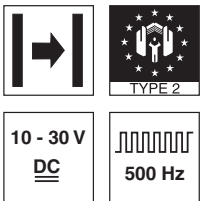


SLS 96

Protective throughbeam photoelectric sensors

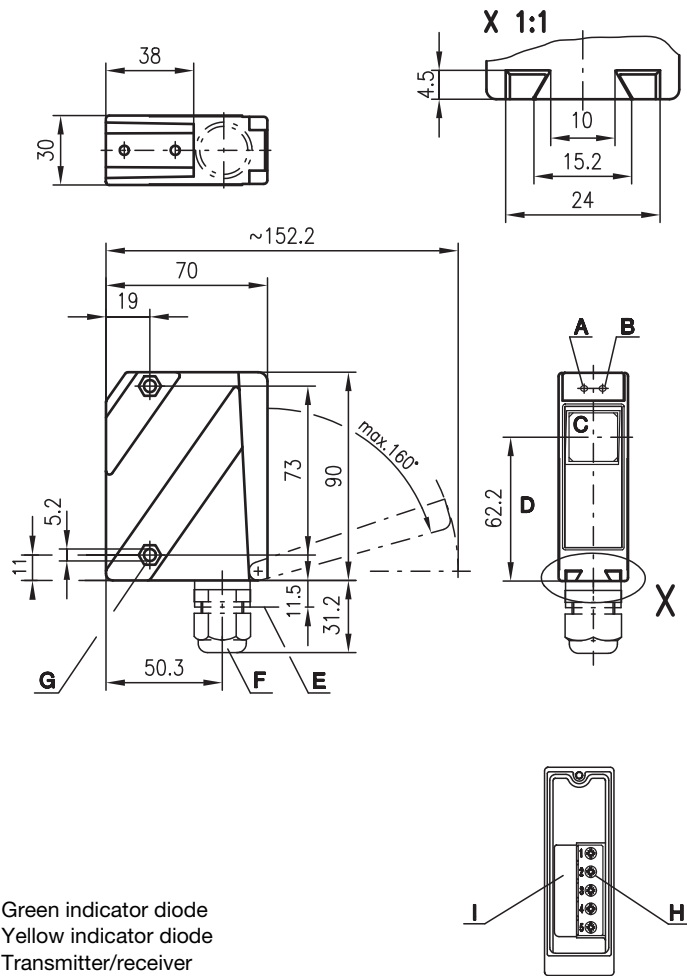
en 13-2016/02 602075-03



**65m
39m**

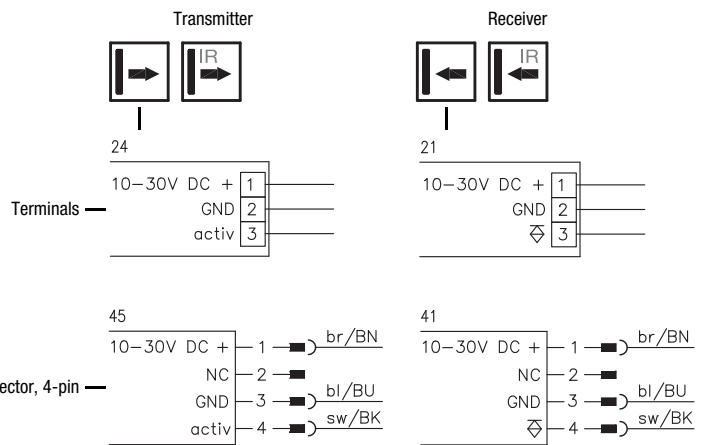
- Protective throughbeam photoelectric sensor with high performance reserve in visible red light or infrared light, up to PL c, category 2 in accordance with ISO 13849-1
- Robust metal housing with glass cover or plastic housing, protection class IP 67 for industrial application
- 2 indicators each at the transmitter and receiver for displaying their status when commissioning and in operation
- Optics heating for use with low temperatures
- Connection via M12 connector or terminal compartment

Dimensioned drawing

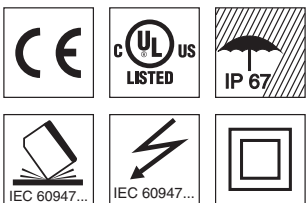


- A** Green indicator diode
- B** Yellow indicator diode
- C** Transmitter/receiver
- D** Optical axis
- E** Device plug M12x1
- F** Screwed cable gland M16x1.5 for Ø 5 ... 10mm
- G** Countersinking for SK nut M5, 4.2 deep
- H** Connection terminals
- I** Cable entry

