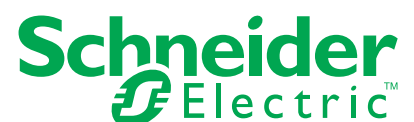


Catalog 2014

Light curtains





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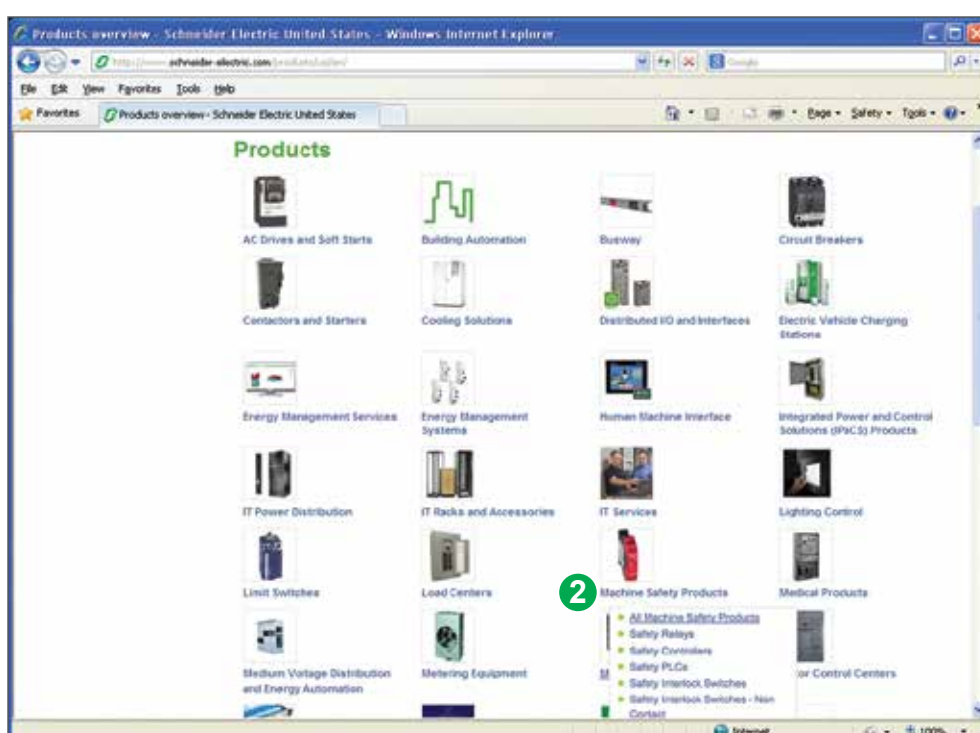


Go online to www.schneider-electric.com for information about Preventa™ products listed in this catalog, including:

- 1 Go to: www.schneider-electric.com and select **“Products”** on the “Products and Services” tab.



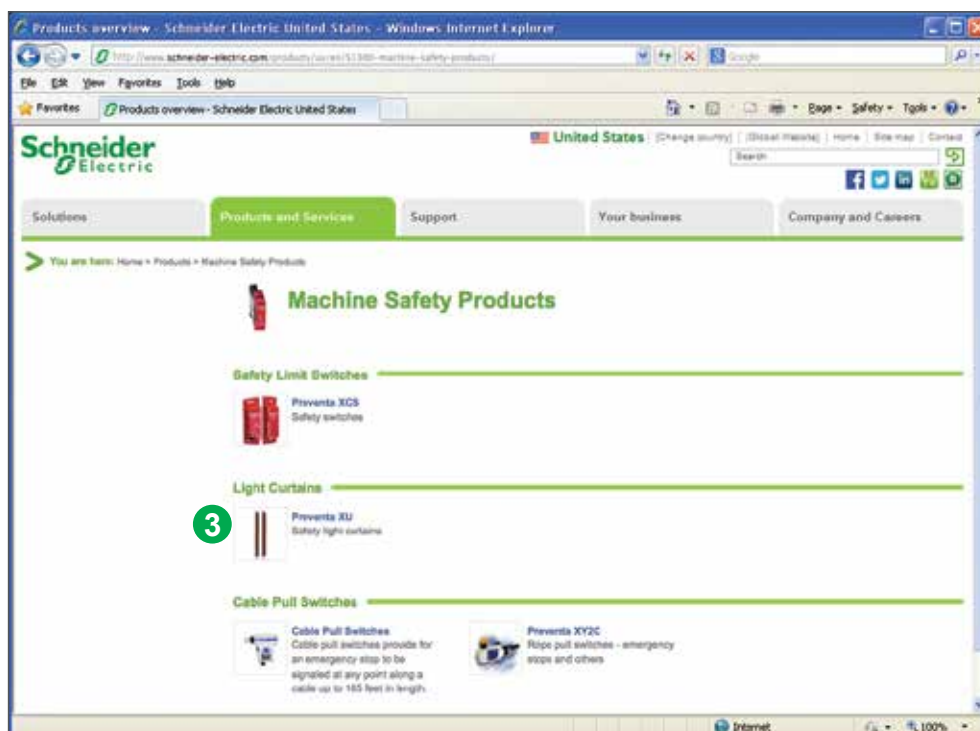
- 2 On the “Products” page, find the “Machine Safety Products” icon and select **“All Machine Safety Products”**.



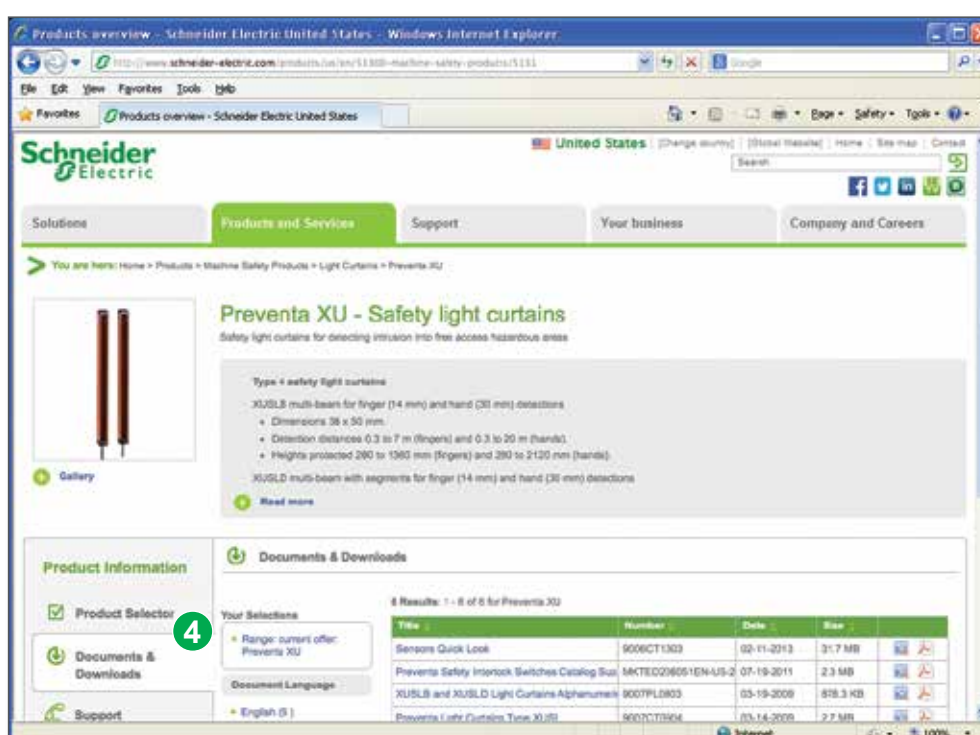
> Specifications > Dimensions > References
> Curves > Links to user guides and CAD files



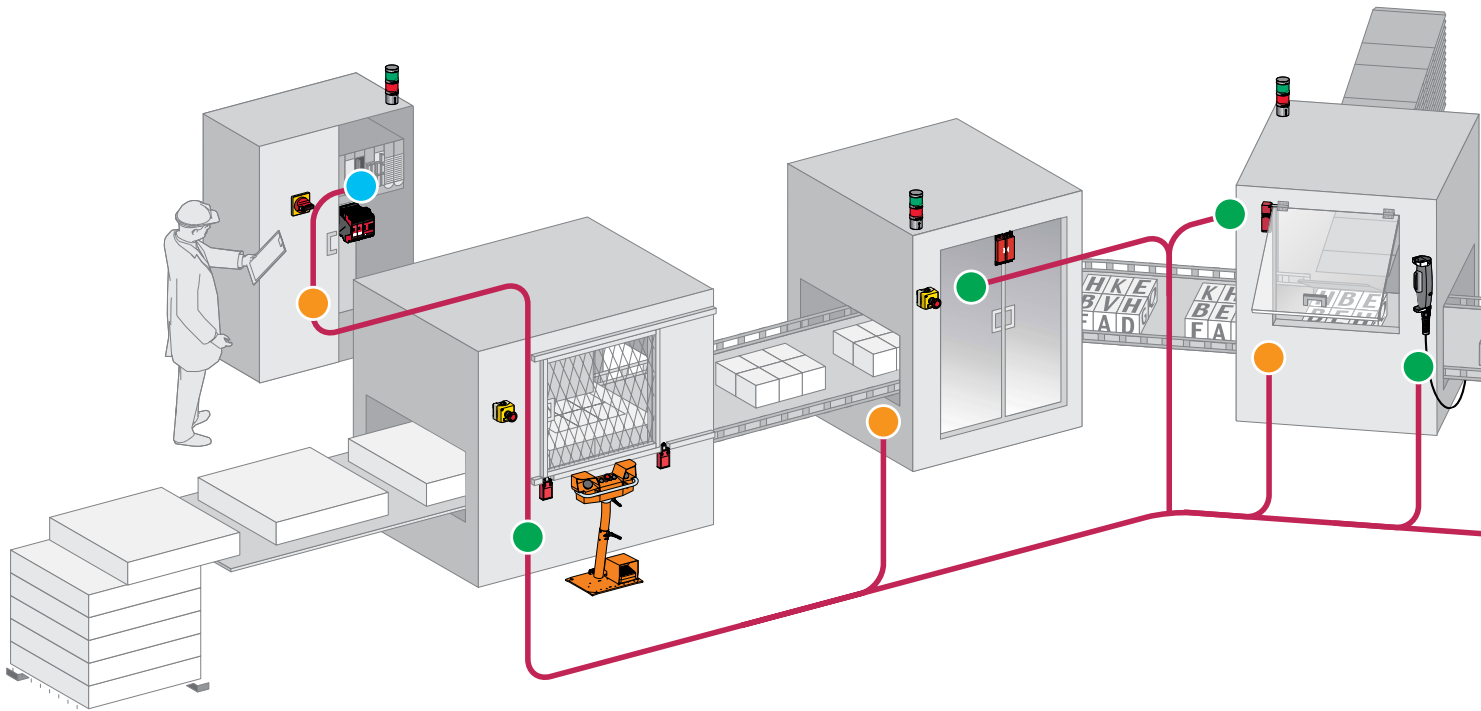
- 3 On the “Machine Safety Products” page, select the product you are interested in, for example: **“Light Curtains - Preventa XU - Safety light curtains”**.



- 4 Explore the product page you have selected, including the “Product Information” tabs: **“Documents & Downloads”** and **“Support”**.



Save time and money with our Preventa™ machine safety solutions offer



Safety-related signal transmission

Acquiring information...

- > Safety interlock devices used as part of safeguarding systems to control access, under specific conditions of reduced risk.
- > Light curtains to detect approach to dangerous and limited areas.
- > Emergency stop buttons and cable pull switches for emergency shut down.



Safety interlocks

Monitoring and processing...

- > Safety relay modules with specific safety functions – to monitor input signals from safety-related devices, and to interface with contactors and drives – by switching off output safety contacts.
- > Safety Controller: configurable safety device capable of centralizing a range of safety monitoring functions.
- > Safety PLCs: programmable electronic systems to carry out safety or non-safety related tasks for machinery and equipment.
- > “As-interface safety at work”: safety field bus network certified to work with safety-related devices to provide safety functions.



Light curtains



Emergency stop



Cable pull switch



Safety relays



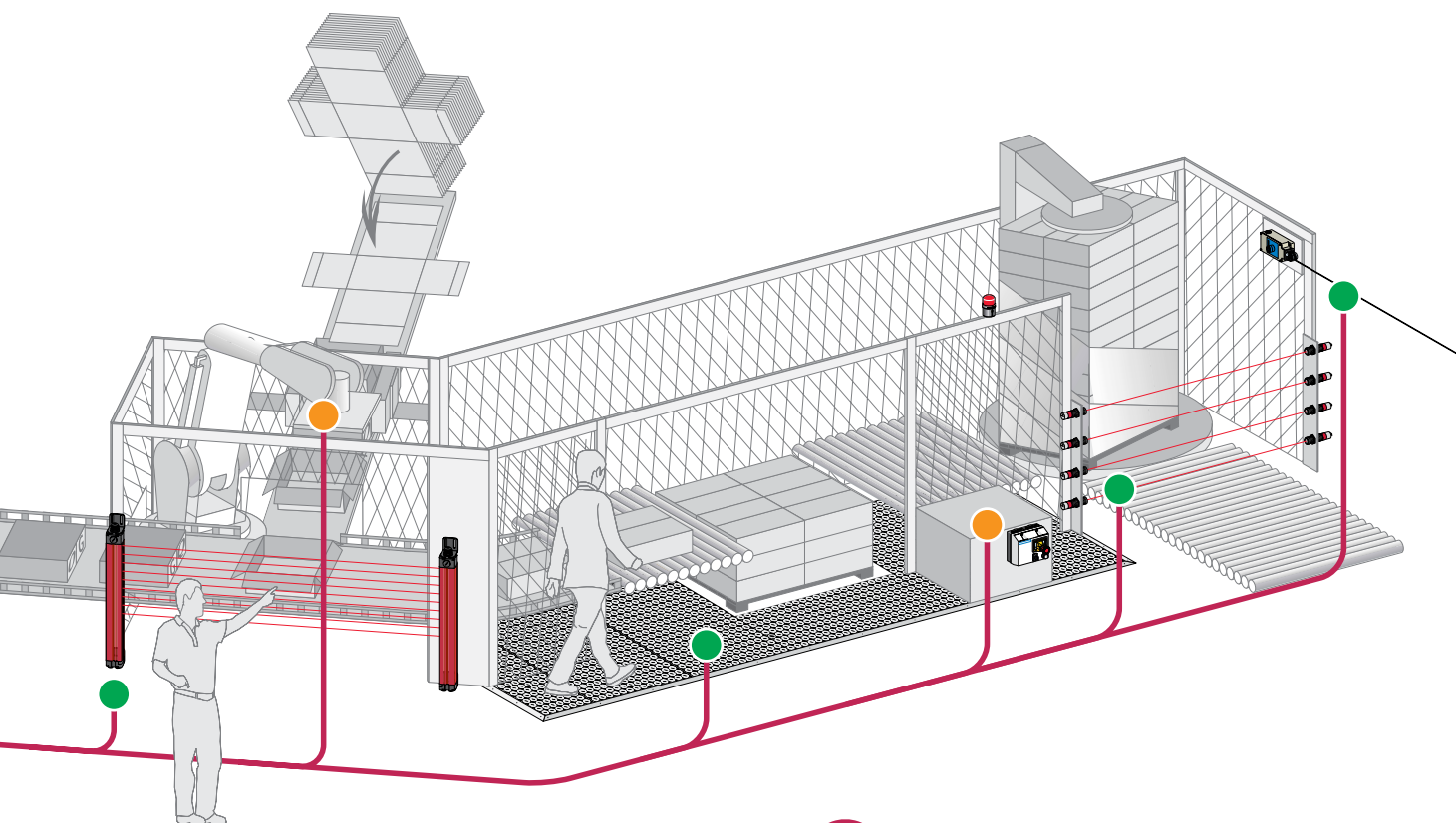
Safety Controller



Safety PLCs



As-interface safety at work



Stopping the machine...

- > Contactors to cut-off the electrical power supply to motors – with mechanically linked or mirrored auxiliary contacts – integrated for feedback loop diagnosis of safety relay modules, safety controllers, or safety PLCs.
- > Variable speed drives and servo drives with integrated safety functions...control stopping of dangerous movements.

**Up to 50%
better space
optimization**

Compact components
have smaller footprint

**Save up
to 30%
on installation
time**

Reduce installation
time with quick and
easy wiring




Variable
speed drives




Servo drives



Contactors

Applications		Machine tool, material handling, automotive, etc.	
Functions		Finger protection: 0.55 in. (14 mm), or hand protection: 1.18 in. (30 mm)	
Device		Light curtains, type 4	
		Multi-beam, infrared transmission, light curtains (1 transmitter-receiver pair)	
		Optimum Type	Universal Type
			
Conformity	Product standards	ANSI/RIA R15.06, ANSI B11:19-1990, OSHA 1910.217(C), OSHA 1910.212, EN/IEC 61496-1 and EN/IEC 61496-2 and IEC 61508-1, 2 (Type 4 ESPE)	
	European directives	Machinery directive 2006/42/EC, Work equipment directive 89/655/EEC and EMC directive 89/336 EEC ROHS directive 2002/95/EC	
Product certifications		CE, TUV, UL, CSA	
Degree of protection		IP65	
Cross-section		1.50 x 1.97 in. (38 x 50 mm)	
Protected height	Conforming to EN 999	11–53.5 in. (280–1360 mm) (finger protection)	
		12.6–83.5 in. (320–2120 mm) (hand protection)	
Nominal sensing distance		1–23 ft (0.3–7 m) (finger protection) 1–65 ft (0.3–20 m) (hand protection)	
Response time		Depending on height protected: 23–41 ms (finger protection) Depending on height protected: 23–32 ms (hand protection)	
Type of outputs	Safety	2 solid-state PNP outputs (N.O.) ⎓ 24 V, ≤ 625 mA Short-circuit protection	
	Auxiliary	1 solid-state 100 mA, ⎓ 24 V, PNP or NPN output depending on the model	
Main functions		<ul style="list-style-type: none">- Auto/manual- Test- EDM (external device monitoring)- Light beam coding	<ul style="list-style-type: none">- Auto/manual- Test- EDM (external device monitoring)- Light beam coding- Blanking (fixed and floating)- Cascadable (up to 4 segments)- Muting
Muting function (inhibition of the light curtain Detection function)			
Supply voltage		⎓ 24 V ± 20%, 2 A	
References		XUSLB	XUSLD
Pages		5/14	5/15

Applications		Packaging, conveyor systems, material handling, warehousing, stocking, etc.
Functions		Body protection 11.8, 15.7, 19.7, 23.6 in (300, 400, 500 and 600 mm) and single beam
Device		Light curtains, type 4
		1–6 beam light curtains with infrared transmission (1 transmitter-receiver pair)
		Type 4 model, solid-state output
		
Conformity	Product standards	ANSI/RIA R15.06, ANSI B11:19-1990, OSHA 1910.217(C), OSHA 1910.212, type 4 (ESPE) conforming to IEC 61496-1 and 2
	European directives	Machinery directive 2006/42/EC, Work equipment directive 89/655/EEC and EMC directive 89/336/EEC
Product certifications		CE, TUV, UL, CSA
Degree of protection		IP67
Cross-section		2.05 x 2.17 in. (52 x 55 mm)
Protected height	Conforming to EN 999	29.53–70.87 in. (750–1800 mm) (1–6 light beams)
Nominal sensing distance		2.6–65.5 ft or 2.6–229.7 ft (0.8–20 m or 0.8–70 m) depending on configuration 2.6–26.3 ft (0.8–8 m) for light curtains with passive receiver
Response time		< 16 to < 24 ms, depending on the light beam coding selected
Type of outputs	Safety	2 solid-state PNP outputs (N.O.) — 24 V, ≤ 650 mA Short-circuit protection
	Auxiliary	1 solid-state 100 mA, — 24 V PNP output
Main functions		Functions integrated in the light curtain: Auto/Manual start and manual 1st cycle, - EDM (external devices monitoring), - test input, - 3 light beam codings available, - Muting via external module
Muting function (inhibition of the light curtain Detection function)		
Supply voltage		— 24 V ± 20%, 2 A
References		XUSLP●●●●
Pages		5/33

Applications
Functions

Packaging, conveyor systems, material handling, warehousing, stocking, etc.
Hand protection 1.18 in. (30 mm)

Device

Light curtains, type 2
Multi-beam light curtains with infrared transmission (1 transmitter-receiver pair)
Slim, compact model, solid-state output Automatic or manual start



Conformity	Product standards
	European directives

IEC 61496-1 and IEC 61496-2 type 2 (ESPE)
Machinery directive 2006/42/EC, Work equipment directive 89/655/EEC and EMC directive 89/336/EEC

Product certifications

CE, TUV. UL, CSA

Degree of protection

IP65

Cross-section

1.12 x 1.26 in. (28.5 x 32 mm)

Protected height	Conforming to EN 999
------------------	----------------------

5.91–59.06 in. (150–1500 mm) (hand protection)

Nominal sensing distance

0.98–49.21 ft (0.3–15 m)

Response time

14–24 ms

Type of outputs	Safety
	Auxiliary

2 solid-state PNP outputs (N.O.) — 24 V, ≤ 500 mA Short-circuit protection
1 x 100 mA, — 24 V PNP alarm output

Main functions
Muting function (inhibition of the light curtain Detection function)

Functions integrated in the light curtain: - automatic or manual start, depending on the version - Muting via external module

Supply voltage

— 24 V ± 20%, 2 A

References

XUSLNG5C●●●●, XUSLNG5D●●●●

Pages

5/41

Packaging, conveyor systems, material handling, warehousing, stocking, etc.

Body protection

Light curtains, type 2

Single-beam, infrared transmission, light curtains (Preventa safety monitoring module plus 1–4 thru-beam photoelectric sensors)

Type 2 model, relay outputs (N.O.)



IEC 60947-1, EN 61496-1, EN 60825-1, UL 508, type 2 (ESPE) conforming to IEC 61496-1 and 2

Machinery directive 2006/42/EC, Work equipment directive 89/655/EEC and EMC directive 89/336/EEC EN 60825-1 (emission class 1)

CE type approval BIA/Cologne. UL, CSA

IP67

Ø of sensors: 18 mm

29.5–47.2 in. (750–1200 mm) (1–4 light beams)

26.2 ft (8 m)

< 20 ms (sensors + safety module)

Solid-state PNP
Preventa safety module XPSCM outputs
2 guided contact relays, each 1 N.O.
AC-15: C300, 1800 VA inrush, 180 VA maintained
DC-13: ≤ 24 V/1.5 A, L/R = 50 ms
Maximum thermal current = 2.5 A

≤ 24 V, 20 mA

Muting integrated in the safety monitoring module XPSCM

Safety module XPSCM: ≤ 24 V (19–29 V)
Sensors XU2S: ≤ 24 V (10–30 V)

XU2S●●●●●● + XPSCM

5/54

Introduction

Protection of personnel

Light curtains are electro-sensitive protection equipment (ESPE) designed to help protect persons operating or working in the vicinity of machinery, by stopping the dangerous movement of parts as soon as one of the light beams is broken. In particular, they help provide protection for personnel operating dangerous machinery (annex IV of 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 a door or guard makes access easier and reduces the time required for loading, inspection, or adjustment operations.

Directives and standards

Conformity to standards

These light curtains conform to the following:

- European Machinery Safety Directive 2006/42/EC and European Work Equipment Directive 89/655/EEC,
- Low Voltage Directives 73/23/EEC and 93/68/EEC and the Electromagnetic Compatibility Directive 89/336/EEC,
- Standard EN/IEC 61496-1, EN/IEC 61496-2 and IEC 61508 (only XUSLB, XUSLDM and XUSLDS) (electro-sensitive protection equipment: ESPE),
- Standard EN 60825 (emission power),
- Standard EN 999/ISO 13855 (installation positioning).

These light curtains are UL, CSA, and TÜV certified.

Applications

Main applications

- Applications for type 2 products:
 - assembly and packaging lines,
 - conveying and handling lines,
 - warehousing and storage systems,
 - waste disposal skips.
- Types of machine requiring the use of type 4 products:
 - presses (all types), shears, and trimmers,
 - hoisting equipment,
 - saws (all types),
 - machine tools (lathes, milling machines, machining centers),
 - woodworking machines (planing machines, lathes, spindle molding machines, side and face milling cutters),
 - textile machinery (carding machines, weaving looms, steam rooms),
 - assembly machines,
 - assembly robots.

Safety requirements

Detection of anomalies

Detection of anomalies liable to compromise safety, and stopping of the machine

The design of the machine and its control system must be to the same level of safety as that of the light curtain in order to provide the immediate stopping of the machine's dangerous 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 protective light beams. The 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 danger exists and no personnel are present in the hazardous zone. The risk that persons might be inside the protected zone but out of the protective light beams must be addressed.

Functions

Protection mode

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

- In Auto mode: Upon power-up or after the beams have been cleared, the light curtain resets itself automatically (closing of the OSSD output safety circuits),
- In Manual mode: Upon power-up or after the beams have been cleared, the light curtain keeps its output safety circuits in the Open position. Pressing and releasing the reset button will reset the light curtain and close its OSSD output safety circuits.

Note: In all cases, a general start instruction for the machine will trigger its actual start-up.

Monitoring the external switching devices

Also called EDM (external device monitoring) by standard EN/IEC 61496, this consists of monitoring the state (open or closed) of the machine's power switching components, along with the time taken to reach that state.

Auxiliary output

Where configurable (XUSLP), this is a low power solid-state output for signaling to the automation system. This output closes when the light curtain switches to run mode.

Alarm

This is a low power solid-state output for signaling to the automation system. This output closes when the light curtain switches to alarm mode.

Signaling

LED display of operating modes and alarm.

Alignment aid

Display by visible infrared LED of each beam broken.

Muting (inhibition)

When activated, the Muting function inhibits the Detection function of the light curtain.

Activation (or deactivation) is achieved by means of standard sensors (photoelectric or other). When activated, a signal is sent to the automation system. This function is used to allow objects to access the hazardous zones during the process.

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

Blanking

While the Muting function inhibits *all* beams in the light curtain from detecting objects, the Blanking function inhibits a *selected* group of light beams. This allows objects to be present during process operations. Blanking is adaptable to the size of the objects present.

Blanking effectively increases the Minimum Object Sensitivity (MOS). This imposes a greater safety distance, increasing the minimum distance between the light curtain and the hazard. Also, additional protection on each side of the object present must be provided, in order to prevent any intrusion into the free areas.

Floating blanking

This function makes it possible to inhibit one or two light beams (adjacent or otherwise), anywhere in the light curtain. This configuration is used, for example, for metal plate feeding applications on folding presses or shears.

Blanking plus floating blanking

The Blanking function (fixed inhibition of light beams) and Floating Blanking function (moving inhibition of one or two light beams) can be combined.

Multi-segments

The "multi-segments" enable the protection of zones using a single connection. Only the first segment (XUSLDM...), also called the "master", has to be connected to the enclosure or control cabinet. This first segment, which can either be for finger or hand detection, can support up to 3 other segments, also called intermediate segments or "slaves" which are connected by jumper cables to the M12 connectors located on its top surface. The intermediate segments can be of different detection capacities and heights protected than that of the "Master". They are fully dependent on the functions configured in the first segment. Note: the multi-segment system developed can not exceed 256 light beams in total and each intermediate segment must not exceed 128 light beams nor have a jumper cable longer than 10 m between them.

Light curtain type			XUSLBQ6A●●●● XUSLDMQ6A●●●● 0.55 in. (14 mm)	XUSLBR5A●●●● 1.18 in. (30 mm)	XUSLDMY5A●●●●● 1.18 in. (30 mm)
Environmental specifications					
Conformity to standards				ANSI/RIAR15.06, ANSI B11:19-1990, OSHA 1910.217(C), OSHA 1910.212, EN/IEC 61496-1 and EN/IEC 61496-2 and IEC 61508-1, 2 (Type 4 ESPE)	
Certifications				CE, TUV, UL, CSA	
European directives				Machinery directive 2006/42/EC, Work equipment directive 89/655/EEC and EMC directive 89/336 EEC ROHS directive 2002/95/EC	
Maximum safety level (1)				PL = e/category 4 conforming to EN/ISO 13849-1 SIL 3 conforming to EN/IEC 61508	
Reliability data				PFH _a = 4.9E ⁻⁶ 1/h conforming to EN/IEC 61508	
Ambient air temperature	Operating	°F (°C)	14 to +131 (-10 to +55)		
	Storage	°F (°C)	-13 to +167 (-25 to +75)		
Relative humidity				95% maximum, without condensation	
Degree of protection				IP65	
Shock and vibration resistance		Conforming to IEC 61496-1	Shock resistance: 10 gn, impulse 16 ms Vibration resistance: 10–55 Hz, amplitude: 0.35 ±0.05 mm		
Materials				Casing: aluminum with electrostatically applied red (RAL 3000) polyester paint finish; end caps: 20% fiberglass impregnated polycarbonate. Lens: PMMA (polymethyl methacrylate).	
Mounting				End brackets (included)	
Optical specifications					
Minimum detection capacity (MOS)				0.55 in. (14 mm) (finger)	1.18 in. (30 mm) (hand)
Nominal sensing distance (Sn)			ft (m)	1–23 (0.3–7) or 9.8 (3) with PDM (2)	1–65.6 (0.3–20) or 26.2 (8) with PDM (2)
Protected height			in. (mm)	11–53.5 (280–1360)	12.6–83.5 (320–2120)
Effective aperture angle (EAA)				2.5° at 9.8ft (3 m) (3° when used with IP67 protection tube)	
Light source				GaAIAs LED, 880 nm	
Immunity to ambient light				Conforming to IEC/EN 61496-2	
Electrical specifications					
Response time			ms	23–41	23–32
Power supply				--- 24 V ± 20% 2 A conforming to EN/IEC 61496 and EN/IEC 60204-1	
	Transmitter	mA	285		
	Receiver	A	1.8 (with maximum load)		
Maximum current consumption (no-load)	Transmitter	mA	285 (SELV: Safety Extra Low Voltage)		
	Receiver	mA	450		
Immunity to interference				Conforming to EN 61496-1	
Safety outputs OSSD (output signal switching devices)				2 solid-state PNP (N.O.) outputs ≤ 625 mA, --- 24 V (short-circuit protected)	
Auxiliary output				1 solid-state output 100 mA, --- 24 V, PNP or NPN (depending on the model)	
Monitoring activation of output switching devices (MPCE/EDM)				50 mA, --- 24 V and start/restart 10 mA	
Signaling	Transmitter		1 LED (power supply)		
	Receiver		4 LEDs (stop, run, interlock, ECS/B Blanking or FB Floating Blanking)		
Connections (3)					
Light curtains	Transmitter		M12, 5-pin, female connector		
	Receiver		M12, 8-pin, female connector		
Segments XUSLDS	Transmitter/Receiver		M12, 4-pin, female connector on pigtail		
XPSLCM1	Receiver		M12, 4-pin, female connector		
Pre-wired connectors c.s.a.	Transmitter/Receiver		22 AWG (0.32 mm²) conductors with M12, 5-pin, male connector		
	Receiver		22 AWG (0.32 mm²) conductors with M12, 8-pin, male connector		
Jumper cables c.s.a.	Transmitter/receiver		22 AWG (0.32 mm²) conductors with M12, 4-pin, male/female connectors		
Cable resistance of pre-wired connectors	Transmitter/receiver	Ω	0.1686 per ft (0.05531 per m) for 22 AWG (0.32 mm²) conductors		
Cable lengths				Pre-wired connectors with cable lengths of 16.4, 32.8, 49.2, and 98.4 ft (5, 10, 15 and 30 m) are available separately. The maximum cable length is 196.9 ft (60 m), depending on the load current and power supply.	

(1) Using an appropriate and correctly connected control system.

(2) PDM: programming and diagnostic module, available as an option. See page 5/18.

(3) Pre-wired connectors must be ordered separately. See page 5/18.

Light curtain type		XUSLB●●●●●●	XUSLDM●●●●●●
Functions			
Functions	Accessible by cabling alone (1)	<input type="checkbox"/> Automatic start <input type="checkbox"/> Auxiliary output (PNP, status signaling) <input type="checkbox"/> Test (MTS: monitoring test signal) <input type="checkbox"/> Alignment aid by display of each light beam broken <input type="checkbox"/> LED display of operating modes and anomalies	
	Accessible via programming and diagnostic module	<input type="checkbox"/> Auto/Manual <input type="checkbox"/> Monitoring of the external switching devices (EDM: external device monitoring) <input type="checkbox"/> Light beam coding (A or B) <input type="checkbox"/> Sensing distance (short, long) <input type="checkbox"/> Programming and downloading the configuration settings, via programming and diagnostic module (PDM) <input type="checkbox"/> Display of operating modes and anomalies by LED or PDM (2)	<input type="checkbox"/> Auto/Manual, manual 1st cycle <input type="checkbox"/> Monitoring of the external switching devices (EDM: external device monitoring) <input type="checkbox"/> Blanking (ECS/B) <input type="checkbox"/> Monitored Blanking <input type="checkbox"/> Floating Blanking (FB) <input type="checkbox"/> Reduction of resolution <input type="checkbox"/> Response time (normal, slow) <input type="checkbox"/> Light beam coding (A or B) <input type="checkbox"/> Sensing distance (short, long) <input type="checkbox"/> Auxiliary output (alarm or status signaling, PNP or NPN) <input type="checkbox"/> Start button (N.O. or N.C., 0 V or 24 V) <input type="checkbox"/> Muting (see page 5/11) <input type="checkbox"/> Cascadable versions with up to 4 segments total (256 light beams max., modular finger/hand) using XUSLDS segments <input type="checkbox"/> Programming and downloading the configuration settings, via programming and diagnostic module (PDM) <input type="checkbox"/> Display of operating modes and anomalies by LED or PDM (2)
Monitoring the external switching devices (EDM: external device monitoring)		Monitoring of the function (open or closed) as well as the response time of the power components.	
Test function		Initiates the stop instruction of the light curtain by opening the contact (simulated intrusion)	
Muting function (inhibition)		<input type="checkbox"/> With external module XPSLCM1150	<input type="checkbox"/> Integrated when using connection module XPSLCM1 for connecting sensors and Muting indicator light <input type="checkbox"/> or with module XPSLCM1150

(1) Not requiring use of PDM.

(2) PDM: programming and diagnostic module, available as an option. See page 5/18.

Safety detection solutions

Light curtains, type 4

Optimum XUSLB with solid-state output



XUSLBQ6A.....

Transmitter-receiver pairs for finger protection (1)

Detection capacity: 0.55 in. (14 mm).

Sensing distance: 1–22.9 ft (0.3–7 m), or 9.8 ft (3 m) with PDM.

■ 2 PNP safety outputs

Protected height	Response time	Number of light beams	Auxiliary output	References (2)	Weight
in. (mm)	ms				lb (kg)
11 (280)	23	24	PNP	XUSLBQ6A0280	3.95 (1.790)
12.6 (320)	23	32	PNP	XUSLBQ6A0320	4.34 (1.970)
14.2 (360)	23	36	PNP	XUSLBQ6A0360	4.74 (2.150)
17.3 (440)	23	44	PNP	XUSLBQ6A0440	5.51 (2.500)
20.5 (520)	23	52	PNP	XUSLBQ6A0520	6.33 (2.870)
23.6 (600)	23	60	PNP	XUSLBQ6A0600	7.10 (3.220)
28.3 (720)	32	72	PNP	XUSLBQ6A0720	8.29 (3.760)
29.9 (760)	32	76	PNP	XUSLBQ6A0760	8.69 (3.940)
34.6 (880)	32	88	PNP	XUSLBQ6A0880	9.85 (4.470)
36.2 (920)	32	92	PNP	XUSLBQ6A0920	10.25 (4.650)
37.8 (960)	32	96	PNP	XUSLBQ6A0960	10.65 (4.830)
40.9 (1040)	32	104	PNP	XUSLBQ6A1040	11.44 (5.190)
44.1 (1120)	32	112	PNP	XUSLBQ6A1120	12.21 (5.540)
47.2 (1200)	32	120	PNP	XUSLBQ6A1200	13.01 (5.900)
53.5 (1360)	41	136	PNP	XUSLBQ6A1360	13.62 (6.180)

Transmitter-receiver pairs for hand protection (1)

Detection capacity: 1.18 in. (30 mm).

