Optoelectronic safety devices

Product information

SCHMERSAL

Safe solutions for your industry

Introduction

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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 600 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 150 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 Steuerungssysteme GmbH

- Founded in 1991 (2012)
- 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 350 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 45 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

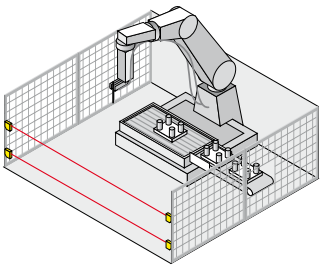
In order to choose the appropriate active optoelectronic protective device (AOPD) such as light barriers, light curtains/grids to use them correctly, both the requirements of the standards (EN 61496, EN ISO 13849, EN ISO 13855, C standards etc.) and product-specific features (detection sensitivity, range,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

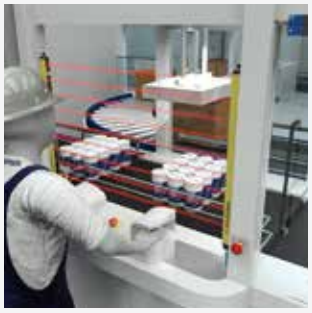
Safety light barriers

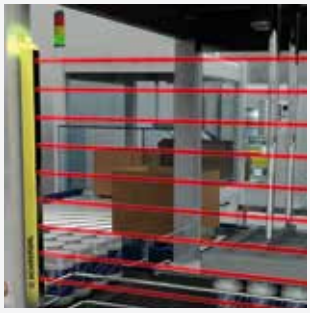


The safety light barrier systems of the SLB range are active optoelectronic protective devices (AOPD) fulfilling the Category type 2 and type 4 in accordance with EN 61496. These systems are used as entry guards on hazardous zones and entrances. They ensure the protection of people without restricting the production process. Typical applications for safety light barriers are on automatic-processing plants, transfer lines, rack storage and pallet loaders.

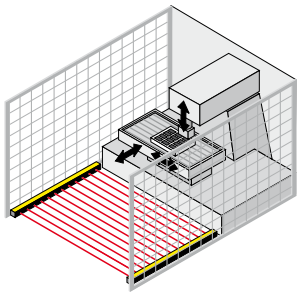
The entire safety light barrier system includes a light emitter, a light receiver and a safety-monitoring module. This module monitors the signals of the emitter. If the light beam is interrupted, a signal is emitted to bring the dangerous movement of the machine to a standstill.

The safety monitoring module integrates functions such as start and restart interlock as well as contactor monitoring. The maintenance-free safety sensors of the system with protection class IP67 offer an integrated soiling check. The small size of the safety light barriers makes it very easy to integrate them into applications.





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, this is 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 a 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. DIN EN 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 curtains are generally used to detect the intrusion of a complete 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

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

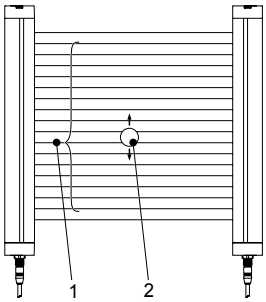
Automatic / Protective mode
The protective mode switches the AOPD outputs to an ON state (protection field not interrupted), without external release of a switching device. This mode of operation creates an automatic machine restart if the protection field is not interrupted and should only be selected 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 the 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
In applications with access monitoring, a complete overview of the hazardous areas is not often possible, despite that, a reset of the command device for the restart interlock outside of the hazardous area by third parties is at all times enabled, 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 visualizes 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.

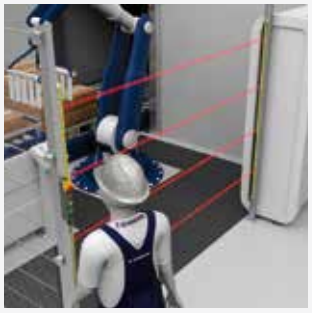
Object blanking



1 Object blanking area
2 Movable object

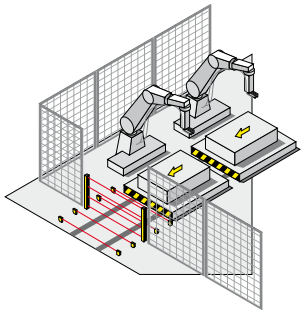
If continuity of the production process is required, a part of the protection field can be blanked without triggering a stop signal in contrast to the muting function. In this way, objects such as work pieces can be fed or a conveyor belt can be positioned at a fixed position in the protection field. 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 moveable 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 interrupt 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 EN 13855. Further technical product information can be found in this brochure.

