

# Safety relays - PSR-SPP- 24DC/ESD/5X1/1X2/300 - 2981431

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Safety relay to emergency stop and safety door monitoring up to SIL 3 or Cat. 4, PL e according to EN ISO 13849, one- or two-channel operation, automatic or manual activation, 3 N/O contacts, 1 N/C contact, 2 N/O contacts switch-off delay set at 0 to 300 s

The illustration shows the versions with screw connection

## Product Features

- Maximum of 3 undelayed and 2 dropout delay contacts
- Manually monitored and automatic activation
- Up to Cat. 3/4 and PL d/e according to ISO 13849-1, SILCL 3 according to IEC 62061, SIL 3 according to IEC 61508
- Protective labels to prevent manipulation of the set time (PSR-ESD-300) or electronic protection against manipulation (PSR-ESD-30)
- For emergency stop and safety door monitoring, plus evaluation of light grids (suitable light grids available on request)
- Single and two-channel control



## Key commercial data

package_quantity	1
GTIN	4017918975234

## Technical data

### Note

Utilization restriction	EMC: class A product, see manufacturer's declaration in the download area
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### Dimensions

Width	45 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

### 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 $U_N$	155 mA DC

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## Technical data

### Input data

<b>Voltage at input/start and feedback circuit</b>	approx. 24 V DC
<b>Typical response time</b>	70 ms (Monitored/manual start)
<b>Typical response time</b>	600 ms (Auto-start)
<b>Typical release time</b>	20 ms (undelayed contacts)
<b>Typical release time range</b>	0.2 s ... 300 s
<b>Concurrence input 1/2</b>	Infinite
<b>Recovery time</b>	1 s
<b>Max. permissible overall conductor resistance</b>	11 Ω (Input and start circuits at U <sub>N</sub> )

### Output data

<b>Contact type</b>	3 enabling current paths undelayed
<b>Contact type</b>	2 enabling current paths delayed
<b>Contact type</b>	1 signaling current path undelayed
<b>Contact material</b>	AgSnO <sub>2</sub>
<b>Minimum switching voltage</b>	15 V AC/DC
<b>Maximum switching voltage</b>	250 V AC/DC
<b>Limiting continuous current</b>	6 A (N/O contact)
<b>Limiting continuous current</b>	3 A (N/C contact)
<b>Inrush current, minimum</b>	25 mA
<b>Maximum inrush current</b>	6 A
<b>Sq. Total current</b>	$55 \text{ A}^2 (I_{TH}^2 = I_1^2 + I_2^2 + I_3^2 + I_4^2 + I_5^2)$
<b>Interrupting rating (ohmic load) max.</b>	144 W (24 V DC, τ = 0 ms)
<b>Interrupting rating (ohmic load) max.</b>	288 W (48 V DC, τ = 0 ms)
<b>Interrupting rating (ohmic load) max.</b>	77 W (110 V DC, τ = 0 ms)
<b>Interrupting rating (ohmic load) max.</b>	88 W (220 V DC, τ = 0 ms)
<b>Interrupting rating (ohmic load) max.</b>	1500 VA (250 V AC, τ = 0 ms)
<b>Maximum interrupting rating (inductive load)</b>	42 W (24 V DC, τ = 40 ms)
<b>Maximum interrupting rating (inductive load)</b>	40 W (48 V DC, τ = 40 ms)
<b>Maximum interrupting rating (inductive load)</b>	35 W (110 V DC, τ = 40 ms)
<b>Maximum interrupting rating (inductive load)</b>	33 W (220 V DC, τ = 40 ms)
<b>Switching capacity min.</b>	0.4 W
<b>Output fuse</b>	6 A fast blow (undelayed)
<b>Output fuse</b>	C6 (24 V AC/DC) automatic device (undelayed)
<b>Output fuse</b>	10 A gL/gG NEOZED (delayed)

