

PSR-...-24DC/URML4/3X1/1X2/B

Safety relay as contact extension for emergency stop relays, safety door switches, and light grids



Data sheet
105430_en_01

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1 Description

In combination with electrosensitive protective equipment (ESPE) with monitored active switching output (OSSD) according to EN 61496, as well as with safety devices with monitored semiconductor outputs (e.g. TRISAFE), the safety relay can be used as an expansion device.

Depending on the external wiring, up to category 4, PL e according to EN ISO 13849-1 or SILCL 3 according to EN 62061 can be achieved.

The safety relay is equipped with three enabling current paths that drop out without delay corresponding to stop category 0 according to EN 60204-1.

Features

- Contact extension
- Suitable up to category 4, PL e (EN ISO 13849-1), SILCL 3 (EN 62061)
- Single or two channel operation
- 3 undelayed enabling current paths
- 1 undelayed signaling current path
- Option of screw or spring-cage terminal blocks for plug-in



WARNING: Risk of electric shock

Observe the safety instructions in the corresponding section!



Make sure you always use the latest documentation.
It can be downloaded from the product at phoenixcontact.net/products.



This data sheet is valid for all products listed on the following pages.

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3 Ordering data

Description	Type	Order No.	Pcs. / Pkt.
Single or two-channel contact extension for OSSD signals (e.g., light grid), 3 N/O contacts, 1 N/C contact, up to Cat. 4 PL e according to EN ISO 13849, SIL 3 according to EN 62061, plug-in screw terminal blocks, width: 22.5 mm	PSR-SCP-24DC/URML4/3X1/1X2/B	2903583	1
Single or two-channel contact extension for OSSD signals (e.g., light grid), 3 N/O contacts, 1 N/C contact, up to Cat. 4 PL e according to EN ISO 13849, SIL 3 according to EN 62061, plug-in spring-cage terminal blocks, width: 22.5 mm	PSR-SPP-24DC/URML4/3X1/1X2/B	2903584	1
Documentation	Type	Order No.	Pcs. / Pkt.
User manual, English, for applications for PSR safety relay	UM EN SAFETY RELAY APPLICATION	2888712	1

4 Technical data

Input data

Nominal input voltage U_N	24 V DC
Input voltage range (factor)	0.85 ... 1.1
Typical input current	70 mA DC
Voltage at input/start and feedback circuit	24 V DC
Typical response time	25 ms (man. start)
Typical pick-up time	100 ms (automatic start)
Typical release time	10 ms
Recovery time	1 s

Output data

Contact type	3 enabling current paths 1 signaling current path
Contact material	AgSnO ₂
Minimum switching voltage	15 V AC/DC
Maximum switching voltage	250 V AC/DC
Limiting continuous current	6 A (N/C contact / N/O contact)
Maximum inrush current	6 A
Inrush current, minimum	25 mA
Sq. Total current	$72 \text{ A}^2 (I_{TH}^2 = I_1^2 + I_2^2 + I_3^2)$ (see derating curve)
Interrupting rating (ohmic load) max.	144 W (24 V DC, $\tau = 0 \text{ ms}$) 288 W (48 V DC, $\tau = 0 \text{ ms}$) 77 W (110 V DC, $\tau = 0 \text{ ms}$) 88 W (220 V DC, $\tau = 0 \text{ ms}$) 1500 VA (250 V AC, $\tau = 0 \text{ ms}$)
Maximum interrupting rating (inductive load)	48 W (24 V DC, $\tau = 40 \text{ ms}$) 40 W (48 V DC, $\tau = 40 \text{ ms}$) 35 W (110 V DC, $\tau = 40 \text{ ms}$) 33 W (220 V DC, $\tau = 40 \text{ ms}$)
Switching capacity min.	0.4 W
Mechanical service life	Approx. 10^7 cycles
Switching capacity (360/h cycles)	6 A (24 V DC) 5 A (230 V AC)
Switching capacity (3600/h cycles)	3 A (24 V (DC13)) 3 A (230 V (AC 15))
Output fuse	10 A gL/gG NEOZED (N/O contact) 4 A gL/gG NEOZED (Signaling current path)