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 EN 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 monitoring 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, EN ISO 13855 presents the following general formula:

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

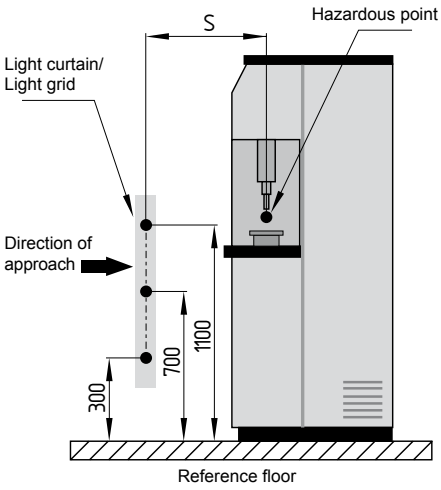
Key:
S the safety distance to the hazardous area (mm)

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 monitoring 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 (EN ISO 13855).



Further calculation examples can be found in DIN EN ISO 13855 as well as in the mounting instructions of the SLC/SLG safety sensors.

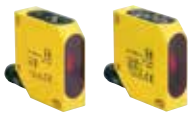
Optoelectronic safety devices
Overview

Selection	Type to EN 61496	Special features	Series	Refer to
Safety light barriers SLB	Type 2	Range to 4 m	SLB200	Page 12
	Type 4	Range to 15 m	SLB400	
Safety light curtains SLC	Type 2	Standard	SLC220	Page 14
		Master / Slave	SLC220 M/S	
		High protection class	SLC220 IP69K	
	Type 4	Standard	SLC420	Page 18
		Master / Slave	SLC420 M/S	
		High protection class	SLC420 IP69K	
		Cyclic operation	SLC421	
		Integrated muting and override function	SLC425I	Page 20
		High protection class	SLC425I IP69K	
		Compact	SLC440COM	Page 24
		Standard	SLC440	
		Multifunctional	SLC445	
Safety light grids SLG	Type 2	Standard	SLG220	Page 15
		High protection class	SLG220 IP69K	
		Active-passive system with mirror	SLG220-P	
	Type 4	Standard	SLG420	Page 19
		High protection class	SLG420 IP69K	
		Active-passive system with mirror	SLG422-P	
		Integrated muting and override function	SLG425I	Page 20
		High protection class	SLG425I IP69K	
		Active-passive system with mirror	SLG425I-P	
		Compact	SLG440COM	Page 25
		Standard	SLG440	
		Multifunctional	SLG445	

Optoelectronic safety devices

Safety light barriers - Series SLB

Overview



	■ SLB200	■ SLB400
Key Features		
	• **Range 4 m** • **LEDs visible from both sides**	• **Range 15 m** • **LED status display** • **Connector can be rotated**
Technical features		
Standards	IEC/EN 61496	IEC/EN 61496
Safety type according to IEC 61496-1	2	4
Material of the enclosure	thermoplastic	thermoplastic
Range of the protection field	4 m	15 m
Min. object size	Ø 9 mm	Ø 13 mm
Response time	30 ms *	25 ms *
Start/restart interlock	Only in combination with SLB200-C04-1R	Only in combination with SLB400-C10-1R
Wave length of the sensor	880 nm	880 nm
Angle of radiation	± 4°	± 2°
Execution of the electrical connection	Cable (10 cm) with connector plug M8	Connector plug M12 can be rotated
Connector plug (transmitter/receiver)	3-pole / 4-pole	4-pole / 4-pole
Cable length	max. 50 m	max. 100 m
Recommended monitoring module	SLB200-C04-1R	SLB400-C10-1R
Ambient temperature	−10 °C … +55 °C	0 °C … +60 °C
Protection class	IP67	IP67
Rated operating voltage U_e	Only in combination with SLB200-C04-1R	Only in combination with SLB400-C10-1R
Safety outputs	Only in combination with SLB200-C04-1R	Only in combination with SLB400-C10-1R
Dimensions (H x W x L)	30.8 x 50.3 x 18.8 mm	17 x 50 x 63.5 mm
Safety classification		
Approval	TÜV	CE

