PSR-...-24DC/FSP/2X1/1X2

SIL coupling relay



Data sheet
104510_en_03

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1 Description

Intended Use

The SIL coupling relay is used to adjust the power and for electrical isolation in high- and low-demand applications.

The coupling relay safely interrupts circuits.

Possible signal generators

– Failsafe controllers

Contact switching type

– 2 undelayed enabling current paths
– 1 undelayed confirmation current path

The enabling current paths and the confirmation current path drop out without delay as per stop category 0 in accordance with EN 60204-1.

Control

– 1-channel
– Automatic start

Achievable safety integrity

– Suitable for high- and low-demand applications up to SIL 3 (IEC 61508), SIL 3 (IEC 61511), Cat. 4 / PL e (EN ISO 13849), SIL 3 (EN 62061)

Additional features

– Easy proof test according to IEC 61508 due to forcibly guided signal contact
– Integrated DCS test pulse filter
– Optional pluggable screw or Push-in terminal blocks
– 17.5 mm housing width

Approvals

Observe these notes

WARNING: Risk of electric shock
Observe the safety regulations and installation notes in the corresponding section.

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

This document is valid for the products listed in the “Ordering data” chapter.
This document meets the same requirements as the original operating instructions with respect to the contents.

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3 Ordering data

Description	Type	Item no.	Pcs./Pkt.
Safe coupling relay for SIL 3 high- and low-demand applications, couples digital output signals to the periphery, two enabling current paths, one signal contact, module for safe state off applications, integrated test pulse filter, plug-in screw connection, width: 17.5 mm	PSR-SCP- 24DC/FSP/2X1/1X2	2986960	1
Safe coupling relay for SIL 3 high and low demand applications, coupled digital output signals to the I/O, 2 enabling current paths, 1 signal contact, module for safe state off applications, integrated test pulse filter, width: 17.5 mm, pluggable Push-in terminal block	PSR-SPP- 24DC/FSP/2X1/1X2	2986957	1

Accessories	Type	Item no.	Pcs./Pkt.
Crimping pliers, for ferrules without insulating collar according to DIN 46228 Part 1 and ferrules with insulating collar according to DIN 46228 Part 4, 0.25 mm² ... 6.0 mm², lateral entry, trapezoidal crimp	CRIMPFOX 6	1212034	1

4 Technical data

Hardware/firmware version	
HW/FW	≥ 03/--
The technical data and safety characteristics are valid as of the specified HW/FW version.	
Supply: A1/A2	
Rated control circuit supply voltage U_S	24 V DC -15 % / +10 %
Rated control supply current I_S	typ. 55 mA (typ. with U_S)
Power consumption at U_S	typ. 1.32 W
Inrush current	max. 100 mA (typ. with U_S)
Filter time	max. 5 ms (in the event of voltage dips at U_s) max. 1 ms (Test pulse width; high test pulse at A1/A2) ≥ 100 ms (Test pulse width; high test pulse at A1/A2) Test pulse rate = 100 x test pulse width max. 5 ms (Test pulse width; low test pulse at A1/A2) ≥ 50 ms (Test pulse rate; low test pulse at A1/A2) Test pulse rate = 15 x Test pulse width
Protective circuit	Surge protection, Suppressor diode, 33 V (A1 - A2)
Relay outputs: Enabling current paths (13/14, 23/24)	
Number of outputs	2
Output description	2 x N/O, undelayed
Contact material	AgCuNi, + 0.2 µm Au
Switching voltage range (Observe the load curve)	15 V AC/DC ... 250 V AC/DC (Observe the load curve)
Limiting continuous current (see section “Relay data”)	5 A
Inrush current, minimum	5 mA
Inrush current	max. 5 A
Sq. Total current $I_{TH}^2 = I_1^2 + I_2^2 + ... + I_N^2$	50 A^2 (observe derating)
Switching capacity	min. 75 mW
Switching frequency	max. 0.5 Hz
Service life electrical	See section “Electrical service life”
Mechanical service life	10^7 cycles
Switching capacity	5 A (24 V (DC13)) 5 A (230 V (AC15))
Output fuse	10 A gL/gG

Relay outputs: 31/32	
Number of outputs	1
Output description	1 N/C signal contact
Contact material	AgCuNi, + 0.2 µm Au
Switching voltage range (Observe the load curve)	15 V AC/DC ... 250 V AC/DC (Observe the load curve)
Limiting continuous current	100 mA
Inrush current, minimum	5 mA
Inrush current	max. 100 mA
Switching capacity	min. 75 mW
Service life electrical	See section “Electrical service life”
Mechanical service life	10^7 cycles
Switching capacity	5 A (24 V (DC13)) 5 A (230 V (AC15))
Output fuse	4 A gL/gG

Times	
Typical starting time with U_s	50 ms (with U_s when controlled via A1)
Typical release time with U_s	50 ms (with U_s when controlled via A1)
Recovery time	1 s

