

# Защитные световые завесы серии XUSL

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# Safety detection solutions

## Safety light curtains

### XUSL range

#### Presentation

#### Protection of personnel

Safety light curtains are electro-sensitive protective equipment (ESPE) designed to help protect people 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 the Machinery Directive 2006/42/EC), but they are equally suitable for use with many other types of machine. They help to 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

**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 2014/35/EU and the Electromagnetic Compatibility Directive 2014/30/EU
- 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, EAC, RCM, and TÜV certified.

#### Application sectors

#### Main applications

XUSL2 and XUSL4 safety light curtains are used to detect fingers (1), hands, and bodies in the vicinity of hazardous machinery such as:

- robotic systems
- assembly and packaging lines
- turret punch presses
- palletizers
- packing 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.

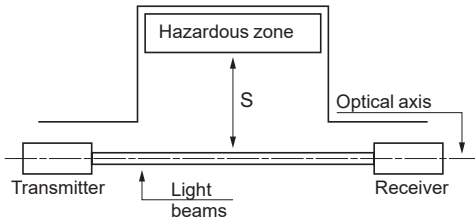
(1) Finger detection: **XUSL4E** light curtains only.

# Safety detection solutions

## Safety light curtains

### XUSL range

#### 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 the minimum safety distance **S** between the light curtain and the hazardous zone:

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

- S** = minimum distance in mm
- K** = approach speed of body (or part of the body) in mm/s
- t<sub>1</sub>** = response time of protection device in s
- t<sub>2</sub>** = stopping time of machine (hazardous movements) in s
- C** = additional distance in mm

■ For multi-beam light curtains:

$$K = 2,000 \text{ mm/s}$$

$$C = 8 (R - 14) \text{ where } R = \text{resolution of the light curtain in mm}$$

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

$$K = 1600 \text{ mm/s}$$

$$C = 850 \text{ mm for multiple single beams}$$

The protected heights are as follows:

Number of light beams	Height of light beams in relation to the reference plane (e.g. the ground)
	(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 "XUSL2E/XUSL4E User Manual" or the "XUSL4M User Manual".

# Safety detection solutions

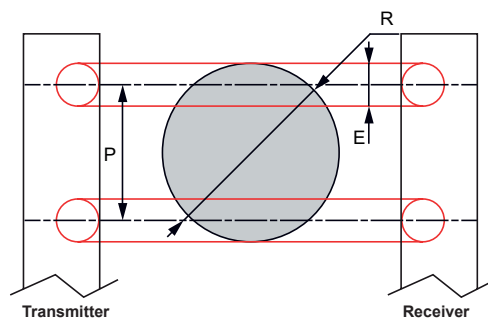
## Safety light curtains

### XUSL range

#### 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.



$$R = P + E$$

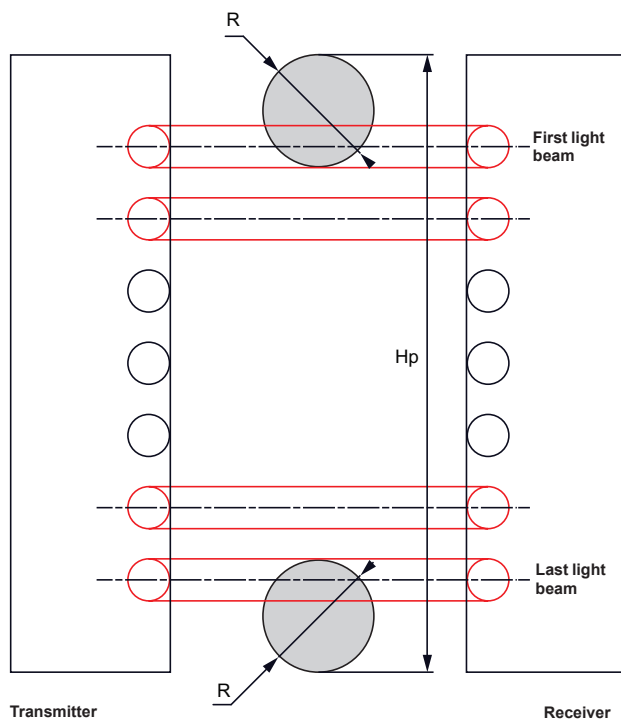
**P:** distance between the mid point of the 2 adjacent light beams

**E:** diameter of the light beams

**R:** resolution (or detection capability)

##### Protected height (Hp)

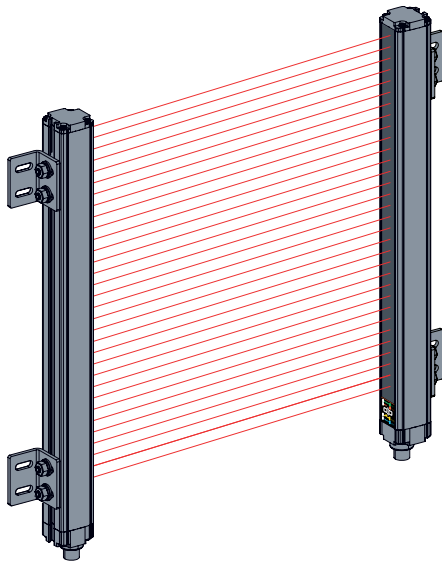
The protected height is the zone (or height) within which an object of diameter at least equal to the resolution (or detection capability) **R** is detected with absolute certainty.



# Safety detection solutions

## Safety light curtains

### XUSL range



#### 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.

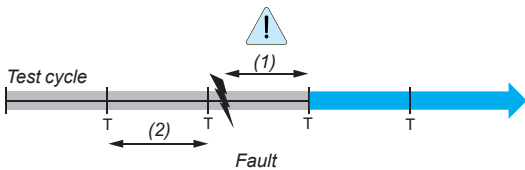
##### Type 2 and type 4 definitions

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 system 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.

##### Operating fault detected for type 2 safety light curtain:



- : OSSD outputs, ON
- : OSSD outputs, OFF

- (1) Risk
- (2) Test period: 500 ms

##### 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 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.

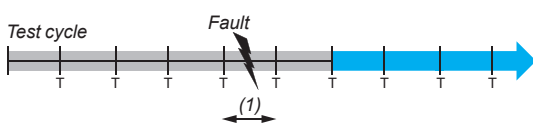
This architecture allows the immediate detection of a failure within a given response time.

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 4 safety light curtain:



- : OSSD outputs, ON
- : OSSD outputs, OFF

- (1) Maximum response time

# Safety detection solutions

## Safety light curtains

### XUSL range

#### Functions and definitions (continued)

##### Risk assessment

Risk assessment and risk reduction form part of an iterative process described in standards EN ISO 12100, 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 XUSL2 and XUSL4 light curtain reference (see pages 12 to 27).

##### 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:

$$T = t1 + t2$$

**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 each XUSL2 and XUSL4 light curtain reference (see pages 12 to 27).

**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**".

# Safety detection solutions

## Safety light curtains

### XUSL range

#### Functions and definitions (continued)

##### Selecting the sensing distance

Two different maximum sensing distances can be selected for each XUSL4 and XUSL2 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 IP69K sealed tube

###### Hand detection:

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

##### Sensing distance for XUSL4E safety light curtains with IP69K 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

##### Sensing distance for XUSL4M safety light curtains with built-in muting function

###### Hand and body detection

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

- 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.



# Safety detection solutions

## Safety light curtains

### XUSL range

#### Functions and definitions (continued)

##### 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
- Status and muting indicator light built into receiver on XUSL4MA light curtains

##### Muting function (inhibition)

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 (XU NO photoelectric sensors with PNP output).

The muting function is:

- built in for XUSL4M light curtains
- available with the XPSLCMUT1160 safety module (1) associated with XUSL2E and XUSL4E light curtains

XUSL4M light curtains can be used with muting arms equipped with preset and pre-wired photoelectric sensors to meet the needs of numerous applications (see pages 28 and 29).

Depending on the type of muting selected, this function allows objects to pass inside or outside the hazardous zone, without interrupting the process.

Signaling can be used to inform the operator or operators that they are not protected.

(1) See pages 20 and 21.

# Safety detection solutions

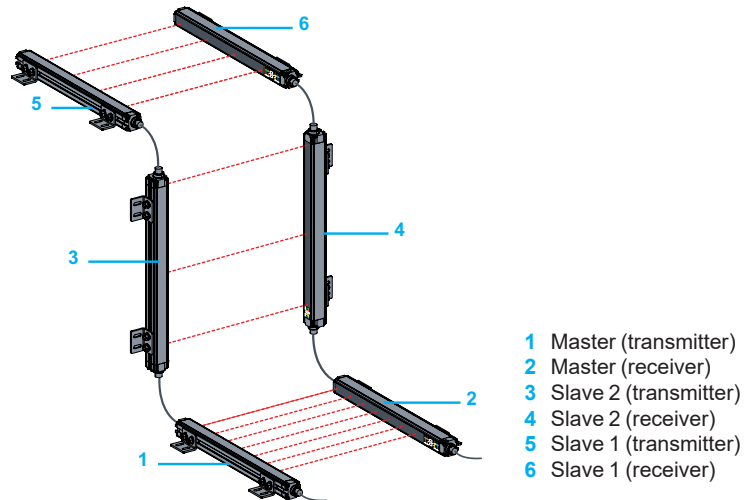
## Safety light curtains

### XUSL range

#### Functions and definitions (continued)

#### Master/slave multi-segments for type 4 light curtains (XUSL4E only)

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)

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 two 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 two slave segments is 50 meters.

#### Light curtains with IP69K sealed protection tube (XUSL2E and XUSL4E light curtains only)

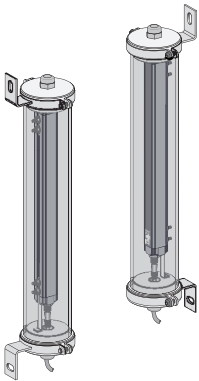
Safety light curtains with protection tube are supplied mounted and pre-wired.