Sensing distance: 1–65.6 ft (0.3–20 m), or 26.2 ft (8 m) with PDM.

■ 2 PNP safety outputs

Protected height	Response time	Number of light beams	Auxiliary output	References (2)	Weight
in. (mm)	ms				lb (kg)
12.6 (320)	23	16	PNP	XUSLBR5A0320	4.34 (1.970)
14.2 (360)	23	18	PNP	XUSLBR5A0360	4.74 (2.150)
17.3 (440)	23	22	PNP	XUSLBR5A0440	5.51 (2.500)
20.5 (520)	23	26	PNP	XUSLBR5A0520	6.33 (2.870)
23.6 (600)	23	30	PNP	XUSLBR5A0600	7.10 (3.220)
26.8 (680)	23	34	PNP	XUSLBR5A0680	7.89 (3.580)
29.9 (760)	23	38	PNP	XUSLBR5A0760	8.69 (3.940)
34.6 (880)	23	44	PNP	XUSLBR5A0880	9.85 (4.470)
36.2 (920)	23	46	PNP	XUSLBR5A0920	10.25 (4.650)
40.9 (1040)	23	52	PNP	XUSLBR5A1040	11.44 (5.190)
47.2 (1200)	23	60	PNP	XUSLBR5A1200	13.01 (5.900)
53.5 (1360)	23	68	PNP	XUSLBR5A1360	14.59 (6.620)
55.1 (1400)	23	70	PNP	XUSLBR5A1400	14.99 (6.800)
59.8 (1520)	32	76	PNP	XUSLBR5A1520	16.16 (7.330)
61.4 (1560)	32	78	PNP	XUSLBR5A1560	16.53 (7.500)
64.6 (1640)	32	82	PNP	XUSLBR5A1640	17.35 (7.870)
67.7 (1720)	32	86	PNP	XUSLBR5A1720	18.14 (8.230)
70.9 (1800)	32	88	PNP	XUSLBR5A1800	18.94 (8.590)
75.6 (1920)	32	96	PNP	XUSLBR5A1920	20.11 (9.120)
83.5 (2120)	32	106	PNP	XUSLBR5A2120	22.09 (10.020)

(1) Includes a test rod, 2 sets of 2 brackets with mounting hardware, a user guide with the certificate of conformity on CD-ROM, and 1 arc suppressor set.

Programming and diagnostic module (if required) and pre-wired connectors must be ordered separately. See page 5/18.

(2) To order a receiver only, add the letter **R** to the end of the catalog number for the corresponding transmitter-receiver pair.

Example: XUSLBR5A0320 becomes **XUSLBR5A0320R** for the receiver only.

To order a transmitter only, add the letter **T** to the end of the catalog number for the corresponding transmitter-receiver pair.

Example: XUSLBR5A0320 becomes **XUSLBR5A0320T** for the transmitter only.

Other versions

Combining type 4 safety light curtains with external module for Muting function. See page 5/64.

Separate components and accessories: page 5/18

Safety detection solutions

Light curtains, type 4

Universal XUSLDM with solid-state output



XUSLDMQ.....



XUSLDMY.....

Transmitter-receiver pairs for finger protection (1)

Detection capacity: 0.55 in. (14 mm).

Sensing distance: 1–22.9 ft (0.3–7 m) or 9.8 ft (3 m) with PDM.

■ 2 PNP safety outputs

Protected height	Response time		Number of light beams	Auxiliary output	References (2)	Weight
	Normal	Slow				
in. (mm)	ms	ms				lb (kg)
11 (280)	23	38	24	PNP/NPN	XUSLDMQ6A0280	3.95 (1.790)
12.6 (320)	23	38	32	PNP/NPN	XUSLDMQ6A0320	4.34 (1.970)
14.2 (360)	23	38	36	PNP/NPN	XUSLDMQ6A0360	4.74 (2.150)
17.3 (440)	23	38	44	PNP/NPN	XUSLDMQ6A0440	5.51 (2.500)
20.5 (520)	23	38	52	PNP/NPN	XUSLDMQ6A0520	6.39 (2.900)
23.6 (600)	23	38	60	PNP/NPN	XUSLDMQ6A0600	7.10 (3.220)
28.3 (720)	32	53	72	PNP/NPN	XUSLDMQ6A0720	8.29 (3.760)
29.9 (760)	32	53	76	PNP/NPN	XUSLDMQ6A0760	8.69 (3.940)
34.6 (880)	32	53	88	PNP/NPN	XUSLDMQ6A0880	9.85 (4.470)
36.2 (920)	32	53	92	PNP/NPN	XUSLDMQ6A0920	10.25 (4.650)
37.8 (960)	32	53	96	PNP/NPN	XUSLDMQ6A0960	10.65 (4.830)
40.9 (1040)	32	53	104	PNP/NPN	XUSLDMQ6A1040	11.44 (5.190)
44.1 (1120)	32	53	112	PNP/NPN	XUSLDMQ6A1120	12.21 (5.540)
47.2 (1200)	32	53	120	PNP/NPN	XUSLDMQ6A1200	13.01 (5.900)
53.5 (1360)	41	68	136	PNP/NPN	XUSLDMQ6A1360	14.59 (6.620)

Transmitter-receiver pairs for hand protection (1)

Detection capacity: 1.18 in. (30 mm).

Sensing distance: 1–65.6 ft (0.3–20 m), or 26.2 ft (8 m) with PDM.

■ 2 PNP safety outputs

Protected height	Response time		Number of light beams	Auxiliary output	References (2)	Weight
	Normal	Slow				
in. (mm)	ms	ms				lb (kg)
12.6 (320)	23	38	16	PNP/NPN	XUSLDMY5A0320	4.34 (1.970)
14.2 (360)	23	38	18	PNP/NPN	XUSLDMY5A0360	4.74 (2.150)
17.3 (440)	23	38	22	PNP/NPN	XUSLDMY5A0440	5.51 (2.500)
20.5 (520)	23	38	26	PNP/NPN	XUSLDMY5A0520	6.33 (2.870)
23.6 (600)	23	38	30	PNP/NPN	XUSLDMY5A0600	7.10 (3.220)
26.8 (680)	23	38	34	PNP/NPN	XUSLDMY5A0680	7.89 (3.580)
29.9 (760)	23	38	38	PNP/NPN	XUSLDMY5A0760	8.69 (3.940)
34.6 (880)	23	38	44	PNP/NPN	XUSLDMY5A0880	9.85 (4.470)
36.2 (920)	23	38	46	PNP/NPN	XUSLDMY5A0920	10.25 (4.650)
40.9 (1040)	23	38	52	PNP/NPN	XUSLDMY5A1040	11.44 (5.190)
47.2 (1200)	23	38	60	PNP/NPN	XUSLDMY5A1200	13.01 (5.900)
53.5 (1360)	23	38	68	PNP/NPN	XUSLDMY5A1360	14.59 (6.620)
55.1 (1400)	23	38	70	PNP/NPN	XUSLDMY5A1400	14.99 (6.800)
59.8 (1520)	32	53	76	PNP/NPN	XUSLDMY5A1520	16.16 (7.330)
61.4 (1560)	32	53	78	PNP/NPN	XUSLDMY5A1560	16.53 (7.500)
64.6 (1640)	32	53	82	PNP/NPN	XUSLDMY5A1640	17.35 (7.870)
67.7 (1720)	32	53	86	PNP/NPN	XUSLDMY5A1720	18.14 (8.230)
70.9 (1800)	32	53	88	PNP/NPN	XUSLDMY5A1800	18.94 (8.590)
75.6 (1920)	32	53	96	PNP/NPN	XUSLDMY5A1920	20.11 (9.120)
83.5 (2120)	32	53	106	PNP/NPN	XUSLDMY5A2120	22.09 (10.020)

(1) Includes a test rod, 2 sets of 2 brackets with mounting hardware, user guide with certificate of conformity on CD-ROM and 1 arc suppressor set.

Programming and diagnostic module (if required) and pre-wired connectors must be ordered separately. See page 5/18.

(2) To order a receiver only, add the letter **R** to the end of the catalog number for the corresponding transmitter-receiver pair.

Example: XUSLDMY5A0320 becomes **XUSLDMY5A0320R** for the receiver only.

To order a transmitter only, add the letter **T** to the end of the catalog number for the corresponding transmitter-receiver pair.

Example: XUSLDMY5A0320 becomes **XUSLDMY5A0320T** for the transmitter only.

Other versions

Combining type 4 safety light curtains with external module for Muting function. See page 5/64.

Separate components and accessories: page 5/18



XUSLDM + XUSLDS

Segments for cascadable Universal light curtains

Cascadable versions with up to 4 segments total (256 light beams max., modular finger/hand), using XUSLDS segments

XUSLDS light curtain segments cannot be used separately as stand-alone systems. They must be connected to an XUSLDM light curtain. The XUSLDM is the initial (or base) light curtain, and the first XUSLDS segment is connected to the XUSLDM. Each successive XUSLDS is then connected to the previous XUSLDS

Configuration of XUSLDS segments

Two segments

Number of light beams	Response time
	ms
0–65	23
66–120	32
121–174	41
175–229	50
230–256	59

Three segments

Number of light beams	Response time
	ms
0–59	23
60–114	32
115–168	41
169–223	50
224–256	59

Four segments

Number of light beams	Response time
	ms
0–53	23
54–108	32
109–162	41
163–217	50
218–256	59

Separate components and accessories: page 5/18

Safety detection solutions

Light curtains, type 4

XUSLDS segments for Universal XUSLDM light curtains



XUSLDSQ6A.....



XUSLDSY5A.....

XUSLDS light curtain segments cannot be used separately as stand-alone systems. They must be connected to an XUSLDM light curtain. The XUSLDM is the initial (or base) light curtain, and the first XUSLDS segment is connected to the XUSLDM. Each successive XUSLDS is then connected to the previous XUSLDS.

Transmitter-receiver pairs for finger protection (1)

Detection capacity: 0.55 in. (14 mm).

Sensing distance: depends on XUSLDM light curtain used.

■ Segments for cascable Universal light curtains (2)

Protected height in. (mm)	Number of light beams	References (3)	Weight lb (kg)
11 (280)	24	XUSLDSQ6A0280	3.95 (1.790)
12.6 (320)	32	XUSLDSQ6A0320	4.34 (1.970)
14.2 (360)	36	XUSLDSQ6A0360	4.74 (2.150)
17.3 (440)	44	XUSLDSQ6A0440	5.51 (2.500)
20.5 (520)	52	XUSLDSQ6A0520	6.33 (2.870)
23.6 (600)	60	XUSLDSQ6A0600	7.10 (3.220)
28.3 (720)	72	XUSLDSQ6A0720	8.29 (3.760)
29.9 (760)	76	XUSLDSQ6A0760	8.69 (3.940)
34.6 (880)	88	XUSLDSQ6A0880	9.85 (4.470)
36.2 (920)	92	XUSLDSQ6A0920	10.25 (4.650)
37.8 (960)	96	XUSLDSQ6A0960	10.65 (4.830)
40.9 (1040)	104	XUSLDSQ6A1040	11.44 (5.190)
44.1 (1120)	112	XUSLDSQ6A1120	12.21 (5.540)
47.2 (1200)	120	XUSLDSQ6A1200	13.01 (5.900)

Transmitter-receiver pairs for hand protection (1)

Detection capacity: 1.18 in. (30 mm).

Sensing distance: depends on XUSLDM light curtain used.

■ Segments for cascable Universal light curtains (2)

Protected height in. (mm)	Number of light beams	References (3)	Weight lb (kg)
12.6 (320)	16	XUSLDSY5A0320	4.34 (1.970)
14.2 (360)	18	XUSLDSY5A0360	4.74 (2.150)
17.3 (440)	22	XUSLDSY5A0440	5.51 (2.500)
20.5 (520)	26	XUSLDSY5A0520	6.33 (2.870)
23.6 (600)	30	XUSLDSY5A0600	7.10 (3.220)
26.8 (680)	34	XUSLDSY5A0680	7.89 (3.580)
29.9 (760)	38	XUSLDSY5A0760	8.69 (3.940)
34.6 (880)	44	XUSLDSY5A0880	9.85 (4.470)
36.2 (920)	46	XUSLDSY5A0920	10.25 (4.650)
40.9 (1040)	52	XUSLDSY5A1040	11.44 (5.190)
47.2 (1200)	60	XUSLDSY5A1200	13.01 (5.900)
53.5 (1360)	68	XUSLDSY5A1360	14.59 (6.620)
55.1 (1400)	70	XUSLDSY5A1400	14.99 (6.800)
59.8 (1520)	76	XUSLDSY5A1520	16.16 (7.330)
61.4 (1560)	78	XUSLDSY5A1560	16.53 (7.500)
64.6 (1640)	82	XUSLDSY5A1640	17.35 (7.870)
67.7 (1720)	86	XUSLDSY5A1720	18.14 (8.230)
70.9 (1800)	88	XUSLDSY5A1800	18.94 (8.590)
75.6 (1920)	96	XUSLDSY5A1920	20.11 (9.120)
83.5 (2120)	106	XUSLDSY5A2120	22.09 (10.020)

(1) Includes 2 sets of 2 brackets and hardware.

Jumper cables must be ordered separately. See page 5/18.

(2) The segments are to be connected to the M12 4-pin connector on top of the XUSLDM light curtains.

(3) To order a receiver only, add the letter **R** to the end of the catalog number for the corresponding transmitter-receiver pair.

Example: XUSLDSY5A0320 becomes **XUSLDSY5A0320R** for the receiver only.

To order a transmitter only, add the letter **T** to the end of the catalog number for the corresponding transmitter-receiver pair.

Example: XUSLDSY5A0320 becomes **XUSLDSY5A0320T** for the transmitter only.

Separate components and accessories: page 5/18

Safety detection solutions

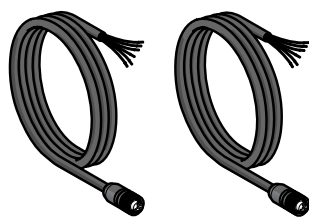
Light curtains, type 4

Optimum XUSLB and Universal XUSLDM/LDS

With solid-state output



XUSLPDM



XSZ BCT●●

XSZ BCR●●

Separate components

Power supplies, 90° mirror adapters, protective covers, anti-vibration kit, mounting bases, laser alignment tool


See pages 5/19 and 5/44 to 5/51.

Accessories

Description	For use with	Length ft (m)	References	Weight lb (kg)
Programming and diagnostic module (PDM)	XUSLB/LDM light curtains	–	XUSLPDM	0.62 (0.280)
Holder mount	Programming and diagnostic module XUSLPDM	–	XUSLZPDM	0.09 (0.040)
Pre-wired connectors for light curtains XUSLB/XUSLDM	Transmitter type	16.4 (5)	XSZBCT05	0.86 (0.390)
		32.8 (10)	XSZBCT10	1.52 (0.690)
		49.2 (15)	XSZBCT15	2.27 (1.030)
		98.4 (30)	XSZBCT30	4.25 (1.930)
	Receiver type	16.4 (5)	XSZBCR05	0.99 (0.450)
		32.8 (10)	XSZBCR10	1.72 (0.780)
		49.2 (15)	XSZBCR15	2.43 (1.100)
		98.4 (30)	XSZBCR30	5.03 (2.280)
Jumper cables for XUSLDS segments M12 male/female, 4-pin, straight	Transmitter type	1 (0.3)	XSZDCT003	0.11 (0.050)
		1.6 (0.5)	XSZDCT005	0.15 (0.070)
		3.3 (1)	XSZDCT010	0.24 (0.110)
		6.6 (2)	XSZDCT020	0.46 (0.210)
		9.9 (3)	XSZDCT030	0.66 (0.300)
		16.4 (5)	XSZDCT050	1.08 (0.490)
		32.8 (10)	XSZDCT100	2.09 (0.950)
	Receiver type	1 (0.3)	XSZDCR003	0.11 (0.050)
		1.6 (0.5)	XSZDCR005	0.15 (0.070)
		3.3 (1)	XSZDCR010	0.24 (0.110)
		6.6 (2)	XSZDCR020	0.46 (0.210)
		9.9 (3)	XSZDCR030	0.66 (0.300)
		16.4 (5)	XSZDCR050	1.08 (0.490)
		32.8 (10)	XSZDCR100	2.12 (0.960)
Jumpers for replacing XUSLT light curtains with XUSLB or XUSLDM	Transmitter type male/female 5 pins	1 (0.3)	XSZTBMCT003	0.13 (0.060)
	Receiver type male/female 8 pins	1 (0.3)	XSZTBMCR003	0.13 (0.060)
Description	For use with	References		Weight lb (kg)
Replacement caps for M12 connector (Sold in lots of 10)	XUSLDM light curtains and XUSLDS segments	XUSLZ600		0.002 (0.001)
Replacement caps for M8 connector (programming and diagnostic module XUSLPDM connection to light curtains) (Sold in lots of 10)	XUSLB/LDM light curtains and XUSLDS segments	XUSLZ610		0.02 (0.010)
Mounting kit (2 brackets)	XUSLB/LDM light curtains and XUSLDS segments	XUSLZ228		0.22 (0.100)
Sliding nuts (4 nuts) for rear or side mounting with XUSLZ228	XUSLB/LDM light curtains	XUSLZ330		0.09 (0.040)
Arc suppressor (pair)	All light curtain types	XUSLZ500		0.04 (0.020)
IP67 protection tube (see page 5/19)				–
User guide on CD-ROM	All light curtain types	XUSLZ450		0.02 (0.010)
Connection module for muting of light curtains (see page 5/26)	XUSLDM light curtains	XPSLCM1		0.42 (0.190)

IP67 protection tubes for XUSLB/XUSLDM light curtains and XUSLDS segments		XUSLZD7●●●●	
Environmental specifications			
Air temperature	Operating	°F (°C)	32 to +104 (0 to +40)
	Storage	°F (°C)	−13 to +158 (−25 to +70)
Degree of protection			IP67 conforming to IEC 60529
Material			Acrylic
Sensing distance (Sn) reduction coefficient			0.90

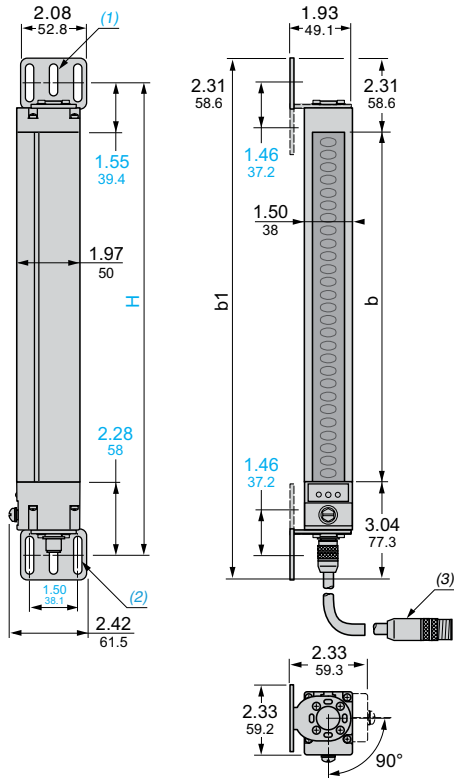
Environmental chemicals			
Chemical resistance	Aliphatic hydrocarbons		Resistant
	Alkalis		
	Aqueous solutions		
	Detergents and cleaners		
	Inorganic diluted acids		
	Chlorinated or aromatic hydrocarbons		Limited resistance
	Esters		
	Ketones		
Environmental resistance	Adverse weather, sunlight (UV)		Resistant
	Humidity		
	Immersion in water		

References of IP67 protection tubes					
	Description	For use with	Height in. (mm)	References	Weight lb (kg)
 <p>XUSLZD7●●●●</p>	IP67 protection tubes for XUSLB/ LDM transmitter-receiver pair and XUSLDS segments (0.90 Sn) (1) <i>(Sold in lots of 2)</i>	XUSL●●6A0280	11.2 (284.4)	XUSLZD70280	5.84 (2.650)
		XUSL●●●A0320	12.8 (324.8)	XUSLZD70320	6.19 (2.810)
		XUSL●●●A0360	14.4 (364.5)	XUSLZD70360	6.53 (2.960)
		XUSL●●●A0440	17.5 (443.9)	XUSLZD70440	7.21 (3.270)
		XUSL●●●A0520	20.6 (523.4)	XUSLZD70520	7.89 (3.580)
		XUSL●●●A0600	23.8 (604.1)	XUSLZD70600	8.58 (3.890)
		XUSL●●5A0680	26.9 (683.6)	XUSLZD70680	9.24 (4.190)
		XUSL●●6A0720	28.5 (724)	XUSLZD70720	9.59 (4.350)
		XUSL●●●A0760	30 (763)	XUSLZD70760	9.92 (4.500)
		XUSL●●●A0880	34.8 (882.8)	XUSLZD70880	10.93 (4.960)
		XUSL●●●A0920	36.3 (922.5)	XUSLZD70920	11.28 (5.120)
		XUSL●●6A0960	37.9 (963.6)	XUSLZD70960	11.62 (5.270)
		XUSL●●●A1040	41.1 (1042.9)	XUSLZD71040	12.30 (5.580)
		XUSL●●6A1120	44.2 (1122.3)	XUSLZD71120	12.99 (5.890)
		XUSL●●●A1200	47.4 (1203.8)	XUSLZD71200	13.67 (6.200)
		XUSL●●●A1360	53.6 (1362)	XUSLZD71360	15.01 (6.810)
		XUSL●●5A1400	55.2 (1401.7)	XUSLZD71400	15.37 (6.970)
		XUSL●●5A1520	59.9 (1521.5)	XUSLZD71520	16.38 (7.430)
		XUSL●●5A1560	61.5 (1563.3)	XUSLZD71560	16.71 (7.580)
		XUSL●●5A1640	64.6 (1641.3)	XUSLZD71640	17.89 (7.890)
		XUSL●●5A1720	67.7 (1720.8)	XUSLZD71720	18.08 (8.200)
		XUSL●●5A1800	71 (1802.9)	XUSLZD71800	18.76 (8.510)
		XUSL●●5A1920	75.7 (1922.8)	XUSLZD71920	19.78 (8.970)
		XUSL●●5A2120	83.5 (2120.7)	XUSLZD72120	21.47 (9.740)

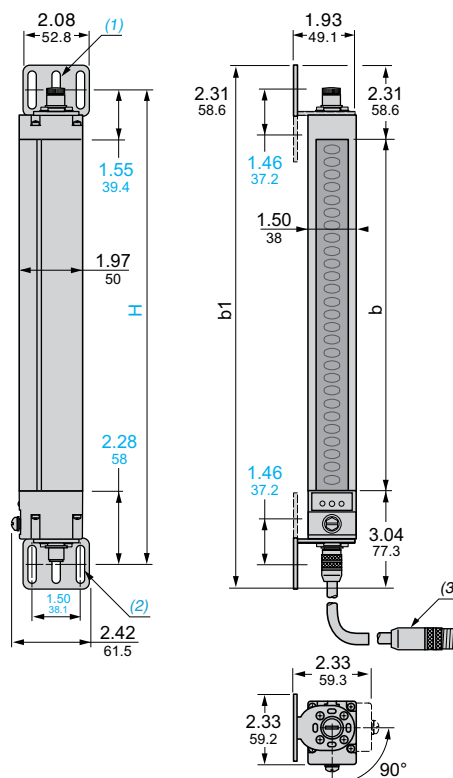
(1) Sensing distance reduction coefficient must be taken into account for each pair of IP67 protection tubes used.

Light curtains

XUSLB



XUSLDM



Dual Dimensions:
in. (mm)

XUS	b	b1	H	Protected height
LB●●●0280	11.2 (284.4)	16.6 (420.4)	15 (381.7)	11 (280)
LB●●●0320	12.8 (324.8)	18.1 (460.8)	16.6 (422.1)	12.6 (320)
LB●●●0360	14.4 (364.5)	19.7 (500.5)	18.2 (461.8)	14.2 (360)
LB●●●0440	17.5 (443.9)	22.8 (579.9)	21.3 (541.2)	17.3 (440)
LB●●●0520	20.6 (523.4)	26 (659.4)	24.4 (620.7)	20.5 (520)
LB●●●0600	23.8 (604.1)	29.1 (740.1)	27.6 (701.4)	23.6 (600)
LB●●●0680	26.9 (683.6)	32.3 (819.6)	30.7 (780.9)	26.8 (680)
LB●●●0720	28.5 (724)	33.9 (860)	32.3 (821.3)	28.3 (720)
LB●●●0760	30 (763)	35.4 (899)	33.9 (860.3)	29.9 (760)
LB●●●0880	34.8 (882.8)	40.1 (1018.8)	38.6 (980.1)	34.6 (880)
LB●●●0920	36.3 (922.5)	41.7 (1058.5)	40.1 (1019.8)	36.2 (920)
LB●●●0960	37.9 (963.6)	43.3 (1099.6)	41.8 (1060.9)	37.8 (960)
LB●●●1040	41.1 (1042.9)	46.4 (1178.9)	44.9 (1140.2)	40.9 (1040)
LB●●●1120	44.2 (1122.3)	49.5 (1258.3)	48 (1219.6)	44.1 (1120)
LB●●●1200	47.4 (1203.8)	52.7 (1339.8)	51.2 (1301.1)	47.2 (1200)
LB●●●1360	53.6 (1362)	59 (1498)	57.5 (1459.3)	53.5 (1360)
LB●●●1400	55.2 (1401.7)	60.5 (1537.7)	59 (1499)	55.1 (1400)
LB●●●1520	59.9 (1521.5)	65.3 (1657.5)	63.7 (1618.8)	59.8 (1520)
LB●●●1560	61.5 (1563.3)	66.9 (1699.3)	65.4 (1660.6)	61.4 (1560)
LB●●●1640	64.6 (1641.3)	70 (1777.3)	68.4 (1738.6)	64.6 (1640)
LB●●●1720	67.7 (1720.8)	73.1 (1856.8)	71.6 (1818.1)	67.7 (1720)
LB●●●1800	71 (1802.9)	76.3 (1938.9)	74.8 (1900.2)	70.9 (1800)
LB●●●1920	75.7 (1922.8)	81.1 (2058.8)	79.5 (2020.1)	75.6 (1920)
LB●●●2120	83.5 (2120.7)	88.8 (2256.7)	87.3 (2217.3)	83.5 (2120)

XUS	b	b1	H	Protected height
LDM●●●0280	11.2 (284.4)	16.6 (420.4)	15 (381.7)	11 (280)
LDM●●●0320	12.8 (324.8)	18.1 (460.8)	16.6 (422.1)	12.6 (320)
LDM●●●0360	14.4 (364.5)	19.7 (500.5)	18.2 (461.8)	14.2 (360)
LDM●●●0440	17.5 (443.9)	22.8 (579.9)	21.3 (541.2)	17.3 (440)
LDM●●●0520	20.6 (523.4)	26 (659.4)	24.4 (620.7)	20.5 (520)
LDM●●●0600	23.8 (604.1)	29.1 (740.1)	27.6 (701.4)	23.6 (600)
LDM●●●0680	26.9 (683.6)	32.3 (819.6)	30.7 (780.9)	26.8 (680)
LDM●●●0720	28.5 (724)	33.9 (860)	32.3 (821.3)	28.3 (720)
LDM●●●0760	30 (763)	35.4 (899)	33.9 (860.3)	29.9 (760)
LDM●●●0880	34.8 (882.8)	40.1 (1018.8)	38.6 (980.1)	34.6 (880)
LDM●●●0920	36.3 (922.5)	41.7 (1058.5)	40.1 (1019.8)	36.2 (920)
LDM●●●0960	37.9 (963.6)	43.3 (1099.6)	41.8 (1060.9)	37.8 (960)
LDM●●●1040	41.1 (1042.9)	46.4 (1178.9)	44.9 (1140.2)	40.9 (1040)
LDM●●●1120	44.2 (1122.3)	49.5 (1258.3)	48 (1219.6)	44.1 (1120)
LDM●●●1200	47.4 (1203.8)	52.7 (1339.8)	51.2 (1301.1)	47.2 (1200)
LDM●●●1360	53.6 (1362)	59 (1498)	57.5 (1459.3)	53.5 (1360)
LDM●●●1400	55.2 (1401.7)	60.5 (1537.7)	59 (1499)	55.1 (1400)
LDM●●●1520	59.9 (1521.5)	65.3 (1657.5)	63.7 (1618.8)	59.8 (1520)
LDM●●●1560	61.5 (1563.3)	66.9 (1699.3)	65.4 (1660.6)	61.4 (1560)
LDM●●●1640	64.6 (1641.3)	70 (1777.3)	68.4 (1738.6)	64.6 (1640)
LDM●●●1720	67.7 (1720.8)	73.1 (1856.8)	71.6 (1818.1)	67.7 (1720)
LDM●●●1800	71 (1802.9)	76.3 (1938.9)	74.8 (1900.2)	70.9 (1800)
LDM●●●1920	75.7 (1922.8)	81.1 (2058.8)	79.5 (2020.1)	75.6 (1920)
LDM●●●2120	83.5 (2120.7)	88.8 (2256.7)	87.3 (2217.3)	83.5 (2120)

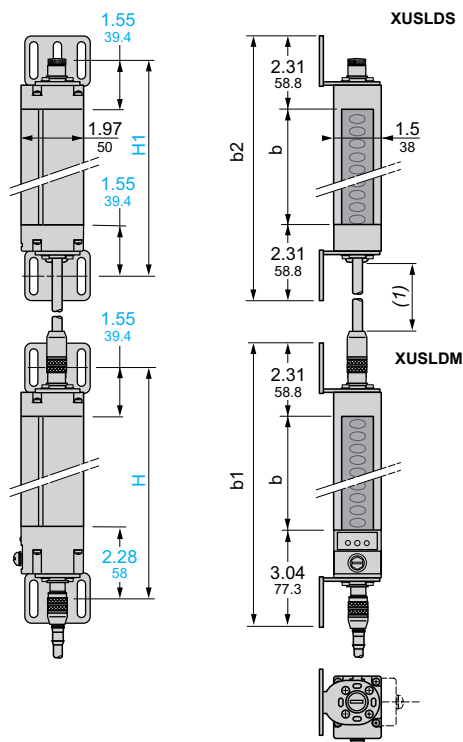
(1) 2 elongated holes, 0.73 x 0.27 in. (18.5 x 6.8 mm).

(2) 4 elongated holes, 0.91 x 0.27 in. (23.2 x 6.8 mm).

(3) M12 male connector on 10.6 in. (0.27 m) pigtail.

Cascadable segments

XUSLDS

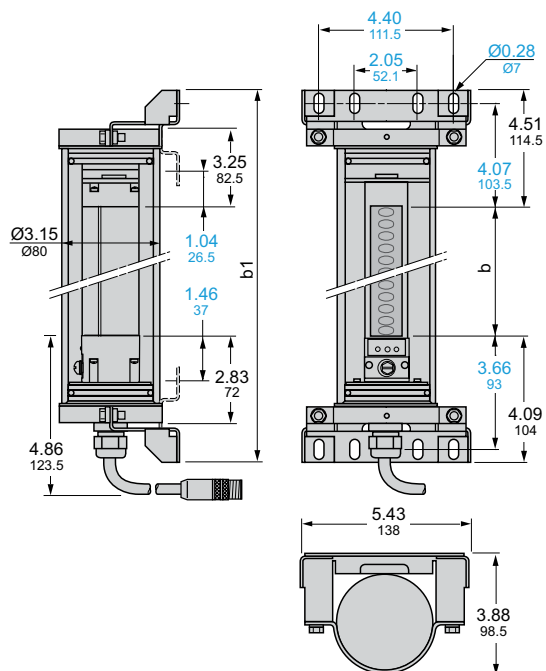


XUS	b	b1	b2	H	H1	Protected height
LDS●●●0280	11.2 (284.4)	16.6 (420.4)	15.8 (401.5)	15 (381.7)	14.3 (363.1)	11 (280)
LDS●●●0320	12.8 (324.8)	18.1 (460.8)	17.4 (442.3)	16.6 (422.1)	15.9 (403.5)	12.6 (320)
LDS●●●0360	14.4 (364.5)	19.7 (500.5)	19 (482)	18.2 (461.8)	17.4 (443.2)	14.2 (360)
LDS●●●0440	17.5 (443.9)	22.8 (579.9)	22.1 (561.4)	21.3 (541.2)	20.6 (522.6)	17.3 (440)
LDS●●●0520	20.6 (523.4)	26 (659.4)	25.2 (640.9)	24.4 (620.7)	23.7 (602.1)	20.5 (520)
LDS●●●0600	23.8 (604.1)	29.1 (740.1)	28.4 (721.6)	27.6 (701.4)	26.9 (682.8)	23.6 (600)
LDS●●●0680	26.9 (683.6)	32.3 (819.6)	31.5 (801.1)	30.7 (780.9)	30 (762.3)	26.8 (680)
LDS●●●0720	28.5 (724)	33.9 (860)	33.1 (841.5)	32.3 (821.3)	31.6 (802.7)	28.3 (720)
LDS●●●0760	30 (763)	35.4 (899)	34.7 (880.5)	33.9 (860.3)	33.1 (841.7)	29.9 (760)
LDS●●●0880	34.8 (882.8)	40.1 (1018.8)	39.4 (1000.3)	38.6 (980.1)	37.9 (961.5)	34.6 (880)
LDS●●●0920	36.3 (922.5)	41.7 (1058.5)	40.9 (1040)	40.1 (1019.8)	39.4 (1001.2)	36.2 (920)
LDS●●●0960	37.9 (963.6)	43.3 (1099.6)	42.6 (1081.1)	41.8 (1060.9)	41 (1042.3)	37.8 (960)
LDS●●●1040	41.1 (1042.9)	46.4 (1178.9)	45.7 (1160.4)	44.9 (1140.2)	44.2 (1121.6)	40.9 (1040)
LDS●●●1120	44.2 (1122.3)	49.5 (1258.3)	48.8 (1239.8)	48 (1219.6)	47.3 (1201)	44.1 (1120)
LDS●●●1200	47.4 (1203.8)	52.7 (1339.8)	52 (1321.3)	51.2 (1301.1)	50.5 (1282.5)	47.2 (1200)
LDS●●●1360	53.6 (1362)	59 (1498)	58.2 (1479.5)	57.5 (1459.3)	56.7 (1440.7)	53.5 (1360)
LDS●●●1400	55.2 (1401.7)	60.5 (1537.7)	59.8 (1519.2)	59 (1499)	58.3 (1480.4)	55.1 (1400)
LDS●●●1520	59.9 (1521.5)	65.3 (1657.5)	64.5 (1639)	63.7 (1618.8)	63 (1600.2)	59.8 (1520)
LDS●●●1560	61.5 (1563.3)	66.9 (1699.3)	66.2 (1680.8)	65.4 (1660.6)	66.1 (1679.2)	61.4 (1560)
LDS●●●1640	64.6 (1641.3)	70 (1777.3)	69.2 (1758.8)	68.4 (1738.6)	67.7 (1720)	64.6 (1640)
LDS●●●1720	67.7 (1720.8)	73.1 (1856.8)	72.4 (1838.3)	71.6 (1818.1)	70.8 (1799.5)	67.7 (1720)
LDS●●●1800	71 (1802.9)	76.3 (1938.9)	75.6 (1920.4)	74.8 (1900.2)	74.1 (1881.6)	70.9 (1800)
LDS●●●1920	75.7 (1922.8)	81.1 (2058.8)	80.3 (2040.3)	79.5 (2020.1)	78.8 (2001.5)	75.6 (1920)
LDS●●●2120	83.5 (2120.7)	88.8 (2256.7)	88.1 (2237.5)	87.3 (2217.3)	86.6 (2198.7)	83.5 (2120)

(1) Flexible 4.33 in. (0.11 m) cable.

