

Safety automation solutions

Safety monitoring module

Preventa XPS LCM

for the "muting" function of type 2 and type 4 safety light curtains

Operating principle

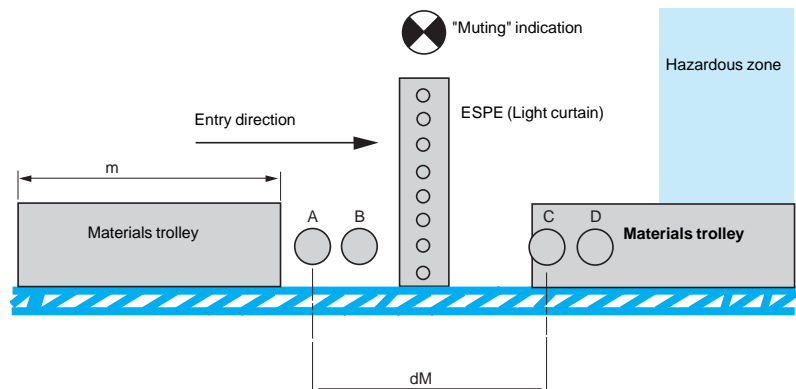
XPS LCM safety modules are used with type 4 light curtains conforming to EN/IEC 61496-1 to provide a system inhibiting the light curtain protection, i.e. "muting". This function enables the automatic passage of parts for machining or loaded pallets, without interrupting the transportation movement within the zone protected by the electro-sensitive protection equipment (ESPE) system. In addition to the electro-sensitive protection and XPS LCM safety modules, the system comprises 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 XPS LCM 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 face 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 face 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.

Whilst the "muting" function is activated, a "muting" status indicator light is controlled by the XPS LCM module. A fault at indicator light level (short-circuit, open circuit) is immediately recognised and deactivates the "muting" function. The indicator light only illuminates when a "muting" signal is generated and indicates the inhibition of the protection 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 XUB 0BPSNL2 + XUB 0BKSNL2T, polarised reflex type XUB 0BPSNL2 + XUC Z50 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 XPS LCM 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.

Characteristics				
Module type		XPS LCM1150		
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		
Product certifications		UL, CSA, TÜV		
Ambient air temperature	For operation	°C	0...+ 55	
	For storage	°C	- 25...+ 75	
Degree of protection conforming to IEC 60529	Terminals		IP 20	
	Enclosure		IP 20	
Power supply	Voltage	V	24 ---	
	Voltage limits		- 10...+ 10%	
Maximum consumption		W	< 150	
Rated insulation voltage (Ui)		V	300 (degree of pollution 2 conforming to IEC/EN 60947-5-1, DIN VDE 0110 parts 1 and 2)	
Rated impulse withstand voltage (Uimp)		kV	4 (overvoltage category III, conforming to IEC/EN 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		2 to 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, polarised reflex or sensors with volt-free contacts		
Synchronisation 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: 4 mm ²	
		Without cable end	Flexible cable: 0.14...1.5 mm ²	
	2-wire connection	With cable end	Without bezel, flexible cable: 0.14...1.5 mm ²	
		Without cable end	Solid cable: 0.14...1.5 mm ²	
	Without cable end	Flexible cable: 0.14...0.75 mm ²		

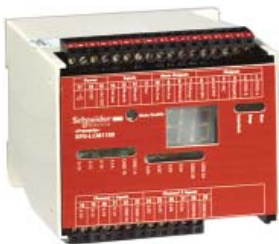
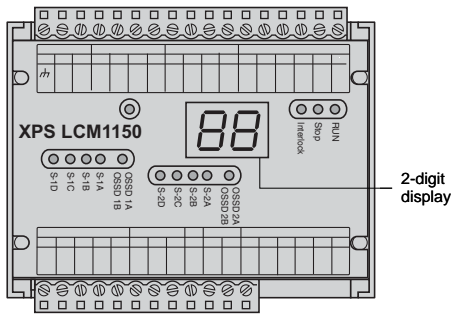
(1) Using an appropriate and correctly connected control system.

