

SLSR 46B

Protective throughbeam photoelectric sensor

Dimensioned drawing

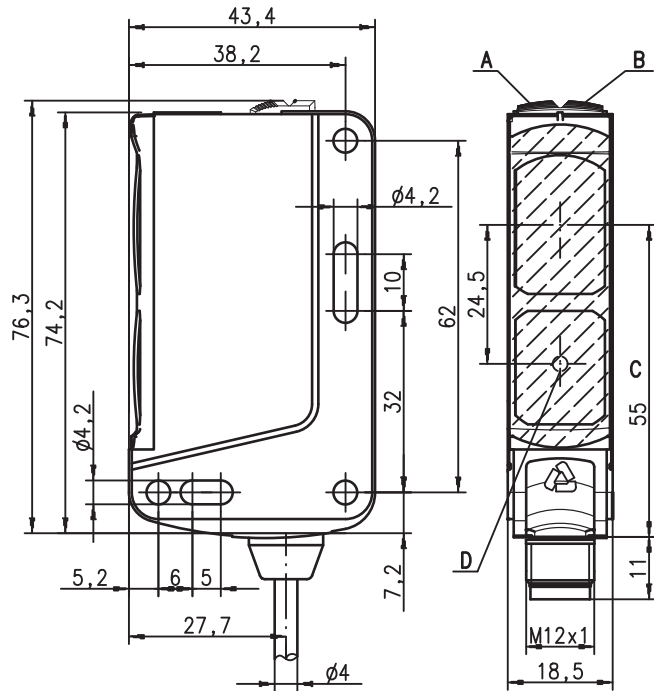
en 02-2010/01 50110389-01



0 ... 44m

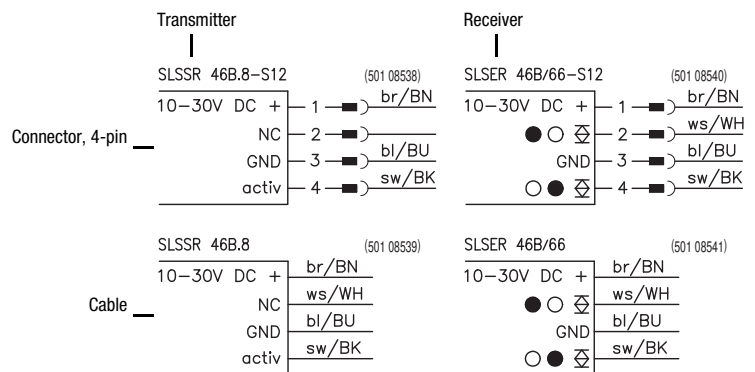


- Protective throughbeam photoelectric sensor with visible red light, category 2
- Small and compact construction with robust plastic housing, protection class IP 67/IP 69K for industrial application
- Fast alignment through *brightVision*<sup>®</sup>
- LED display featuring excellent visibility for alignment control
- Push-pull switching outputs



- A Green indicator diode
- B Yellow indicator diode
- C Optical axis
- D Alignment control indicator diode (only at receiver)

Electrical connection



Accessories:

(available separately)

- Mounting systems (BT 46.1, BT 46.1.5, BT 46.2)
- M12 connectors (KD ...)
- Ready-made cables (K-D ...)
- Test monitoring units  
 TNT 35 (Part No. 500 33058)  
 TMC 66 (Part No. 500 82121)
- Sensorscope SAT 5  
 (Alignment tool, Part No. 501 09545)

We reserve the right to make changes • DS\_SLSR\_46B\_en.fm



## Specifications

### Optical data

Typ. operating range limit <sup>1)</sup>	0.5 ... 44 m
Operating range <sup>2)</sup>	0.5 ... 40 m
Light source <sup>3)</sup>	LED (modulated light)
Wavelength	624 nm (visible red light)

### Timing

Switching frequency	100Hz
Response time	5ms
Delay before start-up	≤ 100ms

### Electrical data

Operating voltage $U_B$ <sup>4)</sup>	10 ... 30VDC (incl. residual ripple)
Residual ripple	≤ 15% of $U_B$
Open-circuit current	≤ 15mA per transmitter/receiver, ≤ 30mA per pair
Switching output/function <sup>5)</sup>	2 push-pull switching outputs pin 2: PNP dark switching, NPN light switching pin 4: PNP light switching, NPN dark switching
Signal voltage high/low	≥ ( $U_B - 2V$ ) / ≤ 2V
Output current	max. 100mA