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:

- with heating system (operating temperature: -30 to +55 °C)
- without heating system (operating temperature: -20 to +55 °C)



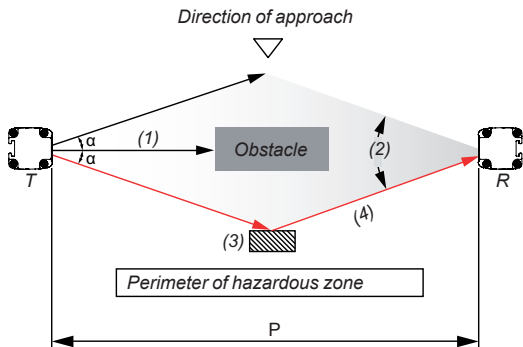
Light curtains with IP69K sealed protection tube

# Safety detection solutions

## Safety light curtains

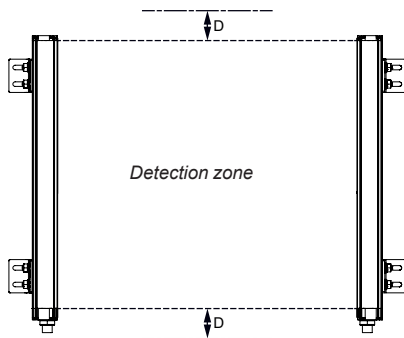
### XUSL range

#### 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 lengthwise:



#### 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 the reflective surface (mm)

**For type 4 (XUSL4 light curtains):**

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

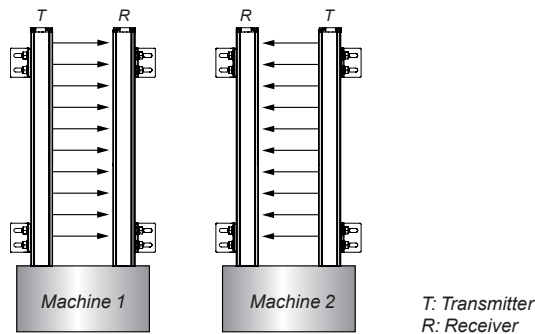
If  $P > 3$  m, then  $D = \tan(2.5^\circ) \times 1,000 \times P$  (m) =  $43.66 \times P$  (m)

##### Mutual interference

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

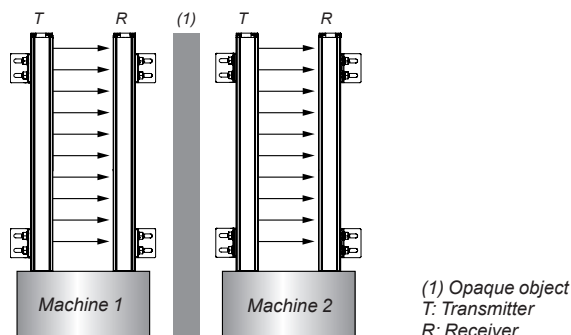
To help prevent interference between safety light curtains, the following installation is recommended.

##### Receivers installed back-to-back



T: Transmitter  
R: Receiver

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



(1) Opaque object  
T: Transmitter  
R: Receiver

# Safety detection solutions

## Safety light curtains

### XUSL range

#### 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.**

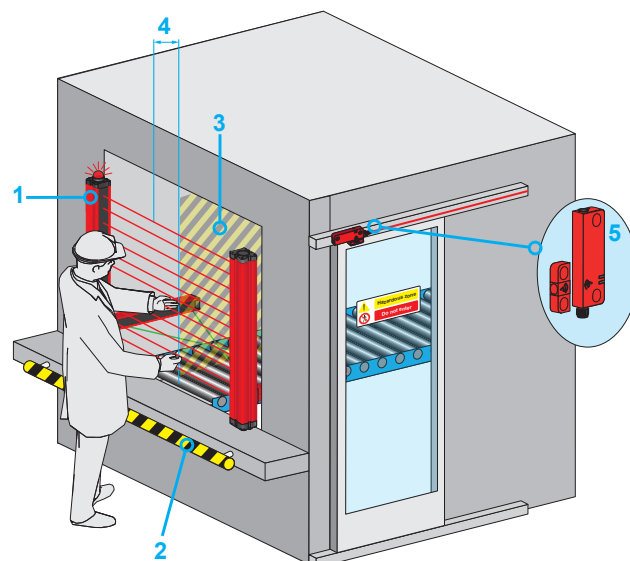
Where safety light curtains do not provide an adequate degree of protection due to their location, additional suitable protection devices or additional light curtains must be used in order to prevent operators from entering the protective light curtain and reaching the hazardous zone (EN/ISO 13857), 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 Hazardous zone
- 4 Safety distance
- 5 XCSRC, XCSLF, or XCSLE safety interlock switches

# Safety detection solutions

## Safety light curtains, type 4

### XUSL range

#### Standard sensing distance



XUSL4E14F016N

XUSL4E14F031N

#### 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: -20 °C...+55 °C
- TM (mission time): 20 years

Protected height	Total height	Number of light beams	Response time (t1)	PFH <sub>D</sub> IEC 61508	Reference	Weight
mm	mm		ms			kg
160	213	15	4	1.03 x 10 <sup>-8</sup>	XUSL4E14F016N	0.400
310	363	30	5.5	1.27 x 10 <sup>-8</sup>	XUSL4E14F031N	0.700
460	513	45	7.5	1.52 x 10 <sup>-8</sup>	XUSL4E14F046N	1.000
610	663	60	9	1.75 x 10 <sup>-8</sup>	XUSL4E14F061N	1.200
760	813	75	11	2.00 x 10 <sup>-8</sup>	XUSL4E14F076N	1.500
910	963	90	13	2.24 x 10 <sup>-8</sup>	XUSL4E14F091N	1.700
1,060	1,113	105	14.5	2.49 x 10 <sup>-8</sup>	XUSL4E14F106N	2.000
1,210	1,263	120	16.5	2.73 x 10 <sup>-8</sup>	XUSL4E14F121N	2.300
1,360	1,413	135	18	2.98 x 10 <sup>-8</sup>	XUSL4E14F136N	2.500
1,510	1,563	150	20	3.22 x 10 <sup>-8</sup>	XUSL4E14F151N	2.800
1,660	1,713	165	22	3.48 x 10 <sup>-8</sup>	XUSL4E14F166N	3.000
1,810	1,863	180	23.5	3.71 x 10 <sup>-8</sup>	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: -30 °C...+55 °C
- TM (mission time): 20 years

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



XUSL4E30H016N

XUSL4E30H031N

#### 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: -30 °C...+55 °C
- TM (mission time): 20 years

Protected height	Total height	Light beams Number/spacing	Response time (t1)	PFH <sub>D</sub> IEC 61508	Reference	Weight
mm	mm		ms			kg
510	677	2 / 500 mm	2.5	6.89 x 10 <sup>-9</sup>	XUSL4E2BB051N	1.100
810	977	3 / 400 mm	3	7.55 x 10 <sup>-9</sup>	XUSL4E3BB081N	1.600
910	1,077	4 / 300 mm	3	8.21 x 10 <sup>-9</sup>	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 24 and 25).

# Safety detection solutions

## Safety light curtains, type 4

### XUSL range

#### 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: -20 °C...+55 °C
- TM (mission time): 20 years

Protected height	Total height	Number of light beams	Response time (t1)	PFH <sub>0</sub> IEC 61508	Reference	Weight
mm	mm		ms			kg
160	213	8	3	$9.13 \times 10^{-9}$	XUSL4E30H016L	0.400
310	363	16	4	$1.04 \times 10^{-8}$	XUSL4E30H031L	0.700
460	513	23	5	$1.16 \times 10^{-8}$	XUSL4E30H046L	1.000
610	663	31	6	$1.28 \times 10^{-8}$	XUSL4E30H061L	1.200
760	813	38	6.5	$1.41 \times 10^{-8}$	XUSL4E30H076L	1.500
910	963	46	7.5	$1.53 \times 10^{-8}$	XUSL4E30H091L	1.700
1,060	1,113	53	8.5	$1.66 \times 10^{-8}$	XUSL4E30H106L	2.000
1,210	1,263	61	9.5	$1.78 \times 10^{-8}$	XUSL4E30H121L	2.300
1,360	1,413	68	10	$1.91 \times 10^{-8}$	XUSL4E30H136L	2.500
1,510	1,563	76	11	$2.03 \times 10^{-8}$	XUSL4E30H151L	2.800
1,660	1,713	83	12	$2.16 \times 10^{-8}$	XUSL4E30H166L	3.000
1,810	1,863	91	13	$2.29 \times 10^{-8}$	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: -20 °C...+55 °C
- TM (mission time): 20 years

Protected height	Total height	Light beams Number/spacing	Response time (t1)	PFH <sub>0</sub> IEC 61508	Reference	Weight
mm	mm		ms			kg
510	677	2 / 500 mm	2.5	$9.15 \times 10^{-9}$	XUSL4E2BB051L	1.100
810	977	3 / 400 mm	2.5	$9.99 \times 10^{-9}$	XUSL4E3BB081L	1.600
910	1,077	4 / 300 mm	2.5	$1.08 \times 10^{-8}$	XUSL4E4BB091L	1.700

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

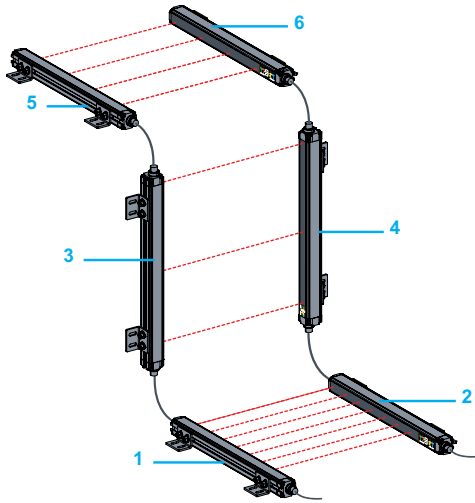
(2) Connection cables and test rods must be ordered separately (see pages 24 and 25).

