

Part no. ES4P-221-DMXX1
111016
EL Number 4521511
(Norway)

General specifications		
Product name		Eaton Moeller® series ES4P Safety relay
Part no.		ES4P-221-DMXX1
EAN		4015081105267
Product Length/Depth		72 millimetre
Product height		90 millimetre
Product width		108 millimetre
Product weight		0.324 kilogram
Compliances		CE Marked
Certifications		UL Listed EN Listed CSA Certified IEC 61508 CSA Class No.: 2252-81; 2252-01 UL Category Control No.: NRAQ CSA-22.2 No. 142-MI1987 IEC 62061 EN 50156-1 CSA-C22.20.4-04 UL File No.: CSA report applies to both US and Canada EN 50178 EN 50156-2 CE IEC/EN 61000-4-2 CSA CSA File No.: 012528 IEC/EN 61000-6-2 UL 508 IEC/EN 61000-6-3 EN ISO 13849-1 EN 50581
Product Tradename		ES4P
Product Type		Safety relay
Product Sub Type		None
Catalog Notes		1000
Features & Functions		
Features		Expandable Safety/standard circuit diagram
Fitted with:		Timer Real time clock Relay output Expandable standard inputs/outputs Expandable standard bus systems
Functions		Redundancy Thermal cutout
Inscription		Individual laser inscriptions possible
General information		
Accuracy		± 5 s/day depending on the ambient temperature ± 2 s/day (± 0.5 h/year), Real-time clock, normally
Cable length		1000 m, shielded, Single cable length of test signal output to the device input, Digital inputs 24 V DC 3000 m, shielded, Total of single cable lengths from one test signal output to the device inputs, Digital inputs 24 V DC 50 m, unshielded, Transistor outputs 100 m, unshielded, Digital inputs 24 V DC
Degree of protection		IP20
Duty factor		T0.95 ≈ 3 x T0.65 = 3 x L/R (Inductive load to EN 60947-5-1, Without external suppressor circuit) T0.95 = Time in ms, until 95 % of the steady-state current has been reached (Inductive load to EN 60947-5-1, Without external suppressor circuit) 100 % (Inductive load to EN 60947-5-1, With external suppressor circuit)
Insulation resistance		According to EN 50178
Lifespan, mechanical		10,000,000 Operations

