

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

**Part no.** ESR5-NZ-21-24VAC-DC
**Article no.** 118703

Powering Business Worldwide

## Delivery programme

| | | | |
|---|---|---|---|
| Product range | | | Electronic safety relays |
| Basic function | | | Protective door<br>Two-hand function<br>Feedback circuit |
| **Features** | | | |
| Mounting width | | mm | 22.5 |
| | | | Automatic start<br>External contactor / expansion unit monitoring |
| Operation | | | Two-channel |
| Supply voltage | $U_s$ | | 24 V DC<br>24 V AC, 50/60 Hz |
| Approval | | | Functional Safety TÜV FS TÜV Rheinland Group Type Approved |
| Safety related characteristics | | | EN 574 Typ III C<br>Cat. 4<br>PL e according to EN ISO 13849-1<br>SILCL 3 according to IEC 62061<br>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 | | | 2 |
| Signal current paths | | | 1 |

## Technical data

### General

| | | | |
|---|---|---|---|
| Intended use | | | Sicherheitsrelais zur Überwachung von Zweihand-Steuerungen nach EN 574 Typ IIIC und Schutztürschaltern.<br>Mit Hilfe dieses Modules werden Stromkreise sicherheitsgerichtet unterbrochen. |
| Policies List | | | EMV 2004/108/EG, Maschinen 2006/42/EG |
| Standards | | | EN 574 Part no. IIIC,<br>EN ISO 13849-1:2008,<br>EN 62061:2005+AC:2010,<br>EN 61508, Parts 1-7:2001,<br>EN 50178:1997,<br>EN 60204-1:2006+A1:2009 |
| Dimensions (W x H x D) | | mm | 22.5 x 114.5 x 99 |
| Mounting width | | mm | 22.5 |
| Weight | | kg | 0,19 |
| 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)<br>2x (0.2 – 1) |
| Flexible with ferrule | | $mm^2$ | 1x (0.25 – 2.5)<br>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<br>Contacts: Material: silver tin oxide, gold plated (AgSnO2, 0.2 µm Au) |
| Duty factor | | % DF | 100 |
| Operating conditions | | | |
| Climatic environmental conditions | | | |
| Climatic proofing | | | Dry heat to IEC 60068-2-2<br>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<br>Amplitude: 0.15 mm<br>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 | 6000 |
| Insulation | | | Basic isolation<br>Safe isolation<br>Reinforced insulation |
| Overvoltage category/pollution degree | | | III/2 |
| Stop category | according to EN60204-1 | | 12,1 |
| Technical safety parameters: | | | |
| Values according to EN ISO 13849-1 | | | |
| Performance level | according to EN ISO 13849 | | PL e |
| Category | according to EN ISO 13849 | | 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 $10^{-10}$ | 12.1 |
| Prooftest High Demand | | Months | 240 |
| 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 Ue |
| Rated insulation voltage | $U_i$ | V AC | 250 |
| Quadratic summation current | | $A^2$ | 72 $A^2$ ($I_{TH}^2 = I_1^2 + I_2^2$) |
| 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 |
| DC operated | | W | 1.5 |
| Fuse for control circuit supply | | | |
| 24 V | | | short-circuit proof |

## Input data

| | | | |
|---|---|---|---|
| Rated current | | mA | S11, S21:60, Y2:45 |
| Current consumption | | mA | AC: 125<br>DC: 60 |
| Voltage at input, starting and feedback circuit | | V DC | Approx. 24 |
| Max. resistive load of the cable | R | Ω | 22 |
| Short-circuit current | | A | 2.3 |
| Pick-up time (K1, K2) for UN automatic mode, typical | $t_A$ | ms | 50 |
| Pick-up time (K1, K2) for UN manual operation, typical | $t_A$ | ms | 50 |
| Pick-up time | | ms | at Ue in automatic mode: normally 50<br>at Ue in manual mode: normally 50 |
| Reset time (K1, K2) for $U_N$ , normally | $t_R$ | ms | 20 |
| Recovery time | $t_W$ | ms | Approx. < 1000 |
| Simultaneity for inputs 1/2 | $t_{sync}$ | ms | < 500 |
| Maximum permissible total cable resistance (input and starting circuits for UN) | $R_L$ | Ω | 50 |
| Maximum switching frequency | | Hz | 0.5 |
| Status indication | | LED | Green |

## Output data

| | | | |
|---|---|---|---|
| Contact type | | | |
| Non-delayed enable current paths | | | 2 |
| Non-delayed signal current path | | | 1 |
| Switching voltage | | | min – max 15 - 250 V AC<br>15 - 250 V DC |
| Limiting continuous current | | A | per N/O: 6<br>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 (τ = 0 ms) | | | |
| 24 V DC | | W | 144 |
| 48 V DC | | W | 288 |
| 110 V DC | | W | 110 |
| 220 V DC | | W | 88 |
| 250 V AC | | VA | 1500 |
| Inductive load (τ = 40 ms) | | | |
| 24 V DC | | W | 42 |
| 48 V DC | | W | 42 |
| 110 V DC | | W | 42 |
| 220 V DC | | W | 42 |
| Switching capacity | | | |
| | | | In accordance with IEC 60947-5-1 |
| AC-15 | | | |
| 230 V | | A | 5 A bei 3600S/h |
| DC-13 | | | |
| 24 V | | A | 5 A bei 3600S/h |
| Further information (flip catalog) | | | description |

