



## Safety Relay Module UE 48-2 OS range

### 1 Safety

The UE 48-2 OS Safety Relay module meets safety-related requirements up to and including Safety Category 4 (EN 954).

#### 1.1 Safety regulations

- Installation and electrical connection may only be carried out by technically qualified personnel.
- National and international legislative regulations apply to the use and installation of the Safety Relays and to the commissioning and any repetitive technical verification. These regulations embrace, in particular
  - the EU Directive 98/37 EG on machinery
  - the EU Directive 89/655 EWG on the provision and use of work equipment
  - the EU Directive 73/23 EWG on low voltage
  - Safety regulations, as well as
  - accident prevention regulations, and rules and guidelines on aspects of safety
- Manufacturers and operators of the machine, to which safety devices are fitted, are responsible in ensuring that all applicable and currently valid safety regulations and legislation, are co-ordinated and observed in collaboration with the authorities concerned.

- The information and test specifications embodied in these Operating Instructions are to be unconditionally observed and applied at all times.
- Tests and checks are to be effected by technically competent personnel or by specialist personnel specifically authorised and appointed for this purpose, the tests and checks being documented on each occasion for the purposes of traceability.
- The Operating Instructions are to be made available to the operator of the machine to which the Safety Relay module is fitted. The operator of the machine must be trained by technically qualified personnel.
- The Operating Instructions are to be suitably archived for future reference and use!

#### 1.2 Scope of application of the Safety Relay module

The Safety Relay module UE 48-2 OS is for exclusive use on

- non-contact protection systems (ESPD) with active switching output (OSSD): single channel, dual channel

#### 1.3 Use in accordance with the regulations and conditions

If used in any other way than intended, or in the event that modifications have been made to the unit, or if the unit has been opened up - even during the course of assembly and installation - any claim made under the warranty upon SICK AG shall become null and void.

#### 1.4 Environmentally compatible disposal

Unusable and irreparable units must always be disposed of in accordance with current waste disposal regulations specific to the country concerned. SICK is able to offer assistance regarding disposal of any units.

## 2 Product description

### 2.1 Construction and method of operation of the unit

Inputs of the Safety Relay module UE 48-2 OS have been designed for connection to the respective safety sensors mentioned in the Section entitled "Scope of application". Two separate input circuits control the internal relays. The two electrical output circuits serve as fail safe outputs. The alarm circuit is not a fail safe output circuit.

### 2.2 Functions of the units

With an intrusion into the protection field of the connected ESPD, the outputs of the ESPD are effectively deactivated, opening the output circuits and closing the alarm circuit.

**Manual resetting:** The protection field of the ESPD becoming clear does not effect the immediate closing of the output circuit and the opening of the alarm circuit. This is not done until the reset button is activated. Depending upon the switching arrangement, the resetting is accomplished with a descending or an ascending edge of the pulse.

**Automatic resetting:** The protection field of the ESPD becoming clear effects the immediate closing of the output circuits and opens the alarm circuit. This function is accomplished by appropriate wiring of the UE 48-2 OS.

**Monitoring of the contactors:** Contactor monitoring system monitors the contactors controlled by the output circuits (e.g. motor contactors). By wiring the normally closed contacts of the contactors in series to the reset input, the output circuits are only closed (and the alarm circuit only opens) if all contactors are de-energised. This monitoring system is effective upon resetting.

### 2.3 Indicators

The LEDs, fitted in the cover of the unit, indicate the following conditions:

### 3 Assembly

Description	Colour	Function
SUPPLY	Green	Supply voltage present
K 1	Green	Relay K 1 energised
K 2	Green	Relay K 2 energised

### Control cabinet installation only!

The UE 48-2 OS Safety Relay module is only suitable for installation into control cabinets having a minimum protective type of enclosure to Class IP 54.

Installation of the units is made by snap-clipping on to a TS 35 (EN 50 022) mounting rail.

### 4 Electrical installation

#### Switch off and electrically isolate the system from all supply voltages!

In order to prevent any inadvertent start up of the system or the creating an electrical hazard, the system is to be switched off and electrically isolated from all voltage supplies.

#### Protection against electrocution to EN 50 178.

In order to secure protection from electrocution in accordance with EN 50 178, observe the instructions given in the *Technical Data*.

