Safety functions and solutions using Preventa

Catalogue

2011





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Safety functionsSelection of protective functions

On the basis of the risk estimation established, the designer will select one or more protective functions that will meet the needs.

The standards classify these functions into two distinct groups.

Emergency stops

This function, required on all machines, is not considered as a principal method of risk reduction. It supplements other protective measures (standard EN ISO 12100).

Depending on the type of stop, the standard recognises three categories (see details below):

- emergency stop categories 0 or 1,
- controlled stop categories 1 or 2, generally used with variable speed drives (please refer to our specific Variable Speed Drive catalogues).

	Selection of safety function families						
	Emergency stop	lety fulletion fail	iiiics	Protective solu	utions		
	zmorgonoy otop			Protective function			
			Control of access to hazardous zones				
				Control of access to	hazardous zones		
	Stop category 0	Stop category 1	Stop category 2	Interlocking Guard	AAPth and all a state of		
				Without guard locking	With guard locking		
				9			
				9-0			
				<u> </u>			
Access to hazardous zones:							
■ Free, frequent to continuous	-	-		•	-		
■ Occasional (e.g.: once per shift)	-	-		•	•		
or frequent (1)							
Protection for all personnel		-		•	•		
Stopping time of a dangerous movement:							
■ Short		_			_		
	_						
Long (high inertia)	-	•		-	•		
■ Long (high inertia); power is maintained on actuators	-	-	•	•			
(1) in case of risk of ejection.							
The function provides the solut	ion as long as the recomn	nended use limits are co	mplied with.				
☐ The use of this function is poss	ible but is not recommend	led.					

- The function does not provide the solution.

Protection methods

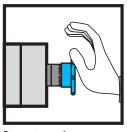
The functions selected, as shown in the chart above, are based on two criteria:

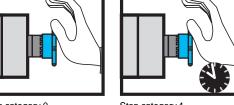
- 1 persons may occasionally enter the hazardous zones or may work continuously within a hazardous
- 2 the methods adopted to reduce the risks involve the use of defined functions.

				Starting and enabling o movements	f dangerous
Coded magnetic switch	Light curtains ESPE	ESPE with muting function	Safety mats	Two-hand control station	Enabling switch (grip switch)
-		•	•	•	-
•					•
•	•	•	•	•	•
-	-	-	-	-	-
-	-	-	-	-	-

Safety functions

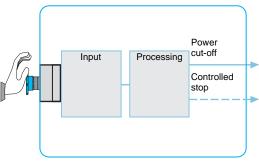
Emergency stop function and Principal protective functions Guards without guard locking device Guards with guard locking device



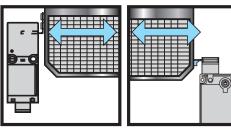


Stop category 0 Emergency stop function

Stop category 1

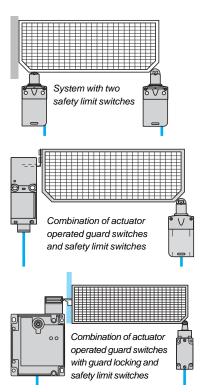


Sub-elements of the emergency stop function



Guard without guard locking

Guard with guard locking device



Emergency stop function

International standard EN/ISO 13850 (which replaces standard EN 418) specifies the functional requirements and design principles of emergency stop devices. It applies to all machines, whatever type of energy is used to control this function.

When the emergency stop instruction ceases, the effect must be maintained until it is reset. Manual resetting must only be possible in the location where the instruction

Resetting must not start the machine, but simply enable the starting cycle. Restarting of the machine must not be possible until the emergency stop has been

The standard allows two types of stop:

- category 0: stopping by immediate cutting-off of power or mechanical disconnection between the dangerous components,
- category 1 stop: controlled stopping with power maintained to the actuator to achieve stopping (braking for example), then cut-off of power when standstill is reached.

The choice between these two stopping methods is determined by an evaluation of the machine-related risks.

This function includes several sub-functions but is generally represented by the drawings opposite.

The operator interface may be:

- a pushbutton equipped with a mushroom head,
- a cable actuated switch,
- a foot switch.

Guards without guard locking device

On a large number of potentially dangerous machines, the operator must be kept at a distance during operation, but needs to take action when the machine is stopped to position a part, remove a product or adjust a tool.

An effective means of protection is to install a guard which, according to the type of installation, will cut-off the power to the motor if an attempt is made to open it during the machine operating phase.

In all cases, it must not be possible to restart the machine until the guard is closed.

Depending on the level of protection required, the system will comprise two conventional limit switches or a combination of protected, actuator operated guard switches to prevent tampering.

Guards with guard locking device

This type of guard is necessary for potentially dangerous machines with high inertia (long rundown time).

The guard is interlocked (by a solenoid for example); it cannot be opened until the machine has come to a complete standstill.

Safety functions

guards with imprecise guiding.

further processing of the signal.

of a system.

Principal protective functions (continued) Coded magnetic guard switch and system Safety light curtains

A non-contact solution is often used on industrial machines fitted with a door or

It is particularly suitable for machines subjected to frequent washing or splashing of liquids as well as small machines with a single guard for self-contained systems.

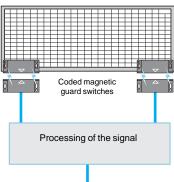
Depending on the models used, the sensing distance will be between 5 and 10 mm. The reed contacts used for the coded magnetic switches cannot withstand shortcircuits and the switches always incorporate a resistor in series. Their operation can

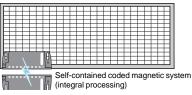
The Hall-effect self-contained systems with integral processing do not require any

The illustrations opposite show the functions of coded magnetic guard switches and

therefore only be guaranteed with the associated processing module.

Coded magnetic guard switch and system





Functions of a coded magnetic guard switch system

Safety light curtains

Safety light curtains are electro-sensitive systems (Electro-Sensitive Protective Equipment) designed to protect persons working in the vicinity of machinery, by stopping dangerous movements when a light beam is broken.

The absence of a door or guard reduces loading, inspection or tool changing times.

This type of system, defined by standards EN/IEC 61496-1 and EN/IEC 61496-2, is frequently used with machines such as:

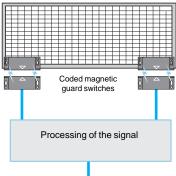
- presses.
- machine tools,
- assembly lines, etc.

The machine must be designed so that it is impossible to gain access to dangerous movements without breaking one or more of the light beams. In addition, the movement must be stopped whatever the entry speed of the operator

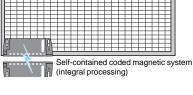
into the hazardous zone.

The diagram opposite illustrates the operation of a light curtain.

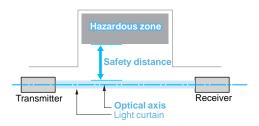




Functions of coded magnetic guard switches





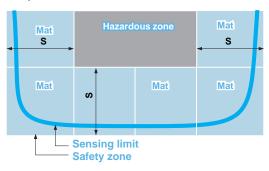


Safety functionsPrincipal protective functions *(continued)* Safety mats

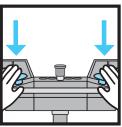
Two-hand control stations



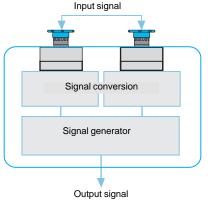
Safety mat



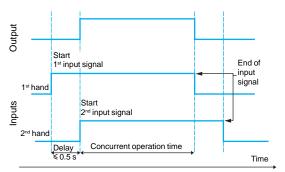
Example of a safety mat application



Two-hand control station



Functions of a two-hand control station



Functional diagram of a two-hand control station

6

Safety mats

Safety mats are used to detect persons walking across or standing on the mat or objects falling onto the mat.

Standards EN 1760-1/ISO 13856 define their performance.

Any detection of an object on the mat initiates stopping of any dangerous machine movement.

Restarting can be controlled manually or automatically, depending on the configuration of the associated processing unit.

When pressure is applied, the mat distorts locally and the integrated sensors are short-circuited.

The special design of these sensors requires that the mat and the detection module be matched.

In general, several mats are used to cover the safety zone.

The safety distance S, defined by the standard, takes into account the speed at which a person can cross the safety zone to reach the hazardous zone.

Two-hand control stations

Standards ISO 13851 and EN 574 define this device.

It requires simultaneous operation by both hands in order to start and maintain operation of a machine.

it therefore provides protection exclusively for the person operating it.

A diagram representing the function is given opposite; it must meet the following requirements:

- concurrent, maintained operation of the two input controls for the same period of
- synchronous operation; the delay between the two signals must not exceed 0.5 s,
- prevention of accidental operation (mechanical guard),
- protection against tampering.

Safety functions

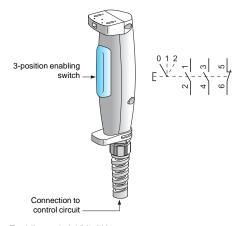
Principal protective functions (continued)
Enabling switch (grip switch)



Enabling switch



Marking identifying an enabling switch



Enabling switch XY2 AU1: 2 enabling functions, 3 positions + 1 N/C

Enabling switch

Enabling switches, allow authorised personnel to carry out maintenance, adjustment or programming operations within hazardous zones of machines, provided certain conditions are met.

These devices conform to standards EN/IEC 60947-5-8 and EN/IEC 60204-1. In effect, to gain access, these operations, often performed at reduced speed, must be selected by authorised personnel using selectors with key or equivalent.

Important note: the enabling switch alone must not lead to the actuation of any dangerous movements associated with the machine; a secondary, intentional, control action is required from the operator.

All devices which conform to the standard must be identified by the marking scheme shown opposite.

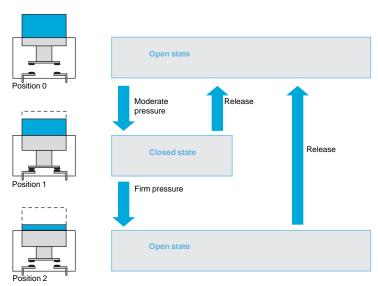
Operating principle

The three possible states are:

- position 0: contact open (control operator at rest),
- position 1: contact closed (control operator depressed to normal enabling position),
- position 2: contact open (control operator fully depressed).

When the switch is depressed in position 1, it must return to position 0 when released.

The switch must change from position 1 to position 2 when pressed more firmly. When it is released from position 2 to position 0, the switching contact must not close.



Operating principle of an enabling switch

Safety functions Selection of Preventa safety solutions

The table below indicates the associated control solutions for each safety function.

The Schneider Electric range of safety control solutions comprises four product families:

- dedicated safety modules with one or two safety functions,
- configurable controllers managing several safety functions,
- safety monitors and interfaces dedicated to the AS-Interface system, allowing use of a single medium for control and safety,
- safety PLCs used within complex safety systems.

Proc		

Safety modules

Configurable safety controllers







Architecture		
Setting-up		
Diagnostics		

Functions	Emergency stop monitoring
	Monitoring of emergency stop and of a guard with timer
	Monitoring of a guard with safety switch
	Monitoring of a guard with coded magnetic switch
	Monitoring of safety mats and sensitive edges
	Two-hand control station (type IIIC acc. EN 574)
	Two-hand control station (type IIIA acc. EN 574)
	Monitoring of type 4 safety light curtains, solid-state outputs and test function
	Monitoring of single-beam photo-electric sensors (transmitter + receiver) with test input and built-in muting function
	Monitoring of a type 4 light curtain with relay output
	Monitoring muting function of 2 light curtains with transistor outputs
	Monitoring of an enabling switch
	Zero speed detection on motor
	Monitoring the position of a lift cabin
	Safety foot switch

Simple machines	Machines with several safety functions			
Wired link	Configurable by pushbuttons	Configurable by software		
LED	LED	LED		
-	-	PC		
Solid-state outputs	Solid-state outputs	Modbus serial link (RTU), CANopen, Profibus DP		

		Or in topon, i Tonbuo Bi
XPS AC, XPS AF, XPS AK, XPS AR, XPS AXE	Х	X
XPS ATE, XPS AV, XPS ABV	х	х
XPS AC, XPS AF, XPS AK, XPS AR, XPS AXE	Х	X
XPS DMB, XPS DME	Х	Х
XPS AK	Х	Х
XPS BCE, XPS BF	-	Х
XPS BA	-	-
XPS AFL, XPS AR, XPS AK	Х	Х
XPS CM	-	-
-	-	Х
XPS LCM	-	-
XPS VC	х	Х
XPS VNE	-	Х
XPS EDA	-	Х
-	-	Х

XPS AC, XPS AF,...

The product family provides the function.

The product family provides the function after programming (by means of pushbutton or software, depending on the product).

The product family does not provide the function.

AS-Interface "safety at work" safety interfaces and monitors







		Million.
Machines using AS-Interface		
Interface to be connected	Built-in interfaces	Monitor library configurable by software
-		LED
-	-	PC
	-	AS-Interface
ASI SSLB4, ASI SSLE4, ASI SSLE5	ASI SEA1C, ASI SSK1C, ASI SSLE4, ASI SSLE5	x
		-
ASI SSLC1, ASI SSLC2, ASI SSLLS		Х
ASI SSLC1, ASI SSLC2, ASI SSLLS	-	Х
-		Х
2 x ASI SSLC2		Х
-		Х
-	-	Х
-		
ASI SSLC1, ASI SSLC2, ASI SSLLS	-	х
-	-	-
	-	-
-	-	
-		
ASI SSLC1, ASI SSLC2, ASI SSLLS	-	X

Safety functions Selection of Preventa safety products

This selection table indicates which safety products to select, according to the required safety functions.

Final selection will be made by consulting the specific catalogue pages for each of these products.

Safety control solution								
Emergency stop		Prevention functions						
		Control of access to hazardous zones						
Stop category 0	Stop category 0+1	Interlocking guard with and without guard locking	Coded magnetic switch	ESPE light curtains	ESPE light curtains with muting function	Safety mats		















			Ш. Э		••				
	EN/ISO 13849	EN/IEC 62061							
Safety modules	max. Category 1, PL b	SIL1	-	-	-	-	-	-	-
One safety function, Hard wired.	max. Category 2, PL c	SIL1	-	-	-	-	XPS CM	XPS CM	-
	max. Category 3, PL d	SIL 2	XPS AC, XPS AFL	XPS ATE (cat. 1 stop), XPS ABV	XPS AC	XPS DMB, XPS DME	XPS AFL	-	XPS AK
	max. Category 4, PL e	SIL3	XPS AF, XPS AK, XPS AR, XPS AXE	XPS ATE (cat. 0 stop), XPS ABV, XPS AV	XPS AF, XPS AK, XPS AR, XPS AXE	XPS DMB, XPS DME	XPS AFL, if OSSDs are tested by ESPE	XPS CM, XPS LCM	-
Configurable	max. Category 1,	SIL1	_	_	-	-	-	_	-
safety	PLb	SIL I	-	_	_	-	-	_	_
Several safety functions controllers,	max. Category 2, PL c	SIL 1	-	-	-	-	-	-	-
Hard wired, Fieldbus for diagnostics (only	max. Category 3, PL d	SIL 2	-	-	-	-	-	-	-
for XPS MC).	max. Category 4, PL e	SIL3	XPS MP, XPS MC	XPS MC	XPS MP, XPS MC	XPS MP, XPS MC	XPS MP, XPS MC	XPS MC	XPS MP, XPS MC
AS-Interface "safety at work" safety	max. Category 1, PL b	SIL 1	-	-	-	-	-	-	-
monitors and interfaces	max. Category 2, PL c	SIL1	-	-	-	-	-	-	-
Several safety functions, Safety Network,	max. Category 3, PL d	SIL2	-	-	-	-	-	-	-
Fieldbus for diagnostics.	max. Category 4, PL e	SIL3	X	Х	Х	Х	Х	-	-
Safety PLCs Several safety functions.	max. Category 1, PL b	SIL 1	X	X	Х	Х	X	X	X
Safety Network, Fieldbus for	max. Category 2, PL c	SIL 1	X	Х	Х	Х	Х	Х	X
diagnostics.	max. Category 3, PL d	SIL2	X	X	Х	Х	х	X	Х
	max. Category 4, PL e	SIL 3	X	X	X	Х	X	X	X

XPS AC, ...:: The solution is specifically provided by the products indicated. : The solution is provided by the products.

: The solution is not provided by the products.

Starting and er dangerous mo	nabling of vements	Safety monitori	ng functions			Functions for sp	pecific machines	3
Two-hand control station	Enabling	Zero speed detection (remanent voltage)	Zero speed detection/safety speed reduction		Increasing the number of safety contacts	Safety valve monitoring	Safety function for presses	Lift cabin levelling and door monitoring
	(8)	0			111111111111111111111111111111111111111			
XPS BA	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	XPS VNE	-	XPS TSA XPS TSW	-	-	-	-
XPS BCE, XPS BF	XPS VC	-	-	-	XPS ECME, XPS ECPE	-	-	XPS EDA
XPS BA	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
XPS MC	XPS MP, XPS MC	-	XPS MC	XPS MC	-	XPS MC	XPS MC	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
X	-	-	-	X	-	-	-	-
X	x	-	х	x	X	X	X	х
X	Х	-	Х	Х	Х	Х	Х	Х
х	х	-	х	х	х	х	х	х
Х	х	-	х	х	х	х	х	х

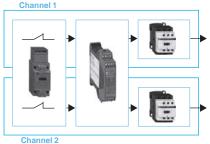
Safety functions

Application examples Optimised compact machine



Typical application: compact packaging machine

Scheme of the safety-related part of a packaging machine control circuit



Functional representation of the scheme conforming to EN/ISO 13849-1

Optimised compact machine

To aid understanding, we are presenting three application examples covering typical cases encountered in machines.

Similar examples can be extract from the "Safety Chain Solutions" files proposed by Schneider Electric.