### General

<b>Relay type</b>	Electromechanically forcibly guided, dust-proof relay.
<b>Mechanical service life</b>	Approx. 10 <sup>7</sup> cycles
<b>Mounting type</b>	DIN rail mounting
<b>Degree of protection</b>	IP20
<b>Min. degree of protection of inst. location</b>	IP54
<b>Mounting position</b>	any

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## Technical data

### General

Category according to EN 13849-1	3 (For delayed contacts)
Category according to EN 13849-1	4 (For non-delayed contacts)
Stop category	0 (For non-delayed contacts)
Stop category	1 (For delayed contacts)
Designation	Air and creepage distances between the power circuits
Standards/regulations	DIN EN 50178/VDE 0160
Rated surge voltage / insulation	4 kV / basic isolation, (safe isolation, reinforced insulation and 6 kV between the enabling current paths (13/14, 23/24, 33/34) and the remaining current paths and between 13/14, 23/24, 33/34 between each other.)
Rated insulation voltage	250 V
Pollution degree	2
Surge voltage category	III

### Connection data

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

### Safety-related characteristic data

Stop category	0
Stop category	1
Designation	IEC 61508 - High demand
Safety Integrity Level (SIL)	3
SFF <sub>Single-channel</sub>	100 %
SFF <sub>Two-channel</sub>	90.94 %
Mean time to a hazardous failure (MTTF <sub>d</sub> )	60327 Years
Probability of a hazardous failure per hour (PFH <sub>D</sub> )	1.89 x 10 <sup>-9</sup>
Diagnostic coverage (DC)	96.49 %
Proof test interval	240 Months
Note	The details apply assuming the following calculation basis:dop: 365.25 days (assumption)hop: 24 hours (assumption)tcycle: 3600 seconds (assumption)B10d for AC-15 6A: 230 000 (manufacturer's value)Data only applies if the safety function is demanded at least once a year. Only applies if signal contact is left in position!
Designation	IEC 61508 - Low demand
Safety Integrity Level (SIL)	3
SFF <sub>Single-channel</sub>	100 %
SFF <sub>Two-channel</sub>	78.04 %

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## Technical data

### Safety-related characteristic data

Mean time to a hazardous failure (MTTF <sub>d</sub> )	4927 Years
Probability of a hazardous failure on demand (PFD <sub>AVG</sub> )	1,43 x 10 <sup>-4</sup>
Diagnostic coverage (DC)	15.67 %
Proof test interval	19 Months
Designation	EN ISO 13849
Performance level (PL)	e (for dropout delay contacts PL d)
Category	4 (Undelayed contacts)
Diagnostic coverage (DC <sub>avg</sub> )	96.49 %
CCF	Passed
T <sub>10d</sub>	26 Years
Note	The details apply assuming the following calculation basis:dop: 365.25 days (assumption)hop: 24 hours (assumption)tcycle: 3600 seconds (assumption)B10d for AC-15 6A: 230 000 (manufacturer's value)Data only applies if the safety function is demanded at least once a year. Only applies if signal contact is left in position!
Designation	EN 62061
Safety Integrity Level Claim Limit (SIL CL)	3
PFH <sub>b</sub>	1,89 x 10 <sup>-9</sup>
Note	The details apply assuming the following calculation basis:dop: 365.25 days (assumption)hop: 24 hours (assumption)tcycle: 3600 seconds (assumption)B10d for AC-15 6A: 230 000 (manufacturer's value)Data only applies if the safety function is demanded at least once a year. Only applies if signal contact is left in position!