General data

Relay type	
Nominal operating mode	100% operating factor
Degree of protection	IP20
Min. degree of protection of inst. location	IP54
Mounting position	any
Mounting type	DIN rail mounting
Type of housing	Polyamide PA non-reinforced yellow
Air and creepage distances between the power circuits	DIN EN 50178/VDE 0160
Rated insulation voltage	250 V

General data		
Rated surge voltage/insulation	4 kV / Basic isolation, (safe isolation, reinforced insulation and 6 kV between input circuit and enabling current paths.)	
Pollution degree	2	
Surge voltage category	III	
Dimensions	Screw connection	Spring-cage connection
W x H x D	22.5 x 99 x 114.5 mm	22.5 x 112 x 114.5 mm
Connection data	Screw connection	Spring-cage connection
Conductor cross section, solid	0.2 mm ² ... 2.5 mm ²	0.2 mm ² ... 1.5 mm ²
Conductor cross section, stranded	0.2 mm ² ... 2.5 mm ²	0.2 mm ² ... 1.5 mm ²
Conductor cross section AWG/kcmil	24 ... 12	24 ... 16
Stripping length	7 mm	8 mm
Ambient conditions		
Ambient temperature (operation)	-20 °C ... 55 °C	
Ambient temperature (storage/transport)	-40 °C ... 70 °C	
Certification / Approvals		
Approvals		
Safety data		
Stop category according to IEC 60204	0	
Safety parameters for IEC 61508 - High demand		
SIL	3	
PFH _d	5.56 x 10 ⁻¹⁰	
Demand rate	< 12 Months	
Proof test interval	240 Months	
Duration of use	240 Months	
Data only applies if the safety function is demanded at least once a year and the signal contact is read back.		
The specifications apply assuming the following calculation basis		
B _{10d}	300000 (At 5 A DC 13)	
d _{op}	365.25 Days	
h _{op}	24 h	
t _{cycle}	3600 s	
Safety parameters for IEC 61508 - Low demand		
SIL	3	
MTTF _d	17913.5 Years	
PFD _{avg}	1,50 x 10 ⁻⁴	
Proof test interval	75 Months	
Duration of use	240 Months	
Safety characteristic data according to EN ISO 13849		
Category	4	
Performance level	e	
CCF	Passed	
Duration of use	240 Months	
Data only applies if the safety function is demanded at least once a year and the signal contact is read back.		
The specifications apply assuming the following calculation basis		

Safety characteristic data according to EN ISO 13849

B_{10d}	300000 (At 5 A DC 13)
d_{op}	365.25 Days
h_{op}	24 h
t_{Cycle}	3600 s

5 Basic circuit diagram

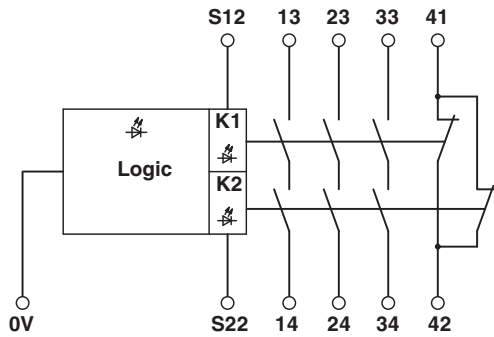


Figure 1 Block diagram

6 Derating

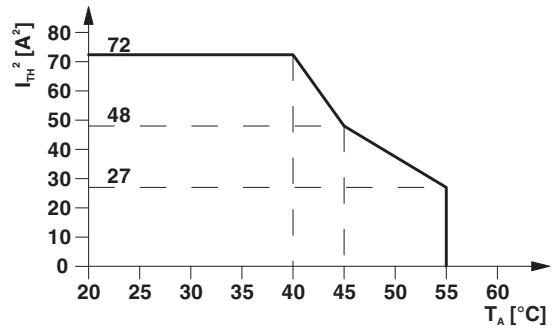


Figure 2 Derating curve

Key:

Designation	Explanation
0 V	Supply voltage
S12/S22	Input circuit
13/14	Enabling current paths
23/24	
33/34	
41/42	Signaling current path

7 Safety notes



WARNING: Risk of electric shock

During operation, parts of electrical switching devices carry hazardous voltages.

