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.

Product Safety
Functional Safety
TÜVRheinland CERTIFIED
www.tuv.com ID 0600000000

c UL us LISTED
(not for plug-in terminals)

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.

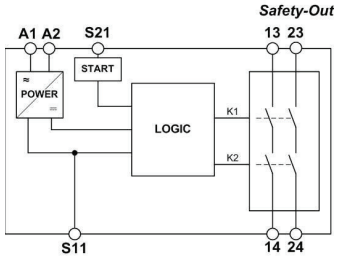


Fig. 1 Block diagram SCR-1

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.

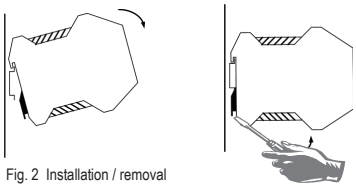


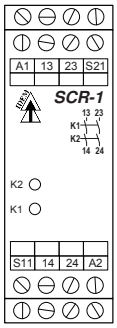
Fig. 2 Installation / removal

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.
- 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 mm^2 must not be exceeded.
- The line cross section must not exceed 2.5mm^2.
- 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

Safety Relays from IDEM SCR-1

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

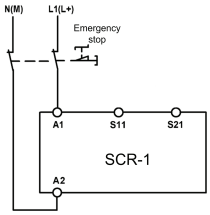


Fig. 1:
Two-channel emergency stop circuit without fault monitoring of the emergency stop button and the supply cables.
(category 3, up to PL d)

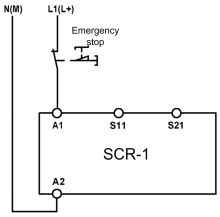


Fig. 2:
Single-channel emergency stop circuit without fault monitoring of the emergency stop button and the supply cables.
(category 1, up to PL c)

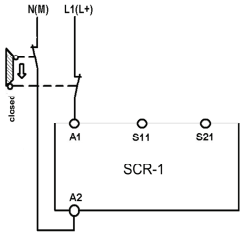


Fig. 3:
Two-channel sliding guard monitoring with positively driven limit switches.
(category 3, up to PL d)

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

Starting Behavior

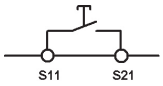
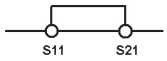


Fig. 4:
Manual start.



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

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

Feedback Loop

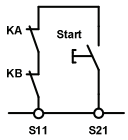


Fig. 6:
Feedback loop.
Monitoring of externally connected contactors or expansion modules.

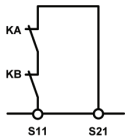


Fig. 7:
Feedback loop for automatic start:
The feedback loop monitors contactors or the expansion modules .

Safety contacts

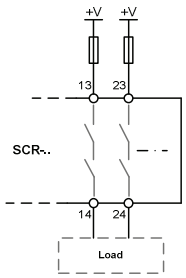


Fig. 8:
Connecting load to safety contacts.

(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.

Safety Relays from IDEM SCR-1

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

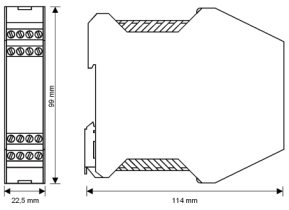
Corresponds to the standards	EN 60204-1; EN ISO 13849-1 ; EN 62061
Operating voltage	AC 230 V, AC 115 V, AC/DC 24 V
Rated supply frequency	AC: 50-60 Hz
Permissible deviation	+ / - 10 %
Power consumption	***DC 24 V AC 230 V*** approx. 1.2 W approx. 3.5 VA
Control voltage at S11	DC 24 V
Control current 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

Safety Relays from IDEM SCR-1

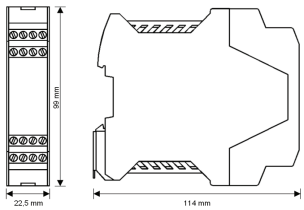
User Information

Dimension Drawing

Fixed Terminals



Plug-In Terminals



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

L01
Ver. B
E61-322-00

Safety Relays from IDEM SCR-2

User Information

Correct Use

The SCR-2 is a universal emergency stop safety switching device with two safe relay outputs that can quickly and safely stop the moving parts of a machine or system in case of danger.

Applications for the SCR-2 include single or dual-channel emergency stop circuits and guard monitoring on machines and systems.

Product Safety Functional Safety
TÜVRheinland CERTIFIED
www.tuv.com ID 0600000000

c UL us LISTED
(not for plug-in terminals)

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:*
  - Monitored manual start
  - Automatic start
- *Up to PL e, SILCL 3, category 4*

Function

The emergency stop safety switching device SCR-2 is designed for safe isolation of safety circuits according to EN 60204-1 and can be used up to safety category 4, PL e according to EN ISO 13849-1.

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

If the emergency stop circuit 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 fault is detected by cyclical self-monitoring no later than when the system is switched off and switched on again.

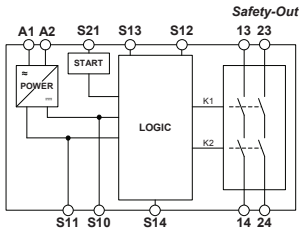


Fig. 1 Block diagram SCR-2

Installation

As per DIN 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 35 mm DIN rail according to DIN EN 60715 TH35.

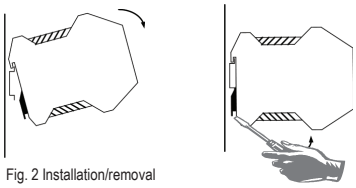


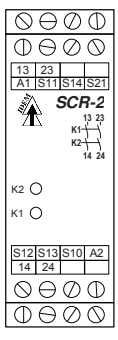
Fig. 2 Installation/removal

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 safety 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 safety contacts (10 A gG) must be provided.
- A maximum length of the control lines of 1000 meters with a line cross section of 0.75 mm^2 must not be exceeded.
- The line cross section must not exceed 2.5 mm^2.
- 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*
S10:	*Control line*
S21:	*Start control line*
S13:	*Control line*
S14:	*Control line*
S12:	*Control line*
13-14:	*Safety contact 1*
23-24:	*Safety contact 2*

Fig. 3 Connections

Safety Relays from IDEM SCR-2

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. 11.

Emergency Stop Circuit

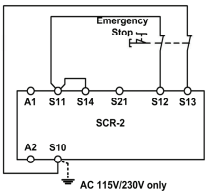


Fig. 1:
Two-channel emergency stop circuit with short circuit and earth fault monitoring.
(category 4, up to PL e)

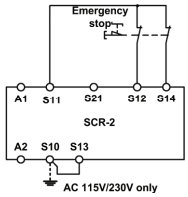


Fig. 2:
Two-channel emergency stop circuit with earth fault monitoring.
(category 3, up to PL d)

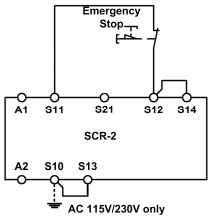


Fig. 3:
Single-channel emergency stop circuit with earth fault monitoring.
(category 1, up to PL c)

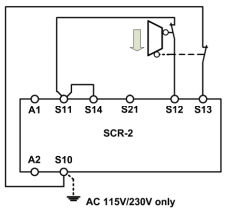


Fig. 4:
Two-channel sliding guard monitoring with short circuit and earth fault monitoring.
(category 4, up to PL e)

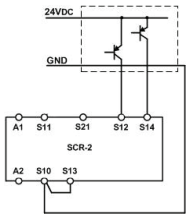


Fig. 5:
Two-channel emergency stop with pnp-outputs/OSSD-outputs ***with*** *short circuit monitoring.*
(category 4, up to PL e)

Notice:
In order to activate earth fault monitoring, S10 must be connected to PE (protective earth) on the AC115/230V devices. With AC/DC 24 V, connect PE only to the power supply unit according to EN60204-1.

Corresponded to the application, the starting circuit have to be wired according to Fig. 6 or Fig. 7.

Starting Behavior

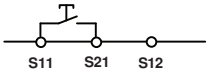
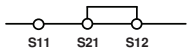


Fig. 6:
Monitored manual start.
It is monitored that the start button was opened before the emergency stop button closes.
(Prerequisite:
operating voltage must not be interrupted.)



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

Fig. 7:
Automatic start.
Max perm. delay during closing of the safety switches on S12 and S13:
S12 before S13: 300 ms
S13 before S12: any

Feedback Loop

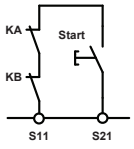


Fig. 8:
Feedback loop for monitored manual start:
The feedback loop monitors contactors or the expansion modules .

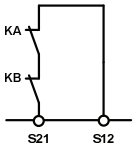


Fig. 9:
Feedback loop for automatic start:
The feedback loop monitors contactors or the expansion modules .

Power supply and Safety contacts

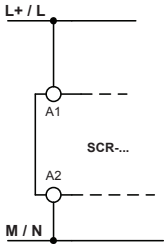


Fig. 10:
Power supply A1 and A2.

(Power supply according to techn. Data)

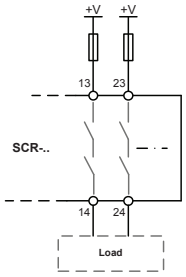


Fig. 11:
Connecting load to safety contacts.

(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. 5).

2. Wiring start circuit:
Wire the start circuit according to Fig. 6 or Fig. 7 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 "Monitored 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. 8 or Fig. 9.

4. Wiring power supply:
Connect the power supply to terminals A1 and A2 (Fig. 10).
Warning: Wiring only in de-energized state.

5. Starting the device:
Switch on the operating voltage.
Warning:
If the "Automatic start" starting behavior is set, the safety contacts will close immediately.
If the "Monitored 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.