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XPS LCM1150

Description

XPS LCM1150

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

References

Safety module

Description	Type of terminal block connection	Number of safety circuits	Auxiliary outputs	Supply	Reference	Weight kg
Safety module for "muting" function	Removable from module	2 PNP	1 PNP + 1 NPN	24 V $\overline{\text{DC}}$	XPS LCM1150	0.660

Spare parts

Description	Power W	Reference	Weight kg
"Muting" indicator light kit	5	XSZ CM01	0.012
Replacement bulbs for "muting" indicator light kit comprising one lot of 10 replacement bulbs and 1 removal/insertion tool XBF X13	1 to 7	XSZ CM02	0.016

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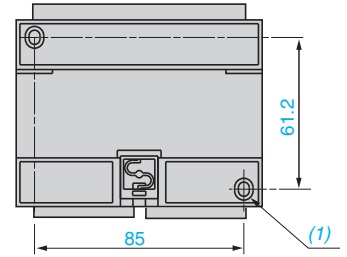
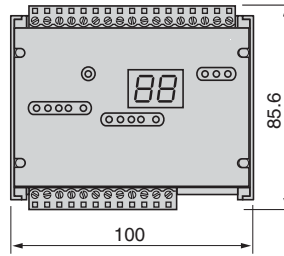
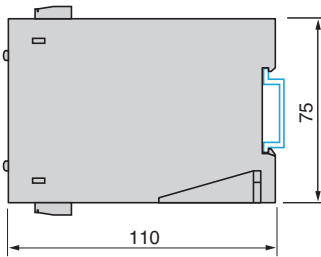
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Dimensions

XPS LCM1150

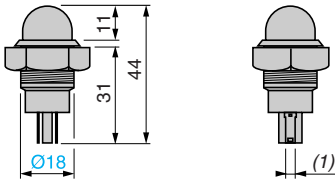
Mounting on 35 mm rail

Rear view



(1) 2 elongated holes $\varnothing 4 \times 5.7$.

"Muting" indicator light kit XSZ CM01



(1) Faston connector 4.7.

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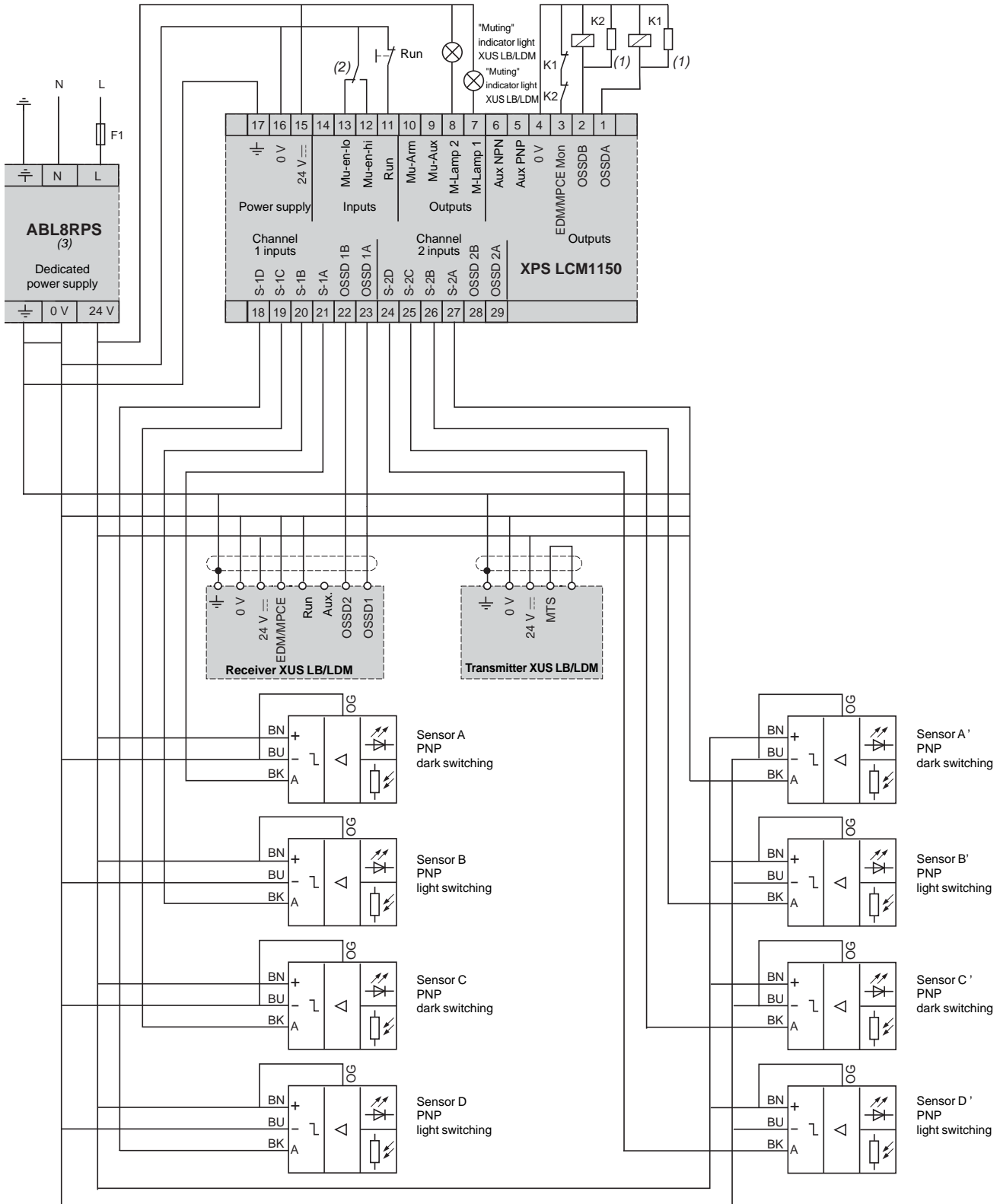
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Connection via the safety monitoring module XPS LCM1150