* Only in combination with recommended safety monitoring module

Detailed information about the products and the approvals can be found at **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	SLB200 	Transmitter	SLB200-E31-21	101138921
		Receiver	SLB200-R31-21	101138922
	SLB400 	Transmitter	SLB400-E50-21P	101138898
		Receiver	SLB400-R50-21P	101146816

Connector plug

- Female connector for emitter SLB200
  M8, 3-pole straight
- Without cable **101210562**
  Cable length 2 m **101210564**
  Cable length 5 m **101210566**

Connector plug

- Female connector for receiver SLB200
  M8, 4-pole straight
- Without cable **101210015**
  Cable length 2 m **101209946**
  Cable length 5 m **101209942**

Connector plug

- For emitter / receiver SLB400
  M12, 4-pole straight
- Cable length 2 m **101208522**
  Cable length 5 m **101209918**
  Cable length 10 m **101209937**

BF31 101150260

- Mounting angle for safety light barriers SLB200

BF50 101140970

- Mounting angle for safety light barriers SLB400

BF UNI-1 101150261

- Universal mounting angle for safety light barriers SLB200 and SLB400

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 220

Overview

	■ SLC220	■ SLC220 M/S	■ SLC220 IP69K
Key Features			
	• Safety light curtain • Standard	• Safety light curtain • Master/Slave	• Safety light curtain • High protection class
Technical features			
Resolution	30, 80 mm	30, 80 mm	30, 80 mm
Protection field height	175 mm … 1675 mm	175 mm … 2450 mm	175 mm … 1675 mm
Number of beams	6 … 66	6 … 96	6 … 66
Range of the protection field	0.3 … 14 m	0.3 … 6 m	0.3 … 14 m
Operating modes			
- Protective mode / Automatic	Yes	Yes	Yes
- Restart interlock (manual reset)	Yes	Yes	Yes
- Parameter setting	NSR-0700 (adapter)	NSR-0700 (adapter)	NSR-0700 (adapter)
Functions integrated			
- Contactor control	Yes	Yes	Yes
- Blanking of objects	Yes	Yes	Yes
- Muting	No	No	No
- Cyclic function	No	No	No
- Further functions	Start interlock	Start interlock	Start interlock
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	12 … 45 ms	12 … 65 ms	12 … 45 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)	8-pole	8-pole	8-pole
Dimensions [1)]	Ø 40 mm	Ø 40 mm	Ø 60 mm
Ambient conditions			
Ambient temperature	−10 °C … +50 °C	−10 °C … +50 °C	−10 °C … +50 °C
Protection class	IP65	IP65	IP69K
Safety classification			
Standards	EN ISO 13849-1, EN 62061	EN ISO 13849-1, EN 62061	EN ISO 13849-1, EN 62061
PL	up to d	up to d	up to d
Category	up to 2	up to 2	up to 2
PFH	3.59 x 10^{-8} /h	3.59 x 10^{-8} /h	3.59 x 10^{-8} /h
SIL	up to 2	up to 2	up to 2
Approval	TÜV CE UL	TÜV CE UL	TÜV CE UL

Detailed information about the products and the approvals can be found at **www.schmersal.net**

		
■ SLG220	■ SLG220 IP69K	■ SLG220-P
• **Safety light grid** • **Standard**	• **Safety light grid** • **High protection class**	• **Safety light grid** • **Active-passive with 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 … 30 m	0.3 … 30 m	0.3 … 6 m
Yes	Yes	Yes
Yes	Yes	No
NSR-0700 (adapter)	NSR-0700 (adapter)	NSR-0700 (adapter)
Yes	Yes	No
No	No	No
No	No	No
No	No	No
Start interlock	Start interlock	Start interlock
24 VDC ± 10%	24 VDC ± 10%	24 VDC ± 10%
2 x PNP	2 x PNP	2 x PNP
12 … 19 ms	12 … 19 ms	12 ms
500 mA	500 mA	500 mA
LED	LED	LED
Connector plug	Cable+Connector plug	Connector plug
8-pole	8-pole	8-pole
Ø 40 mm	Ø 60 mm	Ø 40 mm
−10 °C … +50 °C	−10 °C … +50 °C	−10 °C … +50 °C
IP65	IP69K	IP65
EN ISO 13849-1, EN 62061	EN ISO 13849-1, EN 62061	EN ISO 13849-1, EN 62061
up to d	up to d	up to d
up to 2	up to 2	up to 2
3.59 x 10^{-8} /h	3.59 x 10^{-8} /h	3.59 x 10^{-7} /h
up to 2	up to 2	up to 2
TÜV CE UL	TÜV CE UL	TÜV CE UL

