

# Safety relays - PSR-SPP- 24DC/ESP4/2X1/1X2 - 2981017

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Safety relay for SIL 3 high and low-demand applications, also approved according to EN 50156, Germanischer Lloyd, and EN ISO 13849, emergency stop and safety door monitoring, single-channel, 2 enabling current paths, 1 alarm contact, plug-in spring-cage terminal blocks, width: 22.5 mm

## Product Features

- Up to Cat. 4/PL e according to ISO 13849-1, SILCL 3 according to IEC 62061, SIL 3 according to IEC 61508
- Single-channel control
- Safe isolation
- With inrush current reduction, therefore suitable for coupling to failsafe controllers (PSR-ESP4)



## Key commercial data

|                  |               |
|------------------|---------------|
| package_quantity | 1             |
| GTIN             | 4017918911072 |

## Technical data

### Dimensions

|        |          |
|--------|----------|
| Width  | 22.5 mm  |
| Height | 112 mm   |
| Depth  | 114.5 mm |

### Ambient conditions

|  |                  |
|--|------------------|
| Ambient temperature (operation)                | -20 °C ... 55 °C |
| Ambient temperature (storage/transport)        | -40 °C ... 70 °C |
| Max. permissible relative humidity (operation) | 75 %             |
| Max. permissible humidity (storage/transport)  | 75 %             |

### Input data

|   |                                |
|---|--------------------------------|
| Nominal input voltage $U_N$                 | 24 V DC                        |
| Input voltage range in reference to $U_N$   | 0.85 ... 1.1                   |
| Typical input current at $U_N$              | 50 mA DC                       |
| Typical inrush current                      | < 1 A                          |
| Voltage at input/start and feedback circuit | 24 V DC                        |
| Typical response time                       | 60 ms (Automatic/manual start) |
| Typical release time                        | 20 ms                          |

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### Technical data

#### Input data

|                |             |
|----------------|-------------|
| Recovery time  | approx. 1 s |
| Status display | Green LED   |

#### Output data

|  |   |
|--|---|
| Contact type                                 | 2 enabling current paths                                |
| Contact type                                 | 1 signaling current path (type B according to EN 50205) |
| Contact material                             | AgSnO <sub>2</sub> , gold-flashed                       |
| Minimum switching voltage                    | 10 V  |
| Maximum switching voltage                    | 250 V AC/DC   |
| Limiting continuous current                  | 6 A (N/O contact/N/C contact, high demand)              |
| Limiting continuous current                  | 4 A (N/O contact/N/C contact, low demand)               |
| Inrush current, minimum                      | 10 mA   |
| Maximum inrush current                       | 6 A   |
| Sq. Total current                            | $72 \text{ A}^2 (I_{TH}^2 = I_1^2 + I_2^2)$             |
| Interrupting rating (ohmic load) max.        | 144 W (24 V DC, $\tau = 0 \text{ ms}$ )                 |
| Interrupting rating (ohmic load) max.        | 200 W (48 V DC, $\tau = 0 \text{ ms}$ )                 |
| Interrupting rating (ohmic load) max.        | 77 W (110 V DC, $\tau = 0 \text{ ms}$ )                 |
| Interrupting rating (ohmic load) max.        | 70 W (220 V DC, $\tau = 0 \text{ ms}$ )                 |
| Interrupting rating (ohmic load) max.        | 1500 VA (250 V AC, $\tau = 0 \text{ ms}$ )              |
| Maximum interrupting rating (inductive load) | 42 W (24 V DC, $\tau = 40 \text{ ms}$ )                 |
| Maximum interrupting rating (inductive load) | 40 W (48 V DC, $\tau = 40 \text{ ms}$ )                 |
| Maximum interrupting rating (inductive load) | 35 W (110 V DC, $\tau = 40 \text{ ms}$ )                |
| Maximum interrupting rating (inductive load) | 33 W (220 V DC, $\tau = 40 \text{ ms}$ )                |
| Switching capacity min.                      | 0.2 W   |
| Output fuse                                  | 6 A gL/gG NEOZED (High demand)                          |
| Output fuse                                  | 4 A gL/gG NEOZED (Low demand)                           |