For clarity, only the safety functions will be detailed and, in all cases, the calculation methods corresponding to the following two standards will be used:

- standard EN/ISO 13849-1 defines Performance Levels PL,
- standard EN/IEC 62061 defines Safety Integrity Levels SIL.

A detailed presentation of these two standards is given on page 38816/10.

Typical applications

Compact and repetitive machines, hard wired. We will choose a packaging machine as an example.

Description of safety functions

This application uses several motors which must be stopped when the safety guard is opened.

The estimated level of risk reduction for this function of the machine requires a performance level **PL d** or a safety integrity level **SIL 2**.

It will therefore be necessary to use:

- an XCS A guard switch 2-pole N/C + N/C,
- an XPS AC safety module,
- two LC1 D contactors in series.

Connections are by means of conventional wiring.

Calculation and component selection for a PLr d

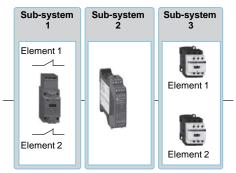
To achieve the required performance level, two redundant channels must be used, corresponding to category 3. Fault exclusion is considered for the guard switch device as we assume that the key guard will not be damaged. The calculation is shown in the table below.

Cycle time (s)	180
Number of hours' operation per day (h)	24
Number of days' operation per year	365
Number of operations per year	175 200

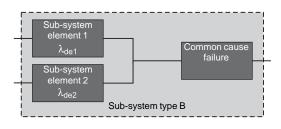
		Requirement: PL d	Channel 1	Channel 2
Input (sensors)	B ₁₀	-	1 000 000	1 000 000
XCS A	% dangerous failure	-	20%	20%
	B10 _d	-	5 000 000	5 000 000
	MTTF _d	-	285.39	285.39
	DC	-	60% (1)	60% (1)
Processing unit (safety module)	MTTF _d	-	210.4	210.4
XPS AC	DC	-	99%	99%
Output (actuator)	B ₁₀	-	1 000 000	1 000 000
LC1 D	% dangerous failure	-	73%	73%
	B _{10d}	-	1 369 863	1 369 863
	MTTF _d	-	78.19	78.19
	DC	-	99% (2)	99% (2)
Safety function	MTTF _{dC}	30 ≤ MTTF _d < 100	47.51	47.51
	DC _{avg}	60% ≤ DC < 99%	92	.5%
	MTTF _d for the different channels	Category 3	47	7.51

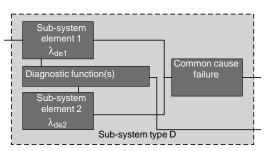
- (1) Due to short-circuit detection of the XPS AC safety module.
- (2) Due to the feedback loop of the mechanically-linked auxiliary contacts built-into the LC1 D contactor.

Safety functionsApplication examples (continued) Optimised compact machine (continued)



Functional representation of the scheme conforming to EN/IEC 62061





Architectures selected for the sub-systems

Optimised compact machine (continued)

Calculation and component selection for a SIL 2

For sub-system 1, we will use a type B architecture: the safety guard switch contains redundant contacts.

Sub-system 3 is type D: diagnostics are performed by the mechanically-linked auxiliary contacts built-into the contactors and connected to the XPS AC safety module (sub-system 2) that incorporates this function.

The calculation method is shown in the table below.

The result conforms to the requirements.

Cycle time (s)	60
Cycle time in hours (h)	0.01667
Number of cycles per hour	60

Type of

Require-

Element 1 Element 2

Input (sensor) XCS A Portion of clargerous failures Port			sub-system	ment	Element	Element 2
Portion of dangerous failures %	(sensor)	B ₁₀ (operations)	-	-	1 000 000	1 000 000
$\frac{\lambda_{D}}{\beta} = - \frac{1.20E^{-96}}{1.20E^{-96}} 1.20E^{-96$	XCS A	dangerous failures	-	-	20%	20%
B		λ	-	-	6.00E ⁻⁰⁶	6.00E ⁻⁰⁶
Life expectancy in years 10		λ_{D}	-	-	1.20E ⁻⁰⁶	1.20E ⁻⁰⁶
Vears Life expectancy or test interval T1 (h) DC - 60% (1) 60% (1)		β	-	-	10	0%
test interval T1 (h) DC PFH _{DSSB} Sub-system B HFT = 1 no diagnostic function Processing unit (safety module) XPS AC Coutput (actuator) LC1 D B ₁₀ (operations) Portion of dangerous failures % λ 6.00E-06 6.00E-06 λ β 73% 73% Anguerous failures % λ 6.00E-06 6.00E-06 λ 5 % Life expectancy in years Life expectancy or test interval T1 (h) DC PFH _{DSSB} Sub-system D HFT = 1 diagnostic function Sub-system D HFT = 1 diagnostic function Sub-system D HFT = 1 diagnostic function Sub-system D FFH _{DSSB} Sub-system D FFH Sub-system D FFH Sub-system D FFT = 1 diagnostic function Safety-related PFH Sub-system D FFT = 1 diagnostic function 10-7 ≤ < 10-6 3.85E-07					1	10
PFH _{DSSB}		test interval T1 (h)	-	-	83	
HFT = 1 no diagnostic function			-	-		
HFT = 1 diagnostic function diagnostic function DC -		PFH _{DSSB}	HFT = 1 no diagnostic	SILCL 2	1.5	9E ⁻⁰⁷
Output (actuator) LC1 D B ₁₀ (operations) - - 1 000 000 1 000 000 1 000 000 Portion of dangerous failures % - - 73% 73% λ _D - - 6.00E-96 6.00E-96 λ _D - - 4.38E-96 4.38E-96 β - - 5 % Life expectancy in years 20 Life expectancy or test interval T1 (h) - - 22 831 DC - - 99% (2) 99% (2) PFH _{DSSB} Sub-system D HFT = 1 diagnostic function 3.85E-97	(safety module)	PFH _{DSSD}	HFT = 1 diagnostic	SILCL 3	3,5	6E ⁻⁰⁹
		DC	-	-	99	9%
Portion of dangerous failures $\frac{1}{9}$ - $\frac{73\%}{10}$ - $\frac{73\%}{10}$ - $\frac{73\%}{10}$ - $\frac{1}{3}$ -	(actuator)	B ₁₀ (operations)	-	-	1 000 000	1 000 000
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	LC1 D	dangerous failures	-	-	73%	73%
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$		λ	-	-	6.00E ⁻⁰⁶	6.00E ⁻⁰⁶
Life expectancy in years Life expectancy or test interval T1 (h) DC 99% (2) 99% (2) PFH _{DSSB} Sub-system D HFT = 1 diagnostic function Safety-related PFH _{DSSECS} 10°7 ≤< 10°6 3.85E°07		λ_{D}	-	-	4.38E ⁻⁰⁶	4.38E ⁻⁰⁶
years Life expectancy or test interval T1 (h) DC 99% (2) 99% (2) PFH _{DSSB} Sub-system D HFT = 1 diagnostic function Safety-related PFH _{DSRECS} 10°7 ≤< 10°6 3.85E°07		β	-	-	5	%
test interval T1 (h) DC 99% (2) 99% (2) PFH _{DSSB} Sub-system D HFT = 1 diagnostic function Safety-related PFH _{DSRECS} 10°7 ≤< 10°6 3.85E°07					2	20
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$			-	-	22	831
HF I = 1 diagnostic function Safety-related PFH _{DSRFCS} 10 ⁻⁷ ≤< 10 ⁻⁶ 3.85E ⁻⁰⁷			-	-	99% (2)	99% (2)
Safety-related PFH _{DSRECS} 10 ⁻⁷ ≤< 10 ⁻⁶ 3.85E ⁻⁰⁷		PFH _{DSSB}	HFT = 1 diagnostic	SILCL 3	2.2	3E ⁻⁰⁷
		PFH _{DSRECS}		10 ⁻⁷ ≤< 10 ⁻⁶	3.8	5E ⁻⁰⁷

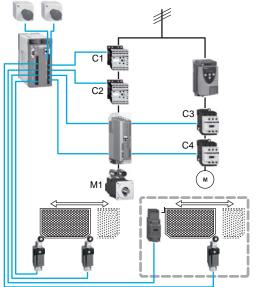
- (1) Due to short-circuit detection of the XPS AC safety module..
- (2) Due to the feedback loop of the mechanically-linked auxiliary contacts built-into the LC1 D contactor.

Safety functions

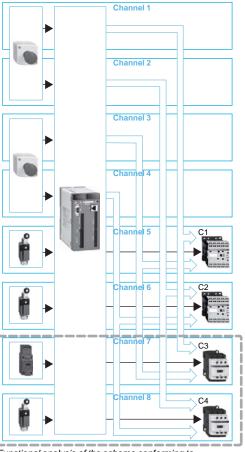
Application examples (continued) Upgradable compact machine



Printing machine



Safety-related part of a printing machine scheme (the calculation is made on the portion of circuit surrounded in grey)



Functional analysis of the scheme conforming to EN/ISO 13849-1

Upgradable compact machine

Typical applications

This type of machine is generally integrated into a manufacturing process and must be suited to the customer's process. To facilitate upgrading, a CanOpen fieldbus is used

Examples: woodworking machines, printing machines, packaging machines.

Description of safety functions

Protection systems will limit the possibility of access to hazardous areas. As the risk for operators is high, a performance level **PL e** or a safety integrity level **SIL 3** will be required.

It will therefore be necessary to use protective systems (partially represented on the scheme) such as guards, light curtains, etc.

The complexity of the circuit leads to selection of a controller to provide all the emergency stop and safety functions. It offers the advantage of being able to communicate the operating states and diagnostics on the fieldbus.

Contactors in series cut-off the power in variable speed drives.

Safety connections are made by means of conventional wiring.

The control system is monitored via a CanOpen fieldbus.

Calculation and component selection for a PLr e

The required Performance Level of safety necessitates the use of category 4 products (redundancy and self-monitoring).

In compliance with standard EN/ISO 13849-1, the functional analysis is performed by splitting into channels. The figure opposite represents channels 1 to 8 which ensure operation of the scheme.

It should be noted that the contactors are common to several channels:

- C1 is common to channels 1, 3, 5
- C2 is common to channels 2, 4, 6
- C3 is common to channels 3, 7
- C4 is common to channels 4, 8

For clarity, the calculation shown below only relates to channels 7 and 8.

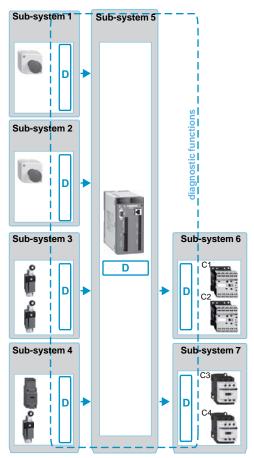
Cycle time (s)	360
Number of hours' operation per day (h)	24
Number of days' operation per year	365
Number of operations per year	87600

		Requirement: PL e	Channel 7	Channel 8
Input (sensors)	B ₁₀		1 000 000	10 000 000
XCS A, XCS D	% dangerous failures		20%	20%
	B _{10d}		5 000 000	50 000 000
	MTTF _d		570.78	5707.76
	DC		99% (1)	99% (1)
Processing unit (controller)	MTTF _d		71	71
XPS MC	DC		99%	99%
Output	B ₁₀		1 000 000	1 000 000
(actuator) LC1 D	% dangerous failures		73%	73%
	B _{10d}		1 369 863	1 369 863
	MTTF _d		156.38	156.38
	DC		99% (2)	99% (2)
Safety function	MTTF _{dC}	30 ≤ MTTF _d < 100	44.98	48.42
	DC _{avg}	DC ≥ 99%	9:	9%
	MTTF _d for the different channels	Category 4	46	5.72

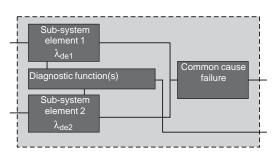
(1) Due to diversity of the components and contact switch input monitoring of the XPS MC configurable controller.

(2) Due to the feedback loop of the mechanically-linked auxiliary contacts built-into the LC1 D contactor.

Safety functionsApplication examples (continued) Upgradable compact machine (continued)



Functional representation of the scheme conforming to EN/IEC 62061



Architecture of a type D sub-system

Upgradable compact machine (continued)

Specification of SRECS and calculation and component selection for a SIL 3

As in the previous calculation, we will analyse the safety functions associated with motors M1.

On the figure representing the break-down into sub-systems, the required level SIL 3 necessitates a type **D** architecture for each sub-system: in addition to redundancy of the circuits, it includes a diagnostic function.

It should be noted that the diagnostic functions are provided by the XPS MC controller: it monitors operation of the sensors and contactors.

The calculation method is shown in the table below. The result conforms to the SIL3 requirements.

Cycle time (s)	360
Cycle time in hours (h)	0.1
Number of cycles per hour	10

		Type of sub-system	Require- ment	Element 1	Element 2
Input (sensors)	B ₁₀ (operations)			1 000 000	10 000 000
XCS PA, XCS PM	Proportion of dangerous failures %			20%	20%
	λ			1.00E ⁻⁰⁶	1.00E ⁻⁰⁷
	λ_{D}			2.00E ⁻⁰⁷	2.00E ⁻⁰⁸
	β			Ę	5%
	Life expectancy in years				10
	Life expectancy or test interval T1 (h)			87	600
	DC			99% (1)	99% (1)
	PFH _{DSSD}	Sub-system D HFT = 1 diagnostic function	SILCL 3	5.5	60E-09
Processing unit (controller) XPS MC	PFH _{DSSD}	Sub-system D HFT = 1 diagnostic function	SILCL 3	1.2	'9E ⁻⁰⁸
	DC			9	9%
Output (actuators)	B ₁₀ (operations)			1 000 000	1 000 000
2 x LC1 D	Proportion of dangerous failures %			73%	73%
	λ			1.00E ⁻⁰⁶	1.00E ⁻⁰⁶
	λ_{D}			7.30E ⁻⁰⁷	7.30E ⁻⁰⁷
	β				5%
	Life expectancy in years			:	20
	Life expectancy or test interval T1 (h)			100	000
	DC			99% (2)	99% (2)
	PFH _{DSSD}	Sub-system D HFT = 1 diagnostic function	SILCL 3	3.7	OE-08
Safety-related control function			10 ⁻⁸ ≤ < 10 ⁻⁷	5.5	4E ⁻⁰⁸

⁽¹⁾ Due to diversity of the components and contact switch input monitoring of XPS MC configurable controller.

⁽²⁾ Due to the feedback loop of the mechanically-linked auxiliary contacts built-into the LC1 D contactor.

Safety products level Reliable values according to standard EN/ISO 13849-1 and EN/IEC 62061

	EN/ISO 13849-	1 <u> </u>				
	Category for the device inte	rnal	MTTF _d (mean time failure. in years)	e to dangerous	PL (Performance Level): up to.	
	Device + outputs in Stop category 0	Device + outputs in Stop category 1	Single channel with output in Stop category 0	Single channel with output in Stop category 1	Device + outputs in Stop category 0	Device + outputs in Stop category 1
Preventa safety Modules						
PS ABV1133P	4	3	53	53	е	d
PS ABV11330P	4	3	53	53	е	d
(PS ABV1133C	4	3	53	53	е	d
(PS ABV11330C	4	3	53	53	e	d
(PS AC3421P	4	_	210.4	_	e	_
PS AC3721P	4		210.4		е	
(PS AC5121P	4		210.4		е	
(PS AC3721	4		210.4		е	
PS AC1321	4	_		_		_
	4		210.4		е	_ -
(PS AC5121		-	210.4	-	е	
PS AC3421	4	-	210.4	-	е	-
PS AC1321P	4	-	210.4	-	е	
(PS AF5130	4	-	243.0	-	е	_
PS AF5130P	4	-	243.0	-	е	-
(PS AFL5130P	4	-	172.1	-	е	-
(PS AFL5130	4	-	172.1	-	е	_
(PS AK371144P	4	-	154.5	-	е	_
(PS AK351144P	4	_	154.5	_	е	_
(PS AK371144	4	_	154.5	_	e	_
(PS AK351144	4	_	154.5	_	e	_
(PS AK361144	4	_	154.5	_	e	_
(PS AK311144	4	_	154.5	_	e	_
PS AK311144P	4		154.5	_	e	
		<u>-</u>		_	-	
PS AK361144P	4	-	154.5	-	е	
PS AR351144	4	-	277.8	-	е	-
PS AR371144	4	-	277.8	-	е	
PS AR311144	4	-	277.8	-	е	-
PS AR351144P	4	-	277.8	_	е	_
PS AR371144P	4	-	277.8	-	е	_
PS AR311144P	4	_	277.8	_	е	_
(PS AT5110	4	3	139.7	54.0	е	d
(PS AT3410	4	3	139.7	54.0	е	d
(PS AT3710	4	3	139.7	54.0	e	d
		3		54.0		
(PS AT5110T100	4		139.7		е	d
PS ATE5110	4	3	134.8	54.5	е	d
(PS ATE5110P	4	3	134.8	54.5	е	d
(PS ATE3410	4	3	134.8	54.5	е	d
(PS ATE3410P	4	3	134.8	54.5	е	d
XPS ATE3710	4	3	134.8	54.5	e	d
(PS ATE3710P	4	3	134.8	54.5	e	d
(PS AV11113P	4	4	75.8	75.8	е	е
(PS AV11113T050	4	4	75.8	75.8	е	е
PS AV11113	4	4	75.8	75.8	е	е
PS AX5120	4	_	222.2	_	е	_
PS AXE5120P	4	-	457.0	-	е	-
PS AXE5120C	4	_	457.0	-	е	_
PS BA5120	1	_	160.8	_	С	_
PS BC1110	4	_	63.9	_	e	_
PS BC3110	4	_	63.9	_	e	_
PS BC3410	4	_	63.9	_	e	_
		-				_
PS BC3710	4	_	63.9	_	e	_
PS BCE3110P	4	_	37.0	_	е	_
PS BCE3110C	4	-	37.0	-	е	-
PS BCE3410P	4	-	37.0	-	е	-
PS BCE3410C	4	-	37.0	-	е	-
PS BCE3710P	4	_	37.0	-	е	_
PS BCE3710C	4	-	37.0	-	е	-
PS BF1132	4	_	50.1	_	e	_
(PS BF1132P	4	_	50.1	_	e	_
(PS CM1144P	2	_	16.6	_	С	_
4 - O O O O O O O O O O O O O O O O O O	4	_	110.0	1.7	10	