[1] The height depends on the protection field height

Optoelectronic safety devices

Safety light grids / light curtains Type 2 - Series 220

Preferred types

Type to EN 61496	Safety	Feature	Series	Special features
Type 2	Light curtain SLC	Standard	SLC220	Standard
				High range
		Master / Slave	SLC220 M/S	master
				slave
		High protection class	SLC220 IP69K	Standard
				High range
	Light grid SLG	Standard	SLG220	Standard
				High range
		High protection class	SLG220 IP69K	Standard
				High range
		Active-passive with ULS	SLG220-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
	30 mm	175 … 1675 mm	0.3 … 6 m	**SLC220-ER-xxxx-30-RFB**	**---**
	80 mm	325 … 1675 mm	0.3 … 6 m	**SLC220-ER-xxxx-80-RFB**	**---**
	30 mm	175 … 1675 mm	4 … 14 m	**SLC220-ER-xxxx-30-RFB-H**	**---**
	80 mm	325 … 1675 mm	4 … 14 m	**SLC220-ER-xxxx-80-RFB-H**	**---**
	30 mm	175 … 2450 mm	0.3 … 6 m	**SLC220-ER-xxxx-30-RFBM**	**---**
	80 mm	325 … 2450 mm	0.3 … 6 m	**SLC220-ER-xxxx-80-RFBM**	**---**
	30 mm	175 … 2450 mm	0.3 … 6 m	**SLC220-ER-xxxx-30-RFBS**	**---**
	80 mm	325 … 2450 mm	0.3 … 6 m	**SLC220-ER-xxxx-80-RFBS**	**---**
	30 mm	175 … 1675 mm	0.3 … 6 m	**SLC220-ER-xxxx-30-69-RFB**	**---**
	80 mm	325 … 1675 mm	0.3 … 6 m	**SLC220-ER-xxxx-80-69-RFB**	**---**
	30 mm	175 … 1675 mm	4 … 14 m	**SLC220-ER-xxxx-30-69-RFB-H**	**---**
	80 mm	325 … 1675 mm	4 … 14 m	**SLC220-ER-xxxx-80-69-RFB-H**	**---**
	2 beams	500 mm	0.3 … 6 m	**SLG220-ER-0500-02RF**	**101206616**
	3 beams	800 mm	0.3 … 6 m	**SLG220-ER-0800-03RF**	**101206617**
	4 beams	900 mm	0.3 … 6 m	**SLG220-ER-0900-04RF**	**101206618**
	2 beams	500 mm	5 … 30 m	**SLG220-ER-0500-02RFH**	**101206619**
	3 beams	800 mm	5 … 30 m	**SLG220-ER-0800-03RFH**	**101206620**
	4 beams	900 mm	5 … 30 m	**SLG220-ER-0900-04RFH**	**101206621**
	2 beams	500 mm	0.3 … 6 m	**SLG220-ER-0500-02-69-RF**	**101206636**
	3 beams	800 mm	0.3 … 6 m	**SLG220-ER-0800-03-69-RF**	**101206637**
	4 beams	900 mm	0.3 … 6 m	**SLG220-ER-0900-04-69-RF**	**101206638**
	2 beams	500 mm	5 … 30 m	**SLG220-ER-0500-02-69-RFH**	**101206640**
	3 beams	800 mm	5 … 30 m	**SLG220-ER-0800-03-69-RFH**	**101206641**
	4 beams	900 mm	5 … 30 m	**SLG220-ER-0900-04-69-RFH**	**101206642**
	2 beams	500 mm	0.3 … 6 m	**SLG220-P-ER-0500-02RF**	**101206634**

Optoelectronic safety devices

Safety light grids / light curtains Type 4 - Series 420/421/422

Overview

	■ SLC420	■ SLC420 M/S	■ SLC420 IP69K
Key Features			
	• Safety light curtain • Standard	• Safety light curtain • Master/Slave	• Safety light curtain • 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	Yes	Yes	Yes
- Restart interlock (manual reset)	Yes	Yes	Yes
- Parameter setting	NSR-0801 (adapter)	NSR-0801 (adapter)	NSR-0801 (adapter)
Functions integrated			
- Contactor control	Yes	Yes	Yes
- Blanking of objects	Yes	Yes	Yes
- Muting	No	No	No
- Cyclic function	No	No	No
- 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	−10 °C … +50 °C	−10 °C … +50 °C	−10 °C … +50 °C
Protection class	IP67	IP67	IP69K
Safety classification			
Standards	EN ISO 13849-1, EN 62061	EN ISO 13849-1, EN 62061	EN ISO 13849-1, EN 62061
PL	up to e	up to e	up to e
Category	up to 4	up to 4	up to 4
PFH	7.42 x 10^{-9} /h	7.42 x 10^{-9} /h	7.42 x 10^{-9} /h
SIL	up to 3	up to 3	up to 3
Approval	TÜV CE UL	TÜV CE UL	TÜV CE UL

