

PSEN opII3F Series

PILZ
THE SPIRIT OF SAFETY

- PSEN sensor technology

Operating Manual 1003504-EN-01

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SD means Secure Digital

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Introduction

Validity of documentation

This documentation is valid for the product PSEN opII3F Series. It is valid until new documentation is published.

This operating manual explains the function and operation, describes the installation and provides guidelines on how to connect the product.

Using the documentation

This document is intended for instruction. Only install and commission the product if you have read and understood this document. The document should be retained for future reference.

Definition of symbols

Information that is particularly important is identified as follows:



DANGER!

This warning must be heeded! It warns of a hazardous situation that poses an immediate threat of serious injury and death and indicates preventive measures that can be taken.



WARNING!

This warning must be heeded! It warns of a hazardous situation that could lead to serious injury and death and indicates preventive measures that can be taken.



CAUTION!

This refers to a hazard that can lead to a less serious or minor injury plus material damage, and also provides information on preventive measures that can be taken.



NOTICE

This describes a situation in which the product or devices could be damaged and also provides information on preventive measures that can be taken. It also highlights areas within the text that are of particular importance.

INFORMATION

This gives advice on applications and provides information on special features.

Overview

Safety light grids in the PSEN opII3F Series constitute electrosensitive protective equipment (ESPE type: 3) in accordance with DIN EN 61496-1 for work areas in which machines, robots, and automated systems could endanger the physical integrity of operators.

Unit features

- Resolution: 14 mm
- Infrared protected field is generated
- LED indicator for status information
- Optical synchronisation of transmitters and receivers
- Connection to evaluation devices
  - PDP67 ION and PDP67 ION HP: 5-pin M12 two-sided connector (see Order reference for accessories, connection to PDP67 [54])
  - all other suitable evaluation devices (see System connection [32]): 5-pin M12 one-sided connector and open cable end connection to clamping sleeves (see Order reference for accessories, connection to other evaluation devices [54])
- Aluminium alloy housing
- Die-cast zinc end caps
- Shock resistance
  - Bracket Swivel-Mount : 10g
  - Bracket Adv Bracket Kit : 50g
- Front panel of PC
- Standard installation kit with flexible bracket (swivel mount) (included in delivery) to hold the transmitter/receiver
  - For standard application
  - Transmitter/receiver remains rotatable for proper orientation
- Dead-zone-free safety light grid installation [22] with the PSEN opII Adv Bracket Kit (available as an accessory [53]) as a bracket for a transmitter/receiver
  - Dead-zone-free on both sides for protected field height of 300 mm or more
  - Dead-zone-free on one side for protected field height of 150 mm
  - Transmitter/receiver remains rotatable for proper orientation
  - Protected field heights of 150-600 mm, including: 1 PSEN opII Adv Bracket Kit-2 (=2 clamping units per transmitter and receiver)

– Protected field heights of 750-1200 mm, including: 1 PSEN opII Adv Bracket Kit-3 (=3 clamping units per transmitter and receiver)
– Protected field heights of 1350-1800 mm, including: 2 PSEN opII Adv Bracket Kit-2 (=4 clamping units per transmitter and receiver)

Unit view

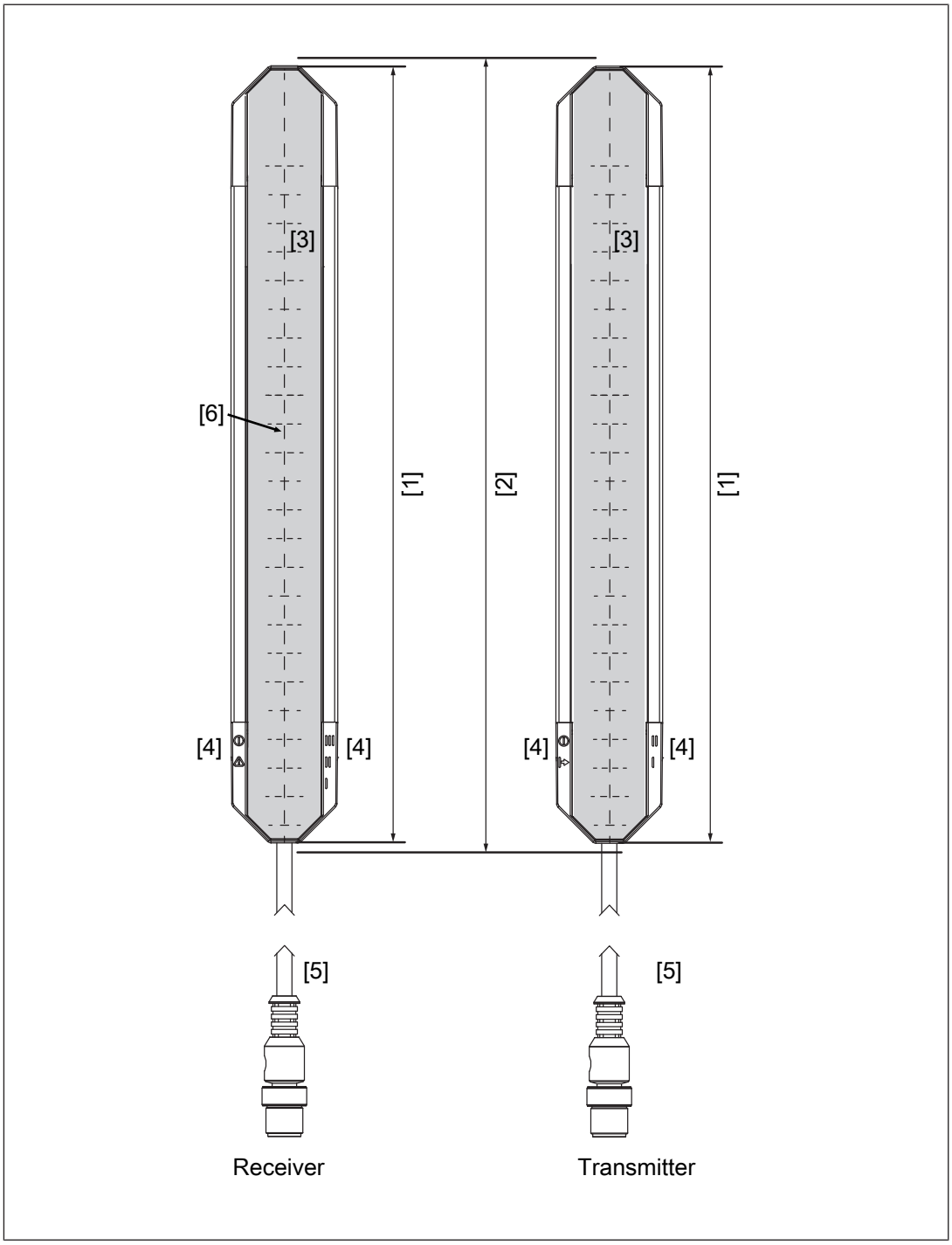


Fig.: Front view of the safety light grid transmitter and receiver, protected field height 300-1800 mm with connection cable

Legende

[1] Protected field height

[2] Effective protected field height

[3] Tinted front panel

[4] LEDs for status information

[5] Connection cable, M12 connector

[6] Optical centre axis

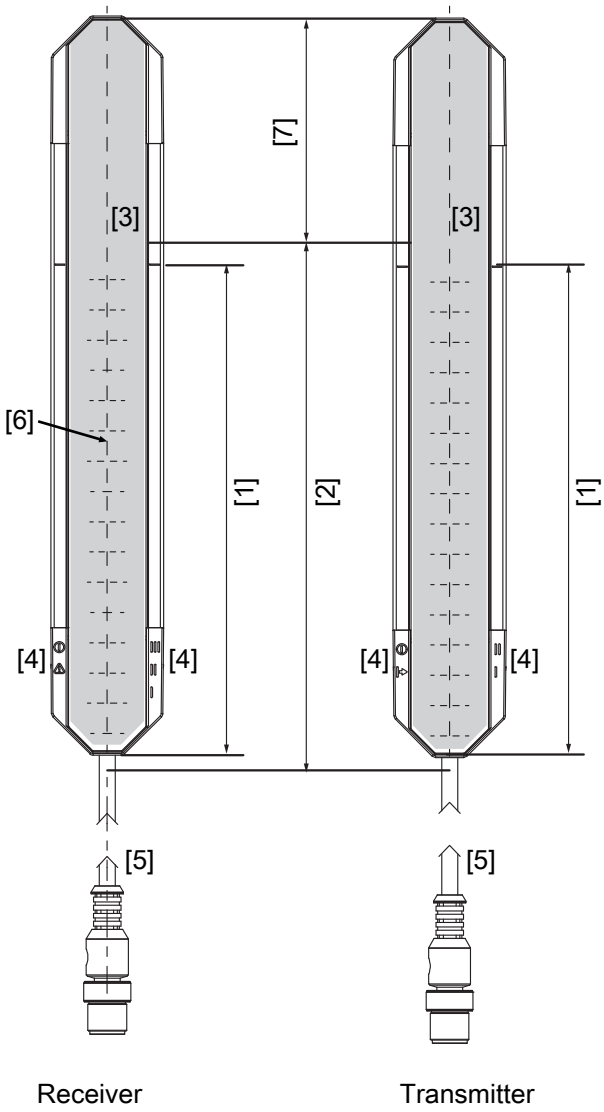


Fig.: Front view of the safety light grid transmitter and receiver, protected field height 150 mm with connection cable

Legende

[1] Protected field height

[2] Effective protected field height

[3] Tinted front panel

[4] LEDs for status information

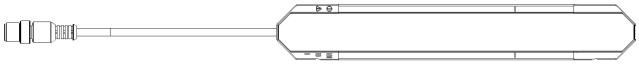
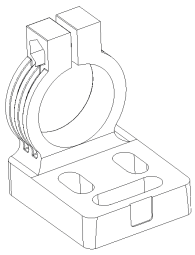
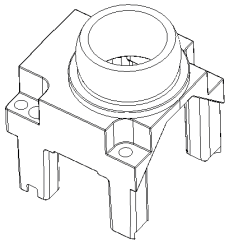
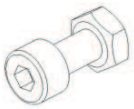
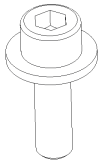
[5] Connection cable, M12 connector

[6] Optical centre axis

[7] Dead zone

The beginning of the dead zone is indicated by black lines on both sides of the front panel

Scope

Qty	Description	Diagram
1	Transmitter	
1	Receiver	
4	Standard installation kit consisting of:	
4	▸ Flexible bracket (swivel mount) in which transmitters/receivers can be fastened and rotated to the proper orientation	
4	▸ Holder for connecting the transmitter/receiver end caps to the flexible bracket	
16	▸ Tightening screw M3x33.4 oval-head screw, self-tapping	
4	▸ Clamping screw with nut ISO 4762 M4x10 8.8 cylinder screw with nut	
8	▸ Mounting screw ISO 4762 M6x20 8.8 cylinder screw with washer	

Safety

Intended use

Safety light grids of the PSEN opII3F Series are electrosensitive protective equipment of the 3. They are used to protect personnel and systems. The safety light grids are designed for

- securing hazardous areas within buildings and
- securing access within buildings with a resolution of 14 mm.

The safety light grid may only be used for personal protection on machinery if

- the hazardous state can be removed by the safety light grid and
- the starting of the machine is controlled by the safety light grid and
- the safety assessment prescribes no better resolution than 14 mm.

The safety level PL d (Cat. 3)/SIL CL 2 is only achieved if

- the safety outputs use 2-channel processing.

The safety light grid is not equipped with a restart interlock.

If the safety assessment necessitates a restart interlock, this feature must be ensured within the plant's programmable safety system. The system may not be started in the hazardous area following a protection violation if personnel are still in the hazardous area.

Prevent circumvention of the protected field. This means that other safety devices and safeguards may be required in addition to the safety light grid. These should be determined via a safety assessment based on the specific application area and specific local conditions (e.g. official specifications).

Refer to IEC/TS 62046 to determine other necessary safeguards for securing the hazardous area.

Their application must fulfil the site's relevant national regulations (e. g. EN 60204-1, NFPA 79:17-7).

The following is deemed improper use in particular:

- Any component, technical or electrical modification to the product
- Use of the product outside the areas described in this manual
- Use of the product outside the technical details (see Technical details [📖 42]).



NOTICE

EMC-compliant electrical installation

The product is designed for use in an industrial environment. The product may cause interference if installed in other environments. If installed in other environments, measures should be taken to comply with the applicable standards and directives for the respective installation site with regard to interference.

Safety regulations

Safety assessment

Before using a unit it is necessary to perform a safety assessment in accordance with the Machinery Directive.

Functional safety is guaranteed for the product as a single component. However, this does not guarantee the functional safety of the overall plant/machine. In order to achieve the required safety level for the overall plant/machine, define the safety requirements for the plant/machine and then define how these must be implemented from a technical and organisational standpoint.

Use of qualified personnel

The products may only be assembled, installed, programmed, commissioned, operated, maintained and decommissioned by competent persons.

A competent person is someone who, because of their training, experience and current professional activity, has the specialist knowledge required to test, assess and operate the work equipment, devices, systems, plant and machinery in accordance with the general standards and guidelines for safety technology.

It is the company's responsibility only to employ personnel who:

- Are familiar with the basic regulations concerning health and safety / accident prevention
- Have read and understood the information provided in this description under "Safety"
- And have a good knowledge of the generic and specialist standards applicable to the specific application.

Warranty and liability

All claims to warranty and liability will be rendered invalid if

- The product was used contrary to the purpose for which it is intended
- Damage can be attributed to not having followed the guidelines in the manual
- Operating personnel are not suitably qualified
- Any type of modification has been made (e.g. exchanging components on the PCB boards, soldering work etc.).

Disposal

- In safety-related applications, please comply with the mission time T_M in the safety-related characteristic data.
- When decommissioning, please comply with local regulations regarding the disposal of electronic devices (e.g. Electrical and Electronic Equipment Act).

