# 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 13851/EN 574.**


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

(not for plug-in terminals)

### 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.

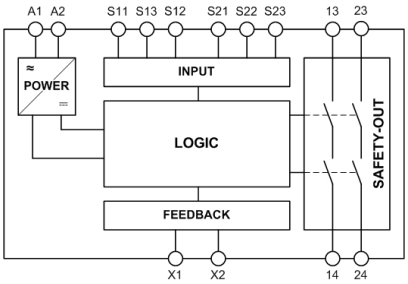



Fig. 1 Block diagram SCR-2H

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.

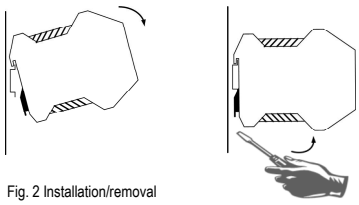


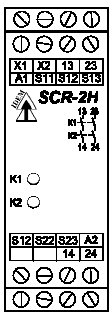
Fig. 2 Installation/removal

### 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 (6 A slow-blow or 8 A quick-action or 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 13851/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:

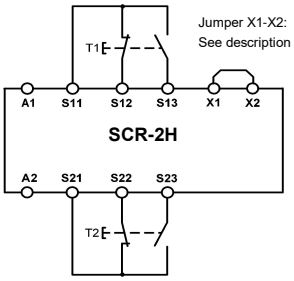



***Fig. 1:***
*Wiring of the SCR-2H with a 2-hand push-buttons*

***Feedback loop***

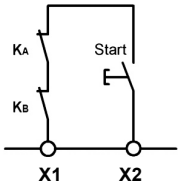



***Fig. 2: Feedback loop***
*Contactors connected to the SCR-2H or the basic devices are monitored via the feedback loop of the basic device. KA and KB are the positively driven contacts of the connected contactor or expansion module.*

### *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 13851/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 EN 999, 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 dan

gerous movement.

**C**: Additional distance in mm that based on entry into the danger area prior to the triggering of the safety device. For twohand

***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*

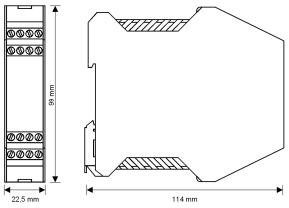
| | |
|---|---|
| Corresponds to the standards | EN574, EN60204-1, EN ISO 13849-1, EN 62061 |
| Operating voltage | AC 230 V, AC 115 V, AC/DC 24 V |
| Rated supply frequency | AC: 50-60 Hz |
| Permissible deviation | +/- 10 % |
| Power consumption | **DC 24 V** **AC 230 V**<br>approx. 1.5 W approx. 3.7 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,<br>250 V, 3 A for AC-15<br>DC: 24 V, 192 W, 8 A for ohmic load;<br>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 | 6 A slow-blow or 8 A quick-action or 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<br>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

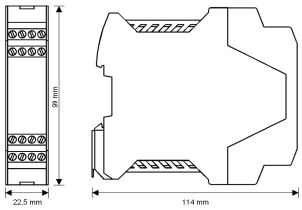
## User Information

*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 | 2020 | 01/205/5240.02/20 |

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

**2006/42/EG : Machinery directive** **2011/65/EU: RoHS directive**

**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:**
According to the certificate of TÜV-Rheinland:

**EN ISO 13849-1:2015** **EN 62061:2005 + Cor.:2010 + A1:2013 + A2:2015**
**EN ISO 13851:2019**

Certification Body:
TÜV Rheinland Industrie Service GmbH
Am Grauen Stein
51105 Köln
No.: 0035

16th December 2020

**M. Mohtasham:** Managing Director

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