Electrical connection



We reserve the right to make changes • DS_SLS_96_en_602075_03.fm



Accessories:

(available separately)

- Mounting systems (BT 96, BT 96.1, UMS 96, BT 450.1-96)
- M12 connectors (KD ...)
- Ready-made cables (K-D ...)
- Test monitoring units
 - MSI-TR1B-01 (Part No. 547958)
 - MSI-TR1B-02 (Part No. 547959)
- BT 96-ARH alignment aid (Part No. 50080502)
- Sensorscope SAT 5 (alignment control, Part No. 50109545)

Specifications

Safety-relevant data

Type in accordance with IEC/EN 61496	type 2
Performance Level (PL) in accordance with ISO 13849-1 ¹⁾	PL c
Category in accordance with ISO 13849 ¹⁾	cat. 2
Mean time to dangerous failure (MTTFd)	400 years
Service life (TM)	20 years

Optical data

Typ. operating range limit ²⁾	0 ... 65m	0 ... 39m
Operating range ³⁾	0 ... 50m	0 ... 30m
Light source	LED (modulated light)	LED (modulated light)
Wavelength	880nm	660nm

Timing

Sensor switching frequency	500Hz
Sensor response time	1 ms
Delay before start-up	≤ 200ms

Electrical data

Operating voltage U_B ⁴⁾	10 ... 30VDC (incl. residual ripple)
Residual ripple	≤ 15% of U_B
Open-circuit current	≤ 50mA
Switching output	PNP transistor
Function	light switching
Signal voltage high/low	$\geq (U_B - 2V) / \leq 2V$
Output current	max. 100mA

Indicators

Receiver	
Green LED	ready
Yellow LED	light path free
Yellow LED, flashing	light path free, no performance reserve
Transmitter	
Green LED	ready
Yellow LED	transmitter active

Mechanical data

Housing	Plastic housing	Metal housing
Optics cover	polycarbonate	diecast zinc
Weight	plastic	glass
Connection type	150g	380g
	terminals or M12 connector	

Environmental data

Ambient temp. (operation/storage)	-20°C ... +60°C / -40°C ... +70°C
Protective circuit ⁵⁾	1, 2, 3
VDE safety class ⁶⁾	II, all-insulated
Protection class	IP 67
Light source	exempt group (in acc. with EN 62471)
Standards applied	IEC 60947-5-2
Certifications	UL 508, C22.2 No.14-13 ⁴⁾ 7)

Options

Optics heating	
Low temperature	
Activation input active	for temperature changes, prevents fogging
Transmitter active/not active	to -35°C
Activation/disable delay	≥ 8V / ≤ 2V
Input resistance	≤ 1ms
	10KΩ ± 10%

- 1) In combination with a suitable test monitoring unit, e.g. MSI-TR1B-0x
- 2) Typ. operating range limit: max. attainable range without performance reserve
- 3) Operating range: recommended range with performance reserve
- 4) For UL applications: for use in class 2 circuits only
- 5) 1=transient protection, 2=polarity reversal protection, 3=short circuit protection for all outputs
- 6) Rating voltage 250VAC / Overvoltage category II
- 7) These proximity switches shall be used with UL Listed Cable assemblies rated 30V, 0.5A min, in the field installation, or equivalent (categories: CYJV/CYJV7 or PVVA/PVVA7)

Tables

Infrared light

0	50	65
---	----	----

Red light

0	30	39
---	----	----

- Operating range [m]
- Typ. operating range limit [m]