Function description

Basic function

The safety light grid consists of a transmitter and a receiver.

Their shape and design

- protect the transmitter and receiver from external damage
- protect the safety light grid from malfunctions caused by vibration (see Technical details, environmental data section [42]).

The protected area is covered by infrared light beams, which are emitted from the transmitter to the receiver. The protected field thus produced is able to detect an opaque object.

The control and monitoring of the transmitted and received infrared rays is performed by microprocessors.

The output signal switching devices (OSSDs) switch to the OFF state when one of the following conditions is met:

- one or more light beams are interrupted by an object, a body part, or an opaque object that is at least as large as the resolution (14 mm) covered by the safety light grid,
- an error is detected by one of the OSSDs,
- or interfering light is detected.

If an error occurs, the OSSDs remain in the OFF state. The state can be returned to the ON state only after a successful restart [38] of the safety light grid.

The safety light grid of the PSEN opII3F Series offers the following functions:

- automatic start
- automatic restart
- Operation of 2 safety light grids that are parallel to one another and are installed with the same orientation (noting the information in ambient conditions [20] and minimum separation of parallel, aligned safety light grids [20])

Transmitters and receivers are each electrically connected with a cable with an M12 connector that is assigned to the transmitter and receiver on the LED side.

The transmitter and receiver are optically synchronised and therefore need not be directly connected to each other.

Information about the operating status of the safety light grid and any error state is provided by means of LEDs.

The indicators are described in the Status Information [35] section.

Automatic start and restart

Automatic start

During safety light grid commissioning, the safety light grid starts automatically, and the OSSDs switch to the ON state under the following conditions:

- both OSSDs are wired correctly **and**
- no error has occurred **and**
- the protected field is clear.

If the protected field is violated, the OSSDs switch to the OFF state.

Automatic restart

The OSSDs automatically switch to the ON state during operation under the following conditions:

- both OSSDs are wired correctly **and**
- no error has occurred **and**
- the protected field is clear **and**
- at least 80 ms have elapsed since the switch to the OFF state.

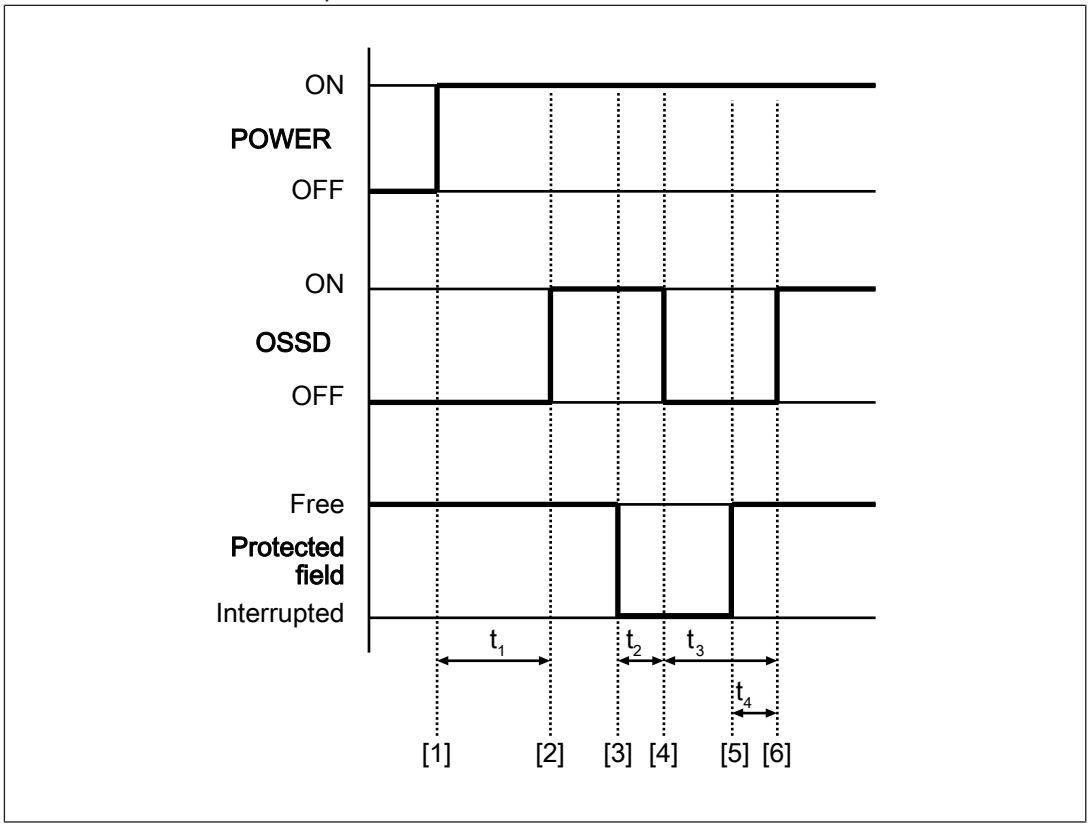


Fig.: Automatic start and restart timing diagram

Legende

[1]	Safety light grid is switched on
[2]	Check completed successfully, OSSDs in the ON state
[3]	Protected field broken
[4]	OSSDs in the OFF state
[5]	Protected field is clear again, check for errors is restarted
[6]	OSSDs in the ON state
t_1	Check is begun to determine whether the protected field is clear and whether there are errors
t_2	Response time required for the OSSDs to switch to the OFF state (see Technical details [42])
t_3	Minimum time that the OSSDs remain in the OFF state: 80 ms

t_4 Interval between enabling of the protected field and the OSSD's change to the ON state

- If a synchronisation beam pair is interrupted: Response time + 10 ms
- If both synchronisation beam pairs (first and last light beam pair) are interrupted: typically 600 ms (no more than 4 s)

Project configuration

Maintaining the safety distance

The minimum distance between the safety light grid and the hazardous machine component should be such that the operator cannot reach the hazardous area until the hazardous machine part has come to a standstill.

In accordance with the standard

- EN ISO 13855

this distance depends on three factors:

- Response time of the safety light grid

  Interval between interruption of the beams and the OSSD's change to the OFF state
- Machine's stopping time

  Interval between the change of the OSSD to the OFF state and the stopping of the hazardous machine movement (including the reaction time of the connected relay)
- Approach speed

  The speed with which the object to be detected is nearing the hazardous area in mm/s

The general formula for calculating the minimum distance in accordance with EN ISO 13855 is as follows:

$S = K * (t_1 + t_2) + C$

S	Minimum distance in mm, measured from the start of the protected field to the danger source
K	Approach speed with which the object to be detected is nearing the hazardous area in mm/s K = 1600 mm/s when S > 500 mm K = 2000 mm/s when S ≤ 500 mm
t_1	Response time of the safety light grid in seconds Time it takes for the signal at the OSSD output on the safety light grid to change once a protected field has been violated
t_2	Machine's stopping time in seconds The time required for the machine to stop after the signal at the OSSD output changes

C	Additional distance of 0 mm for safety light grids with finger protection

Resolution

The safety light grids may only be used for protected fields in which a detection capability of 14 mm is sufficient.

Protected field perimeters

During planning, ensure sufficient protected field height to secure the hazardous area.

The protected field perimeter is defined in dimensions [40].

Ambient conditions

- Install the safety light grids in an environment that corresponds to the environmental data provided in the Technical details [42].
- Do not install the safety light grid near particularly intense and/or flashing light sources; this applies to the receiver in particular.
- The transmitter of one safety light grid must not interfere with the receiver of another safety light grid.
- The transmitters and receivers of two different safety light grids must not be synchronised.
- Avoid strong electromagnetic interference when operating the safety light grid.
- When operating the safety light grid, avoid the development of smoke, mist, or dust that would reduce the grid's operating range.

Distance from reflective surfaces

If there are reflective surfaces near the beams emitted from the safety light grid (whether from above, below, or from the side), passive reflections can cause an object within the protected field to remain undetected (see diagrams).

This means that there must be a certain minimum distance between the safety light grid and reflective surfaces.

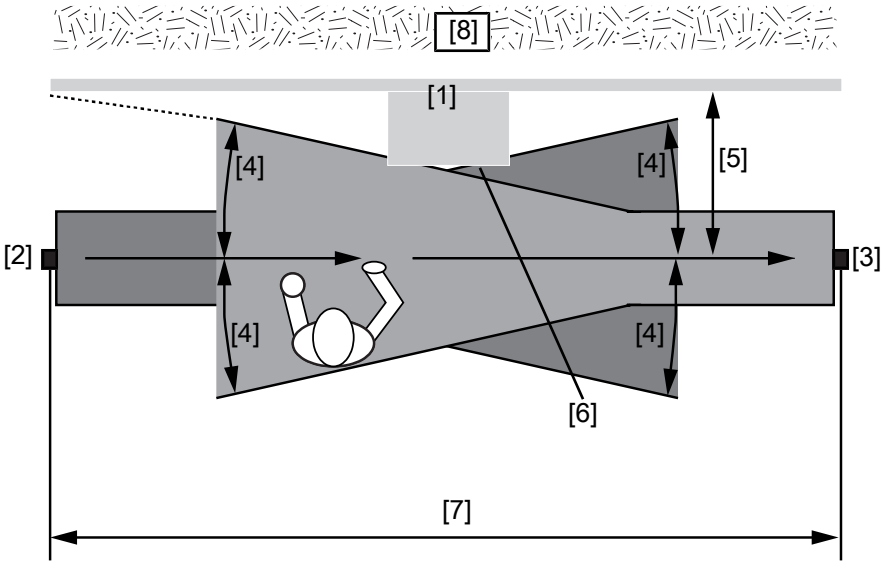
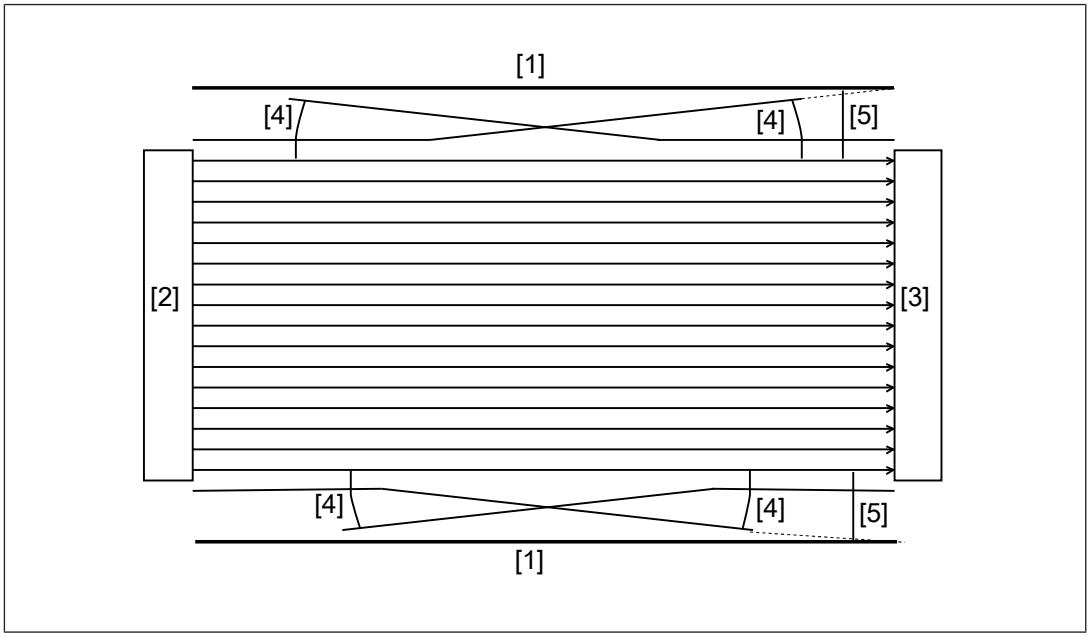


Fig.: Interference with the function of the safety light grid due to reflective surfaces – top view



Legend

[1] Reflective surface

[2] Transmitter

[3] Receiver

[4] Half of the opening angle [42] (= α) of the light beams emitted by the safety light grid

[5] Minimum distance D between the safety light grid and the reflective surface

[6] Passive reflections on the surface

[7] Distance between transmitter and receiver (working distance)

[8] Hazardous area

The minimum distance D depends on two factors:

- Working distance between transmitter and receiver
- the maximum opening angle [42] of the light beams emitted by the safety light grid at:

  5° = ± 2.5° in relation to the optical axis

Minimum distance of the safety light grid to reflective surfaces

The formula for calculating the minimum distance D is:

- For a working distance of less than 3 m: D = 0.131 m
- For a working distance of 3 m or more: D = working distance in m x tan α