Protection tube for XUSLB/XUSLDM light curtains and XUSLDS segments

XUSLZD7●●●●

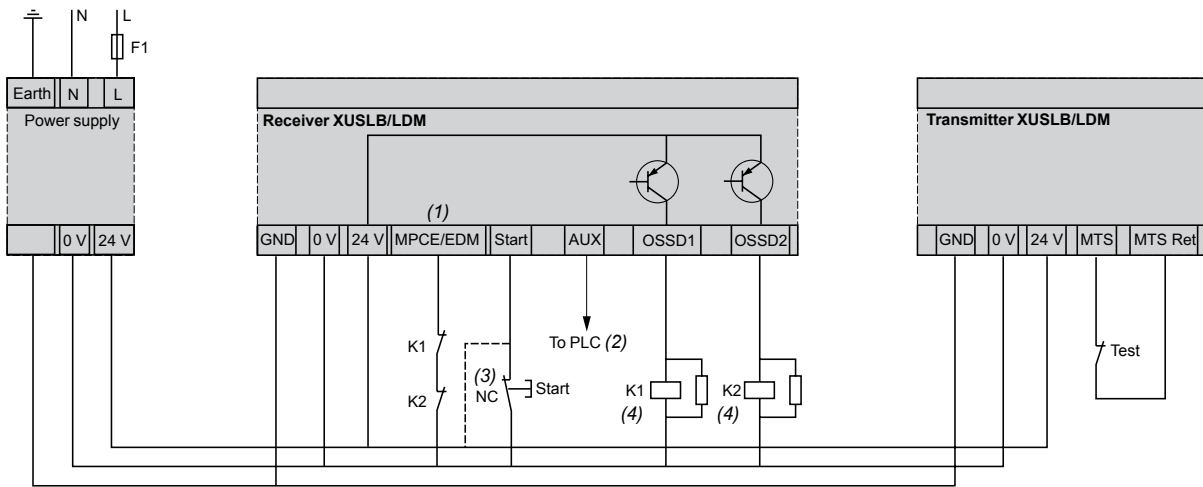


XUS	b	b1
LZD70280	11.2 (284.4)	19.8 (502.8)
LZD70320	12.8 (324.8)	21.4 (543.2)
LZD70360	14.4 (364.5)	22.9 (582.9)
LZD70440	17.5 (443.9)	26.1 (662.3)
LZD70520	20.6 (523.4)	29.2 (741.8)
LZD70600	23.8 (604.1)	32.4 (822.5)
LZD70680	26.9 (683.6)	35.5 (902)
LZD70720	28.5 (724)	37.1 (942.4)
LZD70760	30 (763)	38.6 (981.4)
LZD70880	34.8 (882.8)	43.4 (1101.2)
LZD70920	36.3 (922.5)	44.9 (1140.9)
LZD70960	37.9 (963.6)	46.5 (1182)

XUS	b	b1
LZD71040	41.1 (1042.9)	49.7 (1261.3)
LZD71120	44.2 (1122.3)	52.8 (1340.7)
LZD71200	47.4 (1203.8)	56 (1422.2)
LZD71360	53.6 (1362)	62.2 (1580.4)
LZD71400	55.2 (1401.7)	63.8 (1620.1)
LZD71520	59.9 (1521.5)	68.5 (1739.9)
LZD71560	61.5 (1563.3)	70.1 (1781.7)
LZD71640	64.6 (1641.3)	73.2 (1859.2)
LZD71720	67.7 (1720.8)	76.3 (1939.2)
LZD71800	71 (1802.9)	79.6 (2021.2)
LZD71920	75.7 (1922.8)	84.3 (2141.2)
LZD72120	83.5 (2120.7)	92.1 (2338.4)

Dual Dimensions:
in. (mm)

Direct connection with XUSLB/LDM●●●



(1) For testing prior to installation, you can select MPCE/EDM OFF (factory default setting). In that case, the MPCE/EDM line must be connected to the 0 V line of the system.

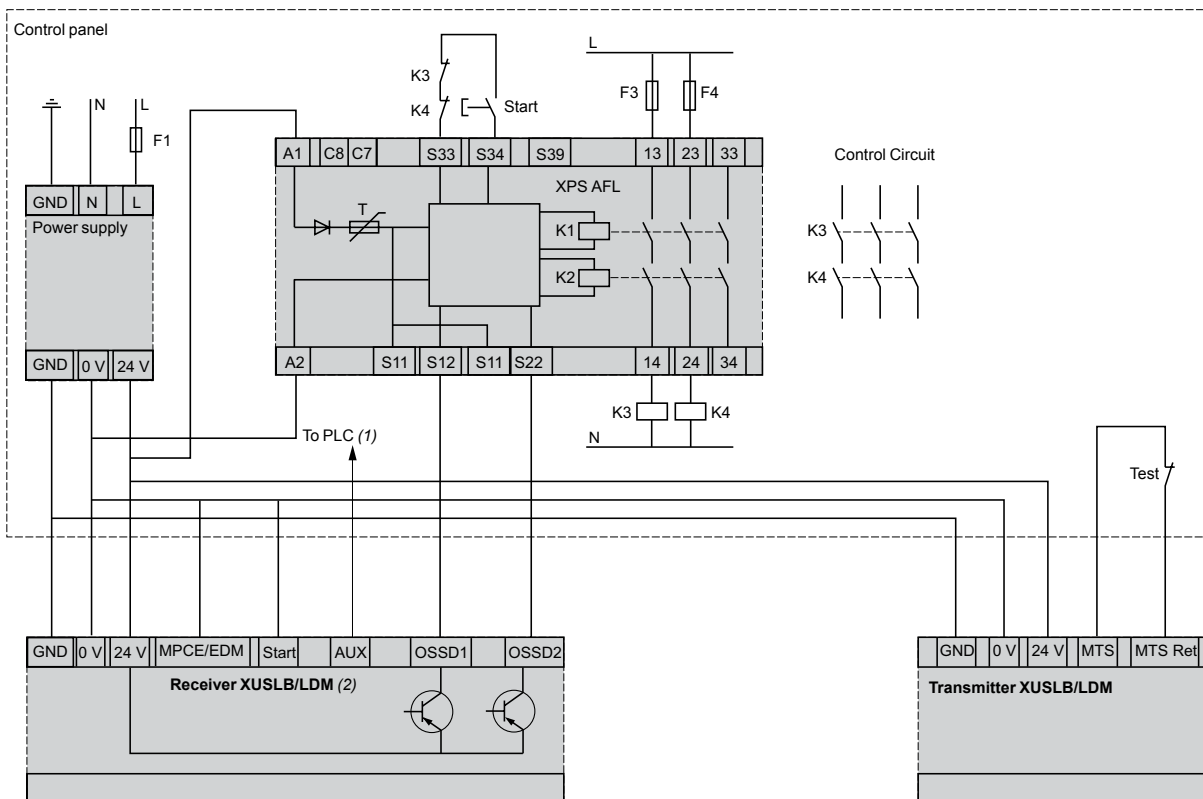
(2) The auxiliary output connects to a PLC (optional).

(3) If remote start is not used, connect the start line to the 0 V line.

(4) The K1 and K2 coils must be protected using the arc suppressors included in the documentation kit.

Note: Relays K1 and K2 must have mechanically linked contacts.

Connection via a Preventa XPSAFL module



(1) The auxiliary output connects to a PLC (optional).

(2) The light curtain must be configured with MPCE/EDM OFF and with automatic start.

Note: Relays K3 and K4 must have mechanically linked contacts.

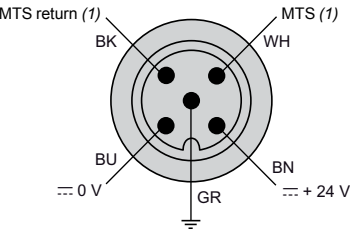
Safety detection solutions

Light curtains, type 4
Optimum XUSLB and Universal XUSLDM
with solid-state output

Transmitter

Transmitter connector

Transmitter status indicator



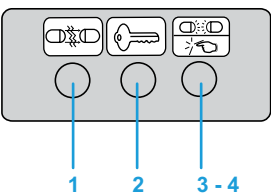
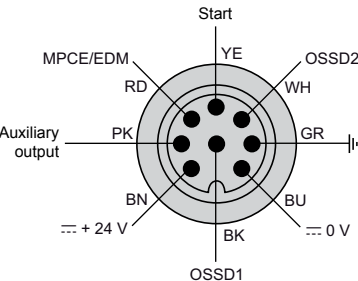
(1) Light curtain test input.

1 Yellow LED

Receiver

Receiver connector

Receiver status indicator

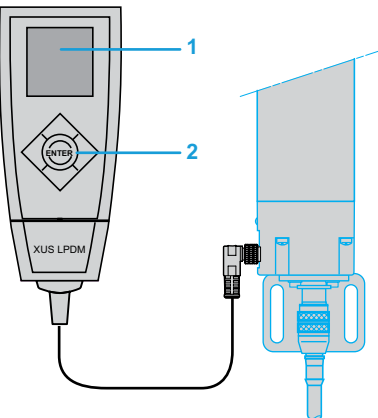


1 Blanking: Orange LED
2 Interlock or Alarm: Yellow LED
3-4 Machine run: Green LED
Machine stop: Red LED

Programming and diagnostic module

Description and connection to XUSLB/XUSLDM light curtains

XUSLPDM



1 Screen
2 Navigation button for displaying menus and selecting functions

Substitution table

Cross-reference from XUSLT
to XUSLB and XUSLDM

Safety detection solutions

Light curtains, type 4

Optimum XUSLB and Universal XUSLDM
with solid-state output

5

Optimum light curtains

Detection capacity: 0.55 in. (14 mm)

Old light curtain

XUSLTQ6A0260, XUSLTQ6B0260

New light curtain

XUSLBQ6A0280

XUSLTQ6A0350, XUSLTQ6B0350

XUSLBQ6A0320, XUSLBQ6A0360

XUSLTQ6A0435, XUSLTQ6B0435

XUSLBQ6A0440

XUSLTQ6A0520, XUSLTQ6B0520

XUSLBQ6A0520

XUSLTQ6A0610, XUSLTQ6B0610

XUSLBQ6A0600

XUSLTQ6A0700, XUSLTQ6B0700

XUSLBQ6A0720

XUSLTQ6A0785, XUSLTQ6B0785

XUSLBQ6A0760

XUSLTQ6A0870, XUSLTQ6B0870

XUSLBQ6A0880, XUSLBQ6A0920

XUSLTQ6A0955, XUSLTQ6B0955

XUSLBQ6A0960

XUSLTQ6A1045, XUSLTQ6B1045

XUSLBQ6A1040

XUSLTQ6A1130, XUSLTQ6B1130

XUSLBQ6A1120

XUSLTQ6A1215, XUSLTQ6B1215

XUSLBQ6A1200

XUSLTQ6A1305, XUSLTQ6B1390,
XUSLTQ6A1390, XUSLTQ6B1390

XUSLBQ6A1360

Detection capacity: 1.18 in. (30 mm)

Old light curtain

XUSLTR5A0350, XUSLTR5B0350

New light curtain

XUSLBR5A0320, XUSLBR5A0360,
XUSLBR5A0440

XUSLTR5A0520, XUSLTR5B0520

XUSLBR5A0520, XUSLBR5A0600

XUSLTR5A0700, XUSLTR5B0700

XUSLBR5A0680, XUSLBR5A0760

XUSLTR5A0870, XUSLTR5A0870,

XUSLBR5A0880, XUSLBR5A0920

XUSLTR5A1045, XUSLTR5B1045

XUSLBR5A1040

XUSLTR5A1215, XUSLTR5B1215

XUSLBR5A1200, XUSLBR5A1360

XUSLTR5A1390, XUSLTR5B1390

XUSLBR5A1400, XUSLBR5A1520

XUSLTR5A1570, XUSLTR5B1570

XUSLBR5A1560, XUSLBR5A1640

XUSLTR5A1745, XUSLTR5B1745

XUSLBR5A1720, XUSLBR5A1800

XUSLTR5A1920, XUSLTR5B1920

XUSLBR5A1920

XUSLTR5A2095, XUSLTR5B2095

XUSLBR5A2120

Note: The specifications of the ranges (optics, connections, dimensions, mounting, functions, etc.) are not exactly the same.

Please refer to the detailed specifications of the XUSLB..... and XUSLD..... ranges and associated accessories when replacing a light curtain from the XUSLT..... range.

Safety detection solutions

Light curtains, type 4

Optimum XUSLB and Universal XUSLDM
 with solid-state output

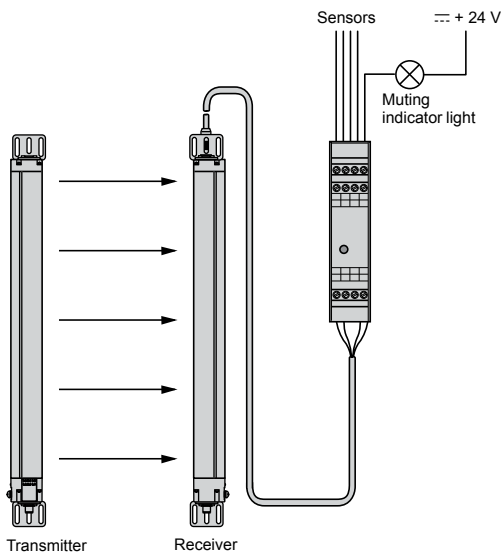
Universal light curtains

Detection capacity: 1.18 in. (30 mm)

Old light curtain	New light curtain
XUSLTY5A0350, XUSLTY5B0350	XUSLDMY5A0320, XUSLDMY5A0360, XUSLDMY5A0440
XUSLTY5A0520, XUSLTY5B0520	XUSLDMY5A0520, XUSLDMY5A0600
XUSLTY5A0700, XUSLTY5B0700	XUSLDMY5A0680, XUSLDMY5A0760
XUSLTY5A0870, XUSLTY5B0870	XUSLDMY5A0880, XUSLDMY5A0920
XUSLTY5A1045, XUSLTY5B1045	XUSLDMY5A1040
XUSLTY5A1215, XUSLTY5B1215	XUSLDMY5A1200, XUSLDMY5A1360
XUSLTY5A1390, XUSLTY5B1390	XUSLDMY5A1400, XUSLDMY5A1520
XUSLTY5A1570, XUSLTY5B1570	XUSLDMY5A1560, XUSLDMY5A1640
XUSLTY5A1745, XUSLTY5B1745	XUSLDMY5A1720, XUSLDMY5A1800
XUSLTY5A1920, XUSLTY5B1920	XUSLDMY5A1920
XUSLTY5A2095, XUSLTY5B2095	XUSLDMY5A2120

Note: The specifications of the ranges (optics, connections, dimensions, mounting, functions, etc.) are not exactly the same.

Please refer to the detailed specifications of the XUSLB..... and XUSLD..... ranges and associated accessories when replacing a light curtain from the XUSLT..... range.



Operating principle

Universal XUSLDM light curtains have an integrated Muting function that is configurable using the XUSLPDM programming and diagnostic module. This function allows for the automatic passage of parts for machining or loaded pallets, without interrupting the transportation movement within the zone protected by the electro-sensitive protection equipment (ESPE) system. In addition to the safety light curtain, an XPSLCM1 connection module, which is connected directly to the top of the light curtain receiver, allows for the cabling of 2–4 muting sensors as well as an indicator light. In the event of a sequence error, the muting indicator light flashes (1 second interval); turning the Start key switch off and on restarts the system.

When the system is switched on by the start command, and the light curtain protection not interrupted, the main circuit is closed by the safety outputs of the XUSLDM light curtain (solid-state safety outputs). In addition to the safety outputs, the light curtain incorporates signaling LEDs and an auxiliary output (alarm or status signaling) for sending system status information to the PLC. Four LEDs on the light curtain and one on the front face of the XPSLCM1 connection module provide information on the safety circuit status.

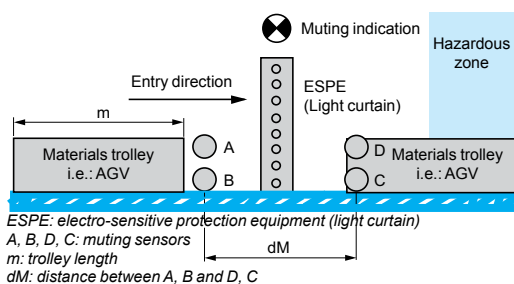
An interruption of the protection field monitored by the electro-sensitive protection equipment causes instantaneous opening of the safety outputs; the process PLC receives a stop command, and the LED display mounted on the front face indicates the change of state of the safety circuits. The Open state is maintained until the light beams are unobstructed, and the Start key switch is operated (if included in the light curtain configuration).

The Muting function cannot be activated by energizing the muting sensors unless the safety outputs have been closed beforehand. To trigger the Muting function, the muting devices must be activated within the configurable time interval (50 ms to 5 seconds, in increments of 50 ms). During the activated muting phase, materials can be transported through the protection field without deactivating the safety outputs. In the event of intrusion into the hazardous zone, a person cannot activate the muting sensors in the same way, and the system stops.

During the muting operation process, a light indicating the muting state is controlled by the XPSLCM1 module. The indicator light comes on when a muting signal is generated, and indicates the inhibition of the protection function. An indicator light error (short-circuit, open-circuit) will be recognized, and will deactivate the Muting function.

Conditions to be observed for the Muting function

- The muting sensors must either be either:
 - thru-beam: XUK0ARCTL2 (sensing distance 98.4 ft / 30 m) + XUK0ARCTL2T,
 - polarized reflex: XUK0ARCTL2 (sensing distance 16.4 ft / 5 m) + reflector XUJZC50,
 - mechanical limit switches with hard contacts.
- $dM \leq m$ to obtain continuous validation of the Muting function.
- Avoid the intrusion of persons during the muting phase. This phase is indicated by the indicator light connected to the muting indicator output of the XPSLCM1 connection module.
- A materials trolley must generate the muting signal before entering the protection field, and discontinue the muting signal on exiting once it has cleared all the sensors of the protection field.

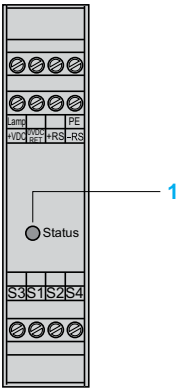


Safety detection solutions

Preventa™ connection module XPSLCM1
for Muting function on XUSLDM light curtains

Specifications			
Connection module type		XPSLCM1	
Maximum achievable safety level (1)		PL e/Category 4 conforming to EN/ISO 13849-1, SILCL 3 conforming to EN/IEC 62061	
Conformity to standards		ANSI/RIA R15.06, ANSI B11:19-1990, OSHA 1910.217(C), OSHA 1910.212, EN/IEC 61496-1 and EN/IEC 61496-2 and IEC 61508-1, 2 (Type 4 ESPE)	
Certifications		CE, TÜV, CSA, UL	
Product designed for max. use in safety related parts of control systems		Conforming to EN 954-1/ISO 13849-1	Category 4
Ambient air temperature	Operating	°F (°C)	32 to +131 (0 to +55)
	Storage	°F (°C)	−13 to +167 (−25 to +75)
Degree of protection conforming to IEC 529	Terminals		IP 20
	Enclosure		IP 20
Power supply by XUSLDM light curtain	Voltage	V	− 24 (±20%)
	Maximum current	mA	30
Maximum consumption		W	0.7
Rated insulation voltage (Ui)		V	500
Rated impulse withstand voltage (Uimp)		kV	1.1
Shock resistance		gn	6 (10–55 Hz)
Vibration resistance		gn	10 (16 ms)
Number of light curtains that can be connected		1 transmitter-receiver pair	
Inputs for muting sensors		2–4 per Muting function	
- number of inputs to be monitored			
- supply voltage of sensors		V	− 24
- output current of each sensor		mA	< 20
Type of muting sensors		Thru-beam, polarized reflex or sensors with hard contacts	
Synchronization time of muting sensors		ms	50–500 (configurable in XUSLDM light curtain in increments of 50 ms)
Maximum muting time		min	2 or unlimited
Safety outputs	Number and type	2 PNP (terminals 1 and 2)	
	Breaking capacity of outputs	mA	30 V/100
Muting indicator light	Output	1 NPN	
	Power	W	1–7 max.
	Type	LED or filament bulb	
Signaling		1 LED	
Connection		Captive screw clamp terminals, nonremovable	
1-wire connection	Type		
	Without cable end	Solid or flexible cable: 26–14 AWG (0.14–2.5 mm²)	
	With cable end	Without bezel, flexible cable: 24–14 AWG (0.25–2.5 mm²)	
2-wire connection	With cable end	With bezel, flexible cable: 24–16 AWG (0.25–1.5 mm²)	
	Without cable end	Without bezel, flexible cable: 24–18 AWG (0.25–1.0 mm²)	
	Without cable end	Double, with bezel, flexible cable: 22–16 AWG (0.5–1.5 mm²)	

(1) Using an appropriate and correctly connected control system.



Description

XPSLCM1

To aid diagnostics, the connection module has 1 LED on the front face 1.

References

Connection module

Description	Type of terminal block connection	Muting indicator light output	Supply	References	Weight oz (kg)
Connection module for Muting function	Nonremovable	1 NPN	~ 24 V	XPSLCM1	6.70 (0.190)

Connection cables

Description	Length ft (m)	References	Weight lbs (kg)
Pre-wired connectors for connection between the XPSLCM1 module and the XUSLD receiver	32.81 (10)	XPSDCRM10	1.521 (0.690)
	49.21 (15)	XPSDCRM10	2.271 (1.030)
	98.43 (30)	XPSDCRM10	4.255 (1.930)

Spare parts

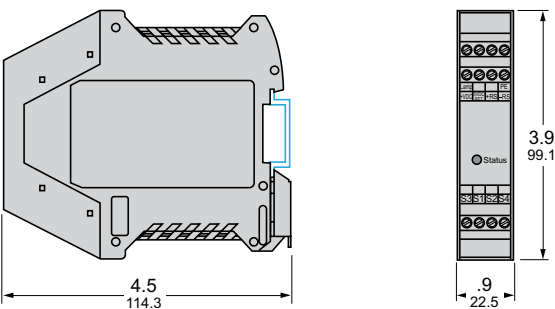
Description	Power W	References	Weight oz (kg)
Muting indicator light kit (1)	5	XSZCM01	0.42 (0.012)
Replacement bulbs for muting indicator light kit consisting of one lot of 10 replacement bulbs and 1 removal/insertion tool XBF X13	1–7	XSZCM02	0.56 (0.016)

(1) XVB or XVD with steady light LED or filament bulb can also be used.

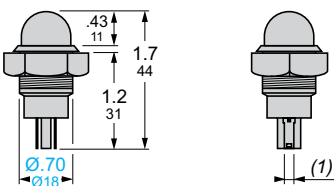
Dimensions

XPSLCM1

Mounting on 35 mm rail



Muting indicator light kit XSZCM01

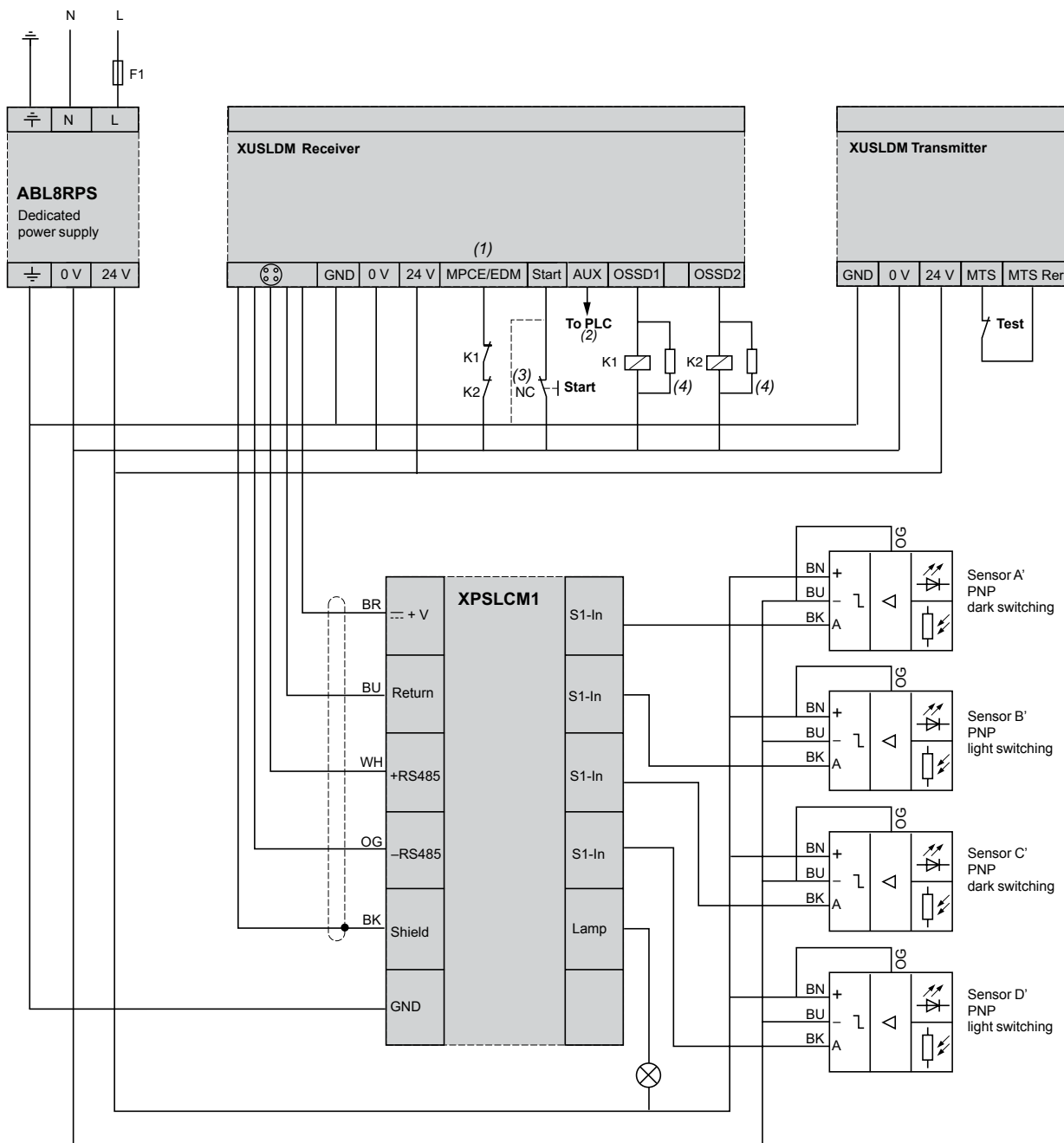


(1) Faston® connector 4.7.

Dual Dimensions:
in. (mm)

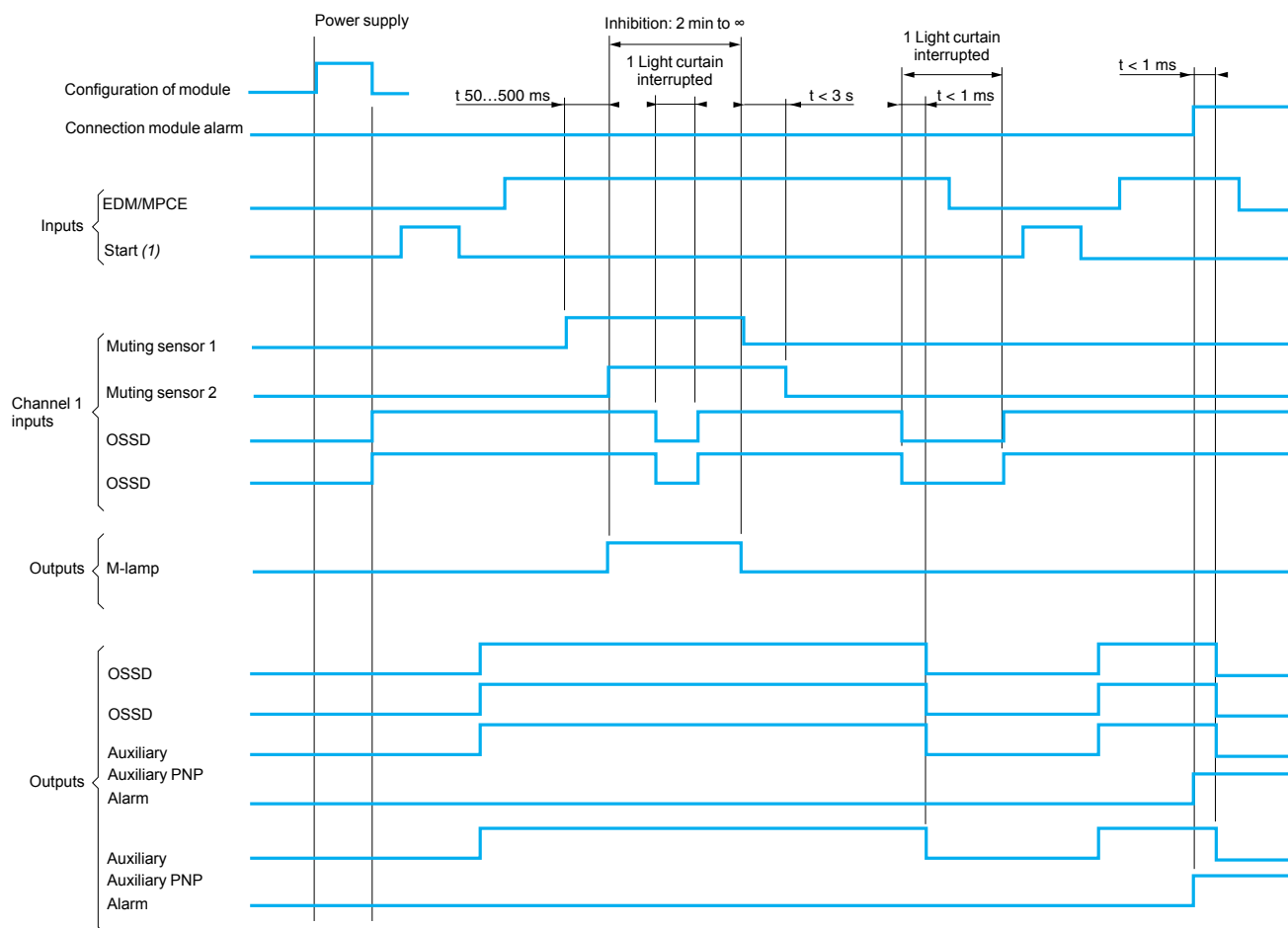
Connection of XUSLDM light curtains with connection module XPSLCM1

Example configuration with XUSLDM light curtains



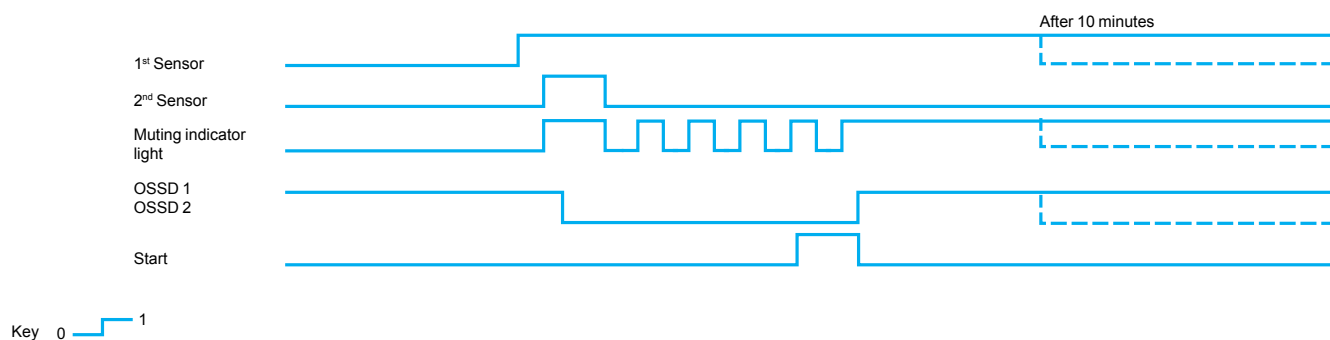
Functional diagram of XUSLDM light curtain with connection module XPSLCM1

Start/Restart Interlock mode with 2 sensors



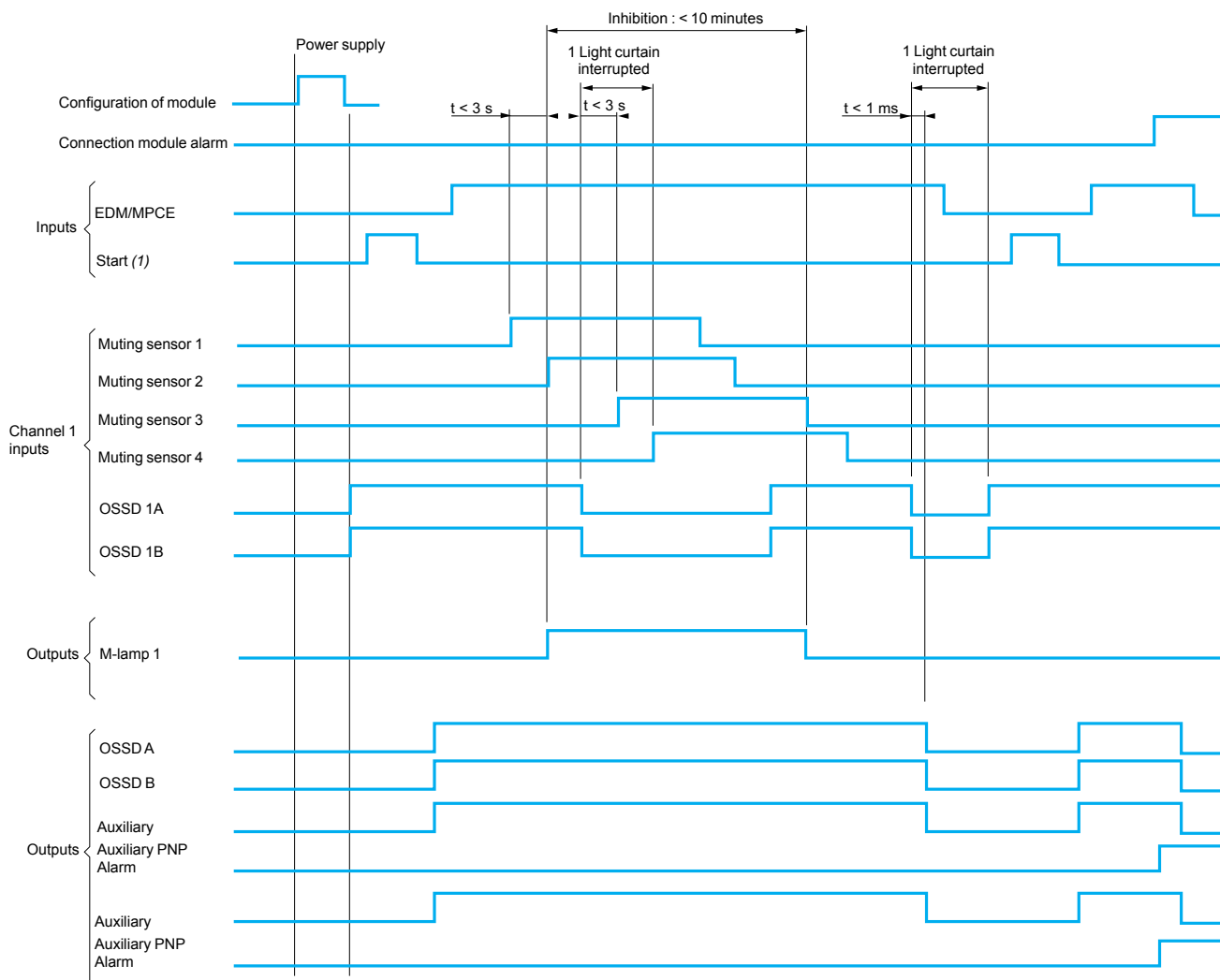
(1) Press the Start button.

Override function



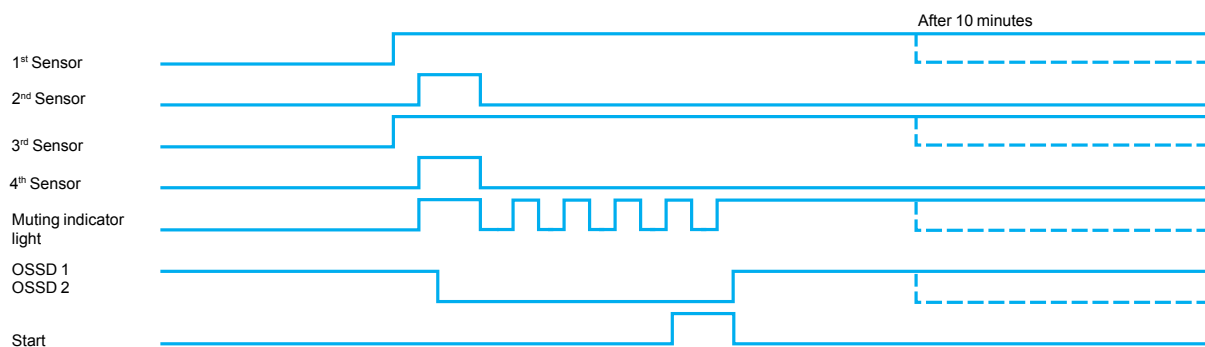
Functional diagram of XUSLDM light curtain with connection module XPSLCM1

Start/Restart Interlock mode with 4 sensors



(1) Press the Start button.

