

Specifications



Eaton 118700

Eaton ESR5 Safety relay emergency stop/protective door, 24VDC/AC, 2 enabling paths

General specifications

PRODUCT NAME Eaton ESR5 Safety relay

CATALOG NUMBER 118700

MODEL CODE ESR5-NO-21-24VAC-DC

EAN 4015081168408

PRODUCT LENGTH/DEPTH 114.5 mm

PRODUCT HEIGHT 99 mm

PRODUCT WIDTH 22.5 mm

PRODUCT WEIGHT 0.165 kg

IEC 61508, Parts 1-7
 UL
 UL 508
 IEC/EN 60204
 UL report applies to both US and Canada
 UL File No.: E29184
 Certified by UL for use in Canada
 CSA-C22.2 No. 14-95
 EN 50178
 CE
 IEC 62061
 2014/30/EU
 CSA Class No.: 3211-83;
 3211-03
 EN ISO 13849-1
 UL Category Control No.: NKCR; NKCR7
 Machines 2006/42/EG

CERTIFICATIONS

CATALOG NOTES

Replacement: ESR5-NO-21-24VDC (EP-401061)



Powering Business Worldwide

Ambient conditions, mechanical

MOUNTING POSITION	As required
PROOFTEST	240 Months (High Demand) 66 Months (Low Demand)
SWITCHING CAPACITY	3 A at 3600 O/h, AC-15 at 230 V, Outputs 4 A at 360 O/h, DC-13 at 24 V, Outputs 2.5 A at 3600 O/h, DC-13 at 24 V, Outputs 0.4 W In accordance with IEC 60947-5-1, Outputs 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 - MAX	55 °C
AMBIENT STORAGE TEMPERATURE - MAX	70 °C
AMBIENT OPERATING TEMPERATURE - MIN	-20 °C
AMBIENT STORAGE TEMPERATURE - MIN	-40 °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 - MAX	55 °C
OPERATING TEMPERATURE - MIN	-20 °C
RELATIVE HUMIDITY	< 75 %

Design verification

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.
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	Does not apply, since the

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 - MAX	26.4 V
RATED CONTROL SUPPLY VOLTAGE (US) AT AC, 50 HZ - MIN	0 V
RATED CONTROL SUPPLY VOLTAGE (US) AT AC, 60 HZ - MAX	24 V
RATED CONTROL SUPPLY VOLTAGE (US) AT AC, 60 HZ - MIN	20.4 V
RATED CONTROL SUPPLY VOLTAGE (US) AT DC - MAX	24 V
RATED CONTROL SUPPLY VOLTAGE (US) AT DC - MIN	0 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	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	6A gL/gG, NEOZED (N/C), Output fuse, External, Output data 10A gL/gG, NEOZED (N/O), Output fuse, External, Output data

AGAINST ELECTRIC SHOCK	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.
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

Features & functions

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

General information

CONNECTION TYPE	M3 screw terminals
CURRENT CONSUMPTION	140 mA, AC 65 mA, DC
DEGREE OF PROTECTION	Installation location: ≥ IP54 Terminals: IP20 Enclosure: IP20 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)	6000 V AC
RECOVERY TIME	1000 ms
SAFETY PARAMETER (EN ISO 13849-1)	300,000 switching cycles, B10d Cat. 4, Category PL e, Performance level
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	Monitoring of position switches Safety relay for monitoring emergency stop and protective door switch Monitoring of emergency-stop circuits Module used to safely interrupt electrical circuits
SWITCHING FREQUENCY	Max. 0.5 Hz, Input data
TYPE	<ul style="list-style-type: none"> • Emergency stop category 0; emergency switching off • Feedback circuit • Protective door
VOLTAGE TYPE	AC/DC

Input/Output

BREAKING POWER	144 W max., resistive load ($\tau = 0$ ms), at 24 V DC 1500 VA, max., resistive load ($\tau = 0$ ms), at 250 V AC 35 W max., inductive load ($\tau = 40$ ms), at 220 V DC 48 W max., inductive load ($\tau = 40$ ms), at 24 V DC 288 W max., resistive load ($\tau = 0$ ms), at 48 V DC 35 W max., inductive load ($\tau = 40$ ms), at 110 V DC 40 W max., inductive load ($\tau = 40$ ms), at 48 V DC 77 W max., resistive load ($\tau = 0$ ms), at 110 V DC 88 W max., resistive load ($\tau = 0$ ms), at 220 V DC
INPUT	∞ ms, Simultaneity for inputs 1/2
NOMINAL CURRENT	30 A
NUMBER OF INPUTS	1-channel
NUMBER OF OUTPUTS (SAFETY RELATED, DELAYED) WITH CONTACT	0
NUMBER OF OUTPUTS (SAFETY RELATED, UNDELAYED) WITH CONTACT	2
NUMBER OF OUTPUTS (SIGNALLING FUNCTION, DELAYED) WITH CONTACT	0
NUMBER OF OUTPUTS (SIGNALLING FUNCTION, UNDELAYED) WITH CONTACT	1
PERMISSIBLE TOTAL CABLE RESISTANCE	Approx. 50 Ω (input and starting circuits for UN)
PICK-UP TIME	100 ms typ. (at U_e in automatic mode) 100 ms typ. (K1, K2 - for UN automatic mode)
QUADRATIC SUMMATION CURRENT	72 A ² ($I_{TH}^2 = I_1^2 + I_2^2$)
RESET TIME	Normally 10 ms (dual-channel) 45 ms (single-channel)
RESISTANCE	50 Ω (impedance)
SWITCHING VOLTAGE	250 V

Terminal capacities

SCREWDRIVER SIZE	2, Terminal screw, Pozidriv screwdriver 0.6 x 3.5 mm, Terminal screws
STRIPPING LENGTH (MAIN CABLE)	7 mm
TERMINAL CAPACITY	24 - 12 AWG, solid or stranded 2 x (0.2 - 1) mm ² , solid 1 x (0.2 - 2.5) mm ² , solid 2 x (0.25 - 1) mm ² , flexible with ferrule 1 x (0.25 - 2.5) mm ² , flexible with ferrule
TIGHTENING TORQUE	0.6 Nm, Screw terminals

**UNINTERRUPTED
CURRENT**

6 A N/O, Limiting
continuous current
6 A N/C, Limiting
continuous current

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	eaton-safety-relay-declaration-of-conformity-eu250613en.pdf eaton-safety-relay-declaration-of-conformity-uk251096en.pdf
DRAWINGS	eaton-safety-relays-relay-esr5-safety-relay-dimensions-002.eps eaton-safety-relays-relay-esr5-safety-relay-3d-drawing.eps eaton-general-esr5-safety-relay-symbol.eps eaton-general-technology-esr5-safety-relay-symbol-002.eps
ECAD MODEL	DA-CE-ETN.ESR5-NO-21-24VAC-DC
INSTALLATION INSTRUCTIONS	IL05013027Z
MANUALS AND USER GUIDES	MN049007_EN
MCAD MODEL	eaton-safety-relays-mcad-3d-models-esr5-no-xx-24vdc.stp eaton-safety-relays-mcad-drawings-esr5-no-xx-24vdc.dwg
WIRING DIAGRAMS	eaton-safety-relays-esr5-safety-relay-wiring-diagram-003.eps eaton-safety-relays-esr5-safety-relay-wiring-diagram.eps eaton-safety-relays-esr5-safety-relay-wiring-diagram-002.eps

PROJECT NAME:

PROJECT NUMBER:

PREPARED BY:

DATE:



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