
Safety light curtains

Preventa XUSL

Catalogue



Simply easy!™

Safety light curtains Preventa XUSL

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Safety detection solutions

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Safety light curtains

Presentation

Protection of personnel

Safety light curtains are electro-sensitive protective equipment (ESPE) designed for the protection of persons operating or working in the vicinity of machinery, by stopping the hazardous movement of parts as soon as one of the light beams is broken.

In particular, they provide protection to help ensure the **safety of personnel** operating hazardous machinery (annex IV of Directive 2006/42/EC) but they are equally suitable for use with many other types of machines. They make it possible to help protect personnel while allowing free access to machines.

The absence of mechanical protectors reduces the time required for loading, inspection, or adjustment operations as well as making access easier.

Directives and standards

Conformity to standards

Preventa XUSL2 and XUSL4 safety light curtains conform to the following standards:

- European Machinery Directive 2006/42/EC and European Use of Work Equipment Directive 2009/104/EC
- Low Voltage Directive 2006/95/EC and the Electromagnetic Compatibility Directive 2004/108/EC
- EN/IEC 61496-1 and EN/IEC 61496-2
- IEC 62061 and IEC 61508 (electro-sensitive protective equipment (ESPE))
- EN/ISO 13849-1
- EN/ISO 13855 (installation conditions, safety distances)

These light curtains are cULus and TÜV certified.

Application sectors

Main applications

Preventa XUSL2 and XUSL4 safety light curtains are used to detect fingers, hands, and bodies in the vicinity of hazardous machinery, such as:

- robotic systems
- assembly and packaging lines
- turret punch presses
- palletizers
- packaging machines
- assembly machines
- welding equipment
- handling equipment (rollers, winders, and unwinders)
- machine tools
- equipment for the agri-food industry
- mechanical and hydraulic presses

Safety rules

Detection of failures

Detection of failures liable to compromise safety and stopping of the machine

The design of the machine and its control system must be appropriate to the safety light curtain selected in order to immediately stop the machine's hazardous movement as soon as the hazardous zone, protected by the light curtain, is entered.

It must not be possible to enter the protected zone without breaking the light beams. The safety light curtain must therefore be installed in such a manner that the light beams cannot be avoided.

The machine can only be restarted if no hazard exists and no personnel are present in the hazardous zone.

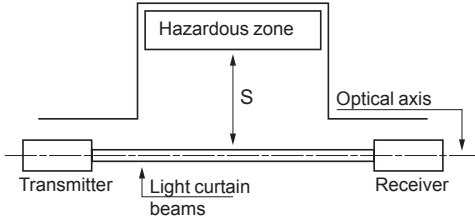
The risk that persons might be inside the hazardous zone but out of the protective light beams must be addressed.

Safety detection solutions

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Safety light curtains

Positioning of safeguards



Standard EN/ISO 13855 (1) defines the parameters for the positioning of safeguards. In particular:

- the safety distance between the light curtain and the hazardous zone
- the body approach speed
- multi-beam devices
- multiple single-beam light curtains (2, 3, or 4 beams)

Calculation of minimum safety distance S between the light curtain and the hazardous zone

$$S = K (t_1 + t_2) + C \text{ (general formula)}$$

S = minimum distance in mm

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

t₁ = response time of protection device in s

t₂ = stopping time of machine (hazardous movements) in s

C = additional distance in mm

■ For multi-beam light curtains:

K = 2,000 mm/s

C = 8 (R - 14) where R = resolution of the safety light curtain mm

■ For multiple single-beam light curtains or light curtains with 2, 3, or 4 beams:

K = 1,600 mm/s

C = 850 mm for multiple single beams

The protected heights are as follows:

Number of light beams	Protected height (mm)
4	300, 600, 900, 1,200
3	300, 700, 1,100
2	400, 900

Special rules for presses

The use of safety light curtains and mechanical protectors on metal working presses is governed by specific standards and rules.

The standards specify that safeguarding methods should be selected that reduce the risk as far as possible, considering the significant hazards and the production method so that, if a person enters the protective field while the hazardous movement is in progress, the machine stops as quickly as possible. "Quick stopping" means stopping of the ram before the operator can reach the hazardous zone, taking into account their speed of movement.

The continuous self-monitoring function of safety light curtains is essential for metal working press applications. If a failure is detected in the protection device, the potentially hazardous machine movement must be stopped automatically.

Once the protected zone is clear, the movement that was started and then interrupted by entry into the zone must not resume its normal travel, even after a Reset button has been pressed. Resetting must restart the movement from the beginning of the cycle. **The safety light curtain must only allow starting of a hazardous movement if its correct operation has been proved** (by pushing a test rod into the hazardous zone, or by means of an automatic device) and if a Reset button (start interlock) has been reactivated.

The safety distance S is calculated in a special way for:

- mechanical presses: refer to **EN 692**
- hydraulic presses, pneumatic folding machines, shears, bending and shaping machines: refer to **EN 693**

(1) To calculate the safety distance according to the standard applicable in the United States (OSHA 1910.217), refer to the calculation formulae given in the "Preventa XUSL User Manual".

Safety detection solutions

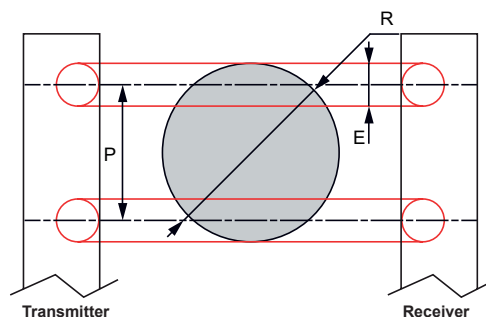
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Safety light curtains

Functions and definitions

Resolution (R)

This is the smallest diameter (of an object) that type 4 or type 2 safety light curtains are able to detect with absolute certainty.



$$R = P + E$$

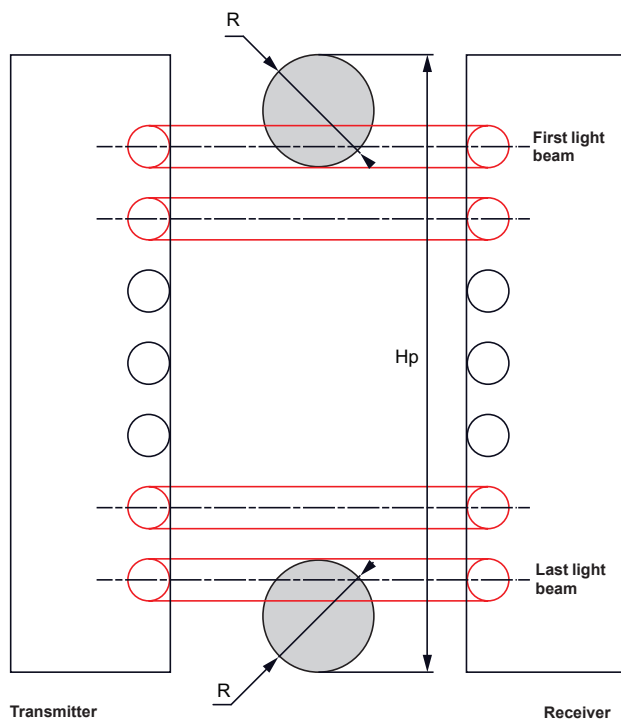
P: distance between the mid point of the 2 adjacent light beams

E: diameter of the light beams

R: resolution (or detection capability)

Protected height (Hp)

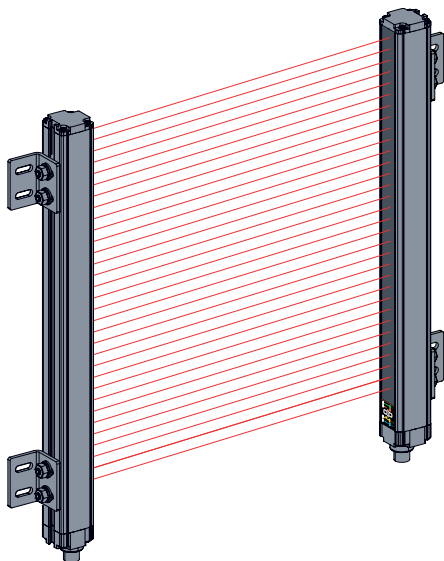
The protected height is the zone (or height) within which an object of diameter at least equal to the resolution (or detection capability) **R** is detected with absolute certainty.



Safety detection solutions

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Safety light curtains



Functions and definitions (continued)

Operation of a safety light curtain

A safety light curtain is an optical protection system with infrared beams that provides protection for operators in the vicinity of hazardous zones. Any moving parts in this zone are stopped if at least one of the light beams is broken.

The system comprises a transmitter and a receiver positioned facing each other and controlled by a microprocessor. They are not physically interconnected. A row of diodes in the transmitter emits infrared beams to a row of photosensitive cells in the receiver.

The infrared diodes are triggered consecutively and the photosensitive cells are synchronized to detect the corresponding light beam only. When the detection zone is clear, both OSSD redundant outputs are enabled (ON) and the equipment connected downstream operates normally.

When an object larger than or equal in size to the resolution breaks at least one of the beams, both OSSD redundant outputs switch to the OFF state to send the stop command to the machine.

Type 2 and type 4 definitions

There are significant differences between XUSL2 (type 2) and XUSL4 (type 4) safety light curtains that need to be clarified. Types 2 and 4 are defined in standard IEC 61496-1.

It is the responsibility of the user or systems integrator to verify that the appropriate safety light curtain - type 2 or type 4 - is used according to the expected level of risk presented by the machine.

In order to select the correct product, it is necessary to carry out a risk assessment of the application.

Type 2

Type 2 safety light curtains test their internal circuits periodically (e.g. every 500 ms for XUSL2E). If a failure occurs between two test sequences, it will only be detected at the time of the next test.

A type 2 device has reduced capability in comparison with a type 4 device (for example, it has a wider aperture angle and a longer response time).

These light curtains are designed for use in applications where the risk assessment has identified a low risk of injury to operators.

Type 2 light curtains are less expensive than type 4 devices due to their simplified architecture. They are only capable of hand and body detection.

XUSL2 safety light curtains are type 2 (IEC 61496-1), SIL 1 (IEC 61508), SILCL1 (IEC 62061), and PLc - Cat. 2 (EN/ISO 13849-1) compatible.

Type 4

In contrast to type 2 devices, type 4 safety light curtains are designed based on an automatic self-monitoring redundant architecture.