General data	
Relay type	Electromechanical relay with force-guided contacts in accordance with IEC/EN 61810-3
Nominal operating mode	100% operating factor
Degree of protection	IP20
Min. degree of protection of inst. location	IP54
Mounting type	DIN rail mounting
Mounting position	any
Type of housing	PA zinc yellow (RAL 1018)
Operating voltage display	1 x yellow LED
Rated insulation voltage	250 V
Rated surge voltage/insulation	See “Insulation coordination”
Degree of pollution	2
Overvoltage category	III
Maximum power dissipation for nominal condition	2.4 W

Dimensions	Screw connection	Push-in connection
W x H x D	17.5 x 99 x 114.5 mm	17.5 x 112 x 114.5 mm

Connection data	Screw connection	Push-in connection
Conductor cross section rigid	0.2 mm² … 2.5 mm²	0.2 mm² … 1.5 mm²
Conductor cross section flexible	0.2 mm² … 2.5 mm²	0.2 mm² … 1.5 mm²
Conductor cross-section AWG	24 … 12	24 … 16
Conductor cross section flexible, with ferrule without plastic sleeve		0.25 mm² … 1.5 mm² (only together with CRIMPFOX 6)
Conductor cross section flexible, with ferrule with plastic sleeve		0.25 mm² … 1.5 mm² (only together with CRIMPFOX 6)
Stripping length	7 mm	8 mm
Screw thread	M3	
Tightening torque	0.5 Nm … 0.6 Nm	

Ambient conditions	
Ambient temperature (operation)	-20 °C … 55 °C (observe derating)
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)
Information on operating height	See the “Using PSR devices at altitudes greater than 2000 m above sea level” section
Shock	15g
Vibration (operation)	10 Hz … 150 Hz, 2g

Conformance/Approvals	
CE	CE-compliant
The complete EU declaration of conformity is available on the Internet at phoenixcontact.com/products.	
Approvals	

Safety data	
Stop category according to IEC 60204	0

Safety parameters in accordance to IEC 61508 - high demand	
IEC 61508 - High demand	
Equipment type	Type A
HFT	1
SIL	3 (max. 10% of the entire SIL; diagnostic coverage (DC) of the control unit at A1/A2 must be ≥ 90%)
Systematic Capabiltiy (SC)	3
PFH_D	2.02 x 10^{-11} (4 A DC13; 5 A AC15; 8760 switching cycles/ year)
Diagnostic coverage (DC)	99 % (during evaluation of the confirmation current path)
Demand rate	< 12 Months
Proof test interval	240 Months
Mission time	240 Months

SIL examination as a 1oo1 structure alternative illustration	
Equipment type	Type A
HFT	0
SIL	3 (max. 10% of the entire SIL; diagnostic coverage (DC) of the control unit at A1/A2 must be ≥ 90%)
Systematic Capabiltiy (SC)	3
Safe Failure Fraction (SFF)	99.99 %
λSD	198 FIT
λSU	63.9 FIT
λDD	3.66 FIT
λDU	0.02 FIT
λTotal	264.38 FIT
MTBF	342 Years (includes errors which are not part of the safety function; MTTR = 8 h)

Safety parameters according to IEC 61508 - low demand	
Equipment type	Type A
HFT	1
SIL	3 (max. 10% of the entire SIL; diagnostic coverage (DC) of the control unit at A1/A2 must be ≥ 90%)
Systematic Capabiltiy (SC)	3
PFD_{avg}	9.88×10^{-05}
Proof test interval	60 Months
Mission time	240 Months
The safety characteristic data is calculated assuming an average ambient temperature of 40°C. At higher ambient temperatures, a safety factor of 1.8 should be applied to the characteristics.	

SIL examination as a 1oo1 structure alternative illustration	
Equipment type	Type A
HFT	0
SIL	3 (max. 10% of the entire SIL; diagnostic coverage (DC) of the control unit at A1/A2 must be ≥ 90%)
Systematic Capabiltiy (SC)	3
Safe Failure Fraction (SFF)	99.76 %
λSD	0 FIT
λSU	1026.9 FIT
λDD	0 FIT
λDU	2.42 FIT
λTotal	1029.32 FIT
MTBF	104 Years (includes errors which are not part of the safety function; MTTR = 8 h)
PFD_{avg}	1.06×10^{-5} (for proof test interval = 1 year)
The safety characteristic data is calculated assuming an average ambient temperature of 40°C. At higher ambient temperatures, a safety factor of 1.8 should be applied to the characteristics.	

