PSR-...-230AC/ESAM2/3X1/1X2/B

Safety relay for emergency stop and safety door monitoring

Data sheet
105817_en_00

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1 Description

The safety relay can be used in safety circuits according to EN 60240-1 and IEC 61508.

With this switching device, circuits are interrupted in a safety-oriented manner.

Control is via a single channel, either with automatic or manual start circuit.

A connected reset button is not monitored.

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 and one signaling current path that drop out without delay according to stop category 0.

Features

- Emergency stop and safety door monitoring
- Suitable up to category 1, PL c (EN ISO 13849-1), SILCL 1 (EN 62061)
- Depending on the application, suitable up to category 4, PL e (EN ISO 13849-1), SIL CL 3 (EN 62061)
- Optional plug-in screw or spring-cage terminal blocks
- Single-channel wiring
- Safe isolation
- Housing width of 22.5 mm
- 3 undelayed enabling current paths
- 1 undelayed signaling current path

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.

2 Table of contents

3 Ordering data

Description	Type	Order No.	Pcs. / Pkt.
Safety relay for emergency stop and safety door up to SIL 1, SIL CL 1, Cat. 1, PL c, depending on the application up to SIL 3, SIL CL 3, Cat. 4, PL e, single-channel operation, 3 enabling current paths, nominal input voltage of 230 V AC/DC, plug-in screw terminal blocks	PSR-SCP-230AC/ESAM2/3X1/1X2/B	2901430	1
Safety relay for emergency stop and safety door up to SIL 1, SIL CL 1, Cat. 1, PL c, depending on the application up to SIL 3, SIL CL 3, Cat. 4, PL e, single-channel operation, 3 enabling current paths, nominal input voltage of 230 V AC/DC, plug-in spring-cage terminal blocks	PSR-SPP-230AC/ESAM2/3X1/1X2/B	2901431	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	230 V AC
Input voltage range (factor)	0.85 ... 1.1
Typical input current	22 mA
Voltage at input/start and feedback circuit	~ 24 V DC
Max. permissible overall conductor resistance (Input and reset circuit at U_N)	50 Ω
Typical response time	50 ms (manual start) 300 ms (automatic start)
Typical release time	20 ms (when controlled via S11/S12)
Recovery time	1 s
Operating voltage display	Green LED
Status display	2 x green LEDs
Protective circuit	Surge protection Suppressor diode

Output data	
Contact type	3 enabling current paths 1 signaling current path
Contact material	$AgSnO_2$, gold-flashed
Minimum switching voltage	10 V AC/DC
Maximum switching voltage	250 V AC/DC
Limiting continuous current	6 A (N/O contact)
Maximum inrush current	6 A
Inrush current, minimum	10 mA
Interrupting rating (ohmic load) max.	144 W (at 24 V DC) 230 W (at 48 V DC) 68 W (at 110 V DC) 88 W (at 220 V DC) 2000 VA (for 250 V AC)
Maximum interrupting rating (inductive load)	48 W (at 24 V DC) 40 W (at 48 V DC) 35 W (at 110 V DC) 33 W (at 220 V DC)
Switching capacity min.	100 mW
Mechanical service life	Approx. 10^7 cycles

Output data	
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 (enabling current paths) 6 A gL/gG NEOZED (signaling current paths)

General data	
Relay type	Electromechanically forcibly guided, dust-proof relay.
Nominal operating mode	100% operating factor
Degree of protection	IP20
Min. degree of protection of inst. location	IP54
Mounting position	any
Air and creepage distances between the power circuits	DIN EN 50178/VDE 0160
Rated surge voltage / insulation	4 kV / basic insulation (safe isolation, reinforced insulation, and 6 kV between A1-A2/logic/enabling and signaling current paths)

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 mm² ... 2.5 mm²	0.2 mm² ... 1.5 mm²
Conductor cross section, stranded	0.2 mm² ... 2.5 mm²	0.2 mm² ... 1.5 mm²
Conductor cross section AWG/kcmil	24 ... 12	24 ... 16
Stripping length	7 mm	8 mm

Ambient conditions	
Ambient temperature (operation)	-25 °C ... 55 °C
Ambient temperature (storage/transport)	-40 °C ... 85 °C

Certification / Approvals	
Approvals	?