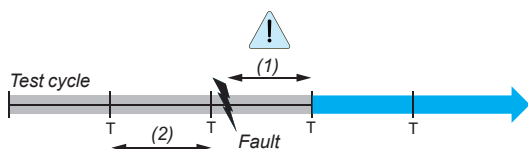
This architecture allows the immediate detection of a failure within a given response time.

Type 4 safety light curtains are suitable for applications where the risk assessment has identified moderate or high risk of injury to operators.

Type 4 safety light curtains are capable of providing finger, hand, and body detection. XUSL4 light curtains offer a shorter response time and a narrower beam aperture angle than XUSL2 light curtains.

XUSL4 light curtains are type 4 (IEC 61496-1), SIL 3 (IEC 61508), SILCL3 (IEC 62061), and PLe - Cat. 4 (EN/ISO 13849-1) compatible.

Operating fault detected for type 2 safety light curtain:



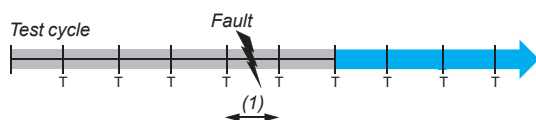
Grey bar : OSSD outputs, ON

Blue bar : OSSD outputs, OFF

(1) Risk

(2) Test period: 500 ms

Operating fault detected for type 4 safety light curtain:



Grey bar : OSSD outputs, ON

Blue bar : OSSD outputs, OFF

(1) Maximum response time

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Safety light curtains

Functions and definitions (continued)

Risk assessment

Risk assessment and risk reduction form part of an iterative process described in standards EN ISO12100, IEC 61496-1, IEC 61508, and IEC 62061 (SIL), and EN/ISO 13849 (PL).

There are different techniques for evaluating hazards, none of which can be considered as the best risk assessment method. The standards describe general principles, but do not specify precisely what to do in each case.

For safety-related data, refer to the PFHd (Probability of dangerous Failure per Hour" according to IEC 61508) value indicated for each XUSL2E and XUSL4E light curtain reference (see pages 10 to 17).

Response time

European standard EN ISO13855 incorporates the various aspects of response time in the formula for calculating the minimum safety distance. The total response time (T) corresponding to the overall stopping performance of the system is calculated using the following formula:

$$T = t_1 + t_2$$

t₁ is the response time of the protection device (in seconds).

It is the total time between detection by the device and switching of the output component.

Response time t₁ is indicated for XUSL2E and XUSL4E light curtains (see pages 10 to 17).

t₂ is the stopping time of the machine and, in particular, of its hazardous movements (in seconds).

This information is provided by the machine manufacturer. It is the time between the stop command and the actual stop of the hazardous mechanical components.

The response time of the machine control system (a relay or a safety controller for example) is included in "t₂".

Selecting the sensing distance

Two different maximum sensing distances can be selected for each XUSL4E and XUSL2E safety light curtain: short and long.

Both sensing distances can be selected by wiring.

Sensing distance for XUSL2E safety light curtains

Hand and body detection, standard sensing distance:

Short sensing distance: 0...4 m. Long sensing distance: 0...12 m

Sensing distance for XUSL4E safety light curtains

Finger detection, standard sensing distance:

Short sensing distance: 0...3 m. Long sensing distance: 1...6 m

Hand and body detection, standard sensing distance:

Short sensing distance: 0...4 m. Long sensing distance: 0...12 m

Hand and body detection, increased sensing distance:

Short sensing distance: 0...10 m. Long sensing distance: 3...20 m

Sensing distance for XUSL2E safety light curtains with IP 69K sealed tube

Hand detection:

Short sensing distance: 0...3 m. Long sensing distance: 3...10 m

Sensing distance for XUSL4E safety light curtains with IP 69K sealed tube

Finger detection:

Short sensing distance: 0...2 m. Long sensing distance: 1...5 m

Hand and body detection

Short sensing distance: 0...8 m. Long sensing distance: 3...17 m

Automatic or manual start mode

AUTO/MAN (automatic/manual): this is what standard EN/IEC 61496 calls start (or restart) interlock of the safety light curtain:

- In AUTO mode: On power-up, if the detection zone is not occupied, or after the beams have been cleared, the safety light curtain resets itself automatically. Both OSSD outputs change to the "closed" position (ON).

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Safety light curtains

Functions and definitions (continued)

Automatic or manual start mode (continued)

■ In MANUAL mode: On power-up (regardless of whether the detection zone is occupied or not), or after the beams have been cleared, the safety light curtain maintains both OSSD outputs in the “open” position (OFF). Pressing (and releasing) the reset button effectively resets the light curtain, if the detection zone is not entered. Both OSSD outputs change to the “closed” position (ON).

Note: In all cases, a general machine run command will trigger its start-up.

External device monitoring

External device monitoring (EDM) is an important safety function. It monitors the interface between the safety light curtains and the protected machine:

- to check that the external devices, such as contactors and relays, are responding correctly to the light curtain outputs
 - to detect any inconsistency between the two external control devices that could prevent a stop command from reaching the equipment connected downstream (e.g. power contactors or solenoid valve relays)
- The EDM controls the external contactors K1/K2. To do this, the NC contacts of the external contactors, connected in series, are monitored.

Test function

This function is designed to simulate entry into the detection zone (a break in transmission). An external control unit (e.g. a safety PLC) can then verify correct operation of the entire system (monitoring downstream equipment).

Signaling

LED display of operating modes and detected faults.

Muting function available with XPSLCMUT1160 module

Muting is the temporary suspension of the protection function provided by the safety light curtain.

Activation or deactivation is achieved by means of standard sensors (OsiSense XU “dark on” photoelectric sensors with PNP output).

When activated, a signal is sent to the control system. This function is used to allow objects to access the hazardous zone during the process.

Signaling informs the operator or operators that they are not protected.

Master/slave multi-segments for type 4 light curtains

Multi-segments help protect multiple zones via a series connection.

Only the first segment, known as the “master”, is connected to the control cabinet or enclosure.

This master segment, which can detect fingers, hands, or bodies, can support up to 2 other intermediate segments, known as “slaves”, connected via extension cables to the M12 connectors on the top of the segment.

Slave segments can be of different resolutions (R) and protected heights than the “master”, without restricting the overall protected height.

They are totally dependent on the functions configured in the master segment.

The maximum distance for connection cables between 2 slave segments is 50 meters.

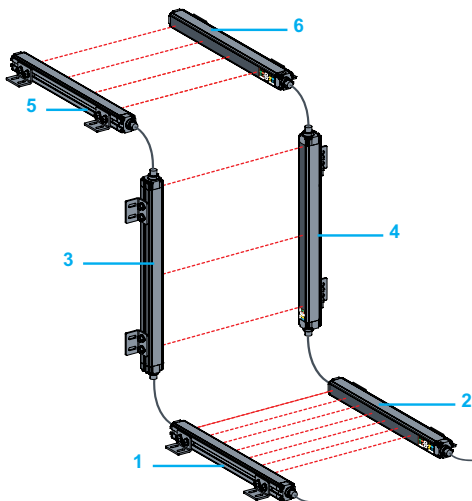
Light curtains with IP 69K sealed protection tube

Safety light curtains with protection tube are supplied mounted and pre-wired. The materials used are suitable for the food industry.

The sealed tubes provide additional protection to the light curtains against humidity, condensation, cleaning products, and certain chemical products.

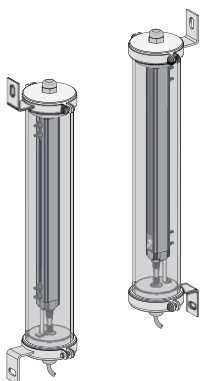
Light curtains with sealed protection tube can be supplied as follows:

- Operating temperature **with** heating system: -25° to +55 °C
- Operating temperature **without** heating system: -10° to +55 °C



Master/slave multi-segment light curtains:
example of daisy-chained function

- 1 Master (transmitter)
- 2 Master (receiver)
- 3 Slave 2 (transmitter)
- 4 Slave 2 (receiver)
- 5 Slave 1 (transmitter)
- 6 Slave 1 (receiver)



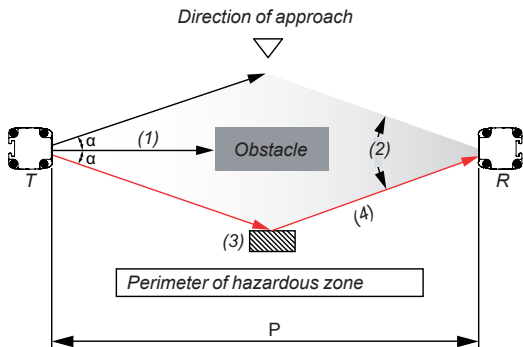
Light curtains with IP 69K sealed
protection tube

Safety detection solutions

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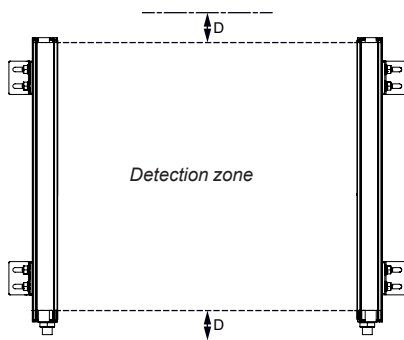
Safety light curtains

Reflective surface positioned sideways:



- (1) Optical axis
- (2) Operating width of light beam
- (3) Reflective surface
- (4) Reflected beam (prevents light beam being broken)
- T: Transmitter
- R: Receiver

Reflective surface positioned lengthways:



Installation precautions

Reflective surface

The devices must be installed such that the transmitter and associated receiver are mounted facing each other and correctly aligned for both height and angle.

The aperture angle of the optics and transmitter/receiver alignment tolerance are:
 $\alpha = 2.5^\circ$ (type 4)
 $\alpha = 5^\circ$ (type 2)

Reflective surfaces located alongside the optical axis could result in stray reflections interfering with the light beams that are the furthest away from the axis and, consequently, prevent detection of an object entering the hazardous zone. The direct light beam could then be joined by a stray reflected beam and this latter beam would not be broken when the object is in the axis.