Safety parameters according to EN ISO 13849-1	
Category	4 (Diagnostic coverage (DC) of the control unit at A1/A2 must be ≥ 99%)
Performance level	e (Diagnostic coverage (DC) of the control unit at A1/A2 must be ≥ 99%)
Mission time	240 Months

Safety parameters according to EN IEC 62061	
SIL	3 (max. 10% of the entire SIL; diagnostic coverage (DC) of the control unit at A1/A2 must be ≥ 90%)

Safety parameters for EN 50156	
SIL	3

5 Notes regarding documentation

5.1 Identification of warning notes



This symbol indicates hazards that could lead to personal injury.

There are three signal words indicating the severity of a potential injury.

DANGER Indicates a hazard with a high risk level. If this hazardous situation is not avoided, it will result in death or serious injury.

WARNING Indicates a hazard with a medium risk level. If this hazardous situation is not avoided, it could result in death or serious injury.

CAUTION Indicates a hazard with a low risk level. If this hazardous situation is not avoided, it could result in minor or moderate injury.



This symbol together with the **NOTE** signal word warns the reader of actions that might cause property damage or a malfunction.



Here you will find additional information or detailed sources of information.

5.2 Validity

This data sheet is valid for the described product(s) from the hardware/firmware version specified in the technical data.

5.3 Target group

This data sheet is therefore aimed at:

- Qualified personnel who plan and design safety equipment for machines and systems and are familiar with regulations governing occupational safety and accident prevention.
- Qualified personnel who install and operate safety equipment in machines and systems.

Qualified personnel:

Qualified personnel are people who, because of their education, experience, and instruction and their knowledge of relevant standards, regulations, accident prevention, and service conditions, have been authorized by those responsible for the safety of the system to carry out any required operations and who are able to recognize and avoid any possible dangers.

Requirements:

Knowledge of the following topics is required:

- Handling safety components
- Valid EMC regulations
- Valid regulations governing occupational safety and accident prevention

6 Safety regulations and installation notes

WARNING: Death, serious personal injury or damage to equipment

Depending on the application, incorrect handling of the device may pose serious risks for the user or cause damage to equipment.

- Observe all the safety notes and warning instructions provided in this chapter and elsewhere in this document.

Direct/indirect contact

- Protection against direct and indirect contact according to VDE 0100 Part 410 must be ensured for all components connected to the system.

In the event of an error, parasitic voltages must not occur (single-fault tolerance).

Power supply units for 24 V supply

- Only use power supply units with safe isolation and SELV/PELV.
- Protect the 24 V area with a suitable external fuse.
- Make sure that the power supply unit is able to supply **four times** the nominal current of the external fuse, to ensure that it trips in the event of an error.
- Make sure that the output voltage of the voltage supply does not exceed 32 V even in the event of error.

Startup, mounting, and modifications

Startup, mounting, modifications, and upgrades may only be carried out by qualified personnel.

- Before working on the device, disconnect the power.
- Ensure that the device is disconnected from the power supply.
- Carry out wiring according to the application. Refer to the “Application examples” section for this.

Reliable operation is only ensured if the device is installed in housing protected from dust and humidity.

- Install the device in housing protected from dust and humidity (min. IP54).

In operation

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

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

For emergency stop applications, automatic startup of the machine can pose serious risks for the user.

- The machine must be prevented from restarting automatically by a higher-level controller.

Inductive loads can lead to welded relay contacts.

- Connect a suitable and effective protective circuit to inductive loads.
- Implement the protective circuit parallel to the load and not parallel to the switch contact.

EMC notes

Noise emission may occur when operating relay modules. Wireless reception may be disrupted in residential areas.

The device is a Class A product.

- Observe the requirements for noise emission for electrical and electronic equipment (EN 61000-6-4).
- Implement appropriate precautions against noise emission.

Surge voltages can destroy the device.

- Make sure that the output voltage of the power supply does not exceed 30 V even in the event of an error.

Faulty devices

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

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

Only the manufacturer or their authorized representative may perform the following activities. Otherwise the warranty is invalidated.

– Repairs to the device
– Opening the housing

Replacing the device

- Dispose of the device in the following circumstances:
- Make sure that the device can never be reused.

– At the end of its mission time

See “Technical data” section.

– At the end of its electrical service life

See section “Electrical service life”.

– In the event of a fault

6.1 Safety of machines or systems

Draw up and implement a safety concept

The machine or system manufacturer and the operator are responsible for the safety of the machine or system and the application in which the machine or system is used. In order to use the device described in this document, you must have drawn up an appropriate safety concept for your machine or system. This includes a risk assessment in accordance with the directives and standards specified in the EC Declaration of Conformity, as well as other standards.

Risk assessment, validation and function test

- Before using the device, perform a risk assessment on the machine or system.
- Validate your entire safety system.
- Carry out a new validation every time you make a safety-related modification.
- Perform a function test on a regular basis.

Achievable safety integrity

The functional safety is ensured for the device as a single component. However, this does not guarantee functional safety for the entire machine or system. In order to be able to achieve the desired safety level for the entire machine or system, define the safety requirements for the machine or system as well as how to implement them from both a technological and an organizational perspective.

