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Isolation amplifier - MACX MCR-EX-SL-NAM-R-SP - 2924045

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Ex i NAMUR isolating amplifier For operating proximity sensors and switches in Ex areas. The signals are transmitted via a relay output (PDT contact) to the safe area. Line fault detection (LFD), 3-way isolation, SIL 2.

The illustration shows the versions with screw connection

Why buy this product

- Power supply and error indication possible via DIN rail connector
- Installation in zone 2, protection type "n" (EN 60079-15) permitted
- Up to SIL 2 according to EN 61508
- Line fault detection (LFD), can be activated/deactivated, error indicated by red flashing LED with de-excitation of output relay
- Input for NAMUR proximity sensors (EN 60947-5-6), floating contacts or contacts with resistance circuit, [Ex ia] IIC
- Relay signal output (PDT)
- Direction of operation can be selected (operating or closed circuit current behavior)
- 3-way electrical isolation
- LED indicators for supply voltage, switching state, and malfunction according to NAMUR NE 44



Key Commercial Data

Packing unit	1 STK
GTIN	4 046356 338059

Technical data

Note

Utilization restriction	EMC: class A product, see manufacturer's declaration in the download area
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Dimensions

Width	12.5 mm
Height	99 mm
Depth	114.5 mm

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Technical data

Ambient conditions

Ambient temperature (operation)	-20 °C ... 60 °C (Any mounting position)
Ambient temperature (storage/transport)	-40 °C ... 85 °C
Maximum altitude	≤ 2000 m
Permissible humidity (operation)	10 % ... 95 % (non-condensing)
Noise immunity	EN 61000-6-2 EN 61326
Degree of protection	IP20

Input data

Non-load voltage	~ 8 V DC
Switching points (attenuated)	< 1.2 mA (blocking)
Switching points (unattenuated)	> 2.1 mA (conductive)

Output data

Switching output	Relay output
Contact type	1 PDT
Contact material	AgSnO ₂ , hard gold-plated
Maximum switching voltage	250 V AC (2 A)
	120 V DC (0.2 A)
	30 V DC (2 A)
Maximum switching capacity	500 VA
Mechanical service life	10 ⁷ cycles

Power supply

Nominal supply voltage	24 V DC -20 % ... +25 %
Supply voltage range	19.2 V DC ... 30 V DC (24 V DC -20%...+25%)
Max. current consumption	21 mA (24 V DC)
Power consumption	< 650 mW
	< 650 mW

Connection data

Conductor cross section solid min.	0.2 mm ²
Conductor cross section solid max.	1.5 mm ²
Conductor cross section flexible min.	0.2 mm ²
Conductor cross section flexible max.	1.5 mm ²
Conductor cross section AWG min.	24
Conductor cross section AWG max.	16
Stripping length	8 mm
Connection method	Push-in connection

General

No. of channels	1
Status display	Green LED (supply voltage)
	LED yellow (switching state)

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Technical data

General

	Red LED (line errors)
Flammability rating according to UL 94	V0
Degree of pollution	2
Overvoltage category	II
Housing material	PA 66-FR
Color	green
Designation	Input/output
Electrical isolation	375 V (Peak value in accordance with EN 60079-11)
Designation	Input/output/supply, DIN rail connector
Electrical isolation	300 V _{rms} (Rated insulation voltage (overvoltage category II; degree of pollution 2, safe isolation as per EN 61010-1))
	2.5 kV (50 Hz, 1 min., test voltage)
Designation	Output/input, supply, TBUS
Electrical isolation	300 V _{rms} (Rated insulation voltage (overvoltage category III; degree of pollution 2, safe isolation as per EN 61010-1))
	2.5 kV (50 Hz, 1 min., test voltage)
Designation	Input/supply, DIN rail connector
Electrical isolation	375 V (Peak value in accordance with EN 60079-11)
Conformance	CE-compliant, additionally EN 61326
ATEX	# II (1) G [Ex ia Ga] IIC
	# II (1) D [Ex ia Da] IIIC
IECEX	[Ex ia Ga] IIC
	[Ex ia Da] IIIC
	Ex nA nC IIC T4 Gc
UL, USA / Canada	Class I Div 2; IS for Class I, II, III Div 1