For this reason, EN/IEC 61496-2 specifies a minimum distance **D** whereby:

For type 2 (XUSL2E light curtains):

If $P \leq 3$ m, then $D = 262$ mm

If $P > 3$ m, then $D = \tan(5^\circ) \times 1,000 \times P$ (m) = $87.49 \times P$ (m)

P = Transmitter/Receiver distance (m)

D = minimum distance between the light curtain and reflective surface (mm)

For type 4 (XUSL4E light curtains):

If $P \leq 3$ m, then $D = 131$ mm

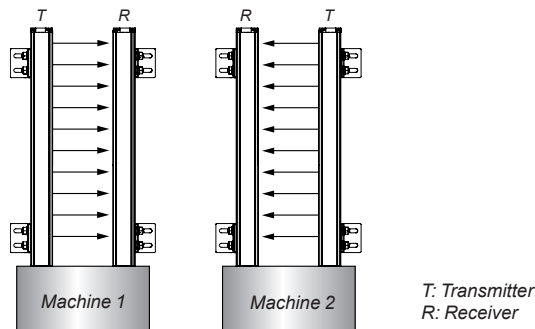
If $P > 3$ m, then $D = \tan(2.5^\circ) \times 1,000 \times P$ (m) = $43.66 \times P$ (m)

Mutual interference

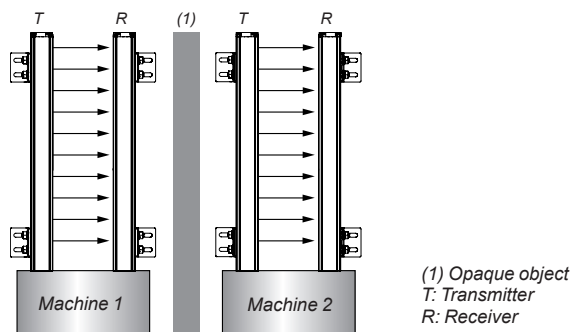
Certain installation configurations may require the installation of 2 (or more) safety light curtains side by side.

To help prevent interference between safety light curtains, the following installation is recommended.

Receivers installed back-to-back



Light curtains separated by an opaque object, to break the light beams one at a time



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Safety light curtains

Installation precautions (continued)

Environments subject to interference

Industrial applications sometimes place products in extreme operating conditions, mainly due to:

■ Electromagnetic interference

- conforming to level 3 according to EN/IEC 61496-1
- resistance to interference caused by variable speed drives

■ Light interference

- conforming to EN/IEC 61496-2

Additional devices

Safety light curtains can only be used on machines on which the movement of working components can be **stopped at any time during a hazardous phase**.

These light curtains provide a stop signal, not a control instruction. This stop signal must be stored.

Clearing of the light curtain must not result in restarting of moving parts. Subsequent restarting must only be possible by means of deliberate operation of the appropriate control device, after having checked that there is no longer any danger.

Electrical interfacing between the light curtain and the machine circuits must correspond to the machine standard specifications.

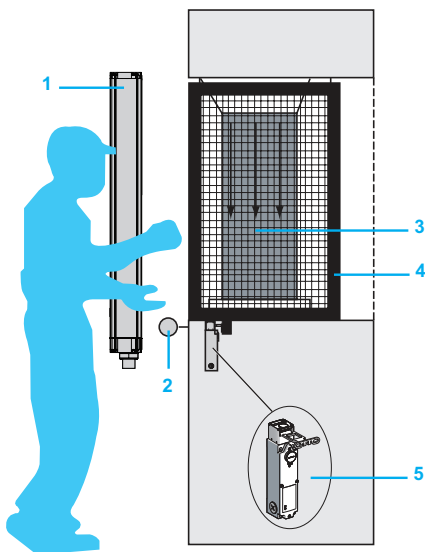
Where safety light curtains do not provide an adequate degree of protection due to their location, additional suitable protection devices or additional light curtains must be used in order to prevent operators from entering the protective light curtain and reaching the hazardous zone (EN/ISO 13857), or from remaining in the area between the hazardous zone and the safety light curtain (EN/ISO 13855).

The position and size of these additional protection devices must be such that it is **impossible for operators to reach the hazardous zone** in any way whatsoever (over the top, from beneath, from behind, or from the side) **without breaking at least one of the light curtain beams**.

These additional devices must be:

- either fixed
(if possible, screwed or welded to the machine)
- or moving
(with continuous monitoring of their position if they have to open)

It must be impossible for operators to disconnect or cut-out the switching circuits for these additional devices.



- 1 Safety light curtain
- 2 Mechanical barrier
- 3 Hazard zone
- 4 Example of additional device
- 5 Safety interlock switches (Preventa XCSLF or XCSLE)

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Safety light curtains, type 4
Standard sensing distance



XUSL4E14F016N

XUSL4E14F031N



XUSL4E30H016N

XUSL4E30H031N

Transmitter-receiver pairs for finger detection (1) (2)

Resolution 14 mm. Sensing distance 0...3 or 1...6 m, selectable by wiring

- 2 PNP outputs
- Operating temperature range: -10 °C...+55 °C
- TM (mission time): 20 years

Protected height	Total height	Number of light beams	Response time (t1)	PFHd IEC 61508	Reference	Weight
mm	mm		ms			kg
160	213	15	4	1.03 x 10 ⁻⁸	XUSL4E14F016N	0.400
310	363	30	5.5	1.27 x 10 ⁻⁸	XUSL4E14F031N	0.700
460	513	45	7.5	1.52 x 10 ⁻⁸	XUSL4E14F046N	1.000
610	663	60	9	1.75 x 10 ⁻⁸	XUSL4E14F061N	1.200
760	813	75	11	2.00 x 10 ⁻⁸	XUSL4E14F076N	1.500
910	963	90	13	2.24 x 10 ⁻⁸	XUSL4E14F091N	1.700
1,060	1,113	105	14.5	2.49 x 10 ⁻⁸	XUSL4E14F106N	2.000
1,210	1,263	120	16.5	2.73 x 10 ⁻⁸	XUSL4E14F121N	2.300
1,360	1,413	135	18	2.98 x 10 ⁻⁸	XUSL4E14F136N	2.500
1,510	1,563	150	20	3.22 x 10 ⁻⁸	XUSL4E14F151N	2.800
1,660	1,713	165	22	3.48 x 10 ⁻⁸	XUSL4E14F166N	3.000
1,810	1,863	180	23.5	3.71 x 10 ⁻⁸	XUSL4E14F181N	3.300

Transmitter-receiver pairs for hand detection (1) (2)

Resolution 30 mm. Sensing distance 0...4 or 0...12 m, selectable by wiring

- 2 PNP outputs
- Operating temperature range: -10 °C...+55 °C
- TM (mission time): 20 years

Protected height	Total height	Number of light beams	Response time (t1)	PFHd IEC 61508	Reference	Weight
mm	mm		ms			kg
160	213	8	4	7.08 x 10 ⁻⁹	XUSL4E30H016N	0.400
260	313	13	5	8.06 x 10 ⁻⁹	XUSL4E30H026N	0.600
310	363	16	5.5	8.20 x 10 ⁻⁹	XUSL4E30H031N	0.700
460	513	23	7.5	9.47 x 10 ⁻⁹	XUSL4E30H046N	1.000
610	663	31	9	1.06 x 10 ⁻⁸	XUSL4E30H061N	1.200
760	813	38	10.5	1.19 x 10 ⁻⁸	XUSL4E30H076N	1.500
910	963	46	12.5	1.30 x 10 ⁻⁸	XUSL4E30H091N	1.700
1,060	1,113	53	14	1.43 x 10 ⁻⁸	XUSL4E30H106N	2.000
1,210	1,263	61	15.5	1.54 x 10 ⁻⁸	XUSL4E30H121N	2.300
1,360	1,413	68	17	1.67 x 10 ⁻⁸	XUSL4E30H136N	2.500
1,510	1,563	76	19	1.78 x 10 ⁻⁸	XUSL4E30H151N	2.800
1,660	1,713	83	20.5	1.90 x 10 ⁻⁸	XUSL4E30H166N	3.000
1,810	1,863	91	22	2.02 x 10 ⁻⁸	XUSL4E30H181N	3.300

Transmitter-receiver pairs for body detection (1) (2)

2, 3, or 4 beams. Sensing distance 0...4 or 0...12 m, selectable by wiring

- 2 PNP outputs
- Operating temperature range: -10 °C...+55 °C
- TM (mission time): 20 years

Protected height	Total height	Light beams Number/spacing	Response time (t1)	PFHd IEC 61508	Reference	Weight
mm	mm		ms			kg
510	677	2 / 500 mm	2.5	6.89 x 10 ⁻⁹	XUSL4E2BB051N	1.100
810	977	3 / 400 mm	3	7.55 x 10 ⁻⁹	XUSL4E3BB081N	1.600
910	1,077	4 / 300 mm	3	8.21 x 10 ⁻⁹	XUSL4E4BB091N	1.700

(1) The safety light curtains are supplied with mounting brackets and screws.

(2) Connection cables and test rods must be ordered separately (see pages 22 and 23).

Safety detection solutions

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Safety light curtains, type 4
Increased sensing distance



XUSL4E30H016L

XUSL4E30H031L

Transmitter-receiver pairs for hand detection (1) (2)

Resolution 30 mm. Sensing distance 0...10 or 3...20 m, selectable by wiring

- 2 PNP outputs
- Operating temperature range: -10 °C...+55 °C
- TM (mission time): 20 years

Protected height	Total height	Number of light beams	Response time (t1)	PFHd IEC 61508	Reference	Weight
mm	mm		ms			kg
160	213	8	3	9.13×10^{-9}	XUSL4E30H016L	0.400
310	363	16	4	1.04×10^{-8}	XUSL4E30H031L	0.700
460	513	23	5	1.16×10^{-8}	XUSL4E30H046L	1.000
610	663	31	6	1.28×10^{-8}	XUSL4E30H061L	1.200
760	813	38	6.5	1.41×10^{-8}	XUSL4E30H076L	1.500
910	963	46	7.5	1.53×10^{-8}	XUSL4E30H091L	1.700
1,060	1,113	53	8.5	1.66×10^{-8}	XUSL4E30H106L	2.000
1,210	1,263	61	9.5	1.78×10^{-8}	XUSL4E30H121L	2.300
1,360	1,413	68	10	1.91×10^{-8}	XUSL4E30H136L	2.500
1,510	1,563	76	11	2.03×10^{-8}	XUSL4E30H151L	2.800
1,660	1,713	83	12	2.16×10^{-8}	XUSL4E30H166L	3.000
1,810	1,863	91	13	2.29×10^{-8}	XUSL4E30H181L	3.300

Transmitter-receiver pairs for body detection (1) (2)

2, 3, or 4 beams. Sensing distance 0...10 or 3...20 m, selectable by wiring

- 2 PNP outputs
- Operating temperature range: -10 °C...+55 °C
- TM (mission time): 20 years

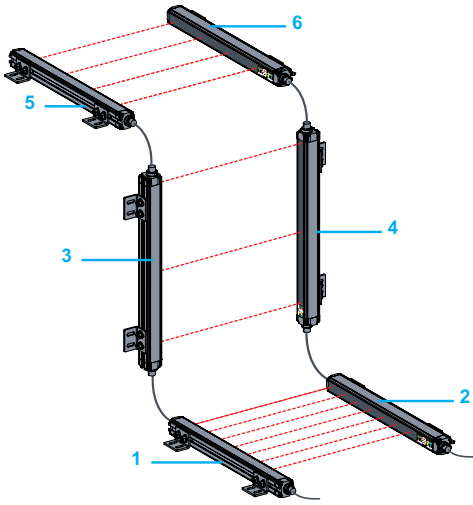
Protected height	Total height	Light beams Number/spacing	Response time (t1)	PFHd IEC 61508	Reference	Weight
mm	mm		ms			kg
510	677	2 / 500 mm	2.5	9.15×10^{-9}	XUSL4E2BB051L	1.100
810	977	3 / 400 mm	2.5	9.99×10^{-9}	XUSL4E3BB081L	1.600
910	1,077	4 / 300 mm	2.5	1.08×10^{-8}	XUSL4E4BB091L	1.700

(1) The safety light curtains are supplied with mounting brackets and screws.