## classifications

### eCl@ss

eCl@ss 4.0	27371102
eCl@ss 4.1	27371102
eCl@ss 5.0	27371901
eCl@ss 5.1	27371901
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

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## classifications

### UNSPSC

UNSPSC 12.01	39121501
UNSPSC 13.2	39121501

## approvals

UL Listed / GOST / cUL Listed / cULus Listed /

### Approval details

UL Listed

GOST

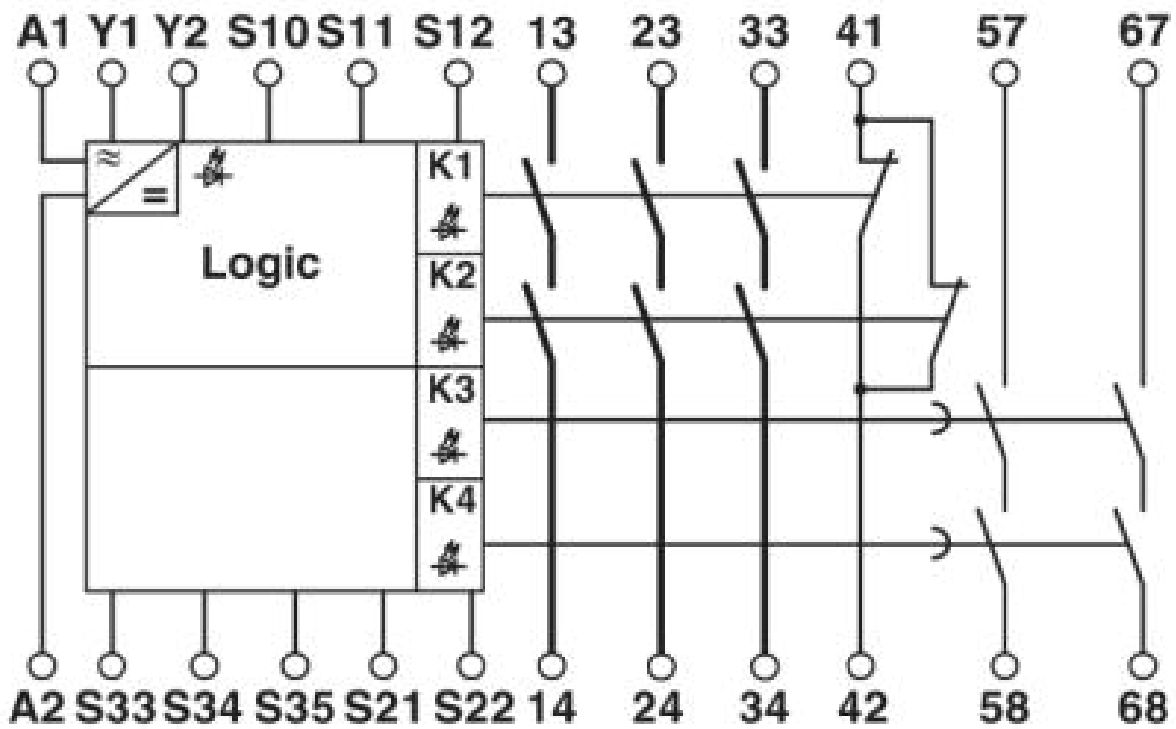
cUL Listed

cULus Listed

## Drawings

# Safety relays - PSR-SPP- 24DC/ESD/5X1/1X2/300 - 2981431

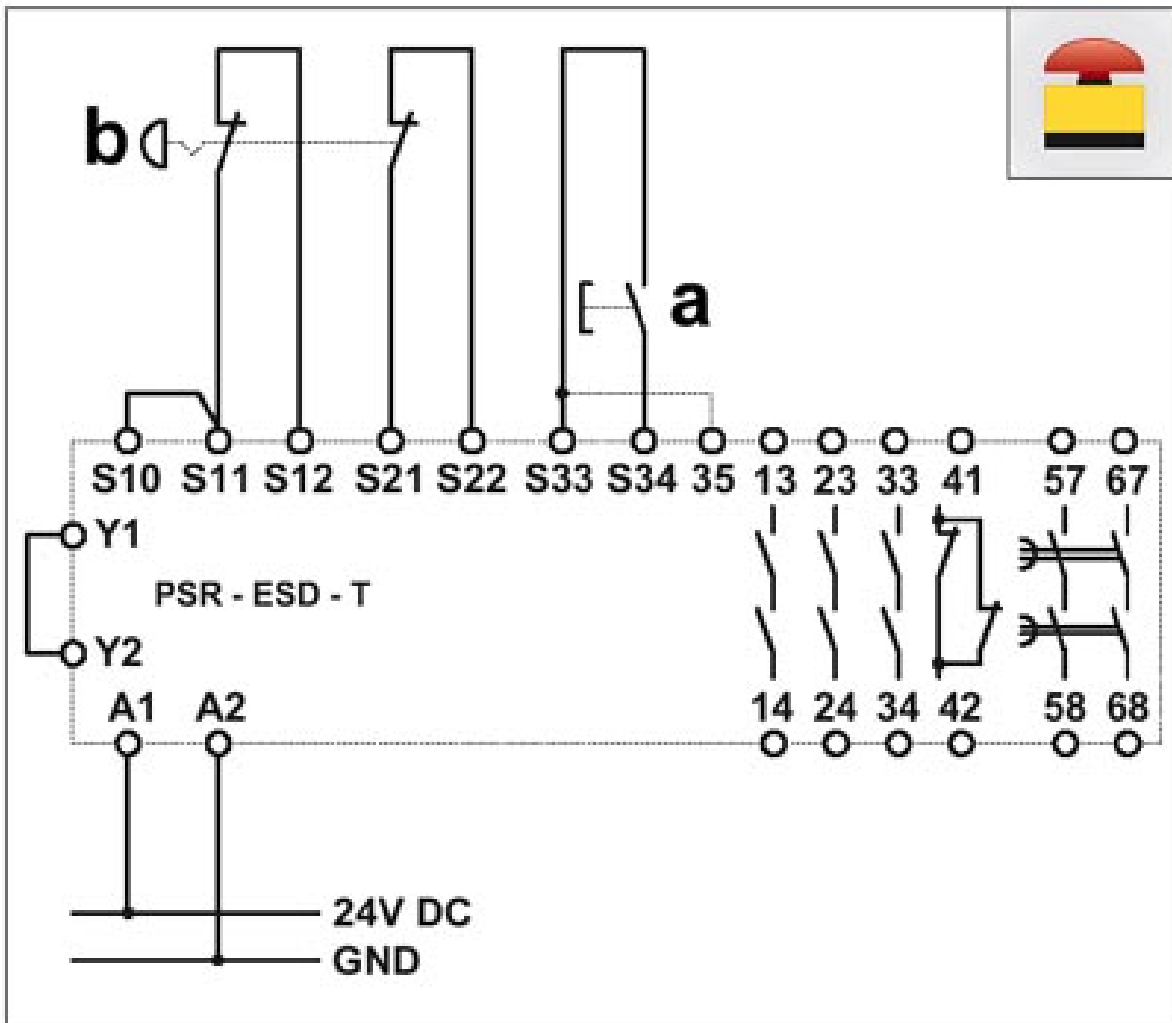
Circuit diagram



1 = logics