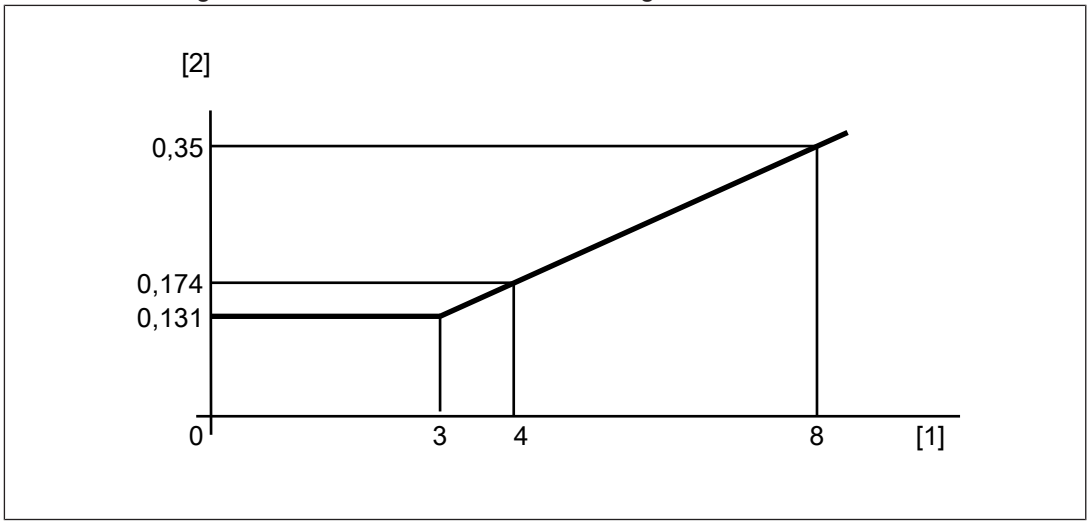


Fig.: Relationship between minimum distance and working distance

Legende

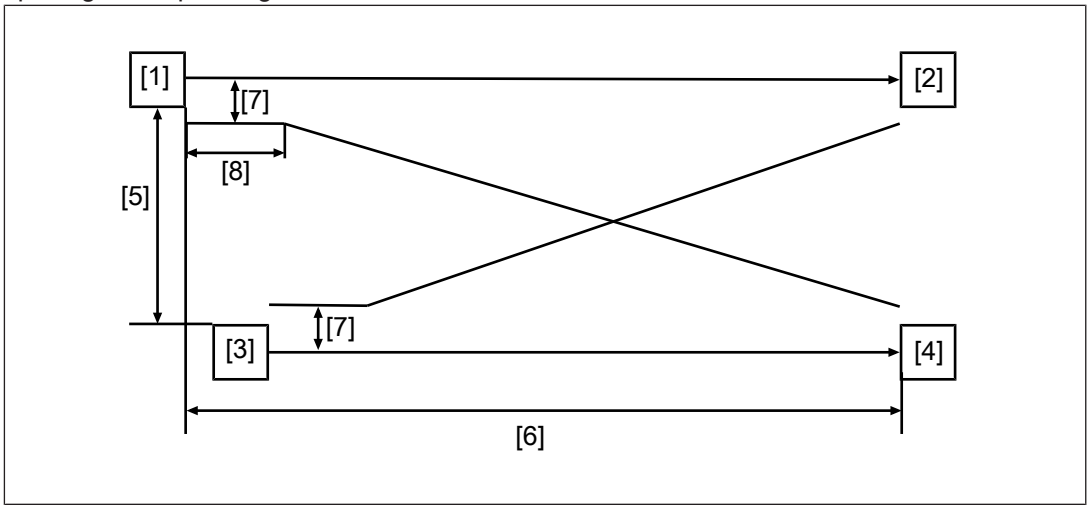
[1] Working distance in m

[2] Minimum distance D to reflective surfaces in m

Minimum distance between parallel, aligned safety light grids

Please note:

Safety light grids that are installed so as to be parallel and aligned must have a minimum spacing corresponding to the information in distance to reflective surfaces.



Legend

[1] Transmitter from the first safety light grid

[2] Receiver from the first safety light grid

[3] Transmitter from the second safety light grid

[4] Receiver from the second safety light grid

[5] Minimum distance of **2 x D** between two safety light grids that are aligned

[6] Working distance

[7] Minimum distance D, dependent on the working distance

[8] Working distance (= 3 m) with constant minimum distance D = 0.131 m

Installation of several adjacent safety light grids

An arrangement of several adjacent safety light grids can be achieved by various methods.

When installing of several adjacent safety light grids, note the ambient conditions [16].

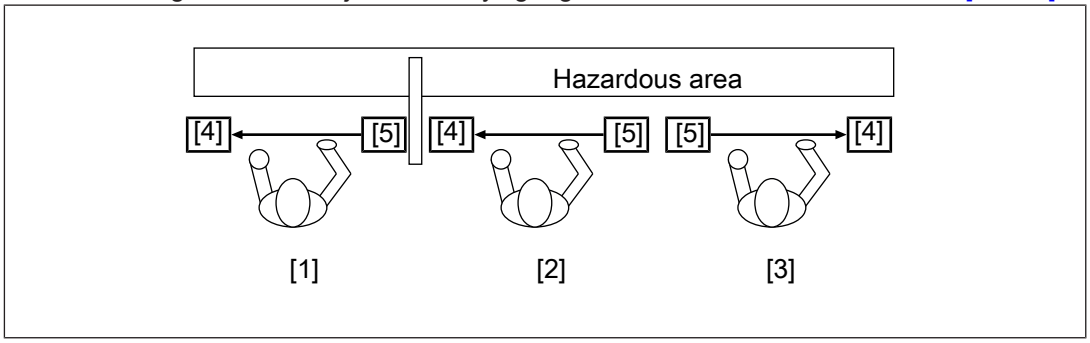


Fig.: Using several adjacent safety light grids

Legende

[1] Connecting the safety light grid with an opaque surface to shield the safety light grid on the right

[2] Connection of the safety light grid aligned with [1]

[3] Connection of safety light grid without shielding, but in the orientation opposite to [2]

[4] Receiver

[5] Transmitter

Use of deviating mirrors

Hazardous areas with different but adjacent access sides can be monitored using a safety light grid in conjunction with deviating mirrors [53].

The diagram below shows an example solution for monitoring three different access sides using two deviating mirrors. The deviating mirrors must be positioned at an angle of 45° to the beams from the safety light grid.

When using deviating mirrors, please note:

- Even a minor angular displacement of the mirror can lead to misalignment, adversely affecting or preventing the function of the safety light grid. Use the laser pointer PSEN opII for alignment (see Order reference for accessories [53]).
- The minimum safety distance to the hazardous area must be maintained for all sections of the light path.
- Use of a single deviating mirror reduces the operating range by about 20%. This percentage increases when an additional deviating mirror is used (more detailed information is provided in the technical data for the relevant mirror). Please consider this reduction when positioning the safety light grid.
- You should not use more than two mirrors per device.
- Any dust or dirt on the mirror's reflective surface will drastically reduce the operating range.

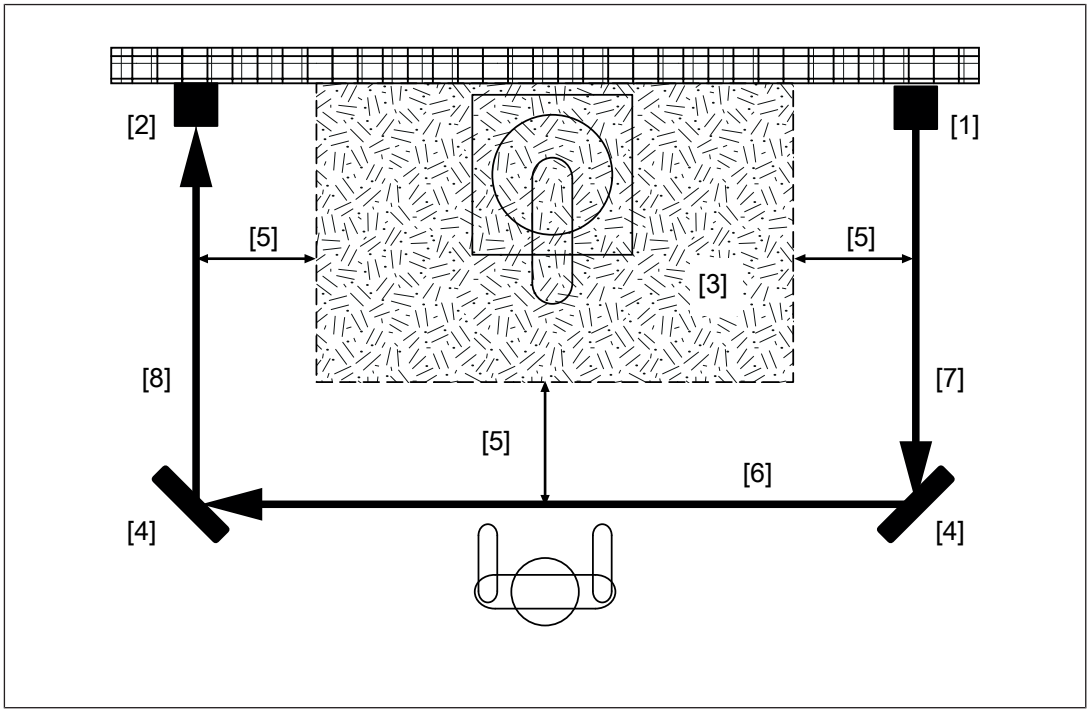


Fig.: Example for using deviating mirrors

Legende

[1] Transmitter

[2] Receiver

[3] Hazardous area

[4] Deviating mirrors

[5] Minimum safety distance

[6] Distance between the deviating mirrors (see the following table)

[7] Distance from transmitter to deviating mirror

[8] Distance from deviating mirror to receiver

Number of mirrors per device	Maximum operating range [42] in m
1	6.4 m (8 m – 20 %)
2	5.12 m (8 m – 2 x 20 %)

Dead zones

Use of the standard installation kit results in a dead zone of 15.4 mm on both sides of the safety light grid.

If you want to use the safety light grid without dead zones, use the PSEN opII Adv Bracket Kit for safety light grid installation (see Dead-zone-free installation [6]).

Use the installation information provided in the PSEN opII Adv Bracket Kit operating manual.

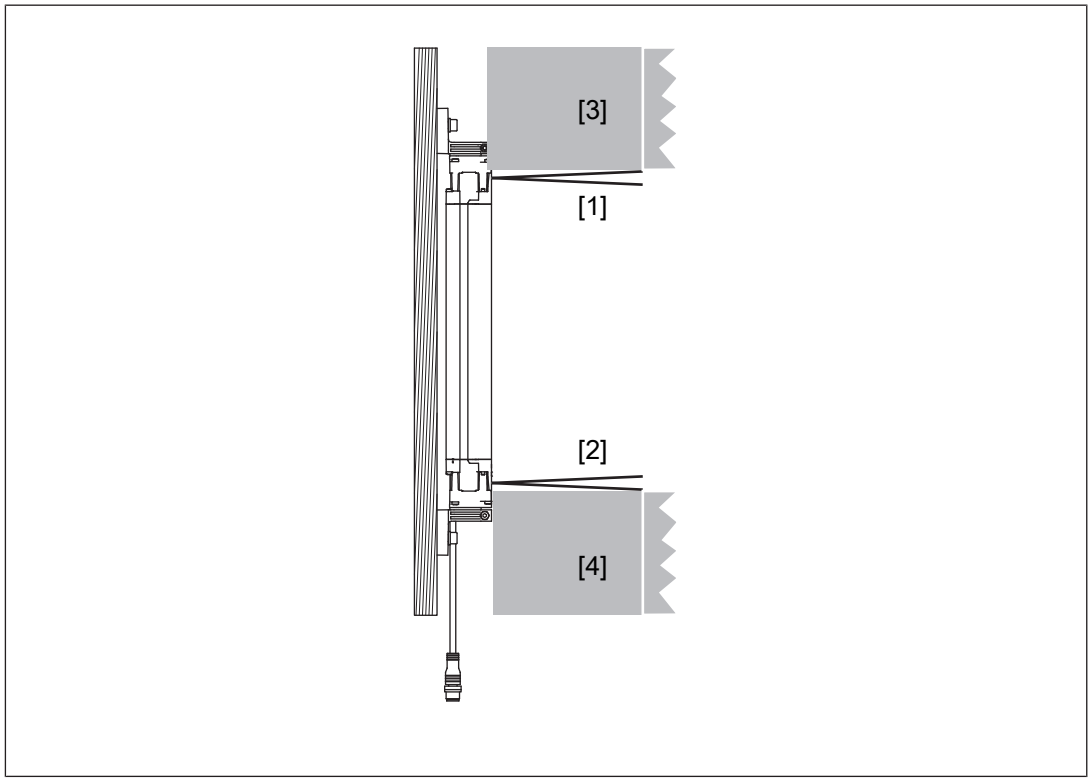


Fig.: Placement of the dead zones in vertical safety light grid installation

Legende

[1] Last light beam (wiring side)

[2] Last light beam (cable side)

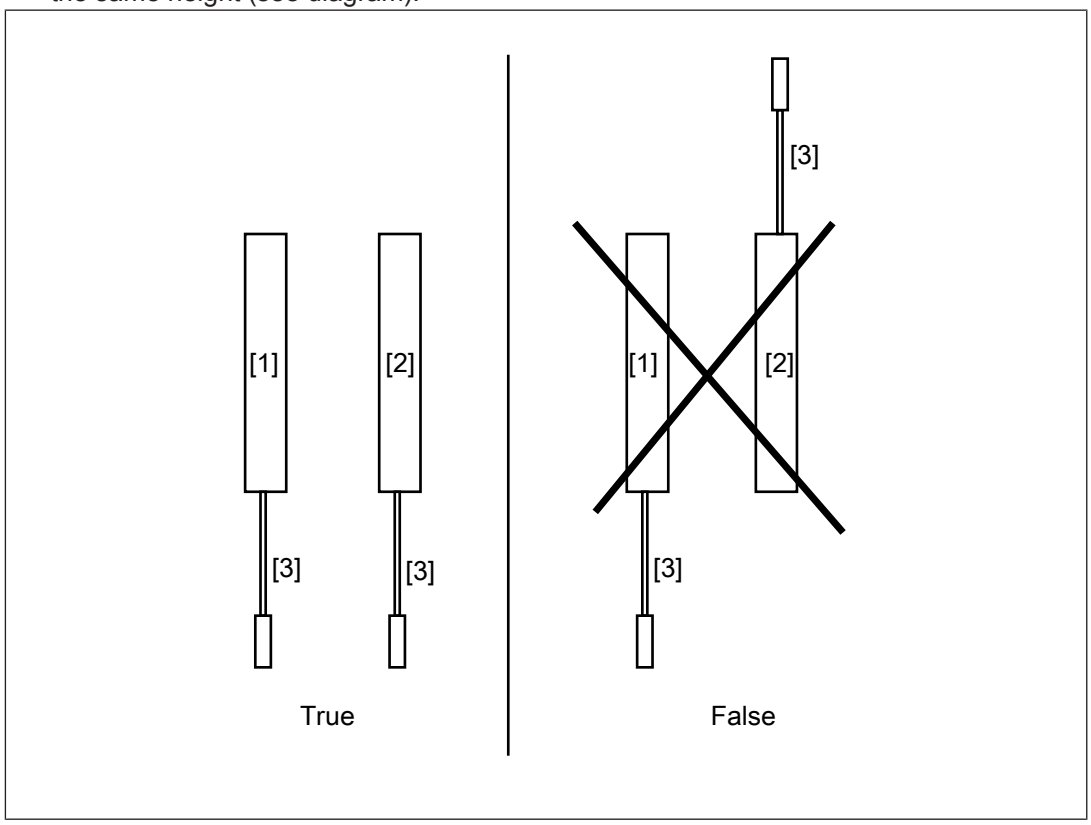
[3] Wiring-side dead zone

[4] Cable-side dead zone

Installation and orientation

Please note:

- The optical surfaces of the transmitter and receiver must be parallel to each other and oriented opposite to each other.
- The connection sides of the transmitter and receiver must be on the same side and at the same height (see diagram).