Safety Relays from IDEM SCR-2

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.*
- *Was the start button opened before closing of the emergency stop circuit (with manual start)?*
- *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 e

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-2			
Load (DC-13; 24 V)	**<= 0.1 A**	**<= 1 A**	**<= 3 A**
T10d [years]	**20**	**20**	**20**
Category	**4**	**4**	**4**
PL	**e**	**e**	**e**
PFHd [1/h]	**1.2E-08**	**1.2E-08**	**1.2E-08**
nop [cycle / year]	**<= 400,000**	**<= 100,000**	**<= 22,500**

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*** approx. 1.5 W ***AC 230V*** approx. 3.5 VA
Control voltage at S11	DC 24 V
Control current S11...S14	approx. 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 (6 switching cycles/ min) 250 V, 3 A for AC-15 DC: 24 V, 144 W, 6A for ohmic load (6 switching cycles/ min) 24 V, 3 A for DC-13
Minimum contact load	24 V, 20 mA
Min. Contact fuses	10 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	$AgSnO_2$
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

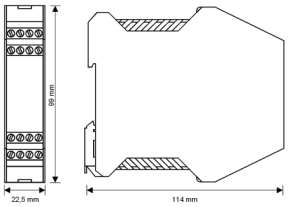
*) 20 % Undervoltage: T_{max}: 50 °C

Safety Relays from IDEM SCR-2

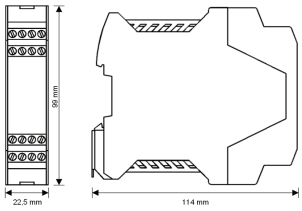
User Information

Dimension Drawing

Fixed Terminals



Plug-In Terminals



Versions

SCR-2, AC 230V (50-60Hz), fixed screw terminals
SCR-2, AC 115V (50-60Hz), fixed screw terminals
SCR-2, AC/DC 24V (AC: 50-60Hz), fixed screw terminals
SCR-2, AC 230V (50-60Hz), plug-in terminals
SCR-2, AC 115V (50-60Hz), plug-in terminals
SCR-2, AC/DC 24V (AC: 50-60Hz), 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

L01
Ver. B
E61-323-00

Safety Relays from IDEM SCR-3

User Information

Correct Use

The SCR-3 is a universal emergency stop safety switching device with three safe relay outputs that can quickly and safely stop the moving parts of a machine or system in case of danger.

Applications for the SCR-3 include single or dual-channel emergency stop circuits and guard monitoring on machines and systems.

Product Safety Functional Safety
TÜVRheinland CERTIFIED
www.tuv.com ID 0600000000

c UL us LISTED
(not for plug-in terminals)

Features

- *3 safe, redundant relay outputs*
  1 auxiliary contact (signaling contact)
- *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:*
  - Monitored manual start
  - Automatic start
- *Short circuit and earth fault monitoring*
- *Up to PL e, SILCL 3, category 4*

Function

The emergency stop safety switching device SCR-3 is designed for safe isolation of safety circuits according to EN 60204-1 and can be used up to safety category 4, PL e according to EN ISO 13849-1.

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

When 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 fault is detected by cyclical self-monitoring no later than when the system is switched off and switched on again.

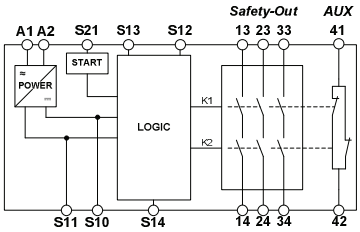


Fig. 1 Block diagram SCR-3

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 35 mm DIN rail according to DIN EN 60715 TH35.

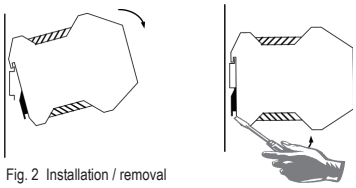


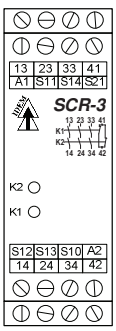
Fig. 2 Installation / removal

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 safety 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 safety contacts (10 A gG) must be provided.
- A maximum length of the control lines of 1000 meters with a line cross section of 0.75 mm^2 must not be exceeded.
- The line cross section must not exceed 2.5 mm^2.
- 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*
S10:	*Control line*
S21:	*Start control line*
S13:	*Control line*
S14:	*Control line*
S12:	*Control line*
13-14:	*Safety contact 1*
23-24:	*Safety contact 2*
33-34:	*Safety contact 3*
41-42:	*Auxiliary contact*

Fig. 3 Connections

Safety Relays from IDEM SCR-3

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. 11.

Emergency Stop Circuit

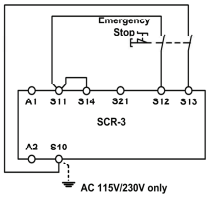


Fig. 1:
Two-channel emergency stop circuit with short circuit and earth fault monitoring.
(category 4, up to PL e)

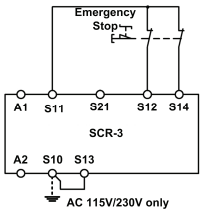


Fig. 2:
Two-channel emergency stop circuit with earth fault monitoring.
(category 3, up to PL d)

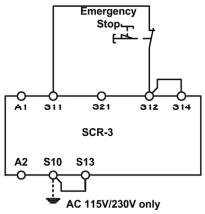


Fig. 3:
Single-channel emergency stop circuit with earth fault monitoring.
(category 1, up to PL c)

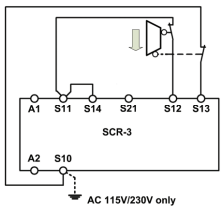


Fig. 4:
Two-channel sliding guard monitoring with short circuit and earth fault monitoring.
(category 4, up to PL e)

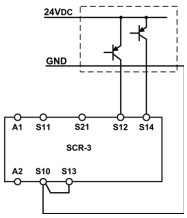


Fig. 5:
Two-channel emergency stop with pnp-outputs/OSSD-outputs ***with*** *short circuit monitoring.*
(category 4, up to PL e)

Notice:
In order to activate earth fault monitoring, S10 must be connected to PE (protective earth) on the AC115/230V devices. With AC/DC 24 V, connect PE only to the power supply unit according to EN60204-1.

Corresponded to the application, the starting circuit have to be wired according to Fig. 6 or Fig. 7.

Starting Behavior

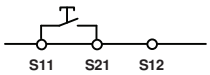
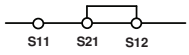


Fig. 6:
Monitored manual start.
It is monitored that the start button was opened before the emergency stop button closes. (Prerequisite: operating voltage must not be interrupted.)



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

Fig. 7:
Automatic start.
Max perm. delay during closing of the safety switches on S12 and S13:
S12 before S13: 300 ms
S13 before S12: any

Feedback Loop

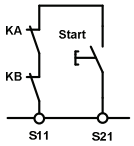


Fig. 8:
Feedback loop for monitored manual start:
The feedback loop monitors contactors or the expansion modules .

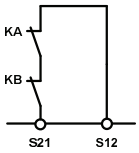


Fig. 9:
Feedback loop for automatic start:
The feedback loop monitors contactors or the expansion modules .

Power supply and Safety contacts

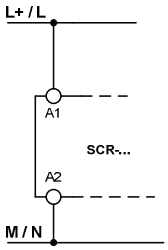


Fig. 10:
Power supply A1 and A2.

(Power supply according to techn. Data)

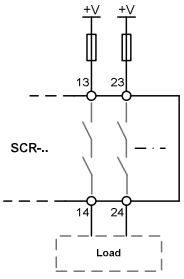


Fig. 11:
Connecting load to safety contacts.

(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. 5).

2. Wiring start circuit:

Wire the start circuit according to Fig. 6 or Fig. 7 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 "Monitored 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. 8 or Fig. 9.

4. Wiring power supply:

Connect the power supply to terminals A1 and A2 (Fig. 10).

Warning: Wiring only in de-energized state.

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 "Monitored 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.

Safety Relays from IDEM SCR-3

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.*
- *Was the start button opened before closing of the emergency stop circuit (with manual start)?*
- *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 e.

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-3

Load (DC-13; 24 V)	**<= 0.1 A**	**<= 1 A**	**<= 2 A**
T10d [years]	**20**	**20**	**20**
Category	**4**	**4**	**4**
PL	**e**	**e**	**e**
PFHd [1/h]	**1.2E-08**	**1.2E-08**	**1.2E-08**
nop [cycle / year]	**<= 500,000**	**<= 350,000**	**<= 100,000**

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	50-60 Hz
Permissible deviation	+ / - 10 %
Power consumption	***DC 24 V*** ***AC 230 V*** approx. 2.3 W approx. 6.9 VA
Control voltage at S11	DC 24 V
Control current S11...S14	approx. 60 mA
Safety contacts	3 NO contacts
Auxiliary contacts	1 NC contact
Max. switching voltage	AC 250 V
Safety contact breaking capacity (13-14, 23-24, 33-34)	AC: 250 V, 2000 VA, 8 A for ohmic load (6 switching cycles/ min) 250 V, 3 A for AC-15 DC: 40 V, 320 W, 8 A for ohmic load (6 switching cycles/ min) 24 V, 3 A for DC-13 Max. total current through all 3 contacts 15 A (13-14, 23-24, 33-34) *)
Auxiliary contact breaking capacity (41-42)	AC: 250 V, 500 VA, 2 A for AC-12 DC: 40 V, 80 W, 2 A for DC-12
Minimum contact load	24 V, 20 mA
Min. Contact fuses	10 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	-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

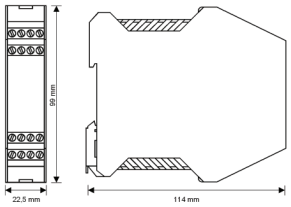
*) If several SCR-3 devices are closely spaced under load, the max. total current at the ambient temperature of T=20 °C: 9 A; at T=30 °C: 3 A; at T=40 °C =1 A.
If these currents are exceeded, a spacing of 5 mm between the devices must be observed.

