DATASHEET - ESR5-NO-31-UC

Safety relay emergency stop/protective door/light curtain monitoring with wide range input, 24 V-230 VDC/AC

Part no. ESR5-NO-31-UC
Catalog No. 191796

Powering Business Worldwide

Delivery program

Product range			Electronic safety relays
Basic function			Emergency stop; emergency switching off Protective door Light curtain Feedback circuit
Features			
Mounting width		mm	22.5
			Automatic or manual start Start button monitoring
Operation			1-channel 2-channel
Supply voltage	U_s		24 V DC 24 V AC, 50/60 Hz 24 V AC/DC - 230 V AC/DC, 50/60 Hz 115 V AC, 50/60 Hz 230 V AC, 50/60 Hz
Safety related characteristics			Cat. 4 PL e according to EN ISO 13849-1 SILCL 3 according to IEC 62061 SIL 3 according to IEC 61508
Number of enabling paths to EN 60204-1 Stop functions category			
Enable current paths to IEC/EN 60204-1 Stop category 0			3
Signal current paths			1

Technical data

General

Intended use			Safety relay for monitoring one or two-channel signal generators and control of actuators. If the sensor circuit is interrupted, the safety relay switches to safe mode. Module used to safely interrupt electrical circuits.
Policies List			EMV 2004/108/EG, Maschinen 2006/42/EG
Standards			EN ISO 13849-1:2015, EN 62061:2005+A1:2013+A2:2015, EN 61508, Parts 1-7:2010, EN 50156-1:2015, Parts 1-2 EN 60947-5-1:2004+Cor:2005+A1:2009
Dimensions (W x H x D)		mm	22.5 x 112.2 x 114.5
Mounting width		mm	22.5
Weight		kg	0,244
Mounting position			As required
Mounting			Top-hat rail IEC/EN 60715, 35 mm
Connection type			M3 screw terminals
Operating conditions			
Ambient temperature			
Operation	ϑ	°C	-40 - +55 (observe derating)
Storage	ϑ	°C	-40 - +85
Condensation			Non-condensing
Atmospheric conditions			
relative humidity		%	Max. 75

Air pressure (operation)		hPa	795 - 1080
Altitude	Above sea level	m	2000

Ambient conditions, mechanical

Degree of protection to VDE 0470-1			
Enclosures			IP20
Terminals			IP20
Degree of Protection			Installation location: ≥ IP54
Insulation			4 kV basic insulation between 23/24 and 33/34 enable signal current paths and 41/42 signaling current path 4 kV basic insulation between all current paths and enclosure Safe isolation 6 kV reinforced insulation between all other current paths
Overvoltage category/pollution degree			III/2
Stop category	according to EN60204-1		0
Technical safety parameters:			
Values according to EN ISO 13849-1			
Performance level	according to EN ISO 13849-1		PL e
Category	according to EN ISO 13849-1		Kat. 4
Safety integrity level claim limit	in accordance with 62061		SILCL 3
Safety integrity level	In accordance with IEC 61508		SIL 3
Probability of failure per hour	PFH_d	x 10^{-10}	10
Prooftest High Demand		Months	240
Demand level		Months	< 12
Prooftest Low Demand		Months	56
Lifetime		Months	240
Rated operational voltage	U_e	V AC	230
Rated insulation voltage	U_i	V AC	250
Quadratic summation current		A^2	72 A^2 ($I_{TH}^2 = I_1^2 + I_2^2 + \ldots + I_N^2$)
Notes			Observe derating curve → Engineering
Minimum switching capacity		W	0.05

Input data

Pick-up time		ms	at Ue in automatic mode: normally <150 at Ue in manual mode: normally <100
Reset time (K1, K2) for U_N , normally	t_R	ms	< 20 ms (when driven via the sensor circuits)
Simultaneity for inputs 1/2	t_{sync}	ms	∞
Maximum switching frequency		Hz	1
Status indication			Green LED

Output data

Contact type			
Non-delayed enable current paths			3
Non-delayed signal current path			1
Limiting continuous current		A	per N/O: 6
Short-circuit protection for output circuits, external			6 A gL/gG
Maximum breaking power			
Resistive load (τ = 0 ms)			
250 V AC		VA	1500
Inductive load (τ = 40 ms)			
24 V DC		W	48
48 V DC		W	40
110 V DC		W	35
220 V DC		W	33