# Safety detection solutions

## Safety light curtains, type 4

### XUSL range

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) (3)

- 2 PNP outputs
- Operating temperature range:
  - for finger detection: - 20°C...+ 55°C
  - for hand and body detection: - 30°C...+ 55°C
- TM (mission time): 20 years

Protected height	Total height	Light beams Number/spacing	Response time (4)	PFH <sub>D</sub> IEC 61508	Reference	Weight
mm	mm					kg
<b>For finger detection</b>						
<b>Resolution 14 mm. Sensing distance 0...3 or 1...6 m, selectable by wiring</b>						
310	387	30	5.5	1.27 x 10 <sup>-8</sup>	XUSL4E14F031NM	0.720
460	537	45	7.5	1.52 x 10 <sup>-8</sup>	XUSL4E14F046NM	1.020
610	687	60	9	1.75 x 10 <sup>-8</sup>	XUSL4E14F061NM	1.220
760	837	75	11	2.00 x 10 <sup>-8</sup>	XUSL4E14F076NM	1.520

<b>For hand detection</b>						
<b>Resolution 30 mm. Sensing distance 0...4 or 0...12 m, selectable by wiring</b>						
460	537	16	7.5	9.47 x 10 <sup>-9</sup>	XUSL4E30H046NM	1.020
610	687	23	9	1.06 x 10 <sup>-8</sup>	XUSL4E30H061NM	1.220
760	837	31	10.5	1.19 x 10 <sup>-8</sup>	XUSL4E30H076NM	1.520
910	987	38	12.5	1.30 x 10 <sup>-8</sup>	XUSL4E30H091NM	1.720
1,060	1,137	46	14	1.43 x 10 <sup>-8</sup>	XUSL4E30H106NM	2.020

<b>For body detection</b>						
<b>2, 3, or 4 beams. Sensing distance 0...4 or 0...12 m, selectable by wiring</b>						
510	677	2 / 500 mm	2.5	6.89 x 10 <sup>-9</sup>	XUSL4E2BB051NM	1.100
810	977	3 / 400 mm	3	7.55 x 10 <sup>-9</sup>	XUSL4E3BB081NM	1.600
910	1,077	4 / 300 mm	3	8.21 x 10 <sup>-9</sup>	XUSL4E4BB091NM	1.700

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

<b>For finger detection</b>						
<b>Resolution 14 mm. Sensing distance 0...3 or 1...6 m, selectable by wiring</b>						
460	537	45	7.5	1.52 x 10 <sup>-8</sup>	XUSL4E14F046NS2	1.020
610	687	60	9	1.75 x 10 <sup>-8</sup>	XUSL4E14F061NS2	1.220
760	837	75	11	2.00 x 10 <sup>-8</sup>	XUSL4E14F076NS2	1.520

<b>For hand detection</b>						
<b>Resolution 30 mm. Sensing distance 0...4 or 0...12 m, selectable by wiring</b>						
460	537	23	7.5	9.47 x 10 <sup>-9</sup>	XUSL4E30H046NS2	1.020
610	687	31	9	1.06 x 10 <sup>-8</sup>	XUSL4E30H061NS2	1.220
760	837	38	10.5	1.19 x 10 <sup>-8</sup>	XUSL4E30H076NS2	1.520
910	987	46	12.5	1.30 x 10 <sup>-8</sup>	XUSL4E30H091NS2	1.720
1,060	1,137	53	14	1.43 x 10 <sup>-8</sup>	XUSL4E30H106NS2	2.020

<b>For body detection</b>						
<b>2, 3, or 4 beams. Sensing distance 0...4 or 0...12 m, selectable by wiring</b>						
510	677	2 / 500 mm	2.5	6.89 x 10 <sup>-9</sup>	XUSL4E2BB051NS2	1.100
810	977	3 / 400 mm	3	7.55 x 10 <sup>-9</sup>	XUSL4E3BB081NS2	1.600
910	1,077	4 / 300 mm	3	8.21 x 10 <sup>-9</sup>	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 24 and 25).
- (3) A Master transmitter-receiver pair cannot be used without a slave transmitter-receiver pair.
- (4) 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

## Safety light curtains, type 4

### XUSL range

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)	PFH <sub>D</sub> IEC 61508	Reference	Weight
mm	mm					kg
<b>For finger detection</b>						
<b>Resolution 14 mm. Sensing distance 0...3 or 1...6 m, selectable by wiring</b>						
310	363	30	5.5	$1.27 \times 10^{-8}$	XUSL4E14F031NS1	0.720
460	513	45	7.5	$1.52 \times 10^{-8}$	XUSL4E14F046NS1	1.020
610	663	60	9	$1.75 \times 10^{-8}$	XUSL4E14F061NS1	1.220
760	813	75	11	$2.00 \times 10^{-8}$	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	$9.47 \times 10^{-9}$	XUSL4E30H046NS1	1.020
610	663	31	9	$1.06 \times 10^{-8}$	XUSL4E30H061NS1	1.220
760	813	38	10.5	$1.19 \times 10^{-8}$	XUSL4E30H076NS1	1.520
910	963	46	12.5	$1.30 \times 10^{-8}$	XUSL4E30H091NS1	1.720
1,060	1,113	53	14	$1.43 \times 10^{-8}$	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	$6.89 \times 10^{-9}$	XUSL4E2BB051NS1	1.100
810	953	3 / 400 mm	3	$7.55 \times 10^{-9}$	XUSL4E3BB081NS1	1.600
910	1,053	4 / 300 mm	3	$8.21 \times 10^{-9}$	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 24 and 25).

(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

$$\text{Resolution 14 mm} \quad R_{t_{\text{tot}}} = [0.06 \times (\text{No.}_{\text{slave1}} + \text{No.}_{\text{master}}) + 0.9636] \times 2$$

$$R_{t_{\text{tot}}} = [0.06 \times (\text{No.}_{\text{slave1}} + \text{No.}_{\text{slave2}} + \text{No.}_{\text{master}}) + 1.0036] \times 2$$

$$\text{Resolution 30 mm and multi-beam} \quad R_{t_{\text{tot}}} = [0.11 \times (\text{No.}_{\text{slave1}} + \text{No.}_{\text{master}}) + 0.9376] \times 2$$

$$R_{t_{\text{tot}}} = [0.11 \times (\text{No.}_{\text{slave1}} + \text{No.}_{\text{slave2}} + \text{No.}_{\text{master}}) + 1.0508] \times 2$$

#### Calculation of the total PFH<sub>D</sub> for Master/slave light curtains, type 4, standard sensing distance

$$\text{PFH}_{D_{\text{tot}}} = \text{PFH}_{D_{\text{master}}} + \text{PFH}_{D_{\text{slave1}}} (+ \text{PFH}_{D_{\text{slave2}}})$$

No.: Number of light beams

R<sub>t<sub>tot</sub></sub>: Total response time

PFH<sub>D<sub>tot</sub></sub>: Total probability of dangerous failure per hour.

**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

## Safety light curtains, type 4

### XUSL range

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: -20 °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)	PFH <sub>D</sub> IEC 61508	Reference	Weight
mm	mm		ms			kg
310	470	30	5.5	1.27 x 10 <sup>-8</sup>	XUSL4E14F031NWC	3.560
460	620	45	7.5	1.52 x 10 <sup>-8</sup>	XUSL4E14F046NWC	4.050
610	770	60	9	1.75 x 10 <sup>-8</sup>	XUSL4E14F061NWC	4.560
760	920	75	11	2.00 x 10 <sup>-8</sup>	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: -20 °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)	PFH <sub>D</sub> IEC 61508	Reference	Weight
mm	mm		ms			kg
460	620	23	7.5	1.16 x 10 <sup>-8</sup>	XUSL4E30H046LWC	4.050
610	770	31	9	1.28 x 10 <sup>-8</sup>	XUSL4E30H061LWC	4.560
760	920	38	10.5	1.41 x 10 <sup>-8</sup>	XUSL4E30H076LWC	5.050
910	1,070	46	12.5	1.53 x 10 <sup>-8</sup>	XUSL4E30H091LWC	5.550
1,060	1,220	53	14	1.66 x 10 <sup>-8</sup>	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: -20 °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)	PFH <sub>D</sub> IEC 61508	Reference	Weight
mm	mm		ms			kg
510	677	2 / 500 mm	2.5	9.15 x 10 <sup>-9</sup>	XUSL4E2BB051LWC	3.810
810	977	3 / 400 mm	3	9.99 x 10 <sup>-9</sup>	XUSL4E3BB081LWC	4.430
910	1,077	4 / 300 mm	3	1.08 x 10 <sup>-8</sup>	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 24).