		10,000,000 Operations (Relay outputs)
Mounting method		Screw fixing using fixing brackets ZB4-101-GF1 (accessories) Top-hat rail fixing (according to IEC/EN 60715, 35 mm) Rail mounting possible Wall mounting/direct mounting
Mounting width		107.5 mm
Operating frequency		Resistive load < 100 kΩ, depending on program and load 900 Operations/h at input (does not apply to I1, I2, if function block SM or OM is used) 13500 Operations/h at resistive load
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) ≤ 5 %
Resolution		1 min (Range H:M) 1 s (Range M:S) 50 ms (Range S)
Suitable for		Safety functions
Switching capacity		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 DC-13, 24 V DC, 0.1 Hz: 40000 operations (in accordance with IEC 60947-5-1), Relay outputs
Switching frequency		15 Hz, Relay outputs 0.5 Hz, Transistor outputs, Inductive load to EN 60947-5-1, with external suppressor circuit, Max. switching frequency, max. duty factor = 50%
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		70 °C
Environmental conditions		Condensation: prevent with appropriate measures Clearance in air and creepage distances according to EN 50178, UL 508, CSA C22.2, No. 142, EN 60664-1:2003
Relative humidity		5 - 95 % (non-condensing, IEC 60068-2-30, IEC 60068-2-78)
Electro magnetic compatibility		
Air discharge		15 kV
Burst impulse		4 kV, Supply cable According to IEC/EN 61000-4-4 4 kV, Signal cable
Contact discharge		8 kV
Electromagnetic compatibility		Increased EMC requirements for safety-relevant functions (according to ICE 62061)
Electromagnetic fields		30 V/m (according to IEC EN 61000-4-3) 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) 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 55022) Class B (EN 55011)
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		≤ 10 ms According to EN 61131-2
Terminal capacities		
Terminal capacity		0.2 - 4 mm ² (AWG 22 - 12), solid 0.2 - 2.5 mm ² (22 - 12 AWG), flexible with ferrule
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) U = U _# - 1 V (signal 1 at I _# = 0.5 A, transistor outputs) Output Voltage@≤ 2.4 V (at signal 0 at external load < 10 MΩ, transistor outputs)
Peak short-circuit current		16 A
Rated control supply voltage		24 V DC (Us)
Rated insulation voltage (Ui)		250 V
Rated operational current (Ie)		Max. 0.5 A at signal „1“ DC per channel
Rated operational voltage		250 V AC 20.4 - 28.8 V DC 24 V DC (transistor outputs) 20.4 - 28.8 V DC (Transistor outputs) 24 V DC (digital inputs) 24 V DC (-15 %/+ 20 % - power supply) < 5 V DC on 0 signal > 15 V DC on 1 signal
Short-circuit current		8 A, Transistor outputs
Short-circuit protection		Yes, Transistor outputs ≤ 8 A, Back-up fuse, Transistor outputs
Short-circuit tripping current		0.7 ≤ I _e ≤ 2 per output, For R _a ≤ 10 mΩ, Transistor outputs
Supply current		60/100 mA, Normally/max., On 1 signal, Transistor outputs 50/50 mA, Normally/max., On 0 signal, Transistor outputs
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 1000 kBit/s, 6 m, easyNet 10 kBit/s, 1000 m, easyNet 500 kBit/s, 25 m, easyNet 50 kBit/s, 300 m, easyNet 250 kBit/s, 40 m, easyNet 125 kBit/s, 125 m, easyNet
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		
Capacitive load		0.6 μF max., Transistor outputs
Lamp load		5 W (without R _v per channel)
Number of inputs (analog)		0
Number of inputs (digital)		14
Number of outputs (analog)		4
Number of outputs (digital)		5
Off-delay		< 1 ms
Output		4 Test signal outputs (T1 - T4) 4 Transistor Outputs Relay outputs in groups of 1
Parallel switching		Not permitted
Pulse characteristics		1 ms (max. duration of external test pulse) 1 ms (Off test pulse)
Utilization factor		1 (Inductive load to EN 60947-5-1, With external suppressor circuit)

Safety		
Explosion safety category for dust		None
Explosion safety category for gas		None
Potential isolation		Between easyNet and Power supply: yes Between Digital inputs 24 V DC and easyNet: yes Between Transistor outputs and easyLink: yes Between Relay outputs and easyNet: yes Between Relay outputs and Power supply: yes Between Transistor output and interface: yes Between Digital inputs 24 V DC and Outputs: yes Between easyNet and Outputs: yes Between Power supply and easyNet: yes Between Relay outputs and Digital inputs: yes Between Inputs and internal Power supply: Yes Between Power supply and Inputs: yes Between Relay outputs and Inputs: yes Between easyNet and Inputs: yes Between easyNet and PC interface: yes Basic isolation: 600 V AC (Relay outputs) Between Relay outputs and Interface: yes Between easyNet and Memory card: yes Safe isolation according to EN 50178: 300 V AC (Relay outputs) Between Power supply and Outputs: yes
Protection		! 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
Protection against polarity reversal		Yes
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		Enabling switch Two-hand control Protective door OSSD input 3 redundant relay outputs, 6 months test interval Stopping in the event of an emergency Zero speed monitoring Highest speed monitoring Safety timing relay Mode selection Feedback circuit According to EN 50156 ESPE with muting function
Safety parameter (EN ISO 13849-1)		Cat. 4, Category PL e, Performance level
Safety parameter (IEC 62061)		SILCL 3, Safety integrity level claim limit 23 x 10 ⁻¹⁰ , PFHd, Probability of failure per hour SIL 3, Safety integrity level, In accordance with IEC 61508
Design verification		
Equipment heat dissipation, current-dependent Pvid		0 W
Heat dissipation capacity Pdis		0 W
Heat dissipation per pole, current-dependent Pvid		0 W
Rated operational current for specified heat dissipation (In)		0 A
Static heat dissipation, non-current-dependent Pvs		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	4
Number of analogue inputs		0
Number of analogue outputs		4
Number of digital inputs		14
Number of digital outputs		5
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			No
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