Switching capacity			
DC-13			
24 V		A	5 A

Design verification as per IEC/EN 61439

Technical data for design verification			
Rated operational current for specified heat dissipation	I_n	A	0
Heat dissipation per pole, current-dependent	P_{vid}	W	0
Equipment heat dissipation, current-dependent	P_{vid}	W	2.7
Static heat dissipation, non-current-dependent	P_{vs}	W	2.9
Heat dissipation capacity	P_{diss}	W	0
Operating ambient temperature min.		°C	-40
Operating ambient temperature max.		°C	55
IEC/EN 61439 design verification			
10.2 Strength of materials and parts			
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 Verification of resistance of insulating materials to abnormal heat and fire due to internal electric 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 Insulation properties			
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 7.0

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@ss10.0.1-27-37-18-19 [ACO304011])			
Model			Basic device
Suitable for monitoring of position switches			No
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			Yes
Suitable for monitoring of proximity switches			No
Type of electric connection			Screw connection
Rail mounting possible			Yes

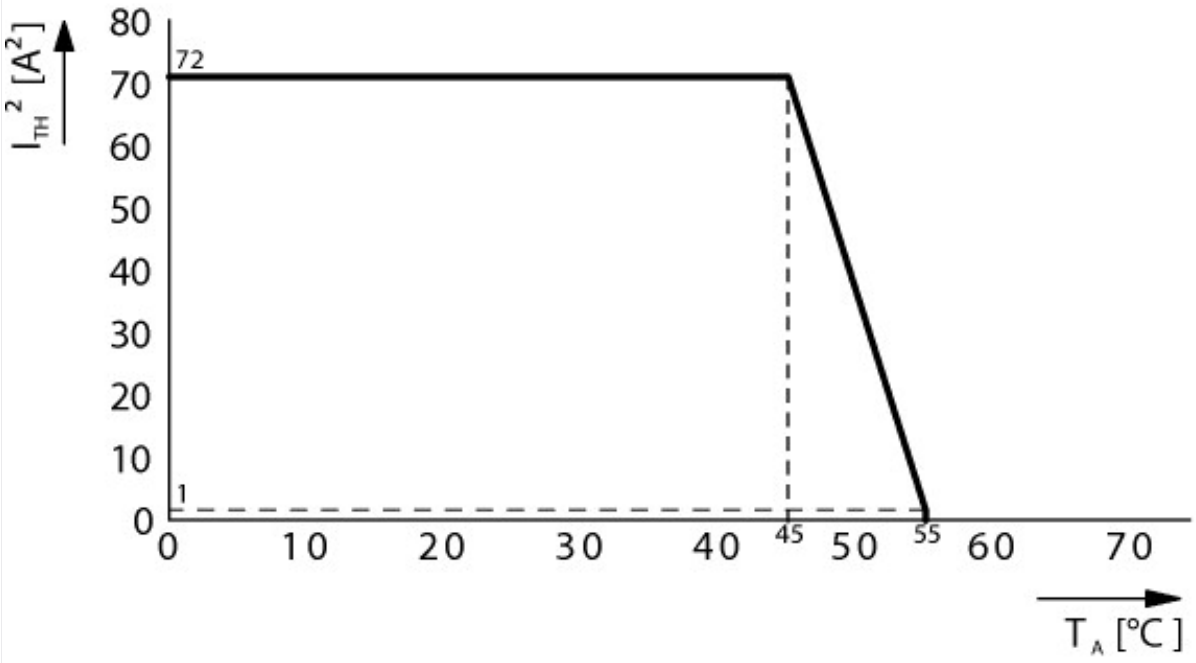
Rated control supply voltage Us at AC 50HZ	V	24 - 230
Rated control supply voltage Us at AC 60HZ	V	24 - 230
Rated control supply voltage Us at DC	V	24 - 230
Voltage type for actuating		AC/DC
With detachable clamps		Yes
Evaluation inputs		One- and two-channel
With start input		Yes
With muting function		No
With feedback circuit		Yes
Release-delay	s	0 - 0
Number of outputs, safety related, undelayed, with contact		0
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		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
Category according to EN 954-1		None
Type of safety acc. IEC 61496-1		None
Stop category acc. IEC 60204		0
Performance level acc. EN ISO 13849-1		Level e
SIL according to IEC 61508		3
With approval for TÜV		No
With approval for BG BIA		No
With approval according to UL		Yes
Width	mm	22.5
Height	mm	112.2
Depth	mm	114.5

