

PSR-SCP- 24-230UC/ESAM4/3X1/1X2

PSR-SPP- 24-230UC/ESAM4/3X1/1X2

Safety Relay for Monitoring EMERGENCY STOP and Safety Door Circuits, With or Without Start Button Monitoring



INTERFACE

Data Sheet

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Description

The **PSR-...- 24-230UC/ESAM4/3X1/1X2** safety relay can be used in safety circuits according to DIN EN 60204-1/VDE 0113-1 and IEC 61508.

Depending on the external circuit, up to Safety Category 4 according to EN 954-1 and SIL 3 according to IEC 61508 can be achieved. SIL 3 is achieved once the safety equipment has been in use for 34 months or a function test is carried out (experiment test).

Control is implemented via an EMERGENCY STOP button or a safety door switch (mechanical or electronic) via one or two channels with manual or automatic activation. The connected start button is monitored.

The relay has three enable current paths and a signaling current path with Stop Category 0 according to DIN EN 60204-1/VDE 0113-1. The current paths have safe isolation. Values between 24 V and 230 V AC or DC are possible for the supply voltage. The maximum limiting continuous current is 6 A.



Observe the safety notes on page 3!



Make sure you always use the latest documentation.
It can be downloaded at www.download.phoenixcontact.com.

A conversion table is available on the Internet at
www.download.phoenixcontact.com/general/7000_en_00.pdf



This data sheet is valid for all products listed on the following page:

Ordering Data

Safety Relays

Description	Type	Order No.	Pcs./Pkt.
Safety relay for monitoring EMERGENCY STOP and safety door circuits, with or without start button monitoring, with screw terminal block	PSR-SCP- 24-230UC/ESAM4/3X1/1X2	2981114	1
Safety relay for monitoring EMERGENCY STOP and safety door circuits, with or without start button monitoring, with spring-cage terminal block	PSR-SPP- 24-230UC/ESAM4/3X1/1X2	2981127	1

Documentation

Description	Type	Order No.	Pcs./Pkt.
Application manual for PSR safety relays	UM EN SAFETY RELAY APPLICATION	2888712	1

Technical Data

Input Data

Nominal input voltage U_N	24 V AC/DC ... 230 V AC/DC
Permissible range	0.85 - 1.1 x U_N
Typical current consumption at U_N	
24 V DC	120 mA
230 V AC	25 mA
Voltage at input, start, and feedback circuit	24 V DC, approximately
Maximum voltage drop ($T_{amb} = 25^\circ\text{C}$) for S11-S12 and S21-S22 (e.g., two N/C contacts of an EMERGENCY STOP button)	2 V DC, approximately (corresponds to 11 Ω)
Typical response time	
Monitored/manual start	60 ms
Automatic start	250 ms
Typical release time (K1, K2)	20 ms
Recovery time	1 s, approximately

Output Data

Contact type	3 enable current paths, 1 signaling current path		
Contact material	Silver tin oxide, gold-flashed (AgSnO ₂ 0..2 $\mu\text{m Au}$)		
Max. switching voltage	250 V AC/DC		
Min. switching voltage	15 V AC/DC		
Limiting continuous current	6 A (N/O contact/N/C contact)		
$I_{TH}^2 = I_1^2 + I_2^2 + I_3^2$	50 A ²		
Max. inrush current	6 A		
Min. inrush current	25 mA		
Max. power rating	ohmic load $\tau = 0 \text{ ms}$	inductive load $\tau = 40 \text{ ms}$	
	24 V DC	144 W	42 W
	48 V DC	288 W	42 W
	110 V DC	77 W	42 W
	220 V DC	88 W	42 W
	250 V AC	1500 VA	
Min. switching capacity	0.4 W		
Mechanical service life	10 ⁷ cycles, approximately		
Switching capacity in accordance with DIN EN 60947-5-1/VDE 0660-200	Cycles	DC13	AC15
	360/h:	24 V:	4 A
		230 V:	—
			4 A
	3600/h:	24 V:	2.5 A
		230 V:	—
			3 A
Short circuit protection of output circuits, external	6 A fast-blow, 4 A slow-blow		

