# Optoelectronic safety devices

Product information


SCHMERSAL

Safe solutions for your industry

# Introduction

Heinz and Philip Schmersal, Executive Directors of the Schmersal Group

**Safety in system – Protection for man and machine**

Often, it is unavoidable that people have to intervene with the workings of a machine. When this is done the safety of the operator is imperative. This demands the responsibility of the machine operator, which is also required by the world's standards and guidelines for machine safety.
The Schmersal Group has concentrated for many years on safety at work with our products and solutions; today we can offer the industry the world's largest range of safety switchgear and systems for the protection of man and machine.

Under the guiding principle "Safety with system – protection for man and machine" we develop and produce products that carry the system concept and can be optimally integrated into the work processes. Because we are convinced that safety does not contradict higher productivity.

In our fields of activity we have a leading position due to our expertise, our innovative power and our comprehensive range of products. With this we follow a central theme: Together with you, we want to make the world a little safer. Talk to us – we look forward to working with you.

# Content

# Schmersal Worldwide
## Offices in Germany

### Wuppertal

**K.A. Schmersal GmbH & Co. KG**

- Founded in 1945
- Around 700 employees

**Focal points**
- Headquarters of the Schmersal Group
- Development and manufacture of switchgears and switching systems for safety, automation and lift engineering
- Accredited test laboratory
- Central research and development
- Logistics centre for European markets

### Wettenberg

**K.A. Schmersal GmbH & Co. KG**

- Founded in 1952 (1997)
- Around 180 employees

**Focal points**
- Development and manufacture of switchgears for operation and monitoring, safety-related relay modules and controls as well as switchgears for explosion protection

### Mühldorf / Inn

**Safety Control GmbH**

- Founded in 1994 (2008)
- Around 30 employees

**Focal points**
- Development and manufacture of optical electronic components for safety and automation engineering

### Bergisch Gladbach

**Böhnke + Partner GmbH Steuerungssysteme**

- Founded in 1991 (2013)
- Around 70 employees

**Focal points**
- Development and manufacture of components, controls and remote diagnostic systems for the lift industry

( ) = inclusion in the Schmersal Group

# Schmersal Worldwide
International Offices

## Boituva / Brazil

**ACE Schmersal**

- Founded in 1974
- Around 400 employees

**Focal points**
- Manufacture of electromechanical and electronic switchgears
- Customer-specific control systems for the North and South American market

## Shanghai / China

**Schmersal Industrial Switchgear Co. Ltd**

- Founded in 1999
- Around 165 employees

**Focal points**
- Development and manufacture of switchgears for safety, automation and lift engineering for the Asian market

## Pune / India

**Schmersal India Private Limited**

- Founded in 2013
- Around 60 employees

**Focal points**
- Development and manufacture of switchgears for safety, automation and lift engineering for the Indian market

# Optoelectronic safety devices
Description

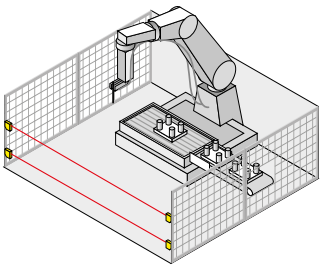
## Usage / selection of AOPD

In order to choose the appropriate active optoelectronic protective device (AOPD) such as light barriers, light curtains/grids to use them correctly, both the requirements of the standards (EN 61496, ISO 13849-1, ISO 13855, C standards etc.) and product-specific features (detection sensitivity, range, etc.) must be taken into account.

AOPD's can be used, provided that:
- The dangerous movement can be stopped at all times and that it is ensured that the dangerous area can only be reached after the movement has come to standstill.
- The stopping time for the machine and all safety components used are known.
- No objects (work pieces, liquids, etc.) can be ejected.
- The AOPD meet the requirements of Type 2 or Type 4 acc. to EN 61496.
- The dangerous area can only be reached by passing through the protected field of the AOPD.
- Reaching over, under or through the protected field is impossible.
- The start or restart command devices are fitted in such a way that the entire hazardous area is completely visible from the outside and it cannot be activated from within the hazardous area.
- the safety distance is calculated and constructively applied in accordance with ISO 13855.

The effectiveness of the protection equipment is only as good as the risk analysis carried out when designing the system, which took into consideration all the marginal conditions such as surroundings, machine and functional sequences.

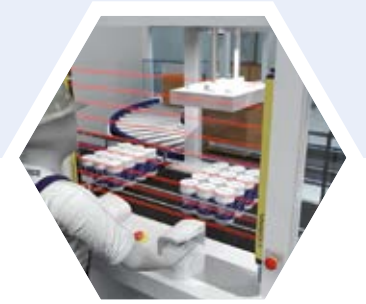
## Safety light barriers



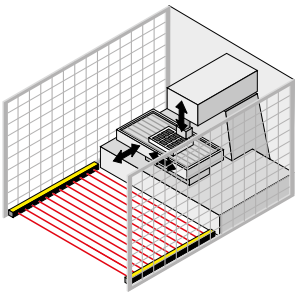
All SLB photoelectric barriers have fail-safe integrated semi-conductor outputs (2 x PNP) and can be incorporated directly in the safety circuit without external safety monitoring. The new product family meets the requirements of all type 2 or type 4 applications in accordance with IEC 61496. The safety photoelectric barriers are distinguished by extremely small dimensions which means that they can be well placed in the surrounding structure and can also be mounted easily and quickly even in tight spaces. At the same time, the compact design does not come at a cost to the range: both models have a range of 15 metres. The SLB 440…-H model features a range of up to 75 metres and, as an option, has integrated heating for use in minus temperatures.

Single beam photoelectric barriers are particularly suitable for safeguarding smaller hazardous areas – such as machines with small openings or slots. In this case, the safety-orientated opto-electronics reliably protect operating personnel by triggering a signal that safely brings the hazardous machine movement to a standstill should the light beam be interrupted.

With this set of features, the new photoelectric barriers can be deployed in numerous ways – for example in work areas where assembly and material handling technology is used as well as in the wood, paper and print industry. Other areas of application are (semi) automated shelving and commissioning systems, high shelf warehouses and packaging machines as well as for confining work areas of man and machine. It can also be used in outside areas, for example in the wood and cement industry, in gravel pits or in harbours/ports.



# Safety light grids / light curtains



The safety light curtains and safety light grids of the SLC and SLG range meet the requirements of Category type 2 and type 4 according to EN 61496.
Typical applications for safety light barriers are on robots, automatic-processing plants, transfer lines, rack storage and pallet loaders.
In these active optoelectronic protective devices (AOPD), the emitter and receiver are fitted in two separate enclosures. An infrared signal is emitted by the transmitter and evaluated and monitored by the receiver. If the light beam is interrupted by an object or a person, a stop signal is emitted to bring the machine to standstill.

The protection field is defined by the height and width of the protection field. The protected height is the range between the first and last infrared light beam of a light curtain. The protected height defines the physical size of the system to be used. The protected width or operating range is the distance between the transmitter and receiver unit.
If the light beam is interrupted, a signal is emitted to bring the dangerous movement of the machine to a standstill. Here, the following rule applies: the smaller the distance between two adjacent light beams, the more accurate the detection sensitivity of the AOPD.

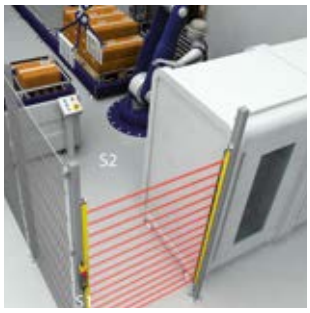
For the detection of body parts, a distinction is made between finger, hand and body protection. ISO 13855 sets the biometric data for finger protection to 14 mm, for hand detection to 30 mm, for leg detection up to 70 mm and for body detection to over 70 mm. Safety light grids are generally used to detect the penetration of the entire human body. Safety light curtains are multiple beam systems (Resolution < 40 mm) and can also detect smaller objects in case of intrusion into the protected field.

The optoelectronic safety light grids and safety light curtains can be smoothly connected through a M12 connector; they are equipped with a diagnostic interface as well as an LED for status indication. The safety light curtains or light grids feature an integrated safety-monitoring module with start/restart interlock and contactor control. Additional functions such as blanking, muting and a synchronisation function for the light curtains are also available.