(2) Connection cables and test rods must be ordered separately (see pages 22 and 23).

Safety detection solutions Preventa

Safety light curtains, type 4
Master/slave. Standard sensing distance



Example of daisy-chained function

- 1 Master (transmitter)
- 2 Master (receiver)
- 3 Slave 2 (transmitter)
- 4 Slave 2 (receiver)
- 5 Slave 1 (transmitter)
- 6 Slave 1 (receiver)



XUSL4E.....NM
XUSL4E.....NS2

Master transmitter-receiver pairs (1) (2)

- 2 PNP outputs
- Operating temperature range: -10 °C...+55 °C
- TM (mission time): 20 years

Protected height	Total height	Light beams Number/spacing	Response time (3)	PFHd IEC 61508	Reference	Weight
mm	mm					kg
For finger detection						
Resolution 14 mm. Sensing distance 0...3 or 1...6 m, selectable by wiring						
310	387	30	5.5	1.27 x 10 ⁻⁸	XUSL4E14F031NM	0.720
460	537	45	7.5	1.52 x 10 ⁻⁸	XUSL4E14F046NM	1.020
610	687	60	9	1.75 x 10 ⁻⁸	XUSL4E14F061NM	1.220
760	837	75	11	2.00 x 10 ⁻⁸	XUSL4E14F076NM	1.520

For hand detection

Resolution 30 mm. Sensing distance 0...4 or 0...12 m, selectable by wiring

460	537	16	7.5	9.47 x 10 ⁻⁹	XUSL4E30H046NM	1.020
610	687	23	9	1.06 x 10 ⁻⁸	XUSL4E30H061NM	1.220
760	837	31	10.5	1.19 x 10 ⁻⁸	XUSL4E30H076NM	1.520
910	987	38	12.5	1.30 x 10 ⁻⁸	XUSL4E30H091NM	1.720
1,060	1,137	46	14	1.43 x 10 ⁻⁸	XUSL4E30H106NM	2.020

For body detection

2, 3, or 4 beams. Sensing distance 0...4 or 0...12 m, selectable by wiring

510	677	2 / 500 mm	2.5	6.89 x 10 ⁻⁹	XUSL4E2BB051NM	1.100
810	977	3 / 400 mm	3	7.55 x 10 ⁻⁹	XUSL4E3BB081NM	1.600
910	1,077	4 / 300 mm	3	8.21 x 10 ⁻⁹	XUSL4E4BB091NM	1.700

Slave 2 transmitter-receiver pairs (1) (2)

For finger detection

Resolution 14 mm. Sensing distance 0...3 or 1...6 m, selectable by wiring

460	537	45	7.5	1.52 x 10 ⁻⁸	XUSL4E14F046NS2	1.020
610	687	60	9	1.75 x 10 ⁻⁸	XUSL4E14F061NS2	1.220
760	837	75	11	2.00 x 10 ⁻⁸	XUSL4E14F076NS2	1.520

For hand detection

Resolution 30 mm. Sensing distance 0...4 or 0...12 m, selectable by wiring

460	537	23	7.5	9.47 x 10 ⁻⁹	XUSL4E30H046NS2	1.020
610	687	31	9	1.06 x 10 ⁻⁸	XUSL4E30H061NS2	1.220
760	837	38	10.5	1.19 x 10 ⁻⁸	XUSL4E30H076NS2	1.520
910	987	46	12.5	1.30 x 10 ⁻⁸	XUSL4E30H091NS2	1.720
1,060	1,137	53	14	1.43 x 10 ⁻⁸	XUSL4E30H106NS2	2.020

For body detection

2, 3, or 4 beams. Sensing distance 0...4 or 0...12 m, selectable by wiring

510	677	2 / 500 mm	2.5	6.89 x 10 ⁻⁹	XUSL4E2BB051NS2	1.100
810	977	3 / 400 mm	3	7.55 x 10 ⁻⁹	XUSL4E3BB081NS2	1.600
910	1,077	4 / 300 mm	3	8.21 x 10 ⁻⁹	XUSL4E4BB091NS2	1.700

(1) The safety light curtains are supplied with mounting brackets and screws.

(2) Connection cables and test rods must be ordered separately (see pages 22 and 23).

(3) The response time of a daisy-chained function must include the response time of each of the component segments (see the calculation table on the next page).

Other versions: Master/slave light curtains can be ordered for other protection heights than those listed above.
Please contact our Customer Care Center.

Safety detection solutions

Preventa

Safety light curtains, type 4

Master/slave. Standard sensing distance



XUSL4E●●●●●●●●NS1

Slave 1 transmitter-receiver pairs (1) (2)						
Protected height	Total height	Light beams Number/spacing	Response time (3)	PFHd IEC 61508	Reference	Weight
mm	mm					kg
For finger detection						
Resolution 14 mm. Sensing distance 0...3 or 1...6 m, selectable by wiring						
310	363	30	5.5	1.27×10^{-8}	XUSL4E14F031NS1	0.720
460	513	45	7.5	1.52×10^{-8}	XUSL4E14F046NS1	1.020
610	663	60	9	1.75×10^{-8}	XUSL4E14F061NS1	1.220
760	813	75	11	2.00×10^{-8}	XUSL4E14F076NS1	1.520
For hand detection						
Resolution 30 mm. Sensing distance 0...4 or 0...12 m, selectable by wiring						
460	513	23	7.5	9.47×10^{-9}	XUSL4E30H046NS1	1.020
610	663	31	9	1.06×10^{-8}	XUSL4E30H061NS1	1.220
760	813	38	10.5	1.19×10^{-8}	XUSL4E30H076NS1	1.520
910	963	46	12.5	1.30×10^{-8}	XUSL4E30H091NS1	1.720
1,060	1,113	53	14	1.43×10^{-8}	XUSL4E30H106NS1	2.020
For body detection						
2, 3, or 4 beams. Sensing distance 0...4 or 0...12 m, selectable by wiring						
510	653	2 / 500 mm	2.5	6.89×10^{-9}	XUSL4E2BB051NS1	1.100
810	953	3 / 400 mm	3	7.55×10^{-9}	XUSL4E3BB081NS1	1.600
910	1,053	4 / 300 mm	3	8.21×10^{-9}	XUSL4E4BB091NS1	1.700

(1) The safety light curtains are supplied with mounting brackets and screws.

(2) Connection cables and test rods must be ordered separately (see pages 22 and 23).

(3) The response time of a daisy-chained function must include the response time of each of the component segments. See the calculation table below:

Calculation of response time for Master/slave light curtains, type 4, standard sensing distance

Resolution 14 mm $R_{t_{tot}} = [0.06 \times (No_{slave1} + No_{mater}) + 0.9636] \times 2$

$$R_{t_{tot}} = [0.06 \times (No_{slave1} + No_{slave2} + No_{mater}) + 1.0036] \times 2$$

Resolution 30 mm and multi-beam $R_{t_{tot}} = [0.11 \times (No_{slave1} + No_{mater}) + 0.9376] \times 2$

$$R_{t_{tot}} = [0.11 \times (No_{slave1} + No_{slave2} + No_{mater}) + 1.0508] \times 2$$

No.: Number of light beams

$R_{t_{tot}}$: Total response time

Other versions: Master/slave light curtains can be ordered for other protection heights than those listed above.
Please contact our Customer Care Center.

Safety detection solutions Preventa

Safety light curtains, type 4

With IP 69K sealed protection tube, no heating system



XUSL4E14F031NWC



XUSL4E30H046LWC

Transmitter-receiver pairs with IP 69K sealed protection tube for finger detection (1) (2)

Resolution 14 mm. Sensing distance 0...2 or 1...5 m, selectable by wiring

- 2 PNP outputs
- Operating temperature range: -10 °C...+55 °C
- Resistance to acidic and alkaline cleaning agents, and aliphatic hydrocarbons
- TM (mission time): 20 years

Pro- tected height	Total height	Number of light beams	Response time (t1)	PFHd IEC 61508	Reference	Weight
mm	mm		ms			kg
310	470	30	5.5	1.27 x 10 ⁻⁸	XUSL4E14F031NWC	3.560
460	620	45	7.5	1.52 x 10 ⁻⁸	XUSL4E14F046NWC	4.050
610	770	60	9	1.75 x 10 ⁻⁸	XUSL4E14F061NWC	4.560
760	920	75	11	2.00 x 10 ⁻⁸	XUSL4E14F076NWC	5.550

Transmitter-receiver pairs with IP 69K sealed protection tube for hand detection (1) (2)

Resolution 30 mm. Sensing distance 0...8 or 3...17 m, selectable by wiring

- 2 PNP outputs
- Operating temperature range: -10 °C...+55 °C
- Resistance to acidic and alkaline cleaning agents, and aliphatic hydrocarbons
- TM (mission time): 20 years

Pro- tected height	Total height	Number of light beams	Response time (t1)	PFHd IEC 61508	Reference	Weight
mm	mm		ms			kg
460	620	23	7.5	1.16 x 10 ⁻⁸	XUSL4E30H046LWC	4.050
610	770	31	9	1.28 x 10 ⁻⁸	XUSL4E30H061LWC	4.560
760	920	38	10.5	1.41 x 10 ⁻⁸	XUSL4E30H076LWC	5.050
910	1,070	46	12.5	1.53 x 10 ⁻⁸	XUSL4E30H091LWC	5.550
1,060	1,220	53	14	1.66 x 10 ⁻⁸	XUSL4E30H106LWC	6.060

Transmitter-receiver pairs with IP 69K sealed protection tube for body detection (1) (2)

Sensing distance 0...8 or 3...17 m, selectable by wiring

- 2 PNP outputs
- Operating temperature range: -10 °C...+55 °C
- Resistance to acidic and alkaline cleaning agents, and aliphatic hydrocarbons
- TM (mission time): 20 years

Pro- tected height	Total height	Light beams Number/ spacing	Response time (t1)	PFHd IEC 61508	Reference	Weight
mm	mm		ms			kg
510	677	2 / 500 mm	2.5	9.15 x 10 ⁻⁹	XUSL4E2BB051LWC	3.810
810	977	3 / 400 mm	3	9.99 x 10 ⁻⁹	XUSL4E3BB081LWC	4.430
910	1,077	4 / 300 mm	3	1.08 x 10 ⁻⁸	XUSL4E4BB091LWC	4.660

(1) These safety light curtains are supplied mounted in a sealed protection tube and pre-wired (10 m PVC cable). Mounting brackets are included. Light curtains with protection tube can be mounted on XUSZSS●●● rails.

