

Safety relay, 24 V DC, 14DI, 4DO relays, display, easyNet



Part no. ES4P-221-DRXD1
111019
EL Number 4521514
(Norway)

General specifications	
Product name	Eaton Moeller® series ES4P Safety relay
Part no.	ES4P-221-DRXD1
EAN	4015081105298
Product Length/Depth	72 millimetre
Product height	90 millimetre
Product width	108 millimetre
Product weight	0.385 kilogram
Certifications	EN ISO 13849-1 IEC 62061 IEC/EN 61000-4-2 UL File No.: CSA report applies to both US and Canada CSA-C22.20.4-04 EN 50156-2 EN 50178 IEC/EN 61000-6-3 CE UL 508 CSA UL Category Control No.: NRAQ CSA File No.: 012528 CSA-22.2 No. 142-MI1987 EN 50581 EN 50156-1 CSA Class No.: 2252-81; 2252-01 IEC 61508 IEC/EN 61000-6-2
Product Tradename	ES4P
Product Type	Safety relay
Product Sub Type	None
Catalog Notes	1000
Features & Functions	
Features	Safety/standard circuit diagram Expandable
Fitted with:	Display Keypad Expandable standard bus systems Real time clock Timer Relay output Expandable standard inputs/outputs
Functions	Redundancy
Indication	LCD-display used as Output status indication of Transistor outputs
Inscription	Individual laser inscriptions possible
General information	
Accuracy	± 2 s/day (± 0.5 h/year), Real-time clock, normally ± 5 s/day depending on the ambient temperature
Cable length	3000 m, shielded, Total of single cable lengths from one test signal output to the device inputs, Digital inputs 24 V DC 1000 m, shielded, Single cable length of test signal output to the device input, Digital inputs 24 V DC 100 m, unshielded, Digital inputs 24 V DC
Degree of protection	IP20
Display temperature - min	0 °C
Display temperature - max	55 °C
Insulation resistance	According to EN 50178
Lifespan, mechanical	10,000,000 Operations 10,000,000 Operations (Relay outputs)
Mounting method	Top-hat rail fixing (according to IEC/EN 60715, 35 mm) Wall mounting/direct mounting Screw fixing using fixing brackets ZB4-101-GF1 (accessories) Rail mounting possible

Mounting width		107.5 mm
Operating frequency		900 Operations/h at input (does not apply to I1, I2, if function block SM or OM is used)
Overvoltage category		III
Pollution degree		2
Product category		Control relays for safety applications
Rated impulse withstand voltage (Uimp)		6 kV (contact-coil)
Residual ripple		5 % (transistor outputs) 0 %
Resolution		1 min (Range H:M) 1 s (Range M:S) 50 ms (Range S)
Suitable for		Safety functions
Switching capacity		DC-13, 24 V DC, 0.1 Hz: 40000 operations (in accordance with IEC 60947-5-1), Relay outputs AC: R300 (in accordance with UL 508), Relay outputs AC-15, 230 V AC, 3 A: 80000 operations (in accordance with IEC 60947-5-1), Relay outputs DC: B300 (in accordance with UL 508), Relay outputs
Switching frequency		15 Hz, Relay outputs
Type		easy800 with safety function blocks
Voltage type		DC
Ambient conditions, mechanical		
Constant acceleration		2 g, 57 - 150 Hz
Constant amplitude		0,15 mm, 10 - 57 Hz, according to IEC/EN 60068-2-6, Vibrations
Drop and topple		50 mm Drop height, Drop to IEC/EN 60068-2-31
Height of fall (IEC/EN 60068-2-32) - max		0.3 m
Shock resistance		15 g, Mechanical, according to IEC/EN 60068-2-27, Half-sinusoidal shock 11 ms, 18 Impacts
Vibration resistance		3.5 mm / 1 g, According to IEC/EN 60068-2-6
Climatic environmental conditions		
Air pressure		795 - 1080 hPa (operation)
Ambient operating temperature - min		-25 °C
Ambient operating temperature - max		55 °C
Ambient storage temperature - min		-40 °C
Ambient storage temperature - max		55 °C
Environmental conditions		Clearance in air and creepage distances according to EN 50178, UL 508, CSA C22.2, No. 142, EN 60664-1:2003 Condensation: prevent with appropriate measures
Relative humidity		5 - 95 % (non-condensing, IEC 60068-2-30, IEC 60068-2-78)
Electro magnetic compatibility		
Air discharge		15 kV
Burst impulse		According to IEC/EN 61000-4-4 4 kV, Supply cable 4 kV, Signal cable
Contact discharge		8 kV
Electromagnetic compatibility		Increased EMC requirements for safety-relevant functions (according to ICE 62061)
Electromagnetic fields		1 V/m at 2 - 2.7 GHz (according to IEC EN 61000-4-3) 10 V/m at 0.08 - 1.0 GHz (according to IEC EN 61000-4-3) 30 V/m (according to IEC EN 61000-4-3) 3 V/m at 1.4 - 2 GHz (according to IEC EN 61000-4-3)
Immunity to line-conducted interference		20 V (according to IEC/EN 61000-4-6)
Radio interference class		Class B (EN 55011) Class B (EN 55022)
Surge rating		According to IEC/EN 61000-4-5, power pulses (Surge), EMC 4 kV, semi-conductor outputs, symmetrical, power pulses (Surge), EMC 2 kV, Supply cables, symmetrical, power pulses (Surge), EMC
Voltage dips		According to EN 61131-2 ≤ 10 ms
Terminal capacities		
Terminal capacity		0.2 - 2.5 mm ² (22 - 12 AWG), flexible with ferrule 0.2 - 4 mm ² (AWG 22 - 12), solid
Tightening torque		0.6 Nm, Screw terminals
Screwdriver size		3.5 x 0.8 mm, Terminal screw