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		EN/IEC 62061 (EN/IEC 61508)				
DC (diagnostic cap for the device intern		PFH _d (Dangerous		SILCL (Safety Inte	HFT (Hardware Fault Tolerance)		
Device + outputs in Stop category 0	Device + outputs in Stop category 1	Device + outputs in Stop category 0	Device + outputs in Stop category 1	Device + outputs in Stop category 0	Device + outputs in Stop category 1		
	The second				1.	1.	
> 99 %	6090 %	3.00 x 10 ⁻⁸	2.00 x 10 ⁻⁷	3	2	1	
> 99 %	6090 %	3.00 x 10 ⁻⁸	2.00 x 10 ⁻⁷	3	2	1	
> 99 %	6090 %	3.00 x 10 ⁻⁸	2.00 x 10 ⁻⁷	3	2	1	
> 99 %	6090 %	3.00 x 10 ⁻⁸	2.00 x 10 ⁻⁷	3	2	1	
> 99 %	_	3.56 x 10 ⁻⁹	_	3	_	1	
> 99 %	_	3.56 x 10 ⁻⁹	_	3	_	1	
> 99 %	_	3.56 x 10 ⁻⁹	_	3	_	1	
		3.56 x 10 ⁻⁹		3		1	
> 99 %			_		_	1	
> 99 %	-	3.56 x 10 ⁻⁹		3	-	1	
> 99 %	-	3.56 x 10 ⁻⁹	-	3	-	1	
> 99 %	-	3.56 x 10 ⁻⁹	_	3	-	1	
> 99 %	-	3.56 x 10 ⁻⁹	-	3	-	1	
> 99 %	_	4.62 x 10 ⁻⁹	_	3	_	1	
> 99 %	_	4.62 x 10 ⁻⁹	_	3	_	1	
> 99 %	_	5.61 x 10 ⁻⁹	-	3	-	1	
> 99 %	_	5.61 x 10 ⁻⁹	-	3	_	1	
> 99 %	_	7.39 x 10 ⁻⁹	_	3	_	1	
> 99 %	_	7.39 x 10 ⁻⁹	_	3	_	1	
> 99 %		7.39 x 10 ⁻⁹		3		1	
				3	_	1	
> 99 %	-	7.39 x 10 ⁻⁹	_			1	
> 99 %	-	7.39 x 10 ⁻⁹	-	3	-	1	
> 99 %	-	7.39 x 10 ⁻⁹	_	3	-	1	
> 99 %	-	7.39 x 10 ⁻⁹	-	3	-	1	
> 99 %	-	7.39 x 10 ⁻⁹	-	3	-	1	
> 99 %	_	2.22 x 10 ⁻⁹	_	3	_	1	
> 99 %	_	2.22 x 10 ⁻⁹	_	3	_	1	
> 99 %	_	2.22 x 10 ⁻⁹	_	3	_	1	
> 99 %	_	2.22 x 10 ⁻⁹	_	3	_	1	
> 99 %	_	2.22 x 10 ⁻⁹	_	3	_	1	
> 99 %	_	2.22 x 10 ⁻⁹	_	3	_	1	
> 99 %	96.9 %		0.05 40-8	3	2	4	
		6.84 x 10 ⁻⁹	2.05 x 10 ⁻⁸		2	1	
> 99 %	96.9 %	6.84 x 10 ⁻⁹	2.05 x 10 ⁻⁸	3	2	1	
> 99 %	96.9 %	6.84 x 10 ⁻⁹	2.05 x 10 ⁻⁸	3	2	1	
> 99 %	96.9 %	6.84 x 10 ⁻⁹	2.05 x 10 ⁻⁸	3	2	1	
> 99 %	98.4 %	6.81 x 10 ⁻⁹	1.96 x 10 ⁻⁸	3	2	1	
> 99 %	98.4 %	6.81 x 10 ⁻⁹	1.96 x 10 ⁻⁸	3	2	1	
> 99 %	98.4 %	6.81 x 10 ⁻⁹	1.96 x 10 ⁻⁸	3	2	1	
				3		1	
> 99 %	98.4 %	6.81 x 10 ⁻⁹	1.96 x 10 ⁻⁸		2	1	
> 99 %	98.4 %	6.81 x 10 ⁻⁹	1.96 x 10 ⁻⁸	3	2	1	
> 99 %	98.4 %	6.81 x 10 ⁻⁹	1.96 x 10 ⁻⁸	3	2	1	
> 99 %	> 99 %	7.95 x 10 ⁻⁹	7.95 x 10 ⁻⁹	3	3	1	
> 99 %	> 99 %	7.95 x 10 ⁻⁹	7.95 x 10 ⁻⁹	3	3	1	
> 99 %	> 99 %	7.95 x 10 ⁻⁹	7.95 x 10 ⁻⁹	3	3	1	
	2 00 70		7.83 X 10			1	
> 99 %	_	1.90 x 10 ⁻⁹	_	3	_	4	
> 99 %	_	3.00 x 10 ⁻⁸	_	3	-	1	
> 99 %	-	3.00 x 10 ⁻⁸	-	3	-	1	
-	-	7.10 x 10 ⁻⁷	-	no SILCL	-	0	
> 99 %	-	1.75 x 10 ⁻⁸	-	3	-	1	
> 99 %	-	1.75 x 10 ⁻⁸	-	3	-	1	
> 99 %	-	1.75 x 10 ⁻⁸	-	3	-	1	
> 99 %	-	1.75 x 10 ⁻⁸	-	3	-	1	
> 99 %	_	3.00 x 10 ⁻⁸	_	3	_	1	
> 99 %	_	3.00 x 10 ⁻⁸	-	3	-	1	
> 99 %	_	3.00 x 10 ⁻⁸	_	3	_	1	
> 99 %		3.00 x 10 ⁻⁸	_	3		1	
	-		_			1	
> 99 %	_	3.00 x 10 ⁻⁸	_	3	_	4	
> 99 %	-	3.00 x 10 ⁻⁸	-	3	_	1	
> 99 %	-	1.30 x 10 ⁻⁸	-	3	-	1	
> 99 %	-	1.30 x 10 ⁻⁸	-	3	-	1	
		2 12 4 10-7		1		1	
95.5 %	-	3.12×10^{-7}				'	

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Safety products level Reliable values according to standard EN/ISO 13849-1 and EN/IEC 62061

	EN/ISO 13849	-1				
	Category for the device inte	rnal	MTTF _d (mean tim failure in years)	ne to dangerous	PL (Performance	Level): up to
	Device + outputs in Stop category 0	Device + outputs in Stop category 1	Single channel with output in Stop category 0	Single channel with output in Stop category 1	Device + outputs in Stop category 0	Device + outputs in Stop category 1
Preventa safety Modules (continue	d)		catogory o	oalogoly !		
PS DMB1132P	4	_	83.1	_	е	I_
	4		83.1			
PS DMB1132		_		_	е	-
PS DME1132TS220	4	_	82.4	-	е	-
PS DME1132	4	-	82.4	_	е	_
PS DME1132P	4	_	82.4	_	е	_
PS ECM3431	4 (1)	_	346.2	-	e (1)	_
PS ECM5131	4 (1)	_	346.2	_	e (1)	_
PS ECM3731	4 (1)	_	346.2		e (1)	_
PS ECME5131P	. ,		45		1 1	
	4 (1)	_		_	e (1)	-
PS ECME5131C	4 (1)	-	45	-	e (1)	-
PS ECP5131	4 (1)	_	346.2	-	e (1)	-
PS ECP3431	4 (1)	-	346.2	-	e (1)	-
PS ECP3731	4 (1)	_	346.2	_	e (1)	_
PS ECPE5131P	4 (1)	_	30	_	e (1)	_
			30			
PS ECPE5131C	4 (1)	_		_	e (1)	_
PS ECPE3910P	4 (1)	_	30	-	e (1)	-
PS ECPE3910C	4 (1)	-	30	-	e (1)	-
PS FB3411	4	_	55.8	-	е	-
PS FB3711	4	_	55.8	-	е	-
PS FB5111	4	_	55.8	_	e	_
PS FB5311	4	_	55.8	_	e	
		_		_		_
PS TSA3442P	3	-	126	_	d	_
PS TSA3742P	3	-	126	-	d	-
PS TSA5142P	3	_	126	-	d	-
PS TSW3742P	3	_	126	_	d	_
PS TSW3442P	3	_	126	_	d	_
PS TSW5142P	3	_	126	_	d	
		<u>-</u>		_		_
PS VC1132	4	-	50.0	-	е	_
PS VC1132P	4	-	50.0	_	е	_
PS VNE1142P	3	_	124.1	-	d	-
PS VNE1142HSP	3	_	124.1	-	d	_
PS VNE1142LFP	3	_	124.1	_	d	_
PS VNE3442P	3		124.1		d	
		<u> </u>		_		_
PS VNE3442HSP	3	-	124.1	-	d	_
PS VNE3442LFP	3	-	124.1	_	d	_
PS VNE3742P	3	-	124.1	-	d	-
PS VNE3742HSP	3	_	124.1	-	d	-
Preventa safety controllers						
	1		75.0			
PS MP11123P	4	_	75.8	-	е	_
PS MP11123	4	-	75.8	-	е	-
PS MC●●Z● (transistor outputs)	4	4	76.6	76.6	е	е
PS MC●●Z●(Relay outputs)	4	4	71.0	71.0	е	е
safety monitors and interfaces on A						
			454	454	1-	1-
SI SAFEMON1	4	4	451	451	е	е
SI SAFEMON1B	4	4	451	451	е	е
SI SAFEMON2	4	4	451	451	е	е
SI SAFEMON2B	4	4	451	451	е	e
SI SSLB5	4	4	103.4	103.4	е	е
SI SSLB4	4	4	103.4	103.4	е	е
SI SSLC1	4	4	103.6	103.6	е	е
SI SSLC2	4	4	103.6	103.6		
					е	е
SISSLLS	4	4	103.6	103.6	е	е
SI SEA1C	4	4	103.9	103.9	е	е
SI SEK1C	4	4	103.9	103.9	е	е
SI SSLE4	4	4	103.9	103.9	е	e

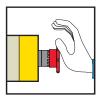
(1) The Category, the Performance Level (PL) or the Safety Integrity Level Claim Level (SILCL) are only achieved with the full connection to the base unit or start unit.

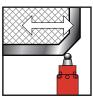
		EN/IEC 62061 (EN/IEC 61508)			
DC (diagnostic capability) for the device internal		PFH _d (Dangerous Failure per Hour)		SILCL (Safety Inte	SILCL (Safety Integrity Level Claim Level)	
Device + outputs	Device + outputs	Device + outputs	Device + outputs	Device + outputs	Device + outputs	
in Stop category 0	in Stop category 1	in Stop category 0	in Stop category 1	in Stop category 0	in Stop category 1	
						'
> 99 %	_	3.92 x 10 ⁻⁹	_	3	_	1
> 99 %	_	3.92 x 10 ⁻⁹	_	3	_	1
> 99 %	-	3.97 x 10 ⁻⁹	_	3	_	1
> 99 %	_	3.97 x 10 ⁻⁹	_	3	_	1
> 99 %	_	3.97 x 10 ⁻⁹	_	3	_	1
099 % (1)	_	7.51 x 10 ⁻⁹	_	3 (1)	_	1
099 % (1)	-	7.51 x 10 ⁻⁹	_	3 (1)	_	1
099 % (1)	-	7.51 x 10 ⁻⁹	_	3 (1)	_	1
6090 %	_	2.00 x 10 ⁻⁷	_	3 (1)	_	1
6090 %	_	2.00 x 10 ⁻⁷	_	3 (1)	_	1
099 % (1)	-	7.51 x 10 ⁻⁹	_	3 (1)	_	1
099 % (1)	_	7.51 x 10 ⁻⁹	_	3 (1)	_	1
099 % (1)	-	7.51 x 10 ⁻⁹	-	3 (1)	-	1
099 % (1)	-	3.00 x 10 ⁻⁹	-	3 (1)	-	1
099 % (1)	-	3.00 x 10 ⁻⁹	-	3 (1)	-	1
099 % (1)	_	3.00 x 10 ⁻⁹	_	3 (1)	_	1
099 % (1)	-	3.00 x 10 ⁻⁹	-	3 (1)	-	1
>99%	_	1.13 x 10 ⁻⁸	_	3	_	1
> 99 %	_	1.13 x 10 ⁻⁸	_	3	_	1
> 99 %	_	1.13 x 10 ⁻⁸	_	3	_	1
> 99 %	_	1.13 x 10 ⁻⁸	_	3	_	1
6090 %	_	1.30 x 10 ⁻⁷	_	2	_	1
6090 %	_	1.30 x 10 ⁻⁷	_	2	_	1
6090 %		1.30 x 10 ⁻⁷		2		1
6090 %	_	1.30 x 10 ⁻⁷	_	2	_	1
6090 %		1.30 x 10		2		1
6090 %		1.30 x 10		2 2		1
> 99 %		1.30 x 10 ⁻⁸		3		1
> 99 %	_	1.30 x 10 ⁻⁸		3		1
> 99 %		9.26 x 10 ⁻⁹		2	_	1
> 99 %		9.26 x 10 ⁻⁹		2		1
	_		_	2	_	1
> 99 % > 99 %	_	9.26 x 10 ⁻⁹ 9.26 x 10 ⁻⁹	_	2 2	_	1
	_		_	2	_	1
> 99 %	_	9.26 x 10 ⁻⁹	_		_	1
> 99 %	_	9.26 x 10 ⁻⁹	_	2	_	1
> 99 %	-	9.26 x 10 ⁻⁹	-	2	_	1
> 99 %	_	9.26 x 10 ⁻⁹	_	2	_	1
00.0/		7.05 40-9		0		4
> 99 %	_	7.95 x 10 ⁻⁹	_	3	_	1
> 99 %	-	7.95 x 10 ⁻⁹	-	3	-	1
> 99 %	> 99 %	1.29 x 10 ⁻⁸	1.29 x 10 ⁻⁸	3	3	1
> 99 %	> 99 %	1.40 x 10 ⁻⁸	1.40 x 10 ⁻⁸	3	3	1
00.04				le.	le.	1.
> 99 %	> 99 %	9.00 x 10 ⁻⁹	9.00 x 10 ⁻⁹	3	3	1
> 99 %	> 99 %	9.00 x 10 ⁻⁹	9.00 x 10 ⁻⁹	3	3	1
> 99 %	> 99 %	9.00 x 10 ⁻⁹	9.00 x 10 ⁻⁹	3	3	1
> 99 %	> 99 %	9.00 x 10 ⁻⁹	9.00 x 10 ⁻⁹	3	3	1
> 99 %	> 99 %	1.82 x 10 ⁻⁸	1.82 x 10 ⁻⁸	3	3	1
> 99 %	> 99 %	1.82 x 10 ⁻⁸	1.82 x 10 ⁻⁸	3	3	1
> 99 %	> 99 %	1.82 x 10 ⁻⁸	1.82 x 10 ⁻⁸	3	3	1
> 99 %	> 99 %	1.82 x 10 ⁻⁸	1.82 x 10 ⁻⁸	3	3	1
> 99 %	> 99 %	1.82 x 10 ⁻⁸	1.82 x 10 ⁻⁸	3	3	1
						1
> 99 %	> 99 %	1.82 x 10 ⁻⁸	1.82 x 10 ⁻⁸	3	3	1
> 99 %	> 99 %	1.82 x 10 ⁻⁸	1.82 x 10 ⁻⁸	3	3	
> 99 %	> 99 %	1.82 x 10 ⁻⁸	1.82 x 10 ⁻⁸	3	3	1
> 99 %	> 99 %	1.82 x 10 ⁻⁸	1.82 x 10 ⁻⁸	3	3	1

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Machine safety Preventa safety controllers

Applications









Modules

Controllers for monitoring 2 independent safety functions simultaneously. User selection of 2 functions from a choice of 15, programmable from front face of controller.

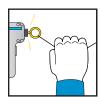


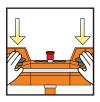
Functions		□ Emergency stop monitoring □ Switch monitoring □ Enabling switch monitoring □ Sensing mat or edges monitoring □ Light curtain monitoring, relay output type □ etc.
Maximum achievable s	afety level	PL e/Category 4 conforming EN ISO 13849-1, SILCL 3 conforming to EN/IEC 61508 and EN/IEC 62061
Conformity to standards		EN/IEC 60204-1, EN/IEC 60947-1, EN/IEC 60947-5-1
Product certifications		UL, CSA, TÜV
Number of circuits		
	Safety	6 NO (3 NO per function)
	Additional	3 solid-state outputs for signalling to PLC
Display		12 LEDs
Supply voltage		24 V
Communication	CANopen bus	-
	Pro bus bus	-
	Modbus bus	-
Module type		XPS MP

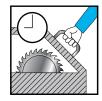
38784/2











Configurable controllers using software, for several independent safety functions: selection of safety functions using configuration software running on Windows (16 or 32 inputs and 8 independent safety outputs)



- □ Emergency stop monitoring□ Limit switch monitoring
- ☐ Two-hand control monitoring
- ☐ Safety light curtain monitoring, with or without "muting" function
- ☐ Enabling switch monitoring, coded magnetic switch monitoring

- □ Safety mat monitoring
 □ Hydraulic press solenoid valve monitoring
 □ Eccentric press safety stop at top dead centre monitoring. Zero speed detection
 □ Hydraulic press monitoring
- □ Eccentric press monitoring
- □ Foot switch monitoring
- □ Chain shaft breakage monitoring
- □ Safe tool
- □ Position selector

PL e/Category 4 conforming EN ISO 13849-1, SILCL 3 conforming to EN/IEC 61508 and EN/IEC 62061

EN/IEC 60204-1, EN 1760-1/ISO 13856-1, EN/IEC 61496-1, EN 574/ISO 13851, EN/IEC 60947-1 EN/IEC 60947-5-1

UL, CSA, TÜV

4 NO (2 NO per function) + 6 solid-state

1 "muting" signalling output

LED display on front face

24 V

Via SUB-D 9-pin male connector, only on XPS MC16ZC and XPS MC32ZC

Via SUB-D 9-pin female connector, only on XPS MC16ZP and XPS MC32ZP

Via RJ45 connector, on all controllers XPS MC●●Z●

XPS MC

38789/2

Safety automation solutions

Preventa safety controllers type XPS MP With pre-de ned functions

Presentation

Operating principle

Preventa safety controller modules XPS MP are designed for a Performance Level of up to PL e/ Category 4 conforming to standard EN/ISO 13849-1.