Detailed information about the products and the approvals can be found at **www.schmersal.net**

			
■ SLC421	■ SLG420	■ SLG420 IP69K	■ SLG422-P
• **Safety light curtain** • **Cyclic operation**	• **Safety light grid** • **Standard**	• **Safety light grid** • **High protection class**	• **Safety light grid** • **Active-passive with ULS**
14, 30 mm	300, 400 or 500 mm	300, 400 or 500 mm	300 mm
170 mm … 1770 mm	500, 800 or 900 mm	500, 800 or 900 mm	500 mm
8 … 144	2, 3 or 4 beams	2, 3 or 4 beams	2 beams
0.3 … 10 m	0.3 … 40 m	0.3 … 18 m	0.3 … 7 m
Yes	Yes	Yes	Yes
Yes	Yes	Yes	Yes
BDB01, BDB02	NSR-0801 (adapter)	NSR-0801 (adapter)	NSR-0801 (adapter)
Yes	Yes	Yes	Yes
Yes	Yes	Yes	No
No	No	No	No
Yes	No	No	No
BC, SI	BC, SI	BC, SI	SI
24 VDC ± 10%	24 VDC ± 10%	24 VDC ± 10%	24 VDC ± 10%
2 x PNP	2 x PNP	2 x PNP	2 x PNP
15 … 32 ms	10 … 15 ms	10 … 15 ms	10 ms
500 mA	500 mA	500 mA	500 mA
LED	LED	LED	LED
Connector plug	Connector plug	Cable+Connector plug	Connector plug
4-pole / 12-pole	4-pole / 8-pole	4-pole / 8-pole	8-pole
Ø 49 mm	Ø 49 mm	Ø 60 mm	Ø 49 mm
−10 °C … +50 °C	−10 °C … +50 °C	−10 °C … +50 °C	−10 °C … +50 °C
IP67	IP67	IP69K	IP67
EN ISO 13849-1, EN 62061	EN ISO 13849-1, EN 62061	EN ISO 13849-1, EN 62061	EN ISO 13849-1, EN 62061
up to e	up to e	up to e	up to e
up to 4	up to 4	up to 4	up to 4
7.42 x 10^{-9} /h	7.42 x 10^{-9} /h	7.42 x 10^{-9} /h	7.42 x 10^{-9} /h
up to 3	up to 3	up to 3	up to 3
TÜV CE UL	TÜV CE UL	TÜV CE UL	TÜV CE UL

[1] The height depends on the protection field height

Key

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

Optoelectronic safety devices

Safety light grids / light curtains Type 4 - Overview series 425I

Overview

■ SLC425I

■ SLC425I IP69K

■ SLG425I

Features

	• Safety light curtain • Standard	• Safety light curtain • High protection class	• Safety light grid • 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	No	No	No
- Restart interlock (manual reset)	Yes	Yes	Yes
- Parameter setting	NSR-0801 (adapter)	NSR-0801 (adapter)	NSR-0801 (adapter)
Functions integrated			
- Contactor control	Yes	Yes	No
- Blanking of objects	Yes	Yes	Yes
- Muting	Yes	Yes	Yes
- Cyclic function	Yes	Yes	No
- 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	EN ISO 13849-1, EN 62061	EN ISO 13849-1, EN 62061	EN ISO 13849-1, EN 62061
PL	up to e	up to e	up to e
Category	up to 4	up to 4	up to 4
PFH	7.42 x 10^{-9} /h	7.42 x 10^{-9} /h	7.42 x 10^{-9} /h
SIL	up to 3	up to 3	up to 3
Approval	TÜV CE UL	TÜV CE UL	TÜV CE UL

Detailed information about the products and the approvals can be found at **www.schmersal.net**