Legend

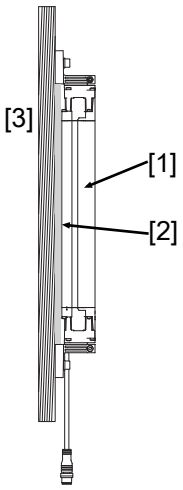
[1] Transmitter

[2] Receiver

[3] Connection cable

- The distance between the transmitter and receiver must be within the operating range of the safety light grid used (see Technical details [📖 42]).
- The installation surface must be at least as wide as the standard installation kit
- The installation surface may have a flatness imperfection of no more than 1.5 mm.

Attach the safety light grid to the installation surface

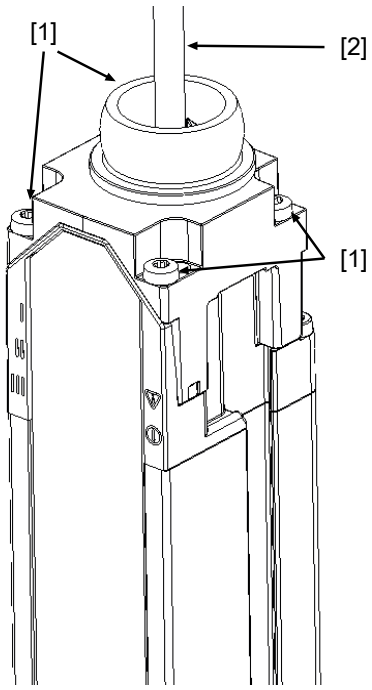


Please note the following when installing the safety light grid [1]:

If the standard installation kit is used, the gap [2] between the safety light grid [1] and the installation surface [3] must be smaller than the safety light grid resolution.

Prepare the installation surface.

Clean the installation surface. The installation surface must be free of dust and grease.



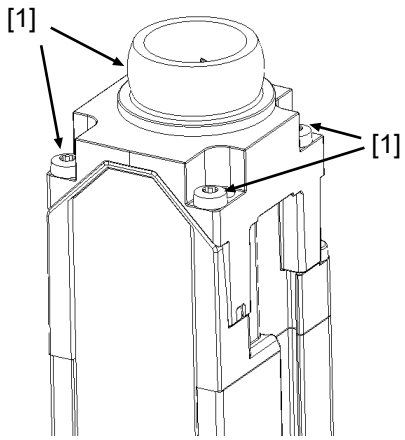
Mount the holder on the end cap on the connection side of the safety light grid

Feed the cable [2] through the opening in the holder.

Ensure that the holder is flush with the end cap (see diagram).

Attach the holder to the end cap with the tightening screws included in delivery.

[1] Torque setting 0,7 Nm

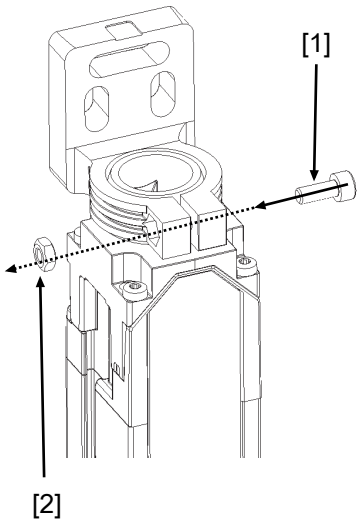


Mount the holder on the end cap on the wiring side of the safety light grid

Ensure that the holder is flush with the end cap (see diagram).

Attach the holder to the end cap with the tightening screws included in delivery.

[1] Torque setting 0,7 Nm

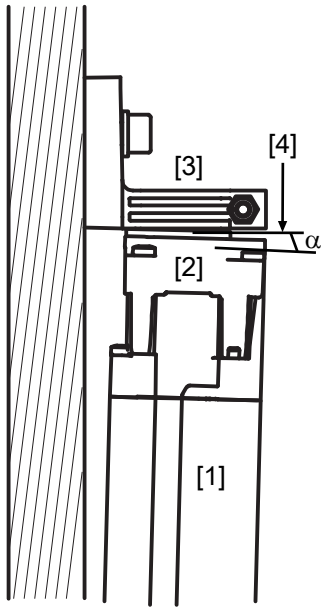


Mount the flexible bracket (swivel mount) on the holder on both the connection and wiring sides of the safety light grid.

Push the flexible bracket over the holder. The flexible bracket must lie flush with the holder.

Fix the flexible bracket in place with the clamping screw [1] and the nut [2].

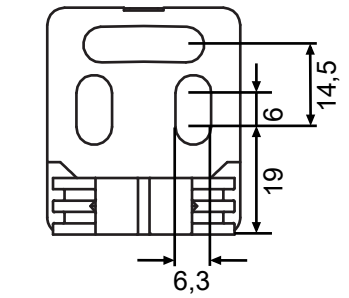
The screw connection is only tightened to the final torque when the assembly is orientated.



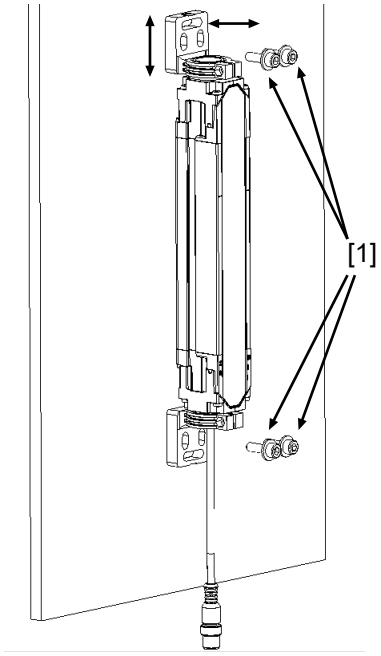
Uneven installation surfaces can be compensated for with the standard installation kit to a limited extent only.

Please note the following when installing the safety light grid [1]:

- The angle [4] of the flexible bracket [3] on the holder [2] may not be more than 2°.
- The flexible bracket [3] must be seated on one side of the holder [2].



Bore holes in the installation surface (two M6 screw boreholes per flexible bracket) for mounting the flexible brackets for the transmitter and receiver.

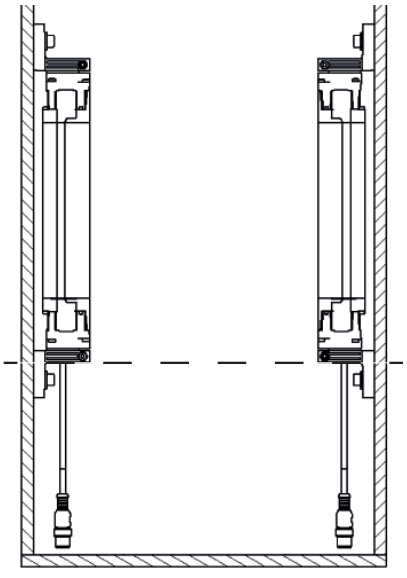


Fix the transmitter and receiver and their flexible brackets in place on the installation surface.

For each bracket, use two mounting screws with washers [1] included in delivery [10]. If necessary, mounting screws with deviating lengths can be used.

Transmitters and receivers can be shifted vertically and horizontally.

The screw connection is only tightened to the final torque when the assembly is orientated.



Ensure that the transmitters and receivers are properly installed in a suitable place.
Ensure that the transmitters and receivers are positioned at the same height and parallel to one another.

Orientation

General guidelines

For the safety light grid to function properly, the transmitter and receiver must be correctly aligned.

The transmitter and receiver on the safety light grid can be aligned with our without the help of a laser alignment aid.

- Alignment with laser alignment aid: the safety light grid does not need to be switched on
- Alignment without laser alignment aid: the safety light grid must already be wired (see chapter entitled "Wiring" in the safety grid's operating manual) and must be switched on

For alignment Pilz recommends the PSEN opII Laserpointer (see Order references for accessories [📖 53]) or another laser alignment aid.

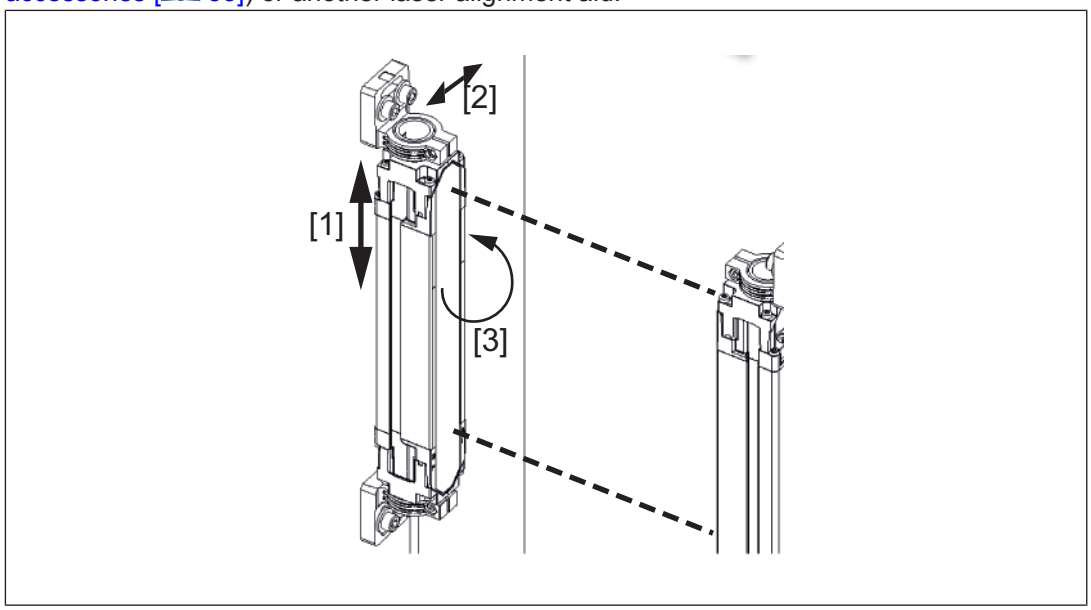


Fig.: Transmitter/receiver modification directions during orientation

Legende

[1] Vertical: by vertical shifting of position in the elongated holes in the top and bottom flexible brackets

[2] Horizontal: by horizontal shifting of position in the elongated holes in the top and bottom flexible brackets

[3] The axis orientation can be changed by rotating the flexible bracket right or left

Pilz recommends that modifications to the orientation of the transmitter/receiver be made in the following sequence:

1. Vertical modification
2. Horizontal modification
3. Axis orientation modification

Safety light grid alignment

Optimum alignment using a laser alignment aid

Optimum alignment with a laser alignment aid is achieved when the following conditions apply:

- Beam from the laser alignment aid on the transmitter strikes the receiver **and**
- Beam from the laser alignment aid on the receiver strikes the transmitter

Perform the orientation as described in the laser orientation aid's operating manual.



WARNING!

The laser beam of the laser orientation aid is harmful to the human eye

The human eye may be injured.

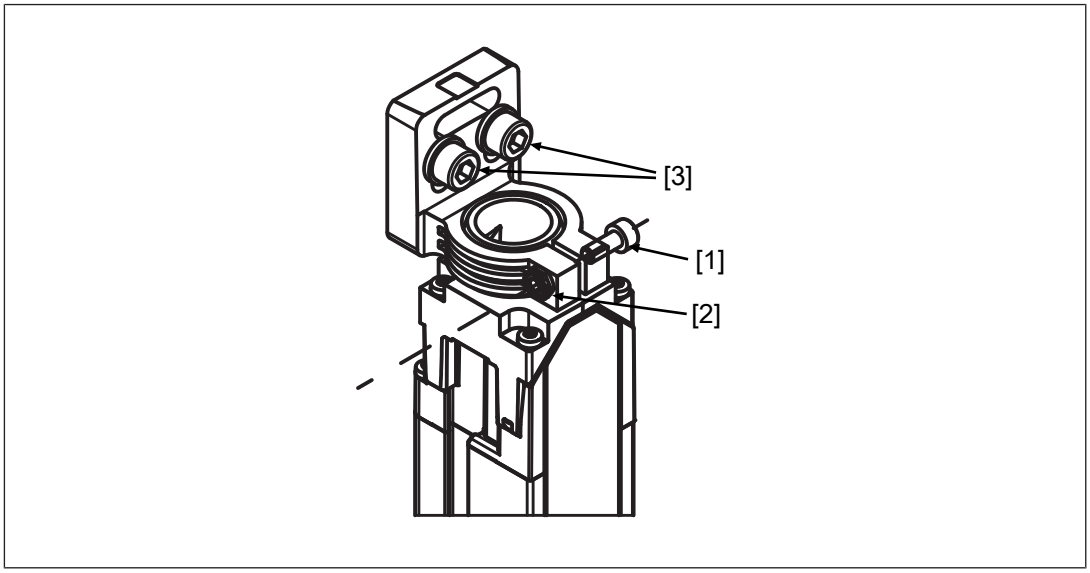
– Ensure that the laser beam is not directed at a human eye.