The product range SLC and SLG therefore have the greatest possible flexibility for the protection of different hazards.

# Optoelectronic safety devices
Modes of operation and functions

## Operating modes




Double acknowledgement/reset

The operating modes of an AOPD must be defined according to the risk analysis of a machine.

**Automatic / Protective mode**

The protective mode switches the AOPD outputs to an ON state (protection field not interrupted), without external release of a switching device. This mode of operation creates an automatic machine restart if the protection field is not interrupted and should only be selected with the restart interlock of the machine.

**Restart interlock (manual reset)**

The restart interlock (manual reset) prevents an automatic enabling of the outputs (OSSD's ON state) after switch-on of the operating voltage or an interruption of the protection field. The system switches the outputs only to an ON state, when an external command device generates an enabling signal at the restart input (receiver).

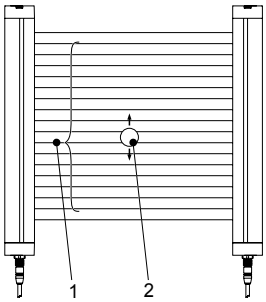
**Restart interlock with double acknowledgement/reset**

In applications with access monitoring, a complete overview of the hazardous areas is often not possible; despite that, a reset of the command device for the restart interlock outside of the hazardous area by third parties is enabled at all times, although possible persons/operators are in the non visible area. This hazardous situation of an unexpected start-up can be avoided by means of a double reset, i.e. integration of two command devices inside and outside the hazardous area.

**Setting mode**

Before commissioning an AOPD, the best possible alignment of the sensors should be determined, this will ensure a high availability of the system. The set-up mode visualises the set-up quality during the installation of the sensors by ensuring equal height (basic adjustment) and a perpendicular protection field orientation (fine adjustment). Visualisation is via a 7-segment display or status indicator at the receiver.

## Object blanking



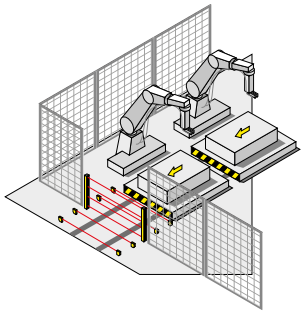

1 Object blanking area
2 Movable object

If continuity of the production process is required, a part of the protection field can be blanked without triggering a stop signal in contrast to the muting function. In this way, objects such as work pieces can be fed or a conveyor belt can be positioned at a fixed position in the protection field. The integrated floating blanking function of the SLC440/445-light curtains enables a flexible blanking of up to 2 light beams in the protection field of the light curtain. This function is required to ensure that light beams can be interrupted at an undefined position in the protection field. In this way, objects such as movable electrical cables or materials with slightly varying heights can be fed through the light curtain without triggering a stop signal.

Different blanking functions are available. The distinguishing feature of the different modes is the number of light beams that can be interrupted by an object. In addition to that, it can be defined whether the object may be in the protection field permanently or only temporarily. The interrupted light beams can be at any position in the protection field. Apart from the first infrared light beam (the beam closest to the connector), any light beam can be used for blanking.

If the floating blanking function is configured the resolution of the light curtain changes.
The technical documentation of the different light curtains includes the tables with the effective resolutions to calculate the minimum safety distance according to ISO 13855.

## Muting



If goods or objects need to be transported in or out of the hazardous area without stopping the machine, the safety light curtain must be automatically and temporarily suspended. Two or four muting signals are used to detect whether a person is approaching the hazardous area or a transport system is entering or leaving the hazardous area. Suitable muting inputs are light barriers, proximity switches or position switches.

The integrated safety-muting controller of the safety light curtain or light grid monitors and controls the muting process. The safety outputs are not disabled. Depending on the application, different light barriers with integrated muting functions are available. Detailed product information can be found in the operating instructions.

## Cyclic operation

Cyclic operation is an AOPD operating mode to control an automatic production process with manual placement and simultaneous monitoring of the hazardous area. The light curtain additionally monitors a signal from the application controller (machine contact), which signals the end of the hazardous movement. This signal is used for the cycle reset and enables an immediate intervention in the protection zone. A cycle is defined as the one-time interruption and release of the protection zone. A single cycle operation starts a new machine cycle if the protection field is interrupted once.

**Example**
The material is fed automatically without interruption of the protection zone. After initialisation, the machine starts the first cycle. The operator now interrupts the protection zone to remove the material. The next cycle starts automatically.
With a dual cycle operation, a new machine cycle is started after the protection field has been interrupted twice.

**Example**
The operator loads the machine with the material to be processed and gives the start command. After the process is finished, the operator removes the processed material (1st cycle) and loads new material for processing (2nd cycle). The next cycle starts automatically.

During the dangerous movement, the machine should be stopped before any intervention in the AOPD protection field. A new start cycle is to be initialised by actuating the command device to release the restart interlock.

## Safety distance

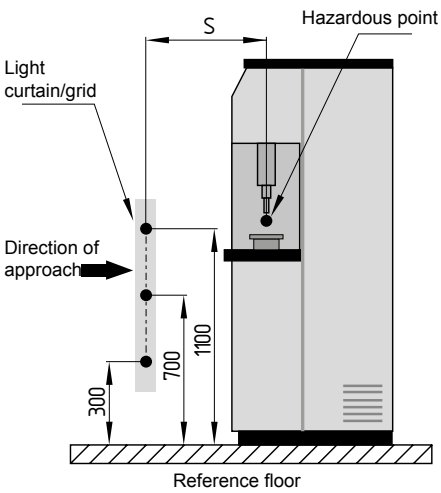
The stopping time for the complete system and the resolution capacity of the AOPD essentially determines the required safety distance of the AOPD to the dangerous area. The safety light grid or light curtain must be sized and installed so that a stop signal would be transmitted and the hazard ceased prior to a person or a body part accessing the danger zone.

The standard ISO 13855 provides the user with detailed information about the calculation of the minimum safety distances. These include the following important influencing factors:

- Stopping time of the entire system, taking the different reaction times of the individual systems into account (e.g. machine, safety relay module, AOPD etc.)
- Detection capability of the AOPD to detect body parts (finger, hand and whole body)
- Arrangement of each protection device in the normal position (vertical mounting), parallel orientation (horizontal mounting) or at any angle in front of the guard system
- Approach speed to the protection field

For the calculation of the minimum safety distance S to the hazardous area, ISO 13855 presents the following general formula:

$$S = K \times T + C$$




Key:

**S** the safety distance to the hazardous area (mm)

**K** the approach speed of the body or the body part (mm/s)

**T** total reaction time of the system (s)
(inc. machine run-on time, reaction time of the safety guard and the safety relay module, etc.)

**C** additional distance (mm) before the safety guard

If access to the hazardous area (by passing across the protection field) cannot be excluded by using vertically mounted contactless protective equipment such as a light grid, an additional minimum distance CRO should be considered.
This distance is dependent on the protection field height above the ground and the position of the hazardous area (ISO 13855).