## Electromagnetic compatibility (EMC)

| | | | |
|---|---|---|---|
| Emitted interference | | | In accordance with EN 61000-6-4 |
| Interference immunity | | | according to EN 61000-6-2 |

## 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 | -25 |
| 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 | | | Meets the product standard's requirements. |
| 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. |
| 10.12 Electromagnetic compatibility | | | Is the panel builder's responsibility. |
| 10.13 Mechanical function | | | The device meets the requirements, provided the information in the instruction leaflet (IL) is observed. |

## Technical data ETIM 6.0

| | | | |
|---|---|---|---|
| Relays (EG000019) / Two-hand control relay (EC001452) | | | |
| Electric engineering, automation, process control engineering / Low-voltage switch technology / Monitoring equipment (low-voltage switch technology) / Two-hand switchgear (ecl@ss8.1-27-37-18-21 [ACO306008]) | | | |
| Type of electric connection | | | - |
| Rail mounting possible | | | Yes |
| Rated control supply voltage Us at AC 50HZ | | V | 0 - 0 |
| Rated control supply voltage Us at AC 60HZ | | V | 0 - 0 |
| Rated control supply voltage Us at DC | | V | 0 - 0 |
| Voltage type for actuating | | | AC/DC |
| With detachable clamps | | | Yes |
| Type of switch function of the inputs | | | - |
| With feedback circuit | | | Yes |
| With start input | | | No |
| Number of outputs, safety related, undelayed, with contact | | | 2 |
| 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 |
| Suitable for safety functions | | Yes |
| Category according to EN 954-1 | | 4 |
| Type class for safety demands in accordance with EN 574 | | Type III C |
| SIL according to IEC 61508 | | 3 |
| Performance level acc. to EN ISO 13849-1 | | Level e |
| 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 |

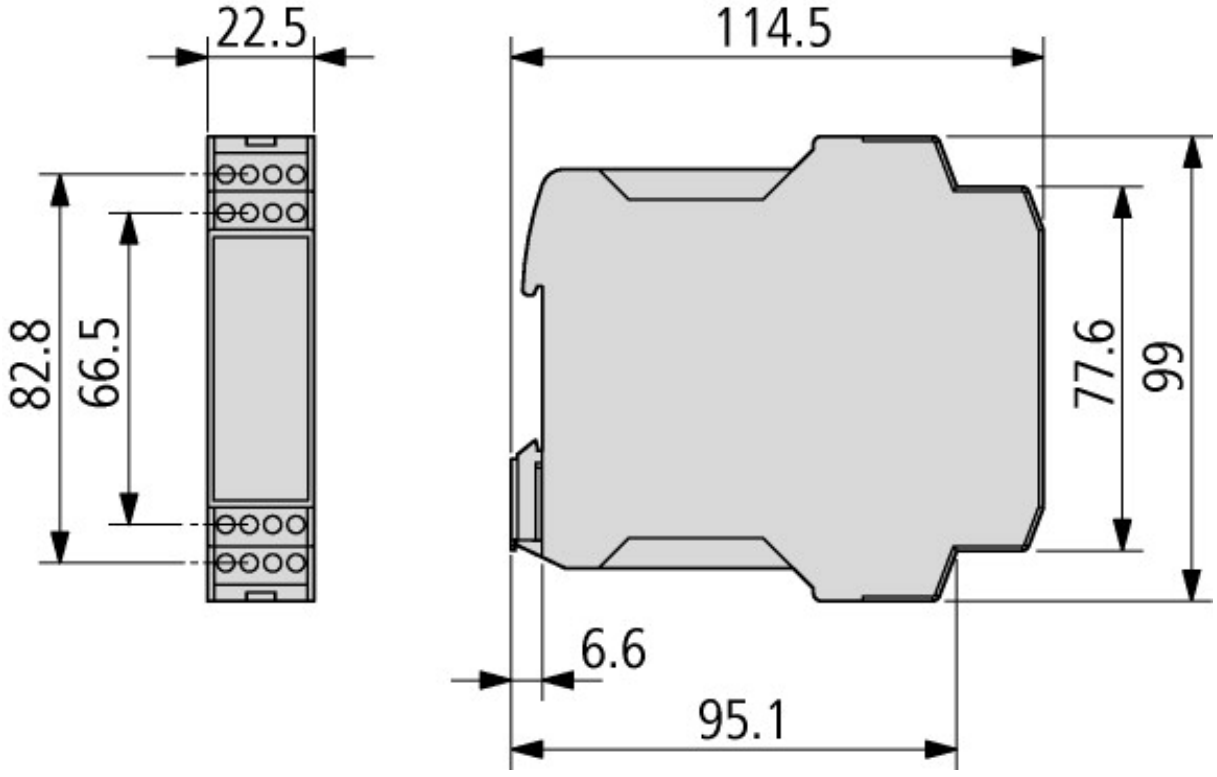
## Approvals

| | |
|---|---|
| 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

PU05907001Z safety manual

## Dimensions




## Additional product information (links)

**IL05013030Z operator manual for electricians**

| | |
|---|---|
| IL05013030Z operator manual for electricians | ftp://ftp.moeller.net/DOCUMENTATION/AWA_INSTRUCTIONS/IL05013030Z2014_04.pdf |
| description | http://de.ecat.moeller.net/flip-cat/?edition=HPLTE&startpage=13.15 |

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