperature	-40 °C ... +90 °C (-40 °F ... +194 °F)
Vibration resistance	

Technical specifications (continued)

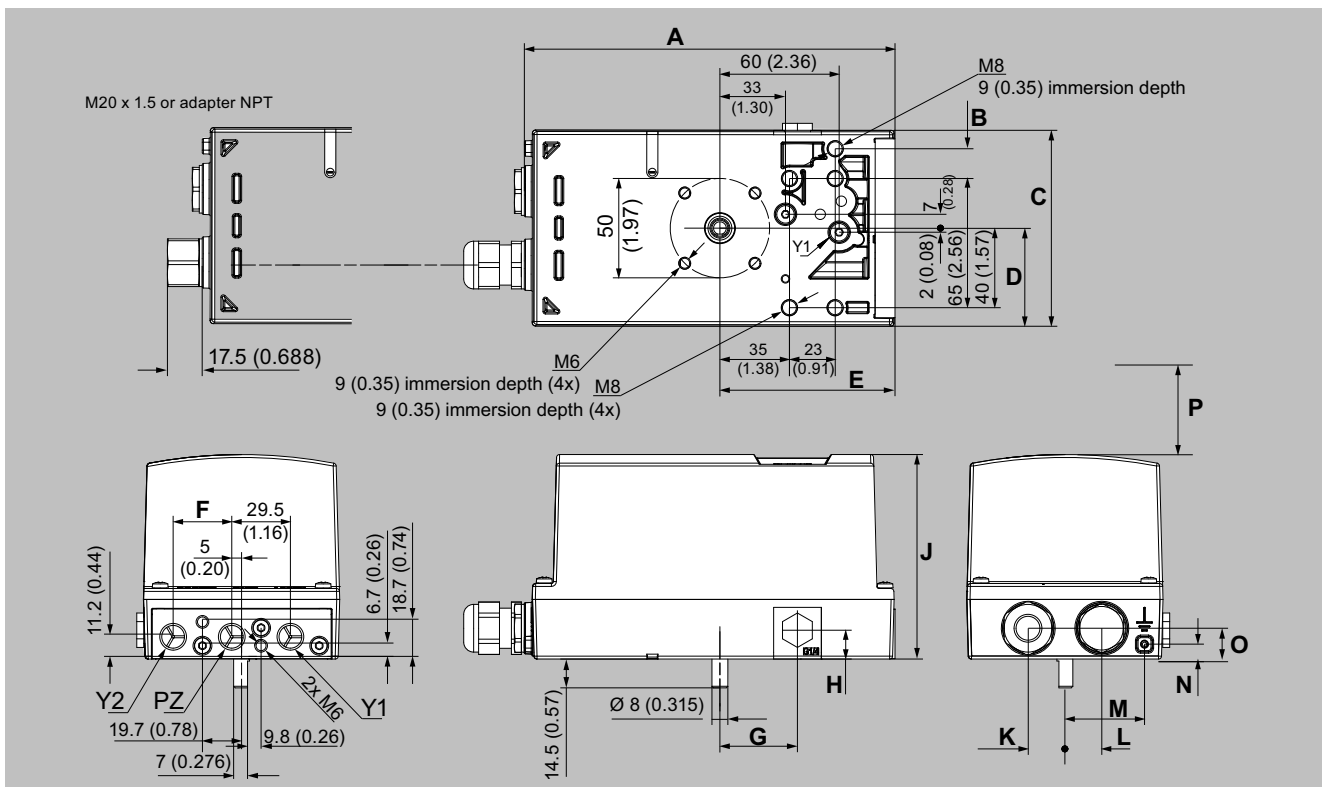
NCS sensor	Without explosion protection 6DR4004-8N*
• Harmonic oscillations (sine) according to IEC 60068-2-6	3.5 mm (0.14"), 2 ... 27 Hz, 3 cycles/axis 98.1 m/s ² (321.84 ft/s ²), 27 ... 300 Hz, 3 cycles/axis
• Bumping according to IEC 60068-2-29	300 m/s ² (984 ft/s ²), 6 ms, 4000 shocks/axis
Degree of protection	IP68 according to IEC/EN 60529; Type 4X according to NEMA 250

Booster	
Operating conditions	
Permissible ambient temperature for operation	-30 ... +80 °C (-22 ... +176 °F)
Climatic class	According to IEC EN 60721-3
• Storage	1K23, -40 ... +80 °C (-40 ... +176 °F)
• Transport	2K12, -40 ... +80 °C (-40 ... +176 °F)
Vibration resistance	
• Harmonic oscillations	According to ISA-S75.13
• Bumping (half-sine) according to EN 60068-2-27/02.2010	150 m/s ² (492 ft/s ²), 6 ms, 1 000 shocks/axis
Structural design	
Booster weight	
• Single-acting	
- Optional module for standard enclosure	2.9 kg (6.5 lb)
- Installed with polycarbonate enclosure	4.0 kg (8.8 lbs)
- Optional module for flameproof aluminum enclosure	3.3 kg (7.3 lbs)
- Installed with flameproof aluminum enclosure	7.9 kg (17.4 lbs)
• Double-acting	
- Optional module for standard enclosure	4.3 kg (9.4 lbs)
- Installed with polycarbonate enclosure	5.3 kg (11.7 lbs)
- Optional module for flameproof aluminum enclosure	4.7 kg (10.4 lbs)
- Installed with flameproof aluminum enclosure	9.3 kg (20.5 lbs)
Connections	
• Pneumatic	½-14 NPT or G½
Pneumatic data	
Auxiliary power (inlet air)	Compressed air, carbon dioxide (CO ₂), nitrogen (N ₂), noble gasses or natural gas
• Pressure	1.4 ... 7 bar (20.3 ... 101.5 psi)
• Inlet air	According to ISO 8573-1
• Air consumption	$1.2 \times 10^{-2} \text{ Nm}^3/\text{h}$ (0.007SCFM)
Pressure gauge	Stainless steel enclosure MPa, bar, psi Degree of protection IP54
Flow capacity	$C_v = 2.0$

Positioners

SIPART PS2

Dimensional drawings



SIPART PS2, non-flameproof enclosure, dimensions in mm (inch)

Value	6DR5..0		6DR5..1	6DR5..2	6DR5..3	
	G $\frac{1}{4}$	$\frac{1}{4}$ -18 NPT			G $\frac{1}{4}$	$\frac{1}{4}$ -18 NPT
A	184.5 (7.26)	186.5 (7.34)	185 (7.28)	186.5 (7.34)	186.5 (7.34)	188.5 (7.42)
B	-	-	-	15 (0.59)	-	-
C	95 (3.74)	95 (3.74)	84 (3.31)	99 (3.90)	98.6 (3.88)	98.6 (3.88)
D	48 (1.89)	48 (1.89)	34.5 (1.36)	49.5 (1.95)	48.6 (1.91)	48.6 (1.91)
E	88.5 (3.48)	90.5 (3.56)	88.8 (3.50)	88.5 (3.48)	88.8 (3.50)	90.8 (3.57)
F ¹⁾	29.5 (1.16)	29.5 (1.16)	-	29.5 (1.16)	29.5 (1.16)	29.5 (1.16)
G	39 (1.54)	39 (1.54)	44 (1.73)	39 (1.54)	39 (1.54)	39 (1.54)
H	14.5 (0.57)	14.5 (0.57)	16 (0.63)	16 (0.63)	14.5 (0.57)	14.5 (0.57)
J	96.6 (3.80)	96.6 (3.80)	96.6 (3.80)	98.5 (3.88)	103 (4.06)	103 (4.06)
K	18.5 (0.73)	18.5 (0.73)	22 (0.87)	18.5 (0.73)	18.5 (0.73)	18.5 (0.73)
L	18.5 (0.73)	18.5 (0.73)	7 (0.23)	18.5 (0.73)	18.5 (0.73)	18.5 (0.73)
M	-	-	26.5	41.5	40	40
N	-	-	7.5	7.5	7.5	7.5
O	14.5 (0.57)	14.5 (0.57)	14.5 (0.57)	14.5 (0.57)	15.5 (0.61)	15.5 (0.61)
P	> 150 (5.91) ²⁾	> 150 (5.91) ²⁾	> 150 (5.91) ²⁾	> 150 (5.91) ²⁾	> 150 (5.91) ²⁾	> 150 (5.91) ²⁾

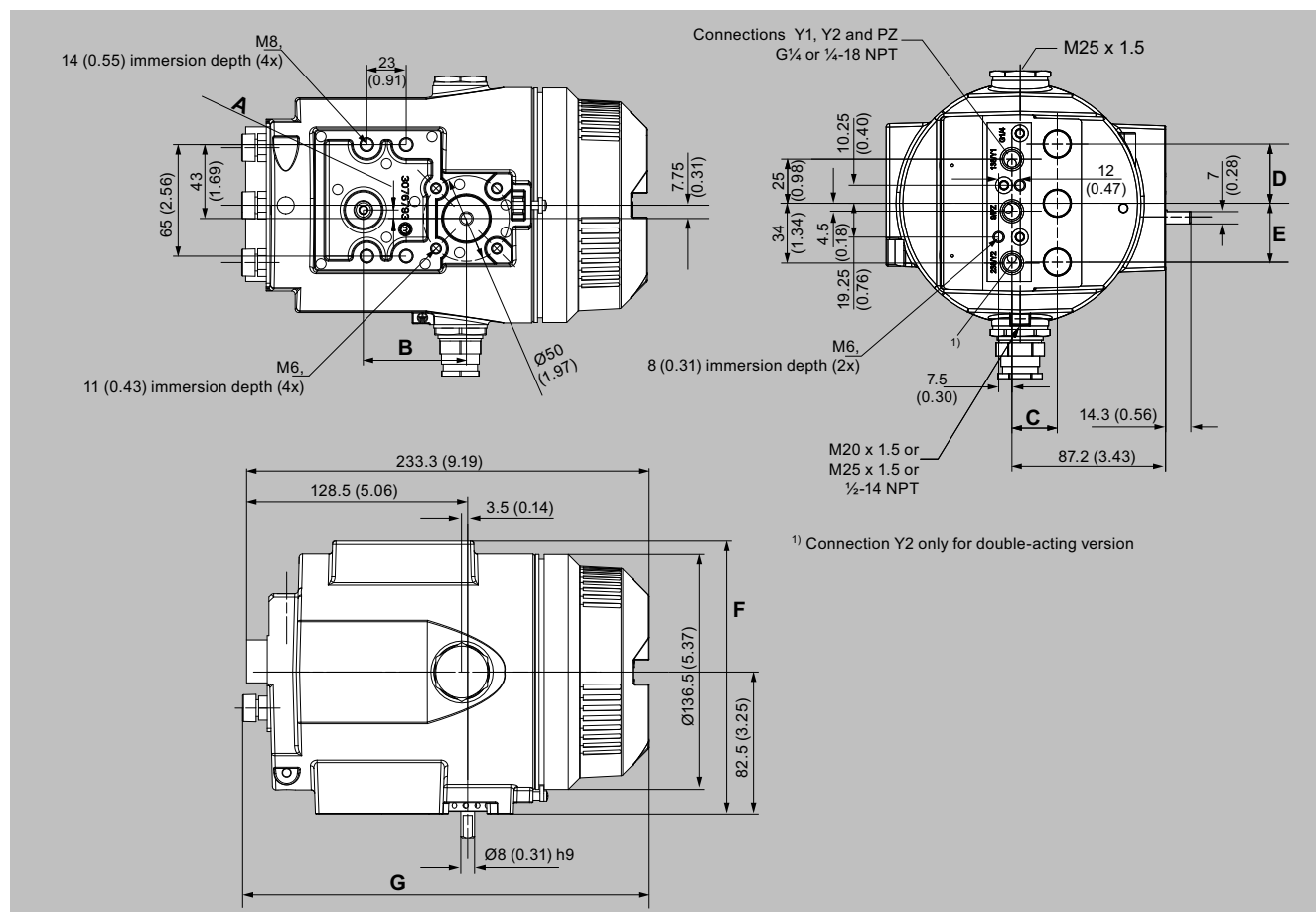
1) Dimension applies only to double-acting actuators.

2) Adhere to this minimum clearance P for service and maintenance above the lid.

SIPART PS2, non-flameproof enclosure

6DR5..0	Polycarbonate enclosure; dimensions with pneumatic interface G $\frac{1}{4}$ or $\frac{1}{4}$ -18 NPT
6DR5.11	Aluminum enclosure, only single-acting
6DR5..2	Stainless steel enclosure, without inspection window
6DR5..3	Aluminum enclosure; dimensions with pneumatic connection G $\frac{1}{4}$ or $\frac{1}{4}$ -18 NPT

Dimensional drawings (continued)



SIPART PS2, flameproof enclosure, dimensions in mm (inch)

Value	6DR5..5	6DR5..6
A	5 (0.2)	-
B	60 (2.36)	-
C	25.7 (1.01)	21.7 (0.85)
D	33.5 (1.32)	25 (0.99)
E	33.5 (1.32)	-
F	158.5 (6.24)	160 (6.3)
G	235.3 (9.26)	227.6 (8.96)

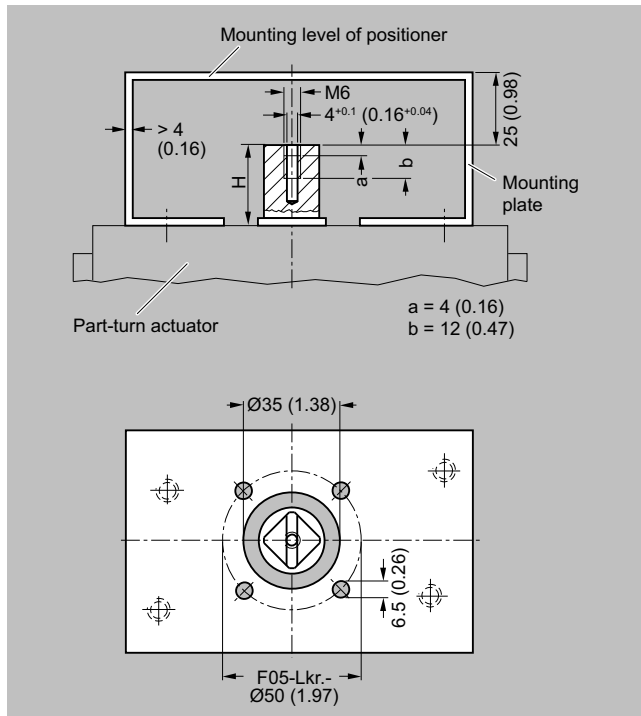
SIPART PS2, flameproof enclosure

6DR5..5	Aluminum enclosure, flameproof; dimensions with pneumatic interface G $\frac{1}{4}$ or $\frac{1}{4}$ -18 NPT
6DR5..6	Stainless steel enclosure, flameproof

Positioners

SIPART PS2

Dimensional drawings (continued)

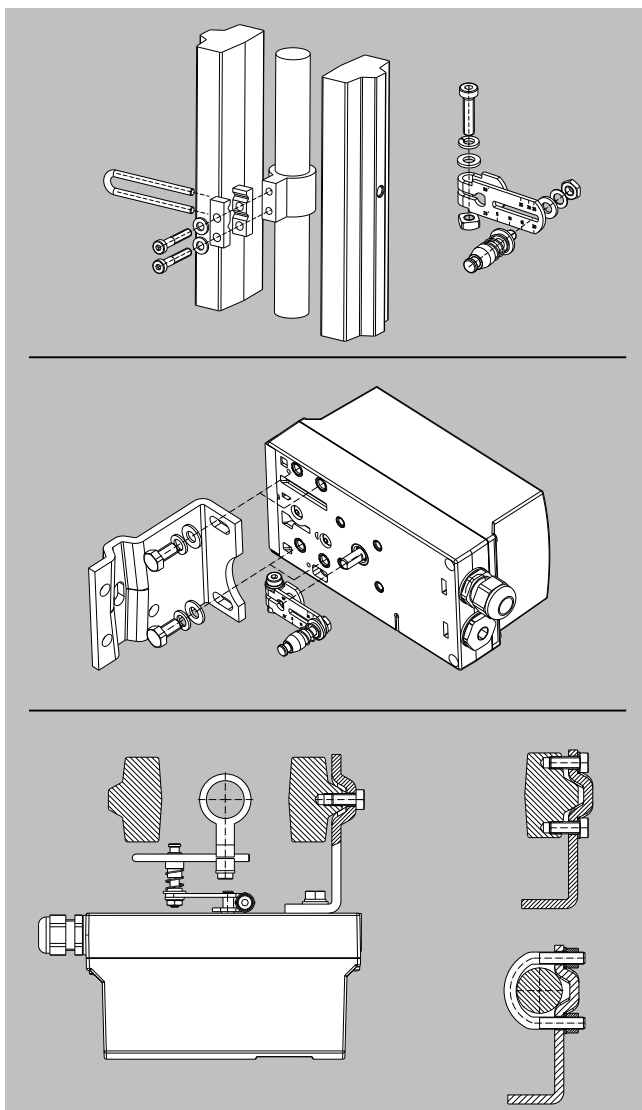


Mounting onto part-turn actuators; mounting console can be ordered via 6DR4004-1D/-2D/-3D/-4D, extract from VDI/VDE 3845, dimensions in mm (inch)

Mounting kit for NAMUR linear actuators 6DR4004-8V

- 1 mounting bracket
- 2 clamps
- 1 U-bracket
- 1 lever arm with adjustable tapered roller
- 2 U-bolts
- Various screws and lock washers

Dimensional drawings (continued)

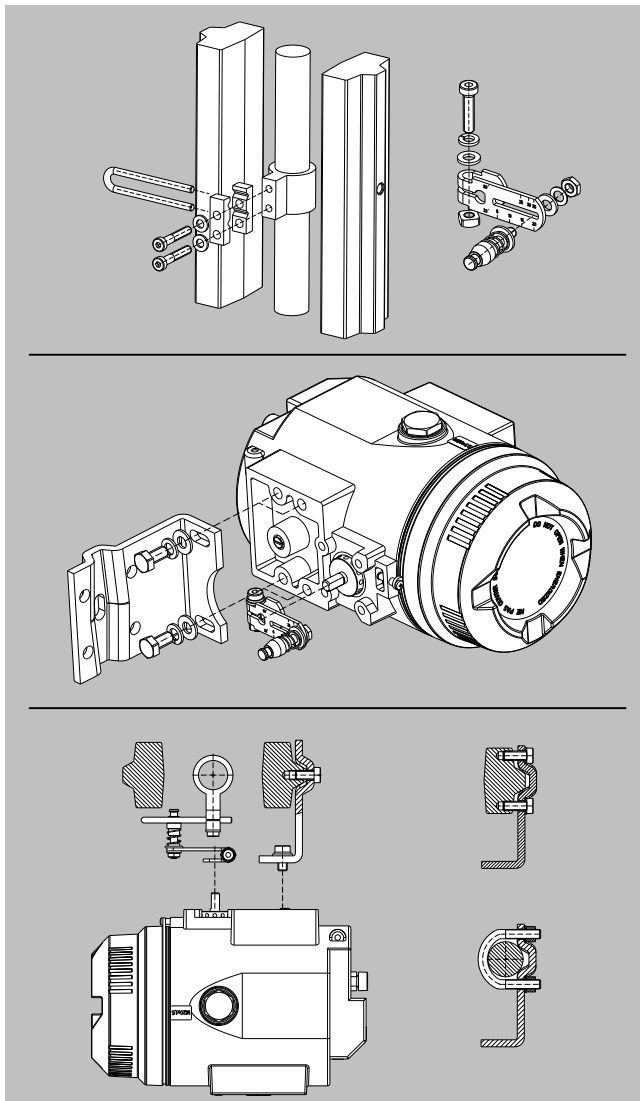


Mounting of SIPART PS2 on linear actuators

Positioners

SIPART PS2

Dimensional drawings (continued)

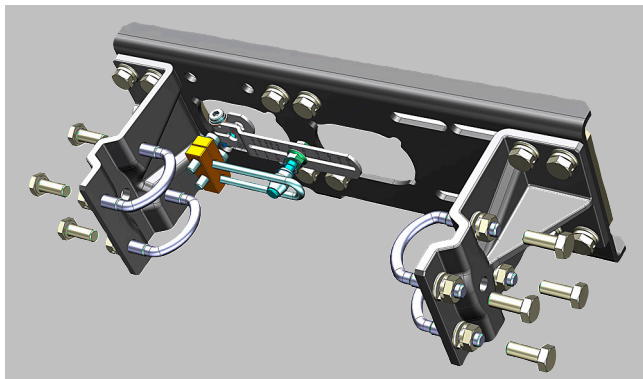


Mounting of SIPART PS2 in flameproof aluminum enclosure on linear actuators

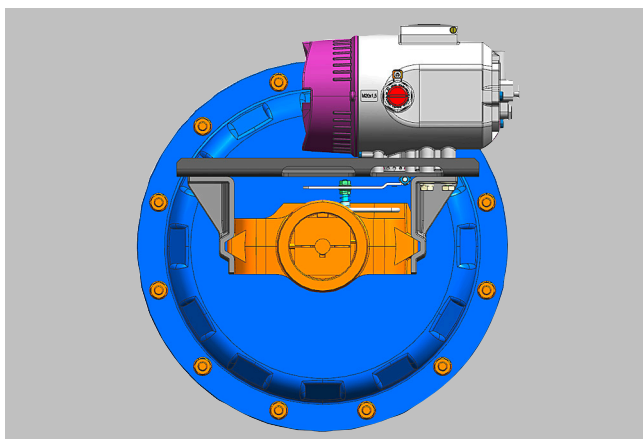
Mounting console made of stainless steel 316L for linear actuators 6DR4004-8R

- Console with 2 adjustable mounting brackets
- 4 U-brackets for pillar mounting
- 1 lever arm with adjustable tapered roller
- 2 clamps with U-bracket
- Screws and lock washers

Dimensional drawings (continued)



Mounting console made of stainless steel 316L 6DR4004-8R



Mounting console stainless steel 316L mounted on SIPART PS2 in flameproof stainless steel enclosure 316L

Mounting kit for NAMUR part-turn actuators 6DR4004-8D

- 1 coupling wheel
- 1 driver pin
- 8 scales
- 1 pointer
- Various screws and lock washers

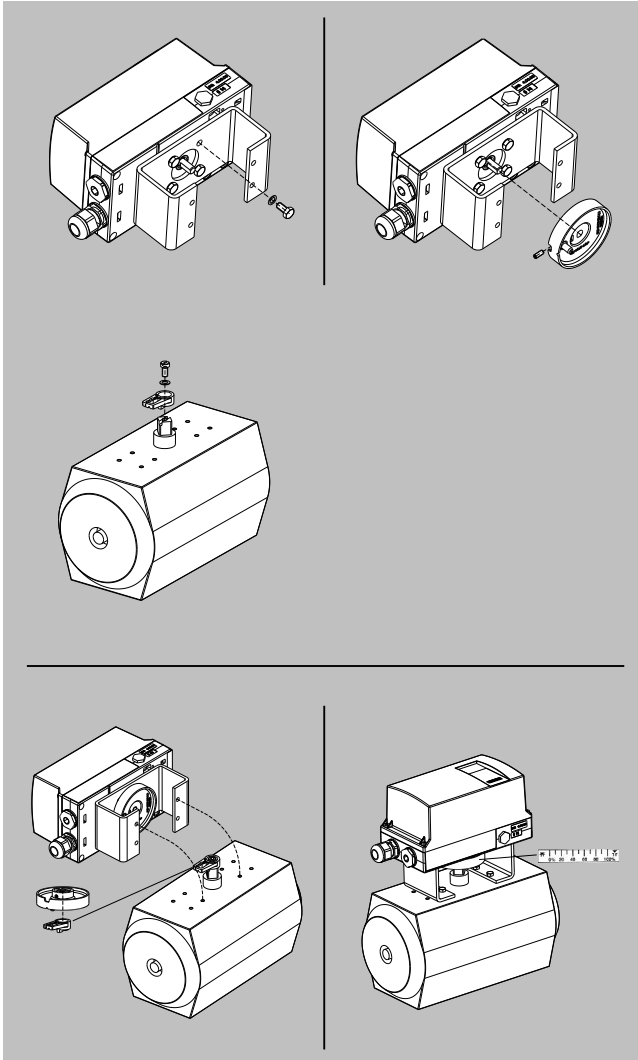
Notice

The mounting console for mounting on the part-turn actuators is not included in the scope of delivery, but can be ordered separately via 6DR4004-1D/-2D/-3D/-4D. Fixing screws are not included in the scope of delivery (see "Technical specifications")

Positioners

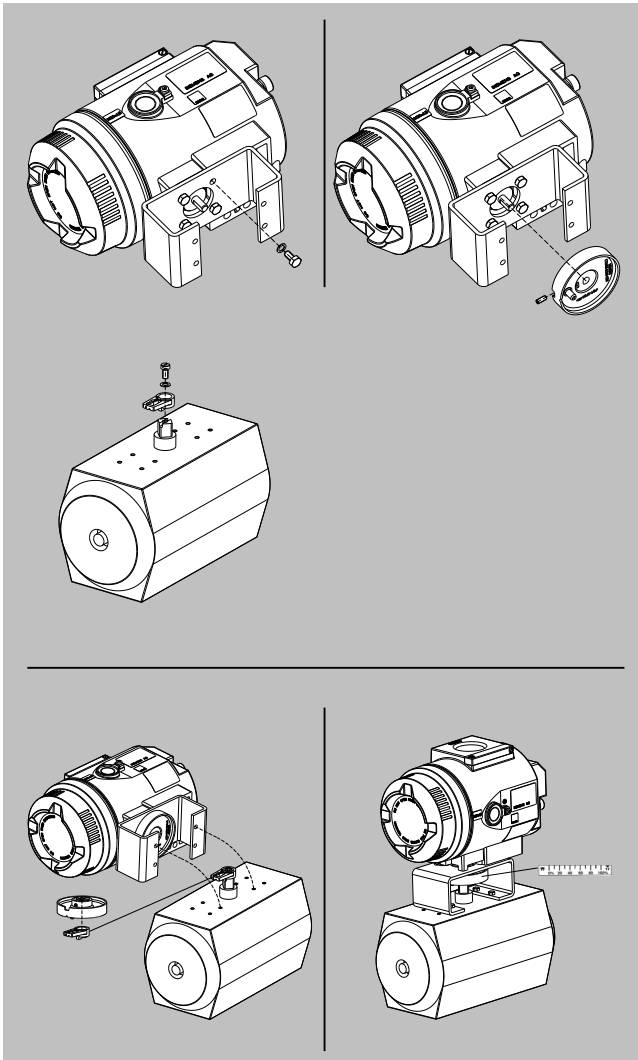
SIPART PS2

Dimensional drawings (continued)



Mounting of SIPART PS2 on part-turn actuators

Dimensional drawings (continued)



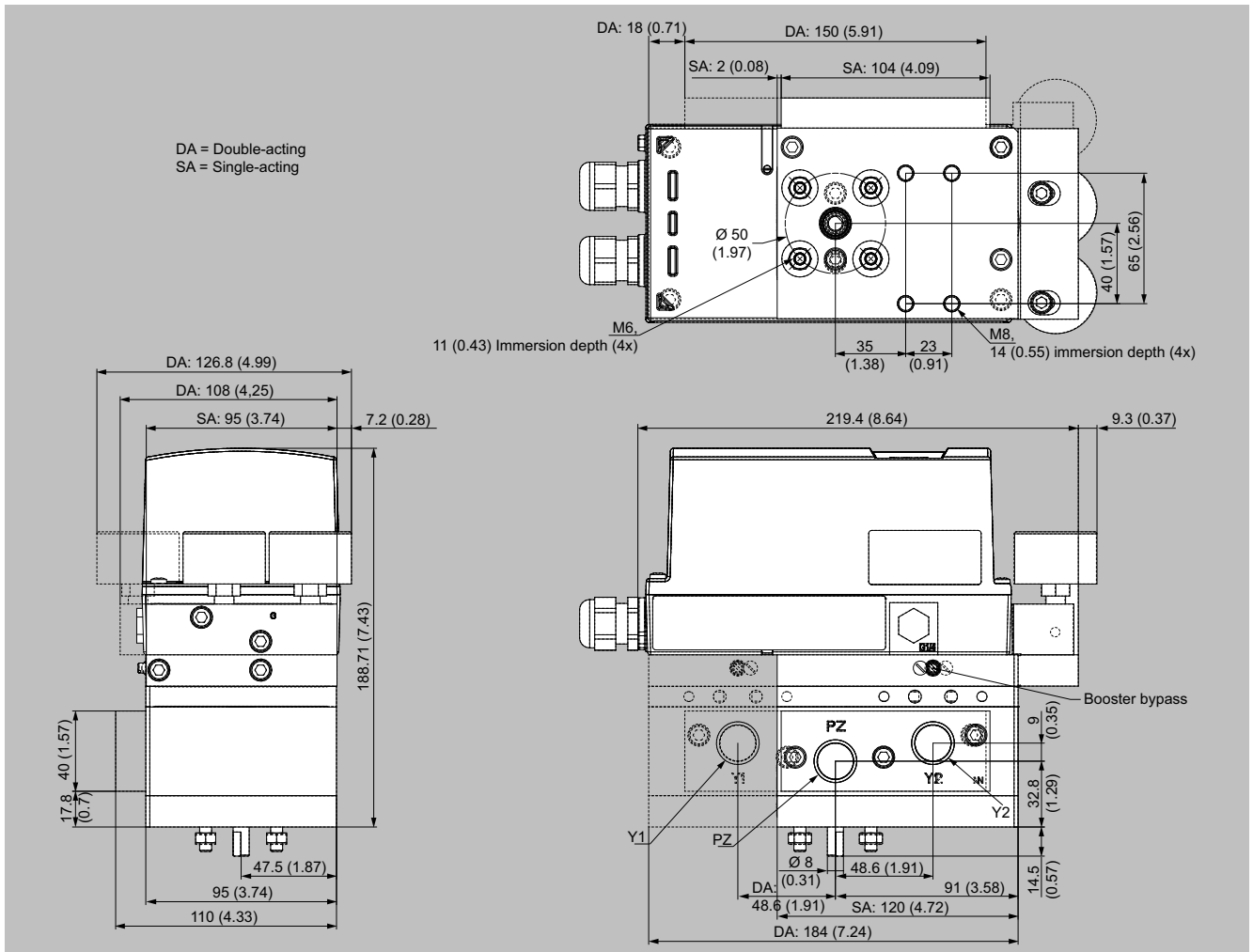
Mounting of SIPART PS2 in flameproof aluminum enclosure on part-turn actuators

Positioners

SIPART PS2

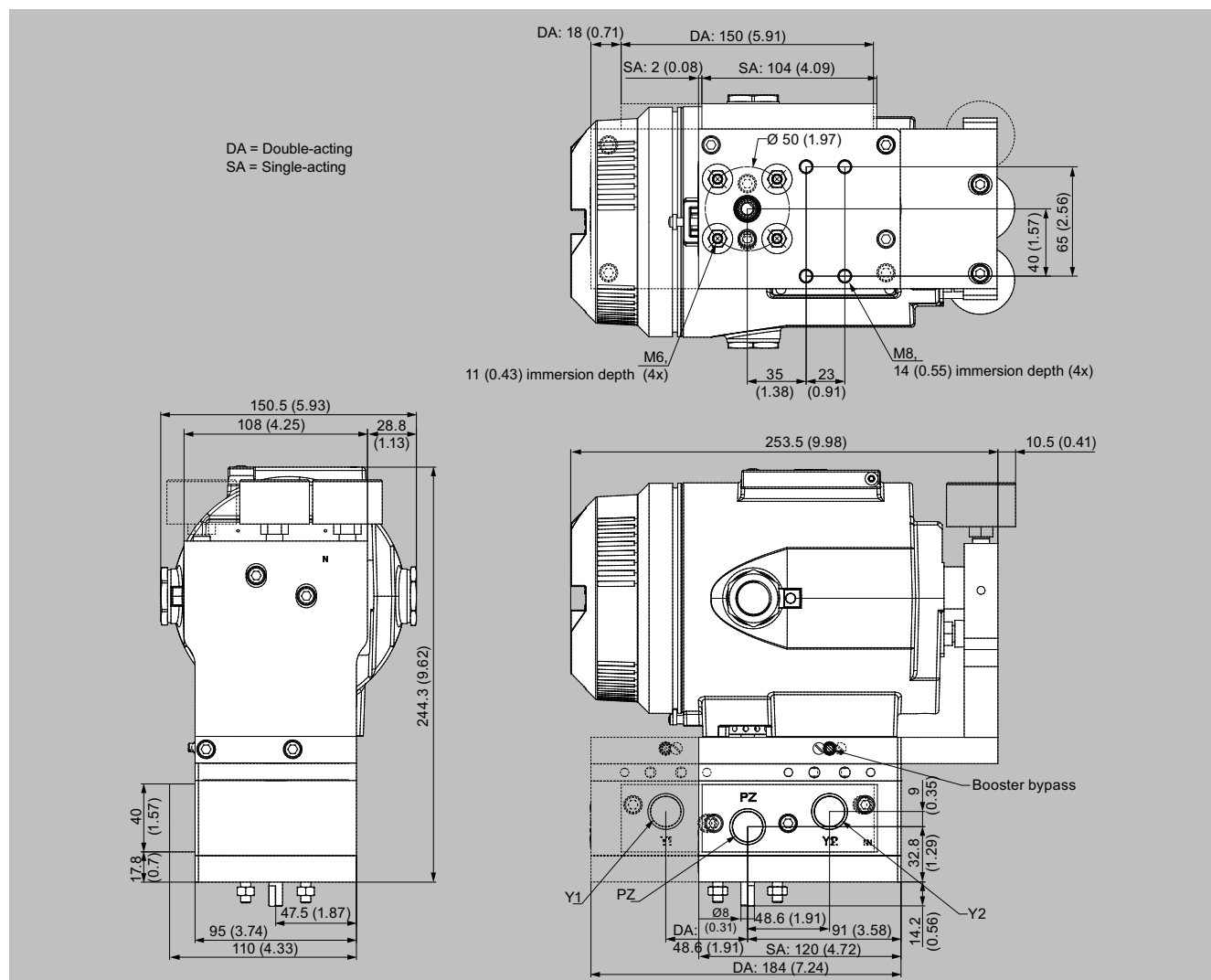
Dimensional drawings (continued)

Booster mounted on positioner



Booster mounted on positioner, dimensions in mm (inch)

Dimensional drawings (continued)



Booster mounted on positioner in a flameproof enclosure, dimensions in mm (inch)

More information

Documentation and certificates

All documentation and all available certificates are available free of charge in multiple languages through the QR code below:

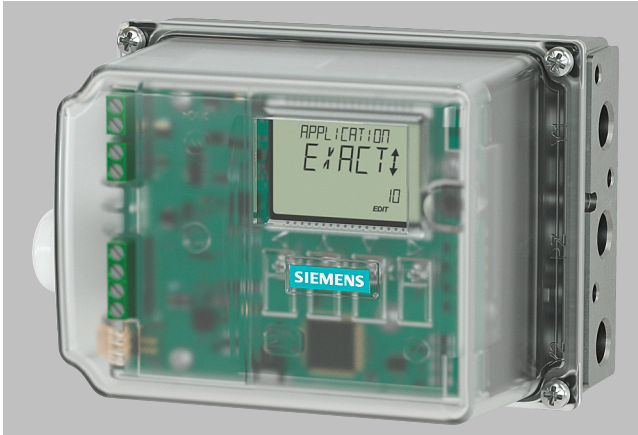
**Special designs**

On request

Positioners

SIPART PS100

Overview



SIPART PS100 with polycarbonate lid



SIPART PS100 in aluminum enclosure

The SIPART PS100 electropneumatic positioner is used to control the process valve or damper position of pneumatic linear or part-turn actuators. The SIPART PS100 regulates the process valve according to the setpoint.

Benefits

The SIPART PS100 positioners offer the following advantages:

- Fast commissioning at the push of a button
- Simple operation via the local display and four buttons
- Local display symbols according to NAMUR NE 107
- Negligible air consumption in stationary operation
- Setting the application profile based on predefined selection options, e.g. close tight valve, open/close valve, small valve
- Rapid response in end positions means short travel times and a close tight valve.
- Insensitive to oscillations (vibrations) and steam hammer
- Leakage compensation ensures a constant actual value and protects the actuator
- Only one device version for linear and part-turn actuators
- Consistent parameter assignment with HART communication
- Safe use in hazardous areas

Application

The SIPART PS100 is used in the following industry sectors:

- Valve manufacturing
- Chemical industry
- Power supply
- Paper
- Water and wastewater
- Food and beverages
- Pharmaceuticals

The SIPART PS100 can be utilized in applications with pneumatic actuators and a setpoint signal of 4 ... 20 mA.

Design

The SIPART PS100 positioner comprises the following components:

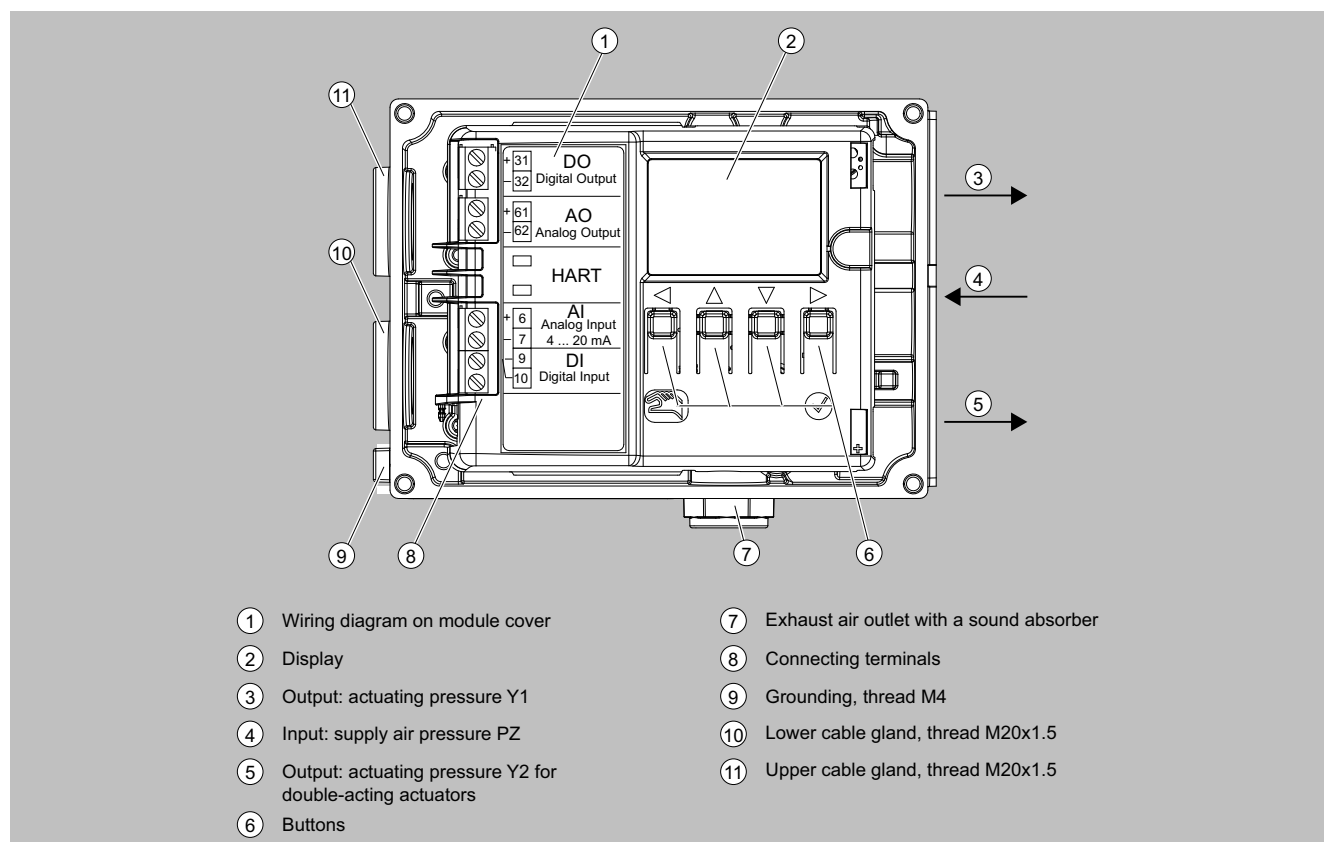
- Enclosure (base plate with lid)
- Electronics
- Wear-free, contact-free position detection
- Pneumatic block

The pneumatic block is located in the enclosure, the pneumatic connections for the inlet air and the actuating pressure on the right-hand side of the enclosure. The electrical connections are located on the left-hand side of the enclosure.

The SIPART PS100 positioner is fitted to the relevant pneumatic linear or part-turn actuator using an appropriate mounting kit. The positioner shaft is located on the underside of the base plate. The positioner shaft is connected to the spindle of the linear actuator or the actuator shaft of the part-turn actuator using the mounting kit.

The electronics are available with the following options:

- Analog output (AO) 4 to 20 mA
The current position of the valve is converted into a 4 to 20 mA signal.
- Digital input and digital output (DI and DQ)
 - Position limit monitoring.
 - Output of an alarm in the event of a control deviation or a device fault.
 - Approach of a defined process valve position, disabling of keys, blocking of valve process valve by means of digital input.
- HART communication on parameter assignment and information on the device status



SIPART PS100, enclosure with open lid

Positioners

SIPART PS100

Function

Local operation is performed using the built-in local display and the four buttons. It enables, for example:

- Starting automatic commissioning with the press of a button
- Configuring the device
- Switching between the operation modes:
 - AUTO: The positioner controls the valve according to the analog input (AI) 4 to 20 mA
 - MANUAL: Valve movement with the middle keys

A hallmark of the SIPART PS100 is its own extremely low consumption of air. Compressed air is only required to move the valve. In the controlled state, consumption of air is negligible.

Selection and ordering data

SIPART PS100 electropneumatic positioner without explosion protection		Article No. 6DR71		● ● - 0 ● ● ● ● - ● ● ● 0											
Click the article number for online configuration in the PIA Life Cycle Portal.															
Enclosure material															
Polycarbonate, lid with inspection window		0													
Aluminum, lid without inspection window		1													
Actuator type															
For single-acting actuators		1													
For double-acting actuators		2													
Communication															
2-wire, 4 ... 20 mA						N									
2-wire, 4 ... 20 mA, HART						A N									
Device option 1															
Without device option 1						N									
With digital input (DI) and digital output (DQ)						A									
Device option 2															
Without device option 2								0							
With analog output (AQ) 4 ... 20 mA								1							
Thread of the lower cable entry/cable gland															
M20 × 1.5/without cable gland								0							
M20 × 1.5/with plastic cable gland								1							
M20 × 1.5/with metal cable gland								2							
½-14 NPT/without cable gland								4							
Thread of the upper cable entry/cable gland															
M20 × 1.5/with blanking plug												0			
M20 × 1.5/with plastic cable gland												1			
M20 × 1.5/with metal cable gland												2			
½-14 NPT/without cable gland												4			
Pneumatic thread															
G¼												A			
¼-18 NPT												B			
Pneumatic accessories															
Without gauge block												A			
Pressure gauge made of plastic, block made of aluminum												C			
Pressure gauge made of metal, block made of aluminum												D			
Gauge made of stainless steel, block made of stainless steel												E			

SIPART PS100 electropneumatic positioner with explosion protection		Article No. 6DR71		● ● - ● ● N ● ● - ● ● ● 0													
Click the article number for online configuration in the PIA Life Cycle Portal.																	
Enclosure material																	
Polycarbonate, lid with inspection window		0		1													
Aluminum, lid without inspection window		1															

Selection and ordering data (continued)

SIPART PS100 electropneumatic positioner with explosion protection	Article No. 6DR71	● ● - ● ● N ● ● - ● ● ● 0
Actuator type		
For single-acting actuators	1	
For double-acting actuators	2	
Degree of protection		
Ex i (ATEX, IECEx,...) SITRANS I200 output isolation amplifier sold separately (7NG4131-1AA00).	1	
Ex i; Ex e (ATEX, IECEx,...) SITRANS I200 output isolation amplifier sold separately (7NG4131-1AA00).	2	
Ex i; Ex e; Ex t (ATEX, IECEx,...) SITRANS I200 output isolation amplifier sold separately (7NG4131-1AA00).	3	
Communication		
2-wire, 4 ... 20 mA		N
2-wire, 4 ... 20 mA, HART		A
Device option 2		
Without device option 2		0
With analog output (AQ) 4 ... 20 mA SITRANS I100 isolating power supply sold separately (7NG4124-1AA00).		1
Thread of the lower cable entry/cable gland		
M20 x 1.5/without cable gland		0
M20 x 1.5/with plastic cable gland		1
M20 x 1.5/with metal cable gland		2
½-14 NPT/without cable gland		4
Thread of the upper cable entry/cable gland		
M20 x 1.5/with blanking plug		0
M20 x 1.5/with plastic cable gland		1
M20 x 1.5/with metal cable gland		2
½-14 NPT/without cable gland		4
Pneumatic thread		
G¼		A
¼-18 NPT		B
Pneumatic accessories		
Without gauge block		A
Pressure gauge made of plastic, block made of aluminum		C
Pressure gauge made of metal, block made of aluminum		D
Gauge made of stainless steel, block made of stainless steel		E

Options	Order code
Add "Z" to article number, specify order code and plain text	
TAG plate made of stainless steel, 3-line Input fields Text line 1: plain text from Y15 Text line 2: plain text from Y16 Text line 3: plain text from Y17	A20
Version with stainless steel sound absorbers	A40
Explosion protection (Japan)	E29
EN 10204 certificate type 2.1	C35
DNV (Det Norske Veritas)	S10
Measuring point description	Y15
Input field: Max. 16 characters; specify in plain text	
Measuring point text	Y16
Input field: Max. 24 characters; specify in plain text	
Measuring point number (TAG no.)	Y17
Input field: Max. 32 characters; specify in plain text	

Positioners

SIPART PS100

Selection and ordering data (continued)

Accessories	Article No.
Bluetooth adapter and assembly kit PS100	7MP3210-0AA01
Gauge block	
With pressure gauges made of plastic IP31 (MPa, bar)	
• Block made of aluminum, single-acting, G $\frac{1}{4}$	6DR4004-1M
• Block made of aluminum, double-acting, G $\frac{1}{4}$	6DR4004-2M
With pressure gauges made of plastic IP31 (MPa, psi)	
• Block made of aluminum, single-acting, $\frac{1}{4}$ -18 NPT	6DR4004-1MN
• Block made of aluminum, double-acting, $\frac{1}{4}$ -18 NPT	6DR4004-2MN
With gauges made of metal IP44 (MPa, bar, psi)	
• Block made of aluminum, single-acting, G $\frac{1}{4}$	6DR4004-1P
• Block made of aluminum, double-acting, G $\frac{1}{4}$	6DR4004-2P
• Block made of aluminum, single-acting, $\frac{1}{4}$ -18 NPT	6DR4004-1PN
• Block made of aluminum, double-acting, $\frac{1}{4}$ -18 NPT	6DR4004-2PN
With pressure gauges made of stainless steel 316 IP54 (MPa, bar, psi)	
• Block made of stainless steel 316, single-acting, G $\frac{1}{4}$	6DR4004-1Q
• Block made of stainless steel 316, double-acting, G $\frac{1}{4}$	6DR4004-2Q
• Block made of stainless steel 316, single-acting, $\frac{1}{4}$ -18 NPT	6DR4004-1QN
• Block made of stainless steel 316, double-acting, $\frac{1}{4}$ -18 NPT	6DR4004-2QN
Venting gauge block	
Depressurizing of Y2 on compressed air failure with pressure gauges made of metal IP44 (MPa, bar, psi). The double-acting actuator with springs moves into the safety position.	
• Block made of aluminum, double-acting, G $\frac{1}{4}$	6DR4004-2RE
• Block made of aluminum, double-acting, $\frac{1}{4}$ -18 NPT	6DR4004-2RF
Booster (Cv = 2)	
Aluminum with gauges made of metal IP44 (MPa, bar, psi)	
• Single-acting, G $\frac{1}{2}$	6DR4004-1RJ
• Double-acting, G $\frac{1}{2}$	6DR4004-2RJ
• Single-acting, $\frac{1}{2}$ -14 NPT	6DR4004-1RK
• Double-acting, $\frac{1}{2}$ -14 NPT	6DR4004-2RK
Mounting kit for NAMUR part-turn actuators	
VDI/VE 3845, with plastic coupling wheel, without mounting console	6DR4004-8D
VDI/VE 3845, with stainless steel coupling, without mounting console	TGX:16300-1556
Console for mounting on NAMUR part-turn actuators VDI/VE 3845	
• 80 × 30 × 20 mm (3.15 × 1.18 × 0.79 inches)	6DR4004-1D
• 80 × 30 × 30 mm (3.15 × 1.18 × 1.18 inches)	6DR4004-2D
• 130 × 30 × 30 mm (5.12 × 1.18 × 1.18 inches)	6DR4004-3D
• 130 × 30 × 50 mm (5.12 × 1.18 × 1.97 inches)	6DR4004-4D
Mounting kit for other part-turn actuators	
The following mounting consoles can be used together with the NAMUR part-turn actuator mounting kit 6DR4004-8D.	
SPX (DEZURIK) Power Rac, sizes R1, R1A, R2 and R2A	TGX:16152-328
Masoneilan Camflex II	TGX:16152-350
Fisher 1051/1052/1061, to 30, 40, 60 to 70	TGX:16152-364
Fisher 1051/1052, size 33	TGX:16152-348

Selection and ordering data (continued)

Accessories	Article No.
Mounting kit for NAMUR linear actuators	
NAMUR-linear actuator with short lever (2 ... 35 mm (0.08 ... 1.38 inches))	6DR4004-8V
Lever arm for strokes of 35 ... 130 mm (1.38 ... 5.12 inches) without NAMUR mounting bracket	6DR4004-8L
Reduced mounting kit (as for 6DR4004-8V but without fixing angle and U-bracket), with short lever with up to 35 mm (1.38 inches) stroke	6DR4004-8VK
Reduced mounting kit (as for 6DR4004-8V but without fixing angle and U-bracket), with long lever > 35 mm (1.38 inches) stroke	6DR4004-8VL
Roll and disk made of stainless steel 316 for replacement of the Teflon roll and aluminum disk in the 6DR4004-8, -8VK and -8VL mounting kits for NAMUR linear actuators	6DR4004-3N
Two terminal blocks made of stainless steel 316 for replacement of the aluminum terminal blocks in the 6DR4004-8V, -8VK and -8VL mounting kits for NAMUR linear actuators	6DR4004-3M
Mounting kit for other linear actuators	
MASONEILAN type 87/88	TGX:16152-1210
MASONEILAN type 37/38, all sizes	TGX:16152-1215
Fisher type 657/667, size 30 ... 80	TGX:16152-900
Interface according to VDI/VDE 3847	
Interface according to VDI/VDE 3847 for single and double-acting, CATS-equipped (Clean Air To Spring) on single-acting, not for flameproof enclosure	6DR4004-5PB

Scope of delivery for positioner

1 SIPART PS100 positioner as ordered

Positioners

SIPART PS100

Technical specifications

SIPART PS100	
Input	
Analog input (AI), terminals 6 and 7	
• Nominal signal range	4 ... 20 mA
• Minimum current to maintain operation	3.8 mA
• Maximum load voltage	6.5 V (corresponds to 325 Ω at 20 mA)
• Static destruction limit	± 40 mA
• Type of communication	HART 7
Digital input (DI), terminals 9 and 10	
• Galvanic isolation	Electrically connected to analog input Galvanically isolated from the outputs
• Signal state 0, floating contact open	> 300 kΩ
• Signal state 1, floating contact closed	< 3 kΩ
• Contact load	Suitable only for floating contact; max. contact load < 20 μA, 3 V
Output	
Analog output (AO), terminals 61 and 62	
• Connection type	2-wire connection
• Nominal signal range	4 ... 20 mA
• Fault current	< 3.6 mA
• Supply voltage U _H	12 ... 30 V
• External load R _B [kΩ]	≤ (U _H [V] - 12 V)/I _O [mA]
• Resolution in relation to the nominal signal range	0.05%
• Transmission error in relation to the nominal signal range	± 0.3%
• Effect of ambient temperature	± 0.1%/10K
• Maximum residual ripple	± 0.5%
• Galvanic isolation	Galvanically isolated from the other electrical inputs and outputs
Digital output (DQ), terminals 31 and 32	
• Maximum supply voltage U _H	35 V
• External current consumption	To be limited to 50 mA
• "Conductive" state	<ul style="list-style-type: none"> • Permissible rated current 50 mA • Maximum terminal voltage 3 V • Overload-proof
• "Locked" state "Locked" is also the state if the device is faulty or analog input (AI) is = 0 mA.	I < 60 μA
Operating conditions	
Ambient conditions for operation according to IEC 60068-2	For indoor and outdoor use
Ambient temperature	
• Ambient temperature	-20 ... +80 °C (-4 ... +176 °F)
• Relative humidity	0 ... 100%
Pollution degree according to IEC 61010-1	2
Overvoltage category according to IEC 61010-1	II
Degree of protection of enclosure	
• According to IEC 60529	IP66
• According to NEMA 250	Type 4X
Corrosion protection according to EN ISO 9227:2022 and EN ISO 12944:2017	
• 6DR710 polycarbonate enclosure	C5-M medium durability
• 6DR711 aluminum enclosure	C5-M medium durability
Vibration resistance	
• Harmonic oscillations (sine) according to IEC 60068-2-6	3.5 mm (0.14"), 2 ... 27 Hz, 3 cycles/axis, 98.1 m/s ² (321.84 ft/s ²), 27 ... 300 Hz, 3 cycles/axis

Technical specifications (continued)

SIPART PS100	
• Bumping (half-sine) according to IEC 60068-2-27	150 m/s ² (492 ft/s ²), 6 ms, 1 000 shocks/axis
• Noise (controlled digitally) according to IEC 60068-2-64	10 ... 200 Hz; 1 (m/s ²) ² /Hz (3.28 (ft/s ²) ² /Hz) 200 ... 500 Hz; 0.3 (m/s ²) ² /Hz (0.98 (ft/s ²) ² /Hz), 4 hours/axis
Climatic class	According to IEC EN 60721-3
• Storage	1K23, -40 ... +80 °C (-40 ... +176 °F)
• Transport	2K13, -40 ... +80 °C (-40 ... +176 °F)
Pneumatic data	
Pneumatic operating medium	
• Operating pressure	Compressed air, carbon dioxide (CO ₂), nitrogen (N ₂), noble gasses 1.4 ... 7 bar (20.3 ... 101.5 psi)
Air quality according to ISO 8573-1	
• Solid particulate size and density	Class 3
• Pressure dew point	Class 3 (min. 20 K (36 °F) below ambient temperature)
• Oil content	Class 3
Flow rate	
• Aerate process drive	
- Supply pressure 4 bar (58 psi)	7.1 Nm ³ /h (31.3 USgpm)
- Supply pressure 6 bar (87 psi)	9.8 Nm ³ /h (43.1 USgpm)
• Depressurize process drive	
- Actuating pressure 4 bar (58 psi)	13.7 Nm ³ /h (60.3 USgpm)
- Actuating pressure 6 bar (87 psi)	19.2 Nm ³ /h (84.5 USgpm)
Leakage actuator chamber (positioner portion)	< 6 · 10 ⁻⁴ Nm ³ /h (0.0026 USgpm)
Typical auxiliary power consumption in the controlled state	0.01 Nm ³ /h (0.044 US gpm)
Sound pressure	<ul style="list-style-type: none"> • L_{A eq} < 75 dB • L_{A max} < 80 dB
Structural design	
Supported actuator types	
• Linear actuator, range of stroke	10 ... 130 mm (0.39 ... 5.12")
• Part-turn actuator, angle-of-rotation range	10 ... 100°
Weight, positioner without accessories	Approx. 1.0 kg (2.20 lbs)
Material	
• Lid	<ul style="list-style-type: none"> • Aluminum • Polycarbonate
• Base plate	Aluminum
• Gauge block	Aluminum, anodized or stainless steel 316
• Pressure gauge	<ul style="list-style-type: none"> • Plastic, mechanics brass • Stainless steel, mechanics brass nickel-plated • Stainless steel, mechanics stainless steel 316
Torques	
• Lid fixing screws	1.5 Nm (1.1 ft lb)
• Part-turn actuator fixing screws DIN 933 M6x12-A2	5 Nm (3.7 ft lb)
• Linear actuator fixing screws DIN 933 M8x16-A2	12 Nm (8.9 ft lb)
• Gland pneumatic G ¹ / ₄	15 Nm (11.1 ft lb)
• Gland pneumatic ¹ / ₄ -18 NPT	
- Without sealant	12 Nm (8.9 ft lb)
- With sealant	6 Nm (4.4 ft lb)
• M20 cable gland, plastic	4 Nm (3 ft lb)
• M20 cable gland, metal	6 Nm (4.4 ft lb)
• ¹ / ₂ -14 NPT cable gland, metal	15 Nm (11.1 ft lb)

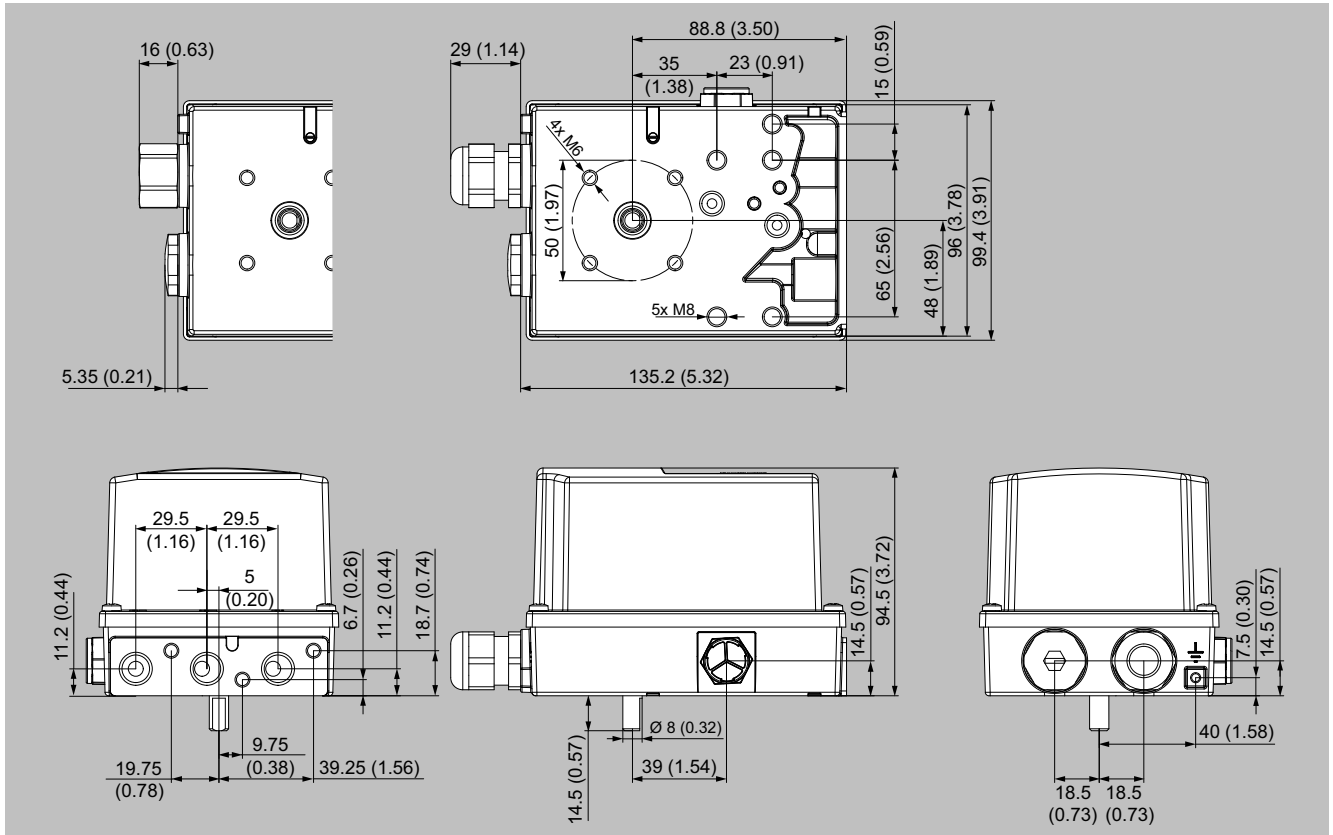
Technical specifications (continued)

SIPART PS100	
<ul style="list-style-type: none"> • ½-14 NPT cable gland, metal in the NPT adapter 	68 Nm (50 ft lb)
IMPORTANT: To avoid damage to the device, the NPT adapter must be held in place while the NPT gland is screwed into the NPT adapter.	
<ul style="list-style-type: none"> • Union nut made of plastic 	2.5 Nm (1.8 ft lb)
<ul style="list-style-type: none"> • Union nut made of metal 	4 Nm (3 ft lb)
<ul style="list-style-type: none"> • Gauge block fixing screws 	6 Nm (4.4 ft lb)
Pressure gauge	
<ul style="list-style-type: none"> • Degree of protection 	
- Plastic pressure gauge, mechanics brass	IP31
- Metal pressure gauge, mechanics brass nickel-plated	IP44
- Stainless steel pressure gauge, mechanics stainless steel 316L	IP54
Connections, electrical	
<ul style="list-style-type: none"> • Screw terminals 	2.5 mm ² AWG30-14
<ul style="list-style-type: none"> • Cable bushing 	M20x1.5 or ½-14 NPT with NPT adapter
Connections, pneumatic	
	G¼ or ¼-18 NPT
Controller	
Controller unit	
<ul style="list-style-type: none"> • Five-point switch 	Adaptive
<ul style="list-style-type: none"> • Deadband 	
- Adjustable maximum value	± 0.1 ... 3%, plus hysteresis (half of the deadband, but at least 0.2%)
- Minimization of the maximum value	Always active
Analog input (AI), terminals 6 and 7	
<ul style="list-style-type: none"> • Sampling interval 	50 ms
<ul style="list-style-type: none"> • Resolution 	0.05%
Position detection	
<ul style="list-style-type: none"> • Sampling interval 	10 ms
<ul style="list-style-type: none"> • Resolution at 10 mm stroke 	0.1%
<ul style="list-style-type: none"> • Temperature influence effect 	0.1%/10 K (0.1%/18 °F)
Certificates and approvals	
DoC compliance	You can find the appropriate directives and standards, including the relevant versions, in the Declaration of Conformity on the internet.
UL conformity	The SIPART PS100 has documented compliance with the safety requirements in the USA and Canada. These are UL classified, recognized and listed.
Explosion protection	You can find details on explosion protection in the compact operating instructions and the explosion protection certificates.

Positioners

SIPART PS100

Dimensional drawings



Non-flameproof enclosure, dimensions in mm (inch)

More information

Documentation and certificates

All documentation and all available certificates are available free of charge in multiple languages through the QR code below:



Special designs

On request





6/2	Product overview
6/4	Acoustic and motion sensing
6/4	Introduction
6/6	Acoustic sensors
6/6	SITRANS DA400 Acoustic diagnostic unit
6/12	SITRANS AS100 Acoustic sensor
6/18	SITRANS CU02 Control Unit
6/22	Motion sensors
6/22	Milltronics MFA 4p Motion failure alarm controller
6/31	Milltronics MSP-7 Motion sensor
6/34	SITRANS WM300 Motion failure alarm controller
6/39	SITRANS WM100 Motion sensor

Process Protection

Product overview

Overview

	Application	Device description
<p>Acoustic sensor for pump monitoring</p> 	<p>Acoustic diagnostics unit for flow valve leakage monitoring in oscillating displacement pumps or for material flow monitoring of bulk solids in pipes, conveyors or raceways.</p>	<p>SITRANS DA400</p> <ul style="list-style-type: none"> • 4 inputs for structure-borne noise sensors • 4 universal inputs • 6 digital outputs • With PROFIBUS DP or PROFIBUS PA • Sensor degree of protection IP66/IP68
<p>Acoustic sensors for material flow monitoring</p> 	<p>Acoustic sensor for solids flow detection.</p> <p>Alarm control unit for use with SITRANS AS100 acoustic sensor to provide reliable continuous protection for bulk solid flow. It processes signals from the sensor, providing relay and analog outputs for interface into a process.</p>	<p>SITRANS AS100</p> <ul style="list-style-type: none"> • Non-invasive • Screw in, bolt on, weld, or bond in place • Analog output • High and low sensitivity range of operation <p>SITRANS CU02</p> <ul style="list-style-type: none"> • 3 digit LCD display • 4 ... 20 mA output • Two programmable relays • Adjustable independent time delay for each relay • DIN rail mounting provides easy installation

Overview (continued)

Motions sensors	Application	Device description
	<p>Highly sensitive single set point motion sensor alarm unit, used with MSP probes.</p>	<p>Milltronics MFA 4p</p> <ul style="list-style-type: none"> Probe/target separation up to 100 mm (4 inch) Minimum velocity of moving ferrous target: 1 cm/sec. (2 fpm)
	<p>Highly sensitive dual setpoint motion sensor system, used with Milltronics MSP probes.</p>	<p>SITRANS WM300 MFA</p> <ul style="list-style-type: none"> Up to 100 mm (4 inch) gap between target and probe. Setpoint adjustment range 2 to 5 000 Hz (120 to 300 000 ppm)
	<p>Heavy duty 3-wire motion sensor that provides an NPN open collector output to PLCs.</p>	<p>Milltronics MSP-7</p> <ul style="list-style-type: none"> Up to 100 mm (4 inch) gap between target and probe Corrosion resistant construction
	<p>Heavy-duty zero speed alarm switch.</p>	<p>SITRANS WM100</p> <ul style="list-style-type: none"> Detects the absence or presence of motion of rotating or reciprocating or conveying equipment

Process Protection

Acoustic and motion sensing

Introduction

Overview

Process protection devices act as early warning systems to avoid costly process interruptions and breakdowns of equipment. Non-contacting motion sensors detect changes in motion and speed of conveying, reciprocating and rotating machinery.

Non-invasive acoustic sensors detect inaudible, high frequency acoustic emissions generated by friction and impact, caused by materials in motion. They can detect conditions of flow/no flow or high/low flow, to warn of blockages, product absence or equipment failure. They are located outside of the process, accurately detecting conditions without wear on the sensor.

Motion sensors can warn in case of equipment malfunction and shut down machinery in case of a slowdown or failure. They are rugged and perform even in harsh industrial conditions. Most of the MFA 4p motion sensing probes, as well as the SITRANS WM100, can be mounted up to 100 mm (4 inch) from the ferrous target, reducing the chance of damage to the probe and the equipment. The probes are not affected by moisture or dust build-up.