#### General

|   |  |
|---|--|
| Relay type                                  | Electromechanically forcibly guided, dust-proof relay. |
| Mechanical service life                     | Approx. $10^7$ cycles                                  |
| Mounting type                               | DIN rail mounting                                      |
| Degree of protection                        | IP20   |
| Min. degree of protection of inst. location | IP54   |
| Mounting position                           | On horizontal and vertical DIN rail                    |
| Category according to EN 13849-1            | 4  |
| Stop category                               | 0  |
| Designation                                 | Air and creepage distances between the power circuits  |
| Standards/regulations                       | DIN EN 50178/VDE 0160                                  |
| Rated surge voltage / insulation            | 6 kV / Safe isolation, increased insulation            |
| Rated insulation voltage                    | 250 V  |
| Pollution degree                            | 2  |
| Surge voltage category                      | III  |

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## Technical data

### General

|                         |                             |
|-------------------------|-----------------------------|
| <b>Housing material</b> | Polyamide PA non-reinforced |
|-------------------------|-----------------------------|

### Connection data

|   |                        |
|---|------------------------|
| <b>Conductor cross section solid min.</b>     | 0.2 mm <sup>2</sup>    |
| <b>Conductor cross section solid max.</b>     | 1.5 mm <sup>2</sup>    |
| <b>Conductor cross section stranded min.</b>  | 0.2 mm <sup>2</sup>    |
| <b>Conductor cross section stranded max.</b>  | 1.5 mm <sup>2</sup>    |
| <b>Conductor cross section AWG/kcmil min.</b> | 24                     |
| <b>Conductor cross section AWG/kcmil max</b>  | 16                     |
| <b>Stripping length</b>                       | 8 mm                   |
| <b>Connection method</b>                      | Spring-cage connection |

### Safety-related characteristic data

|   |                          |
|---|--------------------------|
| <b>Stop category</b>  | 0                        |
| <b>Designation</b>  | IEC 61508 - High demand  |
| <b>Safety Integrity Level (SIL)</b>                                     | 3                        |
| <b>Probability of a hazardous failure per hour (PFH<sub>D</sub>)</b>    | 1,16 x 10 <sup>-10</sup> |
| <b>Proof test interval</b>  | 240 Months               |
| <b>Duration of use</b>  | 240 Months               |
| <b>Designation</b>  | IEC 61508 - Low demand   |
| <b>Safety Integrity Level (SIL)</b>                                     | 3                        |
| <b>Probability of a hazardous failure on demand (PFD<sub>AVG</sub>)</b> | 1,24 x 10 <sup>-4</sup>  |
| <b>Proof test interval</b>  | 72 Months                |
| <b>Duration of use</b>  | 240 Months               |
| <b>Designation</b>  | EN ISO 13849             |
| <b>Performance level (PL)</b>   | e                        |
| <b>Category</b>   | 4                        |
| <b>Mean time to a hazardous failure (MTTF<sub>d</sub>)</b>              | 269 Years                |
| <b>Diagnostic coverage (DC<sub>avg</sub>)</b>                           | 99 %                     |
| <b>T<sub>10d</sub></b>  | 20 Years                 |
| <b>Duration of use</b>  | 240 Months               |
| <b>Designation</b>  | EN 62061                 |
| <b>Safety Integrity Level Claim Limit (SIL CL)</b>                      | 3                        |
| <b>Duration of use</b>  | 240 Months               |

## classifications

### eCl@ss

|                   |          |
|-------------------|----------|
| <b>eCl@ss 4.0</b> | 27371102 |
| <b>eCl@ss 4.1</b> | 27371102 |
| <b>eCl@ss 5.0</b> | 27371901 |
| <b>eCl@ss 5.1</b> | 27371901 |

