



Chipsmall Limited consists of a professional team with an average of over 10 year of expertise in the distribution of electronic components. Based in Hongkong, we have already established firm and mutual-benefit business relationships with customers from,Europe,America and south Asia,supplying obsolete and hard-to-find components to meet their specific needs.

With the principle of "Quality Parts,Customers Priority,Honest Operation,and Considerate Service",our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

We are looking forward to setting up business relationship with you and hope to provide you with the best service and solution. Let us make a better world for our industry!



## Contact us

Tel: +86-755-8981 8866 Fax: +86-755-8427 6832

Email & Skype: info@chipsmall.com Web: www.chipsmall.com

Address: A1208, Overseas Decoration Building, #122 Zhenhua RD., Futian, Shenzhen, China



# PSR-...-24UC/URM4/5X1/2X2

PL  
EN ISO 13849

SILCL  
IEC 62061



## Safety relay for contact extension

Data sheet  
100011\_en\_05

© PHOENIX CONTACT 2015-07-14

### 1 Description

The safety relay can be used as a contact extension for emergency stop relays and two-hand control devices.

The extension module is used in safety circuits according to EN 60204-1.

The safety relay is equipped with five enabling current paths, one signaling current path, and one confirmation current path that drop out without delay according to stop category 0.

Depending on the basic device, up to category 4, PL e according to EN ISO 13849-1 or SILCL 3 according to EN 62061 can be achieved once confirmation current path 11/12 has been wired externally and correctly connected.

### Features

- Contact extension for emergency stop relays and two-hand control devices
- Suitable up to category 4, PL e (EN ISO 13849-1), SILCL 3 (EN 62061) in conjunction with an appropriate evaluation device
- Single-channel or two-channel wiring
- Reinforced insulation
- Stop category 0
- 5 enabling current paths
- 1 signaling current path
- 1 Check-back 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](http://phoenixcontact.net/products).



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

---

<b>2</b>	<b>Table of contents</b>	
1	Description .....	1
2	Table of contents .....	2
3	Ordering data .....	3
4	Technical data .....	3
5	Basic circuit diagram .....	6
6	Derating .....	6
7	Safety notes .....	7
8	Operating and indication elements .....	8
9	Diagnostics .....	8
10	Application examples .....	9
10.1	Single-channel connection with integration of the confirmation current path and externally monitored contacts .....	9
10.2	Two-channel connection with integration of the confirmation current path and externally monitored contacts .....	10

### 3 Ordering data

Description	Type	Order No.	Pcs./Pkt.
Single-channel or two-channel contact extension, 5 N/O contacts, 1 N/C contact, 1 confirmation current path, together with basic unit up to Cat. 4 PL e according to EN ISO 13849 safe isolation, plug-in terminal blocks, width: 35 mm	PSR-SCP- 24UC/URM4/5X1/2X2	2963734	1
Single-channel or two-channel contact extension, 5 N/O contacts, 1 N/C contact, 1 confirmation current path, together with basic unit up to Cat. 4 PL e according to EN ISO 13849 safe isolation, plug-in terminal blocks, width: 35 mm	PSR-SPP- 24UC/URM4/5X1/2X2	2964005	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 AC/DC
Input voltage range (factor)	0.8 ... 1.1
Typical input current	47 mA (per channel)
Typical response time	20 ms
Typical release time	20 ms
Status display	Green LED
Protective circuit	Surge protection Suppressor diode
Output data	
Contact type	5 enabling current paths 1 signaling current path 1 confirmation current path
Contact material	AgSnO <sub>2</sub> , + 0.2 μm Au
Minimum switching voltage	15 V AC/DC
Maximum switching voltage	250 V AC/DC
Limiting continuous current	6 A (N/O contact) 3 A (N/C contact 11/12)
Maximum inrush current	6 A
Inrush current, minimum	25 mA
Sq. Total current	$72 \text{ A}^2$ ( $I_{TH}^2 = I_1^2 + I_2^2 + \dots + I_5^2$ ) (see derating curve)
Interrupting rating (ohmic load) max.	144 W (24 V DC, $\tau = 0$ ms, N/C contact 11/12: 72 W) 288 W (48 V DC, $\tau = 0$ ms, N/C contact 11/12: 144 W) 110 W (110 V DC, $\tau = 0$ ms) 88 W (220 V DC, $\tau = 0$ ms) 1500 VA (250 V AC, $\tau = 0$ ms, N/C contact 11/12: 750 VA)
Maximum interrupting rating (inductive load)	42 W (24 V DC, $\tau = 40$ ms) 42 W (48 V DC, $\tau = 40$ ms) 42 W (110 V DC, $\tau = 40$ ms) 42 W (220 V DC, $\tau = 40$ ms)
Switching capacity min.	0.4 W
Mechanical service life	Approx. $10^7$ cycles