General Data

Permissible ambient temperature	-20°C ... +55°C
Rated operating mode	100% ED
Degree of protection in accordance with VDE 0470-1	
Housing	IP40
Connection terminal blocks	IP20
Point of installation	IP54, minimum
Mounting position	Any
Air and creepage distances between the power circuits	In acc. with DIN EN 50178:1998-04 ¹
Rated surge voltage	4 kV
Contamination class	2
Surge voltage category	III
Dimensions (W x H x D):	
PSR-SCP- 24-230UC/ESAM4/3X1/1X2	45 mm x 99 mm x 114.5 mm
PSR-SPP- 24-230UC/ESAM4/3X1/1X2	45 mm x 112 mm x 114.5 mm
Conductor cross section	0.2 mm ² ... 2.5 mm ²
Housing material	Polyamide PA, not reinforced

¹ Safe isolation, reinforced insulation, and 6 kV between the input circuit and the output contact paths (13-14, 23-24, and 33-34), and between the output contact paths themselves (13-14, 23-24, and 33-34).

Tests/Approvals

TÜV



UL

applied for

Safety Notes

- During operation, parts of the electric switchgear carry high voltages!
- Before starting work, disconnect the device from the power supply!
- Observe the electrotechnical safety regulations and those of the trade association! Ignoring the safety regulations can lead to death, serious injury or cause considerable damage!
- The device may only be started up, assembled, modified or retrofitted by an authorized electrician.



- In EMERGENCY STOP applications, a higher level control unit must ensure that the machine cannot start up again automatically!
- During operation, the protective covers must not be removed from the electric switchgear!



- The device must always be replaced after the first malfunction!
- Repairs to the device, especially those involving opening the housing, may only be carried out by the manufacturer or by a person authorized by the manufacturer. Otherwise the manufacturer's guarantee automatically expires!

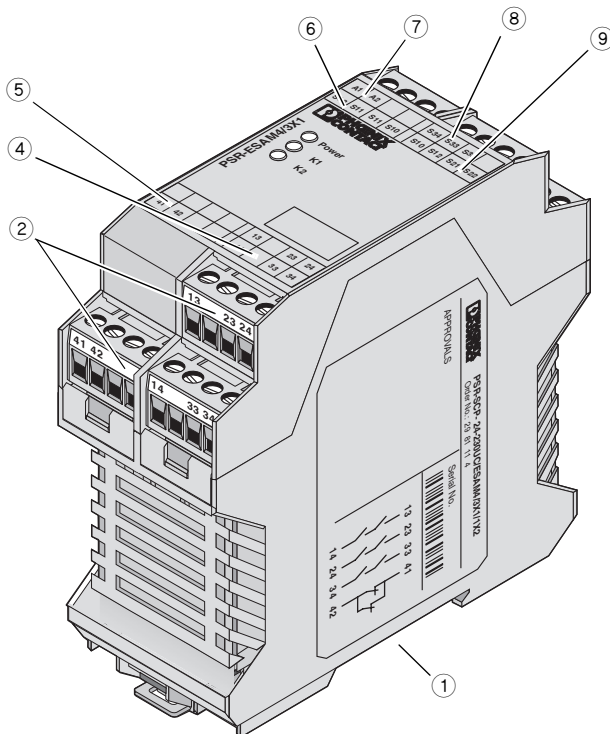


Operation in a closed control cabinet (according to EN 61508-6:2001, Table D1).

