

Safety Relays from IDEM

SCR-1



User Information

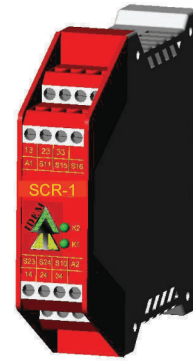
Correct Use

SCR-1 is the low-cost emergency stop safety relay with which machines and systems can be safely switched off by disconnecting the power supply. Internal fault monitoring takes place during restarting via the start button.

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



- 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.

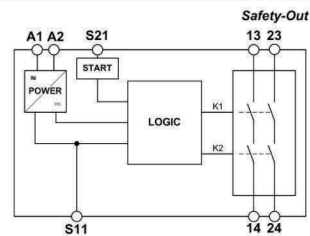


Fig. 1 Block diagram SCR-1

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.

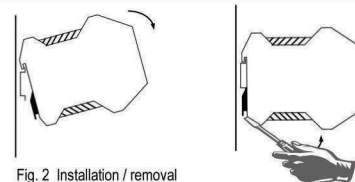


Fig. 2 Installation / removal

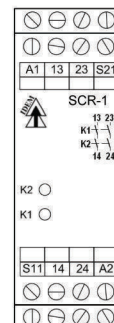
Safety Precautions



- 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.

Electrical Connection

- When the 24V 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 (4A slow-blow or 6A quick-action or 10A gG) must be provided.
- A maximum length of the control lines of 1000 meters with a line cross section of 0.75mm² 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 24V 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

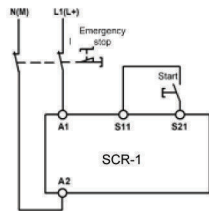


Fig. 1:
Two-channel emergency stop circuit without fault monitoring of the emergency stop button and the supply cables.
(category 3, up to PL d)

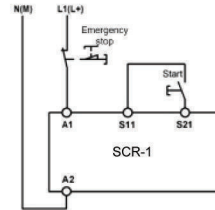


Fig. 2:
Single-channel emergency stop circuit without fault monitoring of the emergency stop button and the supply cables.
(category 1, up to PL c)

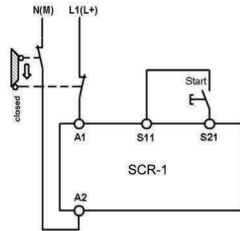


Fig. 3:
Two-channel sliding guard monitoring with positively driven limit switches.
(category 3, up to PL d)

Starting Behavior

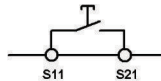


Fig. 4:
Manual start.

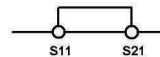


Fig. 5:
Automatic start
(e.g. for applications with a safety door).

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

Feedback Loop

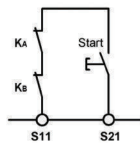


Fig. 6:
Feedback loop.
Monitoring of externally connected contactors or expansion modules.

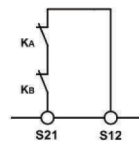


Fig. 7:
Feedback loop for automatic start.
The feedback loop monitors contactors or the expansion modules.

Safety contacts

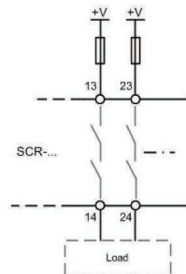


Fig. 8:
Connecting load to safety contacts.

(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.

5. 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.

6. Triggering safety function:

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

7. 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 (DC13; 24V)	<= 0,1A	<= 1A	<= 2A
T10d [years]	20	20	20
Category:	3	3	3
PL	d	d	d
PFHd [1/h]:	1,03E-07	1,3E-07	1,3E-07
nop [cycle / year]	<= 400.000	<= 73.000	<= 17.000

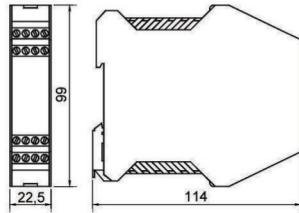
Techn. Data

Corresponds to the standards	EN 60204-1; EN ISO 13849-1 ; EN 62061
Operating voltage	AC/DC 24V
Rated supply frequency	AC: 50-60Hz
Permissible deviation	+ / - 10%
Power consumption	DC 24V ca. 1.2 W
Control voltage at S11	DC 24V
Control current S11...S14	max. 40mA
Safety contacts	2 NO contacts
Max. switching voltage	AC 250V
Safety contact breaking capacity (13-14, 23-24)	AC: 250V, 1500VA, 6A for ohmic load, 250V, 4A for AC-15 DC: 24V, 30W, 1.25A for ohmic load; 24V, 30W, 2A for DC-13
Minimum contact load	24V, 20mA
Min. Contact fuses	4A slow-blow or 6 A quick-action or 10A gG
Max. line cross section	0.14 - 2.5mm ²
Max. length of control line	1000m with 0.75mm ²
Contact material	AgNi
Contact service life	mech. approx. 1 x 10 ⁷ , electr. 1 x 10 ⁵ operating cycles
Test voltage	2.5kV (control voltage/contacts)
Rated impulse withstand voltage, leakage path/air gap	4kV (DIN VDE 0110-1)
Rated insulation voltage	250V
Degree of protection	IP20
Temperature range	DC 24V: -15°C to +60°C AC 230/115V: -15°C to +40°C
Degree of contamination	2 (DIN VDE 0110-1)
Overvoltage category	3 (DIN VDE 0110-1)
Weight	approx. 230g
Mounting	DIN rail according to EN 60715TH35



User Information

Dimension
Drawing



Variants

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

CE EC Declaration of Conformity

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

Devices: Safety Emergency Stop, Relays for monitoring Emergency Stop and Safety Switches
Identification: Types: SCR-1, SCR-2, SCR-3

Product Name	Affixing of CE marking	No. of Certificate
SCR-1	2010	01/205/5055/10
SCR-2	2010	01/205/5055/10
SCR-3	2010	01/205/5055/10

The above products conform to the Safety Requirement of the following directives:

Machinery Directive 2006/42/EC

EMC Directive (2004/108/EC)

Low Voltage Directive (2006/95/EC)

and the relevant requirements of the stated standards:

EN60439-1:2005-01	EN60947-1:2008-04	EN60947-5-1:2010-04
EN60947-7-1:2003-07	EN61000-6-2:2006-03	EN61000-6-3:2007-09
EN61326-3-1:2008-11	EN ISO13849-1:2008-12	EN ISO13849-2:2008-09
IEC62061:2005-10		

Certification Body: No. NB0035
TÜV Rheinland Industrie Service GmbH
10882 Berlin
Zertifizierungsstelle für Maschinen

11th October 2010

M. Mohtasham Managing Director

V. Crolla, Documentation Manager