Example: configuration with light curtains XUS LB/LDM



(1) Arc suppressor.
 (2) Muting activation/deactivation key switch.
 (3) The power supply must conform to EN/IEC 61496 and EN/IEC 60204-1 standards.

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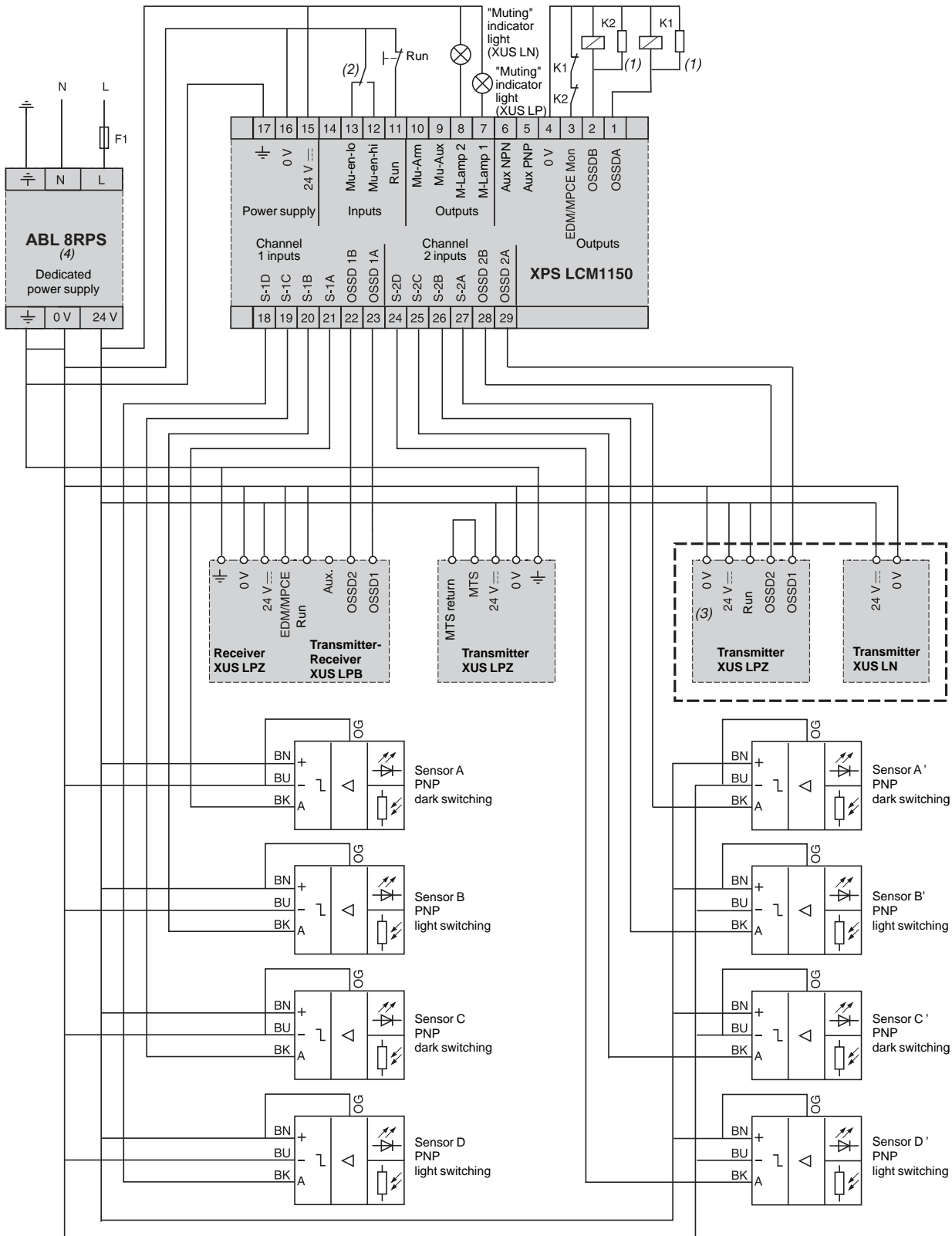
Safety monitoring module