Optimal orientation without a laser orientation aid

1. Determine the maximum rotation range in when the protected field LED (OSSD status) illuminates green.
   Rotate the transmitter and receiver until the protected field LED (OSSD status) changes from red to green.
2. Rotate the transmitter to the centre of the rotation range in which the protected field LED illuminates green.
3. Rotate the receiver to the centre of the rotation range in which the protected field LED illuminates green.

After the safety light grid's transmitter and receiver have been orientated, the clamping screws and nuts and the mounting screws must be tightened to their final torques.

- Tighten the clamping screws [1] and the nuts [2] on the flexible bracket to a torque of 1,1 Nm.
- Tighten the brackets' mounting screws [3] on the installation surface to a torque of 3 Nm.



Legend

[1] Clamping screw

[2] Nut

[3] Mounting screws

Wiring

General guidelines

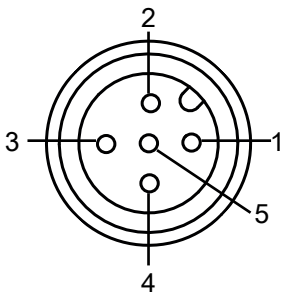
- Do not lay the connecting cable near or in contact with cables that carry high or highly volatile currents.
- Use separate cables to connect the wires to the OSSDs on different safety light grids or safety switches.
- Do **not** connect contacts OSSD1 and OSSD2 in series or in parallel.
- For supply voltage, use only PELV/SELV power supplies that have a voltage buffer in accordance with EN 60204-1.
- The power supply must be able to bridge a short (20 ms) supply voltage failure in accordance with EN 61496-1.
- SELV power supply
  - Do **not** connect the safety light grid housing to the earth conductor or the protective conductor. The transmitters and receivers must be electrically isolated from the machine/system. The use of the flexible bracket (swivel mount) provides this electrical isolation.
- Connection to PDP67
  - Use the order reference of the cable listed (see Accessories, connection to PDP67 [📖 54])

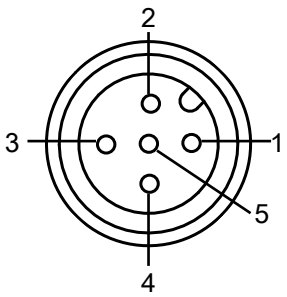
- Connection to other evaluation devices
  - Use the order reference of the cable listed (see Accessories, connection to other evaluation devices [54])
  - The clamps for connection to the evaluation device must be kept in a locked control cabinet. This prevents unauthorised modifications.
- Ensure compliance with permissible cable bending radii (see Technical details [42]).

Connector pin assignment

Transmitter and receiver electrical connections are made with M12 connectors. These connectors are located on the bottom of the transmitters and receivers.

- Ensure that the wiring has been performed as indicated. Pins 1 **and** 5 must be connected to 24 V DC, otherwise, the correct functionality is not guaranteed.

5-pin connector on the transmitter	PIN	Assignment	Cable colour
	1	+24 VDC	brown
	2	reserved	white
	3	0 VDC	blue
	4	reserved	black
	5	+24 VDC	grey

5-pin connector on the receiver	PIN	Assignment	Cable colour
	1	+24 VDC	brown
	2	OSSD 1	white
	3	0 VDC	blue
	4	OSSD 2	black
	5	+24 VDC	grey

Earthing the safety light grid

Please note:

- Connect the 0 V connections on all the 24 V power supplies and earth the 0 V mains at a single point, or ensure that measures are in place to monitor for earth faults.
- The connection of the 0 V supply to the central earth bar or earth fault monitor must be in accordance with relevant national regulations (such as EN 60204-1, NFPA 79:17-7, NEC: Article 250).
- Connections should be protected from corrosion.
- Flexible earthing straps should be used on moving earth parts (e.g. machine parts, gates). Ensure these earthing straps are as short and wide as possible.

- For PELV power supplies
  Connect the power supply circuit to the earth conductor.

Commissioning

System connection

Make sure that the selected evaluation device has the following properties:

- 2-channel with feasibility monitoring
- OSSD signals are evaluated
- A test pulse lasting no longer than 300 µs is bridged

Suitable Pilz evaluation devices are, for example:

- PNOZelog for monitoring safety light grids
- PNOZsigma for monitoring safety light grids
- PNOZ X for monitoring safety light grids
- PDP67 ION and PDP67 ION HP
  Make the connection using one of the cables listed in the order reference (see Order reference for accessories, connection to PDP67 [📖 54]).
- PNOZmulti for safety light grid monitoring
  Configure the safety light grid in the PNOZmulti Configurator with switch type 3.
- Automation system PSS 4000 for monitoring safety light grids with the FS_LightCurtain function block

The correct connection to the respective evaluation device is described in the operating manual for the evaluation device. Connect the evaluation device according to the specifications in the selected evaluation device's operating manual.

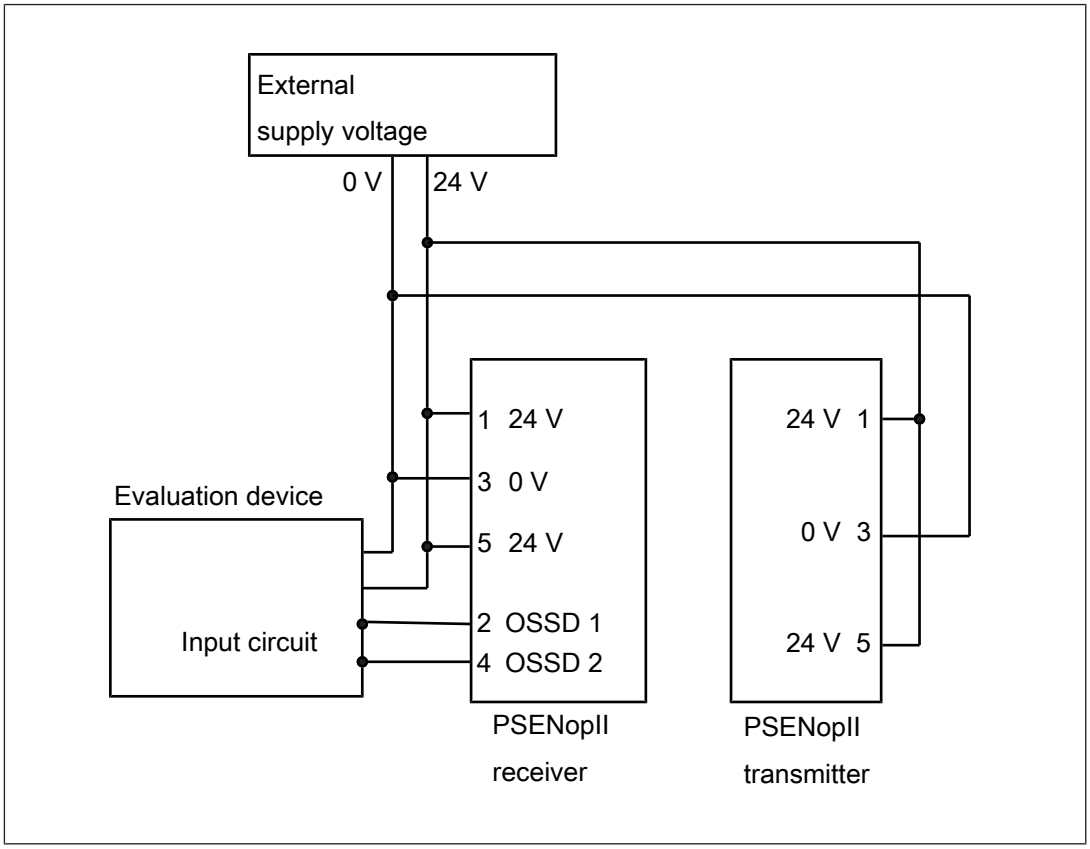


Fig.: Dual-channel connection of the safety light grid to the input circuit of an evaluation device

CAUTION!

When considering the examples, please note that Pilz accepts no responsibility for the specific application. In particular, they may not be used without testing and approval.

The system manufacturer is responsible for creating appropriate safety concepts for the overall plant and for connection to the programmable safety system (including the user program). The applicable standards and regulations must be considered and observed.

Checking the safety light grid

Once the safety light grid has been installed and aligned, final inspections must be carried out before it can be put into service.

INFORMATION

This inspection may only be carried out by qualified personnel.

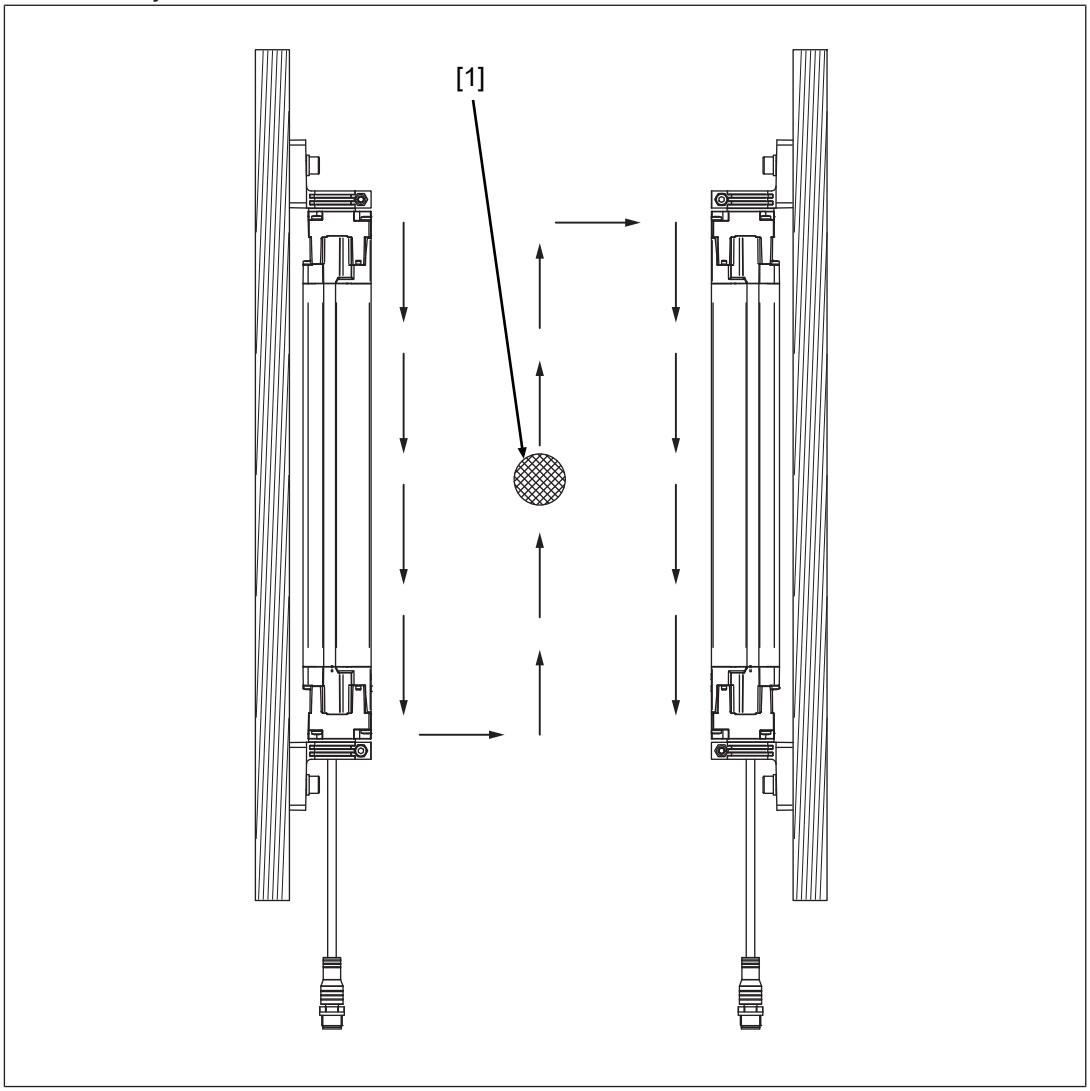
Check the safety function of the safety light grid

Procedure

In each of the indicated checks, the OSSDs must switch to the OFF state.

The OSSD status LED ⚠ on the left side of the receiver must illuminate red.

1. Move the test rod slowly through the protected field (see diagram):
   – In the vicinity of the transmitter
   – In the vicinity of the receiver
   – In the centre of the protected field
2. Place the test rod at rest in a position in the protected field that is considered critical for the safety assessment results



Legend

[1] Test rod

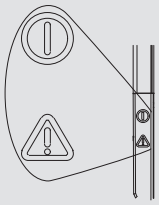
Check ambient conditions and installation

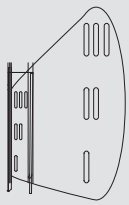
- Correct orientation and attachment
  Check the seating of the mounting screw by applying pressure to edge of the safety light grid. Neither the device status LED of the transmitter nor that of the receiver may illuminate.
- Safety distance
  The safety distance must comply with the requirements in Maintaining the safety distance [15].
- Circumvention of the protected field
  The hazardous zone must be secured so that it is impossible to access by circumventing the protected field
- Protected field perimeters
  The protected field perimeters (see Dimensions [40]) must completely secure the hazardous area, making it inaccessible.
- Response and stopping times must fulfil the requirements in Maintaining the safety distance [15]
  Ensure that the safety light grid's response time and the machine's stopping time fulfil the requirements in Maintaining the safety distance [15].
- No intense or flashing light sources in the vicinity
  There may be no especially intense or flashing light sources in the vicinity of the safety light grid.
- Ambient conditions
  Please observe the environmental conditions [16].
- Use of deviating mirrors
  Check all areas that are bounded by a deviating mirror.