#### Instructions

- If the connected ESPD has its own contactor monitoring system, this may not be activated!
- Wiring of the contactor monitoring system (alarm contacts of the switch module) is to be made in the same installation housing used for the Safety Relay module.
- To prevent the final switching device contacts from welding, a fuse, rated to provide protection from short circuit to max. 6 A (Operation Class gG), is to be incorporated in the output circuitry (refer to Fig. 2, fuses F2/F3).
- In the case of switching capacitive or inductive loadings to output circuits, a spark suppression system should be used. It should be noted that some spark suppression systems can prolong the response time of the overall safety system.
- The cables for carrying the input and output signals are to be wired externally of the installation housing to correspond to the category of safety to be applied (EN 954). For example, protected wiring, single sheathed cable / wiring with a screen, etc.
- The details given in the *Technical Data* are to be observed unconditionally and without reservation.

#### 4.1 Wiring of connections

A 1	Voltage supply (DC-Mode: + 24 V)
A 2	Voltage supply (DC-Mode: 0 V)
S 11	+ 24 V DC (control voltage)
S 33	+ 24 V DC (control voltage)
S 21	0 V DC (control voltage)
S 34	Resetting (Trailing edge pulse)
S 35	Resetting (Leading edge pulse)
S 12	+ Input circuit 1 (K 1)
S 31	+ Input circuit 2 (K 2)
S 22	- Input circuits 2 (K 2)
13 - 14	Output circuit 1
23 - 24	Output circuit 2
31 - 32	Signal circuit (not fail safe)

### 4.2 Operating modes

#### 4.2.1 Single channel operation

Wire links are to be made between S 12 - S 31 and S 21 - S 22. The switching output of the ESPD is connected to terminal S 12.

#### 4.2.2 Dual channel operation

A wire bridge is to be made between S 21 - S 22. The two switching outputs of the ESPD are to be connected to S 12 or S 31.

#### 4.2.3 Resetting

**Manual resetting**  
 A reset button having a normally open contact is wired between contacts S 33 and S 34 (resetting with a trailing edge pulse). The reset button having a normally closed contact is wired between contacts S 33 and S 35 (resetting with a leading edge pulse). The reset button is to be installed outside the danger zone in such a manner that it cannot be activated from within the danger zone. In addition, the operator must have full visual command of the danger zone.

#### Automatic resetting

A wire link is to be made between S 12 - S 35.

#### 4.2.4 Monitoring of the contactors

Connecting the normally closed contacts of the contactors in series with the reset button ensures static monitoring of the contactors.

## 5 Commissioning

### Check the danger zone is clear!

Prior to commissioning, it must be ensured that the danger zone is clear of personnel. The safety regulations and test instructions as described above are to be observed.

The following functional tests are to be carried out during commissioning:

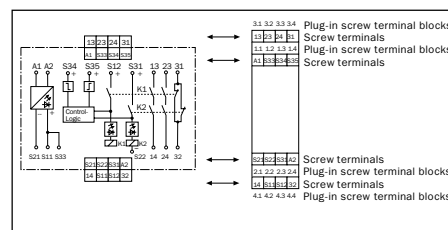


Fig. 1: Internal wiring UE 48-2 OS

### 5.1 Manual reset, functional testing

After applying the supply voltage, the output circuits are opened. (LED SUPPLY indicator illuminates). If the protection field of the ESPD is clear (i.e. the output circuits ESPD HIGH), then the output circuits close, or the alarm circuit opens when the reset button is activated (LED K 1 and K 2 illuminate).

Intrusion into the protection field of the ESPD (output circuits of the ESPD LOW) initiates the opening of the output circuit and the closing of the alarm circuit (LED K 1 and K 2 indicators extinguished). By the protection field of the ESPD becoming clear and subsequent activation of the reset button, the output circuits close (and the alarm circuit opens).

### 5.2 Automatic reset, functional testing

After applying the supply voltage (LED SUPPLY illuminates), the output circuits remain open (alarm circuit closed). If the protective field of the ESPD is clear, (i.e. the switching outputs ESPD HIGH), the interface output circuits then close and the alarm circuit opens (LED K 1 and K 2 illuminate). Intrusion into the protective field of the ESPD (switching outputs of ESPD LOW) effects the opening of the output circuits and the closing of the alarm circuit (LED K 1 and K 2 are extinguished). After the protection field of the BWS becomes clear the output circuits close and the alarm circuit opens.