Override function



Key 0 1

Light curtain type		XUSLP●●●●
Environmental specifications		
Conformity to standards		ANSI/RIA R15.06, ANSI B11:19-1990, OSHA 1910.217(C), OSHA 1910.212, EN/IEC 61496-1-2 for type 4 ESPE
Certifications		CE, TUV, UL, CSA
European directives		Machinery directive 2006/42/EC, Work equipment directive 89/655/EEC and EMC directive 89/336 EEC
Maximum safety level (1)		PL = e/category 4 conforming to EN/ISO 13849-1 SIL 3 conforming to EN/IEC 61508
Reliability data		PFH _d = 2.7E ⁻⁹ 1/h conforming to EN/IEC 61508
Ambient air temperature	Operating	°F (°C) +32 to +131 (0 to +55)
	Storage	°F (°C) -13 to +167 (-25 to +75)
Relative humidity		95% maximum, without condensation
Degree of protection		IP65 and IP67
Shock and vibration resistance	Conforming to IEC 61496-1	Shock resistance: 10 gn, impulse 16 ms, Vibration resistance: 10–55 Hz, amplitude: 0.35 ±0.05 mm
Materials		Casing: aluminum with electrostatically applied red (RAL 3000) polyester paint finish; end caps: 20% fiberglass impregnated polycarbonate. Front cover: acrylic.
Mounting		End brackets (included)
Optical specifications		
Minimum detection capacity	in. (mm)	11.8, 15.7, 19.7, 23.6 (300, 400, 500, 600) and single beam (Body protection)
Nominal sensing distance (Sn)	ft (m)	2.6–65.5 or 2.6–229.7 (0.8–20 or 0.8–70), depending on the configuration; and 2.6–26.2 (0.8–8) for light curtains with passive receiver
Protected height		Depends on the number of light beams. See the table on page 5/37.
Effective aperture angle (EAA)		2.5° at 9.8 ft (3 m)
Light source		GaAlAs LED, 850 nm
Immunity to ambient light		Conforming to EN/IEC 61496-2
Electrical specifications		
Response time	ms	< 16 to < 24, depending on the light beam coding selected
Power supply	Transmitter	--- 24 V ± 20% 2 A conforming to EN/IEC 61496 and EN/IEC 60204-1
	Receiver	100 (SELV: Safety Extra Low Voltage)
Maximum current power consumption (no-load)	Transmitter	1.6 (with maximum load)
	Receiver	100
Immunity to interference		Conforming to EN/IEC 61496-1
Safety outputs OSSD (output signal switching devices)		2 solid-state PNP (N.O.) outputs ≤ 650 mA, --- 24 V (short-circuit protected)
Auxiliary output		1 solid-state output 100 mA, --- 24 V, PNP
Monitoring activation of output switching devices (MPCE/EDM)		50 mA, --- 24 V
Signaling	Transmitter	1 LED (power supply)
	Receiver	3 LEDs (stop, run, interlock) and a 2-digit display for diagnostics
Connections (2)	Transmitter	M12, 5-pin, male connector or terminal block
	Receiver	M12, 8-pin, male connector or terminal block
Conductor	Transmitter/receiver pre-wired connector	22 (0.35), tinned wires.
Cable resistance	Transmitter/receiver	0.016 per ft (0.055 per m) for 22 AWG (0.35 mm ²) wire
Cable lengths		Pre-wired connectors with cable lengths of 16.4, 32.8, 49.2 and 98.4 ft (5, 10, 15, and 30 m) are available separately. The maximum cable length is 394 ft (120 m), depending on the load current and power supply.
Functions		
Functions		Start: - Auto/Manual, manual 1 st cycle - Monitoring of the external switching devices (EDM: external device monitoring) - Test (MTS: monitoring test signal) for XUSLPZ only - Alignment aid by display of each broken light beam - Display of operating modes and alarm by LEDs and 2-digit display Selection of Auto/Manual, relay monitoring, alarm or auxiliary output functions, light beam coding and selection of sensing distance using configuration switches.
Monitoring the external switching devices (EDM = external device monitoring)		Monitoring of the function (open or closed) as well as the response time of the power components. Parameters can be set using configuration switches.
Test function		Initiates the stop instruction of the light curtain by opening the contact (simulated intrusion)
Muting function (inhibition)		Possible with external module XPSLCM1150

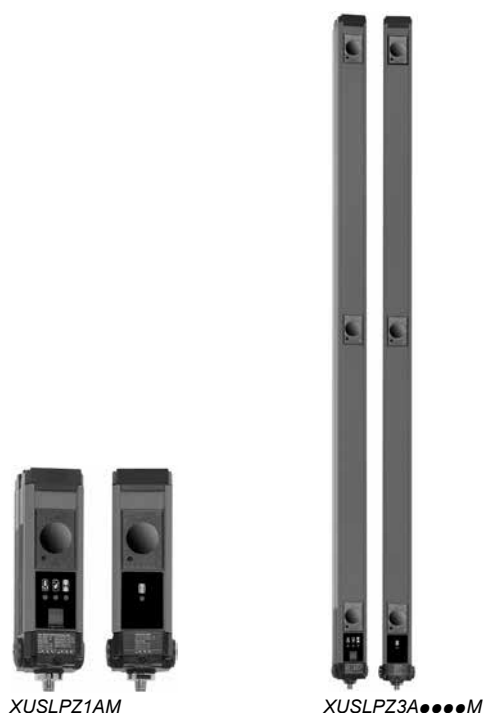
(1) Using an appropriate and correctly connected control system.

(2) Pre-wired female connectors must be ordered separately. See page 5/35.

Safety detection solutions

Light curtains, type 4

XUSLP compact light curtains with solid-state output, with connector



XUSLPZ1AM

XUSLPZ3A●●●●M

Transmitter-receiver pairs for body protection (1)

Detection capacity: 11.8, 15.7, 19.7, 23.6 in. (300, 400, 500, 600 mm) and single beam.

Sensing distance: 2.6–65.5 ft or 2.6–229.7 ft (0.8–20 m or 0.8–70 m) (depending on the configuration).

■ 2 PNP safety outputs

Detection capacity (3)	Response time Light beam coding			Number of light beams	Auxiliary output	References (2)	Weight
	A	B	C				
in. (mm)	ms	ms	ms				lb (kg)
–	< 24	< 20	< 16	1	PNP	XUSLPZ1AM	9.92 (4.500)
19.69 (500)	< 24	< 20	< 16	2	PNP	XUSLPZ2A0500M	13.89 (6.300)
23.62 (600)	< 24	< 20	< 16	2	PNP	XUSLPZ2A0600M	14.77 (6.700)
15.75 (400)	< 24	< 20	< 16	3	PNP	XUSLPZ3A0400M	15.87 (7.200)
19.69 (500)	< 24	< 20	< 16	3	PNP	XUSLPZ3A0500M	18.96 (8.600)
11.81 (300)	< 24	< 20	< 16	4	PNP	XUSLPZ4A0300M	18.08 (8.200)
11.81 (300)	< 24	< 20	< 16	5	PNP	XUSLPZ5A0300M	20.94 (9.500)
11.81 (300)	< 24	< 20	< 16	6	PNP	XUSLPZ6A0300M	22.93 (10.400)

(1) Includes 2 sets of 2 brackets with mountings and a user guide with certificate of conformity.

Pre-wired female connectors must be ordered separately. See page 5/35.

(2) To order a receiver only, add the letter **R** to the end of the catalog number for the corresponding transmitter-receiver pair.

Example: XUSLPZ2A0600M becomes **XUSLPZ2A0600MR** for the receiver only.

To order a transmitter only, add the letter **T** to the end of the catalog number for the corresponding transmitter-receiver pair.

Example: XUSLPZ2A0600M becomes **XUSLPZ2A0600MT** for the transmitter only.

(3) Detection capacity (also known as MOS) is the smallest diameter object that the light curtain is capable of detecting. The protected height of a light curtain depends on the detection capacity and the number of beams in the light curtain. Refer to pages 5/36 and 5/37 for dimensions and for determination of protected height.

Transmitter-receiver pairs for body protection, with passive receiver (reflector) (1)

Detection capacity: 19.7 and 23.6 in. (500 and 600 mm).

Sensing distance: 2.6–26.3 ft (0.8–8 m).

■ 2 PNP safety outputs

■ The XUSLPB system integrates the transmitter and receiver into one assembly (transceiver), which is mated with a passive reflector unit. The passive reflector unit does not require electrical connections.

Detection capacity (3)	Response time Light beam coding			Number of light beams	Auxiliary output	References (2)	Weight
	A	B	C				
in. (mm)	ms	ms	ms				lb (kg)
19.69 (500)	< 24	< 20	< 16	2	PNP	XUSLPB2A500M	13.89 (6.300)
23.62 (600)	< 24	< 20	< 16	2	PNP	XUSLPB2A600M	14.77 (6.700)

(1) Includes 2 sets of 2 brackets with mountings and a user guide with certificate of conformity.

Pre-wired female connectors must be ordered separately. See page 5/35.

(2) To order a passive receiver (reflector), replace the letter **M** with the letter **P** at the end of the catalog number for the corresponding transmitter-receiver pair.

Example: XUSLPB2A500M becomes **XUSLPB2A500P** for the passive receiver (reflector).

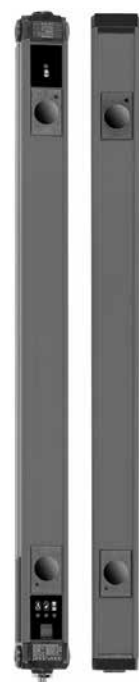
To order a transmitter-receiver (transceiver) only, add the letter **R** to the end of the catalog number for the corresponding transmitter-receiver pair.

Example: XUSLPB2A600M becomes **XUSLPB2A600MR** for the transmitter-receiver (transceiver) only.

(3) Detection capacity (also known as MOS) is the smallest diameter object that the light curtain is capable of detecting. The protected height of a light curtain depends on the detection capacity and the number of beams in the light curtain. Refer to pages 5/36 and 5/37 for dimensions and for determination of protected height.

Other versions

Combining type 4 light curtains with an external module for the Muting function. See page 5/64.



XUSLPB2●●

Separate components and accessories: page 5/35

Safety detection solutions

Light curtains, type 4

XUSLP compact light curtains with solid-state output, with terminal block (3)



Transmitter-receiver pairs for body protection (1)

Detection capacity:

11.8, 15.7, 19.7, 23.6 in. (300, 400, 500, 600 mm) and single beam.

Sensing distance:

2.6–65.5 ft or 2.6–229.7 ft (0.8–20 m or 0.8–70 m), depending on the configuration

■ 2 PNP safety outputs

Detection capacity (4)	Response time Light beam coding			Number of light beams	Auxiliary output	References (2)	Weight
	A	B	C				
in. (mm)	ms	ms	ms				lb (kg)
–	< 24	< 20	< 16	1	PNP	XUSLPZ1AB	9.92 (4.500)
19.69 (500)	< 24	< 20	< 16	2	PNP	XUSLPZ2A0500B	13.89 (6.300)
23.62 (600)	< 24	< 20	< 16	2	PNP	XUSLPZ2A0600B	14.77 (6.700)
15.75 (400)	< 24	< 20	< 16	3	PNP	XUSLPZ3A0400B	15.87 (7.200)
19.69 (500)	< 24	< 20	< 16	3	PNP	XUSLPZ3A0500B	18.96 (8.600)
11.81 (300)	< 24	< 20	< 16	4	PNP	XUSLPZ4A0300B	18.08 (8.200)
11.81 (300)	< 24	< 20	< 16	5	PNP	XUSLPZ5A0300B	20.94 (9.500)
11.81 (300)	< 24	< 20	< 16	6	PNP	XUSLPZ6A0300B	22.93 (10.400)

(1) Includes 2 sets of 2 brackets with mountings and a user guide with certificate of conformity.

(2) To order a receiver only, add the letter **R** to the end of the catalog number for the corresponding transmitter-receiver pair.

Example: XUSLPZ2A0600B becomes **XUSLPZ2A0600BR** for the receiver only.

To order a transmitter only, add the letter **T** to the end of the catalog number for the corresponding transmitter-receiver pair.

Example: XUSLPZ2A0600B becomes **XUSLPZ2A0600BT** for the transmitter only.

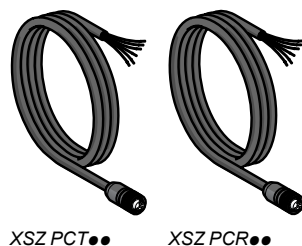
(3) Terminal block versions provide 3 conduit openings with M20 thread. When installing light curtain, use an M20 threaded cable gland (liquid tight cable strain relief fitting), or a DE9RA1220 conduit adapter for use with ½" NPT. The DE9RA1220 is not supplied with the light curtain and must be ordered separately. A micro style connector may also be used.

(4) Detection capacity (also known as MOS) is the smallest diameter object that the light curtain is capable of detecting. The protected height of a light curtain depends on the detection capacity and the number of beams in the light curtain. Refer to pages 5/36 and 5/37 for dimensions and for determination of protected height.

Other versions

Combining type 4 light curtains with an external module for the Muting function. See page 5/64.

Separate components and accessories: page 5/35



Separate components

Power supplies, 90° mirror adapters, protective covers, anti-vibration kit, mounting bases

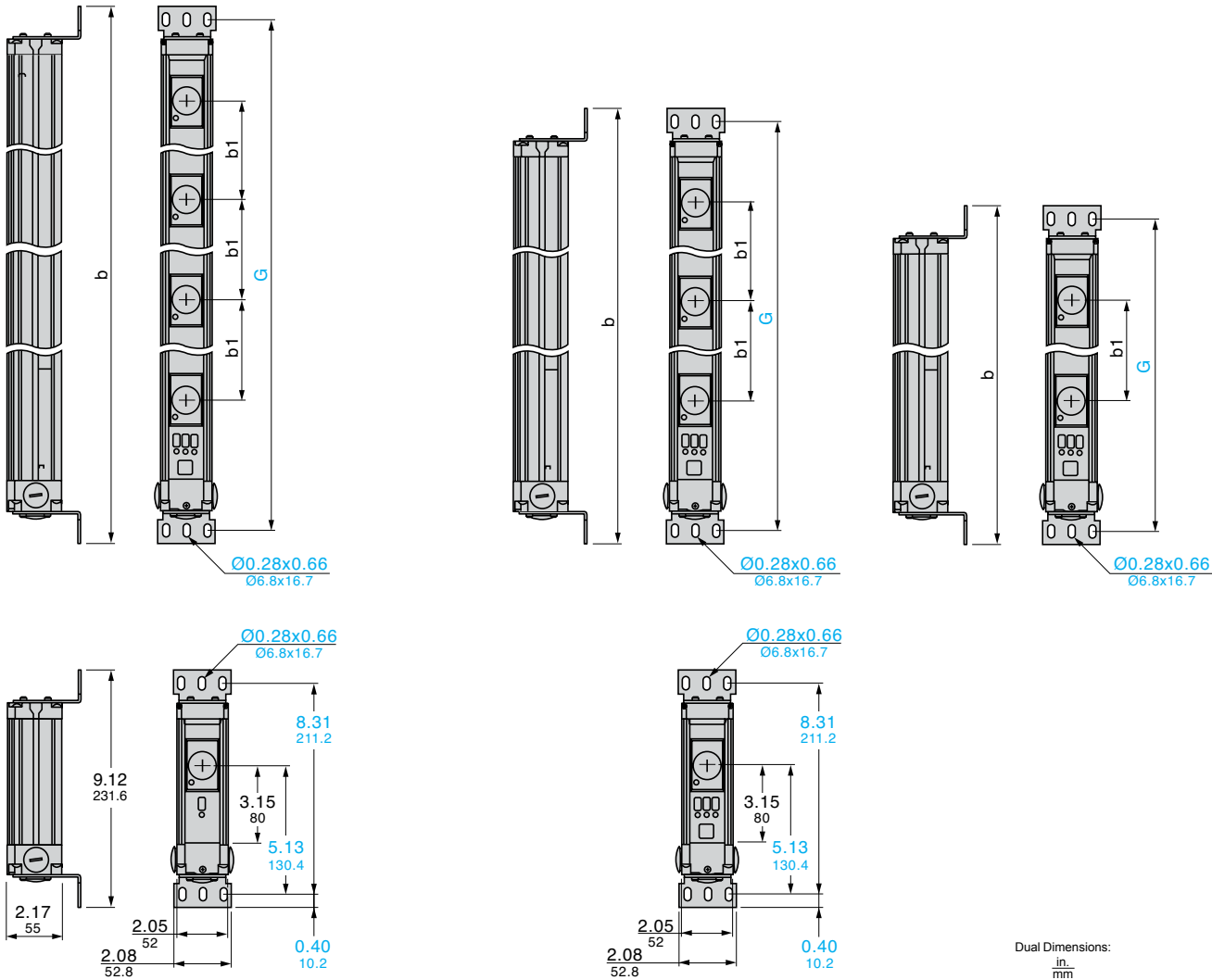
See pages 5/44 to 5/51.

Accessories

Description	Usage	Length ft (m)	References	Weight lb (kg)
Mounting kit (2 brackets)	For XUSLP light curtains	–	XUSLZ219	0.99 (0.450)
Pre-wired female connectors	Transmitter type	16.40 (5)	XSZ PCT05	0.77 (0.350)
		32.81 (10)	XSZ PCT10	1.54 (0.700)
		49.21 (15)	XSZ PCT15	2.25 (1.020)
		98.43 (30)	XSZ PCT30	4.45 (2.020)
	Receiver type	16.40 (5)	XSZ PCR05	0.77 (0.350)
		32.81 (10)	XSZ PCR10	1.54 (0.700)
		49.21 (15)	XSZ PCR15	2.25 (1.020)
		98.43 (30)	XSZ PCR30	4.45 (2.020)
Sliding nuts for side mounting (4 nuts)	–	–	XUSLZ320	0.99 (0.450)
User guide on CD-ROM	All light curtain types	–	XUSLZ450	0.04 (0.020)
Arc suppressor (pair)	All light curtain types	–	XUSLZ500	0.04 (0.020)

Power supplies: page 5/44

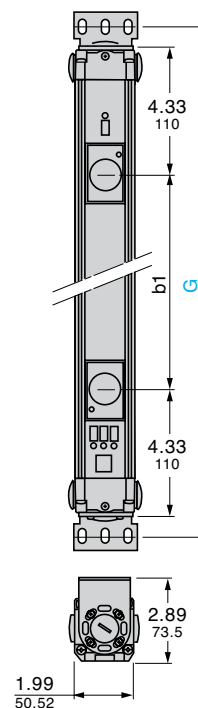
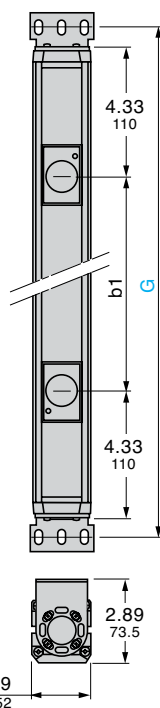
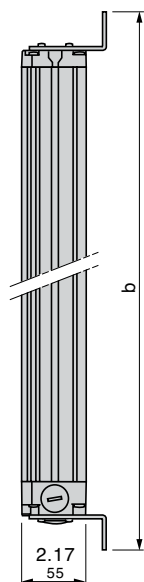
Light curtains
XUSLPZ●●●



XUS	b in. (mm)	b1 in. (mm)	G in. (mm)
LPZ1A●	9.12 (231.6)	—	8.69 (220.7)
LPZ2A0500●	28.80 (731.6)	19.69 (500)	28.37 (720.7)
LPZ2A0600●	32.74 (831.6)	23.62 (600)	32.31 (820.7)
LPZ3A0400●	40.61 (1031.6)	15.75 (400)	40.19 (1020.7)
LPZ3A0500●	48.49 (1231.6)	19.69 (500)	48.06 (1220.7)
LPZ4A0300●	44.93 (1141.1)	11.81 (300)	44.12 (1120.7)
LPZ5A0300●	56.36 (1431.6)	11.81 (300)	55.56 (1411.2)
LPZ6A0300●	68.17 (1731.6)	11.81 (300)	67.37 (1711.2)

Light curtains

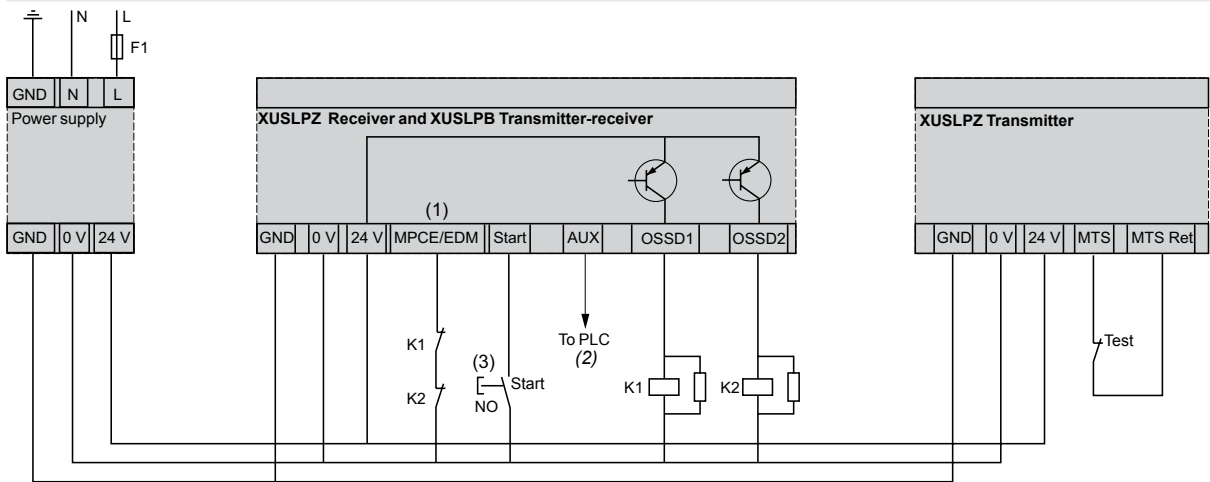
XUSLPB...



Dual Dimensions:
in. (mm)

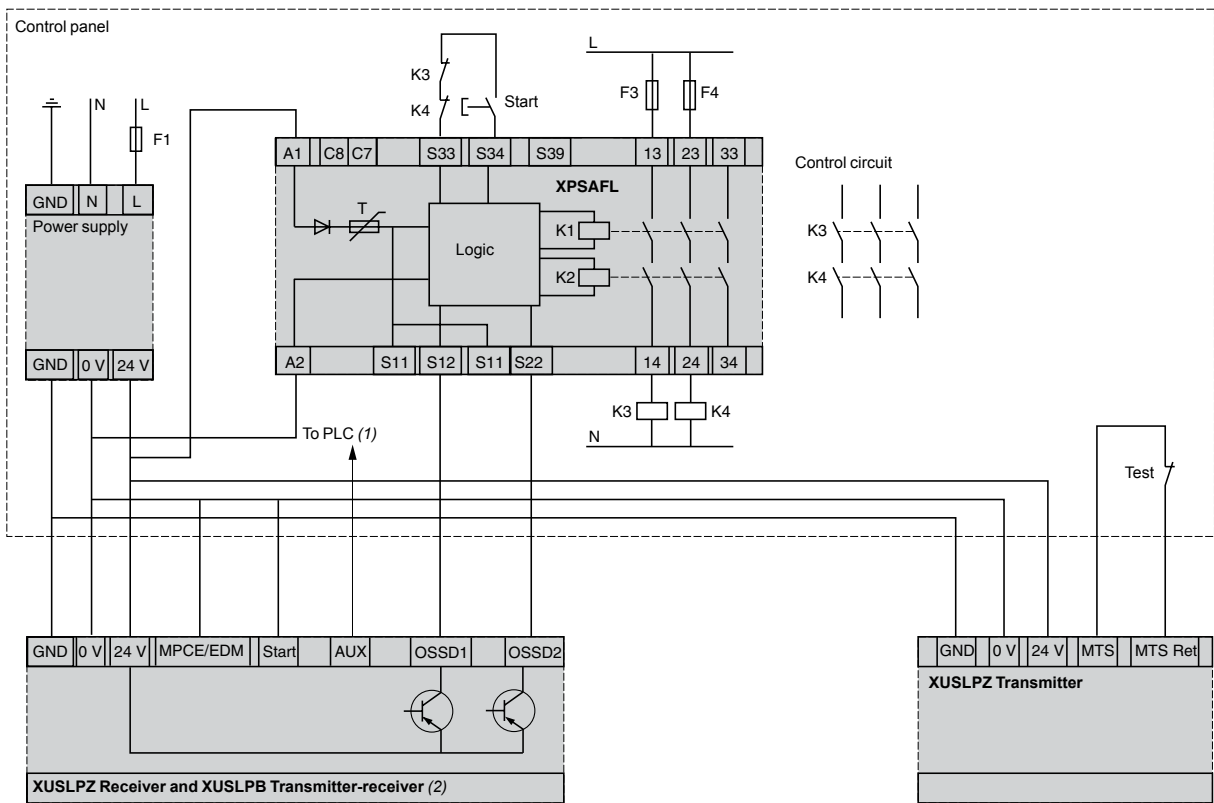
XUS	b in. (mm)	b1 in. (mm)	G in. (mm)
LPB2A500M	30.75 (781.1)	19.69 (500)	29.95 (760.7)
LPB2A600M	34.69 (881.1)	23.62 (600)	33.89 (860.7)

Direct connection with XUSLP●●●



- (1) For testing prior to installation, you can select MPCE/EDM OFF (factory default setting). In that case, the MPCE/EDM line must be connected to the 0 V line of the system.
- (2) The auxiliary output connects to a PLC (optional).
- (3) If remote start is not used, connect the start line to the 0 V line.

Connection via a Preventa XPSAFL module

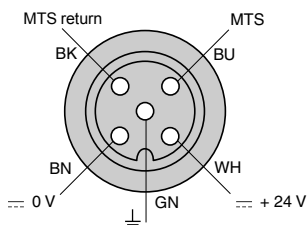


- (1) The auxiliary output connects to a PLC (optional).
- (2) The light curtain must be configured with MPCE/EDM OFF and with automatic start.

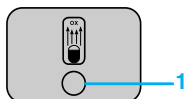
XUSLPZ/LPB

Transmitter

Pre-wired connector of transmitter (XUSLPZ)

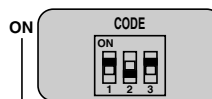


Transmitter status indicator



1 Yellow LED

Configuration indicator XUSLPZ

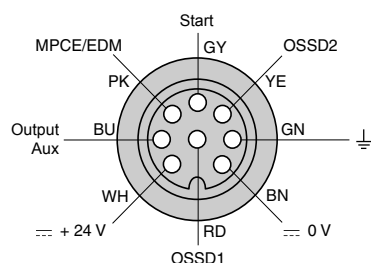


Configuration indicator XUSLPB

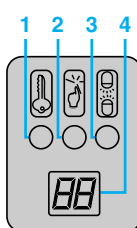


Receiver

Pre-wired connector of receiver (XUSLPZ) and pre-wired connector of transmitter-receiver (XUSLPB)

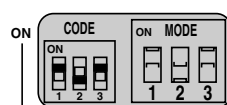


Receiver status indicator

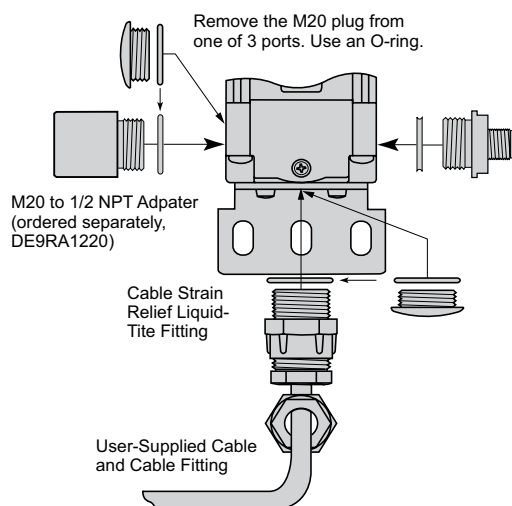


- 1 Interlock or Alarm yellow LED
- 2 Machine stop red LED
- 3 Machine run green LED
- 4 2-digit display

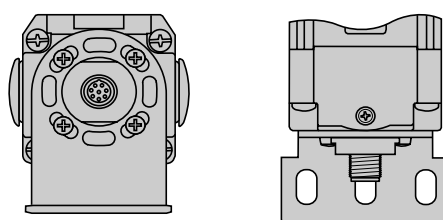
Configuration indicator XUSLPZ and XUSLPB



Connection to terminal block



Connection to M12 connector



Light curtain type		XUSLNG●●●● 1.18 in. (30 mm)
Environmental specifications		
Conformity to standards		IEC 61496-1 and IEC 61496-2 (Type 2 ESPE)
Certifications		CE, TUV, UL, CSA
European directives		Machinery directive 2006/42/EC, Work equipment directive 89/655/EEC and EMC directive 89/336 EEC
Maximum safety level (1)		PL = c/category 2 conforming to EN/ISO 13849-1 SIL 2 conforming to EN/IEC 61508
Reliability data		$PFH_d = 2.29E^{-7}$ 1/h conforming to EN/IEC 61508
Ambient air temperature	Operating	°F (°C) +32 to +131 (0 to +55)
	Storage	°F (°C) -13 to +167 (-25 to +75)
Relative humidity		95% maximum, without condensation
Degree of protection		IP65
Shock and vibration resistance		Shock resistance: 10 gn, impulse 16 ms, Vibration resistance: 10–55 Hz, amplitude: 0.35 ±0.05 mm
Materials		Casing: aluminum with electrostatically applied red (RAL 3000) polyester paint finish; end caps: 30% fiberglass impregnated nylon; front cover: acrylic.
Mounting		End brackets (included)
Optical specifications		
Minimum detection capacity	in. (mm)	1.18 (30) (Hand)
Nominal sensing distance (Sn)	ft (m)	1–49.3 (0.3–15)
Protected height	in. (mm)	5.29–57.87 in. (150–1500 mm)
Effective aperture angle (EAA)		5° at 3 m conforming to IEC 61496-1 and IEC 61496-2 (Type 2 ESPE)
Light source		GaAlAs LED, 880 nm
Immunity to ambient light		Conforming to IEC/EN 61496-2
Electrical specifications		
Response time	ms	14–24
Power supply		--- 24 V ± 20% 2 A conforming to IEC 61496 and IEC 60204-1 (-10% using the EDM function)
	Transmitter	mA 50 (SELV: Safety Extra Low Voltage)
	Receiver	A 1.09 (with maximum load)
Maximum current power consumption (no-load)	Transmitter	mA 50
	Receiver	mA 90
Immunity to interference		Conforming to EN 61496-1 and EN 61496-2
Safety outputs OSSD (output signal switching devices)		2 solid-state PNP (N.O.) outputs ≤ 500 mA, --- 24 V (short-circuit protection)
Signaling	Transmitter	2 LEDs (power supply and diagnostic)
	Receiver	4 LEDs (stop, run, top alignment, and bottom alignment)
Connections (2)	Transmitter	M12, 4-pin, male connector
	Receiver	M12, 5-pin, male connector
Pre-wired connectors	Transmitter/Receiver	AWG (mm ²) 22 (0.25) tinned wires.
Cable resistance	Transmitter/Receiver	Ω 0.028 Ω/ft (0.093 Ω/m) for 22 AWG (0.25 mm ²) wire
Cable lengths	ft (m)	Pre-wired connectors with cable lengths of 9.84, 32.81, and 98.43 ft (3, 10, and 30 m) are available separately. The maximum cable length is 164 ft (50 m), depending on the load current and power supply.
Functions		
Functions		<ul style="list-style-type: none"> Start: <ul style="list-style-type: none"> Automatic: model XUSLNG5C Manual: model XUSLNG5D Alignment aid using 2 LEDs LED display of operating modes Monitoring of the external switching devices EDM/MPCE
Muting function (inhibition)		Possible with external module XPSLCM1150

(1) Using an appropriate and correctly connected control system.

(2) Pre-wired female connectors must be ordered separately. See page 5/41.

Safety detection solutions

Light curtains, type 2

XUSL N slim, compact light curtains with solid-state output



XUSLNG5.....

Transmitter-receiver system for hand protection ⁽¹⁾

Detection capacity: 1.18 in. (30 mm). Sensing distance: 0.89–49.21 ft (0.3–15 m).

■ 2 PNP safety outputs—Automatic start

Protected height	Response time	Number of light beams	Alarm output	References	Weight
in. (mm)	ms			(2)	lb (kg)
5.91 (150)	14	7	PNP	XUSLNG5C0150	5.95 (2.700)
11.81 (300)	15	14	PNP	XUSLNG5C0300	6.39 (2.900)
17.72 (450)	16	21	PNP	XUSLNG5C0450	7.05 (3.200)
23.62 (600)	17	28	PNP	XUSLNG5C0600	7.50 (3.400)
29.53 (750)	18	35	PNP	XUSLNG5C0750	7.94 (3.600)
35.43 (900)	19	42	PNP	XUSLNG5C0900	8.60 (3.900)
41.34 (1050)	20	49	PNP	XUSLNG5C1050	9.04 (4.100)
47.24 (1200)	21	56	PNP	XUSLNG5C1200	9.48 (4.300)
53.15 (1350)	22	63	PNP	XUSLNG5C1350	9.92 (4.500)
59.06 (1500)	23	70	PNP	XUSLNG5C1500	10.58 (4.800)

■ 2 PNP safety outputs—Manual start

Protected height	Response time	Number of light beams	Alarm output	References	Weight
in. (mm)	ms			(2)	lb (kg)
5.91 (150)	14	7	PNP	XUSLNG5D0150	5.95 (2.700)
11.81 (300)	15	14	PNP	XUSLNG5D0300	6.39 (2.900)
17.72 (450)	16	21	PNP	XUSLNG5D0450	7.05 (3.200)
23.62 (600)	17	28	PNP	XUSLNG5D0600	7.50 (3.400)
29.53 (750)	18	35	PNP	XUSLNG5D0750	7.94 (3.600)
35.43 (900)	19	42	PNP	XUSLNG5D0900	8.60 (3.900)
41.34 (1050)	20	49	PNP	XUSLNG5D1050	9.04 (4.100)
47.24 (1200)	21	56	PNP	XUSLNG5D1200	9.48 (4.300)
53.15 (1350)	22	63	PNP	XUSLNG5D1350	9.92 (4.500)
59.06 (1500)	23	70	PNP	XUSLNG5D1500	10.58 (4.800)

(1) Includes a test rod, 2 sets of 2 brackets with mountings, and a user guide with certificate of conformity and 1 arc suppressor set.

Pre-wired female connectors must be ordered separately. See below.

(2) To order a transmitter only, replace the letter C or D with E and add the letter T to the end of the catalog number for the corresponding transmitter-receiver pair.

Example: XUSLNG5C0150 becomes **XUSLNG5E0150T** for the transmitter only.

To order a receiver only, add the letter R to the end of the catalog number for the corresponding transmitter-receiver pair.

Example: XUSLNG5C0150 becomes **XUSLNG5C0150R** for the receiver only.

Other versions

Combining type 4 light curtains with an external module for the Muting function. See page 5/64.