# Optoelectronic safety devices
## Overview

| Selection | Type to EN 61496 | Special features | Series | refer to |
|---|---|---|---|---|
| Safety light barriers SLB | Type 2 | Range to 15 m | SLB240 | page 12 |
| | Type 4 | Range to 15 m | SLB440 | |
| | | Range to 75 m | SLB440-H | |
| Safety light curtains SLC | Type 2 | Compact | SLC240COM | page 14 |
| | Type 4 | Standard | SLC420 | page 16 |
| | | Master / Slave | SLC420 M/S | |
| | | High protection class | SLC420 IP69K | |
| | | Integrated muting and override function | SLC425I | page 18 |
| | | High protection class | SLC425I IP69K | |
| | | Compact | SLC440COM | page 22 |
| | | Standard | SLC440 | |
| | | Multifunctional | SLC445 | |
| Safety light grids SLG | Type 2 | Compact | SLG240COM | page 14 |
| | Type 4 | Standard | SLG420 | page 16 |
| | | High protection class | SLG420 IP69K | |
| | | Active-passive system with mirror | SLG422-P | |
| | | Integrated muting and override function | SLG425I | page 18 |
| | | High protection class | SLG425I IP69K | |
| | | Active-passive system with mirror | SLG425I-P | |
| | | Compact | SLG440COM | page 22 |
| | | Standard | SLG440 | |
| | | Multifunctional | SLG445 | |

# Optoelectronic safety devices

## Safety light barriers – Series SLB

### Overview

| | ■ SLB240 | ■ SLB440 | ■ SLB440-H |
|---|---|---|---|
| **Key Features** | • Safety light barrier type 2<br>• 4-stage coding<br>• Integr. evaluation | • Safety light barrier type 4<br>• 4-stage coding<br>• Integr. evaluation | • Safety light barrier type 4<br>• 4-stage coding<br>• Integr. evaluation<br>• optional heater |
| **Technical features** | | | |
| **Range of the protection field** | 15 m | 15 m | 75 m |
| **Min. object size** | Ø 10 mm | Ø 10 mm | Ø 70 mm |
| **Wave length of the sensor** | 880 nm | 880 nm | 880 nm |
| **Electrical characteristics** | | | |
| **Response time** | 7 … 22 ms | 7 … 22 ms | 7 … 22 ms |
| **Automatic/restart interlock** | ■ | ■ | ■ |
| **Rated operating voltage Ue** | 24 VDC ± 10% | 24 VDC ± 10% | 24 VDC ± 10% |
| **Safety outputs** | 2 x OSSD | 2 x OSSD | 2 x OSSD |
| **Mechanical data** | | | |
| **Material of the enclosure** | Aluminium | Aluminium | Aluminium |
| **Connection** | ST: Connector plug M12<br>LST: 20 cm Cable with connector M12 | ST: Connector plug M12<br>LST: 20 cm Cable with connector M12 | ST: Connector plug M12<br>LST: 20 cm Cable with connector M12 |
| **Connector plug (transmitter/receiver)** | 4-pole / 5-pole | 4-pole / 5-pole | 4-pole / 5-pole |
| **Cable length** | max. 100 m | max. 100 m | max. 100 m |
| **Dimensions (H x W x L)** | ST: 28 x 91 x 33 mm<br>LST: 28 x 72 x 33 mm | ST: 28 x 91 x 33 mm<br>LST: 28 x 72 x 33 mm | ST: 28 x 131 x 33 mm<br>LST: 28 x 111 x 33 mm |
| **Ambient conditions** | | | |
| **Ambient temperature** | −30 °C … +50 °C | −30 °C … +50 °C | −30 °C … +50 °C |
| **Protection class** | IP67 | IP67 | IP67 |
| **Recommended safety-monitoring module for the series wiring** | SRB-E-204ST | SRB-E-204ST | SRB-E-204ST |
| **Safety classification** | | | |
| **Standards** | ISO 13849-1<br>EN 62061 | ISO 13849-1<br>EN 62061 | ISO 13849-1<br>EN 62061 |
| **PL/SIL** | c/2 | e/3 | e/3 |
| **Category** | 2 | 4 | 4 |
| **PFH** | $1.5 \times 10^{-8}$ /h | $1.5 \times 10^{-8}$ /h | $1.5 \times 10^{-8}$ /h |
| **Certificates** | TÜV UL | TÜV UL | TÜV UL |

To get detailed information about the products and certificates, visit **www.schmersal.net**.

# Optoelectronic safety devices

## Safety light barriers – Series SLB

### Preferred types and accessories

| Type | Series | | Type | Type designation | Material number |
|---|---|---|---|---|---|
| Safety light barriers | SLB240 |  | Coding 1* | **SLB240-ER-1-ST** | **103013801** |
| | | | Coding 1* | **SLB240-ER-1-LST** | **103013529** |
| | SLB440 |  | Coding 1* | **SLB440-ER-1-ST** | **103019521** |
| | | | Coding 1* | **SLB440-ER-1-LST** | **103013525** |
| | SLB440-H |  | Coding 1* | **SLB440-ER-1-ST-H** | **103015483** |
| | | | Coding 1* | **SLB440-ER-1-LST-H** | **103015487** |
| | | | Coding 1* | **SLB440-ER-1-ST-H-EH** | **103015491** |
| | | | Coding 1* | **SLB440-ER-1-LST-H-EH** | **103015497** |

*Other coding available

**Connector plug**

- Connector M12, straight, 4 pole
  5 m **KA-0804**
  10 m **KA-0805**
  20 m **KA-0808**
- Connector M12, straight, 5 pole
  5 m **A-K5P-M12-S-G-5M-BK-2-X-A-1**
  10 m **A-K5P-M12-S-G-15M-BK-2-X-A-1**

**KA-0977** **103013625**

- Parametrisation cable for SLB series
- Y-splitter, M12, 5-pole with P-button

**MS-…**

- Assembly sets for SLB series
  **MS-1100** qty. 4 brackets, qty. 8 screws (for SLB440-H)
  **MS-1101** qty. 2 brackets, qty. 4 screws (for SLB240 / SLB440)

**SMA-80** **101150262**

- Tilted mirror for SLB series
- Height: 80 mm
- Width: 120 mm

**BF-SMA-80-1** **101150263**

- Mounting bracket for attachment of tilted mirror SMA-80 (horizontal tilt)

**BF-SMA-80-2** **101150264**

- Mounting bracket for attachment of tilted mirror SMA-80 (vertical tilt)

Detailed information for the selection of accessories can be found at **www.schmersal.net**.

# Optoelectronic safety devices

## Safety light grids / light curtains type 2 – Series 240COM

### Overview

| | ■ SLC240COM | ■ SLG240COM |
|---|---|---|
| **Features** | | |
| | • Safety light curtain<br>• Compact | • Safety light grid<br>• Compact |
| **Technical features** | | |
| **Resolution** | 14, 30, 35 mm | 300, 400 or 500 mm |
| **Protection field height** | 330 mm … 1930 mm | 500, 800 or 900 mm |
| **Number of beams** | 11 … 192 | 2, 3 or 4 beams |
| **Range of the protection field** | 0.3 … 12 m | 0.3 … 12 m |
| **Operating modes** | | |
| **- Protective mode / Automatic** | ■ | ■ |
| **- Restart interlock (manual reset)** | ■ | ■ |
| **- Parameter setting** | KA-0896 | KA-0896 |
| **Functions integrated** | | |
| **- Contactor control** | – | – |
| **- Blanking of objects** | ■ | ■ |
| **- Muting** | – | – |
| **- Cyclic function** | – | – |
| **- Further functions (see key)** | DM, RS | DM, RS |
| **Electrical characteristics** | | |
| **Operating voltage** | 24 VDC ± 10% | 24 VDC ± 10% |
| **Safety output OSSD, 24 VDC** | 2 x PNP (timing) | 2 x PNP (timing) |
| **Response time OSSD** | 10 … 28 ms | 10 ms |
| **Switching capacity OSSD** | 500 mA | 500 mA |
| **LED status display, 7-segment display** | Status display | Status display |
| **Mechanical data** | | |
| **Execution of the electrical connection** | Connector plug | Connector plug |
| **Connector plug (transmitter/receiver)** | 4-pole / 5-pole | 4-pole / 5-pole |
| **Dimensions** [1)] | 27.8 x 33 mm | 27.8 x 33 mm |
| **Ambient conditions** | | |
| **Ambient temperature** | −10 °C … +50 °C | −10 °C … +50 °C |
| **Protection class** | IP67 | IP67 |
| **Safety classification** | | |
| **Standards** | ISO 13849-1,<br>EN 62061 | ISO 13849-1,<br>EN 62061 |
| **PL/SIL** | c/1 | c/1 |
| **Category** | 2 | 2 |
| **PFH** | 8.05 x $10^{-9}$ /h | 8.05 x $10^{-9}$ /h |
| **Certificates** | TÜV UL EAC | TÜV UL EAC |

# Optoelectronic safety devices

## Safety light grids / light curtains type 2 – Series 240COM

### Preferred types

| Type to EN 61496 | Safety | Series | Resolution | Protection field height | Range | Type designation | Material number |
|---|---|---|---|---|---|---|---|
| Type 2 | Light curtain SLC | SLC240COM | 14 mm | 330 … 1930 mm | 0,3 … 7 m | **SLC240COM-ER-xxxx-14** | **---** |
| | | | 30 mm | 330 … 1930 mm | 0,3 … 12 m | **SLC240COM-ER-xxxx-30** | **---** |
| | | | 35 mm | 330 … 1930 mm | 0,3 … 7 m | **SLC240COM-ER-xxxx-35** | **---** |
| | Light grids SLG | SLG240COM | 2 beams | 500 mm | 0.3 … 12 m | **SLG240COM-ER-0500-02** | **103016120** |
| | | | 3 beams | 800 mm | 0.3 … 12 m | **SLG240COM-ER-0800-03** | **103016122** |
| | | | 4 beams | 900 mm | 0.3 … 12 m | **SLG240COM-ER-0900-04** | **103016127** |

**xxxx** = For different heights and other combinations, see **www.schmersal.net.**
--- = The material number is dependent on the protective field heights.