Mode of operation

Acoustic Sensing

Acoustic sensors monitor high frequency emissions generated by friction and the impact of flowing material or mechanical parts. The sensors can also sense the turbulence of gases or liquids leaking through valves and flanges. When matter vibrates between 0 Hz and 200 kHz, it creates acoustic energy. Sound energy between 20 Hz and 20 kHz can be detected by humans. Acoustic sensors detect high-frequency acoustic energy between 75 kHz and 175 kHz. Acoustic energy travels quickly through dense materials (metal) and poorly through less dense materials (air). Because the acoustic sensors are mounted directly to the external wall of the chute work, other plant noises are well below 75 kHz and effectively ignored by the sensors.

The acoustic sensors contain a specialized piezocrystal and filter circuit that responds effectively to the high-frequency band between 75 kHz and 175 kHz. As the crystal is excited by the acoustic energy, it produces a continuous electrical signal in direct proportion to the level of acoustic energy received. The SITRANS AS100 sensor output of 0 to 10 V DC can be applied to a PLC or to an optional control unit for a programmable alarm relay or 4 to 20 mA signal output.

Motion sensing

Siemens Milltronics probes work on the principle of Faraday's Laws of Electromagnetic Induction. When a ferromagnetic object enters the probe's permanent magnetic field, it distorts the flux, causing its coil windings to generate a voltage. This voltage is proportional to the strength of the magnet and the number of wire turns in the coil (constant in the probes) and the speed at which the ferrous target passes through the flux. The generated voltage is also inversely proportional to the square of the distance between the target and the probe.

The robust motion sensors provide the contacts to shut down machinery whenever under-speed, over-speed or plant equipment failure occurs. On belt, drag and screw conveyors, or on bucket elevators, fans and pumps, the speed alarm option can warn instantly of equipment malfunction. Some probes may be linked to a programmable logic controller to monitor equipment.

Technical specifications

Process Protection Selection Guide

Criteria	SITRANS DA400	SITRANS AS100	Milltronics MFA 4p	SITRANS WM300 MFA	Milltronics MSP-7	SITRANS WM100
Typical industries	Mining, water/wastewater, chemicals/petrochemicals and oil & gas industry	Aggregates, grain, cement, food processing, power generation, steel processing	Aggregates, cement, mining, wastewater, grain	Mining aggregate, cement, and other primary and secondary industries.	General industrial applications	Aggregates, cement, mining
Typical Applications	Oscillating displacement pumps such as diaphragm piston pumps, piston pumps and hose-type diaphragm piston pumps. Monitoring of flowing materials in pipes, conveyors or channels.	Pipes, pneumatic conveyors, aerated gravity flow systems, burst filter bag detection	Tail pulleys, driven pulleys, motor shaft sensing, screw conveyor flights, bucket elevators	Tail pulleys, motor shaft sensing, screw conveyor flights, bucket elevators	Tail pulley shafts, driven pulleys, motor shaft sensing, belt or drag conveyors, screw conveyor flights, bucket elevators, fans and pumps	Tail pulleys, driven pulleys, motor shaft sensing, screw conveyor flights, bucket elevators
Operation	Acoustic detection of cavitation, optionally acoustic detection of impact noises of high frequency	Acoustic sensing	Motion sensing	Motion sensing	Motion sensing	Motion sensing
Enclosure	Electronics housing, Makrolon IP65, sensor, stainless steel material number 1.4571 (316Ti SST)	Compact 304 or 303 stainless steel, IP68	Type 4X/NEMA 4X/IP65 polycarbonate	Polycarbonate	Type 4X/NEMA 4X/IP67 aluminum	Type 4X/NEMA 4X/IP67 aluminum
Sensor mounting	Screw to outside of pump housing. For material flow monitoring on the outside of pipes, channels, chutes or raceways	Sensor non-invasive: glue or weld-on disc, bolt or weld-on tab, drill and tap	Non-contacting probes secured with supplied flange	Non-contacting probes secured with supplied flange	Non-contacting probe secured with supplied flange	Non-contacting, secured with supplied flange
Operating temperature	Electronics: -20 ... +60 °C (-4 ... +140 °F) Sensor: -20 ... +110 °C (-4 ... +230 °F)	-20 ... +80 °C (-4 ... +176 °F) ¹⁾	-20 ... +50 °C (-4 ... +122 °F) ²⁾	-20 ... +50 °C (-4 ... +122 °F)	-40 ... +60 °C (-40 ... +140 °F)	-40 ... +60 °C (-40 ... +140 °F)
Power requirements	19 V ... 36 V DC, < 100 mA	20 ... 30 V DC, 18 mA	100/115/200/230 V AC ± 10 % 50/60 Hz, 15 VA	100 ... 240 V AC, 50/60 Hz, 0.7 ... 0.35 A per LOGO! power module	21 ... 28 V DC, 40 mA max.	115 or 230 V AC ± 10 % 50/60 Hz, 7 VA
Approvals	CE, PROFIBUS DP, and PROFIBUS PA conform, Ex protection to ATEX 1G or 1D	CE, RCM, CSA/FM Class II, Div. 1, Groups E, F, G optional, ATEX II, 2GD, 3D optional, EAC	CSA _{US/IC} , CE, RCM	CE, CSA/UL _{C/US} , FM, EAC, RCM, KCC	CE, RCM	CSA _{US/IC} , CE, RCM

¹⁾ Extended temperature model -40 ... +125 °C (-40 ... +257 °F) available (CE version)

²⁾ Probes available for -40 ... +260 °C (-40 ... +500 °F)

Process Protection

Acoustic sensors

SITRANS DA400 Acoustic diagnostic unit

Overview



The SITRANS DA400 acoustic diagnostic unit acoustically measures the structure-borne noise

- In the version for pump monitoring; on oscillating displacement pumps
- In the version for material flow monitoring; on pipes, conveying equipment or channels.

It comprises an electric diagnostic unit and up to four acoustic sensors.

Application

In the version for pump monitoring, the SITRANS DA400 allows continuous, simultaneous and independent monitoring of up to four flow control valves in a pump for leaks. In addition, another four inputs are available for monitoring standard signals (e.g. diaphragm and temperature monitoring). This means that the condition of an oscillating displacement pump is monitored in every phase of its operation.

The SITRANS DA400 is used in all industries where an oscillating displacement pump is used.

The version for material flow monitoring monitors the material flow in liquids or gases that is usually as a result of impact or friction, e.g. against the pipe or channel wall.

Benefits

Benefits when pump monitoring

- Increased availability of the system through:
 - Advanced maintenance planning thanks to early recognition of defective components
 - Reduced downtimes (no fault locating necessary)
 - Increased maintenance intervals
 - Greater pump reliability
- Prevention of expensive consequential damage
- Increased safety of critical applications
- Early recognition of a reduction in power
- Increased productivity

Benefits when material flow monitoring

- Detection of insufficient or excessive inflow of material in a liquid or gas flow
- Detection of blockages or clogging
- Reduction of down times
- Increased product quality
- Increased availability
- Guaranteed operational safety
- Increased productivity

Function

Product features

Continuous and independent status monitoring:

- Of the flow control valves, for leaks
- Of the membranes, for material fatigue
- Of the temperature loading of the hydraulic oil
- Of flowing bulk solids in pipes, conveying equipment or channels

Communication of the status to superordinate control systems:

- Via digital outputs
- Digitally, via PROFIBUS DP

Simple to operate and parameterize:

- Locally, via digital display and keys
- PROFIBUS DP

Mode of operation

Principle of measurement

Leaks in the flow control valves of oscillating displacement pumps are flows in which cavitation occurs. This results in sound waves that are transmitted to the valve housing, where they are recorded by the structure-borne sound sensor in the SITRANS DA400 on the outside.

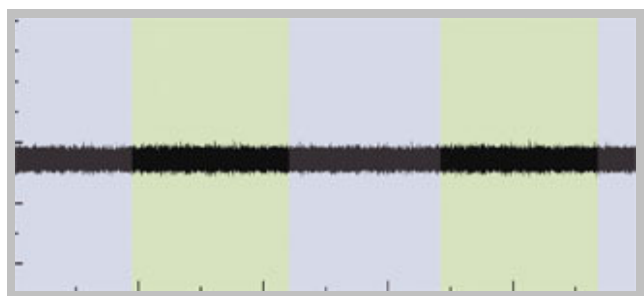
The SITRANS DA400 utilizes the fact that with both an open valve and a closed intact valve, no cavitation occurs and the measured sound level thus corresponds to the operating noise of the pump. By contrast, with a closed defective valve cavitation does occur, which can be identified by a period increase in the sound level (see figures). The measured value from the SITRANS DA400 corresponds exactly to this increase in the sound level.

In the version for material flow monitoring, SITRANS DA400 continuously detects high-frequency acoustic oscillations by means of structure-born noise sensors.

These oscillations are created by:

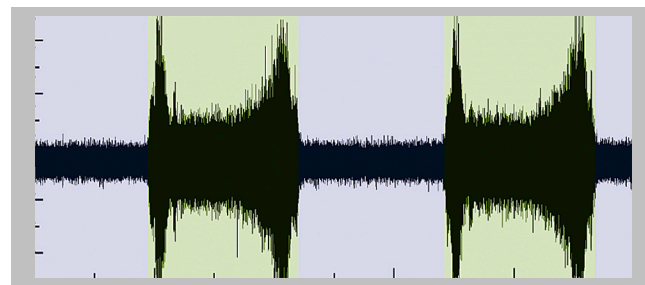
- Friction and impact of bulk solids in:
 - pipes, raceways or channels
 - chutes
 - conveyors
- Friction and impact of mechanical parts
- Bursting of bubbles
- Cavitation
- Turbulence in gas and liquid flows

The following shows an example of signal levels at an oscillating displacement pump



Signal from structure-borne sound sensor with intact valve

Function (continued)



Signal from structure-borne sound sensor with defective valve

Sensor operation

The structure-borne sound sensor works on the piezoelectric principle. The structure-borne sound is injected into the sensor via the sensor base (mounting surface) and inside it is converted into an electrical voltage by a piezo-ceramic element. This is amplified in the sensor and transmitted via the cable.

The sensor frequency range lies in the ultrasonic range (> 20 kHz). The sensor is non-directional, i.e. the angle at which the sound wave impacts on the sensor base is not important.

Process Protection

Acoustic sensors

SITRANS DA400 Acoustic diagnostic unit

Selection and ordering data

		Article No.				
SITRANS DA400 Acoustic diagnostic unit Monitors material flow in pipes, leakage in valves or oscillating pumps with up to 4 independent acoustic sensors.		7MJ2400-	●	A	A	0 ●
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.						
Communication						
• PROFIBUS DP			1			
Application software						
For continuous condition monitoring of positive displacement pumps						1
For material flow monitoring in pipes, raceways and conveyors						2

		Article No.				
SITRANS DA400 Acoustic diagnostic unit Monitors material flow in pipes, leakage in valves or oscillating pumps with up to 4 independent acoustic sensors.		7MJ2000-	1	A	●	0 0
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.						
Cable						
(incl. pin and allen screw M6)						
20 m					B	
40 m					C	
100 m					F	

Technical specifications

SITRANS DA400	
Input	
Acoustic channels	4
• Cycle time	10 ms
Universal inputs	4
• Cycle time	80 ms
• Low pass filter time	1 s
Universal analog current input	
• Load	< 105 Ω
• Resolution	0.1 %
• Accuracy	0.5 %
• Fault signal	> 21 mA or < 3.6 mA (at 4 ... 20 mA)
• Alarm monitoring hysteresis	0.5 %
• Static destruction limit	40 mA, 4 V
Universal input 24 V digital signal	
• Input resistance	> 19 kΩ
• Signal level Low	< 4.5 V or open
• Signal level High	> 7 V
• Hysteresis	> 1 V
• Static destruction limit	± 40 V
8.2 V source for NAMUR signal (DIN EN 60947-5-6)	
• Open circuit voltage	8.2 V ± 0.3 V, short-circuit proof
• Input resistance	< 950 Ω
• Static destruction limit for incorrect wiring	+20 V/-10 V
Output	
Digital outputs	6
• Semiconductor relay	Individually isolated, short circuit-proof
• Switching voltage	24 V AC/36 V DC, any polarity
• Destruction limit	35 V AC, 50 V DC
• Max. switching current	100 mA
Conditions of use	
Installation conditions	Vertical wall mounting, cables fed in from below
Climatic class	Class 4K4 according to EN 60721-3-4
Permissible ambient temperature	-20 ... +60 °C (-4 ... +140 °F)
Storage temperature	-20 ... +60 °C (-4 ... 140 °F)
Mechanical load	Class 4M3 according to EN 60721-3-4
Degree of protection to EN 60529	IP65
Electromagnetic Compatibility	
• Emitted interference and interference immunity	To EN 61326 and NAMUR NE 21
Usage limits for water	
• Delivery side	≥ 10 bar a
• Number of strokes	Min. 4 min ⁻¹ , max. 10 ... 500 min ⁻¹
Design	
Weight (without options)	Approx. 2.5 kg
Dimensions (W x H x D) in mm (inch)	172 x 320 x 80 (6.8 x 12.6 x 3.2)
Enclosure material	Polycarbonate
Electrical connection via screw terminals	<ul style="list-style-type: none"> • Rigid 2.5 mm (0.984 inch) • Flexible 1.5 mm (0.59 inch) • Flexible with connector sleeves 1.5 mm (0.59 inch)
Cable inlet via plastic cable joints	<ul style="list-style-type: none"> • 2 x Pg 13.5 • 5 x Pg 11

Technical specifications (continued)

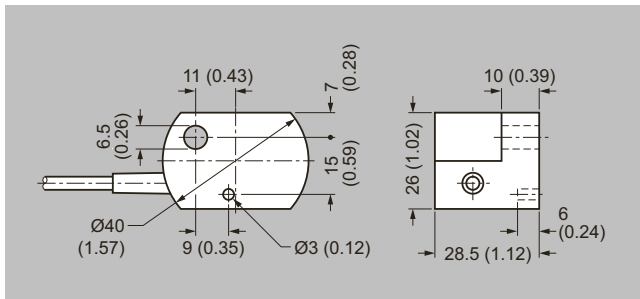
SITRANS DA400	
Power supply	
Rated voltage	24 V DC
Operating range	19 ... 36 V DC
Current consumption	< 100 mA
Communication	
PROFIBUS DP	RS 485, switchable terminating resistor
Protocol	Cyclic with Master C1 and acyclic with Master C2
PC parameterization software	SIMATIC PDM (not included in the scope of delivery)
Sensor for SITRANS DA400	
Setup	
	<ul style="list-style-type: none"> • Piezoceramic sensor with pre-amplifier • Encapsulated electronics • 4-wire cable with anti-kink sleeve
Conditions of use	
Permissible ambient temperature	-40 ... +110 °C (-40 ... +230 °F)
Degree of protection to EN 60529	P66/IP68
Mechanical load	Class 4M7 according to EN 60721-3-4
Climatic class	Class 4K4 according to EN 60721-3-4
Design	
Housing material	Stainless steel 1.4571 (316Ti SST)
Cable	Ends with wire protectors and cable shoe for connection to the SITRANS DA400
Weight	125 g (0.276 lb)
Dimensions (W x H x D) in mm (inch)	26 x 29 x 40 (1.02 x 1.14 x 1.57)
Power Supply	Power fed from device

Process Protection

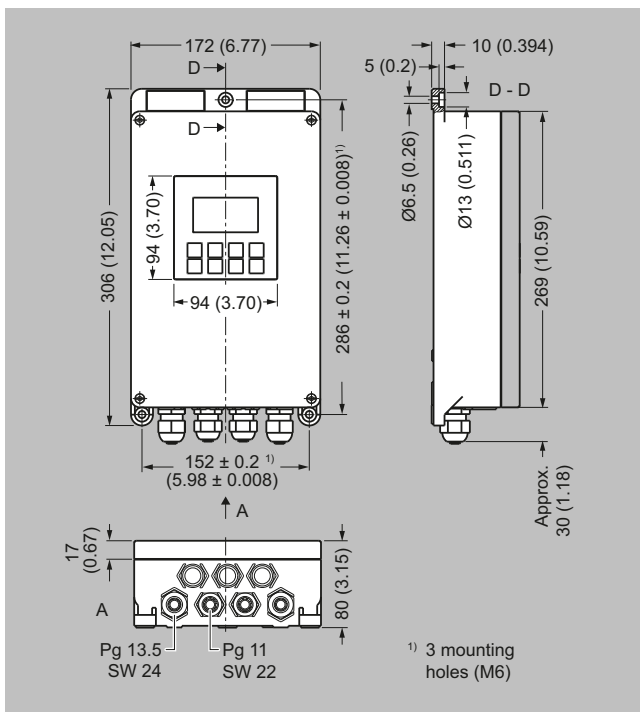
Acoustic sensors

SITRANS DA400 Acoustic diagnostic unit

Dimensional drawings

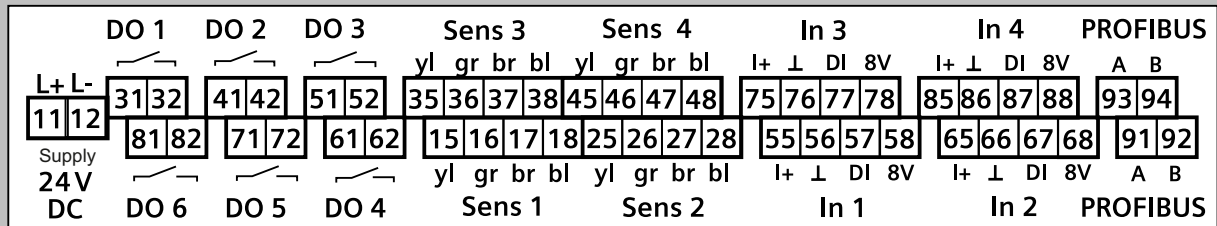


Sensor for SITRANS DA400, dimensions in mm (inch)



SITRANS DA400, dimensions in mm (inch)

Circuit diagrams



L+/L- Power supply
DO Digital output
Sens Sensor

In Input
yl Yellow
gr Green
br Brown
bl Black
I+ Analog current input +

⊥ Ground
DI Digital input
A Signal A (green) with PROFIBUS DP
B Signal B (red) with PROFIBUS DP

SITRANS DA400, terminal assignment

Process Protection

Acoustic sensors

SITRANS AS100 Acoustic sensor

Overview

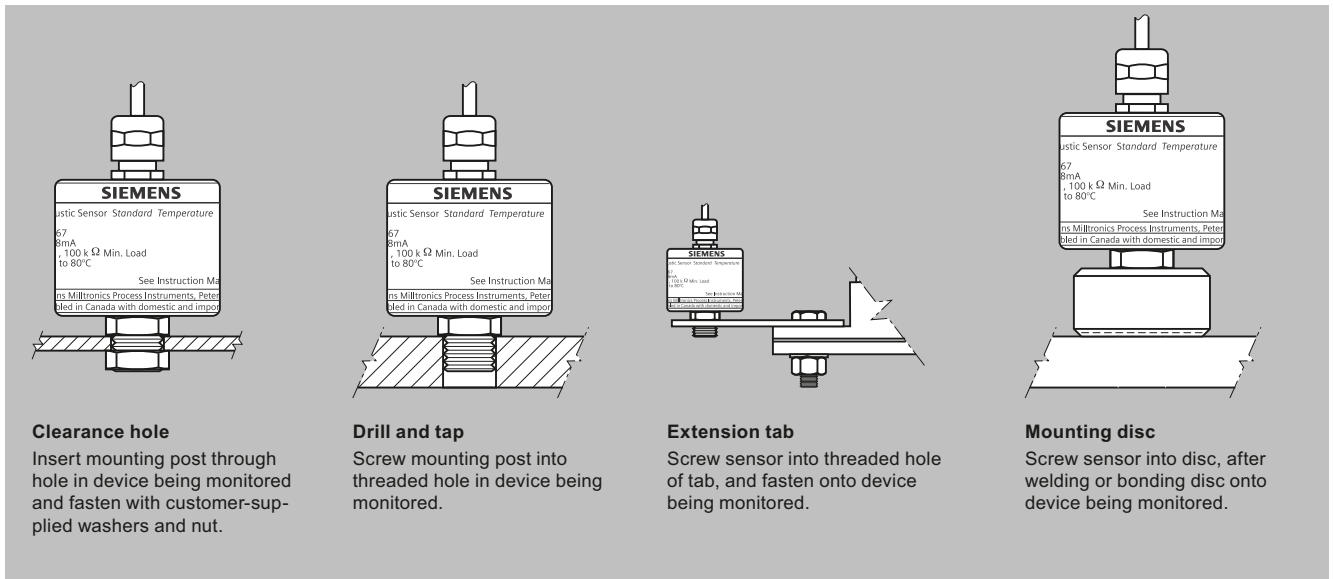


SITRANS AS100 is an acoustic sensor used for solids flow detection.

Benefits

- Non-invasive
- Screw in, bolt on, weld, or bond in place
- Analog output
- High and low sensitivity range of operation

Design



SITRANS AS100 mounting

Application

SITRANS AS100 detects changes in high frequency sound waves from equipment and materials in motion. It detects and reacts instantly to changes in solids flow to warn of blockages, product absence, or equipment failure such as burst filter bags. This allows an operator to take early preventative action and avoid costly damage.

Common applications include pellets, powders and most bulk solids in pipes, chutes, vibratory feeders, pneumatic conveyors or aerated gravity flow systems.

Operating with a SITRANS CU02 control unit, the system detects conditions of high flow, low flow or no flow. It can be added to a control loop via a 4 to 20 mA output. Two relays are fully programmable and independent of each other and can be used to operate an alarm or control device.

With no moving parts and a type 304 or 303 stainless steel enclosure sealed against dust and moisture, this non-invasive unit requires little or no maintenance. With a dual operating range, the sensor offers an exceptionally wide range of application capabilities.

- Key applications: pipes, chutes, vibratory feeders, aerated gravity flow systems, burst filter bag detection

Selection and ordering data

		Article No.					
SITRANS AS100 Acoustic sensor Non-invasive, for detection of solids flow.		7MH7560-	●	●	●	0	●
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.							
Sensor							
Standard temperature range [-20 ... +80 °C (-4 ... +176 °F)] ¹⁾		1					
Extended temperature range [-40 ... +125 °C (-40 ... +257 °F)] ²⁾		3					
Extended temperature range [-30 ... +120 °C (-22 ... +248 °F)] ³⁾		4					
Cable Length							
4 m (13.12 ft)			A				
Sensor Mounting							
None					A		
Mounting disk					B		
Mounting tab					C		
Approvals							
Ordinary Locations/General Purpose (Non-Ex), CE, UKCA, RCM, EAC, KC							1
CSA/FM Class II, Div. 1, Group E, F, and G (includes ½" NPT female fitting)							3
CSA Class II, Div. 1, Group E, F, and G (includes ½" NPT female fitting)							4
FM/CSA Class II, Div. 1, Groups E, F, & G; ATEX II 3D, Ex tc IIIC T100°C Dc, Ta 0= -20°C to +80°C, IP68 (includes M20 female fitting); UKEX II 3D, Ex tc IIIC T100°C Dc, Ta = -20°C to +80°C, IP68 (includes M20 female fitting); EAC Ex Ex tc IIIC T100°C Dc; CE, UKCA, RCM							5
ATEX II 2 G Ex d IIC T4 Gb, c/w cable gland; ATEX II 2 D Ex tb IIIC T100°C Db, c/w cable gland; EAC Ex 1 Ex db IIC T4 Gb; EAC Ex Ex tb IIIC T100°C Db ⁴⁾							6

1) Available with approval options 1, 3, 5, and 6 only.

2) Available with approval option 1 only.

3) Available with approval option 4 only.

4) Available with sensor option 1 only and sensor mounting option A only.

Selection and Ordering data	Order code
Further designs	
Please add "-Z" to Article No. and specify Order code(s).	
Manufacturer's test certificate: According to EN 10204-2.2	C11
Acrylic coated, stainless steel tag [12 x 45 mm (0.5 x 1.75 inch)]: Measuring-point number/identification (max. 16 characters), specify in plain text	Y17

Spare Parts	Article No.
Operating Instructions	
All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation	
Spare Parts	
Mounting tab	7MH7723-1AA
Mounting disk	7MH7723-1AB
½" NPT adapter kit for standard temperature range sensor, not Class II approved	7MH7723-1BW
M20 adapter kit for standard temperature range sensor, not Class II or ATEX and UKEX approved	7MH7723-1BV
½" NPT adapter kit for extended temperature range sensor, not Class II approved Note: Adapter kits are not CSA Class II approved	7MH7723-1BX

Process Protection

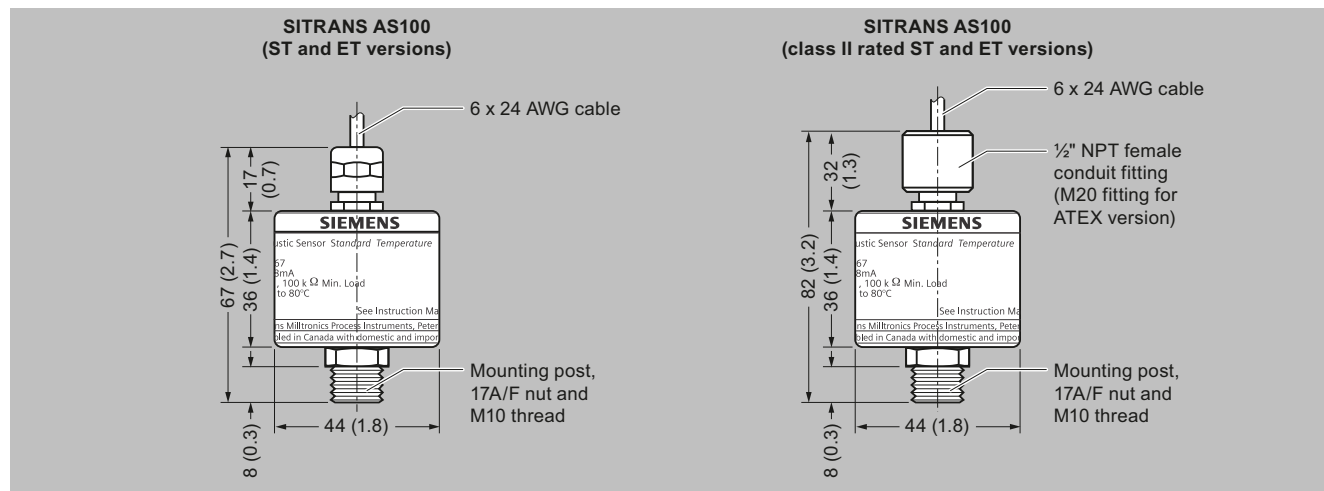
Acoustic sensors

SITRANS AS100 Acoustic sensor

Technical specifications

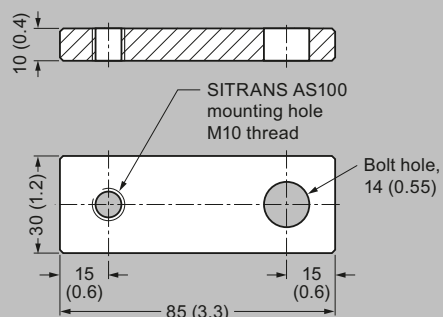
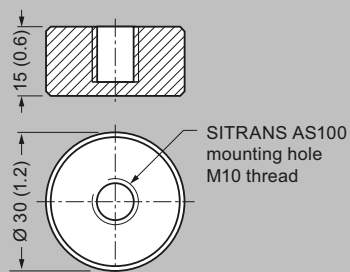
SITRANS AS100 Acoustic sensor	
Mode of Operation	
Operating principle	Acoustic sensing of high frequency emissions caused by impact or friction
Typical application	<ul style="list-style-type: none"> • Detects burst filter bags in dust collection systems • Detects material being conveyed in pneumatic conveyor lines • Route confirmation in chute work
Model	
Standard	Standard operating temperature range
Extended	Extended operating temperature range
Operation	
Relative sensitivity	0.5 %/°C of reading, average over the operating range
Outputs	Analog, 0.08 ... 10 V DC nominal, 100 kΩ minimum load impedance
Rated operating conditions	
Amb. temperature for enclosure	
• Standard	-20 ... +80 °C (-4 ... +176 °F)
• Extended	<ul style="list-style-type: none"> • -40 ... +125 °C (-40 ... +257 °F) (CE and UKCA only) • -30 ... +120 °C (-22 ... +248 °F) option
Storage temperature	
• Standard	-20 ... +80 °C (-4 ... +176 °F)
• Extended	<ul style="list-style-type: none"> • -40 ... +125 °C (-40 ... +257 °F) (CE and UKCA only) • -30 ... +120 °C (-22 ... +248 °F) option
Design	
Weight	0.4 kg (1 lb)
Enclosure	Enclosure: 304 (1.4301) stainless steel [303 stainless steel (1.4305) on Class II version, aluminum 231 on 2GD version]
Degree of protection	IP68 (waterproof)
Cable	
• Standard	4 m (13 ft) cable, PVC jacketed, 3 twisted pairs, 24 AWG (0.25 mm ²), shielded
• Extended	4 m (13 ft) cable, thermoplastic elastomer jacketed, 6 conductor, 24 AWG (0.25 mm ²) conductor, shielded
Power supply	20 ... 30 V DC, 18 mA (typical)
Certificates and approvals	CE, UKCA, RCM, EAC, KC, CSA/FM, Class II, Div. 1, Groups E, F, G (optional), ATEX II 2GD (optional), ATEX II 3D (optional), UKEX II 3D (optional), EAC Ex

Dimensional drawings



SITRANS AS100, dimensions in mm (inch)

Accessories

Extension tab - bolt on
(304 stainless steel)Mounting disc - bonded or welded
(304 stainless steel)

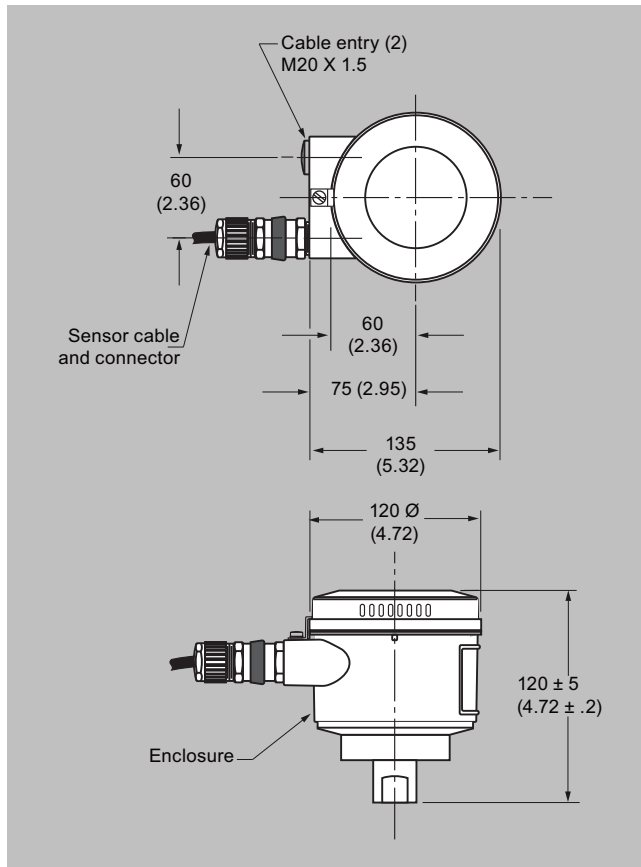
SITRANS AS100 accessories, dimensions in mm (inch)

Process Protection

Acoustic sensors

SITRANS AS100 Acoustic sensor

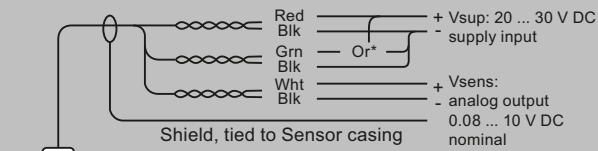
Dimensional drawings (continued)



SITRANS AS100 (2D, 2G, XP version), dimensions in mm (inch)

Circuit diagrams

Standard temperature range

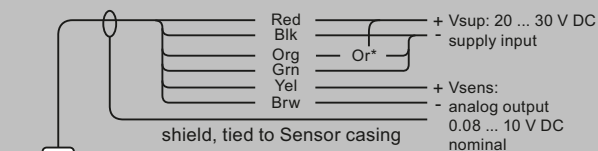


* Sensor range selection

High sensitivity range = red and green to Vsup+

Low sensitivity range = red to Vsup+, green to Vsup-

Extended temperature range



* Sensor range selection

High sensitivity range = red and orange to Vsup+

Low sensitivity range = red to Vsup+, orange to Vsup-

Interconnection

The longer the cable, the more susceptible it is to noise and earth loops. It is therefore recommended to use cable with heavy gauge conductors and good RF/electrical shielding (copper braid rather than drain and foil). A proper junction box close to the sensor is an ideal location not only to extend the cable but also to configure the wiring for high or low sensitivity range operation.

The following table provides a guideline for suitable wire gauges where distances are considerable.

Max. distance between sensor and supply
(24 V or Control Unit).

AWG	Wire size		Distance	
	mm	mm ²	meters	feet
24	7 x 0.20	0.25	500	1 600
22	7 x 0.25	0.35	800	2 600
20	10 x 0.25	0.5	1 200	3 900

SITRANS AS100 connections

Process Protection

Acoustic sensors

SITRANS CU02 Control Unit

Overview



SITRANS CU02 is an alarm control unit, for use with SITRANS AS100 acoustic sensor, that provides reliable continuous protection for bulk solids flow.

Benefits

- 4 to 20 mA output
- Two programmable relays
- Adjustable independent time delay for each relay
- Adjustable start-up time delay
- DIN rail mounting provides easy installation
- Built-in password protection to parameters

Application

SITRANS CU02 receives a 0 to 10 V DC input signal from the SITRANS AS100 sensor, providing relay and analog outputs for interface into a process.

- Key applications: with SITRANS AS100 for bulk solids flow

Function

The system can be readily configured for set points indicating such conditions as high flow, low flow or no flow. Alternatively, it can be added to a control loop via a 4 to 20 mA isolated output for trend monitoring proportional to the signal from the sensor.

Two relays are fully programmable and independent of each other and can be used to operate an alarm or control device. Alarming may be provided above or below a setpoint or within a band. Readings are also displayed locally by the SITRANS CU02 on its LCD.

The SITRANS CU02 may be mounted up to 500 m (1 500 ft) from the sensor.

Selection and ordering data

	Article No.			
SITRANS CU02 Control unit Set-point alarm controller, for use with AS100 acoustic sensor.	7MH7562- ●	●	●	●
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.				
Power Supply				
100 V AC	1			
115 V AC	2			
200 V AC	3			
230 V AC	4			
Enclosure				
Standard DIN Rail			A	
Approvals				
Ordinary Locations/General Purpose (Non-Ex), cCSA _{US} , CE, UKCA, RCM, EAC, KC				A

Selection and Ordering data	Order code
Further designs	
Please add "-Z" to Article No. and specify Order code(s).	
Manufacturer's test certificate: According to EN 10204-2.2	C11
Acrylic coated, stainless steel tag [38 x 51 mm (1.5 x 2 inch)]: Measuring-point number/identification (max. 16 characters), specify in plain text	Y18
Operating Instructions	
All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation	

Process Protection

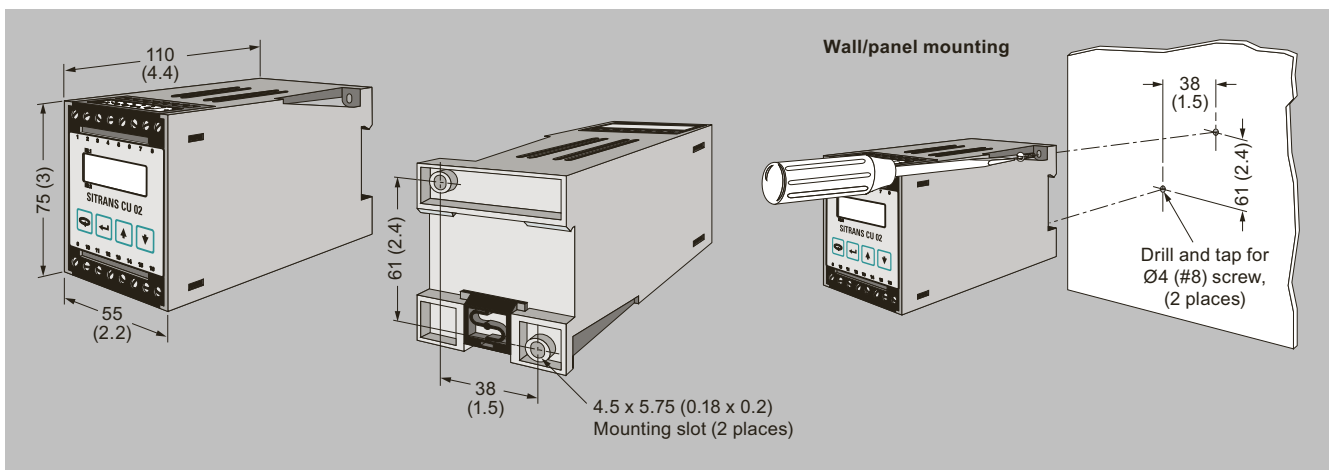
Acoustic sensors

SITRANS CU02 Control Unit

Technical specifications

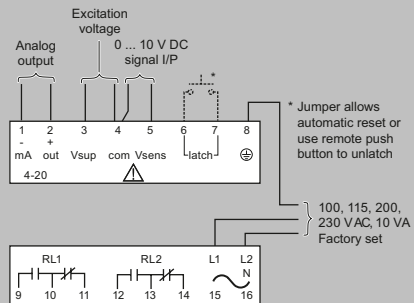
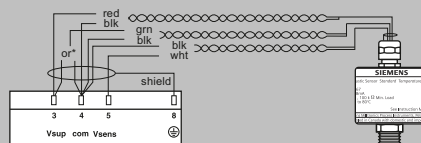
SITRANS CU02 Control unit	
Mode of operation	
Measuring principle	Controller for acoustic sensing (SITRANS AS100)
Typical application	Connects to SITRANS AS100 to detect burst filter bag
Input	0 ... 10 V DC, from sensor
Output	
Output signal	4 ... 20 mA isolated output, 2 Form C relays - latching or non-latching - 5 amp at 250 V AC non-inductive
Sensor excitation	26 V DC
Max. load	750 Ω
Rated operating conditions	
Installation conditions	
• Location	Indoor
Ambient conditions	
• Ambient temperature for enclosure	-20 ... +50 °C (-4 ... +122 °F)
• Storage temperature	-20 ... +50 °C (-4 ... +122 °F)
• Relative humidity	80 % for temperatures up to 50 °C (122 °F)
• Degree of protection	IP20
• Installation category	II
• Pollution degree	2
Design	
Weight	550 g (18 oz)
Dimensions (W x H x D)	55 x 75 x 110 mm (2.2 x 3 x 4.4 inch)
Material enclosure	Polycarbonate
Mounting	DIN Rail (DIN 46277 or DIN EN 50022), or wall mount, up to 500 m (1 500 ft) from sensor
Cable	2 twisted pair, 24 AWG (22 mm ²), shielded. Mount up to 500 m (1 500 ft) from sensor
Display	Liquid crystal, three digits, 9 mm (0.35 inch), high and multi-segment graphic symbols for operation status
Power supply	
Supply voltage	100, 115, 200, 230 V AC ± 15 %, 50/60 Hz, factory set
Power consumption	Max. 10 VA
Approvals	cCSAus, CE, UKCA, RCM, EAC, KC

Dimensional drawings

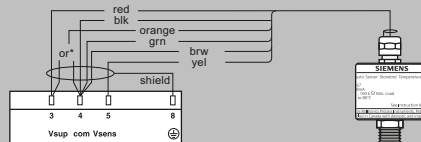


SITRANS CU02, dimensions in mm (inch)

Circuit diagrams

**Standard temperature version**

* Sensor range selection
 High sensitivity range = green to 'Vsup'
 Low sensitivity range = green to 'com'

Extended temperature version

* Sensor range selection
 High sensitivity range = orange to 'Vsup'
 Low sensitivity range = orange to 'com'

Mounting

Installation shall only be performed by qualified personnel and in accordance with local governing regulations.
 This product is susceptible to electrostatic shock. Follow proper grounding procedures.

Interconnection

All field wiring must have insulation suitable for at least 250 V.
 Relay contact terminals are for use with equipment having no accessible live parts and wiring having insulation suitable for at least 250 V.

The maximum allowable working voltage between adjacent relay contacts shall be 250 V. If sensor case is grounded, do not connect shield of cable to SITRANS CU02 ground terminal.

SITRANS CU02 connections

Process Protection

Motion sensors

Milltronics MFA 4p Motion failure alarm controller

Overview



MFA 4p motion failure alarm controller is a highly sensitive single setpoint motion sensor system, used with Milltronics MSP probes.

Benefits

- Up to 100 mm (4 inch) gap between target and probe
- Switch selectable overspeed or underspeed detection
- Setpoint adjustment 0.15 to 3 000 PPM (pulses/minute)
- Adjustable start-up time delay
- Visual indication of probe operation and relay status
- General purpose, suitable for majority of industrial applications; rugged probe designs provide unmatched reliability

Application

The MFA 4p detects changes in the motion and speed of rotating, reciprocating or conveying equipment. It warns of equipment malfunction and signals through contacts to shut down machinery in case of a slowdown or failure. Its reliability makes it a cost-effective way to protect valuable process equipment.

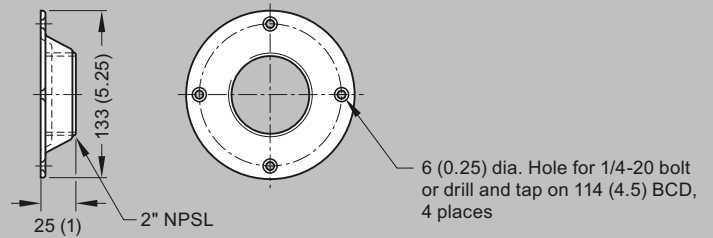
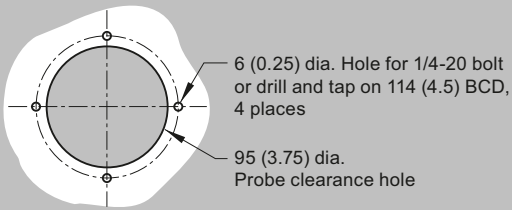
The single setpoint system suits most industrial applications. This versatile unit can be used on tail pulley shafts, driven pulleys, motor shaft sensing, belt or drag conveyors, screw conveyor flights, bucket elevators, fans and pumps.

A special feature is the adjustable 0 to 60 second time delay, allowing the monitored device to accelerate to normal running speed before monitoring begins. A wide range of probes are available to suit specific needs, including high temperatures and corrosive installations. The CE and UKCA approval allows the MFA 4p to consistently meet the needs of the mining aggregate, cement and other primary and secondary industries.

- Key Applications: tail pulleys, motor shaft sensing, screw conveyor flights, bucket elevators

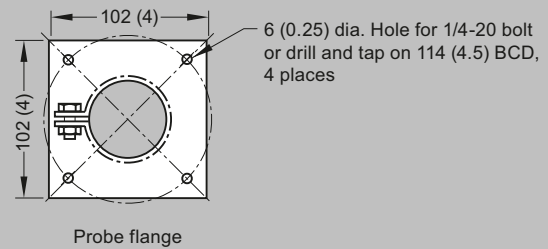
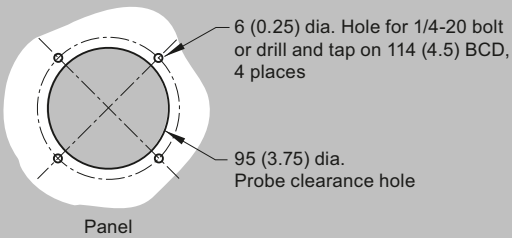
Design

Mounting for Milltronics MSP-12, MSP-3, XPP-5



Note: Mounting flange supplied with probe.

Mounting for Milltronics MSP-9



Milltronics MSP-12, MSP-3, MSP-9, XPP-5 mounting, dimensions in mm (inch)

Process Protection

Motion sensors

Milltronics MFA 4p Motion failure alarm controller

Design (continued)



Standard Milltronics MSP-12

- Heavy-duty general purpose motion probe
- Long lasting aluminum body with internal amplifier
- Convenient mounting flange and locknut for fast installation and setup
- Temperature rating: -40 ... +60 °C (-40 ... +140 °F)
- Enclosure rating: Type/NEMA 4X, 6, IP67



Milltronics XPP-5

- CSA hazardous approval (Class I, Div. 1, Groups A, B, C, D; Class II Div. 1, Groups E, F, G; Class III)
- Aluminum body that is fully potted
- Convenient mounting flange and locknut
- 3/4" NPT male hub connection
- Operating temperature from -40 ... 60 °C (-40 ... 140 °F)
- Enclosure rating: Type/NEMA 4X,6, IP67



High temperature Milltronics MSP-3

- Heavy-duty, high temperature aluminum probe designed to withstand operating temperatures from -50 ... 260 °C (500 °F)
- Cast aluminum probe with convenient mounting flange and locknut
- 1.5 m (5 ft) of high temperature PTFE cable provided. Up to 30 m (100 ft) may be used.
- Amplifier remote mounted in enclosure 140 x 140 x 100 mm (5.5 x 5.5 x 4 inch), available in cast aluminum (1/2" NPT conduit entry), painted steel (Type/NEMA 4, IP65 rating), or stainless steel (Type/NEMA 4X, IP65 rating)
- Amplifier temperature rating -40 ... +60 °C (-40 ... +140 °F)
- Enclosure rating: Type/NEMA 4X, 6, IP67



Stainless high temperature Milltronics MSP-9

- Heavy-duty, high temperature 304 stainless steel probe
- Special construction allows operation of probe in environment from -50 ... 260 °C (500 °F)
- 1.5 m (5 ft) special high temperature PTFE cable provided. Up to 30 m (100 ft) may be used.
- Amplifier remote mounted in enclosure 140 x 140 x 100 mm (5.5 x 5.5 x 4 inch), available in cast aluminum (1/2" NPT conduit entry), painted steel (Type/NEMA 4, IP65 rating), or stainless steel (Type/NEMA 4X, IP65 rating)
- Enclosure rating: Type/NEMA 4X, 6, IP67
- Amplifier temperature rating -40 ... +60 °C (-40 ... +140 °F)



Milltronics RMA (Remote Mounted Amplifier)

- Available for internal mounting within Probe, or in enclosure for remote mounting
- Enclosures available in cast aluminum (1/2" NPT entry), painted steel (Type/NEMA 4 rating) or stainless steel (Type/NEMA 4X, IP65 rating)
- Operating temp. from -40 ... +60 °C (-40 ... +140 °F)
- Enclosure rating: Type/NEMA 4X, 6, IP67

Milltronics motion probes

Selection and ordering data

		Article No.				
Milltronics MFA 4p Motion failure alarm controller Set-point alarm controller, for use with MSP motion probes.		7MH7144-	●	●	●	●
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.						
Enclosure						
NEMA 4X, polycarbonate enclosure		1				
NEMA 4, painted mild steel enclosure		2				
NEMA 4X, 304 (1.4301) stainless steel enclosure		3				
Input Voltage						
100 ... 240 V AC, ± 10 %, 50/60 Hz, 15 VA				A		
Speed detection version						
Standard, underspeed (U/S) or overspeed (O/S), switch selectable					A	
Slow speed (S/S), U/S or O/S detection, switch selectable (limit of 15 ppm)					B	
Approvals						
Ordinary Locations/General Purpose (Non-Ex), CE, UKCA, RCM, EAC, KC, cCSA _{US} , FM						2

Selection and Ordering data	Order code
Further designs	
Please add "-Z" to Article No. and specify Order code(s).	
Manufacturer's test certificate: According to EN 10204-2.2	C11
Acrylic coated, stainless steel tag [69 x 50 mm (2.7 x 1.97 inch)]: Measuring-point number/id-entification (max. 27 characters), specify in plain text	Y15
Painted mild steel, heated enclosure with viewing window for use down to -50 °C (-58 °F) (finished unit is mounted inside enclosure) [483 x 584 x 203 mm (19 x 23 x 8 inch)]	A35
Stainless steel, sun/weather shield (finished unit is field mounted inside enclosure) [357 x 305 x 203 mm (14 x 12 x 8 inch)]	S50

Spare parts	Article No.
Operating Instructions	
All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation	
Spare Parts	
Circuit Card, standard	7MH7723-1DU
Circuit Card, Slow speed	7MH7723-1DV
Lid with overlay for MFA 4p	7MH7723-1GY

		Article No.				
Milltronics RMA Remote mounted amplifier Remote mounted amplifier for Milltronics MSP-3 and MSP-9 motion sensing probes.		7MH7145-	0	●		
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.						
Enclosure						
Aluminum enclosure, IP65, Type/NEMA 4X, ½" NPT entry					A	
Painted steel, Type/NEMA 4, IP65 rating					C	
304 (1.4301) stainless steel enclosure, Type/NEMA 4X, IP65 rating					D	

Process Protection

Motion sensors

Milltronics MFA 4p Motion failure alarm controller

Selection and ordering data (continued)

Selection and Ordering data	Order code
Further designs	
Please add "-Z" to Article No. and specify Order code(s).	
Manufacturer's test certificate: According to EN 10204-2.20	C11
Acrylic coated, stainless steel tag [38 x 51 mm (1.5 x 2 inch)]: Measuring-point number/id-entification (max. 16 characters), specify in plain text	Y18

Spare parts	Article No.
Operating Instructions	
All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation	
Spare Parts	
Card, RMA	7MH723-1DT

	Article No.
Milltronics Motion sensing probes Heavy duty, 100 mm measuring range, for use with RMA, MFA 4p, WM300 MFA, or other control. Note: Milltronics MSP-3 and MSP-9 probes require the use of Milltronics RMA (amplifier)	7MH7146- ● ● ●
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	
Cable Length	
Standard length (as described in Model options) ¹⁾	0
Add Order code Y01 and plain text: "Total cable length ... m"	
Extended cable length 2 000 ... 30 000 mm (79.2 ... 1 181 inch) ²⁾	1
Extended cable length 30 001 ... 50 000 mm (1 181 ... 1 969 inch) ⁴⁾	2
Extended cable length 50 001 ... 100 000 mm (1 969 ... 3 937 inch) ⁴⁾	3
Model [standard cable length/type]	
MSP-3, ½" NPT cable inlet ³⁾ [1.5 m (5 ft) high temperature cable]	B
MSP-9 [1.5 m (5 ft) high temperature cable] ³⁾	D
MSP-12, ½" NPT cable inlet, no cable	E
XPP-5 [1.5 m (5 ft) cable, (CSA Class I, Groups A, B, C and D; Class II Groups E, F, and G)]	G
XPP-5 [10 m (32.8 ft) cable, (CSA Class I, Groups A, B, C, and D; Class II Groups E, F, and G)]	H
XPP-5 [15 m (49.2 ft) cable, (CSA Class I, Groups A, B, C, and D; Class II Groups E, F, and G)]	J
Approvals	
Ordinary Locations/General Purpose (Non-Ex), CE, UKCA, RCM, EAC, KC	A

¹⁾ No Y01 needed in Order code for standard length.

²⁾ Only available with model options B, D, G, H, J.

³⁾ MSP-3 and MSP-9 probes required the use of RMA (amplifier).

⁴⁾ Available with Model options G, H, and J only.

Selection and ordering data (continued)

Selection and Ordering data	Order code
Further designs	
Please add "-Z" to Article No. and specify Order code(s).	
Total cable length: enter the total cable length in plain text description	Y01
Acrylic coated, stainless steel tag [13 x 45 mm (0.5 x 1.75 inch)]: Measuring-point number/identification (max. 16 characters), specify in plain text	Y17
Cable gland kit	A57
Manufacturer's test certificate: According to EN 10204-2.2	C11

Spare parts	Article No.
Operating Instructions	
All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation	
Spare Parts	
Locknut, for MSP-3, MSP-7, MSP-12, XPP-5	7MH7723-1CR
Mounting flange, for MSP-3, MSP-7, MSP-12, XPP-5	7MH7723-1CS
Mounting bracket for MSP-9	7MH7723-1CT
Lid, 1/2" NPT cable inlet for MSP-3, MSP-7, MSP-12	7MH7723-1CU
Lid for MSP-9	7MH7723-1CV
Lid gasket, for MSP-3, MSP-9	7MH7723-1CW
Lid gasket, for MSP-7, MSP-12	7MH7723-1CX
Motion cable gland adaptor kit	7MH7723-1JU

Process Protection

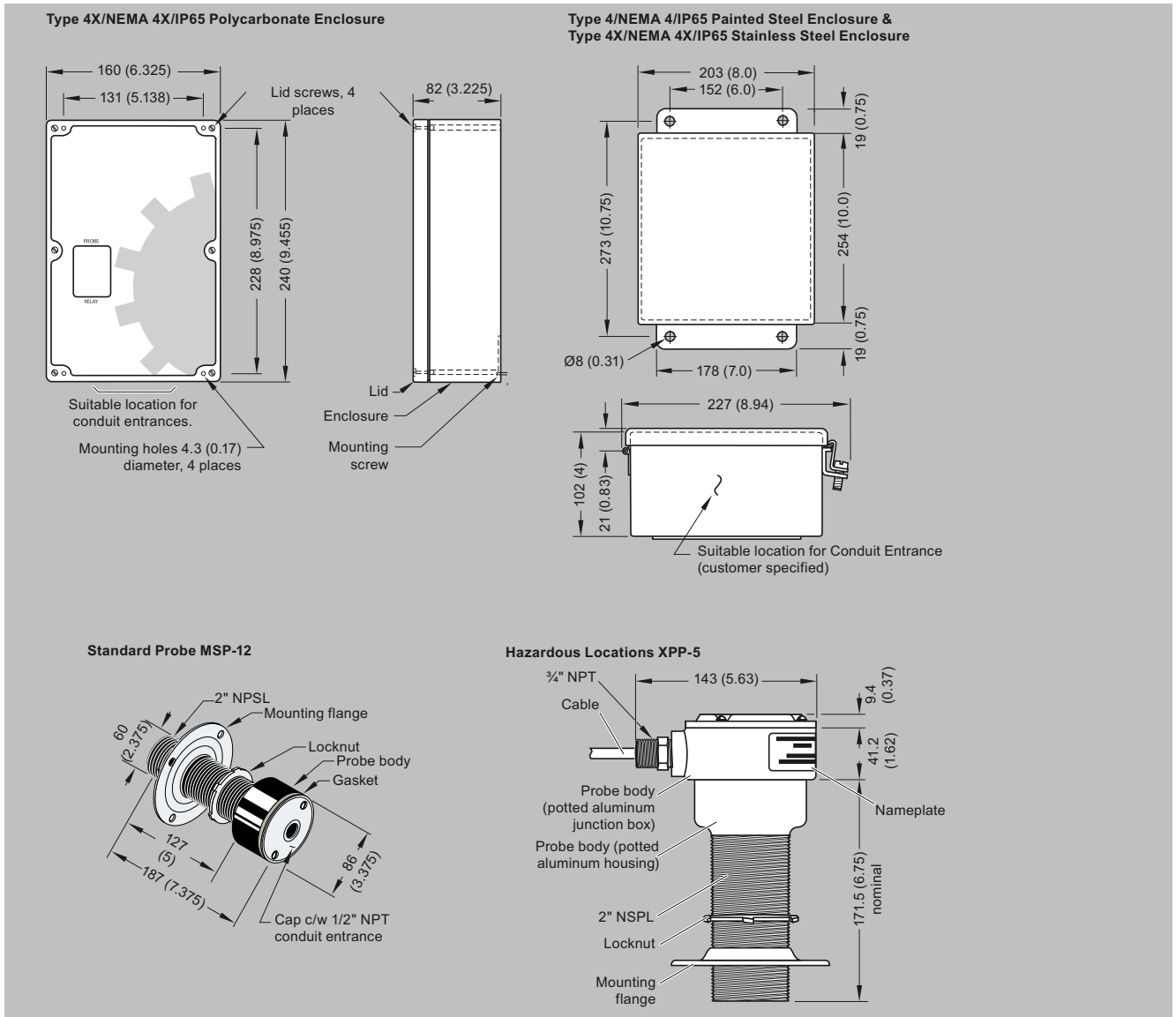
Motion sensors

Milltronics MFA 4p Motion failure alarm controller

Technical specifications

Milltronics MFA 4p Motion failure alarm controller	
Mode of operation	
Measuring principle	Motion monitor and alarm
Typical application	Monitoring loss of motion in tail pulley, screw flights, bucket elevators
Features	<ul style="list-style-type: none"> • Switch selectable overspeed or under-speed detection • Setpoint adjustment: 0.15 ... 3 000 PPM • Adjustable start-up time delay: 0 ... 60 seconds • Visual indication of probe operation and relay status
Output	2 relays working in unison, each providing 1 SPDT Form C relay contact, rated 8 A at 250 V AC resistive
Performance	
Repeatability	± 1 %
Dead band	± 0.25 %
Dynamic Range	0 ... 7 200 PPM
Ambient Temperature Range	-20 ... +50 °C (-5 ... +122 °F)
Storage temperature	-20 ... +50 °C (-5 ... +122 °F)
Design	
Enclosure rating	Type 4X/NEMA 4X/IP65 (standard and optional stainless steel) Type 4/NEMA 4/IP65 (optional mild steel)
Enclosure dimensions	160 x 240 x 82 mm (6.3 x 9.5 x 3.2 inch) Optional: mild steel or 304 (1.4301) stainless steel 203 x 254 x 102 mm (8 x 10 x 4 inch)
Enclosure material	Polycarbonate Optional: mild steel or stainless steel
Power Supply	100 ... 240 V AC, 50/60 Hz, 15 VA, ± 10 % of rated voltage
Certificates and approvals	CE, UKCA, RCM, EAC, KC, cCSA _{US} , FM

Dimensional drawings



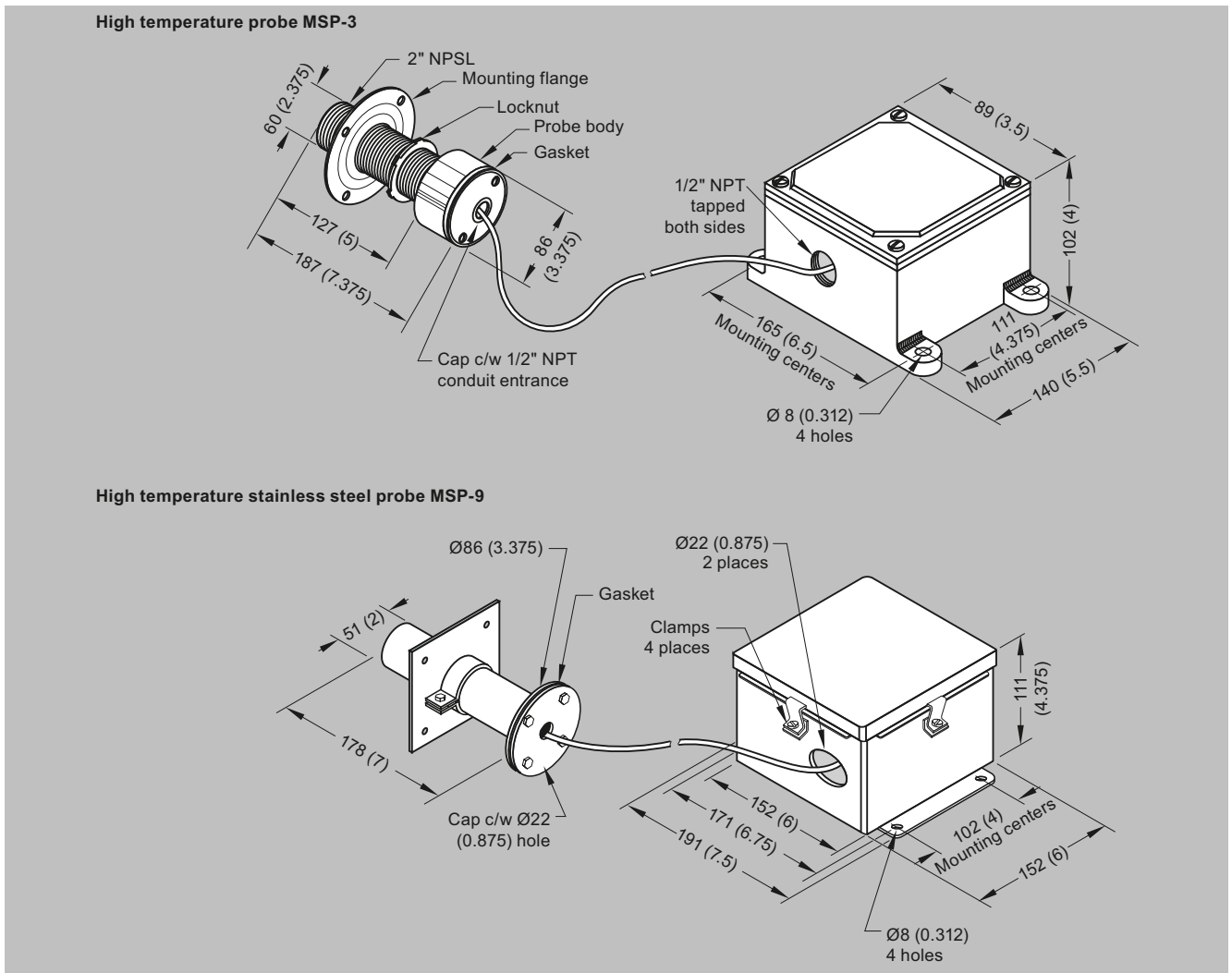
Milltronics MFA 4p and probe, dimensions in mm (inch)

Process Protection

Motion sensors

Milltronics MFA 4p Motion failure alarm controller

Dimensional drawings (continued)



Milltronics probes, dimensions in mm (inch)

Overview



Milltronics MSP-7 is a heavy-duty 3-wire motion sensor that provides an NPN open collector output to PLCs.

Benefits

- Up to 100 mm (4 inch) gap between target and probe
- Corrosion resistant construction
- General purpose, suitable for majority of industrial applications; rugged probe designs provide unmatched reliability

Application

The MSP-7 motion sensing probe can detect changes in the rotation and movement of ferrous equipment. When connected to a PLC it can warn of malfunction and signals to stop or slow down equipment, preventing costly failure or downtime. Its reliability makes it a very cost effective sensor.

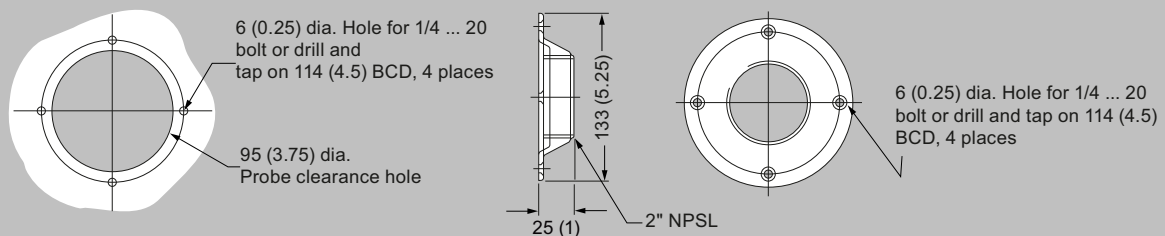
The single setpoint system suits most industrial applications. This versatile unit can be used on tail pulley shafts, driven pulleys, motor shaft sensing, belt or drag conveyors, screw conveyor flights, bucket elevators, fans and pumps.

An NPN open collector 3-wire output allows for versatile connection to most PLC models and a large dynamic range ensures that the MSP-7 can detect changes in target speed for a variety of applications.

- Key Applications: tail pulleys, motor shaft sensing, screw conveyor flights, bucket elevators

Design

Mounting for Milltronics MSP-7



Note: Mounting flange supplied with probe.

Mounting for Milltronics MSP-7, dimensions in mm (inch)

Process Protection

Motion sensors

Milltronics MSP-7 Motion sensor

Selection and ordering data

	Article No.			
Milltronics Motion sensing probes Heavy duty, 100 mm measuring range, for use with WM300 MFA, or other control.	7MH7146-	●	●	●
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.				
Cable Length				
Standard length (as described in Model options) ¹⁾		0		
Add Order code Y01 and plain text: "Total cable length ... m"				
Extended cable length 2 ... 30 m (6.6 ... 98.4 ft)		1		
Model [standard cable length/type]				
MSP-7, 1/2" NPT cable inlet [1.5 m (5 ft) cable]			K	
Approvals				
Ordinary Locations/General Purpose (Non-Ex), CE, UKCA, RCM, EAC, KC				A

¹⁾ No Y01 needed in Order code for standard length.

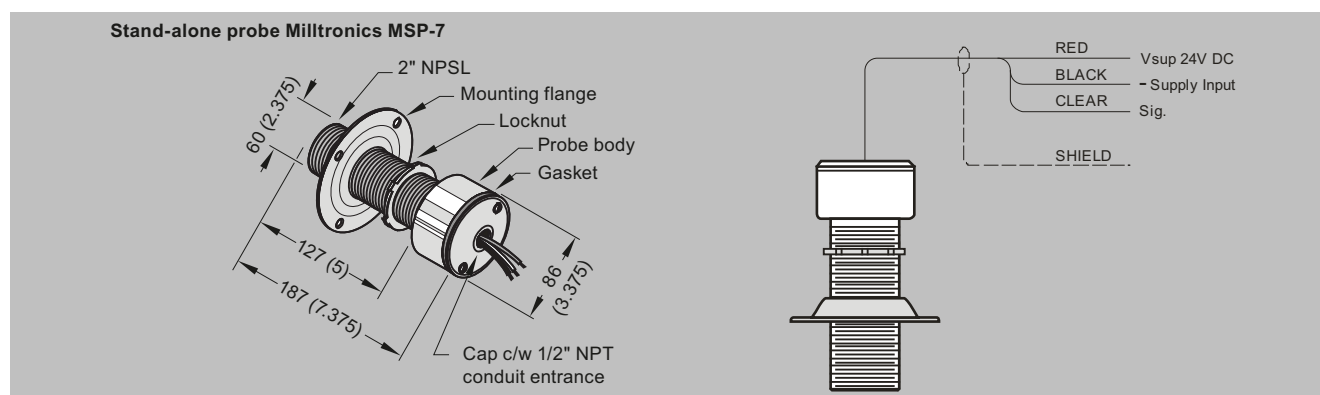
Selection and Ordering data	Order code
Further designs	
Please add "-Z" to Article No. and specify Order code(s).	
Total cable length: enter the total cable length in plain text description	Y01
Acrylic coated, stainless steel tag [13 x 45 mm (0.5 x 1.75 inch)]: Measuring-point number/identification (max. 16 characters), specify in plain text	Y17
Cable gland kit	A57
Manufacturer's test certificate: According to EN 10204-2.2	C11

Spare parts	Article No.
Operating Instructions	
All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation	
Spare Parts	
Locknut, for MSP-3, MSP-7, MSP-12, XPP-5	7MH7723-1CR
Mounting flange, for MSP-3, MSP-7, MSP-12, XPP-5	7MH7723-1CS
Lid, 1/2" NPT cable inlet for MSP-3, MSP-7, MSP-12	7MH7723-1CU
Lid gasket, for MSP-7, MSP-12	7MH7723-1CX
Motion cable gland adaptor kit	7MH7723-1JU

Technical specifications

Milltronics MSP-7 Motion sensor	
Measuring principle	Magnetic
Typical application	Monitoring loss of motion in tail pulley, screw flights, bucket elevators
Features	<ul style="list-style-type: none"> Rugged corrosion resistant aluminum body Low voltage operation Large dynamic range Threaded body for finite adjustment
Output	NPN open collector, 2 k Ω pull up to input voltage, 330 Ω impedance, 40 mA max.
Performance	
Repeatability	$\pm 1\%$
Dead band	$\pm 0.25\%$
Dynamic Range	0 ... 7 200 PPM
Ambient Temperature Range	-40 ... +60 °C (-40 ... +140 °F)
Storage temperature	-40 ... +60 °C (-40 ... +140 °F)
Design	
Enclosure rating	Type 4X/NEMA 4X/IP67
Power Supply	21 ... 28 V DC, 40 mA max.
Certificates and approvals	CE, UKCA, RCM, EAC, KC

Dimensional drawings

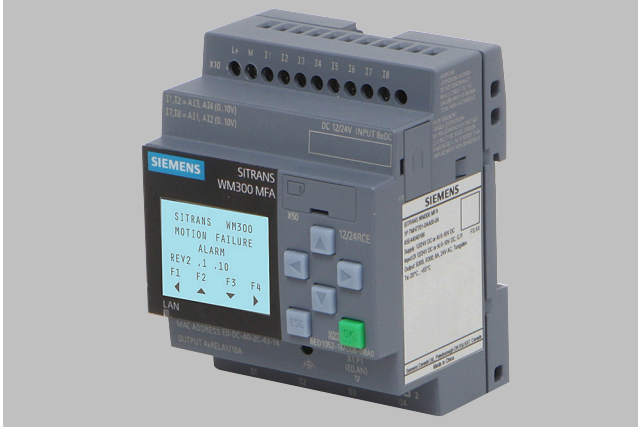


Process Protection

Motion sensors

SITRANS WM300 Motion failure alarm controller

Overview



SITRANS WM300 MFA motion failure alarm controller is a highly sensitive dual setpoint motion sensor system, used with Milltronics MSP probes.