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Connection via the safety monitoring module XPS LCM1150

Example: configuration with 2 light curtains XUS LP and XUS LN



(1) Arc suppressor.

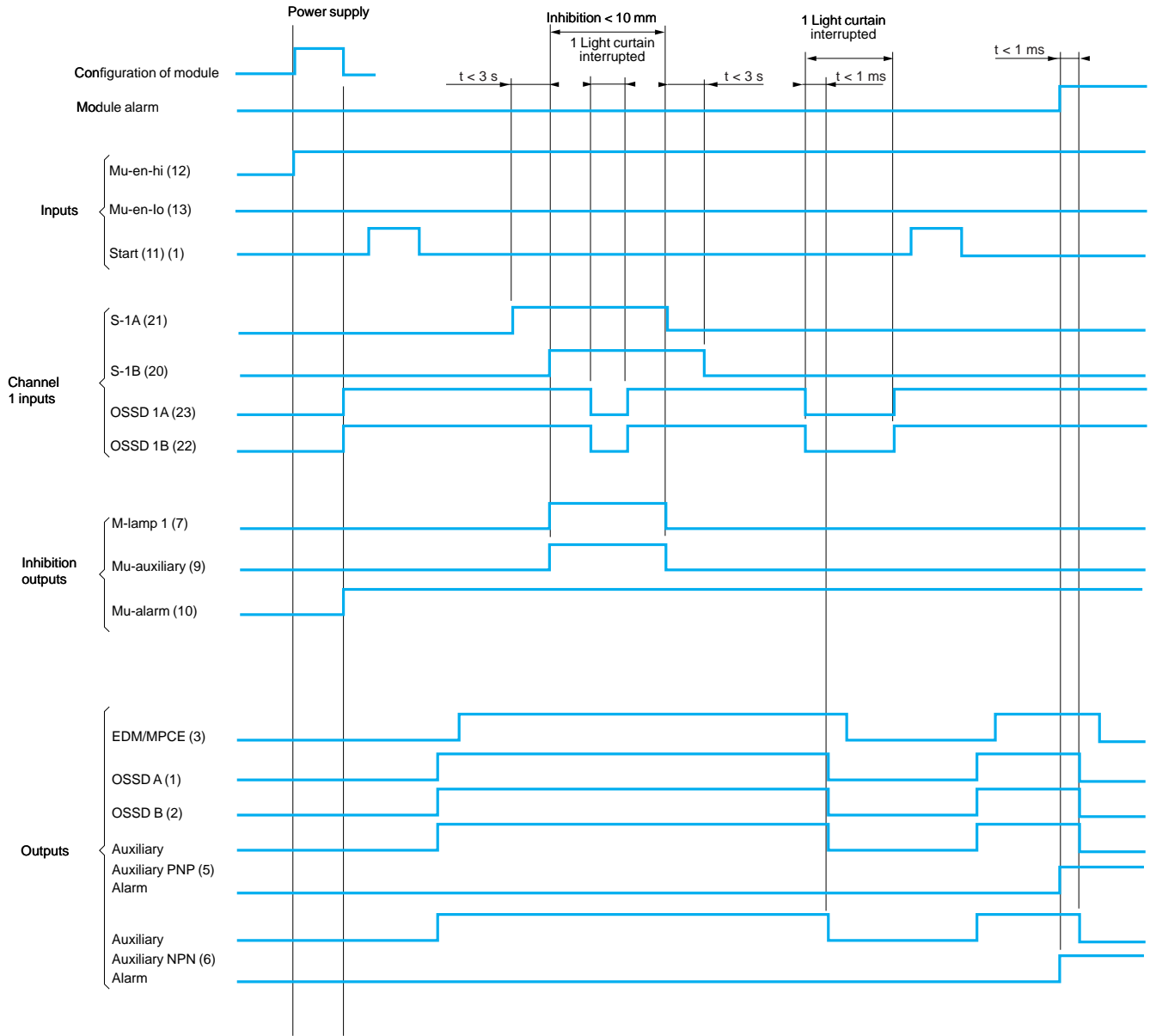
(2) Muting activation/deactivation key switch.