### Indicators

<b>Transmitter</b>	
Green LED	ready
Yellow LED	transmitter active
<b>Receiver</b>	
Green LED	ready
Yellow LED	light path free
Yellow LED, flashing	light path free, no performance reserve
Yellow LED, front	alignment indicator <sup>6)</sup>

### Mechanical data

Housing	plastic
Optics cover	plastic
Weight (plug/cable)	100g/200g per pair
Connection type	M12 connector (4-pin) or cable, length 2 m (cross section 4x0.21 mm <sup>2</sup> )

### Environmental data

Ambient temp. (operation/storage)	-30°C ... +55°C / -30°C ... +60°C
Protective circuit <sup>7)</sup>	2, 3
VDE safety class <sup>8)</sup>	II, all-insulated
Protection class	IP 67, IP 69K
LED class	1 (acc. to EN 60825-1)
Standards applied	IEC 60947-5-2

### Activation input active

Transmitter active/not active	≥ 8V / ≤ 2V
Activation/disable delay	≤ 1 ms / ≤ 2 ms
Input resistance	10KΩ ± 10%



- 1) Typ. operating range limit: max. attainable range without performance reserve
- 2) Operating range: recommended range with performance reserve
- 3) Average life expectancy 100,000h at an ambient temperature of 25°C
- 4) For UL applications: for use in class 2 circuits only
- 5) The push-pull switching outputs must not be connected in parallel
- 6) LED display featuring excellent visibility for alignment control
- 7) 2=polarity reversal protection, 3=short-circuit protection for all transistor outputs
- 8) Rating voltage 50V

## Order guide

	Designation	Part No.
<b>With M12 connector</b>		
Transmitter and receiver	SLSR 46B/66.8-S12	
Transmitter	SLSSR 46B.8-S12	50108538
Receiver	SLSER 46B/66-S12	50108540
<b>Cable, cable length 2m</b>		
Transmitter and receiver	SLSR 46B/66.8	
Transmitter	SLSSR 46B.8	50108539
Receiver	SLSER 46B/66	50108541

## Tables

0.5	40	44
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	Operating range [m]
	Typ. operating range limit [m]

## Remarks

### ⚠ Safety notes:

1. The protective throughbeam photoelectric sensor is a contactless active protective device only in connection with a safety-relevant control system, in which the cyclical testing of transmitter and receiver is carried out according to EN 61496-1, category 2 (testing).
2. The power supply unit used to operate the photoelectric sensor has to be able to compensate for changes and interruptions of the supply voltage acc. to EN 61496-1. Minimum blackening object: Ø 22mm.

### ⚠ Safety notes for test function:

1. To perform testing correctly the activation input of the SLSR 46B transmitter must be connected to the test monitoring unit.
2. The test duration during access protection must not exceed 150ms.
3. Subsequent to sensor activation the output switching elements of the test monitoring unit must remain in the 'off' state for at least 80ms so that the downstream equipment can be switched off safely when the photoelectric sensor is used for access protection. In order to comply with points 2 and 3 the use of Leuze test monitoring units (TNT 35, TMC 66, MSI-m) is recommended.

### ● Approved purpose:

This product may only be used by qualified personnel and must only be used for the approved purpose. This sensor is not a safety sensor and is not to be used for the protection of persons.

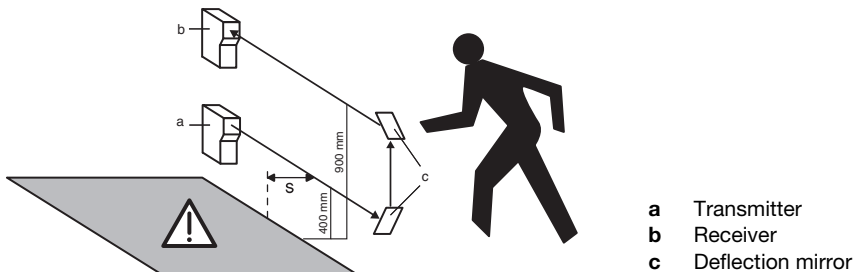
**SLSR 46B**

**Protective throughbeam photoelectric sensor**

**Mounting instructions**

**Safety distances**

The protective throughbeam photoelectric sensor must be installed sufficiently distanced from a potentially dangerous motion: if an interruption of the light beam occurs, the danger area may only be reached once the machine has already come to a dead stop.