Operation

Display elements

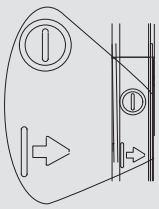
The safety light grid's operating status is indicated with LEDs in the end caps of the connection side of the receiver and on the transmitter.

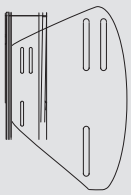




	Device status		Reception quality:
	OSSD status (protected field LED)		III: best quality I: worst quality

LED indicator on the receiver





	Device status		Light beam error information
	Light beam status		

LED indicators on the transmitter

Status information

Legend

LED on

LED flashes

LED off

Displays on the receiver

					Meaning
green	green	●	●	●	Ready for operation
		The current reception quality status is indicated			
green	red	green	green	green	Safety light grid is started
green	red	●	●	●	Protected field is interrupted
red	red	●	●	●	OSSD error. Perform a safety light grid restart [📖 38].
red	red	●	●	●	An error has occurred. Perform a safety light grid restart [📖 38].
green	green	green	green	green	Interfering light warning Warns of the OSSDs' change to the OFF state due to incident interfering light.

					Meaning
red	red	green	green	green	Interfering light error OSSDs have changed to the OFF state due to incident interfering light. 1. Install an opaque surface on the side facing the interfering light source **or** reverse the positions of the safety light grid's transmitter and receiver. 2. Perform a safety light grid restart [📖 38].
red	red	green	●	●	Overtemperature; OSSD in the OFF state 1. Ensure that the ambient temperature corresponds to the information in the Technical details [📖 42]. 2. Perform a safety light grid restart [📖 38].
red	red	●	green	●	Undervoltage; OSSD in the OFF state 1. Ensure that the supply voltage corresponds to the information in the Technical details [📖 42]. 2. Perform a safety light grid restart [📖 38].

Indicators on the transmitter

				Meaning
green	red	green	green	Safety light grid is started
green	green	●	●	Safety light grid in operation
red	red	●	●	An error has occurred. Perform a safety light grid restart [📖 38].

				Meaning
red	red	green	●	Overtemperature; OSSD in the OFF state 1. Ensure that the ambient temperature corresponds to the information in the Technical details [42]. 2. Perform a safety light grid restart [38].
red	red	●	green	Undervoltage; OSSD in the OFF state 1. Ensure that the supply voltage corresponds to the information in the Technical details [42]. 2. Perform a safety light grid restart [38].

Safety light grid restart

⇨ Disconnect the supply voltage from the safety light grid and reconnect it. The automatic restart [14] begins.

Malfunction

DANGER!

Loss of safety function due to a malfunction of the safety light grid

A safety light grid malfunction may lead to serious injury or death.

If there is a safety light grid malfunction, immediately discontinue operation of the system components whose hazardous area the grid secures.

Regular checks and maintenance

Checks

Regular checks can bring to light changes to the plant/machine, safeguards and ambient conditions.

Regular check

Pilz recommends that the safety light grid be checked every six months.

- Check the safety light grid's front panel.
  - Scratched front panel: Replace the safety light grid.
  - Dirty front panel: Clean the front panel [39].

    In a particularly dirty environment, front panel cleanliness should be checked more frequently.

- Check the tightness of the safety light grid's front panel.
  All screws must be tightened to the torque specified in the Technical details [42].
- Check the safety function of the safety light grid (see Check the safety function of the safety light grid [34]).

Check after plant/machine modification

Check the safety light grid each time the plant/machine is modified. Changing the safety light grid or swapping safety light grid components should be regarded as a modification. The requirements of the applicable national regulations must be observed **absolutely**.



INFORMATION

This inspection may only be carried out by qualified personnel.

The Appendix contains a Checklist [56] which should help you perform the safety check.

Maintenance

Other than cleaning the lens covers, the safety light grids requires no other form of maintenance.



CAUTION!

Improper cleaning agents can damage the safety light grid and lead to malfunctions

Moist cotton cloths should be used for cleaning.

Avoid using

- Alcohol,
- Solvents,
- Cloths made of wool,
- Cloths made of synthetic material.

Clean the lens covers during the regular check of the safety light grid [38].

Dimensions

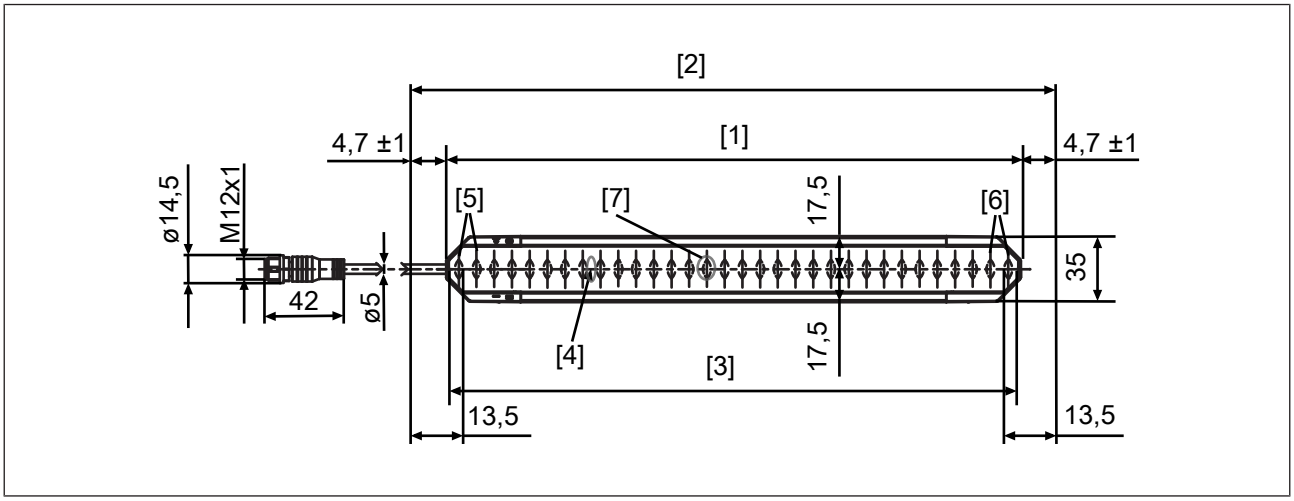


Fig.: Front view of the safety light grid transmitter, protected field height 300-1800 mm with connection cable

Legende

[1] Total length of transmitter (without cable)

[2] Effective protected field height

[3] Protected field height (see Technical details [📖 42])

[4] Optical centre axis

[5] Cable-side beam pair for beam synchronisation

[6] Wiring-side beam pair for beam synchronisation

[7] Eye shield

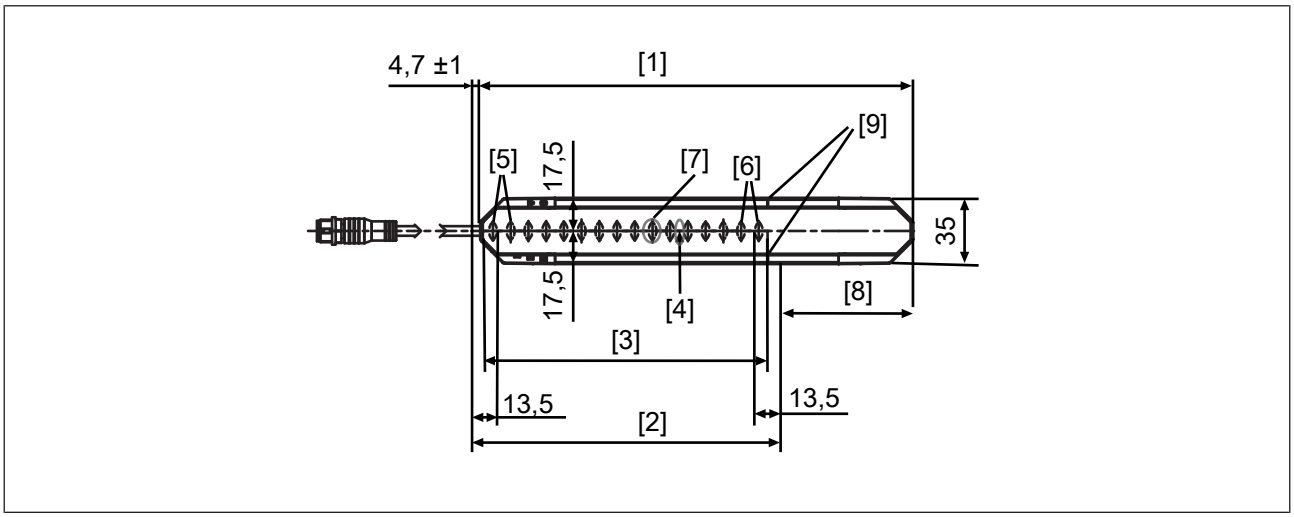


Fig.: Front view of the safety light grid transmitter, protected field height 150 mm with connection cable

Legende

[1] Total length of transmitter (without cable)

[2] Effective protected field height

[3] Protected field height (see Technical details [📖 42])

[4] Optical centre axis

[5] Cable-side beam pair for beam synchronisation

[6] Wiring-side beam pair for beam synchronisation

[7] Eye shield

[8] Dead zone 70.3 mm

[9] Protected field perimeter markings

Schematic representation of the relationship between the safety light grid dimensions and the effective protected field height

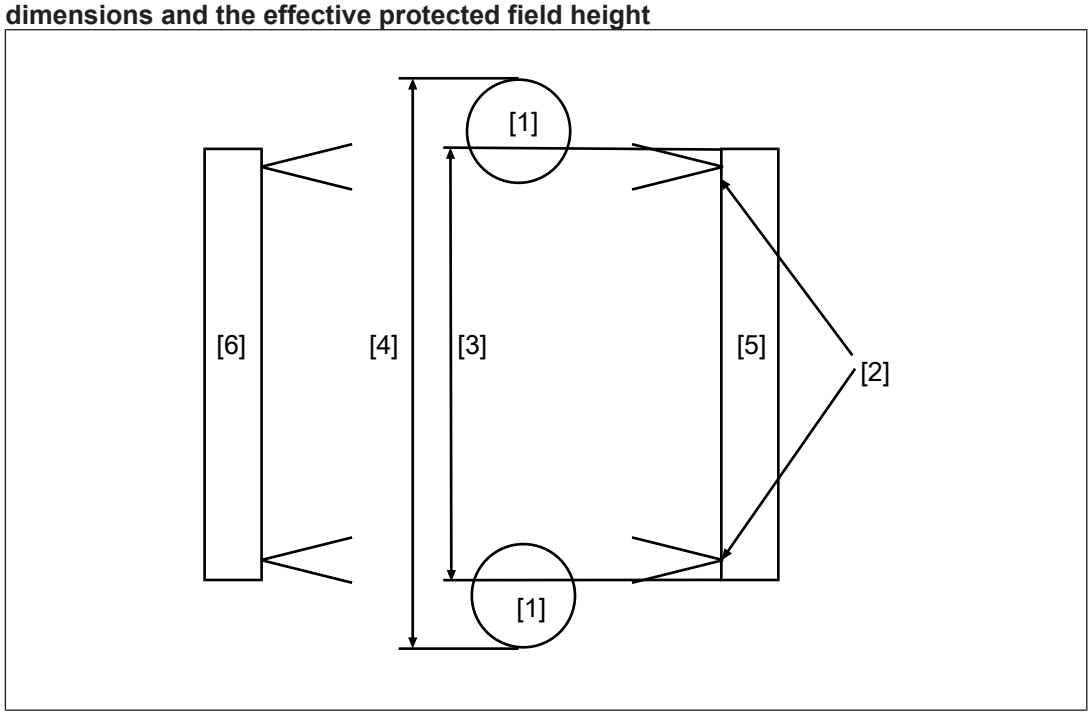


Fig.: Relationship between the effective protected field height and the safety light grid dimensions (schematic representation)

Legende

[1] Resolution

[2] Last light beams on the connection and wiring sides

[3] Protected field height

[4] Effective protected field height

[5] Transmitter

[6] Receiver

Technical details Order no. 632040-632042

General	632040	632041	632042
Approvals	CE, TÜV	CE, TÜV	CE, TÜV
ESPE type	3	3	3
Sensor's mode of operation	Infrared	Infrared	Infrared
Height of protected field	150 mm	300 mm	450 mm
Resolution			
Operating range	0,2 - 8 m	0,2 - 8 m	0,2 - 8 m
Detection capability	14 mm	14 mm	14 mm
Electrical data	**632040**	**632041**	**632042**
Supply voltage			
Voltage	24 V	24 V	24 V
Kind	DC	DC	DC
Voltage tolerance	-25 %/+20 %	-25 %/+20 %	-25 %/+20 %
Residual ripple DC	5 %	5 %	5 %
Max. power consumption receiver	12 W	12 W	12 W
Max. power consumption transmitter	7,2 W	7,2 W	7,2 W
Max. inductive load per output	1 H	1 H	1 H
Optical data	**632040**	**632041**	**632042**
Opening angle	-2,5 - 2,5 deg	-2,5 - 2,5 deg	-2,5 - 2,5 deg
Used wavelength range	850 nm	850 nm	850 nm
Inputs	**632040**	**632041**	**632042**
Max. overall line capacitance Clmax	40 nF	40 nF	40 nF
Semiconductor outputs	**632040**	**632041**	**632042**
OSSD safety outputs	2	2	2
Switching current per output	100 mA	100 mA	100 mA
Times	**632040**	**632041**	**632042**
Test pulse duration, safety outputs	300 µs	300 µs	300 µs
Supply interruption before de-energisation	600 µs	600 µs	600 µs
Response time t1	14 ms	14 ms	15 ms

