DATASHEET - ESR5-NOS-31-230VAC

Safety relay emergency stop/protective door, 230VAC, 3 enabling paths

Part no.	**ESR5-NOS-31-230VAC**
	153152
EL Number (Norway)	**4560866**

General specifications

Product name	Eaton ESR5 Safety relay
Part no.	ESR5-NOS-31-230VAC
EAN	4015081497485
Product Length/Depth	114.5 millimetre
Product height	99 millimetre
Product width	22.5 millimetre
Product weight	0.177 kilogram
Certifications	Machines 2006/42/EG Certified by UL for use in Canada IEC 61508, Parts 1-7 IEC/EN 60204 CSA Class No.: 3211-83; 3211-03 UL Category Control No.: NKCR; NKCR7 CSA-C22.2 No. 14-95 UL 508 UL report applies to both US and Canada 2014/30/EU IEC 62061 EN 50156-1 CE EN ISO 13849-1 UL UL File No.: E29184 EN 50178
Product Tradename	ESR5
Product Type	Safety relay
Product Sub Type	None

Features & Functions

Electric connection type	Screw connection
Features	Automatically/manually monitored start Basic insulation Safe insulation 3 Non-delayed enable current paths Reinforced insulation 6 kV between A1-A2 / logic / enable and signal current paths
Fitted with:	Detachable clamps Approval according to UL Start input Approval for TÜV Feedback circuit
Functions	1-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	22 mA, DC
Degree of protection	Installation location: ≥ IP54 IP20 Enclosure: IP20 Terminals: IP20
Duty factor	100 %
Emitted interference	According to EN 61000-6-4
Interference immunity	According to EN 61000-6-2
LED indicator	Status indication of SmartWire-DT network: Green LED
Lifespan, mechanical	10,000,000 Operations
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 5.43 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)	4000 V AC
Recovery time	1000 ms
Safety parameter (EN ISO 13849-1)	Cat. 1, Category 300,000 switching cycles, B10d PL c, Performance level
Safety parameter (IEC 62061)	2.42 x 10-10, PFHd, Probability of failure per hour SIL 1, Safety integrity level, In accordance with IEC 61508 SILCL 1, Safety integrity level claim limit Cat. 1, Category
Stop category (IEC 60204)	0
Suitable for	Monitoring of position switches Safety relay for monitoring emergency stop and protective door switch Module used to safely interrupt electrical circuits Monitoring of emergency-stop circuits
Switching frequency	Max. 0.5 Hz, Input data
Type	Protective door Emergency stop category 0; emergency switching off
Voltage type	AC

Ambient conditions, mechanical

Mounting position	As required
Switching capacity	In accordance with IEC 60947-5-1, Outputs 0.01 W
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	85 °C
Climatic proofing	Damp heat, constant, to IEC 60068-2-3 Cold to EN 60068-2-1 Dry heat to IEC 60068-2-2
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	-25 °C
Operating temperature - max	55 °C
Relative humidity	< 75 %

Terminal capacities

Terminal capacity	1 x (0.25 – 2.5) mm^2, flexible with ferrule 1 x (0.2 – 2.5) mm^2, solid 2 x (0.25 – 1) mm^2, flexible with ferrule 2 x (0.2 – 1) mm^2, solid 24 - 12 AWG, solid or stranded
Stripping length (main cable)	7 mm
Screwdriver size	0.6 x 3.5 mm, Terminal screws 2, Terminal screw, Pozidriv screwdriver
Tightening torque	0.6 Nm, Screw terminals

Electrical rating

Inrush current	0.1 - 6 A
Rated control supply voltage (Us) at AC, 50 Hz - min	0 V
Rated control supply voltage (Us) at AC, 50 Hz - max	230 V
Rated control supply voltage (Us) at AC, 60 Hz - min	20.4 V
Rated control supply voltage (Us) at AC, 60 Hz - max	230 V
Rated control supply voltage (Us) at DC - min	0 V
Rated control supply voltage (Us) at DC - max	0 V

Rated insulation voltage (Ui)	250 V
Rated operational voltage	Approx. 24 V DC at input, starting and feedback circuit 230 V AC 230 V AC (power supply)
Short-circuit protection	Fuse 6 A gL/gG (Signal current paths), For output circuits, External Fuse 10 A gL/gG (Enable current paths), 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	68 W max., resistive load (τ = 0 ms), at 110 V DC 230 W max., resistive load (τ = 0 ms), at 48 V DC 33 W max., inductive load (τ = 40 ms), at 220 V DC 144 W max., resistive load (τ = 0 ms), at 24 V DC 35 W max., inductive load (τ = 40 ms), at 110 V DC 48 W max., inductive load (τ = 40 ms), at 24 V DC 2000 VA, max., resistive load (τ = 0 ms), at 250 V AC 40 W max., inductive load (τ = 40 ms), at 48 V DC 88 W max., resistive load (τ = 0 ms), at 220 V DC
Input	∞ ms, Simultaneity for inputs 1/2
Number of inputs	1-channel
Number of outputs (safety related, delayed) with contact	0
Number of outputs (safety related, undelayed) with contact	3
Number of outputs (signaling function, delayed) with contact	0
Number of outputs (signaling function, undelayed) with contact	1
Permissible total cable resistance	50 Ω (input and starting circuits for UN)
Pick-up time	50 ms typ. (at U# in manual mode) 300 ms typ. (K1, K2 - for UN automatic mode) 330 ms typ. (if actuated via A1 or S11/S12) 300 ms typ. (at U# in automatic mode) 50 ms typ. (K1, K2 - for UN manual operation)
Quadratic summation current	72 A^2 ($ITH^2 = I1^2 + I2^2 + I3^2$)
Reset time	Normally 150 ms (on actuation via A1) 20 ms (on actuation via S11/S12)
Switching voltage	250 V
Uninterrupted current	6 A N/O, Limiting continuous current 5 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	5.43 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 [ACO304016])

Model			Basic device
Rail mounting possible			Yes
With detachable clamps			Yes
Type of electric connection			Screw connection
Voltage type (supply voltage)			AC
Supply voltage AC 50 Hz		V	230 - 230
Supply voltage AC 60 Hz		V	230 - 230
Supply voltage DC		V	0 - 0
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	5.43
With start input			Yes
With muting function			No
With feedback circuit			Yes
Release-delay		s	0 - 0
Type of control voltage 1			AC
Control voltage 1		V	230 - 230
Type of control voltage 2			AC
Control voltage 2		V	230 - 230
Number of outputs, safety related, undelayed, with contact			3
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
Operating voltage AC 50 Hz		V	230 - 230
Operating voltage AC 60 Hz		V	230 - 230
Operating voltage DC		V	0 - 0
Rated switch current		A	6
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 c
SIL according to IEC 61508			1
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

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