Specifications

Eaton 118705

Eaton ESR5 Safety relay emergency stop/protective door/light curtain, 24 V DC, 4 enabling paths(2del.)

General specifications	
PRODUCT NAME	Eaton ESR5 Safety relay
CATALOG NUMBER	118705
MODEL CODE	ESR5-NV3-30
EAN	4015081168453
PRODUCT LENGTH/DEPTH	114.5 mm
PRODUCT HEIGHT	99 mm
PRODUCT WIDTH	22.5 mm
PRODUCT WEIGHT	0.171 kg
CERTIFICATIONS	EN ISO 13849-1 CE CSA Class No.: 3211-83; 3211-03 IEC 61508, Parts 1-7 UL File No.: E29184 UL 508 UL report applies to both US and Canada IEC/EN 60204 EN 50178 Certified by UL for use in Canada IEC 62061 2014/30/EU CSA-C22.2 No. 14-95 UL Category Control No.: NKCR; NKCR7 UL Machines 2006/42/EG

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Feature & Functions

ELECTRIC CONNECTION TYPE	Screw connection
FEATURES	Automatic start Manual start Basic insulation 2 Non-delayed enable current paths
FITTED WITH:	Approval for TÜV Start input Selectable cross-circuit detection Detachable clamps Feedback circuit Approval according to UL
FUNCTIONS	1-channel 2-channel Time function
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	75 mA, DC
DEGREE OF PROTECTION	Terminals: IP20 IP20 Installation location: ≥ IP54 Enclosure: IP20
DUTY FACTOR	100 %
EMITTED INTERFERENCE	According to EN 61000-6-4
INTERFERENCE IMMUNITY	According to EN-61000-6-2 According to EN 662061_x
LED INDICATOR	Status indication of SmartWire-DT network: Green LED
LIFESPAN, MECHANICAL	10,000,000 Operations
LIFETIME	240 month
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 7.8 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	330 ms (restart)
SAFETY PERFORMANCE LEVEL (EN ISO 13849-1)	Level e
SAFETY PARAMETER (IEC 62061)	SIL 3 only for high demand requirements, Safety integrity level Cat. 4, Category 18 x 10-10, PFHd, Probability of failure per hour

	SIL 3, Safety integrity level SILCL 3, Safety integrity level claim limit SIL 3, Safety integrity level, In accordance with IEC 61508
STOP CATEGORY (IEC 60204)	0 1
SUITABLE FOR	Monitoring of position switches Module used to safely interrupt electrical circuits Safety relay for monitoring emergency stop and protective door switch Monitoring of optoelectronic protection equipment Monitoring of emergency-stop circuits Safety position switch with mechanical securing action LS-S...MT-ZBZ
SWITCHING FREQUENCY	Max. 0.5 Hz, Input data
TYPE	• Emergency stop category 1; emergency switching off • Feedback circuit • Light curtain • Protective door
VOLTAGE TYPE	DC

Ambient conditions, mechanical

MOUNTING POSITION	As required
PROOFTEST	240 Months (High Demand)
SWITCHING CAPACITY	3 A at 3600 O/h, DC-13 at 24 V, Outputs 5 A at 3600 O/h, AC-15 at 230 V, Outputs 0.4 W 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	45 °C
AMBIENT STORAGE TEMPERATURE - MIN	-40 °C
AMBIENT STORAGE TEMPERATURE - MAX	70 °C
CLIMATIC PROOFING	Dry heat to IEC 60068-2-2 Damp heat, constant, to IEC 60068-2-3 Cold to EN 60068-2-1

ENVIRONMENTAL CONDITIONS	Clearance in air and creepage distances according to EN 60947-1, UL 508, CSA C22.2, No. 14-95 Condensation: Non-condensing
OPERATING TEMPERATURE - MIN	-20 °C
OPERATING TEMPERATURE - MAX	45 °C
RELATIVE HUMIDITY	< 75 %

Terminal capacities

TERMINAL CAPACITY	2 x (0.2 – 1) mm², solid 24 - 12 AWG, solid or stranded 1 x (0.2 – 2.5) mm², solid 2 x (0.25 – 1) mm², flexible with ferrule 1 x (0.25 – 2.5) mm², 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	1.8 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	26.4 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	24 V DC (power supply) Approx. 24 V DC at input, starting and feedback circuit 230 V AC
SHORT-CIRCUIT CURRENT	0.1 A, Input data
SHORT-CIRCUIT PROTECTION	Fuse 10 A gL/gG NEOZED, 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	144 W max., resistive load (τ = 0 ms), at 24 V DC 42 W max., inductive load (τ = 40 ms), at 24 V DC 88 W max., resistive load (τ = 0 ms), at 220 V DC 1500 VA, max., resistive load (τ = 0 ms), at 250 V AC 23 W max., inductive load (τ = 40 ms), at 220 V DC 288 W max., resistive load (τ = 0 ms), at 48 V DC 33 W max., inductive load (τ = 40 ms), at 48 V DC 25 W max., inductive load (τ = 40 ms), at 110 V DC 90 W max., resistive load (τ = 0 ms), at 110 V DC
INPUT	∞ ms, Simultaneity for inputs 1/2
NOMINAL CURRENT	3.5 A
NUMBER OF INPUTS	One- and two-channel
NUMBER OF OUTPUTS (SAFETY RELATED, DELAYED) WITH CONTACT	2
NUMBER OF OUTPUTS (SAFETY RELATED, UNDELAYED) WITH CONTACT	2
NUMBER OF OUTPUTS (SIGNALING FUNCTION, DELAYED) WITH CONTACT	0
NUMBER OF OUTPUTS (SIGNALING FUNCTION, UNDELAYED) WITH CONTACT	0
OFF-DELAY	0.1 - 30 s (± 40 %, K3, K4 adjustable)
PERMISSIBLE TOTAL CABLE RESISTANCE	500 Ω (input and starting circuits for UN)
PICK-UP TIME	150 ms typ. (at U_e in automatic mode) 150 ms typ. (controlled start, K1, K2 - for UN manual operation) 150 ms typ. (controlled start, K1, K2 - for UN automatic mode)

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	7.8 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.

	150 ms typ. (at U_e in manual mode)
QUADRATIC SUMMATION CURRENT	55 A^2 ($ITH^2 = I1^2 + I2^2 + I3^2 + I4^2 + I5^2$)
RESET TIME	Normally 100 ms (delayed contacts) 20 ms (non-delayed contacts)
RESISTANCE	500 Ω (impedance)
SWITCHING VOLTAGE	250 V
UNINTERRUPTED CURRENT	6 A N/O, Limiting continuous current 6 A N/C, 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-005.eps
DECLARATIONS OF CONFORMITY	DA-DC-00005009.pdf DA-DC-00004588.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-NV3-30
INSTALLATION INSTRUCTIONS	IL05013033Z
MANUALS AND USER GUIDES	MN049010_EN
MCAD MODEL	eaton-esr5_nv3_30_ve3-42-drawing.dwg eaton-esr5_nv3_30_ve3-42-3d-model.stp
WIRING DIAGRAMS	eaton-safety-relays-esr5-safety-relay-wiring-diagram-013.eps eaton-safety-relays-esr5-safety-relay-wiring-diagram-015.eps eaton-safety-relays-esr5-safety-relay-wiring-diagram-014.eps

PROJECT NAME:	
PROJECT NUMBER:	
PREPARED BY:	
DATE:	

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