Safety Relays from IDEM SCR-3

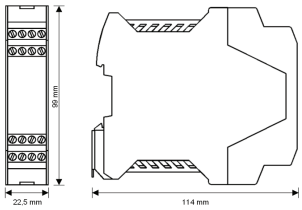
User Information

Dimension Drawing

Fixed Terminals



Plug-In Terminals



Variants

SCR-3, AC/DC 24 V, (50-60 Hz), fixed screw terminals
SCR-3, AC 115 V, (50-60 Hz), fixed screw terminals
SCR-3, AC 230 V, (50-60 Hz), fixed screw terminals
SCR-3, AC/DC 24 V, (50-60 Hz), plug-in terminals
SCR-3, AC 115 V, (50-60 Hz), plug-in terminals
SCR-3, AC 230 V, (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

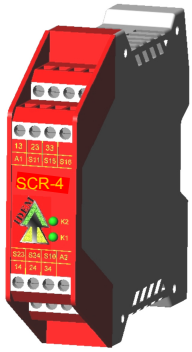
IDEM SAFETY SWITCHES Ltd, 2 Ormside Close, Hindley Industrial Estate ,Hindley Green, Wigan, WN2 4HR UK, Tel: +44 (0)1942 261000 Fax.: +44 (0)1942 676293
IDEM (U.S.A.) - 3909 Washington Blvd. 204, Fremont, CA 94538 email: sales@idemsafety.com web: www.idemsafety.com

Safety Relays from IDEM SCR-4-TD..

User Information

Correct Use

SCR-4 is an emergency stop safety relay combination that combines non-time-delayed and time-delayed contacts in a very compact housing. This permits dangerous components of a system to be switched off quickly and safely in an emergency situation. At the same time, other circuits can continue to be supplied with voltage for up to 30 seconds to allow a tool to be moved to its idle position or to brake following parts, for example.



Product Safety Functional Safety
TÜVRheinland CERTIFIED
www.tuv.com ID 0600000000

c UL us LISTED
(not for plug-in terminals)

Features

- *4 positively driven safety relays contacts. Possible variants:*
  - *3 non-time-delayed and 1 time-delayed contact*
  - *2 non-time-delayed and 2 time-delayed contact*
  - *1 non-time-delayed and 3 time-delayed contact*
- *Continuously adjustable time delay (1 to 30 s).*
- *Connection of:*
  - *Emergency stop buttons*
  - *Safety switches*
  - *Non-contacts safety switches*
  - *OSSD-Outputs*
- *1- or 2-channel activation 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:*
  - *monitored manual start*
  - *automatic start*
- *Short circuit and earth fault monitoring*
- *Up to PL e, SILCL 3, category 4*

Function

The moving parts of a machine or system can be quickly and safely stopped in case of danger with the non-time-delayed contacts of the SCR-4 Safety contacts with time-delay switch-off are also integrated into the SCR-4. They are used whenever it is safer to keep supplying voltage to parts of a machine after the emergency stop switch is operated.

It is ensured that a single fault or malfunction does not lead to a loss of the safety function and that every fault is detected by cyclical self-monitoring no later than when the system is switched off and switched on again.

The time-delay contacts are activated at the same time as the non-time-delay contacts; however, when the emergency stop button is pressed, the contacts are only deactivated after the time set on the potentiometer (1 … 30 s).

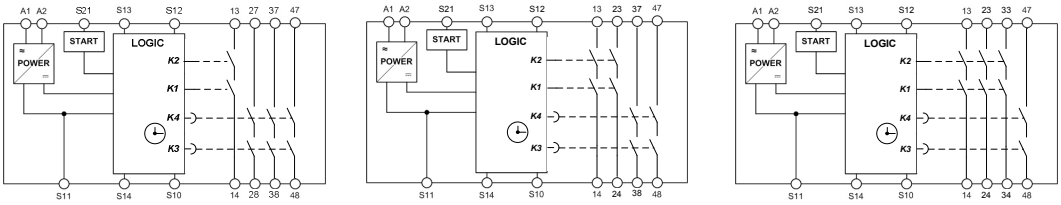


Fig. 1 Block diagram: SCR-4 -TD3(1nd/3d); SCR-4 -TD2(2nd/2d); SCR-4 -TD1(3nd/1d)

Installation

As per DIN 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 35 mm DIN rail according to DIN EN 60715 TH35.

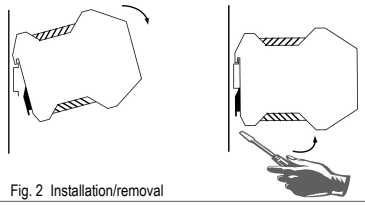


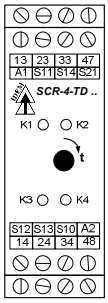
Fig. 2 Installation/removal

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: x”) 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

- A safe 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 safety contacts (10 A gG) must be provided.
- A maximum length of the control lines of 1000 meters with a line cross section of 0.75 mm^2 must not be exceeded.
- The line cross section must not exceed 2.5 mm^2.
- 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*
S10:	*Control line*
S12:	*Control line*
S13:	*Control line*
S14:	*Control line*
S21:	*Start control line*
13-14:	*Safety contact 1 (nd)*
23-24/27-28:	*Safety contact 2 (d / nd)*
33-34/37-38:	*Safety contact 3 (d / nd)*
47-48:	*Safety contact 4 (d)*

Fig. 3 Connections nd = non-time delayed; d = time-delayed

Safety Relays from IDEM SCR-4-TD..

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. 11. Non-time delayed contacts can be used up to category 4, PL e, time-delayed safety contacts up to category 3, PL e.

Emergency Stop Circuit

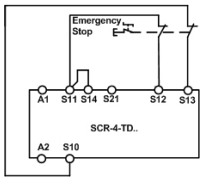


Fig. 1:
Two-channel emergency stop circuit with short circuit and earth fault monitoring.
(up to category 4, PL e)

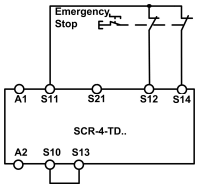


Fig. 2:
Two-channel emergency stop circuit with earth fault monitoring.
(up to category 3, PL d)

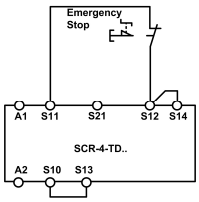


Fig. 3:
Single-channel emergency stop circuit with earth fault monitoring.
(up to category 1, PL c)

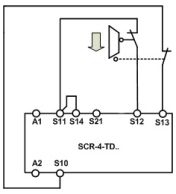


Fig. 4:
Two-channel sliding guard monitoring with short circuit and earth fault monitoring.
(up to category 4, PL e)

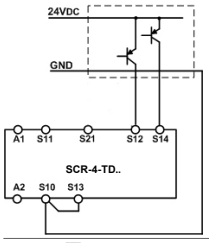


Fig. 5:
Two-channel emergency stop with pnp-outputs/OSSD-outputs ***with*** *short circuit monitoring.*
(up to category 4, PL e)

Warning:
In order to activate earth fault monitoring, the PE must be connected only to the power supply unit in accordance with EN60204-1.

Corresponded to the application, the starting circuit have to be wired according to Fig. 6 or Fig. 7.

Starting Behavior

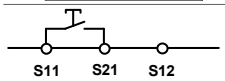
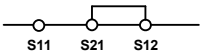


Fig. 6:
Manual start.



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

Fig. 7:
Automatic start (e.g. for application with a safety door).
Max perm. delay during closing of the safety switches on S12 and S13:

Feedback Loop

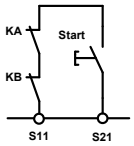


Fig. 8:
Feedback loop for manual start:
The feedback loop monitors contactors or the expansion modules .

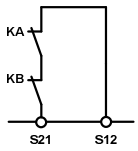


Fig. 9:
Feedback loop for automatic start:
The feedback loop monitors contactors or the expansion modules .

Power supply and Safety contacts

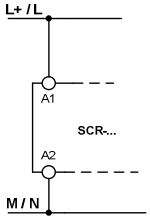


Fig. 10:
Power supply A1 and A2.

(Power supply according to techn. data)

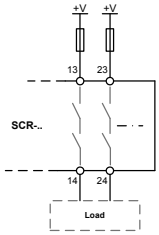


Fig. 11:
Connecting load to safety contacts.

(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. 5).

2. Wiring start circuit:
Wire the start circuit according to Fig. 6 or Fig. 7 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 “Monitored 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. 8 or Fig. 9.

4. Wiring power supply:
Connect the power supply to terminals A1 and A2 (Fig. 10).
Warning: Wiring only in de-energized state.

5. Set time delay:
Set the desired time delay on the rotary knob (not for fixed delay time)

Warning:
Scale divisions should be regarding only as a setting aid. Always make shure to measure the delay time.

6. Starting the device:
Switch on the operating voltage.

Warning:
If the “Automatic start” starting behavior is set, the safety contacts will close immediately.
If the “Monitored manual start” starting behavior is set, close the start button to close the safety contacts.
LEDs ***K1***, ***K2, K3*** and ***K4*** are lit.

7. Triggering safety function:
Open the emergency stop circuit by actuating the connected safety switch. The safety contacts open immediately.
Warning: *Messen Sie die Verzögerungszeit.*

8. 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.

Safety Relays from IDEM SCR-4-TD..

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 (to do this, check the wiring of the device and activate the emergency stop function. Check the delay time).

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.*
- *Was the start button opened before closing of the emergency stop circuit (with manual start)?*
- *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 e.

