




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



Part no. ESR5-NO-31-24VAC-DC
Catalog No. 118702

EL-Nummer (Norway) 0004133318

Delivery program

| | | | |
|---|----------------|----|--|
| Product range | | | Electronic safety relays |
| Basic function | | | Emergency stop; emergency switching off Protective door Feedback circuit |
| Features | | | |
| Mounting width | | mm | 22.5 |
| | | | Automatic reset |
| Operation | | | single-channel dual-channel |
| Supply voltage | U _s | | 24 V DC 24 V AC, 50/60 Hz |
| Approval | | |  |
| 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 emergency stop and protective door switch. Module used to safely interrupt electrical circuits. |
| Policies List | | | EMV 2004/108/EG, Maschinen 2006/42/EG |
| Standards | | | EN ISO 13849-1:2008, EN 62061:2005+AC:2010, EN 61508, Parts 1-7:2001, EN 50178:1997, EN 60204-1:2006+A1:2009 |
| Dimensions (W x H x D) | | mm | 22.5 x 99 x 114.5 |
| Mounting width | | mm | 22.5 |
| Weight | | kg | 0,23 |
| Mounting position | | | As required |
| Mounting | | | Top-hat rail IEC/EN 60715, 35 mm |
| Connection type | | | M3 screw terminals |
| Lifespan, mechanical | Operations | x 10 ⁶ | 10 |
| Terminal capacity | | | |
| Solid | | mm ² | 1x (0.2 – 2.5) 2x (0.2 – 1) |
| Flexible with ferrule | | mm ² | 1x (0.25 – 2.5) 2x (0.25 – 1) |
| Solid or stranded | | AWG | 24 - 12 |
| Terminal screw | | Nm | |
| Pozidriv screwdriver | | Size | 2 |
| Standard screwdriver | | mm | 0.6 x 3.5 |
| Max. tightening torque | | Nm | 0.6 |
| Stripping length | | mm | 7 |
| Material | | | Housing: polyamide PA not reinforced |

| | | | |
|-----------------------------------|-----------------|------|--|
| | | | Contacts: Material: silver tin oxide, gold plated (AgSnO ₂ , 0.2 μm Au) |
| Duty factor | | % DF | 100 |
| Operating conditions | | | |
| Climatic environmental conditions | | | |
| Climatic proofing | | | Cold to EN 60068-2-1 Dry heat to IEC 60068-2-2 Damp heat as per EN 60068-2-3 |
| Ambient temperature | | | |
| Operation | θ | °C | -20 - +55 |
| Storage | θ | °C | -40 - +70 |
| Condensation | | | Non-condensing |
| Atmospheric conditions | | | |
| relative humidity | | % | Max. 75 |
| Air pressure (operation) | | hPa | 795 - 1080 |
| Altitude | Above sea level | m | 2000 |
| Power loss | P | W | 5.16 |

Ambient conditions, mechanical

| | | | |
|---|------------------------------|---------------------|---|
| Degree of protection to VDE 0470-1 | | | |
| Enclosures | | | IP20 |
| Terminals | | | IP20 |
| Degree of Protection | | | Installation location: ≥ IP54 |
| B10d [switching cycles] | | | 300000 |
| Protection against direct contact when actuated from front (EN 50274) | | | Finger and back-of-hand proof |
| Vibrations (IEC/EN 60068-2-6) | | | 10 - 150 Hz Amplitude: 0.15 mm Acceleration: 2 g |
| Clearance in air and creepage distances | | | EN 50178, UL 508, CSA C22.2, No. 14-95 |
| Rated impulse withstand voltage | U _{imp} | V AC | 4000 |
| Insulation | | | Basic isolation Safe isolation, reinforced isolation, and 6 kV between input circuit and enable current paths. |
| Overvoltage category/pollution degree | | | III/2 |
| Stop category | according to EN60204-1 | | 5,05 |
| 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 | 5.05 |
| Prooftest High Demand | | Months | 240 |
| Demand level | | Months | < 12 |
| Prooftest Low Demand | | Months | 66 |
| Lifetime | | Months | 240 |
| Rated operational voltage | U _e | V AC | 230 |
| Rated operational voltage | U _e | V | 24 V AC, 24 V DC |
| Permissible range | | | 0.85 - 1.1 x U _e |
| 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 + I ₃ ²) |
| Notes | | | Observe derating curve → Engineering |
| Inrush current | | A | min - max 0.025 - 6 |
| Minimum switching capacity | | W | 0.4 |