[1] The height depends on the protection field height

**Key**
BC = Beam coding
DQ = Double acknowledgement/reset
MS = Multiple scan
DM = Setting mode
SI = Start interlock
RS = Series-wiring

To get detailed information about the products and certificates, visit www.schmersal.net.

# Optoelectronic safety devices

## Safety light grids / light curtains type 4 – Series 420/422

### Overview



| | ■ SLC420 | ■ SLC420 M/S | ■ SLC420 IP69K |
|---|---|---|---|
| **Key Features** | | | |
| | • Safety light curtain<br>• Standard | • Safety light curtain<br>• Master/Slave | • Safety light curtain<br>• High protection class |
| **Technical features** | | | |
| **Resolution** | 14, 30, 50 mm | 14, 30, 50 mm | 14, 30 mm |
| **Protection field height** | 170 mm … 1770 mm | 170 mm … 2420 mm | 175 mm … 1450 mm |
| **Number of beams** | 2 … 144 | 4 … 208 | 2 … 144 |
| **Range of the protection field** | 0.3 … 18 m | 0.3 … 18 m | 0.3 … 10 m |
| **Operating modes** | | | |
| **- Protective mode / Automatic** | ■ | ■ | ■ |
| **- Restart interlock (manual reset)** | ■ | ■ | ■ |
| **- Parameter setting** | NSR-0801 (adapter) | NSR-0801 (adapter) | NSR-0801 (adapter) |
| **Functions integrated** | | | |
| **- Contactor control** | ■ | ■ | ■ |
| **- Blanking of objects** | ■ | ■ | ■ |
| **- Muting** | – | – | – |
| **- Cyclic function** | – | – | – |
| **- Further functions (see key)** | BC, SI | BC, SI | BC, SI |
| **Electrical characteristics** | | | |
| **Operating voltage** | 24 VDC ± 10% | 24 VDC ± 10% | 24 VDC ± 10% |
| **Safety output OSSD, 24 VDC** | 2 x PNP | 2 x PNP | 2 x PNP |
| **Response time OSSD** | 10 … 27 ms | 10 … 37 ms | 10 … 27 ms |
| **Switching capacity OSSD** | 500 mA | 500 mA | 500 mA |
| **LED status display, 7-segment display** | LED | LED | LED |
| **Mechanical data** | | | |
| **Execution of the electrical connection** | Connector plug | Connector plug | Cable + connector plug |
| **Connector plug (transmitter/receiver)** | 4-pole / 8-pole | 4-pole / 8-pole | 4-pole / 8-pole |
| **Dimensions** [1)] | Ø 49 mm | Ø 49 mm | Ø 60 mm |
| **Ambient conditions** | | | |
| **Ambient temperature** | −25 °C … +50 °C | −10 °C … +50 °C | −10 °C … +50 °C |
| **Protection class** | IP67 | IP67 | IP69K |
| **Safety classification** | | | |
| **Standards** | ISO 13849-1,<br>EN 62061 | ISO 13849-1,<br>EN 62061 | ISO 13849-1,<br>EN 62061 |
| **PL/SIL** | e/3 | e/3 | e/3 |
| **Category** | 4 | 4 | 4 |
| **PFH** | 7.42 x $10^{-9}$ /h | 7.42 x $10^{-9}$ /h | 7.42 x $10^{-9}$ /h |
| **Certificates** | TÜV UL EAC | TÜV UL EAC | TÜV UL EAC |

To get detailed information about the products and certificates, visit **www.schmersal.net**.

|  |  |  |
|---|---|---|
| ■ SLG420 | ■ SLG420 IP69K | ■ SLG422-P |
| • Safety light grid<br>• Standard | • Safety light grid<br>• High protection class | • Safety light grid<br>• Active-passive with deflecting mirror ULS |
| 300, 400 or 500 mm | 300, 400 or 500 mm | 300 mm |
| 500, 800 or 900 mm | 500, 800 or 900 mm | 500 mm |
| 2, 3 or 4 beams | 2, 3 or 4 beams | 2 beams |
| 0.3 … 50 m | 0.3 … 18 m | 0.3 … 7 m |
| | | |
| ■ | ■ | ■ |
| ■ | ■ | ■ |
| NSR-0801 (adapter) | NSR-0801 (adapter) | NSR-0801 (adapter) |
| | | |
| ■ | ■ | ■ |
| ■ | ■ | – |
| – | – | – |
| – | – | – |
| BC, SI | BC, SI | SI |
| | | |
| 24 VDC ± 10% | 24 VDC ± 10% | 24 VDC ± 10% |
| 2 x PNP | 2 x PNP | 2 x PNP |
| 10 … 15 ms | 10 … 15 ms | 10 ms |
| 500 mA | 500 mA | 500 mA |
| LED | LED | LED |
| | | |
| Connector plug | Cable + connector plug | Connector plug |
| 4-pole / 8-pole | 4-pole / 8-pole | 8-pole |
| Ø 49 mm | Ø 60 mm | Ø 49 mm |
| | | |
| −25 °C … +50 °C | −10 °C … +50 °C | −10 °C … +50 °C |
| IP67 | IP69K | IP67 |
| | | |
| ISO 13849-1, EN 62061 | ISO 13849-1, EN 62061 | ISO 13849-1, EN 62061 |
| e/3 | e/3 | e/3 |
| 4 | 4 | 4 |
| 7.42 x $10^{-9}$ /h | 7.42 x $10^{-9}$ /h | 7.42 x $10^{-9}$ /h |
| TÜV UL EAC | TÜV UL EAC | TÜV UL |

[1] The height depends on the protection field height

**Key**

BC = Beam coding
DQ = Double acknowledgement/reset
MS = Multiple scan
DM = Setting mode
SI = Start interlock

