

Optoelectronic safety devices

Product information



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.

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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

Mühdorf / 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

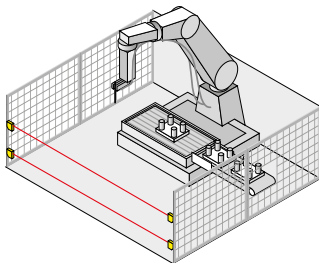
In order to choose the appropriate active optoelectronic protective device (AOPD) such as light barriers, light curtains/grids to use them correctly, both the requirements of the standards (EN 61496, ISO 13849-1, ISO 13855, C standards etc.) and product-specific features (detection sensitivity, range,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

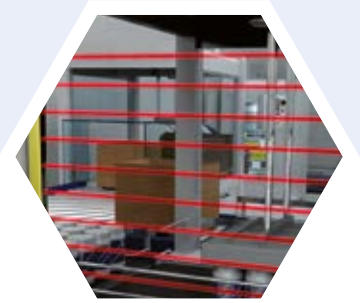
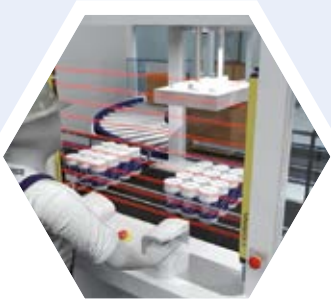
Safety light barriers



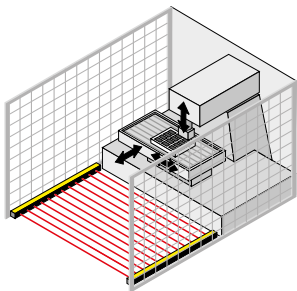
All SLB photoelectric barriers have fail-safe integrated semi-conductor outputs (2 x PNP) and can be incorporated directly in the safety circuit without external safety monitoring. The new product family meets the requirements of all type 2 or type 4 applications in accordance with IEC 61496. The safety 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).

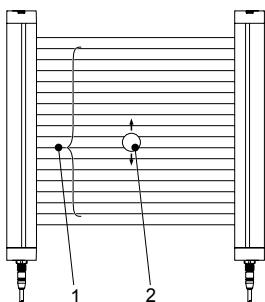
Restart interlock with double acknowledgement/reset

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

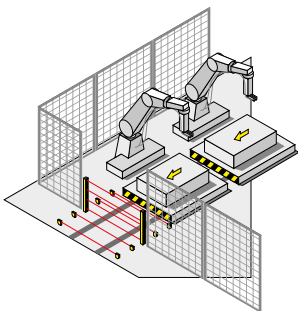
If continuity of the production process is required, a part of the protection field can be blanked without triggering a stop signal in contrast to the muting function. In this way, objects such as work pieces can be fed or a conveyor belt can be positioned at a fixed position in the protection field.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

Optoelectronic safety devices

Safety distance

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)

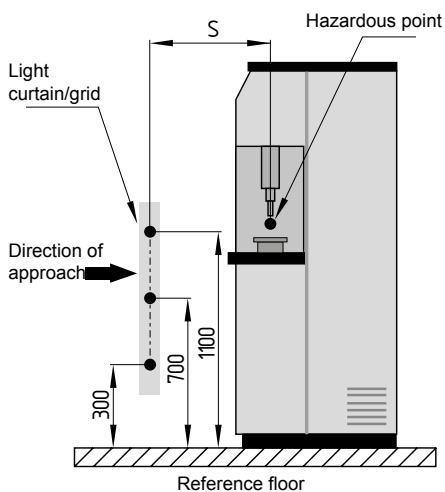
K the approach speed of the body or the body part (mm/s)

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



Key Features

- | | | |
|---|---|--|
| <ul style="list-style-type: none"> • Safety light barrier type 2 • 4-stage coding • Integr. evaluation | <ul style="list-style-type: none"> • Safety light barrier type 4 • 4-stage coding • Integr. evaluation | <ul style="list-style-type: none"> • Safety light barrier type 4 • 4-stage coding • Integr. evaluation • 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 U_e	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 LST: 20 cm Cable with connector M12	ST: Connector plug M12 LST: 20 cm Cable with connector M12	ST: Connector plug M12 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 LST: 28 x 72 x 33 mm	ST: 28 x 91 x 33 mm LST: 28 x 72 x 33 mm	ST: 28 x 131 x 33 mm 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 EN 62061	ISO 13849-1 EN 62061	ISO 13849-1 EN 62061
PL/SIL	c/2	e/3	e/3
Category	2	4	4
PFH	1.5 x 10 ⁻⁸ /h	1.5 x 10 ⁻⁸ /h	1.5 x 10 ⁻⁸ /h
Certificates			