They enable two independent safety functions (selected from a choice of 15 pre-de ned con gurations) to be performed using the same product. Con guration selection is easily made using 3 buttons on the front face of the module.

These 15 pre-programmed safety functions provide a solution for the majority of safety applications, for example: monitoring Emergency stops, limit switches, safety mats and sensing edges, enabling switches, coded magnetic switches, type 4 safety light curtains conforming to EN 61496-1.

Safety controllers XPS MP incorporate 6 safety outputs (3 per function) and 3 solidstate signalling outputs for signalling to the process PLC.

To aid diagnostics, the modules have LEDs on the front face which provide information on the monitoring circuit status. They also indicate and assist selection of the 2 required con gurations.

	Configuration Synchronisation		Type of start (1)		Start test	Notes	
		time	Automatic or unmonitored				
Functions disabled	0	_	_	-	_	Factory setting	
Emergency stop monitoring,	1	_	Χ	_	_	_	
1-channel wiring (category 2)	2	_	_	X	_	_	
Emergency stop monitoring,	3	Unlimited	X	_	X	_	
2-channel wiring, or guard	4	Unlimited	_	X	X	_	
monitoring (category 4)	5	1.5 s	X	_	X	_	
	6	1.5 s	_	X	X	-	
	7	Unlimited	X	_	-	-	
	8	Unlimited	_	Х	_	-	
Guard monitoring for injection press or blowing machine (category 4)	9	1.5 s	_	X	X	Uses both safety outputs (2)	
		•	<u>'</u>	<u>'</u>	'		
Enabling grip switch monitoring (3 position switch) (category 4)	10	-	X	-	X	The start button acts as start-up preparation	
		<u>'</u>	,		'		
Sensing mat and edges monitoring	11	-	X	T-	-	Mats with circuit	
(category 3)	12	-	-	Х	-	making contacts	
Relay output safety light curtain monitoring (category 4)	13	0.5 s	_	X	X	_	
		1	1				
Coded magnetic switch monitoring	14	1.5 s	Х	T-	-	Magnetic switches	
(category 4)	15	1.5 s	_	X	_	with 2 contacts, 1 NO and 1 NC	

⁽¹⁾ Automatic start: there is no contact or it is shunted.

Unmonitored start: The output is activated on closing of the start contact.

Monitored start: the start input is monitored so that there is no start-up in the event of the start contact being shunted or the start circuit being closed for more than 10 seconds.

Start-up is triggered following activation of the start button (push-release function) on opening of the contact.

⁽²⁾ Tool zone guard with 3rd switch.

Additional rear guard (optional) with automatic start. The opening of the guard cuts all outputs.

Safety automation solutionsPreventa safety controllers type XPS MP
With pre-de ned functions

			I	I make the second secon			
Module type			XPS MP11123	XPS MP11123P			
Maximum achievable safe	ty level		PL e/Category 4 conforming to EN/ISO 138	349-1, SILCL 3 conforming to EN/IEC 62061			
Reliability data	Mean Time To dangerous Failure (MTTF _d)	Years	75.8				
	Diagnostic Coverage (DC)	%	> 99				
	Probability of dangerous Failure per Hour (PFH _d)	1/h	7.95 x 10 ⁻⁹				
Product certifications			UL, CSA, TÜV				
Conformity to standards			EN/IEC 60204-1, EN/IEC 60947-1, EN/IEC 60947-5-1				
Supply voltage		٧	24				
Voltage limits			- 20+ 20%				
Consumption		w	≤5				
Module inputs fuse protec	ction		Internal, electronic				
Start button monitoring			Yes/No (depending on con guration selection)	cted)			
Control unit voltage Between input terminals C1-	l1, C2-I2, C3-I3, C4-I4, C5-I5 or C6-I6	V	24 (at nominal supply voltage)				
Calculation of wiring resistance RL between input terminals		Ω	100 max. Maximum cable length: 2000 m				
Synchronisation time bet	ween inputs	s	0.5, 1.5 or unlimited, depending on con guration selected				
Outputs	Voltage reference		Volt-free				
	Number and type of safety circuits		3 NO per function (6 NO total) (13-14, 23-	24, 33-34, 43-44, 53-54, 63-64)			
	Number and type of additional circuits		3 solid-state				
	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				
	Breaking capacity of solid-state outputs		24 V/20 mA				
	Max. thermal current (Ithe) for each group of 3 outputs		3.3 A for all 3 outputs, or 6 A for 1 output and 2 A for the other 2 outputs, or 2 A for 1 output and 4 A for the other 2 outputs				
	Max. total thermal current	Α	20				
	Output fuse protection		4 gG or 6 fast acting, conforming to IEC/EN 60947-5-1, DIN VDE 0660 part 200				
	Minimum current	mA	10				
	Minimum voltage	٧	17				
Electrical durability			See page 38610-EN/2				
Response time on input o	pening	ms	< 30				
Rated insulation voltage (Ui)	٧	300 (degree of pollution 2 conforming to IE	C/EN 60947-5-1, DIN VDE 0110 parts 1 & 2			
Rated impulse withstand	voltage (Uimp)	kV	<u> </u>	EC/EN 60947-5-1, DIN VDE 0110 parts 1 & 2			
LED display	= ` ` ' /		12				
Operating temperature		°C	-10+55				
Storage temperature		°C	- 25+ 85				
Degree of protection	Terminals	_	IP 20				
conforming to IEC 60529	Enclosure		IP 40				
Connections	Туре		Captive screw clamp terminals	Captive screw clamp terminals, removable terminal block			
	1-wire connection, without cable end		Solid or exible cable: 0.142.5 mm ²	Solid or exible cable: 0.22.5 mm ²			
	1-wire connection, with cable end		Without bezel, exible cable: 0.252.5 m				
	doidaile dia		With bezel, exible cable: 0.251.5 mm ²				
	2-wire connection, without cable end		Solid or exible cable: 0.140.75 mm ² Solid cable: 0.21 mm ² Flexible cable: 0.21.5 mm ²				
	2 wire connection with cable and		Without bezel, exible cable: 0.251 mm ²				
	2-wire connection, with cable end						

Safety automation solutionsPreventa safety controllers type XPS MP
With pre-de ned functions



XPS MP11123

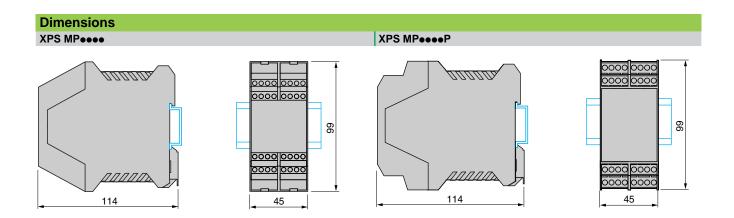
References						
Description	Type of terminal block connection	Number of safety circuits	Additional outputs	Supply	Reference	Weight kg
Modules for 2 independent safety functions	Integrated in module	3 NO per function (6 NO total)	3 solid-state	24 V 	XPS MP11123	0.320



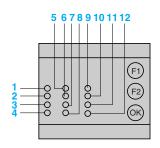
XPS MP11123P

Removable from module	3 NO per function (6 NO total)	3 solid-state	24 V	XPS MP11123P	0.320
	(6 NO total)				

AM1 DP200 rail mounting



LED details



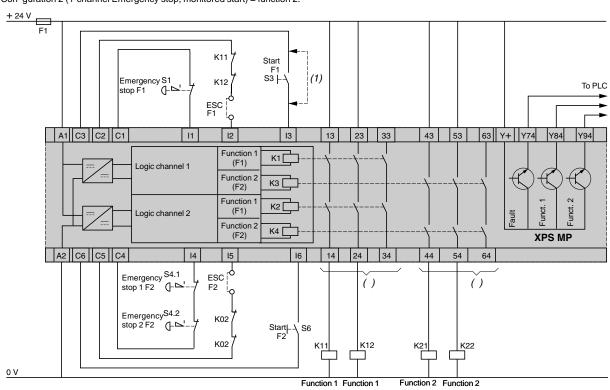
Function 1 con guration code. K1/K2 status (function 1, NO safety outputs closed). 1-2-3 5-6-7 8 Function 2 con guration code.
K3/K4 status (function 2, NO safety outputs closed). Supply voltage A1-A2. Fault.
Function 1 con guration.
Function 2 con guration.
Con guration buttons. 10 11 12 F1, F2, OK:

With pre-de ned functions

XPS MP

Emergency stop monitoring, 1-channel wiring

Con guration 1 (1-channel Emergency stop, automatic or unmonitored start) = function 1. Con guration 2 (1-channel Emergency stop, monitored start) = function 2.



(1) Automatic start.

(2) Function 1 safety outputs.

t < 10s

(3) Function 2 safety outputs. ESC = External start conditions.

Functional diagrams Configuration 1 Configuration 1 Automatic start Unmonitored start Power-up (Self-test accomplished) Power-up (Self-test accomplished) Emergency stop not activated Emergency stop not activated Emergency Key Emergency Emergency Emergency stop Key 0 • activated Input 1, Emergency stop Input 1. Emergency stop C1-I1, (C4-I4) Input 2, ESC C2-I2, (C5-I5) Input 2, ESC C2-I2, (C5-I5) Automatic start C3-I3, (C6-I6) Start button C3-I3, (C6-I6) NO output 13-14/23-24/ NO output 13-14/23-24/ 33-34, (43-44/53-54/63-64) 33-34, (43-44/53-54/63-64) Signalling output Y84, (Y94) Signalling output Y84, (Y94) Configuration 2 Monitored start Power-up (Self-test accomplished) Emergency Key Emergency Emergency stop stop activated Input 1, Emergency stop C1-I1. (C4-I4) Input 2, ESC C2-I2, (C5-I5) Start button C3-I3, (C6-I6) NO output 13-14/23-24/ 33-34, (43-44/53-54/63-64) Signalling output Y84, (Y94)

38784-EN_Ver7.0

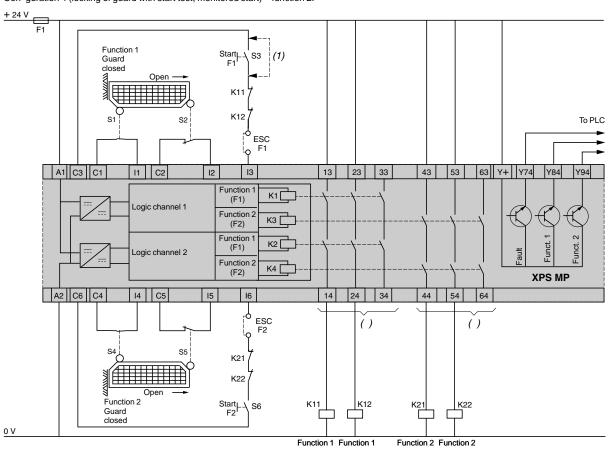
Schneider

With pre-de ned functions

XPS MP

Guard monitoring with start test

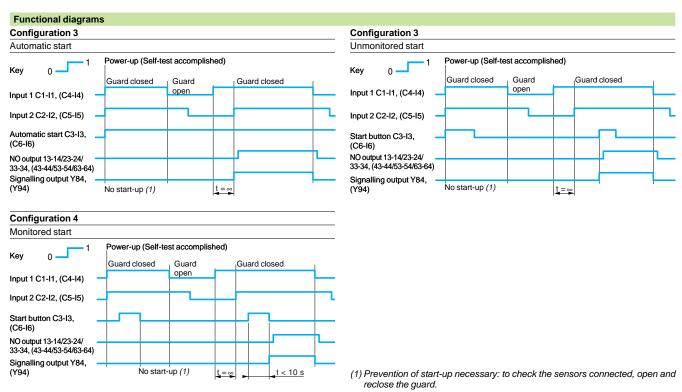
Con guration 3 (locking of guard with start test, automatic or unmonitored start) = function 1. Con guration 4 (locking of guard with start test, monitored start) = function 2.



- (1) Automatic start.
- (2) Function 1 safety outputs.

(3) Function 2 safety outputs

ESC = External start conditions

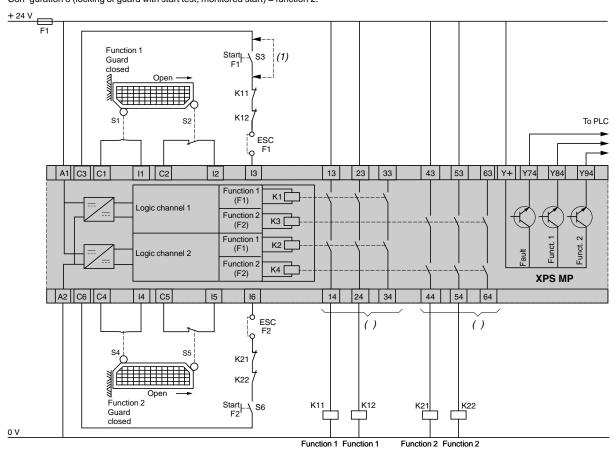


With pre-de ned functions

XPS MP

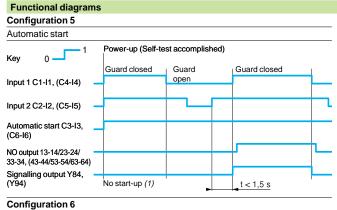
Guard monitoring with start test and synchronisation time = 1.5 ms

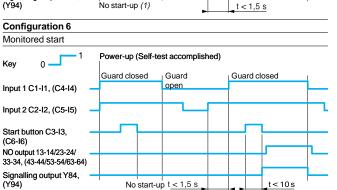
Con guration 5 (locking of guard with start test, automatic or unmonitored start) = function 1. Con guration 6 (locking of guard with start test, monitored start) = function 2.



- (1) Automatic start.
- (2) Function 1 safety outputs.

(3) Function 2 safety outputs. ESC = External start conditions.





Configuration 5 Unmonitored start Power-up (Self-test accomplished) Guard closed Guard Guard closed End of travel 1 C1-I1, End of travel 2 C2-I2, (C5-I5) Start button C3-I3, (C6-I6) NO output 13-14/23-24/ 33-34, (43-44/53-54/63-64) Signalling output Y84, (Y94) No start-up (1) t < 1,5 s

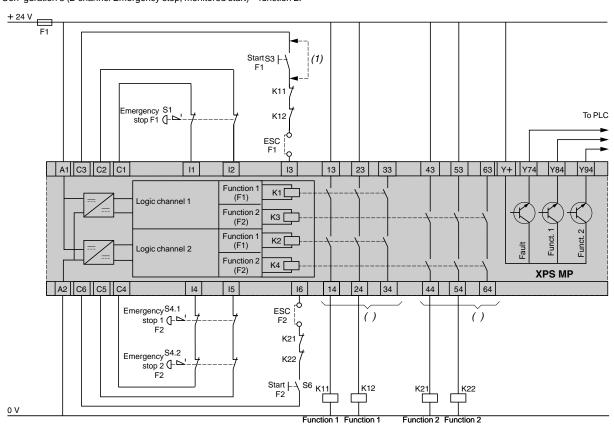
(1) Prevention of start-up necessary: to check the sensors connected, open and reclose the guard.

Safety automation solutionsPreventa safety controllers type XPS MP With pre-de ned functions

XPS MP

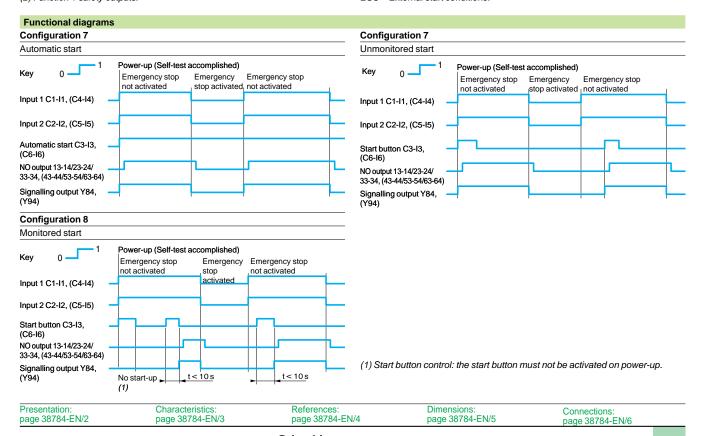
Emergency stop monitoring, 2-channel wiring

Con guration 7 (2-channel Emergency stop, automatic or unmonitored start) = function 1. Con guration 8 (2-channel Emergency stop, monitored start) = function 2.



- (1) Automatic start.
- (2) Function 1 safety outputs.

(3) Function 2 safety outputs ESC = External start conditions.

