



Safety relay emergency stop/protective door, 24VDC/AC, 4 enabling paths

Part no. ESR5-NO-41-24VAC-DC  
118701  
EL Number 4133317  
(Norway)

General specifications		
Product name		Eaton ESR5 Safety relay
Part no.		ESR5-NO-41-24VAC-DC
EAN		4015081168415
Product Length/Depth		114.5 millimetre
Product height		99 millimetre
Product width		22.5 millimetre
Product weight		0.218 kilogram
Certifications		Machines 2006/42/EG IEC/EN 60204 UL report applies to both US and Canada Certified by UL for use in Canada EN ISO 13849-1 2014/30/EU CE UL 508 IEC 62061 IEC 61508, Parts 1-7 EN 50178 UL Category Control No.: NKCR; NKCR7 UL File No.: E29184 CSA-C22.2 No. 14-95 UL CSA Class No.: 3211-83; 3211-03
Product Tradename		ESR5
Product Type		Safety relay
Product Sub Type		None
Features & Functions		
Electric connection type		Screw connection
Features		Basic insulation Safe insulation Manual start 6 kV between input circuit / NC contacts, and enable current paths Reinforced insulation Automatic start 4 Non-delayed enable current paths
Fitted with:		Approval according to UL Start input Detachable clamps Approval for TÜV Feedback circuit
Functions		1-channel
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		65 mA, DC 140 mA, AC
Degree of protection		Enclosure: IP20 Terminals: IP20 Installation location: ≥ IP54 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		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 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)		4000 V AC
Recovery time		1000 ms
Safety parameter (EN ISO 13849-1)		PL e possible only with the aid of fault exclusions 230,000 switching cycles, B10d Cat. 1, Category PL c, Performance level
Safety parameter (IEC 62061)		4.05 x 10 <sup>-10</sup> , PFHd, Probability of failure per hour Cat. 1, Category SILCL 1, Safety integrity level claim limit SIL 1, Safety integrity level, In accordance with IEC 61508
Stop category (IEC 60204)		0
Suitable for		Safety relay for monitoring emergency stop and protective door switch Monitoring of emergency-stop circuits Monitoring of position switches Module used to safely interrupt electrical circuits
Switching frequency		Max. 0.5 Hz, Input data
Type		Protective door Feedback circuit Emergency stop category 0; emergency switching off
Voltage type		AC/DC
Ambient conditions, mechanical		
Mounting position		As required
Prooftest		167 Months (Low Demand) 240 Months (High Demand)
Switching capacity		2.5 A at 3600 O/h, DC-13 at 24 V, Outputs 4 A at 360 O/h, DC-13 at 24 V, Outputs In accordance with IEC 60947-5-1, Outputs 4 A at 360 O/h, AC-15 at 230 V, Outputs 0.4 W 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
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		1 x (0.2 – 2.5) mm <sup>2</sup> , solid 24 - 12 AWG, solid or stranded 2 x (0.25 – 1) mm <sup>2</sup> , flexible with ferrule 1 x (0.25 – 2.5) mm <sup>2</sup> , flexible with ferrule 2 x (0.2 – 1) mm <sup>2</sup> , solid
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		3.4 W (AC operated 50/60 Hz)

		1.6 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		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		Fuse 6 A gL/gG, For output circuits, External Miniature circuit-breaker with characteristic C: 24 V AC/DC 6 A, For output circuits, External Short-circuit proof, 24 V, Fuse for control circuit supply, Control circuit
Short-circuit protection rating		6 A, Output fuse, Output data
<b>Input/Output</b>		
Breaking power		42 W max., inductive load ( $\tau = 40$ ms), at 110 V DC 110 W max., resistive load ( $\tau = 0$ ms), at 110 V DC 42 W max., inductive load ( $\tau = 40$ ms), at 48 V DC 42 W max., inductive load ( $\tau = 40$ ms), at 220 V DC 144 W max., resistive load ( $\tau = 0$ ms), at 24 V DC 288 W max., resistive load ( $\tau = 0$ ms), at 48 V DC 88 W max., resistive load ( $\tau = 0$ ms), at 220 V DC 42 W max., inductive load ( $\tau = 40$ ms), at 24 V DC 1500 VA, max., resistive load ( $\tau = 0$ ms), at 250 V AC
Input		$\infty$ ms, Simultaneity for inputs 1/2
Nominal current		65 A
Number of inputs		One- and two-channel
Number of outputs (safety related, delayed) with contact		0
Number of outputs (safety related, undelayed) with contact		4
Number of outputs (signaling function, delayed) with contact		0
Number of outputs (signaling function, undelayed) with contact		1
Permissible total cable resistance		22 $\Omega$ (input and starting circuits for UN)
Pick-up time		20 ms typ. 65 ms typ. (K1, K2 - for UN automatic mode)
Quadratic summation current		72 A <sup>2</sup> ( $I_{TH}^2 = I_1^2 + I_2^2 + I_3^2 + I_4^2$ )
Reset time		45 ms
Resistance		22 $\Omega$ (impedance)
Switching voltage		250 V
Uninterrupted current		3 A N/C, Limiting continuous current 6 A N/O, Limiting continuous current
<b>Design verification</b>		
Equipment heat dissipation, current-dependent P <sub>vid</sub>		0 W
Heat dissipation capacity P <sub>diss</sub>		0 W
Heat dissipation per pole, current-dependent P <sub>vid</sub>		0 W
Rated operational current for specified heat dissipation (I <sub>n</sub> )		0 A
Static heat dissipation, non-current-dependent P <sub>vs</sub>		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			One- and two-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			4
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 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