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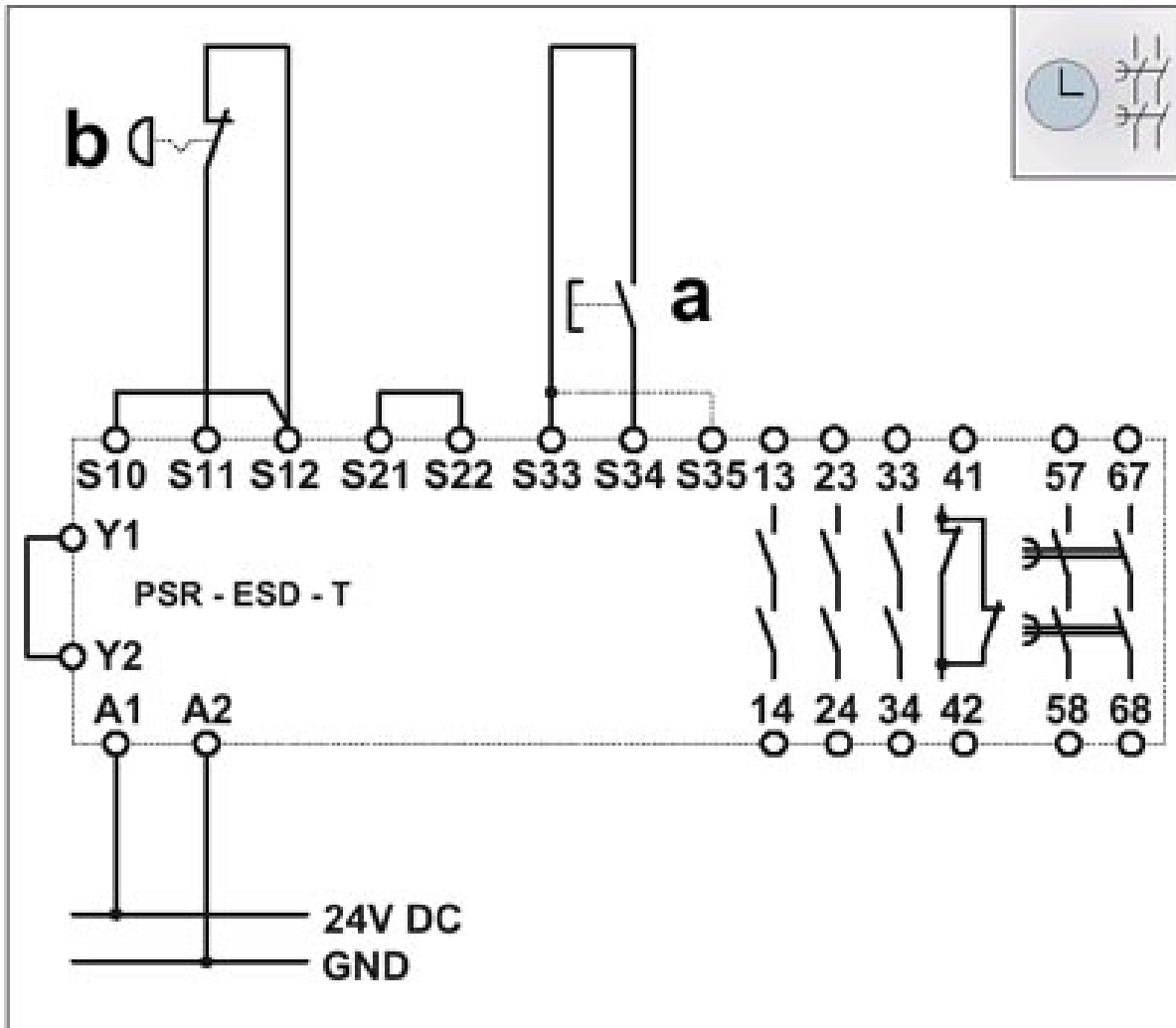
Circuit diagram



a = RESET  
 b = Emergency stop  
 Two-channel emergency stop circuit with cross circuiting detection and monitored reset button (bridge on S33/S35: Automatic activation), suitable up to safety category 4.