■ SLG425I IP69K

■ SLG425-IP

• **Safety light grid** • **High protection class**	• **Safety light grid** • **Active-passive with 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
No	No
Yes	Yes
NSR-0801 (adapter)	NSR-0801 (adapter)
No	No
Yes	No
Yes	Yes
No	No
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
EN ISO 13849-1, EN 62061	EN ISO 13849-1, EN 62061
up to e	up to e
up to 4	up to 4
7.42 x 10^{-9} /h	7.42 x 10^{-9} /h
up to 3	up to 3
TÜV CE UL	TÜV CE UL

[1] The height depends on the protection field height

Key

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

Optoelectronic safety devices

Safety light grids / light curtains Type 4 - Series 420/421/422/425I

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
		Integrated cyclic function / cycle operation	SLC421	Standard
				Integrated status display
	Light grid SLG	Standard	SLG420	Standard
				High range
		High protection class	SLG420 IP69K	Standard
		Active-passive with ULS	SLG422-P	Active-passive system
Type 4	Light curtain SLC	Integrated muting and override function	SLC425I	Standard
		High protection class	SLC425I IP69K	
	Light grid SLG	Integrated muting and override function	SLG425I	Standard
		High protection class	SLG425I IP69K	
		Active-passive with 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**	**---**
	14 mm	170 … 1450 mm	0.3 … 7 m	**SLC421-ER-xxxx-14-RFBC**	**---**
	30 mm	170 … 1770 mm	0.3 … 10 m	**SLC421-ER-xxxx-30-RFBC**	**---**
	14 mm	170 … 1450 mm	0.3 … 7 m	**SLC421-ER-xxxx-14-RFBC-01**	**---**
	30 mm	170 … 1770 mm	0.3 … 10 m	**SLC421-ER-xxxx-30-RFBC-01**	**---**
	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 … 40 m	**SLG420-ER-0500-02-RFH**	**101207362**
	3 beams	800 mm	8 … 40 m	**SLG420-ER-0800-03-RFH**	**101207363**
	4 beams	900 mm	8 … 40 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 440/445

Overview

■ SLC440COM

■ SLC440

■ SLC445

Features			
	• Safety light curtain • Compact	• Safety light curtain • Standard	• Safety light curtain • Multifunctional
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	Yes	Yes	Yes
- Restart interlock (manual reset)	Yes	Yes	Yes
- Parameter setting	Wiring	KA-0974	KA-0976
Functions integrated			
- Contactor control	No	Yes	Yes
- Blanking of objects	No	Yes	Yes
- Muting	No	No	Yes
- Cyclic function	No	No	Yes
- 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 … 20 ms	10 … 27 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 / 4 (E.) 5-pole	4-pole / 8-pole	4-pole / 12-pole
Dimensions [1)]	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 (V2)	−25 °C … +50 °C
Protection class	IP67	IP67	IP67
Safety classification			
Standards	EN ISO 13849-1, EN 62061	EN ISO 13849-1, EN 62061	EN ISO 13849-1, EN 62061
PL	up to e	up to e	up to e
Category	up to 4	up to 4	up to 4
PFH	6.74 x 10^{-9} /h	5.14 x 10^{-9} /h	5.14 x 10^{-9} /h
SIL	up to 3	up to 3	up to 3
Approval	TÜV CE UL	TÜV CE UL	TÜV CE UL

Detailed information about the products and the approvals can be found at **www.schmersal.net**

		
■ SLG440COM	■ SLG440	■ SLG445
• **Safety light grid** • **Compact**	• **Safety light grid** • **Standard**	• **Safety light grid** • **Multifunctional**
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 … 12 m	0.3 … 20 m
Yes	Yes	Yes
Yes	Yes	Yes
Wiring	KA-0974	KA-0976
No	Yes	Yes
No	Yes	Yes
No	No	Yes
No	No	Yes
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 / 4 (E.) 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 (V2)	−25 °C … +50 °C
IP67	IP67	IP67
EN ISO 13849-1, EN 62061	EN ISO 13849-1, EN 62061	EN ISO 13849-1, EN 62061
up to e	up to e	up to e
up to 4	up to 4	up to 4
6.74 x 10^{-9} /h	5.14 x 10^{-9} /h	5.14 x 10^{-9} /h
up to 3	up to 3	up to 3