Safety data	
Stop category according to IEC 60204	0

Safety parameters for IEC 61508 - High demand	
SIL	1 (up to SIL 3 depending on the application)

Safety parameters for IEC 61508 - Low demand	
SIL	1 (up to SIL 3 depending on the application)

Safety characteristic data according to EN ISO 13849	
Category	1 (up to Cat. 4 depending on the application)
Performance level	c (up to PL e depending on the application)

5 Basic circuit diagram

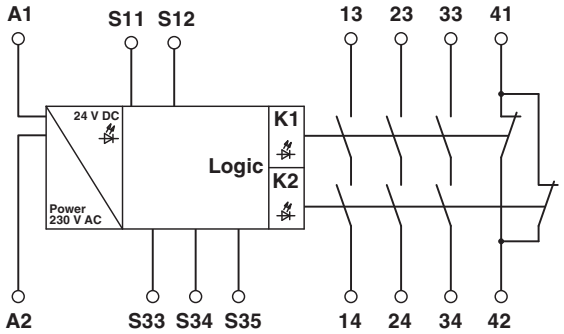

Figure 1 Block diagram

6 Derating

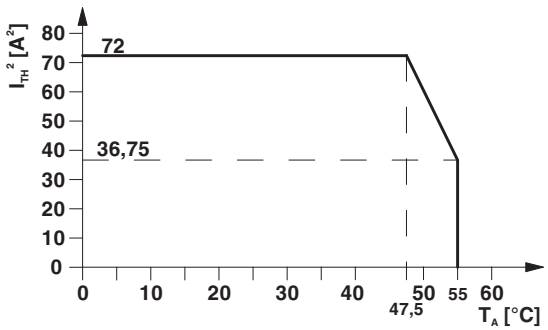

Figure 2 Derating curve

Key:

Designation	Explanation
A1, A2	Safety relay input voltage
S11, S12	Input circuit
S33, S34, S35	Start 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