(2) Test rods must be ordered separately (see page 22).

Other versions: Light curtains with sealed protection tube can be ordered for other protection heights than those listed above. Please contact our Customer Care Center.

Safety detection solutions

Preventa

Safety light curtains, type 4

With IP 69K sealed protection tube and heating system

ECOLAB[®]



XUSL4E30H046LWH

Transmitter-receiver pairs with IP 69K sealed protection tube for finger detection (1) (2)

Resolution 14 mm. Sensing distance 0...2 or 1...5 m, selectable by wiring

- 2 PNP outputs
- Operating temperature range: -25 °C...+55 °C
- Resistance to acidic and alkaline cleaning agents, and aliphatic hydrocarbons
- TM (mission time): 20 years

Pro- tected height	Total height	Number of light beams	Response time (t1)	PFHd IEC 61508	Reference	Weight
mm	mm		ms			kg
310	470	30	5.5	1.27 x 10 ⁻⁸	XUSL4E14F031NWH	3.560
460	620	45	7.5	1.52 x 10 ⁻⁸	XUSL4E14F046NWH	4.050
610	770	60	9	1.75 x 10 ⁻⁸	XUSL4E14F061NWH	4.560
760	920	75	11	2.00 x 10 ⁻⁸	XUSL4E14F076NWH	5.550

Transmitter-receiver pairs with IP 69K sealed protection tube for hand detection (1) (2)

Resolution 30 mm. Sensing distance 0...8 or 3...17 m, selectable by wiring

- 2 PNP outputs
- Operating temperature range: -25 °C...+55 °C
- Resistance to acidic and alkaline cleaning agents, and aliphatic hydrocarbons
- TM (mission time): 20 years

Pro- tected height	Total height	Number of light beams	Response time (t1)	PFHd IEC 61508	Reference	Weight
mm	mm		ms			kg
460	620	23	7.5	1.16 x 10 ⁻⁸	XUSL4E30H046LWH	4.050
610	770	31	9	1.28 x 10 ⁻⁸	XUSL4E30H061LWH	4.560
760	920	38	10.5	1.41 x 10 ⁻⁸	XUSL4E30H076LWH	5.050
910	1,070	46	12.5	1.53 x 10 ⁻⁸	XUSL4E30H091LWH	5.550
1,060	1,220	53	14	1.66 x 10 ⁻⁸	XUSL4E30H106LWH	6.060

Transmitter-receiver pairs with IP 69K sealed protection tube for body detection (1) (2)

Sensing distance 0...8 or 3...17 m, selectable by wiring

- 2 PNP outputs
- Operating temperature range: -25 °C...+55 °C
- Resistance to acidic and alkaline cleaning agents, and aliphatic hydrocarbons
- TM (mission time): 20 years

Pro- tected height	Total height	Light beams Number/ spacing	Response time (t1)	PFHd IEC 61508	Reference	Weight
mm	mm		ms			kg
510	677	2 / 500 mm	2.5	9.15 x 10 ⁻⁹	XUSL4E2BB051LWH	3.810
810	977	3 / 400 mm	3	9.99 x 10 ⁻⁹	XUSL4E3BB081LWH	4.430
910	1,077	4 / 300 mm	3	1.08 x 10 ⁻⁸	XUSL4E4BB091LWH	4.660

(1) These safety light curtains are supplied mounted in a sealed protection tube and pre-wired (10 m PVC cable). Mounting brackets are included. Light curtains with protection tube can be mounted on XUSZSS●●● rails.

(2) Test rods must be ordered separately (see page 22).

Other versions: Light curtains with sealed protection tube can be ordered for other protection heights than those listed above. Please contact our Customer Care Center.

Safety detection solutions Preventa

Safety light curtains, type 2
Standard sensing distance



XUSL2E30H016N

XUSL2E30H031N

Transmitter-receiver pairs for hand detection (1) (2)

Resolution 30 mm. Sensing distance 0...4 or 0...12 m, selectable by wiring

- 2 PNP outputs
- Operating temperature range: -10 °C...+55 °C
- TM (mission time): 20 years

Pro- tected height	Total height	Number of light beams	Response time (t1)	PFHd IEC 61508	Reference	Weight
mm	mm		ms			kg
160	213	8	4.5	2.04×10^{-8}	XUSL2E30H016N	0.400
260	313	13	5.5	2.55×10^{-8}	XUSL2E30H026N	0.600
310	363	16	6	2.66×10^{-8}	XUSL2E30H031N	0.700
460	513	23	8	3.30×10^{-8}	XUSL2E30H046N	1.000
610	663	31	10	3.92×10^{-8}	XUSL2E30H061N	1.200
760	813	38	11	4.57×10^{-8}	XUSL2E30H076N	1.500
910	963	46	13	5.19×10^{-8}	XUSL2E30H091N	1.700
1,060	1,113	53	14.5	5.83×10^{-8}	XUSL2E30H106N	2.000
1,210	1,263	61	16	6.45×10^{-8}	XUSL2E30H121N	2.300
1,360	1,413	68	17.5	7.09×10^{-8}	XUSL2E30H136N	2.500
1,510	1,563	76	19.5	7.71×10^{-8}	XUSL2E30H151N	2.800
1,660	1,713	83	21	8.35×10^{-8}	XUSL2E30H166N	3.000
1,810	1,863	91	22.5	8.98×10^{-8}	XUSL2E30H181N	3.300

Transmitter-receiver pairs for body detection (1) (2)

Sensing distance 0...4 or 0...12 m, selectable by wiring

- 2 PNP outputs
- Operating temperature range: -10 °C...+55 °C
- TM (mission time): 20 years

Pro- tected height	Total height	Light beams Number/ spacing	Response time (t1)	PFHd IEC 61508	Reference	Weight
mm	mm		ms			kg
510	677	2 / 500 mm	3	1.71×10^{-8}	XUSL2E2BB051N	1.120
810	977	3 / 400 mm	3.5	1.87×10^{-8}	XUSL2E3BB081N	1.620
910	1,077	4 / 300 mm	3.5	2.02×10^{-8}	XUSL2E4BB091N	1.720

(1) The safety light curtains are supplied with mounting brackets and screws.

(2) Connection cables and test rods must be ordered separately (see pages 22 and 23).

Safety detection solutions

Preventa

Safety light curtains, type 2

With IP 69K sealed protection tube

Standard sensing distance

ECOLAB[®]



XUSL2E30H046NWC

Transmitter-receiver pairs with IP 69K sealed protection tube, for hand detection, without heating system (1) (2)

Resolution 30 mm. Sensing distance 0...3 or 3...10 m, selectable by wiring

- 2 PNP outputs
- Operating temperature range: -10 °C...+55 °C
- Resistance to acidic and alkaline cleaning agents, and aliphatic hydrocarbons
- TM (mission time): 20 years

Pro- tected height	Total height	Number of light beams	Response time (t1)	PFHd IEC 61508	Reference	Weight
mm	mm		ms			kg
460	620	23	8	3.30×10^{-8}	XUSL2E30H046NWC	4.050
610	770	31	10	3.92×10^{-8}	XUSL2E30H061NWC	4.560
760	920	38	11	4.57×10^{-8}	XUSL2E30H076NWC	5.050
910	1,070	46	13	5.19×10^{-8}	XUSL2E30H091NWC	5.550
1,060	1,220	53	14.5	5.83×10^{-8}	XUSL2E30H106NWC	6.060

Transmitter-receiver pairs with IP 69K sealed protection tube, for hand detection, with heating system (1) (2)

Resolution 30 mm. Sensing distance 0...3 or 3...10 m, selectable by wiring

- 2 PNP outputs
- Operating temperature range: -25 °C...+55 °C
- Resistance to acidic and alkaline cleaning agents, and aliphatic hydrocarbons
- TM (mission time): 20 years

Pro- tected height	Total height	Number of light beams	Response time (t1)	PFHd IEC 61508	Reference	Weight
mm	mm		ms			kg
460	620	23	8	3.30×10^{-8}	XUSL2E30H046NWH	4.050
610	770	31	10	3.92×10^{-8}	XUSL2E30H061NWH	4.560
760	920	38	11	4.57×10^{-8}	XUSL2E30H076NWH	5.050
910	1,070	46	13	5.19×10^{-8}	XUSL2E30H091NWH	5.550
1,060	1,220	53	14.5	5.83×10^{-8}	XUSL2E30H106NWH	6.060

(1) These safety light curtains are supplied mounted in a sealed protection tube and pre-wired (10 m PVC cable). Mounting brackets are included. Light curtains with protection tube can be mounted on XUSZSS●●● rails.

(2) Test rods must be ordered separately (see page 22).

Other versions:

Light curtains with sealed protection tube can be ordered for other protection heights than those listed above. Light curtains with sealed protection tube for body protection are also available. Please contact our Customer Care Center.