[1] The height depends on the protection field height

Key

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

Optoelectronic safety devices

Safety light grids / light curtains Type 4 - Series 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
		Multifunctional	SLC445	Muting cyclic operation with multiscan
	Light grid SLG	Compact	SLG440COM	Compact
		Standard	SLG440	Standard
				High range
				Integrated status display
				High range and integrated status display
		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	**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	**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 301MC-24V	■ SRB 301MA-24VAC/DC
Key Features		
	• Function STOP 0 • 3 safety contacts • 1 or 2 channel control • Automatic reset function • 1 auxiliary contact	• Function STOP 0 • 3 safety contacts • 1 or 2 channel control • Reset with trailing edge • 1 auxiliary contact
Technical features		
Electrical data		
Operating voltage	24 VDC −15% / +20% 24 VAC −15% / +10%	24 VDC −15% / +20% 24 VAC −15% / +10%
Operating current	0.09 A	0.08 A
Electronic fuse	Yes	Yes
Hybrid fuse	No	No
Pull-in delay for automatic start	typ. 100 ms	typ. 100 ms
Pull-in delay with reset button	typ. 20 ms	typ. 15 ms, max. 20 ms
Max. switching capacity of the safety contacts	250 VAC / 8 A	250 VAC / 8 A
of the auxiliary contacts	24 VDC / 2 A	24 VDC, 2 A
of the signalling outputs	–	–
Utilisation category (EN 60947-5-1) STOP 0 STOP 1	AC-15, DC-13 230 VAC / 6 A; 24 VDC / 6 A	AC-15, DC-13 230 VAC / 6 A; 24 VDC / 6 A
Drop-out delay in case of „E-Stop“	typ. 20 ms, max. 25 ms	typ. 10 ms, max. 15 ms
Mechanical data		
With removable terminals	No	No
Dimensions (H x W x D)	22.5 x 121 x 100 mm	22.5 x 121 x 100 mm
Ambient temperature	−25 °C … +60 °C	−25 °C … +60 °C
Safety classification		
Standards	EN ISO 13849-1, IEC 61508, EN 60947-5-1	EN ISO 13849-1, IEC 61508, EN 60947-5-1
PL	up to e	up to e
Category	up to 4	up to 4
DC	99%	99%
CCF	> 65 points	> 65 points
PFH-value *	≤ 2.0 x 10^{-8}/h	≤ 2.0 x 10^{-8}/h
SIL	up to 3	up to 3
Approval		

* Note: for max. 50,000 switching cycles/year and max. 80% contact load

Detailed information about the products and the approvals can be found at **www.schmersal.net**

		
■ SRB 301ST V.2	**■ SRB 211ST V.2**	**■ SRB 202MSL-24V**
• Function STOP 0 • 3 safety contacts • 1 or 2 channel control • Reset with trailing edge/auto. start • 1 auxiliary contact	• Function STOP 0/1 • 2/1 safety contacts • 1 or 2 channel control • Reset with trailing edge/auto. start • 1 signalling output	• Muting function • Lamp current monitoring • 2 safety contacts, STOP 0 • 2/4 Muting sensors, connectable • Signalling output "Simultaneity"
24 VDC −15% / +20% 24 VAC −15% / +10%	24 VDC −15% / +20% 24 VAC −15% / +10%	24 VDC −15% / +20%
0.09 A	0.24 A	0.24 A
Yes	Yes	Yes
Yes	Yes	No
typ. 100 ms	typ. 120 ms	typ. 200 ms
typ. 15 ms	typ. 25 ms	–
250 VAC / 8 A	250 VAC / 8 A (STOP 0) 250 VAC / 6 A (STOP 1)	24 VDC / 4 A
24 VDC / 2 A	–	–
–	24 VDC / 100 mA	24 VDC / 50 mA
AC-15, DC-13 230 VAC / 6 A; 24 VDC / 6 A	AC-15, DC-13 230 VAC / 6 A; 24 VDC / 5 A 230 VAC / 3 A; 24 VDC / 2 A	AC-15, DC-13 24 V / 2 A
typ. 25 ms / ≤ 32 ms	typ. 15 ms, max. 20 ms	typ. 17 ms / ≤ 20 ms
Yes	Yes	Yes
22.5 x 121 x 100 mm	22.5 x 121 x 100 mm	45 x 121 x 100 mm
−25 °C … +60 °C	−25 °C … +60 °C	−25 °C … +45 °C
EN ISO 13849-1, IEC 61508, EN 60947-5-1	EN ISO 13849-1, IEC 61508, EN 60947-5-1	EN ISO 13849-1, IEC 61508, EN 60947-5-1
up to e	up to e (STOP 0) / up to d (STOP 1)	up to e
up to 4	up to 4 (STOP 0) / up to 3 (STOP 1)	up to 4
99%	99% (STOP 0) / > 60% (STOP 1)	99%
> 65 points	> 65 points	> 65 points
≤ 2.0 x 10^{-8}/h	≤ 2.0 x 10^{-8}/h (STOP 0) ≤ 2.0 x 10^{-7}/h (STOP 1)	≤ 2.0 x 10^{-8}/h
up to 3	up to 3 (STOP 0) / up to 2 (STOP 1)	up to 3

Optoelectronic safety devices
Accessories

SG.

