

# SCR - Viper Safety Relays

## SCR-31-i / SCR-21-i / SCR-31P-i

The new generation of safety relays from IDEM

- Single or Dual channel operation
- Monitored Manual or Auto Start/Reset
- Up to 3 Safety output contacts  
1 Auxiliary output contact  
(Depending on model No.)
- Contactor feedback check
- Easy diagnosis of status via 6 LEDs
- Up to PLe, SILCL 3, Category 4
- 22.5mm DIN rail mounting
- 24Vac/dc operation
- Emergency stop and guard interlock monitoring
- Output expansion units available to increase number of outputs.

The Viper Safety Relays range from IDEM are designed to meet the latest safety standards and offer enhanced LED diagnostics and simplified wiring. Applications include safety interlock switches, emergency e-stop devices door guard monitoring. The SCR-31P-i is design to be compatible with OSSD devices.(e.g. Light Curtains)

The Viper Safety Relays range includes output expansion units that can be directly wired to SCR-21-i / SCR-31-i / SCR-31P-i safety relays to increase the number of safety output contacts. The expansion modules are available with either immediate or time-delayed output contacts.

The SCR-21-i / SCR-31-i / SCR-31P-i internal logic uses force guided relays to achieve cross monitoring, this ensures that a single fault does not lead to the loss of the safety function and that all faults are detected at or before the next safety demand.

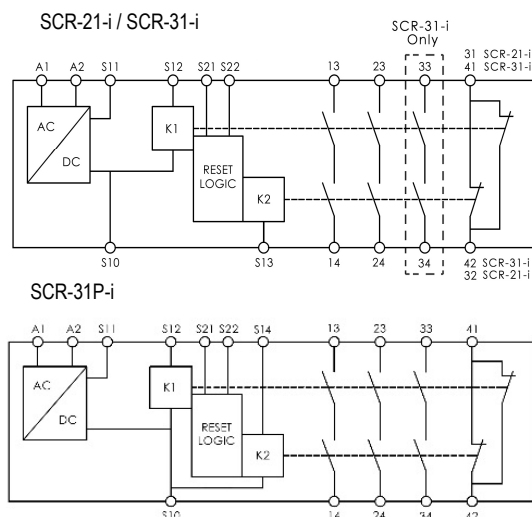


### Functional Description

When the control line inputs are closed and the start/reset condition has been met the safety output contacts close. The safety relay outputs open when the inputs are de-activated or if there is a power failure. When dual channel inputs are used it is not necessary to synchronise switching of the input channels.

When operating in the monitored manual reset configuration the reset button must perform a make-then-break action before the safety relay will activate. External device feedback contacts can be monitored via the reset loop.

### Block Diagram and Connections



| Terminal | Description                                       |
|----------|---|
| A1       | Power Supply                                      |
| A2       | Power Supply                                      |
| S11      | 24Vd.c. Control voltage                           |
| S12      | Control Line                                      |
| S13      | Control Line (SCR-21-i / SCR-31-i only)           |
| S14      | Control Line (SCR-31P-i only)                     |
| S10      | Control Line                                      |
| S21      | Auto Start  |
| S22      | Monitored Manual Start                            |
| 13-14    | Safety Output Contact 1                           |
| 23-24    | Safety Output Contact 2                           |
| 33-34    | Safety Output Contact 3 (SCR-31-i / SCR-31P-i)    |
| 41-42    | Auxiliary Output Contact 1 (SCR-31-i / SCR-31P-i) |
| 31-32    | Auxiliary Output Contact 1 (SCR-21-i)             |

## Variants

| Part No. | Description   |
|----------|---|
| 280001   | SCR-21-i, AC/DC 24 V, (50-60Hz), Fixed screw terminals  |
| 280002   | SCR-31-i, AC/DC 24 V, (50-60Hz), Fixed screw terminals  |
| 280003   | SCR-31P-i, AC/DC 24 V, (50-60Hz), Fixed screw terminals |
| 280001-P | SCR-21-i, AC/DC 24 V, (50-60Hz), Pluggable Terminals    |
| 280002-P | SCR-31-i, AC/DC 24 V, (50-60Hz), Pluggable Terminals    |
| 280003-P | SCR-31P-i, AC/DC 24 V, (50-60Hz), Pluggable Terminals   |

