DATASHEET - ESR5-NV3-30

Safety relay emergency stop/protective door/light curtain, 24 V DC, 4 enabling paths(2del.)

Part no.	**ESR5-NV3-30**
	118705
EL Number (Norway)	**4133323**

General specifications

Product name	Eaton ESR5 Safety relay
Part no.	ESR5-NV3-30
EAN	4015081168453
Product Length/Depth	114.5 millimetre
Product height	99 millimetre
Product width	22.5 millimetre
Product weight	0.171 kilogram
Certifications	CE UL UL File No.: E29184 UL 508 UL report applies to both US and Canada CSA Class No.: 3211-83; 3211-03 IEC/EN 60204 2014/30/EU CSA-C22.2 No. 14-95 IEC 61508, Parts 1-7 UL Category Control No.: NKCR; NKCR7 EN ISO 13849-1 EN 50178 Certified by UL for use in Canada IEC 62061 Machines 2006/42/EG
Product Tradename	ESR5
Product Type	Safety relay
Product Sub Type	None

Features & Functions

Electric connection type	Screw connection
Features	Automatic start Manual start Basic insulation 2 Non-delayed enable current paths
Fitted with:	Approval for TÜV Start input Selectable cross-circuit detection Detachable clamps Feedback circuit Approval according to UL
Functions	1-channel 2-channel Time function
Material	Contacts: silver tin oxide, gold plated (AgSnO2, 0.2 µm Au) Enclosure: Polyamide (PA), not reinforced

General information

Connection type	M3 screw terminals
Current consumption	75 mA, DC
Degree of protection	Terminals: IP20 IP20 Installation location: ≥ IP54 Enclosure: IP20
Duty factor	100 %
Emitted interference	According to EN 61000-6-4
Interference immunity	According to EN-61000-6-2 According to EN 662061_x
LED indicator	Status indication of SmartWire-DT network: Green LED
Lifespan, mechanical	10,000,000 Operations
Lifetime	240 mo
Model	Basic device

Mounting method	Top-hat rail fixing (according to IEC/EN 60715, 35 mm) Rail mounting possible
Mounting width	22.5 mm
Overvoltage category	III
Pollution degree	2
Power loss	Normally 7.8 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	330 ms (restart)
Safety parameter (EN ISO 13849-1)	400,000 switching cycles, B10d Cat. 4, Category PL e, Performance level
Safety parameter (IEC 62061)	SIL 3 only for high demand requirements, Safety integrity level Cat. 4, Category 18 x 10-10, PFHd, Probability of failure per hour SIL 3, Safety integrity level SILCL 3, Safety integrity level claim limit SIL 3, Safety integrity level, In accordance with IEC 61508
Stop category (IEC 60204)	0 1
Suitable for	Monitoring of position switches Module used to safely interrupt electrical circuits Safety relay for monitoring emergency stop and protective door switch Monitoring of optoelectronic protection equipment Monitoring of emergency-stop circuits Safety position switch with mechanical securing action LS-S…MT-ZBZ
Switching frequency	Max. 0.5 Hz, Input data
Type	Emergency stop category 1; emergency switching off Feedback circuit Light curtain Protective door
Voltage type	DC

Ambient conditions, mechanical

Mounting position	As required
Prooftest	240 Months (High Demand)
Switching capacity	3 A at 3600 O/h, DC-13 at 24 V, Outputs 5 A at 3600 O/h, AC-15 at 230 V, Outputs 0.4 W In accordance with IEC 60947-5-1, 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	45 °C
Ambient storage temperature - min	-40 °C
Ambient storage temperature - max	70 °C
Climatic proofing	Dry heat to IEC 60068-2-2 Damp heat, constant, to IEC 60068-2-3 Cold to EN 60068-2-1
Environmental conditions	Clearance in air and creepage distances according to EN 60947-1, UL 508, CSA C22.2, No. 14-95 Condensation: Non-condensing
Operating temperature - min	-20 °C
Operating temperature - max	45 °C
Relative humidity	< 75 %

Terminal capacities

Terminal capacity	2 x (0.2 – 1) mm^2, solid 24 - 12 AWG, solid or stranded 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	0.6 x 3.5 mm, Terminal screws 2, Terminal screw, Pozidriv screwdriver

Tightening torque	0.6 Nm, Screw terminals

Electrical rating

Inrush current	0.025 - 6 A
Power supply circuit	1.8 W (DC operated)
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	26.4 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	24 V DC (power supply) Approx. 24 V DC at input, starting and feedback circuit 230 V AC
Short-circuit current	0.1 A, Input data
Short-circuit protection	Fuse 10 A gL/gG NEOZED, For output circuits, External
Short-circuit protection rating	10A gL/gG, NEOZED (N/O), Output fuse, External, Output data 6A gL/gG, NEOZED (N/C), Output fuse, External, Output data

Input/Output

Breaking power	144 W max., resistive load (τ = 0 ms), at 24 V DC 42 W max., inductive load (τ = 40 ms), at 24 V DC 88 W max., resistive load (τ = 0 ms), at 220 V DC 1500 VA, max., resistive load (τ = 0 ms), at 250 V AC 23 W max., inductive load (τ = 40 ms), at 220 V DC 288 W max., resistive load (τ = 0 ms), at 48 V DC 33 W max., inductive load (τ = 40 ms), at 48 V DC 25 W max., inductive load (τ = 40 ms), at 110 V DC 90 W max., resistive load (τ = 0 ms), at 110 V DC
Input	∞ ms, Simultaneity for inputs 1/2
Nominal current	3.5 A
Number of inputs	One- and two-channel
Number of outputs (safety related, delayed) with contact	2
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	0
Off-delay	0.1 - 30 s (± 40 %, K3, K4 adjustable)
Permissible total cable resistance	500 Ω (input and starting circuits for UN)
Pick-up time	150 ms typ. (at U# in automatic mode) 150 ms typ. (controlled start, K1, K2 - for UN manual operation) 150 ms typ. (controlled start, K1, K2 - for UN automatic mode) 150 ms typ. (at U# in manual mode)
Quadratic summation current	55 A^2 ($ITH^2 = I1^2 + I2^2 + I3^2 + I4^2 + I5^2$)
Reset time	Normally 100 ms (delayed contacts) 20 ms (non-delayed contacts)
Resistance	500 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	7.8 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	0 - 0
Supply voltage AC 60 Hz		V	0 - 0
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			Yes
Suitable for monitoring of tactile sensors			No
Suitable for monitoring of magnetic switches			No
Suitable for monitoring of proximity switches			No
Evaluation inputs			One- and two-channel
Power consumption		W	7.8
With start input			Yes
With muting function			No
With feedback circuit			Yes
Release-delay		s	0.1 - 30
Type of control voltage 1			DC
Control voltage 1		V	24 - 24
Type of control voltage 2			DC
Control voltage 2		V	24 - 24
Number of outputs, safety related, undelayed, with contact			2
Number of outputs, safety related, delayed, with contact			2
Number of outputs, safety related, undelayed, semiconductors			0
Number of outputs, safety related, delayed, semiconductors			0
Number of outputs, signalling function, undelayed, with contact			0
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)			DC

Operating voltage AC 50 Hz		V	0 - 0
Operating voltage AC 60 Hz		V	0 - 0
Operating voltage DC		V	24 - 24
Rated switch current		A	5
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