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-4

Load (DC-13; 24 V)	**<= 0.1 A**	**<= 1 A**	**<= 2 A**
T10d [years]	20	20	20
Category			
Time-delay	3	3	3
Non-time-delay	4	4	4
PL	e	e	e
PFHd [1/h]			
Time-delay	8.84E-08	8.84E-08	8.84E-08
Non-time-delay	4.22E-08	4.22E-08	4.22E-08
nop [cycle / year]	<= 500,000	<= 350,000	<= 100,000

Techn. Data

Corresponds to the standards	EN60204-1, VDE0113-1, EN ISO 13849-1, EN 62061
Operating voltage	AC/DC 24 V
Rated supply frequency	50 - 60 Hz
Permissible deviation	+/- 10 %
Power consumption	**DC 24 V** **AC 24 V** approx. 4.7 W approx. 5.3 VA
Control voltage at S11	DC 24 V
Control current	approx. 190 mA
Response delay after actuation of the buttons	< 20 ms
Safety contacts	4 NO contacts (3n/1d, 2n/2d, 1n/3d)
Max. switching voltage	AC 250 V
Safety contact breaking capacity	AC: 250 V, 2000 VA, 8 A for omic load (6 switching cycles/ min) 250 V, 3 A for AC-15 DC: 40 V, 320 W, 8 A for omic load (6 switching cycles/ min) 24 V, 3 A for DC-13
Max. cumulative current on the safety contacts	15 A *)
Time delay	1 ... 30 s, continuously adjustable
Minimum contact load	24 V, 20 mA
Min. contact fuses	10 A gG
Max. line cross section	0.14 - 2.5 mm^2
Max. length of control line	1000 m at 0.75 mm^2
Contact material	$AgSnO_2$
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
Rated insulation voltage	250 V
Degree of protection	IP20
Degree of contamination	2 (DIN VDE 0110-1)
Overvoltage category	3 (DIN VDE 0110-1)
Temperature range	-15 °C ... +40 °C
Weight	approx. 250 g
Mounting	DIN rail according to EN 60715TH35

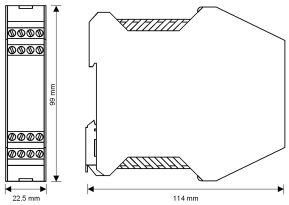
*) If several SCR-4 devices are closely spaced under load, the max. total current at the ambient temperature of T=20 °C: 9 A; at T=30 °C: 3 A; at T=40 °C =1 A. If these currents are exceeded, a spacing of 5 mm between the devices must be observed.

Safety Relays from IDEM SCR-4-TD..

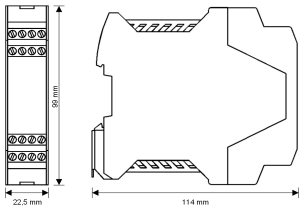
User Information

Dimension Drawing

Fixed Terminals



Plug-In Terminals



Versions

SCR-4-TD1	AC/DC 24 V, 3 non-time del./ 1 time-del. contact 1-30 s, fixed screw terminals
SCR-4-TD2	AC/DC 24 V, 2 non-time del./ 2 time-del. contacts 1-30 s, fixed screw terminals
SCR-4-TD3	AC/DC 24 V, 1 non-time del./ 3 time-del. contacts 1-30 s, fixed screw terminals
SCR-4-TD1	AC/DC 24 V, 3 non-time del./ 1 time-del. contact 1-30 s, plug-in terminals
SCR-4-TD2	AC/DC 24 V, 2 non-time del./ 2 time-del. contacts 1-30 s, plug-in terminals
SCR-4-TD3	AC/DC 24 V, 1 non-time del./ 3 time-del. contacts 1-30 s, 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 relay for monitoring Emergency Stop and Safety Switches

Product Name	Affixing of CE marking:	No of Certificate
SCR-4	2015	01/205/5239.01/15

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

2006/42/EG : Machinery directive

2004/108/EG : EMC directive till 2016-04-19 **2014/30/EU : EMC directive from 2016-04-20**

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

EN 60439-1:2005-01
EN 61000-6-2:2006-03
EN 60947-1:2011-10
EN 61000-6-3:2011-09
EN 60947-5-1:2010-04
DIN EN 61326-3-1:2008-11

According to the certificate of TÜV-Rheinland:

DIN EN ISO 13849-1:2008-12 **EN 62061:2005 +AC:2010:A1:2013**

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

14th August 2015

M. Mohtasham: Managing Director

V. Crolla: Documentation Manager

H02
Ver. A
E61-325-00

Safety Relays from IDEM SEU-1

User Information

(not for plug-in terminals)

Correct Use

The SEU-1 contact block in combination with any basic device from the IDEM SCR series can be used to produce up to three additional safety contact paths per device. An existing system can thus be expanded practically indefinitely in a modular manner. Activation takes place via a safety contact of the basic device, the SEU-1 provides signaling contacts for fault monitoring. The devices can be used in machines and systems up to safety category 4, PL e according to EN ISO 13849-1.

Features

- *3 safe, redundant relay outputs*
  1 auxiliary contact (fault monitoring)
- *Activation via basic device from the IDEM SCR series*
- *Modular, freely configurable safety system*
- *Fault monitoring by basic device*
- *Earth fault monitoring*
- *Indication of the switching state via LED*
- *Up to category 4, PL e, SILCL 3*

Function

The safety expansion module SEU-1 in combination with a basic device from the IDEM SCR series is designed for safe isolation of safety circuits according to EN 60204-1 and can be used up to safety category 4, PL e according to EN ISO 13849-1.

Terminal S11 (DC 24 V control voltage) is connected with terminals S15 and S16 via the safety contacts of the basic device. Starting the basic device also activates the SEU-1. The basic device disconnects the control voltage when the safety switch is operated, and the safety contacts of the SEU-1 open immediately.

If a fault occurs in the SEU-1, this is detected by the basic device via terminals S23 and S24.

Independent operation without basic device is not possible.

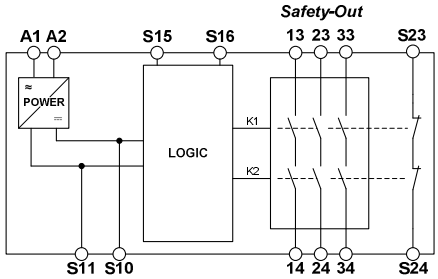


Fig. 1 Block diagram SEU-1

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 35 mm DIN rail according to DIN EN 60715 TH35.

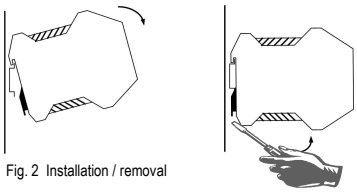


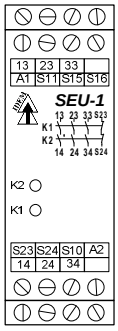
Fig. 2 Installation / removal

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: x”) 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 DIN EN 61558-2-6 or a power supply unit with electrical isolation from the mains must be connected.
- External fusing of the safety 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 mm^2 must not be exceeded.
- The line cross section must not exceed 2.5 mm^2.
- 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*
S10:	*Control line*
S15:	*Control line*
S16:	*Control line*
S23:	*Fault monitoring*
S24:	*Fault monitoring*
13-14:	*Safety contact 1*
23-24:	*Safety contact 2*
33-34:	*Safety contact 3*

Fig. 3 Connections

Safety Relays from IDEM SEU-1

User Information

Applications

Depending on the application, the device must be wired with a IDEM basic device as shown in Fig. 1 to Fig. 2.If the devices are wired inside a control cabinet (minimum degree of protection IP54), the fault involving a short circuit between the activation lines can be ruled out (protected wiring space). Category 4, PL e according to EN ISO 13849-1 is thereby possible.

If this fault cannot be ruled out, category 3, PL e is achieved.

Wiring

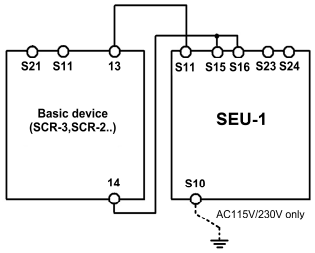


Fig. 1: Connection of SEU-1 to basic device

Wiring of the SEU-1 via only 4 lines:

A safety contact of the basic devices (e.g. 13-14) activates the relays of the SEU-1 (S11 and S15/S16).

Two lines on S23 and S24 are required for feedback/fault monitoring. According to the application, they have to be wired according to Fig. 3 respective Fig. 4.

A fault in the SEU-1 thereby prevents the entire safety chain from restarting.

Earth faults in the control lines are detected in addition to internal faults.

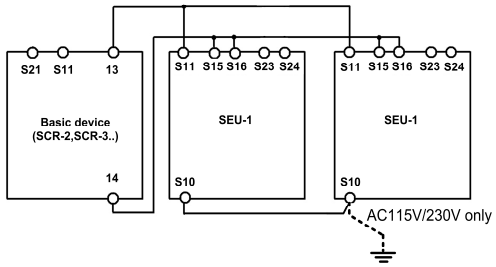


Fig. 2: Connection of several SEU-1 units to basic device

If further SEU-1 units are to be integrated into the system, terminals S11 must be connected in parallel on all SEU-1 units. This also applies to terminals S10 and terminals S15/S16.

The feedback-loops (S23-S24) of the several expansion devices have to be wired in series to the start of the basic device (see Fig. 3 respective Fig. 4).

Notice:

In order to activate earth fault monitoring, S10 must be connected to PE (protective earth) on the AC115/230V devices. With AC/DC 24 V, connect PE only to the power supply unit according to EN60204-1.