**Output data**

Switching capacity (360/h cycles)	4 A (24 V DC) 4 A (230 V AC)
Switching capacity (3600/h cycles)	2.5 A (24 V (DC13)) 3 A (230 V (AC 15))
Output fuse	6 A fast blow C6 (24 V AC/DC) automatic device

**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
Mounting type	DIN rail mounting
Air clearances and creepage distances between the power circuits	DIN EN 50178/VDE 0160
Rated insulation voltage	250 V
Rated surge voltage/insulation	4 kV / Basic isolation, (safe isolation, reinforced insulation and 6 kV between input circuit and enabling current paths(43/44, 53/54, 63/64, 71/72) and between 43/44, 53/54, 63/64, 71/72 themselves.)
Pollution degree	2
Surge voltage category	III

**Dimensions**

	<b>Screw connection</b>	<b>Spring-cage connection</b>
W x H x D	35 x 99 x 114.5 mm	35 x 112 x 114.5 mm

**Connection data**

	<b>Screw connection</b>	<b>Spring-cage connection</b>
Conductor cross section, solid	0.2 mm <sup>2</sup> ... 2.5 mm <sup>2</sup>	0.2 mm <sup>2</sup> ... 1.5 mm <sup>2</sup>
Conductor cross section, flexible	0.2 mm <sup>2</sup> ... 2.5 mm <sup>2</sup>	0.2 mm <sup>2</sup> ... 1.5 mm <sup>2</sup>
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
Max. permissible relative humidity (operation)	75 % (on average, 85% infrequently, non-condensing)
Max. permissible humidity (storage/transport)	75 % (on average, 85% infrequently, non-condensing)
Maximum altitude	≤ 2000 m (Above sea level)

**Conformance / approvals**

Approvals	
-----------	---

**Safety data**

Stop category according to IEC 60204	0
--------------------------------------	---

**Safety parameters for IEC 61508 - High demand**

SIL	3 (In conjunction with suitable evaluating device)
PFH <sub>d</sub>	9.04 x 10 <sup>-11</sup> (In conjunction with suitable evaluating device)
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

**Safety parameters for IEC 61508 - High demand**

B <sub>10d</sub>	230000 (At 5 A DC 13)
d <sub>op</sub>	365.25 Days
h <sub>op</sub>	24 h
t <sub>Cycle</sub>	3600 s

**Safety parameters for IEC 61508 - Low demand**

SIL	3 (In conjunction with suitable evaluating device)
MTTF <sub>d</sub>	32186 Years
PFD <sub>avg</sub>	1,46 x 10 <sup>-4</sup>
Proof test interval	110 Months
Duration of use	240 Months

**Safety characteristic data according to EN ISO 13849**

Category	4 (In conjunction with suitable evaluating device)
Performance level	e (In conjunction with suitable evaluating device)
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

B <sub>10d</sub>	230000 (At 5 A DC 13)
d <sub>op</sub>	365.25 Days
h <sub>op</sub>	24 h
t <sub>Cycle</sub>	3600 s