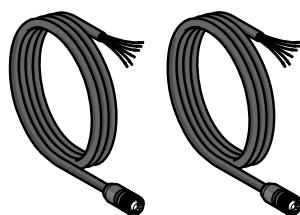
Accessories

Description	For use with	Length ft (m)	References	Weight oz (kg)
Mounting kit (2 brackets)	XUSL N light curtains	—	XUSLZ218	0.99 (0.450)
Pre-wired female connectors	Transmitter type	XUSL N light curtains	9.84 (3) XSZ NCT03	1.50 (0.680)
			32.81 (10) XSZ NCT10	2.01 (0.910)
			98.43 (30) XSZ NCT30	3.00 (1.360)
	Receiver type	XUSL N light curtains	9.84 (3) XSZ NCR03	1.50 (0.680)
			32.81 (10) XSZ NCR10	2.01 (0.910)
			98.43 (30) XSZ NCR30	3.00 (1.360)
Arc suppressor (pair)	All types of light curtains	—	XUSLZ500	0.04 (0.020)
User guide on CD-ROM	All types of light curtains and accessories	—	XUSLZ450	0.04 (0.020)

Separate components

Power supplies, 90° mirror adapters, anti-vibration kit, and mounting bases

See pages 5/44 to 5/51.



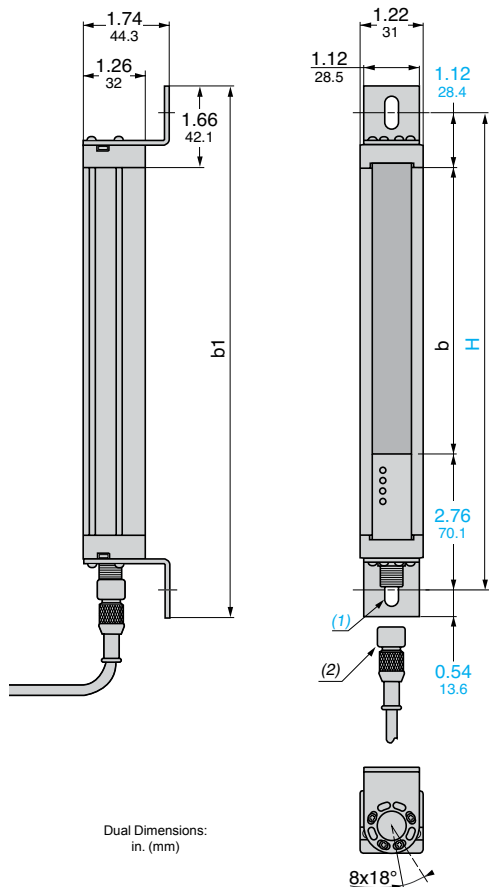
XSZ NCT..

XSZ NCR..

Dimensions

Slim, compact light curtains

XUSLN...



XUS	b in. (mm)	b1 in. (mm)	H in. (mm)	Protected height in. (mm)
LN...0150	5.79 (147)	10.71 (272)	9.67 (245.6)	5.91 (150)
LN...0300	11.57 (294)	16.50 (419)	15.46 (392.6)	11.81 (300)
LN...0450	17.36 (441)	22.28 (566)	21.24 (539.5)	17.72 (450)
LN...0600	23.15 (588)	28.07 (713)	27.03 (686.6)	23.62 (600)
LN...0750	28.94 (735)	33.86 (860)	32.82 (833.6)	29.53 (750)
LN...0900	34.72 (882)	39.65 (1007)	38.61 (980.6)	35.43 (900)
LN...1050	40.51 (1029)	45.43 (1154)	44.39 (1127.6)	41.34 (1050)
LN...1200	46.30 (1176)	51.22 (1301)	50.18 (1274.6)	47.24 (1200)
LN...1350	52.09 (1323)	57.01 (1448)	55.97 (1421.6)	53.15 (1350)
LN...1500	57.87 (1470)	62.80 (1595)	61.76 (1568.6)	59.06 (1500)

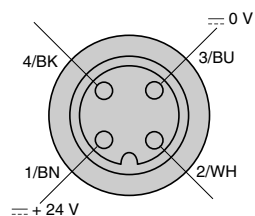
(1) 1 elongated hole Ø0.27 x 0.66 in. (Ø6.75 x 16.75 mm.)

(2) M12 male connector.

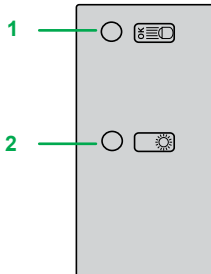
Connections

Transmitter

Pre-wired connector of transmitter XSZ NCT



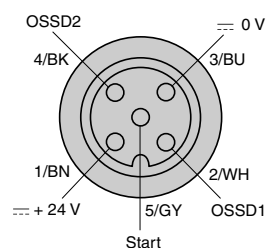
Transmitter status indicator



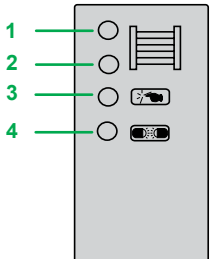
- 1 Interlock or Alarm
yellow LED
- 2 Switch-on/Machine run
green LED

Receiver

Pre-wired connector of receiver XSZ NCR



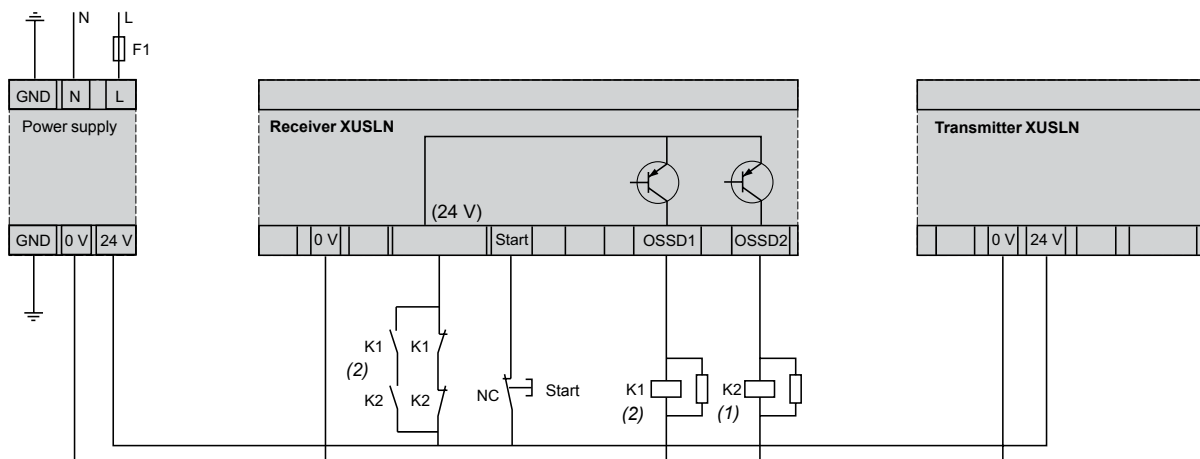
Receiver status indicator



- 1 Top alignment
yellow LED
- 2 Bottom alignment
yellow LED
- 3 Stop
red LED
- 4 Run
green LED

Wiring diagrams (continued)

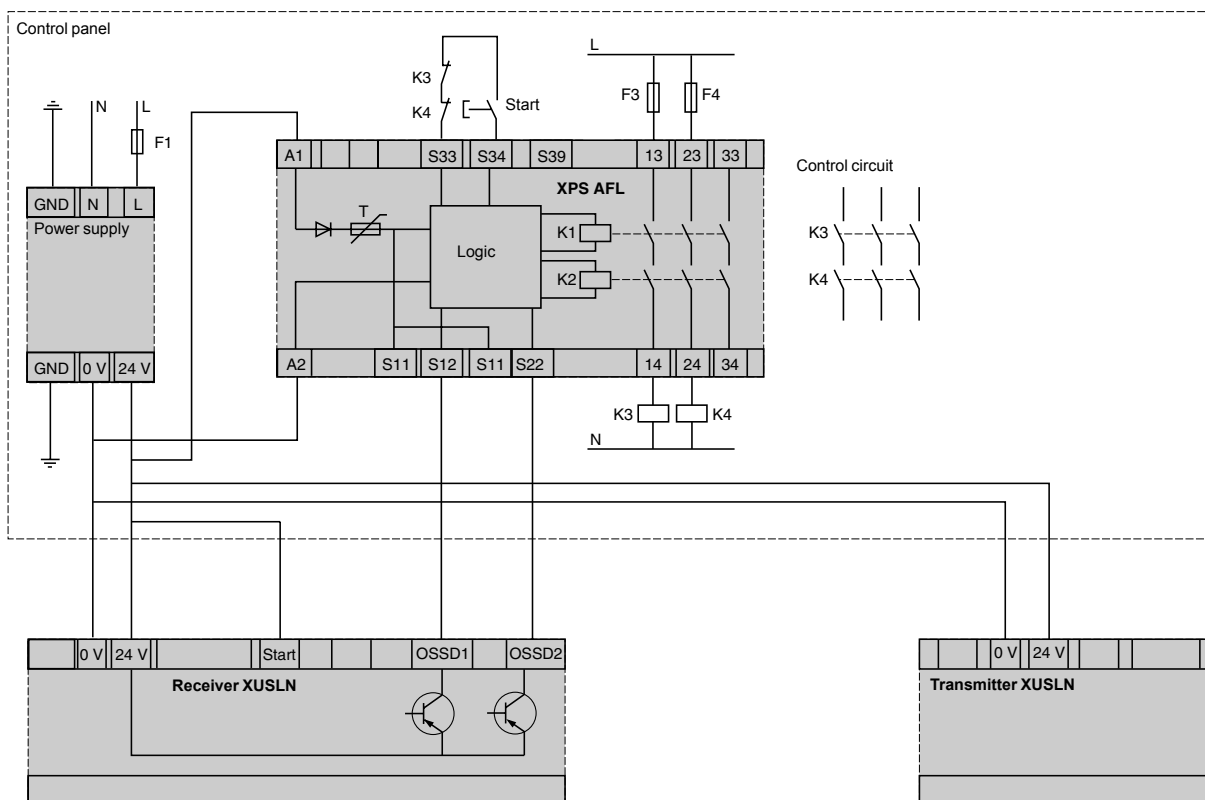
Direct connection with XUSLNG5D●●●

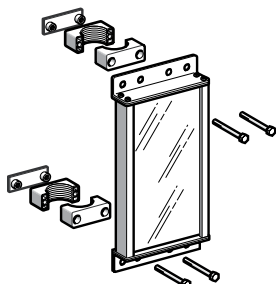


(1) The K1 and K2 coils must be protected using the arc suppressors included in the documentation kit.

(2) For the EDM function, contactors LC1D●●BD and control relays CAD●●BD, CA4KN●●BW3, and CA3KN●●BD are recommended

Connection of XUSLN5C●●● light curtain via a Preventa XPSAFL module





XUSZM/ZA.....

90° mirror adapter for light curtains

Glass mirror (0.88 Sn) (1)

Description	For use with light curtains			Height (2)	References	Weight
	XUSLB/LDM	XUSLP	XUSLN	in. (mm)		lb (kg)
90° mirror adapter with rotatable mounting	—	XUSLPZ1A●	—	5.5 (140)	XUSZM0102	2.3 (1.040)
	—	—	—	7.5 (191)	XUSZM0152	2.9 (1.300)
	XUSLB/LDM0280	—	XUSLN●●●0150	13.5 (343)	XUSZM0305	4.2 (1.900)
	XUSLB/LDM0320	—	XUSLN●●●0300	19.5 (495)	XUSZM0457	5.5 (2.500)
	XUSLB/LDM0360	—	—	—	—	—
	XUSLB/LDM0440	—	XUSLN●●●0450	21.5 (546)	XUSZM0508	6.2 (2.800)
	XUSLB/LDM0520	XUSLP●2A500●	—	25.5 (648)	XUSZM0610	7.1 (3.200)
	XUSLB/LDM0600/0680	XUSLP●2A0600●	XUSLN●●●0600	29.5 (749)	XUSZM0711	8.2 (3.700)
	XUSLB/LDM0720	—	—	31.5 (800)	XUSZM0762	8.4 (3.800)
	XUSLB/LDM0760	—	XUSLN●●●0750	33.5 (851)	XUSZM0813	8.8 (4.000)
	XUSLB/LDM0880	XUSLPZ3A0400●	—	37.5 (953)	XUSZM0914	9.9 (4.500)
	XUSLB/LDM0920/0960	—	XUSLN●●●0900	41.5 (1054)	XUSZM1016	11 (5.000)
	XUSLB/LDM1040	XUSLPZ3A0500●	—	43.5 (1105)	XUSZM1067	11.5 (5.200)
	XUSLB/LDM1120	XUSLPZ4A0300●	XUSLN●●●1050	49.5 (1257)	XUSZM1219	13 (5.900)
	XUSLB/LDM1200	XUSLPZ5A0300●	XUSLN●●●1200	53.5 (1359)	XUSZM1321	13.9 (6.300)
	XUSLB/LDM1360	—	XUSLN●●●1350	55.5 (1410)	XUSZM1372	14.3 (6.500)
	XUSLB/LDM1400	—	—	57.5 (1461)	XUSZM1422	14.8 (6.700)
	XUSLB/LDM1520	—	XUSLN●●●1500	61.5 (1562)	XUSZM1524	15.9 (7.200)
	XUSLB/LDM1560	XUSLPZ6A0300●	—	65.5 (1664)	XUSZM1626	16.8 (7.600)
	XUSLB/LDM1640/1720	—	—	73.5 (1867)	XUSZM1830	18.7 (8.500)
	XUSLB/LDM1800	—	—	73.5 (1867)	XUSZM1830	18.7 (8.500)
	XUSLB/LDM1920/2120	—	—	85.5 (2172)	XUSZM2134	21.6 (9.800)

Stainless steel mirror (0.82 Sn) (1)

Description	For use with light curtains			Height (2)	References	Weight
	XUSLB/LDM	XUSLP	XUSLN	in. (mm)		lb (kg)
90° mirror adapter with rotatable mounting	—	XUSLPZ1A●	—	5.5 (140)	XUSZA0102	2.4 (1.090)
	—	—	—	7.5 (191)	XUSZA0152	2.9 (1.300)
	XUSLB/LDM0280	—	XUSLN●●●0150	13.5 (343)	XUSZA0305	4.4 (2.000)
	XUSLB/LDM0320	—	XUSLN●●●0300	19.5 (495)	XUSZA0457	6 (2.700)
	XUSLB/LDM0360	—	—	—	—	—
	XUSLB/LDM0440	—	XUSLN●●●0450	21.5 (546)	XUSZA0508	6.6 (3.000)
	XUSLB/LDM0520	XUSLP●2A500●	—	25.5 (648)	XUSZA0610	7.7 (3.500)
	XUSLB/LDM0600/0680	XUSLP●2A0600●	XUSLN●●●0600	29.5 (749)	XUSZA0711	8.6 (3.900)
	XUSLB/LDM0720	—	—	31.5 (800)	XUSZA0762	9.3 (4.200)
	XUSLB/LDM0760	—	XUSLN●●●0750	33.5 (851)	XUSZA0813	9.7 (4.400)
	XUSLB/LDM0880	XUSLPZ3A0400●	—	37.5 (953)	XUSZA0914	9.9 (4.500)
	XUSLB/LDM0920/0960	—	XUSLN●●●0900	41.5 (1054)	XUSZA1016	11.9 (5.400)
	XUSLB/LDM1040	XUSLPZ3A0500●	—	43.5 (1105)	XUSZA1067	12.3 (5.600)
	XUSLB/LDM1120	XUSLPZ4A0300●	XUSLN●●●1050	49.5 (1257)	XUSZA1219	14.1 (6.400)
	XUSLB/LDM1200	XUSLPZ5A0300●	XUSLN●●●1200	53.5 (1359)	XUSZA1321	15 (6.800)
	XUSLB/LDM1360	—	XUSLN●●●1350	55.5 (1410)	XUSZA1372	15.4 (7.000)
	XUSLB/LDM1400	—	—	57.5 (1461)	XUSZA1422	16.1 (7.300)
	XUSLB/LDM1520	—	XUSLN●●●1500	61.5 (1562)	XUSZA1524	17.2 (7.800)
	XUSLB/LDM1560	XUSLPZ6A0300●	—	65.5 (1664)	XUSZA1626	18.3 (8.300)
	XUSLB/LDM1640/1720	—	—	73.5 (1867)	XUSZA1830	20.3 (9.200)
	XUSLB/LDM1800	—	—	73.5 (1867)	XUSZA1830	20.3 (9.200)
	XUSLB/LDM1920/2120	—	—	85.5 (2172)	XUSZA2134	23.4 (10.600)

(1) Sensing distance reduction coefficient must be taken into account for each 90° mirror adapter used.

(2) Usable reflective height.

Accessories

Description	Usage	References	Weight
			lb (kg)
Laser alignment tool	XUSLB, XUSLD, XUSLP, XUSLN	XUSLAT1	0.75 (0.340)

Power supplies for XUSL● light curtains

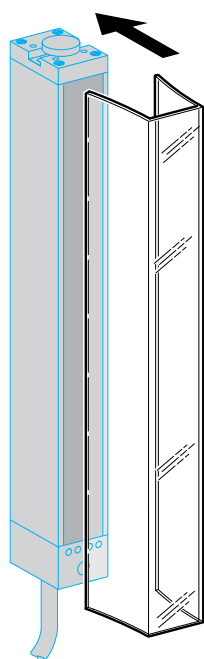
Input voltage	Secondary			Reset	Conforming to standard EN 61000-3-2	References	Weight lb (kg)
	Output voltage	Nominal power	Nominal current				
Single phase (N-L1) or 2-phase (L1-L2) connection							
100–120 / 200–500 V~ –15 %, +10 % 50/60 Hz	24–28.8	72 W	3 A	Auto/manual	Yes	ABL8RPS24030	0.7 (0.300)
	V---	120 W	5 A	Auto/manual	Yes	ABL8RPS24050	1.5 (0.700)
		240 W	10 A	Auto/manual	Yes	ABL8RPS24100	2.2 (1.000)



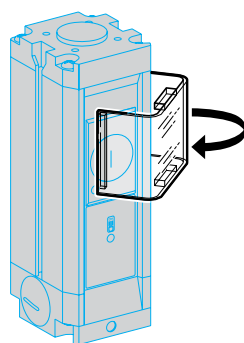
ABL8RPS24050

Protective covers for light curtains XUSLB/XUSLDM/XUSLP			XUSZWS●●●●
Environmental specifications			
Air temperature	Operating	°F (°C)	32 to +131 (0 to +55)
	Storage	°F (°C)	−13 to +158 (−25 to +70)
Material			polycarbonate
Sensing distance (Sn) reduction coefficient			0.91 (1)
Environmental chemicals			
Chemical resistance	Acids, aliphatic hydrocarbons		Resistant
	Alcohols, alkalis		Limited resistance
	Detergents and cleaners		
	Greases and oils		
	Silicone oils and greases not containing alkaline products		
	Amines		Not resistant
	Aromatic hydrocarbons		
	Detergents and cleaners containing alkaline		
	Esters		
	Halogenated hydrocarbons		
	Ketones		
	Silicone oils and greases containing alkaline products		

References of protective covers



XUSLZWB●●●●



XUSZWSP

Description	For use with	Height in. (mm)	References	Weight lb (kg)
Polycarbonate protective covers for transmitter-receiver pair (0.91 Sn) (1) (Sold in sets of 2)	XUSLB/DM280	12.2 (310)	XUSLZWB0280	0.6 (0.282)
	XUSLB/DM320	13.8 (350)	XUSLZWB0320	0.7 (0.318)
	XUSLB/DM360	15.4 (390)	XUSLZWB0360	0.8 (0.354)
	XUSLB/DM440	18.5 (470)	XUSLZWB0440	0.9 (0.426)
	XUSLB/DM520	21.7 (550)	XUSLZWB0520	1.1 (0.497)
	XUSLB/DM600	24.8 (630)	XUSLZWB0600	1.3 (0.569)
	XUSLB/DM680	28 (710)	XUSLZWB0680	1.4 (0.641)
	XUSLB/DM720	29.5 (750)	XUSLZWB0720	1.5 (0.677)
	XUSLB/DM760	31.1 (790)	XUSLZWB0760	1.6 (0.713)
	XUSLB/DM880	35.8 (910)	XUSLZWB0880	1.8 (0.821)
	XUSLB/DM920	37.4 (950)	XUSLZWB0920	1.9 (0.857)
	XUSLB/DM960	39 (990)	XUSLZWB0960	2.0 (0.893)
	XUSLB/DM1040	42.1 (1070)	XUSLZWB1040	2.1 (0.965)
	XUSLB/DM1120	45.3 (1150)	XUSLZWB1120	2.3 (1.037)
	XUSLB/DM1200	48.4 (1230)	XUSLZWB1200	2.4 (1.108)
	XUSLB/DM1360	54.7 (1390)	XUSLZWB1360	2.8 (1.252)
	XUSLB/DM1400	56.3 (1430)	XUSLZWB1400	2.8 (1.288)
	XUSLB/DM1520	61 (1550)	XUSLZWB1520	3.1 (1.396)
	XUSLB/DM1560	62.6 (1590)	XUSLZWB1560	3.2 (1.432)
	XUSLB/DM1640	65.7 (1670)	XUSLZWB1640	3.3 (1.504)
	XUSLB/DM1720	68.9 (1750)	XUSLZWB1720	3.5 (1.576)
	XUSLB/DM1800	72 (1830)	XUSLZWB1800	3.6 (1.648)
	XUSLB/DM1920	76.8 (1950)	XUSLZWB1920	3.9 (1.756)
	XUSLB/DM2120	84.6 (2150)	XUSLZWB2120	4.3 (1.935)

Description	For use with	Height in. (mm)	References	Weight lb (kg)
Polycarbonate protective covers for single beam device (0.91 Sn) (1) (Sold in sets of 2)	XUSLP	2.5 (62.48)	XUSZWSP	2.2 (0.100)

(1) Sensing distance reduction coefficient must be taken into account for each pair of polycarbonate protective covers used.

Anti-vibration kit

Selection according to weight and application

Weight classes

Light curtain type	Height in. (mm)	Weight class				Type of mirror adapters	Height in. (mm)	Weight class			
		1	2	3	4			1	2	3	4
XUSLN	5.9–23.6 (150–600)	•				XUSZM (1)	4 (102)	•			
	29.5–59.1 (750–1500)		•				12–18 (305–457)		•		
XUSLB/LDMQ/LDSQ	11–40.9 (280–1040)		•			XUSZA	20–28 (508–711)			•	
	44.1–53.5 (1120–1360)			•			32–40 (813–1016)				•
XUSLBR/LDMY/LDSY	12.6–40.9 (320–1040)		•				4 (102)	•			
	44.1–83.5 (1120–2120)			•			12–42 (305–1067)		•		
XUSLPZ1A	–			•		(1) Use of the anti-vibration kit is not recommended for mirror adapters greater than 40 in. (1016 mm) in height.	48–64 (1219–1626)			•	
XUSLPZ2A0500 and XUSLPZ2A0600	–			•			72–84 (1830–2134)				•
XUSLPZ3A0400	–			•							
XUSLPZ3A0500	–				•						
XUSLPZ4A0300	–			•							
XUSLPZ5A0300 and XUSLPZ6A0300	–				•						
XUSLPB2A500 and XUSLPB2A600	–			•							

Applications

Weight class	Anti-shock applications (1)				Anti-vibration applications (2)			
	Shear mounted		Compression mounted		Shear mounted		Compression mounted	
	Number of mountings per head (3)	References	Number of mountings per head (3)	References	Number of mountings per head (3)	References	Number of mountings per head (3)	References
1	2	XSZSMK	Not recommended		2 or 4	XSZSMK	2	XSZSMK1
	2	XSZSMK1			2 or 4	XSZSMK1		
2	2 or 4	XSZSMK	2	XSZSMK1	2 or 4	XSZSMK	2	XSZSMK
	2 or 4	XSZSMK1			2 or 4	XSZSMK1	2 or 4	XSZSMK1
3	4	XSZSMK	2 or 4	XSZSMK	2	XSZSMK2	2 or 4	XSZSMK
	4	XSZSMK1			4	XSZSMK1		
	2 or 4	XSZSMK2			2 or 4	XSZSMK2		
	4	XSZSMK			4	XSZSMK1		
4	4	XSZSMK	2	XSZSMK	2	XSZSMK	2	XSZSMK
	4	XSZSMK1			4	XSZSMK1		
	2	XSZSMK2			2 or 4	XSZSMK2		
	4	XSZSMK			4	XSZSMK1		

(1) Low frequency, high amplitude applications, such as punching presses, where a powerful shock can exist.

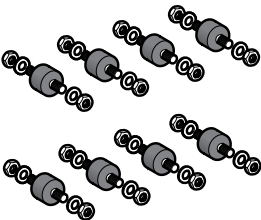

(2) High frequency, low amplitude applications, such as offset printing machines, where constant vibration can exist.

(3) Head: transmitter, receiver, or mirror.

Shock absorber specifications

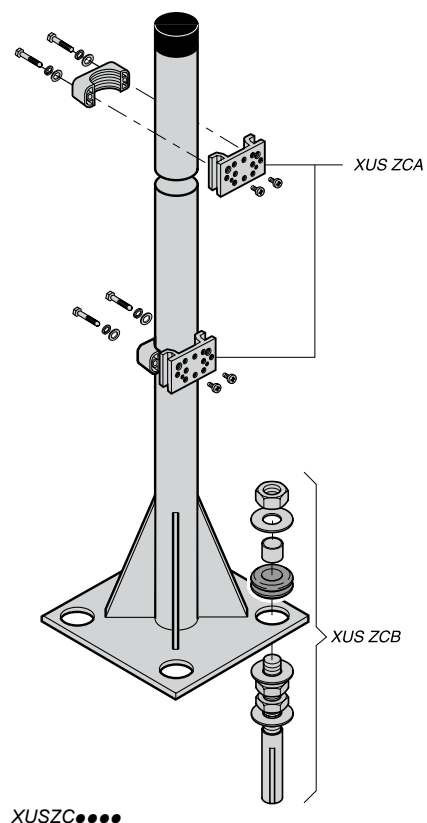
Specifications per shock absorber		Compression mounted			Shear mounted		
		Maximum load	Torque	Natural frequency	Maximum load	Torque	Natural frequency
		lb (kg)	lb-in (N-m)	Hz	lb (kg)	lb-in (N-m)	Hz
For anti-vibration kit	XSZSMK	18.0 (8.16)	222.5 (25.16)	11	3.0 (1.36)	27.7 (3.13)	9.5
	XSZSMK1	4.8 (2.177)	96.1 (10.86)	14	2.5 (1.13)	20.7 (2.34)	9
	XSZSMK2	55.0 (24.94)	949.7 (107.39)	13	23.0 (10.43)	132.2 (14.94)	7.5

References of anti-vibration kits

	Description	For use with	References	Weight lb (kg)
 XSZSMK•	Anti-vibration kit consisting of 8 shock absorbers, stud mounting. 16 washers and 16 nuts included with kit.	All light curtain types and 90° mirror adapters	XSZSMK	0.07 (0.030)
			XSZSMK1	0.04 (0.020)
			XSZSMK2	0.1 (0.045)
 XUSLZ227	Mounting kit for XUSLN (2 brackets)	Anti-vibration kit	XUSLZ227	1.0 (0.450)

Mounting base for light curtains and mirrors		XUSZC●●●●	
Environmental specifications			
Ambient air temperature	Operating	°F (°C)	−13 to +158 (−25 to +70)
	Storage	°F (°C)	−13 to +158 (−25 to +70)
Materials			Mounting base: steel End protection: black polycarbonate, 20% fiberglass

References



Mounting bases

Designation	For use with			Protected height in. (mm)	Catalog number	Weight lb (kg)
	Light curtains	Mirrors	IP67 tube			
	Height in. (mm)	Height in. (mm)	Height in. (mm)			
Mounting base XUSZC●●●●	5.9–35.4 (150–900)	7.2–35.2 (182–894)	19.8–38.6 (503–981)	47.2 (1200)	XUSZC1200	25 (11.340)
	36.2–59.1 (920–1500)	39.2–59.2 (995–1503)	43.4–63.8 (1102–1620)	70.9 (1800)	XUSZC1800	35 (15.880)
	59.8–70.9 (1520–1800)	63.2–67.2 (1605–1706)	68.5–76.3 (1740–1939)	82.7 (2100)	XUSZC2100	45 (20.410)
	75.6–82.5 (1920–2095)	75.2 (1910)	79.6–84.3 (2021–2141)	94.5 (2400)	XUSZC2400	60 (27.220)
	–	88.2 (2240)	92 (2336)	122 (3100)	XUSZC3100	66 (29.940)

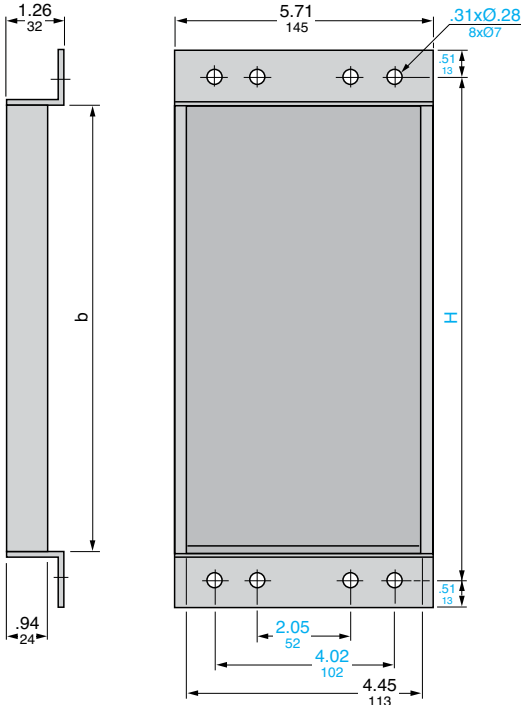
Accessories

Description	For use with	Catalog number	Weight lb (kg)
Mounting kit (sold in lots of 2)	Mounting base XUSZC●●●●	XUSZCA	1.0 (0.450)
Floor mounting kit Consisting of: 4 bolts, 4 rawplugs, 12 washers, 8 standard nuts, 4 lock nuts, 4 rubber insulators, 4 spacers (tube)	Mounting base XUSZC●●●●	XUSZCB	1.0 (0.450)

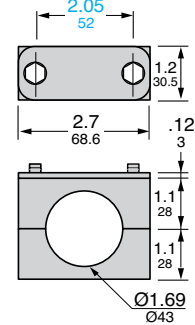
90° mirror adapters + Mounting clamps

XUSZM●●●●/XUSZA●●●●

Mounting clamp (quantity 2)



XUS			
Glass	Stainless steel	b in. (mm)	H in. (mm)
ZM0102	ZA102	5.5 (140)	0.7 (182)
ZM0152	ZA152	7.5 (191)	9.2 (233)
ZM0305	ZA0305	13.5 (343)	15.2 (386)
ZM0457	ZA0457	19.5 (495)	21.2 (538)
ZM0508	ZA0508	21.5 (546)	23.2 (589)
ZM0610	ZA0610	25.5 (648)	27.2 (690)
ZM0711	ZA0711	29.5 (749)	31.2 (792)
ZM0762	ZA0762	31.5 (800)	33.2 (843)
ZM0813	ZA0813	33.5 (851)	35.2 (894)
ZM0914	ZA0914	37.5 (953)	39.2 (995)
ZM1016	ZA1016	41.5 (1054)	43.2 (1097)
ZM1067	ZA1067	43.5 (1105)	45.2 (1148)
ZM1219	ZA1219	49.5 (1257)	51.2 (1300)
ZM1321	ZA1321	53.5 (1359)	55.2 (1402)
ZM1372	ZA1372	55.5 (1410)	57.2 (1452)
ZM1422	ZA1422	57.5 (1461)	59.2 (1503)
ZM1524	ZA1524	61.5 (1562)	63.2 (1605)
ZM1626	ZA1626	65.5 (1664)	67.2 (1706)
ZM1830	ZA1830	73.5 (1867)	75.2 (1910)
ZM2134	ZA2134	85.5 (2172)	87.2 (2214)

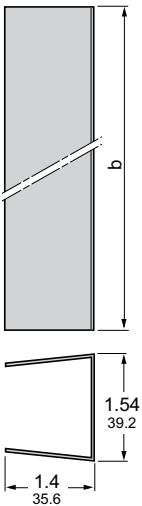

Dual Dimensions: Inches
Millimeters

Protective cover

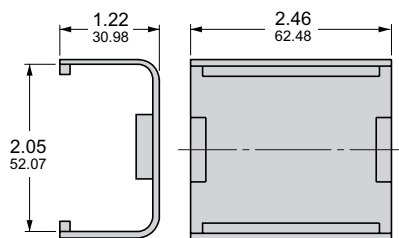
XUSZW●●● for XUL B/D

XUS b in. (mm)

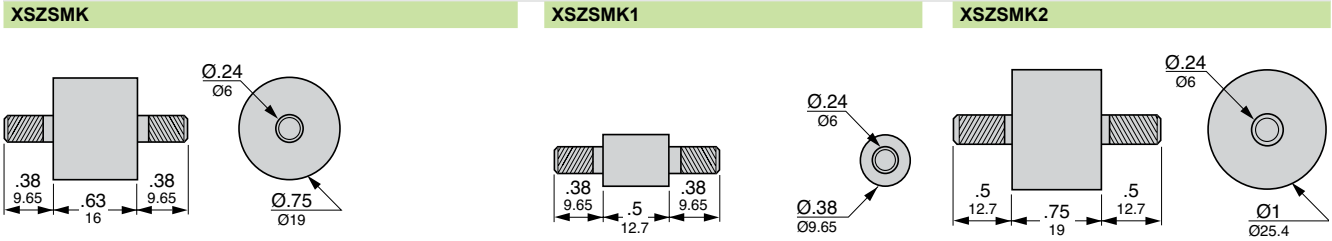
XUSZWSP for XUSLP



LZWB0280	12.2 (310)
LZWB0320	13.8 (350)
LZWB0360	15.4 (390)
LZWB0440	18.5 (470)
LZWB0520	21.7 (550)
LZWB0600	24.8 (630)
LZWB0680	28 (710)
LZWB0720	29.5 (750)
LZWB0760	31.1 (790)
LZWB0880	35.8 (910)
LZWB0920	37.4 (950)
LZWB0960	39 (990)
LZWB1040	42.1 (1070)
LZWB1120	45.3 (1150)
LZWB1200	48.4 (1230)
LZWB1360	54.7 (1390)
LZWB1400	56.3 (1430)
LZWB1520	61 (1550)
LZWB1560	62.6 (1590)
LZWB1640	65.7 (1670)
LZWB1720	68.9 (1750)
LZWB1800	72 (1830)
LZWB1920	76.8 (1950)
LZWB2120	84.6 (2150)

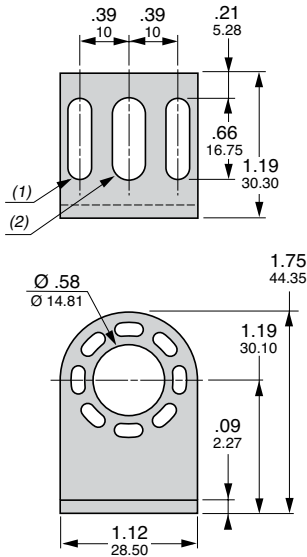


Anti-vibration kits (1)



(1) The anti-vibration kit consists of 8 shock absorbers, 16 washers, and 16 nuts.

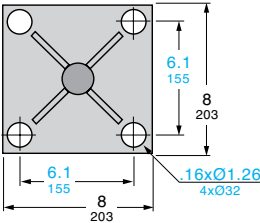
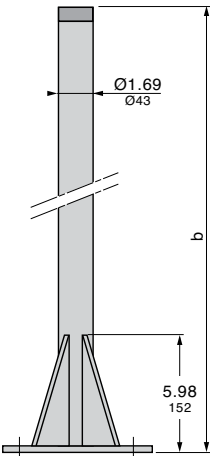
Mounting brackets for anti-vibration kit
XUSLZ227 and XUSLN



(1) 2 elongated holes Ø0.2 x 0.7 in. (Ø5.10 x 16.75 mm).
(2) 1 elongated hole Ø0.3 x 0.7 in (Ø6.75 x 16.75 mm).