Feedback Loop

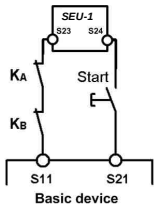


Fig. 3: Feedback Loop

Contactors connected to the SEU-1 or the basic devices are monitored via the feedback loop of the basic device. KA and KB are the positively driven contacts of the connected contactor or expansion module.

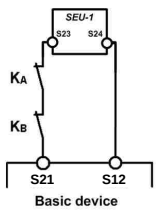


Fig. 4: Feedback Loop with Auto-Start

Contactors connected to the SEU-1 or the basic devices are monitored via the feedback loop of the basic device. KA and KB are the positively driven contacts of the connected contactor or expansion module.

Power supply and Safety contacts

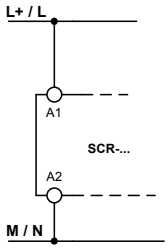


Fig. 5:

Power supply A1 and A2.

(Power supply according to techn. Data)

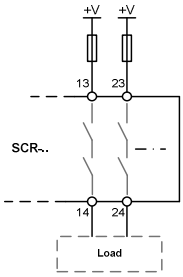


Fig. 6:

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 SEU-1:

Wire the SEU-1 with the IDEM basic device according to your application (see Fig. 1 to Fig. 2).

2. Wiring basic device:

Wire the basic device according to the required Performance Level determined (see user information for the basic device).

3. Wiring feedback loop:

Wire the feedback loop as shown in Fig. 3 or Fig. 4.

4. Wiring power supply:

Connect the power supply to terminals A1 and A2 (Fig. 5).

Warning: Wiring only in de-energized state.

5. Starting the device:

Switch on the operating voltage.

Warning:

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

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

The LEDs ***K1*** and ***K2*** *on the basic device and on the SEU-1* are lit.

6. Triggering safety function:

Open the emergency stop circuit by actuating the connected safety switch. The safety contacts of the basic device and the SEU-1 open immediately.

7. Reactivation:

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

If the “Monitored manual start” starting behavior is set, close the start button on the basic device to close the safety contacts of the basic device and the SEU-1.

Safety Relays from IDEM SEU-1

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 of the SEU-1 and the basic device by comparing it with the wiring diagrams (also see user information for the basic device).*
- *Check the safety switch used on the basic device for correct function and adjustment.*
- *Check whether the emergency stop circuit of the basic device is closed.*
- *Check whether the start button on the basic device (with manual start) is closed.*
- *Check the operating voltage at A1 and A2 on the basic device and on the SEU-1.*
- *Is the feedback loop closed?*

Device cannot be switched on again after an emergency stop:

- *Check whether the emergency stop circuit was closed again.*
- *Was the start button opened before closing of the emergency stop circuit (with manual start)?*
- *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 e.

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 SEU-1			
Load (DC-13; 24 V)	**<= 0.1 A**	**<= 1 A**	**<= 2 A**
T10d [years]	**20**	**20**	**20**
Category	**4**	**4**	**4**
PL	**e**	**e**	**e**
PFHd [1/h]	**1.2E-08**	**1.2E-08**	**1.2E-08**
nop [cycle / year]	**<= 400,000**	**<= 73,000**	**<= 17,000**

Techn. Data

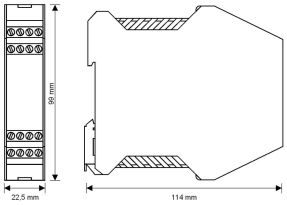
Corresponds to the standards	EN 60204-1; EN ISO 13849-1 ; EN 62061
Operating voltage	AC 230 V, AC 115 V, AC/DC 24 V
Rated supply frequency	AC: 50-60 Hz
Permissible deviation	+ / - 10 %
Power consumption	***DC 24 V*** ***AC 230 V*** approx. 1.2 W approx. 3.5 VA
Control voltage at S11	DC 24 V
Control current S11...S14	max. 40 mA
Safety contacts	3 NO contacts
Auxiliary contacts	1 NC contact; monitoring contact for basic device
Max. switching voltage	AC 250 V
Safety contact breaking capacity	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 Max. total current through all 3 contacts: 10.5 A
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 operating cycles
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 115 / 230 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

Safety Relays from IDEM SEU-1

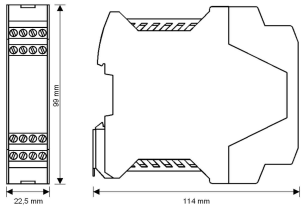
User Information

Dimension Drawing

Fixed Terminals



Plug-In Terminals



Variants

SEU-1, AC 230 V (50-60 Hz), fixed screw terminals
SEU-1, AC 115 V (50-60 Hz), fixed screw terminals
SEU-1, AC/DC 24 V (AC: 50-60 Hz), fixed screw terminals
SEU-1, AC 230 V (50-60 Hz), plug-in terminals
SEU-1, AC 115 V (50-60 Hz), plug-in terminals
SEU-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 contact extension module for monitoring Emergency Stop and Safety Switches

Product Name	Affixing of CE marking:	No of Certificate
SEU-TD1	2014	968/ EZ 470.01/14
SEU-1	2014	968/ EZ 469.01/14

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

2006/42/EG : Machinery directive

2004/108/EG : EMC directive till 2016-04-19 **2014/30/EU : EMC directive from 2016-04-20**

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

EN 60439-1:2005-01 **EN 60947-1:2011-10** **EN 60947-5-1:2010-04**
EN 61000-6-2:2006-03 **EN 61000-6-3:2011-09** **DIN EN 61326-3-1:2008-11**

According to the certificate of TÜV-Rheinland:

DIN EN ISO 13849-1:2008+AC:2009 **EN 62061:2005 +AC:2010:A1:2013**

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

06th April 2016

M. Mohtasham: Managing Director

V. Crolla: Documentation Manager

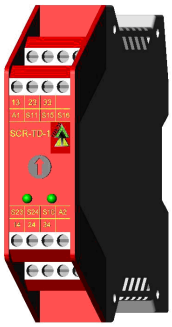
H04
Ver. A
E61-326-00

Safety Relays from IDEM SEU-TD-1

User Information

Correct Use

The SEU-TD-1 is an expansion module that can be operated with any basic device from the IDEM SCR series, e.g. SCR-2 or SCR-3, in order to permit delayed switch-off of machine parts. This could be the case if it is safer to return a tool to its initial position first instead of stopping operation immediately. The SEU-TD-1 was developed as a component for a modular system. Any combination of SEU-TD-1 units and non-time-delayed SEU-1 expansion blocks can be interconnected with just a few lines, permitting realization of an overall system with different times and the specific number of safety contacts required.



(not for plug-in terminals)

Features

- 3 safe, redundant, time-delayed relay outputs
  1 auxiliary contact (fault monitoring)
- Activation via basic device from the IDEM SCR series
- Continuously adjustable delay, 1 to 30 s
- Modular, freely configurable safety system
- Corresponds to STOP category 1
- Fault monitoring by basic device
- Indication of the switching state via LED
- Up to PL d, category 3, SILCL 2

Function

The time-delayed emergency stop safety switching device SEU-TD-1 in combination with a basic device from the IDEM SCR series 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 SEU-TD-1 provides a control voltage of DC 24V at terminal S11. In order for the SEU-TD-1 to switch together with the connected basic device, the control voltage at S11 is connected to terminals S15 and S16 of the SEU-TD-1 via one of the safety contacts of the basic device (see *Wiring* section on page 2).

The safety contacts of the basic device close when the basic device is activated, and the control voltage at terminal S11 is then connected with terminals S15 and S16 of the SEU-TD-1. The safety contacts of the SEU-TD-1 switch immediately.

The basic device disconnects the control voltage when the safety switch is operated, and the safety contacts of the SEU-TD-1 open after the time set on the SEU-TD-1 elapses (the power supply must be present during the time sequence).

If a fault occurs in the SEU-TD-1, this is detected by the basic device via terminals S25 and S26.

Independent operation without basic device is not possible.

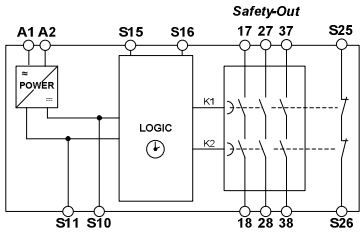


Fig. 1 Block diagram SEU-TD-1

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 35 mm DIN rail according to DIN EN 60715 TH35.

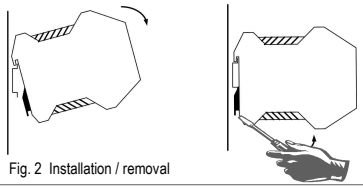


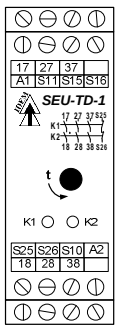
Fig. 2 Installation / removal

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: x”) 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 safe 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 safety 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 mm^2 must not be exceeded.
- The line cross section must not exceed 2.5 mm^2.
- 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*
S10:	*Control line*
S15:	*Control line*
S16:	*Control line*
S25:	*Fault monitoring*
S26:	*Fault monitoring*
17-18:	*Time-delayed safety contact 1*
27-28:	*Time-delayed safety contact 2*
37-38:	*Time-delayed safety contact 3*

Fig. 3 Connections

Safety Relays from IDEM SEU-TD-1

User Information

Applications

Depending on the application, the device must be wired with a IDEM basic device as shown in Fig. 1 to Fig. 6.

Wiring

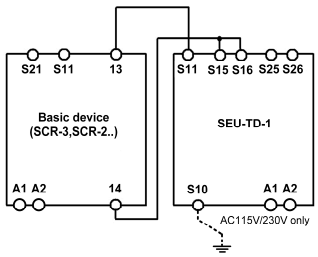


Fig. 1: Connection of SEU-TD-1 to basic device

Wiring of the SEU-TD-1 via only 4 lines:

A safety contact of the basic device (e.g. 13-14) activates the relays of the SEU-TD-1 (S11 and S15/S16).