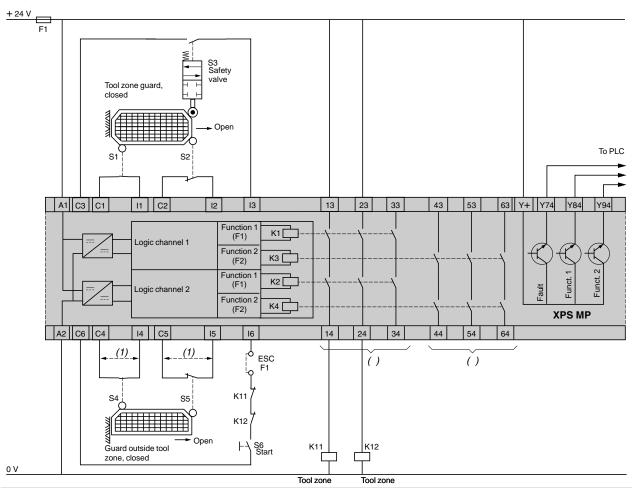


With pre-de ned functions

XPS MP

Guard monitoring for injection press or blowing machine

Con guration 9 (this con guration uses both functions of the controller. Only function 1 is con gured).



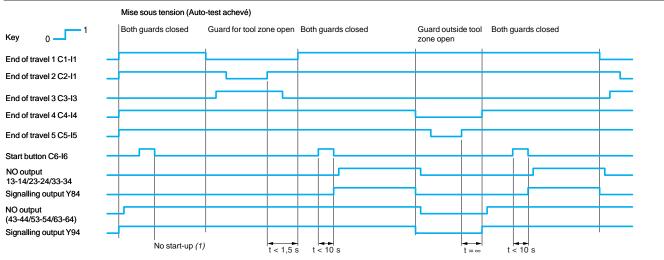
- (1) If sensors S4 and S5 are not used, terminals C4-I4 and C5-I5 must be linked.
- (2) Safety outputs for tool zone.
- (3) Safety outputs for rear access safety doors.

In con guration mode 9, the NC contacts of the relays or contactors controlled via outputs 43-44, 53-54, 63-64 cannot be monitored by the feedback loop (ESC).

ESC = External start conditions

Functional diagrams

Configuration 9



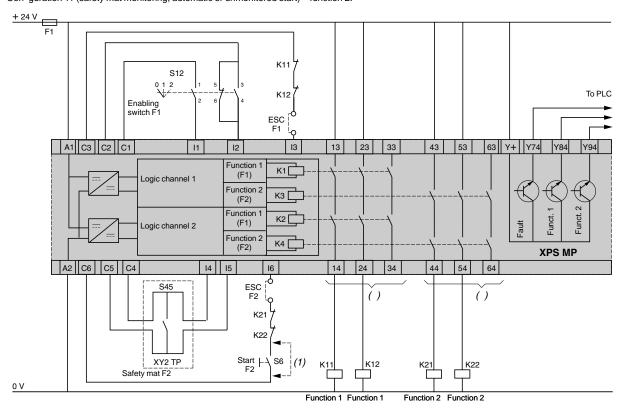
(1) Prevention of start-up necessary: to check the sensors connected, open and reclose the guard.

Safety automation solutionsPreventa safety controllers type XPS MP With pre-de ned functions

XPS MP

Enabling switch monitoring, safety mat monitoring

Con guration 10 (enabling switch monitoring, with or without start-up preparation) = function 1. Con guration 11 (safety mat monitoring, automatic or unmonitored start) = function 2.



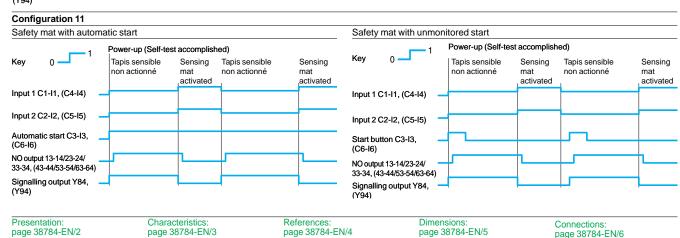
(1) Automatic start.

Functional diagrams

(3) Function 2 safety outputs. ESC = External start conditions.

(2) Function 1 safety outputs.

Configuration 10 **Enabling switch** Power-up (Self-test accomplished) Key Switching level: Input 1 C1-I1, (C4-I4) Input 2 C2-I2, (C5-I5) Input 3 C3-I3, (C6-I6) Input 3 C3-I3, (C6-I6) NO output 13-14/23-24/ 33-34, (43-44/53-54/63-64) Signalling output Y84,

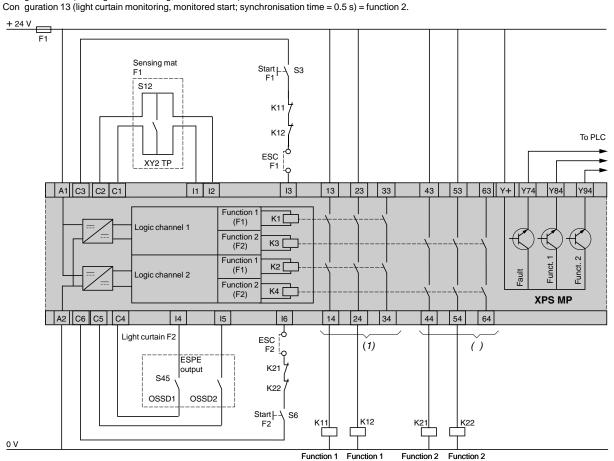


With pre-de ned functions

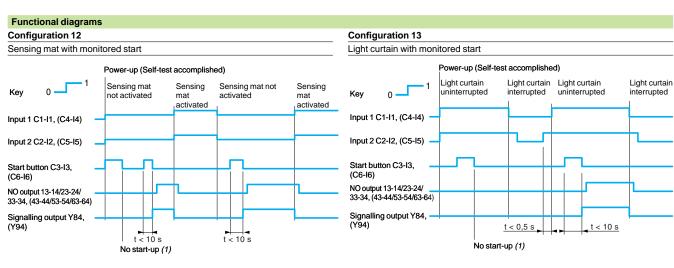
XPS MP

Safety mat monitoring, safety light curtain monitoring

Con guration 12 (sensing mat monitoring, monitored start) = function 1.



- (1) Function 1 safety outputs.
- (2) Function 2 safety outputs.
- ESC = External start conditions.



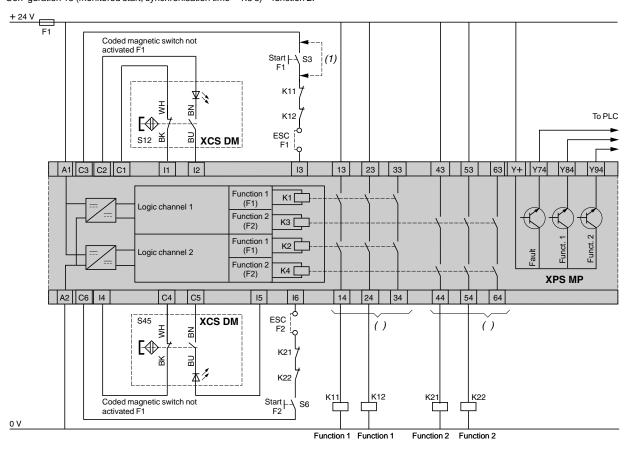
(1) Start button control: the start button must not be activated on power-up.

Safety automation solutionsPreventa safety controllers type XPS MP With pre-de ned functions

XPS MP

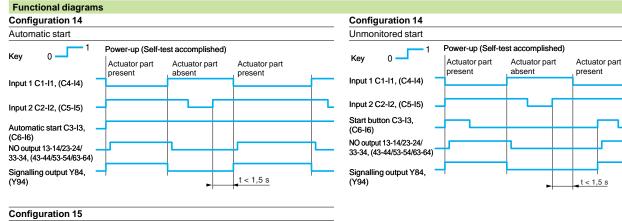
Coded magnetic switch monitoring

Con guration 14 (automatic or unmonitored start, synchronisation time = 1.5 s) = function 1. Con guration 15 (monitored start, synchronisation time = 1.5 s) = function 2.



- (1) Automatic start.
- (2) Function 1 safety outputs.

- (3) Function 2 safety outputs.
- ESC = External start conditions.



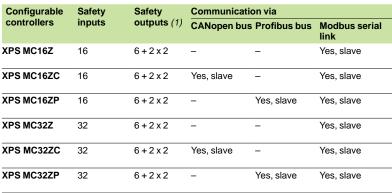
Safety automation solutions

Preventa con gurable safety controllers Type XPS MC

Presentation

Con gurable safety controllers XPS MC••Z• are designed to provide a solution for safety applications requiring conformity to Performance Level PL e/Category 4 in accordance to standard EN/ISO 13849-1 and SIL 3 requirements of standard EN/IEC 61508.

The range of con gurable safety controllers comprises 6 products, each with different technical characteristics.





The safety inputs are supplied by the various control outputs (2), in such a manner so as to monitor for short-circuits between the inputs, short-circuits between each input and earth or the presence of residual voltages.

The controller, assisted by the control outputs, continuously tests all the connected inputs. As soon as an error is detected on an input, all the outputs associated with this input are disconnected. Safety outputs associated with other inputs remain active.

Configuration

Safety controllers XPS MC••Z• are con gurable and addressable using software XPS MCWIN running on a PC. Connection accessories required: see page 38789-EN/9.

Connections

For connection of safety inputs and outputs, safety controllers XPS MC••Z• can be tted with a choice of:

- $\hfill\Box$ screw connectors type XPS MCTS $\bullet \bullet$, or
- ☐ spring clip connectors type XPS MCTC ••

These connectors are to be ordered separately, see page 38789-EN/8.





XPS MC16ZC

XPS MC32ZC

Schneider

^{(1) 8} independent safety outputs = 6 solid-state safety outputs + 2 x 2 relay outputs (4 relay outputs with guided contacts).

^{(2) 8} control outputs are available but they are not safety outputs.

Safety automation solutions

Preventa con gurable safety controllers Type XPS MC

Safety functions

Con guration of the safety functions is carried out using software XPS MCWIN which is available on the Safety Suite V2 CD-ROM.

30 certi ed safety functions are available with this software and they are easily assignable to the safety outputs. The safety functions have multiple combination possibilities and various starting conditions.

The safety functions are:

□ certi ed in accordance with EN/ISO 13849-1 and IEC 61508,

 $\hfill \square$ con gurable in controller XPS MC using software XPS MCWIN which is available on the Safety Suite V2 software pack.

All 8 safety outputs are suitable for use in safety related parts of control systems conforming to Performance Level PL e/Category 4 in accordance to EN/ISO 13849-1.

Main safety functions

- Emergency stop monitoring, with or without time delay, 1 or 2-channel wiring
- Two-hand control (type III-C conforming to EN 574/ISO 13851)
- Guard monitoring with 1 or 2 limit switches
- Guard monitoring for injection presses and blowing machines
- Magnetic switch monitoring
- Sensing mat monitoring
- Light curtain (type 4 conforming to EN/IEC 61496, relay or solid-state output) monitoring
- Zero speed detection
- Dynamic monitoring of hydraulic valves on linear presses
- Monitoring safety stop at top dead centre on eccentric press
- Safety time delays
- "Muting" function of light curtains
- Enabling switch monitoring, 2 or 3 contact
- Hydraulic press
- Eccentric press
- Foot switch monitoring
- Chain shaft breakage monitoring
- Position selector

Application schemes and functional diagrams

See page 38788-EN/2 onwards.

Safety automation solutions

Preventa con gurable safety controllers
Type XPS MC

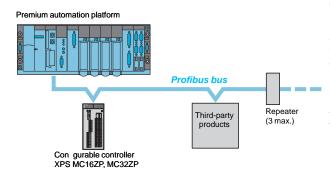
Communication

CANopen fieldbus

Con gurable safety controllers XPS MC••ZC incorporate a SUB-D 9-pin male connector for direct connection on CANopen bus.

CANopen bus is a open bus that ensures deterministic and reliable access to the real-time data of automation equipment. The bus uses a shielded dual twisted pair on which a maximum of 127 devices can be connected by chaining.

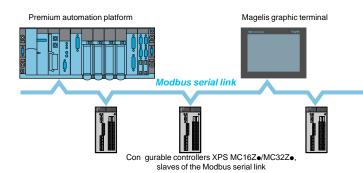
The baud rate varies between 10 Kbps and 1Mbps depending on the length of the bus (5000 m to 20 m).



Profibus bus

Con gurable safety controllers XPS MC●●ZP incorporate a SUB-D 9-pin male connector for connection on Pro bus bus. Con gurable safety controllers XPS MC●●ZP are slaves on the Pro bus bus.

Pro bus bus is a eldbus that meets industrial communication requirements. The topology of the Pro bus bus is of the linear type with a centralised master/slave type access procedure. The physical link is a single shielded twisted pair.



Modbus serial link

Con gurable safety controllers XPS MC●●Z● incorporate a Modbus communication interface (RJ45 connector) for con guration and diagnostics.

This interface enables connection of the controllers to:

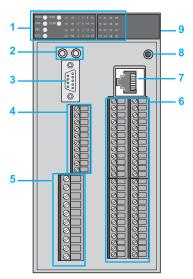
- □ a PC (con guration),
- □ a PLC (diagnostics), or
- $\hfill\Box$ an operator dialogue terminal (diagnostics).

The Modbus serial link comprises a master station (Premium automation platform) and slave stations (con gurable controllers XPS MC16/32Z♠).

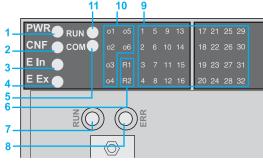
Two exchange mechanisms are possible:

- Question/response: the questions from the master are addressed to a given slave. The response is expected by return from the interrogated slave.
- **Distribution**: the master distributes a message to all the stations of the Modbus serial link. The latter execute the order without transmitting a reply.

Type XPS MC



Configurable safety controller XPS MC••Z•, with screw connectors



Illuminated display

Description

Configurable safety controllers XPS MC●•Z●

Front face of controllers:

- LED display and system diagnostics.
- Two LEDs for CANopen or Pro bus (1) connection status.
- SUB-D 9-pin male connector for connection on CANopen bus (XPS MC16ZC/ MC32ZC) or SUB-D 9-pin female connector for connection on Pro bus bus (XPS MC16ZP/MC32ZP).
- Solid-state safety output and "muting" indicator light terminals.
- Power supply (24 V ---) and relay safety output terminals.
- Control output terminals for power supply to safety inputs and safety input terminals.
- RJ45 connector for connection on Modbus serial link.
- 8 RESET button (resetting of controller).

Rear face of controllers:

9 Fixing plate for mounting on rail.

(1) Depending on controller model.

LE	ED detai	ls		
LE	ED	Colour	Status	Meaning
1	PWR	Green	On	Supply voltage present.
2	CNF	Yellow	On	In con guration mode.
			Flashing	Not con gured, initial power-up.
3	E In	Red	On	Internal error: all safety outputs deactivated.
4	E Ex	Red	On	External error: all safety outputs associated with the defective circuit are deactivated.
5	СОМ	Green	On	Controller communicating via the TER (RJ45) connection.
6	R1, R2	Green	On	Relay outputs 13/14, 23/24, 33/34 and 43/44 activated.
			Flashing	Fault on these outputs.
7	RUN	Green	Off	Hardware OK for the Pro bus bus or the CANopen bus.
			On	Communicating on Pro bus bus or on CANopen bus. Normal status.
8	ERR	Red	On	Communication impossible, con guration error, damaged cabling or absence. Bus deactivated
			Off	Communicating on CANopen or Pro bus bus. Normal status.
			Flashing (x 1)	Warning limit reached.
			Flashing (x 2)	Control event error on CANopen bus.
			Flashing (x 3)	Synchronisation error on CANopen bus.
9	116	Green	On	Input circuit closed.
	132		Flashing	Error detected on input relating to LED.
10	0106	Green	On	Solid-state output activated.
			Flashing	Short-circuit, fault on output.
11	RUN	Green	On	Run mode.
			Flashing	Changing from run mode to stop mode.

Safety automation solutionsPreventa con gurable safety controllers
Type XPS MC

Configurable safet	v controlle	er type		XPS MC16Z and MC32Z, XPS MC16ZC and MC32ZC, XPS MC16ZP and MC32Z	
Maximum achievab		••		PLe/Category 4 conforming to EN/ISO 13849-1, SILCL3 conforming to EN/IEC 6150	
			Years	Transistor outputs: 76.6	
-		(50)	24	Relay outputs: 71	
_		overage (DC)	%	> 99	
	obability of FH _d)	dangerous Failure per Hour	1/h	Transistor outputs: 1.29 x 10 ⁻⁸ Relay outputs: 1.40 x 10 ⁻⁸	
Product certification	ns			UL, CSA, TÜV	
Conformity to stand	dards			EN/IEC 60204-1, EN 1760-1/ISO 13856-1, EN/IEC 61496-1, EN 574/ISO 13851, EN/IEC 60947-1, EN/IEC 60947-5-1	
Supply voltage			٧	24 ± 20%	
laximum consump	otion		w	12	
use protection			Α	16 gL max.	
Start button monito	ring			Con gurable	
Control circuit voltage				28.8 V/13 mA (between input terminals C1-I1 to C8-I16, resp.I32)	
Calculation of wiring resistance RL			Ω	100 max, maximum cable length: 2000 m (between input terminals)	
ynchronisation tin	ne betweei	n inputs	s	Depending on con guration selected	
utputs Re	elay	Voltage reference		Volt-free	
		Safety circuit		2 NO per function (4 NO total) (13-14, 23-24, 33-34, 43-44)	
		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	
		Thermal current (Ithe) for each group of 2 outputs	Α	6 for 1 output and 2 for the other, or 4 for both outputs.	
		Current limit	Α	Ith ≤ 16 (with several relay output circuits simultaneously loaded)	
		Output fuse protection	Α	4 gL or 6 quick blow	
		Minimum current	mA	10 (1)	
		Minimum voltage	٧	17 (1)	
Sc	olid-state	Breaking capacity		24 V/2 A	
		Safety circuit		6 solid-state (O1, O2, O3, O4, O5, O6)	
		Current limit	Α	Ith ≤ 6.5 (with several solid-state output circuits simultaneously loaded)	
lectrical durability	,			See page 38788-EN/2	
Response time on i	nput openi	ing	ms	Response time = 20 or 30, con gurable using software XPS MCWIN if 20 for controllers XPS MC••Z•: 30 for a safety mat if 30 for controllers XPS MC••Z•: 45 for a safety mat	
Rated insulation voltage (Ui)			V	300 (degree of pollution 2 conforming to EN/IEC 60647-5-1, DIN VDE 0110 part 1)	
Rated impulse withstand voltage (Uimp)			kV	4 (overvoltage category III, conforming to EN/IEC 60647-5-1, DIN VDE 0110 part 1	
LED display			30 (XPS MC16Z), 46 (XPS MC32Z) 32 (XPS MC16ZC/MC16ZP), 48 (XPS MC32ZC/MC32ZP)		
Temperature Op	perating		°C	-10+55	
· <u></u>	orage		°C	- 25+ 85	
Degree of protection	n			IP 20 conforming to EN/IEC 60529 (connector and enclosure)	

⁽¹⁾ The controller is also capable of switching low power loads (17 V/10 mA minimum) provided that the contact has not been used for switching high power loads (possible contamination or wear of the gold layer on the contact tips).