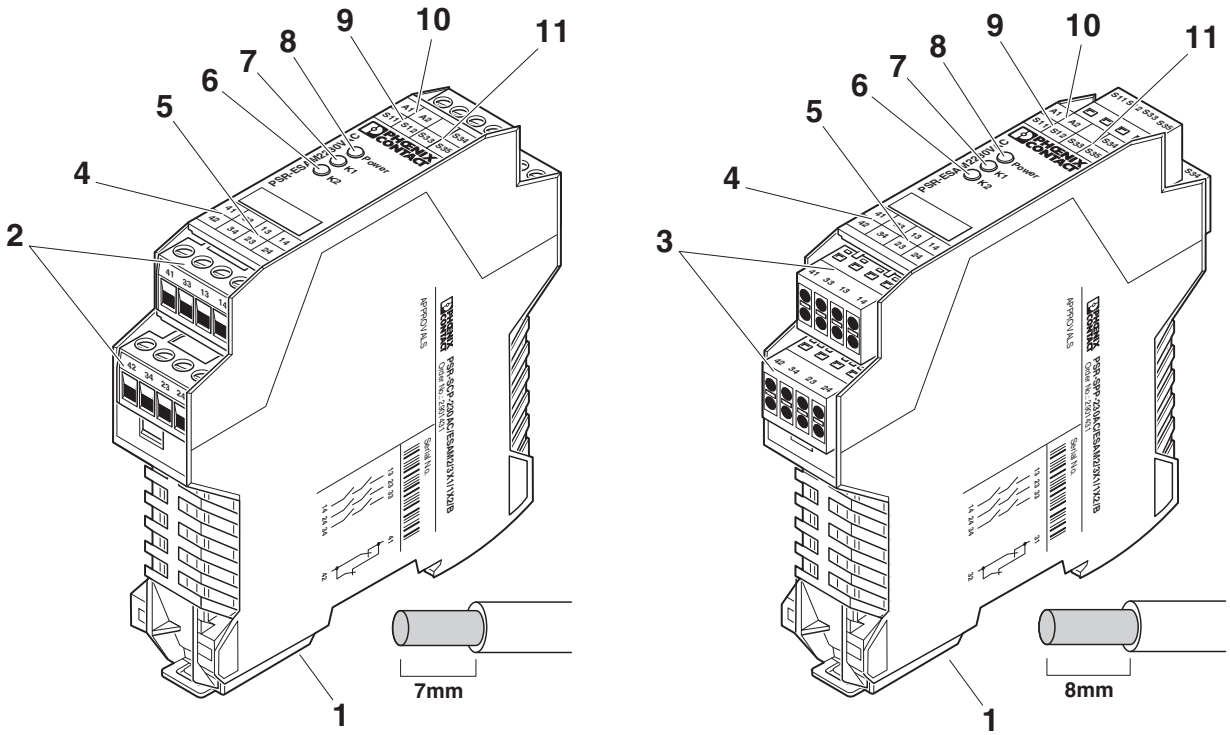

Figure 3 PSR-SCP-230AC/ESAM2/3X1/1X2/B and PSR-SPP-230AC/ESAM2/3X1/1X2/B

Key:

Designation	Explanation
1	Metal lock for mounting on the DIN rail
2	COMBICON plug-in screw terminal blocks
3	COMBICON plug-in spring-cage terminal blocks
4	41/42 - Signaling current path
5	13/14, 23/24, 33/34 - enabling current paths
6	LED status indicator, green - K2
7	LED status indicator, green - K1
8	LED status indicator, green - Power
9	S11/S12 - input circuit
10	A1/A2 - supply voltage connection
11	S33, S34, S35 - start circuit (activating circuit)

9 Diagnostics

The diagnostic descriptions can be found in Section 7 of the application manual for PSR safety relays.

10 Application examples

10.1 Single-channel emergency stop circuit with manual activation

– Manual activation
– Suitable up to category 1, PL c (EN ISO 13849-1), SIL-CL 1 (EN 62061)

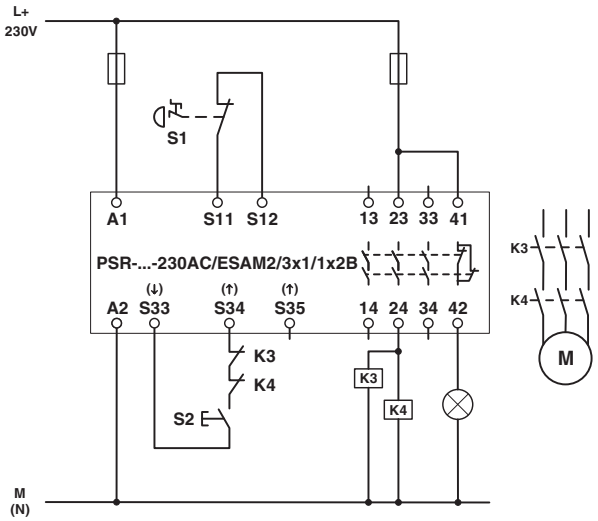

Figure 4 Single-channel emergency stop circuit

10.2 Single-channel safety door monitoring with automatic activation

– Automatic activation
– Suitable up to category 1, PL c (EN ISO 13849-1), SIL-CL 1 (EN 62061)

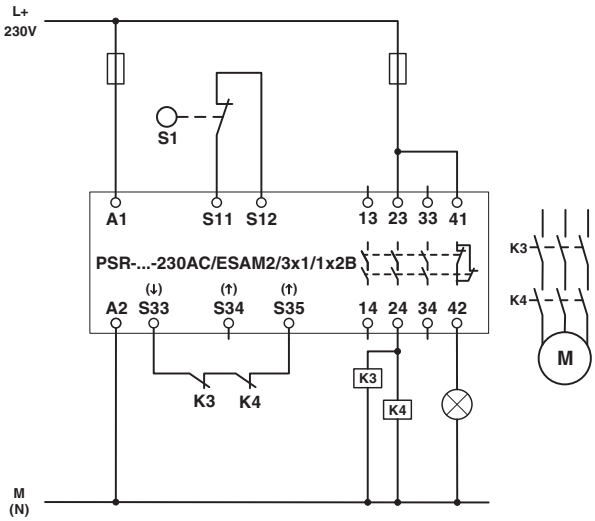

Figure 5 Single-channel safety door monitoring