# Optoelectronic safety devices

## Safety light grids / light curtains type 4 – Series 425I

### Overview



| | ■ SLC425I | ■ SLC425I IP69K | ■ SLG425I |
|---|---|---|---|
| **Key Features** | | | |
| | • Safety light curtain<br>• Standard | • Safety light curtain<br>• High protection class | • Safety light grid<br>• Standard |
| **Technical features** | | | |
| **Resolution** | 14, 30 mm | 14, 30 mm | 300, 400 or 500 mm |
| **Protection field height** | 170 mm … 1770 mm | 170 mm … 1450 mm | 500, 800 or 900 mm |
| **Number of beams** | 8 … 144 | 8 … 144 | 2, 3 or 4 beams |
| **Range of the protection field** | 0.3 … 10 m | 0.3 … 10 m | 0.3 … 18 m |
| **Operating modes** | | | |
| **- Protective mode / Automatic** | – | – | – |
| **- Restart interlock (manual reset)** | ■ | ■ | ■ |
| **- Parameter setting** | NSR-0801 (adapter) | NSR-0801 (adapter) | NSR-0801 (adapter) |
| **Functions integrated** | | | |
| **- Contactor control** | ■ | ■ | – |
| **- Blanking of objects** | ■ | ■ | ■ |
| **- Muting** | ■ | ■ | ■ |
| **- Cyclic function** | ■ | ■ | – |
| **- Further functions (see key)** | BC, SI | BC, SI | BC, SI |
| **Electrical characteristics** | | | |
| **Operating voltage** | 24 VDC ± 10% | 24 VDC ± 10% | 24 VDC ± 10% |
| **Safety output OSSD, 24 VDC** | 2 x PNP | 2 x PNP | 2 x PNP |
| **Response time OSSD** | 15 … 32 ms | 15 … 32 ms | 15 … 20 ms |
| **Switching capacity OSSD** | 500 mA | 500 mA | 500 mA |
| **LED status display, 7-segment display** | LED | LED | LED |
| **Mechanical data** | | | |
| **Execution of the electrical connection** | Connector plug | Cable + connector plug | Connector plug |
| **Connector plug (transmitter/receiver)** | 4-pole / 8-pole | 4-pole / 12-pole | 4-pole / 8-pole |
| **Dimensions** [1)] | Ø 49 mm | Ø 60 mm | Ø 49 mm |
| **Ambient conditions** | | | |
| **Ambient temperature** | −10 °C … +50 °C | −10 °C … +50 °C | −10 °C … +50 °C |
| **Protection class** | IP67 | IP69K | IP67 |
| **Safety classification** | | | |
| **Standards** | ISO 13849-1, EN 62061 | ISO 13849-1, EN 62061 | ISO 13849-1, EN 62061 |
| **PL/SIL** | e/3 | e/3 | e/3 |
| **Category** | 4 | 4 | 4 |
| **PFH** | 7.42 x $10^{-9}$ /h | 7.42 x $10^{-9}$ /h | 7.42 x $10^{-9}$ /h |
| **Certificates** | TÜV UL EAC | TÜV UL EAC | TÜV UL EAC |

To get detailed information about the products and certificates, visit **www.schmersal.net**.

|  |  |
|---|---|
| ■ SLG425I IP69K | ■ SLG425-IP |
| • Safety light grid<br>• High protection class | • Safety light grid<br>• Active-passive with deflecting mirror ULS |
| 300, 400 or 500 mm | 300 mm |
| 500, 800 or 900 mm | 500 mm |
| 2, 3 or 4 beams | 2 beams |
| 0.3 … 18 m | 0.3 … 7 m |
| | |
| – | – |
| ■ | ■ |
| NSR-0801 (adapter) | NSR-0801 (adapter) |
| | |
| – | – |
| ■ | – |
| ■ | ■ |
| – | – |
| BC, SI | SI |
| | |
| 24 VDC ± 10% | 24 VDC ± 10% |
| 2 x PNP | 2 x PNP |
| 15 … 20 ms | 15 ms |
| 500 mA | 500 mA |
| LED | LED |
| | |
| Cable + connector plug | Connector plug |
| 4-pole / 12-pole | 8-pole |
| Ø 60 mm | Ø 49 mm |
| | |
| −10 °C … +50 °C | −10 °C … +50 °C |
| IP69K | IP67 |
| | |
| ISO 13849-1,<br>EN 62061 | ISO 13849-1,<br>EN 62061 |
| e/3 | e/3 |
| 4 | 4 |
| 7.42 x $10^{-9}$ /h | 7.42 x $10^{-9}$ /h |
| TÜV UL EAC | TÜV UL EAC |

[1] The height depends on the protection field height

**Key**

BC = Beam coding
DQ = Double acknowledgement/reset
MS = Multiple scan
DM = Setting mode
SI = Start interlock

# Optoelectronic safety devices

## Safety light grids / light curtains type 4 – Series 420/422/425I

### Preferred types

| Type to EN 61496 | Safety | Feature | Series | Special features |
|---|---|---|---|---|
| Type 4 | Light curtain SLC | Standard | SLC420 | Standard |
| | | | | High range |
| | | Master / Slave | SLC420 M/S | Master |
| | | | | Master + High range |
| | | | | Slave |
| | | | | Slave + High range |
| | | High protection class | SLC420 IP69K | Standard |
| | Light grids SLG | Standard | SLG420 | Standard |
| | | | | High range |
| | | High protection class | SLG420 IP69K | Standard |
| | | Active-passive with deflecting mirror ULS | SLG422-P | Active-passive system |
| Type 4 | Light curtain SLC | Integrated muting and override function | SLC425I | Standard |
| | | High protection class | SLC425I IP69K | |
| | Light grids SLG | Integrated muting and override function | SLG425I | Standard |
| | | High protection class | SLG425I IP69K | |
| | | Active-passive with deflecting mirror ULS | SLG425I-P | Active-passive system |

**xxxx** = For different heights and other combinations, see **www.schmersal.net.**
--- = The material number is dependent on the protective field heights.

| | Resolution | Protection field height | Range | Type designation | Material number |
|---|---|---|---|---|---|
| | 14 mm | 170 … 1450 mm | 0.3 … 7 m | **SLC420-ER-xxxx-14-RFB** | **---** |
| | 30 mm | 170 … 1770 mm | 0.3 … 10 m | **SLC420-ER-xxxx-30-RFB** | **---** |
| | 50 mm | 170 … 1770 mm | 0.3 … 10 m | **SLC420-ER-xxxx-50-RFB** | **---** |
| | 30 mm | 170 … 1770 mm | 0.3 … 18 m | **SLC420-ER-xxxx-30-RFBH** | **---** |
| | 14 mm | 170 … 2100 mm | 0.3 … 7 m | **SLC420-ER-xxxx-14-RFBM** | **---** |
| | 30 mm | 170 … 2420 mm | 0.3 … 10 m | **SLC420-ER-xxxx-30-RFBM** | **---** |
| | 50 mm | 170 … 2420 mm | 0.3 … 10 m | **SLC420-ER-xxxx-50-RFBM** | **---** |
| | 30 mm | 170 … 2420 mm | 0.3 … 18 m | **SLC420-ER-xxxx-30-RFBMH** | **---** |
| | 14 mm | 170 … 2100 mm | 0.3 … 7 m | **SLC420-ER-xxxx-14-RFBS** | **---** |
| | 30 mm | 170 … 2420 mm | 0.3 … 10 m | **SLC420-ER-xxxx-30-RFBS** | **---** |
| | 50 mm | 170 … 2420 mm | 0.3 … 10 m | **SLC420-ER-xxxx-50-RFBS** | **---** |
| | 30 mm | 170 … 2420 mm | 0.3 … 18 m | **SLC420-ER-xxxx-30-RFBSH** | **---** |
| | 14 mm | 170 … 1450 mm | 0.3 … 7 m | **SLC420-ER-xxxx-14-69-RFB** | **---** |
| | 30 mm | 170 … 1450 mm | 0.3 … 10 m | **SLC420-ER-xxxx-30-69-RFB** | **---** |
| | 2 beams | 500 mm | 0.3 … 18 m | **SLG420-ER-0500-02-RF** | **101207359** |
| | 3 beams | 800 mm | 0.3 … 18 m | **SLG420-ER-0800-03-RF** | **101207360** |
| | 4 beams | 900 mm | 0.3 … 18 m | **SLG420-ER-0900-04-RF** | **101207361** |
| | 2 beams | 500 mm | 8 … 50 m | **SLG420-ER-0500-02-RFH** | **101207362** |
| | 3 beams | 800 mm | 8 … 50 m | **SLG420-ER-0800-03-RFH** | **101207363** |
| | 4 beams | 900 mm | 8 … 50 m | **SLG420-ER-0900-04-RFH** | **101207364** |
| | 2 beams | 500 mm | 0.3 … 18 m | **SLG420-ER-0500-02-69-RF** | **101207377** |
| | 3 beams | 800 mm | 0.3 … 18 m | **SLG420-ER-0800-03-69-RF** | **101207378** |
| | 4 beams | 900 mm | 0.3 … 18 m | **SLG420-ER-0900-04-69-RF** | **101207379** |
| | 2 beams | 500 mm | 0.3 … 7 m | **SLG422P-ER-0500-02-RF** | **101207547** |
| | 14 mm | 170 … 1450 mm | 0.3 … 7 m | **SLC425I-ER-xxxx-14-RFBC** | **---** |
| | 30 mm | 170 … 1770 mm | 0.3 … 10 m | **SLC425I-ER-xxxx-30-RFBC** | **---** |
| | 14 mm | 170 … 1450 mm | 0.3 … 7 m | **SLC425I-ER-xxxx-14-69-RFB** | **---** |
| | 30 mm | 170 … 1450 mm | 0.3 … 10 m | **SLC425I-ER-xxxx-30-69-RFB** | **---** |
| | 2 beams | 500 mm | 0.3 … 18 m | **SLG425I-ER-0500-02-RF** | **101207663** |
| | 3 beams | 800 mm | 0.3 … 18 m | **SLG425I-ER-0800-03-RF** | **101207664** |
| | 4 beams | 900 mm | 0.3 … 18 m | **SLG425I-ER-0900-04-RF** | **101207665** |
| | 2 beams | 500 mm | 0.3 … 18 m | **SLG425I-ER-0500-02-69-RF** | **101209656** |
| | 3 beams | 800 mm | 0.3 … 18 m | **SLG425I-ER-0800-03-69-RF** | **101209657** |
| | 4 beams | 900 mm | 0.3 … 18 m | **SLG425I-ER-0900-04-69-RF** | **101209658** |
| | 2 beams | 500 mm | 0.3 … 7 m | **SLG425IP-ER-0500-02-RF** | **101207672** |