Safety automation solutionsPreventa con gurable safety controllers
Type XPS MC

Communic							
Modbus seria	al link						
Compatibility				XPS MC16Z, XPS MC32Z, XPS MC16ZC, XPS MC32ZC, XPS MC16ZP, XPS MC32ZP			
Serial link ports		Number and type		1 x RJ45			
		Status		Slave			
Data exchange				14 words			
Addressing				1247			
Baud rate			bps	1200, 2400, 4800, 9600 or 19200			
Parity				Even, odd, none			
Fixed parameters				RTU (Remote Terminal Unit) mode 1 start bit/8 data bits 1 stop bit stop with "even" or "odd" parity 2 stop bits without parity			
Functions supp	orted			01: 8-bit output data/32-bit input data (0 = 0 02: 32-bit input data/8-bit output data (0 = 0 03: information and errors			
CANopen bu	s						
Compatibility				XPS MC16ZC, XPS MC32ZC			
Serial link ports		Number and type		1 x SUB-D 9-pin male			
		Status		Slave			
Data exchange				14 words By included dual port memory: address an	d diagnostic data, but no baud rates		
Parameters		Baud rate	Kbps	20, 50, 125, 250, 500, 800			
(adjustable using	g software		Mbps	1			
XPS MCWIN)		Address		1127			
Profibus bus				·			
Compatibility			XPS MC16ZP, XPS MC32ZP				
Serial link ports	1	Number and type		1 x SUB-D 9-pin female			
•		Status		Slave			
Data exchange				14 words By included dual port memory: only address data			
Parameters		Baud rate	Mbps	12			
		Address		1125			
Connectio	ns			•			
Туре				Removable screw	Removable spring clip connector		
-71				connector XPS MCTS●● (1)	XPS MCTC•• (1)		
Power supply a	and relay outpu	ut terminals					
	1 conductor	Without cable end		Solid or exible cable: 0.22.5 mm², AWG	G 24-12		
		With cable end	mm²	Without bezel, exible cable: 0.252.5			
			mm²	With bezel, exible cable: 0.252.5			
	2 conductors	Without cable end	mm²	Solid or exible cable: 0.21.5	_		
		With cable end	mm²	Without bezel, exible cable: 0.251.5	-		
			mm²	Double, with bezel, exible cable: 0.51.5	Double, with bezel, exible cable: 0.5		
	Tightening tor	que of screw terminals	Nm	0.50.6	-		
	Wire stripping	length	mm	10			
Other terminals	s						
	1 conductor	Without cable end		Solid or exible cable: 0.141.5 mm², AW	G 28-16		
		With cable end	mm²	Without bezel, exible cable: 0.251.5			
			mm²	With bezel, exible cable: 0.250.5			
	2 conductors	Without cable end	mm²	Solid cable: 0.140.5 Flexible cable: 0.140.75	-		
		With cable end	mm²	Without bezel, exible cable: 0.250.34	-		

⁽¹⁾ To be ordered separately.

Type XPS MC





References					
Configurable sat	fety contr	ollers (conn	ector not included)	
Number of inputs	Number of	of outputs	- 411	Reference	Weight
	Relay	Solid-state			kg
16	4 (2 x 2)	6	Modbus	XPS MC16Z	0.820
			Modbus, CANopen	XPS MC16ZC	0.820
			Modbus, Pro bus	XPS MC16ZP	0.820





32	4 (2 x 2)	6	Modbus	XPS MC32Z	0.840
			Modbus, CANope	en XPS MC32ZC	0.840
			Modbus, Pro bus	XPS MC32ZP	0.840

XPS MC16ZC

XPS MC32ZC





XPS MC32ZP

Plug-in connect	ors for configurable safety contro	ollers (1)	
Description	For use with	Reference	Weight kg
Screw connectors	XPS MC16Z, MC16ZC, MC16ZP	XPS MCTS16	0.080
	XPS MC32Z, MC32ZC, MC32ZP	XPS MCTS32	0.110
Spring clip connectors	XPS MC16Z, MC16ZC, MC16ZP	XPS MCTC16	0.080
	XPS MC32Z, MC32ZC, MC32ZP	XPS MCTC32	0.110

Configuration software

- Reference XPS MCWIN is the full version of con guration software XPS MCWIN version 2.10 and must be installed if no previous version of this software has been
- Reference SSVXPSMCWINUP is an update for con guration software XPS MCWIN and can be used if XPS MCWIN has been installed using Safety Suite V1. An update from version 2.0 to 2.10 for the software XPS MCWIN will then be performed.

Description	Operating system	Characteristics (2)	Languages	Reference	Weight kg
Configuration software for controllers XPS MC••Z• CD-ROM + user manual	Windows 2000 Windows XP		FR, EN, DE, IT, ES, PT	XPS MCWIN	0.520
XPS MCWIN software update CD-ROM + user manual	Windows 2000 Windows XP	Software update available on Safety Suite V2 software pack	FR, EN, DE, IT, ES, PT	SSVXPSMCWINUP	0.520

⁽¹⁾ To be ordered separately to the controllers.
(2) EDS and GSD files are available on the XPS MCWIN configuration software CD-ROM.

Type XPS MC









TSX CUSB485



TSX CAN TDM4



ABL 8RPS24100

References					
Connecting cables (1)					
Function			Length m	Reference	Weight kg
Diagnostics using Magelis o	perator	dialogue terminal type XBT GT	3	VW3 A8 306 R30	1.130
Configuration software	1	Adaptor: RJ45 socket/PC connection cables	-	XPS MCCPC	0.011
1 2	2	Cable to PC serial port (type SUB-D9)	2.5	TSX PCX 1031	0.170
	3	Straight shielded twisted pair cables, EIA/TIA 568 standard (RJ45 connector at each end)	2	490 NTW 000 02	_
			5	490 NTW 000 05	_
			12	490 NTW 000 12	_
		Straight shielded twisted pair cables,	2	490 NTW 000 02U	
		UL and CSA 22.1 approved	5	490 NTW 000 05U	_
		(RJ45 connector at each end)	12	490 NTW 000 12U	_
	with	RJ45/PC USB port converter (2)	0.4	TSX CUSB485	

Function	Medium	Length m	Reference	Weight kg
Modbus serial link access	Premium automation platform TSX SCY 21601	-	XPS MCSCY	-
CANopen bus access	1 CANopen connection cables	0.3	TSX CANCADD03	_
2	(tted with: 1 SUB-D 9-pin female connector	1	TSX CANCADD1	_
	at each end)	3	TSX CANCADD3	_
1011 2		5	TSX CANCADD5	-
1	2 CANopen tap-off box	-	TSC CANTDM4	_
	3 Standard CANopen cables	50	TSX CANCA50	_
(2) 112		100	TSX CANCA100	-
		300	TSX CANCA300	_
Profibus bus access		100	TSX PBS CA100	_
		400	TSX PBS CA400	_

Accessories (1)
---------------	----

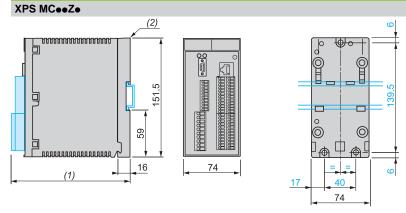
Regulated switch mode power supply, single-phase Output voltage: 24...28.8 V --Nominal current: 10 A Nominal power: 240 W

ABL 8RPS24100

1.000

(1) To be ordered separately.
(2) The converter **TSX CUSB485** is installed using **Driver Pack V2.3**. This "driver" is available on the Safety Suite V2 software or downloadable from our site: www.schneider-electric.com

Dimensions, mounting



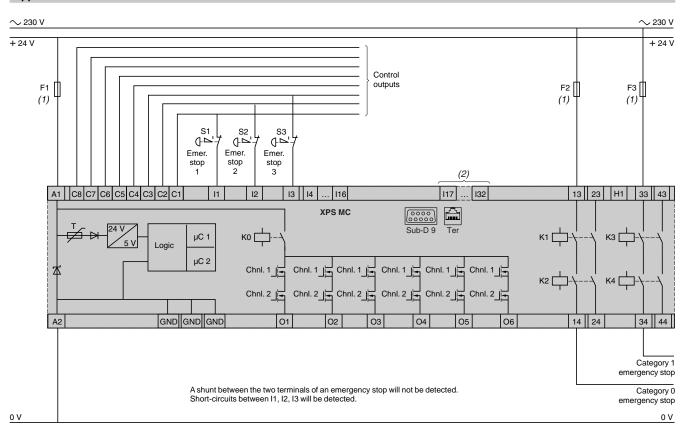
- (1) 153 mm with screw connector XPS MCTS●●. 151.4 mm with spring clip connector XPS MCTC●●. (2) Metal adaptor for fixing on ∟ 35 mm metal rail.

Type XPS MC

Emergency stop monitoring, with or without time delay, 1-channel wiring, with automatic start

Category 4 achieved with necessary precautions taken to eliminate input circuit faults.

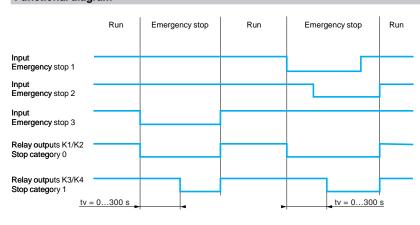
Application scheme



(1) Technical characteristics for maximum rating of fuses, see page 38789-EN/6.

(2) Only applicable to XPS MC32Z.

Functional diagram



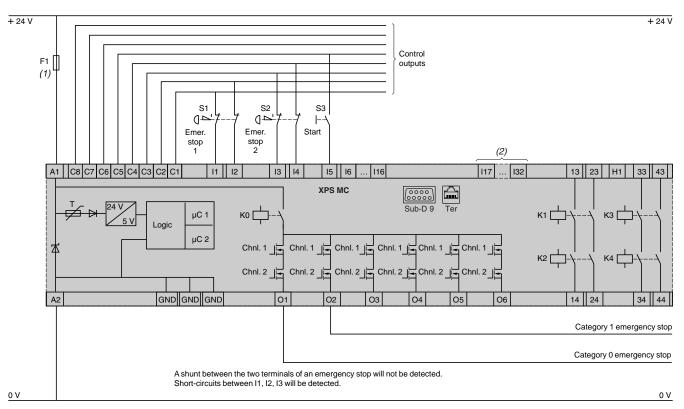


Type XPS MC

Emergency stop monitoring, with or without time delay, 2-channel wiring, with start button

Category 4 conforming to standard EN/ISO 13849-1.

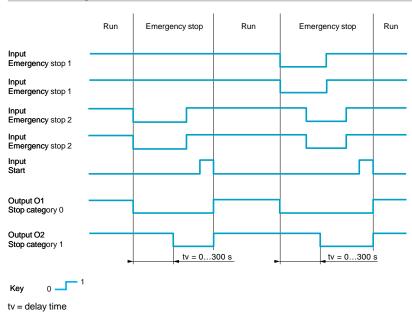
Application scheme



(1) Technical characteristics for maximum rating of fuses, see page 38789-EN/6.

(2) Only applicable to XPS MC32Z•.

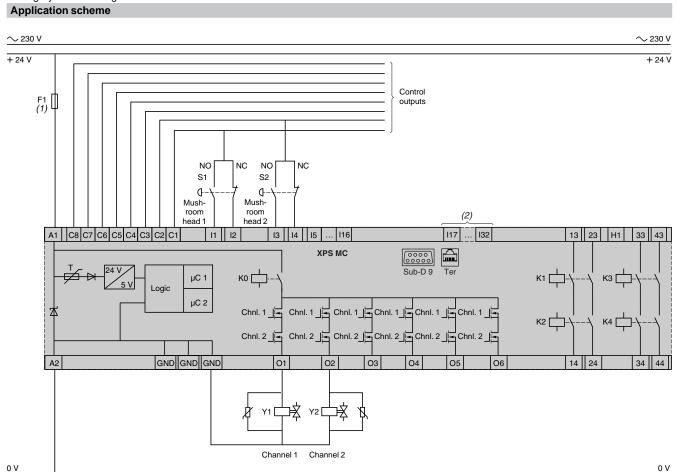
Functional diagram



Type XPS MC

Two-hand control (type III-C conforming to EN 574-1)

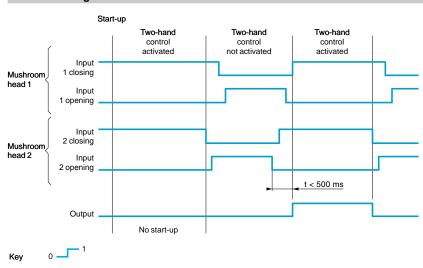
Category 4 conforming to standard EN/ISO 13849-1.



(1) Technical characteristics for maximum rating of fuses, see page 38789-EN/6.

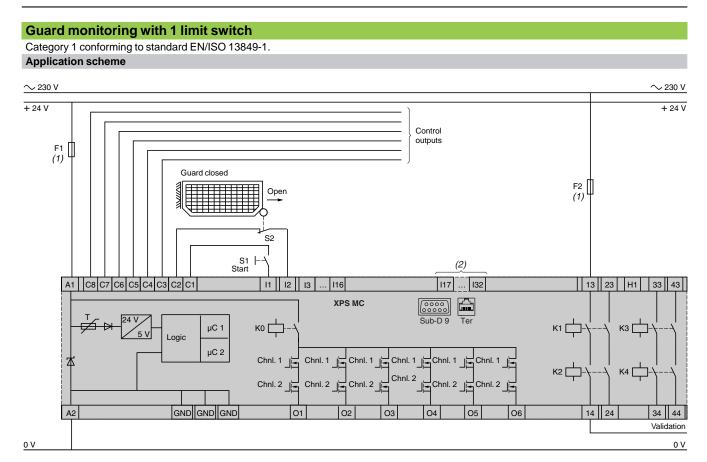
(2) Only applicable to XPS MC32Ze.

Functional diagram

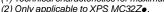


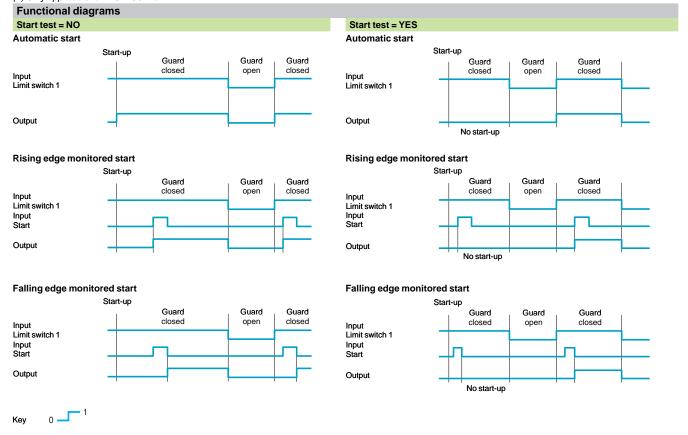
tv = delay time

Type XPS MC



(1) Technical characteristics for maximum rating of fuses, see page 38789-EN/6. (2) Only applicable to XPS MC32Z€.





Type XPS MC

Guard monitoring with 2 limit switches Category 4 conforming to standard EN/ISO 13849-1. **Application scheme** \sim 230 V \sim 230 V + 24 V + 24 V Control F1 *(1)* outputs ESC ์รร K01 K02 S1 |-EDM A1 | C8 C7 C6 C5 C4 C3 C2 C1 11 | 12 | 13 | 14 | 15 ... 116 ... 132 13 23 H1 33 43 XPS MC 0000 Sub-D 9 μC 1 ко 📛--7 КЗ 🗀 Logic μC 2 Chnl. 1 Chnl. 1 Chnl. 1 _ Chnl. 1 _ Chnl. 1 _ Chnl. 1 Chnl. 2 Chnl. 2 Chnl. 2 GND GND GND О3 O5 14 24

Channel 2

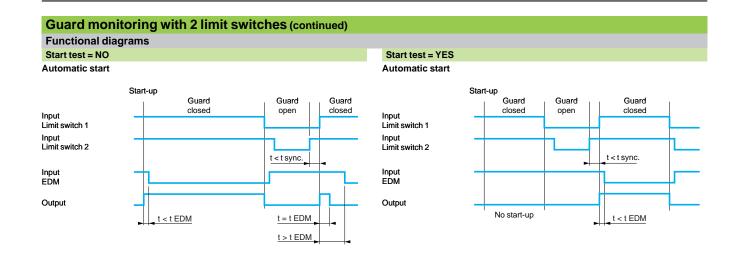
Channel 1

ESC = external start conditions EDM = external devices monitoring

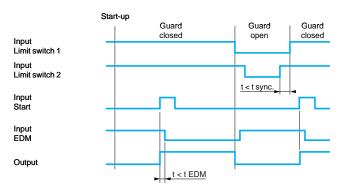
- (1) Technical characteristics for maximum rating of fuses, see page 38789-EN/6.
- (2) Only applicable to XPS MC32Z.