Benefits

- Up to 100 mm (4 inch) gap between target and probe.
- Over and under speed setpoint detection.
- Setpoint adjustment range 2 to 5 000 Hz (120 to 300 000 ppm).
- Adjustable start-up time delay.
- Visual indication of probe operation and relay status.
- General purpose, suitable for majority of industrial applications; rugged probe designs provide unmatched reliability.

Application

The SITRANS WM300 MFA detects changes in the motion and speed of rotating, reciprocating or conveying equipment. It warns of equipment malfunction and signals through contacts to shut down machinery in case of a slowdown or failure. Its reliability makes it a cost-effective way to protect valuable process equipment.

The dual setpoint system suits most industrial applications. This versatile unit can be used on tail pulley shafts, driven pulleys, motor shaft sensing, belt or drag conveyors, screw conveyor flights, bucket elevators, fans and pumps.

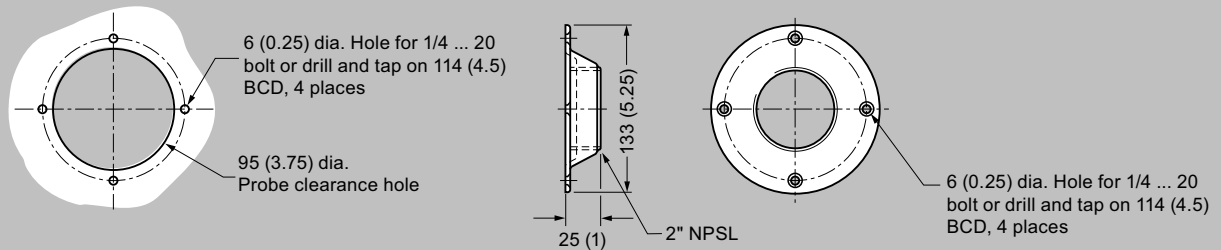
Multiple machines can be monitored with twin, independent probe inputs as well as an additional 2 inputs for differential speed detection (DSD) within a machine monitoring solution such as a belt conveyor comparing the head to tail pulley speeds. An optional analog output module can convert the WM300 into a non-contacting tachometer (NCT) with 2 mA outputs.

A special feature is the adjustable 0 to 60 second time delay, allowing the monitored device to accelerate to normal running speed before monitoring begins. A wide range of probes are available to suit specific needs, including high temperatures and corrosive installations. SITRANS WM300 MFA consistently meets the needs of mining aggregate, cement and other primary and secondary industries.

- Key Applications: tail pulleys, motor shaft sensing, screw conveyor flights, bucket elevators

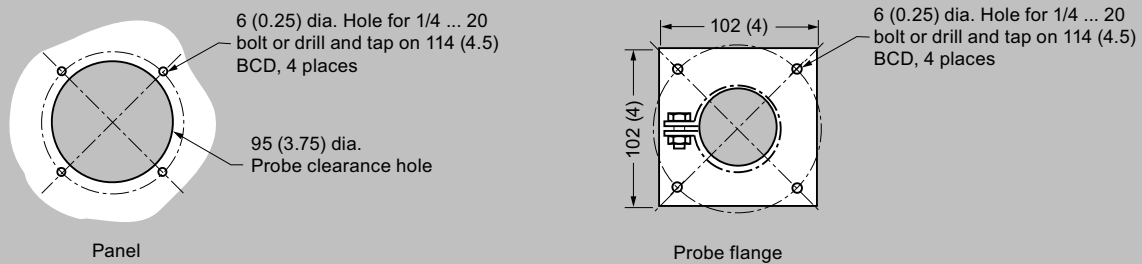
Design

Mounting for Milltronics MSP-3, MSP-7, MSP-12, XPP-5



Note: Mounting flange supplied with probe.

Mounting for Milltronics MSP-9



Milltronics MSP-12, MSP-3, MSP-7, MSP-9, XPP-5 mounting, dimensions in mm (inch)

Standard Milltronics MSP-12

- Heavy-duty general purpose motion probe
- Long lasting aluminum body with internal amplifier
- Convenient mounting flange and locknut for fast installation and setup
- Temperature rating: -40 ... +60 °C (-40 ... +140 °F)
- Enclosure rating: Type/NEMA 4X, 6, IP67

Standard Milltronics MSP-7

- Heavy-duty general purpose motion probe for direct connection to WM300 MFA
- Long lasting aluminum body
- Convenient mounting flange and locknut for fast installation and setup
- Temperature rating: -40 ... +60 °C (-40 ... +140 °F)
- Enclosure rating: Type/NEMA 4X, 6, IP67
- NPN, open collector output
- 24 V DC power supply

Milltronics XPP-5

- CSA hazardous approval (Class I, Div. 1, Groups A, B, C, D; Class II Div. 1, Groups E, F, G; Class III)
- Aluminum body that is fully potted
- Convenient mounting flange and locknut
- 3/4" NPT male hub connection
- Operating temperature from -40 ... 60 °C (-40 ... 140 °F)
- Enclosure rating: Type/NEMA 4X, 6, IP67

High temperature Milltronics MSP-3

- Heavy-duty, high temperature aluminum probe designed to withstand operating temperatures from -50 ... 260 °C (500 °F)
- Cast aluminum probe with convenient mounting flange and locknut
- 1.5 m (5 ft) of high temperature PTFE cable provided. Up to 30 m (100 ft) may be used.
- Enclosure rating: Type/NEMA 4X, 6, IP67

Stainless high temperature Milltronics MSP-9

- Heavy-duty, high temperature 304 stainless steel probe
- Special construction allows operation of probe in environment from -50 ... 260 °C (500 °F)
- 1.5 m (5 ft) special high temperature PTFE cable provided. Up to 30 m (100 ft) may be used.
- Enclosure rating: Type/NEMA 4X, 6, IP67

Milltronics RMA (Remote Mounted Amplifier)

- Available for internal mounted IMA in probe, or without and converting older existing applications into 3-wire NPN signals for use with WM300 MFA
- DIN rail mount
- Operating temp. from -40 ... +60 °C (-40 ... +140 °F)

Milltronics motion probes

Process Protection

Motion sensors

SITRANS WM300 Motion failure alarm controller

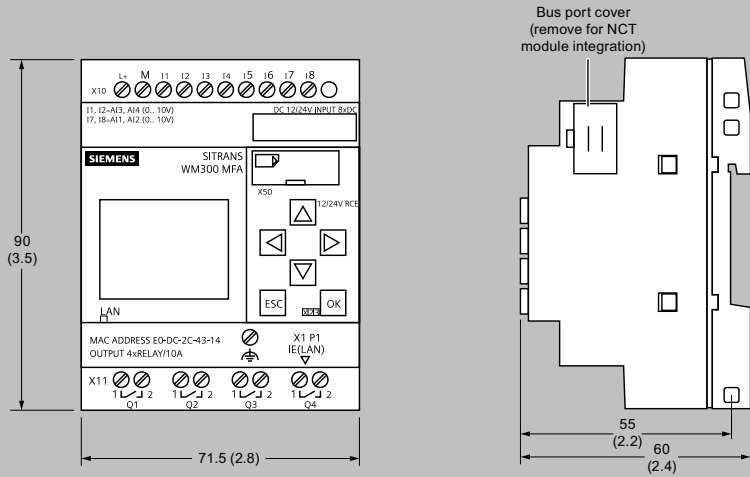
Selection and ordering data

Selection and ordering data	Article No.
Motion Failure Alarm MFA, DSD, NCT A highly sensitive dual setpoint motion sensor system, used with up to 2 MSP or XPP probes. Capable of hi/lo setpoint as well as differential monitoring with 2 additional probes.	7MH7701-0AA00-0A
Remote Mounted Amplifier RMA A remote mounted amplifier for 2 Milltronics MSP-1, MSP-3, MSP-9, MSP-12 and XPP-5 motion sensing probes.	7MH7702-0B
Analog output module NCT Additional module required for NCT applications featuring 2, 4 ... 20 mA outputs, used with WM300.	6ED10551MM000BA2
Power conversion module Convert 100 ... 240 V AC ... 24 V DC power, for use with WM300	6EP33316SB000AY0
Remote display and configuration panel Larger text display panel mount HMI for use with enclosure mounted WM300 for easy user access and monitoring.	6ED10554MH080BA0
Operating Instructions All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation .	

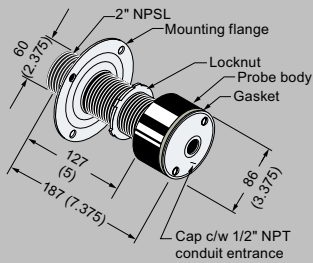
Technical specifications

Mode of operation Measuring principle Typical application	Motion monitor and alarm Monitoring loss of motion in tail pulley, screw flights, bucket elevators
Features	<ul style="list-style-type: none"> Switch user configurable overspeed and underspeed detection Setpoint adjustment range: <ul style="list-style-type: none"> Standard model: 2 ... 5 000 Hz (120 ... 300 000 ppm) Slow speed version: 2 ... 400 seconds (30 ... 0.15 ppm) Adjustable start-up time delay: 0 ... 60 seconds Visual indication of probe operation and relay status
Output Resistive rating	4 relays <ul style="list-style-type: none"> 10 A at 24 V DC 10 A at 240 V AC
Performance Repeatability Dead band	± 1 % ± 0.25 %
MSP and XPP dynamic range	0 ... 7 200 PPM
Ambient temperature range	-20 ... +50 °C (-5 ... +122 °F)
Storage temperature	-20 ... +50 °C (-5 ... +122 °F)
Design Enclosure dimensions Enclosure material	71.5 x 90 x 60 mm (2.8 x 3.5 x 2.4 inch) Polycarbonate
Power	<ul style="list-style-type: none"> 10.8 ... 28.8 V DC, 25 ... 165 mA Power supply: 100 ... 240 V AC, 50/60 Hz, 0.7 ... 0.35 A per LOGO! power module
Certificates and approvals	CE, UKCA, cCSA/UL _{US} , FM, EAC, RCM, KC

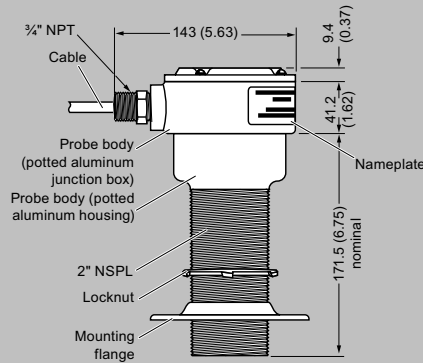
Dimensional drawings



Standard Probe MSP-7, MSP-12



Hazardous Locations XPP-5



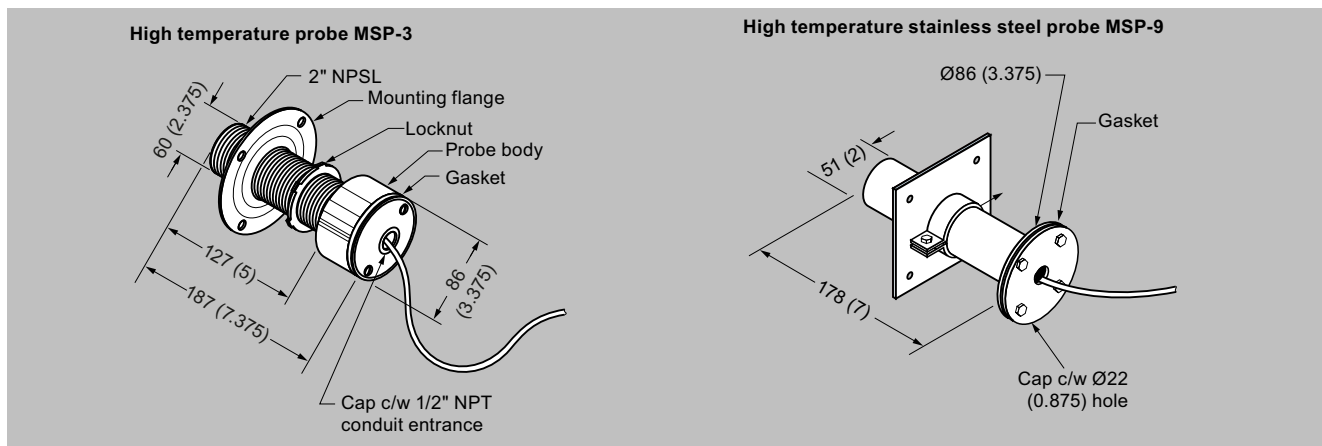
SITRANS WM300 MFA and probe, dimensions in mm (inch)

Process Protection

Motion sensors

SITRANS WM300 Motion failure alarm controller

Dimensional drawings (continued)



Milltronics probes, dimensions in mm (inch)

Overview



SITRANS WM100 is a heavy-duty zero-speed alarm switch. This non-contacting unit provides cost-effective equipment protection even in the harshest conditions.

Benefits

- Up to 100 mm (4 inch) gap between SITRANS WM100 and targets
- Rugged, low maintenance suitable for tough environments
- 1 SPDT Form C relay contact
- Provides cost-effective protection
- Visual indication of target triggered pulse

Application

This rugged unit is impervious to dust, dirt, build-up and moisture and is ideal for such primary industries as mining, aggregate, and cement. Operating where other systems are prone to failure, the non-contacting design eliminates the need for lubricating, cleaning and part replacement. Downtime and clean-up expenses associated with conveying equipment failure are reduced by the SITRANS WM100. It alarms to minimize spillage, prevent extensive damage or even fire caused by belt slippage at the head pulley, and warns against conveyor malfunction.

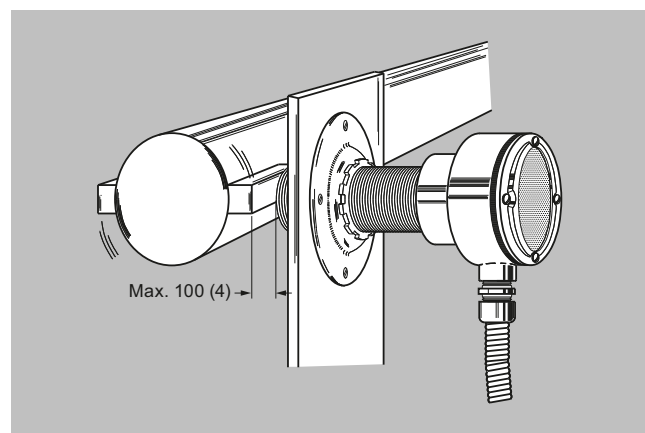
The SITRANS WM100 has built-in selectable start delays and 1 Form C relay contact. With an aluminum body, it operates from -40 to +60 °C (-40 to +140 °F).

- Key Applications: tail pulleys, driven pulleys, motor shaft sensing, screw conveyor flights, bucket elevators

Design

Mounting

The WM100 probe should be mounted, using the supplied mounting flange, onto a vibration-free structure. The gap between the probe and the target should be sufficient such that there is no danger of the target damaging the probe. The maximum allowable gap is 100 mm (4 inch) from the face of the target to the face of the probe for 4.5 x 4.5 mm (3/16 x 3/16 inch) keyway. The WM100 is sensitive to lateral disturbances to its magnetic field. If the WM100 is responding to motion from an interfering target, move the WM100 or install a ferrous plate (steel) as a shield between the WM100 and the interfering target. Where possible, the probe should be mounted such that the cable inlet is pointing downward to avoid accumulation of condensation in the casing. Connection of the probe should be made via flexible conduit for easier removal or adjustment of the probe.



SITRANS WM100 mounting, dimensions in mm (inch)

Process Protection

Motion sensors

SITRANS WM100 Motion sensor

Selection and ordering data

SITRANS WM100 Motion sensor Heavy duty speed alarm switch with 100 mm measuring range.	Article No. 7MH71- 0 58 -	●	A	0	0
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.					
Model					
115 V AC			A		
230 V AC			B		

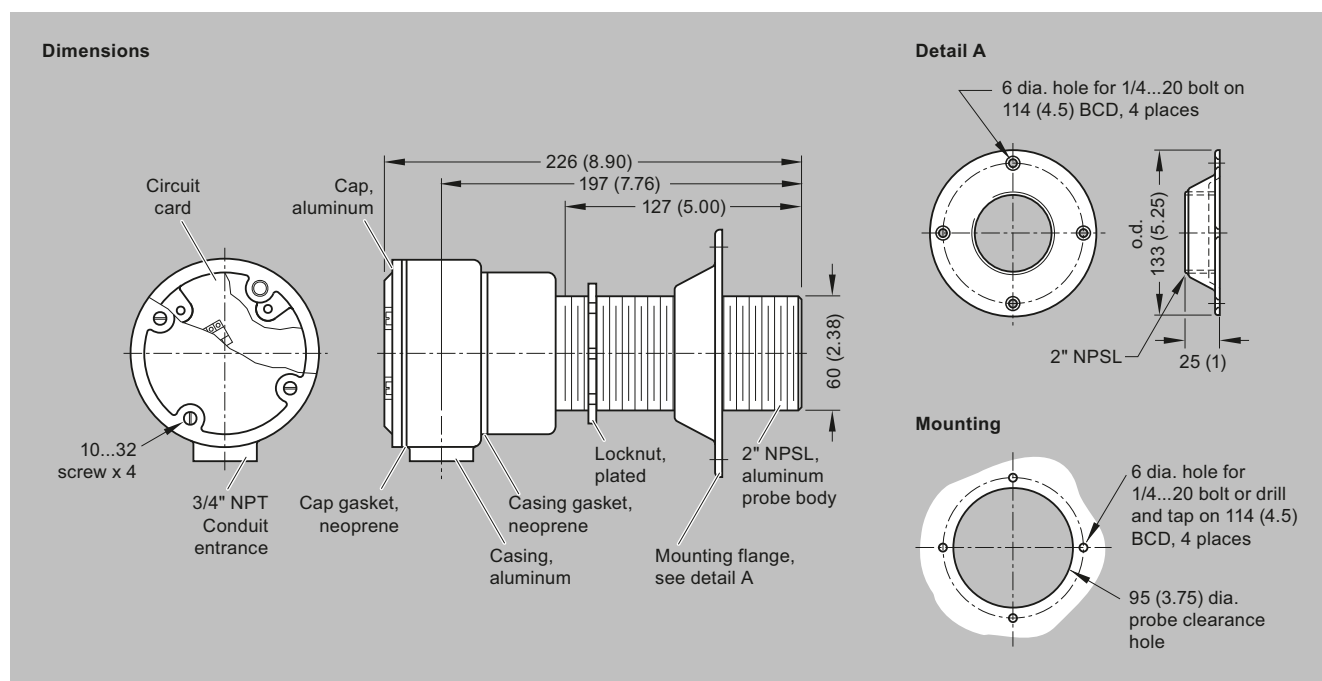
Selection and Ordering data	Order code
Further designs	
Please add "-Z" to Article No. and specify Order code(s).	
Manufacturer's Test Certificate: According to EN 10204-2.2	C11
Acrylic coated, stainless steel tag [13 x 45 mm (0.5 x 1.75 inch)]: Measuring-point number/i-identification (max. 16 characters), specify in plain text	Y17

Accessories	Article No.
Operating Instructions	
All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation	
Accessories	
Locknut	7MH7723-1CR
Mounting flange	7MH7723-1CS
Motion cable gland adaptor kit	7MH7723-1JU

Technical specifications

Mode of operation	
Measuring principle	Disruption of magnetic field by ferrous target
Typical application	Monitors absence or presence of motion in harsh conditions
Output	
Contact	1 SPDT Form C dry relay contact, rated 5 A at 250 V AC, fail-safe operation
Time delay	Start up: 10 ... 14 seconds (5 ... 7 seconds with 12 ppm jumper installed)
Zero Speed (selected via a common jumper)	5 seconds ± 1 (minimum speed 10 ... 15 ppm) or 10 seconds ± 2 (minimum speed 5 ... 7.5 ppm)
Rated operating conditions	
Operating temperature	-40 ... +60 °C (-40 ... +140 °F)
Storage temperature	-40 ... +60 °C (-40 ... +140 °F)
Design	
Probe body	Aluminum
Process mounting	2" NPSL
Connection box	Aluminum, 3/4" NPT conduit entrance, 5 screw terminals plus grounding terminal for electrical connection, max. 12 AWG (3.30 mm ²) wire size
Gasketing	Neoprene
Display	Red LED for verification of pulses
Enclosure rating	Type NEMA 4x, 6, IP67
Dynamic range	
	Minimum 6 or 12 pulses per minute Maximum 3 000 pulses per minute
Shipping weight	
	2 kg (4.4 lb)
Power supply	
	<ul style="list-style-type: none"> • 115 V AC/50 ... 60 Hz, 7 VA • 230 V AC/50 ... 60 Hz, 7 VA • ± 10 % of rated voltage
Certificates and approvals	
	cCSAus, CE, UKCA RCM, EAC, KC

Dimensional drawings



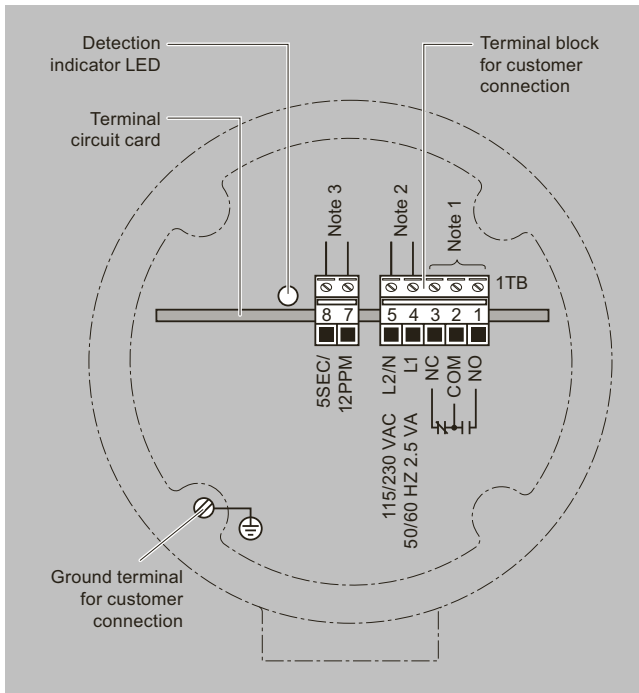
SITRANS WM100 mounting, dimensions in mm (inch)

Process Protection

Motion sensors

SITRANS WM100 Motion sensor

Circuit diagrams



SITRANS WM100 wiring

Notes:

1. Dry contacts shown in de-energized (alarm or shelf) state.
2. SITRANS WM100 is manufactured for either 115 or 230 V AC operation. Check WM100 nameplate for applicable voltage. Correct voltage must be supplied. Voltages lower than specified will result in an inoperative condition. Voltages higher than specified will severely damage unit.
3. For 5 second time delay and a minimum 12 ppm range, connect jumper across terminals 7 and 8. Without a jumper, the default is a 10 second time delay and a minimum 6 ppm range.

Supplementary components

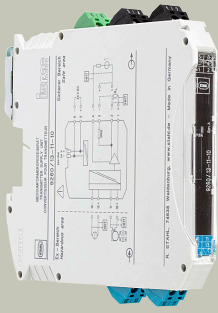
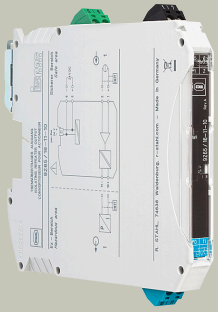




7/2	Product overview
7/6	Supply units and isolation amplifiers
7/6	SITRANS I100
7/9	SITRANS I200
7/12	SITRANS I300
7/14	Displays
7/14	SITRANS RD100
7/17	SITRANS RD150
7/21	SITRANS RD200
7/26	SITRANS RD300
7/31	Remote Terminal Unit
7/31	SIMATIC RTU3000C
7/46	Network transitions
7/46	IE/PB LINK
7/55	SIMATIC CFU
7/58	SIMATIC CFU PA Edition
7/60	SIMATIC CFU DIQ Edition

Supplementary components



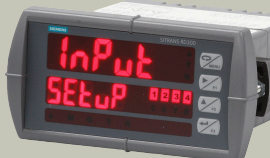
Product overview

Overview

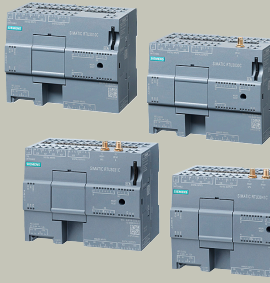
Power supply units and isolation amplifiers			
Type	Area of application	Device description	Programming software
SITRANS I100 	Isolating power supply for 2-wire transmitter, 4-wire transmitter with intrinsically safe input (mA sources) and analog output module (AOM) for SIPART PS2.	Single-channel version, output 0/4 ... 20 mA, intrinsically safe Ex i, approved to SIL 2 (IEC/EN 61508), width 12.5 mm, DIN rail-mounting.	–
SITRANS I200 	Compact single-channel output isolation amplifier for HART output signals 0/4 ... 20 mA. For the intrinsically safe operation of positioners such as SIPART PS2, I/P converters or indicators.	HART output isolation amplifier for DIN rail mounting, with intrinsically safe output. Approved up to SIL 2 (IEC/EN 61508), width 12.5 mm.	–
SITRANS I300 	Isolating power supply for 4-wire devices in hazardous areas	Isolating power supply with intrinsically safe EIA-485 interface for DIN rail mounting, for 4-wire devices.	–

Display devices			
Type	Area of application	Device description	Programming software
SITRANS RD100 	Remote digital display in 2-wire system, power supply via the current loop, NEMA 4X enclosure, for process measuring equipment	<ul style="list-style-type: none"> Versatile 2-wire measuring instrument that displays process tags in level, flow, pressure, temperature and weighing applications FM-approved, CSA-approved and CE-approved device that can be installed in a range of environments, including hazardous areas Large, easy-to-read local display Easy to install and set up using a quick 2-step process 	–

Overview (continued)

Display devices			
<p>SITRANS RD150</p> 	<p>Remote digital display for 4 to 20 mA and HART devices</p>	<ul style="list-style-type: none"> • Easy operation via local display with 4-button menu control • Background illuminated local display • HART communication • Flexible mounting options • Plastic, stainless steel or aluminum enclosures up to IP68 • Complete configuration of the connected sensors with optional USB Communicator and PC • Supports multiple HART sensors with HART Multidrop 	-
<p>SITRANS RD200</p> 	<p>Remote digital display with universal input for control panel mounting for process measuring equipment. Supports RTD, thermocouple, current and voltage inputs. Supporting software enables remote configuration and data logging.</p>	<ul style="list-style-type: none"> • Universal remote digital display for various inputs; ideal for use with most field devices • Standard local display for control panel mounting with optional enclosures • Two optional relays for alarm display or process control applications • Special copy function of the measuring instrument reduces setup time, costs and errors • RD software supports remote configuration, monitoring and logging for up to 100 displays 	-
<p>SITRANS RD300</p> 	<p>Universal, easy-to-operate, remote digital display for control panel mounting for process instruments. Delivers flow rate/total values in various applications (pumped flow rate, summation and control).</p>	<ul style="list-style-type: none"> • Remote digital display for level, flow, pressure, weighing and other process instruments. • The universal, easy-to-operate display device for flow rate/total values is ideal for flow rate, summation and control applications. • Using the RD software, which is available for download free of charge, you can record and display the data on your PC. • It is designed for one or two current and voltage inputs and supports mathematical functions such as averaging. 	-

Remote Terminal Unit

Type	Area of application	Device description	Programming software
<p>SIMATIC RTU3000C</p> 	<p>The devices of the RTU3000C family are compact telecontrol stations (RTU: Remote Terminal Unit) for applications with their own power supply. They are particularly suited for monitoring and control of remote stations that are not connected to a power supply network. The RTUs can independently collect data from connected sensors with timestamps, pre-process the data, and transfer it to a control center. The RTU3000C is supplied with energy by a battery, rechargeable battery or solar panel or a 12 ... 24 V DC power supply unit.</p>	<ul style="list-style-type: none"> • Flexible location of use <ul style="list-style-type: none"> - Energy-optimized operation and flexible power supply concept • Rugged hardware <ul style="list-style-type: none"> - Reliable operation, even in tough environments with increased temperature range (-40 °C to +70 °C) • Flexible connection to control centers <ul style="list-style-type: none"> - Thanks to swappable telecontrol protocols • Fast and flexible data communication • Simple and cost-effective engineering <ul style="list-style-type: none"> - Easy configuration with standard web browser without additional engineering tool. 	-

Supplementary components


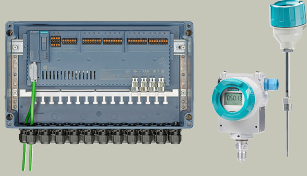
Product overview

Overview (continued)

Remote Terminal Unit

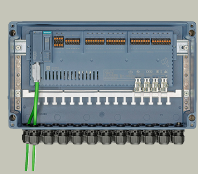
		<ul style="list-style-type: none"> • Remote access <ul style="list-style-type: none"> - To HART or Modbus devices on the Extension Board HART/RS485 via SIMATIC PDM. • Fully automatic timestamp • Automatic temporary storage of process values • Secure data transfer <ul style="list-style-type: none"> - Use of OpenVPN VPN technology and encrypted email connections • Time of day is retained in case of power failure • Saves travel and maintenance costs <ul style="list-style-type: none"> - Thanks to web-based management 	
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Network gateways

Type	Area of application	Device description	Programming software
<p>IE/PB LINK</p> 	<p>IE/PB LINKs are gateways for connecting the two network types, Industrial Ethernet and PROFIBUS, i.e. they enable access to all PROFIBUS nodes connected to the lower-level PROFIBUS network.</p> <p>The variants IE/PB LINK HA and IE/PB LINK PN IO are offered as gateways from Industrial Ethernet and PROFIBUS.</p> <p>IE/PB LINK IO Gateway with PROFINET IO functionality, S7 routing and data record routing for standard ambient conditions</p> <p>IE/PB LINK HA Gateway optimized for use in the process industry through the possibility of deployment in harsh ambient conditions and the connection of PROFIBUS field devices to a redundant AS as PROFINET IO controllers</p>	<p>Both product variants can be used in 2 operation modes:</p> <p>Standard mode enables, for example, loading of programs and configuration data via PG/OP communication, data record routing for configuration and diagnostics of field devices with the SIMATIC PDM tool, S7 routing e.g. for cross-network loading of SIMATIC controllers on PROFIBUS.</p> <p>When operated as a PROFINET IO proxy, from the perspective of the PN IO controller, all PROFIBUS DP slaves connected after the IE/PB LINK are treated as PN IO devices according to the PROFINET standard. The IE/PB LINK is the proxy of the connected PROFIBUS DP slaves.</p> <p>Both IE/PB LINK variants offer the possibility to use different transmission media by employing BusAdapters.</p>	<p>–</p>
<p>SIMATIC Compact Field Unit (CFU)</p> 	<p>Smart field distributors installed at process level and directly connected to the automation system via PROFINET.</p> <p>Two versions are available:</p> <ul style="list-style-type: none"> • SIMATIC CFU PA edition • SIMATIC CFU DIQ edition <p>SIMATIC CFU PA edition</p> <ul style="list-style-type: none"> • PROFIBUS PA already integrated into SIMATIC FCU • Robust and really easy to use • Automatic addressing of connected devices • Device integration via standardized communication profiles 	<ul style="list-style-type: none"> • High overheads for device integration and replacement • Complicated, error-prone wiring and routing over several levels, making the hardware FAT very complex • Very long copper cables and numerous terminal points in the field • Multiple individual control cabinets • Large numbers of different components and protocols necessitate costly spare parts inventories and training sessions • High planning and documentation costs 	<p>–</p>

Overview (continued)

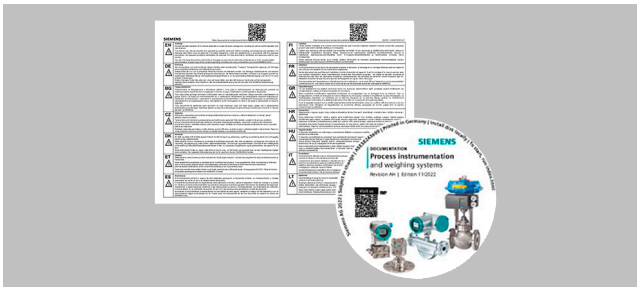
Network gateways

**SIMATIC CFU DIQ edition**

- Individual, customized solutions
- Flexible system expansion
- 16 freely configurable, digital IO channels
- Expansion functions can be configured if desired
- "Counter" and "Frequency measurement" operation modes with a limit frequency of 1 kHz can be activated as additional operation modes.

- Flexible connection options via PROFINET
- Ready for Process Automation (PA Ready)

Supplied product documentation on DVD and safety notes



The scope of delivery of the Siemens products for process instrumentation includes a multilingual instruction sheet with **safety notes** as well as a uniform **mini DVD – Process Instrumentation and Weighing Systems**.

This DVD contains the most important manuals and certificates for the Siemens process instrumentation and weight measurement portfolio. The delivery may also contain product-specific or order-specific printed materials.

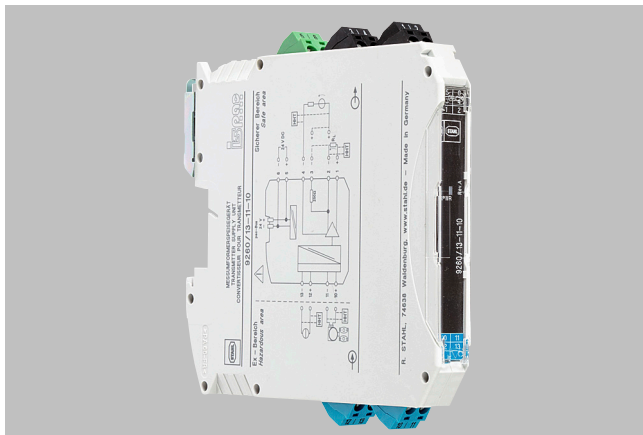
For more information, refer to the Appendix on page 10/3.

Supplementary components

Supply units and isolation amplifiers

SITRANS I100

Overview



Analog input 0/4 to 20 mA

The isolating power supplies are used for the intrinsically safe operation of transmitters or for connecting to intrinsically safe mA sources and the analog output module (AOM) for SIPART PS2. The transmitters are supplied with auxiliary power from the isolating power supplies.

HART communication signals are transmitted bidirectionally by the isolating power supplies.

Benefits

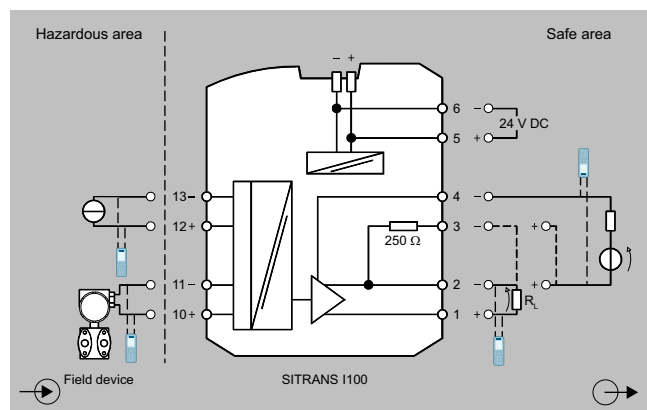
- Active and passive output 0/4 to 20 mA
- Universally applicable for transmitters and mA sources (4-wire transmitters)
- Narrow design – 12.5 mm (0.49 inch) width – for one and two-channel version
- Intrinsically safe input [Ex ia] IIC
- Galvanic isolation between input, output and auxiliary power
- Installation permissible in Zones 2, 22 and Div. 2
- Can be used up to SIL 2 (IEC/EN 61508)

	Zones					
	0	1	2	20	21	22
Ex i interfaces	X	X	X	X	X	X
Installation in			X			X

Design

The SITRANS I100 HART isolating power supply is comprised of a compact plastic enclosure (IP30) and is equipped with push-in screw terminals.

On the front are a green LED for indicating the power supply status and a red LED for signaling errors.



SITRANS I100 isolating power supply HART, function block diagram

Selection and ordering data

	Article No.
SITRANS I100 isolating power supply	7NG4124-1AA00
<ul style="list-style-type: none"> DIN rail mounting For 2-wire transmitters For 4-wire transmitter with intrinsically safe input (mA sources) For analog output module (AOM) for SIPART PS2 Single-channel version with output 0/4 ... 20 mA, intrinsically safe Ex i 12.5 mm wide Approved up to SIL 2 (IEC/EN 61508) 	

Technical specifications

SITRANS I100	
General	
Number of channels	1
Transmitter infeed operation	Yes
Isolation amplifier operation	Yes
Input	0/4 ... 20 mA
Output	0/4 ... 20 mA with HART
Output adjustment time	< 0.2 ms
Output A	0/4 ... 20 mA active (source)
Output B	0/4 ... 20 mA active (sink)
Ex i input	
Input signal	0/4 ... 20 mA with HART
Input functional range	0 ... 24 mA
Communication signal	HART
Transmitter supply voltage	≥ 16 V at 20 mA
Voltage drop	< 3.5 V
Short-circuit current	≥ 22.5 mA
Output	
Output signal	0/4 ... 20 mA with HART (active/passive)
Output functional range	0 ... 24 mA
Communication signal	HART
Output characteristics	= Input signal
Output current at $I_E = 0$	$I_A = 0$ mA
Max. load resistance R_L	1 000 Ω
Residual ripple	≤ 20 mV _{eff}
Settling time (10 ... 90%)	< 200 μs (isolating transformers: < 600 μs)
Galvanic isolation	
• Test voltage according to EN 60079-11	
- Ex i-input to output	375 V peak value
- Ex i-input to auxiliary power	375 V peak value
• Test voltage according to EN 61010/EN 50178	
- Output to auxiliary power	300 V _{eff}
- Output to output	300 V _{eff}
Measuring accuracy	
Error limits temperature influence	≤ 0.1%/10 K
Deviation	≤ 0.1%
Deviation typical	0.05%
Operating conditions	
Degree of protection	
• Enclosure	IP30
• Terminals	IP20
Ambient temperature	-20 ... +60 °C (-4 ... +140 °F)
Storage temperature	-40 ... +80 °C (-40 ... +176 °F)
Relative humidity	≤ 95%, (no condensation)
Usage in height	< 2 000 m (6 562 ft)
Electromagnetic compatibility	
Tested acc. to the following standards and regulations:	
• EN 61326-1 Use in the industrial environment	
• Interference immunity in accordance with EN 61000-6-2	
• Noise radiation according to EN 61000-6-4	
Structural design	
Weight	185 g (0.41 lb)
Enclosure material	Polyamide
Grid size	12.5 mm (0.49 inch)
Fire resistance (UL-94)	V0
Mounting type	DIN rail NS35/15; NS35/7.5

Supplementary components

Supply units and isolation amplifiers

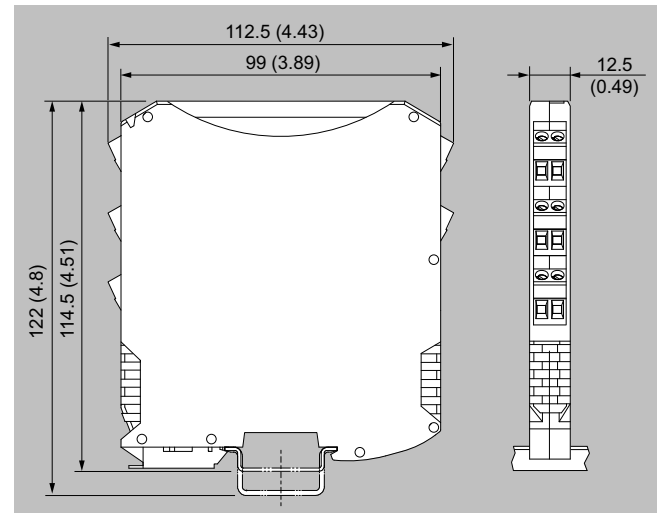
SITRANS I100

Technical specifications (continued)

SITRANS I100	
Mounting position	Vertical or horizontal
Connection type	Screw terminals
• One-wire core cross-section	
- Rigid	0.2 ... 2.5 mm ² (0.00031 ... 0.0039 inch ²)
- Flexible	0.2 ... 2.5 mm ² (0.00031 ... 0.0039 inch ²)
Auxiliary power	
Nominal voltage U_N	24 V DC
Voltage range	19.2 ... 30 V
Residual ripple within voltage range	$\leq 3.6 V_{SS}$
Rated current	76 mA
Power consumption	1.8 W
Max. power loss:	1.2 W
Status indicator	Green "PWR" LED
Reverse polarity protection	Yes
Safety specifications	
• Max. voltage U_o	25.2 V
• Max. current I_o	93 mA
• Max. power P_o	587 mW
• Max. permissible external capacitance C_o for IIC/IIB	107 nF/820 nF
• Max. permissible external inductance L_o for IIC/IIB	2 mH/4 mH
• Internal capacitance C_i and inductance L_i	Negligible
• Max. safety-technical voltage	AC 253 V
• SIL	2
Isolation amplifier, input:	
- Max. output voltage U_o	- ¹⁾
- Max. connectable voltage U_i	30 V
- Max. connectable current I_i	150 mA
- Internal capacitance C_i and inductance L_i of the isolation amplifier	Negligible
Certificates and approvals	
ATEX/IECEx explosion protection	
Certificates	<ul style="list-style-type: none"> • BVS 17 ATEX E 087 X • IECEx BVS 17.0079X
Gas/dust explosion protection, firedamp protection for Zones 2 and 22	
• ATEX	<ul style="list-style-type: none"> • II 3 (1) G Ex nA [ia Ga] IIC T4 Gc • II (1) D [Ex ia Da] IIIC • I (M1) [Ex ia Ma] I
• IECEx	<ul style="list-style-type: none"> • Ex nA [ia Ga] IIC T4 Gc • [Ex ia Da] IIIC • [Ex ia Ma] I
Installation	In Zones 2 and 22, Div. 2 and in safe areas
Other approvals	<ul style="list-style-type: none"> • USA/Canada (UL): NEC certification (Class I, II, III) 1, 2 • DNV marine approval • Other approvals for India and Korea

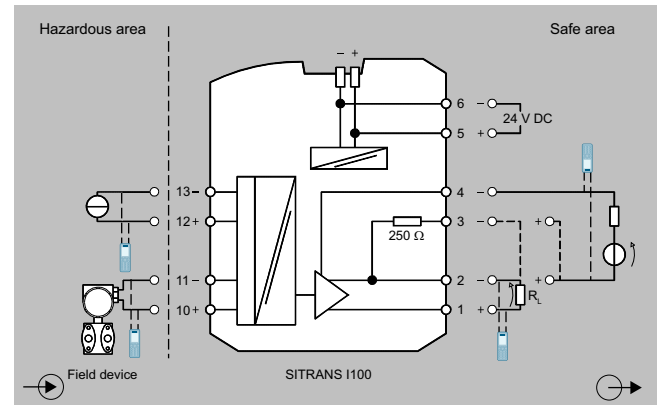
¹⁾ U_o does not have to be taken into account in 4-wire operation.

Dimensional drawings

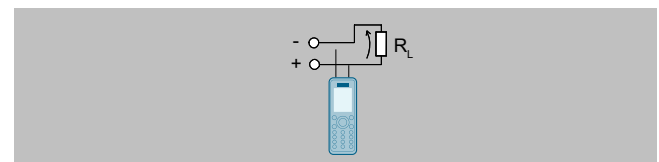


SITRANS I100 isolating power supply HART, dimensions in mm (inch)

Circuit diagrams

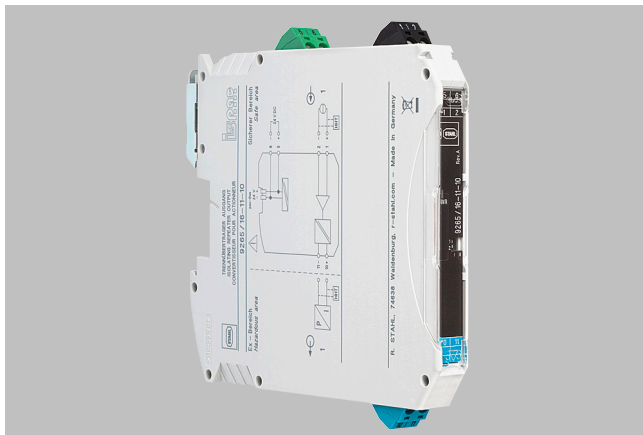


SITRANS I100 isolating power supply HART, connection diagram



SITRANS I100 isolating power supply HART, output configuration

Overview



Analog output 0/4 to 20 mA for HART

The single-channel Ex i output isolation amplifiers are used for intrinsically safe operation of valve positioners, i/p converters or indicators.

Operation of intrinsically safe HART valve positioners (e.g. SIPART PS2) is also possible. The devices transfer a superimposed HART communication signal bidirectionally.

The SITRANS I200 is used for intrinsically safe operation of regulating valves, I/P converters or indicators.

- Superimposed HART communication signals are transmitted bidirectionally by the output isolator.
- Input, output and auxiliary power are electrically isolated from each other.

Benefits

- Compact single-channel Ex i output isolation amplifiers
- Narrow design – 12.5 mm (0.49 inch) width – for single-channel version
- For HART output signals 0/4 to 20 mA
- Output intrinsically safe [Ex ia] IIC
- Galvanic isolation between input, output and auxiliary power
- Wire break and short-circuit monitoring and messaging (can be switched off)
- Installation permissible in Zone 2 and Div. 2
- Can be used up to SIL 2 (IEC/EN 61508)

	Zones					
	0	1	2	20	21	22
Ex intrinsically safe interface	X	X	X	X	X	X
Installation in			X			X

Supplementary components

Supply units and isolation amplifiers

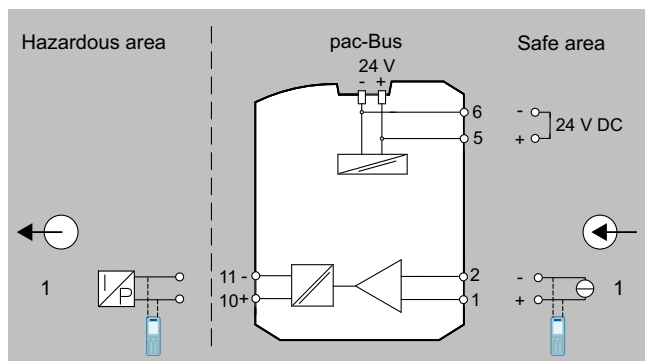
SITRANS I200

Design

The SITRANS I200-Ex i output isolation amplifier is comprised of a compact plastic enclosure (IP30) and is equipped with push-in screw terminals.

On the front are a green LED for indicating the power supply status and a red LED for signaling errors.

The auxiliary power supply can be individually connected using push-in screw terminals.



SITRANS I200 output isolation amplifier, function block diagram

Selection and ordering data

	Article No.
SITRANS I200 Ex i output isolation amplifier, Ex	7NG4131-1AA00
<ul style="list-style-type: none"> • Single channel • DIN rail mounting • For HART output signals 0/4 ... 20 mA • Intrinsically safe operation of positioners, e.g. SIPART PS2, I/P converters or indicators • 12.5 mm wide • Approved up to SIL 2 (IEC/EN 61508) 	

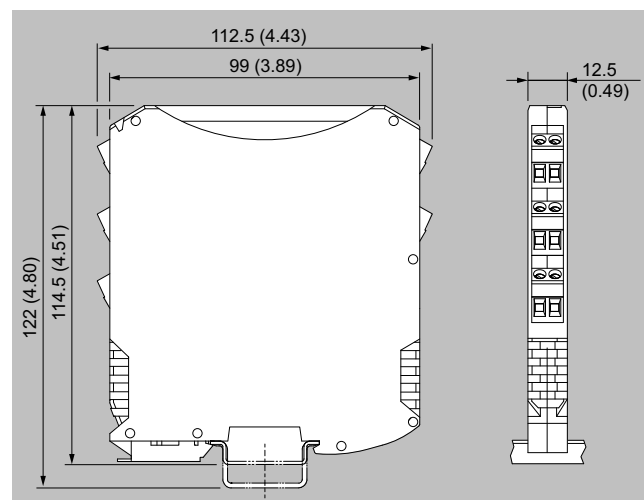
Technical specifications

SITRANS I200	
General	
Number of channels	1
LFD relay (LFD = Line fault detection)	No
Electrical specifications	
Input	
Input signal	0/4 ... 20 mA with HART
Functional range	0 ... 24 mA
Response threshold line fault (L_F)	$I_E > 3.6$ mA
Response of the input to line fault (L_F)	$R_E \geq 1$ M Ω
Output	
Output signal	0/4 ... 20 mA with HART
Functional range	0.0 ... 24.0 mA
Communication signal	HART
Max. load resistance R_L	700 Ω
Residual ripple	≤ 20 mV
Setting time (10 ... 90%) (valid for 4 ... 20 mA)	≤ 140 μ s
No-load voltage U_a	27.00 V
Average measuring error	0.10%
Line fault	
• Setting switch	Enabled/disabled for short circuit
• Response threshold	$I_E > 3.6$ mA
• Display	Red "ERR" LED
Error detection	
• Wire break	$R_L > 10$ k Ω
• Short circuit	$R_L < 50$ Ω
Error limits temperature influence	
	$\leq 0.1\%$ / 10 K
Galvanic isolation	
Test voltage according to IEC EN 60079-11	
• Ex i output to auxiliary power	375 V AC peak value
• Ex i output to input	375 V AC peak value
Test voltage according to EN 61010/EN 50178	
• Input to auxiliary power	300 V_{eff}
Auxiliary power	
Nominal voltage U_N	24 V DC
Voltage range	19.2 ... 30 V
Rated current	45 mA
Power consumption	1.1 W
Max. power loss:	1.1 W
Status indicator	Green "PWR" LED
Reverse polarity protection	Yes
Safety specifications	
• Max. voltage U_o	25.2 V
• Max. current I_o	93 mA
• Max. power P_o	587 mW
• Max. permissible external capacitance C_o for IIC/IIB	0.107 μ F/0.817 μ F
• Max. permissible external inductance L_o for IIC/IIB	2 mH/4 mH
• Internal capacitance C_i / internal inductance L_i	Negligible
• Max. safety-technical voltage	253 V
• SIL	2
Operating conditions	
Degree of protection	
• Enclosure	IP30

Technical specifications (continued)

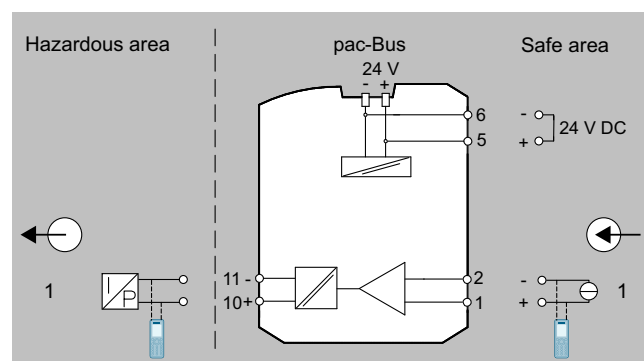
SITRANS I200	
• Terminals	IP20
Ambient temperature	-40 °C ... +70 °C (-40 °F ... +158 °F)
Storage temperature	-40 °C ... +85 °C (-40 °F ... +185 °F)
Relative humidity	≤ 95%
Usage in height	< 2 000 m (6 562 ft)
Electromagnetic compatibility (EMC)	<ul style="list-style-type: none"> • EN 61326-1 Use in the industrial environment • Namur NE 21
Structural design	
Weight	0.170 kg (0.38 lb)
Enclosure material	Polyamide
Grid size	12.5 mm (0.49 inch)
Width	12.5 mm (0.49 inch)
Height	114.5 mm (4.51 inches)
Length	116 mm (4.57 inches)
Fire resistance (UL-94)	V0
Mounting type	DIN rail NS35/15, NS35/7.5
Mounting position	Any (vertical or horizontal)
Connection type	Screw terminal
Screw terminals	
Core cross-section	
• Rigid	0.2 mm ² ... 2.5 mm ² (0.00031 ... 0.0039 inch ²)
• Flexible min.	0.2 mm ² ... 2.5 mm ² (0.00031 ... 0.0039 inch ²)
Conductor cross-section AWG	16 ... 12
Certificates and approvals	
<u>ATEX/IECEx explosion protection</u>	
Operating range (zones)	2
Ex interface zone	0, 20
Gas/dust explosion protection, firedamp protection for Zones 2 and 22	
Certificates	
• ATEX	<ul style="list-style-type: none"> • BVS 20 ATEX E 045 X • IECEx BVS 20.0035X • Ex II 3 (1) G Ex ec [ia Ga] IIC T4 Gc • Ex II (1) D [Ex ia Da] IIIC • Ex I (M1) Ex [Ex ia Ma] I
• IECEx	<ul style="list-style-type: none"> • Ex ec [ia Ga] IIC T4 Gc • [Ex ia Da] IIIC • Ex [Ex ia Ma] I
Installation	In Zone 2, Div. 2 and in the safe area
Certificates	<ul style="list-style-type: none"> • ATEX (BVS), IECEx (BVS), SIL (BVS) • cULus • PESO • KTL
Marine approval	DNV

Dimensional drawings



SITRANS I200 output isolation amplifier HART, dimensions in mm (inch)

Circuit diagrams



SITRANS I200 output isolation amplifier HART, connection diagram

Supplementary components

Supply units and isolation amplifiers

SITRANS I300

Overview



EIA-485 interface for Modbus RTU, PROFIBUS RS 485-IS and BACnet MS/TP communication.

- The isolating power supplies are used for the intrinsically safe operation of 4-wire devices.
- The isolating power supply supplies the 4-wire devices with power.

Benefits

- Suitable for 4-wire devices
- Galvanic isolation between EIA-485 and EIA-485-IS, between the power supply and EIA-485-IS, and between the power supply on the input side and the intrinsically safe power supply on the output side.
- Intrinsically safe power supply and communication [Ex ia] IIC
- Installation permissible in Zone 2 and Div. 2
- Diagnostics via LEDs
- Integrated, connectable bus termination on the non-hazardous side and the hazardous side
- Transmission rates of 1 200 bps to 1.5 Mbps

Application

Isolating power supply for 4-wire devices in hazardous areas

Design

The EIA-485 transmitter isolating power supply consists of a compact plastic enclosure (IP20) in the SIMATIC S7-1200 design, and is equipped with plug-in screw terminals. On the front are a green LED for indicating the auxiliary power supply status and a yellow LED for signaling communication. The push-in screw terminals are jumpered on the EIA-485 transmitter isolating power supply, allowing the power supply and primary-side communication to further SITRANS I300 devices to be looped through.

Selection and ordering data

	Article No.
SITRANS I300 isolating power supply	
Isolating power supply with intrinsically safe EIA-485 interface, DIN rail mounting, for 4-wire devices	A5E39832532

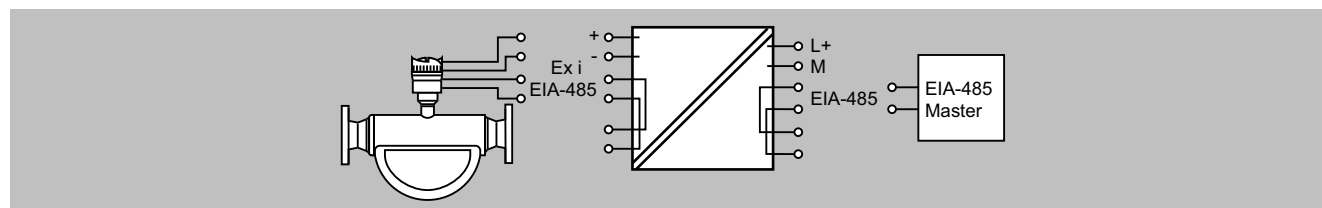
Technical specifications

SITRANS I300	
Power supply	
Input	
• Nominal voltage U_N	24 V DC
• Voltage range	19.2 ... 28.8 V
• Residual ripple within voltage range	$\leq 3.6 V_{SS}$
• SITRANS I300 current consumption (24 V DC)	≤ 210 mA
• Power loss for a load of 1.5 W	3.3 W at 24 V DC
• Reverse polarity protection	Yes
Output	
• Nominal voltage	15.6 V
• Max. current	459 mA
• Max. power	1.5 W
Galvanic isolation	
• EIA-485 to EIA-485-IS	1 500 V AC
• Power supply to EIA-485-IS	1 500 V AC
Operating conditions	
Degree of protection of enclosure	
Degree of protection of terminals	IP20
Ambient conditions	
• Ambient temperature	-40 ... +60 °C (-40 ... +140 °F)
• Storage temperature	-40 ... +70 °C (-40 ... +158 °F)
• Relative humidity (no condensation)	$\leq 95\%$
Electromagnetic compatibility	
Tested acc. to the following standards and regulations: EN 61326-1 Use in the industrial environment	
Structural design	
Dimensions in mm (width x height x depth)	70 x 100 x 75
Weight	Approx. 250 g (0.55 lbs)
Screw terminals	
• One-wire connection	
- Rigid	0.34 ... 2.5 mm ² (AWG 22 ... 14)
- Flexible	0.34 ... 2.5 mm ² (AWG 22 ... 14)
- Flexible with end ferrules	0.34 ... 2.5 mm ² (AWG 22 ... 14)
Mounting type	
• On DIN rail acc. to EN 50022 (NS35/15; NS35/7.5)	
• Wall	
Mounting position	
Vertical or horizontal	
Communication	
EIA-485 segment (primary side)	
• Supported transmission rates	<ul style="list-style-type: none"> • 1 200 bps • 2 400 bps • 4 800 bps • 9 600 bps • 19.2 kbps (factory setting) • 38.4 kbps • 45.45 kbps • 57.6 kbps • 76.8 kbps • 93.75 kbps • 115.2 kbps • 187.5 kbps • 460.8 kbps • 500 kbps • 1.5 Mbps

Technical specifications (continued)

SITRANS I300	
• Terminating resistor	Integrated, connectable
EIA-485-IS segment (secondary side)	
• Permissible cable lengths	
- 1 200 ... 187 500 bps	≤ 1 000 m
- 500 kbps	≤ 400 m
- 1.5 Mbps	≤ 200 m
• Terminating resistor	Integrated, connectable
Diagnostic functions	
• Monitoring, 24 V power supply	Green "PWR" LED
• Bus monitoring	Yellow "RX/TX" LED
Certificates and approvals	
ATEX explosion protection	
• EC type-examination certificate	ATEX LVD EMC RoHS
• Degree of protection	CAT 3[1] G
Installation	
	In Zone 2, Div. 2 and in safe areas
Safety specifications (acc. to IEC 60079-11)	
• Max. voltage U_0	17.42 V
• Max. current I_0	459 mA
• Max. power P_0	2 000 mW
• Max. connectable capacitance C_0 for IIC/IIB	327 nF/1 958 nF
• Max. connectable inductance L_0 for IIC/IIB	134 μ H/675 μ H
• Internal capacitance C_i	Negligible
• Internal inductance L_i	Negligible
• Maximum insulation voltage U_m	See certificate
Explosion protection acc. to EAC Ex	
Available soon	
Marine approvals	
	<ul style="list-style-type: none"> • DNV-GL (Det Norske Veritas/Germanischer Lloyd) • LR (Lloyds Register) • BV (Bureau Veritas) • ABS (American Bureau of Shipping) • RINA (Registro Italiano Navale)

Circuit diagrams



SITRANS I300 isolating power supply, connection diagram

Supplementary components

Displays

SITRANS RD100

Overview



The SITRANS RD100 is a 2-wire loop powered, NEMA 4X enclosed remote digital display for process instrumentation.

Benefits

- Easy setup
- Approved for hazardous locations
- NEMA 4X, IP67 impact-resistant enclosure
- Simple two-step calibration
- Two modes of input allow for easy servicing, with no interruption of loop required

Application

The RD100 is very versatile. It can be installed indoors or outdoors, in hot or cold environments, and in safe or hazardous areas. It has been approved by FM and CSA as Intrinsically Safe and non-incendive, and operates from -40 to +85 °C (-40 to +185 °F), adding only 1 V to the loop. Calibration consists of a quick two-step process involving the adjustment of only two non-interacting potentiometers.

- Key Applications: remotely displays process variables in level, flow, pressure, temperature, and weighing applications, in a 4 to 20 mA loop.

Selection and ordering data

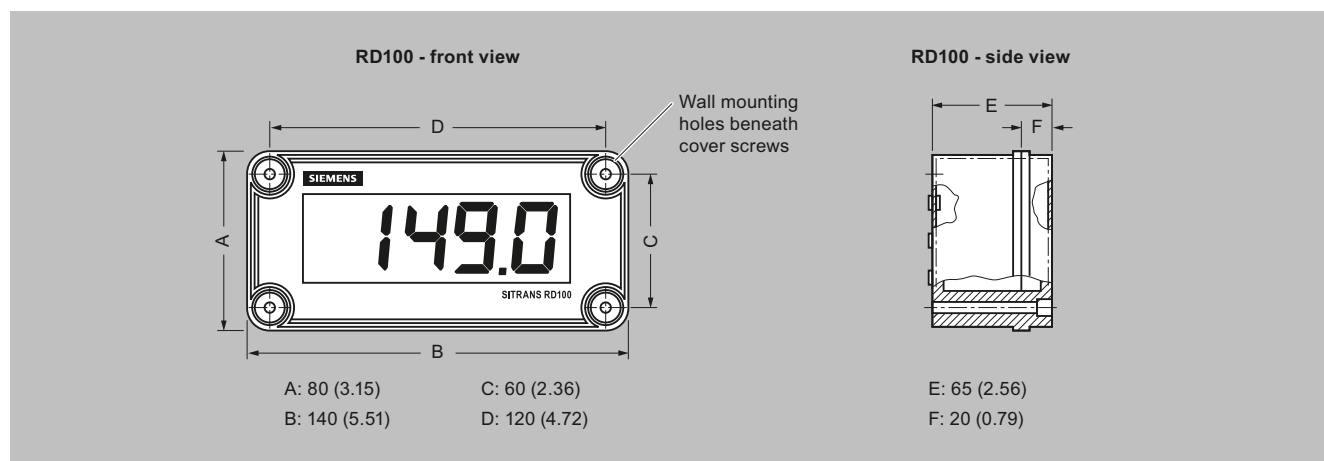
	Article No.
SITRANS RD100 Display Remote digital display for process instruments. 2-wire, loop powered, NEMA 4X enclosure.	7ML5741- ● ● A 0 0 - 0
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	
Conduit hole location (1/2 inch)	
None	1
Bottom	2
Rear	3
Top	4
Approvals	
FM/CSA	A
CE	B

Selection and Ordering data	Article No.
Operating Instructions	
All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation	
Accessories	
Panel mount kit	7ML1930-1BN
2 inch (5.08 cm) pipe mounting kit (zinc plated seal)	7ML1930-1BP
2 inch (5.08 cm) pipe mounting kit (stainless steel, Type 304, EN 1.4301)	7ML1930-1BQ

Technical specifications

SITRANS RD100	
Mode of operation	
Measuring principle	Analog to digital conversion
Measuring range	4 ... 20 mA
Measuring points	1 instrument only
Accuracy	
	± 0.1 % of span ± 1 count
Rated operating conditions	
Ambient conditions	
• Operating temperature range	-40 ... +85 °C (-40 ... +185 °F)
• Storage temperature	-40 ... +85 °C (-40 ... +185 °F)
Design	
Weight	340 g (12 oz)
Material (enclosure)	Impact-resistant glass filled polycarbonate body and clear polycarbonate cover
Degree of protection	NEMA 4X, IP67
Power supply	
External loop power supply	30 V DC max.
Display	
	<ul style="list-style-type: none"> 1.0 inch (2.54 cm) high LCD Numeric range from -1 000 ... +1 999
Certificates and approvals	
Non-hazardous	CE
Hazardous	
• Intrinsically Safe	<ul style="list-style-type: none"> CSA/FM Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G T4 CSA/FM Class I, Zone 0, Group IIC
• Non-incendive	<ul style="list-style-type: none"> CSA/FM Class I, Div. 2, Groups A, B, C, D CSA/FM Class II and III, Div. 2, Groups F and G
Options	
Mounting	<ul style="list-style-type: none"> 2 inch (5.08 cm) pipe mounting kit (zinc plated or stainless steel) Panel mounting kit

Dimensional drawings



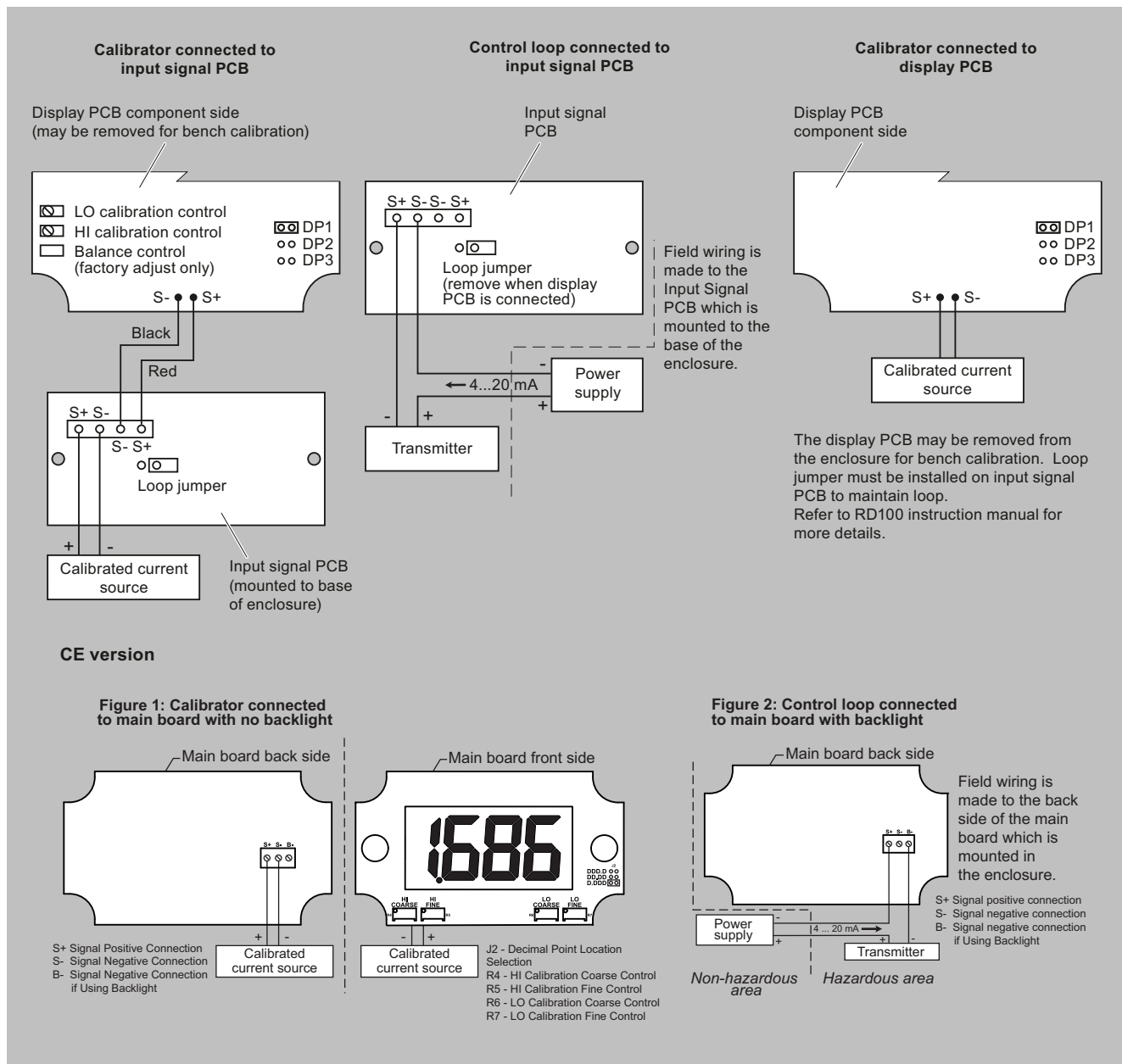
SITRANS RD100, dimensions in mm (inch)

Supplementary components

Displays

SITRANS RD100

Circuit diagrams



SITRANS RD100 connections

Overview



The SITRANS RD150 is a remote display for 4 to 20 mA and HART devices.