# Optoelectronic safety devices

## Safety light grids / light curtains type 4 – Series 440COM/440/445

### Overview



| | ■ SLC440COM | ■ SLC440 | ■ SLC445 |
|---|---|---|---|
| **Key Features** | | | |
| | • Safety light curtain<br>• Compact | • Safety light curtain<br>• Standard | • Safety light curtain<br>• Multifunctional |
| **Other versions** | | | |
| **AS-i SaW** | – | ■ [1] | – |
| **Technical features** | | | |
| **Resolution** | 14, 30, 35 mm | 14, 30 mm | 14, 30 mm |
| **Protection field height** | 330 mm … 1930 mm | 170 mm … 1930 mm | 170 mm … 1770 mm |
| **Number of beams** | 11 … 192 | 8 … 192 | 8 … 144 |
| **Range of the protection field** | 0.3 … 10 m | 0.3 … 10 m | 0.3 … 10 m |
| **Operating modes** | | | |
| **- Protective mode / Automatic** | ■ | ■ | ■ |
| **- Restart interlock (manual reset)** | ■ | ■ | ■ |
| **- Parameter setting** | Wiring | KA-0974 | KA-0976 |
| **Functions integrated** | | | |
| **- Contactor control** | – | ■ | ■ |
| **- Blanking of objects** | – | ■ | ■ |
| **- Muting** | – | – | ■ |
| **- Cyclic function** | – | – | ■ |
| **- Further functions (see key)** | DM | BC, DQ, DM | BC, DQ, MS, DM |
| **Electrical characteristics** | | | |
| **Operating voltage** | 24 VDC ± 10% | 24 VDC ± 10% | 24 VDC ± 10% |
| **Safety output OSSD, 24 VDC** | 2 x PNP (timing) | 2 x PNP (timing) | 2 x PNP (timing) |
| **Response time OSSD** | 10 … 28 ms | 10 … 28 ms | 10 … 27 ms |
| **Switching capacity OSSD** | 500 mA | 500 mA | 500 mA |
| **LED status display, 7-segment display** | Status display | 7-segment display | 7-segment display |
| **Mechanical data** | | | |
| **Execution of the electrical connection** | Connector plug | Connector plug | Connector plug |
| **Connector plug (transmitter/receiver)** | 4-pole / 5-pole | 4-pole / 8-pole | 4-pole / 12-pole |
| **Dimensions** [2] | 27.8 x 33 mm | 27.8 x 33 mm | 27.8 x 33 mm |
| **Ambient conditions** | | | |
| **Ambient temperature** | −10 °C … +50 °C | −25 °C … +50 °C | −25 °C … +50 °C |
| **Protection class** | IP67 | IP67 | IP67 |
| **Safety classification** | | | |
| **Standards** | ISO 13849-1,<br>EN 62061 | ISO 13849-1,<br>EN 62061 | ISO 13849-1,<br>EN 62061 |
| **PL/SIL** | e/3 | e/3 | e/3 |
| **Category** | 4 | 4 | 4 |
| **PFH** | 8.05 x $10^{-9}$ /h | 5.14 x $10^{-9}$ /h | 5.14 x $10^{-9}$ /h |
| **Certificates** | TÜV UL EAC | TÜV UL EAC | TÜV UL EAC |

|  |  |  |
|---|---|---|
| ■ SLG440COM | ■ SLG440 | ■ SLG445 |
| • Safety light grid<br>• Compact | • Safety light grid<br>• Standard | • Safety light grid<br>• Multifunctional |
| – | ■ [1] | – |
| 300, 400 or 500 mm | 300, 400 or 500 mm | 300, 400 or 500 mm |
| 500, 800 or 900 mm | 500, 800 or 900 mm | 500, 800 or 900 mm |
| 2, 3 or 4 beams | 2, 3 or 4 beams | 2, 3 or 4 beams |
| 0,3 … 12 m | 0.3 … 20 m | 0.3 … 20 m |
| | | |
| ■ | ■ | ■ |
| ■ | ■ | ■ |
| Wiring | KA-0974 | KA-0976 |
| | | |
| – | ■ | ■ |
| – | ■ | ■ |
| – | – | ■ |
| – | – | ■ |
| DM | BC, DQ, DM | BC, DQ, MS, DM |
| | | |
| 24 VDC ± 10% | 24 VDC ± 10% | 24 VDC ± 10% |
| 2 x PNP (timing) | 2 x PNP (timing) | 2 x PNP (timing) |
| 10 ms | 10 … 15 ms | 10 … 15 ms |
| 500 mA | 500 mA | 500 mA |
| Status display | 7-segment display | 7-segment display |
| | | |
| Connector plug | Connector plug | Connector plug |
| 4-pole / 5-pole | 4-pole / 8-pole | 4-pole / 12-pole |
| 27.8 x 33 mm | 27.8 x 33 mm | 27.8 x 33 mm |
| | | |
| −10 °C … +50 °C | −25 °C … +50 °C | −25 °C … +50 °C |
| IP67 | IP67 | IP67 |
| | | |
| ISO 13849-1,<br>EN 62061 | ISO 13849-1,<br>EN 62061 | ISO 13849-1,<br>EN 62061 |
| e/3 | e/3 | e/3 |
| 4 | 4 | 4 |
| $8.05 \times 10^{-9}$ /h | $5.14 \times 10^{-9}$ /h | $5.14 \times 10^{-9}$ /h |
| TÜV UL EAC | TÜV UL EAC | TÜV UL EAC |

[1] SLC/SLG440-AS available with AS-i SaW interface
[2] The height depends on the protection field height

**Key**
BC = Beam coding
DQ = Double acknowledgement/reset
MS = Multiple scan
DM = Setting mode
SI = Start interlock

To get detailed information about the products and certificates, visit www.schmersal.net.

# Optoelectronic safety devices

## Safety light grids / light curtains type 4 – Series 440COM/440/445

### Preferred types

| Type to EN 61496 | Safety | Feature | Series | Special features |
|---|---|---|---|---|
| Type 4 | -Light curtain SLC | Compact | SLC440COM | Compact |
| | | Standard | SLC440 | Standard |
| | | | | Integrated Status display |
| | | AS-i | SLC440AS | Integrated AS-i SaW |
| | | Multifunctional | SLC445 | Muting cyclic operation with multiscan |
| | -Light grids SLG | Compact | SLG440COM | Compact |
| | | Standard | SLG440 | Standard |
| | | | | High range |
| | | | | Integrated Status display |
| | | | | High range and integrated status display |
| | | AS-i | SLG440AS | Integrated AS-i SaW |
| | | Multifunctional | SLG445 | Muting cyclic operation with multiscan |

**xxxx** = For different heights and other combinations, see **www.schmersal.net.**
--- = The material number is dependent on the protective field heights.