Safety detection solutions

Preventa module XPSLCMUT1160

For the muting function on type 2 and type 4

Preventa XUSL light curtains

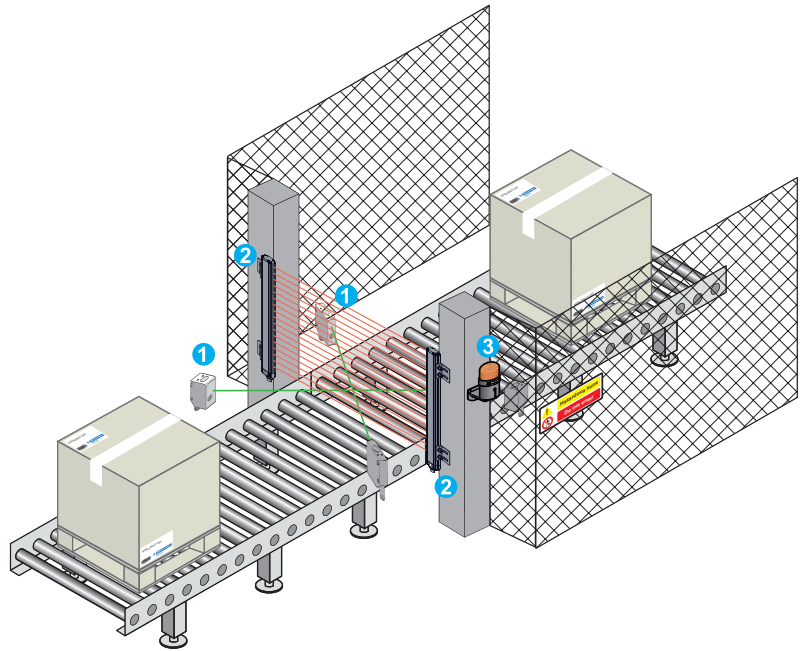
Presentation

Muting is a temporary suspension of the protection function provided by the safety light curtain.

The function is activated or deactivated by means of standard sensors (OsiSense XU "dark on" photo-electric sensors with PNP output).

On activation, a signal is sent to the control system.

This function is used to allow objects to access the hazardous zone during the process. Signaling informs the operator(s) that they are not protected.



- 1 Inhibition sensor (or muting sensor).
- 2 Safety light curtain.
- 3 Muting indicator light.

The muting function (inhibition) effectively ignores the protective function on safety related control systems during a predetermined non-hazardous portion of the machine operation.

Muting mode is only active once the correct sequence of input signals on the inhibition (muting) sensors has occurred.

The purpose of selecting and orienting the inhibition sensors is to recognize the presence of a given part as the means of starting or stopping the inhibition sequence.

Any penetration of animate or inanimate objects into the sensing zone generating a different muting sensor sequence to the one defined, sends a stop signal to the guarded machine.

When the system is in muting mode, an indicator light must be on. This indicator must be visible to all personnel in the vicinity of the machine.

The XPSLCMUT1160 module can be used with a type 2 or type 4 light curtain system.

If the XPSLCMUT1160 module is connected to a **type 4** safety light curtain, with two self-checking solid-state outputs, the system thus created conforms to type 4 (IEC 61496-1) SILCL3 (IEC 62061) and category PLe - Cat. 4 (EN ISO 13849-1:2008).

If the XPSLCMUT1160 module is connected to a **type 2** safety light curtain, with two self-checking solid-state outputs, the system thus created conforms to type 2 (IEC 61496-1) SILCL1 (IEC 62061) and category PLc - Cat. 2 (EN ISO 13849-1:2008).

Note: The muting module response time should be added to that of the associated light curtain system.

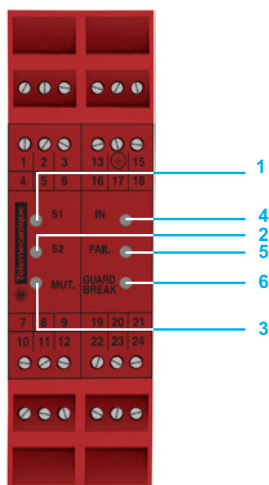


XPSLCMUT1160

Safety detection solutions

Preventa module XPSLCMUT1160

For the muting function on type 2 and type 4
Preventa XUSL light curtains



Description

Status LEDs

- 1 **S1**: status of muting sensor 1.
- 2 **S2**: status of muting sensor 2.
- 3 **MUT.**: status of muting function.
- 4 **IN**: status of safety light curtain OSSD outputs.
- 5 **FAIL**: absence or presence of failure.
- 6 **GUARD BREAK**: status of output relay/fault code.

References

Muting module

- Type 4 level of safety conforming to EN/IEC 61496-1 and EN/IEC 61496-2, SILCL3 conforming to EN/IEC 62061. Category 4, PLe conforming to EN ISO 13849-1: 2008.
- Supply voltage: 24 V $\overline{\text{DC}}$.
- 2 safety relays (NO contacts):
 - Switching capacity conforming to IEC 60947-5-1:
 - AC-15 utilization category: 230 V \sim /2 A, DC-13 utilization category: 24 V $\overline{\text{DC}}$ /2 A.
- B10d (safety relay outputs): 800 000
- Operating temperature range: 0°C...+ 55°C.
- Number of photo-electric sensors that can be connected: 2 (24 V $\overline{\text{DC}}$, PNP "dark on").
- TM (mission time): 20 years.

Description	Connection type	Response time (t _r)	PFHd (1) IEC 61508	Reference	Weight
		ms			kg
Module for muting function	Screw terminals	20 ms max.	6.42 x 10 ⁻⁹ to 5.03 x 10 ⁻⁸	XPSLCMUT1160	0.150

Cabling accessories

Female extensions with 8-pin M12 connector, used to connect the **XPSLCMUT1160** module to the light curtain (receiver) (see page 23).

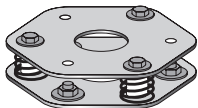
(1) PFHd: Probability of dangerous failure per hour (depends on the load controlled via output relays and the sorties and the frequency of demand).

Safety detection solutions Preventa

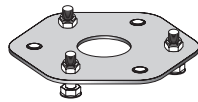
Accessories for safety light curtains
types 2 and 4



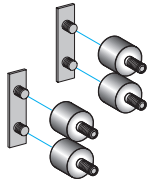
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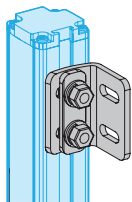
XUSZFB2



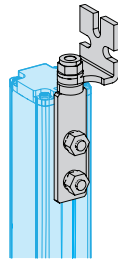
XUSZFB1



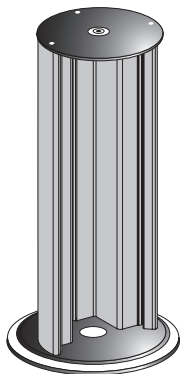
XUSZVA4



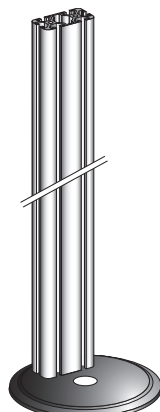
XUSZBSC



XUSZBSS4



XUSZSC



XUSZSS125

Power supplies (1)

Single-phase (N-L1) or 2-phase (L1-L2) connection

Input voltage	Secondary		Reference	Weight kg
	Output voltage	Nominal power Nominal current		
100...120 V ~ 200...500 V ~ -15%, +10% 50/60 Hz	24...28.8 V ---	72 W 3 A	ABL8RPS24030	0.300
		120 W 5 A	ABL8RPS24050	0.700
		240 W 10 A	ABL8RPS24100	1.000

Floor mounting bases for columns and rails

Description	Height	Reference	Weight kg
Double base with springs for level adjustment	47 mm	XUSZFB2	2.200
Single base	26 mm	XUSZFB1	1.000

Anti-vibration kits

Kit contents	Protected height	For use with	Reference	Weight kg
	mm			
<ul style="list-style-type: none"> ■ 4 shock absorbers ■ 2 mounting inserts 	160	XUSLE000016	XUSZVA4	0.050
<ul style="list-style-type: none"> ■ 8 shock absorbers ■ 4 mounting inserts 	260...1,060	XUSLE000026 to XUSLE000106	XUSZVA8	0.100
<ul style="list-style-type: none"> ■ 12 shock absorbers ■ 6 mounting inserts 	1,210...1,810	XUSLE000121 to XUSLE000181	XUSZVA12	0.150

Mounting accessories

Description	Protected height	For use with	Reference	Weight kg
	mm			
Pack of 4 curved brackets (14° rotation of light curtain)	160...1,060	XUSLE000016 to XUSLE000106	XUSZBSC4	0.200
Pack of 6 curved brackets (14° rotation of light curtain)	1,060...1,810	XUSLE000106 to XUSLE000181	XUSZBSC6	0.300
Pack of 4 adjustable brackets (180° rotation of light curtain)	160...1,810	XUSLE000016 to XUSLE000181	XUSZBSS4 (2)	0.150

Aluminum mounting columns and rails for light curtains

Height of column	Protected height	For use with	Reference	Weight kg
mm	mm			
Without mirror adapter, with built-in spirit level				
1,000	610	XUSLE000016 to XUSLE000061	XUSZSC105	3.500
1,330	1,060	XUSLE000076 to XUSLE000106	XUSZSC138	4.400
1,670	1,360	XUSLE000121 to XUSLE000136	XUSZSC172	5.300
1,970	1,810	XUSLE000151 to XUSLE000181	XUSZSC202	6.000
Without mirror adapter, with built-in spirit level and cable gland Pg 11				
1,000	610	XUSLE000016 to XUSLE000061	XUSZSC105R	3.700
1,330	1,060	XUSLE000076 to XUSLE000106	XUSZSC138R	4.500
1,670	1,360	XUSLE000121 to XUSLE000136	XUSZSC172R	5.500
1,970	1,810	XUSLE000151 to XUSLE000181	XUSZSC202R	6.200
Aluminum mounting rail				
1,200	1,210	XUSLE000016 to XUSLE000121	XUSZSS125	1.300

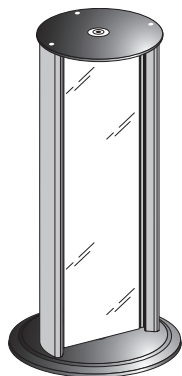
(1) Manual or automatic reset power supplies compliant with EN 61000-3-2. For more information, visit our website www.schneider-electric.com.

(2) XUSZBSS4 adjustable brackets are not compatible with XUSZWPE protective covers and XUSZWPEFC mounting clamps.