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	KA-0977	103013625	MS-...
 <ul style="list-style-type: none"> ■ Connector M12, straight, 4 pole <ul style="list-style-type: none"> 5 m KA-0804 10 m KA-0805 20 m KA-0808 ■ Connector M12, straight, 5 pole <ul style="list-style-type: none"> 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 	 <ul style="list-style-type: none"> ■ Parametrisation cable for SLB series ■ Y-splitter, M12, 5-pole with P-button 	 <ul style="list-style-type: none"> ■ Assembly sets for SLB series <ul style="list-style-type: none"> 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	BF-SMA-80-1	101150263	BF-SMA-80-2	101150264
 <ul style="list-style-type: none"> ■ Tilted mirror for SLB series ■ Height: 80 mm ■ Width: 120 mm 	 <ul style="list-style-type: none"> ■ Mounting bracket for attachment of tilted mirror SMA-80 (horizontal tilt) 	 <ul style="list-style-type: none"> ■ 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
- Compact

- Safety light grid
- 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, EN 62061	ISO 13849-1, EN 62061
PL/SIL	c/1	c/1
Category	2	2
PFH	$8.05 \times 10^{-9} /h$	$8.05 \times 10^{-9} /h$
Certificates		



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
- 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	■	■	■
- 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, 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			



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



■ SLG420



■ SLG420 IP69K



■ SLG422-P

- Safety light grid
- Standard

- Safety light grid
- High protection class

- Safety light grid
- 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
7.42×10^{-9} /h	7.42×10^{-9} /h	7.42×10^{-9} /h



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
- 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	-	-	-
- 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			



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



■ SLG425I IP69K

■ SLG425-IP

- Safety light grid
- High protection class

- Safety light grid
- 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, EN 62061	ISO 13849-1, EN 62061
e/3	e/3
4	4
7.42×10^{-9} /h	7.42×10^{-9} /h

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

Features

- Safety light curtain
- Compact

- Safety light curtain
- Standard

- Safety light curtain
- 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, 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	8.05 x 10 ⁻⁹ /h	5.14 x 10 ⁻⁹ /h	5.14 x 10 ⁻⁹ /h
Certificates			