0 V

Type XPS MC



Rising edge monitored start



Rising edge monitored start

Input Limit switch 1

Limit switch 2

Input

Input Start

Input EDM

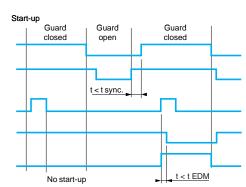
Output

Input Limit switch 1

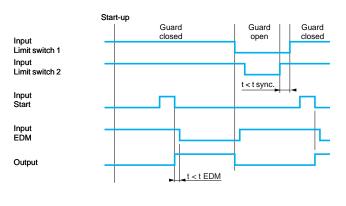
Input Start

Output

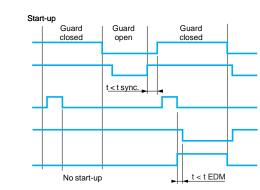
Input Limit switch 2



Falling edge monitored start



Falling edge monitored start



EDM = external devices monitoring

t EDM = maximum monitoring time of external devices t sync. = synchronisation time

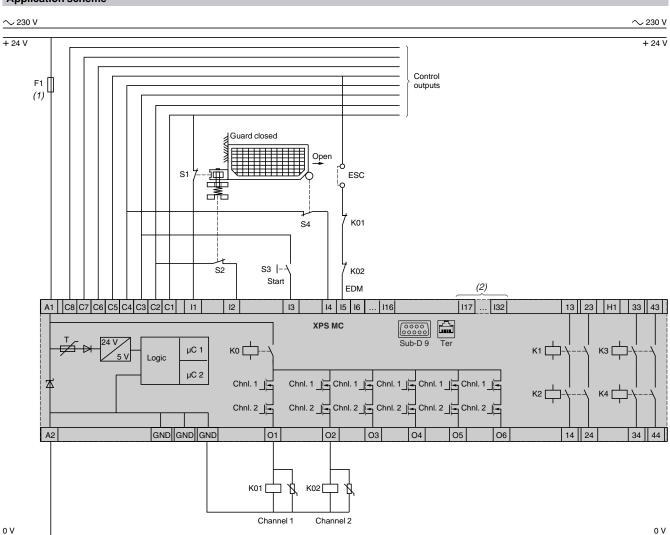
Key

Type XPS MC

Guard monitoring with 2 limit switches, with guard locking

Category 4 conforming to standard EN/ISO 13849-1.

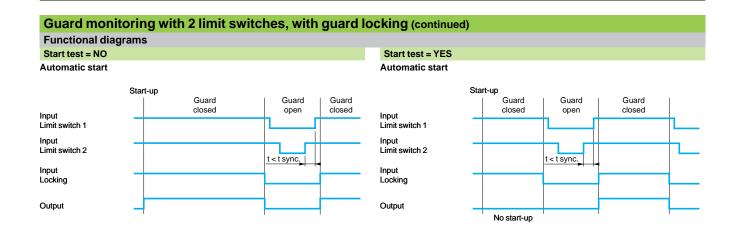
Application scheme



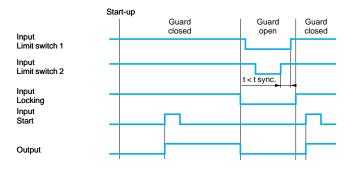
ESC = external start conditions EDM = external devices monitoring

- (1) Technical characteristics for maximum rating of fuses, see page 38789-EN/6.
- (2) Only applicable to XPS MC32Z.

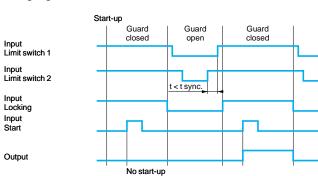
Type XPS MC



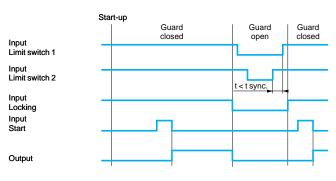
Rising edge monitored start



Rising edge monitored start



Falling edge monitored start



Falling edge monitored start

Input Limit switch 1

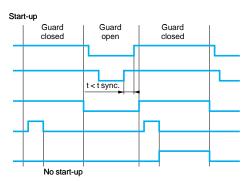
Input

Input Locking

Input Start

Output

Limit switch 2



Key

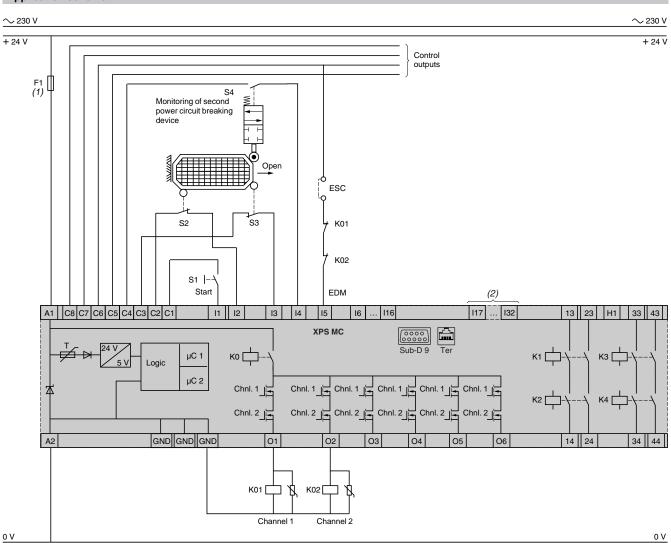
t sync. = synchronisation time

Type XPS MC

Guard monitoring for injection presses and blowing machines

Category 4 conforming to standard EN/ISO 13849-1.

Application scheme

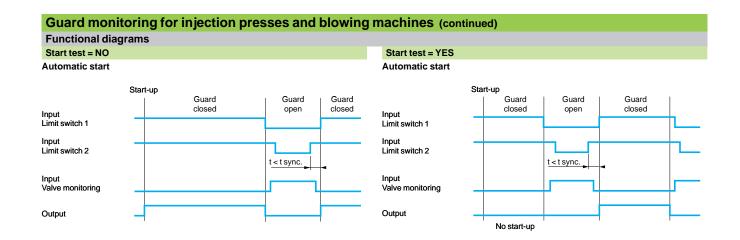


ESC = external start conditions EDM = external devices monitoring

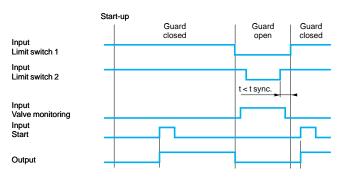
- (1) Technical characteristics for maximum rating of fuses, see page 38789-EN/6.
- (2) Only applicable to XPS MC32Z.

Schneider Belectric

Type XPS MC



Rising edge monitored start



Rising edge monitored start

Input

Input Start

Output

Input

Input

Input Start

Output

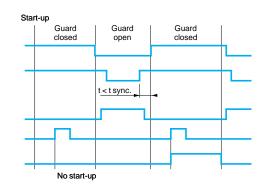
Limit switch 1 Limit switch 2

Valve monitoring

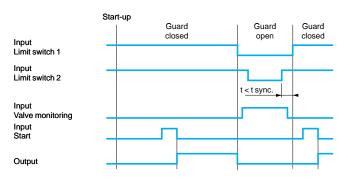
Limit switch 1

Input Limit switch 2

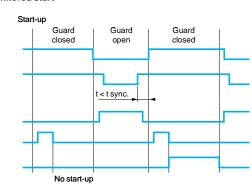
Input Valve monitoring



Falling edge monitored start

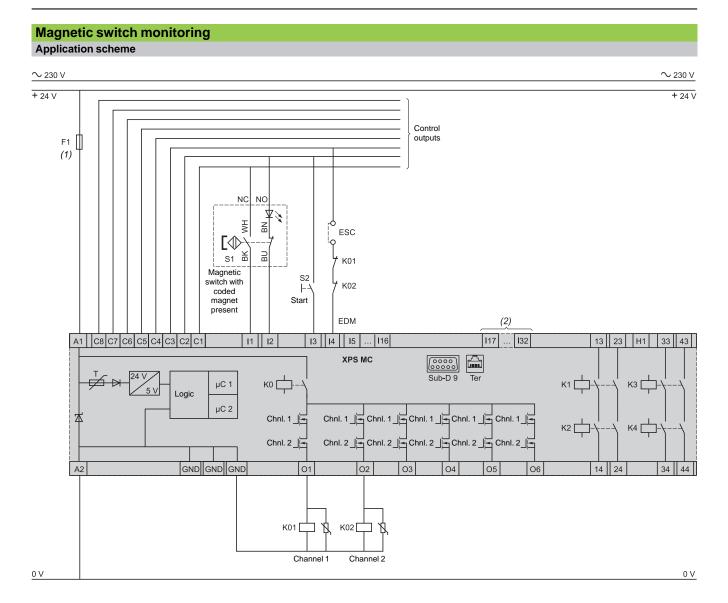


Falling edge monitored start



t sync. = synchronisation time

Type XPS MC



ESC = external start conditions EDM = external devices monitoring

(1) Technical characteristics for maximum rating of fuses, see page 38789-EN/6. (2) Only applicable to XPS MC32Z●.

Type XPS MC

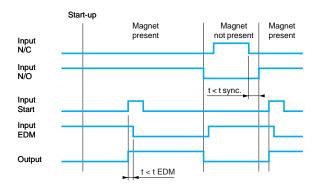
Magnetic switch monitoring (continued) **Functional diagrams** Start test = NO Start test = YES **Automatic start Automatic start** Start-up Start-up Magnet present Magnet not present Magnet present Magnet present Magnet not present Magnet present Input N/C Input N/C Input N/O Input N/O t < t sync. t < t sync. Input EDM Input EDM

Output

Rising edge monitored start

t < t EDM

Output

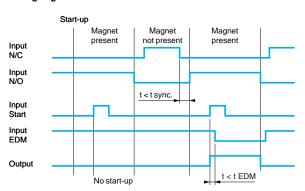


t = t EDM

t > t EDM

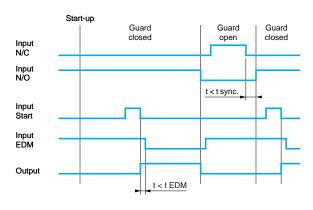
Rising edge monitored start

No start-up

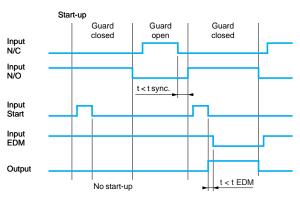


t < t EDM

Falling edge monitored start



Falling edge monitored start



Key

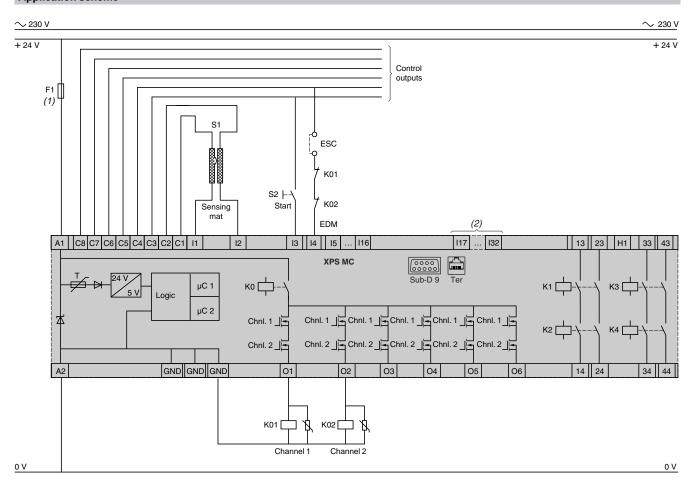
EDM = external devices monitoring t EDM = maximum monitoring time of external devices t sync. = synchronisation time

Type XPS MC

Sensing mat monitoring

- Category 3 conforming to standard EN/ISO 13849-1.
- Control outputs connected to a sensing mat cannot be used for other items.

Application scheme



ESC = external start conditions EDM = external devices monitoring

- (1) Technical characteristics for maximum rating of fuses, see page 38789-EN/6.
- (2) Only applicable to XPS MC32Z.

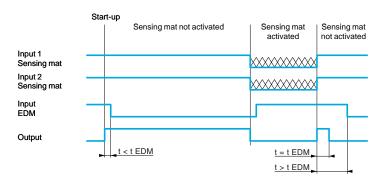
Type XPS MC

Sensing mat monitoring (continued)

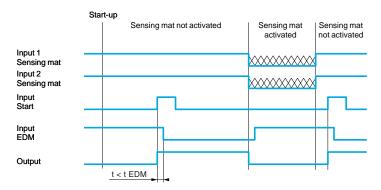
Functional diagrams

Start-up test

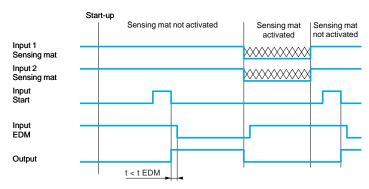
Automatic start



Rising edge monitored start



Falling edge monitored start



Key

EDM = external devices monitoring t EDM = maximum monitoring time of external devices

Chnl. 2 _ Ghnl. 2 _

Type XPS MC

Light curtain monitoring, relay output type Category 4 conforming to standard EN/ISO 13849-1. **Application scheme** \sim 230 V \sim 230 V + 24 V + 24 V Control outputs F1 [(1) (2) ESC ESPE S1 K01 |- \cdots OSSD1 OSSD2 K02 (2) A1 C8 C7 C6 C5 C4 C3 C2 C1 12 13 14 | 15 .. |116 l17 ... l32 13 23 H1 33 43 XPS MC Ter 0000 00000 Sub-D 9 μC 1 μC 2

Chnl. 2

K01

Channel 1

01

Chnl. 2

K02

02

Channel 2

О3

04

ESC = external start conditions ESPE = electro-sensitive protection equipment OSSD1/OSSD2 = output signal switching device

(1) Technical characteristics for maximum rating of fuses, see page 38789-EN/6.

GND GND GND

(2) Only applicable to XPS MC32Z.

A2

0 V

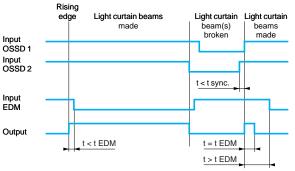
Type XPS MC

Light curtain monitoring, relay output type (continued)

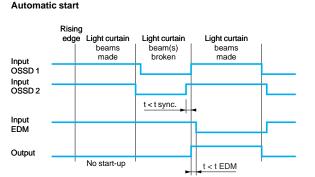
Functional diagrams

Start test = NO

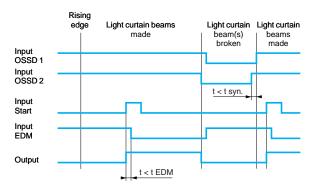
Automatic start



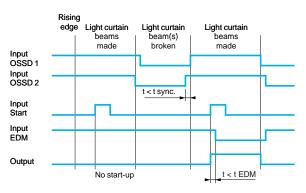
Start test = YES



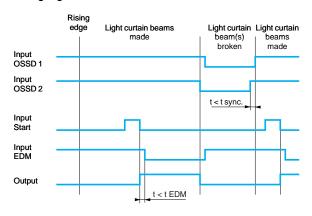
Rising edge monitored start



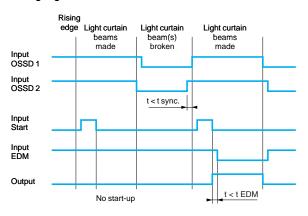
Rising edge monitored start



Falling edge monitored start



Falling edge monitored start



Key

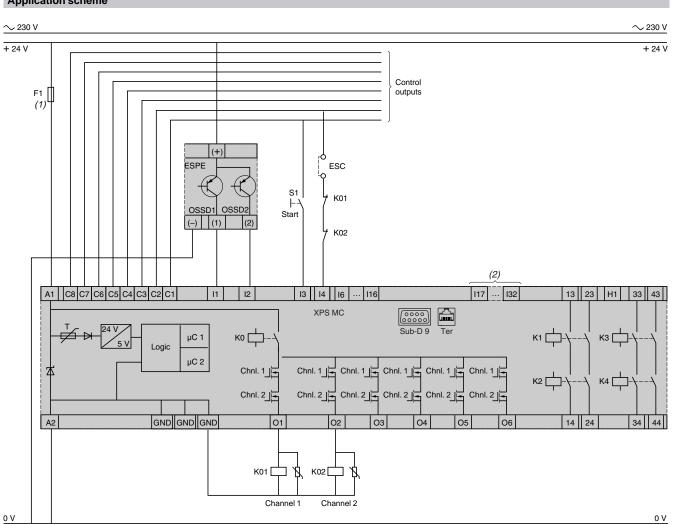
EDM = external devices monitoring t EDM = maximum monitoring time of external devices t sync. = synchronisation time

Type XPS MC

Light curtain monitoring, solid-state output type

Category 4 conforming to standard EN/ISO 13849-1.

Application scheme



ESC = external start conditions ESPE = electro-sensitive protection equipment OSSD1/OSSD2 = output signal switching device

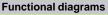
(1) Technical characteristics for maximum rating of fuses, see page 38789-EN/6.

(2) Only applicable to XPS MC32Z.