Electrical rating		
Conventional thermal current I _{th} of auxiliary contacts (1-pole, open)		6 A
Input current		< 250 mA (at 115/230 V AC) 5.7 mA (Digital inputs, at 24 V DC, at signal 1, I1 - I6)
Output voltage		24 V DC (test signal outputs)
Rated control supply voltage		24 V DC (Us)
Rated insulation voltage (Ui)		250 V
Rated operational voltage		24 V DC (-15 %/+ 20 % - power supply) 20.4 - 28.8 V DC 250 V AC 24 V DC (digital inputs) < 5 V DC on 0 signal > 15 V DC on 1 signal
Supply voltage at AC, 50 Hz - min		0 V AC
Supply voltage at AC, 50 Hz - max		0 V AC
Supply voltage at DC - min		20.4 V DC
Supply voltage at DC - max		28.8 V DC
Communication		
Bus termination		First and last station, easyNet
Data transfer rate		20 kBit/s, 700 m, easyNet 500 kBit/s, 25 m, easyNet 125 kBit/s, 125 m, easyNet 10 kBit/s, 1000 m, easyNet 50 kBit/s, 300 m, easyNet 1000 kBit/s, 6 m, easyNet 250 kBit/s, 40 m, easyNet
LED indicator		Status indication of Digital inputs 24 V DC: LCD Display
Memory		100,000,000,000,000 Write cycles of the retentive memory
Module interface		easyNet/easyLink
Number of modules		Max. 8
Protocol		Other bus systems
Input/Output		
Number of inputs (analog)		0
Number of inputs (digital)		14
Number of outputs (analog)		4
Number of outputs (digital)		4
Off-delay		< 1 ms
Output		4 Test signal outputs (T1 - T4) Relay outputs in groups of 1
Pulse characteristics		1 ms (Off test pulse) 1 ms (max. duration of external test pulse)
Safety		
Explosion safety category for dust		None
Explosion safety category for gas		None
Potential isolation		Between Inputs and internal Power supply: Yes Between easyNet and Memory card: yes Between easyNet and Inputs: yes Between Power supply and easyNet: yes Between Power supply and Outputs: yes Between Power supply and Inputs: yes Between easyNet and Outputs: yes Between Relay outputs and easyNet: yes Between Digital inputs 24 V DC and Outputs: yes Between Relay outputs and Inputs: yes Between Digital inputs 24 V DC and easyNet: yes Between Relay outputs and easyLink: yes Between Relay outputs and Interface: yes Safe isolation according to EN 50178: 300 V AC (Relay outputs) Between easyNet and Power supply: yes Between Relay outputs and Digital inputs: yes Basic isolation: 600 V AC (Relay outputs) Between Relay outputs and Power supply: yes Between easyNet and PC interface: yes
Protection		I Protection of an Output relay - Fuse: 6 A gL/gG, Circuit-breaker with C characteristic: 4 A (only permissible with 24V DC), Short-circuit current IK: < 250 A
Safe isolation		Between coil and contacts in accordance with EN 50178 300 V AC, Between coil and contacts, According to EN 50178
Safety function/level		Feedback circuit According to EN 50156