7 Transport, storage, and unpacking

7.1 Transport

The device is delivered in cardboard packaging.

- Observe the instructions on how to handle the package indicated on the packaging.

Suitable transport packaging

- Only transport the device in its original packaging or in packaging suitable for transport.

Technical data and environmental conditions

- For transport, observe the humidity and air pressure specifications, and the temperature range.
  See Section “Technical data”.

7.2 Storage

Suitable storage location

The storage location must meet the following requirements:

– Dry
– Protected against unauthorized access
– Protected against harmful environmental influences such as UV light

Technical data and environmental conditions

- For storage, observe the humidity and air pressure specifications, and the temperature range.
  See Section “Technical data”.

7.3 Unpacking

The device is delivered in packaging together with a packing slip that provides installation instructions.

Observing the packing slip

- Read the entire packing slip carefully.
- Retain the packing slip.

Checking the delivery

- Check the delivery for damage and completeness.
- Submit any claims for transport damage immediately.

Scope of supply

Refer to the ordering data for the standard scope of supply for the product.
See Section “Ordering data”.

8 Function description

8.1 Single-channel control

The external enable signal of the failsafe controller is switched at A1.

8.2 Automatic start

The device starts automatically once it has received the external enable signal of the failsafe controller.

8.3 Safe shutdown

Once the external enable signal of the failsafe controller has been deactivated, the enabling current paths open and the contacts fall into the safe state.

When the enabling current paths are open, the device is in the safe state.

The confirmation current path closes.

8.4 Diagnostics / proof test

You can carry out an optional diagnostic function, whereby the floating confirmation current path is read back into the failsafe controller.

This allows the repeat test required by standards to be carried out easily and safely.

If several devices are used, the N/C contacts of the confirmation current paths can be connected in series.



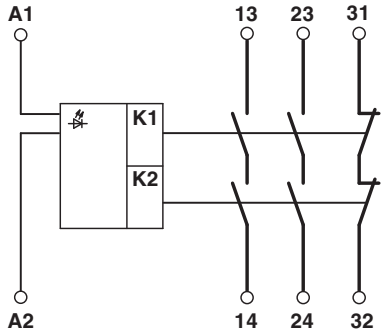
See section “Feedback circuit connection versions”.

8.5 Test pulse filter

By filtering the control controller test pulses, premature failure of the forcibly guided safety relay is prevented.

9 Block diagram

Figure 1 Block diagram



Key:

A1	24 V DC control
A2	0 V control
13/14	Undelayed enabling current paths
23/24	
31/32	Confirmation current path, undelayed

Insulation coordination:

	A1/A2	31/32	13/14, 23/24
A1/A2	-	6 kV ST	6 kV ST
31/32	-	-	6 kV ST
13/14, 23/24	-	-	-

Key:

ST	Safe isolation

Safe isolation/reinforced insulation

(rated surge voltage of 6 kV)

Reinforced insulation (e.g., thanks to greater air clearances and creepage distances between conductive paths) is designed for one overvoltage category higher than basic insulation. This means that SELV circuits of $U \leq 25$ V AC or $U \leq 60$ V DC and circuits with higher voltages can be mixed.

10 Derating

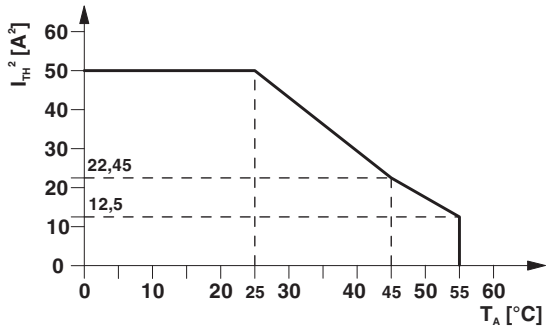
The temperature is measured at a 5 cm clearance below or to the side of the device.

10.1 Any mounting position

The derating curve applies for the following conditions:

– Mounting on a DIN rail in any mounting position
– Devices mounted next to each other without spacing