## 5 Basic circuit diagram

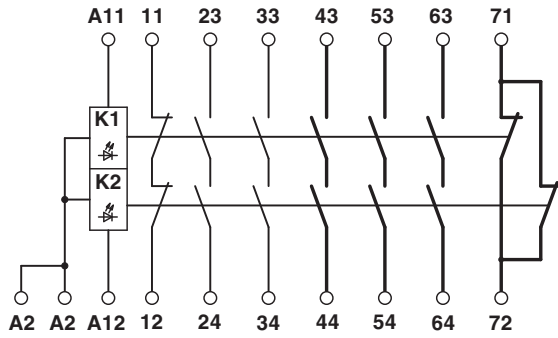


Figure 1 Block diagram

### Key:

Designation	Explanation
A2	GND
A11/A12	Safety relay input voltage
11/12	Confirmation current path
23/24	Enabling current paths
33/34	
43/44	
53/54	
63/64	Signaling current path
71/72	

## 6 Derating

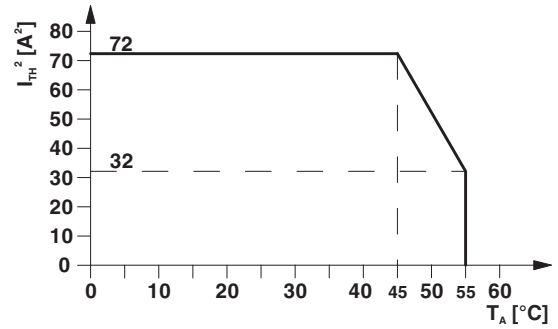


Figure 2 Derating curve



## 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.



Only use power supply units with safe isolation and SELV / PELV in accordance with EN 50178/VDE 0160 (SELV / PELV).



## 8 Operating and indication elements

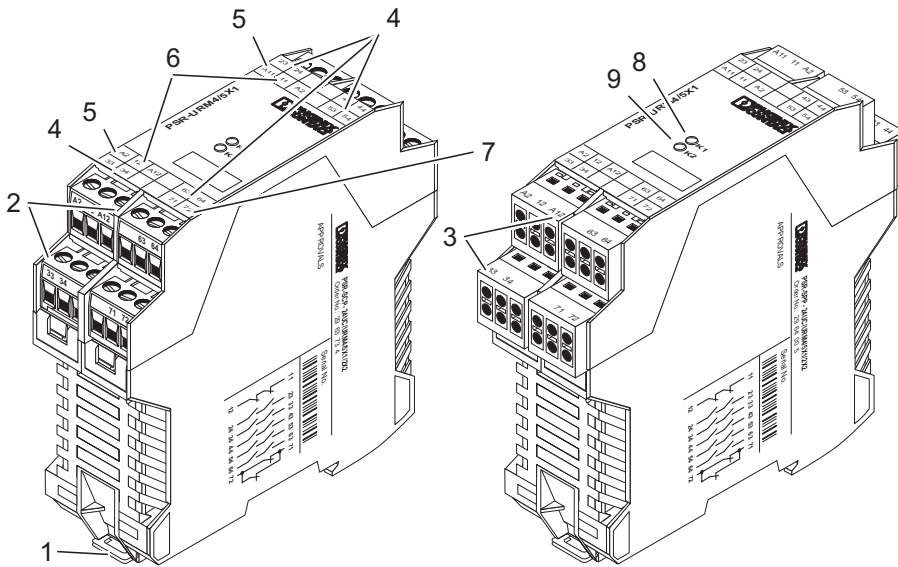


Figure 3 PSR-SCP-24UC/URM4/5X1/2X2 and PSR-SPP-24UC/URM4/5X1/2X2

### 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	23/24, 33/34, 43/44, 53/54, 63/64 - undelayed enabling current paths
5	A2/A11/A12 - Input circuit
6	11/12 - confirmation current path
7	71/72 - signaling current path
8	LED status indicator, green - K1
9	LED status indicator, green - K2

## 9 Diagnostics

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

## 10 Application examples

### 10.1 Single-channel connection with integration of the confirmation current path and externally monitored contacts

- Confirmation current path 11/12 integrated in the basic device
- Externally monitored contacts
- Suitable up to category 4, PL e (EN ISO 13849-1), SIL 3 (EN 62061), if cross-circuits can be ruled out in the control for contact extension



Cross-circuits in the cable installation can be excluded if the safety relay and external contactors K1 and K2 are located in the same electrical installation space.