Approvals

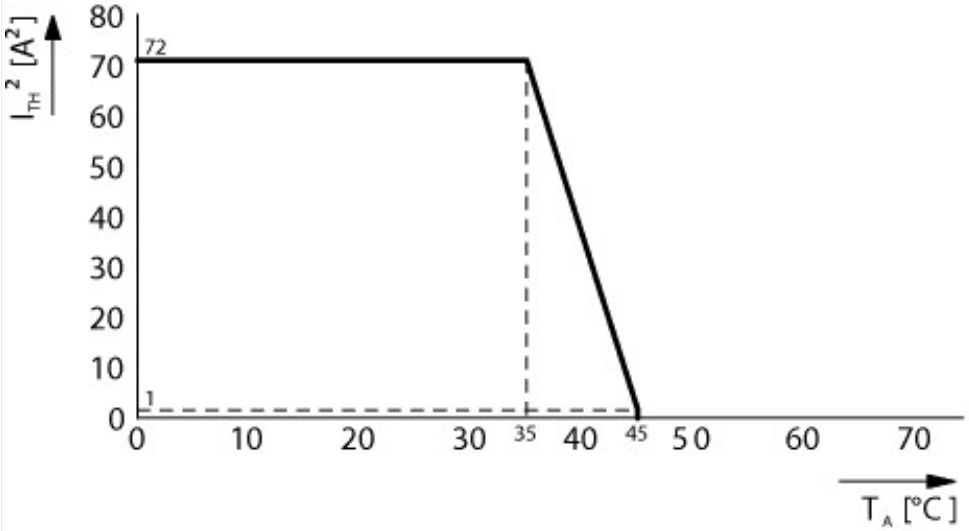
Product Standards		IEC/EN see Technical Data; UL 508; CSA-C22.2 No. 14-95; CE marking
UL File No.		E29184
CSA File No.		UL report applies to both US and Canada
North America Certification		UL listed, certified by UL for use in Canada
Degree of Protection		IEC: IP20, UL/CSA Type: -