- Protective enclosure for SLC/SLG (optional deflecting mirror)
- Protection field heights
  up to 970 mm: **SG5** **103001594**
  up to 1770 mm: **SG6** **103001596**

SGS…

- Protective Cover for SG5 and SG6
- Protection field heights
  up to 970 mm: **SGS5** **103001595**
  up to 1770 mm: **SGS6** **103001597**

MST-....

- Mounting stands
- Height including plinth 500 … 2000 mm

ULS-A4-....

- Deflecting mirror series A
- Mirror height 200 … 1000 mm
- Included in delivery: Mirror and set with 2 mounting angles

ULS-M-....

- Deflecting mirror series M
- Mirror height 350 … 1870 mm
- Included in delivery: Mirror and set with 2 mounting angles

MSD.

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

NSR-....

- Bus converter for parameterization and diagnostics
- For SLC/SLG Type 2: **NSR-0700** **101207740**
  For SLC/SLG Type 4: **NSR-0801** **101207759**

LF 50-11P 101151758

- Reflection light barrier
- Range 0 … 5.5 m

Control unit

- Combinations of fixed and floating beam blanking of the SLC421
- Blanking: **BDB 01** **101213356**
  Cyclic operation: **BDT 01** **101213358**

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

Optoelectronic safety devices
Accessories

MS-1000

- Mounting kit for SLC/SLG220
- Included in delivery: Angle with screws
- Set 4 pieces **MS-1000** **101207737**
  Set 2 pieces **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: 2 steel angles, 4 screws and 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

PLS-..

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

EA5 101211456

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

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**

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

Optoelectronic safety devices
Accessories

MCU-02 103005572

- Muting connection unit
- Release/override, emitter unit (E), up to 4 muting sensors can be connected, 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 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 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 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 for mounting to the sensor profile
- Set complete with 4 Muting sensors, MCU-02, attachment and cable
- Set without SLC/SLG445 and MST

KA-0974 101217615

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

MK.

- Muting lamp with mounting set and connection cable, cable length 3 m
- For SLC/SLG425I: **MK2** **101207771**
  For SLC/SLG445: **MK6** **101214876**

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

Up-to-date without fail.
The online product catalogue

For detailed information, check out
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The Schmersal Group

For many years the privately owned Schmersal Group has been developing and manufacturing products to enhance occupational safety. What started out with the development and manufacture of a very wide variety of mechanical and non-contact switchgear has now become the world's largest range of safety systems and solutions for the protection of man and machine. Over 1,600 employees in more than 50 countries around the world are developing safety technology solutions in close cooperation with our customers, thus contributing to a safer world.

Motivated by the vision of a safe working environment, the Schmersal Group's engineers are constantly working on the development of new devices and systems for every imaginable application and requirement of the different industries. New safety concepts require new solutions and it is necessary to integrate new detection principles and to discover new paths for the transmission and evaluation of the information provided by these principles. Furthermore, the set of ever more complex standards, regulations and directives relating to machinery safety also requires a change in thinking from the manufacturers and users of machines.

These are the challenges which the Schmersal Group, in partnership with machinery manufacturers, is tackling and will continue to tackle in the future.

Product ranges

Safe switching and monitoring
- Guard door monitoring safety switches
- Command devices with safety function
- Tactile safety devices
- Optoelectronic safety devices

Safe signal processing
- Safety monitoring modules
- Safety controllers
- Safety bus systems

Automation
- Position detection
- Command and signalling devices

Industries

- Elevators and escalators
- Packaging
- Food
- Machine tools
- Heavy industry

Services

- Application advice
- CE conformity assessment
- Risk assessment in accordance with the Machinery Directive
- Stop time measurements
- Training courses

Competences

- Machine safety
- Automation
- Explosion protection
- Hygienic design

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