

Safety Relays from IDEM

SCR-1



User Information

Correct Use

SCR-1 is low-cost emergency stop safety relay with which machines and systems can be safely switched off by disconnecting the power supply.

Applications for the SCR-1 include single or dual-channel emergency stop circuits and guard monitoring on machines and systems.

Features

- 2 safe, redundant relay outputs
- Connection of:
 - Emergency stop buttons
 - Safety switches
 - Non-contact safety switches
 - OSSD-Outputs
- Single and dual-channel operation possible
- Feedback loop for monitoring downstream contactors or expansion modules
- Cyclical monitoring of the output contacts
- Indication of the switching state via LED



(not for plug-in terminals)

- 2 start behaviors possible:
 - Manual start
 - Automatic start
- Short circuit and earth fault monitoring
- Up to PL d, SILCL 2, category 3

Function

The emergency stop safety switching device SCR-1 is designed for safe isolation of safety circuits according to EN 60204-1 and can be used up to safety category 3, PL d according to EN ISO 13849-1.

The internal logical system closes the safety contacts when the start button is pressed.

If the safety switch is opened, the positively driven safety contacts are opened and safely switch the machine off. It is ensured that a single fault does not lead to a loss of the safety function and that every internal fault is detected by cyclical self-monitoring no later than when the system is switched off and switched on again. Only a fault in the safety switch itself is not detected. This must be checked regularly as part of a maintenance plan.

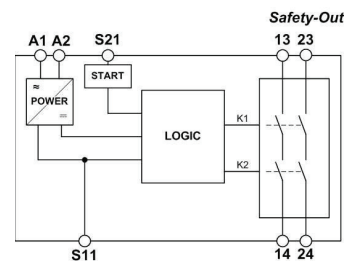


Fig. 1 Block diagram SCR-1

Installation

As per EN 60204-1, the device is intended for installation in control cabinets with a minimum degree of protection of IP54. It is mounted on a 35mm DIN rail according to DIN EN 60715 TH35.

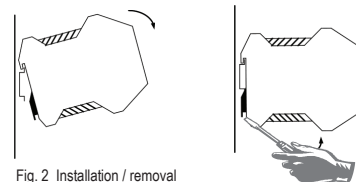


Fig. 2 Installation / removal

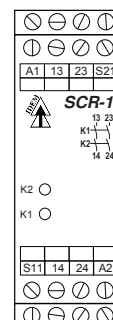
Safety Precautions



- Installation and commissioning of the device must be performed **only by authorized personnel**.
- Observe the country-specific regulations when installing the device.
- The electrical connection of the device is only allowed to be made with the device isolated.
- The wiring of the device must comply with the instructions in this user information, otherwise there is a risk that the safety function will be lost.
- It is not allowed to open the device, tamper with the device or bypass the safety devices.
- All relevant safety regulations and standards are to be observed.
- The overall concept of the control system in which the device is incorporated must be validated by the user.
- Failure to observe the safety regulations can result in death, serious injury and serious damage.
- Note down the version of the product (see label "Ver.") and check it prior to every commissioning of a new device. If the version has changed, the overall concept of the control system in which the device is incorporated must be validated again by the user.

Electrical Connection

- When the 24 V version is used, a control transformer according to EN 61558-2-6 or a power supply unit with electrical isolation from the mains must be connected.
- External fusing of the contacts (6 A gG) must be provided.
- A maximum length of the control lines of 1000 meters with a line cross section of 0.75 mm² must not be exceeded.
- The line cross section must not exceed 2.5mm².
- If the device does not function after commissioning, it must be returned to the manufacturer unopened. Opening the device will void the warranty.



- A1: Power supply
- A2: Power supply
- S11: DC 24 V control voltage
- S21: Control line
- 13-14: Safety contact 1
- 23-24: Safety contact 2

Fig. 3 Connections

User Information

Applications

Depending on the application or the result of the risk assessment according to EN ISO 13849-1, the device must be wired as shown in Fig. 1 to Fig. 8.