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Circuit diagram

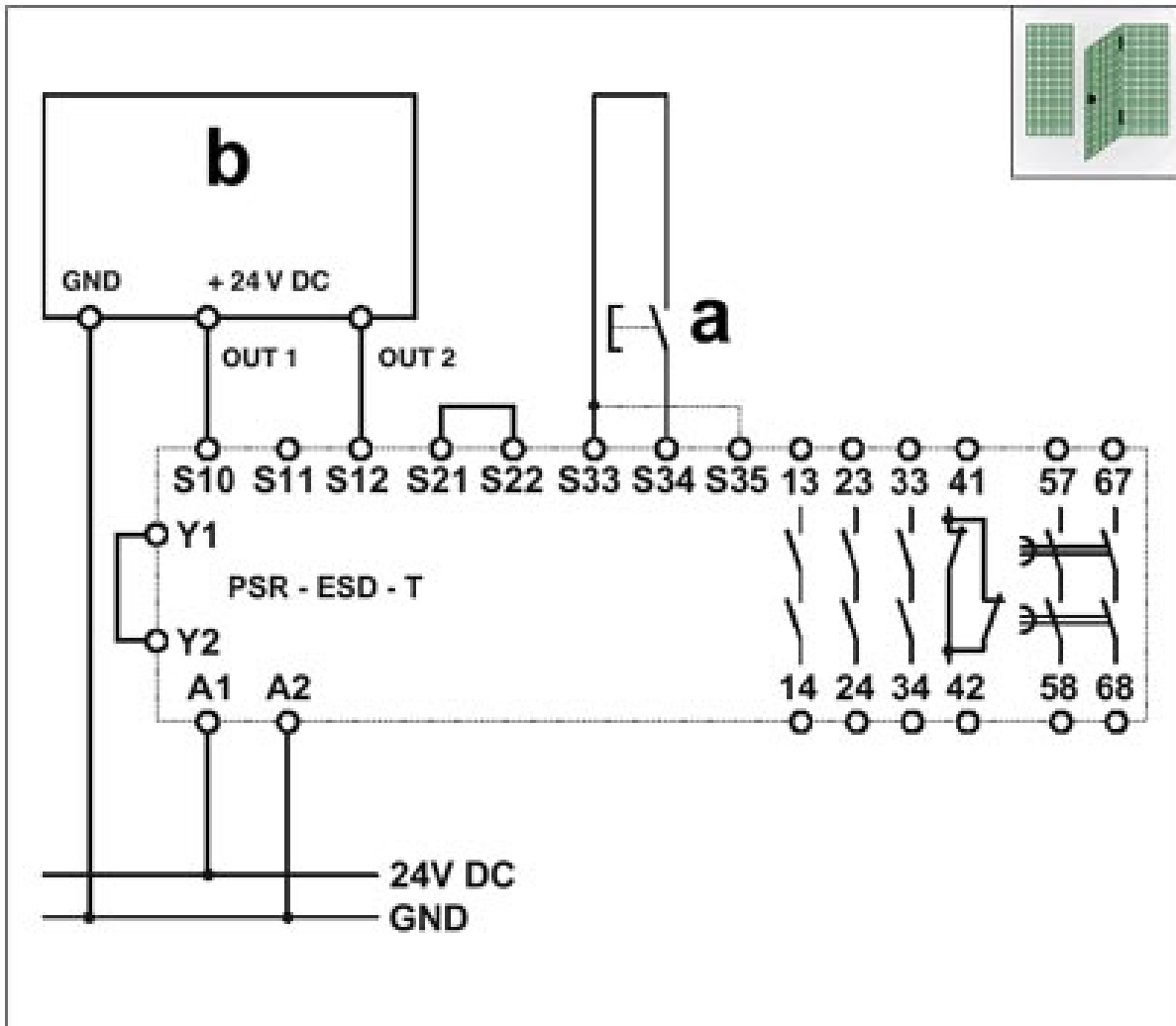


a = RESET  
 b = Emergency stop  
 Single-channel emergency stop circuit with monitored reset button (bridge on S33/S35: Automatic activation), suitable up to safety category 2, safety category 4 only when automatically disconnecting switches are used and cables are installed in separate plastic sheaths.