Figure 2 Derating curve - any mounting position, without spacing



11 Relay data

11.1 Load limit curve at DC load

Figure 3 Relay load curve - resistive load

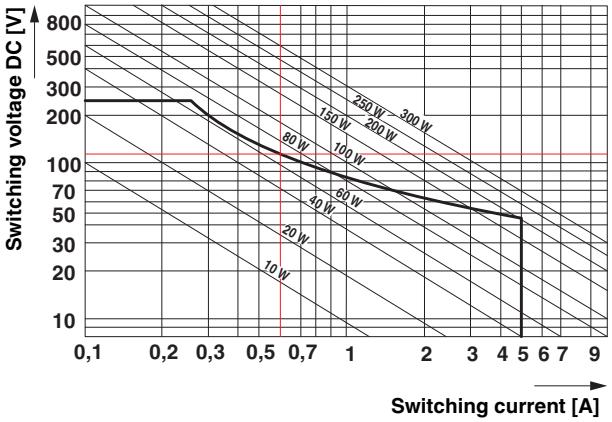
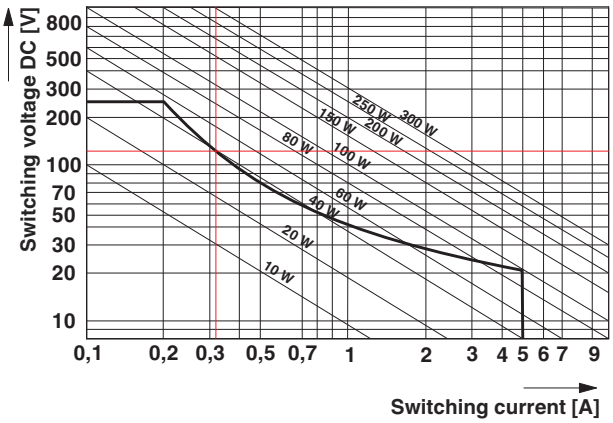
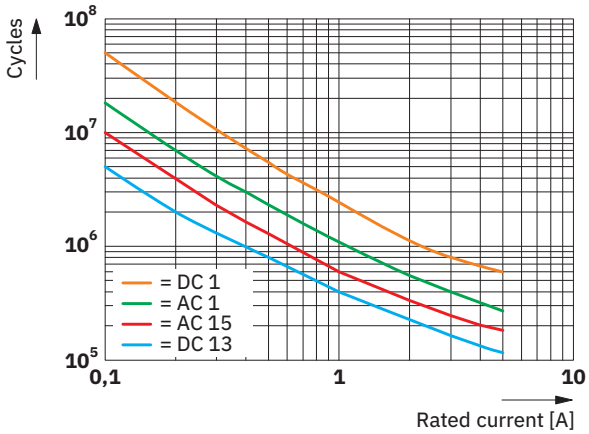


Figure 4 Relay load curve - inductive load



11.2 Electrical service life

Figure 5 Electrical service life for high-demand applications



Behavior of the electrical service life

The service life curves indicate the number of switching cycles after which wear-related failures must be expected.

They depend on the utilization category and the expected load current.

Example:

Let's assume:

– Inductive load = 1 A
– Utilization category = AC15

This results in a contact service life of about 600000 switching cycles.

WARNING: Loss of functional safety

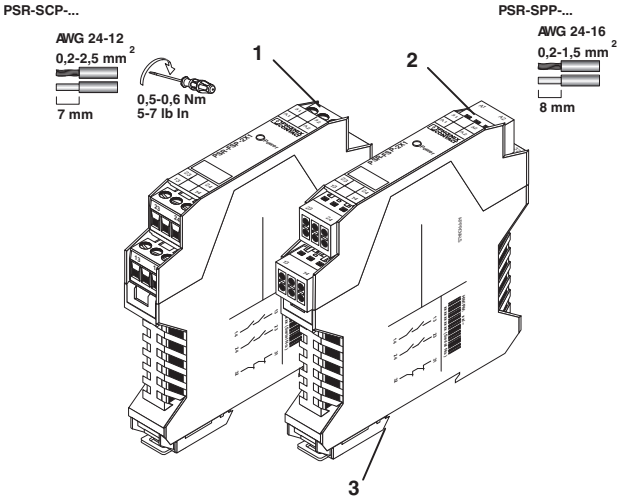
At the end of the electrical service life, there is an increased risk of loss of functional safety.

- Replace the device in good time before the end of the electrical service life.

12 Operating and indication elements

12.1 Connection versions

Figure 6 Connection versions



1 COMBICON plug-in screw terminal block
2 Pluggable COMBICON Push-in terminal block
3 Metal lock for fixing to DIN rail

12.2 Connection assignment



A1 24 V DC control
A2 0 V control
31/32 Confirmation current path, undelayed

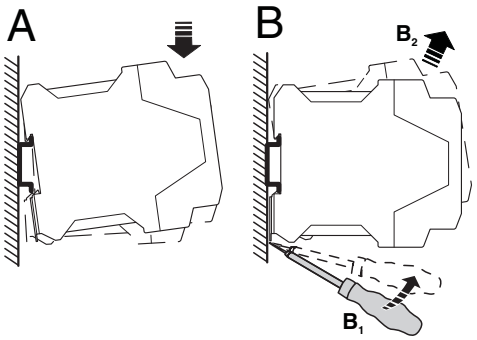
Power Power LED (yellow)

13/14
23/24 Undelayed enabling current paths

13 Mounting and removing

- Mount the device on a 35 mm DIN rail in accordance with EN 60715.
- To remove the device, use a screwdriver to release the snap-on foot.

Figure 7 Mounting and removing



14 Wiring

- Connect the cables to the connection terminal blocks using a screwdriver.