| | Resolution | Protection field height | Range | Type designation | Material number |
|---|---|---|---|---|---|
| | 14 mm | 330 … 1930 mm | 0,3 … 7 m | **SLC440COM-ER-xxxx-14** | **---** |
| | 30 mm | 330 … 1930 mm | 0.3 … 10 m | **SLC440COM-ER-xxxx-30** | **---** |
| | 35 mm | 330 … 1930 mm | 0,3 … 7 m | **SLC440COM-ER-xxxx-35** | **---** |
| | 14 mm | 170 … 1930 mm | 0,3 … 7 m | **SLC440-ER-xxxx-14** | **---** |
| | 30 mm | 170 … 1930 mm | 0.3 … 10 m | **SLC440-ER-xxxx-30** | **---** |
| | 14 mm | 170 … 1930 mm | 0,3 … 7 m | **SLC440-ER-xxxx-14-01** | **---** |
| | 30 mm | 170 … 1930 mm | 0.3 … 10 m | **SLC440-ER-xxxx-30-01** | **---** |
| | 14 mm | 170 ... 1450 mm | 0,3 … 7 m | **SLC440AS-ER-xxxx-14** | **---** |
| | 30 mm | 170 ... 1770 mm | 0.3 … 10 m | **SLC440AS-ER-xxxx-30** | **---** |
| | 14 mm | 170 … 1450 mm | 0,3 … 7 m | **SLC445-ER-xxxx-14-01** | **---** |
| | 30 mm | 170 … 1770 mm | 0.3 … 10 m | **SLC445-ER-xxxx-30-01** | **---** |
| | 2 beams | 500 mm | 0.3 … 12 m | **SLG440COM-ER-0500-02** | **103004060** |
| | 3 beams | 800 mm | 0.3 … 12 m | **SLG440COM-ER-0800-03** | **103004063** |
| | 4 beams | 900 mm | 0.3 … 12 m | **SLG440COM-ER-0900-04** | **103004064** |
| | 2 beams | 500 mm | 0,3 … 12 m | **SLG440-ER-0500-02** | **101216818** |
| | 3 beams | 800 mm | 0,3 … 12 m | **SLG440-ER-0800-03** | **101216819** |
| | 4 beams | 900 mm | 0,3 … 12 m | **SLG440-ER-0900-04** | **101216820** |
| | 2 beams | 500 mm | 3 … 20 m | **SLG440-ER-0500-02-H** | **103009186** |
| | 3 beams | 800 mm | 3 … 20 m | **SLG440-ER-0800-03-H** | **103009187** |
| | 4 beams | 900 mm | 3 … 20 m | **SLG440-ER-0900-04-H** | **103009188** |
| | 2 beams | 500 mm | 0,3 … 12 m | **SLG440-ER-0500-02-01** | **101216821** |
| | 3 beams | 800 mm | 0,3 … 12 m | **SLG440-ER-0800-03-01** | **101216822** |
| | 4 beams | 900 mm | 0,3 … 12 m | **SLG440-ER-0900-04-01** | **101216823** |
| | 2 beams | 500 mm | 3 … 20 m | **SLG440-ER-0500-02-H1** | **103009189** |
| | 3 beams | 800 mm | 3 … 20 m | **SLG440-ER-0800-03-H1** | **103009190** |
| | 4 beams | 900 mm | 3 … 20 m | **SLG440-ER-0900-04-H1** | **103009191** |
| | 2 beams | 500 mm | 0,3 … 12 m | **SLG440AS-ER-0500-02** | **103007551** |
| | 3 beams | 800 mm | 0,3 … 12 m | **SLG440AS-ER-0800-03** | **103007554** |
| | 4 beams | 900 mm | 0,3 … 12 m | **SLG440AS-ER-0900-04** | **103007557** |
| | 2 beams | 500 mm | 0,3 … 12 m | **SLG445-ER-0500-02-01** | **103005424** |
| | 3 beams | 800 mm | 0,3 … 12 m | **SLG445-ER-0800-03-01** | **103005425** |
| | 4 beams | 900 mm | 0,3 … 12 m | **SLG445-ER-0900-04-01** | **103005426** |
| | 2 beams | 500 mm | 3 … 20 m | **SLG445-ER-0500-02-H1** | **103006524** |
| | 3 beams | 800 mm | 3 … 20 m | **SLG445-ER-0800-03-H1** | **103006527** |
| | 4 beams | 900 mm | 3 … 20 m | **SLG445-ER-0900-04-H1** | **103006530** |

# Optoelectronic safety devices
## Safety monitoring modules

| |  |  |
|---|---|---|
| | ■ SRB-E-301ST | ■ SRB-E-204ST |
| **Key Features** | | |
| | • Function STOP 0<br>• 1 or 2 channel control<br>• Start button / autostart<br>• 3 safety contacts<br>• 1 auxiliary contact | • Input expander module<br>• Monitoring of 4 sensors<br>• Start button / autostart<br>• 2 safety outputs<br>• 4 signalling outputs |
| **Technical features** | | |
| **Electrical characteristics** | | |
| **Operating voltage** | 24 VDC −20% / +20% | 24 VDC –20 % / +20 % |
| **Operating current** | 0.1 A | 0.125 A |
| **Max. switching capacity** | | |
| **of the safety contacts** | 3 x 230 V / 6 A | – |
| **of the safe semi-conductor outputs** | – | 2 x 24 V / 2 A |
| **of the auxiliary contacts** | 24 VDC / 1 A | – |
| **of the signalling outputs** | – | 4 x 24 V / 100 mA |
| **Drop-out delay STOP 0** | < 10 ms | < 10 ms |
| **STOP 1** | – | – |
| **Mechanical data** | | |
| **With removable terminals** | ■ | ■ |
| **Dimensions (H x W x D)** | 22.5 x 98 x 115 mm | 22.5 x 98 x 115 mm |
| **Ambient conditions** | | |
| **Ambient temperature** | −25 °C … +60 °C | −25 °C … +60 °C |
| **Safety classification** | | |
| **Standards** | ISO 13849-1, IEC 61508 | ISO 13849-1, IEC 61508 |
| **PL/SIL** | e/3 | e/3 |
| **Category** | 4 | 4 |
| **PFH** | ≤ 1.25 x $10^{-8}$ /h | ≤ 2.66 x $10^{-8}$ /h |
| **Certificates** | TÜV c UL us | TÜV c UL us |

To get detailed information about the products and certificates, visit **www.schmersal.net**.

|  |  |  |
|---|---|---|
| ■ SRB301MC | ■ SRB301MA-24V | ■ SRB202MSL |
| • Function STOP 0<br>• 1 or 2 channel control<br>• Start button / autostart<br>• 3 safety contacts<br>• 1 auxiliary contact | • Function STOP 0<br>• 1 or 2 channel control<br>• Start with edge detection<br>• 3 safety contacts<br>• 1 auxiliary contact | • Muting function<br>• 2 or 4 muting sensors<br>• Lamp current monitoring<br>• 2 safety contacts<br>• 2 signalling outputs |
| 24 VDC −15% / +20%<br>24 VAC −15% / +10% | 24 VDC −15% / +20%<br>24 VAC −15% / +10% | 24 VDC −15% / +20% |
| 0.1 A | 0.1 A | 0.24 A |
| 3 x 230 VAC / 8 A | 3 x 230 VAC / 8 A | 2 x 24 VDC / 4 A |
| – | – | – |
| 24 VDC / 2 A | 24 VDC / 2 A | – |
| – | – | 24 VDC / 0.05 A |
| < 20 ms | < 20 ms | < 20 ms |
| – | – | – |
| | | |
| – | – | ■ |
| 22.5 x 100 x 121 mm | 22.5 x 100 x 121 mm | 45 x 100 x 121 mm |
| −25 °C … +60 °C | −25 °C … +60 °C | −25 °C … +45 °C |
| ISO 13849-1, IEC 61508 | ISO 13849-1, IEC 61508 | ISO 13849-1, IEC 61508 |
| e/3 | e/3 | e/3 |
| 4 | 4 | 4 |
| ≤ 2.0 x $10^{-8}$ /h | ≤ 2.0 x $10^{-8}$ /h | ≤ 2.0 x $10^{-8}$ /h |

# Optoelectronic safety devices
## Accessories

### SG.

- Protective enclosure for SLC/SLG
- Protection field heights
  to 970 mm: **SG5** **103001594**
  to 1930 mm: **SG6** **103001596**

### SGS...

- Protective Cover for SG5 and SG6
- Protection field heights
  to 970 mm: **SGS5** **103001595**
  to 1930 mm: **SGS6** **103001597**

### ULS-SG-1000 103002489

- Tilted mirror for SG5 and SG6
- Height: 1000 mm
- Width: 90 mm

### MST-....

- Mounting stands
- Base L/W 135x135 mm
- Height 500 … 2000 mm

### ULS-M-....

- Deflecting mirror series M
- Mirror height 350 … 1870 mm
- Included in delivery: tilted mirror and qty. 2 mounting brackets

### MSD.

- Vibration damper
  SLC/SLG type 2: **MSD2** **101207735**
  SLC/SLG type 4: **MSD4** **101207754**
- Included in delivery: Set with 8 pieces

### NSR-0801 101207759

- Bus converter for parameterisation and diagnostics with PC/software

### LF 50-11P 101151758

- Reflection light barrier
- Range 0 … 5.5 m

### EA5 101211456

- Alignment kit, laser beam 30 m
- Alignment kit for all SLC/SLG series

Detailed information can be found at **www.schmersal.net**.