■ SLG440COM

■ SLG440

■ SLG445

■ 440/COM IP69K

- Safety light grid
- Compact

- Safety light grid
- Standard

- Safety light grid
- Multifunctional

- Safety light curtain
- SLC/light grid SLG
- Compact

-

■ ¹⁾

-

-

300, 400 or 500 mm
500, 800 or 900 mm
2, 3 or 4 beams
0,3 ... 12 m

300, 400 or 500 mm
500, 800 or 900 mm
2, 3 or 4 beams
0.3 ... 20 m

300, 400 or 500 mm
500, 800 or 900 mm
2, 3 or 4 beams
0.3 ... 20 m

14 ... 500 mm
170 mm ... 1770 mm
8 ... 192
0.3 ... 20 m

■

■

■

■

Wiring

KA-0974

KA-0976

Wiring

-

■

■

■

-

■

■

■

-

-

■

-

DM

BC, DQ, DM

BC, DQ, MS, DM

BC, DQ, DM

24 VDC ± 10%
2 x PNP (timing)
10 ms
500 mA

24 VDC ± 10%
2 x PNP (timing)
10 ... 15 ms
500 mA

24 VDC ± 10%
2 x PNP (timing)
10 ... 15 ms
500 mA

24 VDC ± 10%
2 x PNP (timing)
10 ... 28 ms
500 mA

Status display

7-segment display

7-segment display

7-segment display

Connector plug
4-pole / 5-pole
27.8 x 33 mm

Connector plug
4-pole / 8-pole
27.8 x 33 mm

Connector plug
4-pole / 12-pole
27.8 x 33 mm

Connector plug
4-pole / 8-pole
Ø 50 mm

-10 °C ... +50 °C
IP67

-25 °C ... +50 °C
IP67

-25 °C ... +50 °C
IP67

-10/-25 °C ... +50 °C
IP69K

ISO 13849-1,
EN 62061

ISO 13849-1,
EN 62061

ISO 13849-1,
EN 62061

ISO 13849-1,
EN 62061

e/3

e/3

e/3

e/3

4

4

4

4

8.05 x 10⁻⁹ /h

5.14 x 10⁻⁹ /h

5.14 x 10⁻⁹ /h

5.14 x 10⁻⁹ /h



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
				High protection class / Compact + Protective enclosure
		Standard	SLC440	Standard
				Integrated Status display
				High protection class / SLC440 + Protective enclosure
		AS-i	SLC440AS	Integrated AS-i SaW
		Multifunctional	SLC445	Muting cyclic operation with multiscan
		Light grids SLG	Compact	SLG440COM
	High protection class / Compact + Protective enclosure			
	Standard		SLG440	Standard
				High range
				Integrated Status display
				High range and integrated status display
				High protection class / SLG440 + Protective enclosure
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	---
PH				SLC440COM-ER-xxxx-xx	---
	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	---
PH/SH				SLC440-ER-xxxx-xx	---
	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
PH				SLG440COM-ER-xxxx-xx	---
	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
PH/SH				SLG440-ER-xxxx-xx	---
	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
- 1 or 2 channel control
- Start button / autostart
- 3 safety contacts
- 1 auxiliary contact

- Input expander module
- Monitoring of 4 sensors
- Start button / autostart
- 2 safety outputs
- 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	$\leq 1.25 \times 10^{-8} /h$	$\leq 2.66 \times 10^{-8} /h$
Certificates		



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



■ SRB301MC



■ SRB301MA-24V



■ SRB202MSL

- Function STOP 0
- 1 or 2 channel control
- Start button / autostart
- 3 safety contacts
- 1 auxiliary contact

- Function STOP 0
- 1 or 2 channel control
- Start with edge detection
- 3 safety contacts
- 1 auxiliary contact

- Muting function
- 2 or 4 muting sensors
- Lamp current monitoring
- 2 safety contacts
- 2 signalling outputs

24 VDC -15% / +20% 24 VAC -15% / +10%	24 VDC -15% / +20% 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
$\leq 2.0 \times 10^{-8}$ /h	$\leq 2.0 \times 10^{-8}$ /h	$\leq 2.0 \times 10^{-8}$ /h

Optoelectronic safety devices

Accessories

SG.	SGS...	ULS-SG-...
 <ul style="list-style-type: none"> ■ Protective enclosure for SLC/SLG ■ Protection field heights <ul style="list-style-type: none"> to 970 mm: SG5 to 1930 mm: SG6 <p style="text-align: right;"> 103001594 103001596 </p>	 <ul style="list-style-type: none"> ■ Protective Cover for SGS5 and SGS6 ■ Protection field heights <ul style="list-style-type: none"> to 970 mm: SGS5 to 1930 mm: SGS6 <p style="text-align: right;"> 103001595 103001597 </p>	 <ul style="list-style-type: none"> ■ Tilted mirror for SG5 and SG6 <ul style="list-style-type: none"> 1000 mm: ULS-SG-1000 1870 mm: ULS-SG-1870 <p style="text-align: right;"> 103002489 103016046 </p>
MST-....	ULS-M-....	MSD.
 <ul style="list-style-type: none"> ■ Mounting stands ■ Base L/W 135x135 mm ■ Height 500 ... 2000 mm 	 <ul style="list-style-type: none"> ■ Deflecting mirror series M ■ Mirror height 350 ... 1870 mm ■ Included in delivery: tilted mirror and qty. 2 mounting brackets 	 <ul style="list-style-type: none"> ■ Vibration damper <ul style="list-style-type: none"> SLC/SLG type 2: MSD2 SLC/SLG type 4: MSD4 ■ Included in delivery: Set with 8 pieces <p style="text-align: right;"> 101207735 101207754 </p>
NSR-0801	LF 50-11P	EA5
 <ul style="list-style-type: none"> ■ Bus converter for parameterisation and diagnostics with PC/software 	 <ul style="list-style-type: none"> ■ Reflection light barrier ■ Range 0 ... 5.5 m 	 <ul style="list-style-type: none"> ■ Alignment kit, laser beam 30 m ■ Alignment kit for all SLC/SLG series