## Application Circuits

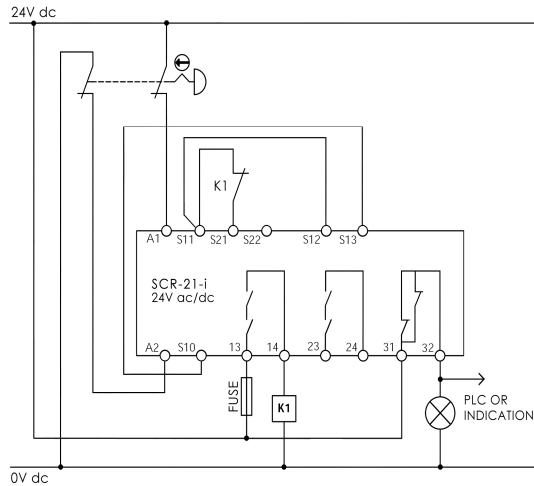


Fig.1 SCR-21-i, Single Channel, E-Stop, Auto Reset

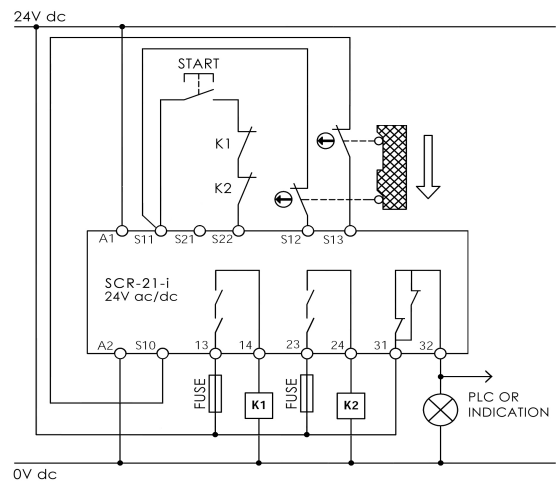


Fig.2 SCR-21-i, Dual Channel, Guard Interlock, Manual Reset

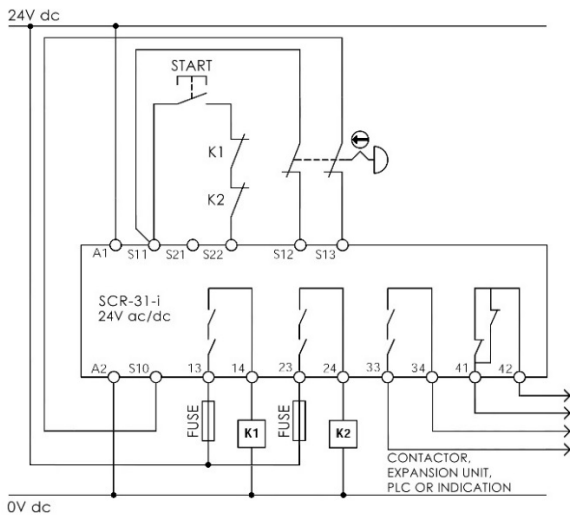


Fig.3 SCR-31-i, Dual Channel, E-stop, Manual Reset

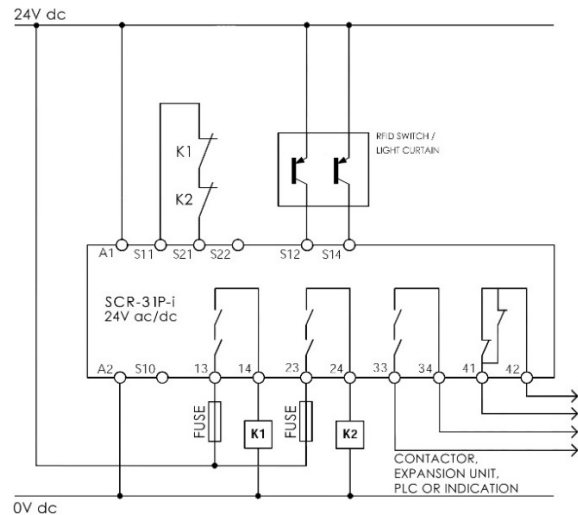


Fig.4 SCR-31P-i, Dual Channel, OSSD Inputs, Auto Reset

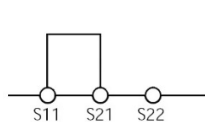


Fig.5 Auto Reset

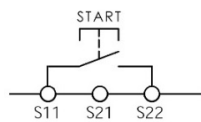


Fig.6 Manual Reset

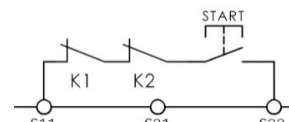


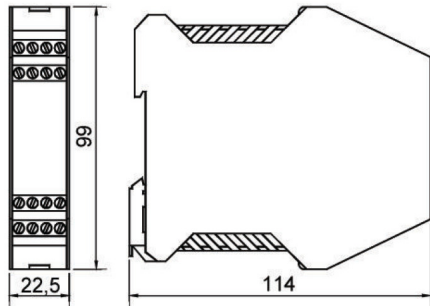
Fig.7 Contactor Feedback Check (Manual Reset)

## Electrical Connection

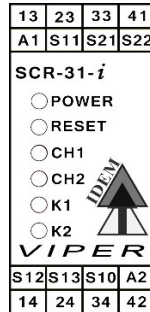
- A power supply unit with electrical isolation from the mains supply must be connected.
- External fusing of each safety output contact is necessary, a 4A. slow-blow or 6A. quick action) must be provided.
- The maximum cabling and connecting resistance of control lines must not be exceed 300 ohms.

Viper Safety Relays  
SCR-21-i / SCR-31-i / SCR-31P-i

Dimensions



Diagnostic LEDs



- POWER Power to the safety relay.
- RESET Reset loop S11-S21 or S11-S22 is closed.
- CH1 Channel 1 control loop S11-S21 is closed.
- CH2 Channel 2 control loop S13-S10 is closed.
- K1 Power to Internal relay K1.
- K2 Power to Internal relay K2.

Safety Characteristics

Characteristic Data according to IEC 62061

|                        |   |
|------------------------|---|
| Safety Integrity Level | SIL3  |
| PFH                    | 4.1 E -10 (1/h) (0.4% of SIL3 (1 E -07 (1/h)) |
| PFD <sub>av</sub>      | 3.6 E -05 (1/h) (3.6% of SIL3 (1 E -03)       |

Characteristic Data according to EN ISO 13849-1

|                     |             |
|---------------------|-------------|
| Performance Level   | e           |
| Category            | 4           |
| MTTF <sub>d</sub>   | 142a (High) |
| Diagnostic Coverage | 99% (High)  |

Specification

|                                  |   |                     |
|----------------------------------|---|---------------------|
| <b>Standards</b>                 | EN/ISO13849-1; EN /SO13849-2; EN62061; EN60204-1; EN/ISO12100;UL508 |                     |