Before working on the switching device, disconnect the power.

Please observe the safety regulations of electrical engineering and industrial safety and liability associations!

Disregarding these safety regulations may result in death, serious personal injury or damage to equipment.

Startup, mounting, modifications, and upgrades should only be carried out by a skilled electrical engineer!



WARNING: Risk of automatic machine restart!

For emergency stop applications, the machine must be prevented from restarting automatically by a higher-level control system.

Protective covers must not be removed when operating electrical switching devices.



WARNING: Danger due to faulty devices!

The devices may be damaged following an error and correct operation can no longer be ensured.

In the event of an error, replace the device immediately.

Repairs to the device, especially if the housing must be opened, may only be carried out by the manufacturer or authorized persons. Otherwise the warranty is invalidated.



NOTE: Risk of damage to equipment due to incorrect installation

For reliable operation, the safety relay must be installed in housing protected from dust and humidity (IP54).

Carry out wiring according to the application. Refer to the "Application examples" section for this.



NOTE: Risk of damage to equipment due to noise emissions

When operating relay modules the operator must meet the requirements for noise emission for electrical and electronic equipment (EN 61000-6-4) on the contact side and, if required, take appropriate measures.

8 Operating and indication elements

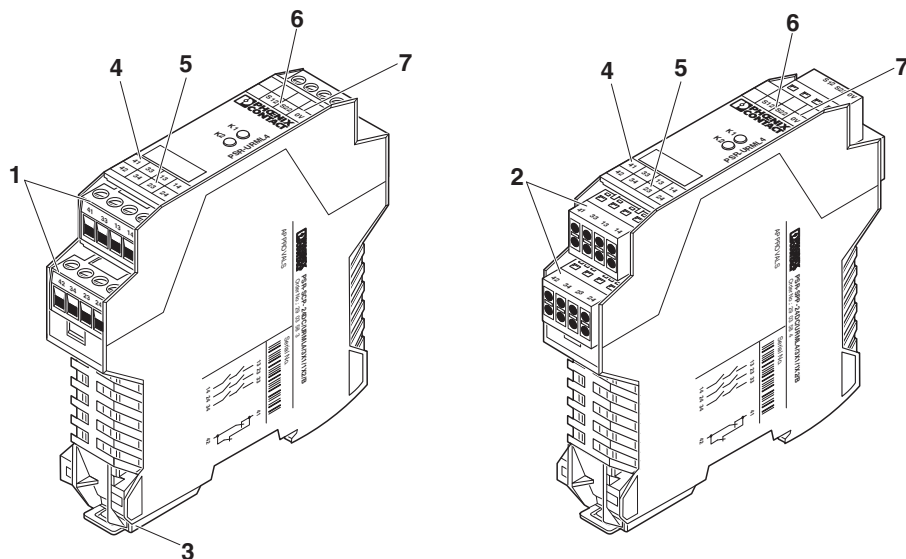


Figure 3 PSR-SCP-24DC/URML4/3X1/1X2 and PSR-SPP-24DC/URML4/3X1/1X2

Key:

Designation	Explanation
1	COMBICON plug-in screw terminal blocks
2	COMBICON plug-in spring-cage terminal blocks
3	Metal lock for mounting on the DIN rail
4	41/42 - signaling current path
5	13/14, 23/24, 33/34 - enabling current paths
6	S12/S22 - input circuit
7	0 V - supply voltage connection

9 Diagnostics

For the diagnostic description, please refer to the application manual for PSR safety relays.