**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

## Safety light curtains, type 4

### XUSL range

With IP 69K sealed protection tube and heating system



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: -30 °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)	PFH <sub>D</sub> IEC 61508	Reference	Weight
mm	mm		ms			kg
310	470	30	5.5	1.27 x 10 <sup>-8</sup>	XUSL4E14F031NWH	3.560
460	620	45	7.5	1.52 x 10 <sup>-8</sup>	XUSL4E14F046NWH	4.050
610	770	60	9	1.75 x 10 <sup>-8</sup>	XUSL4E14F061NWH	4.560
760	920	75	11	2.00 x 10 <sup>-8</sup>	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: -30 °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)	PFH <sub>D</sub> IEC 61508	Reference	Weight
mm	mm		ms			kg
460	620	23	7.5	1.16 x 10 <sup>-8</sup>	XUSL4E30H046LWH	4.050
610	770	31	9	1.28 x 10 <sup>-8</sup>	XUSL4E30H061LWH	4.560
760	920	38	10.5	1.41 x 10 <sup>-8</sup>	XUSL4E30H076LWH	5.050
910	1,070	46	12.5	1.53 x 10 <sup>-8</sup>	XUSL4E30H091LWH	5.550
1,060	1,220	53	14	1.66 x 10 <sup>-8</sup>	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: -30 °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)	PFH <sub>D</sub> IEC 61508	Reference	Weight
mm	mm		ms			kg
510	677	2 / 500 mm	2.5	9.15 x 10 <sup>-9</sup>	XUSL4E2BB051LWH	3.810
810	977	3 / 400 mm	3	9.99 x 10 <sup>-9</sup>	XUSL4E3BB081LWH	4.430
910	1,077	4 / 300 mm	3	1.08 x 10 <sup>-8</sup>	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 24).

**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

## Safety light curtains, type 2

### XUSL range

#### 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: -30 °C...+55 °C
- TM (mission time): 20 years

Pro- tected height	Total height	Number of light beams	Response time (t1)	PFH <sub>D</sub> IEC 61508	Reference	Weight
mm	mm		ms			kg
160	213	8	4.5	2.04 x 10 <sup>-8</sup>	XUSL2E30H016N	0.400
260	313	13	5.5	2.55 x 10 <sup>-8</sup>	XUSL2E30H026N	0.600
310	363	16	6	2.66 x 10 <sup>-8</sup>	XUSL2E30H031N	0.700
460	513	23	8	3.30 x 10 <sup>-8</sup>	XUSL2E30H046N	1.000
610	663	31	10	3.92 x 10 <sup>-8</sup>	XUSL2E30H061N	1.200
760	813	38	11	4.57 x 10 <sup>-8</sup>	XUSL2E30H076N	1.500
910	963	46	13	5.19 x 10 <sup>-8</sup>	XUSL2E30H091N	1.700
1,060	1,113	53	14.5	5.83 x 10 <sup>-8</sup>	XUSL2E30H106N	2.000
1,210	1,263	61	16	6.45 x 10 <sup>-8</sup>	XUSL2E30H121N	2.300
1,360	1,413	68	17.5	7.09 x 10 <sup>-8</sup>	XUSL2E30H136N	2.500
1,510	1,563	76	19.5	7.71 x 10 <sup>-8</sup>	XUSL2E30H151N	2.800
1,660	1,713	83	21	8.35 x 10 <sup>-8</sup>	XUSL2E30H166N	3.000
1,810	1,863	91	22.5	8.98 x 10 <sup>-8</sup>	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: -30 °C...+55 °C
- TM (mission time): 20 years

Pro- tected height	Total height	Light beams Number/ spacing	Response time (t1)	PFH <sub>D</sub> IEC 61508	Reference	Weight
mm	mm		ms			kg
510	677	2 / 500 mm	3	1.71 x 10 <sup>-8</sup>	XUSL2E2BB051N	1.120
810	977	3 / 400 mm	3.5	1.87 x 10 <sup>-8</sup>	XUSL2E3BB081N	1.620
910	1,077	4 / 300 mm	3.5	2.02 x 10 <sup>-8</sup>	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 24 and 25).

# Safety detection solutions

## Safety light curtains, type 2

### XUSL range

With IP 69K sealed protection tube

Standard sensing distance

**ECOLAB**<sup>®</sup>



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: -30 °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)	PFH <sub>D</sub> IEC 61508	Reference	Weight
mm	mm		ms			kg
460	620	23	8	$3.30 \times 10^{-8}$	XUSL2E30H046NWC	4.050
610	770	31	10	$3.92 \times 10^{-8}$	XUSL2E30H061NWC	4.560
760	920	38	11	$4.57 \times 10^{-8}$	XUSL2E30H076NWC	5.050
910	1,070	46	13	$5.19 \times 10^{-8}$	XUSL2E30H091NWC	5.550
1,060	1,220	53	14.5	$5.83 \times 10^{-8}$	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: -30 °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)	PFH <sub>D</sub> IEC 61508	Reference	Weight
mm	mm		ms			kg
460	620	23	8	$3.30 \times 10^{-8}$	XUSL2E30H046NWH	4.050
610	770	31	10	$3.92 \times 10^{-8}$	XUSL2E30H061NWH	4.560
760	920	38	11	$4.57 \times 10^{-8}$	XUSL2E30H076NWH	5.050
910	1,070	46	13	$5.19 \times 10^{-8}$	XUSL2E30H091NWH	5.550
1,060	1,220	53	14.5	$5.83 \times 10^{-8}$	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 24).

#### 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

## Module XPSLCMUT1160

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

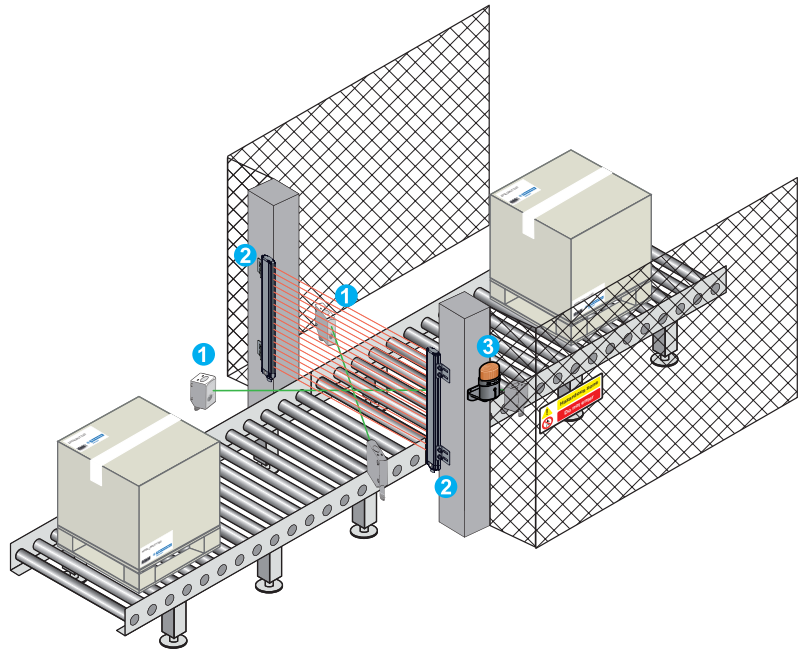
### Presentation

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 (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).

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).

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



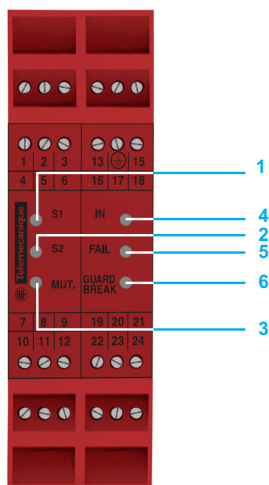
XPSLCMUT1160

## Safety detection solutions

### Module XPSLCMUT1160

For the muting function on type 2 and type 4 safety light curtains

XUSL range



#### 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.
- 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 <sub>r</sub> )	PFH <sub>D</sub> (1) IEC 61508	Reference	Weight
		ms			kg
Module for muting function	Screw terminals	20 ms max.	6.42 x 10 <sup>-9</sup> to 5.03 x 10 <sup>-8</sup>	<b>XPSLCMUT1160</b>	0.150

##### Cabling accessories

Female extensions with 8-pin M12 connector, used to connect the **XPSLCMUT1160** module to the light curtain (receiver) (see page 25).

(1) PFH<sub>D</sub>: 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

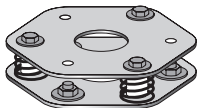
Accessories for safety light curtains

types 2 and 4

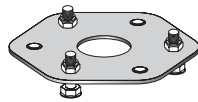
XUSL range



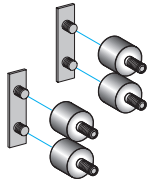
ABL8RPS24050



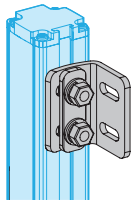
XUSZFB2



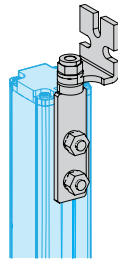
XUSZFB1



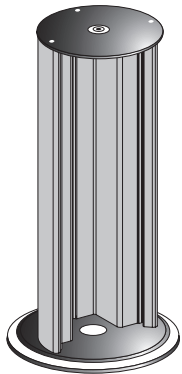
XUSZVA4



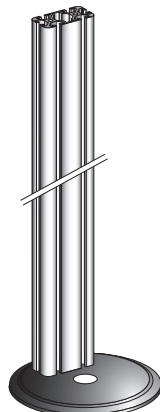
XUSZBSC



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"> <li>■ 4 shock absorbers</li> <li>■ 2 mounting inserts</li> </ul>	160	XUSLE016	XUSZVA4	0.050
<ul style="list-style-type: none"> <li>■ 8 shock absorbers</li> <li>■ 4 mounting inserts</li> </ul>	260...1,060	XUSLE026 to XUSLE106	XUSZVA8	0.100
<ul style="list-style-type: none"> <li>■ 12 shock absorbers</li> <li>■ 6 mounting inserts</li> </ul>	1,210...1,810	XUSLE121 to XUSLE181	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	XUSLE016 to XUSLE106	XUSZBSC4	0.200
Pack of 6 curved brackets (14° rotation of light curtain)	1,060...1,810	XUSLE106 to XUSLE181	XUSZBSC6	0.300
Pack of 4 adjustable brackets (180° rotation of light curtain)	160...1,810	XUSLE016 to XUSLE181	XUSZBSS4 (2)	0.150