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## classifications

### eCl@ss

|            |          |
|------------|----------|
| eCl@ss 6.0 | 27371819 |
| eCl@ss 7.0 | 27371819 |
| eCl@ss 8.0 | 27371819 |

### ETIM

|          |          |
|----------|----------|
| ETIM 2.0 | EC001449 |
| ETIM 3.0 | EC001449 |
| ETIM 4.0 | EC001449 |
| ETIM 5.0 | EC001449 |

### UNSPSC

|               |          |
|---------------|----------|
| UNSPSC 6.01   | 30211901 |
| UNSPSC 7.0901 | 39121501 |
| UNSPSC 11     | 39121501 |
| UNSPSC 12.01  | 39121501 |
| UNSPSC 13.2   | 39121501 |

## approvals

UL Listed / GOST / cUL Listed / GL / Functional Safety / cULus Listed /

### Approval details

UL Listed

GOST

cUL Listed

GL

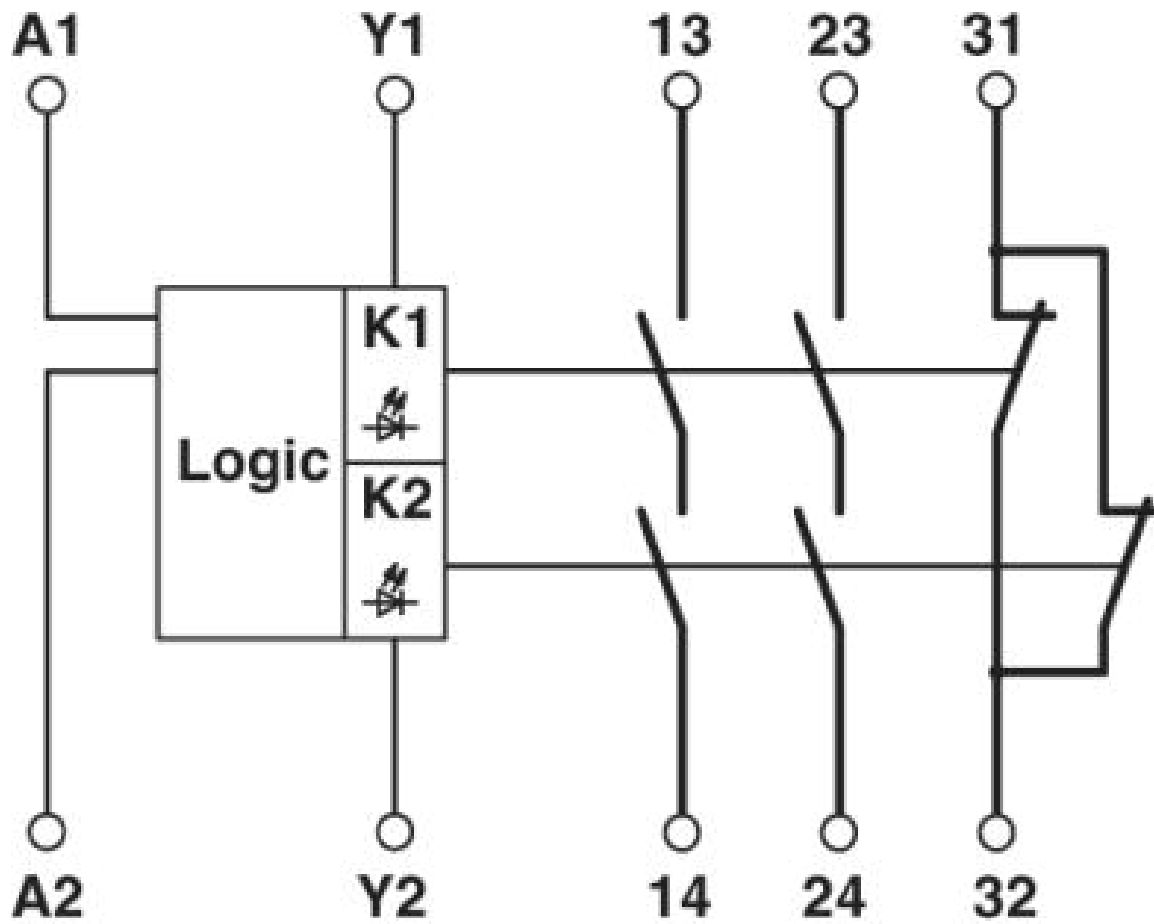
Functional Safety

cULus Listed

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## Drawings

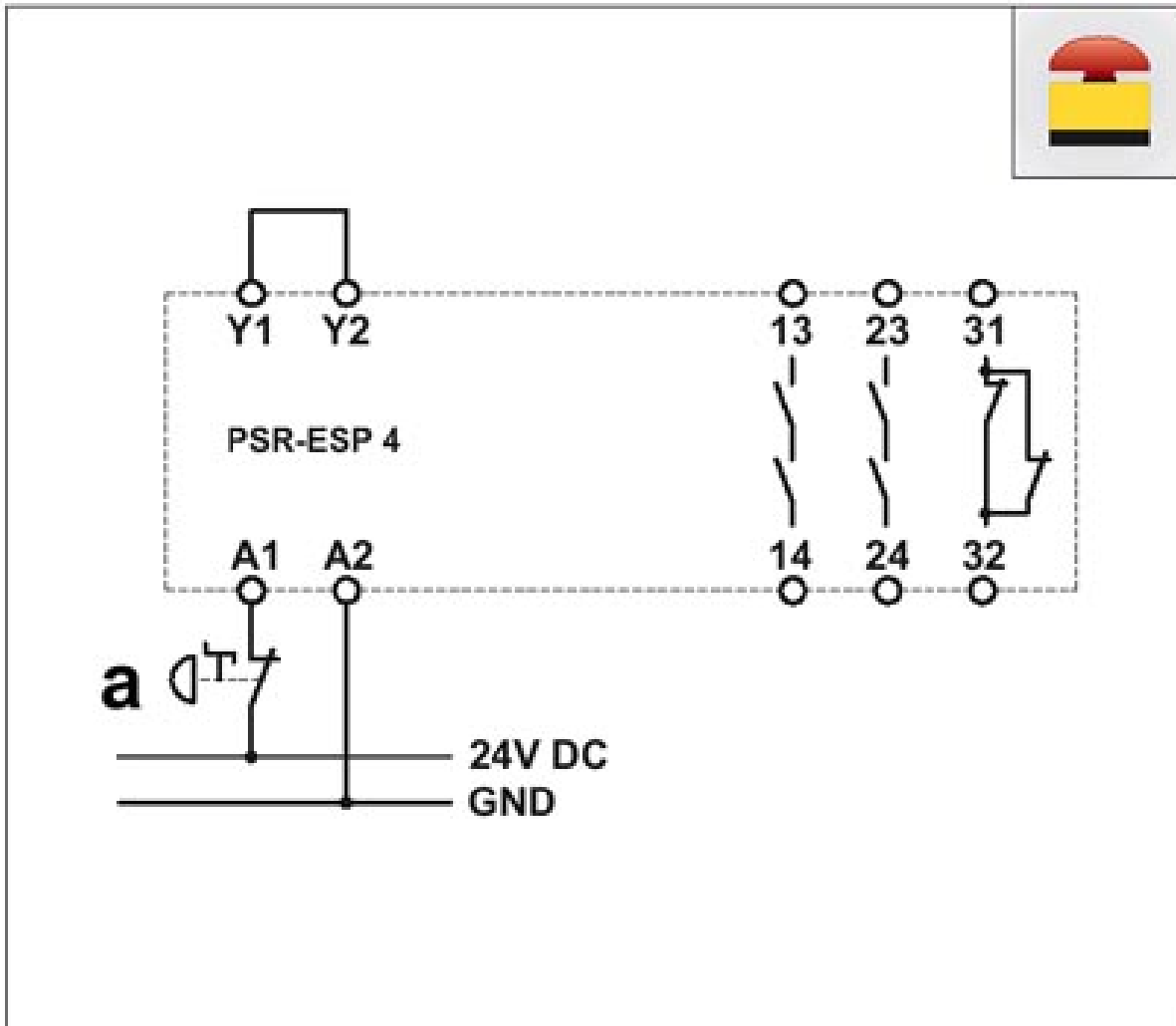
### Circuit diagram



1 = logics

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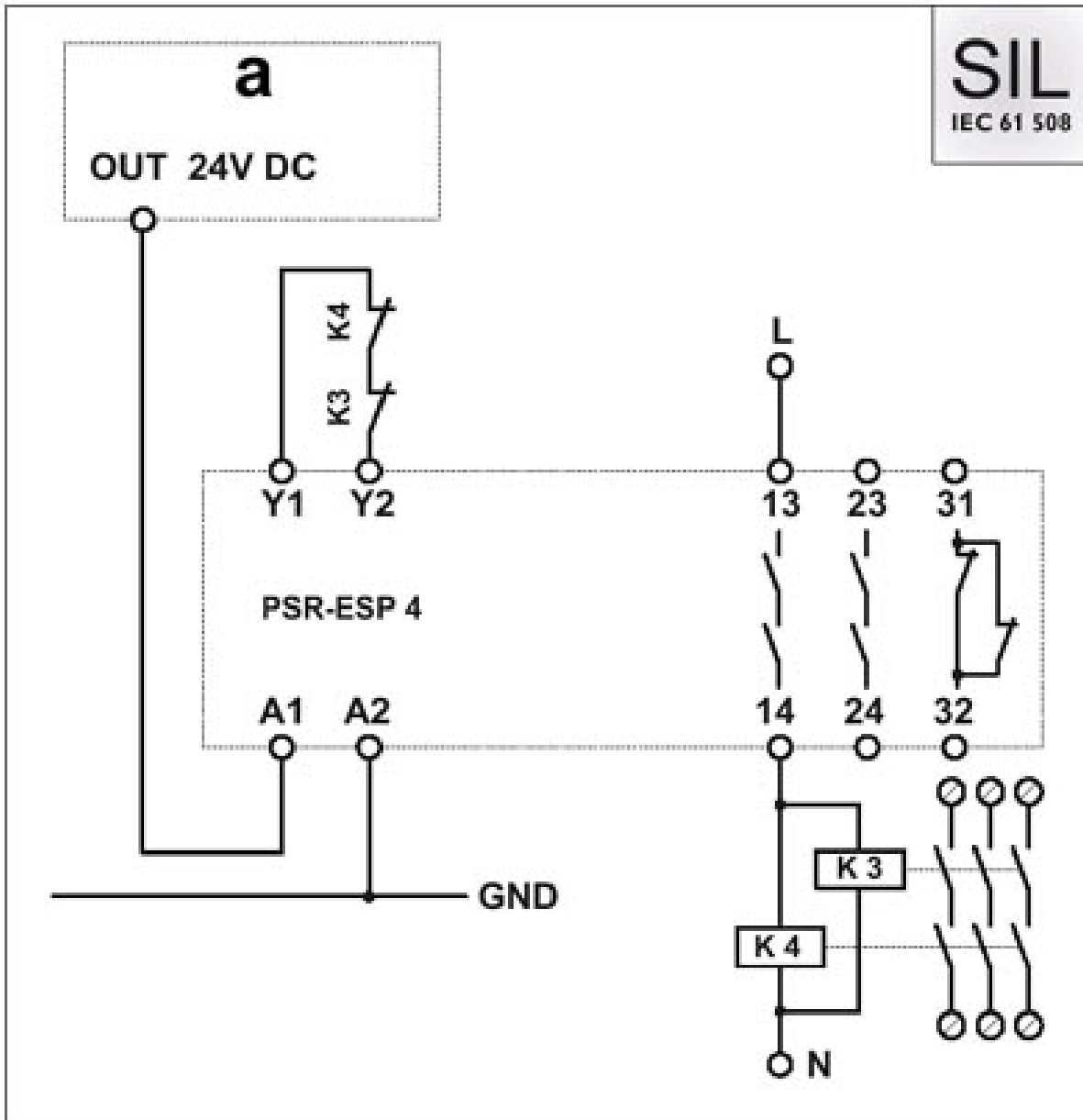
Circuit diagram