Remarks

- SLS = Pair consisting of
- SLSS = Transmitter
- SLSE = Receiver

SLS 96K/P-1070-T2-2

- SLSS 96K-1080-T2-24
- SLSE 96K/P-1070-T2-21

SLS 96K/P-1070-T2-4

- SLSS 96K-1080-T2-45
- SLSE 96K/P-1070-T2-41

SLS 96K/P-1200-T2-2

- SLSS 96K-1210-T2-24
- SLSE 96K/P-1200-T2-21

SLS 96K/P-1200-T2-4

- SLSS 96K-1210-T2-45
- SLSE 96K/P-1200-T2-41

SLS 96K/P-1207-T2-2

- SLSS 96K-1210-T2-24
- SLSE 96K/P-1207-T2-21

SLS 96K/P-1207-T2-4

- SLSS 96K-1210-T2-45
- SLSE 96K/P-1207-T2-41

SLS 96M/P-1070-T2-2

- SLSS 96M-1080-T2-24
- SLSE 96M/P-1070-T2-21

SLS 96M/P-1070-T2-4

- SLSS 96M-1080-T2-45
- SLSE 96M/P-1070-T2-41

SLS 96M/P-1071-T2-2

- SLSS 96M-1090-T2-24
- SLSE 96M/P-1071-T2-21

SLS 96M/P-1071-T2-4

- SLSS 96M-1090-T2-45
- SLSE 96M/P-1071-T2-41

SLS 96M/P-1200-T2-2

- SLSS 96M-1210-T2-24
- SLSE 96M/P-1200-T2-21

SLS 96M/P-1200-T2-4

- SLSS 96M-1210-T2-45
- SLSE 96M/P-1200-T2-41

SLS 96
Protective throughbeam photoelectric sensors
Order guide ¹⁾

Selection table		SLS 96K/P-1070-T2-2 Part No. 50081292 (Tr) Part No. 50081293 (Re)	SLS 96K/P-1070-T2-4 Part No. 50031559 (Tr) Part No. 50031561 (Re)	SLS 96K/P-1200-T2-2 Part No. 50028009 (Tr) Part No. 50028010 (Re)	SLS 96K/P-1200-T2-4 Part No. 50028011 (Tr) Part No. 50028012 (Re)	SLS 96K/P-1207-T2-2 Part No. 50028009 (Tr) Part No. 50035078 (Re)	SLS 96K/P-1207-T2-4 Part No. 50028011 (Tr) Part No. 50041109 (Re)	SLS 96M/P-1070-T2-2 Part No. 50025213 (Tr) Part No. 50025192 (Re)	SLS 96M/P-1070-T2-4 Part No. 50025215 (Tr) Part No. 50025193 (Re)	SLS 96M/P-1071-T2-2 Part No. 50029454 (Tr) Part No. 50029455 (Re)	SLS 96M/P-1071-T2-4 Part No. 50080478 (Tr) Part No. 50080479 (Re)	SLS 96M/P-1200-T2-2 Part No. 50025209 (Tr) Part No. 50031562 (Re)	SLS 96M/P-1200-T2-4 Part No. 50031249 (Tr) Part No. 50031250 (Re)
Order code →													
Equipment ↓													
Housing	metal							●	●	●	●	●	●
	plastic	●	●	●	●	●	●						
Light source	red light (30m)			●	●	●	●					●	●
	infrared light (50m)	●	●					●	●	●	●		
Connection	terminals	●		●		●		●		●		●	
	M12 connector		●		●		●		●		●		●
Features	optics heating/low temperature									●	●		
	activation input	●	●	●	●	●	●	●	●	●	●	●	●
	filter for multi-axis operation					●	●						

1) Version 2010 A-Z

Safety notices

Before using the safety sensor, a risk evaluation must be performed according to valid standards. For mounting, operation and tests, this document as well as all applicable national and international standards and regulations must be observed, printed out and handed to the affected personnel.

Before working with the safety sensor, completely read and observe the documents applicable to your task.

In particular, the following national and international legal regulations apply for the commissioning, technical inspections and work with safety sensors:

- Machinery directive 2006/42/EC
- Use of Work Equipment Directive
- Accident-prevention regulations and safety rules
- Other relevant standards
- Standards, e.g. ISO 13855

Symbols



Attention!

Warning sign – This symbol indicates possible dangers. Please pay especially close attention to these instructions!



These symbols identify the transmitter.



These symbols identify the receiver.

Safety sensor area of application

The protective throughbeam photoelectric sensor is an active optoelectronic protective device only in connection with a safety-relevant control system, in which the cyclical testing of transmitter and receiver is carried out in accordance with EN 61496-1, up to category 2 and PL c in accordance with EN ISO 13849-1.



Attention!

- The safety sensor protects persons at access points or at points of operation of machines and plants.
- The safety sensor only detects persons upon entry to the danger area; it does not detect persons who are located within the danger area. For this reason, a start-up/restart interlock is mandatory.
- No protective function without adequate safety distance.
- 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.
- Also observe the safety notices in the documentation of the connected test device!
- Additional measures must be taken to ensure that the AOPD does not experience a dangerous failure due to glare from other light sources.

Proper use

The safety sensor must only be used after it has been selected in accordance with the respectively valid instructions and relevant standards, rules and regulations regarding occupational safety and safety at work, and after it has been installed on the machine, connected, commissioned, and checked by a competent person.

Foreseeable misuse

Any use other than that defined under the "Proper use" or which goes beyond that use is considered improper use. The user must ensure that no optical influence on the AOPD occurs through other forms of light beams, e.g. through

- wireless control devices on cranes,
- radiation from welding sparks,
- stroboscopic lights.