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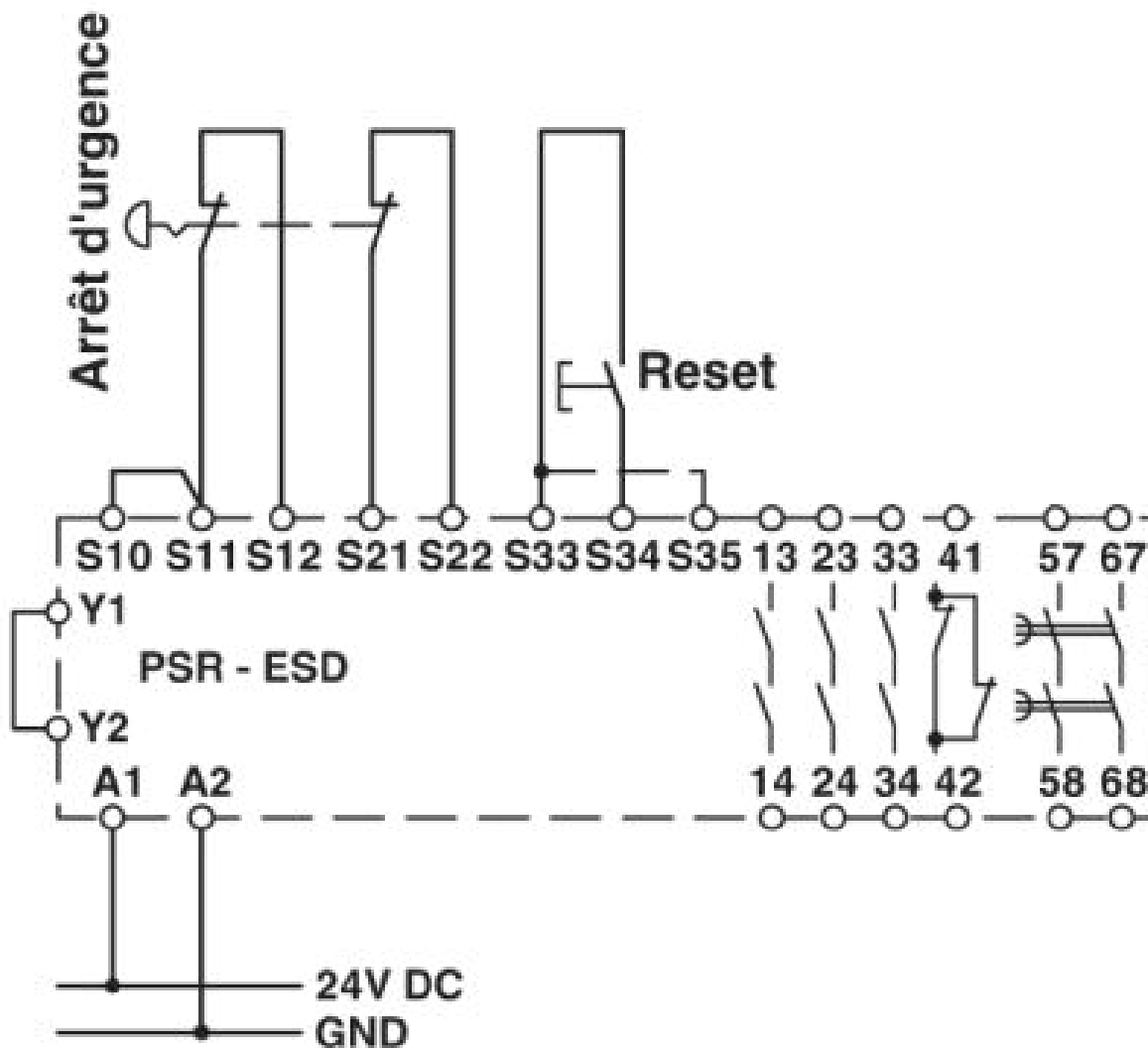
Circuit diagram



a = RESET  
 b = semiconductor output  
 Two-channel limit switch monitoring with semiconductor output and monitored reset button (bridge on S33/S35: Automatic activation), suitable up to safety category 4 depending on the limit switch.