| <b>Power supply Circuit</b>      |   |                     |
| Rated operating voltage          | 24V AC/DC   |                     |
| Operating voltage tolerance      | -15% - +10%   |                     |
| Rated supply frequency           | 50Hz – 60Hz   |                     |
| Rated supply current             | 75mA  |                     |
| Power consumption                | 24V AC/ DC  | 2.5W                |
| <b>Control Circuits</b>          |   |                     |
| Rated output voltage             | S11   | 24V DC              |
| Input current                    | S11..S14  | 100mA               |
| Response time                    | 100ms   |                     |
| Release time                     | 25ms  |                     |
| Recovery time                    | Approx. 1s  |                     |
| <b>Output Circuits</b>           |   |                     |
| Rated output voltage             | 250VAC  |                     |
| Max. current per output          | 6A  |                     |
| Max. total current all outputs   | 6A  |                     |
| Safety contact breaking Capacity | AC  | 230V, 4A for AC-15  |
|                                  | DC  | 24V, 30W, 2A, DC-13 |
| Minimum contact load             | 10V 10mA  |                     |
| Min. contact fuses               | 4A Slow blow, 6A Fast blow  |                     |
| Contact material                 | AgSnO <sub>2</sub>  |                     |
| Contact service life             | 10 x 10 <sup>6</sup>  |                     |
| <b>General Data</b>              |   |                     |
| Rated impulse withstand voltage  | 4kV   |                     |
| Rated insulation voltage         | 250V  |                     |
| Degree of protection             | IP  |                     |
| Temperature range                | -20C + 55C  |                     |
| Degree of contamination          | 2   |                     |
| Overvoltage category             | III   |                     |
| Weight                           | 0.15kg  |                     |
| Mounting                         | Any position  |                     |