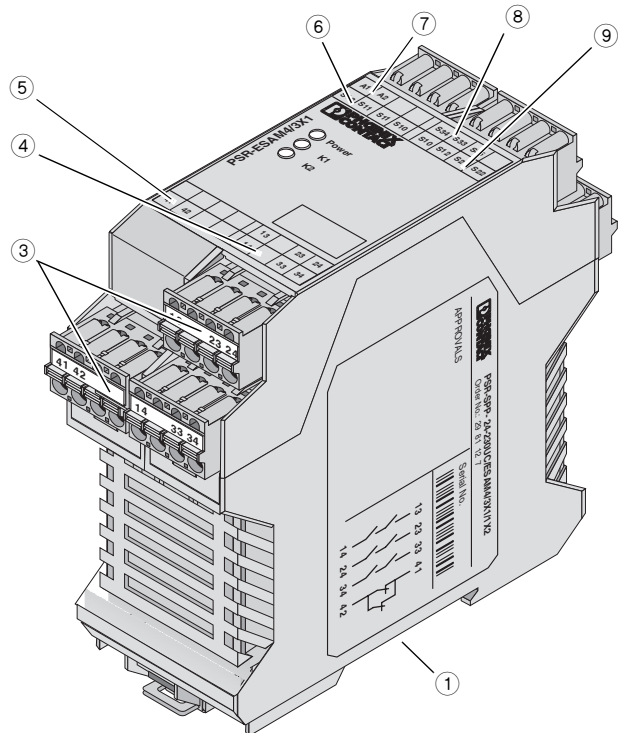


When operating relay assemblies, the operator must see that the requirements pertaining to emitted interference for electrical and electronic operating equipment (EN 61000-6-4) are observed on the contact side, and perform any necessary measures.

Structure



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Figure 1 Structure

- 1 Metal latch for fixing to the DIN rail
- 2 Pluggable screw terminal blocks COMBICON
- 3 Pluggable spring-cage terminal blocks COMBICON
- 4 13-14, 23-24, 33-34: Safety current paths
- 5 41-42: N/C contact
- 6 S10, S11, S12: Input circuits
- 7 A1, A2: Connection, supply voltage
- 8 S33, S34, S35: Start circuit
- 9 S21, S22: Input circuit

Block Diagram

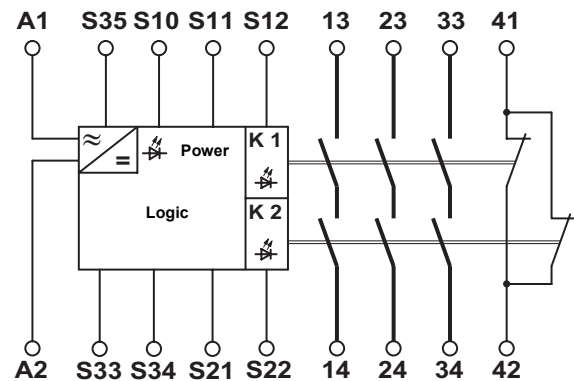


Figure 2 Block diagram

Assembly and Startup



Before starting work, disconnect the device from the power supply!

Observe the electrotechnical safety regulations and those of the trade association!

Ignoring the safety regulations can lead to death, serious injury or cause considerable damage!

The device may only be started up, assembled, modified or retrofitted by an authorized electrician.

In order to comply with UL, use copper cables that are designed for operating temperatures of $> 75^{\circ}\text{C}$.

Cabling must be protected against external short circuits and damage. Automatic disconnecting switches must be used.