### 5.3 Regular inspection / testing of the safety equipment by trained technical personnel

- Inspect / Test the system within the specified period in accordance with national applicable regulations!
- Following major modification work to the machine or the safety equipment, the system is to be tested as if being commissioned in accordance with the specification given above.

## 6 Maintenance

The UE 48-2 OS Safety Relay module operates consistently without the need for regular maintenance to be carried out.

## 7 Technical data

see Table

## 8 Ordering data

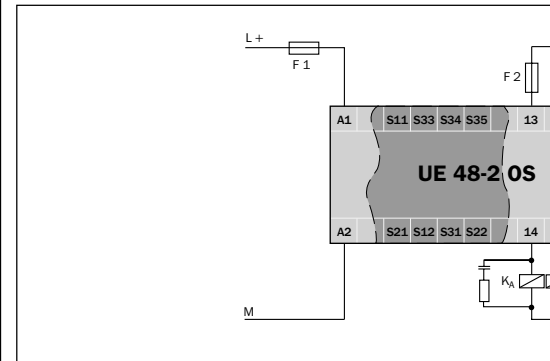


Fig. 2: Basic wiring UE 48-2 OS: voltage supply, dual channel output circuit (see Table)

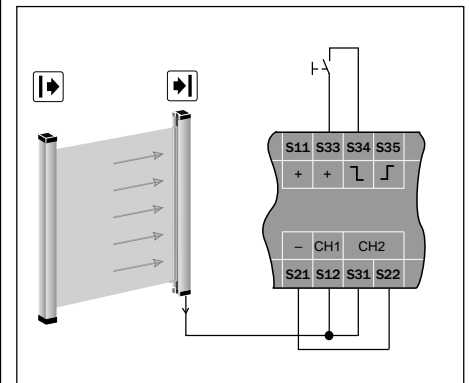


Fig. 3: Single-channel Light Curtain, Type 2, with manual reset

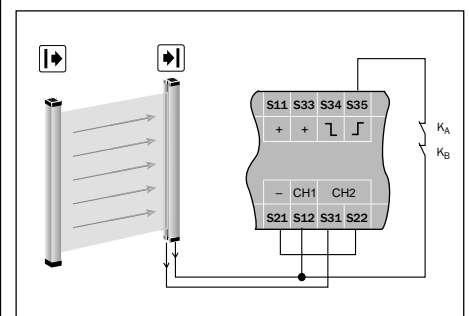


Fig. 6: Dual channel Light Curtain, Type 4, with automatic reset, monitoring system for contactors

### 8.1

Version  
 24 V AC  
 24 V AC  
 plug-in b

### 9 A

### 9.1

BG, UL

### 9.2

### 8.1 Ordering data

Version	Type	Part No.
24 V AC/DC screw terminals	UE 48-2 OS 2 D 2	6 024 915
24 V AC/DC detachable plug-in block terminals	UE 48-2 OS 3 D 2	6 024 916

### 9 Appendix

#### 9.1 Approvals

BG, UL

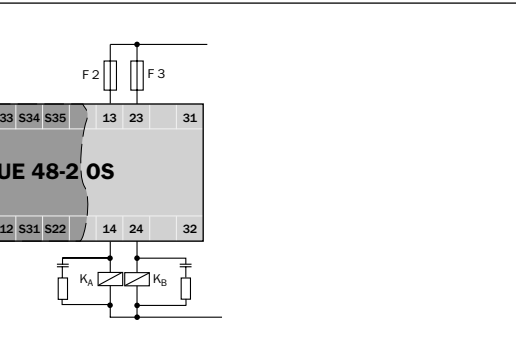
#### 9.2 Examples of circuits

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Output circuit (see Technical Data)

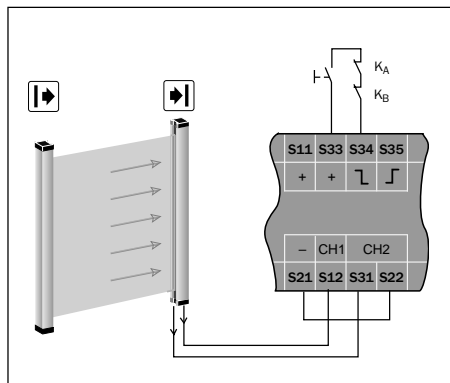


Fig. 4: Dual channel Light Curtain, Type 4, with manual reset monitoring system for contactors

