



Safety relay emergency stop/protective door, 24VDC/AC, 2 enabling paths



Part no. ESR5-NO-21-24VAC-DC
118700
EL Number 4133316
(Norway)

General specifications		
Product name		Eaton ESR5 Safety relay
Part no.		ESR5-NO-21-24VAC-DC
EAN		4015081168408
Product Length/Depth		114.5 millimetre
Product height		99 millimetre
Product width		22.5 millimetre
Product weight		0.165 kilogram
Certifications		UL UL File No.: E29184 CSA-C22.2 No. 14-95 CSA Class No.: 3211-83; 3211-03 IEC/EN 60204 IEC 62061 Certified by UL for use in Canada CE EN ISO 13849-1 EN 50178 UL report applies to both US and Canada IEC 61508, Parts 1-7 2014/30/EU UL 508 UL Category Control No.: NKCR; NKCR7 Machines 2006/42/EG
Product Tradename		ESR5
Product Type		Safety relay
Product Sub Type		None
Features & Functions		
Electric connection type		Screw connection
Features		2 Non-delayed enable current paths Reinforced insulation Safe insulation Automatic reset
Fitted with:		Approval according to UL Approval for TÜV Detachable clamps Feedback circuit Start input
Functions		1-channel 2-channel
Material		Enclosure: Polyamide (PA), not reinforced Contacts: silver tin oxide, gold plated (AgSnO2, 0.2 µm Au)
General information		
Connection type		M3 screw terminals
Current consumption		140 mA, AC 65 mA, DC
Degree of protection		Installation location: ≥ IP54 Terminals: IP20 Enclosure: IP20 IP20
Duty factor		100 %
Emitted interference		According to EN 61000-6-4
Interference immunity		According to EN 662061_x According to EN-61000-6-2
LED indicator		Status indication of SmartWire-DT network: Green LED
Lifespan, mechanical		10,000,000 Operations
Lifetime		240 mo
Model		Basic device
Mounting method		Rail mounting possible Top-hat rail fixing (according to IEC/EN 60715, 35 mm)

Mounting width		22.5 mm
Overvoltage category		III
Pollution degree		2
Power loss		Normally 5.16 W
Product category		Electronic safety relays
Protection		Finger and back-of-hand proof, Protection against direct contact when actuated from front (EN 50274)
Rated impulse withstand voltage (Uimp)		6000 V AC
Recovery time		1000 ms
Safety parameter (EN ISO 13849-1)		300,000 switching cycles, B10d Cat. 4, Category PL e, Performance level
Safety parameter (IEC 62061)		SIL 3, Safety integrity level SIL 3, Safety integrity level, In accordance with IEC 61508 Cat. 4, Category SILCL 3, Safety integrity level claim limit 5.05 x 10-10, PFHd, Probability of failure per hour
Stop category (IEC 60204)		0
Suitable for		Monitoring of position switches Safety relay for monitoring emergency stop and protective door switch Monitoring of emergency-stop circuits Module used to safely interrupt electrical circuits
Switching frequency		Max. 0.5 Hz, Input data
Type		Emergency stop category 0; emergency switching off Feedback circuit Protective door
Voltage type		AC/DC
Ambient conditions, mechanical		
Mounting position		As required
Prooftest		240 Months (High Demand) 66 Months (Low Demand)
Switching capacity		3 A at 3600 O/h, AC-15 at 230 V, Outputs 4 A at 360 O/h, DC-13 at 24 V, Outputs 2.5 A at 3600 O/h, DC-13 at 24 V, Outputs 0.4 W In accordance with IEC 60947-5-1, Outputs 4 A at 360 O/h, AC-15 at 230 V, Outputs
Vibration resistance		10 - 150 Hz, Amplitude: 0.15 mm, Acceleration: 2 g, (IEC/EN 60068-2-6)
Climatic environmental conditions		
Air pressure		795 - 1080 hPa (operation)
Altitude		Max. 2000 m
Ambient operating temperature - min		-20 °C
Ambient operating temperature - max		55 °C
Ambient storage temperature - min		-40 °C
Ambient storage temperature - max		70 °C
Climatic proofing		Dry heat to IEC 60068-2-2 Cold to EN 60068-2-1 Damp heat, constant, to IEC 60068-2-3
Environmental conditions		Clearance in air and creepage distances according to EN 50178, UL 508, CSA C22.2, No. 14-95 Condensation: Non-condensing
Operating temperature - min		-20 °C
Operating temperature - max		55 °C
Relative humidity		< 75 %
Terminal capacities		
Terminal capacity		24 - 12 AWG, solid or stranded 2 x (0.2 – 1) mm ² , solid 1 x (0.2 – 2.5) mm ² , solid 2 x (0.25 – 1) mm ² , flexible with ferrule 1 x (0.25 – 2.5) mm ² , flexible with ferrule
Stripping length (main cable)		7 mm
Screwdriver size		2, Terminal screw, Pozidriv screwdriver 0.6 x 3.5 mm, Terminal screws
Tightening torque		0.6 Nm, Screw terminals
Electrical rating		
Inrush current		0.025 - 6 A