Figure 8 Connecting the cables for PSR-SCP-... (Screw terminal block)

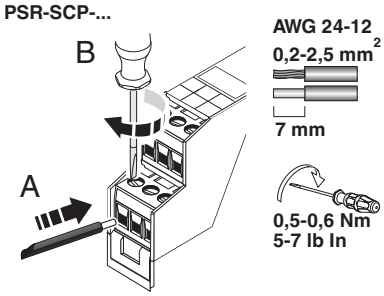
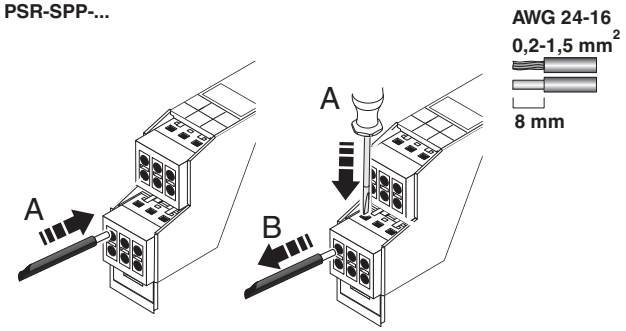


Figure 9 Connecting the cables for PSR-SPP-... (Push-in terminal block)



It is recommended that ferrules are used to connect stranded cables.

Use the CRIMPFOX 6 crimping tool from Phoenix Contact.

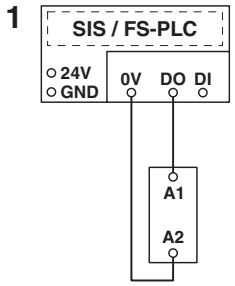
The tool enables the reliable processing of ferrules and easy removal of conductors with ferrules from the connection terminal blocks.

For compliance with UL approval, use copper wire that is approved up to 60°C/75°C.

14.1 Signal generator connection versions

- Connect suitable signal generators to A1.

Figure 10 Signal generator connection versions



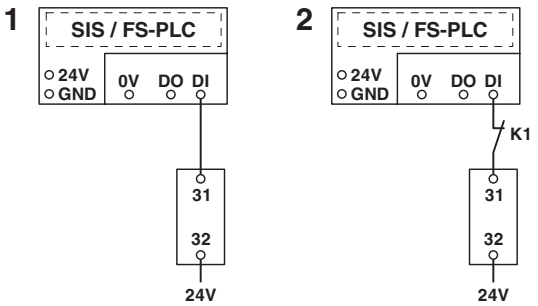
1 1-channel control via failsafe controller

14.2 Feedback circuit connection versions

To carry out the diagnostic function via the confirmation current path, proceed as follows:

- Read confirmation current path 31/32 back into one of the digital inputs of the failsafe controller.
- Place the relevant N/C contact in the path from 31/32 to the digital input of the failsafe controller to monitor external contactors or extension devices with force-guided contacts.

Figure 11 Feedback circuit connection versions



1 Confirmation current path without monitored contact extension

2 Confirmation current path with monitored contact extension

15 Startup

- Provide the external enable signal of the failsafe controller (24 V DC) at terminal block A1.

PWR LED lights up.

The enabling current paths 13/14 and 23/24 close.

Confirmation current path 31/32 opens.

16 Calculating the power dissipation

The total power dissipation of the safety relay is based on the input power dissipation and the contact power dissipation for the same and for different load currents.

Input power dissipation

$P_{Input} = U_B^2 / (U_S/I_S)$

Contact power dissipation

With the same load currents:

$P_{Contact} = n \bullet I_L^2 \bullet 200\ m\Omega$

With different load currents:

$P_{Contact} = (I_{L1}^2 + I_{L2}^2 + ... + I_{Ln}^2) \bullet 200\ m\Omega$

Total power dissipation

$P_{Total} = P_{Input} + P_{Contact}$

therefore

$P_{Total} = U_B^2 / (U_S/I_S) + n \bullet I_L^2 \bullet 200\ m\Omega$

or

$P_{Total} = U_B^2 / (U_S/I_S) + (I_{L1}^2 + I_{L2}^2 + ... + I_{Ln}^2) \bullet 200\ m\Omega$

Key:

P	Power dissipation in mW
U_B	Applied operating voltage
U_S	Rated control circuit supply voltage
I_S	Rated control supply current
n	Number of enabling current paths used
I_L	Contact load current

17 Proof test

To verify the device function, proceed as follows:

1. Deactivate A1.
2. Perform a continuity test for the confirmation current path (31/32).

Or:

Read the confirmation current path back into the failsafe controller.

WARNING: Loss of functional safety due to malfunction

If the proof test contains errors, the device no longer functions correctly.

- Replace the device.

18 Application examples

18.1 Important information about applications with the device

In the case of high-demand applications, the evaluation of the checkback contact must be performed within the process safety time.