Two lines on S25 and S26 are required for feedback/fault monitoring. According to the application, they have to be wired according to Fig. 3 respective Fig. 4.

A fault in the SEU-TD-1 thereby prevents the entire safety chain from restarting. Earth faults in the control lines are detected in addition to internal faults.

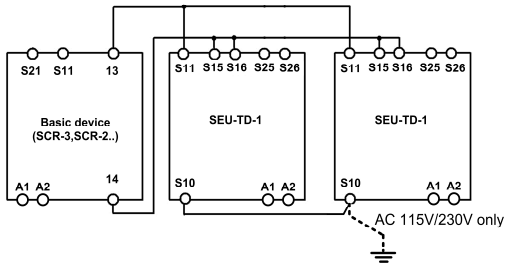


Fig. 2: Connection of several SEU-TD-1 units to basic device

If further SEU-TD-1 units are to be integrated into the system, terminals S11 must be connected in parallel on all SEU-TD-1 units. This also applies to terminals S10 and terminals S15/S16.

The feedback-loops (S25-S26) of the several expansion devices have to be wired in series to the start of the basic device (see Fig. 3 respective Fig. 4).

Notice:

In order to activate earth fault monitoring, S10 must be connected to PE (protective earth) on the AC115/230 V devices. With AC/DC 24 V, connect PE only to the power supply unit according to EN60204-1.

Feedback Loop

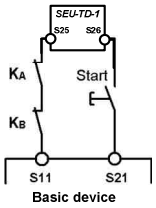


Fig. 3: Feedback loop

*Contactors connected to the SEU-TD-1 or the basic devices are monitored via the feedback loop of the basic device. K**A** and K**B** are the positively driven contacts of the connected contactor or expansion module.*

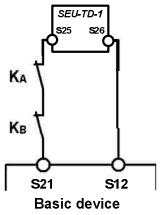


Fig. 4: Feedback Loop with Auto-Start

*Contactors connected to the SEU-TD-1 or the basic devices are monitored via the feedback loop of the basic device. K**A** and K**B** are the positively driven contacts of the connected contactor or expansion module.*

Power supply and Safety contacts

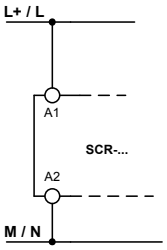


Fig. 5:

Power supply A1 and A2.

(Power supply according to techn. Data)

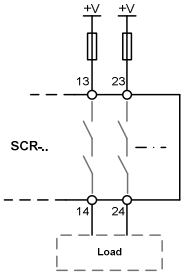


Fig. 6:

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 SEU-TD-1:

Wire the SEU-TD-1 with the IDEM basic device according to your application (see Fig. 1 to Fig. 2).

2. Wiring basic device:

Wire the basic device according to the required Performance Level determined (see user information for the basic device).

3. Wiring feedback loop:

Wire the feedback loop as shown in Fig. 3 or Fig. 4.

4. Wiring power supply:

Connect the power supply to terminals A1 and A2 (Fig. 5).

Warning: Wiring only in de-energized state.

5. Setting delay time:

Set the desired time delay on the rotary knob and seal the knob with the supplied sticker.

Warning:

Scale division lines should be regarding only as a setting aid. Always make sure to measure the delay time.

6. Starting the device:

Switch the operating voltage on.

Warning:

If the “Automatic start” starting behavior is set on the basic device, the safety contacts will close immediately after Power-On. If the “Monitored manual start” starting behavior is set, close the start button on the basic device to close the safety contacts.

The LEDs ***K1*** and ***K2*** *on the basic device and on the SEU-TD-1* are lit when the safety contacts are closed.

7. Triggering safety function:

Open the emergency stop circuit by actuating the connected safety switch. The safety contacts of the basic device open immediately, the safety contacts of the SEU-TD-1 open after expiration of the time set on the rotary knob.

Warning: *Measure the delay time.*

8. Reactivation:

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

If the “Monitored manual start” starting behavior is set, close the start button on the basic device to close the safety contacts of the basic device and the SEU-TD-1.

Safety Relays from IDEM SEU-TD-1

User Information

Maintenance

Once per month, the device must be checked for proper function and for signs of tampering and bypassing of the safety function (to do this, check the wiring of the device and activate the emergency stop function. Check the delay time).

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 of the SEU-TD-1 and the basic device by comparing it with the wiring diagrams (also see user information for the basic device).*
- *Check the safety switch used on the basic device for correct function and adjustment.*
- *Check whether the emergency stop circuit of the basic device is closed.*
- *Check whether the start button on the basic device (with manual start) is closed.*
- *Check the operating voltage at A1 and A2 on the basic device and on the SEU-TD-1.*
- *Is the feedback loop closed?*

Device cannot be switched on again after an emergency stop:

- *Check whether the emergency stop circuit was closed again.*
- *Was the start button opened before closing of the emergency stop circuit (with manual start)?*
- *Is the feedback loop closed?*
- *Is the power supply present during the time sequence?*

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 SEU-TD-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

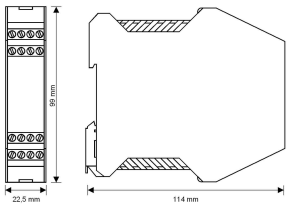
Corresponds to the standards	EN 60204-1; EN ISO 13849-1 ; EN 62061
Operating voltage	AC 230 V, AC 115 V, AC/DC 24 V
Rated supply frequency	AC: 50-60 Hz
Permissible deviation	+ / - 10 %
Power consumption	***DC 24 V*** ***AC 230 V*** approx. 1.5 W approx. 4 VA
Delay time	1 to 30 s, continuously adjustable
Control voltage at S11	DC 24 V
Control current S11...S14	max. 40 mA
Safety contacts	3 NO contacts
Auxiliary contacts	1 NC contact; monitoring contact for basic device
Max. switching voltage	AC 250 V
Safety contact breaking capacity	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 Max. total current through all 3 contacts: 10.5 A
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

Safety Relays from IDEM SEU-TD-1

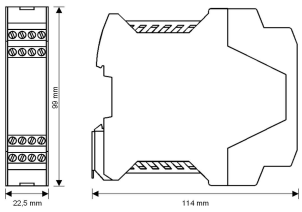
User Information

Dimension Drawing

Fixed Terminals



Plug-In Terminals



Variants

SEU-TD-1, AC 230 V (50-60 Hz), fixed screw terminals
SEU-TD-1, AC 115 V (50-60 Hz), fixed screw terminals
SEU-TD-1, AC/DC 24 V (AC: 50-60 Hz), fixed screw terminals
SEU-TD-1, AC 230 V (50-60 Hz), plug-in terminals
SEU-TD-1, AC 115 V (50-60 Hz), plug-in terminals
SEU-TD-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 contact extension module for monitoring Emergency Stop and Safety Switches

Product Name	Affixing of CE marking:	No of Certificate
SEU-TD1	2014	968/ EZ 470.01/14
SEU-1	2014	968/ EZ 469.01/14

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

2006/42/EG : Machinery directive

2004/108/EG : EMC directive till 2016-04-19 **2014/30/EU : EMC directive from 2016-04-20**

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

EN 60439-1:2005-01 **EN 60947-1:2011-10** **EN 60947-5-1:2010-04**
EN 61000-6-2:2006-03 **EN 61000-6-3:2011-09** **DIN EN 61326-3-1:2008-11**

According to the certificate of TÜV-Rheinland:

DIN EN ISO 13849-1:2008+AC:2009 **EN 62061:2005 +AC:2010:A1:2013**

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

06th April 2016

M. Mohtasham: Managing Director

V. Crolla: Documentation Manager

H04
Ver. A
E61-327-00

Safety Relays from IDEM — SCR-2H

User Information

Correct Use

The SCR-2H 2-hand safety relay is an extremely compact, universal safety two-hand control unit. It complies with EN574, Typ III C, and is intended for use in safety circuits that are designed in accordance with EN 60204-1, e.g. on presses, punches and bending tools. Due to the internal error monitoring, the 2-hand safety relay can be used, despite very compact dimensions, for all applications up to the highest safety category 4 and PL e according to EN ISO 13849-1, SILCL 3 according to EN 62061 or Typ III C according to EN 574.

- *Up to PL e, SILCL 3, category 4*

(not for plug-in terminals)

Features

- *2 safe, redundant relay outputs*
- *Cyclical monitoring of the output contacts*
- *Feedback loop for monitoring downstream contactors or expansion modules*
- *Short circuit and earth fault monitoring*
- *Extrem compact housing*

Function

The IDEM 2-hand safety relay SCR-2H is suitable for setting up and monitoring two-hand circuits and is used to protect the operators. Dangerous work steps can only be triggered when both two-hand buttons connected are operated simultaneously, i.e. within 0.5 s.

It is to be ensured a single fault or a malfunction does not result in the loss of the safety function and every fault is detected by the cyclic self-monitoring at the latest prior to the next actuation.

When the operating voltage is applied to A1-A2 and the feedback loop X1-X2 is closed, the SCR-2H is ready for use. To be able to initiate a switching operation, the output relays must be de-energized. The output relays only switch to the energized position when the two-hand buttons T1 and T2 are operated simultaneously, i.e. within 0.5 s.