Control circuit

| | | | |
|---------------------------------|--|---|---------------------|
| Power supply circuit | | | |
| AC operated 50/60 Hz | | W | 3.4 |
| DC operated | | W | 1.6 |
| Fuse for control circuit supply | | | |
| 24 V | | | short-circuit proof |

Input data

| | | | |
|---|------------|----------|--|
| Rated current | | mA | S12, S22:30, S34:45 |
| Current consumption | | mA | AC: 140 DC: 65 |
| Voltage at input, starting and feedback circuit | | V DC | Approx. 24 |
| Max. resistive load of the cable | R | Ω | ≤ 50 |
| Short-circuit current | | A | 2.3 |
| Pick-up time (K1, K2) for UN automatic mode, typical | t_A | ms | 100 |
| Pick-up time | | ms | at U_e in automatic mode: normally 100 |
| Reset time (K1, K2) for U_N , normally | t_R | ms | 45 (single-channel) 10 (dual-channel) |
| Recovery time | t_W | ms | Approx. 1000 |
| Simultaneity for inputs 1/2 | t_{sync} | ms | ∞ |
| Maximum permissible total cable resistance (input and starting circuits for UN) | R_L | Ω | approx. 50 |
| Maximum switching frequency | | Hz | 0.5 |
| Status indication | | LED | Green |

Output data

| | | | |
|--|--|-------|--|
| Contact type | | | |
| Non-delayed enable current paths | | | 3 |
| Delayed signal current path | | | 1 |
| Switching voltage | | | min – max 15 - 250 V AC 15 - 250 V DC |
| Limiting continuous current | | A | per N/O: 6 N/C: 6 |
| Short-circuit protection for output circuits, external | | | Fuse 6 A gL/gG |
| Output fuse | | | |
| NEOZED (N/O) | | gL/gG | 10 |
| NEOZED (N/C) | | gL/gG | 6 |
| Maximum breaking power | | | |
| Resistive load ($\tau = 0$ ms) | | | |
| 24 V DC | | W | 144 |
| 48 V DC | | W | 288 |
| 110 V DC | | W | 77 |
| 220 V DC | | W | 88 |
| 250 V AC | | VA | 1500 |
| Inductive load ($\tau = 40$ ms) | | | |
| 24 V DC | | W | 48 |
| 48 V DC | | W | 40 |
| 110 V DC | | W | 35 |
| 220 V DC | | W | 33 |
| Switching capacity | | | |
| | | | In accordance with IEC 60947-5-1 |
| AC-15 | | | |
| 230 V | | A | 4 A bei 360 S/h 3 A bei 3600S/h |
| DC-13 | | | |
| 24 V | | A | 4 A bei 360 S/h 2.5 A bei 3600S/h |
| Further information (flip catalog) | | | description |

Electromagnetic compatibility (EMC)

| | | | |
|-----------------------|--|--|--|
| Emitted interference | | | In accordance with EN 61000-6-4 |
| Interference immunity | | | In accordance with EN 61000-6-2 EN 662061_x |

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 | 0 |
| Static heat dissipation, non-current-dependent | P_{vs} | W | 5.16 |
| Heat dissipation capacity | P_{diss} | W | 0 |
| Operating ambient temperature min. | | °C | -20 |
| 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 [AC0304011]) | | | |
| Model | | | Basic device |
| Suitable for monitoring of position switches | | | Yes |
| Suitable for monitoring of emergency-stop circuits | | | Yes |
| Suitable for monitoring of valves | | | No |
| Suitable for monitoring of optoelectronic protection equipment | | | No |
| Suitable for monitoring of tactile sensors | | | No |
| Suitable for monitoring of magnetic switches | | | No |
| Suitable for monitoring of proximity switches | | | No |
| Type of electric connection | | | Screw connection |
| Rail mounting possible | | | Yes |
| Rated control supply voltage U_s at AC 50HZ | | V | 0 - 26.4 |
| Rated control supply voltage U_s at AC 60HZ | | V | 0 - 0 |
| Rated control supply voltage U_s at DC | | V | 0 - 0 |
| Voltage type for actuating | | | AC/DC |