The confirmation current path is not absolutely necessary for low-demand applications. However, readback is recommended so a potential error in the switching operation can be read into the controller. In any case, verify proper function with regular proof tests.

18.2 Single-channel connection with integration of the confirmation current path

Application description:

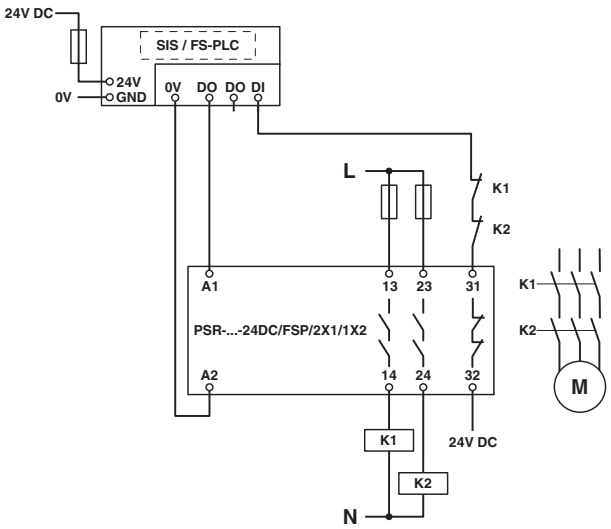
- Integrating the 31/32 configuration path into the safe controller
- It is assumed that errors in the cable installation have been eliminated

Achievable safety integrity:

- Suitable for high-demand applications up to:
  - SIL 3 (IEC 61508), SIL 3 (IEC 61511), SIL 3 (EN IEC 62061), if the diagnostic coverage (DC) of the failsafe controller is ≥ 90 %
  - Cat. 4/PL e (EN ISO 13849), if the diagnostic coverage (DC) of the failsafe controller is ≥ 99 %
- For low-demand applications suitable up to SIL 3 (IEC 61508), SIL 3 (IEC 61511), if the diagnostic coverage (DC) of the failsafe controller is at 90 %

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

Figure 12 1-channel connection with integration of the confirmation current path



Key:

SIS	Safety Instrumented System (safe control)
FS-PLC	Failsafe controller
DC	Diagnostic Coverage according to IEC 61508 (line/load diagnostics at DO)
DI	Digital input
DO	Digital output

18.3 Two-channel connection with integration of the confirmation current path

Application description:

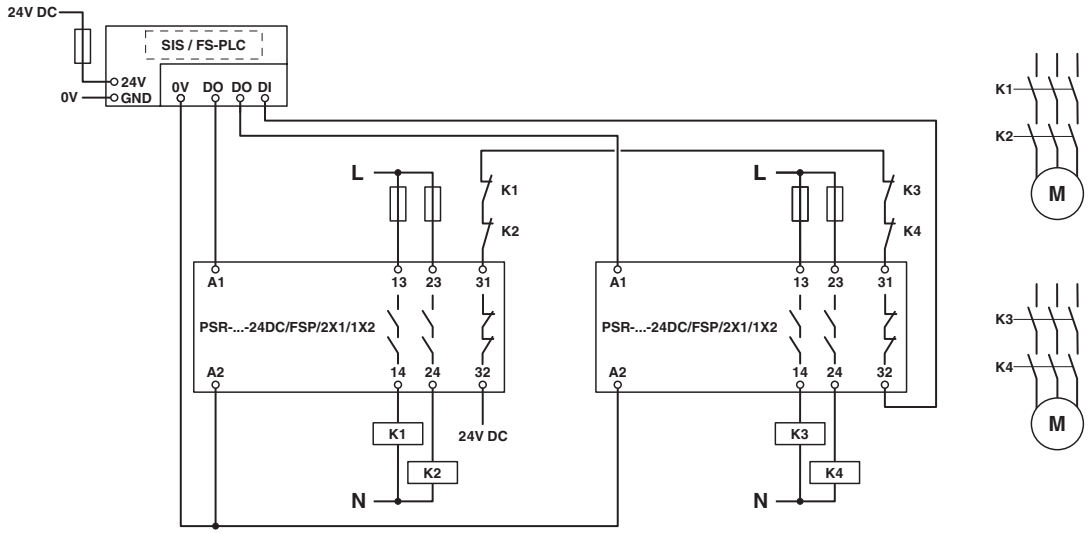
– Integrating the 31/32 configuration paths into the safe controller
– It is assumed that errors in the cable installation have been eliminated

Achievable safety integrity:

– Suitable for high-demand applications up to:
  - SIL 3 (IEC 61508), SIL 3 (IEC 61511), SIL 3 (EN IEC 62061), if the diagnostic coverage (DC) of the failsafe controller is ≥ 90 %
  - Cat. 4/PL e (EN ISO 13849), if the diagnostic coverage (DC) of the failsafe controller is ≥ 99 %
– For low-demand applications suitable up to SIL 3 (IEC 61508), SIL 3 (IEC 61511), if the diagnostic coverage (DC) of the failsafe controller is at 90 %

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

Figure 13 2-channel connection with integration of the confirmation current path



Key:

SIS	Safety Instrumented System (safe control)
FS-PLC	Failsafe controller
DC	Diagnostic Coverage according to IEC 61508 (line/load diagnostics at DO)
DI	Digital input
DO	Digital output

19 Device replacement, device defect, and repair

19.1 Device replacement

The device can be replaced, if necessary.