# Optoelectronic safety devices
## Accessories

### PLS-..

- Test rod
  30 mm diameter: **PLS-01** **101207768**
  14 mm diameter: **PLS-02** **101207769**

### Connector plug

- Connector M12, straight, 5 pole
- Cable length

| | |
|---|---|
| 5 m | **A-K5P-M12-S-G-5M-BK-2-X-A-1** |
| 15 m | **A-K5P-M12-S-G-15M-BK-2-X-A-1** |

### Connector plug

- Connector M12, straight
- Cable length

| | 4-pole | 8-pole |
|---|---|---|
| 5 m | **KA-0804** | **KA-0904** |
| 10 m | **KA-0805** | **KA-0905** |
| 20 m | **KA-0808** | **KA-0908** |

### KA-0974 101217615

- Programming cable for SLC/SLG 440
- Y-splitter, M12, 8-pole with P-button

Detailed information can be found at **www.schmersal.net**.

# Optoelectronic safety devices
## Accessories – Muting

**MCU-02** 103005572

- Muting connection unit
- Release/override, transmitter unit (E), up to 4 muting sensors, muting lamp

**FR-20-PSM4** 103005570

- Muting sensor M8, 4-pole
- Reflection light barrier
- Range 0.1 … 3.5 m
- Mounting brackets not included in the delivery

**KA-0976** 103005575

- Programming cable for SLC/SLG445
- P-button with connector M12, 12-pole

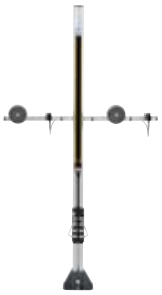
**MUT-SET-L-01** 103006073

- Muting set L-version for mounting to the assembly stand MST
- Set complete with 2 muting sensors, MCU-02, attachment and cable
- Set without SLC/SLG445 and MST

**MUT-SET-L-02** 103006074

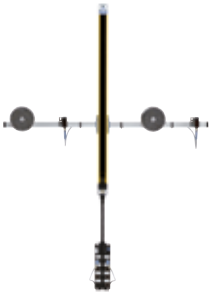
- Muting set L-version for mounting to the sensor profile
- Set complete with 2 muting sensors, MCU-02, attachment and cable
- Set without SLC/SLG445 and MST

**MUT-SET-T-01** 103006075



- Muting set T-version for mounting to the assembly stand MST
- Set complete with 4 muting sensors, MCU-02, attachment and cable
- Set without SLC/SLG445 and MST

**MUT-SET-T-02** 103006076



- Muting set T-version for mounting to the sensor profile
- Set complete with 4 muting sensors, MCU-02, attachment and cable
- Set without SLC/SLG445 and MST

**MUT-SET-T-03** 103009195

- Muting set T-version for mounting to the sensor profile
- Set complete with 2 muting sensors, MCU-02, attachment and cable
- Set without SLC/SLG445 and MST

**MUT-SET-T-04** 103012263

- Muting set T-version for mounting to the assembly stand MST
- Set complete with 2 muting sensors, MCU-02, attachment and cable
- Set without SLC/SLG445 and MST

Detailed information can be found at **www.schmersal.net**.

# Optoelectronic safety devices
## Accessories – Mounting kits

**MS-1000**

- Mounting kit for SLC/SLG220
- Included in delivery: brackets inc. screws
  qty. 4 for: **MS-1000** **101207737**
  qty. 2 for: **MS-1072** **101207804**

**MS-1030** **101207756**

- Mounting kit for SLC/SLG420
- Included in delivery: Angle with screws
- Set with 4 pieces

**MS-1038** **101207757**

- Mounting kit for SLC/SLG420 IP69K and SLC/SLG425I IP69K in V4A
- Included in delivery: Angle with screws
- Set with 4 pieces

**MS-1051** **101207758**

- Mounting kit lateral fixation for SLC/SLG420-425I
- Included in delivery: qty. 2 steel brackets, qty. 4 screws and qty. 4 T-slot nuts

**MS-1031** **101207785**

- Mounting kit for deflecting mirror ULS-A4
- Included in delivery: Angle with screws
- Set with 2 pieces

**MS-1073** **101207805**

- Mounting kit for deflecting mirror ULS-M
- Set with 2 pieces

**MS-1035** **101217102**

- Mounting kit for SLC/SLG220 IP69K in V4A
- Included in delivery: Angle with screws
- Set with 4 pieces

**MS-1100** **101216833**

- Mounting kit for SLC/SLG440COM SLC/SLG440 and SLC/SLG445
- Included in delivery: Angle with screws
- Set with 4 pieces

**MS-1110** **101216834**

- Mounting kit - Centre fixing for SLC/SLG440COM, SLC/SLG440 and SLC/SLG445
- Set with 2 pieces

Detailed information can be found at **www.schmersal.net**.

# tec.nicum
excellence in safety

**tec.nicum – Developed services relating to the machine safety and industrial safety**

In the Schmersal Group, tec.nicum is the department for services relating to machine and industrial safety. The experts at tec.nicum implement all sorts of safety-related projects for their customers - from analysis of the status quo through planning and documentation to the final handover of the finished, norm-compliant machine.

tec.nicum offers companies a global network of TÜV Rheinland -certified Functional Safety Engineers, so the services of the international tec.nicum organisation can be accessed quickly and easily wherever the customer is. tec.nicum experts not only have sound knowledge of the applicable regional and national guidelines, laws and ordinances, they also have technical know-how and extensive experience in project implementation.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# The Schmersal Group

In the demanding field of machine safety, the owner-managed Schmersal Group is one of the international market leaders. The company, which was founded in 1945, has a workforce of about 2000 people and seven manufacturing sites on three continents along with its own companies and sales partners in more than 60 nations.

Customers of the Schmersal Group include global players from the area of mechanical engineering and plant manufacturing as well as operators of machinery. They profit from the company's extensive expertise as a provider of systems and solutions for machine safety. Furthermore, Schmersal specialises in various areas including foodstuff production, the packaging industry, machine tool industry, lift switchgear, heavy industry and the automotive industry.

A major contribution to the systems and solutions offered by the Schmersal Group is made by tec.nicum with its comprehensive range of services: certified Functional Safety Engineers advise machinery manufacturers and machinery operators in all aspects relating to machinery and occupational safety – and do so with product and manufacturer neutrality. Furthermore, they plan and realise complex solutions for safety around the world in close collaboration with the clients.

## Safety Products

- Safety switches and sensors, solenoid interlocks
- Safety controllers and safety relay modules, safety bus systems
- Optoelectronic and tactile safety devices
- Automation technology: position switches, proximity switches

## Safety Systems

- Complete solutions for safeguarding hazard areas
- Individual parametrisation and programming of safety controllers
- Tailor-made safety technology – be it for individual machines or a complex production line
- Industry-specific safety solutions

## Safety Services

- tec.nicum academy – Seminars and training
- tec.nicum consulting – Consultancy services
- tec.nicum engineering – Design and technical planning
- tec.nicum integration – Execution and installation



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