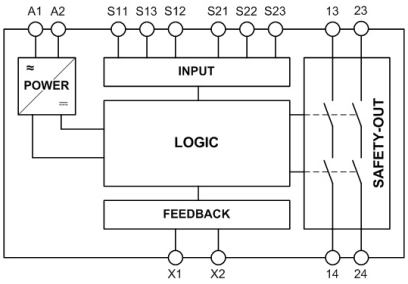


Fig. 1 Block diagram SCR-2H

The output relays are not switched if:

- *only one two-hand button is actuated or the time between the actuation of the 2 two-hand buttons is greater than 0.5 s,*
- *the feedback loop is open (fault in the external contactor),*
- *another error (short circuit, cable break, error in the switching device) has occurred.*

When T1 and/or T2 are/is released, the output relays opens immediately. In order to trigger a new operation, both two-hand buttons must first be released and the feedback loop must be closed.

Installation

As per DIN 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 35 mm DIN rail according to DIN EN 60715 TH35.

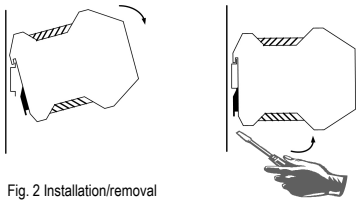


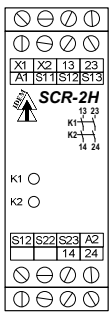
Fig. 2 Installation/removal

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. X”) 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 safety 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 safety contacts (10 A gG) must be provided.
- A maximum length of the control lines of 1000 meters with a line cross section of 0.75 mm^2 must not be exceeded.
- The line cross section must not exceed 2.5 mm^2.
- 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:	*Control line T1*
S12:	*Control line T1*
S13:	*Control line T1*
S21:	*Control line T2*
S22:	*Control line T2*
S23:	*Control line T2*
X1; X2:	*Feedback loop*
13-14:	*Safety contact 1*
23-24:	*Safety contact 2*

Fig. 3 Connections

Safety Relays from IDEM SCR-2H

User Information

Applications

The arrangement of the two-hand buttons must be designed in accordance with the standard EN 574 such that accidental actuation or simple bypassing of the safety function is excluded.
The SCR-2H unit is provided for the connection of 2-hand push-buttons, with one normally open or one normally colsed contact.

Figur 1 shows the wiring of the SCR-2H with a 2-hand push-buttons:

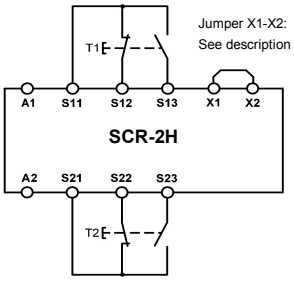


Fig. 1:
Wiring of the SCR-2H with a 2-hand push-buttons

Feedback loop

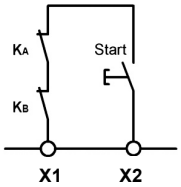


Fig. 2: Feedback loop
Contactors connected to the SCR-2H or the basic devices are monitored via the feedback loop of the basic device. KA and KB are the positively driven contacts of the connected contactor or expansion module.

Installation

Avoiding unintentional actuation or bypassing of the safety device
The arrangement of the two-hand buttons must be designed in accordance with the standard EN 574 such that accidental actuation or simple bypassing of the safety function is excluded.
The operation of both buttons using one hand must be prevented by an adequate distance (at least 260 mm) or by a separating wall. Actuation using forearm, elbow, knee, hip or other parts of the body can be effectively prevented by a further increase in the distance between the two buttons, adequate distance from the floor and/or covers and/or separating walls.

Distance from the two-hand buttons to the danger area
It is necessary to maintain a minimum distance between the buttons for the two-hand circuit and the danger area on the machine or plant so that, after the release of one or both buttons, the machine or plant can only be reached once the dangerous movement has been interrupted or completed. According to the standard DIN EN ISO 13855, the distance is calculated with the following equation:

$$S = (K \cdot T) + C$$

S: Minimum distance from the nearest pushbutton (two-hand button) to the danger area.
K: Parameter in mm/s, derived from data on the approach speeds of the body or parts of the body, for two-hand circuits 1600 mm/s.
T: The overtravel of the overall system in seconds, that is the time from releasing the two-hand button to the end of the dangerous movement.
C: Additional distance in mm that based on entry into the danger area prior to the triggering of the safety device. For twohand circuits this is 250 mm, this distance can also be set to 0mm given an adequate cover on the buttons, however then S must be at least 100 mm.

Example

The overtravel time for the entire system is 90 ms. Then the above equation gives for the minimum distance:

S = (1600 mm/s · 0.09 s) + 250 mm
S = 144 mm + 250 mm = 394 mm

If a suitable cover is used, S can be reduced to 144 mm (see above).

Commissioning Procedure

Note: *The items listed under "Electrical connection" must be observed during commissioning.*

1. Wiring SCR-2H:
Wire the SCR-2H with the IDEM basic device according to your application (see Fig. 1).

2. Wiring feedback loop:
Wire the feedback loop as shown in Fig. 2.

3. Wiring power supply:
Connect the power supply to terminals A1 and A2.

Warning: Wiring only in de-energized state.

4. Starting the device:
Switch the operating voltage on.

5. Switch to working condition:
Press the two buttons T1 and T2 simultaneously, or within 0.5 seconds.
The positive-guided relay switches on.

6. Switch into hibernation:
Release the two buttons T1 and T2.
The positive-guided relay swiches off.

Safety Relays from IDEM SCR-2H

User Information

Maintenance

Once per month, the device must be checked for proper function and for signs of tampering and bypassing of the safety function (to do this, check the wiring of the device and activate the emergency stop function. Check the delay time).

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 whether the 2-hand button of correct function.*
- *Check whether the wiring.*
- *Check the supply voltage on A1 and A2*
- *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 e.

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-2H			
Load (DC-13; 24 V)	**<= 0.1 A**	**<= 1 A**	**<= 3 A**
T10d [years]	**20**	**20**	**20**
Category	**4**	**4**	**4**
PL	**e**	**e**	**e**
PFHd [1/h]	**1.2E-08**	**1.2E-08**	**1.2E-08**
nop [cycle / year]	**<= 400,000**	**<= 100,000**	**<= 22,500**

Techn. Data

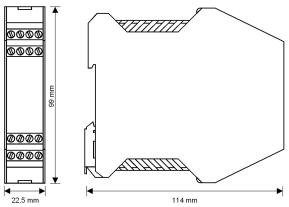
Corresponds to the standards	EN574, EN60204-1, EN ISO 13849-1, EN 62061
Operating voltage	AC 230 V, AC 115 V, AC/DC 24 V
Rated supply frequency	AC: 50-60 Hz
Permissible deviation	+/- 10 %
Power consumption	**DC 24 V** approx. 1.5 W **AC 230 V** approx. 3.7 VA
Control voltage at S12-S12 and at S22-S23	DC 24 V
Control current (both switches)	approx. 2 x 40 mA
Release time for the safety relays after release of a button	< 20 ms
Response delay after actuation of the buttons	< 20 ms
Syncronization time	< 0.5 s
Safety contact configuration	2 NO contacts
Max. switching voltage	AC 250 V
Safety contact breaking capacity	AC: 250 V, 2000 VA, 8 A for ohmic load (6 switching cycles/ min) 250 V, 3 A for AC-15 DC: 24 V, 192 W, 8 A for ohmic load (6 switching cycles/ min) 24 V, 3 A for DC-13
Max. total current through all contacts:	12 A
Minimum contact load	24 V, 20 mA
Min. Contact fuses	10 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	$AgSNO_2$
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
Weight	ca. 230 g
Mounting	DIN rail according to EN 60715 TH35

Safety Relays from IDEM SCR-2H

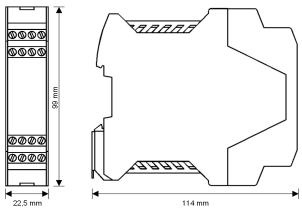
User Information

Dimension Drawing

Fixed Terminals



Plug-In Terminals



Variants

SCR-2H-230 V	AC 230 V (50-60 Hz), fixed screw terminals
SCR-2H-115 V	AC 115 V (50-60 Hz), fixed screw terminals
SCR-2H-24 V	AC/DC 24 V (50-60 Hz), fixed screw terminals
SCR-2H-230 V	AC 230 V (50-60 Hz), plug-in terminals
SCR-2H-115 V	AC 115 V (50-60 Hz), plug-in terminals
SCR-2H-24 V	AC/DC 24 V (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: Two-hand control switching device

Product Name	Affixing of CE marking:	No of Certificate
SCR-2H	2015	01/205/5240.01/15

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

2006/42/EG : Machinery directive

2004/108/EG : EMC directive till 2016-04-19 **2014/30/EU : EMC directive from 2016-04-20**

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

EN 60439-1:2005-01
EN 61000-6-2:2006-03
EN 574:2008-12
EN 60947-1:2011-10
EN 61000-6-3:2011-09
EN 60947-5-1:2010-04
DIN EN 61326-3-1:2008-11

According to the certificate of TÜV-Rheinland:

DIN EN ISO 13849-1:2008-12 **EN 62061:2005 +AC:2010:A1:2013**

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

14th August 2015

M. Mohtasham: Managing Director

V. Crolla: Documentation Manager

H02
Ver. A
E61-328-00

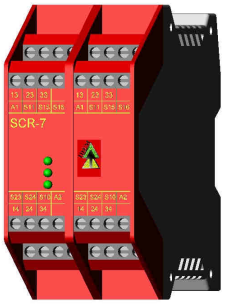
Safety Relays from IDEM SCR-7

User Information

Correct Use

The SCR-7 is a universal emergency stop safety switching device with seven safe relay outputs that can quickly and safely stop the moving parts of a machine or system in case of danger.

Applications for the SCR-7 include single or dual-channel emergency stop circuits and guard monitoring on machines and systems. This safety relay can be delivered with fixed screw terminals or plug-in terminals.