Dual Dimensions: Inches
 Millimeters

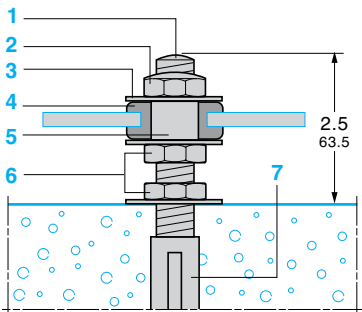
Mounting base
XUSZC●●●●



XUS	b in. (mm)
ZC1200	47.3 (1200)
ZC1800	70.9 (1800)
ZC2100	82.7 (2100)
ZC2400	94.5 (2400)
ZC3100	122 (3100)

Floor mounting kit (quantity 4) for mounting base XUSZC●●●●
XUSZCB

Scale 2.5

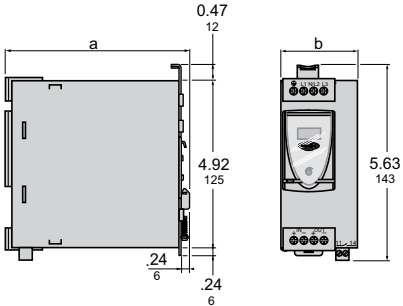


- 1 Bolt
- 2 1 lock nut
- 3 3 washers
- 4 Rubber insulator
- 5 Spacer (tube)
- 6 2 standard nuts
- 7 Rawplug

Dual Dimensions: Inches
Millimeters

Dimensions

ABL8RPS24... common side view

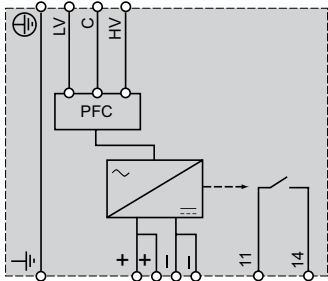
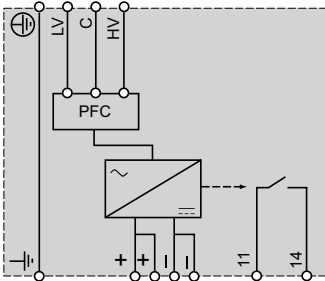
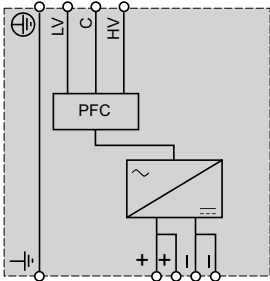


ABL8	a in. (mm)	b in. (mm)
RPS24030	4.7 (120)	1.7 (44)
RPS24050	4.7 (120)	2.2 (56)
RPS24100	5.5 (140)	3.3 (85)

Dual Dimensions: Inches
Millimeters

Internal wiring diagrams

ABL8RPS24030 ABL8RPS24050 ABL8RPS24100



Safety detection solutions

Preventa™ XPSCM safety modules and XU2S single-beam photoelectric sensors

With a test input associated with a built-in “muting” function

Operating principle

XPSCM safety relay modules, when combined with XU2S single-beam photoelectric sensors (periodically tested), form a category 2 light curtain conforming to standards IEC/EN 61496 parts 1 and 2 and EN 60825-1.

The connection of 1–4 pairs of XU2S photoelectric sensors makes it possible to create a protected space up to 47.2 in. (1200 mm) high, conforming to EN 999/ISO 13855, and 26.2 ft (8 m) long.

The built-in “muting” function allows the automatic passage of parts for machining or loaded pallets, without interrupting the transportation movement within the zone protected by the electro-sensitive protection equipment (ESPE).

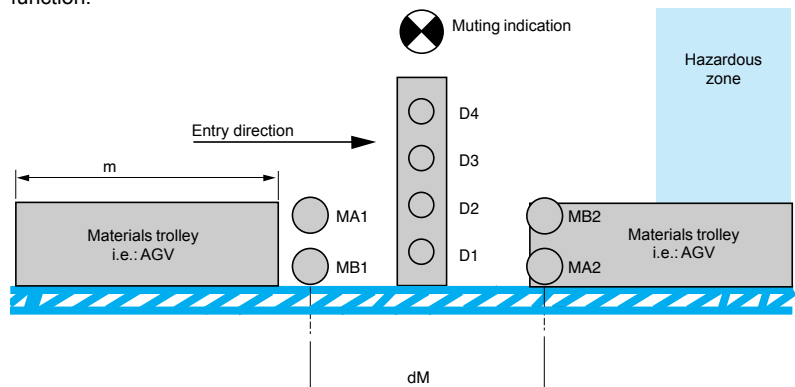
When the system is switched on by the start command, and the light protection is not interrupted, the main circuit is closed by the two safety relays of the XPSCM module.

An 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 protection to be inhibited (muted). This function allows a trolley transporting materials to pass through without triggering the main circuit. The Muting function cannot be activated by energizing the inhibition devices unless the safety outputs have been switched on beforehand.

To trigger the “muting” function, the inhibition devices (muting sensors) must be activated within the 3-second interval. This synchronization time for the two inhibition inputs can be deactivated by connecting two configuration terminals. The muting cycle has a maximum duration 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 may be made infinite by connecting two configuration terminals.

During the muting operation process, a light indicating the muting state is controlled by the XPSCM module. The indicator light comes on when a muting signal is generated, and indicates the inhibition of the protection function. An indicator light error (short-circuit, open-circuit) will be recognized, and will deactivate the Muting function.



D1, D2, D3, D4: monitoring photoelectric sensors

MA1, MB1, MA2, MB2: muting photoelectric sensors

m = trolley length

dM = distance between MA1/MB1 and MA2/MB2

Conditions to be observed for the “muting” function

- “Muting” sensors must be of the XU2 M18PP340 thru-beam or XU9 M18PP340 polarized reflex type, or mechanical limit switches with contacts.
- $dM \leq m$ to obtain continuous validation of the Muting function.
- Avoid the intrusion of persons during the muting phase. This phase is indicated by an indicator light connected to the muting indicator output of the XPSCM module.
- A materials transportation trolley (i.e.: AGV) must generate the muting signal before it enters the protection field, and discontinue the muting signal on exiting once it has cleared all the sensors of the protection field.

Specifications of safety modules

Module type		XPSCM1144	XPSCM1144P
Maximum achievable safety level (1)		PL c/Category 2 conforming to EN/ISO 13849-1, SILCL 1 conforming to EN/IEC 62061	
Reliability data	Mean Time To dangerous failure (MTTF _d)	Years	16.6
	Diagnostic Coverage (DC)	%	95.5
	Probability of dangerous Failure per Hour (PFH _d)	1/h	3.12 x 10 ⁻⁷
Conformity to standards		EN/IEC 61496-1, EN/IEC 61496-2, EN/IEC 60204-1, EN/IEC 60947-1, EN/IEC 60947-5-1,	
Product certifications		UL, CSA, IFA	
Ambient air temperature		°F (°C)	Operation: +14 to +131 (-10 to +55). Storage: -13 to +185 (-25 to +85)
Degree of protection conforming to IEC 529		Terminals: IP 20, enclosure: IP 40	
Supply voltage		V	--- 24, voltage limits: ±20%
Maximum power consumption		W	< 15, with thru-beam photoelectric sensors and muting signaling
Module fuse protection		Internal, electronic	
Rated insulation voltage (Ui)		V	300 (degree of pollution 2 conforming to EN/IEC 60947-5-1, DIN VDE 0110 parts 1 and 2)
Rated impulse withstand voltage (Uimp)		kV	4 (overvoltage category 3, conforming to EN/IEC 60947-5-1, DIN VDE 0110 parts 1 and 2)
Inputs for sensors	Number of inputs to be monitored	4 (terminals Z1, Z2, Z3, Z4)	
	Input voltage	V	--- 24
	Supply voltage of sensors	V	--- 24 (terminal U+/U-)
	Supply current of sensors	mA	< 200
Inputs for the Muting function	Number of muting inputs	2 (terminals MA, MB)	
	Input voltage	V	--- 24 (terminal U+/U-)
	Maximum current	mA	< 200
	Synchronization time for the activation of the MA/MB muting signal	s	3 (±20%) for activation of the MA/MB “muting” signal
	Muting maximum duration	s	60 (-10 to +30%)
Single-beam thru-beam photoelectric sensors for input monitoring Z1-Z2-Z3-Z4		XU2S18PP340●●● (infrared)	
-sensors authorized for the protection field (max. 4)		XU2 M18PP340●●● or XU9 M18PP340●●● photoelectric sensors or XC limit switches	
-muting sensors			
-sensor supply resistivity		Ω	10 max.
Safety outputs		2 N.O. (terminals 13-14, 23-24), hard contacts	
-number and type			
-solid-state output breaking capacity		4 N.O. 24 V/20 mA, (Y33-Y34, Y33-Y44, Y33-Y54, Y33-Y64)	
-breaking capacity in AC-15		VA	C300: inrush 1800, maintained 180
-breaking capacity in DC-13		24 V/1.5 A, L/R = 50 ms	
-maximum thermal current (Ithe)		A	5.6
-sum of maximum thermal current		A	11
-minimum current (volt-free contact)		mA	10
-minimum voltage (volt-free contact)		V	17
-short-circuit protection		A	4 gG or 6 fast-acting fuse cartridge, conforming to EN/IEC 60947-5-1 and DIN VDE 0660 part 200
Muting signaling sensors for incandescent lamp		Number 1 (terminal H1), maximum power: 6.5 W/--- 24 V, minimum power: 4 W/--- 24 V	
Response time on input change of state		ms	< 25
Electrical life		See page 2/172 of the <i>Machine Safety Products</i> catalog, MKTED208051EN-US.	
Display		4 LEDs	
1-wire connection	Type	Captive screw clamp terminals	
		Captive screw clamp terminals, separate, removable terminal block	
	Without cable ends	Solid or flexible cable: 26-14 AWG (0.14 – 2.5 mm ²)	Solid or flexible cable: 24-14 AWG (0.2 – 2.5 mm ²)
	With cable ends, without bezel	Flexible cable: 24-14 AWG (0.25 – 2.5 mm ²)	Flexible cable: 24-14 AWG (0.25 – 2.5 mm ²)
	With cable ends, with bezel	Flexible cable: 24-16 AWG (0.25 – 1.5 mm ²)	Flexible cable: 24-14 AWG (0.25 – 2.5 mm ²)
2-wire connection	Without cable ends	Solid or flexible cable: 26-18 AWG (0.14 – 0.75 mm ²)	Solid cable: 24-18 AWG (0.2 – 1.0 mm ²), Flexible cable: 24-16 AWG (0.2 – 1.5 mm ²)
	With cable ends, without bezel	Flexible cable: 24-18 AWG (0.25 – 1.0 mm ²)	Flexible cable: 24-18 AWG (0.25 – 1.0 mm ²)
	With cable ends, double with bezel	Flexible cable: 22-14 AWG (0.5 – 1.5 mm ²)	Flexible cable: 22-14 AWG (0.5 – 1.5 mm ²)

(1) Using an appropriate and correctly connected control system.

Safety detection solutions

Preventa™ XPSCM safety modules and
XU2S single-beam photoelectric sensors

With a test input associated with a built-in “muting” function

Specifications of photoelectric sensors

Conformity to standards		IEC 61496-1 and IEC 61496-2 (Type 2 ESPE)
Maximum safety level (1)		PL=c/category 2 conforming to EN/ISO 13849-1
Reliability data	Probability of dangerous Failure per Hour (PFH _d)	1/h PFH _d =4.6E ⁻⁷ conforming to EN/IEC 61508 PFH _d =5.5E ⁻⁷ conforming to EN/IEC 61508, with “muting” function
Ambient air temperature		°F (°C) Operation: –13 to +131 (–25 to +55) (infrared transmission sensors), Storage: –40 to +158 (–40 to +70)
Vibration resistance		7 gn (10–55 Hz), conforming to EN/IEC 60068-2-6
Shock resistance		30 gn, 3 axes: 3 times, conforming to EN/IEC 60068-2-27
Degree of protection		IP 67 conforming to EN/IEC 60529
Connection	Pre-cabled Connector	PVC cable, diameter 0.20 in. (5 mm), 16.4 ft (5 m) long wire: 4 x 22 AWG (0.34 mm ²) for thru-beam transmitter M12 male connector, 4-pin (suitable jumper cables and female connectors M12, 4-contact. See the “Machine Cabling” section.)
Materials		Case: nickel-plated brass (infrared transmission sensors). Lenses: PMMA
Nominal sensing distance	ft (m)	26.2 (8) (infrared transmission sensors)
Rated supply voltage	V	– 12–24 (with protection against reverse polarity)
Voltage limits	V	– 10–30 V (including ripple)
Switching capacity (sealed)	mA	≤ 100 mA (with overload and short-circuit protection)
Voltage drop, closed state	V	≤ 1.5
Current power consumption, no-load	mA	≤ 35
Maximum switching frequency	Hz	500
Delays	ms	Response: ≤ 1; recovery: ≤ 1

(1) Using an appropriate and correctly connected control system.

5



XPSCM1144●

Safety modules

Description	Type of terminal block connection	Number of safety circuits	Additional outputs	Supply	References	Weight oz (kg)
Safety modules for monitoring single-beam photoelectric sensors, with a test input associated with a built-in “muting” function	Integrated in module	2	4	– 24 V	XPSCM1144	12.35 (0.350)
	Separate, can be removed from module	2	4	– 24 V	XPSCM1144P	12.35 (0.350)

Safety detection solutions

Preventa™ XPSCM safety modules and
XU2S single-beam photoelectric sensors

With a test input associated with a built-in “muting” function



XU2S18PP340L5



XU2S18PP340WL5



XU2S18KP340L5T



XU2S18KP340WL5T



XU2S18PP340DR

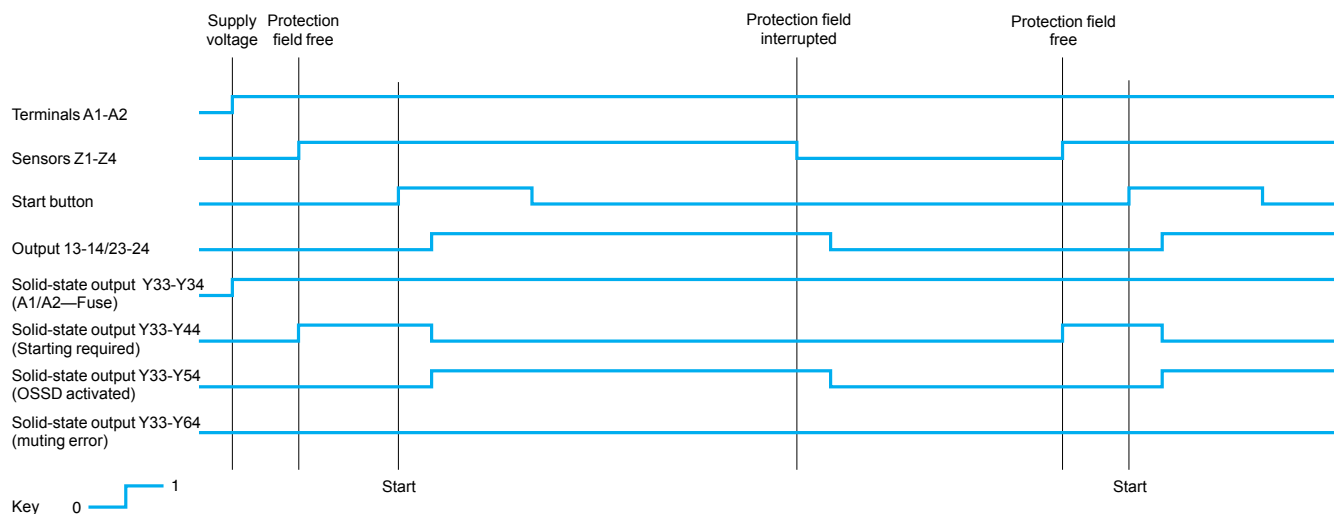


XU2S18PP340WL5R

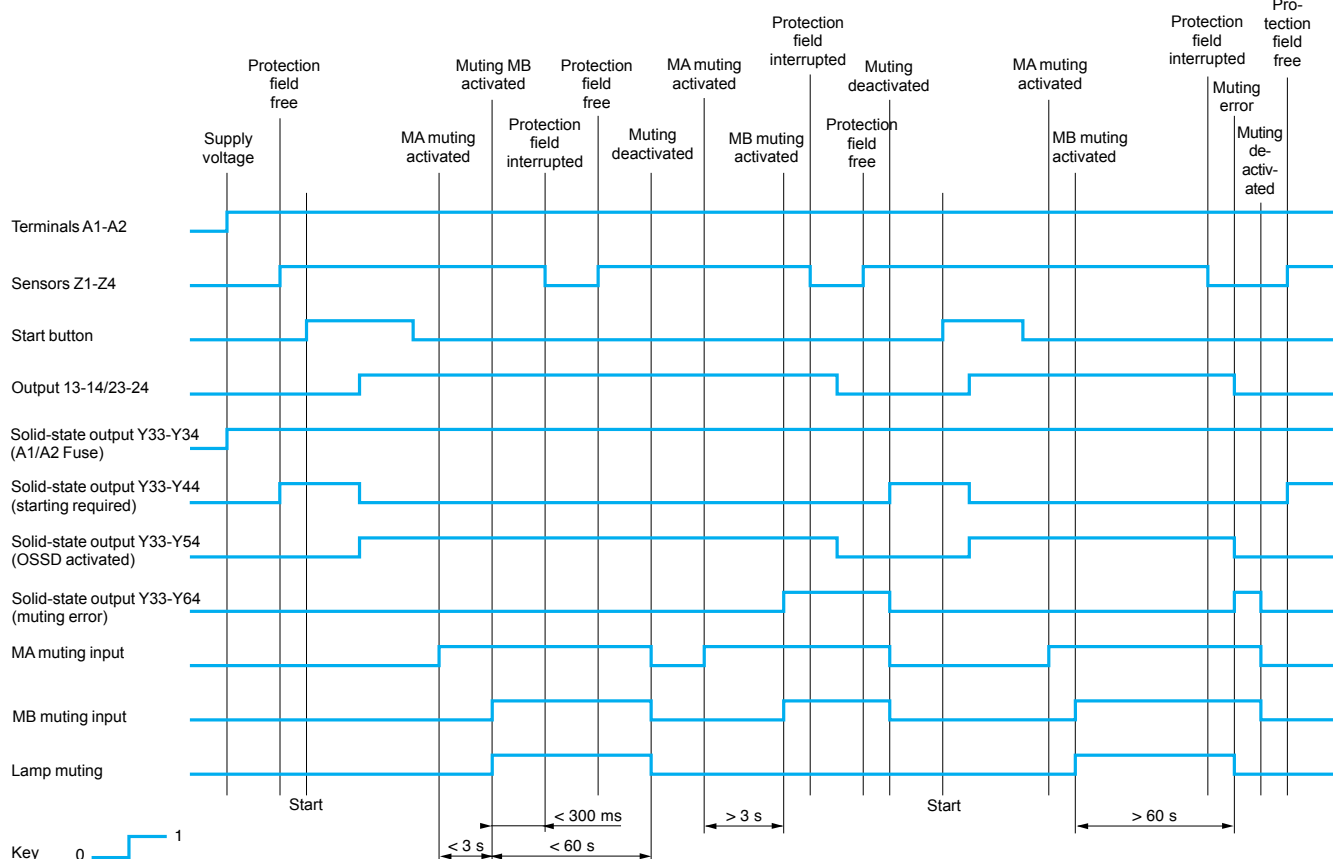
Single-beam photoelectric sensors with a test input

Description	Transmission type	Line of sight	Connection	References	Weight oz (kg)
PNP thru-beam pair (transmitter + receiver) Light or dark programmable switching	Infrared Sensing distance: 26.2 ft (8 m)	Along case axis	Pre-cabled 16.4 ft (5 m)	XU2S18PP340L5	17.11 (0.485)
			M12 connector	XU2S18PP340D	5.47 (0.155)
			90° to case axis	XU2S18PP340WL5	17.11 (0.485)
			M12 connector	XU2S18PP340WD	5.47 (0.155)
Thru-beam transmitter alone (for XPSCM1144●)	Infrared	Along case axis	Pre-cabled 16.4 ft (5 m)	XU2S18KP340L5T	8.29 (0.235)
			M12 connector	XU2S18KP340DT	2.65 (0.075)
			90° to case axis	XU2S18KP340WL5T	8.29 (0.235)
			M12 connector	XU2S18KP340WDT	5.47 (0.155)
PNP thru-beam receiver alone (for XPSCM1144●)	Infrared	Along case axis	Pre-cabled 16.4 ft (5 m)	XU2S18PP340L5R	8.82 (0.250)
			M12 connector	XU2S18PP340DR	2.82 (0.080)
			90° to case axis	XU2S18PP340WL5R	8.82 (0.250)
			M12 connector	XU2S18PP340WDR	2.82 (0.080)

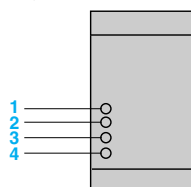
Functional diagram of XPSCM module



Functional diagram of the XPSCM module with “muting” function



Key to LEDs



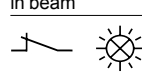
- 1 A1-A2 supply voltage, electronic internal fuse status (Green)
- 2 Signaling for restarting (Yellow)
- 3 Safety output closed (Green)
- 4 Safety output open (Red)

Operation

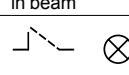
Output state (PNP) indicator, yellow LED (illuminated when sensor output is on)

Light switching

No object in beam

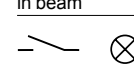


Object in beam

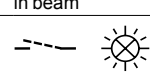


Dark switching

No object in beam

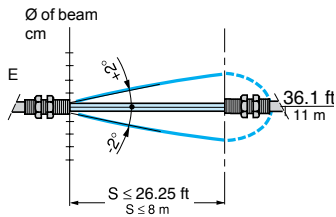


Object in beam

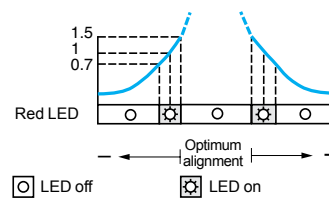


Curves

Infrared detection curve

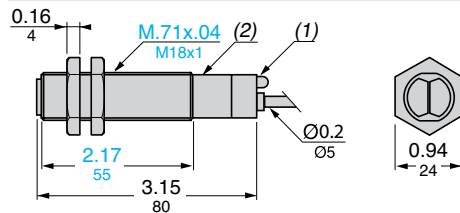


Functional check

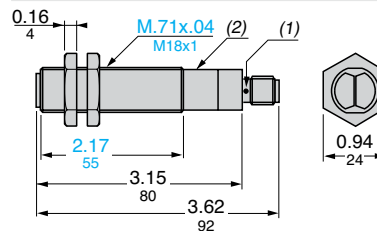


Dimensions

XU2S18PP340L5, XU2S18PP340L5L



XU2S18PP340D



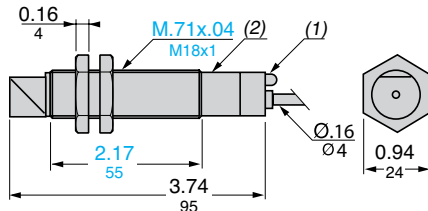
(1) LED

(2) Potentiometer

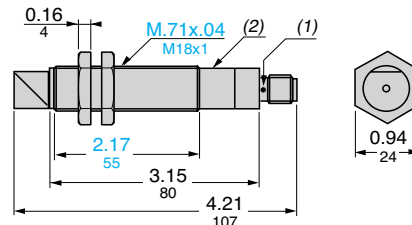
Mounting nut tightening torque: 17.7 lb-ft (24 N·m)

Connector tightening torque: 1.5 lb-ft (2 N·m)

XU2S18PP340WL5



XU2S18PP340WD



Dual Dimensions: Inches
Millimeters

(1) LED

(2) Potentiometer

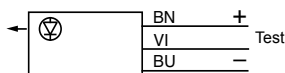
Mounting nut tightening torque: 17.7 lb-ft (24 N·m)

Connector tightening torque: 1.5 lb-ft (2 N·m)

Wiring diagrams (3-wire ---)

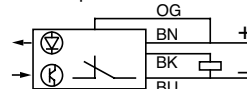
Cable connection

Transmitter



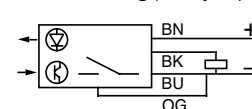
Receiver

Light switching (no object present). PNP output



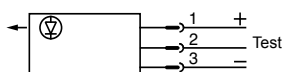
Receiver

Dark switching (no object present). PNP output



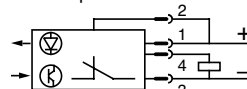
Plug-in connector

Transmitter



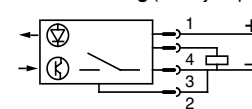
Receiver

Light switching (no object present). PNP output



Receiver

Dark switching (no object present). PNP output



Cable connections

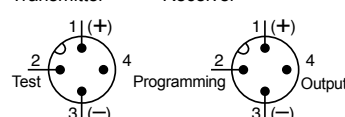
(-) BU (Blue)
(+) BN (Brown)
(OUT) BK (Black) (receiver)
(Prog.) OG (Orange) (receiver)
(Test) VI (Violet) (transmitter)

Connector diagrams

Sensor connector pin view

Transmitter

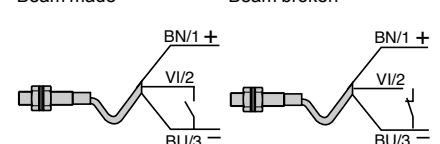
Receiver



Beam break test (for transmitter only)

Beam made

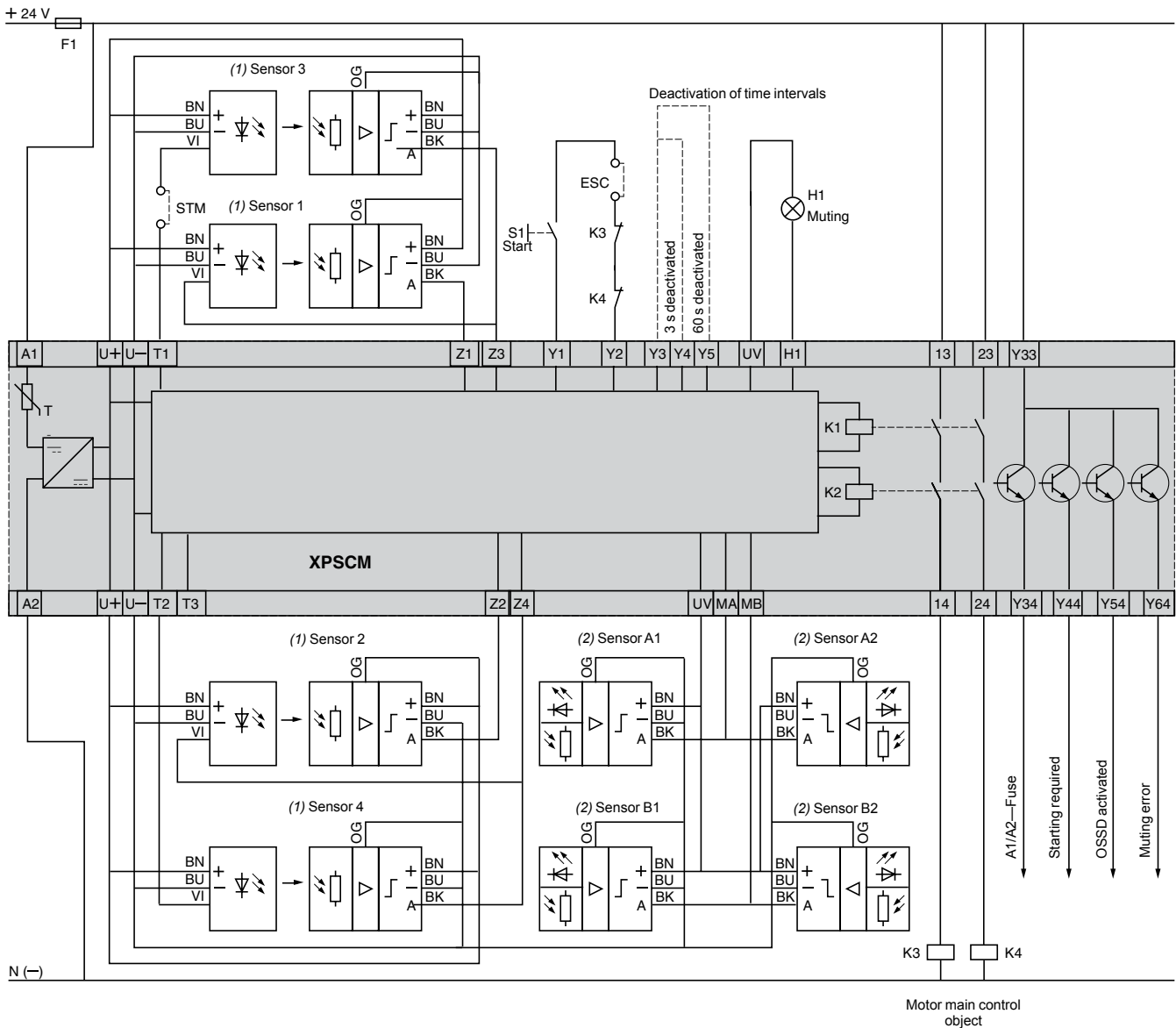
Beam broken



Wiring diagrams (continued)

Connection of XPSCM module with 4 pairs of XU2S single-beam sensors

(Connection of 1 to 4 pairs of XU2 S single-beam sensors to XPS CM, see page 5/59)



XU2S sensors can be programmed for light switching or dark switching (dark switching with sensors 1 and 3 and light switching with sensors 2 and 4, for example).

ESC: external start conditions

Y1-Y2: feedback loop.

STM: for stopping time measurement.

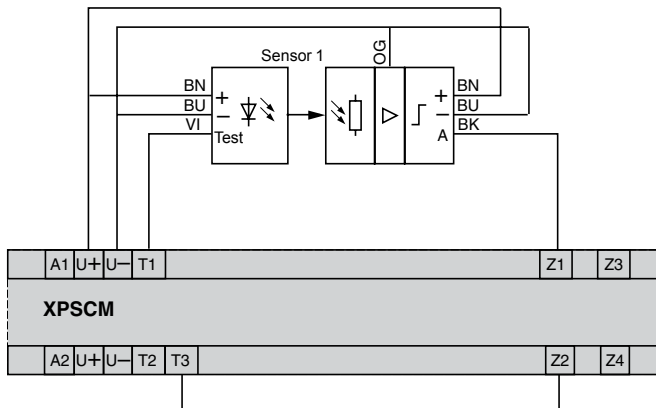
(1) Protection field sensors

(2) Muting sensors

Wiring diagrams (continued)

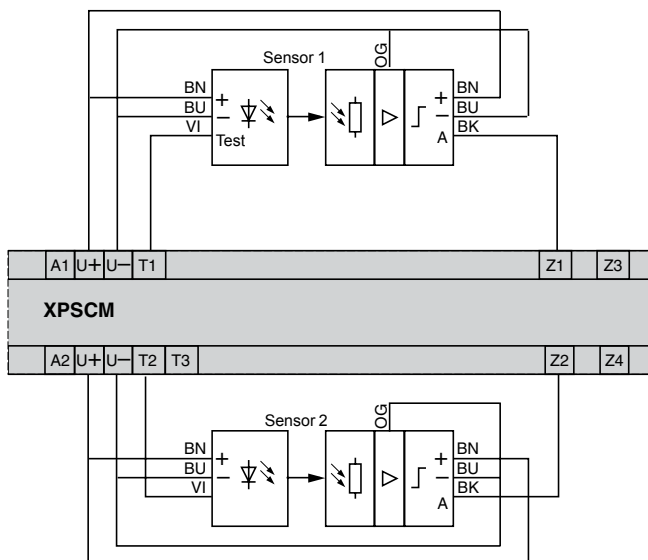
Connection of XPSCM module with 1 pair of XU2S sensors

(dark switching)



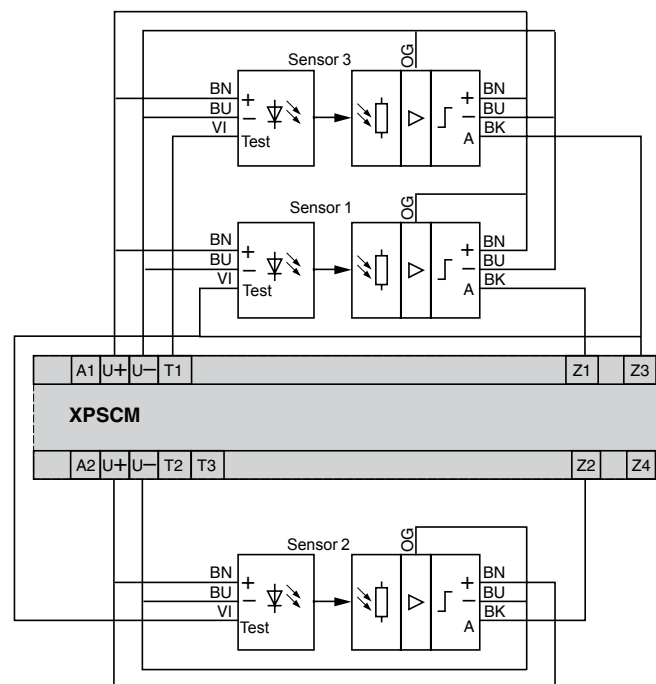
Connection of XPSCM module with 2 pairs of XU2S sensors

(dark switching)



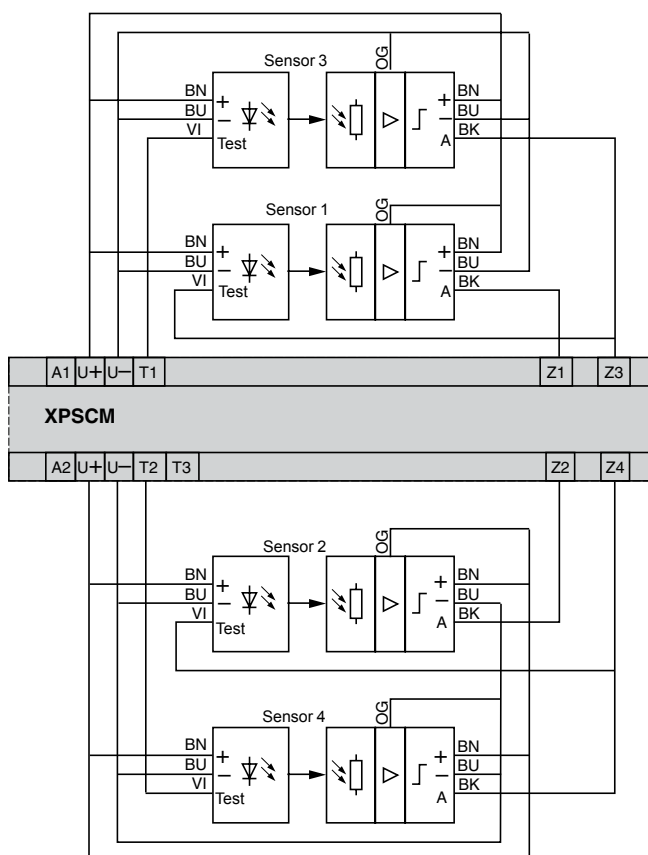
Connection of XPSCM module with 3 pairs of XU2S sensors

(2 for dark switching, 1 for light switching)



Connection of XPSCM module with 4 pairs of XU2S sensors

(2 for dark switching, 2 for light switching)



Operating principle

The safety monitoring module XPSLCD1141 enables independent monitoring of 2 to 4 light curtains type 2 and type 4.

Each output of the light curtain is separately connected to the inputs of the safety monitoring module, which either authorises or prevents activation of its two safety outputs.

The module manages starting and EMD/MPCE functions and therefore, the light curtains connected to it must be configured for automatic start and the EDM/MPCE function deactivated. The safety monitoring module XPSLCD1141 provides the supply and also manages, in addition to its own auxiliary outputs (1 PNP and 1 NPN), the auxiliary outputs of the light curtains.

At the slightest intrusion through one or more light beams of any of the light curtains, the outputs of the safety monitoring module open. This also applies in the event of any internal fault or output relay(s) fault (subject to the EDM/MPCE configuration on the module).

The light curtain system conforms to the standard EN/IEC 61496-1 (type 4).