For reliable and shock-proof contacts, strip the connection ends as follows:

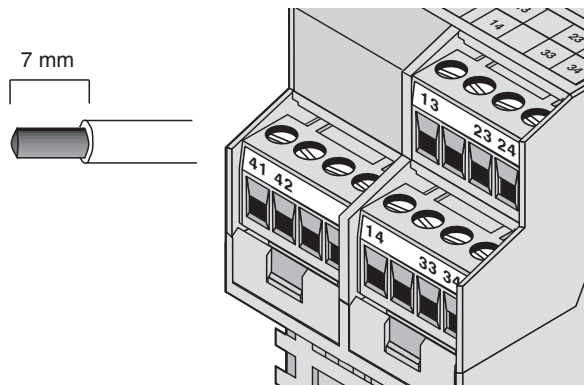


Figure 3 PSR-SCP- 24-230UC/ESAM4/3X1/1X2

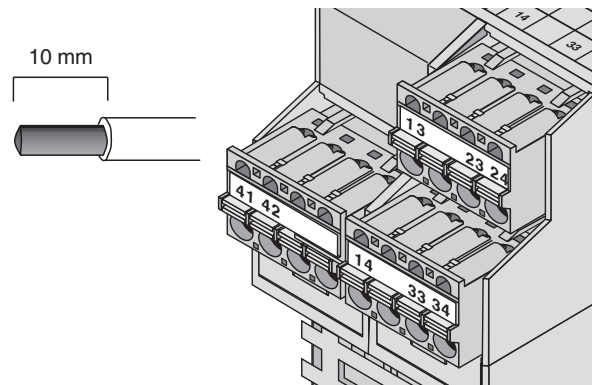


Figure 4 PSR-SPP- 24-230UC/ESAM4/3X1/1X2



For reliable operation, the EMERGENCY STOP safety relay must be installed in housing protected against dust and humidity with IP54 protection.

Ensure the wiring is appropriate to the field of application. Follow the application examples (see page 7).

In general, the safety relay is wired according to the following specifications:

Closing the Activation Circuit and Feedback Circuit

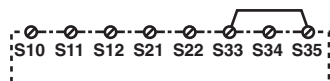


Figure 5 **Automatic activation:** Connect a jumper between S33 and S35.

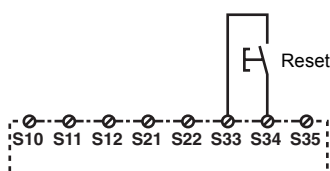


Figure 6 **Monitored reset:** Connect the reset between terminal blocks S33 and S34.

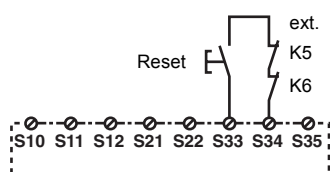


Figure 7 **Monitored reset with monitored contact expansion:** Connect the reset button and the N/C contacts of the expansion contactors in series to terminal blocks S33 and S34.

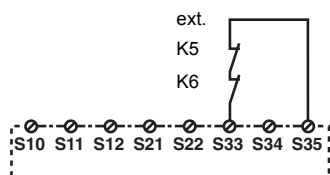


Figure 8 **Automatic activation with monitored contact expansion:** Connect the N/C contacts of the expansion contactors to terminal blocks S33 and S35.

Closing the Input Circuit (Emergency Shutdown)

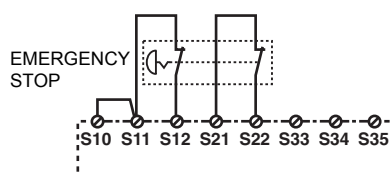


Figure 9 **Two-channel with cross-circuit protection:** Connect the N/C contacts of the tripping device to S11-S12 and S21-S22 and jumper S10-S11.

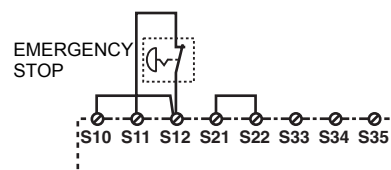


Figure 10 **One-channel:** Connect the N/C contact of the tripping device to S11-S12. Jumper S21-S22 and S10-S12*.

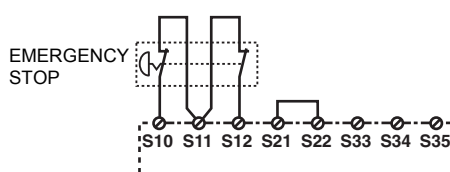


Figure 11 **Two-channel without cross-circuit protection:** Connect the N/C contact of the tripping device to S10-S11 and S11-S12 and jumper S21-S22.