## Aluminum mounting columns and rails for light curtains (3)

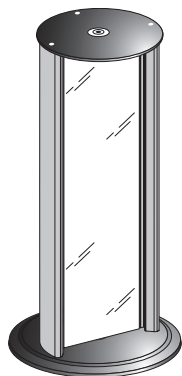
Height of column mm	Protected height mm	For use with	Reference	Weight kg
<b>Without mirror adapter, with built-in spirit level</b>				
1,000	610	XUSLE016 to XUSLE061	XUSZSC105	3.500
1,330	1,060	XUSLE076 to XUSLE106	XUSZSC138	4.400
1,670	1,360	XUSLE121 to XUSLE136	XUSZSC172	5.300
1,970	1,810	XUSLE151 to XUSLE181	XUSZSC202	6.000
<b>Without mirror adapter, with built-in spirit level and cable gland Pg 11</b>				
1,000	610	XUSLE016 to XUSLE061	XUSZSC105R	3.700
1,330	1,060	XUSLE076 to XUSLE106	XUSZSC138R	4.500
1,670	1,360	XUSLE121 to XUSLE136	XUSZSC172R	5.500
1,970	1,810	XUSLE151 to XUSLE181	XUSZSC202R	6.200
<b>Aluminum mounting rail</b>				
1,200	1,210	XUSLE016 to XUSLE121	XUSZSS125	1.300

# Safety detection solutions

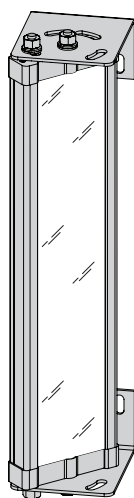
## Accessories for safety light curtains

### types 2 and 4

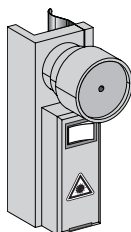
### XUSL range



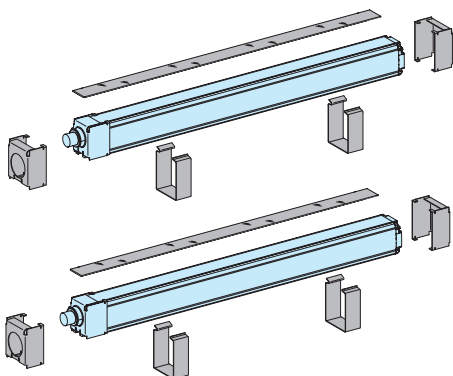
XUSZMF●●●



XUSZMD●●●



XUSZLPE



XUSZWPE●●● + XUSZWPEFC

#### Aluminum mounting columns with mirror adapters <sup>(1)</sup>

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

#### Adjustable mirror adapters <sup>(2)</sup>

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

#### Laser alignment tool

Description	Reference	Weight kg
For aligning transmitters and receivers when used with or without a mirror	XUSZLPE <sup>(3)</sup>	0.800

#### Polycarbonate protective covers <sup>(4)</sup>

Height mm	For use with	Reference	Weight kg
195	XUSL●E●●●016	XUSZWPE015 <sup>(5)</sup>	0.080
345	XUSL●E●●●031	XUSZWPE030 <sup>(5)</sup>	0.140
495	XUSL●E●●●046	XUSZWPE045 <sup>(5)</sup>	0.200
635	XUSL●E2BB051	XUSZWPE050 <sup>(5)</sup>	0.210
645	XUSL●E●●●061	XUSZWPE060 <sup>(5)</sup>	0.260
795	XUSL●E●●●076	XUSZWPE075 <sup>(5)</sup>	0.310
935	XUSL●E3BB081	XUSZWPE080 <sup>(5)</sup>	0.330
945	XUSL●E●●●091	XUSZWPE090 <sup>(5)</sup>	0.380
1,035	XUSL●E4BB091	XUSZWPE091 <sup>(5)</sup>	0.410
1,095	XUSL●E●●●106	XUSZWPE105 <sup>(5)</sup>	0.440
1,245	XUSL●E●●●121	XUSZWPE120 <sup>(5)</sup>	0.500
1,395	XUSL●E●●●136	XUSZWPE135 <sup>(5)</sup>	0.560
1,545	XUSL●E●●●151	XUSZWPE150 <sup>(5)</sup>	0.620
1,695	XUSL●E●●●166	XUSZWPE165 <sup>(5)</sup>	0.680
1,845	XUSL●E●●●181	XUSZWPE180 <sup>(5)</sup>	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

<sup>(1)</sup> The floor mounting bases XUSZFB1 and XUSZFB2 must be ordered separately.

<sup>(2)</sup> Supplied with 2 mounting brackets.

<sup>(3)</sup> Suitable for all light curtains except for those mounted in IP 69K sealed protection tube.

<sup>(4)</sup> The protective covers are not compatible with XUSZBSS4 adjustable brackets.

<sup>(5)</sup> Sold in lots of 4.

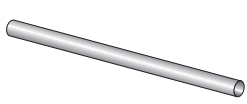


# Safety detection solutions

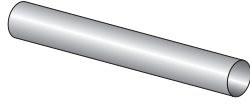
Accessories for safety light curtains

types 2 and 4

XUSL range



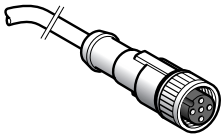
XUSZTR14



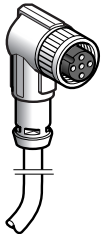
XUSZTR30

### Test rods for checking safety light curtains

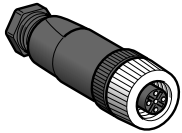
Ø mm	For use with	Reference	Weight kg
14	XUSL4E14F●●	XUSZTR14 (1)	0.020
30	XUSL4E30H●● and XUSL2E30H●●	XUSZTR30 (1)	0.070



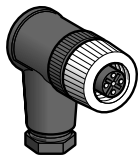
XZCP1164L●



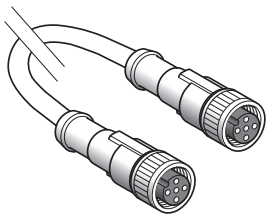
XZCP1264L●



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
	Angled	15	XZCP1164L15	0.750
		25	XZCP1164L25	1.250
		2	XZCP1264L2	0.100
	Angled	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

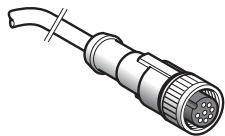
(1) The test rods are not supplied with the safety light curtains; they must be ordered separately.

# Safety detection solutions

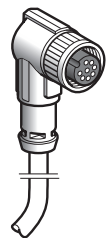
Accessories for safety light curtains

types 2 and 4

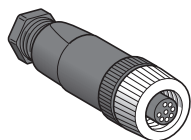
XUSL range



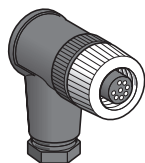
XZCP29P11L●●



XZCP53P11L●●



XZCC12FDM80B



XZCC12FCM80B

## M12, 8-pin connection accessories (receiver)

### Pre-wired connectors

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

# Safety detection solutions

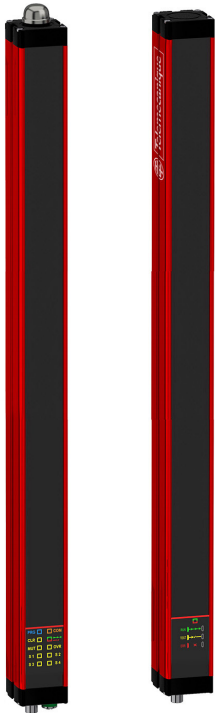
Safety light curtains, type 4, with built-in muting function.

Configurable by wiring or software (1).

Advanced models

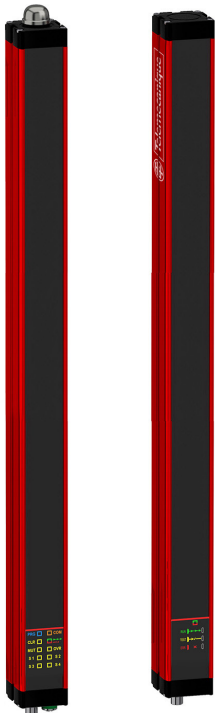
XUSL range

XU-SAF\_61E\_CPMFS18032



XUSL4MA30H●●●N

XU-SAF\_61E\_CPMFS18032



XUSL4MA●BB0●1N

## Transmitter-receiver pairs for hand detection (2) (3)

### Resolution 30 mm. Sensing distance 0...4 or 0...12 m

- 2 PNP outputs
- Operating temperature range: -30 °C...+55 °C
- TM (mission time): 20 years
- Status and muting indicator light built into receiver
- Partial muting

Protected height	Total height	Number of light beams	Response time (t1)	PFH <sub>D</sub> IEC 61508	Reference	Weight
mm	mm		ms			kg
310	420	16	8	1.78 x 10 <sup>-8</sup>	XUSL4MA30H031N	2.210
460	570	23	9.5	1.91 x 10 <sup>-8</sup>	XUSL4MA30H046N	2.850
610	720	31	11	2.02 x 10 <sup>-8</sup>	XUSL4MA30H061N	3.490
760	870	38	12.5	2.15 x 10 <sup>-8</sup>	XUSL4MA30H076N	4.380
910	1,020	46	14.5	2.26 x 10 <sup>-8</sup>	XUSL4MA30H091N	5.020
1,060	1,170	53	16	2.39 x 10 <sup>-8</sup>	XUSL4MA30H106N	5.660
1,210	1,320	61	17.6	2.50 x 10 <sup>-8</sup>	XUSL4MA30H121N	6.300
1,360	1,470	68	19	2.63 x 10 <sup>-8</sup>	XUSL4MA30H136N	6.940
1,510	1,620	76	20.5	2.74 x 10 <sup>-8</sup>	XUSL4MA30H151N	7.580