Characteristics

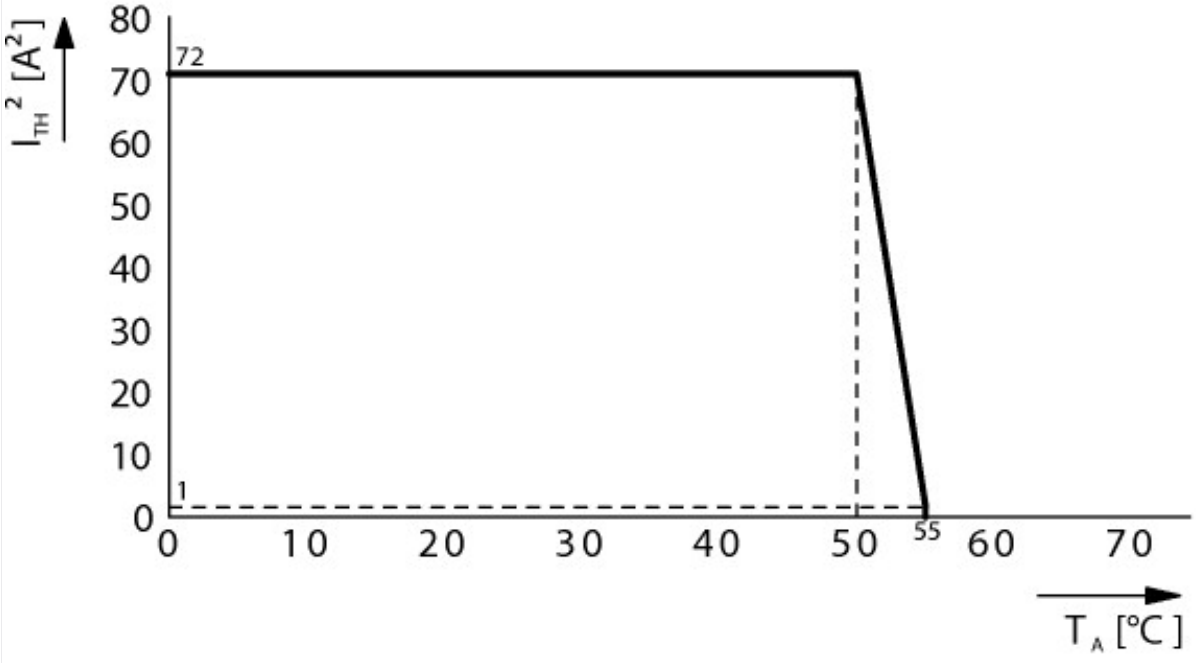
Characteristic curves		



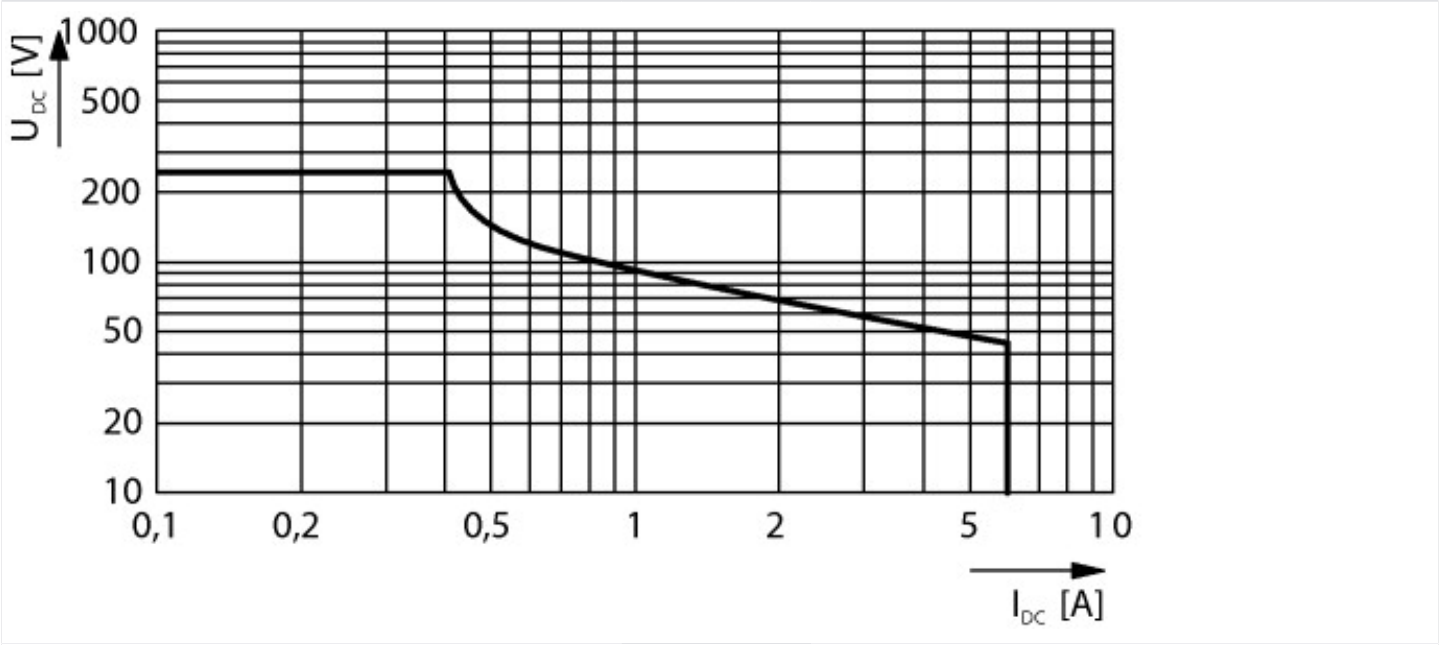
Derating curve - horizontal installation position, without clearance