10 Application examples

10.1 Two-channel light grid monitoring

- Cross-circuit detection via light grid
- Feedback of contactor contacts K3 and K4
- Suitable up to category 4, PL e (EN ISO 13849-1), SILCL 3 (EN 62061)

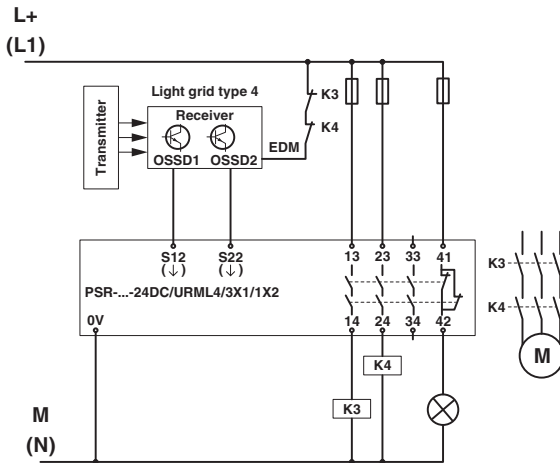


Figure 4 Two-channel light grid monitoring

10.2 Two-channel control via LPSDO module

- Cross-circuit detection by means of LPSDO module
- Feedback of contactor contacts K3 and K4
- Suitable up to category 4, PL e (EN ISO 13849-1), SILCL 3 (EN 62061)

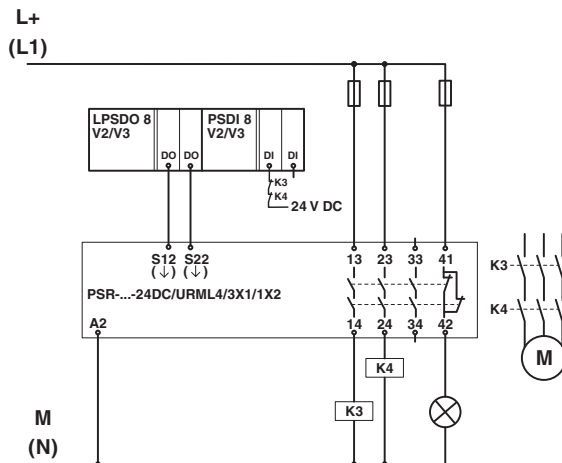


Figure 5 Two-channel control via LPSDO module

10.3 Single-channel control via failsafe controller

- Feedback of contactor contacts K3 and K4
- Suitable up to category 4, PL e (EN ISO 13849-1), SILCL 3 (EN 62061) if the digital output of the safety-related controller meets PL e, SIL 3 and cross-circuits can be ruled out



Cross-circuits in the cable installation can be eliminated if the failsafe PLC and the safety relay are located in the same electrical installation space.

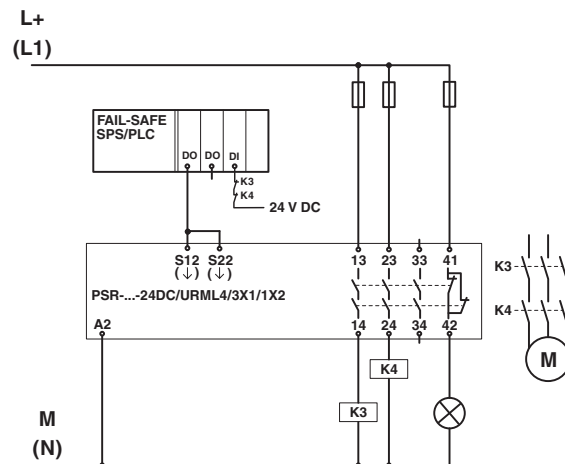


Figure 6 Single-channel control via failsafe PLC