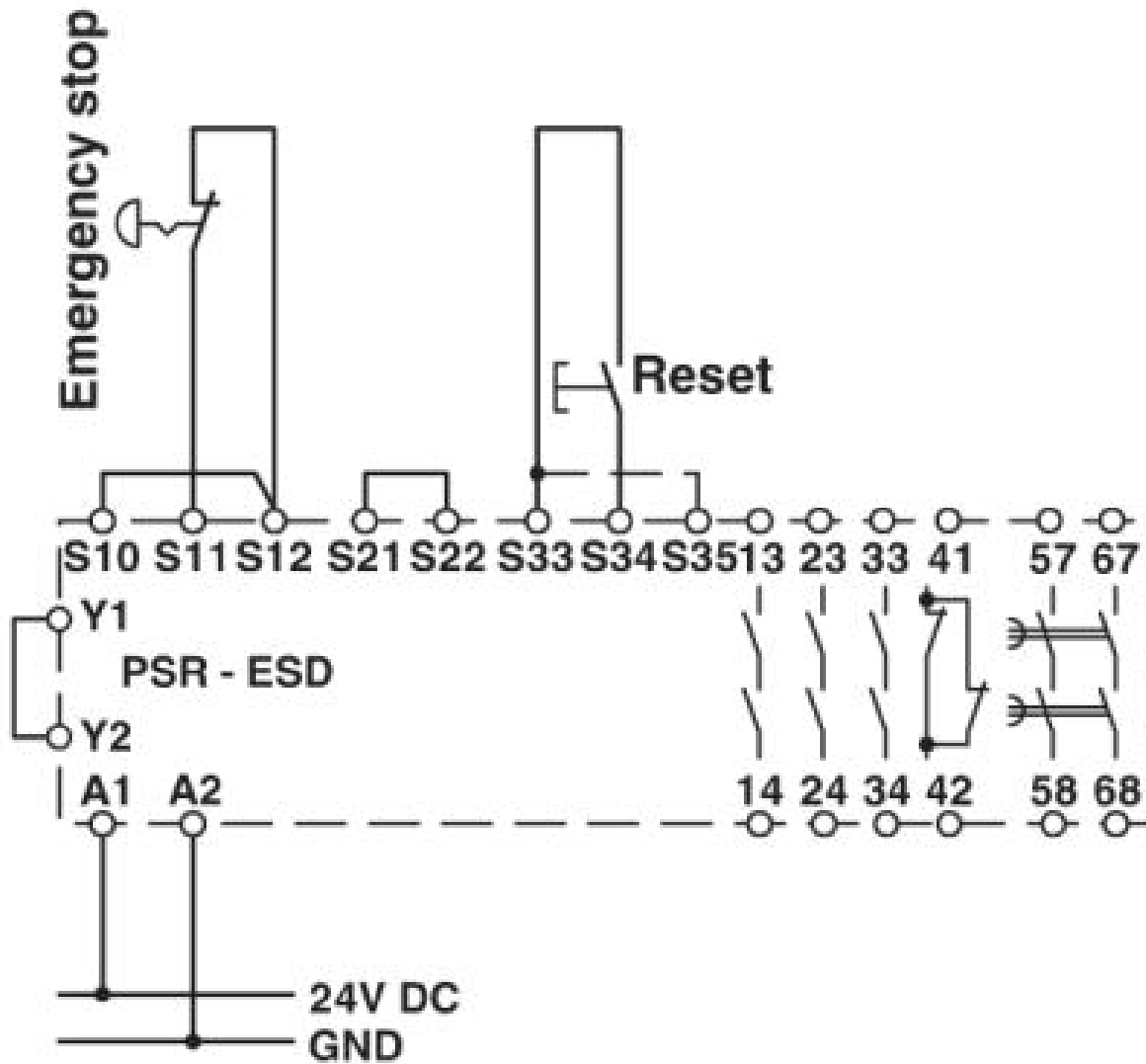
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Circuit diagram



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Circuit diagram



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Circuit diagram

## Semiconductor output