Competent personnel

Prerequisites for competent personnel:

- He has a suitable technical education.
- He knows the instructions for the safety sensor and the machine.
- He has been instructed by the responsible person on the mounting and operation of the machine and of the safety sensor.

Responsibility for safety

Manufacturer and operator must ensure that the machine and implemented safety sensor function properly and that all affected persons are adequately informed and trained.

The **manufacturer** of the machine is responsible for:

- Safe implementation of the safety sensor.
- Imparting all relevant information to the operator.
- Adhering to all regulations and directives for the safe commissioning of the machine.

The **operator** of the machine is responsible for:

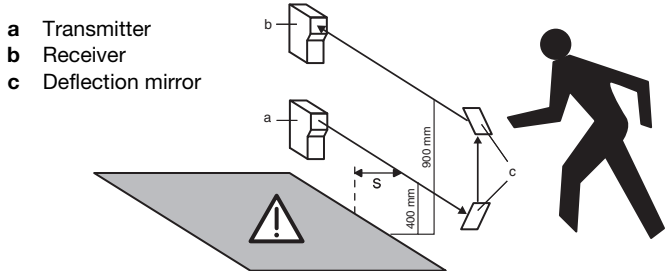
- Instructing the operating personnel.
- Maintaining the safe operation of the machine.
- Adhering to all regulations and directives for occupational safety and safety at work.
- Regular testing by competent personnel.

Safety distances



Attention!

The protective throughbeam photoelectric sensor must be installed with the correctly calculated safety distance as well as suitable beam distances 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.



Beam distances in accordance with ISO 13855		
Number of beams	Heights above reference plane, e.g. floor [mm]	Additional distance C [mm]
1	750	1200
2	400, 900	850
3	300, 700, 1100	850
4	300, 600, 900, 1200	850

The safety distance **S** between photoelectric sensor and danger area is calculated using the following formula (ISO 13855):

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

S: Safety distance [mm] between photoelectric sensor and danger area.

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

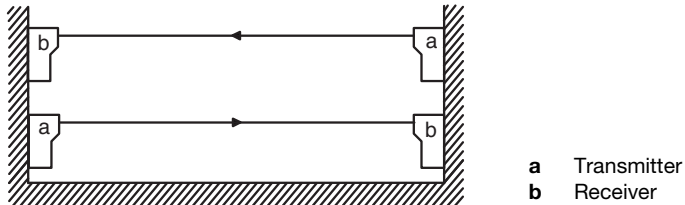
T: Time delay [s] between interruption of the light beam and stand-still of the machine.

C: Safety constant (additional distance) = 850mm or 1200mm, see table above.

Multi-axe installation

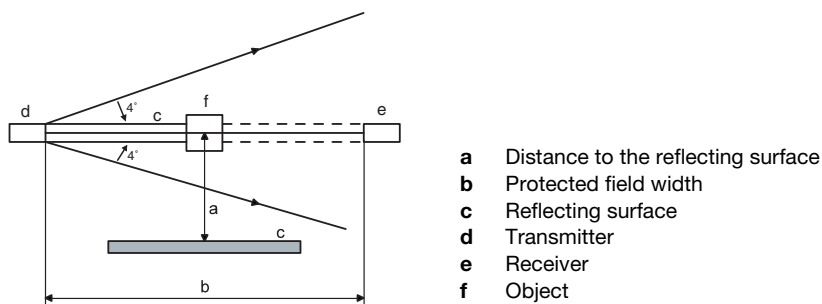
With multi-axe installation the light beams have to run parallel to the reference plane (e.g. floor) and must be aligned mutually parallel.

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

When mounting, a sufficiently large distance from the optical axis to reflecting surfaces must be selected.



Commissioning

Alignment of the sensors

- Mount photoelectric sensors with corresponding fixing brackets from Leuze electronic.
- Apply operating voltage to transmitter and receiver and activate transmitter via activation input (see "Electrical connection").
- Green LEDs on transmitter and receiver and yellow LED on transmitter illuminate.
- Position receiver until the yellow LED illuminates.

Receiver LED blinks yellow: Light path free, but no performance reserve; clean and readjust photoelectric sensor, or check operating conditions.

Safety notices for test function

1. To perform testing correctly the activation input of the SLS 96 transmitter must be connected to a 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.
4. In order to comply with points 2 and 3, the use of Leuze electronic test monitoring units (MSI-TR1B-01, MSI-TR1B-02) is recommended.

Check

The checks should ensure that the Optoelectronic Protective Devices have been used acc. to the national/international regulations, in particular in accordance with the machine and work-equipment directive.