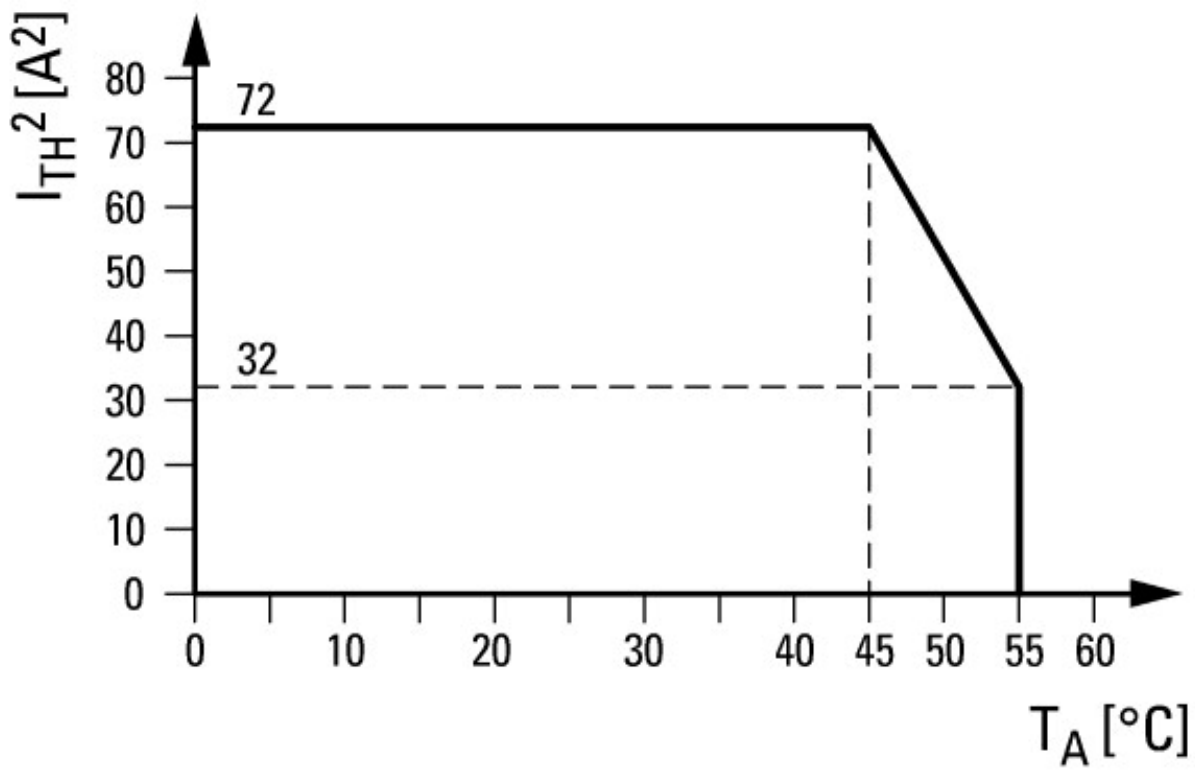
| | | | |
|---|--|----|----------------------|
| With detachable clamps | | | Yes |
| Evaluation inputs | | | One- and two-channel |
| With start input | | | Yes |
| With muting function | | | No |
| With feedback circuit | | | Yes |
| Release-delay | | s | 0 - 0 |
| Number of outputs, safety related, undelayed, with contact | | | 3 |
| 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 | | | 1 |
| 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 | | | 4 |
| 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 | | | Yes |
| With approval for BG BIA | | | No |
| With approval according to UL | | | Yes |
| Width | | mm | 22.5 |
| Height | | mm | 99 |
| 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 |
| UL Category Control No. | | | NKCR; NKCR7 |
| CSA File No. | | | UL report applies to both US and Canada |
| CSA Class No. | | | 3211-83; 3211-03 |
| North America Certification | | | UL listed, certified by UL for use in Canada |
| Degree of Protection | | | IEC: IP20, UL/CSA Type: - |