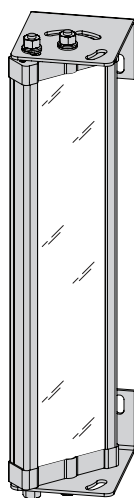
Safety detection solutions

Preventa

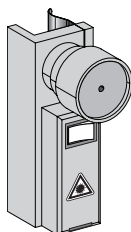
Accessories for safety light curtains
types 2 and 4



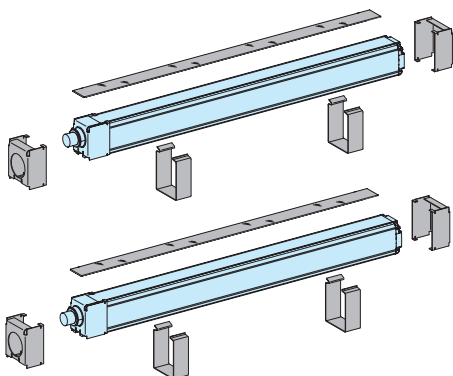
XUSZMF●●●



XUSZMD●●●



XUSZLPE



XUSZWPE●●● + XUSZWPEFC

Aluminum mounting columns with mirror adapters

Height of column mm	Protected height mm	For use with	Reference	Weight kg
1,200	910	XUSLE●●●016 to XUSLE●●●091	XUSZMF125	5.800
1,330	1,060	XUSLE●●●091 to XUSLE●●●106	XUSZMF138	6.400
1,670	1,360	XUSLE●●●106 to XUSLE●●●136	XUSZMF172	8.000
1,970	1,810	XUSLE●●●136 to XUSLE●●●181	XUSZMF202	9.000

Adjustable mirror adapters (1)

Height of mirror mm	Protected height mm	For use with	Reference	Weight kg
250	160	XUSLE●●●016	XUSZMD016	0.900
400	310	XUSLE●●●026 and XUSLE●●●031	XUSZMD031	1.400
540	460	XUSLE●●●046	XUSZMD046	1.800
715	610	XUSLE●●●061 and 2-beam light curtains	XUSZMD061	2.400
885	760	XUSLE●●●076	XUSZMD076	2.800
1,060	910	XUSLE●●●091 and 3-beam light curtains	XUSZMD091	3.300
1,230	1,060	XUSLE●●●106 and 4-beam light curtains	XUSZMD106	3.800
1,400	1,210	XUSLE●●●121	XUSZMD121	4.400
1,450	1,360	XUSLE●●●136	XUSZMD136	4.500
1,600	1,510	XUSLE●●●151	XUSZMD151	5.000
1,750	1,660	XUSLE●●●166	XUSZMD166	5.500
1,900	1,810	XUSLE●●●181	XUSZMD181	6.000

Laser alignment tool

Description	Reference	Weight kg
For aligning transmitters and receivers when used with or without a mirror	XUSZLPE (2)	0.800

Polycarbonate protective covers (3)

Height mm	For use with	Reference	Weight kg
195	XUSLE●●●016	XUSZWPE015 (4)	0.080
345	XUSLE●●●031	XUSZWPE030 (4)	0.140
495	XUSLE●●●046	XUSZWPE045 (4)	0.200
635	XUSLE2BB051	XUSZWPE050 (4)	0.210
645	XUSLE●●●061	XUSZWPE060 (4)	0.260
795	XUSLE●●●076	XUSZWPE075 (4)	0.310
935	XUSLE3BB081	XUSZWPE080 (4)	0.330
945	XUSLE●●●091	XUSZWPE090 (4)	0.380
1,035	XUSLE4BB091	XUSZWPE091 (4)	0.410
1,095	XUSLE●●●106	XUSZWPE105 (4)	0.440
1,245	XUSLE●●●121	XUSZWPE120 (4)	0.500
1,395	XUSLE●●●136	XUSZWPE135 (4)	0.560
1,545	XUSLE●●●151	XUSZWPE150 (4)	0.620
1,695	XUSLE●●●166	XUSZWPE165 (4)	0.680
1,845	XUSLE●●●181	XUSZWPE180 (4)	0.740

Pack of mounting clamps for protective covers

Description	Reference	Weight kg
Stainless steel clamps for XUSZWPE●●● for light curtain pair (transmitter + receiver) ■ 4 end clamps ■ 4 retaining clamps	XUSZWPEFC	0.150

(1) Supplied with 2 mounting brackets.

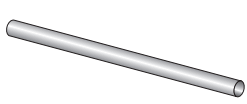
(2) Suitable for all light curtains except for those mounted in IP 69K sealed protection tube.

(3) The protective covers are not compatible with XUSZBSS4 adjustable brackets.

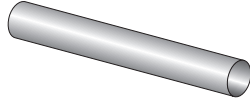
(4) Sold in lots of 4.

Safety detection solutions Preventa

Accessories for safety light curtains
types 2 and 4



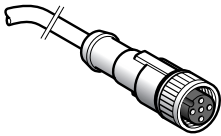
XUSZTR14



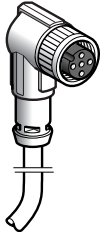
XUSZTR30

Test rods for checking safety light curtains

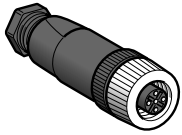
Ø mm	For use with	Reference	Weight kg
14	XUSL4E14F●●	XUSZTR14 (1)	0.020
30	XUSL4E30H●● and XUSL2E30H●●	XUSZTR30 (1)	0.070



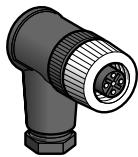
XZCP1164L●



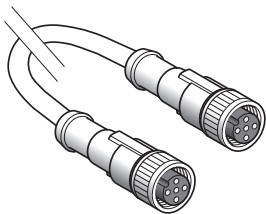
XZCP1264L●



XZCC12FDM50B



XZCC12FCM50B



XZCR1111064D●

M12, 5-pin connection accessories (transmitter)

Pre-wired connectors

Connection	Type	Cable length	Reference	Weight kg
		m		
M12 female connector, PUR cable	Straight	2	XZCP1164L2	0.050
		5	XZCP1164L5	0.250
		10	XZCP1164L10	0.500
		15	XZCP1164L15	0.750
		25	XZCP1164L25	1.250
	Angled	2	XZCP1264L2	0.100
		5	XZCP1264L5	0.250
		10	XZCP1264L10	0.500
		15	XZCP1264L15	0.750
		25	XZCP1264L25	1.250

Connectors for screw terminal connections

Description	Type	Cable length	Reference	Weight kg
		m		
M12 female connectors, metal clamping ring, 7 mm plastic cable gland (Pg 7)	Straight	–	XZCC12FDM50B	0.030
	Angled	–	XZCC12FCM50B	0.030

M12, 5-pin connection accessories (transmitter and receiver)

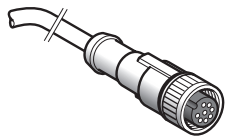
Connection cables for master/slave segments

Description	Type	Cable length	Reference	Weight kg
		m		
2 x M12 female connectors, PUR cable	Straight	0.3	XZCR1111064D03	0.060
		3	XZCR1111064D3	0.180
		5	XZCR1111064D5	0.300
		10	XZCR1111064D10	0.600
		25	XZCR1111064D25	1.500

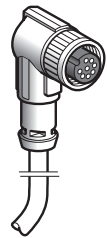
(1) The test rods are not supplied with the safety light curtains; they must be ordered separately.

Safety detection solutions Preventa

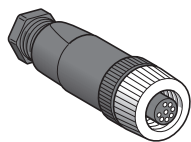
Accessories for safety light curtains
types 2 and 4



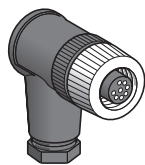
XZCP29P11L●●



XZCP53P11L●●



XZCC12FDM80B



XZCC12FCM80B

M12, 8-pin connection accessories (receiver)

Pre-wired connectors

Connection	Type	Cable length	Reference	Weight
		m		kg
M12 female connector, PUR cable	Straight	2	XZCP29P11L2	0.100
		5	XZCP29P11L5	0.250
		10	XZCP29P11L10	0.500
		15	XZCP29P11L15	0.750
		25	XZCP29P11L25	1.250
	Angled	2	XZCP53P11L2	0.100
		5	XZCP53P11L5	0.250
		10	XZCP53P11L10	0.500
		15	XZCP53P11L15	0.750
		25	XZCP53P11L25	1.250

Connectors for screw terminal connections

Description	Type	Cable length	Reference	Weight
		m		kg
M12 female connectors, metal clamping ring, 7 mm plastic cable gland (Pg 7)	Straight	–	XZCC12FDM80B	0.030
	Angled	–	XZCC12FCM80B	0.030

Safety detection solutions

Preventa safety modules and associated single-beam photo-electric sensors with a test input, with built-in muting function

Operating principle

XPSCM safety modules combined with XU2S single-beam photo-electric sensors (regularly tested) form a category 2 light curtain conforming to EN/IEC 61496 parts 1 and 2.

The connection of 1 to 4 pairs of XU2S photo-electric sensors makes it possible to create a protected zone up to 1,200 mm high conforming to EN 999/ISO 13855 and 8 m long.

The built-in muting function allows the automatic passage of parts to be machined or loaded pallets, without interrupting the transportation movement.

When the system is switched on by the start command (in series with the main circuit feedback loop) and the light protection is not interrupted, the main circuit is closed by the two safety relays in the XPSCM module.

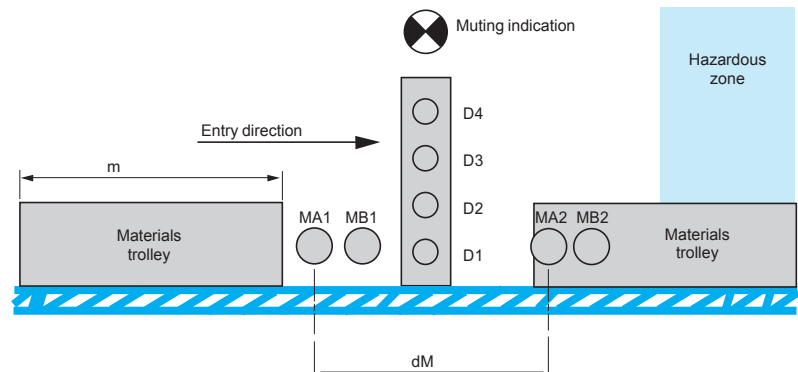
Interruption of the protection field causes the safety outputs to open instantaneously, and the process PLC receives a stop command. The LED on the XPSCM front panel changes from green to red. The "open" state is maintained until the module is restarted using the start button.

The muting function allows the light curtain protection to be inhibited. This can be used to authorize the passage of a materials trolley through the light curtain without tripping the main circuit. The muting function can only be activated by supplying the inhibition sensors if the safety outputs have been switched on beforehand.

To trigger the muting function, activate the inhibition devices within the 3-second time interval. This synchronization time for the two inhibition inputs can be deactivated by connecting two configuration terminals. The muting cycle lasts for a maximum of 60 seconds. During this period, materials can be transported through the protection field without deactivating the safety outputs. The 60-second limit value of the muting cycle can be made infinite by connecting two configuration terminals.