One-channel emergency stop circuit with automatic activation, suitable up to safety category 2.

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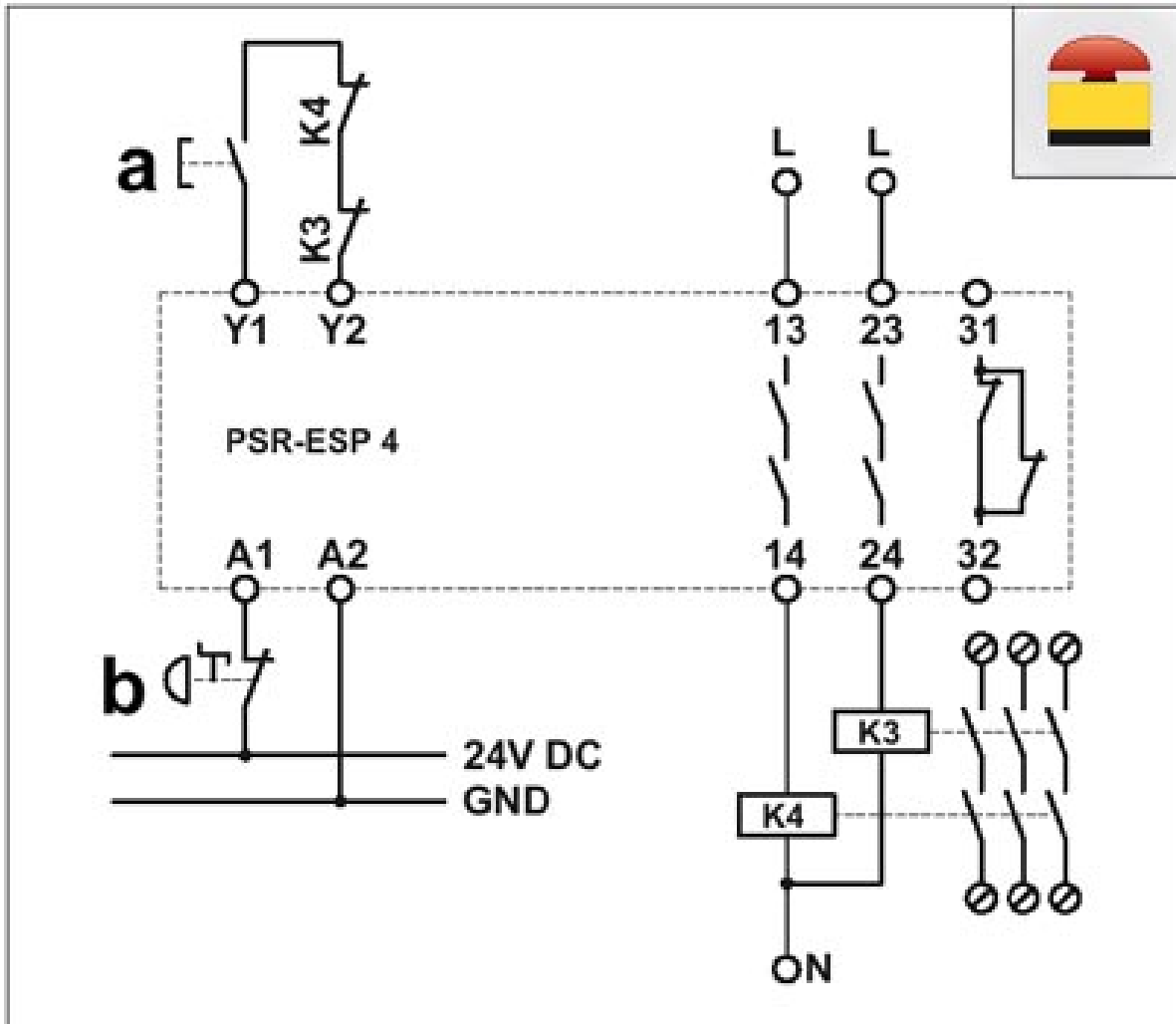
Circuit diagram