The Preventa™ safety monitoring module XPSLCD1141 incorporates removable terminal blocks, thus optimizing machine maintenance.

To aid diagnostics, the safety monitoring module has 9 LEDs and a 2-digit display on the front cover which provide information on the monitoring circuit status.

Environmental specifications

Safety monitoring module type		XPSLCD1141
Maximum achievable safety level (1)		PL e/Category 4 conforming to EN/ISO 13849-1, SILCL 3 conforming to EN/IEC 62061
Conformity to standards		EN/IEC 61496-1, EN/IEC 61496-2, EN/IEC 60204-1, EN/IEC 60947-1, EN/IEC 60947-5-1
Certifications		CE, TÜV, CSA, UL
Ambient air temperature	°F (°C)	Operation: 0...+55; storage: -25...+75
Relative humidity		95% maximum, without condensation
Degree of protection		IP 20
Shock and vibration resistance	Conforming to EN/IEC 61496-1	Shock resistance: 10 gn, impulse 16 ms. Vibration resistance: 5...55 Hz max. on all 3 axes
Materials		ABS thermoplastic enclosure
Mounting		35 mm rail

Electrical specifications

Power supply	V	±24 ± 10%
Current	A	10 max.
Response time	ms	< 1
Safety outputs		2 solid-state PNP outputs (N.O.), 625 mA on ±24 V
Alarm or auxiliary output		1 solid-state PNP (N.O.), 500 mA on ±24 V, and 1 solid-state NPN (N.O.), 100 mA on ±24 V, output
Monitoring activation of output switching devices (EDM/MPCE)	mA	50 ± 20% on ±24 V
Signalling		9 LEDs plus 2-digit display
Functions		<ul style="list-style-type: none"> - Auto/Manual, manual 1st cycle, - Monitoring of external switching devices (EDM: External Devices Monitoring), - Restart request indicator light, - Display of operating modes and alarm by 9 LEDs and 2-digit display. Selection of Auto/Manual, blanking relay monitoring, floating/blanking and blanking + floating/blanking relay monitoring using configuration switches behind front cover of module. - Independent monitoring of 2 to 4 light curtains.
Monitoring of external switching devices (EDM = External Devices Monitoring)		Monitoring of the function (open or closed) as well as the response time of the power components. Selectable by using configuration switches.
Start input	mA	50 at 24 V
Connection	Type	Captive screw clamp terminals, removable terminal block
1-wire connection	Without cable end	Solid cable: 14 AWG (1.63 mm²)
	Without cable end	Flexible cable: 26-16 AWG (0.14...1.5 mm²)
	With cable end	Without bezel, flexible cable: 26-16 AWG (0.14...1.5 mm²)
	With cable end	Without bezel, flexible cable: 26-16 AWG (0.14...1.5 mm²)
2-wire connection	Without cable end	Solid cable: 26-16 AWG (0.14...1.5 mm²)
	Without cable end	Flexible cable: 26-16 AWG (0.14...1.5 mm²)

(1) Using an appropriate and correctly connected control system.

References



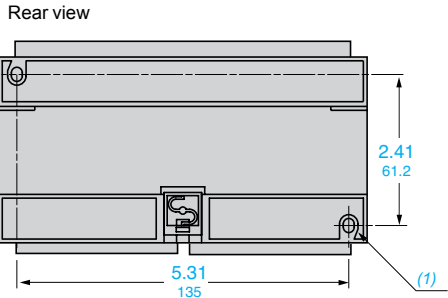
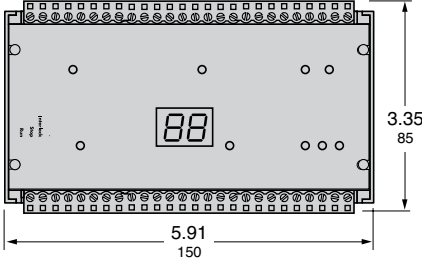
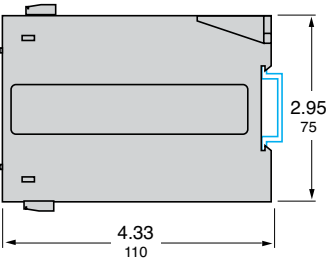
XPSLCD1141

Description	Type of terminal block connection	Number of safety circuits	Additional outputs	Supply	References	Weight
Safety module for monitoring 2 to 4 light curtains type 2 and type 4	Removable from module	2 PNP	5 (4 PNP + 1 PNP or NPN)	24 V	XPSLCD1141	oz (kg)
						26.455 (0.750)

Dimensions

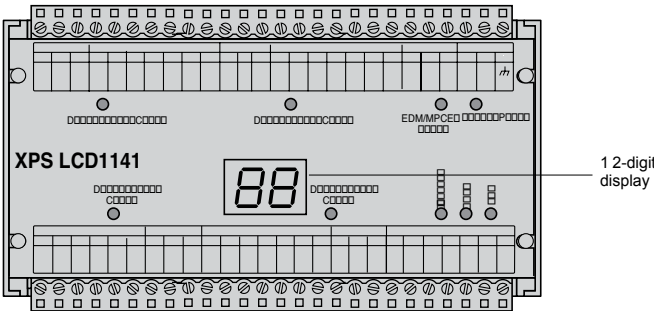
Safety monitoring module
XPSLCD1141

Mounting on 35 mm rail



LED details

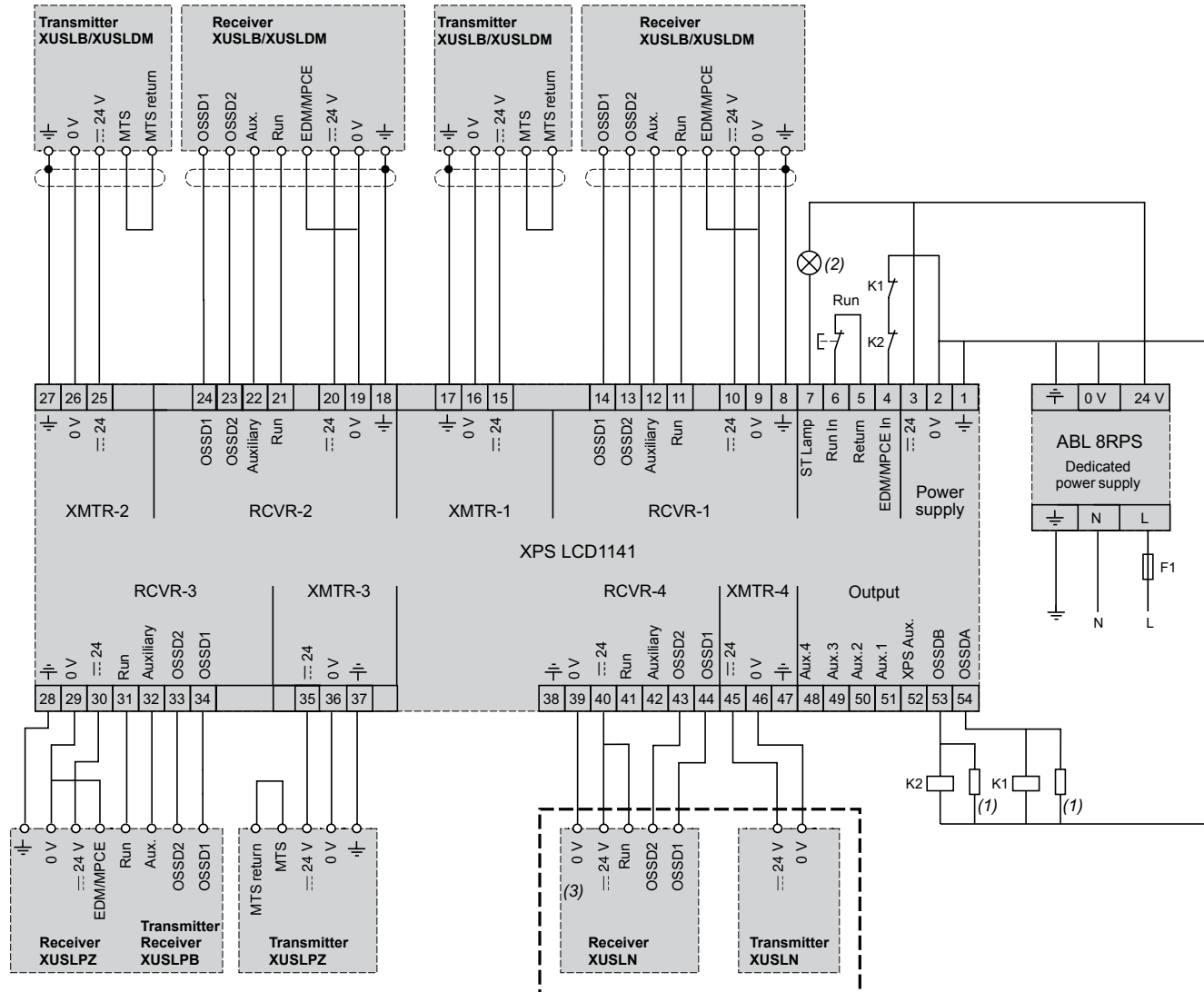
The safety monitoring module XPSLCD has 9 LEDs and a 2-digit display on the front cover.



Dual Dimensions: INCHES
Millimeters

Connection via the safety monitoring module XPSLCD1141

Example: configuration with light curtains XUSLB/XUSLDM, XUSLP and XUSLN



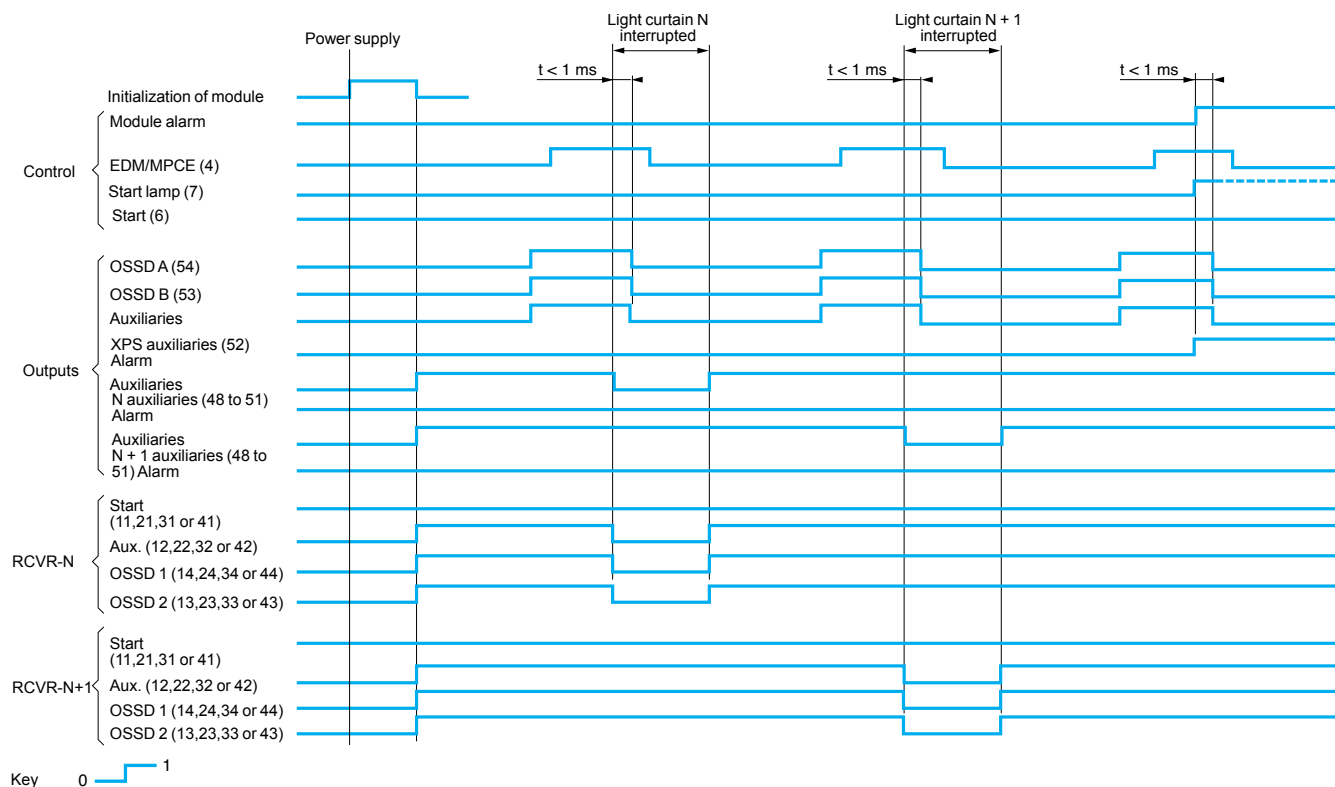
(1) Arc suppressor.

(2) Restart request indicator light.

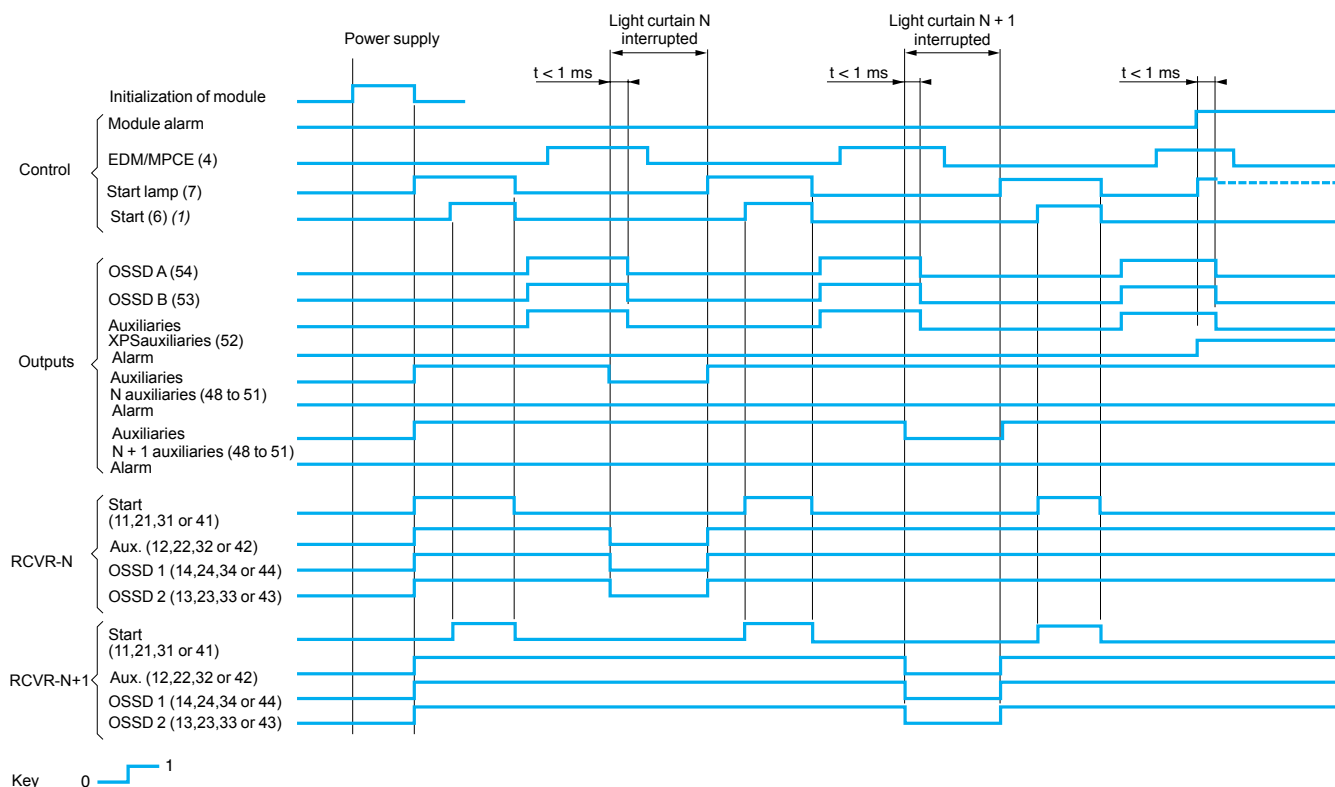
(3) When module XPSLCD1141 is used with a type 2 light curtain (example: XUSLN), the entire protection system is downgraded to category 2.

Functional diagram of module XPSLCD1141

Automatic start and restart mode



Manual start and restart mode



(1) Start button.

Operating principle

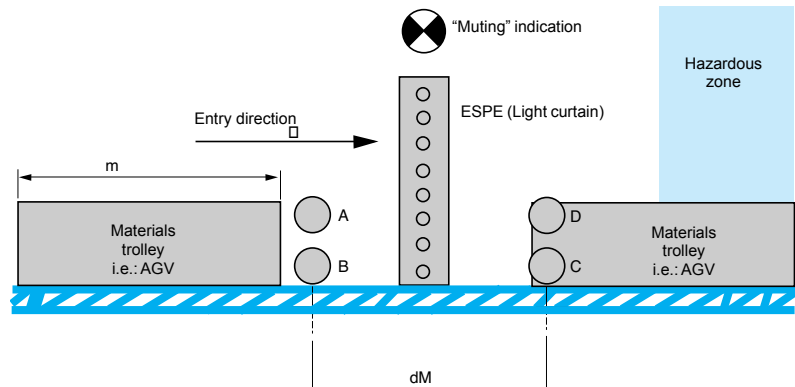
Safety modules XPSLCM are used with type 4 light curtains conforming to EN/IEC 61496-1 to provide a system inhibiting the light curtain protection, i.e. “muting”. This function enables the automatic passage of parts for machining or loaded pallets, without interrupting the transportation movement within the zone protected by the electro-sensitive protection equipment (ESPE) system. In addition to the electro-sensitive protection and safety relay modules XPSLCM, the system consists of 4 to 8 inhibition sensors, 2 indicator lights and a key switch to reset the system to the initial state in the event of a sequence error.

When the system is switched on by the start command and the light curtain protection not interrupted, the main circuit is closed by the safety outputs of the XPSLCM modules (solid-state safety outputs). In addition to safety outputs, the modules incorporate signalling outputs for sending system status information to the PLC. Either 5 or 14 LEDs and a 2-digit display, mounted on the front cover of the module, provide information on the safety circuit status.

An interruption of the protection field monitored by the electro-sensitive protection equipment causes instantaneous opening of the safety outputs; the process PLC receives a stop command and the LED display mounted on the front cover indicates the change of state of the safety circuits. The “open” state is maintained until the module is restarted using the Start button.

The “muting” function cannot be activated by supplying the inhibition sensors unless the safety outputs have been switched on beforehand. To trigger the “muting” function, the inhibition devices must be activated within the 3 second time interval. During the activated “muting” phase, materials can be transported through the protection field without deactivating the safety outputs. In the event of intrusion into the hazardous zone, a person cannot activate the inhibition sensors in the same way and the system stops.

During the muting operation process, a light indicating the muting state is controlled by the XPSLCM module. The indicator light comes on when a muting signal is generated, and indicates the inhibition of the protection function. An indicator light error (short-circuit, open-circuit) will be recognized, and will deactivate the Muting function.



ESPE: electro-sensitive protection equipment (light curtain).

A, B, D, C: “muting” sensors.

m: trolley length and dM = distance between A, B and D, C.

Conditions to be observed for the “muting” function

- The “muting” sensors must either be thru-beam type XUB0BPSNL2 + XUB0BKSNL2T, polarized reflex type XUB0BPSNL2 + XUCZ50 or mechanical limit switches with contacts.
- $dM \leq m$ to obtain continuous validation of the “muting” function.
- Avoid the intrusion of persons during the “muting” phase. This phase is indicated by the indicator light connected to the “muting” indicator output of the XPSLCM module.
- A materials trolley must provide the “muting” signal before entering the protection field and cease it once it has cleared all the sensors of the protection field on exiting.

Specifications			
Module type			XPSLCM1150
Maximum achievable safety level (1)			PL e/Category 4 conforming to EN/ISO 13849-1, SILCL 3 conforming to EN/IEC 62061
Conformity to standards			EN/IEC 61496-1, EN/IEC 61496-2, EN/IEC 60204-1, EN/IEC 60947-1, EN/IEC 60947-5-1
Certifications			CE, TÜV, CSA, UL
Ambient air temperature	For operation	°F (°C)	0...+ 55
	For storage	°F (°C)	- 25...+ 75
Degree of protection conforming to IEC 529	Terminals		IP 20
	Enclosure		IP 20
Power supply	Voltage	V	--- 24
	Voltage limits		- 10...+ 10%
Maximum power consumption		W	< 150
Rated insulation voltage (Ui)		V	300 (degree of pollution 2 conforming to EN/IEC 60947-5-1, DIN VDE 0110 parts 1 and 2)
Rated impulse withstand voltage (Uimp)		kV	4 (overvoltage category III, conforming to EN/IEC 60947-5-1, DIN VDE 0110 parts 1 and 2)
Number of light curtains monitored			1 or 2 transmitter-receiver pairs
Inputs for “muting” sensors	Number of inputs to be monitored		2 to 4 per “muting” function
	Supply voltage of sensors	V	24
	Output current of each sensor	mA	< 20
Type of “muting” sensors			Thru-beam, polarised reflex or sensors with relay hard contacts
Synchronization time of “muting” sensors		s	3 or unlimited
Maximum “muting” time		min	2 or unlimited
Safety outputs			2 PNP (terminals 1 and 2), 0.625 A at 24 V
- number and type - max. thermal current (Ithe)	1 output	A	—
	2 outputs	A	2 x 0.108
	3 outputs	A	—
	3 contacts	A	—
Auxiliary outputs 1 PNP (terminal 5) + 1 NPN (terminal 6)	Breaking capacity of solid-state PNP outputs	mA	24 V/500
	Breaking capacity of solid-state NPN outputs	mA	24 V/100
“Muting” indicator light power		W	1 to 7 max.
Response time on input change of state		ms	1
Signalling			14 LEDs plus 2-digit display
Connection	Type		Captive screw clamp terminals, removable terminal block
	1-wire connection	Without cable end	Solid cable: 14 AWG (1.63 mm ²)
		Without cable end	Flexible cable: 26-16 AWG (0.14...1.5 mm ²)
		With cable end	Without bezel, flexible cable: 26-16 AWG (0.14...1.5 mm ²)
	2-wire connection	Without cable end	Solid cable: 26-16 AWG (0.14...1.5 mm ²)
		Without cable end	Flexible cable: 26-16 AWG (0.14...1.5 mm ²)

(1) Using an appropriate and correctly connected control system.



XPSLCM1150

References

Safety module						
Description	Type of terminal block connection	Number of safety circuits	Auxiliary outputs	Supply	References	Weight oz (kg)
Safety module for “muting” function	Removable from module	2 PNP	1 PNP + 1 NPN	24 V	XPSLCM1150	23.281 (0.660)

Spare parts

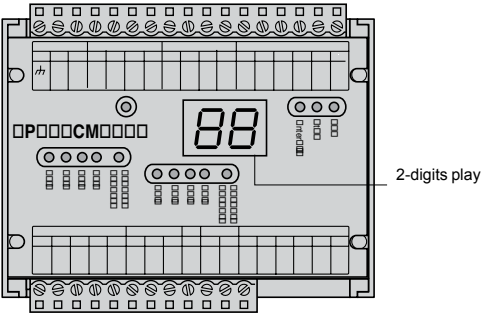
Description	Power W	References	Weight oz (kg)
“Muting” indicator light kit	5	XSZCM01	0.423 (0.012)
Replacement bulbs for “muting” indicator light kit consisting of one lot of 10 replacement bulbs and 1 removal/insertion tool XBF-X13	1 to 7	XSZCM02	0.564 (0.016)

LED details

XPSLCM1150

To aid diagnostics, the safety monitoring module has 14 LEDs and a 2-digit display on the front cover which provide information on the monitoring circuit status.

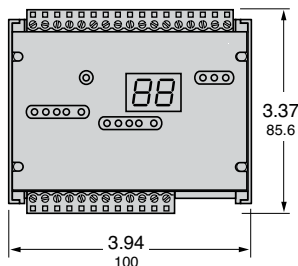
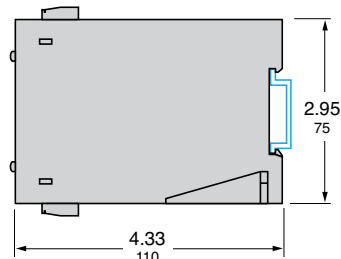
5



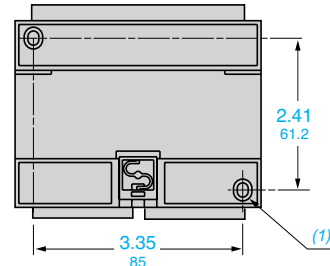
Dimensions

XPSLCM1150

Mounting on 35 mm rail

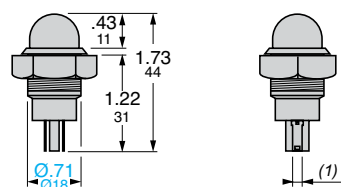


Rear view



(1) 2 elongated holes Ø 4 x 5.7

“Muting” indicator light kit XSZCM01

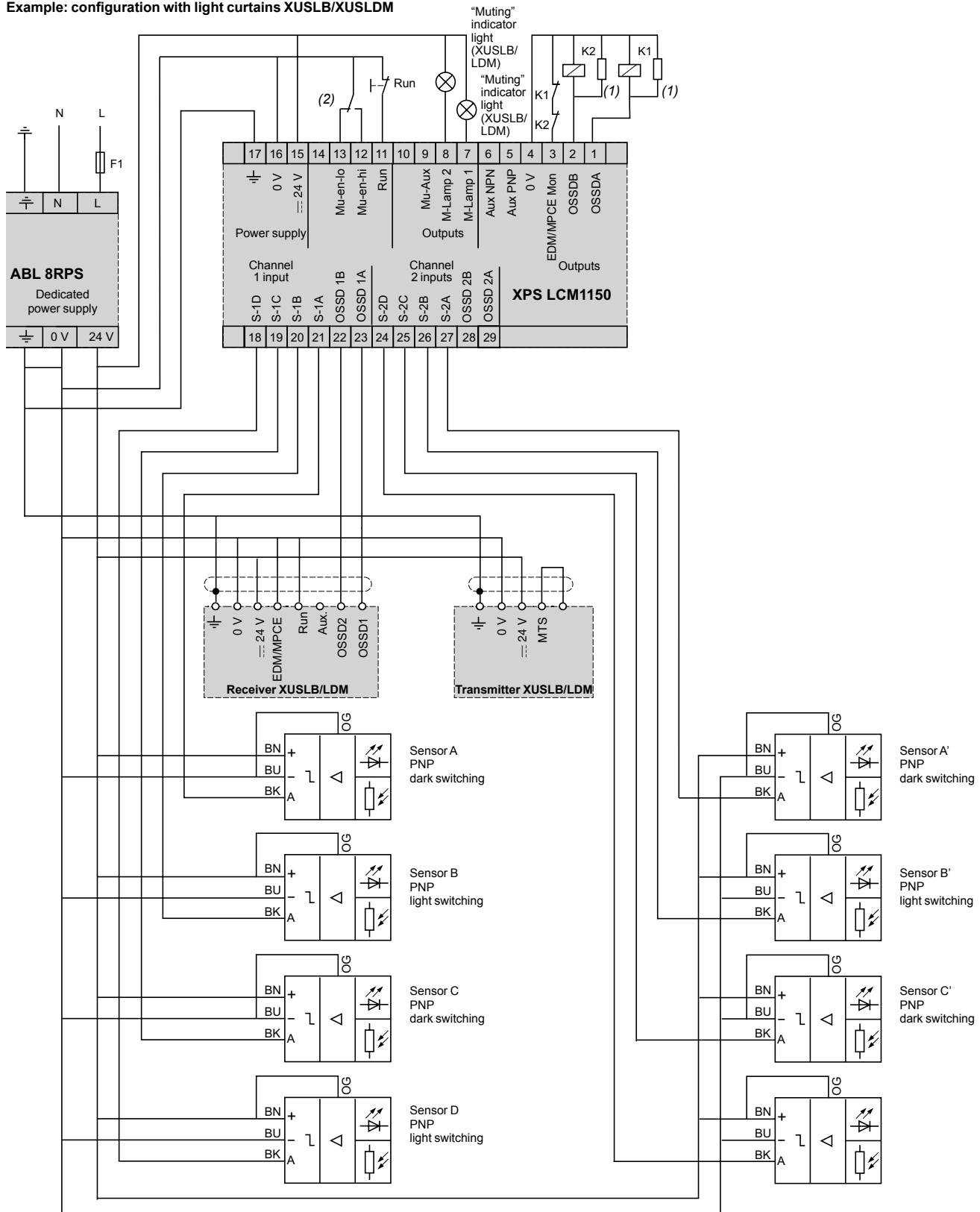


(1) Faston connector 4.7.

Dual Dimensions: INCHES
Millimeters

Connection via the safety monitoring module XPSLCM1150

Example: configuration with light curtains XUSLB/XUSLDM

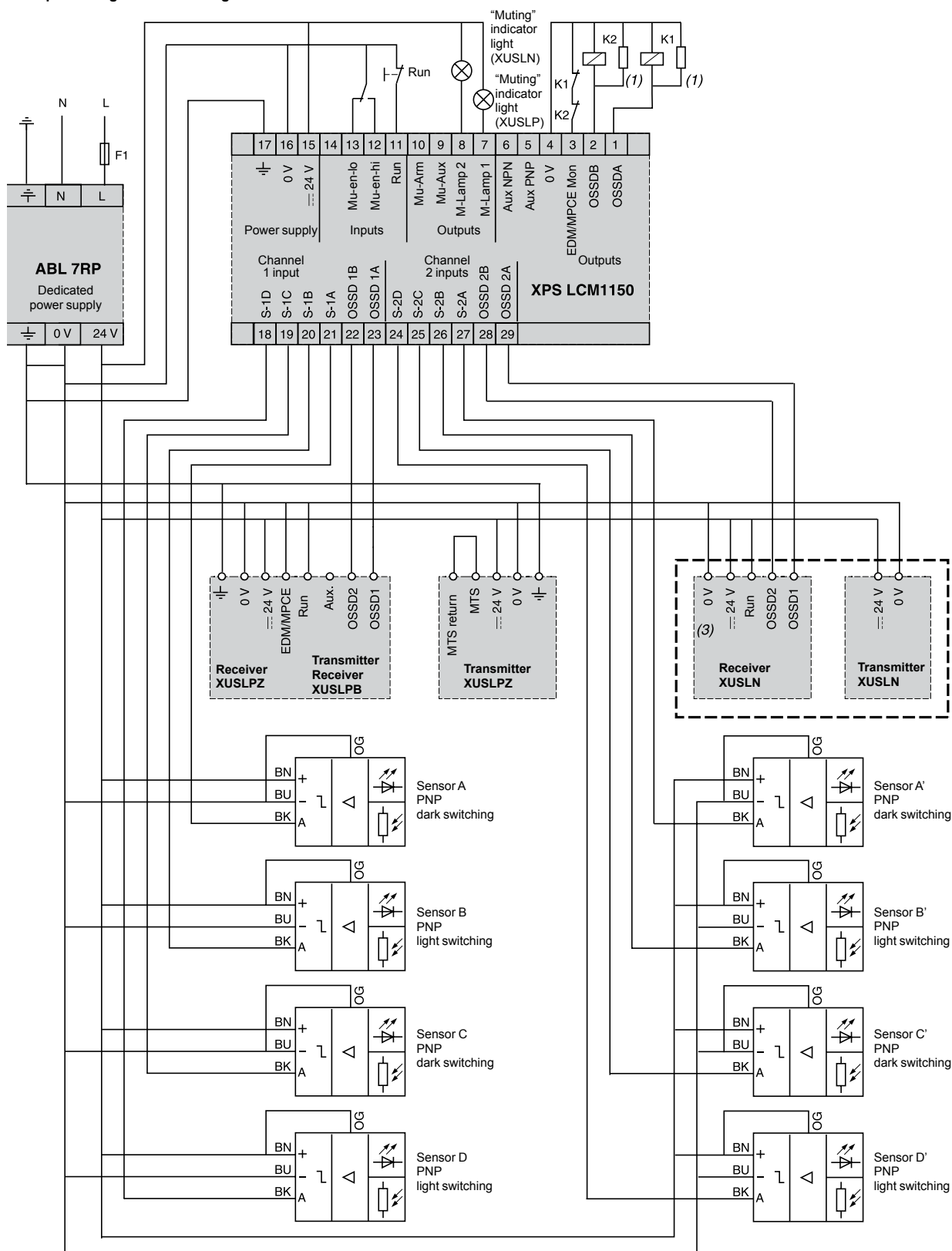


(1) Arc suppressor.

(2) Inhibition activation/deactivation key switch.

Connection via the safety monitoring module XPSLCM1150

Example: configuration with 2 light curtains XUSLP and XUSLN



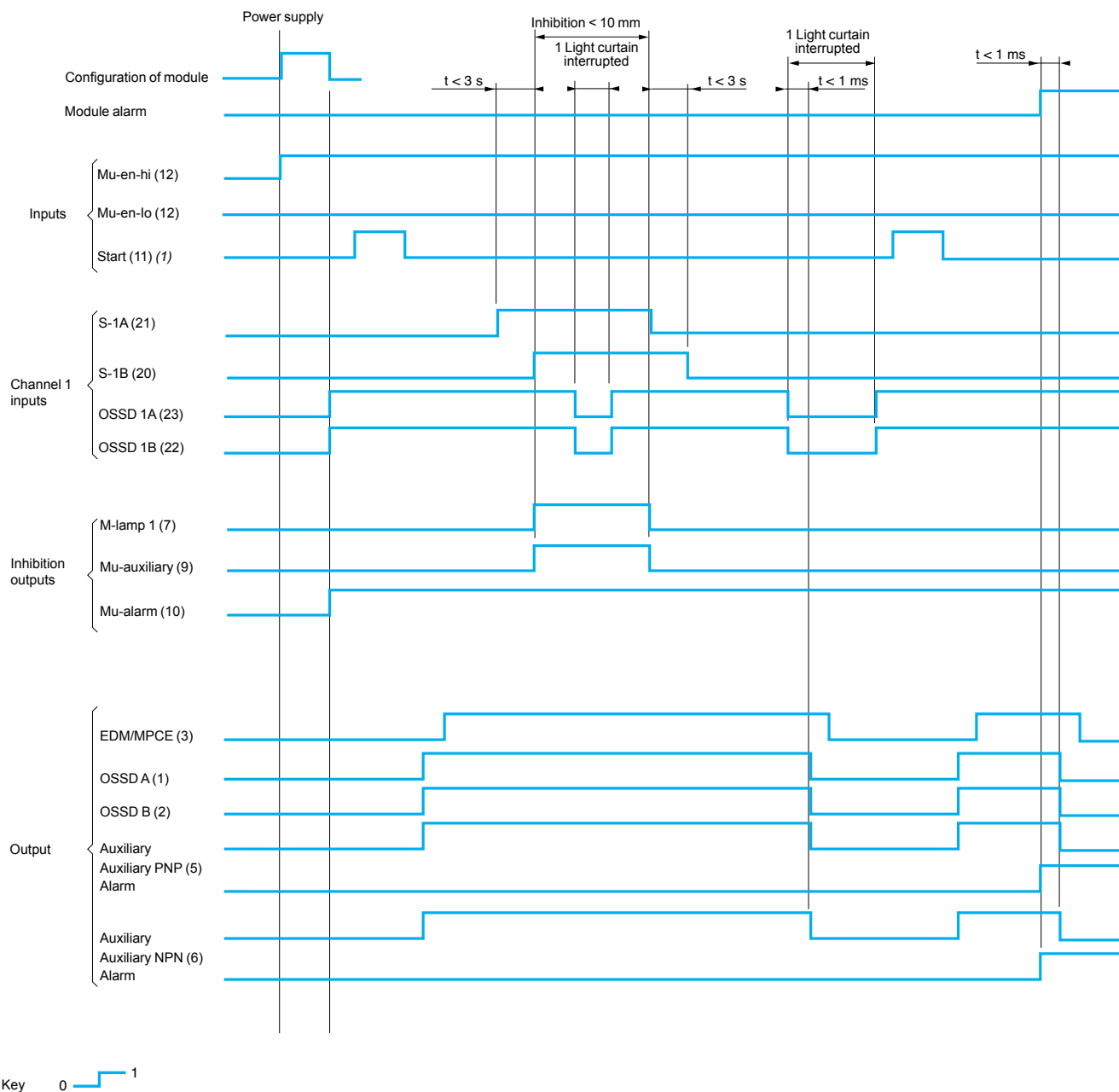
(1) Arc suppressor.