		Highest speed monitoring Enabling switch Safety timing relay Mode selection Two-hand control Protective door ESPE with muting function Zero speed monitoring 3 redundant relay outputs, 6 months test interval Stopping in the event of an emergency OSSD input
Safety parameter (EN ISO 13849-1)		Cat. 4, Category PL e, Performance level
Safety parameter (IEC 62061)		SILCL 3, Safety integrity level claim limit SIL 3, Safety integrity level, In accordance with IEC 61508 4.26 x 10 ⁻¹⁰ , PFHd, Probability of failure per hour
Design verification		
Equipment heat dissipation, current-dependent P _{vid}		0 W
Heat dissipation capacity P _{diss}		0 W
Heat dissipation per pole, current-dependent P _{vid}		0 W
Rated operational current for specified heat dissipation (I _n)		0 A
Static heat dissipation, non-current-dependent P _{vs}		6 W
10.2.2 Corrosion resistance		Meets the product standard's requirements.
10.2.3.1 Verification of thermal stability of enclosures		Meets the product standard's requirements.
10.2.3.2 Verification of resistance of insulating materials to normal heat		Meets the product standard's requirements.
10.2.3.3 Resist. of insul. mat. to abnormal heat/fire by internal elect. effects		Meets the product standard's requirements.
10.2.4 Resistance to ultra-violet (UV) radiation		Meets the product standard's requirements.
10.2.5 Lifting		Does not apply, since the entire switchgear needs to be evaluated.
10.2.6 Mechanical impact		Does not apply, since the entire switchgear needs to be evaluated.
10.2.7 Inscriptions		Meets the product standard's requirements.
10.3 Degree of protection of assemblies		Does not apply, since the entire switchgear needs to be evaluated.
10.4 Clearances and creepage distances		Meets the product standard's requirements.
10.5 Protection against electric shock		Does not apply, since the entire switchgear needs to be evaluated.
10.6 Incorporation of switching devices and components		Does not apply, since the entire switchgear needs to be evaluated.
10.7 Internal electrical circuits and connections		Is the panel builder's responsibility.
10.8 Connections for external conductors		Is the panel builder's responsibility.
10.9.2 Power-frequency electric strength		Is the panel builder's responsibility.
10.9.3 Impulse withstand voltage		Is the panel builder's responsibility.
10.9.4 Testing of enclosures made of insulating material		Is the panel builder's responsibility.
10.10 Temperature rise		The panel builder is responsible for the temperature rise calculation. Eaton will provide heat dissipation data for the devices.
10.11 Short-circuit rating		Is the panel builder's responsibility. The specifications for the switchgear must be observed.
10.12 Electromagnetic compatibility		Is the panel builder's responsibility. The specifications for the switchgear must be observed.
10.13 Mechanical function		The device meets the requirements, provided the information in the instruction leaflet (IL) is observed.

Technical data ETIM 9.0

Programmable logic controllers PLC (EG000024) / Logic module (EC001417)		
Electric engineering, automation, process control engineering / Control, Process Control System (PCS) / Programmable logic control (SPS) / Logic module (ecl@ss13-27-24-22-16 [AKE539019])		
Supply voltage AC 50 Hz	V	0 - 0
Supply voltage AC 60 Hz	V	0 - 0
Supply voltage DC	V	20.4 - 28.8
Voltage type (supply voltage)		DC
Switching current	A	8
Power consumption	W	6
Number of analogue inputs		0
Number of analogue outputs		4
Number of digital inputs		14
Number of digital outputs		4
With relay output		Yes

Number of HW-interfaces industrial Ethernet		0
Number of interfaces PROFINET		0
Number of HW-interfaces RS-232		1
Number of HW-interfaces RS-422		0
Number of HW-interfaces RS-485		0
Number of HW-interfaces serial TTY		0
Number of HW-interfaces USB		0
Number of HW-interfaces parallel		0
Number of HW-interfaces wireless		0
Number of HW-interfaces other		3
With optical interface		No
Supporting protocol for EtherCAT		No
Supporting protocol for TCP/IP		No
Supporting protocol for PROFIBUS		No
Supporting protocol for CAN		No
Supporting protocol for INTERBUS		No
Supporting protocol for ASI		No
Supporting protocol for KNX		No
Supporting protocol for Modbus		No
Supporting protocol for Data-Highway		No
Supporting protocol for DeviceNet		No
Supporting protocol for SUCONET		No
Supporting protocol for LON		No
Supporting protocol for PROFINET IO		No
Supporting protocol for PROFINET CBA		No
Supporting protocol for SERCOS		No
Supporting protocol for Foundation Fieldbus		No
Supporting protocol for EtherNet/IP		No
Supporting protocol for AS-Interface Safety at Work		No
Supporting protocol for DeviceNet Safety		No
Supporting protocol for INTERBUS-Safety		No
Supporting protocol for PROFIsafe		No
Supporting protocol for SafetyBUS p		No
Supporting protocol for other bus systems		Yes
Radio standard Bluetooth		No
Radio standard WLAN 802.11		No
Radio standard GPRS		No
Radio standard GSM		No
Radio standard UMTS		No
IO link master		No
Redundancy		Yes
With display		Yes
Degree of protection (IP)		IP20
Basic device		Yes
Expandable		Yes
Expansion device		No
With time switch clock		Yes
Rail mounting possible		Yes
Wall mounting/direct mounting		Yes
Front built-in possible		No
Rack-assembly possible		No
Suitable for safety functions		Yes
SIL according to IEC 61508		3
Performance level according to EN ISO 13849-1		Level e
Appendant operation agent (Ex ia)		No

Appendant operation agent (Ex ib)			No
Explosion safety category for gas			None
Explosion safety category for dust			None
Certified for UL hazardous location class I			No
Certified for UL hazardous location class II			No
Certified for UL hazardous location class III			No
Certified for UL hazardous location division 1			No
Certified for UL hazardous location division 2			No
Certified for UL hazardous location group A (acetylene)			No
Certified for UL hazardous location group B (hydrogen)			No
Certified for UL hazardous location group C (ethylene)			No
Certified for UL hazardous location group D (propane)			No
Certified for UL hazardous location group E (metal dusts)			No
Certified for UL hazardous location group F (carbonaceous dusts)			No
Certified for UL hazardous location group G (non-conductive dusts)			No
Width		mm	108
Height		mm	90
Depth		mm	72