Derating curve - vertical installation position, without clearance

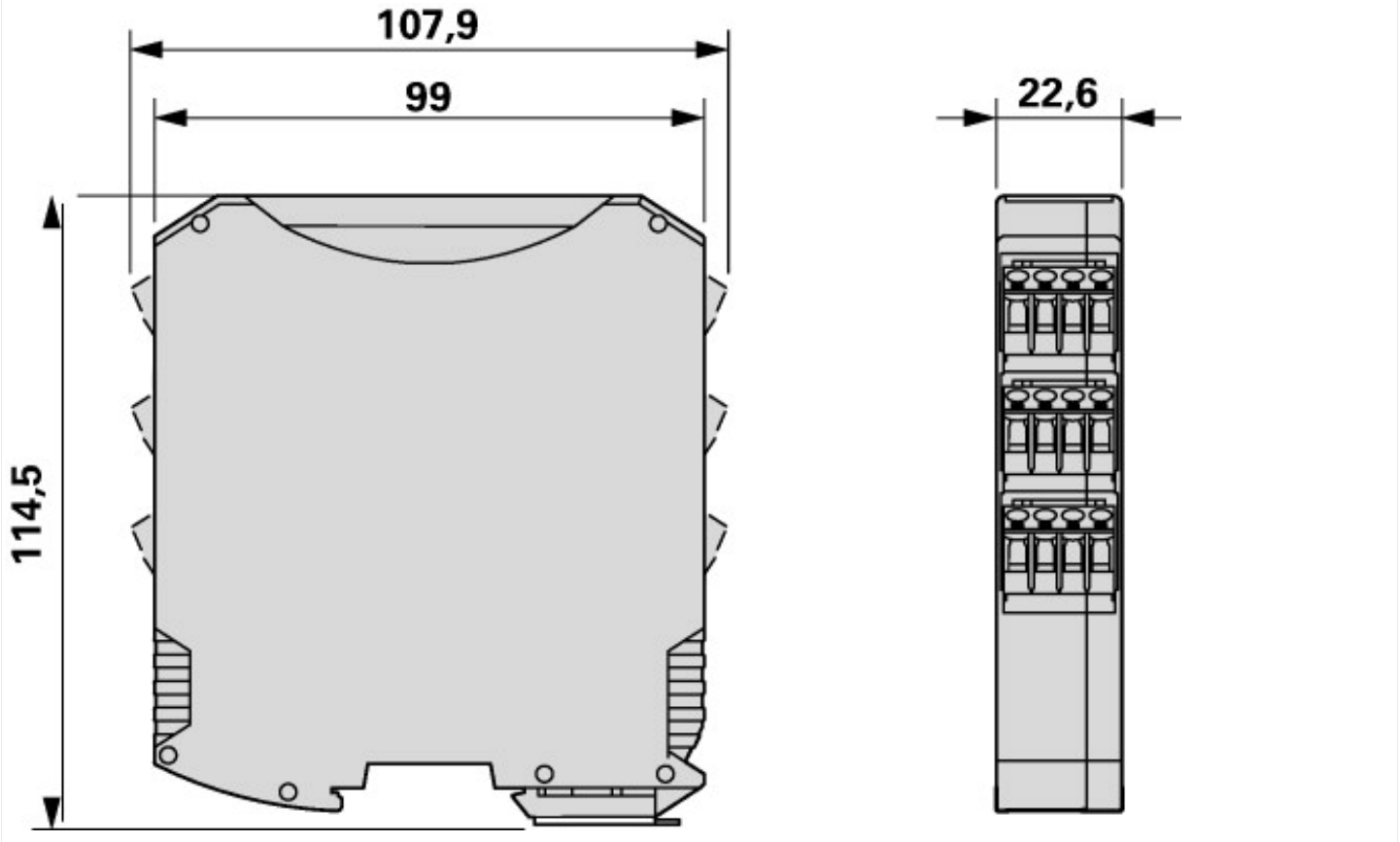


Derating curve - vertical installation position, with clearance



Load curve relay - ohmic load

Dimensions



Additional product information (links)

Product overview (WEB)	http://www.eaton.eu/esr5

Eaton Industries GmbH
http://www.eaton.eu