### Resolution 40 mm. Sensing distance 0...4 or 0...12 m

Protected height	Total height	Number of light beams	Response time (t1)	PFH <sub>D</sub> IEC 61508	Reference	Weight
mm	mm		ms			kg
910	1,020	31	11	1.77 x 10 <sup>-8</sup>	XUSL4MA40H091N	5.020
1,060	1,170	36	12.5	1.85 x 10 <sup>-8</sup>	XUSL4MA40H106N	5.660
1,210	1,320	41	13.5	1.95 x 10 <sup>-8</sup>	XUSL4MA40H121N	6.300
1,360	1,470	46	14.5	2.03 x 10 <sup>-8</sup>	XUSL4MA40H136N	6.940
1,510	1,620	51	15.5	2.12 x 10 <sup>-8</sup>	XUSL4MA40H151N	7.580
1,660	1,770	56	16.5	2.21 x 10 <sup>-8</sup>	XUSL4MA40H166N	8.240
1,810	1,920	61	17.5	2.30 x 10 <sup>-8</sup>	XUSL4MA40H181N	8.880
1,960	2,070	66	18.5	2.38 x 10 <sup>-8</sup>	XUSL4MA40H196N	9.520
2,110	2,220	71	19.5	2.47 x 10 <sup>-8</sup>	XUSL4MA40H211N	10.160
2,260	2,370	76	20.5	2.56 x 10 <sup>-8</sup>	XUSL4MA40H226N	10.800

## Transmitter-receiver pairs for body detection (2) (3)

### 2, 3, or 4 beams. Sensing distance 0...4 or 0...12 m

- 2 PNP outputs
- Operating temperature range: -30 °C...+55 °C
- TM (mission time): 20 years
- Status and muting indicator light built into receiver

Protected height	Total height	Light beams Number/spacing	Response time (t1)	PFH <sub>D</sub> IEC 61508	Reference	Weight
mm	mm		ms			kg
510	710	2 / 500 mm	5.5	8.97 x 10 <sup>-9</sup>	XUSL4MA2BB051N	3.310
810	1,010	3 / 400 mm	5.5	9.63 x 10 <sup>-9</sup>	XUSL4MA3BB081N	4.760
910	1,110	4 / 300 mm	5.5	1.03 x 10 <sup>-8</sup>	XUSL4MA4BB091N	5.180

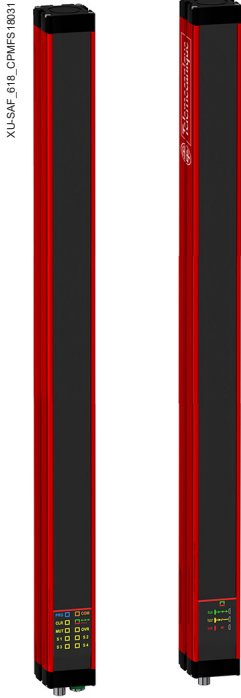
(1) The configuration software is presented on page 32.

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

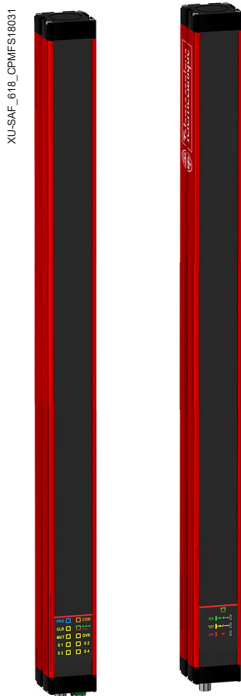
(3) Connection cables and test rods must be ordered separately (see page 32).

# Safety detection solutions

Safety light curtains, type 4, with built-in muting function.  
Configurable by wiring. Basic models  
XUSL range



XUSL4MB30H●●●N



XUSL4MB●BB0●1N

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

Resolution 30 mm. Sensing distance 0...4 or 0...12 m

- 2 PNP outputs
- Operating temperature range: -30 °C...+55 °C
- TM (mission time): 20 years

Protected height	Total height	Number of light beams	Response time (t1)	PFH <sub>D</sub> IEC 61508	Reference	Weight
mm	mm		ms			kg
310	395	16	8	1.78 x 10 <sup>-9</sup>	XUSL4MB30H031N	2.210
460	545	23	9.5	1.91 x 10 <sup>-9</sup>	XUSL4MB30H046N	2.850
610	695	31	11	2.02 x 10 <sup>-9</sup>	XUSL4MB30H061N	3.490
760	845	38	12.5	2.15 x 10 <sup>-9</sup>	XUSL4MB30H076N	4.380
910	995	46	14.5	2.26 x 10 <sup>-9</sup>	XUSL4MB30H091N	5.020
1,060	1,145	53	16	2.39 x 10 <sup>-9</sup>	XUSL4MB30H106N	5.660
1,210	1,295	61	17.6	2.50 x 10 <sup>-9</sup>	XUSL4MB30H121N	6.300
1,360	1,445	68	19	2.63 x 10 <sup>-9</sup>	XUSL4MB30H136N	6.940
1,510	1,595	76	20.5	2.74 x 10 <sup>-9</sup>	XUSL4MB30H151N	7.580

Resolution 40 mm. Sensing distance 0...4 or 0...12 m

Protected height	Total height	Number of light beams	Response time (t1)	PFH <sub>D</sub> IEC 61508	Reference	Weight
mm	mm		ms			kg
910	995	31	11	1.77 x 10 <sup>-9</sup>	XUSL4MB40H091N	5.020
1,060	1,145	36	12.5	1.85 x 10 <sup>-9</sup>	XUSL4MB40H106N	5.660
1,210	1,295	41	13.5	1.95 x 10 <sup>-9</sup>	XUSL4MB40H121N	6.300
1,360	1,445	46	14.5	2.03 x 10 <sup>-9</sup>	XUSL4MB40H136N	6.940
1,510	1,595	51	15.5	2.12 x 10 <sup>-9</sup>	XUSL4MB40H151N	7.580
1,660	1,745	56	16.5	2.21 x 10 <sup>-9</sup>	XUSL4MB40H166N	8.240
1,810	1,895	61	17.5	2.30 x 10 <sup>-9</sup>	XUSL4MB40H181N	8.880
1,960	2,045	66	18.5	2.38 x 10 <sup>-9</sup>	XUSL4MB40H196N	9.520
2,110	2,195	71	19.5	2.47 x 10 <sup>-9</sup>	XUSL4MB40H211N	10.160
2,260	2,345	76	20.5	2.56 x 10 <sup>-9</sup>	XUSL4MB40H226N	10.800

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

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

- 2 PNP outputs
- Operating temperature range: -30 °C...+55 °C
- TM (mission time): 20 years

Protected height	Total height	Light beams Number/spacing	Response time (t1)	PFH <sub>D</sub> IEC 61508	Reference	Weight
mm	mm		ms			kg
510	685	2 / 500 mm	5.5	8.97 x 10 <sup>-9</sup>	XUSL4MB2BB051N	3.310
810	985	3 / 400 mm	5.5	9.63 x 10 <sup>-9</sup>	XUSL4MB3BB081N	4.760
910	1,085	4 / 300 mm	5.5	1.03 x 10 <sup>-8</sup>	XUSL4MB4BB091N	5.180

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

(2) Connection cables and test rods must be ordered separately (see page 32).

# Safety detection solutions

Preset muting arms for safety light curtains, type 4 XUSL range



XUSZASL2XT



XUSZASL2PP,  
XUSZASL2PPT,  
XUSZASL2PPS



XUSZAML2XP,  
XUSZAML2PTS

## L-configuration muting arms

- One-way: muting function active on exit only from the hazardous zone
- Operating temperature range: -30 °C...+55 °C
- TM (mission time): 20 years
- Each reference comprises two components:
  - for the thru-beam system: one transmitter arm + one receiver arm,
  - for the reflex system: one transmitter/receiver arm + one reflector arm.

Sensing distance	Number of built-in sensors	Light beam/sensor type	Reference	Weight
				kg
<b>Single-beam arms</b>				
1...2.5	2	Cross-beam/Thru-beam	XUSZASL2XT	1.170
0...3.5	2	Parallel/Reflex	XUSZASL2PP	1.250

## Multi-beam arms (1) (2)

0...3.5	2	Cross-beam or parallel/Thru-beam	XUSZAML2XP	1.530
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## Single-beam arms for detection of transparent materials

0...2	2	Parallel/Reflex	XUSZASL2PPT	1.250
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## Arms for high-speed conveyors (3)

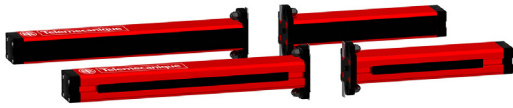
<b>Single-beam</b>				
0...3.5	2	Parallel/Reflex	XUSZASL2PPS	1.450
<b>Multi-beam</b>				
0...3.5	2	Parallel/Thru-beam	XUSZAML2PTS	1.690

- (1) The multi-beam arms and sensors are suitable for detecting non-standard irregular-shaped objects, such as objects with detection holes, like pallets.
- (2) To help prevent interference between multi-beam photo-electric sensors, XUSZAM●● preset muting arms are equipped with sensors that each have different coding: XUSZPM5AXPL09 sensors are A-coded and XUSZPM5BXPL09 sensors are B-coded.
- (3) Arms for high-speed conveyors have a longer distance between muting sensors. These arms are suitable for conveyors that operate at speeds faster than 25 m/minute.