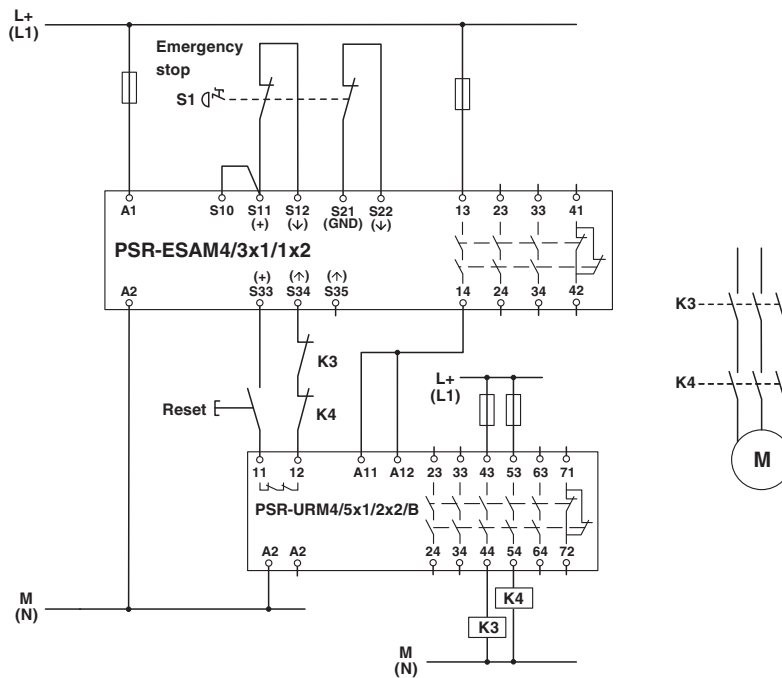


Figure 4 Single-channel connection with integration of the confirmation current path and externally monitored contacts

### 10.2 Two-channel connection with integration of the confirmation current path and externally monitored contacts

- Confirmation current path 11/12 integrated in the basic device
- Externally monitored contacts
- Suitable up to category 4, PL e (EN ISO 13849-1), SIL 3 (EN 62601)

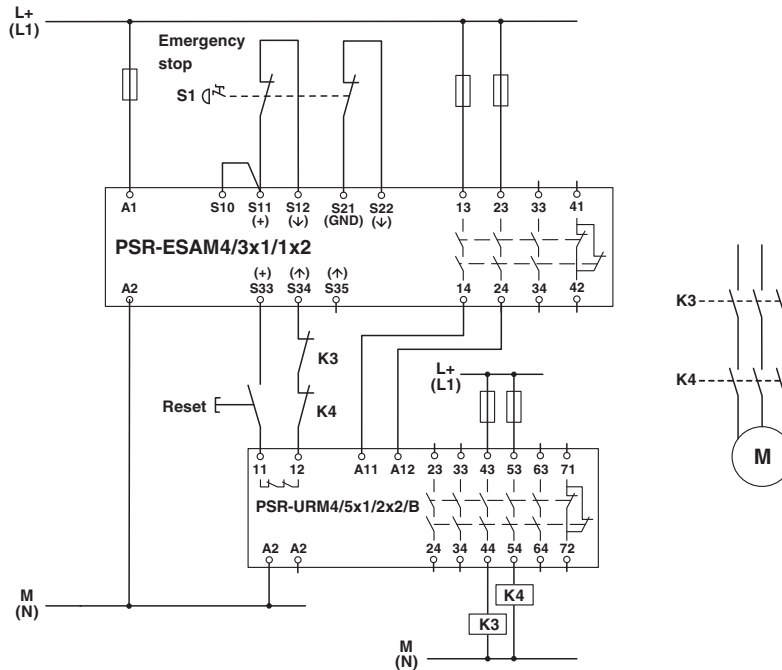


Figure 5 Two-channel connection with integration of the confirmation current path and externally monitored contacts