Benefits

- Ease of use through 4 button menu driven display
- Backlit display
- HART communications
- Flexible mounting options
- Plastic, stainless steel or aluminum housings up to IP68
- Full configuration of connected sensors with optional USB Communicator and PC
- Support for multiple HART sensors with HART Multi-drop

Application

The versatile SITRANS RD150 can be installed remotely from your instrument, providing 4/20 mA or multiple HART variable readings in a safe and convenient location. Easy to use, 4 button, menu driven, display for configuration of HART instruments via standard HART commands and full configuration of connected instruments via USB and computer.

- Key Applications: remotely displays process variables in level, flow, pressure, temperature, and weighing applications, in a 4 to 20 mA HART loop.

Supplementary components

Displays

SITRANS RD150

Selection and ordering data

SITRANS RD150 Display		Article No.	
Remote digital display with configuration for process instruments. HART or 4 to 20 mA loop display, metal and plastic field mount enclosures.		7ML5742- ● ● ● ● ● - ● ● ● ●	
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.			
Approvals			
For Ex-free area	0	A	
ATEX II 1G, 2G Ex ia IIC T6 Ga, Gb ⁴⁾	0	C	
ATEX II 2G Ex db IIC T6 Gb ⁹⁾	0	F	
IEC Ex ia IIC T6 Ga, Gb ⁴⁾	0	J	
IEC Ex db IIC T6 Gb ⁹⁾ 10)	0	M	
cCSA _{US} (IS) Class I, Div. 1, Groups A, B, C, D ¹²⁾	0	N	
cCSA _{US} (XP) Class I, Div. 1, Groups A, B, C, D ⁹⁾ 11)	0	R	
Electronics			
Two-wire 4 ... 20 mA/HART		A	
Two-wire 4 ... 20 mA without HART		B	
Housing			
Plastic ¹⁾⁴⁾⁶⁾			0
Aluminum ²⁾⁴⁾⁷⁾			1
Stainless steel (precision casting) ²⁾⁴⁾⁷⁾			2
For panel mounting (72 x 72 mm) ³⁾⁵⁾⁸⁾			3
Housing protection			
IP66/IP67 NEMA 4X			0
IP66/IP68 NEMA 6P (0.2 bar)			1
IP40 NEMA 2			2
IP40 Type 1			3
Cable entry			
M20 x 1.5/Cable gland PA black (ø5 ... 9 mm), standard			0
M20 x 1.5/Cable gland brass nickel plated (ø6 ... 12 mm)			1
M20 x 1.5/Blind plug			2
M20 x 1.5/Threaded fitting brass nickel-plated; for shielded cable (ø9 ... 13 mm)			3
½" NPT/Blind plug			4
½" NPT/Cable gland PA black (ø5 ... 9 mm)			5
½" NPT/Threaded fitting brass nickel plated (ø6 ... 12 mm)			6
½" NPT/Threaded fitting brass nickel plated; for shielded cable (ø9 ... 13 mm)			7
Without			8
Display			
Without			A
Mounted			B
Mounting			
For wall mounting with aluminum or stainless steel housing			A
For carrier rail and wall mounting with plastic housing			B
For carrier rail with aluminum or stainless steel housing			C
For tube mounting (29 ... 60 mm) incl. mounting material			D
For panel mounting			E
Certificates			
None			0
3.1 Certificate/Instrument with test data			1
Quality and Test plan			2

Selection and ordering data	Article No.
Operating Instructions	
All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation	
Accessories	
USB communicator	A5E35192015
SITRANS LG/SITRANS RD150 sensor display module	A5E34143449

1) Available only with Housing protection option 0.

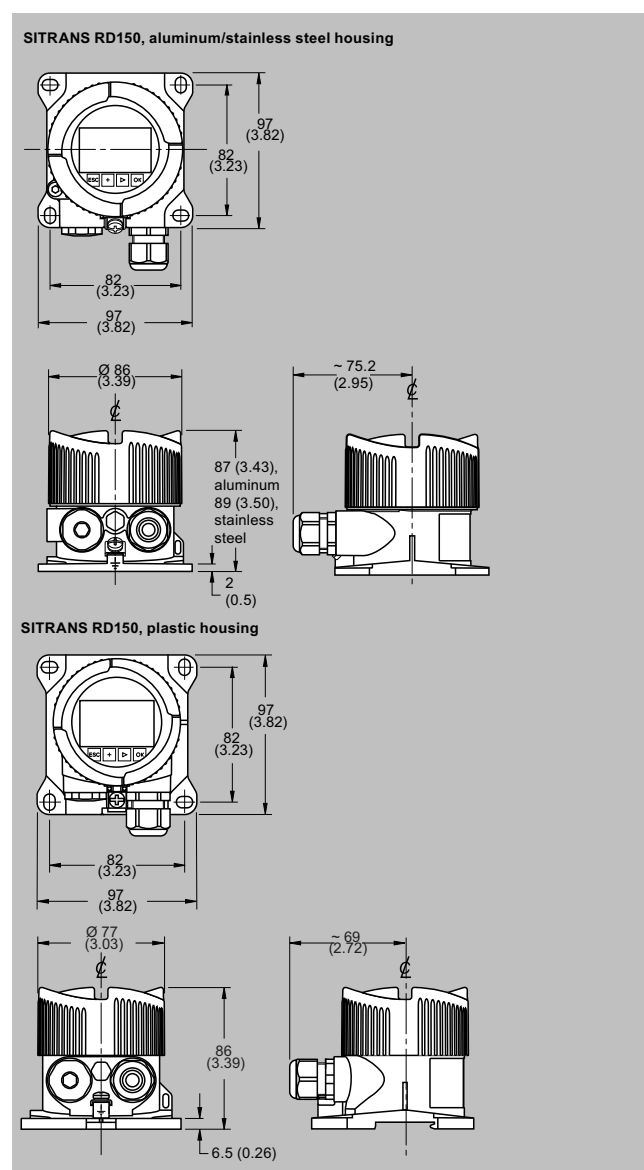
Selection and ordering data (continued)

- 2) Available only with Housing protection option 1.
- 3) Available only with Housing protection option 2.
- 4) Available only with Cable entry options 0, 2, 4, and 5.
- 5) Available only without Cable entry option 8.
- 6) Available only with Carrier rail and Tube mount Mounting options.
- 7) Available only with Wall mount, Carrier rail with aluminum or stainless steel housing, and Tube mount Mounting options.
- 8) Available only with Panel mounting option.
- 9) Available only with Housing options 1 and 2.
- 10) Available only with Cable entry options 2, 3, 4, and 7.
- 11) Available only with Cable entry options 2, 3, 4, 6, and 7.
- 12) Not available with Cable entry option 1.

Technical specifications

SITRANS RD150	
Mode of operation	
Measuring principle	Analog to digital conversion
Measuring range	3.5 ... 22.5 mA
Measuring points	HART multi-drop support
Accuracy	± 0.1 % of 20 mA
Rated operating conditions	
Without display and adjustment module	-40 ... +80 °C (-40 ... +176 °F)
With display and adjustment module	-20 ... +70 °C (-4 ... +158 °F)
Storage temperature	-40 ... +80 °C (-40 ... +176 °F)
Design	
Weight	
• Plastic housing	0.35 kg (0.772 lb)
• Aluminum housing	0.7 kg (1.543 lb)
• Stainless steel housing	2.0 kg (4.409 lb)
Material (enclosure)	
• Plastic housing	Plastic PBT (Polyester)
• Aluminum housing	Aluminum die-casting AISi10Mg, powder-coated (basis: Polyester)
• Stainless steel housing	316L precision casting, blasted
Degree of protection	
• Plastic housing	IEC 60529 IP66/IP 67, NEMA Type 4X
• Housing for panel mounting (mounted)	IEC 60529 IP40, NEMA Type 1
• Aluminum/stainless steel housing	IEC 60529 IP66/IP68 (0.2 bar), NEMA Type 6P
Power supply	
External loop power supply	35 V DC max.
Display	
Number of digits	5
Digit size	7 x 13 mm (0.28 x 0.51 inch)
Certificates and approvals	See the online PIA configuration tool for details.
Options	
Mounting	<ul style="list-style-type: none"> • Panel Mounting • Carrier rail mounting • Pipe mounting

Dimensional drawings

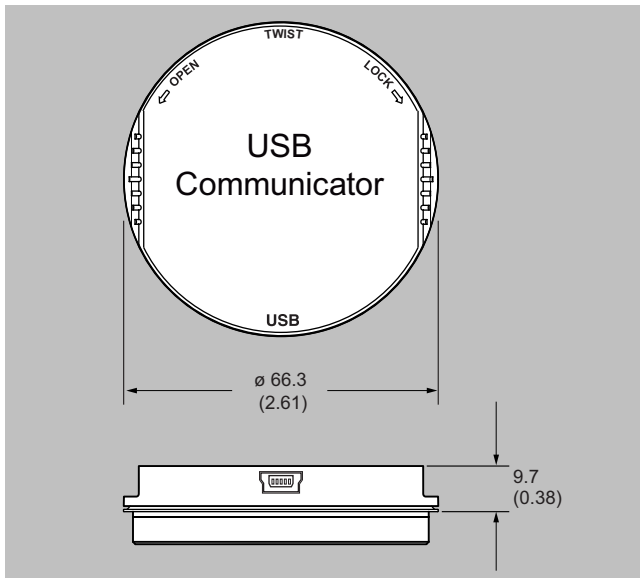


Supplementary components

Displays

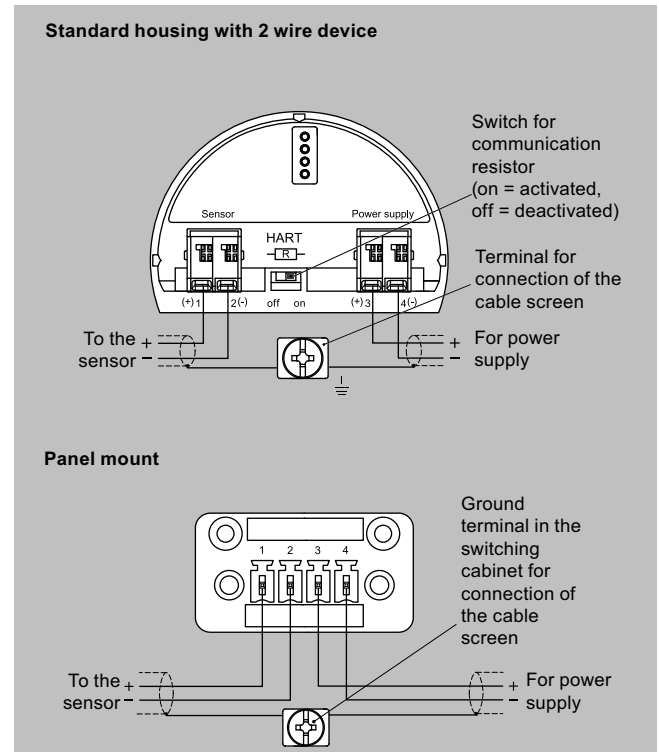
SITRANS RD150

Dimensional drawings (continued)



USB Communicator, dimensions in mm (inch)

Circuit diagrams



SITRANS RD150 connections

Overview

The SITRANS RD200 is a universal input, panel mount remote digital display for process instrumentation.

Benefits

- Easy setup and programming via front panel buttons or remotely using RD software
- Display readable in sunlight
- Universal input: accepts current, voltage, thermocouple, and RTD signals
- Single or dual 24 V DC transmitter power supply
- Serial communication using built in protocol or Modbus RTU
- Two optional relays for alarm indication or process control applications
- Linear or square root function supported
- Meter Copy feature to reduce setup time, cost, and errors
- RD software supports remote configuration, monitoring, and logging for up to 100 displays
- Other features include: 4 to 20 mA analog output option, pump alternation control, and optional NEMA 4 and 4X field enclosures
- 2X option for 30.5 mm (1.2 inch) high, red LED display

Application

The RD200 is a universal remote display for level, flow, pressure, temperature, weighing, and other process instruments. Data can be remotely collected, logged and presented from as many as 100 displays on your local computer using the free downloadable RD Software.

The display accepts a single input of current, voltage, thermocouple, and RTD. This makes the RD200 an ideal fit for use with most field instruments.

The RD200 can be set up as a standard panel mount, or combined with optional enclosures to allow it to house up to 6 displays.

- Key Applications: tank farms, pump alternation control, local or remote display of level, temperature, flow, pressure and weighing instrument values, PC monitoring, and data logging with RD Software.

Supplementary components

Displays

SITRANS RD200

Selection and ordering data

		Article No.	
SITRANS RD200 Display Remote digital display for process instruments. With 4 to 20 mA, 0 to 10 V, RTD, and TC inputs and pump control. Panel mount with field mount enclosure options.		7ML5740- ● ● ● ● ● - ● A	
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.			
Input voltage			
85 ... 265 V AC, 50/60 Hz; 90 ... 265 V DC, 20 W max.		1	
12 ... 36 V DC; 12 ... 24 V AC, 6 W max.		2	
Transmitter supply			
None		A	
Single 24 V DC transmitter supply ¹⁾		B	
Dual 24 V DC transmitter supply ¹⁾²⁾		C	
Output			
None		A	
2 relays		B	
4 ... 20 mA output		C	
Communication			
Modbus RTU			0
Approvals			
Ordinary Locations/General Purpose (Non-Ex), CE, UKCA, UL, cUL			1
Display Size			
Standard			0
2X option for 30.5 mm (1.2 inch) high, red LED			1

¹⁾ Available with input voltage option 1 only.

²⁾ Available with output option C only.

Selection and Ordering data	Article No
Operating Instructions	
All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation	
Accessories	
SITRANS RD200 copy cable 2.1 m (7 ft)	7ML1930-1BR
SITRANS RD200 RS 232 serial adapter (copy cable included)	7ML1930-1BS
SITRANS RD200 RS 422/485 serial adapter (copy cable included)	7ML1930-1BT
RS 232 to RS 422/485 isolated converter	7ML1930-1BU
RS 232 to RS 422/485 non-isolated converter	7ML1930-1BV
USB to RS 422/485 isolated converter	7ML1930-1BX
USB to RS 422/485 non-isolated converter	7ML1930-1BY
RD200 USB serial adapter	7ML1930-6AH
USB to RS 232 converter	7ML1930-6AK
RD Software CD for 1 ... 100 displays	7ML1930-1CC
Low cost polycarbonate plastic enclosure for 1 display	7ML1930-1CF
2 inch (5.08 cm) pipe mounting kit (zinc plated seal) only available with 7ML1930-1CF	7ML1930-1BP
2 inch (5.08 cm) pipe mounting kit (stainless steel, Type 304, EN 1.4301) only available with 7ML1930-1CF	7ML1930-1BQ
Thermoplastic enclosure	
For use with 1 display	7ML1930-1CG
For use with 2 displays	7ML1930-1CH
For use with 3 displays	7ML1930-1CJ
For use with 4 displays	7ML1930-1CK
For use with 5 displays	7ML1930-1CL
For use with 6 displays	7ML1930-1CM
Stainless steel enclosure (Type 304, EN 1.4301)	
For use with 1 display	7ML1930-1CN
For use with 2 displays	7ML1930-1CP

Selection and ordering data (continued)

Selection and Ordering data	Article No
For use with 3 displays	7ML1930-1CQ
For use with 4 displays	7ML1930-1CR
For use with 5 displays	7ML1930-1CS
For use with 6 displays	7ML1930-1CT
<u>Steel enclosure</u>	
For use with 1 display	7ML1930-1CU
For use with 2 displays	7ML1930-1CV
For use with 3 displays	7ML1930-1CW
For use with 4 displays	7ML1930-1CX
For use with 5 displays	7ML1930-1CY
For use with 6 displays	7ML1930-1DA

Supplementary components

Displays

SITRANS RD200

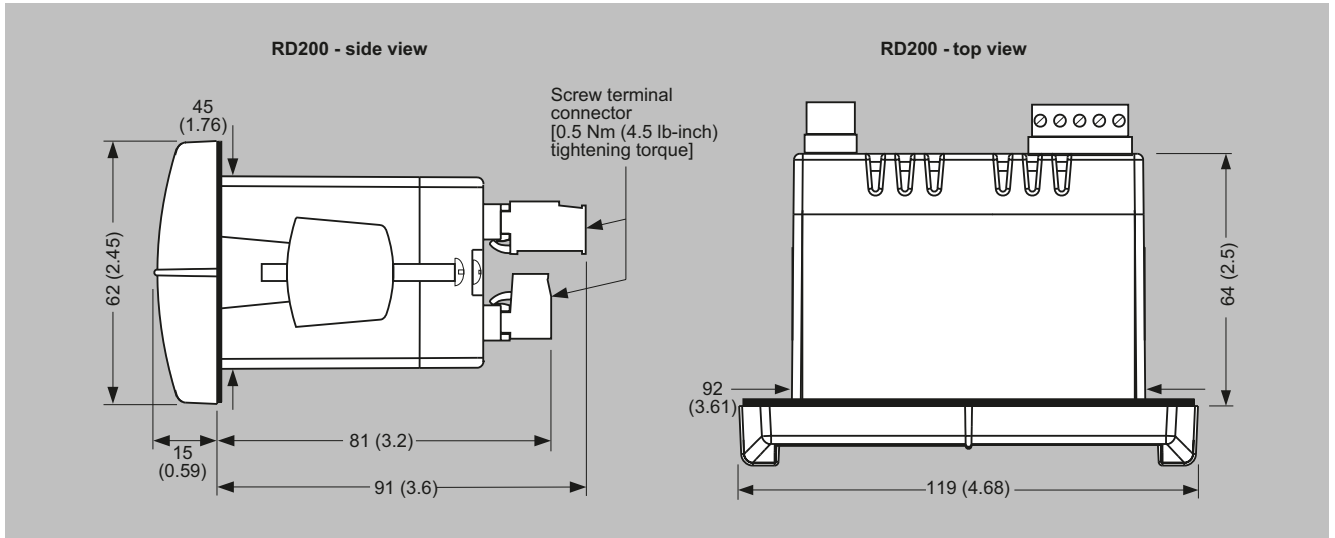
Technical specifications

SITRANS RD200	
Mode of operation	
Measuring principle	Analog to digital conversion
Measuring points	<ul style="list-style-type: none"> 1 instrument Remote monitoring of 100 instruments with PC and RD software
Input	
Measuring range	
• Current	• 4 ... 20 mA, 0 ... 20 mA
• Voltage	• 0 V DC ... 10 V DC, 1 ... 5 V, 0 ... 5 V
• Thermocouple temperature	<ul style="list-style-type: none"> Type J: -50 ... +750 °C (-58 ... +1 382 °F) Type K: -50 ... +1 260 °C (-58 ... +2 300 °F) Type E: -50 ... +870 °C (-58 ... +1 578 °F) Type T: -180 ... +371 °C (-292 ... +700 °F) Type T, 0.1° resolution: -180.0 ... +371 °C (-199.9 ... +700 °F)
• RTD temperature	• 100 Ω RTD: -200 ... +750 °C (-328 ... +1 382 °F)
Output signal	
Output	<ul style="list-style-type: none"> 4 ... 20 mA (optional) Modbus RTU
Relays	2 SPDT Form C relays, rated 3 A at 30 V DC or 3 A at 250 V AC, non-inductive, auto-initializing (optional)
Communications	<ul style="list-style-type: none"> RS 232 with PDC or Modbus RTU RS 422/485 with PDC or Modbus RTU
Accuracy	
4 ... 20 mA optional output	± 0.1 % FS ± 0.004 mA
Process input	± 0.05 % of span ± 1 count, square root: 10 ... 100 % FS
Thermocouple temperature input	<ul style="list-style-type: none"> Type J: ± 1 °C (± 2 °F) Type K: ± 1 °C (± 2 °F) Type E: ± 1 °C (± 2 °F) Type T: ± 1 °C (± 2 °F) Type T, 0.1° resolution: ± 1 °C (± 1.8 °F)
RTD temperature input	• 100 Ω RTD: ± 1 °C (± 1 °F)
Rated operating conditions	
Ambient conditions	
• Storage temperature range	-40 ... +85 °C (-40 ... +185 °F)
• Operating temperature range	-40 ... +65 °C (-40 ... +149 °F)
Design	
Weight	269 g (9.5 oz) (including options)
Material (enclosure)	<ul style="list-style-type: none"> 1/8 DIN, high impact plastic, UL94V-0, color: gray Optional plastic, steel and stainless steel (Type 304, EN 1.4301) NEMA 4 enclosures
Degree of protection	Type 4X, NEMA 4X, IP65 (front cover); panel gasket provided
Electrical connection	
mA output signal	2-core copper conductor, twisted, shielded, 0.82 ... 3.30 mm ² (18 ... 12 AWG), Belden 8 760 or equivalent is acceptable
Electrical connection and relay connection	Copper conductor according to local requirements, rated 3 A at 250 V AC
Power supply	
Input voltage option 1	85 ... 265 V AC, 50/60 Hz; 90 ... 265 V DC, 20 W max.
Input voltage option 2	12 ... 36 V DC; 12 ... 24 V AC, 6 W max.
Transmitter power supply	One or two isolated transmitter power supplies (optional)
• Single power supply	One 24 V DC ± 10 % at 200 mA max.
• Dual power supplies	Two 24 V DC ± 10 % at 200 mA and 40 mA max.

Technical specifications (continued)

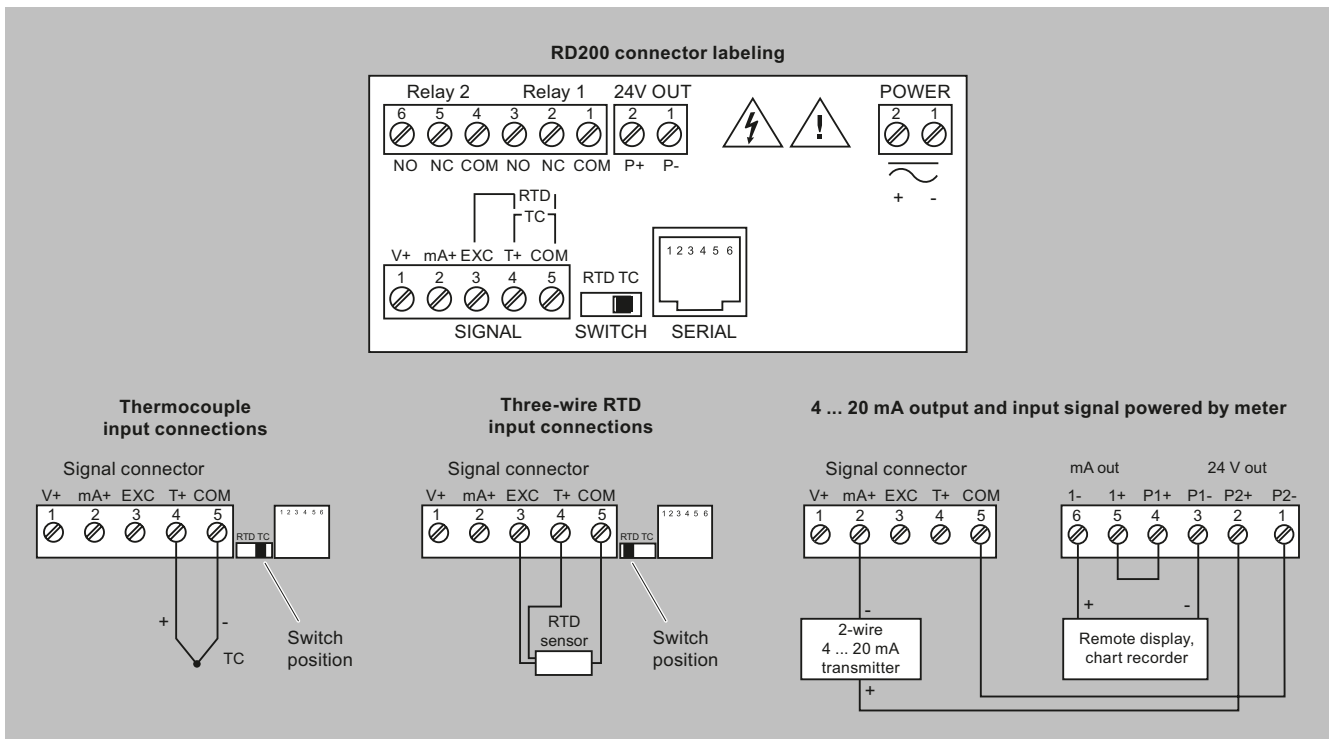
SITRANS RD200	
External loop power supply	35 V DC max.
Output loop resistance	<ul style="list-style-type: none"> 24 V DC, 10 ... 700 Ω max. 35 V DC (external), 100 ... 1 200 Ω max.
Displays and controls	
Display	<ul style="list-style-type: none"> 14 mm (0.56 inch) high LED 2X option for 30.5 mm (1.2 inch) high, red LED Numeric range from -1 999 ... +9 999 Four digits, automatic lead zero blanking Eight intensity levels
Memory	<ul style="list-style-type: none"> Non-volatile Stores settings for minimum of 10 years if power is lost
Programming	<ul style="list-style-type: none"> Primary: front panel Secondary: meter copy or PC with SITRANS RD software
Certificates and approvals	CE, UKCA, UL, cUL
Options	
Enclosures	Plastic, steel, and stainless steel (Type 304, EN 1.4301) NEMA 4 and 4X enclosures
Mounting	<ul style="list-style-type: none"> 2 inch (5.08 cm) pipe mounting kit (zinc plated seal) 2 inch (5.08 cm) pipe mounting kit (stainless steel, Type 304, EN 1.4301)

Dimensional drawings



SITRANS RD200, dimensions in mm (inch)

Circuit diagrams



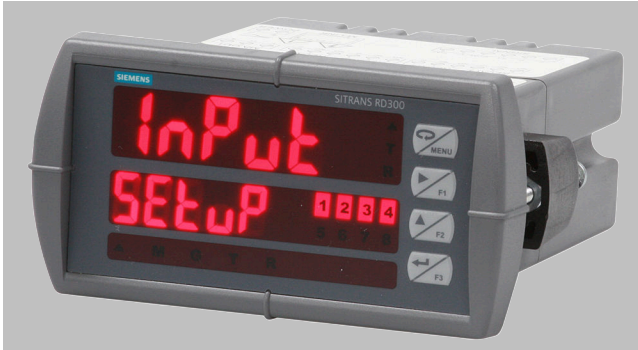
SITRANS RD200 connections

Supplementary components

Displays

SITRANS RD300

Overview



The SITRANS RD300 is a panel mount remote digital display for process instrumentation and acts as a multi-purpose, easy to use, rate/totalizer ideal for flow rate, total, and control applications.

Benefits

- Easy setup and programming via front panel buttons or using free RD software available via USB drive
- Display readable in sunlight
- Input: accepts current and voltage
- Single or dual 24 V DC transmitter power supply
- Serial communication using built in protocol or Modbus RTU
- Supports up to 8 relays and 8 digital I/O for process control and alarming
- 32-Point linearization, square root or exponential linearization
- Multi-pump alternation control
- Supports total, grand total or non-resettable grand total
- 9-digit totalizer with total overflow feature
- Large dual-line, 6-digit display
- Configure, monitor, and datalog from a PC
- Dual-input option with math functions: addition, difference, average, multiplication, division, minimum, maximum, weighted average, ratio, concentration

Application

The RD300 is a remote display for level, flow, pressure, weighing, and other process instruments. This display also acts as a multi-purpose, easy to use rate/totalizer ideal for flow rate, total, and control applications.

Data can be remotely collected, logged and presented on your local computer using the free RD software available via USB drive.

The display accepts a single or dual input of current and voltage. This makes the RD300 an ideal fit for use with most field instruments.

The RD300 can be set up as a standard panel mount, or combined with optional enclosures to allow it to house up to 6 displays.

- Key Applications: tank farms, pump alternation control, local or remote display of level, flow, pressure and weighing instrument values, PC monitoring and data logging with RD Software.

Selection and ordering data

		Article No.	
SITRANS RD300 Display		7ML5744- ● ● ● ● ● - 0 A	
Remote digital panel mount process display with current or voltage inputs.			
Two input, multi-line display, totalizer and pump control.			
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.			
Input voltage			
85 ... 265 V AC, 50/60 Hz; 90 ... 265 V DC, 20 W max.		1	
12 ... 36 V DC; 12 ... 24 V AC, 6 W max.		2	
Output			
None		A	
2 Relays		B	
4 Relays		C	
4 ... 20 mA output		D	
2 Relays and 4 ... 20 mA output		E	
4 Relays and 4 ... 20 mA output		F	
Type			
Single input process and flow rate/totalizer Mtr		A	
Dual input process Mtr		B	
Display			
Standard			0
SunBright			1
Approvals			
UL, cUL, and CE			0

Selection and Ordering data	Article No.
Operating Instructions	
All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation	
Accessories	
DIN-Rail Mounting Kit	7ML1930-6AB
4 Relays Expansion Module	7ML1930-6AC
4 Digital I/O Module	7ML1930-6AD
Dual output 4 ... 20 mA expansion module for dual input meter	7ML1930-6AP
Meter Copy Cable	7ML1930-6AE
RD300 RS 232 Serial Adapter	7ML1930-6AF
RD300 RS 422/485 Serial Adapter	7ML1930-6AG
RD300 USB Serial Adapter	7ML1930-6AJ
USB to RS 232 Converter	7ML1930-6AK
RS 232 to RS 422/485 isolated converter	7ML1930-1BU
RS 232 to RS 422/485 non-isolated converter	7ML1930-1BV
USB to RS 422/485 isolated converter	7ML1930-1BX
USB to RS 422/485 non-isolated converter	7ML1930-1BY
Snubber	7ML1930-6AL
Plastic enclosure	
For 1 meter	7ML1930-6AM
For 2 meters	7ML1930-6AN
For 4 meters	7ML1930-1CK
For 5 meters	7ML1930-1CL
For 6 meters	7ML1930-1CM

Supplementary components

Displays

SITRANS RD300

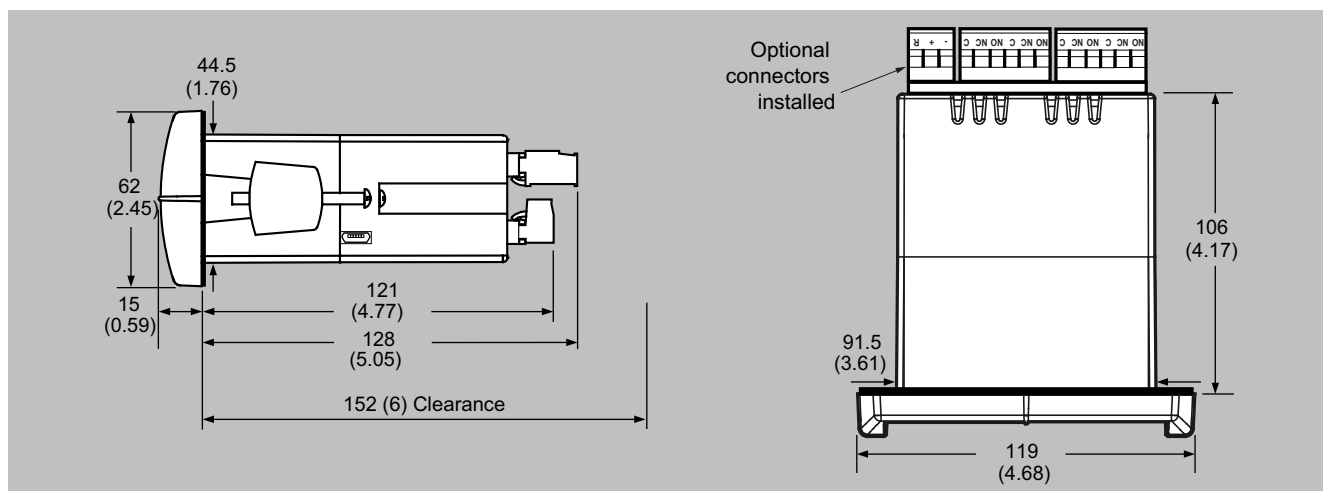
Technical specifications

SITRANS RD300	
Mode of operation	
Measuring principle	Analog to digital conversion
Measuring points	1 or 2 instruments
Input	
Measuring range	
• Current	4 ... 20 mA, 0 ... 20 mA
• Voltage	0 V DC ... +10 V DC, 1 ... 5 V, 0 ... 5 V
Output signal	
Output	<ul style="list-style-type: none"> 4 ... 20 mA (optional) Modbus RTU
Relays	2 or 4 SPDT (Form C) internal and/or 4 SPST (Form A) external; rated 3 A at 30 V DC and 125/250 V AC resistive load; 1/14 HP (50 W) at 125/250 V AC for inductive loads (optional)
Communications	<ul style="list-style-type: none"> RS 232 with Modbus RTU RS 422/485 with Modbus RTU USB configuration and monitoring port
Accuracy	
4 ... 20 mA optional output	± 0.1 % FS ± 0.004 mA
Process input	± 0.05 % of span ± 1 count, square root: 10 ... 100 % FS
Rated operating conditions	
Ambient conditions	
• Storage temperature range	-40 ... +85 °C (-40 ... +185 °F)
• Operating temperature range	-40 ... +65 °C (-40 ... +149 °F)
Design	
Weight	269 g (9.5 oz) (including options)
Material (enclosure)	<ul style="list-style-type: none"> 1/8 DIN, high impact plastic, UL94V-0, color: gray Optional plastic, steel and stainless steel (Type 304, EN 1.4301) NEMA 4 enclosures
Degree of protection	Type 4X, NEMA 4X, IP65 (front cover); panel gasket provided
Electrical connection	
mA output signal	2-core copper conductor, twisted, shielded, 0.82 ... 3.30 mm ² (18 ... 12 AWG), Belden 8 760 or equivalent is acceptable
Electrical connection and relay connection	Copper conductor according to local requirements, rated 3 A at 250 V AC
Power supply	
Input voltage option	85 ... 265 V AC, 50/60 Hz; 90 ... 265 V DC, 20 W max. or jumper selectable 12/24 V DC ± 10 %, 15 W max.
Transmitter power supply	Terminals P+ & P-: 24 V DC ± 10 %, 12/24 V DC powered models selectable for 24, 10, or 5 V DC supply (internal jumper J4), 85 ... 265 V AC models rated at 200 mA max, 12/24 V DC powered models rated at 100 mA max., at 50 mA max. for 5 or 10 V DC supply.
External loop power supply	35 V DC max.
Output loop resistance	<ul style="list-style-type: none"> 24 V DC, 10 ... 700 Ω max. 35 V DC (external), 100 ... 1 200 Ω max.
Displays and controls	
Main display	0.6 inch (15 mm) high, red LEDs
Second display	0.46 inch (12 mm) high, red LEDs, 6-digits; each (-99 999 ... 999 999)
Memory	<ul style="list-style-type: none"> Non-volatile Stores settings for minimum of 10 years if power is lost
Programming	<ul style="list-style-type: none"> Primary: front panel Secondary: Meter Copy or PC with SITRANS RD Software
Certificates and approvals	CE, UL, cUL

Technical specifications (continued)

SITRANS RD300	
Options	
Enclosures	Plastic, steel and stainless steel (Type 304, EN 1.4301) NEMA 4 and 4X enclosures

Dimensional drawings



SITRANS RD300, dimensions in mm (inch)

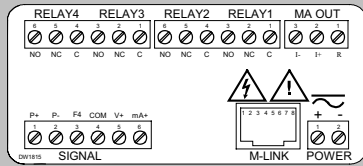
Supplementary components

Displays

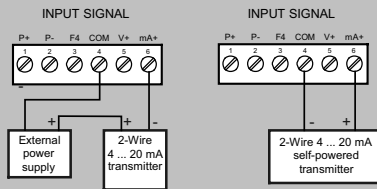
SITRANS RD300

Circuit diagrams

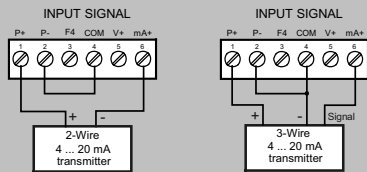
Connector labeling for fully loaded single input meter



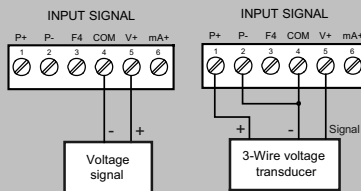
Transmitter powered by external supply or self-powered



Transmitter powered by internal supply

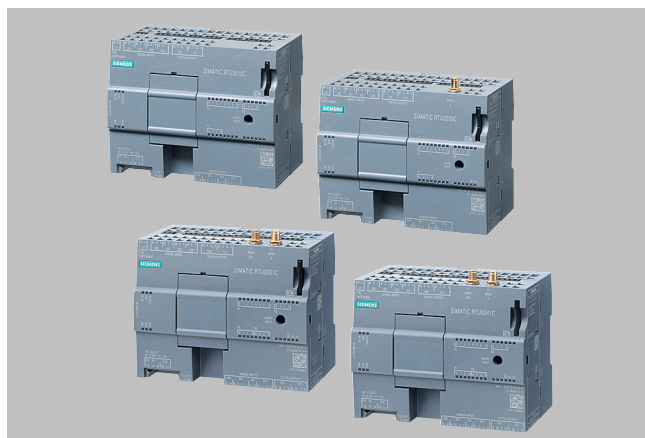


Voltage Input Connections



SITRANS RD300 connections

Overview



The devices of the RTU3000C family are compact RTUs (Remote Terminal Units) for applications with their own power supply. They are particularly suited for monitoring and control of external stations that are not connected to an energy supply network. The RTUs can independently collect data from connected sensors with time stamps, preprocess the data, and transfer it to a control center. The RTU3000C is supplied with power by a battery, an accumulator or a solar panel or by a 12 ... 24 V DC power supply unit. The devices of the RTU3000C series are characterized by the following properties:

- Worldwide data exchange between a remote measuring point and a control center via public or private networks (WAN), e.g. mobile networks, internet
- Communication with a control center (telecontrol center) with the help of the DNP3, IEC 60870-5-104 or SINAUT ST7 telecontrol protocols
- Connection to a control center with TeleControl Server Basic
- Connection to a cloud system via MQTT
- Acquisition of process signals, alarms, count pulses, measured values or output of switching commands by means of integrated inputs as well as digital inputs and outputs
- Preprocessing of the acquired signals by a variety of function/program blocks
- FTP client functionality for transmitting data to an FTP server
- Time synchronization
 - On the basis of NTP (Network Time Protocol)
 - By means of the partner in the control center
 - Via the mobile radio network (RTU3030C, RTU3031C and RTU3041C)
 - Via GPS (RTU3031C and RTU3041C)
- Automatic alarm transmission per email or text message
- Use as data logger by saving the process values to SD card
- Data buffering in the substations in the event of connection failures
- LED signaling for fast diagnostics
- Compact industrial enclosure in S7-1200 design for mounting on a standard DIN rail
- Use in harsh environment thanks to extended temperature range from -40 to +70 °C and IP68 protection thanks to optional protective enclosure
- Fast commissioning thanks to easy configuration using the integrated web server

Overview (continued)

Additional RTU3030C and RTU3031C features:

- Integrated UMTS modem for global wireless data exchange between a remote measuring point and a control center based on the mobile wireless standard UMTS (Universal Mobile Telecommunications System) with data transfer rates of up to 21 Mbps in the downlink (HSDPA) and 5.76 Mbps in the uplink (HSUPA)
- UMTS operation with fixed or dynamic IP addresses, depending on telecommunication contract
- Time synchronization over the mobile network
- Wake-up of station from hibernation mode by means of text message or call

Additional RTU3031C features as compared to RTU3030C:

- Support for 4 additional digital outputs designed as solid-state relays
- GPS antenna connection option for localization and time synchronization
- Function block for comparison of the setpoint/actual position

For RTU3041C:

- Integrated modem for global wireless data exchange between a remote measuring point and a control center on the basis of the LTE-M and NB-IoT mobile wireless standards.
 - With the sole exception of the mobile radio interface, the further functional scope corresponds with that of the RTU3031C. Note that not all network operators for LTE-M and NB-IoT support the text messaging (SMS) function.
- Additional functions with firmware V5.0
- Connection to cloud systems via MQTT, for example to MindSphere, MS Azure, AWS (Amazon) or IBM Cloud
 - Support for MQTT publish/subscribe mechanisms for sending topics from the RTU3000C to the cloud (publish) and receiving topics from the cloud (subscribe).
 - To facilitate commissioning, RTU3000C supports DCP (Discovery and Configuration Protocol).
 - To accelerate firmware updates, the firmware can be upgraded directly via the SD card without using the WBM as of installed V5.0.

Additional functions with firmware V4.0

- Only for RTU3041C: Power saving function eDRX (Extended Discontinuous Reception) for LTE-M and NB-IoT mobile networks, in order to reduce power consumption.
- Function block "Formula": The function block calculates the result of the specified mathematical or Boolean expression, depending on as many as four input variables.

Additional functions with firmware V3.1

- Connection of sensors via Modbus RTU (as of firmware V3.0) or HART Multidrop (as of V3.1) via the optional Extension Board HART/RS485
- Remote access to HART devices on the Extension Board HART/RS485 via SIMATIC PDM
- Remote access to Modbus devices on the Extension Board HART/RS485 via SIMATIC PDM
- Connection of the RTU3000C to a redundant DNP3 Master
- Local logging of Security and Audit events
- Central logging of Security and Audit events using syslog
- Increase the quantity structure of the function blocks and flags
- More efficient encryption mechanisms with TLS connections for HTTPS, Mail, FTP, DynDNS and VPN product versions

Product versions

Different product versions are offered for the various applications:

Supplementary components

Remote Terminal Unit

SIMATIC RTU3000C

Overview (continued)

• SIMATIC RTU3010C

Compact RTU for variable power supply using batteries, rechargeable batteries, solar or 10.8 V DC to 28.8 V DC for connection to external industry routers; connection via TeleControl Basic, DNP3, IEC60870-5-104 or SINAUT ST7 as well as MQTT protocols, on-board I/O (8 DI, 4 DQ, 4 AI), configuration and diagnostics via web interface

• SIMATIC RTU3030C

Compact RTU for variable power supply using batteries, rechargeable batteries, solar or 10.8 V DC to 28.8 V DC with integrated UMTS modem; connection via TeleControl Basic, DNP3, IEC60870-5-104 or SINAUT ST7 as well as MQTT protocols, on-board I/O (8 DI, 4 DQ, 4 AI), configuration and diagnostics via web interface; note country approvals.

• SIMATIC RTU3031C

Compact RTU for variable power supply using batteries, rechargeable batteries, solar or 10.8 V DC to 28.8 V DC with integrated UMTS modem; GPS functionality; connection via TeleControl Basic, DNP3, IEC60870-5-104 or SINAUT ST7 as well as MQTT protocols, on-board I/O (8 DI, 8 DQ, 4 AI), configuration and diagnostics via web interface; note country approvals.

• SIMATIC RTU3041C

Compact RTU for variable power supply using batteries, rechargeable batteries, solar or 10.8 V DC to 28.8 V DC with integrated modem for LTE-M/NB-IoT; GPS functionality; connection via TeleControl Basic, DNP3, IEC60870-5-104 or SINAUT ST7 as well as MQTT protocols, on-board I/O (8 DI, 8 DQ, 4 AI), configuration and diagnostics via web interface; note country approvals.

In conjunction with the "TeleControl Server Basic" control center software, the RTU3000C forms a telecontrol system with additional properties:

- Connection of up to 5000 remote terminal units to the control center via OPC UA
- Central status monitoring of the substations
- No special provider services required for fixed IP addresses
- Wireless teleservice access to the substations
- Wake-up of substations by calling or text message

Together with MQTT, the application possibilities are expanded to include cloud applications. In addition to monitoring process data and visualization of process states of the RTUs in a telecontrol system, all the advantages of cloud systems are made available in this way:

- Improvement of process quality and detection of malfunctions through (big) data analysis of all relevant parameters, predictive maintenance
- Automatic process optimization by combining with data from other data sources, e.g. weather data for a preventive adaptation of the process to avoid critical conditions

Benefits



• Flexible location of use

A flexible power supply concept allows for use of the RTU3000C at different measuring points in a widely distributed network, independent of an existing power supply network.

• Rugged hardware

The rugged hardware enables reliable operation even in harsh environments with an increased temperature range (-40 °C to +70 °C).

• Flexible connection to control centers or cloud systems

Thanks to reloadable telecontrol protocols, various applications and connection options to different control centers or cloud systems are supported in one device.

• Fast and flexible data communication

Time- and event-driven communication ensures that the operating personnel is informed immediately and reliably about process alarms, statuses and values.

• Simple and cost-efficient engineering

The integrated web server enables easy configuration using the standard web browser without additional engineering tools.

• Remote access to HART or Modbus devices on the Extension Board HART/RS485 via SIMATIC PDM.

• Fully automatic time stamp

To enable subsequent and correct archiving of process data in the control system, all data frames are time-stamped at their place of origin.

• Automatic buffering of process values

Data is buffered in the substations to prevent it getting lost in case of connection failures.

• Secure data transmission

Use of OpenVPN technology and encrypted email connections ensures secure data transmission. The RTUs also support secure HTTPS access to the web server both over the local Ethernet interface and remotely, e.g. via mobile wireless. In addition, the FTP file transfer can also be carried out with encryption.

• Time not lost in case of a power outage

A buffered real-time clock ensures that the correct time is available even after a power outage.

• Savings on travel and maintenance costs

Thanks to web-based management, configuration, diagnostics, control and monitoring can easily be performed remotely.

Application

The telecontrol stations of the RTU3000C family can be used as a substation (Remote Terminal Unit) in telecontrol applications. Typical application examples include the acquisition of measured values in plants that are spread over large geographical areas (e.g. level monitoring of water tanks in the water/wastewater industry). In addition to these applications, MQTT enables additional uses in the cloud environment.

- Data exchange and centralized data monitoring for automation systems spread over large geographical areas, including integrated GPS positioning functionality for RTU30x1C
- Connection of difficult-to-access external stations without network infrastructure
- Connection of measuring points at locations without power supply infrastructure

These applications can be found in the most diverse industries:

- Water/wastewater treatment plants
 - Detection of leaks or water loss
 - Monitoring of pumping stations, water towers/reservoirs
 - Acquisition and monitoring of level / pressure / flow / temperature
 - Flood protection
- Inventory management – monitoring of levels in tanks and silos
- Agriculture – monitoring of irrigation systems or greenhouses
- Wind power – wind measurement for designing wind turbines
- Control and localization of mobile stations, such as monitoring of navigation buoys

Design

The SIMATIC RTU3000C is a compact module in SIMATIC S7-1200 format:

- Rugged, compact plastic enclosure for the temperature range -40 °C to +70 °C
- Easily accessible connection and diagnostics elements
- Easy mounting on a standard DIN rail
- Four plug-in screw-type terminals for eight digital inputs (push-button/switch/relay contacts) of which the first two inputs can be configured as counter inputs.
- Four plug-in screw-type terminals for four analog inputs: Current / voltage (0/4 ... 20 mA, 0 ... 10 V, 0 ... 5 V) or temperature measurement (Pt1000)
- Two plug-in screw-type terminals for four digital outputs designed as relay contacts
- RTU30x1C: two additional plug-in screw terminals for four additional digital outputs, designed as solid-state relays
- The close-loop (12 V or 24 V can be selected) and switchable controller outputs X10/X11 can be used for the supply of sensors and actuators
- 5-pin, plug-in terminal strip for connection of an 12 ... 24 V DC external supply voltage; connection protected against polarity reversal
- Connection socket for battery module (up to six battery modules can be connected)
- RJ45 socket for connection to Industrial Ethernet at 10/100 Mbps
- Pushbutton for the functions wake-up, shutdown, warm restart or reset to factory settings
- Slot for an SD card (Siemens SMC, SD or SDHC)
- Installed temperature sensor for monitoring of temperature inside enclosure

RTU3030C and RTU30x1C additions:

- SMA antenna port for mobile network antenna
- Slot for a mini SIM card

RTU30x1C additions:

- Antenna port for GPS antenna
- Support for 4 additional digital outputs designed as solid-state relays

The remote terminal units of the RTU3000C family can be used in stand-alone operation. The power supply can take place in independent operation by means of battery / accumulator / solar panel. The optional batteries are connected directly on the left side of the device without additional wiring. The power can also be supplied by a 5-pin terminal strip on the bottom of the module, even in combination with battery modules. The SD card tray is located on the front of the module. Removable screw-type terminals make for quick module replacement because the connected sensors must not be wired again.

Supplementary components

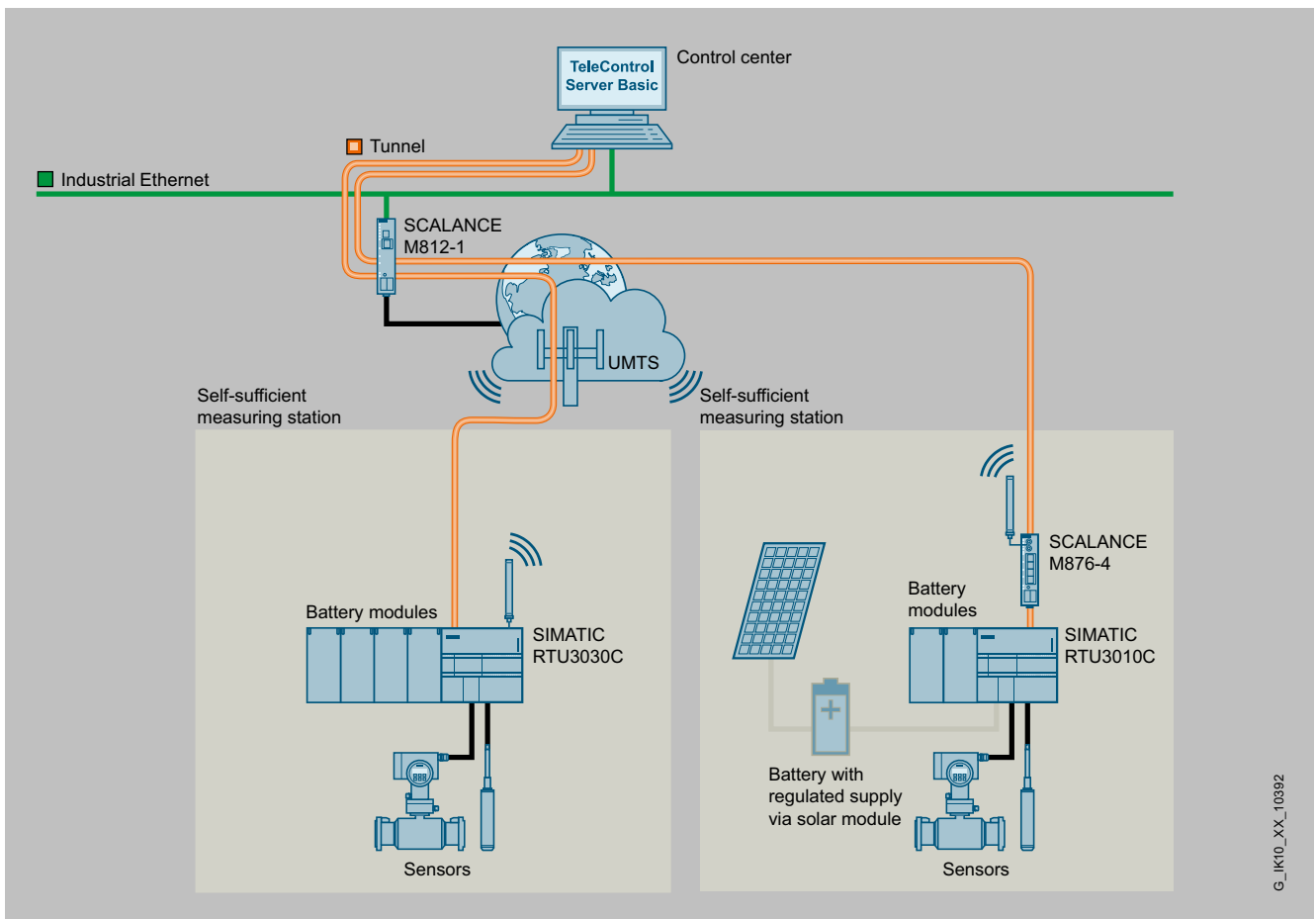
Remote Terminal Unit

SIMATIC RTU3000C

Function

The devices of the RTU3000C family are compact telecontrol stations. They enable connection of remote measuring points to TeleControl Server Basic or another control center as well as a cloud system and monitoring of these measuring points. To ensure autonomous operation, the devices can also switch between four different operating modes:

- **Hibernation mode**
All inputs and communication functions are turned off so that power consumption is minimal. Outputs can retain their last value.
- **Update mode**
Used to query the inputs and outputs. The query cycle can be configured individually.
- **Communication mode**
Mobile wireless connection or connection via LAN interface and external router and communication to the central office are active.
- **Service mode**
Maintenance work can take place without loss of data.



Connection of the SIMATIC RTU3030C to TeleControl Server Basic

Energy-independent mode

The RTU3000C stations can be operated in energy saving mode. Depending on the communication requirements and the connected type of power supply (e.g. battery, solar accumulator), independent operation can thus be guaranteed for many years to come. Power consumption can be determined by the RTU (from hardware level V2) for the diagnostics and prognosis of the battery life. The determined value can be logged and transferred to the control center.

Data backup

Data losses are prevented by the data buffering mechanisms integrated in the product. In the event of a connection failure, time-stamped frames are buffered in the device. When the connection returns, the buffered values are automatically transferred to the control center in the right order.

Data logging

The RTU3000C stations support the backup of process data on SD card. The retentively saved data can be sent cyclically by email and/or FTP or, if necessary, be downloaded directly using web-based management (WBM).

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Function (continued)**Data point configuration**

For data point configuration, the RTUs supports a series of data point types: Digital input, digital output, analog input, counter input. The data points can be configured with little effort using the web pages of the RTU3000C stations. A cyclic and/or event-controller transfer of measured values, setpoints or alarms can thus be implemented in just a few steps.

Data preprocessing

Ready-to-use function and program blocks enable data preprocessing directly in the RTU. The process data can be linked by means of process blocks for basic control jobs.

Up to 44 different types are supported in the following groups:

- Blocks for logical functions (e.g. AND, OR)
- Blocks for time functions (e.g. ON and OFF delay, astronomical clock)
- Blocks for analog value functions (e.g. threshold value monitoring)
- Counter blocks: Featuring the retentivity option, which saves the current count value during restarting and reconfiguration so that it is not lost.
- Analog and digital bit memories for buffering calculation results
- Blocks for messages (text messages, email)
- Block for FTP file transfer
- Relay blocks (latching relay, pulse relay)
- Blocks for silo volume calculation
- Block for rectangular weir overflow calculation
- "Formula" function block for evaluation of mathematical and Boolean expressions of up to four input variables.

Time synchronization

The RTUs support time synchronization and therefore ensure that historical data is given the correct time stamp. The following synchronization mechanisms are available: via NTP, the remote control center, mobile radio and GPS, depending on type of RTU.

Alarms sent by email or text message

Alarm emails or, in the case of RTU3030C and RTU3031C, alarm text messages can be configured for timely communication of station statuses to service and maintenance personnel. If previously defined events (such as threshold violation) should occur, application-specific information is sent automatically by email or SMS (directly or via the connected router).

Note that not all network operators for LTE-M and NB-IoT (RTU3041C) support the text messaging (SMS) function.

GPS position (RTU30x1C)

The function block checks whether a predefined setpoint position has been reached.

The actual position can also be transferred to the control center as a tag.

Telecontrol communication using standard protocols

For communication with the control center, the RTUs support the DNP3, IEC 60870-5-104 and SINAUT ST7 telecontrol protocols. The RTUs act as a DNP3 station, as an IEC slave or, in the case of SINAUT ST7, as a station connected to an ST7 node station, e.g. TIM 1531 IRC. The RTUs can also be connected to the TeleControl Server Basic (TCSB). TCSB enables a connection to any control center software, e.g. WinCC V7 or via any OPC UA-capable client. With MQTT, all the advantages of cloud systems can be used.

Remote maintenance

The RTU3000C stations provide remote maintenance access via WBM for access from the control center. The RTU3030C or RTU3031C can be woken from hibernation mode via text message or a call. When using the "TeleControl Basic" communication protocol, the wake-up text message can be generated in the CMT of TCSB.

Security mechanisms

Access to the RTU3000C stations requires an authorization. Up to 20 authorized email addresses or phone numbers can be defined in the WBM for e-mail and SMS messages. Data is sent through an OpenVPN tunnel or a secure tunnel of the TeleControl Server Basic. Email messages can be encrypted (support of STARTTLS). FTP uploads can be performed encrypted via SSL with FTPS.

Diagnostics

The RTU3000C provides comprehensive diagnostic options for a quick and informative analysis of the station status. Basic diagnostic information, such as the status of the power supply, the communication connection and the inputs and outputs are signaled directly to the RTU by LEDs. The current status of the LEDs can also be retrieved through WBM.

Using the web server, comprehensive information can be retrieved, such as facts about the connection history, buffer status, and the transferred measured values.

Furthermore, up to four new, freely definable tag tables are available in which an independent overview of all required tags can be composed to provide a display of all significant process values at a glance. The categorized user administration (Admin and User) ensures that only authorized persons are given access.

Supplementary components

Remote Terminal Unit

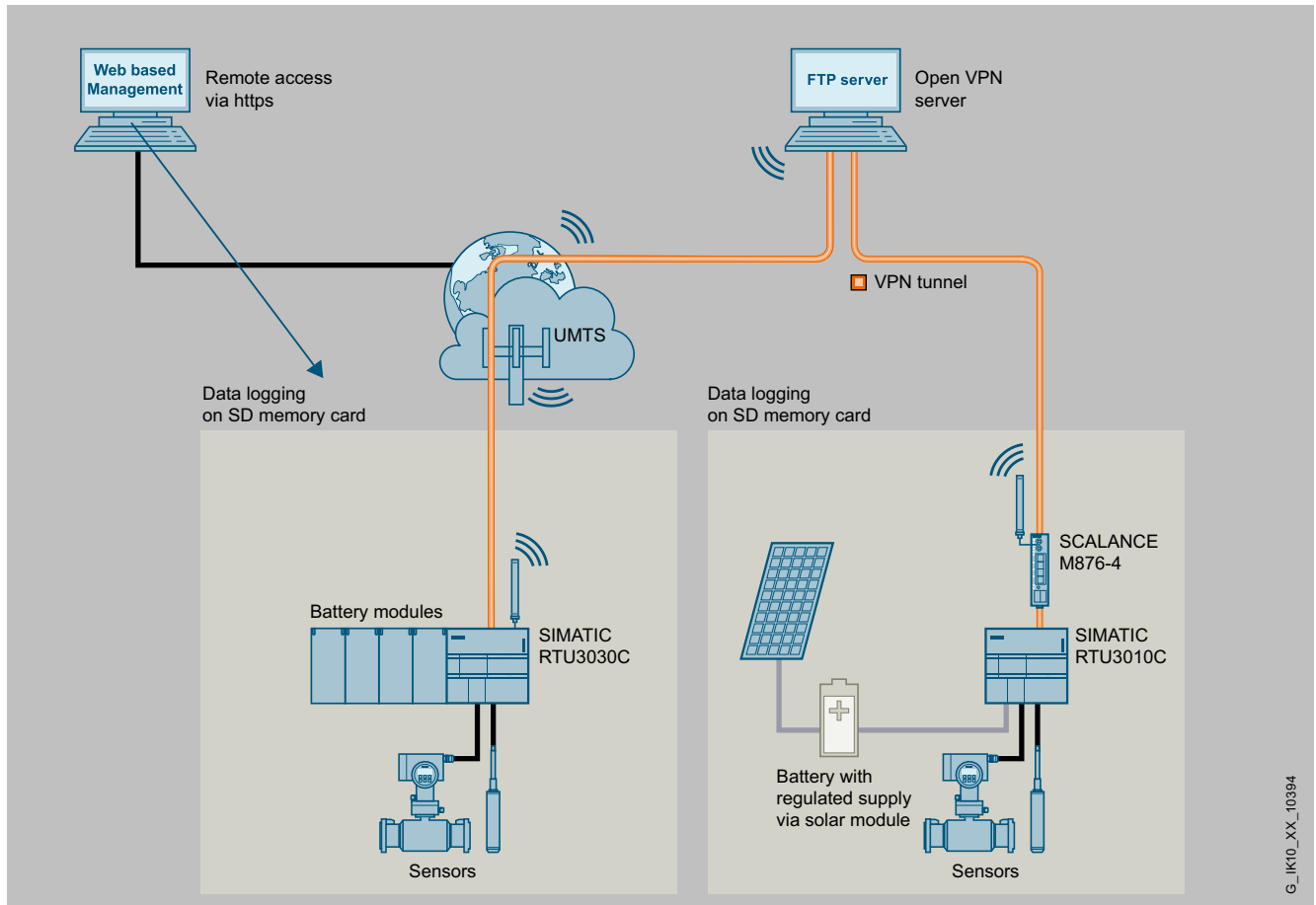
SIMATIC RTU3000C

Function (continued)

Configuration over web server

The integrated web server is accessed locally for diagnostics from a PC or remotely via the mobile wireless interface or Ethernet interface with upstream industrial router. Configuration, firmware update or configuration changes can therefore be performed remotely without additional software thereby saving time and money.