Power supply circuit			1.6 W (DC operated) 3.4 W (AC operated 50/60 Hz)
Rated control supply voltage (Us) at AC, 50 Hz - min			0 V
Rated control supply voltage (Us) at AC, 50 Hz - max			26.4 V
Rated control supply voltage (Us) at AC, 60 Hz - min			20.4 V
Rated control supply voltage (Us) at AC, 60 Hz - max			24 V
Rated control supply voltage (Us) at DC - min			0 V
Rated control supply voltage (Us) at DC - max			24 V
Rated insulation voltage (Ui)			250 V
Rated operational voltage			Approx. 24 V DC at input, starting and feedback circuit 230 V AC 24 V AC/DC (power supply)
Short-circuit current			2.3 A, Input data
Short-circuit protection			Short-circuit proof, 24 V, Fuse for control circuit supply, Control circuit Fuse 6 A gL/gG, For output circuits, External
Short-circuit protection rating			6A gL/gG, NEOZED (N/C), Output fuse, External, Output data 10A gL/gG, NEOZED (N/O), Output fuse, External, Output data
Input/Output			
Breaking power			144 W max., resistive load ($\tau = 0$ ms), at 24 V DC 1500 VA, max., resistive load ($\tau = 0$ ms), at 250 V AC 35 W max., inductive load ($\tau = 40$ ms), at 220 V DC 48 W max., inductive load ($\tau = 40$ ms), at 24 V DC 288 W max., resistive load ($\tau = 0$ ms), at 48 V DC 35 W max., inductive load ($\tau = 40$ ms), at 110 V DC 40 W max., inductive load ($\tau = 40$ ms), at 48 V DC 77 W max., resistive load ($\tau = 0$ ms), at 110 V DC 88 W max., resistive load ($\tau = 0$ ms), at 220 V DC
Input			∞ ms, Simultaneity for inputs 1/2
Nominal current			30 A
Number of inputs			1-channel
Number of outputs (safety related, delayed) with contact			0
Number of outputs (safety related, undelayed) with contact			2
Number of outputs (signaling function, delayed) with contact			0
Number of outputs (signaling function, undelayed) with contact			1
Permissible total cable resistance			Approx. 50 Ω (input and starting circuits for UN)
Pick-up time			100 ms typ. (at U# in automatic mode) 100 ms typ. (K1, K2 - for UN automatic mode)
Quadratic summation current			72 A ² ($I_{TH}^2 = I_1^2 + I_2^2$)
Reset time			Normally 10 ms (dual-channel) 45 ms (single-channel)
Resistance			50 Ω (impedance)
Switching voltage			250 V
Uninterrupted current			6 A N/O, Limiting continuous current 6 A N/C, Limiting continuous current
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			5.16 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

Relays (EG000019) / Device for monitoring of safety-related circuits (EC001449)			
Electric engineering, automation, process control engineering / Low-voltage switch technology / Monitoring equipment (low-voltage switch technology) / Device for monitoring of safety-related circuits (ecI@ss13-27-37-18-19 [ACO304016])			
Model			Basic device
Rail mounting possible			Yes
With detachable clamps			Yes
Type of electric connection			Screw connection
Voltage type (supply voltage)			AC/DC
Supply voltage AC 50 Hz		V	24 - 24
Supply voltage AC 60 Hz		V	24 - 24
Supply voltage DC		V	24 - 24
Suitable for monitoring of position switches			Yes
Suitable for monitoring of emergency-stop circuits			Yes
Suitable for monitoring of valves			No
Suitable for monitoring of optoelectronic protection equipment			No
Suitable for monitoring of tactile sensors			No
Suitable for monitoring of magnetic switches			No
Suitable for monitoring of proximity switches			No
Evaluation inputs			1-channel
Power consumption		W	5.16
With start input			Yes
With muting function			No
With feedback circuit			Yes
Release-delay		s	0 - 0
Type of control voltage 1			AC/DC
Control voltage 1		V	24 - 24
Type of control voltage 2			AC/DC
Control voltage 2		V	24 - 24
Number of outputs, safety related, undelayed, with contact			2
Number of outputs, safety related, delayed, with contact			0
Number of outputs, safety related, undelayed, semiconductors			0
Number of outputs, safety related, delayed, semiconductors			0
Number of outputs, signalling function, undelayed, with contact			1
Number of outputs, signalling function, delayed, with contact			0
Number of outputs, signalling function, undelayed, semiconductors			0
Number of outputs, signalling function, delayed, semiconductors			0
Voltage type (operating voltage)			AC/DC
Operating voltage AC 50 Hz		V	24 - 24
Operating voltage AC 60 Hz		V	24 - 24
Operating voltage DC		V	24 - 24
Rated switch current		A	4
Type of safety according to IEC 61496-1			None

Stop category according to IEC 60204			0
Performance level according to EN ISO 13849-1			Level e
SIL according to IEC 61508			3
With approval for BG BIA			No
With approval according to UL			Yes
Width		mm	22.5
Height		mm	99
Depth		mm	114.5
With approval for TÜV			Yes