Safety characteristic data

Integrity requirement	IEC 61508 - Low demand
Designation	Non-inverted operation
Equipment type	Type A
Safety Integrity Level (SIL)	Up to 2
Safe Failure Fraction (SFF)	78 %
λ_{SU}	2.49×10^{-7} (249 FIT)
λ_{SD}	6×10^{-9} (6 FIT)
λ_{DU}	6.4×10^{-8} (64 FIT)
λ_{DD}	7×10^{-9} (7 FIT)
Probability of a hazardous failure on demand (PFD _{AVG})	3.09×10^{-4} (1 year)
	6.17×10^{-4} (2 years)
	1.54×10^{-3} (5 years)
Diagnostic coverage (DC)	DC _S = 2.4%, DC _D = 9%
Integrity requirement	IEC 61508 - Low demand

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Technical data

Safety characteristic data

Designation	Inverted operation
Equipment type	Type A
Safety Integrity Level (SIL)	Up to 2
Safe Failure Fraction (SFF)	78 %
λ_{SU}	2.48×10^{-7} (248 FIT)
λ_{SD}	1×10^{-9} (1 FIT)
λ_{DU}	6.2×10^{-8} (62 FIT)
λ_{DD}	6×10^{-9} (6 FIT)
Probability of a hazardous failure on demand (PFD _{AVG})	3.01×10^{-4} (1 year)
	6.02×10^{-4} (2 years)
	1.5×10^{-3} (5 years)
Diagnostic coverage (DC)	DC _S = 0.4%, DC _D = 8%

Safety data

Max. internal inductance L_i	negligible
Max. internal capacitance C_i	11 nF
Max. output voltage U_o	9.6 V
Max. output current I_o	10 mA
Max. output power P_o	25 mW
Group	IIC
Max. external inductivity L_o	300 mH
Max. external capacity C_o	3.6 μ F
Group	IIB/IIIC
Max. external inductivity L_o	1000 mH
Max. external capacity C_o	26 μ F
Safety-related maximum voltage U_m	253 V AC (125 V DC)

Standards and Regulations

Flammability rating according to UL 94	V0
Conformance	CE-compliant, additionally EN 61326
ATEX	# II (1) G [Ex ia Ga] IIC
	# II (1) D [Ex ia Da] IIIC
IECEX	[Ex ia Ga] IIC
	[Ex ia Da] IIIC
	Ex nA nC IIC T4 Gc
UL, USA / Canada	Class I Div 2; IS for Class I, II, III Div 1
Group	IIC
	IIB/IIIC

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Classifications

eCl@ss

eCl@ss 4.0	27210121
eCl@ss 4.1	27210121
eCl@ss 5.0	27210121
eCl@ss 5.1	27210121
eCl@ss 6.0	27210121
eCl@ss 7.0	27210121
eCl@ss 8.0	27210121

ETIM

ETIM 2.0	EC001430
ETIM 3.0	EC001599
ETIM 4.0	EC001485
ETIM 5.0	EC001485

UNSPSC

UNSPSC 6.01	30211506
UNSPSC 7.0901	39121008
UNSPSC 11	39121008
UNSPSC 12.01	39121008
UNSPSC 13.2	39121008

Approvals

Approvals

Approvals

UL Listed / cUL Listed / GL / Functional Safety / EAC / cULus Listed

Ex Approvals

IECEX / UL Listed / cUL Listed / ATEX / IECEx / ATEX / EAC Ex / ATEX / cULus Listed

Approvals submitted

Approval details

UL Listed

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Approvals

cUL Listed

GL

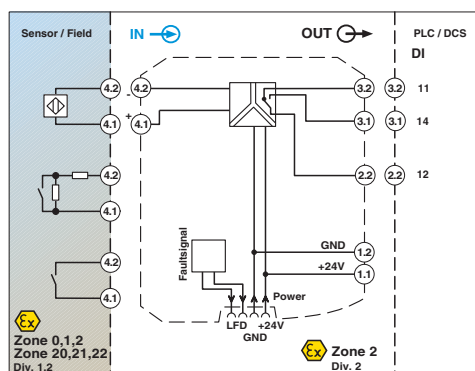
Functional Safety

EAC

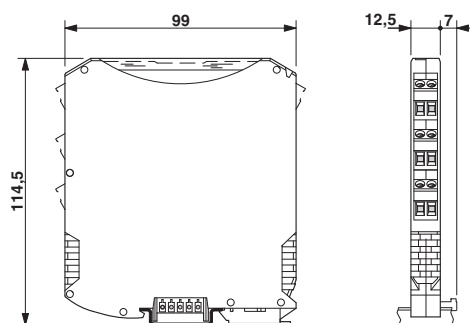
cULus Listed

Drawings

Block diagram



Dimensional drawing



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Product	Code	Reference	Product link
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