One-channel evaluation of a safety controller with automatic activation, suitable up to SIL 3.

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Circuit diagram

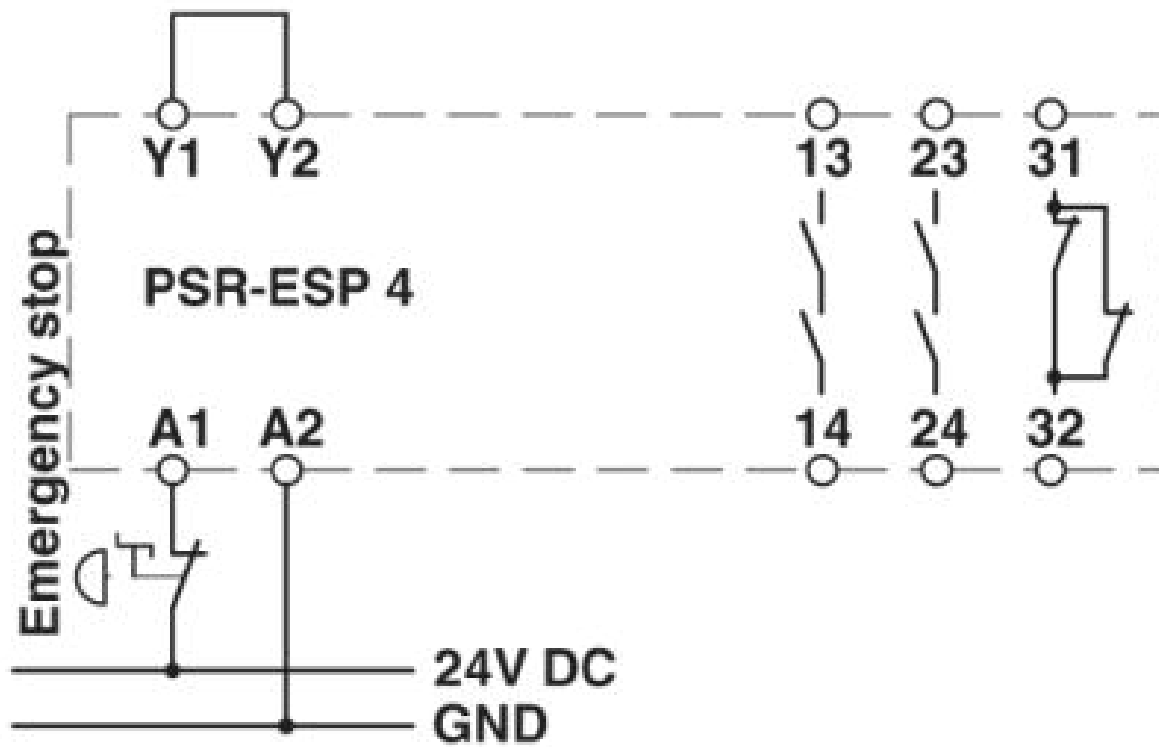


One-channel emergency stop circuit with manual activation and monitored contact expansion, suitable up to safety category 2.