* Safety Category 4 can only be achieved if automatic disconnecting switches are used and the cables are installed in separate cables

Connection Examples

Two-Channel EMERGENCY STOP Circuit With Cross-Circuit Detection and Monitored Reset Button

- Jumper S33-S35: Automatic Activation
- Suitable for up to Safety Category 4

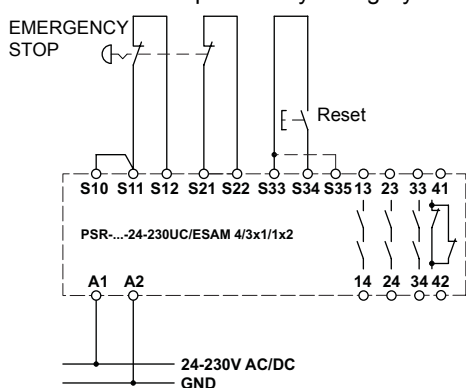


Figure 12 Two-channel EMERGENCY STOP circuit with cross-circuit detection and monitored reset button

Two-Channel Safety Door Circuit With Cross-Circuit Detection and Monitored Reset Button

- Jumper S33-S35: Automatic Activation
- Suitable for up to Safety Category 4

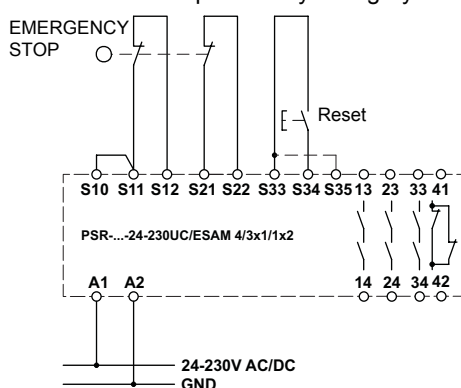


Figure 14 Two-channel safety door circuit with cross-circuit detection and monitored reset button

One-Channel EMERGENCY STOP Circuit With Monitored Reset Button

- Jumper S33-S35: Automatic Activation
- Suitable for up to Safety Category 4*

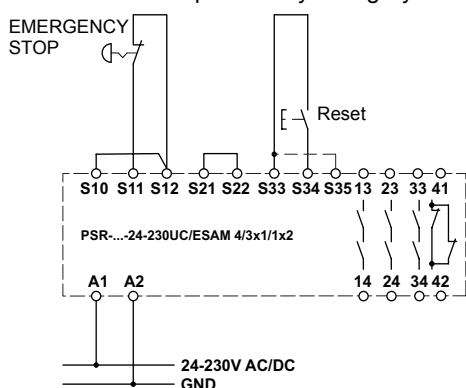


Figure 13 One-channel EMERGENCY STOP circuit with monitored reset button

One-Channel Safety Door Circuit With Monitored Reset Button

- Jumper S33-S35: Automatic Activation
- Suitable for up to Safety Category 4*

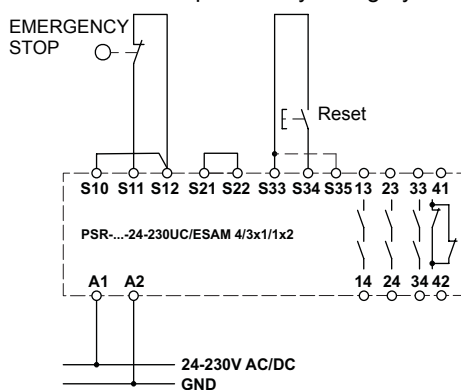


Figure 15 One-channel safety door circuit with monitored reset button

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* Safety Category 4 can only be achieved if automatic disconnecting switches are used and the cables are installed in separate cables