Environmental data	632040	632041	632042
Ambient temperature			
Temperature range	**-10 - 60 °C**	**-10 - 60 °C**	**-10 - 60 °C**
Storage temperature			
Temperature range	**-25 - 70 °C**	**-25 - 70 °C**	**-25 - 70 °C**
Climatic suitability			
Humidity	**95 % r. h. at 50 °C**	**95 % r. h. at 50 °C**	**95 % r. h. at 50 °C**
Condensation during operation	**Not permitted**	**Not permitted**	**Not permitted**
EMC	**EN 61496-1**	**EN 61496-1**	**EN 61496-1**
Vibration			
In accordance with the standard	**EN 60068-2-6**	**EN 60068-2-6**	**EN 60068-2-6**
Frequency	**10 - 150 Hz**	**10 - 150 Hz**	**10 - 150 Hz**
Amplitude	**0,75 mm**	**0,75 mm**	**0,75 mm**
Shock stress			
In accordance with the standard	**EN 60068-2-27**	**EN 60068-2-27**	**EN 60068-2-27**
Number of shocks	**1000**	**1000**	**1000**
Acceleration	**10g**	**10g**	**10g**
Duration	**16 ms**	**16 ms**	**16 ms**
Bracket	**Swivel-Mount**	**Swivel-Mount**	**Swivel-Mount**
In accordance with the standard	**EN 60068-2-27**	**EN 60068-2-27**	**EN 60068-2-27**
Number of shocks	**3**	**3**	**3**
Acceleration	**50g**	**50g**	**50g**
Duration	**11 ms**	**11 ms**	**11 ms**
Bracket	**Adv Bracket Kit**	**Adv Bracket Kit**	**Adv Bracket Kit**
Protection type			
Housing	**IP65**	**IP65**	**IP65**
Mechanical data	**632040**	**632041**	**632042**
Min. bending radius (fixed permanently) K1	**5 x Ø**	**5 x Ø**	**5 x Ø**
Min. bending radius (moving) K1	**10 x Ø**	**10 x Ø**	**10 x Ø**
Connection type			
Receiver	**M12, 5-pin male connector**	**M12, 5-pin male connector**	**M12, 5-pin male connector**
Transmitter	**M12, 5-pin male connector**	**M12, 5-pin male connector**	**M12, 5-pin male connector**
Max. cable length	**50 m**	**50 m**	**50 m**

Mechanical data	632040	632041	632042
Material			
Housing	**Aluminium**	**Aluminium**	**Aluminium**
End caps	**Zn**	**Zn**	**Zn**
Front screen	**PC**	**PC**	**PC**
Max. torque setting			
Clamping screw	**1,1 Nm**	**1,1 Nm**	**1,1 Nm**
Installation screw	**3 Nm**	**3 Nm**	**3 Nm**
Fixing screw	**0,7 Nm**	**0,7 Nm**	**0,7 Nm**
Dimensions			
Height	**229 mm**	**304 mm**	**454 mm**
Width	**35 mm**	**35 mm**	**35 mm**
Depth	**40 mm**	**40 mm**	**40 mm**
Weight	**780 g**	**1.025 g**	**1.438 g**

Where standards are undated, the 2015-12 latest editions shall apply.

Technical details Order no. 632043-632045

General	632043	632044	632045
Approvals	**CE, TÜV**	**CE, TÜV**	**CE, TÜV**
ESPE type	**3**	**3**	**3**
Sensor's mode of operation	**Infrared**	**Infrared**	**Infrared**
Height of protected field	**600 mm**	**750 mm**	**900 mm**
Resolution			
Operating range	**0,2 - 8 m**	**0,2 - 8 m**	**0,2 - 8 m**
Detection capability	**14 mm**	**14 mm**	**14 mm**
Electrical data	**632043**	**632044**	**632045**
Supply voltage			
Voltage	**24 V**	**24 V**	**24 V**
Kind	**DC**	**DC**	**DC**
Voltage tolerance	**-25 %/+20 %**	**-25 %/+20 %**	**-25 %/+20 %**
Residual ripple DC	**5 %**	**5 %**	**5 %**
Max. power consumption receiver	**12 W**	**12 W**	**12 W**
Max. power consumption transmitter	**7,2 W**	**7,2 W**	**7,2 W**
Max. inductive load per output	**1 H**	**1 H**	**1 H**

Optical data	**632043**	**632044**	**632045**
Opening angle	**-2,5 - 2,5 deg**	**-2,5 - 2,5 deg**	**-2,5 - 2,5 deg**
Used wavelength range	**850 nm**	**850 nm**	**850 nm**
Inputs	**632043**	**632044**	**632045**
Max. overall line capacitance Clmax	**40 nF**	**40 nF**	**40 nF**
Semiconductor outputs	**632043**	**632044**	**632045**
OSSD safety outputs	**2**	**2**	**2**
Switching current per output	**100 mA**	**100 mA**	**100 mA**
Times	**632043**	**632044**	**632045**
Test pulse duration, safety outputs	**300 µs**	**300 µs**	**300 µs**
Supply interruption before de-energisation	**600 µs**	**600 µs**	**600 µs**
Response time t1	**15 ms**	**16 ms**	**17 ms**
Environmental data	**632043**	**632044**	**632045**
Ambient temperature			
Temperature range	**-10 - 60 °C**	**-10 - 60 °C**	**-10 - 60 °C**
Storage temperature			
Temperature range	**-25 - 70 °C**	**-25 - 70 °C**	**-25 - 70 °C**
Climatic suitability			
Humidity	**95 % r. h. at 50 °C**	**95 % r. h. at 50 °C**	**95 % r. h. at 50 °C**
Condensation during operation	**Not permitted**	**Not permitted**	**Not permitted**
EMC	**EN 61496-1**	**EN 61496-1**	**EN 61496-1**
Vibration			
In accordance with the standard	**EN 60068-2-6**	**EN 60068-2-6**	**EN 60068-2-6**
Frequency	**10 - 150 Hz**	**10 - 150 Hz**	**10 - 150 Hz**
Amplitude	**0,75 mm**	**0,75 mm**	**0,75 mm**

Environmental data	632043	632044	632045
Shock stress			
In accordance with the standard	**EN 60068-2-27**	**EN 60068-2-27**	**EN 60068-2-27**
Number of shocks	**1000**	**1000**	**1000**
Acceleration	**10g**	**10g**	**10g**
Duration	**16 ms**	**16 ms**	**16 ms**
Bracket	**Swivel-Mount**	**Swivel-Mount**	**Swivel-Mount**
In accordance with the standard	**EN 60068-2-27**	**EN 60068-2-27**	**EN 60068-2-27**
Number of shocks	**3**	**3**	**3**
Acceleration	**50g**	**50g**	**50g**
Duration	**11 ms**	**11 ms**	**11 ms**
Bracket	**Adv Bracket Kit**	**Adv Bracket Kit**	**Adv Bracket Kit**
Protection type			
Housing	**IP65**	**IP65**	**IP65**
Mechanical data	**632043**	**632044**	**632045**
Min. bending radius (fixed permanently) K1	**5 x Ø**	**5 x Ø**	**5 x Ø**
Min. bending radius (moving) K1	**10 x Ø**	**10 x Ø**	**10 x Ø**
Connection type			
Receiver	**M12, 5-pin male connector**	**M12, 5-pin male connector**	**M12, 5-pin male connector**
Transmitter	**M12, 5-pin male connector**	**M12, 5-pin male connector**	**M12, 5-pin male connector**
Max. cable length	**50 m**	**50 m**	**50 m**
Material			
Housing	**Aluminium**	**Aluminium**	**Aluminium**
End caps	**Zn**	**Zn**	**Zn**
Front screen	**PC**	**PC**	**PC**
Max. torque setting			
Clamping screw	**1,1 Nm**	**1,1 Nm**	**1,1 Nm**
Installation screw	**3 Nm**	**3 Nm**	**3 Nm**
Fixing screw	**0,7 Nm**	**0,7 Nm**	**0,7 Nm**
Dimensions			
Height	**604 mm**	**754 mm**	**904 mm**
Width	**35 mm**	**35 mm**	**35 mm**
Depth	**40 mm**	**40 mm**	**40 mm**
Weight	**1.850 g**	**2.263 g**	**2.675 g**

Where standards are undated, the 2015-12 latest editions shall apply.

Technical details Order no. 632046-632048

General	632046	632047	632048
Approvals	CE, TÜV	CE, TÜV	CE, TÜV
ESPE type	3	3	3
Sensor's mode of operation	Infrared	Infrared	Infrared
Height of protected field	1.050 mm	1.200 mm	1.350 mm
Resolution			
Operating range	0,2 - 8 m	0,2 - 8 m	0,2 - 8 m
Detection capability	14 mm	14 mm	14 mm
Electrical data	**632046**	**632047**	**632048**
Supply voltage			
Voltage	24 V	24 V	24 V
Kind	DC	DC	DC
Voltage tolerance	-25 %/+20 %	-25 %/+20 %	-25 %/+20 %
Residual ripple DC	5 %	5 %	5 %
Max. power consumption receiver	12 W	12 W	12 W
Max. power consumption transmitter	7,2 W	7,2 W	7,2 W
Max. inductive load per output	1 H	1 H	1 H
Optical data	**632046**	**632047**	**632048**
Opening angle	-2,5 - 2,5 deg	-2,5 - 2,5 deg	-2,5 - 2,5 deg
Used wavelength range	850 nm	850 nm	850 nm
Inputs	**632046**	**632047**	**632048**
Max. overall line capacitance Clmax	40 nF	40 nF	40 nF
Semiconductor outputs	**632046**	**632047**	**632048**
OSSD safety outputs	2	2	2
Switching current per output	100 mA	100 mA	100 mA
Times	**632046**	**632047**	**632048**
Test pulse duration, safety outputs	300 µs	300 µs	300 µs
Supply interruption before de-energisation	600 µs	600 µs	600 µs
Response time t1	17 ms	18 ms	19 ms

Environmental data	632046	632047	632048
Ambient temperature			
Temperature range	**-10 - 60 °C**	**-10 - 60 °C**	**-10 - 60 °C**
Storage temperature			
Temperature range	**-25 - 70 °C**	**-25 - 70 °C**	**-25 - 70 °C**
Climatic suitability			
Humidity	**95 % r. h. at 50 °C**	**95 % r. h. at 50 °C**	**95 % r. h. at 50 °C**
Condensation during operation	**Not permitted**	**Not permitted**	**Not permitted**
EMC	**EN 61496-1**	**EN 61496-1**	**EN 61496-1**
Vibration			
In accordance with the standard	**EN 60068-2-6**	**EN 60068-2-6**	**EN 60068-2-6**
Frequency	**10 - 150 Hz**	**10 - 150 Hz**	**10 - 150 Hz**
Amplitude	**0,75 mm**	**0,75 mm**	**0,75 mm**
Shock stress			
In accordance with the standard	**EN 60068-2-27**	**EN 60068-2-27**	**EN 60068-2-27**
Number of shocks	**1000**	**1000**	**1000**
Acceleration	**10g**	**10g**	**10g**
Duration	**16 ms**	**16 ms**	**16 ms**
Bracket	**Swivel-Mount**	**Swivel-Mount**	**Swivel-Mount**
In accordance with the standard	**EN 60068-2-27**	**EN 60068-2-27**	**EN 60068-2-27**
Number of shocks	**3**	**3**	**3**
Acceleration	**50g**	**50g**	**50g**
Duration	**11 ms**	**11 ms**	**11 ms**
Bracket	**Adv Bracket Kit**	**Adv Bracket Kit**	**Adv Bracket Kit**
Protection type			
Housing	**IP65**	**IP65**	**IP65**
Mechanical data	**632046**	**632047**	**632048**
Min. bending radius (fixed permanently) K1	**5 x Ø**	**5 x Ø**	**5 x Ø**
Min. bending radius (moving) K1	**10 x Ø**	**10 x Ø**	**10 x Ø**
Connection type			
Receiver	**M12, 5-pin male connector**	**M12, 5-pin male connector**	**M12, 5-pin male connector**
Transmitter	**M12, 5-pin male connector**	**M12, 5-pin male connector**	**M12, 5-pin male connector**
Max. cable length	**50 m**	**50 m**	**50 m**

Mechanical data	632046	632047	632048
Material			
Housing	**Aluminium**	**Aluminium**	**Aluminium**
End caps	**Zn**	**Zn**	**Zn**
Front screen	**PC**	**PC**	**PC**
Max. torque setting			
Clamping screw	**1,1 Nm**	**1,1 Nm**	**1,1 Nm**
Installation screw	**3 Nm**	**3 Nm**	**3 Nm**
Fixing screw	**0,7 Nm**	**0,7 Nm**	**0,7 Nm**
Dimensions			
Height	**1.054 mm**	**1.204 mm**	**1.354 mm**
Width	**35 mm**	**35 mm**	**35 mm**
Depth	**40 mm**	**40 mm**	**40 mm**
Weight	**3.088 g**	**3.500 g**	**3.913 g**

Where standards are undated, the 2015-12 latest editions shall apply.