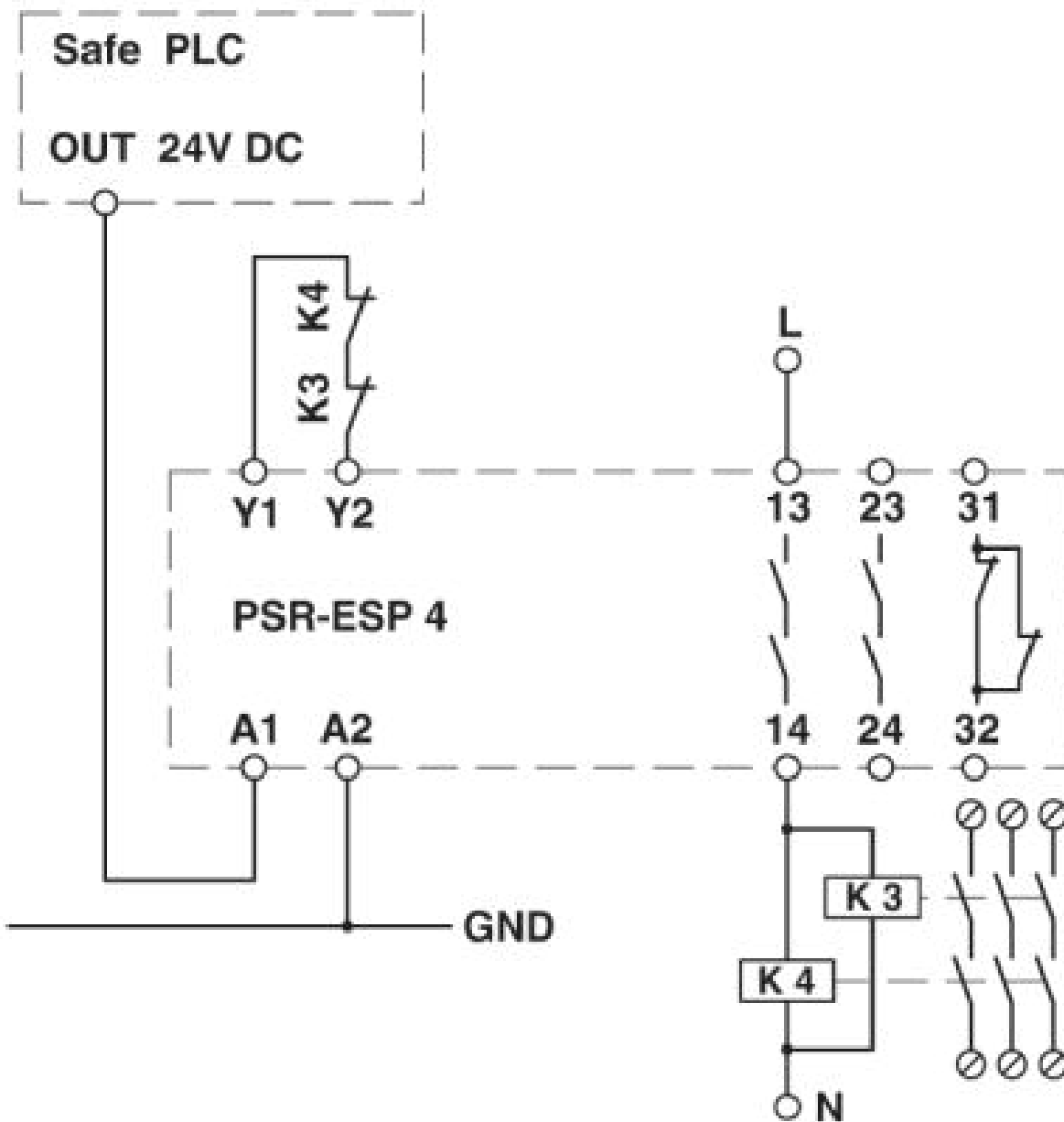
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Circuit diagram



# Safety relays - PSR-SPP- 24DC/ESP4/2X1/1X2 - 2981017

Circuit diagram



# Safety relays - PSR-SPP- 24DC/ESP4/2X1/1X2 - 2981017

Circuit diagram