The safety distance **S** between photoelectric sensor and danger area is calculated using the following formula (acc. to EN 999):

$$S = (K \cdot T) + C$$

**S:** Safety distance [mm] between photo electric sensor and danger area.

**K:** Approach speed (constant 1600 mm/s).

**T:** Time delay [s] between interruption of the light beam and stand-still of the machine.

**C:** Safety constant = 850mm.

**Example:**

The beams of the photoelectric sensor are positioned at a height of 400mm and 900mm.

The approach speed K is set at 1600mm/s, the time delay is 0.2s.

$$S = 1600\text{mm/s} \times 0.2\text{s} + 850\text{mm} = 1170\text{mm}.$$

The safety distance must therefore be at least 1170mm.

**Protected field heights for protective throughbeam photoelectric sensors for the purpose of vertical access protection**

When mounting SLSR 46B single beam safety devices for access or area protection purposes, danger areas must not be accessible by crawling underneath, climbing over or reaching across the light axes. The number and distances of light axes depend on the risk evaluation or machine-specific regulations. EN 999 recommends the following protection planes:

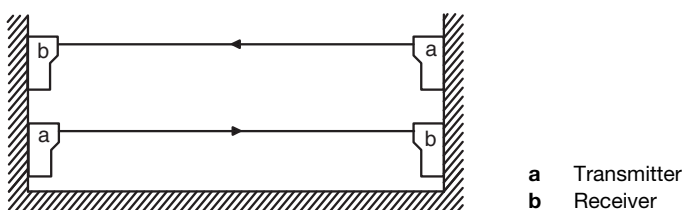
Number of light beams	Height above reference plane, e.g. floor [mm]
4	300, 600, 900, 1200
3	300, 700, 1100
2	400, 900

Table: Protection levels

**Multi-axle installation**

With multi-axle installation the light beams have to run parallel to the reference plane (e.g. floor) and must be aligned mutually parallel.

For this the beam direction must be set oppositely in each case. Otherwise the light beams could cause mutual interference and disturb proper functioning.



**Distance to reflecting surfaces**

Reflecting surfaces within the  $\pm 4^\circ$  transmitting and receiving cones of light can lead to reflection bypass and thus to non-recognition of parts of the human body. Therefore a minimum gap **a** between the optical axis of the SLSR 46B and reflective objects, such as shiny machine components or material containers, must be observed.

The larger the distance between transmitter and receiver, the wider the minimum gap **a** required. This minimum gap is calculated from the opening angle ( $\pm 4.0^\circ$ ) and the distance between transmitter and reflecting surface and protected field width.

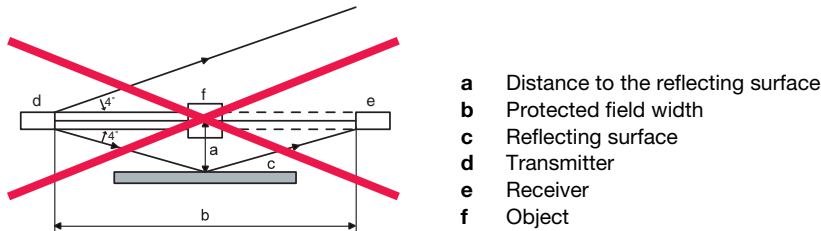


Figure: **Wrong** - Danger due to reflection bypass

The following figure shows the correct installation and the minimum gap **a** as a function of the protected field width.

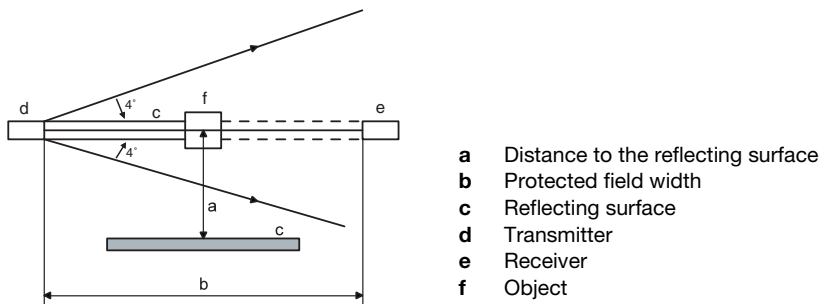


Figure: **Correct** - No danger due to reflection bypass

**⚠ Safety note:**

The check prior to the initial commissioning of a machine or subsequent to retrofitting or repair of the optical protective device as well as possibly other safety components serves to ensure that these have been chosen correctly and offer the protection required.

To perform the check the light beam between transmitter and receiver has to be interrupted using a  $\varnothing 22$ mm test bar.

Regular checks are determined by local regulations. These should detect, among other things, changes (e.g. altered system response time) or manipulations of machines or protective devices.