Specifications

Eaton 118702

Eaton ESR5 Safety relay emergency stop/protective door, 24VDC/AC, 3 enabling paths

General specifications	
PRODUCT NAME	Eaton ESR5 Safety relay
CATALOG NUMBER	118702
MODEL CODE	ESR5-NO-31-24VAC-DC
EAN	4015081168422
PRODUCT LENGTH/DEPTH	114.5 mm
PRODUCT HEIGHT	99 mm
PRODUCT WIDTH	22.5 mm
PRODUCT WEIGHT	0.164 kg
CERTIFICATIONS	2014/30/EU UL File No.: E29184 EN ISO 13849-1 UL report applies to both US and Canada CE UL Category Control No.: NKCR; NKCR7 UL 508 IEC 62061 UL EN 50178 Certified by UL for use in Canada IEC/EN 60204 IEC 61508, Parts 1-7 CSA-C22.2 No. 14-95 CSA Class No.: 3211-83; 3211-03 Machines 2006/42/EG
CATALOG NOTES	Replacement: ESR5-NO-31-24VDC (EP-401062)

Powering Business Worldwide

Feature & Functions

ELECTRIC CONNECTION TYPE	Screw connection
FEATURES	6 kV between input circuit and enable current paths Safe insulation Reinforced insulation 3 Non-delayed enable current paths Automatic reset Basic insulation
FITTED WITH:	Approval for TÜV Feedback circuit Approval according to UL Start input Detachable clamps
FUNCTIONS	2-channel 1-channel
MATERIAL	Contacts: silver tin oxide, gold plated (AgSnO2, 0.2 µ m Au) Enclosure: Polyamide (PA), not reinforced

General information

CONNECTION TYPE	M3 screw terminals
CURRENT CONSUMPTION	140 mA, AC 65 mA, DC
DEGREE OF PROTECTION	IP20 Terminals: IP20 Installation location: ≥ IP54 Enclosure: IP20
DUTY FACTOR	100 %
EMITTED INTERFERENCE	According to EN 61000-6-4
INTERFERENCE IMMUNITY	According to EN 662061_x According to EN-61000-6-2
LED INDICATOR	Status indication of SmartWire-DT network: Green LED
LIFESPAN, MECHANICAL	10,000,000 Operations
LIFETIME	240 month
MODEL	Basic device
MOUNTING METHOD	Rail mounting possible Top-hat rail fixing (according to IEC/EN 60715, 35 mm)
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 PERFORMANCE LEVEL (EN ISO 13849-1)	Level e
SAFETY PARAMETER (IEC 62061)	SIL 3, Safety integrity level SIL 3, Safety integrity level, In accordance with IEC 61508 Cat. 4, Category SILCL 3, Safety integrity level claim limit 5.05 x 10-10, PFHd,

	Probability of failure per hour
STOP CATEGORY (IEC 60204)	0
SUITABLE FOR	Module used to safely interrupt electrical circuits Monitoring of position switches Monitoring of emergency-stop circuits Safety relay for monitoring emergency stop and protective door switch
SWITCHING FREQUENCY	Max. 0.5 Hz, Input data
TYPE	• Emergency stop category 0; emergency switching off • Feedback circuit • Protective door
VOLTAGE TYPE	AC/DC

Ambient conditions, mechanical

MOUNTING POSITION	As required
PROOFTEST	66 Months (Low Demand) 240 Months (High Demand)
SWITCHING CAPACITY	4 A at 360 O/h, DC-13 at 24 V, Outputs In accordance with IEC 60947-5-1, Outputs 3 A at 3600 O/h, AC-15 at 230 V, Outputs 2.5 A at 3600 O/h, DC-13 at 24 V, Outputs 0.4 W 4 A at 360 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	Dry heat to IEC 60068-2-2 Cold to EN 60068-2-1 Damp heat, constant, to IEC 60068-2-3
ENVIRONMENTAL CONDITIONS	Clearance in air and creepage distances according to EN 50178, UL 508, CSA C22.2, No. 14-95 Condensation: Non-condensing
OPERATING TEMPERATURE - MIN	-20 °C
OPERATING TEMPERATURE - MAX	55 °C