## SAFETY WARNINGS



- Installation should only be carried out by competent and authorised personnel and in accordance with the instructions in this manual.
  - Only make electrical connections when the device is isolated from the main supply.
  - If "Automatic Start" is selected be aware that safety output contacts will switch immediately after the power supply is connected.
  - Opening the device will void the warranty. Never attempt to repair any device.
  - Adhere to Safety Checks.
  - **DO NOT DEFEAT, TAMPER, OR BYPASS THE SAFETY FUNCTION. FAILURE TO DO SO CAN RESULT IN DEATH OR SERIOUS INJURY.**
- L'installation doit être effectuée par un personnel compétent et autorisé et en conformité avec les instructions de ce manuel.
  - faites uniquement des connexions électriques lorsque l'appareil est isolé de l'alimentation principale.
  - Si "Démarrage automatique" est sélectionné être conscient que les contacts de sortie de sécurité passeront immédiatement après l'alimentation est connectée.
  - Ouverture de l'appareil annule la garantie. Ne jamais tenter de réparer tout appareil.
  - Adhérer à des contrôles de sécurité.
  - **NE DÉFAITE PAS, SABOTAGE, OU DE CONTOURNER LA FONCTION DE SÉCURITÉ. MANQUEMENT À S'Y PEUT ENTRAÎNER LA MORT OU DES BLESSURES GRAVES**

### Installation and Maintenance

Installation should as per EN 60204-1 in addition to any local regulations. The safety relay should be mounted inside a cabinet enclosure and on a 35mm DIN rail according to DIN EN 60715. No maintenance is required, there are no serviceable parts. (Refer to Safety Checks). The product is designed to be a component of a customised safety orientated control system. It is the responsibility of the user to ensure the correct overall functionality of its systems and machines. IDEM, its subsidiaries and affiliates, are not in a position to guarantee all of the characteristics of a given system or product not designed by IDEM.

### Information Regarding UL 508

Pilot Duty R300, B300  
Single contact must be used

|   |   |
|---|---|
| 250V AC/DC / 6,0A<br>Resistive<br>Single contact must be used | 250V AC/DC / 6,0A<br>General Purpose<br>All contacts at once can be used. |
|---|---|

USE COPPER OR COPPER-CLAD ALUMINUM CONDUCTORS

Maximum surround air temperature 40°C

### Safety Checks.

1. Ensure the appropriate safety level is achieved for the application function.
2. The safety functions must be tested regularly. For applications where infrequent use is foreseeable, the system must have a manual function test. At least once per month for PLe Cat3/4 or once per year for PLd Cat3 (ISO13849-1 / ISO14119).

### EC Declaration of Conformity

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

Product: Safety Emergency Stop Devices


Model types: SCR-21-i  
SCR-31-i  
SCR-31P-i

The above products conform to the safety requirements of the following directives and standards:

Machinery Directive 2006/42/EC  
EMC Directive 2014/30/EC  
Low Voltage Directive 2006/95/EC

EN 13849-1:2015  
EN 13849-2:2012  
EN 62061:2005+A2:2015  
EN 61508 (Parts 1-7): 2011-02  
EN 60204-1:2018  
EN 50178:1997

Third Party Certification: NB 0035 TUV Rheinland Industrie Service GmbH

  
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