Integration



Example of configuration for data logging with RTU3000C

Selection and ordering data

	Article No.
SIMATIC RTU3010C ¹⁾ Compact low-power RTU; battery or solar-powered; connection of external power supply 10.8 V DC to 28.8 V DC; connection of external modems; connection to TeleControl Server Basic, DNP3, IEC 60870-5-104 or SINAUT ST7 as well as MQTT; on-board I/Os: 8 DI, 4 DQ, 4 AI; FTP client; configuration/diagnostics via web server; time synchronization; email; SD card slot.	6NH3112-0BA00-0XX0
SIMATIC RTU3030C ¹⁾ Compact low-power RTU; battery or solar-powered; connection of external power supply 10.8 V DC to 28.8 V DC; integrated UMTS modem; connection to TeleControl Server Basic, DNP3, IEC 60870-5-104 or SINAUT ST7 as well as MQTT, on-board I/Os: 8 DI, 4 DQ, 4 AI; FTP client; Ethernet port; configuration / diagnostics via web server, time synchronization, text message, email, SD card slot, note country approvals.	6NH3112-3BA00-0XX0
SIMATIC RTU3031C ¹⁾ Compact low-power RTU; battery or solar-powered; connection of external power supply 10.8 V DC to 28.8 V DC; integrated UMTS modem; GPS; connection to TeleControl Server Basic, DNP3, IEC 60870-5-104 or SINAUT ST7 as well as MQTT, on-board I/Os: 8 DI, 8 DQ, 4 AI; FTP client; Ethernet port, configuration / diagnostics via web server, time synchronization, text message, email, SD card slot, note country approvals.	6NH3112-3BB00-0XX0
SIMATIC RTU3041C ¹⁾ Compact low-power RTU; battery or solar-powered; connection of external power supply 10.8 V DC to 28.8 V DC; integrated modem for LTE-M/NB-IoT; GPS; connection to Tele- Control Server Basic, DNP3, IEC 60870-5-104 or SINAUT ST7 as well as MQTT, on-board I/Os: 8 DI, 8 DQ, 4 AI; FTP client; Ethernet port, configuration / diagnostics via web server, time synchron- ization, text message, email, SD card slot, note country approvals.	6NH3112-4BB00-0XX0
HART/RS485 extension board Extension card for low-power RTU3000C family; connection of 8 Modbus RTU slaves or of 8 HART devices in multidrop mode.	6NH3112-3BA00-6XX1

¹⁾ Please note country approvals under
www.siemens.com/mobilenetwork-approvals

Accessories

	Article No.
Battery case for SIMATIC RTU3000C Battery case for mounting of two D cell batteries; suitable for SIMATIC RTU3000C; batteries must be procured externally and are not included in the scope of delivery! Please observe information on the battery type in the Equipment Manual!	6NH3112-3BA00-1XX2
Battery expansion case for SIMATIC RTU3000C Battery expansion case for accommodating two D cell batteries; suitable for SIMATIC RTU3000C; batteries must be procured externally and are not included in the scope of delivery. Please observe information on the battery type in the Equipment Manual!	6NH3112-3BA00-1XX6
Enclosure in IP68 degree of protection For SIMATIC RTU3000C; Note: Cable glands and sealing plugs must be ordered separately in the necessary quantity	
• Aluminum enclosure; Temperature range -40 to +80 °C	6NH3112-3BA00-1XX3
• Stainless steel enclosure Temperature range -60 to +135 °C	6NH3112-3BA00-1XX1
M16 cable gland For IP68 enclosure, temperature range -40 to +100 °C, nickel-plated brass	6NH3112-3BA00-1XX4
Blanking plugs M16 For IP68 enclosure, temperature range -40 to +100 °C, nickel-plated brass	6NH3112-3BA00-1XX5
SIMATIC Memory Card	
4 MB	6ES7954-8LC03-0AA0
12 MB	6ES7954-8LE03-0AA0
24 MB	6ES7954-8LF03-0AA0
256 MB	6ES7954-8LL03-0AA0
ANT896-4MA 2G/3G/4G antenna Omnidirectional antenna for GSM (2G), UMTS (3G) and LTE (4G) networks; omnidirectional characteristic; can be rotated radially with additional joint; with SMA plug for direct mounting on the device; antenna gain 2dBi; IP54	6GK5896-4MA00-0AA3
ANT896-4ME 2G/3G/4G antenna Omnidirectional antenna for GSM (2G), UMTS (3G) and LTE (4G) networks; omnidirectional characteristic; with N-female connector for remote installation indoors and outdoors; antenna gain 3dBi; IP66	6GK5896-4ME00-0AA0
ANT794-4MR antenna Omnidirectional antenna for GSM (2G), UMTS (3G) and LTE (4G) networks; omnidirectional; weatherproof for indoor and outdoor use; 5 m connecting cable with fixed connec- tion to antenna; SMA plug; including mounting bracket, screws, wall plugs	6NH9860-1AA00

Supplementary components

Remote Terminal Unit

SIMATIC RTU3000C

Accessories (continued)

	Article No.
ANT895-6ML GPS antenna ANT895-6ML GPS antenna with integrated signal amplifier, including 0.3 m connecting cable and N-female connector; 3 dBi IP67 (-40 ... +85 °C) mounting with magnet or screw mounting; note country approvals; compact instructions on paper in English/German; scope of delivery: 1x ANT 895-6ML	6GK5895-6ML00-0AA0
SIMATIC NET antenna connection cable N/SMA male/male Flexible antenna connecting cable for connection of antenna and SCALANCE M <ul style="list-style-type: none"> • 0.3 m • 1 m • 2 m • 5 m 	6XV1875-5LE30 6XV1875-5LH10 6XV1875-5LH20 6XV1875-5LH50
SIMATIC NET antenna N-Connect male/male flexible connection cable Flexible cable for connecting an RCoax cable or antenna to a SCALANCE W-700 access point with N-Connect connections; pre-assembled with two N-Connect male connections <ul style="list-style-type: none"> • 1 m • 2 m • 5 m • 10 m 	6XV1875-5AH10 6XV1875-5AH20 6XV1875-5AH50 6XV1875-5AN10
SIMATIC NET N-Connect/ N-Connect female/female panel feedthrough Cabinet bushing for wall thicknesses up to 4.5 mm, two N-Connect female connectors	6GK5798-2PP00-2AA6
LP798-1N lightning protector Lightning protector with N/N female/female connector, IP67 (-40 to +85 °C), frequency range: 0 ... 6 GHz	6GK5798-2LP00-2AA6
SITOP PSU100C 1-phase, 12 V DC/2 A Stabilized power supply Input: 100 ... 230 V AC Output: 12 V DC/2 A	6EP1321-5BA00
SITOP PSU100C 1-phase, 12 V DC/6.5 A Stabilized power supply Input: 100 ... 230 V AC Output: 12 V DC/6.5 A	6EP1322-5BA10
SITOP PSU100C 1-phase, 24 V DC/1.3 A Stabilized power supply Input: 120 ... 230 V AC Output: 24 V DC/1.3 A	6EP1331-5BA10
SITOP PSU100C 1-phase, 24 V DC/2.5 A Stabilized power supply Input: 100 ... 230 V AC Output: 24 V DC/2.5 A	6EP1332-5BA00
SITOP PSU100C 1-phase, 24 V DC/3.7 A Stabilized power supply Input: 100 ... 230 V AC (110 ... 300 V AC) Output: 24 V DC/3.7 A Limited output power NEC class 2	6EP1332-5BA20

Technical specifications

Article number product type designation	6NH3112-0BA00-0XX0 RTU3010C	6NH3112-3BA00-0XX0 RTU3030C	6NH3112-3BB00-0XX0 RTU3031C	6NH3112-4BB00-0XX0 RTU3041C
operating mode	Standby mode (Sleep mode), Actualization mode, Communication mode	Standby mode (Sleep mode), Actualization mode, Communication mode	Standby mode (Sleep mode), Actualization mode, Communication mode	Standby mode (Sleep mode), Actualization mode, Communication mode
transfer rate				
transfer rate				
• for Industrial Ethernet	10 ... 100 Mbit/s	10 ... 100 Mbit/s	10 ... 100 Mbit/s	10 ... 100 Mbit/s
• for GPRS transmission				
• with downlink maximum		85.6 kbit/s	85.6 kbit/s	85.6 kbit/s
• with uplink maximum		107 kbit/s	107 kbit/s	107 kbit/s
• with UMTS transmission				
• with downlink maximum		21 Mbit/s	21 Mbit/s	
• with uplink maximum		5.76 Mbit/s	5.76 Mbit/s	
• for LTE-M transmission				
• with downlink maximum				300 kbit/s
• with uplink maximum				375 kbit/s
• for NB-IoT transmission				
• with downlink maximum				21 kbit/s
• with uplink maximum				62.5 kbit/s
interfaces				
number of interfaces according to Industrial Ethernet	1	1	1	1
number of electrical connections				
• at the 1st interface according to Industrial Ethernet	1	1	1	1
• for external antenna(s)		1	2	2
• for power supply	1	1	1	1
number of slots				
• for SIM cards		1	1	1
• for memory cards	1	1	1	1
type of electrical connection				
• at the 1st interface according to Industrial Ethernet	RJ45 port	RJ45 port	RJ45 port	RJ45 port
type of electrical connection				
• for external antenna(s)		SMA socket (50 ohms)	SMA socket (50 ohms)	SMA socket (50 ohms)
• for power supply	5-pole pluggable terminal block	5-pole pluggable terminal block	5-pole pluggable terminal block	5-pole pluggable terminal block
type of antenna				
• at connection 1 connectable		mobile wireless antenna	mobile wireless antenna	mobile wireless antenna
• at connection 2 connectable			Active GPS antenna	Active GPS antenna
slot version				
• for SIM card				
• of the memory card		Mini SIM card, with adapter Micro SIM card also	Mini SIM card, with adapter Micro SIM card also	Mini SIM card, with adapter Micro SIM card also
storage capacity of the memory card maximum	32 Gbyte	SD 1.0, SD 1.1, SDHC, Siemens SMC	SD 1.0, SD 1.1, SDHC, Siemens SMC	SD 1.0, SD 1.1, SDHC, Siemens SMC
design of the removable storage				
• C-PLUG	No	No	No	No
signal inputs/outputs				
number of electrical connections for digital input signals	8	8	8	8
type of electrical connection for digital input signals	pluggable screw terminal block	pluggable screw terminal block	pluggable screw terminal block	pluggable screw terminal block

Supplementary components

Remote Terminal Unit

SIMATIC RTU3000C

Technical specifications (continued)

Article number product type designation	6NH3112-0BA00-0XX0 RTU3010C	6NH3112-3BA00-0XX0 RTU3030C	6NH3112-3BB00-0XX0 RTU3031C	6NH3112-4BB00-0XX0 RTU3041C
digital input version	Suitable for open-drain transistor or switch, 2-wire-technique	Suitable for open-drain transistor or switch, 2-wire-technique	Suitable for open-drain transistor or switch, 2-wire-technique	Suitable for open-drain transistor or switch, 2-wire-technique
number of electrical connections as counter inputs for digital input signals	2	2	2	2
pulse duration at counter input minimum	0.1 ms	0.1 ms	0.1 ms	0.1 ms
pulse frequency at counter input maximum	5 000 Hz	5 000 Hz	5 000 Hz	5 000 Hz
number of electrical connections for digital output signals	4	4	8	8
type of electrical connection for digital output signals	pluggable screw terminal block	pluggable screw terminal block	pluggable screw terminal block	pluggable screw terminal block
digital output version	bistable relay, 2-wire-technique	bistable relay, 2-wire-technique	4DO bistable relay, 2-wire-technology 4DO solid-state relay	4DO bistable relay, 2-wire-technology 4DO solid-state relay
output current at digital output	300 mA; Limiting continuous current	300 mA; Limiting continuous current	300 mA; Limiting continuous current, with solid-state relays 60 mA	300 mA; Limiting continuous current, with solid-state relays 60 mA
number of analog inputs integrated	4	4	4	4
connector type at the analog input	pluggable screw terminal block	pluggable screw terminal block	pluggable screw terminal block	pluggable screw terminal block
type of analog input	2-/3-/4-wire-technique	2-/3-/4-wire-technique	2-/3-/4-wire-technique	2-/3-/4-wire-technique
product function parameterizable analog inputs	Yes; Current 0/4..20mA, Voltage 0..5/10V, Temperature (Pt1000) -80..+140°C	Yes; Current 0/4..20mA, Voltage 0..5/10V, Temperature (Pt1000) -80..+140°C	Yes; Current 0/4..20mA, Voltage 0..5/10V, Temperature (Pt1000) -80..+140°C	Yes; Current 0/4..20mA, Voltage 0..5/10V, Temperature (Pt1000) -80..+140°C
A/D resolution at the analog input	12 bit	12 bit	12 bit	12 bit
wireless technology				
type of mobile wireless service				
• is supported SMS	No	Yes	Yes	Yes
• is supported GPRS		Yes	Yes	Yes
• note	over external, IP-based router	GPRS (Multislot Class 10)	GPRS (Multislot Class 10)	GPRS (Multislot Class 10)
• is supported LTE-M				Yes
• is supported NB-IoT				Yes
type of wireless network is supported				
• GSM		Yes	Yes	Yes
• UMTS		Yes	Yes	
• LTE		No	No	
operating frequency for GSM transmission		operating frequency for GSM transmission 850 MHz, operating frequency for GSM transmission 900 MHz, operating frequency for GSM transmission 1800 MHz, operating frequency for GSM transmission 1900 MHz	operating frequency for GSM transmission 850 MHz, operating frequency for GSM transmission 900 MHz, operating frequency for GSM transmission 1800 MHz, operating frequency for GSM transmission 1900 MHz	operating frequency for GSM transmission 850 MHz, operating frequency for GSM transmission 900 MHz, operating frequency for GSM transmission 1800 MHz, operating frequency for GSM transmission 1900 MHz

Technical specifications (continued)

Article number product type designation	6NH3112-0BA00-0XX0 RTU3010C	6NH3112-3BA00-0XX0 RTU3030C	6NH3112-3BB00-0XX0 RTU3031C	6NH3112-4BB00-0XX0 RTU3041C
operating frequency with UMTS transmission		operating frequency with UMTS transmission 900 MHz, operating frequency with UMTS transmission 2100 MHz	operating frequency with UMTS transmission 900 MHz, operating frequency with UMTS transmission 2100 MHz	
operating frequency for LTE-M transmission				operating frequency for LTE-M transmission band 1 (2100 MHz), operating frequency for LTE-M transmission band 2 (1900 MHz), operating frequency for LTE-M transmission band 3 (1800 MHz), operating frequency for LTE-M transmission band 4 (1700 MHz), operating frequency for LTE-M transmission band 5 (850 MHz), operating frequency for LTE-M transmission band 8 (900 MHz), operating frequency for LTE-M transmission band 12 (700 MHz), operating frequency for LTE-M transmission band 13 (700 MHz), operating frequency for LTE-M transmission band 18 (850 MHz), operating frequency for LTE-M transmission band 19 (850 MHz), operating frequency for LTE-M transmission band 20 (800 MHz), operating frequency for LTE-M transmission band 26 (850 MHz), operating frequency for LTE-M transmission band 28 (700 MHz)
operating frequency for NB-IoT transmission				operating frequency for NB-IoT transmission band 1 (2100 MHz), operating frequency for NB-IoT transmission band 2 (1900 MHz), operating frequency for NB-IoT transmission band 3 (1800 MHz), operating frequency for NB-IoT transmission band 5 (850 MHz), operating frequency for NB-IoT transmission band 8 (900 MHz), operating frequency for NB-IoT transmission band 12 (700 MHz), operating frequency for NB-IoT transmission band 13 (700 MHz), operating frequency for NB-IoT transmission band 18 (850 MHz), operating frequency for NB-IoT transmission band 19 (850 MHz), operating frequency for NB-IoT transmission band 20 (800 MHz), operating frequency for NB-IoT transmission band 26 (800 MHz), operating frequency for NB-IoT transmission band 28 (700 MHz)
supply voltage, current consumption, power loss				
type of voltage of the supply voltage	DC	DC	DC	DC
supply voltage external at DC	12 ... 24 V	12 ... 24 V	12 ... 24 V	12 ... 24 V

Supplementary components

Remote Terminal Unit

SIMATIC RTU3000C

Technical specifications (continued)

Article number product type designation	6NH3112-0BA00-0XX0 RTU3010C	6NH3112-3BA00-0XX0 RTU3030C	6NH3112-3BB00-0XX0 RTU3031C	6NH3112-4BB00-0XX0 RTU3041C
supply voltage external at DC rated value	10.8 ... 28.8 V	10.8 ... 28.8 V	10.8 ... 28.8 V	10.8 ... 28.8 V
type of output voltage for the supply of external devices	DC 12 V or 24 V	DC 12 V or 24 V	DC 12 V or 24 V	DC 12 V or 24 V
supply voltage for GPS antenna maximum			3.8 V; Nominal 3.8 V (3.575 V @ 5 mA, 3.35 V @ 10 mA, 3.125 V @ 15 mA)	3.8 V; Nominal 3.8 V (3.575 V @ 5 mA, 3.35 V @ 10 mA, 3.125 V @ 15 mA)
consumed current note	without connected consumers	without connected consumers	without connected consumers	without connected consumers
consumed current				
• from external supply voltage at 24 V DC				
• in standby mode typical	14 mA	14 mA	14 mA	14 mA
• in update mode typical	35 mA	35 mA	35 mA	35 mA
• in communication mode typical	55 mA	83 mA	83 mA	83 mA
• with battery operation at 7.2 V DC				
• in standby mode typical	0.28 mA	0.28 mA	0.28 mA	0.28 mA
• in update mode typical	71 mA	71 mA	71 mA	71 mA
• in communication mode typical	125 mA	208 mA	208 mA	208 mA
output current for GPS antenna maximum			15 mA	15 mA
power loss [W]	without connected consumers	without connected consumers	without connected consumers	without connected consumers
power loss [W] with external supply voltage at 24 V DC				
• in standby mode typical	0.34 W	0.34 W	0.34 W	0.34 W
• in update mode typical	0.85 W	0.85 W	0.85 W	0.85 W
• in communication mode typical	1.25 W	2 W	2 W	2 W
power loss [W] with battery operation at 7.2 V DC				
• in standby mode typical	0.002 W	0.002 W	0.002 W	0.002 W
• in update mode typical	0.51 W	0.51 W	0.51 W	0.51 W
• in communication mode typical	0.9 W	1.5 W	1.5 W	1.5 W
ambient conditions				
ambient temperature				
• for vertical installation during operation	-40 ... +60 °C	-40 ... +60 °C	-40 ... +60 °C	-40 ... +60 °C
• for horizontally arranged busbars during operation	-40 ... +70 °C	-40 ... +70 °C	-40 ... +70 °C	-40 ... +70 °C
• during storage	-40 ... +70 °C	-40 ... +70 °C	-40 ... +70 °C	-40 ... +70 °C
• during transport	-40 ... +70 °C	-40 ... +70 °C	-40 ... +70 °C	-40 ... +70 °C
relative humidity				
• at 30 °C without condensation during operation maximum	95 %	95 %	95 %	95 %
protection class IP	IP20; IP68 with protective housing (see accessories)	IP20; IP68 with protective housing (see accessories)	IP20; IP68 with protective housing (see accessories)	IP20; IP68 with protective housing (see accessories)
design, dimensions and weights				
module format	Compact module	Compact module	Compact module	Compact module
width	130 mm	130 mm	130 mm	130 mm
height	100 mm	100 mm	100 mm	100 mm
depth	75 mm	75 mm	75 mm	75 mm
net weight	0.34 kg	0.37 kg	0.37 kg	0.37 kg
fastening method				
• 35 mm top hat DIN rail mounting	Yes	Yes	Yes	Yes
• wall mounting	Yes	Yes	Yes	Yes

Technical specifications (continued)

Article number product type designation	6NH3112-0BA00-0XX0 RTU3010C	6NH3112-3BA00-0XX0 RTU3030C	6NH3112-3BB00-0XX0 RTU3031C	6NH3112-4BB00-0XX0 RTU3041C
product features, product functions, product components general				
product function				
• DynDNS client		Yes	Yes	Yes
• no-ip.com client		Yes	Yes	Yes
product functions cloud connectivity				
protocol is supported				
• Message Queuing Telemetry Transport (MQTT)	Yes	Yes	Yes	Yes
product function for cloud connectivity				
• trigger management	Yes	Yes	Yes	Yes
• time stamping	Yes	Yes	Yes	Yes
product feature for cloud connectivity buffered message frame memory	Yes	Yes	Yes	Yes
performance data				
number of users email addresses definable maximum	20			
number of users/telephone numbers/email addresses definable maximum		20	20	20
number of user groups definable maximum	10	10	10	10
number of program block types	42	43	44	44
number of configurable program blocks	48	48	48	48
number of digital bit memories maximum	40	40	40	40
number of analog bit memories maximum	24	24	24	24
performance data IT functions				
number of possible connections				
• as client by means of FTP maximum	1	1	1	1
number of entries in the FTP buffer maximum	12	12	12	12
number of possible connections				
• as server by means of HTTP maximum	2	2	2	2
• as server by means of HTTPS maximum	2; http and https can be combined (max. number of 2 connections cannot be exceeded).	2; http and https can be combined (max. number of 2 connections cannot be exceeded). Max. one connection via https is possible on the mobile wireless interface.	2; http and https can be combined (max. number of 2 connections cannot be exceeded). Max. one connection via https is possible on the mobile wireless interface.	2; http and https can be combined (max. number of 2 connections cannot be exceeded). Max. one connection via https is possible on the mobile wireless interface.
• as email client maximum	1	1	1	1
number of free texts for emails and SMS maximum	20	20	20	20
number of characters per free text for emails or SMS maximum	160	160	160	160
number of entries in the email buffer maximum	12	12	12	12
performance data telecontrol				
suitability for use				
• node station	No	No	No	No
• substation	Yes	Yes	Yes	Yes
• TIM control center	No	No	No	No
control center connection	IEC 60870-5-104, DNP3-capable control stations, SIN-AUT ST7cc/sc, TeleControl Server Basic	IEC 60870-5-104, DNP3-capable control stations, SIN-AUT ST7cc/sc, TeleControl Server Basic	IEC 60870-5-104, DNP3-capable control stations, SIN-AUT ST7cc/sc, TeleControl Server Basic	IEC 60870-5-104, DNP3-capable control stations, SIN-AUT ST7cc/sc, TeleControl Server Basic

Supplementary components

Remote Terminal Unit

SIMATIC RTU3000C

Technical specifications (continued)

Article number product type designation	6NH3112-0BA00-0XX0 RTU3010C	6NH3112-3BA00-0XX0 RTU3030C	6NH3112-3BB00-0XX0 RTU3031C	6NH3112-4BB00-0XX0 RTU3041C
• by means of a permanent connection	supported	supported	supported	supported
• by means of demand-oriented connection	supported	supported	supported	supported
protocol is supported				
• DNP3	Yes	Yes	Yes	Yes
• IEC 60870-5	Yes	Yes	Yes	Yes
• SINAUT ST1 protocol			No	No
• SINAUT ST7 protocol	Yes	Yes	Yes	Yes
product function data buffering if connection is aborted	Yes; number of telegrams for: IEC 60870: approx. 5,000, DNP3: approx. 10,900, SINAUT ST7: approx. 7,700, TeleControl Server Basic: approx. 10.900	Yes; number of telegrams for: IEC 60870: approx. 5,000, DNP3: approx. 10,900, SINAUT ST7: approx. 7,700, TeleControl Server Basic: approx. 10.900	Yes; number of telegrams for: IEC 60870: approx. 5,000, DNP3: approx. 10,900, SINAUT ST7: approx. 7,700, TeleControl Server Basic: approx. 10.900	Yes; number of telegrams for: IEC 60870: approx. 5,000, DNP3: approx. 10,900, SINAUT ST7: approx. 7,700, TeleControl Server Basic: approx. 10.900
data volume as user data per station in telecontrol mode maximum	256 Kibyte	256 Kibyte	256 Kibyte	256 Kibyte
product feature buffered message frame memory	Yes	Yes	Yes	Yes
performance data teleservice				
diagnostics function online diagnostics with SIMATIC STEP 7	No	No	No	No
product function				
• program download with SIMATIC STEP 7	No	No	No	No
• remote firmware update	Yes	Yes	Yes	Yes
• remote configuration	Yes	Yes	Yes	Yes
product functions management, configuration, engineering				
configuration software				
• required	No, configuration by using the integrated webserver	No, configuration by using the integrated webserver	No, configuration by using the integrated webserver	No, configuration by using the integrated webserver
product function gateway for SIMATIC PDM				
• with Modbus TCP	Yes	Yes	Yes	Yes
• with HART-IP protocol	Yes	Yes	Yes	Yes
product functions diagnostics				
product function web-based diagnostics	Yes	Yes	Yes	Yes
product functions security				
operating mode Virtual Private Network (VPN)	Yes; OpenVPN client	Yes; OpenVPN client	Yes; OpenVPN client	Yes; OpenVPN client
product function with VPN connection	OpenVPN	OpenVPN	OpenVPN	OpenVPN
type of encryption algorithms with VPN connection	AES-128, AES-256	AES-128, AES-256	AES-128, AES-256	AES-128, AES-256
type of authentication procedure with VPN connection	certificate based	certificate based	certificate based	certificate based
type of authentication with Virtual Private Network PSK	No	No	No	No
type of hashing algorithms with VPN connection	SHA-256	SHA-256	SHA-256	SHA-256
number of possible connections with VPN connection	2; one simultaneous productive connection only	2; one simultaneous productive connection only	2; one simultaneous productive connection only	2; one simultaneous productive connection only
product function				
• password protection for Web applications	Yes	Yes	Yes	Yes
• password protection for teleservice access	Yes	Yes	Yes	Yes
• password protection for VPN	Yes	Yes	Yes	Yes
• encrypted data transmission	Yes	Yes	Yes	Yes
• switch-off of non-required services	Yes	Yes	Yes	Yes
• SysLog	Yes	Yes	Yes	Yes

Technical specifications (continued)

Article number product type designation	6NH3112-0BA00-0XX0 RTU3010C	6NH3112-3BA00-0XX0 RTU3030C	6NH3112-3BB00-0XX0 RTU3031C	6NH3112-4BB00-0XX0 RTU3041C
product functions time				
protocol is supported				
• NTP	Yes	Yes	Yes	Yes
product component hardware real time clock	Yes	Yes	Yes	Yes
product feature hardware real time clock w. battery backup	Yes	Yes	Yes	Yes
accuracy of the hardware real time clock per day maximum	1.8 s	1.8 s	1.8 s	1.8 s
time synchronization				
• from NTP-server	Yes	Yes	Yes	Yes
• from GPS-signal			Yes	Yes
• from control center	Yes	Yes	Yes	Yes
• from mobile network provider		Yes	Yes	Yes
• PC	Yes	Yes	Yes	Yes
• manual setting	Yes	Yes	Yes	Yes
product functions position detection				
product function				
• position detection with GPS			Yes	Yes
• pass on position data			Yes	Yes
standards, specifications, approvals hazardous environments				
certificate of suitability CCC for hazardous zone according to GB standard	Yes	Yes	Yes	Yes
• as marking	Ex nA IIC T4 Gc	Ex nA IIC T4 Gc	Ex nA IIC T4 Gc	Ex nA IIC T4 Gc

More information

Technical requirements/compatibility

Corresponding suitable industrial routers (e.g. SCALANCE M) for the connection to the control center via the Ethernet interface of the RTU3000C can be found under Remote Networks - IP-based modems and routers.

Supplementary components

Network transitions

IE/PB LINK

Overview



IE/PB Link HA and IE/PB Link PN IO

IE/PB LINKs are gateways for connecting the two network types, Industrial Ethernet and PROFIBUS, i.e. they enable access to all PROFIBUS stations connected to the lower-level PROFIBUS network.

Product variants

Two variants are offered as gateways for Industrial Ethernet and PROFIBUS:

• IE/PB LINK PN IO

Gateway with PROFINET IO functionality, S7 routing and data record routing for standard ambient conditions

• IE/PB LINK HA

Gateway optimized for use in the process industry due to the possibility of deployment in harsh ambient conditions and the connection of PROFIBUS field devices to a redundant AS as PROFINET IO controller

Both product variants can be used in two operating modes: Standard mode enables, for example, loading of programs and configuration data via PG/OP communication, data record routing for configuration and diagnostics of field devices with the SIMATIC PDM tool, S7 routing e.g. for cross-network loading of SIMATIC PLCs on PROFIBUS.

When operated as a PROFINET IO proxy, from the perspective of the PN IO controller, all PROFIBUS DP slaves connected after the IE/PB LINK are treated as PN IO devices according to the PROFINET standard, i.e. the IE/PB LINK is the proxy of the connected PROFIBUS DP slaves.

Both IE/PB LINK versions offer the possibility to use different transmission media by employing BusAdapters.

Benefits

get Designed for Industry

- Protection of investment due to simple connection of PROFIBUS DP slaves to PROFINET IO controller. This enables a step-by-step transition to modern PROFINET networks
- Independence from individual vendors through support of the PROFINET standard for distributed field devices
- Flexible use due to different connection system and hardware; copper (RJ45, FC) and fiber-optic cables (SCRJ for POF/PCF, LC for glass fiber-optic)
- Also enables use in plants with PROFI-safe applications
- Worldwide access to data of the PROFIBUS stations via Industrial Ethernet and Internet for vertical integration
- Access to process data from all enterprise levels
- Loading of STEP 7 programs from a central location
- Easy engineering and extensive diagnostics options due to optimum TIA integration

IE/PB LINK HA also offers:

- High availability through redundancy mechanisms in PROFINET IO through use as S2 device
- Interruption-free plant operation in the redundant system, even when configuration changes are required during operation, through support for Configuration in Run (H-CiR)
- Easy migration of large PROFIBUS networks to PROFINET by supporting up to 125 PROFIBUS DP slaves
- Reliable operation even in harsh ambient conditions

Application

As an autonomous component, both IE/PB LINK versions provide a seamless transition between Industrial Ethernet and PROFIBUS. Using the IE/PB LINK as a proxy, you can continue to use existing PROFIBUS nodes (even with PROFI-safe functionality V2.0 or higher) and integrate them into a PROFINET application. IE/PB LINK HA additionally offers connection to a redundant PROFINET IO automation system and the functionality Configuration in Run (H-CiR).

Both IE/PB LINK versions also offers cross-network PG/OP communication by means of S7 routing. Cross-network access to data of S7 stations for visualization with S7 OPC server and S7 routing; via the IE/PB LINK, access is possible from the Industrial Ethernet (for example for HMI applications with OPC client interface) to data of the S7 stations on the PROFIBUS using the S7 OPC server. In addition, data record routing (PROFIBUS DP) is supported. This means it is possible, for example, to use SIMATIC PDM (on the PC) on Industrial Ethernet to configure and perform diagnostics for a PROFIBUS field device via the IE/PB LINK. IE/PB LINK HA also designed for use in harsh ambient conditions.

Design

Both IE/PB LINK versions provide all the advantages of the SIMATIC ET 200SP design:

- Compact design; the front of the rugged plastic enclosure features:
 - Two RJ45 ports for connecting to Industrial Ethernet; the connection is made via the IE FC RJ45 plug 90 with 90° cable outlet or via a standard patch cable
 - A 9-pin sub-D socket for connection to PROFIBUS
 - A 4-pin terminal strip for connecting the external redundant supply voltage of 24 V DC (two infeeds)
 - Diagnostics LEDs
- Optional connection possibility for Industrial Ethernet via BusAdapter (BA) of the SIMATIC ET 200SP system at the front
- Easy installation on standard mounting rails
- Can be operated without a fan
- Fast device replacement in the event of a fault by using the optional C-PLUG removable data storage medium (not included in scope of supply)

Function

Compact gateway between PROFINET and PROFIBUS

- Connection to Industrial Ethernet via integrated 2-port real-time switch with 100 Mbps full duplex connection with autosensing for automatic switchover
 - In case of replacement part: Connection to Industrial Ethernet also with 10 Mbps half duplex
 - Connection to PROFIBUS with 9.6 Kbps to 12 Mbps
 - Support for MRP (Media Redundancy Protocol) using integrated Real Time Switch
 - SIMATIC ET 200SP design: Use of the BusAdapter (BA) of the SIMATIC ET 200SP system for freely selecting the connection system and physical characteristics on the PROFINET side
- IE/PB LINK HA also offers
- Use in ambient temperatures from -40 °C to +70 °C
 - Conformal coating
 - Support for enhanced interference immunity according to NAMUR recommendation NE21

Operation as PROFINET IO proxy

- Connection of PROFIBUS DP slaves to PROFINET IO controller with real-time property, according to PROFINET standard. From the viewpoint of the controller, all DP slaves are treated like devices with PROFINET interface, i.e. the IE/PB LINK PN IO is their proxy
- IE/PB LINK HA also offers
- Connection of PROFIBUS DP slaves to a redundant SIMATIC S7 controller (S7-400H) as PROFINET S2 device including support for Configuration in Run (H-CiR)
 - Connection of up to 125 PROFIBUS DP slaves on the single controller and up to 64 PROFIBUS DP slaves in operation as S2 device on the redundant controller

Additional functionality for vertical integration (standard operation or operation as PROFINET IO proxy)

- S7 routing
 - Permits cross-network PG communication, in other words, all S7 stations on Industrial Ethernet or PROFIBUS can be programmed remotely using the programming device.
 - Access can take place to visualization data of S7 stations on the PROFIBUS from HMI stations on Industrial Ethernet.
- Data record routing (PROFIBUS DP)
 - Using this option, the IE/PB LINK PN IO can be used as a router for data records that are forwarded to field devices (DP slaves). SIMATIC PDM (Process Device Manager) is a tool that creates data records of this type for parameterization and diagnostics of field devices.
 - The configuration of the IE/PB LINK PN IO for standard mode is possible via SINEC PNI (Primary Setup Tool Network Initialization) as well as STEP 7 / TIA Portal

The supplementary functions for vertical integration can also be used in an existing PROFIBUS application without PROFINET IO for connection to a higher-level Industrial Ethernet.

In this case, the IE/PB Link PN IO is used as an additional DP master Class 2 on a PROFIBUS segment for coupling to Industrial Ethernet and offers the above functions.

Media redundancy (MRP):

- IE/PB LINK supports the media redundancy protocol MRP as an MRP client within a PROFINET network with a ring topology

Diagnostics

Extensive diagnostic options are available via STEP 7 or SNMP, including:

Supplementary components

Network transitions

IE/PB LINK

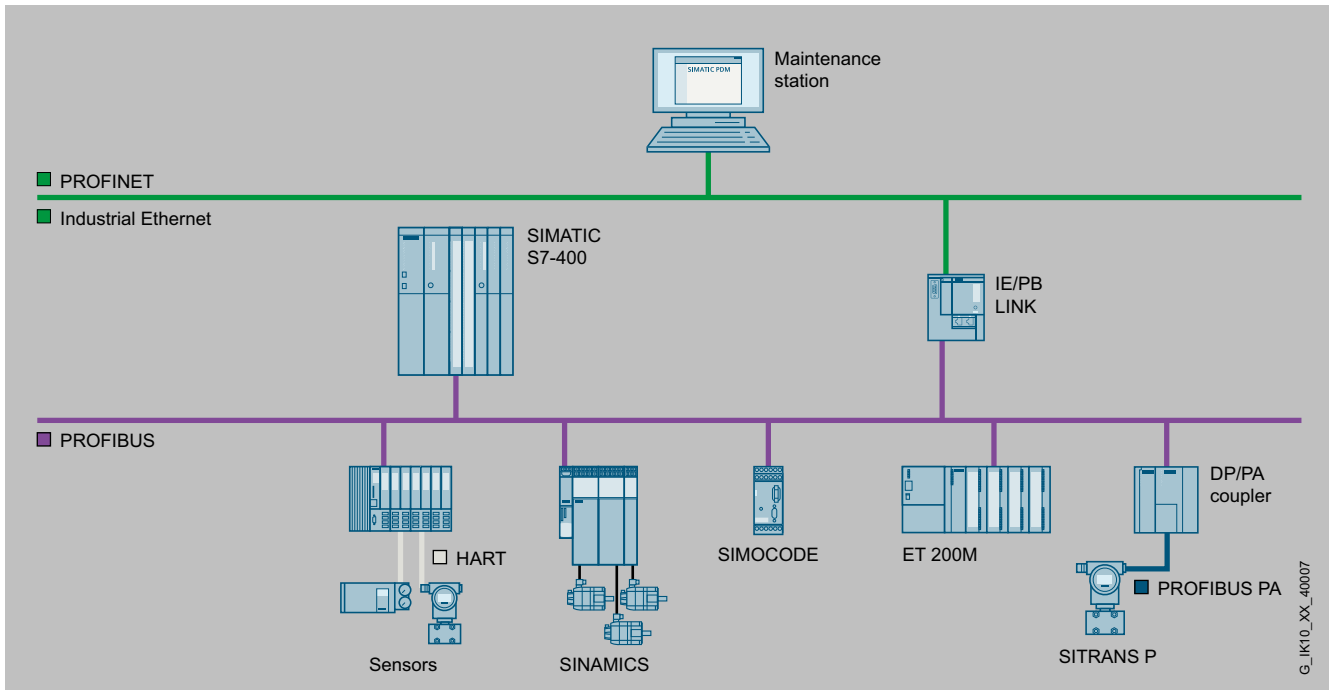
Function (continued)

- Diagnostics of the assigned PROFIBUS field devices; using the IE/PB LINK as a proxy, the connected DP slaves can be diagnosed in the same manner as PROFINET IO devices (even in the user program of the PROFINET IO controller)
- General diagnostics and statistics functions
- Connection diagnostics
- Diagnostic buffer
- Integration into network management systems through the support of SNMP V1 MIB-II

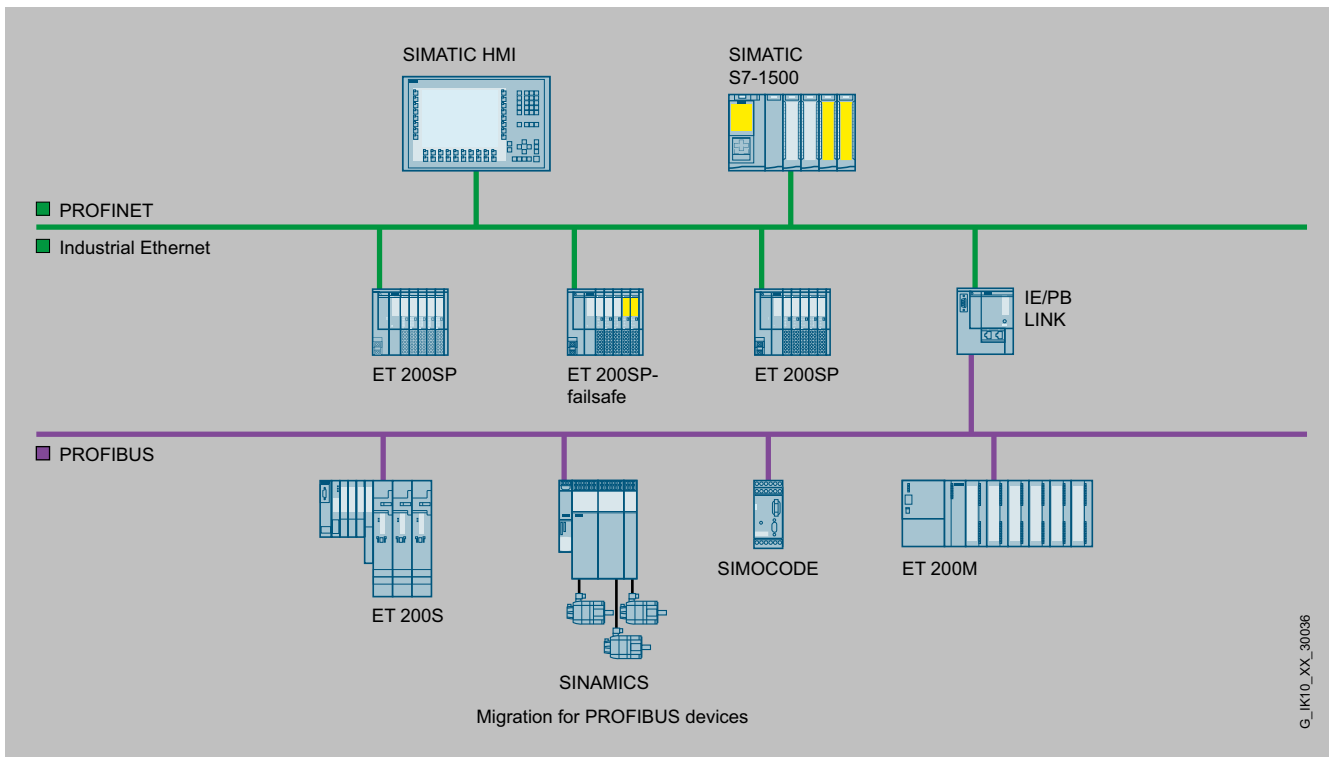
Configuration

- With STEP 7 V5.x or STEP 7 Professional in the TIA Portal, all the necessary parameters for IE/PB Link, e.g. the addresses and all necessary routing information, are generated automatically
- The configuration data for PROFINET IO created with STEP 7 is saved on the IO controller. Attention must however be paid to the memory capacity.
- IE/PB LINK can be swapped in the event of failure without a programming device because the relevant configuration data is saved on the PN IO controller or on the C-PLUG.
- If the IE/PB LINK PN IO is only to be used as a gateway and not as a PROFINET IO device, the IE/PB LINK behaves like a simple network component. Accordingly, the IP and PROFIBUS parameters and the network settings can also be assigned with a STEP 7 Professional (TIA Portal) without a license
- The IP and PROFIBUS parameters as well as the network settings can also be assigned using SINEC PNI
- The initialization data for the Industrial Ethernet interface is backed up on the C-PLUG (configuration plug) removable data storage medium
- Use in networks that support an exchange of devices without programming devices on the basis of the Link Layer Discovery Protocol (LLDP)

Integration



IE/PB LINK: Gateway in standard mode



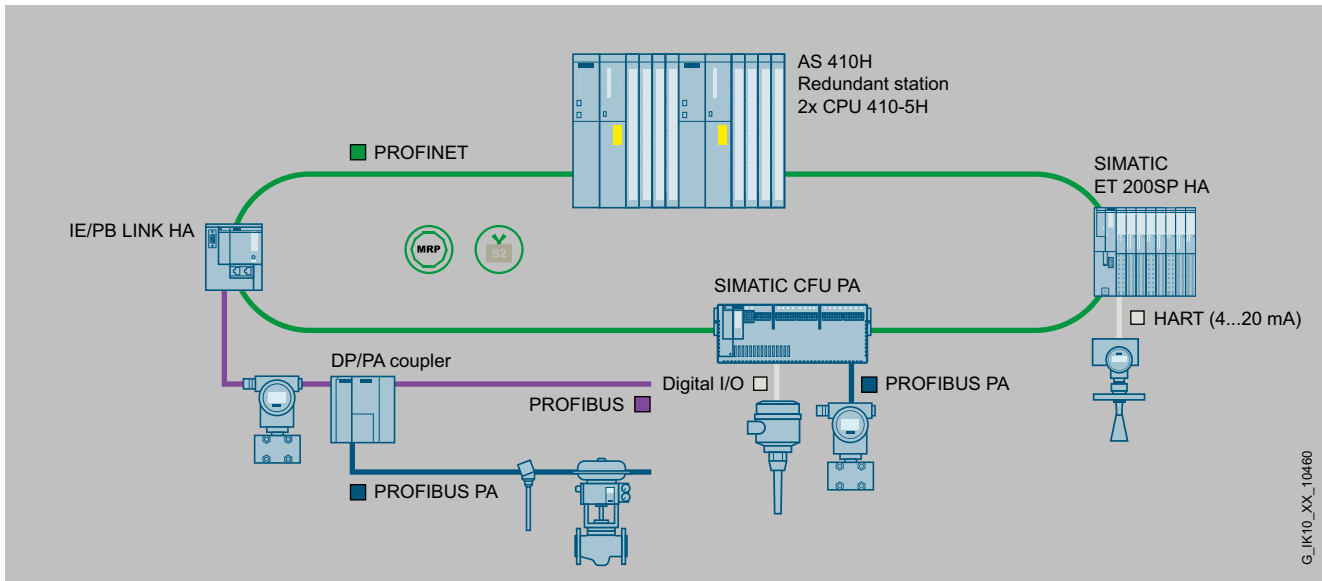
IE/PB LINK: PROFINET IO proxy

Supplementary components

Network transitions

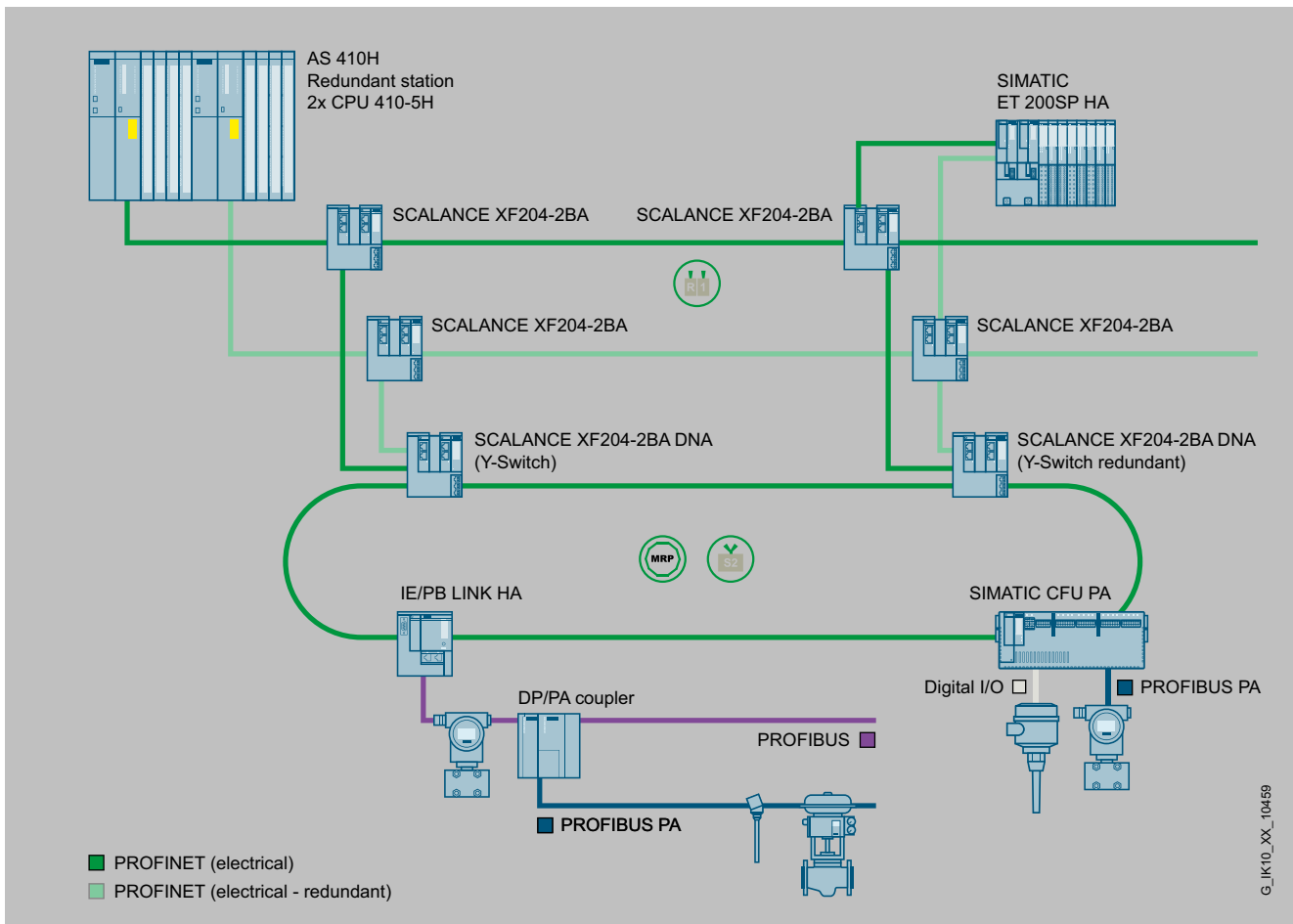
IE/PB LINK

Integration (continued)



G_IK10_XX_10460

IE/PB LINK HA: System redundancy as S2 device in the MRP ring



G_IK10_XX_10469

IE/PB LINK HA: PROFINET system redundancy on R1 system

Selection and ordering data

	Article No.
IE/PB Link PN IO Gateway between Industrial Ethernet and PROFIBUS, PROFINET IO proxy with real-time communication, time synchronization via SIMATIC protocol, NTP, SNMP V1, LLDP, S7 routing, data record routing, connection of up to 64 S7/DPV0/DPV1 slaves, support for DP/PA LINK and DP/FF LINK, 10/100 Mbps Fast Ethernet, MRP, 9.6 kbps up to 12 Mbps PROFIBUS, firmware download via configuration tool, redundant power supply, firmware version V4.0 Gateway	6GK1411-5AB10
IE/PB LINK HA Gateway between Industrial Ethernet and PROFIBUS, PROFINET IO proxy with real-time communication, system redundancy S2, H-CiR, time synchronization via SIMATIC protocol, NTP, SNMP V1, LLDP, S7 routing, data record routing, connection of up to 125 S7/DPV0/DPV1 slaves, support for DP/PA LINK and DP/FF LINK, 10/100 Mbps Fast Ethernet, MRP, 9.6 kbps up to 12 Mbps PROFIBUS, firmware download via configuration tool, redundant power supply, con-formal coating, extended temperature range -40 °C to 70 °C	6GK1411-5BB00
Accessories	
C-PLUG Removable data storage medium for easy device replacement if a fault occurs. For storing configuration and application data. Can be used in the following SIMATIC NET products with C-PLUG slot: SCALANCE XC-200, XP-200, XM-400, XR-500, M-800, W-700, SC-600 and S615	6GK1900-0AB10
BusAdapter BusAdapters offer a free selection of connection system and hardware for the PROFINET interface. Alternatively, they can be used for the Industrial Ethernet interface on the device. The following BusAdapter versions are supported by the IE/PB LINK PN IO: <u>Variants with copper connection (RJ45, FastConnect (FC))</u>	
<ul style="list-style-type: none"> BA 2xRJ45 with 2 RJ45 connections 	6ES7193-6AR00-0AA0
<ul style="list-style-type: none"> BA 2xFC with 2 FastConnect connections 	6ES7193-6AF00-0AA0
<ul style="list-style-type: none"> BA 2xRJ45 HA with 2 RJ45 sockets 	6DL1193-6AR00-0AA0
<ul style="list-style-type: none"> BA 2xFC HA with 2x FastConnect connection 	6DL1193-6AF00-0AA0
<ul style="list-style-type: none"> SIPLUS BusAdapter BA 2xRJ45 with 2 RJ45 connections 	6AG1193-6AR00-7AA0
<ul style="list-style-type: none"> SIPLUS BusAdapter BA 2xFC with 2 FastConnect connections 	6AG1193-6AF00-7AA0

Selection and ordering data (continued)

	Article No.
<ul style="list-style-type: none"> BA 2xRJ45 VD HA BusAdapter VD (variable distance), for Ethernet communication via 2-, 4- or 8-wire copper cables, 2xRJ45 sockets 	6GK5991-2VA00-8AA2
<u>Variants with fiber-optic connection (FOC)</u>	
<ul style="list-style-type: none"> BA 2xLC with LC glass fiber-optic connection 	6ES7193-6AG00-0AA0
<ul style="list-style-type: none"> BA 2xSCRJ with 2 x SCRJ FO connection 	6ES7193-6AP00-0AA0
<ul style="list-style-type: none"> BA 2xLC HA with 2 x LC glass fiber-optic connections 	6DL1193-6AG00-0AA0
<ul style="list-style-type: none"> SIPLUS BusAdapter BA 2xLC with LC glass fiber-optic connection 	6AG1193-6AG00-2AA0
<ul style="list-style-type: none"> SIPLUS BusAdapter BA2SCRJ with 2 x SCRJ FO connection 	6AG1193-6AP00-2AA0
<u>Media converter versions</u>	
<ul style="list-style-type: none"> BA LC/RJ45 Media converter glass fiber-optic cable/CU for 1 x LC FO connection and 1 x RJ45 connection 	6ES7193-6AG20-0AA0
<ul style="list-style-type: none"> BA LC/FC Media converter glass fiber-optic cable/CU 1 x LC FO connection and 1 x RJ45 connection 	6ES7193-6AG40-0AA0
<ul style="list-style-type: none"> BA SCRJ/RJ45 Media converter fiber-optic cable/CU 1 x SCRJ FO connection and 1 x RJ45 connection 	6ES7193-6AP20-0AA0
<ul style="list-style-type: none"> BA SCRJ/FC Media converter fiber-optic cable/CU 1 x SCRJ FO connection and 1 x FastConnect connection 	6ES7193-6AP40-0AA0
<ul style="list-style-type: none"> BA LC/RJ45 HA Media converter glass fiber-optic cable/CU, 1 x LC FO connection and 1 x RJ45 connection 	6DL1193-6AG20-0AA0
<ul style="list-style-type: none"> BA LC/FC HA Media converter glass fiber-optic cable/CU, 1 x LC FO connection and 1 x FastConnect connection 	6DL1193-6AG40-0AA0

Supplementary components

Network transitions

IE/PB LINK

Accessories

C-PLUG

BusAdapters

BusAdapters offer a free selection of connection system and hardware for the PROFINET interface. **Alternatively**, they can be used for the Industrial Ethernet interface on the device.

The following BusAdapter versions are supported by the IE/PB LINK PN IO:

Versions PN copper interfaces (RJ45 or FastConnect (FC))

- **BA 2xRJ45** with 2 RJ45 connections
- **BA 2xFC** with 2 FastConnect connections
- **BA 2xRJ45 HA** with 2 RJ45 sockets
- **BA 2xFC HA** with 2x FastConnect connection
- **BA 2xRJ45 VD HA** with 2 RJ45 connections for variable distance
- **SIPLUS BusAdapter BA 2xRJ45** with 2 RJ45 connections
- **SIPLUS BusAdapter BA 2xFC** with 2 FastConnect connections

Versions with PN fiber-optic connections (FO)

- **BA 2xLC** with two glass fiber-optic connections (Lucent Connector) with increased potential difference
- **BA 2xSCRJ** with 2 SCRJ FO connections with increased potential difference
- **BA 2xLC HA** with LC glass fiber-optic connection
- **SIPLUS BusAdapter BA 2xLC** with LC glass fiber-optic connection
- **SIPLUS BusAdapter BA2SCRJ** with 2 x SCRJ FO connection

Media converter versions:

- **BA SCRJ / RJ45**, with one glass fiber-optic and one RJ45 connection (media converter)
- **BA LC / FC** with one glass fiber-optic and one FastConnect connection (media converter)
- **BA SCRJ / RJ45**, with one SCRJ FO and one RJ45 connection (media converter)
- **BA SCRJ / FC**, with one SCRJ FO and one FastConnect connection (media converter)
- **BA LC/RJ45 HA** with one LC FO connection and one RJ45 connection
- **BA LC/FC HA** with one LC FO connection and one FastConnect connection

The version for connecting IP67 modules of the SIMATIC ET 200AL (BA-SEND, BA 1xFC) is not supported.

Technical specifications

Article number product type designation	6GK1411-5AB10 IE/PB LINK PN IO	6GK1411-5BB00 IE/PB LINK HA
suitability for operation	Gateway between Industrial Ethernet and PROFIBUS	Gateway between Industrial Ethernet and PROFIBUS
transfer rate		
transfer rate		
• at the 1st interface	10 ... 100 Mbit/s	10 ... 100 Mbit/s
• at the 2nd interface	9.6 kbit/s ... 12 Mbit/s	9.6 kbit/s ... 12 Mbit/s
interfaces		
number of electrical connections		
• at the 1st interface according to Industrial Ethernet	2	2
• at the 2nd interface according to PROFIBUS	1	1
• for power supply	2	2
type of electrical connection		
• at the 1st interface according to Industrial Ethernet	RJ45 port onboard or bus adapter	RJ45 port onboard or bus adapter
type of electrical connection		
• at the 2nd interface according to PROFIBUS	9-pin Sub-D socket (RS 485)	9-pin Sub-D socket (RS 485)
• for power supply	4-pole terminal block	4-pole terminal block
design of the removable storage		
• C-PLUG	Yes	Yes
supply voltage, current consumption, power loss		
type of voltage of the supply voltage	DC	DC
supply voltage external at DC rated value	24 V	24 V
relative positive tolerance at DC at 24 V	20 %	20 %
relative negative tolerance at DC at 24 V	15 %	15 %
consumed current		
• from external supply voltage at DC at 24 V typical	0.2 A	0.2 A
• from external supply voltage at DC at 24 V maximum	0.3 A	0.3 A
power loss [W]	4.8 W; Typical	4.8 W; Typical
ambient conditions		
ambient temperature		
• for vertical installation during operation	0 ... 40 °C	-40 ... +50 °C
• for horizontally arranged busbars during operation	0 ... 60 °C	-40 ... +70 °C
• during storage	-40 ... +70 °C	-40 ... +70 °C
• during transport	-40 ... +70 °C	-40 ... +70 °C
relative humidity		
• at 25 °C without condensation during operation maximum	95 %	95 %
protection class IP	IP20	IP20
design, dimensions and weights		
module format	ET 200SP design	ET 200SP design
width	100 mm	100 mm
height	117 mm	117 mm
depth	74 mm	74 mm
net weight	0.6 kg	0.6 kg
product feature conformal coating		Yes
fastening method		
• 35 mm top hat DIN rail mounting	Yes	Yes
performance data PROFIBUS DP		
service as DP master		
• DPV0	Yes	Yes
• DPV1	Yes	Yes
number of DP slaves		
• at the 2nd interface as DP master maximum	64	125

Supplementary components

Network transitions

IE/PB LINK

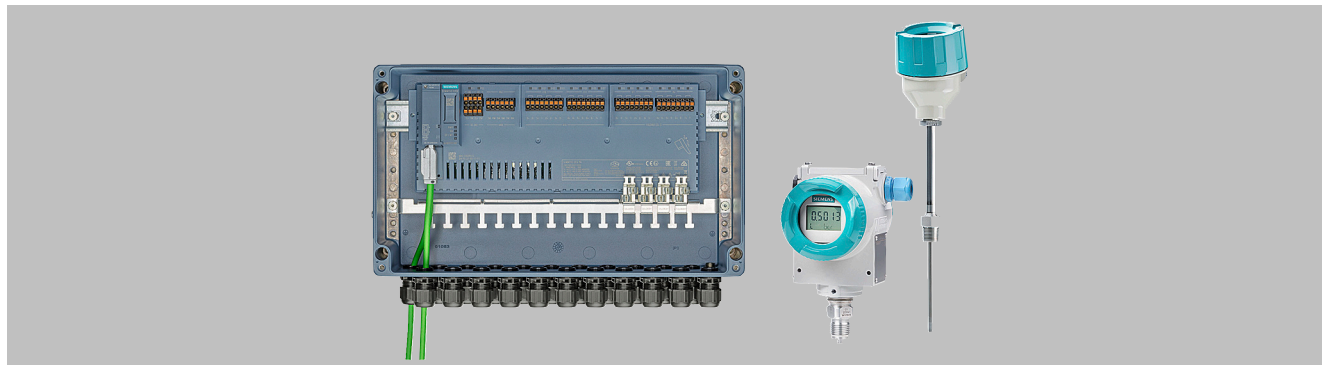
Technical specifications (continued)

Article number product type designation	6GK1411-5AB10 IE/PB LINK PN IO	6GK1411-5BB00 IE/PB LINK HA
data volume		
• of the address range of the inputs as DP master total	2 048 byte	4 096 byte
• of the address range of the outputs as DP master total	2 048 byte	4 096 byte
• of the address range of the inputs per DP slave	244 byte	244 byte
• of the address range of the outputs per DP slave	244 byte	244 byte
performance data S7 communication		
number of possible connections for S7 communication		
• maximum	32	32
performance data multi-protocol mode		
number of active connections with multi-protocol mode	48	48
performance data PROFINET communication as PN IO device		
product function PROFINET IO device	Yes	Yes
product functions management, configuration, engineering		
product function MIB support	Yes	Yes
protocol is supported		
• SNMP v1	Yes	Yes
• DCP	Yes	Yes
• LLDP	Yes	Yes
configuration software		
• required	STEP 7 as of V5.5 SP4 HF11 and HSP, STEP 7 Professional as of V15, PCS7 V9.0, PCS neo as of V3.0, PNI as of V1.0	STEP 7 as of V5.6 SP2 HF3 and HSP, STEP 7 Professional probably as of V17, PCS7 as of V9.0 SP3, PNI as of V1.0.
identification & maintenance function		
• I&M0 - device-specific information	Yes	Yes
• I&M1 - higher level designation/location designation	Yes	Yes
• I&M2 - installation date	Yes	Yes
• I&M3 - comment	Yes	Yes
product functions routing		
service as PROFIBUS data set routing	Yes	Yes
number of possible connections with data set routing maximum	32	32
product functions redundancy		
product function		
• ring redundancy	Yes	Yes
product function		
• of the PROFINET IO device is supported PROFINET system redundancy	No	Yes; as S2-Device at CPU 410-5 H and S7 400H
protocol is supported Media Redundancy Protocol (MRP)	Yes	Yes
product functions time		
product function pass on time synchronization	Yes	Yes
protocol is supported		
• NTP	Yes	Yes
• SIMATIC time synchronization (SIMATIC Time)	Yes	Yes
standards, specifications, approvals hazardous environments		
certificate of suitability CCC for hazardous zone according to GB standard	Yes	Yes
• as marking	Ex nA IIC T4 Gc	Ex nA IIC T4 Gc
accessories		
accessories	Optional: C-PLUG, BusAdapter of the ET 200SP system	Optional: C-PLUG, BusAdapter of the ET 200SP system

More information

<http://www.siemens.com/profinet>

Overview

**Smart Field Distributor – SIMATIC Compact Field Unit**

With the new SIMATIC Compact Field Unit (CFU), we are re-interpreting the conventional approach to field device connection. The smart field distributor is installed at the process level and is connected via PROFINET, the world's leading Industrial Ethernet standard, directly to the automation system to form the foundation for digitalization in the field.

You benefit from greater flexibility and very simple handling coupled with maximum availability. This allows you to efficiently transfer your familiar system concept to the digital world.

Today's challenges for field device connection:

- High overhead for device integration and replacement
- Complicated, error-prone wiring and routing over multiple levels, making the hardware FAT very complex
- Extremely long copper cables and numerous terminal points in the field
- Multiple individual control cabinets
- Large numbers of different components and protocols necessitate costly spare parts inventories and training sessions
- High planning and documentation costs

Supplementary components

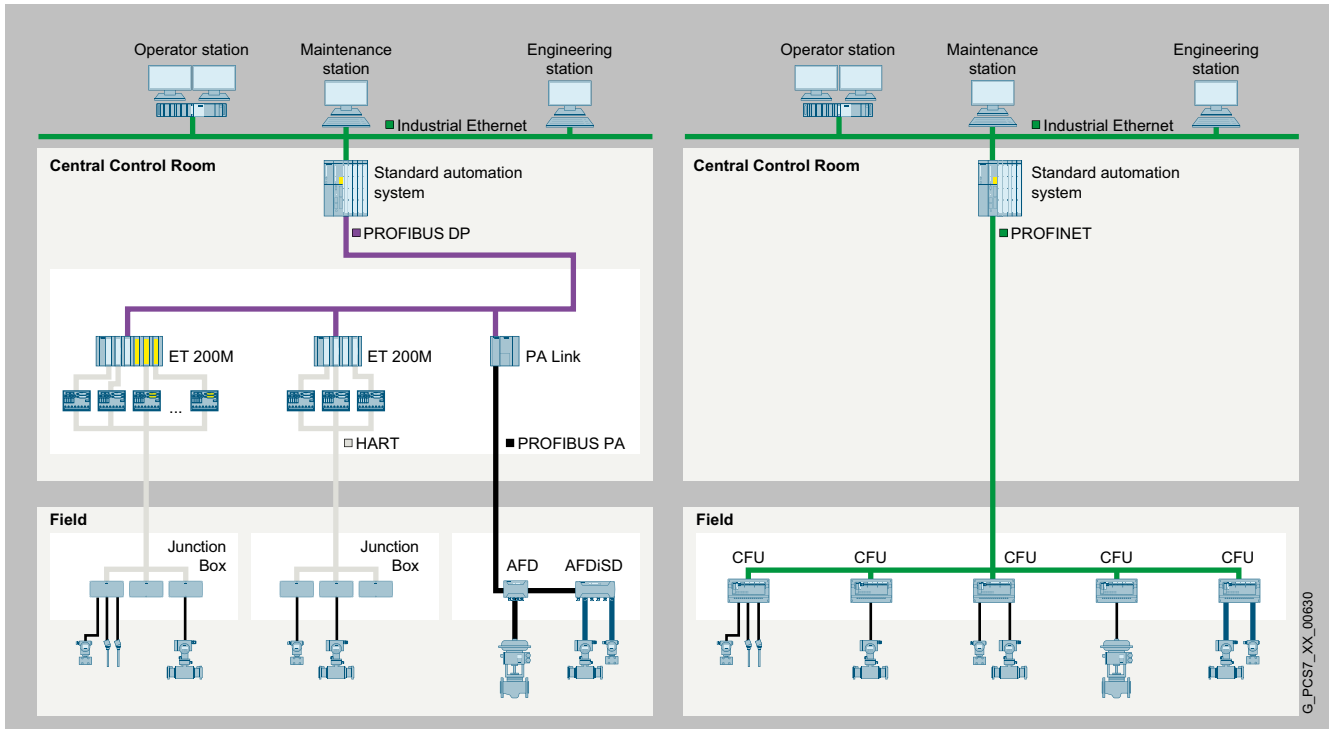
Network transitions

SIMATIC CFU

Overview (continued)

SIMATIC CFU – The answer to these challenges

Mode of operation



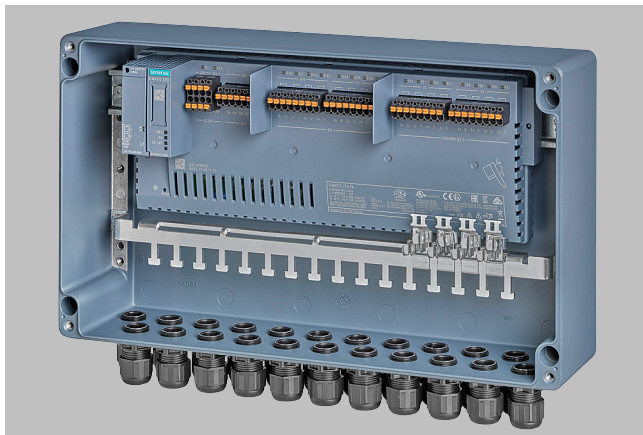
Field device connection with previous technology (left) and with SIMATIC CFU (right)

The SIMATIC Compact Field Unit (CFU) is a real game-changer in field device connection and offers you entirely new prospects regarding simplicity, flexibility and standardization. The smart field distributor is installed at the process level and is connected via PROFINET directly to the automation system to form the foundation for digitalization in the field. Utilization of digital fieldbus communication considerably simplifies device interfacing compared to conventional 4 ... 20 mA engineering.

Greater flexibility thanks to consistent decentralization

Distributed installation of the SIMATIC CFU means that classic control cabinets are no longer required and you can make considerable savings in cabling and the number of terminal points, as well as reducing planning and documentation overheads. The high granularity (16 I/O per SIMATIC CFU) enables flexible assignment to the higher-level controllers.

Function



The SIMATIC CFU was specifically designed to meet the requirements of the process industry in the Industry 4.0 environment (application example: SIMATIC CFU in a standard cast aluminum housing).

System integration via Industrial Ethernet standard

- Flexible connection options via PROFINET
- Ready for Process Automation (PA Ready):
 - Redundant PROFINET connection (S2) for maximum availability
 - Media redundancy (MRP)
 - Configuration in RUN (CiR)
- BusAdapter (electrical, optical or combination)

Ready for distributed use

- Installation up to hazardous zone 2/22 (with conformal housing)
- Extended temperature range from -40 to +70 °C
- Conformal coating use up to 4000 meters altitude
- Implementation of increased interference immunity according to NAMUR NE 21
- Optional: Aluminum enclosure for direct field deployment in zone 2/22

More information

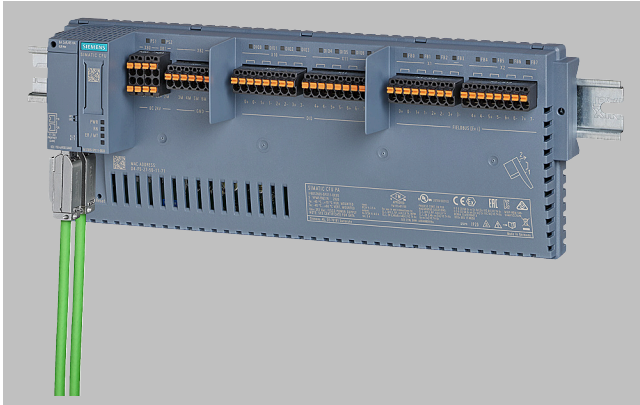
You can find more information on the CFU and its variants, as well as an overview of all ordering data here:
<https://support.industry.siemens.com/cs/ww/en/view/109749357>

Supplementary components

Network transitions

SIMATIC CFU / SIMATIC CFU PA Edition

Overview



SIMATIC CFU here with BusAdapter, PROFINET bus cable and push-in terminals

SIMATIC CFU PA edition

Plug-and-produce simplicity

Digitalization requires a digital infrastructure facilitating integrated digital communication right down to the sensors and actuators. You can use the established and proven PROFIBUS PA standard to achieve this. It is integrated into the PA edition of the SIMATIC CFU, thus combining ruggedness and easy handling with all the advantages of the PROFINET standard based on Industrial Ethernet. Connected devices are automatically addressed. The device is integrated via standardized communication profiles.