RELATIVE HUMIDITY	< 75 %

Terminal capacities

TERMINAL CAPACITY	2 x (0.25 – 1) mm^2, flexible with ferrule 24 - 12 AWG, solid or stranded 1 x (0.2 – 2.5) mm^2, solid 2 x (0.2 – 1) mm^2, solid 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	1.6 W (DC operated) 3.4 W (AC operated 50/60 Hz)
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	230 V AC 24 V AC/DC (power supply) Approx. 24 V DC at input, starting and feedback circuit
SHORT-CIRCUIT CURRENT	2.3 A, Input data
SHORT-CIRCUIT PROTECTION	Short-circuit proof, 24 V, Fuse for control circuit supply, Control circuit Fuse 6 A gL/gG, 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	35 W max., inductive load (τ = 40 ms), at 110 V DC 40 W max., inductive load (τ = 40 ms), at 48 V DC 48 W max., inductive load (τ = 40 ms), at 24 V DC 1500 VA, max., resistive load (τ = 0 ms), at 250 V AC 288 W max., resistive load (τ = 0 ms), at 48 V DC 77 W max., resistive load (τ = 0 ms), at 110 V DC 144 W max., resistive load (τ = 0 ms), at 24 V DC 88 W max., resistive load (τ = 0 ms), at 220 V DC 33 W max., inductive load (τ = 40 ms), at 220 V DC
INPUT	∞ ms, Simultaneity for inputs 1/2
NOMINAL CURRENT	30 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	3
NUMBER OF OUTPUTS (SIGNALING FUNCTION, DELAYED) WITH CONTACT	0
NUMBER OF OUTPUTS (SIGNALING FUNCTION, UNDELAYED) WITH CONTACT	1
PERMISSIBLE TOTAL CABLE RESISTANCE	Approx. 50 Ω (input and starting circuits for UN)
PICK-UP TIME	100 ms typ. (K1, K2 - for UN automatic mode) 100 ms typ. (at U_e in automatic mode)
QUADRATIC SUMMATION CURRENT	72 A^2 ($ITH^2 = I1^2 + I2^2 + I3^2$)
RESET TIME	Normally 10 ms (dual-channel) 45 ms (single-channel)

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	5.16 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.

RESISTANCE	50 Ω (impedance)
SWITCHING VOLTAGE	250 V
UNINTERRUPTED CURRENT	6 A N/C, Limiting continuous current 6 A N/O, Limiting continuous current

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.

Resources

BROCHURES	eaton-esr5-safety-relay-brochure-br049005en-en-us.pdf
CATALOGUES	eaton-product-overview-for-machinery-catalogue-ca08103003zen-en-us.pdf
CHARACTERISTIC CURVE	eaton-safety-relays-esr5-safety-relay-characteristic-curve.eps
DECLARATIONS OF CONFORMITY	DA-DC-00004700.pdf DA-DC-00004697.pdf
DRAWINGS	eaton-safety-relays-relay-esr5-safety-relay-dimensions-002.eps eaton-general-esr5-safety-relay-symbol.eps eaton-safety-relays-relay-esr5-safety-relay-3d-drawing.eps eaton-general-esr5-safety-relay-symbol-002.eps
ECAD MODEL	DA-CE-ETN.ESR5-NO-31-24VAC-DC
INSTALLATION INSTRUCTIONS	IL05013029Z
MANUALS AND USER GUIDES	MN049008_EN
MCAD MODEL	eaton-safety-relays-drawings-esr5-no-xx-24vdc.dwg eaton-safety-relays-3d-models-esr5-no-xx-24vdc.stp
WIRING DIAGRAMS	eaton-safety-relays-esr5-safety-relay-wiring-diagram-007.eps eaton-safety-relays-esr5-safety-relay-wiring-diagram-008.eps eaton-safety-relays-esr5-safety-relay-wiring-diagram-009.eps

PROJECT NAME:	
PROJECT NUMBER:	
PREPARED BY:	
DATE:	

Eaton Corporation plc
Eaton House
30 Pembroke Road
Dublin 4, Ireland
Eaton.com

Follow us on social media to get the latest product and support information.