DATASHEET - ESR5-NV3-300

Safety relays for emergency stop/protective door/light curtain monitoring, 24VDC, off-delayed, 0-300 sec.

Part no.	**ESR5-NV3-300**
	171858
EL Number (Norway)	**4560876**

General specifications

Product name	Eaton ESR5 Safety relay
Part no.	ESR5-NV3-300
EAN	4015081684298
Product Length/Depth	114.5 millimetre
Product height	99 millimetre
Product width	45 millimetre
Product weight	0.472 kilogram
Compliances	Contact Manufacturer
Certifications	Machines 2006/42/EG 2014/30/EU Certified by UL for use in Canada EN ISO 13849-1 CSA-C22.2 No. 14-95 UL report applies to both US and Canada UL Category Control No.: NKCR; NKCR7 IEC 62061 UL File No.: E29184 UL EN 50178 CE IEC 61508, Parts 1-7 UL 508 CSA Class No.: 3211-83; 3211-03 IEC/EN 60204
Product Tradename	ESR5
Product Type	Safety relay
Product Sub Type	None

Features & Functions

Electric connection type	Screw connection
Features	Basic insulation Reinforced insulation Manual start 6 kV between the enable current paths (13/14, 23/24, 33/34) and the remaining rungs, as well as between 13/14, 23/24, 33/34 in relation to each other Automatic start Monitored reset 3 Non-delayed enable current paths Safe insulation
Fitted with:	Approval for TÜV Detachable clamps Approval according to UL Start input Feedback circuit
Functions	2-channel 1-channel

General information

Connection type	M3 screw terminals
Current consumption	155 mA, DC
Degree of protection	IP20 Terminals: IP20 Enclosure: IP20 Installation location: ≥ IP54
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	Top-hat rail fixing (according to IEC/EN 60715, 35 mm) Rail mounting possible

Mounting width	45 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)	300,000 switching cycles, B10d Cat. 4, Category PL e, Performance level
Safety parameter (IEC 62061)	Non-time-delay contacts, SILCL 3 as per IEC 62061 and SIL 3 as per IEC 61508 Cat. 4, Category SIL 3, Safety integrity level, In accordance with IEC 61508 Off-delay contacts, SILCL 2 as per IEC 62061 3.6 x 10-10, PFHd, Probability of failure per hour SILCL 3, Safety integrity level claim limit
Stop category (IEC 60204)	0 + 1
Suitable for	Safety relay for monitoring emergency stop and protective door switch Monitoring of position switches Module used to safely interrupt electrical circuits Monitoring of emergency-stop circuits
Switching frequency	Max. 0.5 Hz, Input data
Type	Protective door Light curtain Emergency stop category 1; emergency switching off
Voltage type	DC

Ambient conditions, mechanical

Mounting position	As required
Prooftest	19 Months (Low Demand) 240 Months (High Demand)
Switching capacity	4 A at 360 O/h, AC-15 at 230 V, Outputs In accordance with IEC 60947-5-1, Outputs 0.4 W 2.5 A at 3600 O/h, DC-13 at 24 V, Outputs 3 A at 3600 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	Damp heat, constant, to IEC 60068-2-3 Dry heat to IEC 60068-2-2 Cold to EN 60068-2-1
Environmental conditions	Condensation: Non-condensing Clearance in air and creepage distances according to EN 50178, UL 508, CSA C22.2, No. 14-95
Operating temperature - min	-20 °C
Operating temperature - max	55 °C
Relative humidity	< 75 %

Terminal capacities

Terminal capacity	24 - 12 AWG, solid or stranded 1 x (0.25 – 2.5) mm^2, flexible with ferrule 2 x (0.25 – 1) mm^2, flexible with ferrule 2 x (0.2 – 1) mm^2, solid 1 x (0.2 – 2.5) mm^2, solid
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

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	26.4 V
Rated control supply voltage (Us) at DC - min	24 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) 230 V AC Approx. 24 V DC at input, starting and feedback circuit
Short-circuit protection	Time-delay 10-A gL/gG Neozed fuse, For output circuits, External Non-time-delay 6-A fast-blow fuse, For output circuits, External
Short-circuit protection rating	10A gL/gG, NEOZED (delayed), Output fuse, External, Output data 6 A (non-delayed), Output fuse, Output data

Input/Output

Breaking power	77 W max., resistive load (τ = 0 ms), at 110 V DC 88 W max., resistive load (τ = 0 ms), at 220 V DC 42 W max., inductive load (τ = 40 ms), at 24 V DC 35 W max., inductive load (τ = 40 ms), at 110 V DC 40 W max., inductive load (τ = 40 ms), at 48 V DC 288 W max., resistive load (τ = 0 ms), at 48 V DC 144 W max., resistive load (τ = 0 ms), at 24 V DC 1500 VA, max., resistive load (τ = 0 ms), at 250 V AC 33 W max., inductive load (τ = 40 ms), at 220 V DC
Input	∞ ms, Simultaneity for inputs 1/2
Number of inputs	One- and two-channel
Number of outputs (safety related, delayed) with contact	2
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
Off-delay	0.2 - 300 s (± 40 %, K3, K4 adjustable)
Permissible total cable resistance	22 Ω (input and starting circuits for UN)
Pick-up time	70 ms typ. (K1, K2 - for UN manual operation) 600 ms typ. (K1, K2 - for UN automatic mode) 70 ms typ. (at U# in manual mode) 600 ms typ. (at U# in automatic mode)
Quadratic summation current	55 A^2 ($ITH^2 = I1^2 + I2^2 + I3^2 + I4^2 + I5^2$)
Reset time	20 ms (non-delayed contacts)
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	5.43 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)			DC
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			No
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	5.43
With start input			Yes
With muting function			No
With feedback circuit			Yes
Release-delay		s	0.2 - 300
Type of control voltage 1			DC
Control voltage 1		V	24 - 24
Type of control voltage 2			AC
Control voltage 2		V	24 - 24
Number of outputs, safety related, undelayed, with contact			3
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			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)			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	4
Type of safety according to IEC 61496-1			None
Stop category according to IEC 60204			0 + 1
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	45
Height		mm	99
Depth		mm	114.5
With approval for TÜV			Yes

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