Technical details Order no. 632049-632051

General	632049	632050	632051
Approvals	**CE, TÜV**	**CE, TÜV**	**CE, TÜV**
ESPE type	**3**	**3**	**3**
Sensor's mode of operation	**Infrared**	**Infrared**	**Infrared**
Height of protected field	**1.500 mm**	**1.650 mm**	**1.800 mm**
Resolution			
Operating range	**0,2 - 8 m**	**0,2 - 8 m**	**0,2 - 8 m**
Detection capability	**14 mm**	**14 mm**	**14 mm**
Electrical data	**632049**	**632050**	**632051**
Supply voltage			
Voltage	**24 V**	**24 V**	**24 V**
Kind	**DC**	**DC**	**DC**
Voltage tolerance	**-25 %/+20 %**	**-25 %/+20 %**	**-25 %/+20 %**
Residual ripple DC	**5 %**	**5 %**	**5 %**
Max. power consumption receiver	**12 W**	**12 W**	**12 W**
Max. power consumption transmitter	**7,2 W**	**7,2 W**	**7,2 W**
Max. inductive load per output	**1 H**	**1 H**	**1 H**

Optical data	**632049**	**632050**	**632051**
Opening angle	**-2,5 - 2,5 deg**	**-2,5 - 2,5 deg**	**-2,5 - 2,5 deg**
Used wavelength range	**850 nm**	**850 nm**	**850 nm**
Inputs	**632049**	**632050**	**632051**
Max. overall line capacitance Clmax	**40 nF**	**40 nF**	**40 nF**
Semiconductor outputs	**632049**	**632050**	**632051**
OSSD safety outputs	**2**	**2**	**2**
Switching current per output	**100 mA**	**100 mA**	**100 mA**
Times	**632049**	**632050**	**632051**
Test pulse duration, safety outputs	**300 µs**	**300 µs**	**300 µs**
Supply interruption before de-energisation	**600 µs**	**600 µs**	**600 µs**
Response time t1	**19 ms**	**20 ms**	**20 ms**
Environmental data	**632049**	**632050**	**632051**
Ambient temperature			
Temperature range	**-10 - 60 °C**	**-10 - 60 °C**	**-10 - 60 °C**
Storage temperature			
Temperature range	**-25 - 70 °C**	**-25 - 70 °C**	**-25 - 70 °C**
Climatic suitability			
Humidity	**95 % r. h. at 50 °C**	**95 % r. h. at 50 °C**	**95 % r. h. at 50 °C**
Condensation during operation	**Not permitted**	**Not permitted**	**Not permitted**
EMC	**EN 61496-1**	**EN 61496-1**	**EN 61496-1**
Vibration			
In accordance with the standard	**EN 60068-2-6**	**EN 60068-2-6**	**EN 60068-2-6**
Frequency	**10 - 150 Hz**	**10 - 150 Hz**	**10 - 150 Hz**
Amplitude	**0,75 mm**	**0,75 mm**	**0,75 mm**

Environmental data	632049	632050	632051
Shock stress			
In accordance with the standard	**EN 60068-2-27**	**EN 60068-2-27**	**EN 60068-2-27**
Number of shocks	**1000**	**1000**	**1000**
Acceleration	**10g**	**10g**	**10g**
Duration	**16 ms**	**16 ms**	**16 ms**
Bracket	**Swivel-Mount**	**Swivel-Mount**	**Swivel-Mount**
In accordance with the standard	**EN 60068-2-27**	**EN 60068-2-27**	**EN 60068-2-27**
Number of shocks	**3**	**3**	**3**
Acceleration	**50g**	**50g**	**50g**
Duration	**11 ms**	**11 ms**	**11 ms**
Bracket	**Adv Bracket Kit**	**Adv Bracket Kit**	**Adv Bracket Kit**
Protection type			
Housing	**IP65**	**IP65**	**IP65**
Mechanical data	**632049**	**632050**	**632051**
Min. bending radius (fixed permanently) K1	**5 x Ø**	**5 x Ø**	**5 x Ø**
Min. bending radius (moving) K1	**10 x Ø**	**10 x Ø**	**10 x Ø**
Connection type			
Receiver	**M12, 5-pin male connector**	**M12, 5-pin male connector**	**M12, 5-pin male connector**
Transmitter	**M12, 5-pin male connector**	**M12, 5-pin male connector**	**M12, 5-pin male connector**
Max. cable length	**50 m**	**50 m**	**50 m**
Material			
Housing	**Aluminium**	**Aluminium**	**Aluminium**
End caps	**Zn**	**Zn**	**Zn**
Front screen	**PC**	**PC**	**PC**
Max. torque setting			
Clamping screw	**1,1 Nm**	**1,1 Nm**	**1,1 Nm**
Installation screw	**3 Nm**	**3 Nm**	**3 Nm**
Fixing screw	**0,7 Nm**	**0,7 Nm**	**0,7 Nm**
Dimensions			
Height	**1.504 mm**	**1.654 mm**	**1.804 mm**
Width	**35 mm**	**35 mm**	**35 mm**
Depth	**40 mm**	**40 mm**	**40 mm**
Weight	**4.325 g**	**4.738 g**	**5.150 g**

Where standards are undated, the 2015-12 latest editions shall apply.

Safety characteristic data

NOTICE

You must comply with the safety-related characteristic data in order to achieve the required safety level for your plant/machine.

Operating Mode	EN ISO 13849-1: 2015 PL	EN ISO 13849-1: 2015 Category	EN 62061 SIL CL	EN 62061 PFH_D [1/h]	IEC 61511 SIL	IEC 61511 PFD	EN ISO 13849-1: 2015 T_M [year]
Sensor with N/C contacts	**PL d**	**Cat. 3**	**SIL CL 2**	**2,00E-07**	–	**2,00E-03**	**20**

All the units used within a safety function must be considered when calculating the safety characteristic data.

INFORMATION

A safety function's SIL/PL values are **not** identical to the SIL/PL values of the units that are used and may be different. We recommend that you use the PAScal software tool to calculate the safety function's SIL/PL values.

Order reference

Order reference for safety light grids

Product type	Features	Order no.
PSEN opII3F-S-14-015	Safety light grid for finger protection, protected field height of 150 mm	632 040
PSEN opII3F-S-14-030	Safety light grid for finger protection, protected field height of 300 mm	632 041
PSEN opII3F-S-14-045	Safety light grid for finger protection, protected field height of 450 mm	632 042
PSEN opII3F-S-14-060	Safety light grid for finger protection, protected field height of 600 mm	632 043
PSEN opII3F-S-14-075	Safety light grid for finger protection, protected field height of 750 mm	632 044
PSEN opII3F-S-14-090	Safety light grid for finger protection, protected field height of 900 mm	632 045

Product type	Features	Order no.
PSEN opII3F-S-14-105	Safety light grid for finger protection, protected field height of 1050 mm	632 046
PSEN opII3F-S-14-120	Safety light grid for finger protection, protected field height of 1200 mm	632 047
PSEN opII3F-S-14-135	Safety light grid for finger protection, protected field height of 1350 mm	632 048
PSEN opII3F-S-14-150	Safety light grid for finger protection, protected field height of 1500 mm	632 049
PSEN opII3F-S-14-165	Safety light grid for finger protection, protected field height of 1650 mm	632 050
PSEN opII3F-S-14-180	Safety light grid for finger protection, protected field height of 1800 mm	632 051

Order reference for accessories

Standard installation kit

Product type	Features	Order No.
PSEN opII Bracket Kit	Standard installation with flexible bracket	632 015

Expanded mounting kit

Product type	Features	Order No.
PSEN opII Adv Bracket Kit-2	Four-piece expanded mounting kit with three degrees of freedom for dead-zone-free conditions for protected field heights between 150 mm and 600 mm (inclusive)	632 016
PSEN opII Adv Bracket Kit-3	Six-piece expanded mounting kit with three degrees of freedom for dead-zone-free conditions for protected field heights between 750 mm and 1200 mm (inclusive)	632 017

Laser orientation aid

Product type	Features	Order No.
PSEN opII laser pointer	Laser orientation aid for safety light grids from the PSEN opII series	632 014

Protective columns

Product type	Features	Order No.
PSEN op Protective Column-060/1	Protective column for safety light grid, H = 600 mm	630 950
PSEN op Protective Column-090/1	Protective column for safety light grid, H = 900 mm	630 951
PSEN op Protective Column-120/1	Protective column for safety light grid, H = 1200 mm	630 952
PSEN op Protective Column-165/1	Protective column for safety light grid, H = 1650 mm	630 953
PSEN op Protective Column-190/1	Protective column for safety light grid, H = 1900 mm	630 954

Test object

Product type	Features	Order no.
PSEN opII Test-piece F 14 mm	Test rod for safety light grid with finger protection, ⌀14 mm	632 018

Connection to PDP67

Product type	Connection 1	Connection 2	Length	Order No.
PSS67/PDP67 cable M12-5sf M12-5sm	straight, M12, 5-pin, socket	straight, M12, 5-pin, connector	3 m	380 208
			5 m	380 209
			10 m	380 210
			20 m	380 220
			30 m	380 211

Connection to other evaluation devices

Product type	Connection 1	Connection 2	Length	Order No.
PSEN op cable M12-5sf	unshielded, straight, M12, 5-pin, socket	Open cable	3 m	630 310
			5 m	630 311
			10 m	630 312
			20 m	630 298
			30 m	630 297
			50 m	630 364

Order reference: Component parts

Transmitter

Product type	Features	Order No.
PSEN opII3F-s-14-015 emitter	For safety light grid for finger protection, protected field height of 150 mm	632240
PSEN opII3F-s-14-030 emitter	For safety light grid for finger protection, protected field height of 300 mm	632241
PSEN opII3F-s-14-045 emitter	For safety light grid for finger protection, protected field height of 450 mm	632242
PSEN opII3F-s-14-060 emitter	For safety light grid for finger protection, protected field height of 600 mm	632243
PSEN opII3F-s-14-075 emitter	For safety light grid for finger protection, protected field height of 750 mm	632244
PSEN opII3F-s-14-090 emitter	For safety light grid for finger protection, protected field height of 900 mm	632245
PSEN opII3F-s-14-105 emitter	For safety light grid for finger protection, protected field height of 1050 mm	632246
PSEN opII3F-s-14-120 emitter	For safety light grid for finger protection, protected field height of 1200 mm	632247
PSEN opII3F-s-14-135 emitter	For safety light grid for finger protection, protected field height of 1350 mm	632248
PSEN opII3F-s-14-150 emitter	For safety light grid for finger protection, protected field height of 1500 mm	632249
PSEN opII3F-s-14-165 emitter	For safety light grid for finger protection, protected field height of 1650 mm	632250
PSEN opII3F-s-14-180 emitter	For safety light grid for finger protection, protected field height of 1800 mm	632251

Receiver

Product type	Features	Order No.
PSEN opII3F-s-14-015 receiver	For safety light grid for finger protection, protected field height of 150 mm	632340
PSEN opII3F-s-14-030 receiver	For safety light grid for finger protection, protected field height of 300 mm	632341
PSEN opII3F-s-14-045 receiver	For safety light grid for finger protection, protected field height of 450 mm	632342
PSEN opII3F-s-14-060 receiver	For safety light grid for finger protection, protected field height of 600 mm	632343

Product type	Features	Order No.
PSEN opII3F-s-14-075 receiver	For safety light grid for finger protection, protected field height of 750 mm	632344
PSEN opII3F-s-14-090 receiver	For safety light grid for finger protection, protected field height of 900 mm	632345
PSEN opII3F-s-14-105 receiver	For safety light grid for finger protection, protected field height of 1050 mm	632346
PSEN opII3F-s-14-120 receiver	For safety light grid for finger protection, protected field height of 1200 mm	632347
PSEN opII3F-s-14-135 receiver	For safety light grid for finger protection, protected field height of 1350 mm	632348
PSEN opII3F-s-14-150 receiver	For safety light grid for finger protection, protected field height of 1500 mm	632349
PSEN opII3F-s-14-165 receiver	For safety light grid for finger protection, protected field height of 1650 mm	632350
PSEN opII3F-s-14-180 receiver	For safety light grid for finger protection, protected field height of 1800 mm	632351

Appendix

Check list

The checklist below is intended as an aid in for the following work on a safety light grid of PSEN opII3F Series:

- commissioning,
- recommissioning, and
- running the specified regular check.

Note that the check list is not intended to replace the plant-specific safety analysis required for commissioning/recommissioning, nor the resulting inspections and actions.



INFORMATION

Commissioning, recommissioning and regular inspection may only be carried out by qualified personnel.

We recommend that you keep the completed check list and store it with the machine documentation for reference.

No.	Action	OK	NOT OK	Notes
1	**Check the category/standards**			
	Does the category of the safety light grid match the category required for the plant/ machine?			
	Have the standards applicable for the plant/ machine been considered?			
2	**Check the safety light grid ambient conditions**			
	Have the environmental conditions been met (see Ambient conditions [📖 16])?			
	Have the technical details been met for all the safety light grid components?			
3	**Check access to the hazardous area** Are all access points to the danger zone safeguarded by either safety light grids or mechanical safeguards?			
4	**Check the minimum distance to hazardous area**			
	Has the minimum distance been calculated in accordance with the applicable standards?			
	Has the calculated minimum distance been maintained at all points?			
5	**Check protected field**			
	Has the ability to creep underneath the protected field undetected been excluded?			
6	**Check safety light grid**			
	Make sure that there are no objects in front of the safety light grid (trailing cable, cross-beams, struts, covers, etc.).			
	Make sure that there are no transparent materials between the monitored protected field and the safety light grid (such as the glass panel).			
	Are all the mechanical connections on the safety light grid attached correctly?			
	Are all the electrical connections to the safety light grid wired correctly?			

No.	Action	OK	NOT OK	Notes
7	**Check the effectiveness of the safety light grid during the hazardous movement** Is the safety light grid effective throughout the whole of the plant/machine's hazardous movement?			
8	**Check the output circuitry of the programmable safety and control system**			
	Have OSSDs been incorporated as required for the desired safety category?			
	Are the switching elements that are connected to the OSSDs (valves, contactors, etc.) monitored with feedback loops?			
	Does the wiring of the OSSDs match the circuit diagram?			
9	**Check guard function for protected field of the safety light grid:** Violate the protected field at various points: The hazardous movement must be shut down.			
10	**Switch off safety light grid** Is the hazardous movement stopped immediately when you switch off?			

EC declaration of conformity

This product/these products meet the requirements of the directive 2006/42/EC for machinery of the European Parliament and of the Council. The complete EC Declaration of Conformity is available on the Internet at www.pilz.com/downloads.
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Support

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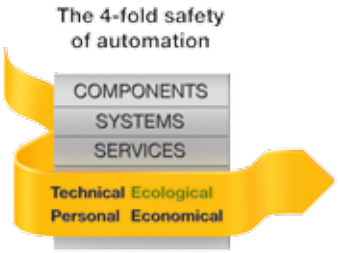
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