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







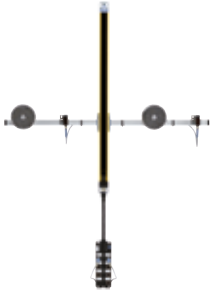


Optoelectronic safety devices

Accessories

PLS-..	Connector plug	Connector plug
 <ul style="list-style-type: none"> ■ Test rod 30 mm diameter: PLS-01 101207768 14 mm diameter: PLS-02 101207769 	 <ul style="list-style-type: none"> ■ 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 	 <ul style="list-style-type: none"> ■ 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 Protective enclosure SH – stainless steel	Protective enclosure PH – polyamide
 <ul style="list-style-type: none"> ■ Programming cable for SLC/SLG 440 ■ Y-splitter, M12, 8-pole with P-button 	 <ul style="list-style-type: none"> ■ Protective enclosure IP69K up to 490 mm: SH-440-ER-01 103026832 up to 890 mm: SH-440-ER-02 103026833 up to 1290 mm: SH-440-ER-03 103026834 up to 1770 mm: SH-440-ER-04 103026835 	 <ul style="list-style-type: none"> ■ Protective enclosure IP69K up to 490 mm: PH-440-ER-01 103026836 up to 890 mm: PH-440-ER-02 103026837 up to 1290 mm: PH-440-ER-03 103026838 up to 1770 mm: PH-440-ER-04 103026839

Optoelectronic safety devices

Accessories – Muting

MCU-02 103005572	FR-20-PSM4 103005570	KA-0976 103005575
 <ul style="list-style-type: none"> ■ Muting connection unit ■ Release/override, transmitter unit (E), up to 4 muting sensors, muting lamp 	 <ul style="list-style-type: none"> ■ Muting sensor M8, 4-pole ■ Reflection light barrier ■ Range 0.1 ... 3.5 m ■ Mounting brackets not included in the delivery 	 <ul style="list-style-type: none"> ■ Programming cable for SLC/SLG445 ■ P-button with connector M12, 12-pole
MUT-SET-L-01 103006073	MUT-SET-L-02 103006074	MUT-SET-T-01 103006075
 <ul style="list-style-type: none"> ■ 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 	 <ul style="list-style-type: none"> ■ 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 	 <ul style="list-style-type: none"> ■ 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	MUT-SET-T-03 103009195	MUT-SET-T-04 103012263
 <ul style="list-style-type: none"> ■ 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 	 <ul style="list-style-type: none"> ■ 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 	 <ul style="list-style-type: none"> ■ 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	MS-1030	MS-1038
 <ul style="list-style-type: none"> ■ Mounting kit for SLC/SLG220 ■ Included in delivery: brackets inc. screws qty. 4 for: MS-1000 101207737 qty. 2 for: MS-1072 101207804 	 <ul style="list-style-type: none"> ■ Mounting kit for SLC/SLG420 ■ Included in delivery: Angle with screws ■ Set with 4 pieces 	 <ul style="list-style-type: none"> ■ Mounting kit for SLC/SLG420 IP69K and SLC/SLG425I IP69K in V4A ■ Included in delivery: Angle with screws ■ Set with 4 pieces
MS-1051	MS-1031	MS-1073
 <ul style="list-style-type: none"> ■ Mounting kit lateral fixation for SLC/SLG420-425I ■ Included in delivery: qty. 2 steel brackets, qty. 4 screws and qty. 4 T-slot nuts 	 <ul style="list-style-type: none"> ■ Mounting kit for deflecting mirror ULS-A4 ■ Included in delivery: Angle with screws ■ Set with 2 pieces 	 <ul style="list-style-type: none"> ■ Mounting kit for deflecting mirror ULS-M ■ Set with 2 pieces
MS-1035	MS-1100	MS-1110
 <ul style="list-style-type: none"> ■ Mounting kit for SLC/SLG220 IP69K in V4A ■ Included in delivery: Angle with screws ■ Set with 4 pieces 	 <ul style="list-style-type: none"> ■ Mounting kit for SLC/SLG440COM, SLC/SLG440 and SLC/SLG445 ■ Included in delivery: Angle with screws ■ Set with 4 pieces 	 <ul style="list-style-type: none"> ■ Mounting kit - Centre fixing for SLC/SLG440COM, SLC/SLG440 and SLC/SLG445 ■ Set with 2 pieces