(2) Inhibition activation/deactivation key switch.

(3) When module XPSLCM1150 is used with a type 2 light curtain (example: XUSLN), the entire protection system is downgraded to category 2.

Functional diagram of safety monitoring module XPSLCM1150

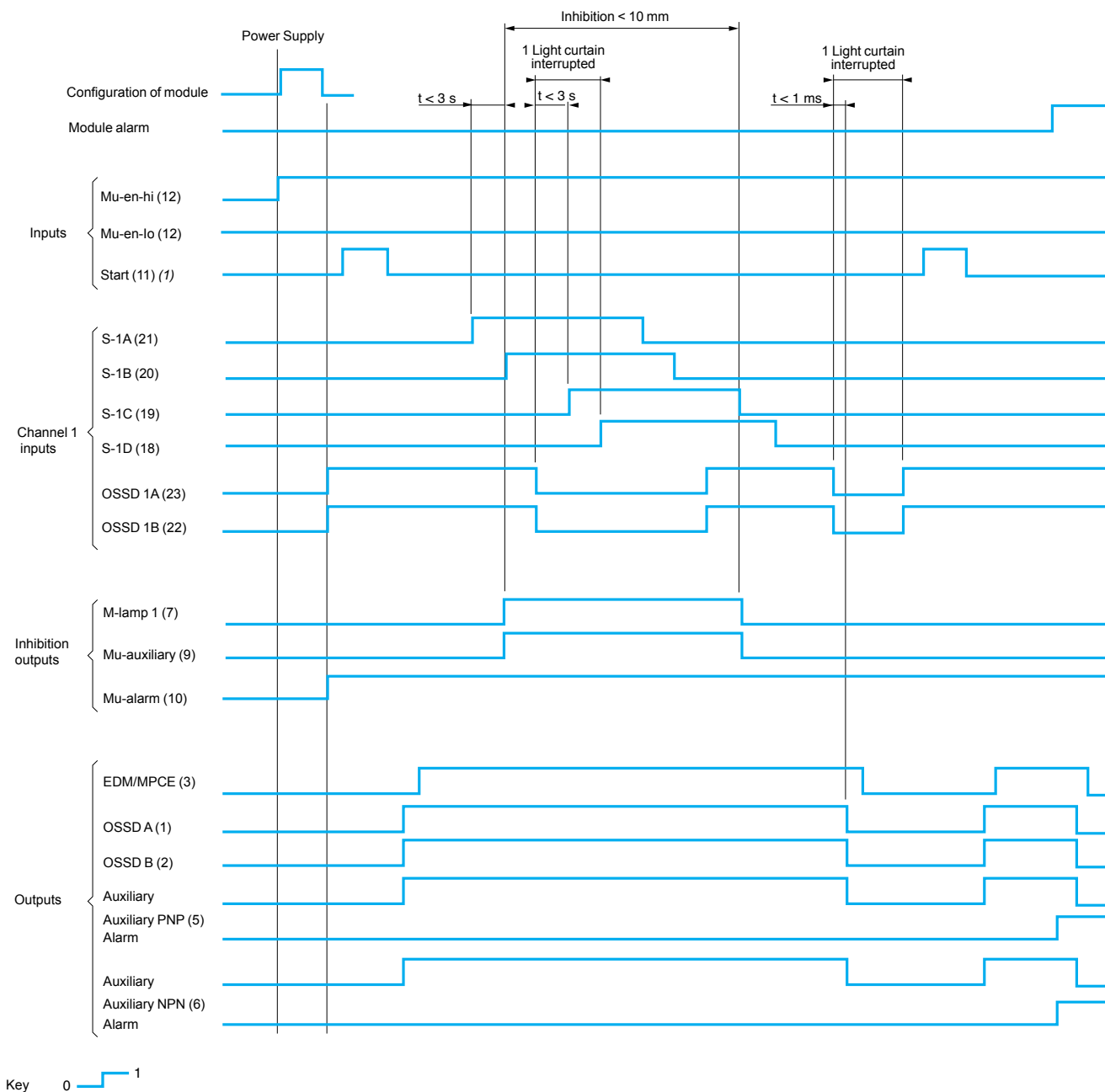
“Start/restart interlock” mode with 2 sensors



(1) Press Start button.

Functional diagram of safety monitoring module XPSLCM1150

“Start/restart interlock” mode with 4 sensors



(1) Press Start button.

Light curtain application and installation

Protection of personnel

Protection of Personnel

Safety light curtains are electro-sensitive protective equipment (ESPE) designed to help protect personnel operating or working around industrial machinery, by sending stop signals to the machine control to stop the hazardous movement as soon as one of the light beams is broken.

In particular, they help provide protection for personnel operating hazardous machinery, 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 a door or guard makes access easier and reduces the time required for loading, inspection, or adjustment operations.

Directives and Standards—These Safety Light Curtains Conform to:

- European Machinery Safety Directive 2006/42/EC and European Work Equipment Directive 89/655/EEC,
- Low Voltage Directives 73/23/EEC and 93/68/EEC and also, the Electromagnetic Compatibility Directive 89/336/EEC,
- Standard EN/IEC 61496-1, EN/IEC 61496-2 and IEC 61508 (only XUS LB, XUS LDM and XUS LDS) (electro-sensitive protection equipment: ESPE),
- Standard EN 60825 (emission power),
- Standard EN 999/ISO 13855 (installation conditions)
- These light curtains are UL, CSA and TÜV certified.

Applications—The Main Applications Are:

For Type 2 Light Curtains:

- Packaging and Assembly Plants
- Conveyor and Mechanical Handling Systems
- Warehousing and Storage Systems
- Waste Disposal Skips
- Robot Areas

For Type 4 Light Curtains

- Presses (all types), Shears and Trimmers
- Hoisting Equipment
- Saws (all types)
- Machine Tools (lathes, milling machines, machining centers)
- Woodworking Machines (truing, lathes, spindle molding machines, side and face milling cutters)
- Textile Machinery (carding machines, weaving looms, steam rooms)
- Assembly Machines
- Assembly Robots

Safety Requirements—Detection of Anomalies that May Jeopardize Machine Safety and Stopping

The machine design and its controls must have the same level of safety as that of the safety light curtain, to ensure that the machine is able to immediately stop its hazardous movement if something enters the zone protected by the safety light curtain.

It must be impossible to enter the protected zone without breaking the protective light beams. The safety light curtain must therefore be installed so that the light curtain cannot be avoided.

The restarting of the machine must only be possible when there is no hazard present and when there is no one in the hazardous zone.

Light curtain application and installation

Standards and basic requirements

Safety Systems

Safety systems consist of many components. No one safety component will ensure the safety of the system. The design of the complete safety system should be considered before you begin. It is very important to follow applicable safety standards when installing and wiring these components.

Standards to be Followed—United States

Standards listed below refer to presses and other metal working and general equipment. This is not a complete listing of all applicable standards to be catalog numberd when using light curtains. There may be other OSHA, ANSI, ANSI/RIA, NEC, NFPA, national, state, and local codes that may include requirements for installation of light curtains on machinery.

- | | |
|-----------------|-------------------|
| - OSHA 1910.211 | - ANSI B11.1 |
| - OSHA 1910.212 | - ANSI B11.19 |
| - OSHA 1910.217 | - ANSI B11.20 |
| | - ANSI/RIA R15.06 |

Directives and Standards to be Followed—Europe

Standards listed below refer to general machinery. This is not a complete listing of all applicable standards to be catalog numberd when using light curtains. There may be other European and local codes that may include requirements for installation of light curtains on machinery.

- | | |
|----------------|--------------|
| - (NF) E09-010 | - EN 811 |
| - DIN 31001 | - EN 999 |
| - BS 5304 | - EN 954-1 |
| - EN 294 | - EN 61496-1 |

5

Light Curtains in the United States—Basic Requirements

- This device must be installed, set up, and serviced only by authorized personnel. ANSI defines Authorized Personnel in ANSI B30.2.
- The user must follow all applicable codes, standards, and regulations. Standards specifically catalog numberd in this document must be followed: ANSI B11.1 through B11.20, OSHA 29 CFR 1910 standards, and ANSI/RIA R15.06 standard. There may be other national and local standards that also must be followed.
- Do not alter or modify this equipment.
- Light curtains must be securely mounted to a rigid surface using the provided mounting brackets.
- The machine must be capable of stopping immediately at any place in its stroke after receiving a stop signal.
- Light curtains must not be used with single stroke (full revolution clutched) machinery.
- Read and understand the sections on Calculating Minimum Safety Distances of this catalog for important details regarding standards, spacings and safe operating distances, and stopping times before beginning installation.
- Light curtains must not be used as a lockout device to meet OSHA lock-out/tag-out requirements.
- Light curtains will not protect machine operators and other personnel from liquids, gases, chips, hot surfaces, and other debris from point of operation.
- Light curtains must be sized and installed so that the machine operator cannot reach over, under, or around the sensing field to reach the point of operation.
- Light curtains must be installed so that machine operators cannot position themselves between the hazardous area (pinch point) and the light curtain.
- Light curtains currently cannot be used as PSDI devices to initiate machine movement on mechanical power presses. For PSDI, refer to OSHA 29 CFR 1910.217 (h), the various appendices catalog numberd on PSDI, and OSHA mandatory regulations requiring third party approval.

Using the light curtain to initiate a machine after an object is removed from the sensing area is called Presence Sensing Device Initiation (PSDI). Use of PSDI places additional requirements on the guarding and safety controls. It can restrict advanced light curtain features such as floating blanking and exact channel selection (ECS) blanking. Contact your local sales office for further information. Other sources of catalog numbers for PSDI include: ANSI RIA 15.06, OSHA 1910.217(h), and ANSI B11.2.

Light curtain application and installation

Minimum safety distances

Minimum Safety Distance

Light Curtains in the United States (Vertical Mount)

The basic formulas for calculating minimum safety distances for light curtains mounted vertically are listed below. These formulas apply to ALL light curtains, including perimeter and point of operation light curtains. ANSI B11.1 is listed first, OSHA 29 CFR 1910.217 listed next.

ANSI B11.1:

This formula applies specifically to the guarding of mechanical power presses, but it is typically used for other applications as well.

$$D_s = K \times (T_s + T_c + T_r + T_{bm}) + D_{pf}$$

D_s = Minimum safe distance between the light curtain sensing area to the nearest point of operation potential hazard.

K = Hand speed constant of 63 in./s. This is the standard minimum accepted value for both ANSI and OSHA. ANSI recognizes that this constant may not be optimal, and that the user should consider all factors before deciding on the value of the K factor to use in the above formula.

T_s = Stop time of the machine (press), as measured from the final control element. It is measured at the maximum velocity of the press, usually at 90° of press rotation on the downstroke.

T_c = Response time of the control circuit to activate the braking system.

NOTE: T_s and T_c are usually measured as one value by a stop time measurement device.

T_r = Response time of the light curtain.

T_{bm} = Additional time allowed for the brake monitor to compensate for wear and variations in the stopping time.

Brake monitors will stop the machine (press) when the stop time of the machinery exceeds a pre-set limit.

NOTE: If a brake monitor is not installed on the machine, a factor must be added to the measured stop time to include brake wear. Generally, brake monitors add approximately 20–25% additional stop time. To determine the actual factor to be used, contact the machine manufacturer.

D_{pf} = Penetration depth factor, to provide for possible penetration through the sensing field by fingers or hands before detection occurs. This value is determined by the Penetration Depth Factor Chart from ANSI B11.1 (see Penetration Depth Factor graph below). Alternately, the following ANSI formula can be used: $D_{pf} = 3.4 (S - 0.276)$, where S = minimum object sensitivity.

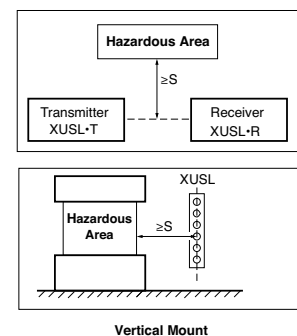
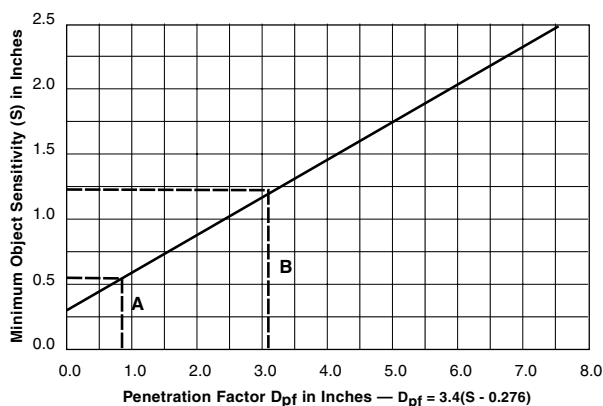
Example: For devices with minimum object sensitivity of 0.55 in. (14 mm):

$$D_{pf} = 3.4 \times (0.55 - 0.276) = 0.94 \text{ in. (23.88 mm)}$$

For devices with minimum object sensitivity of 1.18 in. (30 mm):

$$D_{pf} = 3.4 \times (1.18 - 0.276) = 3.07 \text{ in. (77.98 mm)}$$

Penetration Depth Factor



A = Finger Protection 0.55 in. (14 mm) has a D_{pf} of 0.94 in. (23.88 mm)

B = Hand Protection 1.18 in. (30 mm) has a D_{pf} of 3.07 in. (77.98 mm)

Light curtain application and installation

Minimum safety distances (*continued*)

Minimum Safety Distance (*continued*)

OSHA: CFR 1910.217 (c)(3)(iii)(e)

This formula applies specifically to the guarding of mechanical power presses, but it is typically used for other applications as well.

$$D_s = 63 \text{ in./s} \times T_s$$

Where:

D_s = Minimum safety distance (inches)

63 in./s = hand speed constant

T_s = Stopping time of the press measured at approximately 90° position of the crankshaft rotation (seconds).

Stop time of the machine (press), as measured from the final control element. It is measured to determine worst case time and maximum velocity of the press, usually at 90° of press rotation on the downstroke.

In addition to the formula above, we recommend that OSHA 1910.217 Table O-10 be followed. Per OSHA, the table below shows the maximum width of openings allowed for a guard based on the distance from the guard (light curtain) to the point of operation hazard. The maximum width of opening in the table below corresponds to the minimum object sensitivity for a light curtain.

Example:

Using the formula: $D_s = 63 \text{ in./s} \times T_s$

if $T_s = 0.10 \text{ sec}$

$D_s = 63 \text{ in.} \times 0.10 = 6.3 \text{ in.}$

- For an XUSL light curtain with a minimum object sensitivity of 0.55 in.:
 - Using the example above, the separation distance from the point of operation hazard to the light curtain would be 6.3 in. plus a minimum distance (from table O-10) of 3.5 in., for a total separation distance of 9.8 in. The 3.5 in. was chosen from Table O-10 as the additional distance because the opening (minimum object sensitivity) is 0.55 in. Since 0.55 in. is larger than 0.50 in., the values for 0.50 in. cannot be used. Therefore the next larger opening, 0.625 in., must be used and the distance corresponding to the 0.625 in. opening is 3.5 in.
- For an XUSL light curtain with a minimum object sensitivity of 1.18 in.:
 - Using the example above, the separation distance from the point of operation hazard to the light curtain would be 6.3 in. plus a minimum distance (from table O-10) of 7.5 in., for a total separation distance of 13.8 in.
 - The 7.5 in. was chosen from Table O-10 as the additional distance because the opening (minimum object sensitivity) is 1.18 in. Since 1.18 in. is larger than 0.875 in., the values for 0.875 in. cannot be used. Therefore the next larger opening, 1.25, must be used, and the distance corresponding to the 1.25 opening is 7.5 in.

NOTE: 3.5 in. = 89 mm, and 7.5 in. = 191 mm.

OSHA 1910.217 Table O-10

Distance of Opening from Point of Operation Hazard (in.)	Maximum Width of Opening (in.)
1/2 to 1-1/2	1/4
1-1/2 to 2-1/2	3/8
2-1/2 to 3-1/2	1/2
3-1/2 to 5-1/2	5/8
5-1/2 to 6-1/2	3/4
6-1/2 to 7-1/2	7/8
7-1/2 to 12-1/2	1-1/4
12-1/2 to 15-1/2	1-1/2
15-1/2 to 17-1/2	1-7/8
17-1/2 to 31-1/2	2-1/8

NOTE: If the light curtain is to be used on machinery that will be standardized throughout North America and Europe, then all minimum distance formulas in "Calculating Minimum Safety Distances" on pages 5/74 through 5/79 must be calculated, and the largest separation distance must be used.

Light curtain application and installation

Minimum safety distances (*continued*)

Light Curtains in Europe (Vertical Mount)—Minimum Safety Distance (XUSL multi-beam)

The minimum safety distance S must be calculated using the following General Formula:

$$S \geq K(t_1 + t_2) + C$$

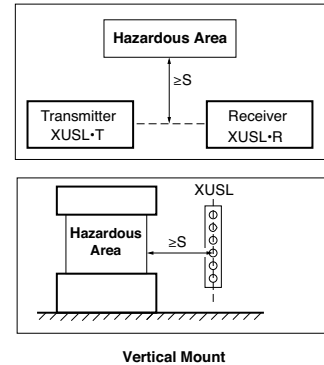
S = Minimum safety (separation) distance between the hazardous area and the light curtain.

K = Accepted general approach speed of a body or parts of the body. Generally accepted values are: 78.7 in./s (2000 mm/s).

t_1 = Response time of the light curtain in seconds. This is the total time from detection of a beam broken to the switching of the outputs of the light curtain.

t_2 = The time (in seconds) needed to stop all hazardous movements of the machine. This information is provided by the machine manufacturer. It is the time between the stop instruction of the light curtain and the actual stop of the hazardous machine components.

C = Additional safety distance. Generally accepted values are:
 0 in. (0 mm) for 0.55 in. (14 mm) minimum object sensitivity
 5.04 in. (128 mm) for 1.18 in. (30 mm) minimum object sensitivity



Using Individual Beam Sensors (XPSCM and XU2S Perimeter Light Curtain)

The formula above is modified from a security light curtain where the light beams are all mounted in the same enclosure. Typically, for a system with individual beam sensors, up to 4 photoelectric sensors are used.

$$S \geq K(t_1 + t_2) + C$$

S = Minimum safety (separation) distance between the hazardous area and the light curtain.

K = Accepted general approach speed of a body or parts of the body. Generally accepted values are: 63 in./s (1600 mm/s).

t_1 = Response time of the light curtain in seconds. This is the total time from detection of a broken beam to the switching of the outputs of the light curtain.

t_2 = The time (in seconds) needed to stop all hazardous movements of the machine. This information is provided by the machine manufacturer. It is the time between the stop instruction of the light curtain and the actual stop of the hazardous machine components.

C = Additional safety distance. Generally accepted values are:
 33.5 in. (850 mm) when using several individual photoelectric beams
 47.3 in. (1200 mm) when using a single photoelectric beam

Special Rules for Presses

The use of safety light curtains and mechanical guards on metal working presses is governed by specific standards and rules. The standards specify that only safety light curtains or mechanical guards must be used as safety devices so that, if a person enters the protective field while the dangerous 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 an anomaly occurs in the safety device, the potentially dangerous machine must be stopped automatically.

Once the protected zone is clear, the movement which 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 dangerous 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 activated.

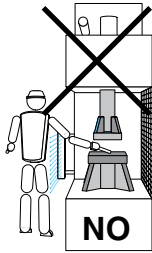
The safety distance S is calculated in a special way for:

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

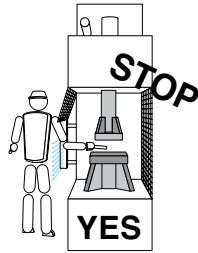
Light curtain application and installation

Prevention of access to hazardous area

Prevention of access over the top of the light curtain



Without additional safety device: insufficient degree of protection



With additional device: light beams broken, the machine stops

Prevention of Access to Hazardous Area

Security light curtains can only be used on machines on which the movement of working components may be *stopped at any time during the hazardous operation phase of the machine*.

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

The clearing of the light curtain must not result in the restarting of moving parts or hazardous operation.

Subsequent restarting must only be possible by means of deliberate operation of the appropriate control device, or a start-up procedure after having checked that there is no longer any hazard.

Electrical interfacing between the security light curtain and the machine circuits must meet all applicable codes where the machine will be used.

Where security light curtains do not provide an adequate degree of protection due to their location, additional suitable safety devices, guards, or additional security light curtains must be used to prevent operators from entering the protective light curtain and reaching the hazardous zone (EN 294/ISO 13852, EN 811/ISO 13853), or from remaining in the area between the hazardous zone and the security light curtain (EN 999/ISO 13855).

The position and size of these additional safety 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 the beams of the light curtain*.

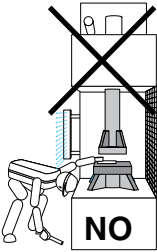
These additional safety devices must be:

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

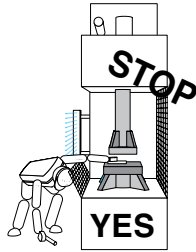
It must be impossible for operators to disconnect or turn off the switching circuits for these additional safety devices.

5

Prevention of access from beneath the light curtain

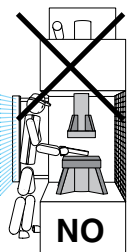


Without additional safety device: insufficient degree of protection

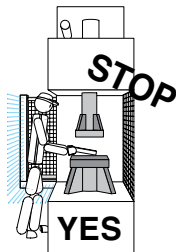


With additional device: light beams broken, the machine stops

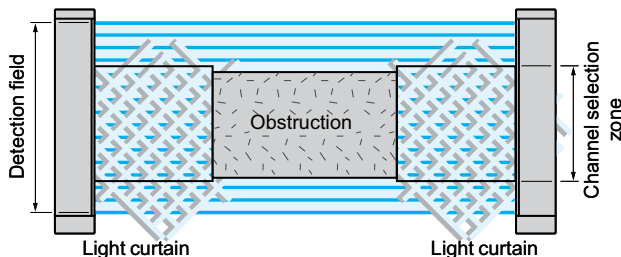
Prevention of access from the back of the light curtain



Without additional safety device: insufficient degree of protection



With additional device: light beams broken, the machine stops



Addition of solid protection to the light curtain when using channel selection

Protection for Blanking, Floating blanking or Monitored blanking functions

The Blanking (inhibition of light beams), Floating blanking (floating inhibition of light beams) or Monitored blanking (fixed and floating inhibition/disinhibition of light beams) functions create non protected areas in the detection field. These non-protected areas are required for some applications. If an obstruction does not completely fill these unprotected areas, one of two actions must be implemented:

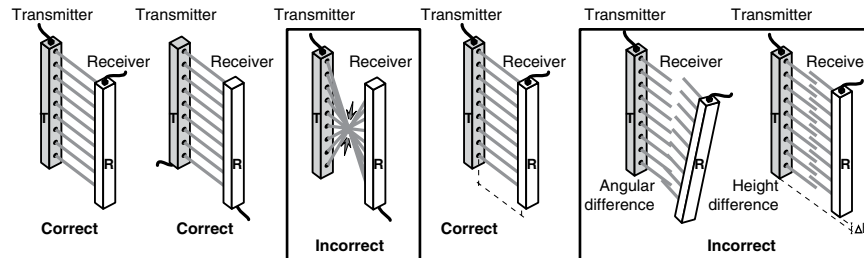
- an increase of safety distance to take into account a larger opening in the light curtain,
- the area not filled by an obstruction must be guarded by a solid protection method (mechanical barrier: metal plate or unfolded structure).

Light curtain application and installation

Alignment and mutual interference

Light Curtain Alignment

Light curtains need to be firmly and securely mounted to the machine. The diagrams below show correct and incorrect mounting. Incorrect mounting as shown below will not allow correct alignment.



Installation Near Reflective Surfaces

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 effective aperture angle of the optics and transmitter/receiver alignment is 2.5° maximum > 3 m (9.8 ft).

Reflective surfaces located near areas protected by light curtains could interfere with the proper operation of the light curtain. Reflective surfaces may include painted metal, shiny sheet metal, stainless steel, or plastic. These reflective surfaces may allow unwanted stray light rays to “go around” objects entering the sensing area of the light curtain. It is necessary to take into account a minimum distance D between the axes of the nearest beam and the reflective surface. This distance is measured from the mid-point between the transmitter and receiver.

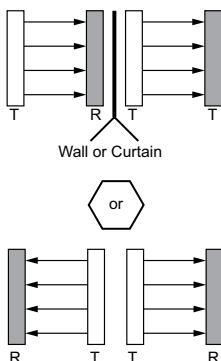
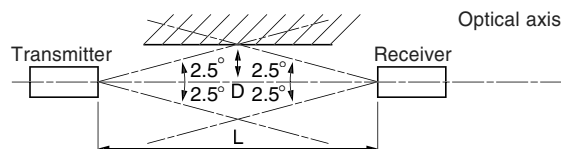
European Standards EN 50100-1 and 2 and EN/IEC 61496-1 specify a minimum distance D where:

for $0 < L < 9.84 \text{ ft (3 m)}$, $D = 5.16 \text{ in. (131 mm)}$

for $L > 9.84 \text{ ft (3 m)}$, $D = (0.035 \times L) + 0.2 \text{ in. (5 mm)}$, with a minimum value for D of 5.16 in. (131 mm)

D = minimum distance between the light curtain and reflective surface

L = sensing distance of the security light curtain.



Mutual Interference

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

The products in the XUSL range are designed to provide maximum operating safety (coded infrared light beams).

Setup as illustrated to the left is recommended for maximum performance and safety.

Environments Subject to Interference

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

- Electromagnetic interference generated by the close proximity of variable speed controllers, welding machines or walkie-talkies. The products in the XUSL range are designed to be immune to such interference. They conform to:
 - level 3 conforming to EN 61496-1 (fast transient/burst interference)
 - resistance to interference caused by variable speed controllers
- Light interference at a low angle of incidence in relation to the optical axis. The products in the XUSL range are resistant in accordance with IEC 61496-2

Light curtain application and installation

Using mirrors

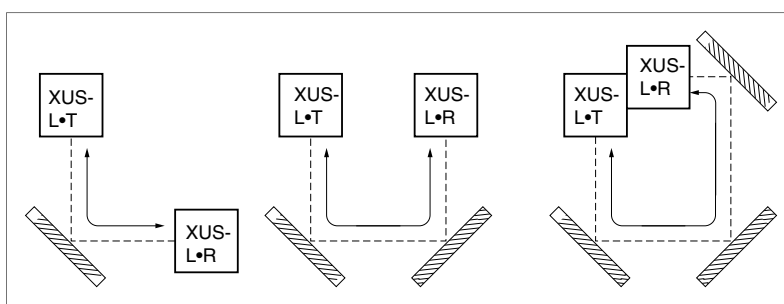
Using Mirrors

It is important to comply with the minimum safety distances throughout the protected area, and around the perimeter where the light curtain beams are being reflected by the mirrors. The distances relating to reflective surfaces must also be calculated and observed.

The use of mirrors will significantly reduce the sensing distance of any light curtain. Each mirror used will further reduce the sensing distance.

Reminder: any contamination on the mirror surfaces, such as dust or dirt, will further reduce the sensing distance. This should be considered when installing a light curtain with mirrors in an area where there will be dust, dirt, or other contaminants. More frequent cleaning of the light curtain lenses and the mirrors may be required.

Mirror Configurations



The total nominal range between the transmitter (XUSL•T) and the receiver (XUSL•R) will be reduced according to the number of deflecting mirrors.

Recommended Maximum Range for Glass Mirrors—XUSLB/XUSLD

No. of Mirrors	XUSLB/XUSLDM Range			
	3 m (9.84 ft)	7 m (21.34 ft)	8 m (26.25 ft)	20 m (60.96 ft)
1	2.6 m (8.66 ft)	6.2 m (18.78 ft)	7.0 m (23.50 ft)	17.6 m (53.64 ft)
2	2.3 m (7.61 ft)	5.4 m (16.52 ft)	6.2 m (20.30 ft)	15.4 m (46.94 ft)
3	2.0 m (6.69 ft)	4.8 m (14.54 ft)	5.5 m (17.90 ft)	13.6 m (41.45 ft)
4	1.8 m (5.91 ft)	4.2 m (12.80 ft)	4.8 m (15.75 ft)	12.0 m (36.58 ft)

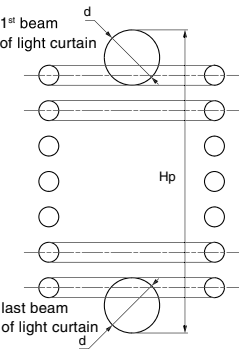
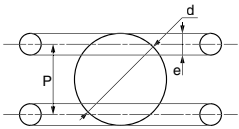
Recommended Maximum Range for Stainless Steel Mirrors—XUSLB/XUSLD

No. of Mirrors	XUSLB/XUSLDM Range			
	3 m (9.84 ft)	7 m (21.34 ft)	8 m (26.25 ft)	20 m (60.96 ft)
1	2.5 m (8.07 ft)	5.7 m (17.50 ft)	6.6 m (21.50 ft)	16.4 m (49.99 ft)
2	2.0 m (6.63 ft)	4.7 m (14.35 ft)	5.4 m (17.60 ft)	13.4 m (40.84 ft)
3	1.7 m (5.41 ft)	3.9 m (11.76 ft)	4.9 m (14.50 ft)	11.0 m (33.53 ft)
4	1.4 m (4.46 ft)	3.2 m (9.65 ft)	3.6 m (11.90 ft)	9.0 m (23.43 ft)

Note: When mirrors are used, the effects of vibration will be more noticeable. Proper alignment may require more time in the setup of the light curtain and the associated mirrors. The mirrors must be firmly and securely mounted and be protected from shock, vibration, and other physical damage.

Light curtain application and installation

MOS and protected height



Minimum Object Sensitivity (MOS)

This is the smallest object diameter which a Type 4 security light curtain is capable of detecting.

$d = P + e$

- d: minimum object sensitivity
- P: distance between the axes of 2 adjacent beams
- e: diameter of the beams

XUSL range	P in. (mm)	e in. (mm)	d in. (mm)
Finger protection	0.39 in. (10 mm)	0.13 in. (3.3 mm)	0.55 in. (14 mm)
Hand protection	0.79 in. (20 mm)	0.35 in. (9 mm)	1.18 in. (30 mm)

Protected Height (HP)

According to EN 50100-2, this is the zone (or height) within which an object of equal diameter to the minimum object sensitivity **d** is always detected.

Test Rod

A test rod is included with each XUSL light curtain for the purpose of periodically testing the light curtain for proper operation. The test rod is the appropriate diameter for testing the light curtain it was shipped with.

Light curtain application and installation

Blanking

Blanking

ECS (Blanking)

The blanking feature, or *exact channel select* (ECS), can be used as an option to disable selected beams or channels in the safety light curtain's sensing field. This feature is used when stationary objects, such as fixtures, conveyors, or tooling, obstruct fixed areas of the sensing field. Once the specific beams or channels have been blocked and the blanking feature has been activated, the selected beams must remain blocked. If the obstruction is removed, the light curtain will transmit a stop signal to the machine.

Floating Blanking

Floating blanking is an option for use with ECS (blanking) or as a stand alone feature. Floating blanking provides the ability for up to two beams or channels to be disabled at any position in the sensing field. The two beams or channels disabled with this feature are not fixed at a single position; they are allowed to float through the sensing field.

It is important to follow the instruction manual provided with the safety light curtain when using the ECS (blanking) and floating blanking optional features together.

If the ECS (blanking) or floating blanking feature is active, the minimum safe distance is affected by an increase in the light curtain's minimum object sensitivity (MOS). According to the ANSI safety distance formula, if the object sensitivity of the light curtain increases, the minimum safe distance must increase.

Protection for the Functions of Blanking and Floating Blanking

The functions of ECS/blanking and floating blanking create "holes" in the detection zone. These holes are required for certain applications. If an obstruction does not completely fill these holes one of two actions will be required:

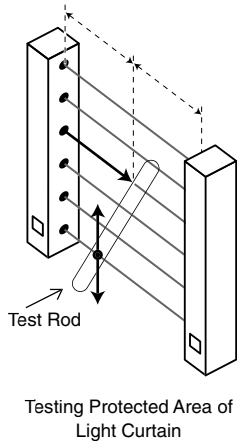
- The safe mounting distance will need to be increased to account for the larger opening in the detection zone.
- The area not filled by an obstruction must be guarded, typically by some method of hard guarding.

Hard guarding refers to mechanical barriers such as sheet or expanded metal.

Light curtain application and installation

Test procedure

Test Procedure



Test Procedure for the United States

The tests below must be performed by qualified personnel (per ANSI B30.2—1993) at or after the following:

- After installation and before the machine is commissioned
- At regular inspections determined by the employer
- After any maintenance, adjustment, or modification to the light curtain or machine
- After tooling or fixture changes
- We also recommend that the following test procedure be performed daily or at each shift change.

Test procedure:

1. Turn off the machine. Turn on the light curtain.
 2. Check the machine to make sure that all guarding is firmly in place, operates properly, and the only access to the hazardous area is through the area protected by the light curtain.
 3. Check that light curtain mounting meets or exceeds the minimum safety distance from the nearest hazardous area (pinch point). Verify that the light curtain is mounted securely to a rigid mounting surface.
 4. Check for damage to mounting brackets, mounting surface, wiring, or mirrors (if used). If any damage is found, the machine should be locked out ▲ until it is repaired.
 5. Verify that operators cannot position themselves between the hazardous area (pinch point) and the light curtain. If this is possible, additional guarding must be installed.
 6. Check the distance between the hazardous area and the light curtain sensing area to verify that it meets or exceeds the minimum safety distance.
 7. Insert the test rod (the round rod included with each XUSL light curtain) into the protected (sensing) area and move the test rod throughout the entire protected area (top, bottom, sides, vertically up and down in the middle of the sensing area).
 8. Remove the test rod and start up the machine. With the machine running, insert the test rod into the sensing area and verify that the machine stops immediately.
 9. With the test rod still in the sensing area, verify that the machine cannot be restarted.
 10. Remove the test rod from the sensing area and verify that the machine cannot be restarted except when the proper start-up sequence has been followed.
 11. Check the stopping mechanisms (including brakes) to verify proper working condition.
 12. If any of the above tests do not give the indicated results, the machine should be locked out ▲ until it is repaired. Then run the above tests again.
- ▲ Follow OSHA 1910.147 for lock-out/tag-out procedures.

XUSZA0152	5/44
XUSZA0305	5/44
XUSZA0457	5/44
XUSZA0508	5/44
XUSZA0610	5/44
XUSZA0711	5/44
XUSZA0762	5/44
XUSZA0813	5/44
XUSZA0914	5/44
XUSZA1016	5/44
XUSZA1067	5/44
XUSZA1219	5/44
XUSZA1321	5/44
XUSZA1372	5/44
XUSZA1422	5/44
XUSZA1524	5/44
XUSZA1626	5/44
XUSZA1830	5/44
XUSZA2134	5/44
XUSZC1200	5/47
XUSZC1800	5/47
XUSZC2100	5/47
XUSZC2400	5/47
XUSZC3100	5/47
XUSZCA	5/47
XUSZCB	5/47
XUSZM0102	5/44
XUSZM0152	5/44
XUSZM0305	5/44
XUSZM0457	5/44
XUSZM0508	5/44
XUSZM0610	5/44
XUSZM0711	5/44
XUSZM0762	5/44
XUSZM0813	5/44
XUSZM0914	5/44
XUSZM1016	5/44
XUSZM1067	5/44
XUSZM1219	5/44
XUSZM1321	5/44
XUSZM1372	5/44
XUSZM1422	5/44
XUSZM1524	5/44
XUSZM1626	5/44
XUSZM1830	5/44
XUSZM2134	5/44
XUSZWSP	5/45



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MKTED208051EN-US Rev. 01, Chapter 5
12/2013