This innovative new implementation of the PROFIBUS PA concept makes it possible to combine the simplicity of a point-to-point wiring system with the scalability of digital PROFIBUS PA fieldbus communication. As with digital field devices, it is not necessary to know prior to connection whether the discrete field device is a sensor or actuator – This can be easily configured afterwards via software.

Combination of digital fieldbus and discrete I/Os

- 8 × digital fieldbus (PROFIBUS PA)
- 8 × digital inputs/outputs, freely configurable (1 × counter functionality / frequency measurement)

Easy to use

- Automatic addressing of PROFIBUS PA field devices
- System-supported detection and integration of PROFIBUS PA field devices into the process control system
 - Utilization of standardized PA profiles
 - Commissioning, device replacement and maintenance wizards
- Implementation of diagnostic messages according to NAMUR NE 107
- Installation on a 35 mm DIN rail

Overview (continued)

Aluminum field housing



SIMATIC CFU aluminum field housing, open



SIMATIC CFU aluminum field housing, closed

The die-cast aluminum housing is suitable for use in zone 2/22 hazardous areas. The following are included in the housing scope of delivery:

- 22 × M20 plastic cable glands (incl. blanking plugs)
- 35 mm DIN rail
- Rail for strain relief and shield support

The enclosure has a display window for LED diagnostics.

Selection and ordering data

SIMATIC CFU PA bundle with push-in terminals Comprising: <ul style="list-style-type: none">• SIMATIC CFU PA, Article No. 6ES7655-5PX11-0XX0• SIMATIC CFU push-in terminals, Article No. 6ES7655-5PX00-1XX0 pre-assembled and tested	6ES7655-5PX11-1XX0
SIMATIC CFU PA bundle with aluminum enclosure Comprising: <ul style="list-style-type: none">• SIMATIC CFU PA, Article No. 6ES7655-5PX11-0XX0• SIMATIC CFU push-in terminals, Article No. 6ES7655-5PX00-1XX0• Aluminum enclosure with cable glands, shield busbar, shield connection clamps pre-assembled and tested	6ES7655-5PX11-1AX0

Supplementary components

Network transitions

SIMATIC CFU / SIMATIC CFU DIQ Edition

Overview



SIMATIC CFU DIQ edition

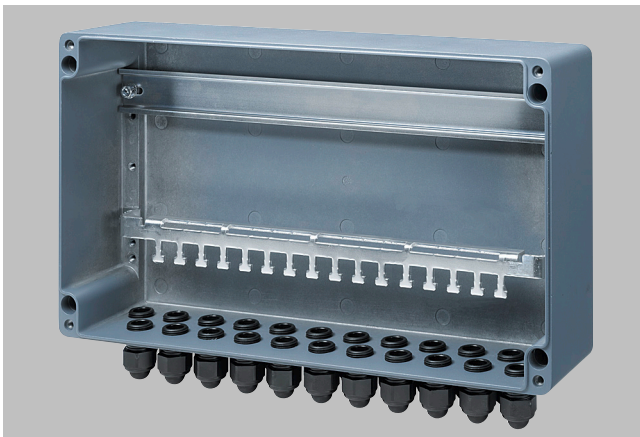
Individual, customer-specific solutions and flexible system/plant extensions are requirements that are becoming increasingly important in the process industry due to digitalization. SIMATIC CFU DIQ edition with 16 freely configurable digital IO channels offers a solution for the growing demands of distributed I/O.

SIMATIC CFU also has expansion functions for optional configuration. Two additional operating modes can be activated for selected digital inputs. "Counter" operating mode and "Frequency measurement" operating mode with a cut-off frequency of 1 kHz.

Actuator shutdown can be set for the digital outputs. The actuator shutdown of the SIMATIC CFU uses a monitoring channel (DI channel) to quickly set all digital outputs to a low digital level.

- 16 × digital inputs/outputs, freely configurable (2 × counter functionality / frequency measurement)

Aluminum field housing



SIMATIC CFU aluminum field housing, open

Overview (continued)



SIMATIC CFU aluminum field housing, closed

The die-cast aluminum housing is suitable for use in zone 2/22 hazardous areas. The following are included in the housing scope of delivery:

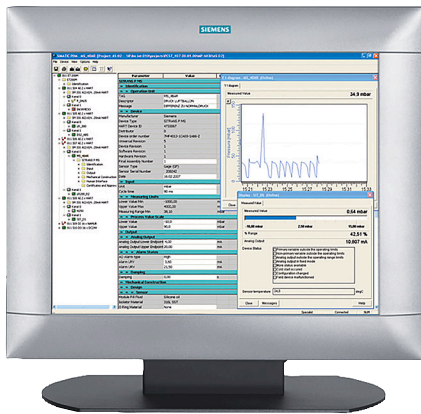
- 22 × M20 plastic cable glands (incl. blanking plugs)
- 35 mm DIN rail
- Rail for strain relief and shield support

The enclosure has a display window for LED diagnostics.

Selection and ordering data

SIMATIC CFU DIQ with aluminum housing Comprising: <ul style="list-style-type: none"> • SIMATIC CFU DIQ, Article No. 6ES7655-5PX31-0XX0 • SIMATIC CFU push-in terminals, Article No. 6ES7655-5PX00-1XX0 • Aluminum housing with cable glands, shield busbar, shield connection clamp pre-assembled and tested	6ES7655-5PX31-1AX0
SIMATIC CFU DIQ Comprising: <ul style="list-style-type: none"> • SIMATIC CFU DIQ, Article No. 6ES7655-5PX31-0XX0 • SIMATIC CFU push-in terminals, Article No. 6ES7655-5PX31-1XX0 pre-assembled and tested	6ES7655-5PX31-1XX0

Digitalization and Communication



8/2	Digitalization
8/2	Digital solutions & apps
8/2	SITRANS SCM IQ, SITRANS CC220, SITRANS MS200
8/6	SITRANS store IQ
8/10	SITRANS mobile IQ
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8/16	Connectivity
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8/19	Communication
8/19	Field device integration
8/19	SIMATIC PDM
8/32	SITRANS DTM
8/33	SITRANS Library
8/34	Communication protocols
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Digitalization and Communication

Digitalization

Digital solutions & apps / SITRANS SCM IQ, SITRANS CC220, SITRANS MS200

Overview



SITRANS SCM IQ is a Siemens Insights Hub-based cloud application, used in conjunction with SITRANS MS200 and SITRANS CC220, for smart condition monitoring and predictive maintenance.

SITRANS CC220 is an industrial IIOT gateway that collects measurement and status data from up to eight SITRANS MS200 multisensors. It then forwards the data, via the plant network or a secondary data channel, to the SITRANS SCM IQ cloud application.

SITRANS MS200 is a battery-powered, wireless multisensor that provides process condition data that is not normally available for typical process control functions. MS200 can monitor conditions such as vibration states and temperature.

Benefits

- Detects changes to the normal operating conditions of industrial machinery such as pumps, motors, gears, etc., in industrial settings
- Detects the on/off state of each connected device
- Labels detected anomalies and sends notifications
- Allows for more efficient maintenance planning through early warnings
- Improves control, protection, and availability of machinery
- Can help to reduce plant downtime
- Built-in configuration tools and device management
- Easy commissioning, minimal training required, and long maintenance cycles

Application

SITRANS MS200 multisensors are suitable for use with a wide range of rotating equipment, within all industries that require rugged IIoT sensors. The sensors are suitable for measurement within any industrial environment and at extreme temperatures. They can be used indoors and outdoors.

SITRANS MS200 sensors and corresponding SITRANS SCM IQ application, can be used in process industries such as food and beverage, power generation, utilities, and chemical. Typical applications include filling stations, agitating vessels, and many types of pumps, gears, compressors, fans or bearings.

Design

SITRANS MS200 is contained within a rugged, IP69 enclosure for use with rotating equipment. SITRANS CC220 is an IP20 device and is typically mounted inside a cabinet.

SITRANS SCM IQ is designed for use on the Siemens cloud-based IIoT ecosystem, Insights Hub. SITRANS SCM IQ can be combined with an array of Siemens cloud-based applications for complete plant supervision and control.

Function

SITRANS MS200, Battery powered clamp-on sensor

- Monitors temperature and vibration of rotating equipment

SITRANS CC220, IIOT gateway

- Cyclically polls data from MS200 multisensors
- Securely uploads data to SITRANS SCM IQ
- Can handle up to eight SITRANS MS200 sensors

SITRANS SCM IQ, Insights Hub application for smart condition monitoring

- Manages connected SITRANS CC220 gateways and SITRANS MS200 multisensors
- Intuitive training of machine learning models to automatically detect anomalies
- Supports labelling anomalies and sends notifications via email or push notification (when used with SIMATIC Notifier)

Selection and ordering data

Selection and ordering data	Article No.
SITRANS MS200 A battery-powered, wireless multisensor that provides process condition data that is collected in addition to the core process control data.	7MP2210-2AB21-2-AB1
SITRANS CC220 A cloud connector that collects measurement and status data from up to eight SITRANS MS200 multisensors, then forwards it to the SITRANS SCM IQ cloud application	7MP2200-2CB05-2-AA1
SITRANS SCM IQ SITRANS SCM IQ is a Siemens Insights hub-based application, used in conjunction with SITRANS MS200 and SITRANS CC220, for smart condition monitoring and predictive maintenance	SITRANS SCM IQ is distributed by the Siemens Digital Exchange. Please visit: https://www.dex.siemens.com
Operating Instructions All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation .	
Spare Parts SITRANS MS200 replacement battery with plug, 3.6 V/2.6 Ah	7MP2210-2AB21-2-AB8

Technical specifications

SITRANS MS200	
Scope of measurement	Vibration and temperature
Data transmission	
Polling	Cyclic, via SITRANS CC220
Vibration sensor	3-axis accelerometer
Frequency range	15 ... 3.3 kHz
Resolution	0.122 mg (nominal at ± 4 g measurement range, 0.488 mg at ± 16 g)
Sampling rate	6.6 kHz
Temperature sensor	
Temperature range	-30 ... +80 °C (-22 ... +176 °F)
Accuracy	± 4 °C
Repeatability	0.1 °C
Voltage supply	
Voltage	3.6 V
Capacity	2.6 Ah
Lithium content	0.65 g (0.023 oz)
Weight of battery	18 g (0.63 oz)
Battery life at 25 °C (77 °F)	2 ... 5 years
Replacement	Replacement batteries are offered by Siemens. Please see spare parts for more details.
Communication	
Bluetooth	Bluetooth BLE 5.0
Data transmission cycle	1 per 100 seconds
Environment	
Storage temperature	-40 ... +85 °C (-40 ... +185 °F)
Ambient temperature	-30 ... +80 °C (-22 ... +176 °F)
Altitude	<ul style="list-style-type: none"> • Operation: -1 000 ... 2 000 m (3 280 ... 6 561.68 ft) • Pressure: 795 ... 1 080 hPa
Rating	IP69 2 m/24 h, according to IEC 60529

SITRANS CC220	
Functions	
Connecting	Connects SITRANS MS200 multisensor with SITRANS SCM IQ cloud application
Polling	Cyclic polling of SITRANS MS200
Cloud connect	Forwards data to SITRANS SCM IQ cloud. Connection through plant network or Internet Access Point (e.g. SCALANCE M876-4).
Voltage supply	
Voltage	24 V nominal
Fuse	No
Fan	Passive cooling
Communication	
To sensor	Bluetooth BLE 5.0
To cloud	MQTT
Environment	
Storage temperature	-20 ... +70 °C (-4 ... +158 °F)
Ambient temperature	0 ... +50 °C (-32 ... +122 °F)
Altitude	<ul style="list-style-type: none"> • Operation: -1 000 ... 2 000 m (3 280 ... 6 561.68 ft) • Pressure: 795 ... 1 080 hPa
Rating	IP20, according to IEC 60529

Technical specifications (continued)

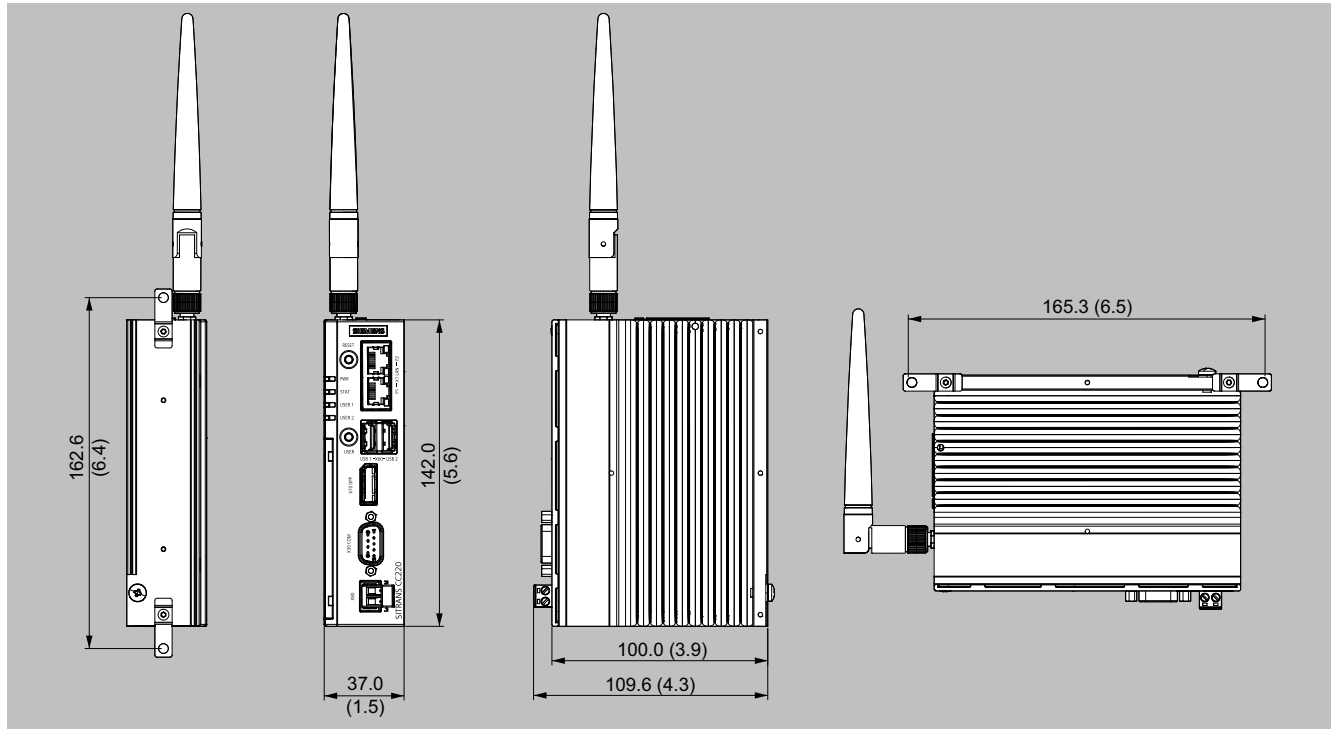
SITRANS SCM IQ	
Device connectivity	Manages connection of SITRANS MS200 and SITRANS CC220 through a convenient user interface
Sensor data modeling	Activation and management of machine learning models
Anomaly management	Documentation and management of detected anomalies
Notifications	Provides notification of detected anomalies via email or push notification (when used with SIMATIC Notifier).

Digitalization and Communication

Digitalization

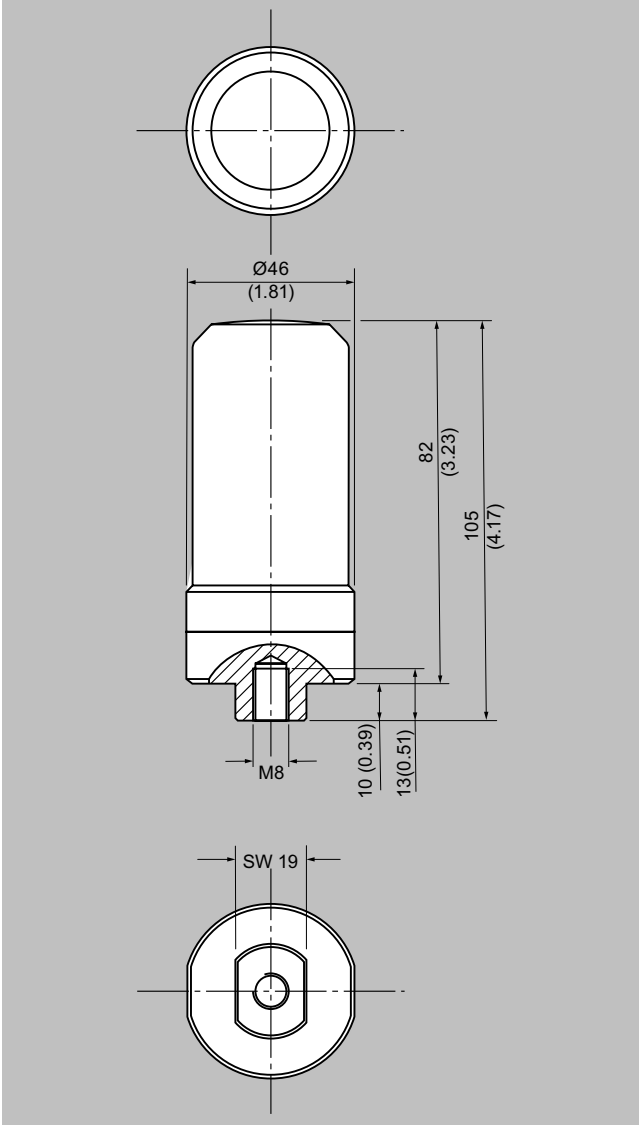
Digital solutions & apps / SITRANS SCM IQ, SITRANS CC220, SITRANS MS200

Dimensional drawings



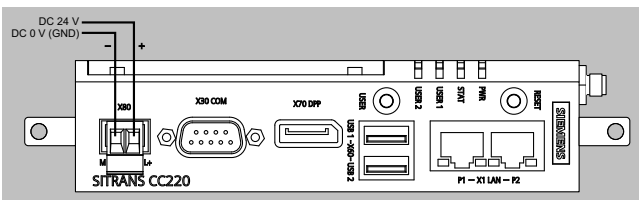
SITRANS CC220, dimensions in mm (inch)

Dimensional drawings (continued)



SITRANS MS200, dimensions in mm (inch)

Circuit diagrams



SITRANS CC220, connections

Digitalization and Communication

Digitalization

Digital solutions & apps / SITRANS store IQ

Overview

SITRANS store IQ is a Siemens cloud based application used to monitor and manage inventories in process and discrete industries.

Benefits

- Manage entire inventory network from a central location.
- Reduce overhead required to monitor and plan stock levels.
- Avoid unnecessary downtime and cost associated with unexpected shortages.
- Increase transparency of measurement reliability.

Application

Inventory management is a necessary task in virtually every value chain. Inventories are required whenever material is processed, produced, or assembled. SITRANS store IQ is an inventory management app based on Siemens cloud resources, that records measurements and data from various types of instrumentation, including a level device at a process tank or scales mounted in storage shelves. SITRANS store IQ also monitors auxiliary measurements, helping to better characterize inventories, for example, with temperature readings or binaries.

SITRANS store IQ records readings and visualizes them in a customizable way, offering structuring with hierarchies, map views, and graph views. The acquired data can be used to create proactive alarms via email or SMS, exactly as required for your application. The SITRANS store IQ app can be used on a desktop computer or mobile device.

Design

- A reliable and accurate record of inventory data from anywhere.
- A flexible structure for configuring an inventory network of any size.
- Provides a visualization of an inventory mix, with material breakdown.
- KPI thresholds to easily assess inventory levels.
- Custom alarms for proactive notifications.
- Based on cloud and cloud connectivity solutions.
- Open to virtually every measurement technology.
- Ability to monitor any process values, including humidity, temperature, digital inputs.

The following standard SITRANS store IQ base package and extensions are available:

SITRANS store IQ can be ordered via the Siemens PLM store:

https://www.dex.siemens.com/ccrz_ProductList?cartID=&operation=quickSearch&searchText=Sitrans%20store%20iq&portalUser=&store=&cccl=en_US&selected=industrial-iot

https://www.dex.siemens.com/ccrz_ProductList?cartID=&operation=quickSearch&searchText=Sitrans%20store%20iq&portalUser=&store=&cccl=en_US&selected=industrial-iot

Pricing Model	
Application subscription	SITRANS Store IQ Package Base See order ¹⁾
Billing cycle	Full amount in advance
SITRANS Store IQ application	✓
Base environment ²⁾	✓
Asset attributes	100 ³⁾
Time series data ingest rate	0.05 KB/s ⁴⁾
Time series data storage	1 GB
Notification emails	1 000 email notifications
Users	100
	According to your specific configuration, the required number of the above mentioned cloud resources might differ.
Extension (for cloud resources)	SITRANS Store IQ Package Asset Attributes Extension See order ¹⁾
Billing cycle	Full amount in advance
Asset attributes	100 additional asset attributes
Time series data ingest rate	0.03 KB/s additional time series data ingest rate
Time series data storage	1 GB additional time series data storage
Extension (for cloud resources)	SITRANS Store IQ Package Data Ingest Extension See order ¹⁾
Billing cycle	Full amount in advance
Time series data ingest rate	0.10 KB/s additional time series data ingest rate
Extension (for cloud resources)	SITRANS Store IQ Package Data Storage Extension See order ¹⁾
Billing cycle	Full amount in advance
Time series data storage	5 GB additional time series data storage
Extension (for cloud resources)	SITRANS Store IQ Package Notification Extension See order ¹⁾
Billing cycle	Full amount in advance
Notification emails	1 000 additional email notifications
SMS notifications	25 additional SMS notifications

Digitalization and Communication

Digitalization

Digital solutions & apps / SITRANS store IQ

Design (continued)

Pricing Model

Extensions (for Third-Party Resources)

Call notifications may be offered in/for certain countries. Offered call notifications are provided as Third-Party technology. Please see Third-Party terms section.

Call notifications may be blocked, delayed or prevented from being delivered by reasons outside of our control and there is no warranty that the call notifications will be uninterrupted, secure or error free or that calls will reach their intended destination during any stated time-frame.

For the avoidance of doubt, Siemens may discontinue this service without prior notice at any time.

- 1) Subscription-based pricing is set forth in the order.
- 2) You can decide if a base environment shall be created and provisioned to you as part of your SITRANS Store IQ Package Base subscription or if the SITRANS Store IQ Package Base (without a base environment) shall be added to an existing account (base environment or capability package account). A package can only be added to an existing account if the account and package are hosted in the same data center location. If you decide to add various packages to one existing account, please note the following: The cloud resources included in the various packages will be combined under one account; it is your responsibility to allocate the cloud resources to the various packages according to your needs. The combination of cloud resources under one account may lead to technical limitations in their accessibility.
- 3) Depending on the configuration of e.g., the transmitter and/or gateway, single or multiple asset attributes are being used by the SITRANS Store IQ application.
- 4) Equals an update of up to 30 asset attributes approximately every five minutes.

Customer Requirement in Relation to Cloud Resources

Requirement from Customer	Effect on Required Number of Asset Attributes	Effect on Required Time Series Data Ingest Rate	Effect on Required Time Series Data Storage
Increase number of measurements	Increase	Higher rate required	Increase
Consideration of complex tank geometries	Increase ¹⁾	Higher rate required	Increase
Increase frequency of data capture	None	Higher rate required	Increase
Increase storage (extend duration of stored data)	None	None	Increase

- 1) Using the features of SITRANS Store IQ application for e.g., for tank monitoring, each measurement might consume over 32 asset attributes.

Note:

The standard subscription term for SITRANS Store IQ Package Base is 12 or 36 months. The subscription term shall automatically renew if stated in the order. Siemens reserves the right to discontinue the SITRANS store IQ app with a 12 months notice and replace the SITRANS store IQ app with a different app that is similar but not identical in functionality.

The subscription term for extensions will be co-termed with the subscription term of the application and therefore can be shorter than the standard subscription term.

If an application subscription is terminated, the associated extensions will also be terminated at the same time.

For all terms and conditions please see the SITRANS Store IQ Package product sheet.

The subscription fee for SITRANS Store IQ Package Base and for any of the extensions described herein are fully charged in advance for the entire subscription term unless otherwise expressly provided in an order.

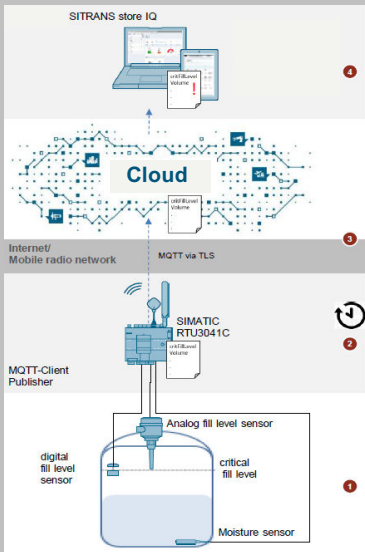
For all terms and conditions, please see the SITRANS Store IQ packages in the Siemens PLM store at

https://www.dex.siemens.com/ccrz_ProductList?cartID=&operation=quickSearch&searchText=Sitrans%20store%20iq&portalUser=&store=&cccl=en_US&selected=industrial-iot

https://www.dex.siemens.com/ccrz_ProductList?cartID=&operation=quickSearch&searchText=Sitrans%20store%20iq&portalUser=&store=&cccl=en_US&selected=industrial-iot

Integration

How to connect field devices to SITRANS store IQ using SIMATIC RTU



SIEMENS

SiePortal > Region and language > Contact > Help > Support Request

> Home > Support > Knowledge base

Entry type: Application example Entry ID: 109810580, Entry date: 08/09/2022

★★★★★ (5)
> Rate

Connection of the SIMATIC RTU3041C

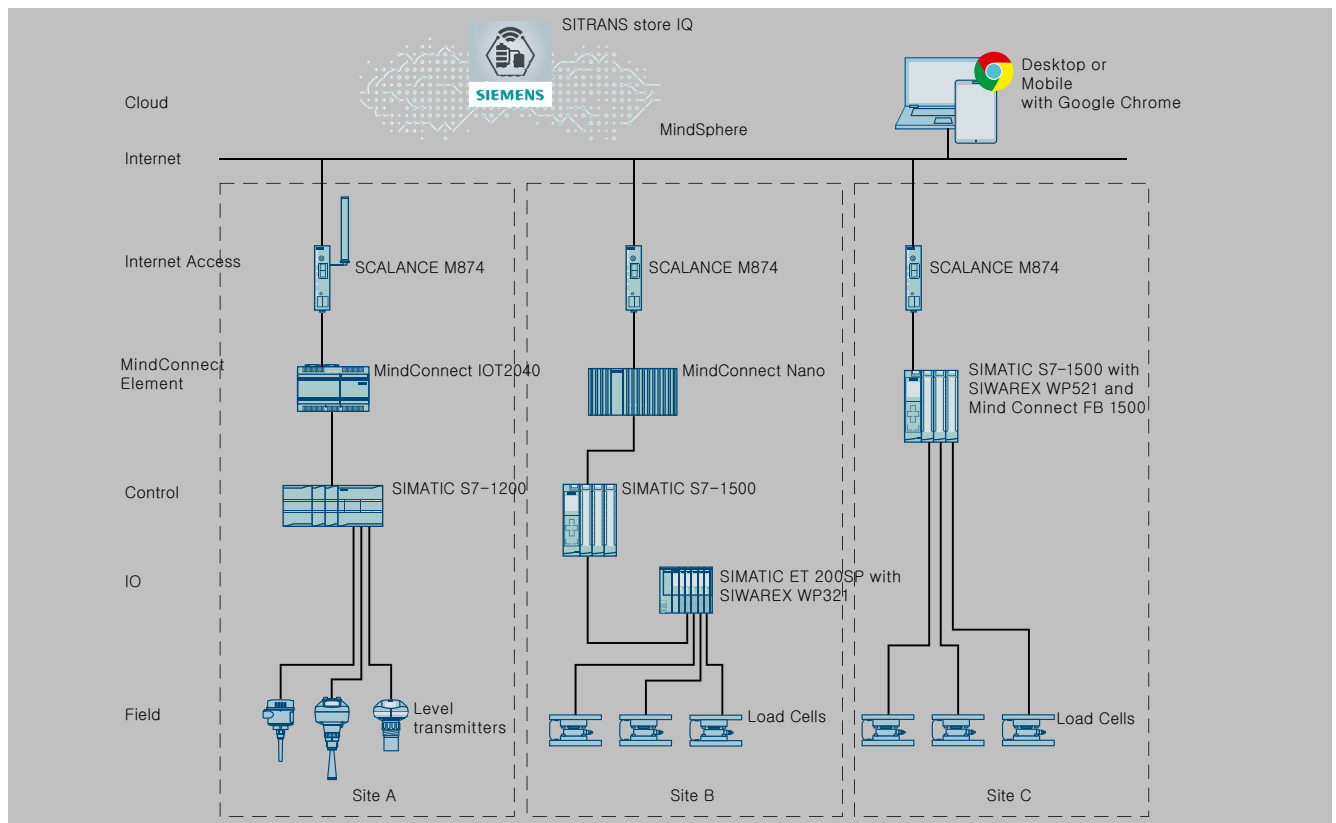
Entry Associated product(s)

The battery powered SIMATIC RTU3000C are used to monitor and control outstations that are geographically distributed and not connected to a power supply network. As of firmware V5.0, the SIMATIC RTU3000C act as an MQTT client and support cloud connections.

The SIMATIC RTU3041C monitors process data from widely distributed sensors, such as the fill level of a rain overflow basin and sends the current values securely to the cloud via MQTT.

The process data is stored in the cloud and read out via SITRANS store IQ. In case of critical values, the operator is informed via SITRANS store IQ by e-mail.

How to connect field devices to SITRANS store IQ using SIMATIC RTU, for more details please visit:
<https://support.industry.siemens.com/cs/de/en/view/109810580>



SITRANS store IQ is based on MindSphere and supports various possibilities to onboard instrumentation devices and acquire data. The figure shows several integration examples.

Digitalization and Communication

Digitalization

Digital solutions & apps / SITRANS mobile IQ

Overview



SITRANS mobile IQ is an app that gives you easy access to SITRANS field devices via your smartphone or tablet.

Benefits

- Commissioning and parameterization of field devices.
- Displays device status and measurement values.
- Helps with identifying errors and troubleshooting in case of failures.
- Direct link to manuals, certificates, FAQs, and much more.

Application

Commissioning and parameterization of field devices:

• Device list

All supported devices in the environment are displayed.

• Device Cockpit

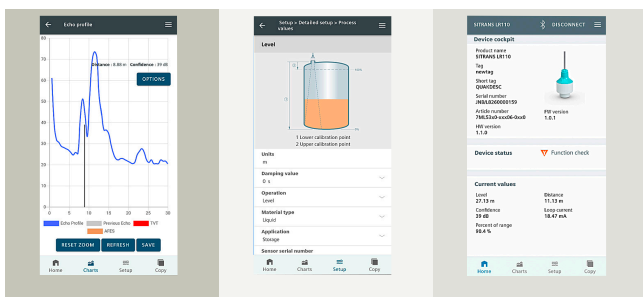
Overview of the connected device, device status, and current measured values.

• Setup

Commissioning and parameterization of the device, including graphical support.

• Charts

History of selected measurement and diagnostic values.



Mode of operation

Mobile devices / operating systems

SITRANS mobile IQ is compatible with supported Android and iOS mobile devices.

SITRANS mobile IQ uses a Bluetooth interface to communicate with the field devices. Your mobile device must have a Bluetooth interface, version 4.2 or better.

Currently supported field devices are listed on SIOS (<http://www.siemens.com/os/SITRANSmobileIQ>) and in the App Store and Google Play. Additional field devices are in preparation and require a new installation of the App on your mobile device. Only the listed field devices are compatible with SITRANS mobile IQ.

Data connection: internet connection is required to access additional information such as manuals of supported field devices.

Integration

Further information

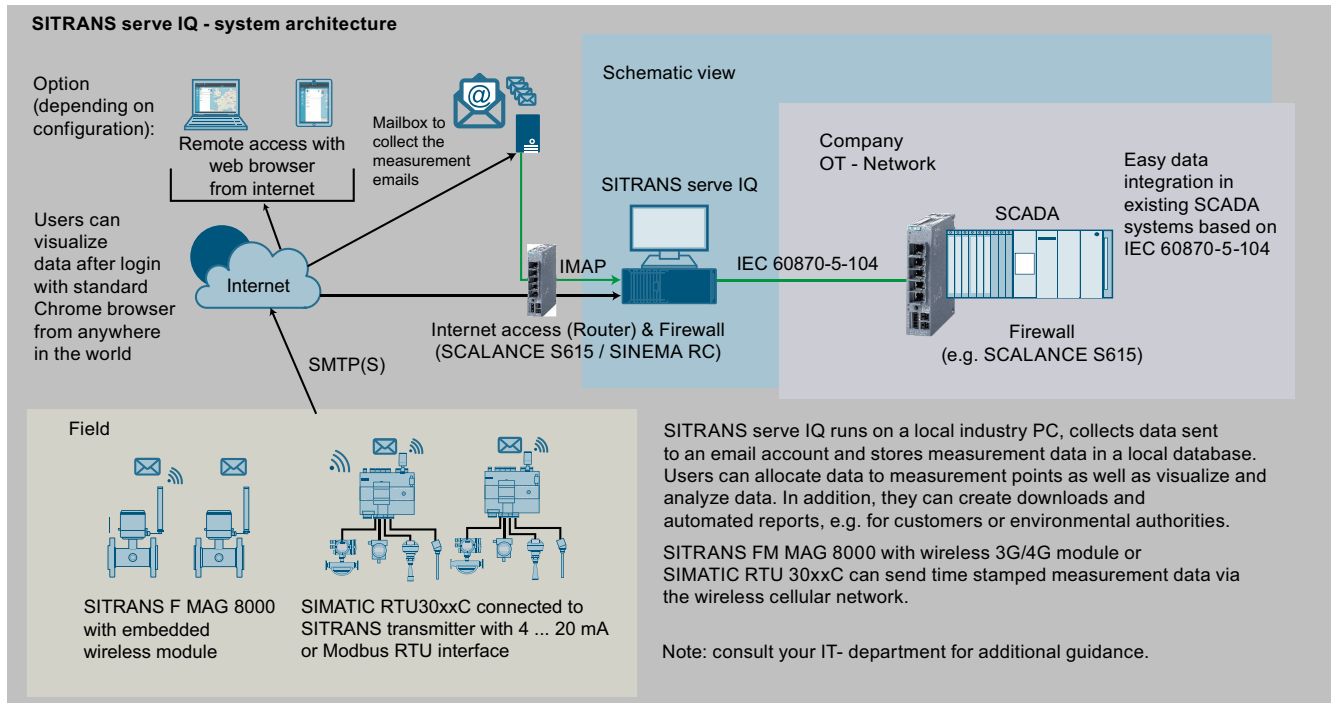
Product note in Industry Online Support – Product Support

<https://support.industry.siemens.com/cs/document/109775578/sitrans-mobile-iq?dti=0&lc=en-WW>

Download App



Overview



SITRANS serve IQ is an on-premise application that acquires measurement data sent by email (CSV file attachments) from remote sensors. The data is stored locally on an Industry PC and visualized in charts and tables. If configured, authorized users can access this on-premise application via the Internet.

Optionally, users can create and send customized reports on measurement data and log events in a log-book to, for example, document services. An interface for forwarding data to a SCADA system using the telemetry protocol IEC 60870-5-104 is also available.

Digitalization and Communication

Digitalization

Digital solutions & apps / SITRANS serve IQ

Benefits

Widely distributed measuring points are used in a range of applications and industries. These include:

- Flow measurement in water supply networks.
- Level measurement in tanks and silos.
- Height measurement in bodies of water.

Today, remote devices send measurement data and alarms in csv-format via email (e.g. SITRANS MAG 8000 3G/4G or SIMATIC RTU 30xxC).

SITRANS serve IQ supports you by:

- Reading and parsing the email attachment containing the measurement data from the email address provided by you.
- Visualizing historical and current process values in charts or tables and displaying alarms.
- As customers or environmental authorities ask for measurement data, users can create customized reports on totalizer values and send them automatically by email. This optional license also enables the logbook functionality that allows users to comment on measurement data or to document service activities.
- Forwarding process values to SCADA via the optional telemetry protocol IEC 60870-5-104.
- If enabled, users can access the application from the Internet using the Google Chrome web-browser. Access is limited to the organization holding the license. Additional measures to ensure IT-security are required (e.g. firewall).

Application

SITRANS serve IQ software must be installed on a local IPC, on-premise and must have access to an email account used for receiving data from remote devices.

When data from supported devices is sent to the predefined email account, SITRANS serve IQ performs the following activities:

- Reads and parses the email attachment containing the valid measurement data from the user provided email address.
- Reads the time stamped measurement data and store it locally on your PC.
- Visualizes the data in trends, display alarms, and downloads the data in tables to authorized users.

Optional features include:

- Customized reports on totalizer values and the ability to send them automatically by email.
- Logbook functionality allowing users to comment on measurement data or to document service activities.
- On further request, ability to forward measurement data to a SCADA system via IEC 60870-5-104 telemetry protocol that is widely used in the water and power industries.

SITRANS serve IQ can be used with the following products:

- SITRANS F MAG8000 with integrated wireless communication module.
- All transmitters in the SITRANS product family with 4 to 20 mA or Modbus RTU interface that can be connected to a SIMATIC RTU30xxC.

SITRANS serve IQ continuously monitors received measurement values against configurable upper and lower limits. Values exceeding the limits will be reported as warnings or alarms, depending on the user setting.

For details and limitation, consult the Product page available at www.siemens.com/SIOS/sitransserveiq.

Design

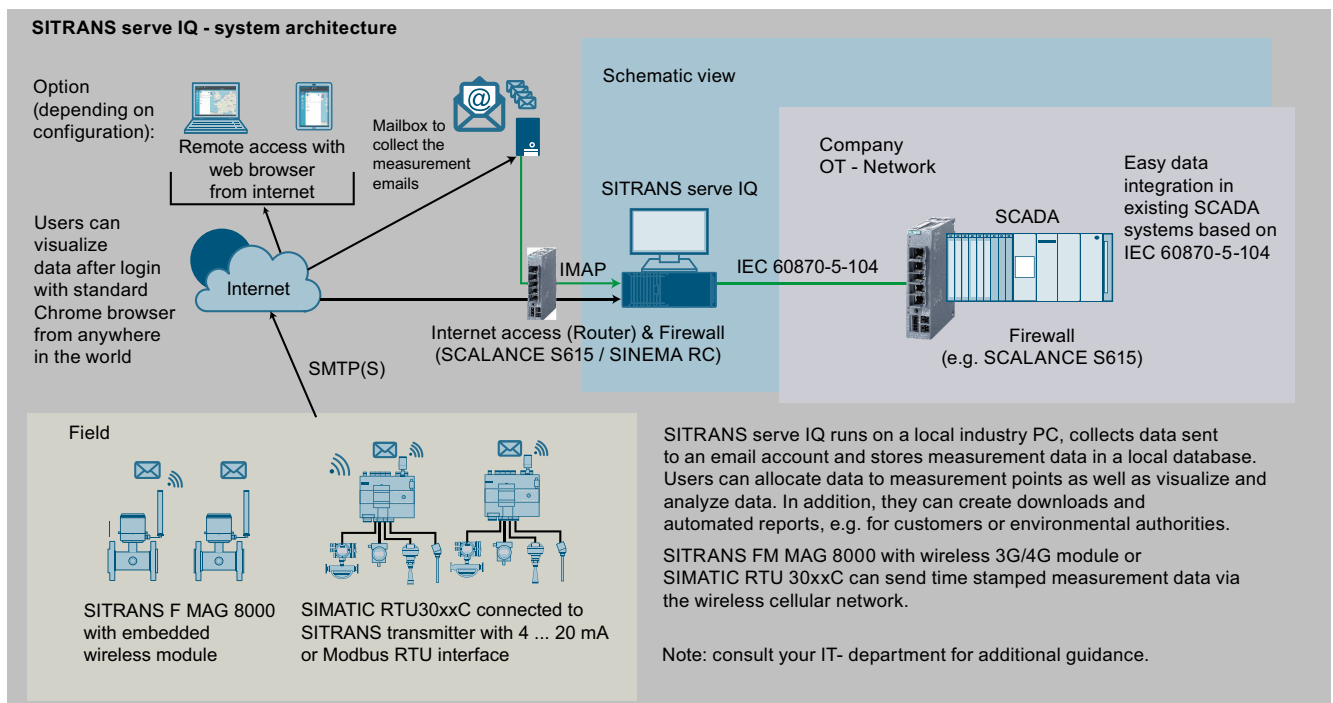
SITRANS serve IQ software is supplied with a Media Package on a USB stick or online software download with an installation program. SITRANS serve IQ consists of a software package and several license upgrade options.

Software packages	SITRANS serve IQ perpetual¹⁾
Number of sending units supported	10 units, with a maximum of 40 variables each
License type	Perpetual license
License upgrade options:	
Additional devices	SITRANS serve IQ license upgrade for 1, 10, 100, or 500 additional devices according to the customer's requirements, to a maximum of 1 300 devices in total.
Logbook and automated reports	<ul style="list-style-type: none"> • Comment on measurement data or document service activities • Create reports on totalizer values and send automatically by email.
IEC 60870-5-104 telemetry protocol	<ul style="list-style-type: none"> • Data interface to SCADA server (single or redundant) with the standardized IEC 60870.5.104 telemetry protocol. • Enables easy integration in SIMATIC PCS 7 Telecontrol.

¹⁾ SITRANS serve IQ software is protected against unauthorized copying by the Automation License Manager (ALM) tool.

Note: a trial version for 90 days for two (2) devices is available.

Following these 90 days, the installed software must be updated to the professional version by means of SITRANS serve IQ perpetual.



SITRANS serve IQ, communication paths: processing, archiving, displaying and transmitting measured values

Digitalization and Communication

Digitalization

Digital solutions & apps / SITRANS serve IQ

Selection and ordering data

	Article No.
SITRANS Serve IQ V1.3 Software Package Complete, 10 devices with logbook and automated reports functionality and support of IEC 60870-5-104 protocol Perpetual license¹⁾²⁾	
• Software and license on USB stick	6BG0000-0AA10-2CS1
• Software and license via Online software download	6BG0000-0AA10-0CS1

	Article No.
SITRANS Serve IQ V1.3 Software Package Base, 10 devices Perpetual license for 10 devices¹⁾²⁾	
• Software and license on USB stick	6BG0000-0AA10-2CS0
• Software and license via Online software download	6BG0000-0AA10-0CS0

	Article No.
SITRANS Serve IQ, License upgrade for logbook and automated reports functionality License activates access to the logbook and report functionalities.¹⁾²⁾	
• Software and license on USB stick	6BG0000-0AA10-3CY5
• Software and license via Online software download	6BG0000-0AA10-1CY5

	Article No.
SITRANS Serve IQ V1.3 Software Package Demo On-premise application for Windows to acquire measurement data from remote sensors as well as store, and visualize data in trends and tables via web browser. 90-day trial license for 2 devices¹⁾²⁾	
• License and software on USB stick	6BG0000-0AA10-2CR0
• License and software via Online software download	6BG0000-0AA100-0CR0

	Article No.
SITRANS Serve IQ, license upgrade, add IEC 60870-5-104 SITRANS Serve IQ license upgrade to add IEC 60870-5-104 telemetry protocol for data integration to SCADA.¹⁾	
• License on USB stick	6BG0000-0AA10-3CY1
• License via Online software download	6BG0000-0AA10-1CY1

Selection and ordering data (continued)

	Article No
SITRANS Serve IQ, license upgrade, add 1 unit SITRANS Serve IQ license upgrade to add 1 additional device.¹⁾²⁾	
• License on USB stick	6BG0000-0AA10-3CA0
• License via Online software download	6BG0000-0AA10-1CA0

	Article No
SITRANS Serve IQ, license upgrade, add 10 units SITRANS Serve IQ license upgrade to add 10 additional devices.¹⁾²⁾	
License on USB stick	6BG0000-0AA10-3CB0
License via Online software download	6BG0000-0AA10-1CB0

	Article No
SITRANS Serve IQ, license upgrade, add 100 units SITRANS Serve IQ license upgrade to add 100 additional devices.¹⁾²⁾	
• License on USB stick	6BG0000-0AA10-3CC0
• License via Online software download	6BG0000-0AA10-1CC0

	Article No
SITRANS Serve IQ, license upgrade, add 500 units SITRANS Serve IQ license upgrade to add 500 additional devices.¹⁾²⁾	
• License on USB stick	6BG0000-0AA10-3CD0
• License via Online software download	6BG0000-0AA10-1CD0

1) SITRANS serve IQ product sheet and specific terms and software licensing conditions shall apply.

2) The number of devices refers to, for example, the number of SITRANS FM MAG8000 flowmeters with a wireless communication module or the number of SIMATIC RTU30xxC devices. Per device, a maximum of 40 values (e.g. process values, indication of battery power, alarms) is possible.

Technical specifications

SITRANS serve IQ	
Technical specifications for the on-premise installation	
Operating system	Windows 10 Pro, 64-bit, version 2019 LTSC
Docker Desktop, Version 4.16.2	Software and Docker ID to be supplied by customer. Software download available at https://docs.docker.com/desktop/release-notes/ . Docker ID available at https://docs.docker.com/docker-id/ . Subscription fees may apply.
RAM	Minimum: 8 GB, recommended: 16 GB
Hard disk	At least 250 GB, SSD recommended
Security	Firewall, additional security measures supplied by customer
Internet access	Routers that allow the forwarding of IP ports and address transformations.
Notes	<ul style="list-style-type: none"> We recommend installing SITRANS serve IQ on a standalone SIMATIC IPC 427E Microbox PC To minimize the risk of software conflicts, we recommend installing only Microsoft Office (Windows® 10 Pro 64-bit, Enterprise), Docker Desktop, and SITRANS serve IQ on the IPC. Installation on any other PC and with other software may have a negative impact on performance and proper functioning of SITRANS serve IQ.
Other technical requirements	
	<ul style="list-style-type: none"> Fixed IP address for the PC hosting SITRANS serve IQ Internet access for the PC hosting SITRANS serve IQ, to read emails, and to access OpenStreetMap. A dedicated email mailbox supporting IMAP and SMTP protocol to which the measurement data will be sent in a specific protocol.
Limitation of service - ability period	
	The maximum serviceability period of SITRANS serve IQ is limited to two years. For further information on service, please visit: https://support.industry.siemens.com/cs/sc/5508/process-information?lc=en-DE
<i>For more details, please visit the product page at www.siemens.com/SIOS/sitransserveiq.</i>	

Digitalization and Communication

Digitalization

Connectivity / SITRANS AW050

Overview



SITRANS AW050 is a Bluetooth adapter for compatible SITRANS field devices. In combination with the SITRANS mobile IQ, SITRANS AW050 allows you to easily parametrize and maintain compatible SITRANS field devices via a smartphone or tablet.

Benefits

- Connects to the existing service or display port of the field device
- Enables remote access to field devices for:
 - Commissioning and parameterization
 - Displaying device status and measurement values
 - Identifying errors and troubleshooting in case of failures
 - Displaying graphs and trend views of measurements and diagnosis information
 - Direct links to manuals, certificates, FAQs, and much more

Application

SITRANS AW050 supports commissioning, parameterization, and maintenance of compatible field devices. AW050 will establish a secure connection to your field device. In combination with SITRANS mobile IQ, several functions are supported:

- **Device list**
All supported devices in the environment are displayed.
- **Device cockpit**
Overview of the connected device, device status, and current measured values.
- **Setup**
Commissioning and parameterization of the device, including graphical support.
- **Charts**
History of selected measurement and diagnostic values.

Design

SITRANS AW050 provides a Bluetooth interface for communication with SITRANS mobile IQ.

Integration

SITRANS AW050 is mounted in the existing cable gland and connected to the service or display port of the device.



SITRANS AW050, mounted on SITRANS Probe LU240



SITRANS AW050, mounted on SIPART PS100

Selection and ordering data

Selection and ordering data	Article No.
SITRANS AW050 Bluetooth adapter, used in combination with SITRANS mobile IQ for easy parametrization and maintenance of compatible SITRANS field devices.	
<ul style="list-style-type: none"> SITRANS AW050 including mounting kit for SIPART PS100 	7MP3210-0AA01
<ul style="list-style-type: none"> SITRANS AW050 including mounting kit for SITRANS Probe LU240 	A5E50514198
SITRANS mobile IQ Application to monitor and parameterize compatible field devices via Bluetooth.	Download via Google Play Store or Apple App Store
Operating instructions All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation	



Technical specifications

SITRANS AW050	
Software requirements	SITRANS mobile IQ <ul style="list-style-type: none"> Available for iOS 12.0 or higher and Android 7.0 or higher
Operating conditions and structural design Ambient conditions Ambient temperature	For use indoors and outdoors For ambient temperature ranges, please refer to the operating instructions for the connected SITRANS field device
<ul style="list-style-type: none"> Permissible ambient temperature for operation (SITRANS AW050 only) Relative humidity 	-40 ... +80 °C (-40 ... +176 °F) 0 ... 100 %
Degree of pollution	2
Overvoltage category	II
Input voltage range	2.2 ... 3.4 V DC
Maximum current consumption	2.5 mA
Weight	13 g (0.46 oz)
Degree of protection	<ul style="list-style-type: none"> Type 4X, Type 6 according to UL 50E IP66, IP68 in accordance with IEC 60529
EMC	EN 61326
Material	Polycarbonate
Communication, interface	Bluetooth BLE 4.2
Range	Class 2, approx. 10 m (32.8 ft)
Certificates and approvals	Radio approvals <ul style="list-style-type: none"> Europe: CE UK: UKCA USA: Contains FCC ID RYIEYSHJN Canada: Contains IC: 4389B-EYSHJN China: CMIIT ID: 2020DJ15120

Notes:

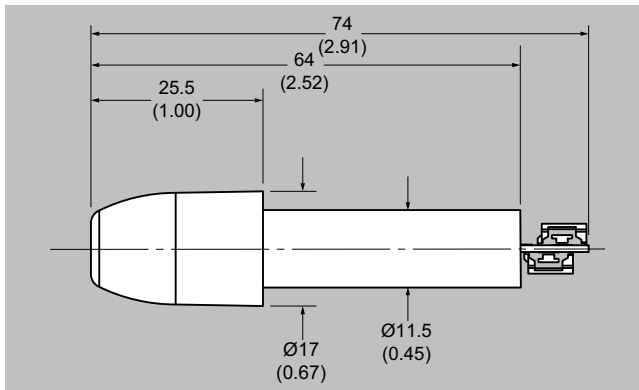
- SITRANS mobile IQ is available for Android and iOS. For more information see: <https://support.industry.siemens.com/cs/ww/en/view/109775578>.
- The instruction manual for the SITRANS AW050, including mounting description is included in the operating instructions of the compatible SITRANS field device.
- Compatible with:
 - SIPART PS100 with FW 1.03.00 or higher.
 - SITRANS Probe LU240 with measurement range 6 m (19.69 ft) and 12 m (39.37 ft).

Digitalization and Communication

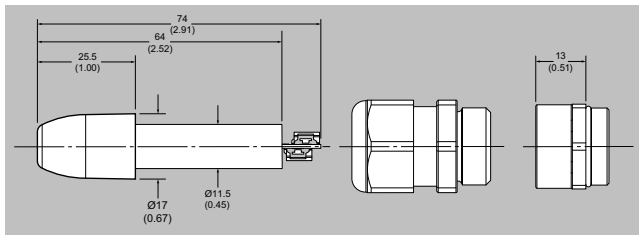
Digitalization

Connectivity / SITRANS AW050

Dimensional drawings

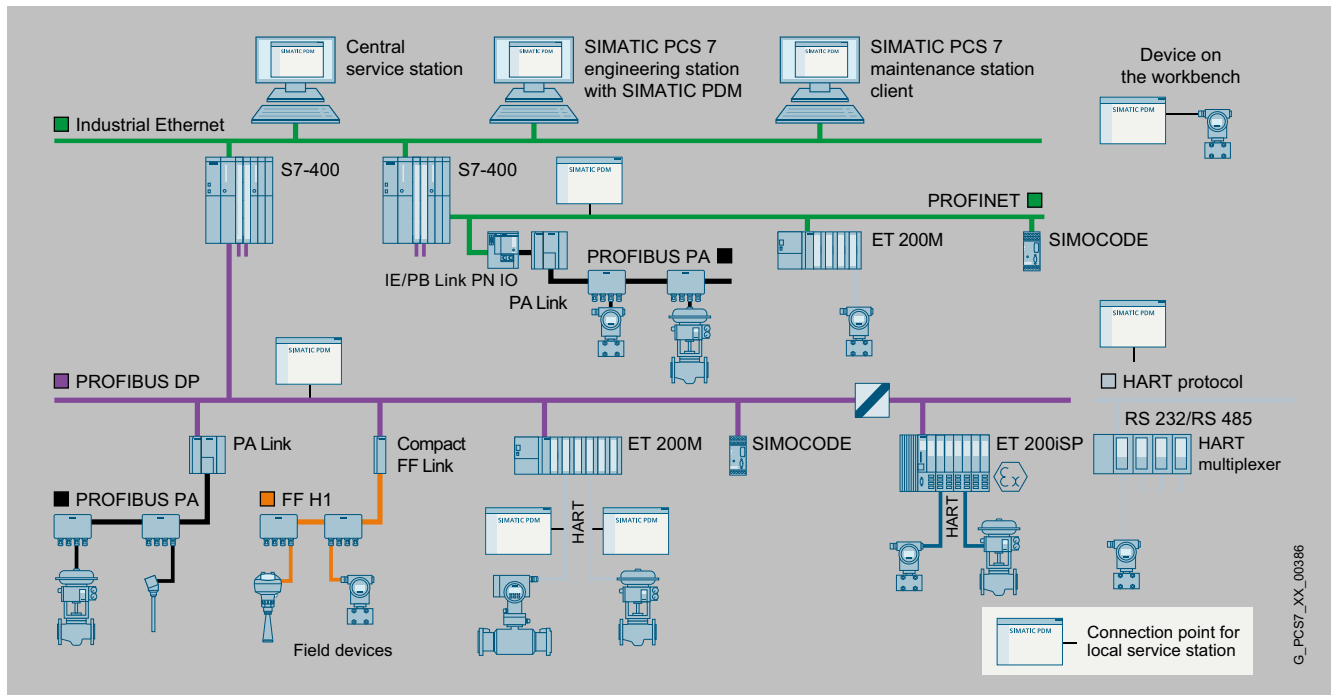


SITRANS AW050, dimensions in mm (inch)



SITRANS AW050 with cable gland and SIPART PS100 mounting kit, dimensions in mm (inch)

Overview



Configuration options with SIMATIC PDM

SIMATIC PDM (Process Device Manager) is a universal, vendor-independent tool for the configuration, parameter assignment, commissioning, diagnostics and servicing of intelligent field devices (sensors and actuators) and field components (remote I/Os, multiplexers, control-room devices, compact controllers), which in the following sections will be referred to simply as devices.

With *one* software product, SIMATIC PDM enables users to work with over 4 000 devices and device variants from Siemens and over 200 other manufacturers worldwide on a *single* homogeneous user interface.

The user interface satisfies the requirements of the VDI/VDE GMA 2187 and IEC 65/349/CD directives. Parameters and functions for all supported devices are displayed in a consistent and uniform fashion independent of their communications interface. Even complex devices with several hundred parameters can be represented clearly and processed quickly. Using SIMATIC PDM it is very easy to navigate in highly complex stations such as remote I/Os and even connected field devices.

From the viewpoint of device integration, SIMATIC PDM is the most powerful open process device manager on the global market. Devices not previously supported can be integrated in SIMATIC PDM by importing their device description packages (either EDD or FDI). This provides security for your investment and saves you investment costs, training expenses and follow-up costs.

SIMATIC PDM supports the operative system management in particular through:

- Uniform representation and operation of devices
- Uniform representation of diagnostics information
- Indicators for preventive maintenance and servicing
- Detection of changes in the project and device
- Increasing the operational reliability
- Reducing the investment, operating and maintenance costs
- Quantity options for
 - Transfer of parameters between devices
 - Transfer of parameter sets to the devices
 - Export and import functions
 - Diagnostics update

SIMATIC PDM can be used extremely flexibly and tailored to a specific task for field device service:

- Single-point station for point-to-point connection to field devices
- Local service and parameter assignment station with connection to fieldbus segments

Digitalization and Communication

Communication

Field device integration / SIMATIC PDM

Overview (continued)

- Central service and parameter assignment station with connection to plant bus
- Central HART service and parameter assignment station for HART multiplexers and WirelessHART field devices
- Integrated into the stand-alone SIMATIC PDM Maintenance Station
- Integrated into the SIMATIC PCS 7 process control system

Maintenance personnel can assign field device parameters at mobile and stationary workstations with SIMATIC PDM. Practically every workstation integrated in the production plant can be used for configuration. Service personnel are thus able to work directly at the location of the field device, while data is stored centrally in the engineering station or maintenance station. This leads to a significant shortening of maintenance and travel times. Additional device-independent system functions support higher-level maintenance stations for creating progress lists for work and servicing.

When a maintenance station is configured in the SIMATIC PCS 7 process control system, SIMATIC PDM is integrated into it and transmits parameter data, diagnostic information and processing information. You can switch directly to the SIMATIC PDM views from the diagnostics faceplates in the maintenance station to perform diagnostics and work on the device in more detail.

A SIMATIC PDM user administration system based on SIMATIC Logon is used to assign various roles with defined function privileges to users. These function privileges refer to SIMATIC PDM system functions, e.g. writing to the device.

For all devices integrated with device description packages, SIMATIC PDM provides a range of information for display and further processing on the maintenance station, for example:

- Device type information (electronic rating plate)
- Detailed diagnostics information (manufacturer information, information on error diagnostics and troubleshooting, further documentation)
- Results of internal condition monitoring functions
- Status information (for example local configuration changes), device test completed
- Information on changes (audit trail report)
- Parameter information

Design

Components	Product packages							
	SIMATIC PDM Stand alone				SIMATIC PDM system-integrated in the configuration environment			
	Minimum configuration	Basic configuration	Service and parameter assignment station		SIMATIC S7		SIMATIC PCS 7	
	PDM Single Point	PDM Basic	local PDM Service	central PDM Stand alone Server	PDM S7	PDM PCS 7	PDM PCS 7 Server	PDM PCS 7 FF
SIMATIC PDM TAGs ¹⁾ in scope of supply	1	4	4 + 50	4 + 100	4 + 100	4 + 100	4 + 100	4 + 100
SIMATIC PDM expansion options								
Count Relevant Licenses (accumulative)	- 10 TAGs - 100 TAGs - 1 000 TAGs	<i>cannot be expanded</i>	o	o	o	o	o	o
SIMATIC PDM Basic		●	●	●	●	●	●	●
SIMATIC PDM Extended		o	o	●	●	●	●	●
SIMATIC PDM integration in STEP 7/PCS 7		o	o	o	●	●	●	●
SIMATIC PDM Routing ²⁾		●	●	●	o	●	●	●
SIMATIC PDM Server		o	o	●	o	o	●	o
SIMATIC PDM 1 Client ³⁾		o	o	● (2 x)	o	o	o	o
SIMATIC PDM Communication FOUNDATION Fieldbus		–	–	–	o	o	o	●
SIMATIC PDM HART Server		o	o	o	o	–	–	–

SIMATIC PDM product structure

● Product component is part of the product package

o Optional product component for the product package; order additive

– Product component is not relevant for the product package or not available

¹⁾ For TAG definition, see "Design" section under "SIMATIC PDM TAGs"

²⁾ In combination with SIMATIC PDM Integration in STEP 7/PCS 7

³⁾ In combination with SIMATIC PDM Server

Customer-oriented product structure

The customer-oriented product structure of SIMATIC PDM provides optimal support for the named main use cases and enables you to adapt the scope of functions and performance to your individual requirements. The product range is organized as follows:

SIMATIC PDM Stand alone product packages

- SIMATIC PDM Single Point, a minimum configuration for single device handling
- SIMATIC PDM Basic for local service and parameter assignment stations as well as basic configuration for individual product package with optional product components
- SIMATIC PDM Service for local service and parameter assignment stations
- SIMATIC PDM Stand alone Server for central service and parameter assignment stations, e.g. for various plant units

SIMATIC PDM system-integrated product packages

- SIMATIC PDM S7 for local SIMATIC S7 engineering and service stations
- Various configurations for central SIMATIC PCS 7 engineering and service stations:
 - SIMATIC PDM PCS 7
 - SIMATIC PDM PCS 7 Server (enables device parameter assignment and diagnostics on clients of the PCS 7 engineering station and PCS 7 Maintenance Station)
 - SIMATIC PDM PCS 7-FF (supports the FOUNDATION Fieldbus H1)

In some circumstances, the product packages can be expanded with optional product components (for details, see the Design section).

Product range	SIMATIC PDM V9.1							
	Single Point	Basic	Service	Stand alone Server	S7	PCS 7	PCS 7 Server	PCS 7-FF
TAGs contained	1	4	4 + 50	4 + 100	4 + 100	4 + 100	4 + 100	4 + 100
Project: Create offline	●	●	●	●	●	●	●	●
Project: Usable TAG extensions	–	●	●	●	●	●	●	●
Project: Process device network view	●	●	●	●	●	●	●	●
Project: Process device plant view	●	●	●	●	●	●	●	●
Project: Export/import devices	–	–	●	●	–	–	–	–
Project: Export/import parameters	–	o	●	●	●	●	●	●
Project: HW Config	–	o	o	o	●	●	●	●
Project: Utilization of SIMATIC PDM options	–	●	●	●	●	●	●	●

Digitalization and Communication

Communication

Field device integration / SIMATIC PDM

Design (continued)

Product range	SIMATIC PDM V9.1							
	Single Point	Basic	Service	Stand alone Server	S7	PCS 7	PCS 7 Server	PCS 7-FF
Project: Integration in STEP 7/PCS 7	–	o	o	o	●	●	●	●
Group operations	–	o	o	●	o	●	●	●
Setting device IDs	–	o	o	●	o	●	●	●
Communication: HART modem	●	●	●	●	●	–	–	–
Communication: HART interface	●	●	●	●	●	–	–	–
Communication: PROFIBUS DP/PA	●	●	●	●	●	●	●	●
Communication: HART over PROFIBUS DP	●	●	●	●	●	●	●	●
Communication: FF H1	–	–	–	–	o	o	o	●
Communication: Modbus	●	●	●	●	●	●	●	●
Communication: Ethernet	●	●	●	●	●	●	●	●
Communication: PROFINET	●	●	●	●	●	●	●	●
Communication: HART over PROFINET	●	●	●	●	●	●	●	●
Devices: Export/import parameters	–	o	o	●	●	●	●	●
Devices: Comparison of parameter values	–	o	o	●	●	●	●	●
Devices: Saving parameters	●	●	●	●	●	●	●	●
Devices: Change log (Audit Trail)	–	o	o	●	●	●	●	●
Devices: Calibration report	–	o	o	●	●	●	●	●
Devices: Print function	●	o	o	●	●	●	●	●
Devices: Document manager	–	o	o	●	●	●	●	●
Lifelist: Basic functionality	●	●	●	●	●	●	●	●
Lifelist: Expanded functionality (scan range, diagnostics, export, addressing)	–	o	o	●	●	●	●	●
Communication: Data record routing	–	o	o	o	o	●	●	●
Communication: HART multiplexer	–	o	o	o	o	–	–	–
Communication: WirelessHART	–	o	o	o	o	–	–	–
Function: HART SHC mode (increased communication speed)	●	●	●	●	●	●	●	●
Function: Device parameterization on PCS 7 maintenance station clients	–	o	o	o	o	o	●	o
Function: Device parameter assignment on SIMATIC PDM clients	–	o	o	● (2 x)	o	o	o	o

SIMATIC PDM overview of functions and features

● Product component is part of the product package

o Optional product component for the product package; order additive

– Product component is not relevant for the product package or not available

SIMATIC PDM Stand alone product packages

SIMATIC PDM Single Point V9.1

This minimum configuration with handheld functionality is intended for handling exactly *one* field device via point-to-point coupling. It cannot be expanded with functions or with SIMATIC PDM TAG or SIMATIC PDM 1 Client licenses. Upgrading to a different product variant, e.g. SIMATIC PDM Basic, or a different product version is also not possible.

Supported communication types:

- PROFIBUS DP/PA
- HART communication (modem, RS 232 and via PROFIBUS/PROFINET)
- Modbus
- Ethernet
- PROFINET

The functionality is matched accordingly. The device functions are supported as defined in the device description, for example:

- Managing the device library and unlimited device selection
- Parameter assignment and diagnostics according to the device description
- Exporting and importing of parameter data
- Device identification
- Lifelist

Design (continued)

- Printing the parameter list

SIMATIC PDM Basic V9.1

SIMATIC PDM Basic is for local service and parameter assignment stations on any computers (IPC/notebook) with local connection to bus segments or direct connection to the device.

Supported communication types:

- PROFIBUS DP/PA
- HART communication (modem, RS 232 and via PROFIBUS/PROFINET)
- Modbus
- Ethernet
- PROFINET

SIMATIC PDM Basic is equipped with all basic functions required for operation and parameter assignment of devices. That is, compared to SIMATIC PDM Single Point, it has the following additional functions:

- EDD-based diagnostics in the lifelist
- Memory function (only exporting and importing of parameter data)
- Report function
- Communication with HART field devices via remote I/Os

As a basic block for an individual configuration, SIMATIC PDM Basic can be expanded with all functional SIMATIC PDM options (PDM Routing only in combination with PDM Integration in STEP 7/PCS 7 required) as well as with cumulative sets of 10, 100 or 1 000 SIMATIC PDM TAGs. Without TAG expansion, SIMATIC PDM Basic is suitable for projects with up to 4 TAGs. SIMATIC PDM 1 Client licenses (sets of 1) can also be added in combination with the SIMATIC PDM Server option.