Emergency Stop Circuit

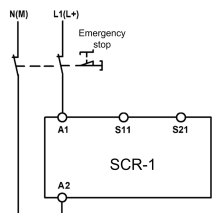


Fig. 1:
Two-channel emergency stop circuit without fault monitoring of the emergency stop button and the supply cables.
(category 3, up to PL d)

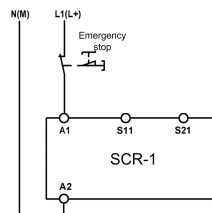


Fig. 2:
Single-channel emergency stop circuit without fault monitoring of the emergency stop button and the supply cables.
(category 1, up to PL c)

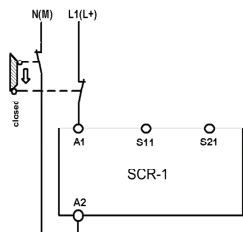


Fig. 3:
Two-channel sliding guard monitoring with positively driven limit switches.
(category 3, up to PL d)

Warning:

Corresponded to the application, the starting circuit have to be wired according to Fig. 4 or Fig. 5.

Starting Behavior

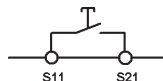


Fig. 4:
Manual start.



Fig. 5:
Automatic start
(e.g. for applications with a safety door).

Warning:
Safety contacts switch immediately when the power supply is connected.

Feedback Loop

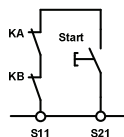


Fig. 6:
Feedback loop.
Monitoring of externally connected contactors or expansion modules.

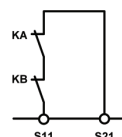


Fig. 7:
Feedback loop for automatic start:
The feedback loop monitors contactors or the expansion modules.

Safety contacts

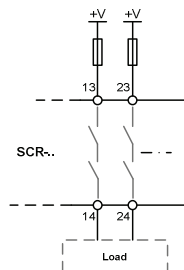


Fig. 8:
Connecting load to safety contacts.
(Figure shows example.
Voltage „+V“ according to techn. Data)

Commissioning Procedure



Note: The items listed under “Electrical connection” must be observed during commissioning.

1. Wiring emergency stop circuit:

Wire the emergency stop circuit according to the required Performance Level determined (see Fig. 1 to Fig. 3).

2. Wiring start circuit:

Wire the start circuit according to Fig. 4 or Fig. 5 to set the starting behavior.

Warning:

If “Automatic start” is set, bear in mind that the safety contacts will switch immediately after the power supply is connected. If “Manual start” is set, the start button must be opened after wiring.

3. Wiring feedback loop:

If your application provides for external contactors or expansion modules, connect them to the device according to Fig. 6 or Fig. 7.

4. Starting the device:

Switch the operating voltage on.

Warning:

If the “Automatic start” starting behavior is set, the safety contacts will close immediately.

If the “Manual start” starting behavior is set, close the start button to close the safety contacts.

LEDs **K1** and **K2** are lit.

5. Triggering safety function:

Open the emergency stop circuit by actuating the connected safety switch. The safety contacts open immediately.

6. Reactivation:

Close the emergency stop circuit. If “Automatic start” is selected, the safety contacts will close immediately.

If the “Monitored manual start” starting behavior is set, close the start button to close the safety contacts.

User Information

Maintenance

The device must be checked once per month for proper function and for signs of tampering and bypassing of the safety function.

The device is otherwise maintenance free, provided that it was installed properly.

What to Do in Case of a Fault?

Device does not switch on:

- Check the wiring by comparing it to the wiring diagrams.
- Check the safety switch used for correct function and adjustment.
- Check whether the emergency stop circuit is closed.
- Check whether the start button (with manual start) is closed.
- Check the operating voltage at A1 and A2.
- Is the feedback loop closed?

Device cannot be switched on again after an emergency stop:

- Check whether the emergency stop circuit was closed again.
- Is the feedback loop closed?

If the fault still exists, perform the steps listed under "Commissioning Procedure".

If these steps do not remedy the fault either, return the device to the manufacturer for examination.

Opening the device is impermissible and will void the warranty.

Safety Characteristics According to EN ISO 13849-1

The device is certified according to EN ISO 13849-1 up to a Performance Level of PL d.

Note:

Additional data can be requested from the manufacturer for applications that deviate from these conditions.