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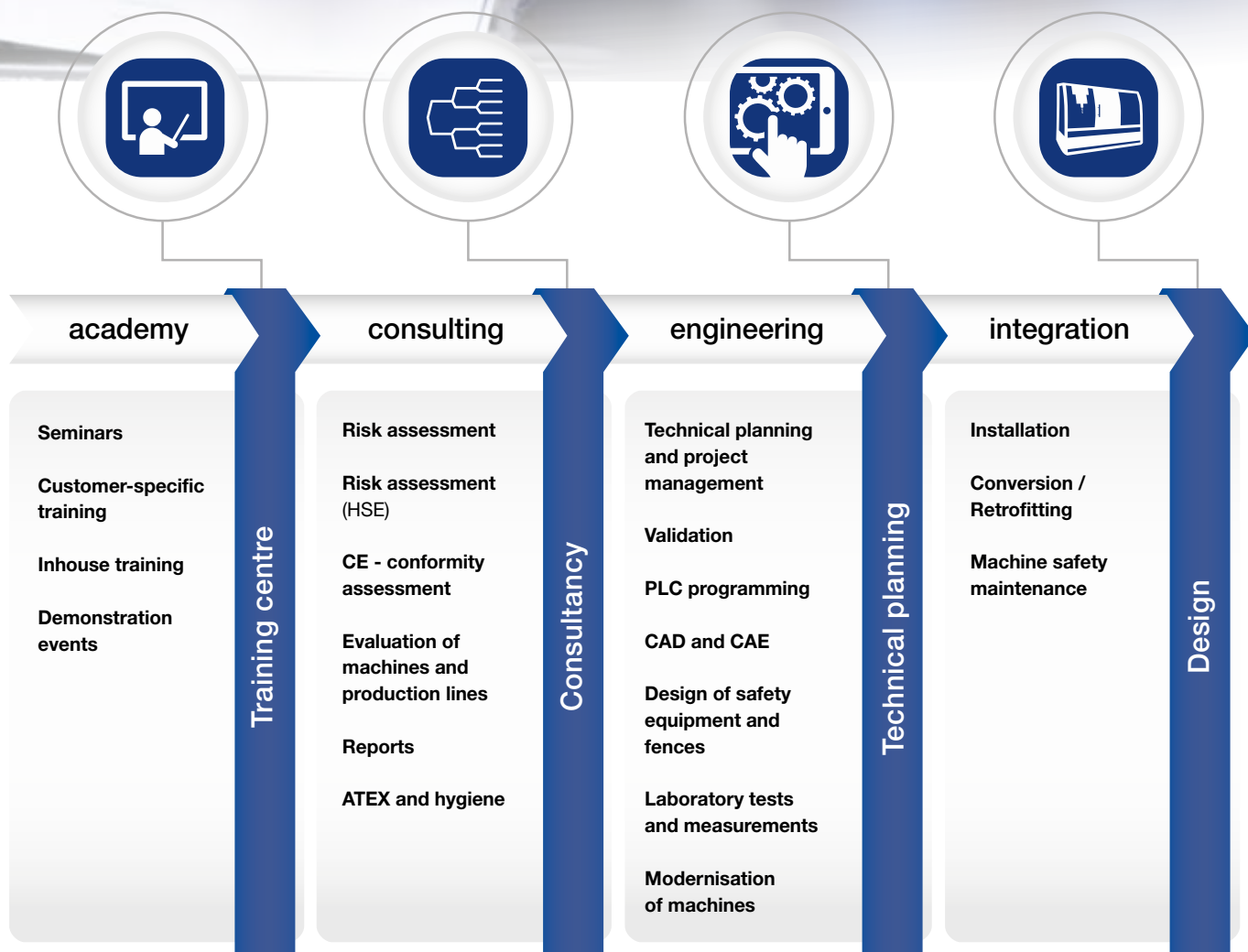
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tec.nicum offers companies a global network of TÜV Rheinland -certified Functional Safety Engineers, so the services of the international tec.nicum organisation can be accessed quickly and easily wherever the customer is. tec.nicum experts not only 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 countries.

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 food & beverage, packaging, machine tools, lift switchgear, heavy industry and automotive.

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 design 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

The details and data referred to have been carefully checked.
Subject to technical amendments and errors.

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 **SCHMERSAL**
Safe solutions for your industry