



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

Powering Business Worldwide™

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 (AgSnO ₂ , 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 0/h, AC-15 at 230 V, Outputs 4 A at 360 0/h, DC-13 at 24 V, Outputs 2.5 A at 3600 0/h, DC-13 at 24 V, Outputs 0.4 W In accordance with IEC 60947-5-1, Outputs 4 A at 360 0/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	$72 A^2 (ITH^2 = I1^2 + I2^2)$
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 Pdiss	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 (ecl@ss13-27-37-18-19 [AC0304016])

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