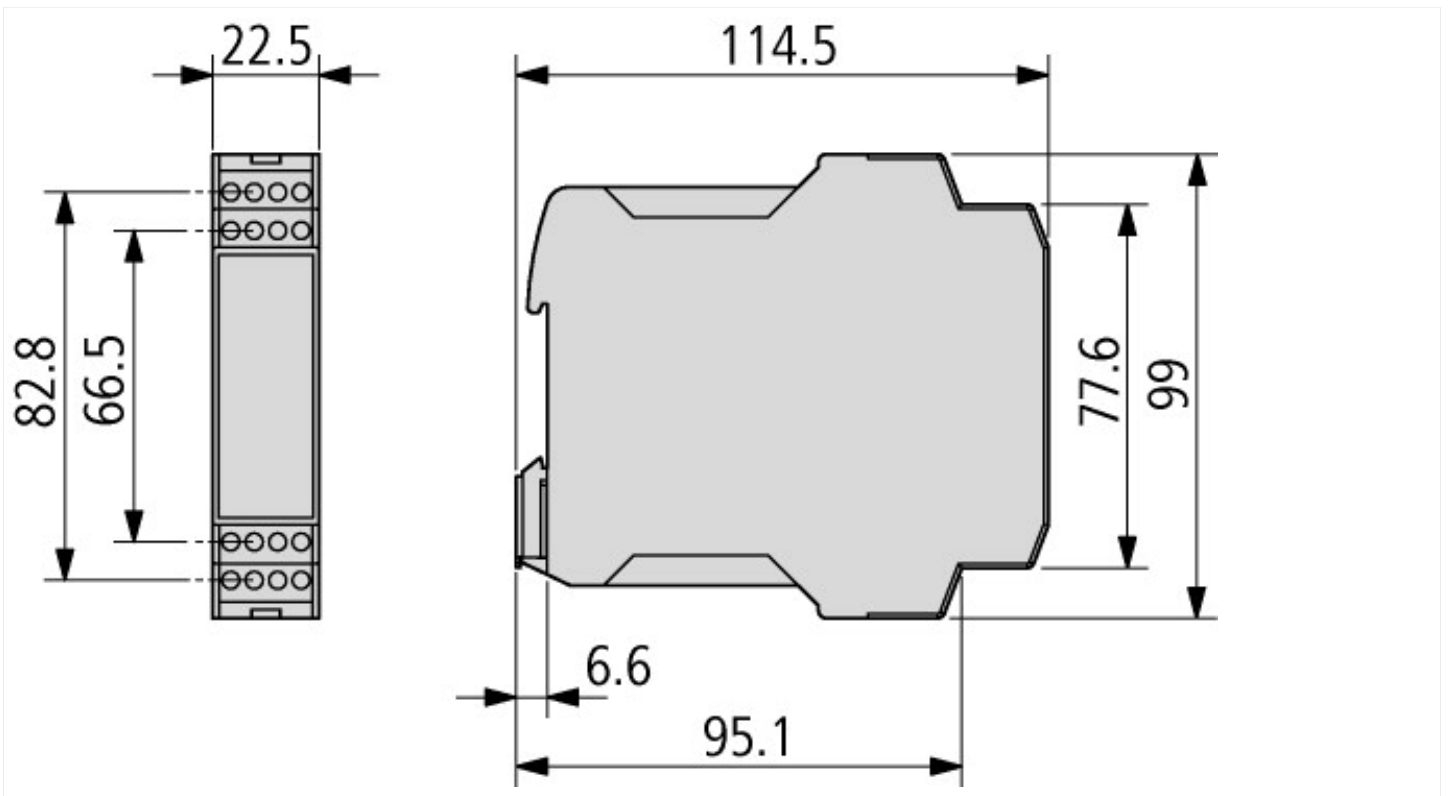
Characteristics

| | | | |
|-----------------------|--|--|--|
| Characteristic curves | | | |
|-----------------------|--|--|--|



Derating curve

Dimensions



Assets (links)

Declaration of CE Conformity

00003263

Instruction Leaflets

IL05013029Z2018_06

Additional product information (links)

IL05013029Z operator manual for electricians

IL05013029Z operator manual for electricians ftp://ftp.moeller.net/DOCUMENTATION/AWA_INSTRUCTIONS/IL05013029Z2018_06.pdf

| | |
|------------------------|---|
| description | http://de.ecat.moeller.net/flip-cat/?edition=HPLTE&startpage=13.15 |
| Product overview (WEB) | http://www.eaton.eu/esr5 |