

Specifications



Eaton 118703

Eaton ESR5 Safety two-hand relay,
24VDC/AC, 2-channel, 2 enabling paths

General specifications

PRODUCT NAME	Eaton ESR5 Safety relay
CATALOG NUMBER	118703
MODEL CODE	ESR5-NZ-21-24VAC-DC
EAN	4015081168439
PRODUCT LENGTH/DEPTH	114.5 mm
PRODUCT HEIGHT	99 mm
PRODUCT WIDTH	22.5 mm
PRODUCT WEIGHT	0.165 kg

CERTIFICATIONS

IEC 62061
UL
CSA-C22.2 No. 14-95
EN 50178
CE
UL Category Control No.:
NKCR; NKCR7
UL 508
UL report applies to both
US and Canada
UL File No.: E29184
IEC 61508, Parts 1-7
2014/30/EU
IEC/EN 60204
CSA Class No.: 3211-83;
3211-03
EN 574 Part no. IIIC
Certified by UL for use in
Canada
EN ISO 13849-1
Machines 2006/42/EG

Ambient conditions, mechanical

MOUNTING POSITION	As required
PROOFTEST	240 Months (High Demand)
SWITCHING CAPACITY	5 A at 3600 O/h, AC-15 at 230 V, Outputs In accordance with IEC 60947-5-1, Outputs 0.4 W 5 A at 3600 O/h, DC-13 at 24 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 Damp heat, constant, to IEC 60068-2-3
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 - 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	3 W (AC operated 50/60 Hz) 1.5 W (DC operated)
RATED CONTROL SUPPLY VOLTAGE (US) AT AC, 50 HZ - MAX	24 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
	24 V AC/DC (power supply)
RATED OPERATIONAL VOLTAGE	230 V AC 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	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	Reinforced insulation Automatic start 2 Non-delayed enable current paths Basic insulation Monitoring of external contactor/expansion unit Safe insulation
FITTED WITH:	Approval according to UL Detachable clamps Feedback circuit Approval for TÜV
FUNCTIONS	2-channel Two-hand function
MATERIAL	Contacts: silver tin oxide, gold plated (AgSnO ₂ , 0.2 µm Au) Enclosure: Polyamide (PA), not reinforced

General information

CONNECTION TYPE	M3 screw terminals
CURRENT CONSUMPTION	60 mA, DC 125 mA, AC
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 61000-6-2
LED INDICATOR	Status indication of SmartWire-DT network: Green LED
LIFESPAN, MECHANICAL	10,000,000 Operations
LIFETIME	240 month
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)	PL e, Performance level 300,000 switching cycles, B10d Cat. 4, Category
SAFETY PARAMETER (IEC 62061)	SILCL 3, Safety integrity level claim limit EN 574 Type III C SIL 3, Safety integrity level, In accordance with IEC 61508 Cat. 4, Category 12.1 x 10 ⁻¹⁰ , PFHd, Probability of failure per hour

	SIL 3, Safety integrity level
STOP CATEGORY (IEC 60204)	0
SUITABLE FOR	Safety functions Module used to safely interrupt electrical circuits Safety relay for monitoring two-hand control per EN 574 Type IIIC and protective door switches
SWITCHING FREQUENCY	Max. 0.5 Hz, Input data
TYPE	• Feedback circuit • Protective door
VOLTAGE TYPE	AC/DC

Input/Output

BREAKING POWER	110 W max., resistive load ($\tau = 0$ ms), at 110 V DC 42 W max., inductive load ($\tau = 40$ ms), at 110 V DC 42 W max., inductive load ($\tau = 40$ ms), at 220 V DC 144 W max., resistive load ($\tau = 0$ ms), at 24 V DC 288 W max., resistive load ($\tau = 0$ ms), at 48 V DC 42 W max., inductive load ($\tau = 40$ ms), at 24 V DC 1500 VA, max., resistive load ($\tau = 0$ ms), at 250 V AC
	42 W max., inductive load ($\tau = 40$ ms), at 48 V DC 88 W max., resistive load ($\tau = 0$ ms), at 220 V DC

INPUT	< 500 ms, Simultaneity for inputs 1/2
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NOMINAL CURRENT	60 A
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NUMBER OF INPUTS	2-channel
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NUMBER OF OUTPUTS (SAFETY RELATED, DELAYED) WITH CONTACT	0
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NUMBER OF OUTPUTS (SAFETY RELATED, UNDELAYED) WITH CONTACT	2
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NUMBER OF OUTPUTS (SIGNALING FUNCTION, DELAYED) WITH CONTACT	0
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NUMBER OF OUTPUTS (SIGNALING FUNCTION, UNDELAYED) WITH CONTACT	1
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PERMISSIBLE TOTAL CABLE RESISTANCE	50 Ω (input and starting circuits for UN)
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PICK-UP TIME	50 ms typ. (at U_e in automatic mode) 50 ms typ. (K1, K2 - for UN automatic mode) 50 ms typ. (K1, K2 - for UN manual operation) 50 ms typ. (at U_e in manual mode)
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QUADRATIC SUMMATION CURRENT	72 A ² ($I_{TH}^2 = I_1^2 + I_2^2$)
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RESET TIME	Normally 20 ms
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RESISTANCE	22 Ω (impedance)
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Terminal capacities

SCREWDRIVER SIZE	3.5 x 0.6 mm, Terminal screw 2, Terminal screw, Pozidriv screwdriver
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STRIPPING LENGTH (MAIN CABLE)	7 mm
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TERMINAL CAPACITY	1 x (0.2 – 2.5) mm ² , solid 2 x (0.2 – 1) mm ² , solid 2 x (0.25 – 1) mm ² , flexible with ferrule 24 - 12 AWG, solid or stranded 1 x (0.25 – 2.5) mm ² , flexible with ferrule
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TIGHTENING TORQUE	0.6 Nm, Screw terminals
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SWITCHING VOLTAGE	250 V
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
DECLARATIONS OF CONFORMITY	eaton-safety-relay-declaration-of-conformity-uk251142en.pdf eaton-safety-relay-declaration-of-conformity-eu250659en.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
ECAD MODEL	DA-CE-ETN.ESR5-NZ-21-24VAC-DC
INSTALLATION INSTRUCTIONS	eaton-safety-relay-esr5-nz-21-24vac-dc-il05013030z.pdf
MANUALS AND USER GUIDES	eaton-safety-relay-esr5-nz-21-24vac-dc-mn049004en-us.pdf
MCAD MODEL	eaton-safety-relays-3d-models-esr5-no-41-24vdc.stp eaton-safety-relays-mcad-drawings-esr5-no-41-24vdc.dwg
WIRING DIAGRAMS	eaton-safety-relays-esr5-safety-relay-wiring-diagram-010.eps eaton-safety-relays-esr5-safety-relay-wiring-diagram-012.eps eaton-safety-relays-esr5-safety-relay-wiring-diagram-011.eps

PROJECT NAME:
PROJECT NUMBER:
PREPARED BY:
DATE:



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