(3) When module XPS LCM1150 is used with a type 2 light curtain (example: XUS LN), the entire protection system is downgraded to category 2.

(4) The power supply must conform to EN/IEC 61496 and EN/IEC 60204-1 standards.

Functional diagram of safety monitoring module XPS LCM1150

"Start/restart interlock" mode with 2 sensors

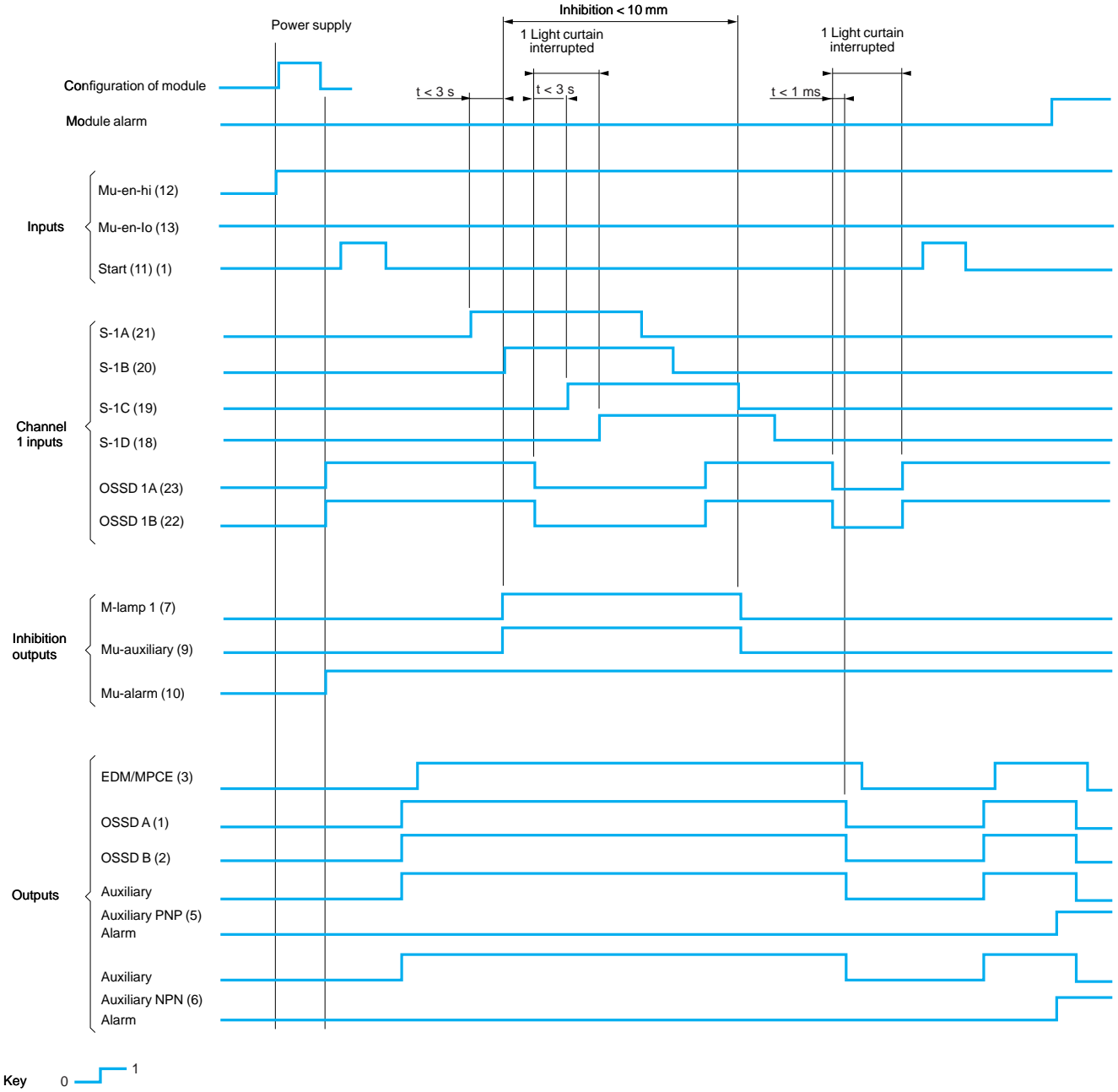


Key 0 1

(1) Press Start button.

Functional diagram of safety monitoring module XPS LCM1150

"Start/restart interlock" mode with 4 sensors



(1) Press Start button.