Features

- *7 safe, redundant relay outputs*
- *4 auxiliary relay outputs; 2 auxiliary transistor outputs*
- *Connection of:*
  - *Emergency stop buttons*
  - *Safety switches*
  - *Non-contact safety switches*
  - *OSSD-Outputs*
- *Single or dual-channel operation possible*
- *Feedback loop for monitoring downstream contactors or expansion modules*
- *Cyclical monitoring of the output contacts*
- *Indication of the swiching state via LED*
- *2 start behavior possible:*
  - *Monitored manual start*
  - *Automatic start*
- *Up to PL e, SILCL 3, category 4*
- *STOP-category: 0*

Function

The emergency stop safety switching device SCR-7 is designed for safe isolation of safety circuits according to EN 60204-1 and can be used up to safety category 4, PL e 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 fault is detected by cyclical self-monitoring no later than when the system is switched off and switched on again.

The operating status of the device is indicate by the auxiliary transistor outputs O1 and O2.

O1: Ready. PWR is connected.

O2: Both relay channel K1, K2 are switched on.

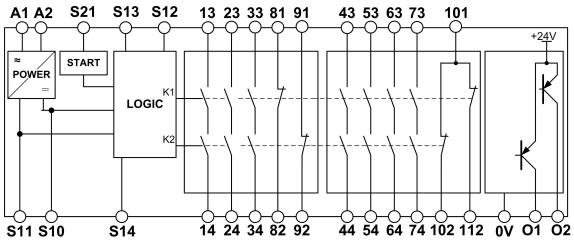


Fig. 1 Block diagramm SCR-7

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 35-mm DIN rail according to DIN EN 60715 TH35.

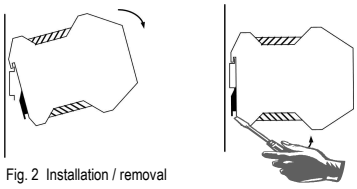


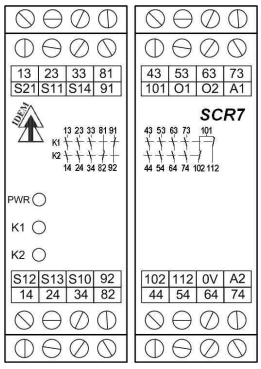
Fig. 2 Installation / removal

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

- A safety transformer according to IEC 61558-2-6 or a power supply unit with electrical isolation from the mains must be connected.
- External fusing of the safety contacts (10 A gG) must be provided.
- A maximum length of the control lines of 1000 meters with a line cross section of 0.75 mm^2 must not be exceeded.
- The line cross section must not exceed 2.5 mm^2.
- 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 Supplay*
S11:	*DC 24V control voltage*
S10:	*Control line*
S12:	*Control line*
S13:	*Control line*
S14:	*Control line*
S21:	*Start, Control line*
O1;O2:	*Aux transistor outputs*
0V:	*Reference common O1, O2*
81-82:	*Auxiliary Contact*
91-92:	*Auxiliary Contact*
101-102:	*Auxiliary Contact*
101-112:	*Auxiliary Contact*
13-14 bis 73-74:	*Safety Out1-7*

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. 11.

Emergency Stop Circuit

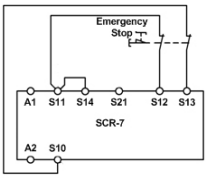


Fig. 1:
Two-channel emergency stop circuit with short circuit and earth fault monitoring.
(category 4, up to PL e)

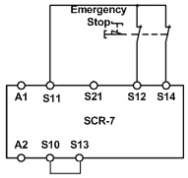


Fig. 2:
Two-channel emergency stop circuit with earth fault monitoring.
(category 3, up to PL d)

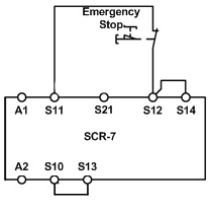


Fig. 3:
Single-channel emergency stop circuit with earth fault monitoring.
(category 1, up to PL c)

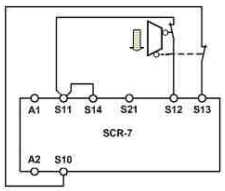


Fig. 4:
Two-channel sliding guard monitoring with short circuit and earth fault monitoring.
(category 4, up to PL e)

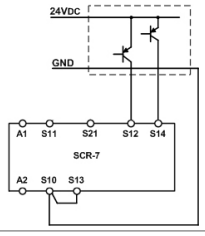


Fig. 5:
Two-channel emergency stop with pnp-outputs/OSSD-outputs ***with*** *short circuit monitoring.*
(category 4, up to PL e)

Warning:
In order to activate earth fault monitoring, the PE must be connected only to the power supply unit in accordance with EN60204-1.

Corresponded to the application, the starting circuit have to be wired according to Fig. 6 or Fig. 7.

Starting Behavior

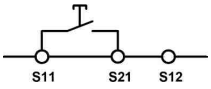
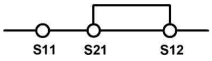


Fig. 6:
Monitored manual start.
It is monitored that the start button was opened before the emergency stop button closes. (Prerequisite: operating voltage must not be interrupted.)



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

Fig. 7:
Automatic start.
Max permitted delay during closing of the safety switches on S12 and S13:
S12 before S13: 300 ms
S13 before S12: any

Feedback Loop

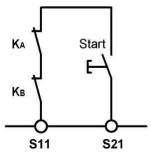


Fig. 8:
Feedback loop for monitored manual start:
The feedback loop monitors contactors or the expansion modules .

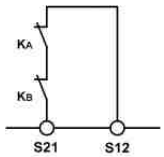


Fig. 9:
Feedback loop for automatic start:
The feedback loop monitors contactors or the expansion modules .

Power supply and Safety contacts

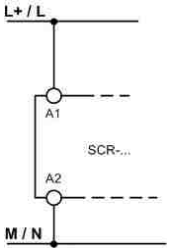


Fig. 10:
Power supply A1 and A2.

(Power supply according to techn. Data)

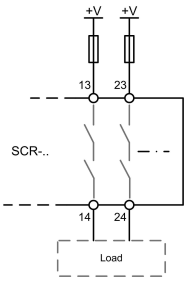


Fig. 11:
Connecting load to safety contacts.

(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. 5).

2. Wiring start circuit:
Wire the start circuit according to Fig. 6 or Fig. 7 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 “Monitored 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. 8 or Fig. 9.

4. Wiring power supply:
Connect the power supply to terminals A1 and A2 (Fig. 10).

Warning: Wiring only in de-energized state.

5. Starting the device:
Switch on the operating voltage.

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

Safety Relays from IDEM SCR-7

User Information

Maintenace

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.*
- *Was the start button opened before closing of the emergency stop circuit (with manual start)?*
- *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 e.

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-7

Load (DC-13; 24V)	**<= 0,1A**	**<= 1A**	**<= 2A**
T10d [years]	**20**	**20**	**20**
Category	**4**	**4**	**4**
PL	**e**	**e**	**e**
PFHd [1/h]	**2,47E-08**	**2,47E-08**	**2,47E-08**
nop [cycle / year]	**<= 500.000**	**<= 350.000**	**<= 100.000**

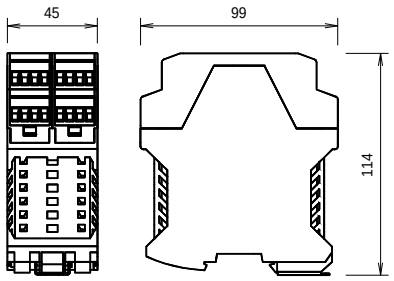
Techn. Data

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** **AC 24V** approx. 4.5W approx. 8.5VA
Control voltage at S11	DC 24V
Control current S11..S14	approx. 250mA
Safety contacts	7 NO contacts
Auxiliary contacts	4 NC contacts
Auxiliary transistor outputs (O1, O2)	DC 24V / 30mA, over current protected
Max. switching voltage	AC 250V
Safety contact breaking capacity (13-14, 23-24, 33-34,43-44, 53-54, 63-64, 73-74)	AC: 250V, 2000VA, 8A for ohmic load (6 switching cycles/ min) 250V, 3A for AC-15 DC: 40V, 320W, 8A for ohmic load (6 switching cycles/ min) 24V, 3A for DC-13 Max. total current through all 7 contact up to Ta=40°C: *35A 10mm spacing between the devices* *20A no spacing between the devices*
Auxiliary contacts braking capacity (81-82, 91-92, 101-102,101-112)	AC: 250V, 2000VA, 8A for ohmic load DC: 40V, 320W, 8A for ohmic load
Minimum contact load	24V, 20mA
Contact fuses	10A gG
Line cross section	0.14 - 2.5mm^2
Max. length of control line	1000m at 0.75 mm^2
Contact material	$AgSnO_2$
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	-15°C bis +40°C
Degree of contamination	2 (DIN VDE 0110-1)
Overvoltage category	3 (DIN VDE 0110-1)
Weight	approx. 350g
Mounting	DIN rail according to EN 60715 TH35

Safety Relays from IDEM SCR-7

User Information

Dimension Drawing



Variants

SCR-7	AC/DC 24V (50-60Hz), fixed screw terminals
SCR-7 (pluggable)	AC/DC 24V (50-60Hz), 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-7	2016	01/205/5182.01/16

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 60947-1:2008-04
EN 60947-5-1:2010-04
EN 60947-7-1:2010-03
EN 61000-6-3:2007-09
DIN EN 61326-3-1:2008-11

According to the certificate of the below mentioned organisation:

DIN EN ISO 13849-1:2015
DIN EN ISO 13849-2:2012
EN50178:1997 (in extracts)
EN 62061:2005+AC:2010+A1:2013+A2:2015
EN 60204-1:2006+A1:2009+A2:2010 (in extracts)

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

2nd May 2016

M. Mohtasham: Managing Director

V. Crolla: Documentation Manager

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