The SIMATIC PDM Extended option allows the activation of additional SIMATIC PDM system functions (for details, see SIMATIC PDM Extended V9.1 under "Optional product components").

SIMATIC PDM Service V9.1

With this product package for extended service, local service and parameter assignment stations can be realized on any type of computer (IPC/notebook) with a local connection to a bus segment or direct connection to field devices.

It comprises:

- SIMATIC PDM Basic (incl. 4 SIMATIC PDM TAGs)
- 50 SIMATIC PDM TAGs

Like SIMATIC PDM Basic, SIMATIC PDM Service can be expanded with all functional SIMATIC PDM options (PDM Routing only in combination with PDM Integration in STEP 7/PCS 7 required) as well as with cumulative SIMATIC PDM TAGs (sets of 10, 100 or 1 000) (see "Optional product components"). SIMATIC PDM 1 Client licenses (sets of 1) can also be added in combination with the SIMATIC PDM Server option. It is permitted to upgrade to another product version.

Note: For use of gateways and for PROFINET or Ethernet communication with field devices, SIMATIC PDM TAG licenses are charged for according to the objects configured in the process device plant view as follows:

- 10 SIMATIC PDM TAGs per S7 DSGW (data record gateway) with one PROFIBUS subnet
- 20 SIMATIC PDM TAGs per S7 DSGW with more than one PROFIBUS subnet
- 10 TAGs per IE/PB Link
- 1 TAG per field device (except in the case of special specifications)

SIMATIC PDM stand-alone server V9.1

With the SIMATIC PDM Stand alone Server product package, you can establish central service and parameter assignment stations that operate according to the client/server principle. Portals opened on licensed SIMATIC PDM clients (SIMATIC PDM sessions) enable handling of production plant field devices via the SIMATIC PDM server on the plant bus assigned via registration. The product package can be used multiple times within a plant, e.g. for various plant units. It comprises:

- SIMATIC PDM Basic (incl. 4 SIMATIC PDM TAGs)
- SIMATIC PDM Extended
- SIMATIC PDM Server
- 2 × SIMATIC PDM 1 Client
- 100 SIMATIC PDM TAGs

SIMATIC PDM Stand alone Server can be expanded with all functional SIMATIC PDM options (PDM Routing only in combination with PDM Integration in STEP 7/PCS 7 required) as well as with cumulative sets of 10, 100 or 1 000 SIMATIC PDM TAGs and SIMATIC PDM 1-client licenses (see "Optional product components"). The portals opened on these clients (SIMATIC PDM sessions) must also be licensed with the SIMATIC PDM 1-client licenses besides the SIMATIC PDM clients. For details about this, refer to "SIMATIC PDM 1 Client" under "Optional

Digitalization and Communication

Communication

Field device integration / SIMATIC PDM

Design (continued)

product components". For user management of the SIMATIC PDM clients, the SIMATIC Logon product is also required. It is possible to upgrade to another product version.

Note: For use of gateways and for PROFINET or Ethernet communication with field devices, SIMATIC PDM TAG licenses are charged according to the objects configured in the process device plant view (for details, see corresponding note under SIMATIC PDM Service V9.1).

SIMATIC PDM system-integrated product packages

SIMATIC PDM S7 V9.1

The SIMATIC PDM S7 product package designed for use in a SIMATIC S7 configuration environment is intended for setup of a local SIMATIC S7 engineering and service station. It requires the installation of STEP 7 V5.5+SP4. It includes:

- SIMATIC PDM Basic (incl. 4 SIMATIC PDM TAGs)
- SIMATIC PDM Extended
- SIMATIC PDM integration in STEP 7/PCS 7
- 100 SIMATIC PDM TAGs

SIMATIC PDM S7 can be expanded with the functional options SIMATIC PDM Routing, SIMATIC PDM Communication FOUNDATION Fieldbus, SIMATIC PDM Server, and SIMATIC PDM HART Server as well as with cumulative SIMATIC PDM TAGs (sets of 10, 100 or 1 000) (see "Optional product components"). SIMATIC PDM 1 Client licenses (sets of 1) can also be added in combination with the SIMATIC PDM Server option.

SIMATIC PDM PCS 7 V9.1

The SIMATIC PDM PCS 7 product package suitable for use in a SIMATIC PCS 7 configuration environment is intended for use in a central SIMATIC PCS 7 engineering and service station. It comprises:

- SIMATIC PDM Basic (incl. 4 SIMATIC PDM TAGs)
- SIMATIC PDM Extended
- SIMATIC PDM integration in STEP 7/PCS 7
- SIMATIC PDM Routing
- 100 SIMATIC PDM TAGs

SIMATIC PDM PCS 7 can be expanded with the functional options SIMATIC PDM Communication FOUNDATION Fieldbus and SIMATIC PDM Server as well as with cumulative SIMATIC PDM TAGs (sets of 10, 100 or 1000) (see "Optional product components"). SIMATIC PDM 1 Client licenses (sets of 1) can also be added in combination with the SIMATIC PDM Server option.

SIMATIC PDM PCS 7 Server V9.1

Instead of SIMATIC PDM PCS 7, the SIMATIC PDM PCS 7 Server product package expanded with the SIMATIC PDM Server option can also be used for a central SIMATIC PCS 7 engineering and service station. Field devices integrated using an Electronic Device Description (EDD) can then be assigned parameters on any client of the SIMATIC PCS 7 Maintenance Station as well as on local SIMATIC PDM clients. The following are components of SIMATIC PDM PCS 7 Server:

- SIMATIC PDM Basic (incl. 4 SIMATIC PDM TAGs)
- SIMATIC PDM Extended
- SIMATIC PDM integration in STEP 7/PCS 7
- SIMATIC PDM Routing
- SIMATIC PDM Server
- 100 SIMATIC PDM TAGs

SIMATIC PDM PCS 7 Server can be expanded with the functional option SIMATIC PDM Communication FOUNDATION Fieldbus as well as with cumulative sets of 10, 100 or 1 000 SIMATIC PDM TAGs and SIMATIC PDM 1-Client licenses (see "Optional product components"). The portals opened on these clients (SIMATIC PDM sessions) must also be licensed with the SIMATIC PDM 1-client licenses besides the SIMATIC PDM clients. For details about this, refer to "SIMATIC PDM 1 Client" under "Optional product components".

SIMATIC PDM PCS 7-FF V9.1

Instead of SIMATIC PDM PCS 7, the SIMATIC PDM PCS 7-FF product package expanded with the SIMATIC PDM Communication FOUNDATION Fieldbus option can also be used for a central SIMATIC PCS 7 engineering and service station. This additionally supports parameter assignment of field devices on FOUNDATION Fieldbus H1. Components of SIMATIC PDM PCS 7-FF are:

- SIMATIC PDM Basic (incl. 4 SIMATIC PDM TAGs)
- SIMATIC PDM Extended
- SIMATIC PDM integration in STEP 7/PCS 7
- SIMATIC PDM Routing
- SIMATIC PDM Communication FOUNDATION Fieldbus
- 100 SIMATIC PDM TAGs

Design (continued)

SIMATIC PDM PCS 7-FF V9.1 can be expanded with the functional option SIMATIC PDM Server as well as with cumulative sets of 10, 100 or 1 000 SIMATIC PDM TAGs (see "Optional product components"). SIMATIC PDM 1 Client licenses (sets of 1) can also be added in combination with the SIMATIC PDM Server option.

Optional product componentsSIMATIC PDM Extended V9.1 option

The SIMATIC PDM Extended option enables you to unlock other system functions for SIMATIC PDM Basic and SIMATIC PDM, for example:

- Change log
- Calibration report
- Extended information in the Lifelist
- Export and import functions
- Print functions
- Document manager
- Comparison function
- Group operations
- Setting device IDs

This functionality is already integrated in the following product packages: SIMATIC PDM Stand alone Server, SIMATIC PDM S7, SIMATIC PDM PCS 7, SIMATIC PDM PCS 7 Server and SIMATIC PDM PCS 7-FF.

SIMATIC PDM Integration option in STEP 7/PCS 7 V9.1

This option is used for the integration of SIMATIC PDM in a SIMATIC S7 or SIMATIC PCS 7 configuration environment. SIMATIC PDM can then be started directly from the hardware configurator (HW Config) in STEP 7/SIMATIC PCS 7.

This functionality is already integrated in the product packages of category "SIMATIC PDM System-integrated" (SIMATIC PDM S7, SIMATIC PDM PCS 7, SIMATIC PDM PCS 7 Server, and SIMATIC PDM PCS 7-FF).

SIMATIC PDM Routing V9.1 option

If SIMATIC PDM is used on an engineering station, the SIMATIC PDM Routing option enables handling of every device in the field that can be configured per EDD throughout the plant and across different bus systems and remote I/Os. SIMATIC PDM Routing can be used in combination with SIMATIC PDM Integration in STEP 7/SIMATIC PCS 7.

Routing is already integrated in SIMATIC PDM PCS 7, SIMATIC PDM PCS 7 Server, and SIMATIC PDM PCS 7-FF. SIMATIC PDM Routing can be additionally installed as an option on a local SIMATIC S7 engineering and service station with SIMATIC PDM S7.

SIMATIC PDM Server V9.1 option

The server functionality can be activated in a local or central service station with this option. It enables parameter assignment of selected field devices on any client of the SIMATIC PCS 7 Maintenance Station as well as on local SIMATIC PDM clients. This functionality is already integrated in the SIMATIC PDM Stand alone Server and SIMATIC PDM PCS 7 Server. The SIMATIC PDM clients as well as the portals opened on these clients (SIMATIC PDM sessions) must be licensed with SIMATIC PDM 1 client licenses. For details about this, refer to "SIMATIC PDM 1 Client" under "Optional product components".

SIMATIC PDM Communication FOUNDATION Fieldbus V9.1 option

In a SIMATIC S7/PCS 7 configuration environment, using this option SIMATIC PDM can communicate with field devices on the FOUNDATION Fieldbus H1 via the FF link.

This functionality is already integrated in the SIMATIC PDM PCS 7-FF product package.

SIMATIC PDM HART Server V9.1 option

This option permits the use of HART multiplexers from various vendors in SIMATIC PDM. Furthermore, WirelessHART field devices can also be parameterized with SIMATIC PDM.

SIMATIC PDM TAGs (version-independent)

Depending on the project size, the SIMATIC PDM TAGs supplied with a product package (except SIMATIC PDM Single Point) can be cumulatively expanded with sets of 10, 100 or 1 000 SIMATIC PDM TAGs.

A SIMATIC PDM TAG corresponds to a SIMATIC PDM object that represents the individual field devices or field components within a project, e.g. measuring instruments, positioners, switching devices or remote I/Os. SIMATIC PDM TAGs are also relevant for diagnostics with the lifelist of SIMATIC PDM. In this case, TAGs are considered to be all recognized devices with diagnostics capability, whose detailed diagnostics is effected through the device description (EDD).

SIMATIC PDM 1 Client (version-independent)

SIMATIC PDM 1 Client is a cumulative single-client license for SIMATIC PDM configurations with SIMATIC PDM Server, for example SIMATIC PDM Stand alone Server or SIMATIC PDM PCS 7 Server. The license is used to activate registered SIMATIC PDM clients and SIMATIC PDM sessions (opened portals) on these clients.

Each "SIMATIC PDM 1 Client" license activates one SIMATIC PDM client with one SIMATIC PDM session. A SIMATIC PDM session is defined as one opened portal together with the parameter views of the field devices opened from the portal. Each additional simultaneously opened SIMATIC PDM session on this client requires its own "SIMATIC PDM 1 Client" license. For larger projects, up to 30 registered SIMATIC PDM Clients are possible.

Digitalization and Communication

Communication

Field device integration / SIMATIC PDM

Design (continued)

The "SIMATIC PDM 1 Client" license must be transferred to the computer with the SIMATIC PDM Server. The SIMATIC PDM Standalone Server product package comes with 2 "SIMATIC PDM 1 Client" licenses.

SIMATIC PDM Software Media Package V9.1

The current SIMATIC PDM installation software is offered without a license in the form of the SIMATIC PDM Software Media Package. Purchasing of corresponding software licenses is necessary to unlock the product-specific functionalities.

With SIMATIC PDM product packages, a SIMATIC PDM Software Media Package is supplied together with each ordering item when supplied via "Goods delivery" (not with optional product components). Further SIMATIC PDM Software Media Packages must be ordered separately as required.

The software of the SIMATIC PDM Media Package without a license can be used for demonstration purposes in demo mode. The SIMATIC PDM functionality is limited as follows in demo mode:

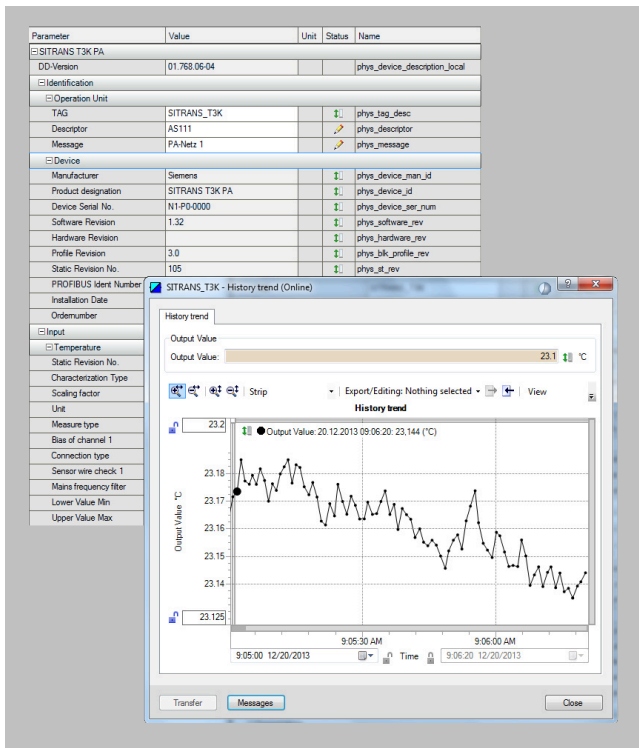
- Stand alone mode
- Storage functions disabled
- Export and import functions disabled
- Expanded functionality disabled
- Communication functions restricted

Information on ordering and delivery

Installation software for the SIMATIC PDM is provided in the form of a software media package. Software media packages and product-specific software licenses are separate packages, which are not merged into a single delivery unit for a goods delivery.

The number of delivered software media packages can be determined by the number of ordered items. You can find more information under "Goods delivery" in the "Software Media and Logistics" section, "PCS 7 Software Packages" subsection in the ST PCS 7 catalog.

Function



SIMATIC PDM, parameter view and trend window

SIMATIC PDM core functions

- Creation of project-specific device libraries
- Adjustment and modification of device parameters
- Comparing (e.g. project and device data)
- Plausibility testing of data input
- Device identification and testing
- Device status indication (operating modes, interrupts, states)
- Simulation
- Diagnostics (standard, detailed)
- Export/import (parameter data, logs, documents)
- Management (e.g. networks and PCs)
- Commissioning functions, e.g. measuring circuit tests of device data
- Lifecycle management functions, e.g. for device replacement
- Global and device-specific modification logbook for user operations (audit trail)
- Device-specific calibration reports
- Graphic presentations of echo envelope curves, trend displays, valve diagnosis results etc.
- Presentation of incorporated manuals
- Document manager for integration of up to 10 multimedia files

Integration

Device integration

SIMATIC PDM supports all devices defined by the Electronic Device Description (EDD) and devices described by Field Device Integration Technology (FDI Technology V1.2). EDD is standardized to EN 50391 and IEC 61804. Internationally it is the most widely used standardized technology for device integration. At the same time, it is the guideline of the established organizations for

- PROFIBUS and PROFINET (PI – PROFIBUS & PROFINET International)
- HART (FCG: Field Communication Group)
- Foundation Fieldbus (FCG: Field Communication Group)

The devices are integrated directly in SIMATIC PDM through a company-specific EDD or through the libraries of the FCG. To achieve improved transparency, they can be managed in project-specific device libraries.

Field devices are described in the EDD or FDI device description packages in terms of functionality and construction using the Electronic Device Description Language (EDDL). Using this description, SIMATIC PDM automatically creates its user interfaces with the specific device data. By simply importing the manufacturer's device-specific device description packages, you can update existing devices and integrate further devices in SIMATIC PDM.

Technical support

If you wish to use devices which cannot be found in the SIMATIC PDM device description library, we would be pleased to help you integrate them.

Support Request

You can request support by service specialists at Technical Support by using a "Support Request" on the Internet:

Contacts in the Region

The Technical Support responsible for your Region can be found on the Internet at:

Digitalization and Communication

Communication

Field device integration / SIMATIC PDM

Selection and ordering data

SIMATIC PDM Stand alone product packages	
Minimum configuration	
<p>SIMATIC PDM Single Point V9.1 including 1 TAG; product package for operation and configuration of one field device; communication via PROFIBUS DP/PA, HART (modem, RS 232, PROFIBUS/PROFINET), Modbus, Ethernet or PROFINET Additional functions or SIMATIC PDM TAGs are not possible 6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs on Windows 7 Ultimate 64-bit, Windows 10 Enterprise 2015 LTSB 64-bit, Windows Server 2012 R2 Standard 64-bit or Microsoft Windows Server 2016 Standard 64-bit (see SIMATIC PDM V9.1 Readme for latest information), floating license for 1 user Without SIMATIC PCS 7 Software Media Package</p> <ul style="list-style-type: none"> • Goods delivery License key on USB flash drive and Certificate of License, bundle with 1 × SIMATIC PDM Software Media Package per order item 	6ES7658-3HA68-0YA5
<ul style="list-style-type: none"> • Online delivery License key download and online Certificate of License combined with SIMATIC PDM Software Media Package (SIMATIC PDM and device library software download) : Email address required! 	6ES7658-3HA68-0YH5
Basic configuration for individual product package as well as local service and parameter assignment stations	
<p>SIMATIC PDM Basic V9.1 including 4 TAGs; product package for operation and configuration of field devices and components; communication via PROFIBUS DP/PA, HART (modem, RS 232, PROFIBUS/PROFINET), Modbus, Ethernet or PROFINET 6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs on Windows 7 Ultimate 64-bit, Windows 10 Enterprise 2015 LTSB 64-bit, Windows Server 2012 R2 Standard 64-bit or Microsoft Windows Server 2016 Standard 64-bit (see SIMATIC PDM V9.1 Readme for latest information), floating license for 1 user Without SIMATIC PCS 7 Software Media Package</p> <ul style="list-style-type: none"> • Goods delivery License key on USB flash drive and Certificate of License, bundle with 1 × SIMATIC PDM Software Media Package per order item 	6ES7658-3AB68-0YA5
<ul style="list-style-type: none"> • Online delivery License key download and online Certificate of License combined with SIMATIC PDM Software Media Package (SIMATIC PDM and device library software download) : Email address required! 	6ES7658-3AB68-0YH5

Selection and ordering data (continued)

Configuration for local service and parameter assignment station	
<p>SIMATIC PDM Service V9.1 Product package for service and measuring circuit tests on a local service station, with</p> <ul style="list-style-type: none"> • SIMATIC PDM Basic incl. 4 TAGs • 50 TAGs <p>6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs on Windows 7 Ultimate 64-bit, Windows 10 Enterprise 2015 LTSB 64-bit, Windows Server 2012 R2 Standard 64-bit or Microsoft Windows Server 2016 Standard 64-bit (see SIMATIC PDM V9.1 Readme for latest information), floating license for 1 user Without SIMATIC PCS 7 Software Media Package</p> <ul style="list-style-type: none"> • Goods delivery License key on USB flash drive and Certificate of License, bundle with 1 × SIMATIC PDM Software Media Package per order item 	6ES7658-3JD68-0YA5
<ul style="list-style-type: none"> • Online delivery License key download and online Certificate of License combined with SIMATIC PDM Software Media Package (SIMATIC PDM and device library software download) : Email address required! 	6ES7658-3JD68-0YH5
Configuration for central service and parameter assignment station	
<p>SIMATIC PDM stand-alone server V9.1 Product package for service and device management in plant units, with</p> <ul style="list-style-type: none"> - SIMATIC PDM Basic incl. 4 TAGs - SIMATIC PDM Extended - SIMATIC PDM Server - 2 × SIMATIC PDM 1 Client - 100 TAGs <p>6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs with Windows 7 Ultimate 64-bit, Windows 10 Enterprise 2015 LTSB 64-bit, Windows Server 2012 R2 Standard 64-bit or Microsoft Windows Server 2016 Standard 64-bit (see SIMATIC PDM V9.1 Readme for latest information), single license for 1 installation Without SIMATIC PCS 7 Software Media Package</p> <ul style="list-style-type: none"> • Goods delivery License key on USB flash drive and Certificate of License, bundle with 1 × SIMATIC PDM Software Media Package per order item 	6ES7658-3TX68-0YA5
<ul style="list-style-type: none"> • Online delivery License key download and online Certificate of License combined with SIMATIC PDM Software Media Package (SIMATIC PDM and device library software download) : Email address required! 	6ES7658-3TX68-0YH5
SIMATIC PDM system-integrated product packages	

Selection and ordering data (continued)

<u>Configuration for local SIMATIC S7 engineering and service station</u>	
<p>SIMATIC PDM S7 V9.1 Product package for use in a SIMATIC S7 configuration environment, with</p> <ul style="list-style-type: none"> - SIMATIC PDM Basic incl. 4 TAGs - SIMATIC PDM Extended - SIMATIC PDM Integration in STEP 7/PCS 7 - 100 TAGs <p>6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs on Windows 7 Ultimate 64-bit, Windows 10 Enterprise 2015 LTSB 64-bit, Windows Server 2012 R2 Standard 64-bit or Microsoft Windows Server 2016 Standard 64-bit (see SIMATIC PDM V9.1 Readme for latest information), floating license for 1 user Without SIMATIC PCS 7 Software Media Package</p> <ul style="list-style-type: none"> • Goods delivery License key on USB flash drive and Certificate of License, bundle with 1 × SIMATIC PDM Software Media Package per order item 	<p>6ES7658-3KD68-0YA5</p>
<ul style="list-style-type: none"> • Online delivery License key download and online Certificate of License combined with SIMATIC PDM Software Media Package (SIMATIC PDM and device library software download) : Email address required! 	<p>6ES7658-3KD68-0YH5</p>
<u>Configuration for central SIMATIC PCS 7 engineering and service stations</u>	
<p>SIMATIC PDM PCS 7 V9.1 Product package for use in a SIMATIC PCS 7 configuration environment</p> <p>6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs with Windows 7 Ultimate 64-bit, Windows 10 Enterprise 2015 LTSB 64-bit, Windows Server 2012 R2 Standard 64-bit or Microsoft Windows Server 2016 Standard 64-bit (see SIMATIC PDM V9.1 Readme for latest information)</p> <p>Floating license for 1 user, with</p> <ul style="list-style-type: none"> - SIMATIC PDM Basic incl. 4 TAGs - SIMATIC PDM Extended - SIMATIC PDM Integration in STEP 7/PCS 7 - SIMATIC PDM Routing - 100 TAGs <p>Without SIMATIC PCS 7 Software Media Package</p> <ul style="list-style-type: none"> • Goods delivery License key on USB flash drive and Certificate of License, bundle with 1 × SIMATIC PDM Software Media Package per order item 	<p>6ES7658-3LD68-0YA5</p>
<ul style="list-style-type: none"> • Online delivery License key download and online Certificate of License combined with SIMATIC PDM Software Media Package (SIMATIC PDM and device library software download) : Email address required! 	<p>6ES7658-3LD68-0YH5</p>

Selection and ordering data (continued)

<p>SIMATIC PDM PCS 7-FF V9.1 Product package for use in a SIMATIC PCS 7 configuration environment, including FOUNDATION Fieldbus H1 communication</p> <p>6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs with Windows 7 Ultimate 64-bit, Windows 10 Enterprise 2015 LTSB 64-bit, Windows Server 2012 R2 Standard 64-bit or Microsoft Windows Server 2016 Standard 64-bit (see SIMATIC PDM V9.1 Readme for latest information)</p> <p>Floating license for 1 user, with</p> <ul style="list-style-type: none"> - SIMATIC PDM Basic incl. 4 TAGs - SIMATIC PDM Extended - SIMATIC PDM Integration in STEP 7/PCS 7 - SIMATIC PDM Routing - SIMATIC PDM Communication FOUNDATION Fieldbus - 100 TAGs <p>Without SIMATIC PCS 7 Software Media Package</p> <ul style="list-style-type: none"> • Goods delivery License key on USB flash drive and Certificate of License, bundle with 1 × SIMATIC PDM Software Media Package per order item 	<p>6ES7658-3MD68-0YA5</p>
<ul style="list-style-type: none"> • Online delivery License key download and online Certificate of License combined with SIMATIC PDM Software Media Package (SIMATIC PDM and device library software download) : Email address required! 	<p>6ES7658-3MD68-0YH5</p>
<p>SIMATIC PDM PCS 7 Server V9.1 Product package for use in a SIMATIC PCS 7 configuration environment, including server functionality</p> <p>6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs with Windows 7 Ultimate 64-bit, Windows 10 Enterprise 2015 LTSB 64-bit, Windows Server 2012 R2 Standard 64-bit or Microsoft Windows Server 2016 Standard 64-bit (see SIMATIC PDM V9.1 Readme for latest information)</p> <p>Single license for 1 installation, with</p> <ul style="list-style-type: none"> - SIMATIC PDM Basic incl. 4 TAGs - SIMATIC PDM Extended - SIMATIC PDM Integration in STEP 7/PCS 7 - SIMATIC PDM Routing - SIMATIC PDM Server - 100 TAGs <p>Without SIMATIC PCS 7 Software Media Package</p> <ul style="list-style-type: none"> • Goods delivery License key on USB flash drive and Certificate of License, bundle with 1 × SIMATIC PDM Software Media Package per order item 	<p>6ES7658-3TD68-0YA5</p>
<ul style="list-style-type: none"> • Online delivery License key download and online Certificate of License combined with SIMATIC PDM Software Media Package (SIMATIC PDM and device library software download) : Email address required! 	<p>6ES7658-3TD68-0YH5</p>

Digitalization and Communication

Communication

Field device integration / SIMATIC PDM

Selection and ordering data (continued)

Optional product components for SIMATIC PDM	
<p>SIMATIC PDM Extended V9.1 For enabling additional system functions 6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs on Windows 7 Ultimate 64-bit, Windows 10 Enterprise 2015 LTSB 64-bit, Windows Server 2012 R2 Standard 64-bit or Microsoft Windows Server 2016 Standard 64-bit (see SIMATIC PDM V9.1 Readme for latest information), floating license for 1 user Without SIMATIC PCS 7/SIMATIC PDM Software Media Package</p> <ul style="list-style-type: none"> Goods delivery License key on USB flash drive and Certificate of License Online delivery (without SIMATIC PCS 7/SIMATIC PDM Software Media Package) License key download and online Certificate of License : Email address required! 	<p>6ES7658-3NX68-2YB5</p> <p>6ES7658-3NX68-2YH5</p>
<p>SIMATIC PDM Integration in STEP 7/SIMATIC PCS 7 V9.1 For integration in a SIMATIC S7/SIMATIC PCS 7 configuration environment 6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs on Windows 7 Ultimate 64-bit, Windows 10 Enterprise 2015 LTSB 64-bit, Windows Server 2012 R2 Standard 64-bit or Microsoft Windows Server 2016 Standard 64-bit (see SIMATIC PDM V9.1 Readme for latest information), floating license for 1 user Without SIMATIC PCS 7/SIMATIC PDM Software Media Package</p> <ul style="list-style-type: none"> Goods delivery License key on USB flash drive and Certificate of License Online delivery License key download and online Certificate of License : Email address required! 	<p>6ES7658-3BX68-2YB5</p> <p>6ES7658-3BX68-2YH5</p>
<p>SIMATIC PDM Routing V9.1 For plant-wide navigation to field devices 6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs on Windows 7 Ultimate 64-bit, Windows 10 Enterprise 2015 LTSB 64-bit, Windows Server 2012 R2 Standard 64-bit or Microsoft Windows Server 2016 Standard 64-bit (see SIMATIC PDM V9.1 Readme for latest information), floating license for 1 user Without SIMATIC PCS 7/SIMATIC PDM Software Media Package</p> <ul style="list-style-type: none"> Goods delivery License key on USB flash drive and Certificate of License Online delivery License key download, online Certificate of License : Email address required! 	<p>6ES7658-3CX68-2YB5</p> <p>6ES7658-3CX68-2YH5</p>

Selection and ordering data (continued)

<p>SIMATIC PDM Server V9.1 For activating the server functionality 6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs with Windows 7 Ultimate 64-bit, Windows 10 Enterprise 2015 LTSB 64-bit, Windows Server 2012 R2 Standard 64-bit or Microsoft Windows Server 2016 Standard 64-bit (see SIMATIC PDM V9.1 Readme for latest information), single license for 1 installation Without SIMATIC PCS 7/SIMATIC PDM Software Media Package</p> <ul style="list-style-type: none"> Goods delivery License key on USB flash drive, Certificate of License Online delivery License key download and online Certificate of License : Email address required! 	<p>6ES7658-3TX68-2YB5</p> <p>6ES7658-3TX68-2YH5</p>
<p>SIMATIC PDM Communication FOUNDATION Fieldbus V9.1 For communication with field devices on FOUNDATION Fieldbus H1 6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs on Windows 7 Ultimate 64-bit, Windows 10 Enterprise 2015 LTSB 64-bit, Windows Server 2012 R2 Standard 64-bit or Microsoft Windows Server 2016 Standard 64-bit (see SIMATIC PDM V9.1 Readme for latest information), floating license for 1 user Without SIMATIC PCS 7/SIMATIC PDM Software Media Package</p> <ul style="list-style-type: none"> Goods delivery License key on USB flash drive and Certificate of License Online delivery License key download and online Certificate of License : Email address required! 	<p>6ES7658-3QX68-2YB5</p> <p>6ES7658-3QX68-2YH5</p>
<p>SIMATIC PDM HART Server V9.1 For using HART multiplexers as well as for configuration of WirelessHART field devices 6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs on Windows 7 Ultimate 64-bit, Windows 10 Enterprise 2015 LTSB 64-bit, Windows Server 2012 R2 Standard 64-bit or Microsoft Windows Server 2016 Standard 64-bit (see SIMATIC PDM V9.1 Readme for latest information), floating license for 1 user Without SIMATIC PCS 7/SIMATIC PDM Software Media Package</p> <ul style="list-style-type: none"> Goods delivery License key on USB flash drive and Certificate of License Online delivery License key download and online Certificate of License : Email address required! 	<p>6ES7658-3EX68-2YB5</p> <p>6ES7658-3EX68-2YH5</p>

Selection and ordering data (continued)

SIMATIC PDM 1 Client	
Cumulative client license for SIMATIC PDM configurations with SIMATIC PDM Server, software class A, single license for 1 installation	
<ul style="list-style-type: none"> Goods delivery License key on USB flash drive and Certificate of License 	6ES7658-3UA00-2YB5
<ul style="list-style-type: none"> Online delivery License key download and online Certificate of License : Email address required! 	6ES7658-3UA00-2YH5
SIMATIC PDM TAGs	
TAG licenses for expanding the available TAG volume, cumulative, software class A, floating license for 1 user	
<ul style="list-style-type: none"> Goods delivery License key on USB flash drive and Certificate of License 	
- 10 TAGs	6ES7658-3XC00-2YB5
- 100 TAGs	6ES7658-3XD00-2YB5
- 1 000 TAGs	6ES7658-3XE00-2YB5
<ul style="list-style-type: none"> Online delivery License key download and online Certificate of License : Email address required! 	
- 10 TAGs	6ES7658-3XC00-2YH5
- 100 TAGs	6ES7658-3XD00-2YH5
- 1 000 TAGs	6ES7658-3XE00-2YH5
SIMATIC PDM Software Media Package	
SIMATIC PDM Software Media Package V9.1	
Installation software without license, 6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs on Windows 7 Ultimate 64-bit, Windows 10 Enterprise 2015 LTSB 64-bit, Windows Server 2012 R2 Standard 64-bit or Microsoft Windows Server 2016 Standard 64-bit (see SIMATIC PDM V9.1 Readme for latest information) Without SIMATIC PCS 7 Software Media Package	
Note: Can only be used in conjunction with a valid license or in demo mode!	
<ul style="list-style-type: none"> Goods delivery SIMATIC PDM and device library software on DVD 	6ES7658-3GX68-0YT8
<ul style="list-style-type: none"> Online delivery SIMATIC PDM and device library software download : Email address required! 	6ES7658-3GX68-0YG8

Technical specifications

SIMATIC PDM V9.1	
Hardware	<ul style="list-style-type: none"> PG/PC/notebook with processor corresponding to operating system requirements
Operating system (alternatives)	<ul style="list-style-type: none"> Windows 7 Professional/Ultimate/Enterprise SP1 32-bit/64-bit Windows 10 Enterprise 2015 LTSB 64-bit Windows Server 2012 R2 SP1 Standard Edition, 64-bit Microsoft Windows Server 2016 Standard 64-bit
Integration in STEP 7/PCS 7	<ul style="list-style-type: none"> SIMATIC PCS 7 V8.0+SP2/V8.1/V8.2 (without Communication FOUNDATION Fieldbus) SIMATIC PCS 7 V9.0 STEP 7 V5.5+SP4/V5.6
SIMATIC PDM Client	<ul style="list-style-type: none"> Microsoft Internet Explorer 10 or 11 Google Chrome

More information

Update/Upgrade

Existing installations based on SIMATIC PDM V6.x or V8.x/V9.0 (including SP in each case) can be upgraded straight to V9.1 with upgrade packages.

Projects with SIMATIC PDM V7.0 can only be upgraded to version 9.1 by first upgrading to version 8.0. Two upgrade packages are offered for SIMATIC PDM V8.x/V9.0:

- SIMATIC PDM Upgrade Package Basic¹⁾ (with/without SIMATIC PDM HART Server option in each case) for configurations based on:

- SIMATIC PDM Basic
- SIMATIC PDM Service
- SIMATIC PDM S7
- SIMATIC PDM PCS 7

- SIMATIC PDM Upgrade Package Complete¹⁾ for configurations based on:

- SIMATIC PDM PCS 7 Server
- SIMATIC PDM PCS 7-FF

¹⁾ Optional product components for SIMATIC PDM such as PDM Extended, PDM Integration in STEP 7/PCS 7, PDM Routing, PDM Server and PDM Communication FOUNDATION Fieldbus are each included in a product package listed in the SIMATIC PDM Upgrade Package Basic or SIMATIC PDM Upgrade Package Complete and are implicitly authorized to be updated via the corresponding license. The SIMATIC PDM Upgrade Package Complete is required for use of the product components PDM Server or PDM Communication FOUNDATION Fieldbus.

For more information, see the section "Update/upgrade packages", "Updates/upgrades asynchronous to the PCS 7 version" - "Upgrades SIMATIC PDM".

Digitalization and Communication

Communication

Field device integration / SITRANS DTM

Overview



SITRANS DTM provides an easy way for Field Device Tool (FDT)/ Device Type Manager (DTM) users to parameterize Siemens Instruments using international standards.

Benefits

- Same look and feel for all Siemens field instruments
- Support for Quick start wizards and other dialog boxes
- Quick overview using table and tree views
- Online and offline configuration
- Conformity to IEC profiles for HART and PROFIBUS

Application

Electronic Device Description (EDD) is a proven way to describe the behavior and functionality of field instruments and other automation components.

For many years, EDD-based tools such as SIMATIC PDM from Siemens or handheld communicator have been used successfully in the process industry. Some years ago, an additional technology called FDT / DTM with the same approach was introduced to the market. To support the FDT DTM Technology for Siemens devices, the software SITRANS DTM has been developed which combines both technologies, EDD and FDT.

SITRANS DTM uses EDDs as the device description and provides the DTM interface to allow the integration of our field instruments into FDT-frame applications.

The following field instruments are currently available in SITRANS DTM:

- SITRANS TH300 HART
- SITRANS TH400 PA
- SITRANS P300 HART
- SITRANS P DSIII HART
- SITRANS P F M MAGFLO MAG6000 DP/PA
- SITRANS F C MASSFLO MASS6000 PA/PA
- SITRANS PROBE LU HART 6 m, 12 m
- SITRANS LR200 HART, PA
- SITRANS LR250 HART, PA
- SITRANS LR260 HART, PA
- SITRANS LR560 HART, PA
- SIPART PS2 HART, PA

Additionally, the SIPART PS2 FF has a DTM.

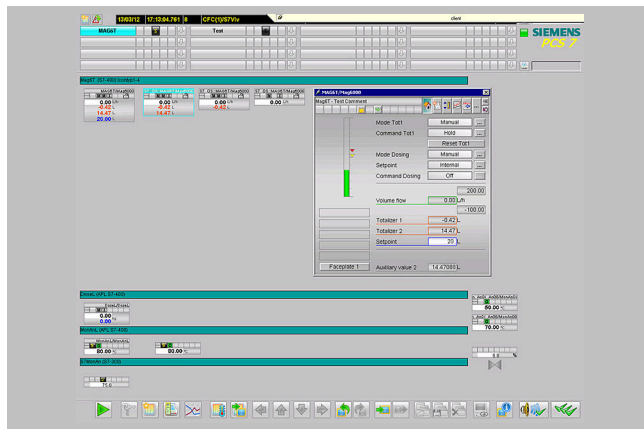
Technical specifications

SITRANS DTM	
Current Version	3.1
Compatible with PACTware versions	3.6, 4.0, 4.1
Compatible with Windows	XP, 7
Certified by FDT group	Yes

Free DTM software can be downloaded here:

- SITRANS DTM V3.1: <https://support.industry.siemens.com/cs/document/53754140/software%3A-sitrans-dtm-v3-1?dti=0&lc=de-WW>
- SITRANS DTM V4.1: <https://support.industry.siemens.com/cs/document/109484287/sitrans-dtm-v4-1?dti=0&lc=de-WW>

Overview



The SITRANS Library for SIMATIC PCS 7 extends the standard functionality of the SIMATIC PCS 7 process control system concentrated in the SIMATIC PCS 7 Advanced Process Library (APL) with technological blocks and faceplates for device-specific functions of the SITRANS field devices.

Benefits

The SITRANS Library allows you to easily operate all device functions, such as dosing, totalizer, min/max pointer, path diagnostic, alarm diagnostics, zero point adjustment (ZPA), etc. In addition, process related diagnostic information is also provided.

The SITRANS Library is based on the modern design of the Advanced Process Library (APL). Together with the APL, the SITRANS Library enables you to create harmonic overall solutions with a consistent look & feel and optimum use of the functions of the SITRANS field devices in many industries.

It helps accelerate the engineering process, reduces the time-to-market, and simplifies process control.

Note:

SITRANS Library V13 will support PCS 7 9.1 SP1 or higher.

Application

The SITRANS Library is best used in combination with SIMATIC PCS 7 and SITRANS field devices.

A current list of SITRANS field devices and the supported SIMATIC PCS 7 versions is available at

<http://new.siemens.com/sitranslibrarypcs7devices>

The SITRANS Library can be used for all core sectors of the process industry. These are:

- Chemical industry
- Pharmaceutical industry
- Water and wastewater
- Glass and solar
- Oil & gas
- Food and beverage industry
- Minerals and mining

Design

The product structure is geared toward the operational environment in the SIMATIC PCS 7 process control system. Consequently, SITRANS Library is offered in the form of an engineering component:

- SITRANS Library users can use the library with their supported PCS 7 version. No additional licenses are required for Engineering or OS runtime.

The SITRANS Library product component enables you to perform configuration work on a SIMATIC PCS 7 engineering station.

The SITRANS Library product component allows you to run blocks from a library on an automation system.

When using function blocks from SITRANS Library in SIMATIC PC 7 automation systems, please note that SIMATIC PCS 7 AS Runtime POs are also booked.

Function

SITRANS Library for SIMATIC PCS 7

Sublibrary for the functional expansion of the SIMATIC PCS 7 Advanced Process Library with:

- Function blocks and faceplates for SITRANS field devices with S7-400 and S7-410 systems.

The function blocks are configured in CFC.

Operator control and monitoring from a panel is configured with the panel interface blocks for the SITRANS F M MAG 6000 DP. Taking operating rights and hierarchical operating concepts (multi-control room operation) into consideration, the technological function can then be operated from both an operator station and a Touch Panel.

For detailed information on which field devices, which systems and system versions are supported as well as on the free download, see:

<http://new.siemens.com/sitranslibrarypcs7devices>

Selection and ordering data

Selection and ordering data	Article No.
SITRANS Library Block library for SIMATIC PCS 7 as of V13.0 with function blocks and faceplates as well as electronic documentation. The following operating systems are supported by SIMATIC PCS 7 V9.1 SP1: <ul style="list-style-type: none"> • Windows 10 Enterprise LTSC 2019 • Windows Server 2019 Standard Edition • Windows Server 2019 Datacenter Edition Engineering license for one customer plant Type of delivery: free download	7MP2990-0AA00

Digitalization and Communication

Communication

Communication protocols / FOUNDATION Fieldbus

Overview

Today, distributed automation solutions based on open field buses are state-of-the-art in large areas of the process engineering industry. It is only with fieldbuses that the functional benefits of digital communication can be put to full use, e.g. better resolution of measured values, diagnostics options and remote parameterization.

Like PROFIBUS PA, the FF bus (FOUNDATION Fieldbus) is an open field bus with a large installed base for a wide range of application. Standardization according to IEC 61158 / EN 50170 provides you with future protection for your investment.

Benefits

- A uniform modular system from the sensor to the connection to the control level enables new plant concepts
- Problem-free exchangeability of field devices, including from different manufacturers, that comply with the standard profile
- Networking of transmitters, valves, actuators, etc.
- Implementation of intrinsically safe applications through use of the field bus in hazardous areas
- Easy installation of 2-wire cables for joint energy supply and data transfer
- Reduced cabling costs through savings of material and installation time
- Reduced configuration costs through central, simple engineering of the field devices, also cross-vendor
- Fast and error-free installation
- Lower service costs thanks to simpler wiring and plant structure plus extensive diagnostics options
- Greatly reduced commissioning costs through simplified loop check
- Scaling/digitizing of the measured values in the field device already, hence no rescaling necessary in SIMATIC PCS 7

Application

The transfer technology of the FOUNDATION Fieldbus is tailored to the needs of the process industry. Interoperability between field devices from different manufacturers and remote parameterization of the field devices during operation are guaranteed by the standardized communication services.

FOUNDATION Fieldbus can just as readily be used in standard environments as in hazardous areas. For use in hazardous areas, FOUNDATION Fieldbus and all connected devices have to be designed with type of explosion protection Ex [i].

Function

FOUNDATION Fieldbus enables the direct connection of actuators and sensors.

FOUNDATION Fieldbus is based on a transfer optimized for intrinsically safe application. The transfer technology is internationally standardized in IEC 61158.

For FOUNDATION Fieldbus the data and energy supply for the field devices can be directed through a 2-wire cable.

FOUNDATION Fieldbus enables device-to-device communication ("control in the field").

Integration

Siemens field devices for process automation which are listed in this catalog and can be controlled using Foundation Fieldbus:

Measuring instruments for pressure

SITRANS P300

SITRANS P DS III

SITRANS P410

Measuring instruments for temperature

SITRANS TH400

Electropneumatic positioners

SIPART PS2

Flow meters

SITRANS F M MAG 6000

SITRANS F M MAG 6000 I / I Ex

SITRANS F C MASS 6000

Level meters

SITRANS LR250

Overview

HART is a widely used communication standard for field devices. HART devices are specified by the FieldComm Group.

The HART standard expands the analog 4 to 20 mA signal to modulated, industry-tested, digital signal transmission.

Benefits

- Tried-and-tested analog measured value transmission
- Simultaneous digital communication with bidirectional data transfer
- Possibility to transfer multiple measured variables from a field device (e.g. diagnostics, maintenance and process information)
- Connection to higher-level systems such as PROFIBUS DP.

Easy installation and commissioning

Benefits in connection with SIMATIC PDM

- Manufacturer-neutral operation of all HART devices through standardized parameter sets
- HART field devices described by HART DLL are integrated in SIMATIC PDM via the Fieldcomm catalog. HART-DD (Device Description) in SIMATIC PDM standardized, manufacturer-neutral and very widely used. Additional field devices are integrated in SIMATIC PDM via EDD (Electronic Device Description)
- Simple operation and commissioning of field devices, even in usage locations that are difficult to access
- Advanced diagnostics, evaluating and logging functions

Application

Devices can be connected in different ways:

- Through the distributed I/O
 - SIMATIC ET 200M, ET 200SP
 - SIMATIC ET 200iSP with the HART modules
 or with analog modules 4 to 20 mA and HART Handheld Communicator,
- via a HART modem with which a point-to-point connection between the PC or Engineering System and the HART device can be established
- via HART multiplexers which are contained in the HART server of the HCF.

Integration

Siemens field devices listed in this catalog for process automation that can be controlled with HART:

Measuring instruments for pressure

SITRANS P300
SITRANS P310
SITRANS P320
SITRANS P DS III
SITRANS P410
SITRANS P420
SITRANS P500

Measuring instruments for temperature

SITRANS TF
SITRANS TH300
SITRANS TH320
SITRANS TH420
SITRANS TR300
SITRANS TR320
SITRANS TR420
SITRANS TW

Flow meters

SITRANS F M MAG 5000
SITRANS F M MAG 6000 19" / IP67
SITRANS F M MAG 6000 I / I Ex
SITRANS F M TRANSMAG 2
SITRANS F C MASS 6000 19" / IP67 / Ex d
SITRANS F C FCT030
SITRANS F S FST030
SITRANS FUS060
SITRANS FX300
SITRANS FX330

Level meters

SITRANS Probe LR
SITRANS Probe LU
SITRANS LUT400
SITRANS Probe LU240
SITRANS LR200
SITRANS LR250
SITRANS LR260
SITRANS LR460
SITRANS LR560
SITRANS LG 240 / LG 250 / LG 260 / LG270

Electropneumatic positioners

SIPART PS2

Power supply units and isolation amplifiers

SITRANS I

Digitalization and Communication

Communication

Communication protocols / PROFIBUS

Overview

Today, distributed automation solutions based on open fieldbuses are standard in many areas of the manufacturing industry and in process engineering. It is only with fieldbuses that the functional benefits of digital communication can be put to full use, e.g. better resolution of measured values, diagnostics options and remote parameterization.

Today, PROFIBUS is the most successful open fieldbus with a large installed base for a wide range of applications. Standardization according to IEC 61158 / EN 50170 provides you with future protection for your investment.

Benefits

- Fully modular system, from the sensor through to the control level, permits new plant concepts
- Problem-free exchangeability of field devices, including from different manufacturers, that comply with the standard profile
- Networking of transmitters, valves, actuators, etc.
- Implementation of intrinsically safe applications through use of the field bus in hazardous areas
- Easy installation of 2-wire cables for joint power supply and data transfer
- Reduced cabling costs through savings of material and installation time
- Reduced configuration costs through central, simple engineering of the field devices (PROFIBUS PA and HART with SIMATIC PDM, also with multi-vendor support)
- Fast and error-free installation
- Lower service costs thanks to simpler wiring and plant structure plus extensive diagnostics options
- Greatly reduced commissioning costs through simplified loop check
- Scaling/digitizing of the measured value in the field device already, hence no rescaling necessary in SIMATIC PCS 7

Application

PROFIBUS is suitable for fast communication with distributed I/O (PROFIBUS DP) in production automation as well as for communication tasks in process automation (PROFIBUS PA). It is the first fieldbus system that meets the demands of both areas with identical communication services.

The transfer technology of PROFIBUS PA is tailored to the requirements of the process industry. The standardized communications services guarantee interoperability between multi-vendor field devices and remote configuration of the field devices during operation.

With SIMATIC PDM (Process Device Manager), a universal tool that is not manufacturer-specific and is used for configuring, parameterizing, commissioning and diagnosing intelligent process devices on PROFIBUS, a variety of process devices of different manufacturers can be configured using a uniform graphic user interface.

PROFIBUS PA can be used both in standard environments and in hazardous areas. For use in hazardous areas, PROFIBUS PA and all connected devices have to be designed with type of protection Ex [i].

The uniform protocol of PROFIBUS DP and PROFIBUS PA enables the linking of both networks and thus the combination of timing performance and intrinsically safe transmission technology.

Function

PROFIBUS PA expands PROFIBUS DP with process-level components for direct connection of actuators and sensors. With PROFIBUS PA, the RS 485 transmission method is replaced by a different transmission method optimized for intrinsically safe applications. Both methods are standardized internationally in IEC 61158.

PROFIBUS PA uses the same communication protocol as PROFIBUS DP; communication services and frames are identical.

With PROFIBUS PA, the information and energy supply for supplying the field devices can be conducted via a 2-wire cable.

Integration

Siemens field devices for process automation listed in this catalog that can be controlled with PROFIBUS:

PROFIBUS PA

Measuring instruments for pressure

SITRANS P300

SITRANS P DS III

SITRANS P410

Measuring instruments for temperature

SITRANS TH400

Flow meters

SITRANS F M MAG 6000 19" / IP67

SITRANS F M MAG 6000 I / I Ex

SITRANS F M TRANSMAG 2

SITRANS F C MASS 6000 19" / IP67 / Ex d

SITRANS FUS060

Level meters

Pointek CLS 200

Pointek CLS 300

SITRANS Probe LU

SITRANS LR200

SITRANS LR250

SITRANS LR260

SITRANS LR460

SITRANS LR560

Electropneumatic positioners

SIPART PS2

Acoustic sensors for pump monitoring

SITRANS DA400

PROFIBUS DP

Measuring instruments for temperature

SITRANS TO500

Flow meters

SITRANS F M MAG 6000 19" / IP67

SITRANS F M MAG 6000 I

SITRANS F C MASS 6000 19" / IP67

SIFLOW FC070 (via ET 200M)

Level meters

HydroRanger 200

MultiRanger 100/200

SITRANS LU 01, LU 02, LU 10

Acoustic sensors for pump monitoring

SITRANS DA400

Services for Process Instrumentation



9/2	Services for Process Instrumentation
9/3	Lifecycle Services
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Services for Process Instrumentation

Services for Process Instrumentation

Overview

Ensure business success with Digital Enterprise Services

Increasing demands make it ever more important that industrial plants operate at highest productivity and efficiency levels. Digital Enterprise Services provides industry businesses with the vital competitive edge.

Whether it's production or process industry - in view of rising cost pressure, growing energy costs, and increasingly stringent environmental regulations, services for industry are a crucial competitive factor in manufacturing as well as in process industries. All over the world Siemens supports its customers with product, system, and application-related services throughout the entire life cycle of a plant.

Right from the earliest stages of planning, engineering, and building all the way to operation and modernization, these services enable customers to benefit from the Siemens experts' unique technological and product knowledge and industry expertise. Thus downtimes are reduced and the utilization of resources is optimized. The bottom line: increased plant productivity, flexibility, and efficiency, plus reduced overall costs.

More information

For more information please visit us via:
www.siemens.com/digital-enterprise-services

Overview

Optimal system-specific remote support and proactive remote services with globally available know-how from the product manufacturer based on state-of-the-art IT infrastructure.

Your need:

- Ensure engineering, commissioning and maintenance without significant in-house effort
- Complete transparency through central administration of all system accesses
- Sustainable remote solution concepts

Our service offer:

- Communication between customer system and Siemens IT via a common remote service platform
- Providing remote IT infrastructure, including support and maintenance
- Based on this, we offer our Remote Service

Benefits

- Secure remote connection to SIMATIC TechSupport IT infrastructure
- Ensuring fast and worldwide availability of experts
- Innovative service concept thanks to industry-standard service and collaboration software
- Compatible with proven security concepts and TÜV/CERT certification of the Siemens cRSP (common Remote Service Platform) infrastructure

Application

- SIMATIC PCS 7, PCS neo, Step 7, TIA Portal and devices of process automation

More information

More information is available online at:
www.siemens.com/siremote

Services for Process Instrumentation

Lifecycle Services

Calibration Services

Overview

Ensuring operational readiness throughout the lifecycle by regularly certifying the accuracy of measurement equipment both offsite and onsite.

Support:

If you have questions about this service, please [contact us](#).

Your need:

- Reliable calibration, measurement and testing of process instrumentation
- High quality engineering performance and related expertise
- Ensuring long-term and reliable performance of equipment and machinery

Our service offer:

- Offsite calibration: Wide range of calibrations for dimension, electronics and process instruments remotely
- Onsite calibration: Maintenance of measuring devices on site to avoid longer down times
- Traceable calibration for measuring equipment of all manufacturers by Siemens Industrial Laboratory (SIRENT) with accreditation by national accreditation body of the Federal Republic of Germany (DAkkS)

Benefits

- Complying with norms, guidelines and legal specifications while calibrating for quality assurance according to ISO 9000
- Verification of billing measurements (cold water, flow of heat/cold segments)
- Early fault detection and determination of the operational reliability of measuring equipment

Application

- Process instrumentation field devices.

Options

	Pressure	Temperature	Flow	Dynamic Weighing
Off-site Calibration according to ISO 9001	✓	✓	✓	
Off-site Calibration according to ISO 17025	✓	✓	✓	
Off-site Domestic Custody Transfer Verification			✓	
Off-site Calibration according to ISO 9001*	✓	✓		✓

*On-site services will be performed by local Siemens Customer Service. Please contact Siemens office in your region for further information.

More information

More information is available [here](#).

Overview

Lifecycle Management Suite is a COMOS MRO-based Computerized Maintenance Management System (CMMS). The pre-configured cloud-based system provides Standard Operation Procedures (SOP) in the form of checkpoints for lifecycle services assigned to SIMATIC PCS 7 system components and field devices of process instrumentation

Support:

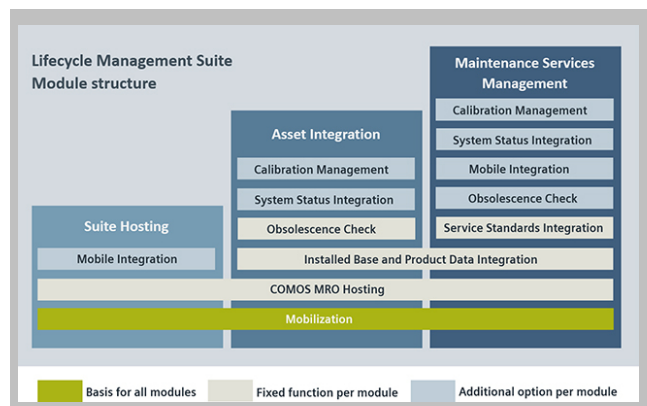
If you have questions about this service, please [contact us](#).

Your need:

- Efficient maintenance of the plant and ensuring availability and serviceability of the control technology
- Feedback of service activities and continuous analysis of maintenance histories
- Availability of monitoring information also on mobile devices

Our service offer:

- COMOS MRO-based and pre-configured CMMS system with standard operation procedures
- Comprehensive range of calibration and verification functions for field devices
- Generation of maintenance, obsolescence and IT security reports



Lifecycle Management Suite

Benefits

- Full transparency thanks to effective import and analysis functions
- Fast system deployment through online setup
- Optimized maintenance and comprehensive asset lifecycle information

Application

SIMATIC PCS 7, PCS neo, Step 7, TIA Portal, field devices of process instrumentation, 6ES7658

Options

COMOS MRO-SW via cloud access for one year	9LA1110-5CA00-0AA0
COMOS MRO-SW and asset management functions via cloud access for 1 year	9LA1110-5CA00-0BA0
COMOS MRO-SW and maintenance management functionalities via cloud access for 1 year	9LA1110-5CA00-0CA0
Integration for PCS 7 >= V8.x	9LA1110-5CA00-1AA0
iBase Integration PCS 7 (Interface SAS DC)	9LA1110-5CA00-1AB0
Service standards- Integration PCS 7	9LA1110-5CA00-1AC0
10x Obsolescence Checks	9LA1110-5CA00-1AD0
System Status Integration (Analyzer Results)	9LA1110-5CA00-1AE0
Integration of COMOS Mobile Operations (1 Authorized Named User) for "Territory"	9LA1110-5CA00-1MA0

Options and Extensions:

Additional 1 floating license COMOS MRO for 3 Authorized Named Users for "Territory" Extension	9LA1110-5CA00-1BA0
Additional 1 Authorized Named User for an existing floating license for "Territory"	9LA1110-5CA00-1BB0
Mobilization "Suite Hosting"	9LA1110-5CA00-1CA0
Mobilization "Asset Integration" (remote)	9LA1110-5CA00-1CB0
Mobilization "Maintenance Services Management" (remote)	9LA1110-5CA00-1CC0
Additional Technical Support 10 h/Subscription Cycle	9LA1110-5CA00-1CD0

More information

More information is available online [here](#).

Services for Process Instrumentation

Lifecycle Services

Inventory Baseline Services

Overview

Inventory Baseline Services show which products are used where in the system and represent the lifecycle status of the automation system. The system information is comprehensively recorded and the plant situation is transparently displayed.

Support:

If you have questions about this service, please contact us: services.automation@siemens.com

Your need:

- Knowledge of the current inventory for planning and preparation of further service measures
- Standardized and complete recording of all installed automation components
- Simultaneously lowest possible time and cost expenditure

Our service offer:

- Cost-efficient, data-based inventory of the automation system
- Transparent overview of the currently installed system inventory and the spare parts stock
- Supply of the result through standardized reports
- Professional evaluation by Siemens experts

Benefits

- Decision support for planning future maintenance and modernization measures
- Data basis for further lifecycle services, e.g., SIMATIC System Audit, Lifecycle Information Services or Asset Optimization Services
- Preparation for updates or upgrades

Application

SIMATIC PCS 7, SIMATIC PCS neo, Step 7, WinCC, 6ES7658

Selection and ordering data

Complete execution of the service for automation systems	9LA1110-8AJ00-1AA0
Only the evaluation of the delivered data for automation systems	9LA1110-8AJ00-2AA0
Evaluation of additional 20 PCs or VMs	9LA1110-8AJ00-4AA0
Complete service execution for the process instruments	9LA1110-8AJ00-1AB0
Only the evaluation of the delivered data for process instruments	9LA1110-8AJ00-2AB0

Options

Automation systems

Complete execution of the data collection of the installed base on site by Siemens and data evaluation (available only for Germany)	9LA1110-8AJ00-1AA0
Evaluation of the installed base, collected with the SAS DC tool (SIMATIC Assessment Suite Data Collector)	9LA1110-8AJ00-2AA0
Extension of the data collection and analysis with additional 20 PCs or VMs	9LA1110-8AJ00-4AA0

Process instrumentation (field devices)

Complete execution of the data collection of the installed base on site by Siemens and analysis of process instruments (available only for Germany)	9LA1110-8AJ00-1AB0
This service can only be ordered upon request, please contact us via e-mail: services.automation@siemens.com	
Evaluation of the installed base, collected with the SAS DC tool (SIMATIC Assessment Suite Data Collector)	9LA1110-8AJ00-2AB0
This service can only be ordered upon request, please contact us via e-mail: services.automation@siemens.com	

More information

More information is available at our [product page](#).

Overview

Continuous supply with information regarding product cycle of deployed automatization components, product-related statistical failure rate as well as plant-specific information about upgrades/updates.

Your need:

- Protection of your plant investment
- Ensuring plant and machine availability and serviceability
- Prevention of unplanned downtime or cost-intensive supply bottlenecks

Our service offer:

- Basic Information: focal point on functional obsolescence
- Extended Analysis: Analysis from the produced related statistical failure rate (MTBF)
- Comprehensive Operation: addition of plant specific information about upgrades/updates and recommended action

Benefits

- Regular proactive service information for reducing obsolescence risks to a minimum
- Information about new functions in successor products provide pointers regarding optimization potential
- Utilization of new technological functions

Application

SIMATIC PCS 7, PCS neo, Step 7, TIA Portal, field devices of process instrumentation, 6ES7658

Selection and ordering data

Description	Article No.	Comments
• Basic Information < 50 article numbers	9LA1110-8AG10-1AA0	- Once
	9LA1110-8AG10-1AB0	- Cyclically 1 x per year
	9LA1110-8AG10-1AC0	- Cyclically 2 x per year
	9LA1110-8AG10-1AD0	- Cyclically 4 x per year
• Basic Information 50-150 article numbers	9LA1110-8AG10-1BA0	- Once
	9LA1110-8AG10-1BB0	- Cyclically 1 x per year
	9LA1110-8AG10-1BC0	- Cyclically 2 x per year
	9LA1110-8AG10-1BD0	- Cyclically 4 x per year
• Basic Information 150-300 article numbers	9LA1110-8AG10-1CA0	- Once
	9LA1110-8AG10-1CB0	- Cyclically 1 x per year
	9LA1110-8AG10-1CC0	- Cyclically 2 x per year
	9LA1110-8AG10-1CD0	- Cyclically 4 x per year
• Extended Analysis < 50 article numbers	9LA1110-8AG10-2AA0	- Once
	9LA1110-8AG10-2AB0	- Cyclically 1 x per year
	9LA1110-8AG10-2AC0	- Cyclically 2 x per year
	9LA1110-8AG10-2AD0	- Cyclically 4 x per year
• Extended Analysis 50-150 article numbers	9LA1110-8AG10-2BA0	- Once
	9LA1110-8AG10-2BB0	- Cyclically 1 x per year
	9LA1110-8AG10-2BC0	- Cyclically 2 x per year
	9LA1110-8AG10-2BD0	- Cyclically 4 x per year
• Extended Analysis 150-300 article numbers	9LA1110-8AG10-2CA0	- Once
	9LA1110-8AG10-2CB0	- Cyclically 1 x per year
	9LA1110-8AG10-2CC0	- Cyclically 2 x per year
	9LA1110-8AG10-2CD0	- Cyclically 4 x per year
• Comprehensive Operation < 50 article numbers	9LA1110-8AG10-3AA0	- Once
	9LA1110-8AG10-3AB0	- Cyclically 1 x per year

Services for Process Instrumentation

Lifecycle Services

Lifecycle Information Services

Selection and ordering data (continued)

Description	Article No.	Comments
• Comprehensive Operation 50-150 article numbers	9LA1110-8AG10-3AC0	- Cyclically 2 × per year
	9LA1110-8AG10-3AD0	- Cyclically 4 × per year
	9LA1110-8AG10-3BA0	- Once
	9LA1110-8AG10-3BB0	- Cyclically 1 × per year
	9LA1110-8AG10-3BC0	- Cyclically 2 × per year
• Comprehensive Operation 150-300 article numbers	9LA1110-8AG10-3BD0	- Cyclically 4 × per year
	9LA1110-8AG10-3CA0	- Once
	9LA1110-8AG10-3CB0	- Cyclically 1 × per year
	9LA1110-8AG10-3CC0	- Cyclically 2 × per year
	9LA1110-8AG10-3CD0	- Cyclically 4 × per year

Options

The module "Basic Analysis" provides a general lifecycle status. The key point here is analyzing functional obsolescence. The service module "Extended Analysis" includes the module "Basic" and in addition the analysis of the product-related statistical failure rate (MTBF - Mean Time Between Failures). The service module "Comprehensive Analysis" contains the module "Extended Analysis" and also plant-specific information about upgrades/updates and relevant services. Identify the right analysis for you in the first tab "Ordering data" on top of the right side.

Sales item	MLFB	Comments
Basic Analysis < 50 article numbers	9LA1110-8AG10-1AA0	Once
	9LA1110-8AG10-1AB0	Cycle 1x per year
	9LA1110-8AG10-1AC0	Cycle 2x per year
	9LA1110-8AG10-1AD0	Cycle 4x per year
Basic Analysis 50-150 article numbers	9LA1110-8AG10-1BA0	Once
	9LA1110-8AG10-1BB0	Cycle 1x per year
	9LA1110-8AG10-1BC0	Cycle 2x per year
	9LA1110-8AG10-1BD0	Cycle 4x per year
Basic Analysis 150-300 article numbers	9LA1110-8AG10-1CA0	Once
	9LA1110-8AG10-1CB0	Cycle 1x per year
	9LA1110-8AG10-1CC0	Cycle 2x per year
	9LA1110-8AG10-1CD0	Cycle 4x per year
Extended Analysis < 50 article numbers	9LA1110-8AG10-2AA0	Once
	9LA1110-8AG10-2AB0	Cycle 1x per year
	9LA1110-8AG10-2AC0	Cycle 2x per year
	9LA1110-8AG10-2AD0	Cycle 4x per year
Extended Analysis 50-150 article numbers	9LA1110-8AG10-2BA0	Once
	9LA1110-8AG10-2BB0	Cycle 1x per year
	9LA1110-8AG10-2BC0	Cycle 2x per year
	9LA1110-8AG10-2BD0	Cycle 4x per year
Extended Analysis 150-300 article numbers	9LA1110-8AG10-2CA0	Once
	9LA1110-8AG10-2CB0	Cycle 1x per year
	9LA1110-8AG10-2CC0	Cycle 2x per year
	9LA1110-8AG10-2CD0	Cycle 4x per year
Comprehensive Analysis < 50 article numbers	9LA1110-8AG10-3AA0	Once
	9LA1110-8AG10-3AB0	Cycle 1x per year
	9LA1110-8AG10-3AC0	Cycle 2x per year
	9LA1110-8AG10-3AD0	Cycle 4x per year
Comprehensive Analysis 50-150 article numbers	9LA1110-8AG10-3BA0	Once
	9LA1110-8AG10-3BB0	Cycle 1x per year
	9LA1110-8AG10-3BC0	Cycle 2x per year
	9LA1110-8AG10-3BD0	Cycle 4x per year
Comprehensive Analysis 150-300 article numbers	9LA1110-8AG10-3CA0	Once
	9LA1110-8AG10-3CB0	Cycle 1x per year
	9LA1110-8AG10-3CC0	Cycle 2x per year
	9LA1110-8AG10-3CD0	Cycle 4x per year

More information

For more information please visit:
www.siemens.com/lis

Overview

One year exclusive and individual technical product support contract for automation, process instrumentation (field devices) and DCS systems to minimize the risk of a production downtime.

Support:

Should you have any question about the ordering process, please contact us at services.automation@siemens.com

Your needs:

- Outsourcing of service activities and concentration on core business
- Competent, high-performance support for engineering tasks and maintenance
- Avoidance of on-site service calls by using future-oriented IT-based services

Our service offer:

This service includes comprehensive system inventory, central coordination of all service activities by an exclusive Siemens support manager and regular status reporting.

Siemens support manager:

- Gets familiar with the plant and maintenance processes to integrate them into the system
- Coordinates and manages all your support requests with the highest priority
- Sends you quarterly status reports – from the initial system acceptance to the final report, over the entire period of the contract.