### Technical Data

	min.	typical	max.
<b>General Data on System</b>			
Safety Classification (EN 50 178)	Protection against electrocution as per DIN VDE 0106, Part 100		
Voltage supply to A 1 / A 2	PELV to A 1 / A 2		
Output circuit > 25 V AC / 60 V DC	PELV to A 1 / A 2		
Output circuit < 25 V AC / 60 V DC	PELV or SELV to A 1 / A 2		
Safety category EN 954-1	4		
Supply voltage $U_v$	20.4 V	24 V	26.4 V AC/DC
Consumption			
AC			3.5 VA
DC			1.5 W
Ripple during DC operation (within the limits of $U_v$ )			2.4 V <sub>SS</sub>
Nominal frequency during AC operation	50 Hz		
<b>Control voltage for S 33 / S 11 and S 21</b>			
Control voltage	24 V DC		
Control current	50 mA		
Short-circuits between S 33 / S 11 and A 2			2200 mA
Fuse / Circuit breaker	PTC resistance		
Short-circuit control voltage S 33 - S 11 against S 21			
Short-circuit voltage			20 V DC
Short-circuit current			100 mA
Electrical separation between A 1 / 2 and S 21, S 11, S 33	none		
<b>Input circuits (S 12 and S 31)</b>			
Input current for S 12 and S 31			30 mA
Input current for S 22			20 mA
Peak input current / half life			75 mA / 45 ms
Fallback delay (response time of protective function)			25 ms
Reset time			
Trailing edge (S 34)			80 ms
Leading edge (S 35)			600 ms
Synchronisation time			500 ms
Activation period for reset button	50 ms		
Input circuit interruption	50 ms		
Activation time			500 ms
Line resistance at input			< 70 Ohm
<b>Output circuits (13 - 14, 23 - 24, 31 - 32)</b>			
Relay contacts	2 output circuits (closers / make contacts) 1 signal circuit (opener / break-contact)		
Contact type	Positively guided		
Contact materials	Silver alloy; gold-plated		
Contact load capacity			
Switching voltage	10 V AC/DC	230 V AC / 30 V DC	
Switching current	10 mA	6 A	
Summated current			12 A
Application category to EN 60 947-5-1: 1991			
AC-15 Ue 230 V AC, I <sub>e</sub> 6 A (3600 c/h)			
DC-13 Ue 24 V DC, I <sub>e</sub> 6 A (360 c/h)			
DC-13 Ue 24 V DC, I <sub>e</sub> 3 A (3600 c/h)			
Permitted switching frequency			3600 c/h
Service life, mechanical (switch clearance tolerances)			1 x 10 <sup>7</sup>
Electrical service life			2 x 10 <sup>6</sup>
<b>Operational data</b>			
Creepage and clearance distance between the electric circuits to DIN VDE 0110 Part 1:			
Measured transient/surge voltage ( $U_{\text{temp}}$ )			4 kV
Overload voltage category			III
Contamination rating of the unit (EN 50 178)			
external			3
internal			2
Measured voltage			300 V AC
Test voltage $U_{\text{eff}}$ (50 Hz) EN 60 439-1			2.0 kV
Type of protective enclosure			
Casing	IP 40		
Terminals	IP 20		
Interference emission to	EN 60 947-1 02/99		
Noise attenuation	EN 60 947-1 02/99		
Ambient operating temperature	- 25 °C	+ 55 °C	
Storage temperature	- 25 °C	+ 75 °C	
Cross-sections of conductors			
Solid-core wire (2x, identical cross-section)	0.14 mm <sup>2</sup>	0.75 mm <sup>2</sup>	
Solid-core wire (1x)	0.14 mm <sup>2</sup>	2.5 mm <sup>2</sup>	
Fine multi-stranded flex with terminal sleeves (2x, identical cross-section)	0.25 mm <sup>2</sup>	0.5 mm <sup>2</sup>	
Fine multi-stranded flex with terminal sleeves (1x)	0.25 mm <sup>2</sup>	2.5 mm <sup>2</sup>	
Weight			0.2 kg