If you need to replace the device, proceed as described in the following section:

– Mounting and removal
– Wiring

Observe the device type and version

The new device must meet the following requirements:

– Same device type
– Same or later version

19.2 Device defect and repair

Do not open the housing

Repairs may only be carried out by Phoenix Contact. Do not open the housing. If the housing is opened, the function of the device can no longer be ensured.

Faulty devices

- Please contact Phoenix Contact.

20 Maintenance, decommissioning, and disposal

20.1 Maintenance

The device requires no maintenance during the permissible mission time. Refer to the technical data for the mission time of the device.

If necessary, carry out proof tests within the specified proof test interval.

See “Technical data” section.

Depending on the application and connected I/O devices, you should test the function of the I/O devices and the safety chain regularly.

Observe the relevant manufacturer specifications for carrying out maintenance on connected I/O devices.

20.2 Decommissioning and disposal

Carry out decommissioning according to the requirements of the machine or system manufacturer.

When decommissioning the system or parts of the system, ensure the following for the devices used.

The device continues to be used only as intended:

- Observe the storage and transport requirements.

See “Transport, storage, and unpacking” section.

The device is not used any more:

The symbol with the crossed-out trash can indicates that this item must be collected and disposed of separately from other waste.
Phoenix Contact or public collection sites will take the item back for free disposal. For information on the available disposal options, visit www.phoenixcontact.com.

Packaging disposal

- Dispose of packaging materials that are no longer needed (cardboard packaging, paper, bubble wrap sheets, pillow bags, etc.) with household waste in accordance with the currently applicable national regulations.

21 Attachment

21.1 Using PSR devices at altitudes greater than 2000 m above sea level

The following section describes the special conditions for using PSR devices at altitudes greater than 2000 m above sea level.
Observe the relevant device-specific data (technical data, derating, etc.) according to the product documentation for the individual device.

Using the device at altitudes **> 2000 m amsl up to max. 4500 m amsl** is possible under the following conditions:

1. Limit the rated control circuit supply voltage (U_S) in accordance with the table below. Observe the technical data for the device.

U_S according to the technical data for the device	U_S when used at altitudes greater than 2000 m above sea level
< 150 V AC/DC	U_S according to the technical data for the device still valid
> 150 V AC/DC	Limited to max. 150 V AC/DC

2. Limit the maximum switching voltage in accordance with the table below. Observe the technical data for the device.

Max. switching voltage according to the technical data for the device	Max. switching voltage when used at altitudes greater than 2000 m above sea level
< 150 V AC/DC	Max. switching voltage according to the technical data for the device still valid
> 150 V AC/DC	Limited to max. 150 V AC/DC

3. Reduce the maximum ambient temperature for operation by the corresponding factor in accordance with the table below.
4. If derating is specified, offset all the points of the derating curve by the corresponding factor in accordance with the table below.

Altitude above sea level	Temperature derating factor
2000 m	1
2500 m	0.953
3000 m	0.906
3500 m	0.859
4000 m	0.813
4500 m	0.766

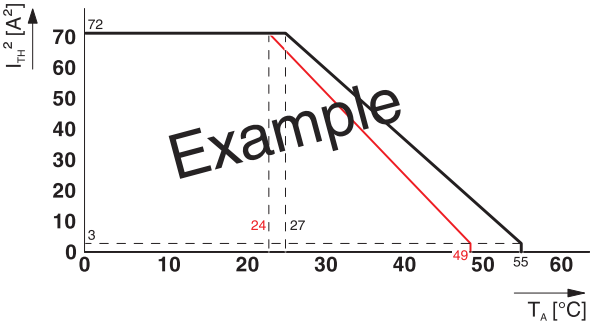
Example calculation for 3000 m

The following calculation and the illustrated derating curve are provided as examples.
Perform the actual calculation and offset the derating curve for the device used according to the technical data and the “Derating” section.

27 °C • 0.906 ≈ 24 °C

55 °C • 0.906 ≈ 49 °C

Figure 14 Example of a suspended derating curve (red)



21.2 Revision history

Version	Date	Contents
02	2018-12-06	New edition of the data sheet
03	2025-05-27	Approvals changed, accessories added to order data, technical data updated; Safety regulations and installation notes section updated; Heading added in Relay data section; Electrical service life section edited; note added to Wiring section