# Safety detection solutions

Preset muting arms for safety light curtains, type 4  
XUSL range

XUSAF\_618\_CPMFS18010

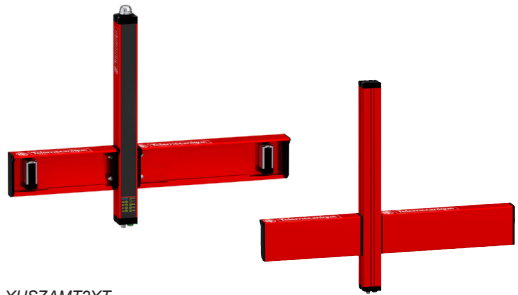


XUSZAST2XT

XUSAF\_618\_CPMFS18014

XUSZAST4PP,  
XUSZAST4PPT,  
XUSZAST4PPS

XUSAF\_618\_CPMFS18024 &amp; 29



XUSZAMT2XT

XUSAF\_61E\_CPMFS18007

XUSZAMT4PT,  
XUSZAMT4PTS

## T-configuration muting arms

- Two-way: muting function active on entry to and exit from the hazardous zone
- Operating temperature range: -30 °C...+55 °C
- TM (mission time): 20 years
- Each reference comprises four components:
  - for the thru-beam system: two transmitter arms + two receiver arms,
  - for the reflex system: two transmitter/receiver arms + two reflector arms.

Sensing distance	Number of built-in sensors	Light beam and sensor type	Reference	Weight
m				kg
<b>Single-beam arms</b>				
1...2.5	2	Cross-beam/Thru-beam	<b>XUSZAST2XT</b>	1.850
0...3.5	4	Parallel/Reflex	<b>XUSZAST4PP</b>	2.480

## Multi-beam arms (1) (2)

0...3.5	2	Cross-beam/Thru-beam	<b>XUSZAMT2XT</b>	2.270
	4	Parallel/Thru-beam	<b>XUSZAMT4PT</b>	3.070

## Single-beam arms for detection of transparent materials

0...2	4	Parallel/Reflex	<b>XUSZAST4PPT</b>	2.480
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## Arms for high-speed conveyors (3)

<b>Single-beam</b>				
0...3.5	4	Parallel/Reflex	<b>XUSZAST4PPS</b>	2.880
<b>Multi-beam</b>				
0...3.5	4	Parallel/Thru-beam	<b>XUSZAMT4PTS</b>	3.390

(1) The multi-beam arms and sensors are suitable for detecting non-standard irregular-shaped objects, such as pallets, which have detection holes that can interfere with detection.

(2) To help prevent interference between multi-beam photo-electric sensors, **XUSZAM●●** preset muting arms are equipped with sensors that each have different coding: **XUSZPM5AXPL09** sensors are A-coded and **XUSZPM5BXPL09** sensors are B-coded.

(3) Arms for high-speed conveyors have a longer distance between muting sensors. These arms are suitable for conveyors that operate at speeds faster than 25 m/minute.

# Safety detection solutions

Safety lights curtains

XUSL range

Separate single-beam photo-electric sensors



XUM9APSBM8



XUK2AKSNM12T



XUK2APANM12R



XUBTAPSNM12  
XU511\_CPODA2018021

Separate photo-electric sensors (1)				
Sensing distance	Function Output	Connections	Reference	Weight
m				kg
<b>Polarized reflex system with adjustable sensitivity</b>				
5 with XU511_CPODA2018021 reflector	NO or NC programmable PNP	M8 connector	<b>XUM9APSBM8</b>	0.010
<b>Thru-beam system</b>				
30 Transmitter	–	M12 connector	<b>XUK2AKSNM12T</b>	0.070
30 Receiver	NO PNP	M12 connector	<b>XUK2APANM12R</b>	0.075
<b>Self-teach coaxial polarized reflex system (along case axis) for detection of transparent objects</b>				
0...1.4 with XU511_CPODA2018021/XU511_CPODA2018021 reflector	NO or NC by programming	M12 connector	<b>XUBTAPSNM12</b>	0.045
<b>Diffuse system with adjustable background suppression</b>				
1	NO or NC by programming	M12 connector	<b>XUK8AKSNM12</b>	0.070

(1) Refer to the "XU photo-electric sensors" catalog.

## Safety detection solutions

Safety lights curtains

XUSL range

Separate multi-beam photo-electric sensors

XU-SAF\_618\_CPMFS10011



XUSZPM5●XPL09

### 5-beam photo-electric sensors for muting function, thru-beam system (transmitter + receiver) (1) (2)

Coding	Sensing distance m	Connection	Reference	Weight kg
<b>A</b>	0...3.5	By remote M12 connector, male, 5-pin (L = 0.90 m)	<b>XUSZPM5AXPL09</b>	0.320
<b>B</b>	0...3.5	By remote M12 connector, male, 5-pin (L = 0.90 m)	<b>XUSZPM5BXPL09</b>	0.320

(1) The multi-beam arms and sensors are suitable for detecting non-standard irregular-shaped objects, such as pallets, which have detection holes that can interfere with detection.

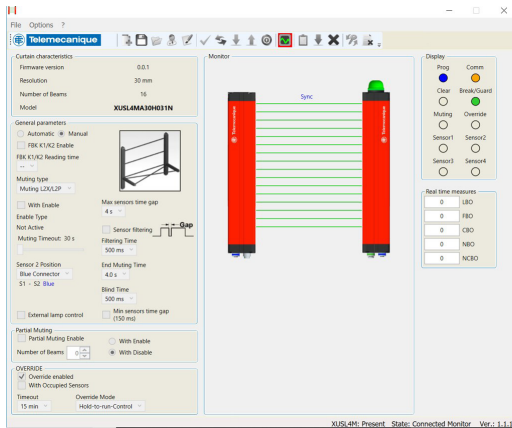
(2) To help prevent interference between multi-beam photo-electric sensors, separate sensors with different coding must be used:

**XUSZPM5AXPL09**: A-coded, **XUSZPM5BXPL09**: B-coded.



# Safety detection solutions

Software and accessories for safety light curtains, type 4, with built-in muting function  
XUSL range



Example programming window

## Configuration software for light curtains (advanced models)

“SoMute” software is used to configure XUSL4MA●● type 4 safety light curtains. It can be downloaded free of charge from or by scanning the QR code on the product label.

“SoMute” offers the flexibility to set all the parameters required for correct operation of the safety light curtain and its muting function.

The main configurable parameters are as follows:

- > Start and restart modes
- > External device monitoring (EDM)
- > Muting configuration: L, T, parallel-beam, cross-beam, number of muting sensors
- > Enable/disable mode for the muting function
- > Enable/disable mode for the partial muting function
- > The command type for the override function
- > Application parameters for the muting function and associated sensors

## Power supply

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

Input voltage	Secondary Output voltage	Nominal power	Nominal current	Reference	Weight kg
100...120 V ~ 200...500 V ~ -15%, +10% 50/60 Hz	24...28.8 V - -	120 W	5 A	ABL8RPS24050 (1)	0.700

### Protective mounting columns for light curtains (2)

Height of column mm	Description	Reference	Weight kg
1,670	Protected height up to 1,360 mm	XUSZSM136	4.900
1,970	Protected height up to 1,660 mm	XUSZSM166	5.600
1,000	2 beams	XUSZSM2B	3.200
1,200	3 beams	XUSZSM3B	3.700
1,330	4 beams	XUSZSM4B	4.000

### Floor mounting bases for columns (2)

Description	Height	Reference	Weight kg
Double base with springs for level adjustment	47 mm	XUSZFB2	2.000
Single base	26 mm	XUSZFB1	2.000

### Mounting accessories

Description	Use	Reference	Weight kg
Pack of 4 curved brackets (14° rotation of light curtain)	Protected height up to 1,060 mm	XUSZBMC4	0.490
Pack of 6 curved brackets (14° rotation of light curtain)	Protected height up to 1,210 mm	XUSZBMC6	0.740

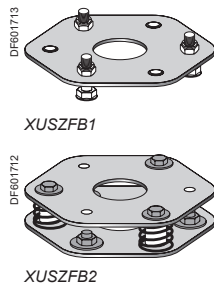
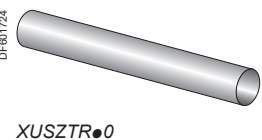
### Test rods for checking safety light curtains

Ø mm	For use with	Reference	Weight kg
40	XUSL4MA40H●●●N, XUSL4MB40H●●●N	XUSZTR40 (3)	0.020
30	XUSL4MA30H●●●N, XUSL4MB30H●●●N	XUSZTR30 (3)	0.070

(1) Schneider Electric product. For more information, visit our website

(2) The protective mounting columns must be mounted on XUSZFB1 or XUSZB2 floor mounting bases (to be ordered separately).

(3) Test rods are not supplied with the safety light curtains; they must be ordered separately.



# Safety detection solutions

Accessories for safety light curtains, type 4, with built-in muting function  
XUSL range



## Connection accessories

**Straight pre-wired M12 female connectors, 12-pin, for connection to main receiver connector**

Connection	Cable length	Reference	Weight
	m		kg
M12 female connector, PVC cable	3	XZCP57V12L3	0.220
	5	XZCP57V12L5	0.350
	10	XZCP57V12L10	0.730
	15	XZCP57V12L15	1.050
	20	XZCP57V12L20	1.400

**Straight pre-wired M12 female connectors, 5-pin, for connection to main transmitter connector**

M12 female connector, PUR cable	2	XZCP1164L2	0.050
	5	XZCP1164L5	0.250
	10	XZCP1164L10	0.500
	15	XZCP1164L15	0.750
	25	XZCP1164L25	1.250

**Straight pre-wired M12 male connectors, 4-pin, for connection to external muting indicator light**

M12 male connector, PUR cable	0.5	XZCP1541L05	0.035
	1	XZCP1541L1	0.050
	2	XZCP1541L2	0.085
	10	XZCP1541L10	0.400

**Straight jumper cables for connecting the light curtain to the PC for programming purposes**

Description	For use with	Reference	Weight
			kg
USB/M12 jumper cable, 5-pin, PVC cable	XUSL4MA●● light curtains	XZCRPC	0.080

**Y-splitter cables, M12, 5-pin**

For transmitter, PVC cable	XUSZAMT4PT and XUSZAMT4PTS Muting arms Separate muting sensors	XZCRSE	0.070
For receiver, PVC cable	XUSZAMT4PT and XUSZAMT4PTS Muting arms Separate muting sensors	XZCRSR	0.070

**Straight M12/M8 jumper cable, 3-pin, for connecting separate muting sensors**

Description	Used for	Cable length	Reference	Weight
		m		kg
Jumper cable, M12 (3-pin)/M8 (3-pin), PUR cable	XUM9APSBM8	1	XZCR1509040H1	0.050
		2	XZCR1509040H2	0.080

**Straight M12/M12 jumper cables, 4-pin, for connecting separate muting sensors**

Jumper cable, M12 male connector (4-pin)/M12 female connector (4-pin), PUR cable	XUK8AKSNM12, XUK2AKSNM12T/ XUK2APANM12R, XUBTAPSNM12	1	XZCR1511041C1	0.065
		2	XZCR1511041C2	0.095

Note: Cables with angled connectors are not suitable for XUSL4MA●● and XUSL4MB●● light curtains.