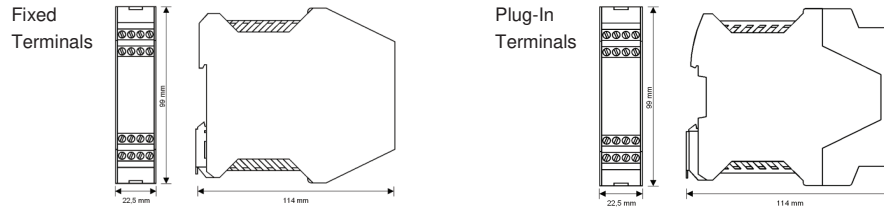
Safety characteristics according to EN ISO 13849-1 for all variants of SCR-1			
Load (DC-13; 24 V)	<= 0.1 A	<= 1 A	<= 2 A
T10d [years]	20	20	20
Category	3	3	3
PL	d	d	d
PFHd [1/h]	1.03E-07	1.03E-07	1.03E-07
nop [cycle / year]	<= 400,000	<= 73,000	<= 17,000

Techn. Data

Corresponds to the standards	EN 60204-1; EN ISO 13849-1 ; EN 62061
Operating voltage	AC 230 V, AC 115 V, AC/DC 24 V
Rated supply frequency	AC: 50-60 Hz
Permissible deviation	+ / - 10 %
Power consumption	DC 24 V AC 230 V approx. 1.2 W approx. 3.5 VA
Control voltage at S11	DC 24 V
Control current S11...S14	max. 40 mA
Safety contacts	2 NO contacts
Max. switching voltage	AC 250 V
Safety contact breaking capacity (13-14, 23-24)	AC: 250 V, 1500 VA, 6 A for ohmic load 250 V, 4 A for AC-15 DC: 24 V, 30 W, 1.25 A for ohmic load 24 V, 30 W, 2 A for DC-13
Minimum contact load	24 V, 20 mA
Min. Contact fuses	6 A gG
Max. line cross section	0.14 - 2.5 mm ²
Max. length of control line	1000 m with 0.75 mm ²
Contact material	AgNi
Contact service life	mech. approx. 1 x 10 ⁷
Test voltage	2.5 kV (control voltage/contacts)
Rated impulse withstand voltage, leakage path/air gap	4 kV (DIN VDE 0110-1)
Rated insulation voltage	250 V
Degree of protection	IP20
Temperature range	DC 24 V: -15 °C to +60°C AC 230/115 V: -15 °C to +40 °C
Degree of contamination	2 (DIN VDE 0110-1)
Overvoltage category	3 (DIN VDE 0110-1)
Weight	approx. 230 g
Mounting	DIN rail according to EN 60715 TH35

User Information

Dimension Drawing



Variants

SCR-1, AC 230 V (50-60Hz), fixed screw terminals
SCR-1, AC 115 V (50-60 Hz), fixed screw terminals
SCR-1, AC/DC 24 V (AC: 50-60 Hz), fixed screw terminals
SCR-1, AC 230 V (50-60 Hz), plug-in terminals
SCR-1, AC 115 V (50-60 Hz), plug-in terminals
SCR-1, AC/DC 24 V (AC: 50-60 Hz), plug-in terminals

CE EC Declaration of Conformity

Producer: IDEM SAFETY SWITCHES Ltd.
2 Ormside Close, Hindley Industrial Estate, Hindley Green, Wigan, WN2 4HR, UK

Product Group: Safety emergency stop switching devices

Product Name	Affixing of CE marking:	No of Certificate
SCR-1.....	2018.....	01/205/5055.02/18
SCR-2.....	2018.....	01/205/5055.02/18
SCR-3.....	2018.....	01/205/5055.02/18

The products conform with the essential protection requirements of the following European directives:

2006/42/EG : Machinery directive

2014/30/EU : EMC directive

If applicable, the conformity of the designated products is proved by full compliance with the following standards:

EN 61000-6-2:2006-03 EN 61000-6-3:2011-09 EN 61326-3-1:2018-04


According to the certificate of the below mentioned organisation:

EN 62061:2005 +AC:2010+A1:2013+A2:2015 EN ISO 13849-1:2015

Certification Body: Nr. NB 0035
TÜV Rheinland Industrie Service GmbH
10882 Berlin
Zertifizierungsstelle für Maschinen

02nd January 2019


M. Mohtasham: Managing Director


V. Crolla: Documentation Manager