During the muting process, a light indicating the muting status is controlled by the XPSCM module. A fault at indicator light level (short-circuit, open circuit) will be recognized immediately and will deactivate the muting function. The indicator light comes on when a muting signal is generated and indicates inhibition of the protection function.

D1, D2, D3, D4: monitoring photo-electric sensors.
MA1, MB1, MA2, MB2: muting photo-electric sensors.
m = trolley length. dM = distance between MA1, MB1 and MA2, MB2.



Conditions to be observed for the muting function

- The muting sensors must either be:
 - Thru-beam type, sensing distance 8 m: XU2S18PP340L5 (or XU2S18PP340D).
 - Thru-beam type, sensing distance 15 m: XUB2BKSNL2T (or XUB2BKSNM12T) + XUB2BPANL2R (or XUB2BPANM12R).
 - Polarized reflex type, sensing distance 2 m: XUB9BPANL2 (or XUB9BPANM12) + XUZC50.
 - Polarized reflex type, sensing distance 5 m: XUM9APCNL2 (or XUM9APCNM8) or XUM9BPANL2 + XUZC50.
 - Mechanical limit switches.
- $dM \leq m$ to obtain continuous validation of the muting function.
- Avoid the intrusion by people during the muting phase. This phase is indicated by the indicator light connected to the muting indicator output of the XPSCM module.
- A materials trolley should generate the muting signal before entering the protection field and cease it once it has cleared all the sensors in the protection field on exiting.

Safety detection solutions

Preventa safety modules and associated single-beam photo-electric sensors with a test input, with built-in muting function

Safety modules

The **XPSCM1144** and **XPSCM1144P** safety modules are designed for monitoring single-beam photo-electric sensors with a test input, with built-in muting function.

- Maximum level of safety: PL = c, category 2 conforming to EN/ISO 13849-1, SILCL1 conforming to EN/IEC 62061 (1).
- Rated supply voltage: 24 V $\overline{\text{---}}$ (voltage limits: - 20...+ 20%).
- Operating temperature range: -10...+ 55°C.
- Degree of protection: IP 20 (terminals), IP 40 (housing) conforming to IEC/EN 60529.
- Number of safety outputs: 2 (NO, volt-free).
- Additional outputs: 4 solid-state outputs (NO, 24 V $\overline{\text{---}}$ /20 mA).

Description	Response time (t _r)	PFHd (2) IEC 61508 ms	Type of terminal block connection	Reference	Weight kg
Safety modules	< 25 ms	3.12 x 10 ⁻⁷	Integrated in module	XPSCM1144	0.350
			Removable from module	XPSCM1144P	0.350



XPSCM1144●

Single-beam photo-electric sensors with a test input

- Maximum level of safety: PL = c, category 2 conforming to EN/ISO 13849-1, Type 2 conforming to IEC 61496-1 and IEC 61496-2 (1).
- Rated supply voltage: 12...24 V $\overline{\text{---}}$, with protection against reverse polarity.
- Operating temperature range: - 25...+ 55°C.
- Degree of protection: IP 67, conforming to IEC/EN 60529.
- Type of transmission: infrared.
- PFHd (2): 4.6E⁻⁷ (5.5E⁻⁷ with the muting function), conforming to EN/IEC 61508.
- Maximum sensing distance: 8 meters.

Description	Line of sight	Connection	Reference	Weight kg
PNP thru-beam pair (transmitter + receiver) Light or dark programmable switching	Along case axis	Pre-cabled, L = 5 m	XU2S18PP340L5	0.485
		M12 connector	XU2S18PP340D	0.155
	90° to case axis	Pre-cabled, L = 5 m	XU2S18PP340WL5	0.485
		M12 connector	XU2S18PP340WD	0.155
Thru-beam transmitter only	Along case axis	Pre-cabled, L = 5 m	XU2S18KP340L5T	0.235
		M12 connector	XU2S18KP340DT	0.075
	90° to case axis	Pre-cabled, L = 5 m	XU2S18KP340WL5T	0.235
		M12 connector	XU2S18KP340WDT	0.155
PNP thru-beam, receiver only	Along case axis	M12 remote connector L = 0.8 m	XU2S18KP340WLDT	0.200
		Pre-cabled, L = 5 m	XU2S18PP340L5R	0.250
	90° to case axis	M12 connector	XU2S18PP340DR	0.080
		Pre-cabled, L = 5 m	XU2S18PP340WL5R	0.250
		M12 remote connector L = 0.8 m	XU2S18PP340WLDR	0,200

Other versions Pre-cabled sensors with other cable lengths. Please contact our Customer Care Center.

(1) With an appropriate, correctly connected control system, combined with the **XPSCM1144** or **XPSCM1144P** safety module.

(2) PFHd: Probability of dangerous failure per hour.

Note: To find other connection accessories suitable for XU2S sensors, please consult our catalog "OsiSense XZ cabling accessories".



XU2S18●P340L5



XU2S18●P340WL5



XU2S18KP340L5T



XU2S18PP340DR



XU2S18PP340WL5R

A					
ABL8RPS24030	20	XUSL4E14F046NS2	12	XUSL4E30H091N	10
ABL8RPS24050	20	XUSL4E14F046NWC	14	XUSL4E30H091NM	12
ABL8RPS24100	20	XUSL4E14F046NWH	15	XUSL4E30H091NS1	13
		XUSL4E14F061N	10	XUSL4E30H091NS2	12
		XUSL4E14F061NM	12	XUSL4E30H106L	11
		XUSL4E14F061NS1	13	XUSL4E30H106LWC	14
		XUSL4E14F061NS2	12	XUSL4E30H106LWH	15
		XUSL4E14F061NWC	14	XUSL4E30H106N	10
		XUSL4E14F061NWH	15	XUSL4E30H106NM	12
		XUSL4E14F076N	10	XUSL4E30H106NS1	13
		XUSL4E14F076NM	12	XUSL4E30H106NS2	12
		XUSL4E14F076NS1	13	XUSL4E30H121L	11
		XUSL4E14F076NS2	12	XUSL4E30H121N	10
		XUSL4E14F076NWC	14	XUSL4E30H136L	11
		XUSL4E14F076NWH	15	XUSL4E30H136N	10
		XUSL4E14F091N	10	XUSL4E30H151L	11
		XUSL4E14F106N	10	XUSL4E30H151N	10
		XUSL4E14F121N	10	XUSL4E30H166L	11
		XUSL4E14F136N	10	XUSL4E30H166N	10
		XUSL4E14F151N	10	XUSL4E30H181L	11
		XUSL4E14F166N	10	XUSL4E30H181N	10
		XUSL4E14F181N	10	XUSL4E3BB081L	11
		XUSL4E2BB051L	11	XUSL4E3BB081LWC	14
		XUSL4E2BB051LWC	14	XUSL4E3BB081LWH	15
		XUSL4E2BB051LWH	15	XUSL4E3BB081N	10
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		XUSL4E2BB051NS1	13	XUSL4E3BB081NS2	12
		XUSL4E2BB051NS2	12	XUSL4E4BB091L	11
		XUSL4E30H016L	11	XUSL4E4BB091LWC	14
		XUSL4E30H016N	10	XUSL4E4BB091LWH	15
		XUSL4E30H026N	10	XUSL4E4BB091N	10
		XUSL4E30H031L	11	XUSL4E4BB091NM	12
		XUSL4E30H031N	10	XUSL4E4BB091NS1	13
		XUSL4E30H046L	11	XUSL4E4BB091NS2	12
		XUSL4E30H046LWC	14	XUSZBSC4	20
		XUSL4E30H046LWH	15	XUSZBSC6	20
		XUSL4E30H046N	10	XUSZBSS4	20
		XUSL4E30H046NM	12	XUSZFB1	20
		XUSL4E30H046NS1	13	XUSZFB2	20
		XUSL4E30H046NS2	12	XUSZLPE	21
		XUSL4E30H061L	11	XUSZMD016	21
		XUSL4E30H061LWC	14	XUSZMD031	21
		XUSL4E30H061LWH	15	XUSZMD046	21
		XUSL4E30H061N	10	XUSZMD061	21
		XUSL4E30H061NM	12	XUSZMD076	21
		XUSL4E30H061NS1	13	XUSZMD091	21
		XUSL4E30H061NS2	12	XUSZMD106	21
		XUSL4E30H076L	11	XUSZMD121	21
		XUSL4E30H076LWC	14	XUSZMD136	21
		XUSL4E30H076LWH	15	XUSZMD151	21
		XUSL4E30H076N	10	XUSZMD166	21
		XUSL4E30H076NM	12	XUSZMD181	21
		XUSL4E30H076NS1	13	XUSZMF125	21
		XUSL4E30H076NS2	12	XUSZMF138	21
		XUSL4E30H091L	11	XUSZMF172	21
		XUSL4E30H091LWC	14	XUSZMF202	21
		XUSL4E30H091LWH	15	XUSZSC105	20
				XUSZSC105R	20
				XUSZSC138	20
				XUSZSC138R	20
				XUSZSC172	20
				XUSZSC172R	20
				XUSZSC202	20
				XUSZSC202R	20
				XUSZSS125	20
				XUSZTR14	22
				XUSZTR30	22
				XUSZVA12	20
				XUSZVA4	20
				XUSZVA8	20
				XUSZWPE015	21
				XUSZWPE030	21
				XUSZWPE045	21
				XUSZWPE050	21
				XUSZWPE060	21
				XUSZWPE075	21
				XUSZWPE080	21
				XUSZWPE090	21
				XUSZWPE091	21
				XUSZWPE105	21
				XUSZWPE120	21
				XUSZWPE135	21
				XUSZWPE150	21
				XUSZWPE165	21
				XUSZWPE180	21
				XUSZWPEFC	21
				XZCC12FCM50B	22
				XZCC12FCM80B	23
				XZCC12FDM50B	22
				XZCC12FDM80B	23
				XZCP1164L10	22
				XZCP1164L15	22
				XZCP1164L2	22
				XZCP1164L25	22
				XZCP1164L5	22
				XZCP1264L10	22
				XZCP1264L15	22
				XZCP1264L2	22
				XZCP1264L25	22
				XZCP1264L5	22
				XZCP29P11L10	23
				XZCP29P11L15	23
				XZCP29P11L2	23
				XZCP29P11L25	23
				XZCP29P11L5	23
				XZCP53P11L10	23
				XZCP53P11L15	23
				XZCP53P11L2	23
				XZCP53P11L25	23
				XZCP53P11L5	23
				XZCR1111064D03	22
				XZCR1111064D10	22
				XZCR1111064D25	22
				XZCR1111064D3	22
				XZCR1111064D5	22

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