DATASHEET - ESR5-NO-41-24VDC

Single-Channel Safety Relay, 4 Enabling + 1 Signaling Path, 24V DC

Part no. **ESR5-NO-41-24VDC**
EP-401060

General specifications

Product name	Eaton ESR5 Safety relay
Part no.	ESR5-NO-41-24VDC
EAN	4015082965129
Product Length/Depth	114.5 millimetre
Product height	99 millimetre
Product width	22.5 millimetre
Product weight	0.218 kilogram
Compliances	EMC Directive: 2004/108/EC
Certifications	UL Category Control No.: NKCR; NKCR7 North America (UL listed, certified by UL for use in Canada) UL File No.: E29184 Machines 2006/42/EG UL report applies to both US and Canada EN 60664-1 EN 62061 IEC 61508, Parts 1-7 EN ISO 13849-1
Product Tradename	ESR5
Product Type	Safety relay
Product Sub Type	None

Features & Functions

Electric connection type	Screw connection
Features	6 kV between input circuit / NC contacts, and enable current paths Reinforced insulation Safe insulation Basic insulation
Fitted with:	Approval for TÜV Approval according to UL Feedback circuit Start input Detachable clamps
Material	Contacts: silver tin oxide, gold plated (AgSnO2, 0.2 µm Au) Enclosure: Polyamide (PA), not reinforced

General information

Connection type	M3 screw terminals
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
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
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 c, Performance level Cat. 1, Category 230,000 switching cycles, B10d

Safety parameter (IEC 62061)	4.05 x 10-10, PFHd, Probability of failure per hour SIL 1, Safety integrity level, In accordance with IEC 61508
Stop category (IEC 60204)	0
Suitable for	monitoring of valves monitoring of tactile sensors monitoring of proximity switches Monitoring of magnetic switches Monitoring of emergency-stop circuits Monitoring of position switches
Switching frequency	Max. 0.5 Hz, Input data

Ambient conditions, mechanical

Mounting position	As required
Prooftest	240 Months (High Demand) 167 Months (Low Demand)
Switching capacity	0.05 W 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 3 A at 3600 O/h, AC-15 at 230 V, Outputs 4 A at 360 O/h, AC-15 at 230 V, Outputs 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	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	65 °C
Relative humidity	< 75 %

Terminal capacities

Terminal capacity	24 - 12 AWG, solid or stranded 2 x (0.25 – 1) mm^2, flexible with ferrule 1 x (0.25 – 2.5) 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	0.01 - 20 (Δt ≦ 100 ms)
Rated control supply voltage (Us) at DC - min	20.4 V DC
Rated control supply voltage (Us) at DC - max	26.4 V DC
Rated operational voltage	24 V DC (power supply)
Short-circuit current	2.3 A, Input data

Input/Output

Breaking power	42 W max., inductive load (τ = 40 ms), at 220 V DC 42 W max., inductive load (τ = 40 ms), at 110 V DC 42 W max., inductive load (τ = 40 ms), at 48 V DC 42 W max., inductive load (τ = 40 ms), at 24 V DC 1500 VA, max., resistive load (τ = 0 ms), at 250 V AC 88 W max., resistive load (τ = 0 ms), at 220 V DC 110 W max., resistive load (τ = 0 ms), at 110 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
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	4

Number of outputs (signaling function, delayed) with contact			0
Number of outputs (signaling function, undelayed) with contact			1
Permissible total cable resistance			22 Ω (input and starting circuits for UN)
Quadratic summation current			72 A^2 ($ITH^2 = I1^2 + I2^2 + I3^2 + I4^2$)
Reset time			< 100 ms (A1) < 10 ms (S12)
Resistance			50 Ω (impedance)
Uninterrupted current			3 A N/C, Limiting continuous current 6 A N/O, Limiting continuous current

Design verification

Static heat dissipation, non-current-dependent Pvs			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 [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	0 - 24
Suitable for monitoring of position switches			Yes
Suitable for monitoring of emergency-stop circuits			Yes
Suitable for monitoring of valves			Yes
Suitable for monitoring of optoelectronic protection equipment			No
Suitable for monitoring of tactile sensors			Yes
Suitable for monitoring of magnetic switches			Yes
Suitable for monitoring of proximity switches			Yes
Evaluation inputs			1-channel
Power consumption		W	1.32

With start input		Yes
With muting function		No
With feedback circuit		Yes
Release-delay	s	0 - 0
Type of control voltage 1		DC
Control voltage 1	V	24 - 26.4
Type of control voltage 2		
Control voltage 2	V	
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)		DC
Operating voltage AC 50 Hz	V	
Operating voltage AC 60 Hz	V	
Operating voltage DC	V	24 - 26.4
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