Check before initial commissioning

- Observe the nationally and internationally valid regulations.
- Is the required safety distance (protective field of the safety sensor to the next point of operation) maintained?
- Is the safety sensor effective during the entire dangerous movement and in all adjustable operating modes of the machine?
- It must not be possible to climb over, climb under or circumvent the light path.
- Ensure that the sensor only detects persons upon entry to the danger area and does not detect whether persons are located within the danger area.
- Is a start-up/restart interlock present?
- Before they begin work, have a competent person train the operating personnel in their respective tasks.

Regular testing by competent personnel

The reliable interaction of safety sensor and machine must be periodically tested in order to detect changes to the machine or impermissible tampering with the safety sensor.

- Have all tests performed by competent personnel.
- Observe the nationally and internationally applicable regulations and the time periods specified therein.

Daily check of the effectiveness of the safety sensor

It is extremely important to examine the effectiveness of the protective field daily so that it is ensured that e.g. even with adjustments to e.g. parameters, the protective function is active at all points.

Interrupt the light beam between the transmitter and receiver (test rod Ø 30mm)

- in front of the transmitter.
- in the middle between the transmitter and receiver.
- in front of and behind the deflection mirror.

It must not be possible to initiate the dangerous state during beam interruption.

Disposal

For disposal observe the applicable national regulations regarding electronic components.


 the **sensor** people

**EG-KONFORMITÄTS-
ERKLÄRUNG**
**EC DECLARATION
OF CONFORMITY**
**DECLARATION CE
DE CONFORMITE**

Hersteller:

Manufacturer:

Constructeur:

**Leuze electronic GmbH + Co. KG
In der Braike 1, PO Box 1111
73277 Owen, Germany**

Produktbeschreibung:

Description of product:

Description de produit:

**Einweg-Sicherheits-
Lichtschranke,
Berührungslos wirkende
Schutzeinrichtung,
Sicherheitsbauteil nach
2006/42/EG Anhang IV
SLS 96
Seriennummer siehe
Typenschild**
**Protective throughbeam
photoelectric sensor,
Active opto-electronic
protective device,
safety component in acc. with
2006/42/EC annex IV
SLS 96
Serial no. see name plates**
**Barrières unidirectionnelles de
sécurité,
Equipement de protection
électro-sensible, Elément de
sécurité selon 2006/42/CE
annexe IV
SLS 96
N° série voir plaques
signalétiques**

 Die alleinige Verantwortung
für die Ausstellung dieser
Konformitätserklärung trägt
der Hersteller.

 This declaration of conformity
is issued under the sole
responsibility of the
manufacturer.

 La présente déclaration de
conformité est établie sous la
seule responsabilité du
fabricant.

 Der oben beschriebene
Gegenstand der Erklärung
erfüllt die einschlägigen
Harmonisierungsrechts-
vorschriften der Union:

 The object of the declaration
described above is in
conformity with the relevant
Union harmonisation
legislation:

 L'objet de la déclaration décrit
ci-dessus est conforme à la
législation d'harmonisation de
l'Union applicable:

Angewandte EG-Richtlinie(n):

Applied EC Directive(s):

Directive(s) CE appliquées:

**2004/108/EG (≤ 19.04.16)
2014/30/EG (≥ 20.04.16)
2006/42/EG**
**2004/108/EC (≤ 19.04.16)
2014/30/EC (≥ 20.04.16)
2006/42/EC**
**2004/108/CE (≤ 19.04.16)
2014/30/CE (≥ 20.04.16)
2006/42/CE**

Angewandte Normen:

Applied standards:

Normes appliquées:

**EN ISO 13849-1: 2008
+ AC: 2009**
CLC/TS 61496-2: 2006
EN 61496-1: 2013

 Notified Body
TÜV NORD CERT GmbH
Benannte Stelle 0044
Langemarckstr. 20
45141 Essen / 44 205 15 159902

 Dokumentationsbevollmächtigter ist der genannte Hersteller, Kontakt: quality@leuze.de.
Authorized for documentation is the stated manufacturer, contact: quality@leuze.de.
Autorisé pour documentation est le constructeur déclaré, contact: quality@leuze.de

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Datum / Date / Date



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Sitz Owen, Registergericht Stuttgart, HRB 230550
Geschäftsführer: Ulrich Balbach
USt-IdNr. DE 145912521 | Zollnummer 2554232
Es gelten ausschließlich unsere aktuellen Verkaufs- und Lieferbedingungen
Only our current Terms and Conditions of Sale and Delivery shall apply

LEO-ZQM-148-06-FO