Selection and ordering data

MSS for automation systems	9LA1110-1BA01-0AA0-Z Y01
MSS for process instrumentation (field devices)	9LA1110-1BD01-0AA0-Z
MSS for DCS systems	9LA1110-1BH01-0AA0-Z Y01
MSS Remote Desktop Sharing	9LA1110-1BR01-0AA0-Z Y01
MSS extension of 25 hrs – for DCS systems and/or field devices	9LA1110-1BL00

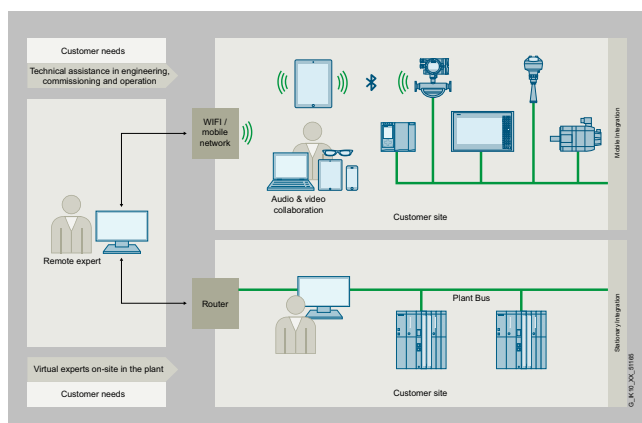
MSS for PCS neo Premium	9LA1110-1BN01-0AA0-ZY01
MSS for PCS neo – Ready for Virtualization – clarification of a possibility of virtualization of the system	9LA1110-1BN01-0VA0-ZY01
25 hrs extension of the support for PCS neo	9LA1110-1BL00-0AA0-ZY01

MSS for Machine Tools Systems	
Small Package	9MC1110-0MS00-0AA0
Medium Package	9MC1110-0MS00-0AA1
Large Package	9MC1110-0MS00-0AA2
25 hrs support extension for machine tools systems	9MC1110-0MS00-0AA3

MSS for Drive Systems	9MC3110-0MS00-0AA0
30 hrs technical support for one year	
MSS for Drive Systems – 25 hrs support extension	9MC3110-0MS00-0AA1

Benefits

- Exclusive channel for fast callback and central request coordination
- Avoid on-site service
- Exclusive access to the Extranet with contract-relevant contents



Remote Collaboration Services

Application

SIMATIC PCS 7, PCS neo, Step 7, TIA Portal, field devices of process instrumentation, machine tools, drive systems, 6ES7658, 6DL89, 6ES74, 6ES76

Services for Process Instrumentation

Lifecycle Services

Managed System Services

Options

Contents of all MSS options:

- 1 year service contract
- 30 hrs technical support
- Service Manager as central contact person
- Access to further information in SiePortal
- Quarterly reporting on processed service requests

MSS for automation systems	9LA1110-1BA01-0AA0-Z Y01
MSS for process instrumentation (field devices)	9LA1110-1BD01-0AA0-Z Y01
MSS for DCS systems	9LA1110-1BH01-0AA0-Z Y01
MSS Remote Desktop Sharing	9LA1110-1BR01-0AA0-Z Y01
MSS 25 hrs support extension – for DCS systems and/or field devices	9LA1110-1BL00

MSS for PCS neo Premium	9LA1110-1BN01-0AA0-ZY01
MSS for PCS neo – Ready for Virtualization – clarification of a possibility of virtualization	9LA1110-1BN01-0VA0-ZY01
25 hrs support extension for PCS neo	9LA1110-1BL00-0AA0-ZY01

MSS for machine tools systems	
Small Package	9MC1110-0MS00-0AA0
Medium Package	9MC1110-0MS00-0AA1
Large Package	9MC1110-0MS00-0AA2
25 hrs support extension for machine tools systems	9MC1110-0MS00-0AA3

MSS for Drive Systems	9MC3110-0MS00-0AA0
30 hrs technical support for one year	
MSS for Drive Systems – 25 hrs support extension	9MC3110-0MS00-0AA1

More information

For any further technical information, please visit the Product Support at <https://support.industry.siemens.com/cs/ww/en/view/109806719>
Visit our website at [siemens.com/mss](https://www.siemens.com/mss)

Overview

Identification of potential risks for SIMATIC PCS 7 systems

Your need:

- Preventive system analysis to minimize risks
- Reduction of maintenance costs
- Avoidance of system downtime

Our service offer:

- Detailed system analyses provided by Siemens experts
- Specific "Tailor-made" measures to increase the maintenance efficiency
- Detailed reports on system condition and recommendation

Benefits

- Fast data acquisition
- Intensive data analysis
- Transparent reporting

Application

SIMATIC PCS 7, Step 7, TIA Portal and WinCC, 6ES7658, 6DL89

Selection and ordering data

Description	Article No.
• Preventive System Analysis one-time	9LA1110-1CD00
• Preventive System Analysis 5	9LA1110-1CA00
• Preventive System Analysis 20	9LA1110-1CB00
• Preventive System Analysis 50	9LA1110-1CC00
• Preventive System Analysis 75	9LA1110-1CE00
• Preventive System Analysis 100	9LA1110-1CF00

Options

Preventive System Analysis one-time	System scope: max. 10 systems* System Status Report generated one time	9LA1110-1CD00
Preventive System Analysis 5	System scope: max. 5 systems	9LA1110-1CA00
Preventive System Analysis 20	System scope: max. 20 systems	9LA1110-1CB00
Preventive System Analysis 50	System scope: max. 50 systems	9LA1110-1CC00
Preventive System Analysis 75	System scope: max. 75 systems	9LA1110-1CE00
Preventive System Analysis 100	System scope: max. 100 systems	9LA1110-1CF00

More information

Further information is available online at:
www.siemens.com/psa

Services for Process Instrumentation

Lifecycle Services

Asset Optimization Services

Overview

Optimize overall spare parts supply for your maintenance activities with a systematic four phases approach to reach high plant availability.

Support:

Should you have any question about the ordering process, please contact us at services.automation@siemens.com

Your need:

- Secure reliable supply of spare parts
- Minimize risks related to functional obsolescence
- Reduce maintenance costs by optimizing the stock
- Optimize inventory, technically and economically (reduced capital lockup)
- Maximize transparency in inventory management
- Maintain the balance between a high plant availability and productivity of your installations and a minimal budget dedicated to the stock of spare parts replacement

Our service offer:

- Analysis of the spare parts situation on site: availability, product life cycle, spare parts delivery times.
- Concept: Analysis of actual demand and development of a spare parts concept
- Implementation: Establishment of required storage structures, storage locations and spare parts
- Operation: Continuous spare parts supply, depending on agreed scope cyclical inventory analysis

Benefits

- Avoid the lack of spare parts
- Minimize inventory and the budget allocated to it
- Transparency about actual spare parts requirements
- Ensuring spare parts availability over the entire life cycle, thus providing the basis for improved serviceability
- Technical and economic warehouse optimization (lower capital commitment)

Application

SIMATIC PCS 7, PCS neo, Step 7, TIA Portal, field devices of process instrumentation, 6ES7658, 6ES74, 6ES76

Options

Modules

Analysis	9LA1110-8AE10-1AA0
Concept	9LA1110-8AE10-2AA0
Implementation	9LA1110-8AE10-3AA0
Operation Spare Parts Supply	9LA1110-8AE10-4AA0
Operation Spare Parts Management	9LA1110-8AE10-4BA0

Options

Product Extension	9LA1110-8AE10-8AA0
Time Extension	9LA1110-8AE10-8BA0

More information

More information is available online at:
www.siemens.com/aos

Overview

Modular service program for a lifecycle service contract ensuring sustainable serviceability and increasing plant availability.

Your need:

- Long-term assurance of investment protection
- Consistent functionality on renewed and maintained system platform
- Plannability of necessary service measures and costs

Our service offer:

- System modernizations
- On-call service and on-site and remote repairs
- Inspection, maintenance, spare parts & repairs
- Contract management, support and consulting
- Obsolescence management

Benefits

- Transparency of costs for services and modernization
- Increased system availability due to assured start-up times for service, spare parts supply and preventive maintenance measures
- Preservation of the serviceability of the system

Application

SIMATIC PCS 7, PCS neo and WinCC SCADA systems

More information

More information is available [here](#).

Appendix



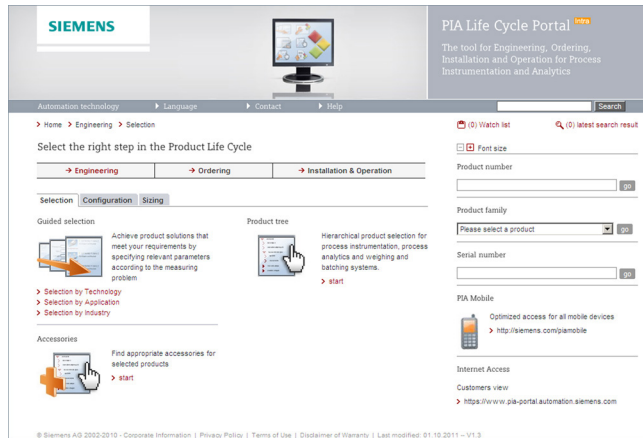
10/2	PIA Life Cycle Portal
10/2	Engineering, Ordering, Installation and Operation Tool
10/3	Delivery Time
10/3	Quick Ship Program, Stock Items delivery
10/4	Partners
10/5	Industry Services
10/6	Industry Services – Portfolio overview
10/8	Online Support
10/9	SITRAIN – Digital Industry Academy
10/11	Product documentation
10/11	Supplied product documentation, QR Code, SIOS
10/12	Partners at Siemens
10/12	Siemens Partner Program
10/13	Pressure Equipment Directive (2014/68/EU)
10/16	Functional safety
10/17	Software licenses
10/19	Conditions of sale and delivery

Appendix

PIA Life Cycle Portal

Engineering, Ordering, Installation and Operation Tool

Overview



The PIA Life Cycle Portal provides the appropriate functionality in all stages of the Product Life Cycle for products of Process Instrumentation, Process Analytics and Weighing Technology.

The application guides you through Engineering & Selection, supports you at the Order and provides tools and information for Installation and Operation.

- **Phase 1:** Selection & Planning
- **Phase 2:** Ordering
- **Phase 3:** Installation & Operation
- **Additional features:** e. g. PIA Mobile

Phase 1: Selection & Planning



Selection

Achieve product solutions that meet your requirements by specifying relevant parameters according to the measuring point by using the *guided selection* or select the product directly in the *product and accessories tree*.



Configuration

Configure a selected product step by step and use the integrated configuration knowledge to avoid errors. Product configurations which cannot be ordered are blocked.



Sizing & calculation

Sizing & calculation tools for Gas Analyzers, Weighing and Batching Systems and Flow measurement instruments.

Phase 2: Ordering



Bulk upload

Verify several part numbers in one step by uploading a simple text file.



Watchlist & projects

Collect products in a *watch list* and save it as a *project* for later use.



Interface to the Industry Mall

Order the selected products with the ordering system for Siemens' automation and drive solutions.

Phase 3: Installation & Operation



Spare parts

Find appropriate *spare parts* for selected products or corresponding product families.



After sales support

Go to the *Service and Support Portal* to access manuals, certificates and further information concerning service & support.



Device information and history

Serial number specific product information for installed devices

Additional features



Personalize

Register in order to customize the application to your personal needs.



PIA Mobile

Use the product *selection, configuration and device information and history* with the version optimized for mobile devices.
www.siemens.com/piamobile



Product details

Find all relevant product information at a single glance: commercial and technical data, certificates, images and documents etc.

More information

PIA Life Cycle Portal
Ostliche Rheinbrückenstraße 50
76187 Karlsruhe, Germany
Tel.: +49 (721) 595 2114
E-Mail: support.pia-portal@siemens.com
www.siemens.com/pia-portal

Overview**Delivery times**

Standard delivery times for our products are shown in the Selection and Ordering data.

Quick Ship and Stock Items delivery

If you need a product quickly, it is possible to choose between defined Stock Items delivery (▶ identifier) and the Quick Ship Program (● identifier) when ordering. Delivery times are then displayed at the end of the configuration overview

Note

In order to obtain special delivery times, only products with the same identifier may be combined (all Stock Item symbols or all Quick Ship Program symbols). It is not possible to combine Stock Item/Quick Ship Program options.

All other information without identifiers is available with the current delivery times, which can be found in the "Basic Data" tab of the PIA Life Cycle Portal.

Example for Stock Items delivery in the PIA Life Cycle Portal

SIPART PS2 2 wire with Hart SA

Status: ◆◆◆ Your configuration is complete

Basic types **Options** > Order processing guidelines for con

Configuration: [Reset](#) | [Print](#) | [Download](#) Change Qu

Description	Ex stock / QS
<input checked="" type="checkbox"/> Shipping clutch <input type="radio"/> 0 without fixable slipping clutch	◀
<input checked="" type="checkbox"/> Explosion protection <input type="radio"/> N without explosion protection	◀
<input checked="" type="checkbox"/> Connection thread elec/pneum. <input type="radio"/> G Connection thread el.: M20x1.5 / pneu.: G 1/4	◀
<input checked="" type="checkbox"/> Limit monitor <input type="radio"/> 0 without limit monitor	◀
<input checked="" type="checkbox"/> Option module <input type="radio"/> 1 with installed position feedback module (4 ... 20 mA)	◀
<input checked="" type="checkbox"/> Version <input type="radio"/> 0	◀
<input checked="" type="checkbox"/> Instruction manual <input type="radio"/> A Brief instructions German / English / Chinese	◀
<input checked="" type="checkbox"/> Attached gauge block assembly <input type="radio"/> 0 without mounted pressure gauge block	◀

Product number (MLFB) 6DR5110 **0 N G 0 1 0 A A 0** Basic L-price/Ur
B-row
L-price/unit
L-price total

Copy & Paste 6DR5110-0NG01-0AA0

Information:
◀ Ex stock, delivery time (working days): 1 (plus transport time)

To get region-specific warehouse information: Registration and login in the PIA Life Cycle Portal required

To get the quick ship and warehouse information specific to your region you need to register::

- Select the desired language.
- Use "Sign up" to register.
- After registering, log in via "Login".

Contact

If you have questions about delivery time or the Quick Ship program, please contact your Siemens sales representative.

Example for Quick Ship Program delivery in the PIA Life Cycle Portal

SITRANS F M MAG 5100 W

Status: ◆◆◆ Your configuration is complete

Basic types **Options** > Order processing guidelines for con

Configuration: [Reset](#) | [Print](#) | [Download](#) Change Qu

Description	Ex stock / QS
Additional feature for pricing! Total price for the marked (1) features	
<input checked="" type="checkbox"/> Label <input type="radio"/> 0	●
<input checked="" type="checkbox"/> Diameter <input type="radio"/> 1V DN15, 1/2 Inch	●
<input checked="" type="checkbox"/> Flange norm/Pressure rating <input type="radio"/> F EN 1092-1, PN 40	●
<input checked="" type="checkbox"/> Flange material <input type="radio"/> 1 Carbon steel flanges ASTM A 105, corrosion-resistant coating of category C4	●
<input checked="" type="checkbox"/> Liner material <input type="radio"/> 2 Liner Material: EPDM	●
<input checked="" type="checkbox"/> Electrode material <input type="radio"/> 2 Hastelloy C-276	●
<input checked="" type="checkbox"/> Transmitter <input type="radio"/> A Sensor for remote transmitter (order transmitter separately)	●
<input checked="" type="checkbox"/> Communication <input type="radio"/> A No bus communication	●
<input checked="" type="checkbox"/> Cable glands/terminal box <input type="radio"/> 1 Metric Polyamid terminal box or 6000 I compact.	●
<input type="radio"/> 2 1/2 inch NPT Polyamid Terminal box or 6000 I compact.	●

Product number (MLFB) 7ME652 **0 1V F 1 2 2 A A 1** Basic L-price/Ur
B-row
L-price/unit
L-price total

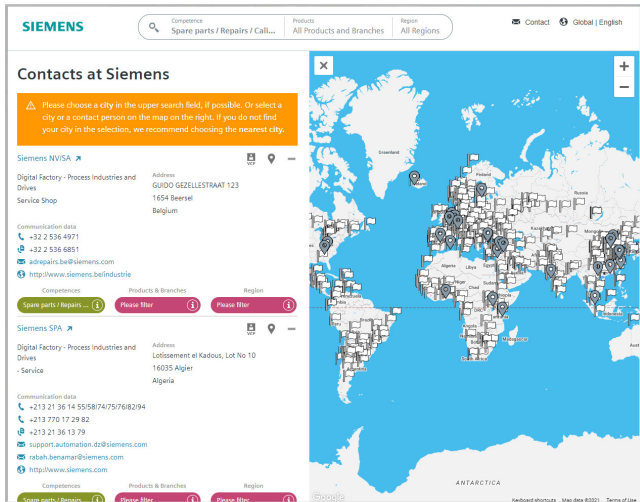
Copy & Paste 7ME6520-1VF12-2AA1

Information:
● A shorter delivery time is possible, delivery time (working days): 5 (plus transport time)

Appendix

Partners

Partners at Siemens



At your service locally, around the globe for consulting, sales, training, service, support, spare parts on the entire portfolio of Siemens.

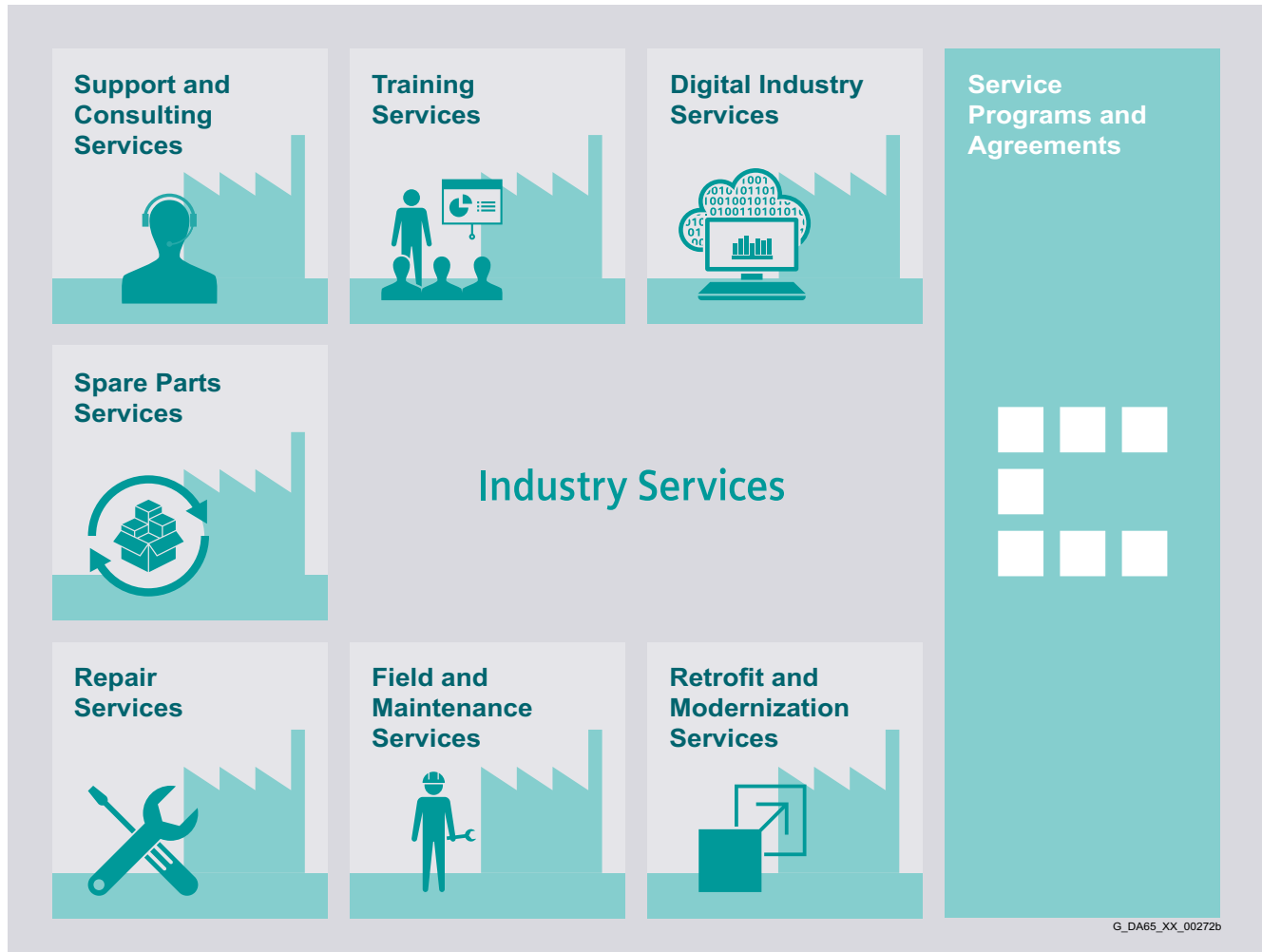
Your partner can be found in our Personal Contacts Database at: www.siemens.com/automation-contact

You start by selecting

- the required competence,
- products and branches,
- a country and a city

or by a

- location search or free text search.

Overview

Keep your business running and shaping your digital future – with Industry Services

Optimizing the productivity of your equipment and operations can be a challenge, especially with constantly changing market conditions. Working with our service experts makes it easier. We understand your industry's unique processes and provide the services needed so that you can better achieve your business goals.

You can count on us to maximize your uptime and minimize your downtime, increasing your operations' productivity and reliability. When your operations have to be changed quickly to meet a new demand or business opportunity, our services give you the flexibility to adapt. Of course, we take care that your production is protected against cyber threats. We assist in keeping your operations as energy and resource efficient as possible and reducing your total cost of ownership. As a trendsetter, we ensure that you can capitalize on the opportunities of digitalization and by applying data analytics to enhance decision making: You can be sure that your plant reaches its full potential and retains this over the longer lifespan.

You can rely on our highly dedicated team of engineers, technicians and specialists to deliver the services you need – safely, professionally and in compliance with all regulations. We are there for you, where you need us, when you need us.

www.siemens.com/industryservices

Appendix

Industry Services

Industry Services – Portfolio overview

Overview

Digital Industry Services



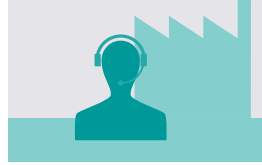
Digital Industry Services make your industrial processes transparent to gain improvements in productivity, asset availability, and energy efficiency.

Production data is generated, filtered and translated with intelligent analytics to enhance decision-making.

This is done whilst taking data security into consideration and with continuous protection against cyber-attack threats.

www.siemens.com/global/en/products/services/industry/digital-industry-services.html

Support and Consulting Services



Industry Online Support site for comprehensive information, application examples, FAQs and support requests.

Technical and Engineering Support for advice and answers for all inquiries about functionality, handling, and fault clearance. The Service Card as prepaid support for value added services such as Priority Call Back or Extended Support offers the clear advantage of quick and easy purchasing.

Information & Consulting Services, e.g. SIMATIC System Audit; clarity about the state and service capability of your automation system or Lifecycle Information Services; transparency on the lifecycle of the products in your plants.

<https://support.industry.siemens.com/cs/ww/en/sc/2235>

Training Services



From the basics and advanced to specialist skills, SITRAIN courses provide expertise right from the manufacturer – and encompass the entire spectrum of Siemens products and systems for the industry.

Worldwide, SITRAIN courses are available wherever you need a training course in more than 170 locations in over 60 countries.

<https://support.industry.siemens.com/cs/ww/en/sc/2226>

Spare Parts Services



Spare Parts Services are available worldwide for smooth and fast supply of spare parts – and thus optimal plant availability. Genuine spare parts are available for up to ten years. Logistic experts take care of procurement, transport, custom clearance, storage and order management. Reliable logistics processes ensure that components reach their destination as needed.

Since not all spare parts can be kept in stock at all times, Siemens offers a preventive measure for spare parts provisioning on the customer's premises with optimized **Spare Parts Packages** for individual products, custom-assembled drive components and entire integrated drive trains – including risk consulting.

Asset Optimization Services help you design a strategy for parts supply where your investment and carrying costs are reduced and the risk of obsolescence is avoided.

<https://support.industry.siemens.com/cs/ww/en/sc/2110>

Overview (continued)

Repair Services



Repair Services are offered on-site and in regional repair centers for fast restoration of faulty devices' functionality.

Also available are extended repair services, which include additional diagnostic and repair measures, as well as emergency services.

<https://support.industry.siemens.com/cs/ww/en/sc/2154>

Retrofit and Modernization Services

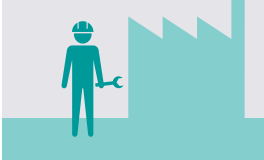


Provide a cost-effective solution for the expansion of entire plants, optimization of systems or upgrading existing products to the latest technology and software, e.g. migration services for automation systems.

Service experts support projects from planning through commissioning and, if desired over the entire extended lifespan, e.g. Retrofit for Integrated Drive Systems for an extended lifetime of your machines and plants.

<https://support.industry.siemens.com/cs/ww/en/sc/2286>

Field and Maintenance Services



Siemens specialists are available globally to provide expert field and maintenance services, including commissioning, functional testing, preventive maintenance and fault clearance.

All services can be included in customized service agreements with defined reaction times or fixed maintenance intervals.

<https://support.industry.siemens.com/cs/ww/en/sc/2265>

Service Programs and Agreements



A technical Service Program or Agreement enables you to easily bundle a wide range of services into a single annual or multi-year agreement.

You pick the services you need to match your unique requirements or fill gaps in your organization's maintenance capabilities.

Programs and agreements can be customized as KPI-based and/or performance-based contracts.

<https://support.industry.siemens.com/cs/ww/en/sc/2275>

Appendix

Industry Services

Online Support

Overview

Online Support – fast, intuitive, whenever you want, wherever you need



Web



www.siemens.com/online-support

App



SIEMENS





Scan the QR code for information on our Online Support app.



	<p>FAQ / Application examples</p> <p>Information about industrial products, programming and configuration as well as application examples</p>
	<p>Technical information</p> <p>Videos, documentation, manuals, updates, product notes, compatibility tool, certificates, planning data such as dimensional drawings, product data, 3D models</p>
	<p>Forum</p> <p>Exchange information and experience with other users and experts</p>

Online Support for Siemens Industry Products

Siemens Industry and Online Support with some 1.7 million visitors per month is one of the most popular web services provided by Siemens. It is the central access point for comprehensive technical know-how about products, systems and services for automation and drives applications as well as for process industries.

In connection with the challenges and opportunities related to digitalization you can look forward to continued support with innovative offerings.

Introduction



SITRAIN - DIGITAL INDUSTRY ACADEMY
The Future of Learning
starts **now**

SITRAIN - Digital Industry Academy stands for a modern learning culture that focuses on the needs of learners and the demands of innovative companies.

SITRAIN offers a comprehensive range of knowledge on Siemens industrial products and, under the vision "Future of Learning", pursues a holistic approach that combines different forms and methods of learning. Different learning formats allow for more effective, flexible and continuous learning depending on the type of learning.

Education and training directly from the manufacturer



Industrial Automation Systems SIMATIC

Training available for:
SIMATIC S7-1500, TIA Portal,
SIMATIC S7-300/400,
SIMATIC S7-1200



Drive Technology

Training available for:
SINAMICS S120 and
SINAMICS G120 low-voltage
converters,
SINAMICS G130 / G150 /
G180 / S150



SINUMERIK CNC automation system

Training available for:
SINUMERIK 840D,
SINUMERIK 840D sl and
SINUMERIK ONE



Process Control Systems

Training available for:
SIMATIC PCS 7,
SIMATIC PCS neo



Digital Enterprise

Training available for:
Openness, SIMIT, OPC UA,
Industrial Edge, Virtual
commissioning



Industrial Communications

Training available for:
PROFINET, SCALANCE, R
UGGEDOM, Industrial Ethernet,
Fieldbus communication,
Industrial Security, Remote
communication



Identification and Locating

Training available for:
RFID, RTLS-Systems



Operator Control and Monitoring Systems

Training available for:
SIMATIC WinCC Unified in TIA
Portal, SIMATIC WinCC in TIA
Portal, SIMATIC WinCC V7x



Motion Control System SIMOTION

Training available for:
SIMOTION (Programming,
Commissioning, Diagnostics,
Service)



Smart Infrastructure

Training available for:
SIRIUS, SENTRON, SIVACON,
ALPHA, SIMOCODE,
Circuit breakers



Process Analytics & Instrumentation

Training is available for process
analytics and instrumentation,
explosion protection, process
gas chromatographs



Additional training offer

SIMOVE with Automated
Guided Vehicles (AGV), SIPLUS
CMS, Guidelines and standards
for control cabinets

Appendix

SITRAIN – Digital Industry Academy

Introduction

Different learning formats and methods for maximum learning success

Face-to-face training in the training center or in the virtual classroom, with fixed dates and course times, learning in a group with a learning guide? Or digital training, on your own responsibility and location-independent, on demand, 24/7?

With the learning formats "Learning Journey", "Learning Membership" and "Learning Event", SITRAIN offers a wide range of different learning options in connection with didactically effective methods and modular possibilities.



Learning Journey

The combination for sustainable learning success

- The optimal mix of self-study units and guided live modules
- Includes a Learning Membership to work through the self-study modules and access on-demand content
- The SITRAIN learning consultant is available for questions and one-on-one consultations
- Ideal integration into the daily work routine and adaptation to one's own learning pace.



Learning Membership

Securing knowledge through continuous learning on your own responsibility

- With access to the comprehensive and constantly growing range of self-study units on SITRAIN access, the digital learning platform
- Search and find specific learning content or simply have a look around – anytime and anywhere
- A modern learning culture through continuous learning on your own responsibility and transparency about your learning success in the team or company.



Learning Event

Acquire theoretical and practical knowledge in a compact and guided format

- You achieve a defined learning goal in the shortest possible time
- The learning consultant guides you through the practical exercises and is also exclusively available to you during the theoretical sessions for the entire duration
- Focused learning, outside of the daily work routine, in a protected learning environment – virtually, in the training center, or at your company.



Live

Learn together with others, simultaneously and guided by a learning consultant. Online, in the SITRAIN training center or at your company.



Self-reliant

Expand your knowledge self-determined with industry learning and work on your learning units at your own pace and according to your own schedule.



On demand

Get the knowledge you need, exactly when you need it. Be it to answer a current question or to work on a special topic.



Individuell

Talk directly with the learning consultant, clarify detailed questions and get personal coaching for transferring the learned topics to your own application.



Training cases catalog

<https://www.siemens.com/sitrain-catalog-training-cases>

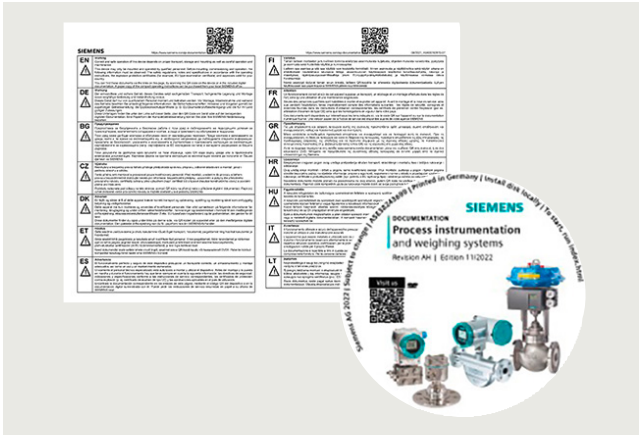
Find
your local
offer here



SITRAIN – Digital Industry Academy worldwide

You will find the regional knowledge offer in the country selection. One click will take you to the corresponding website.

Supplied product documentation on DVD and safety instructions



Siemens products for process instrumentation will be delivered with a multi-language **Safety note** and a **Mini DVD "Process Instrumentation and Weighing Systems"**.

On the DVD, customers can find many important operating instructions and certificates of our Siemens portfolio for process instrumentation and weighing systems. As well, product or order-specific print material may be part of the delivery.

QR Code – Easy access to product information



For easy identification, our devices are fitted with an ID Link (according to IEC 61406) which can be read with the Siemens Industry Support App or any other QR code reader.

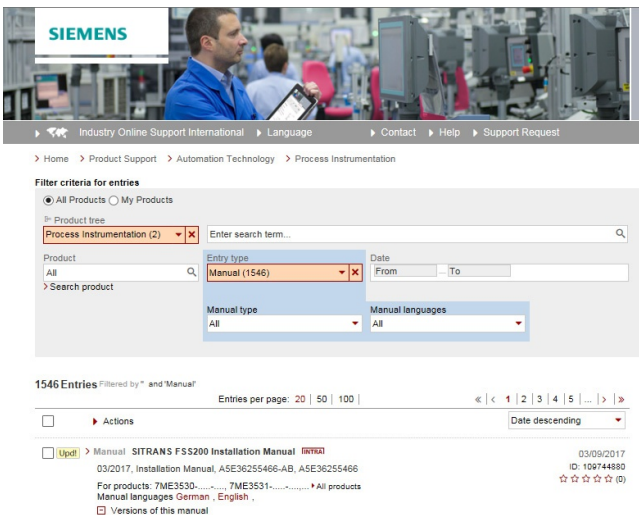
This not only enables simple access to article and serial numbers, it also provides you with a direct link to the product documentation, certificates, FAQs and videos.

You can find the Siemens Industry Support App or other QR code reader in your App Store for iOS, Android or Windows mobile.

More information can be found here:

<https://www.siemens.com/global/en/products/automation/topic-areas/digital-data-chain.html>

Siemens Industry Online Support Portal (SIOS)



For the complete portfolio, customers can download product documentation for free using the following QR code to our Siemens Industry Online Support Portal (SIOS):



By entering the product names as **Search term** and selecting the field **Entry type**, you can find all operating instructions, current catalogs and brochures, certificates, product software (EDDs, calculation tools), product notes and other useful information.

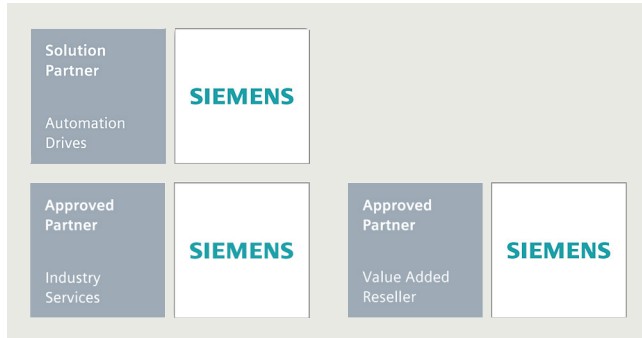
Appendix

Partners at Siemens

Siemens Partner Program

Overview

Siemens Solution and Approved Partner – Partners for your success



Highest competence in automation and drive technology

Siemens works closely together with selected partner companies around the world in order to ensure that customer requirements for all aspects of automation and drives are fulfilled as best as possible – wherever you are, and whatever the time.

We place great value on our customers acting in accordance with the same ideals which characterize Siemens as a whole: Competence, professionalism and quality. That is why continuous development through qualification and certification measures in line with global standards is a central aspect of our Partner Program. This means that with our partners, you benefit from the same high quality standards all over the world. The partner emblem is the symbol for tried and tested quality.

The partner network for industry

The Siemens Partner Program offers you expertise and experience close at hand.

Within our global network, we distinguish between Solution Partners and Approved Partners. We currently work with more than 1,500 Solution Partners around the world. Our network of over 150 Approved Partners continues to grow. In more than 80 countries worldwide.

Siemens Solution Partner – Automation Drives



At present we are working with more than 1,500 Solution Partners worldwide. They are characterized by extensive application, system and sector knowledge, as well as proven project experience, and are able to implement future-proof tailored solutions of the highest quality, based on our product and system portfolio.

Siemens Approved Partner – Value Added Reseller



With their detailed technical knowledge, Siemens Approved Partners – Value Added Resellers offer a combination of products and services that range from specialist technologies and customized modifications to the provision of high-quality system and product packages. They also provide qualified technical support and assistance.

Siemens Approved Partner – Industry Services



Siemens Approved Partner – Industry Services put their unique expertise entirely at the service of enhancing your productivity and can be instrumental in ensuring the availability of your plants.

Partner Finder

The ideal partner for your task is just a mouse click away!

The screenshot shows the Siemens Partner Finder interface. At the top, there's a language selector for English (US). Below that, navigation tabs for Partner Finder, Partner for Industry, and Reference are visible. The main heading is "Siemens Partner Finder" with the sub-heading "Competence near you". A brief description states: "Our partners are proven experts in their field. See for yourself, the right partner is only a few clicks away." Below this is a search form with the following fields:

- Partner Type:** Solution Partner - Automation Drives (dropdown menu)
- Partner Name or Keyword:** Please enter at least 3 characters (text input)
- Location:** Current Location (dropdown menu)
- Country:** All (dropdown menu)
- Industry:** (text input)
- Portfolio Module:** (text input)
- Expert Module:** (text input)
- Search:** (button)
- Clear All:** (button)
- Distance:** 100 km (dropdown menu)
- Radio buttons:** Main Office Only, Main & Regional Offices

In the Siemens global Solution Partner Program, customers are certain to find the optimum partner for their specific requirements – with no great effort. The Partner Finder is basically a comprehensive database that showcases the profiles of all our partners.

Easy selection:

Set filters in the search screen form according to the criteria that are relevant to you. You can also directly enter the name of an existing partner.

Skills at a glance:

Gain a quick insight into the specific competencies of any particular partner with the reference reports.

Direct contact option:

Use our electronic query form:

www.siemens.com/partnerfinder

Additional information of the Siemens Partners for industry is available online at:

www.siemens.com/partnerprogram

General

The pressure equipment directive **2014/68/EU** applies to the alignment of the statutory orders of the European member states for pressure equipment. Such equipment in the sense of the directive includes vessels, pipelines and accessories with a maximum permissible pressure of more than **0.5 bar** above atmospheric.

Classification according to hazard potential

The classification of the devices according to the pressure equipment directive takes place according to the hazard potential (medium/pressure/volume/nominal width) in the categories I to IV or article 4 paragraph 3.

The following criteria are decisive for assessing the hazard potential; they are also listed in diagrams 1 to 4 and 6 to 9:

• Fluid group	Group 1 or 2
• Aggregate state	Liquid, gaseous
• Type of pressurized equipment	Product of pressure and volume (PS * V [barL])
- Vessel	Nominal diameter, pressure or product of pressure and nominal diameter (PS * DN)
- Pipeline	

The fired or otherwise heated pressure equipment is listed separately in diagram 5.

Note:

Liquids according to Article 4 are those liquids whose steam pressure is **not** more than **0.5 bar** above standard atmospheric pressure (1013 mbar) at the maximum permissible temperature.

The **maximum permissible temperature** for the used liquids is the maximum process temperature which can occur, as defined by the user. This must be within the limits defined for the equipment.

Classification of the media (liquid/gas) into fluid groups*

"Fluids" are gases, liquids and vapors in pure phase as well as their mixtures; fluids can include a suspension of solid matter; fluids are classified into the following fluid groups according to article 13 of the pressure equipment directive 2014/68/EU.

Paragraph a

Group 1

Group 1 consisting of substances and mixtures, as defined in points 7 and 8 of article 2 of Regulation (EC) No. 1272/2008, that are classified as hazardous in accordance with the following physical or health hazard classes laid down in parts 2 and 3 of annex I to that Regulation:

- i) unstable explosive substances/mixtures or explosive substances/ mixtures of divisions 1.1, 1.2, 1.3, 1.4 and 1.5
- ii) flammable gases, categories 1 and 2
- iii) oxidizing gases, category 1
- iv) liquids, category 1 and 2
- v) flammable liquids, category 3 where the maximum permissible temperature is above the flash point
- vi) flammable solids, category 1 and 2
- vii) self-reactive substances and mixtures, type A to F
- viii) pyrophoric liquids, category 1
- ix) pyrophoric solids, category 1
- x) substances and mixtures which in contact with water emit flammable gases, category 1, 2 and 3

- xi) oxidizing liquids, category 1, 2 and 3
- xii) oxidizing solids, category 1, 2 and 3
- xiii) organic peroxides, types A to F
- xiv) acute oral toxicity, category 1 and 2
- xv) acute dermal toxicity, category 1 and 2
- xvi) acute inhalation toxicity, category 1, 2 and 3
- xvii) specific target organ toxicity - single exposure, category 1

Group 1 comprises also substances and mixtures in pressure equipment with a maximum allowable temperature TS which exceeds the flash point of the fluid.

Paragraph b

Group 2

All fluids that are not included in Group 1.

* from: "-DIRECTIVE 2014/68/EU OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 15 May 2014 on the harmonisation of the laws of the Member States relating to the making available on the market of pressure equipment (recast)"

Conformity assessment

Pressure equipment of category I to IV must meet the safety requirements set out in annex II and carry a CE marking.

They must meet a conformity assessment procedure set out in annex III of the Directive.

Pressure equipment to article 4 paragraph 3 shall be designed and manufactured in accordance with the sound engineering practice of a Member State and must not have a CE marking (CE markings from other Directives are not affected).

Siemens has (as long as the device is not subject to article 4 paragraph 3) conducted a conformity assessment for its products, given a CE marking and provided a declaration of conformity.

Monitoring of the design, dimensioning, testing and production takes place according to module H (full quality assurance).

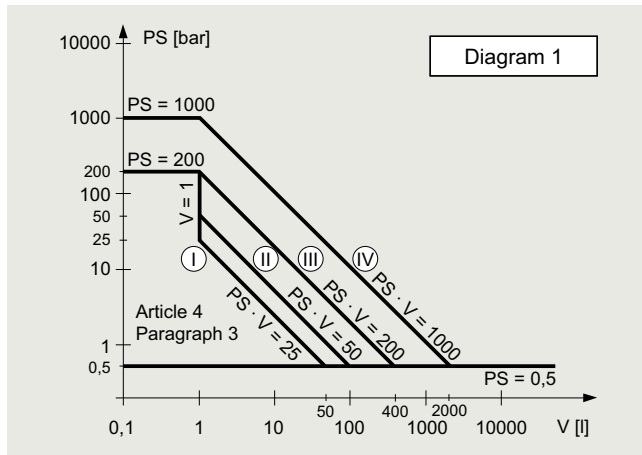
Notes:

- Equipment designed for media with a high danger potential (e.g. gases of fluid group 1) may also be used for media with a lower danger potential (e.g. gases of fluid group 2, or liquids of fluid groups 1 and 2).
- The pressure equipment directive according to Article 1 Paragraph 2 does not apply to equipment such as e.g. mobile offshore plants, ships, aircraft, water supply and waste water networks, nuclear plants, rockets and pipelines outside industrial plants.

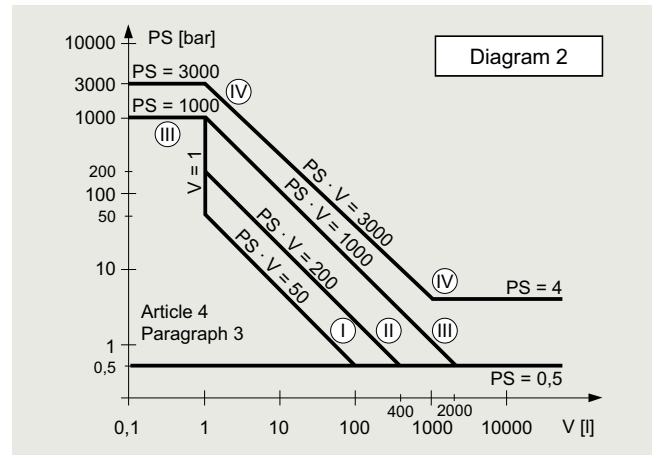
Appendix

Pressure Equipment Directive (2014/68/EU)

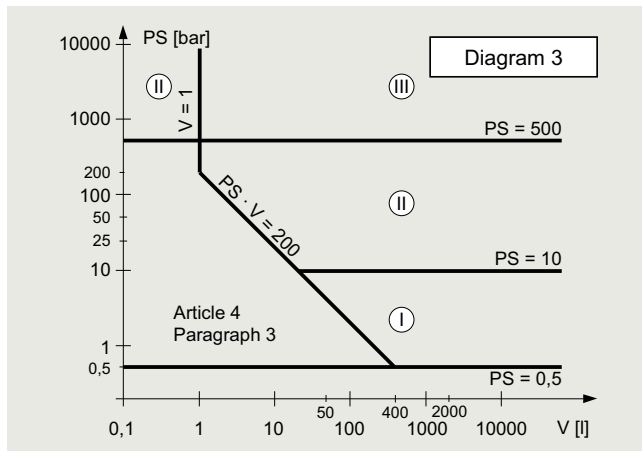
Diagrams



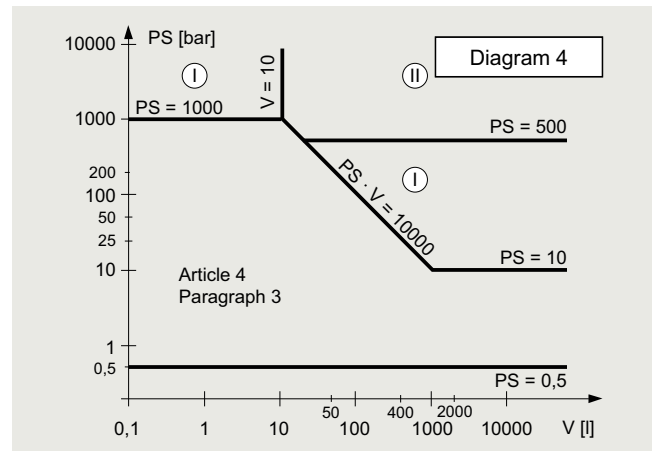
- Gases of fluid group 1
- Vessels in accordance with article 4 paragraph 1 letter a number i first dash
- Exception: unstable gases belonging to Categories I and II must be included in Category III.



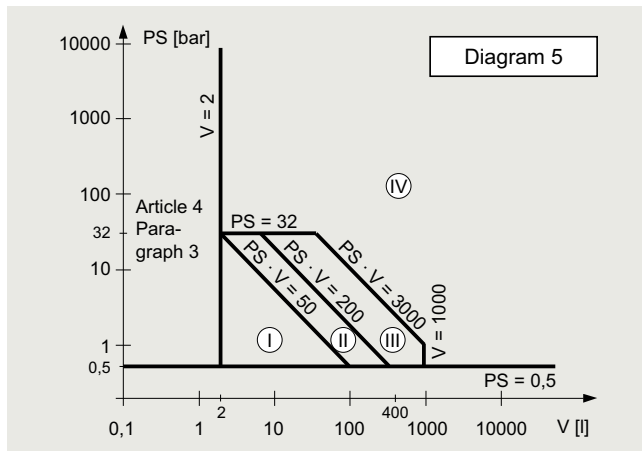
- Gases of fluid group 2
- Vessels in accordance with article 4 paragraph 1 letter a number i second dash
- Exception: fire extinguishers and bottles for breathing apparatus: at least Category III.



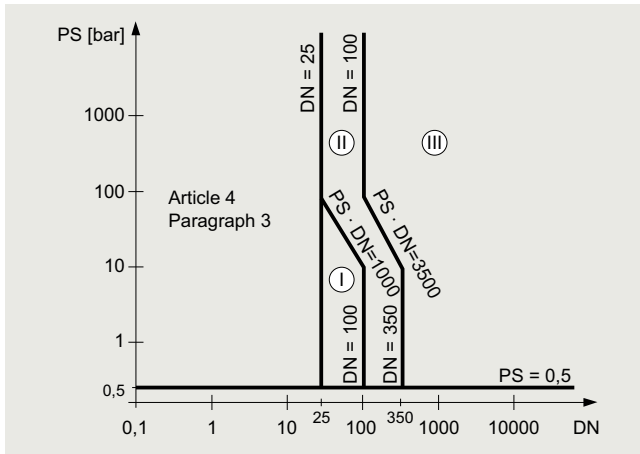
- Liquids of fluid group 1
- Vessels in accordance with article 4 paragraph 1 letter a number ii first dash



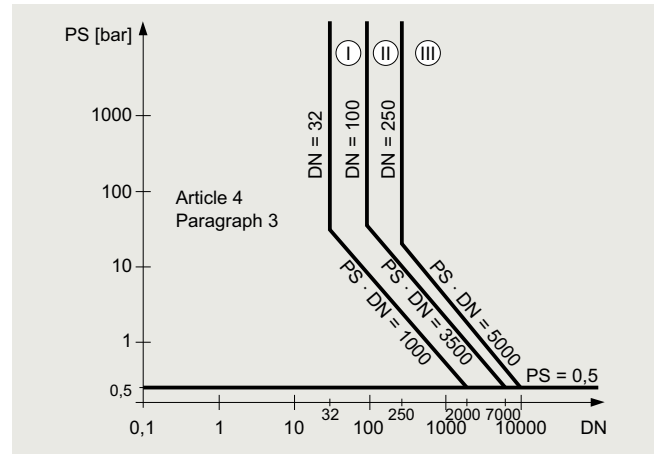
- Liquids of fluid group 2
- Vessels in accordance with article 4 paragraph 1 letter a number ii second dash
- Exception: modules for producing warm water



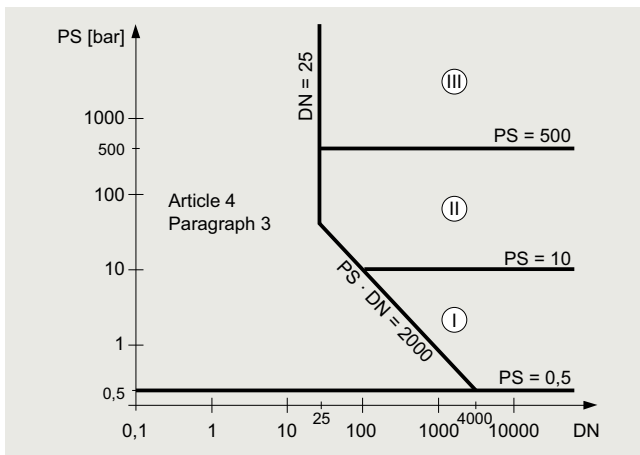
- Fuelled pressure equipment or equipment heated in another manner above 110 °C and liable to overheating.
- Pressure equipment in accordance with article 4 paragraph 1 letter b
- Exception: pressure cooker, test procedure at least according to Category III.



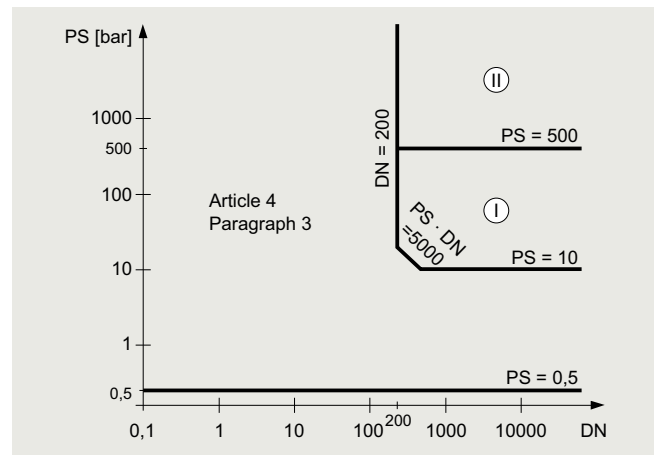
- Gases of fluid group 1
- Piping in accordance with article 4 paragraph 1 letter c number i first dash
- Exception: unstable gases belonging to Categories I and II must be included in Category III.



- Gases of fluid group 2
- Piping in accordance with article 4 paragraph 1 letter c number i second dash
- Exception: liquids at temperatures > 350 °C belonging to Category II must be included in Category III.



- Liquids of fluid group 1
- Piping in accordance with article 4 paragraph 1 letter c number ii first dash



- Liquids of fluid group 2
- Piping in accordance with article 4 paragraph 1 letter c number ii second dash

Appendix

Functional safety

Overview



Functional safety

Functional safety is a strong tradition at Siemens. Werner von Siemens realized as early as 1880 that safety in automated processes is not only a human obligation, it also makes economic sense. In the process industry, hazards for humans, plants and the environment must be minimized without affecting the production process. With Safety Integrated for Process Automation from Siemens, you benefit from a comprehensive product and service offering for safe, fault-tolerant applications.

What is the Safety Integrity Level (SIL)?

The Safety Integrity Level is a term from the field of functional safety. It helps you assess electrical/electronic/programmable electronic systems in terms of the reliability of their safety functions. The goal is to minimize the risk of malfunction of the system and thereby increase the protection of the employed personnel, the environment and property.

The international standard IEC 61508 describes the type of risk assessment as well as measures for designing appropriate safety functions ranging from sensors, logic processing and extending to actuators. The requirements for the process industry are further specified in IEC 61511-1.

Since the standards IEC 61508 and IEC 61511 for functional safety have been in effect, the demand for process instrumentation equipment conforming to SIL classification has continually increased. For this reason, the product portfolio is constantly expanded to include devices that meet the SIL standard.

You will find the current list of SIL devices from Siemens for process instrumentation available today at:

https://cache.industry.siemens.com/dl/files/162/109774162/att_1007813/v1/AP_PI_SIL_Products.pdf

Additional information

Brochure: "Functional Safety in Process Instrumentation with SIL Rating"

https://cache.industry.siemens.com/dl/files/169/109766169/att_980479/v1/SIL-Broschuere_EN.pdf

Website: "Functional Safety"

www.siemens.com/SIL

Overview

Software types

Software requiring a license is categorized into types. The following software types have been defined:

- Engineering software
- Runtime software

Engineering software

This includes all software products for creating (engineering) user software, e.g. for configuring, programming, parameterizing, testing, commissioning or servicing.

Data generated with engineering software and executable programs can be duplicated for your own use or for use by third-parties free-of-charge.

Runtime software

This includes all software products required for plant/machine operation, e.g. operating system, basic system, system expansions, drivers, etc.

The duplication of the runtime software and executable programs created with the runtime software for your own use or for use by third-parties is subject to a charge.

You can find information about license fees according to use in the ordering data (e.g. in the catalog). Examples of categories of use include per CPU, per installation, per channel, per instance, per axis, per control loop, per variable, etc.

Information about extended rights of use for parameterization/configuration tools supplied as integral components of the scope of supply can be found in the readme file supplied with the relevant product(s).

License types

Siemens Industry Automation & Drive Technologies offers various types of software license:

- Floating license
- Single license
- Rental license
- Rental floating license
- Trial license
- Demo license
- Demo floating license

Floating license

The software may be installed for internal use on any number of devices by the licensee. Only the concurrent user is licensed. The concurrent user is the person using the program. Use begins when the software is started.

A license is required for each concurrent user.

Single license

Unlike the floating license, a single license permits only one installation of the software per license.

The type of use licensed is specified in the ordering data and in the Certificate of License (CoL). Types of use include for example per instance, per axis, per channel, etc.

One single license is required for each type of use defined.

Rental license

A rental license supports the "sporadic use" of engineering software. Once the license key has been installed, the software can be used for a specific period of time (the operating hours do not have to be consecutive).

One license is required for each installation of the software.

Rental floating license

The rental floating license corresponds to the rental license, except that a license is not required for each installation of the software. Rather, one license is required per object (for example, user or device).

Trial license

A trial license supports "short-term use" of the software in a non-productive context, e.g. for testing and evaluation purposes. It can be transferred to another license.

Demo license

The demo license support the "sporadic use" of engineering software in a non-productive context, for example, use for testing and evaluation purposes. It can be transferred to another license. After the installation of the license key, the software can be operated for a specific period of time, whereby usage can be interrupted as often as required.

One license is required per installation of the software.

Demo floating license

The demo floating license corresponds to the demo license, except that a license is not required for each installation of the software. Rather, one license is required per object (for example, user or device).

Certificate of License (CoL)

The CoL is the licensee's proof that the use of the software has been licensed by Siemens. A CoL is required for every type of use and must be kept in a safe place.

Downgrading

The licensee is permitted to use the software or an earlier version/release of the software, provided that the licensee owns such a version/release and its use is technically feasible.

Delivery versions

Software is constantly being updated.

The following delivery versions

- PowerPack
- Upgrade

can be used to access updates.

Existing bug fixes are supplied with the ServicePack version.

PowerPack

PowerPacks can be used to upgrade to more powerful software. The licensee receives a new license agreement and CoL (Certificate of License) with the PowerPack. This CoL, together with the CoL for the original product, proves that the new software is licensed.

A separate PowerPack must be purchased for each original license of the software to be replaced.

Upgrade

An upgrade permits the use of a new version of the software on the condition that a license for a previous version of the product is already held.

The licensee receives a new license agreement and CoL with the upgrade. This CoL, together with the CoL for the previous product, proves that the new version is licensed.

A separate upgrade must be purchased for each original license of the software to be upgraded.

Appendix

Software licenses

Overview

ServicePack

ServicePacks are used to debug existing products. ServicePacks may be duplicated for use as prescribed according to the number of existing original licenses.

License key

Siemens Industry Automation & Drive Technologies supplies software products with and without license keys.

The license key serves as an electronic license stamp and is also the "switch" for activating the software (floating license, rental license, etc.).

The complete installation of software products requiring license keys includes the program to be licensed (the software) and the license key (which represents the license).

Software Update Service (SUS)

As part of the SUS contract, all software updates for the respective product are made available to you free of charge for a period of one year from the invoice date. The contract will automatically be extended for one year if it is not canceled three months before it expires.

The possession of the current version of the respective software is a basic condition for entering into an SUS contract.

You can download explanations concerning license conditions from https://mall.industry.siemens.com/legal/ww/en/terms_of_trade_en.pdf

1. General Provisions

By using this catalog you can purchase products (hardware, software and services) described therein from Siemens Aktiengesellschaft subject to the following Terms and Conditions of Sale and Delivery (hereinafter referred to as "T&C"). Please note that the scope, the quality and the conditions for supplies and services, including software products, by any Siemens entity having a registered office outside Germany, shall be subject exclusively to the General Terms and Conditions of the respective Siemens entity. The following T&C apply exclusively for orders placed with Siemens Aktiengesellschaft, Germany.

1.1 For customers with a seat or registered office in European Union

For customers with a seat or registered office in European Union, the following terms and conditions apply subordinate to T&C:

- for products, which include specific terms and conditions in the description text, these specific terms and conditions shall apply and subordinate thereto,
- for stand-alone software products and software products forming a part of a product or project, the "General License Conditions for Software Products for Automation and Drives for Customers with a Seat or registered Office in Germany"¹⁾ and/or
- for consulting services the "Allgemeine Geschäftsbedingungen für Beratungsleistungen der Division DF – Deutschland" (available only in German) and/or
- for other services, the „Supplementary Terms and Conditions for Services ("BL")"¹⁾ and/or
- for other supplies the "General Conditions for the Supply of Products and Services of the Electrical and Electronics Industry"¹⁾.

In case such supplies should contain Open Source Software, the conditions of which shall prevail over the "General Conditions for the Supply of Products and Services of the Electrical and Electronics Industry"¹⁾, a notice will be contained in the scope of delivery in which the applicable conditions for Open Source Software are specified. This shall apply mutatis mutandis for notices referring to other third party software components.

1.2 For customers with a seat or registered office outside European Union

For customers with a seat or registered office outside European Union, the following terms and conditions apply subordinate to T&C:

- for products, which include specific terms and conditions in the description text, these specific terms and conditions shall apply and subordinate thereto,
- for consulting services the "Standard Terms and Conditions for Consulting Services of the Division DF for Customers with a Seat or Registered Office Outside of Germany"¹⁾ and/or
- for other services the "International Terms & Conditions for Services"¹⁾ supplemented by "Software Licensing Conditions"¹⁾ and/or
- for other supplies of hard- and software the "International Terms & Conditions for Products"¹⁾ supplemented by "Software Licensing Conditions"¹⁾

1.3 For customers with master or framework agreement

To the extent our supplies and/or services offered are covered by an existing master or framework agreement, the terms and conditions of that agreement shall apply instead of T&C.

2. Prices

The prices are in € (Euro) ex point of delivery, exclusive of packaging.

The sales tax (value added tax) is not included in the prices. It shall be charged separately at the respective rate according to the applicable statutory legal regulations.

Prices are subject to change without prior notice. We will charge the prices valid at the time of delivery.

To compensate for variations in the price of raw materials (e.g. silver, copper, aluminum, lead, gold, dysprosium and neodym), surcharges are calculated on a daily basis using the so-called metal factor for products containing these raw materials.

A surcharge for the respective raw material is calculated as a supplement to the price of a product if the basic official price of the raw material in question is exceeded.

The metal factor of a product indicates the basic official price (for those raw materials concerned) as of which the surcharges on the price of the product are applied, and with what method of calculation.

An exact explanation of the metal factor can be downloaded at:

https://mall.industry.siemens.com/legal/ww/en/terms_of_trade_en.pdf

To calculate the surcharge (except in the cases of dysprosium and neodym), the official price from the day prior to that on which the order was received or the release order was effected is used.

To calculate the surcharge applicable to dysprosium and neodym ("rare earths"), the corresponding three-month basic average price in the quarter prior to that in which the order was received or the release order was effected is used with a one-month buffer (details on the calculation can be found in the explanation of the metal factor).

3. Additional Terms and Conditions

The dimensions are in mm. In Germany, according to the German law on units in measuring technology, data in inches apply only to devices for export.

Illustrations are not binding.

Insofar as there are no remarks on the individual pages of this catalog – especially with regard to data, dimensions and weights given – these are subject to change without prior notice.

¹⁾ The text of the Terms and Conditions of Siemens AG can be downloaded at https://mall.industry.siemens.com/legal/ww/en/terms_of_trade_en.pdf

Appendix

Conditions of sale and delivery

4. Export Regulations

We shall not be obligated to fulfill any agreement if such fulfillment is prevented by any impediments arising out of national or international foreign trade or customs requirements or any embargoes and/or other sanctions.

Export may be subject to license. We shall indicate in the delivery details whether licenses are required under German, European and US export lists.

Our products are controlled by the U.S. Government (when labeled with "ECCN" unequal "N") and authorized for export only to the country of ultimate destination for use by the ultimate consignee or end-user(s) herein identified. They may not be resold, transferred, or otherwise disposed of, to any other country or to any person other than the authorized ultimate consignee or end-user(s), either in their original form or after being incorporated into other items, without first obtaining approval from the U.S. Government or as otherwise authorized by U.S. law and regulations. Products labeled with "AL" unequal "N" are subject to European / national export authorization.

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Products without label, with label "AL:N" / "ECCN:N", or label "AL:9X9999" / "ECCN: 9X9999" may require authorization from responsible authorities depending on the final end-use, or the destination.

If you transfer goods (hardware and/or software and/or technology as well as corresponding documentation, regardless of the mode of provision) delivered by us or works and services (including all kinds of technical support) performed by us to a third party worldwide, you shall comply with all applicable national and international (re-)export control regulations. In any event of such transfer of goods, works and services you shall comply with the (re-) export control regulations of the Federal Republic of Germany, of the European Union and of the United States of America.

Prior to any transfer of goods, works and services provided by us to a third party you shall in particular check and guarantee by appropriate measures that

- there will be no infringement of an embargo imposed by the European Union, by the United States of America and/ or by the United Nations by such transfer, by brokering of contracts concerning those goods, works and services or by provision of other economic resources in connection with those goods, works and services, also considering the limitations of domestic business and prohibitions of by-passing those embargoes;
- such goods, works and services are not intended for use in connection with armaments, nuclear technology or weapons, if and to the extent such use is subject to prohibition or authorization, unless required authorization is provided;
- the regulations of all applicable Sanctioned Party Lists of the European Union and the United States of America concerning the trading with entities, persons and organizations listed therein are considered.

If required to enable authorities or us to conduct export control checks, you, upon request by us, shall promptly provide us with all information pertaining to the particular end customer, the particular destination and the particular intended use of goods, works and services provided by us, as well as any export control restrictions existing.

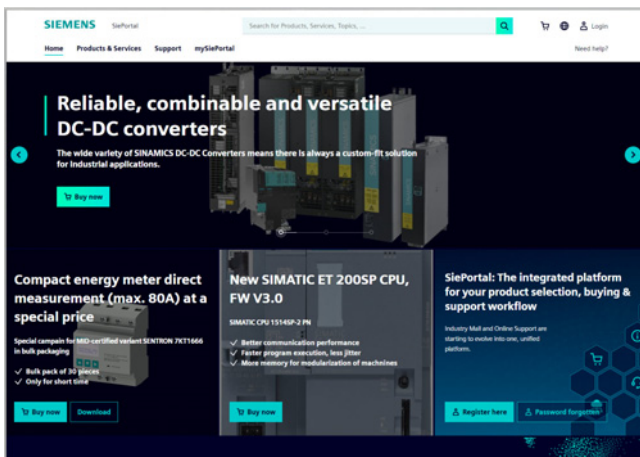
You acknowledge that under the EU embargo regulations against Iran, Syria and Russia respectively the sale of certain listed goods and related services is subject to authorization by the competent export control authorities of the European Union. If (i) the goods or services ordered by you are destined for Iran, Syria or Russia, and (ii) the contract for our supplies and/or services is subject to prior authorization of the competent export control authorities of the European Union, the contract between you and us shall come into force in this respect only upon granting of such authorization.

The products listed in this catalog may be subject to European/German and/or US export regulations. Any export requiring approval is therefore subject to authorization by the relevant authorities.

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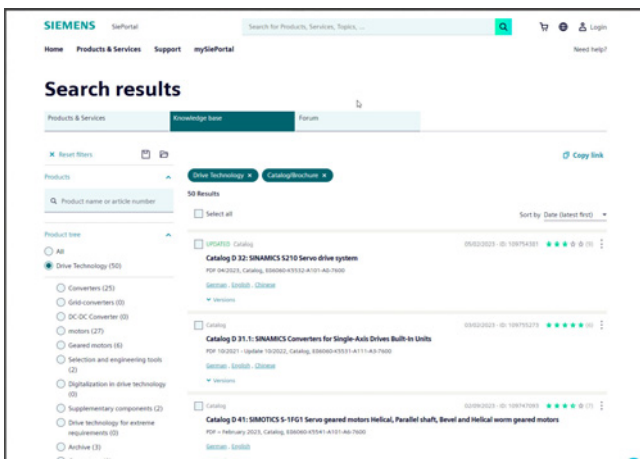
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Security information

Siemens provides products and solutions with industrial security functions that support the secure operation of plants, systems, machines and networks.

In order to protect plants, systems, machines and networks against cyber threats, it is necessary to implement – and continuously maintain – a holistic, state-of-the-art industrial security concept. Siemens' products and solutions constitute one element of such a concept.

Customers are responsible for preventing unauthorized access to their plants, systems, machines and networks. Such systems, machines and components should only be connected to an enterprise network or the internet if and to the extent such a connection is necessary and only when appropriate security measures (e.g. firewalls and/or network segmentation) are in place.

For additional information on industrial security measures that may be implemented, please visit <https://www.siemens.com/industrialsecurity>

Siemens' products and solutions undergo continuous development to make them more secure. Siemens strongly recommends that product updates are applied as soon as they are available and that the latest product versions are used. Use of product versions that are no longer supported, and failure to apply the latest updates may increase customer's exposure to cyber threats.

To stay informed about product updates, subscribe to the Siemens Industrial Security RSS Feed under <https://www.siemens.com/industrialsecurity>

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