# Safety detection solutions

## 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.

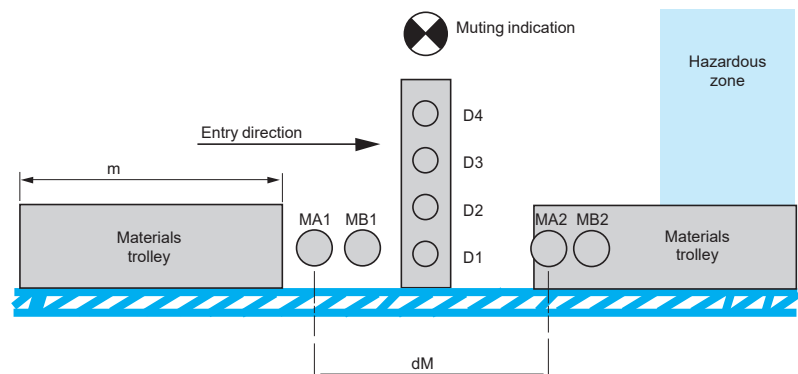
Interruption of the protection field causes the safety outputs to open instantaneously, and the process PLC receives a stop command. The LED on the XPSCM front panel changes from green to red. The "open" state is maintained until the module is restarted using the start button.

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

## 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 <sub>r</sub> )	PFH <sub>D</sub> (2) IEC 61508 ms	Type of terminal block connection	Reference	Weight kg
Safety modules	< 25 ms	3.12 x 10 <sup>-7</sup>	Integrated in module	<b>XPSCM1144</b>	0.350
			Removable from module	<b>XPSCM1144P</b>	0.350

### 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.
- PFH<sub>D</sub> (2): 4.5E<sup>-7</sup> (5.5E<sup>-7</sup> 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	<b>XU2S18PP340L5</b>	0.485
		M12 connector	<b>XU2S18PP340D</b>	0.155
		90° to case axis	Pre-cabled, L = 5 m	<b>XU2S18PP340WL5</b>
		M12 connector	<b>XU2S18PP340WD</b>	0.155
Thru-beam transmitter only	90° to case axis	M12 remote connector L = 0.8 m	<b>XU2S18KP340WLDT</b>	0.200
PNP thru-beam, receiver only	90° to case axis	M12 remote connector L = 0.8 m	<b>XU2S18PP340WLDR</b>	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) PFH<sub>D</sub>: Probability of dangerous failure per hour.



XPSCM1144●



XU2S18PP340L5



XU2S18●P340WL5

<b>A</b>					
ABL8RPS24030	22	XUSL4E14F016N	12	XUSL4E30H106N	12
ABL8RPS24050	22	XUSL4E14F031N	12	XUSL4E30H106NM	14
	32	XUSL4E14F031NM	14	XUSL4E30H106NS1	15
ABL8RPS24100	22	XUSL4E14F031NS1	15	XUSL4E30H106NS2	14
		XUSL4E14F031NWC	16	XUSL4E30H121L	13
		XUSL4E14F031NWH	17	XUSL4E30H121N	12
<b>X</b>		XUSL4E14F046N	12	XUSL4E30H136L	13
XPSCM1144	35	XUSL4E14F046NM	14	XUSL4E30H136N	12
XPSCM1144P	35	XUSL4E14F046NS1	15	XUSL4E30H151L	13
XPSCMUT1160	21	XUSL4E14F046NS2	14	XUSL4E30H151N	12
XU2S18KP340WLDT	35	XUSL4E14F046NWC	16	XUSL4E30H166L	13
XU2S18PP340D	35	XUSL4E14F046NWH	17	XUSL4E30H166N	12
XU2S18PP340L5	35	XUSL4E14F061N	12	XUSL4E30H181L	13
XU2S18PP340WD	35	XUSL4E14F061NM	14	XUSL4E30H181N	12
XU2S18PP340WL5	35	XUSL4E14F061NS1	15	XUSL4MA2BB051N	26
XU2S18PP340WLDR	35	XUSL4E14F061NS2	14	XUSL4MA3BB081N	26
XUBTAPSNM12	30	XUSL4E14F061NWC	16	XUSL4MA4BB091N	26
XUK2AKSNM12T	30	XUSL4E14F061NWH	17	XUSL4MA30H031N	26
XUK2APANM12R	30	XUSL4E14F076N	12	XUSL4MA30H046N	26
XUK8AKSNM12	30	XUSL4E14F076NM	14	XUSL4MA30H061N	26
XUM9APSBM8	30	XUSL4E14F076NS1	15	XUSL4MA30H076N	26
XUSL2E2BB051N	18	XUSL4E14F076NS2	14	XUSL4MA30H091N	26
XUSL2E3BB081N	18	XUSL4E14F076NWC	16	XUSL4MA30H106N	26
XUSL2E4BB091N	18	XUSL4E14F076NWH	17	XUSL4MA30H121N	26
XUSL2E30H016N	18	XUSL4E14F091N	12	XUSL4MA30H136N	26
XUSL2E30H026N	18	XUSL4E14F106N	12	XUSL4MA30H151N	26
XUSL2E30H031N	18	XUSL4E14F121N	12	XUSL4MA40H091N	26
XUSL2E30H046N	18	XUSL4E14F136N	12	XUSL4MA40H106N	26
XUSL2E30H046NWC	19	XUSL4E14F151N	12	XUSL4MA40H121N	26
XUSL2E30H046NWH	19	XUSL4E14F166N	12	XUSL4MA40H136N	26
XUSL2E30H061N	18	XUSL4E14F181N	12	XUSL4MA40H151N	26
XUSL2E30H061NWC	19	XUSL4E30H016L	13	XUSL4MA40H166N	26
XUSL2E30H061NWH	19	XUSL4E30H016N	12	XUSL4MA40H181N	26
XUSL2E30H076N	18	XUSL4E30H026N	12	XUSL4MA40H196N	26
XUSL2E30H076NWC	19	XUSL4E30H031L	13	XUSL4MA40H211N	26
XUSL2E30H076NWH	19	XUSL4E30H031N	12	XUSL4MA40H226N	26
XUSL2E30H091N	18	XUSL4E30H046L	13	XUSL4MA2BB051N	27
XUSL2E30H091NWC	19	XUSL4E30H046LWC	16	XUSL4MB3BB081N	27
XUSL2E30H091NWH	19	XUSL4E30H046LWH	17	XUSL4MB4BB091N	27
XUSL2E30H106N	18	XUSL4E30H046N	12	XUSL4MB30H031N	27
XUSL2E30H106NWC	19	XUSL4E30H046NM	14	XUSL4MB30H046N	27
XUSL2E30H106NWH	19	XUSL4E30H046NS1	15	XUSL4MB30H061N	27
XUSL2E30H121N	18	XUSL4E30H046NS2	14	XUSL4MB30H076N	27
XUSL2E30H136N	18	XUSL4E30H061L	13	XUSL4MB30H091N	27
XUSL2E30H151N	18	XUSL4E30H061LWC	16	XUSL4MB30H106N	27
XUSL2E30H166N	18	XUSL4E30H061LWH	17	XUSL4MB30H121N	27
XUSL2E30H181N	18	XUSL4E30H061N	12	XUSL4MB30H136N	27
XUSL4E2BB051L	13	XUSL4E30H061NM	14	XUSL4MB30H151N	27
XUSL4E2BB051LWC	16	XUSL4E30H061NS1	15	XUSL4MB40H091N	27
XUSL4E2BB051LWH	17	XUSL4E30H061NS2	14	XUSL4MB40H106N	27
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XUSL4E2BB051NS1	15	XUSL4E30H076LWH	17	XUSL4MB40H151N	27
XUSL4E2BB051NS2	14	XUSL4E30H076N	12	XUSL4MB40H166N	27
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XUSL4E3BB081LWC	16	XUSL4E30H076NS1	15	XUSL4MB40H196N	27
XUSL4E3BB081LWH	17	XUSL4E30H076NS2	14	XUSL4MB40H211N	27
XUSL4E3BB081N	12	XUSL4E30H091L	13	XUSL4MB40H226N	27
XUSL4E3BB081NM	14	XUSL4E30H091LWC	16	XUSZAML2PTS	28
XUSL4E3BB081NS1	15	XUSL4E30H091LWH	17	XUSZAML2XP	28
XUSL4E3BB081NS2	14	XUSL4E30H091N	12	XUSZAMT2XT	29
XUSL4E4BB091L	13	XUSL4E30H091NM	14	XUSZAMT4PT	29
XUSL4E4BB091LWC	16	XUSL4E30H091NS1	15	XUSZAMT4PTS	29
XUSL4E4BB091LWH	17	XUSL4E30H091NS2	14	XUSZASL2PP	28
XUSL4E4BB091N	12	XUSL4E30H106L	13	XUSZASL2PPS	28
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				XUSZBSC6	22
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