18

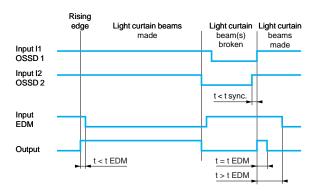
Type XPS MC

Light curtain monitoring, solid-state output type (continued)

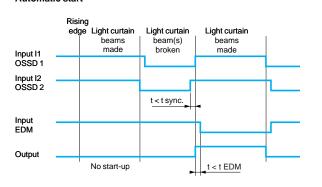


Start test = NO

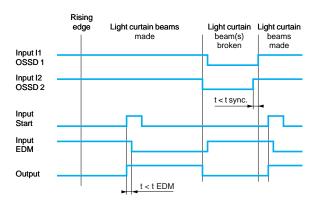
Automatic start



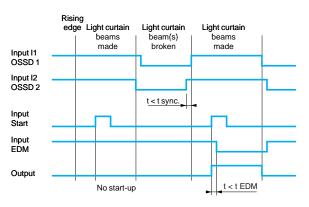
Start test = YES Automatic start



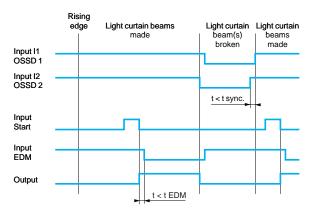
Rising edge monitored start



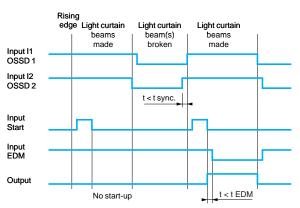
Rising edge monitored start



Falling edge monitored start



Falling edge monitored start



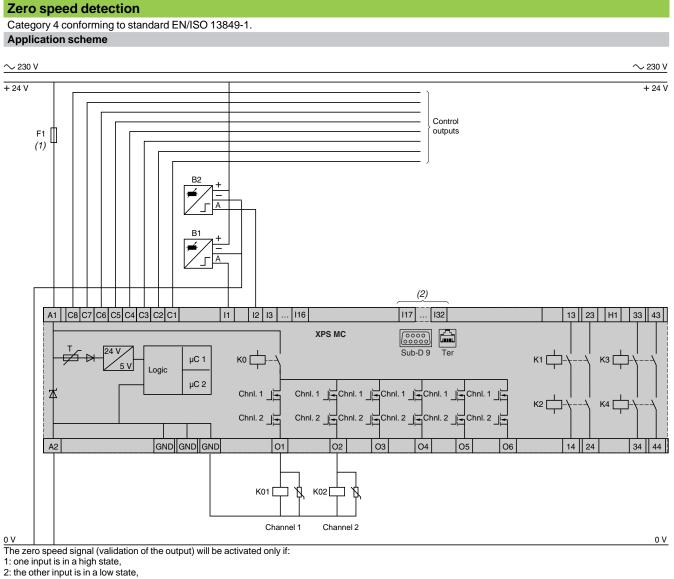


EDM = external devices monitoring

t EDM = maximum monitoring time of external devices

t sync. = synchronisation time

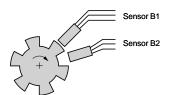
Type XPS MC

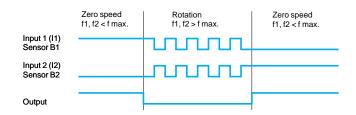


- 3: the frequency of the two inputs is less than the stated value.
- (1) Technical characteristics for maximum rating of fuses, see page 38789-EN/6.
- (2) Only applicable to XPS MC32Ze.

 (3) Only one "Zero speed detection" function can be connected to an XPS MC controller, and only to the inputs i1 and i2.

Functional diagram Sensor control



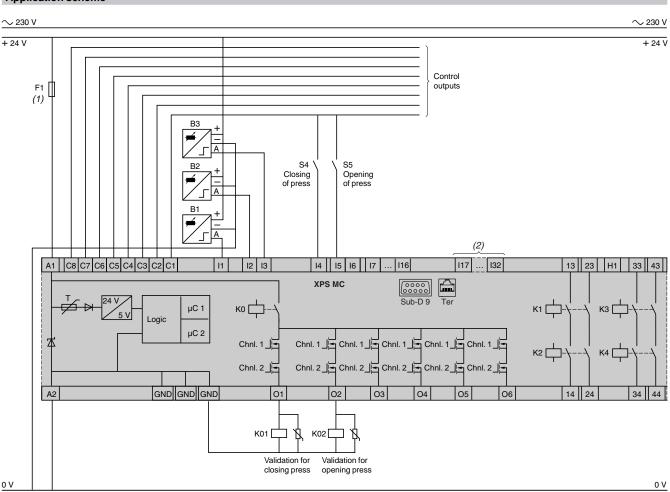


Type XPS MC

Dynamic monitoring of hydraulic valves on linear presses

Category 4 conforming to standard EN/ISO 13849-1.

Application scheme



ESC = external start conditions

(1) Technical characteristics for maximum rating of fuses, see page 38789-EN/6.

(2) Only applicable to XPS MC32Z.

Functional diagrams Valve control Valve sensor signals Press open Closing of Opening of Closing of Press Stop at TDC Stop at Opening of press (TDC) press closed press Input (BDC) Closing of press Valve B1 Input Opening of press (closing) Valve B2 (opening) Input Valve B1 (closing) t < t sync. (closing/opening) Input Valve B2 (opening) Note: The valve sensor signals must function as described above. t < t sync. Input - Valve B3 (closing/opening) t < t sync t < t sync. Output Closing of press Output Opening of press Kev 0 -BDC = Bottom Dead Centre TDC = Top Dead Centre t sync. = synchronisation time

Type XPS MC

Monitoring safety stop at top dead centre on eccentric press

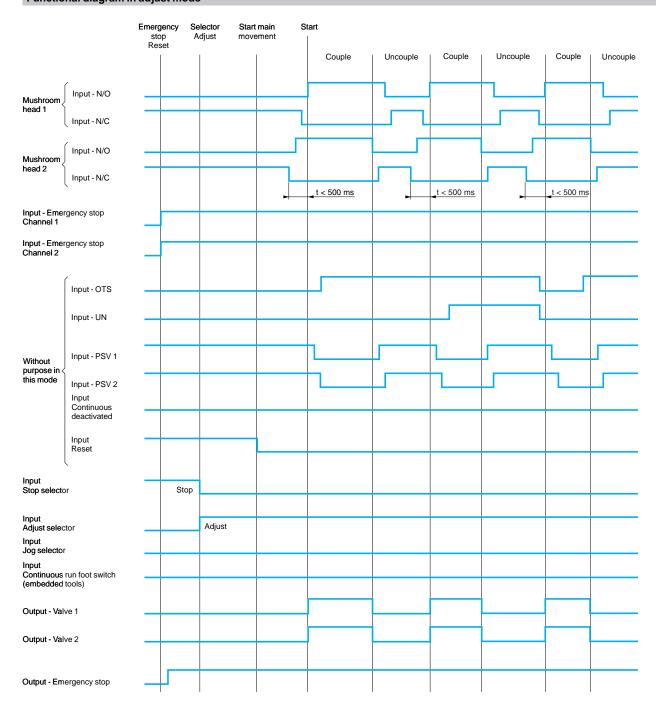
- Category 4 conforming to standard EN/ISO 13849-1.
- This function comprises several monitoring modes including:
- ☐ Safety stop at top dead centre (1),
- □ monitoring braking travel,
- $\hfill \square$ as an option, dynamic monitoring of doubled-bodied solenoid valves (2).

Application scheme <u>∼</u>230 V \sim 230 V + 24 V + 24 V Operation with embedded tools Control outputs F2 (3) (Y1b) 0123 P > S6 Stop PSV2 Continu ous run (1) Ω-S7 Reset NO NC NO S1 1 1 4 Emer-Mushgency stop (4) A1 C8 C7 C6 C5 C4 C3 C2 C1 15 | 16 | 17 | 18 13 | 14 19 XPS MC μC 1 μC 2 Chnl. 1 Chnl. 2 A2 GND GND GND 14 24 To emergency stop FM1 Signalling of SM1 OFF operation with Valve contro Valve control embedded tools PSV 1 PSV 2 SM2 |-KM1 PSV 2 ON Run KM1 0 V N Ν Main movement

- S8: Operating modes:
- 0 stop, 1 adjust,
- 3 automatic continuous run.
- OTS = Limit switch associated with top dead centre (TDC)
- UN = Limit switch associated with bottom dead centre (BDC)
- PSV = safety valve
- (3) Technical characteristics for maximum rating of fuses, see page 38789-EN/6.
- (4) Only applicable to XPS MC32Z.

Type XPS MC

Monitoring safety stop at top dead centre on eccentric press (continued) Functional diagram in adjust mode



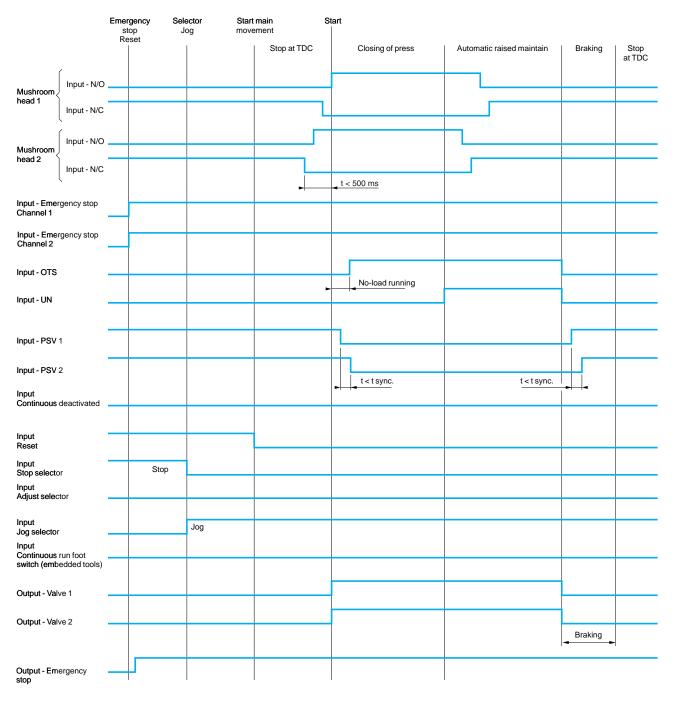
OTS = Limit switch associated with top dead centre (TDC) UN = Limit switch associated with bottom dead centre (BDC) PSV = safety valve

t sync = synchronisation time

Type XPS MC

Monitoring safety stop at top dead centre on eccentric press (continued)

Functional diagram in jog mode





BDC = Bottom Dead Centre

TDC = Top Dead Centre

OTS = Limit switch associated with top dead centre (TDC)

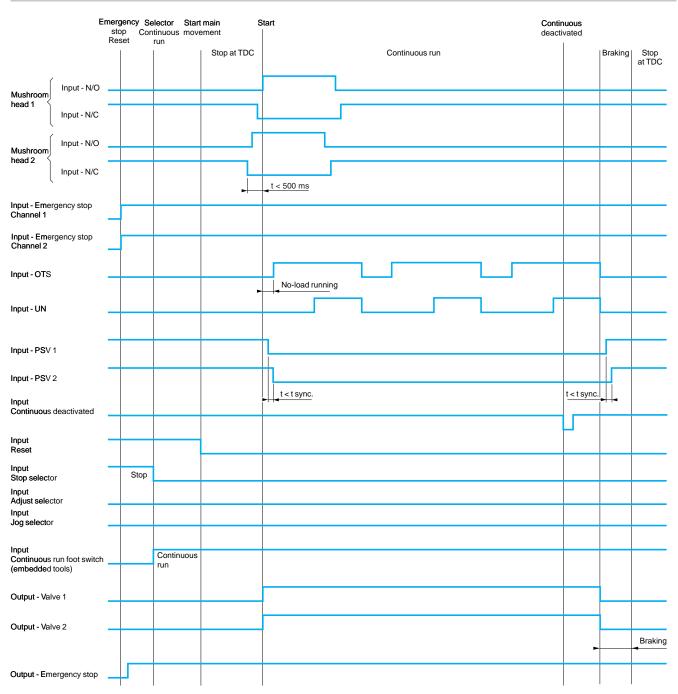
UN = Limit switch associated with bottom dead centre (BDC)

PSV = safety valve t sync = synchronisation time

Type XPS MC

Monitoring safety stop at top dead centre on eccentric press (continued)

Functional diagram in automatic continuous run mode



Key

BDC = Bottom Dead Centre

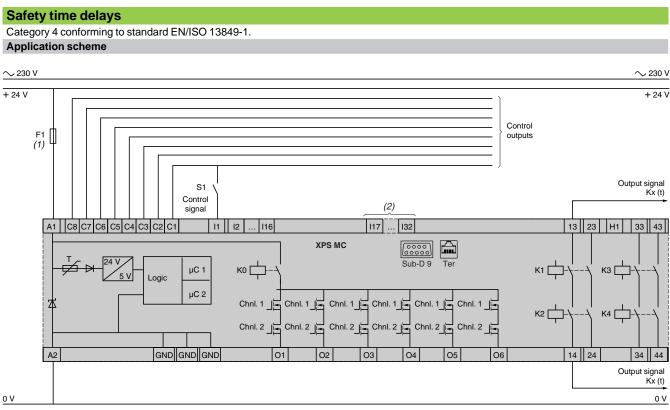
TDC = Top Dead Centre

OTS = Limit switch associated with top dead centre (TDC)

UN = Limit switch associated with bottom dead centre (BDC)

PSV = safety valve t sync = synchronisation time

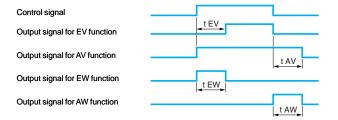
Type XPS MC



(1) Technical characteristics for maximum rating of fuses, see page 38789-EN/6.

(2) Only applicable to XPS MC32Z.

Functional diagrams

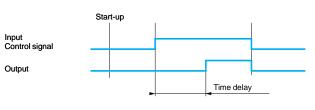


Functions:

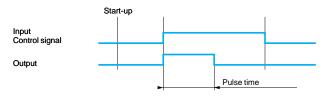
EV = On-delay AV = Off-delay

EW = Pulse on energisation AW = Pulse on de-energisation

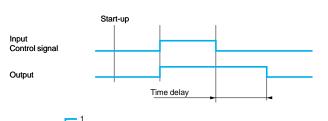
On-delay



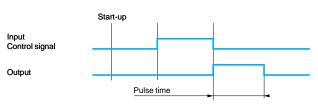
Pulse on energisation



Off-delay

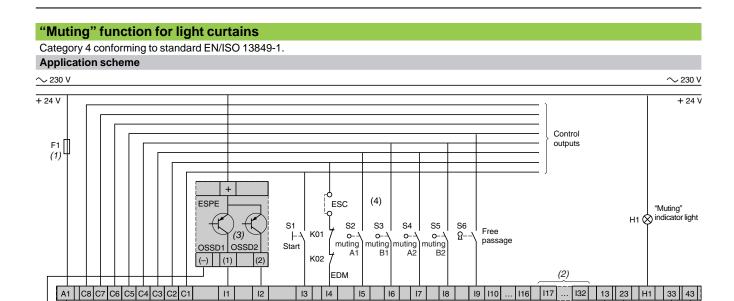


Pulse on de-energisation



Schneider

Type XPS MC



Channel 1 0 V ESC = external start conditions

XPS MC

Chnl. 1 _ Chnl. 1 _

Chnl. 2 _ Chnl. 2 _

Chnl. 2

01

Sub-D9

Chnl. 2

EDM = external devices monitoring

ESPE = electro-sensitive protection equipment

OSSD1/OSSD2 = output signal switching device

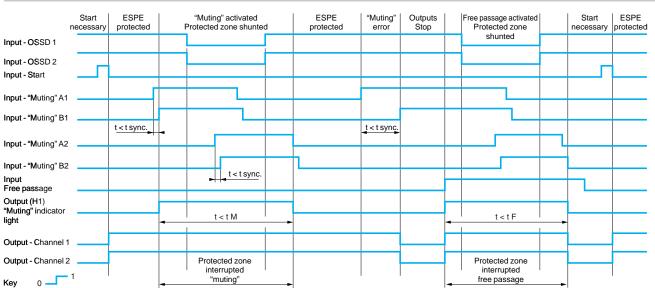
(1) Technical characteristics for maximum rating of fuses, see page 38789-EN/6. (2) Only applicable to XPS MC32Z•.

GND GND GND

- (3) A light curtain with relay outputs can also be used with the "Muting" function.
- (4) Only one "Muting" function can be connected to an XPS MC controller.
- (5) Example using 2 safety outputs to control 2 contactors linked to one safety function.

μC 1 μC 2

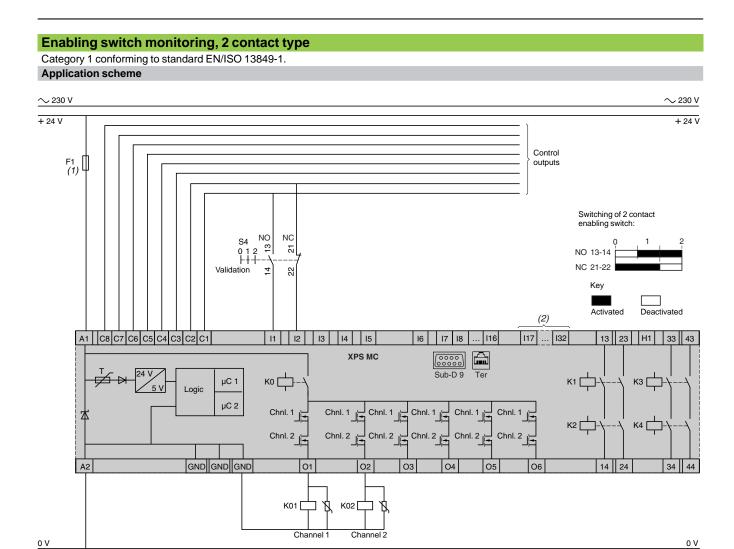
Functional diagram



tM = "Muting" time

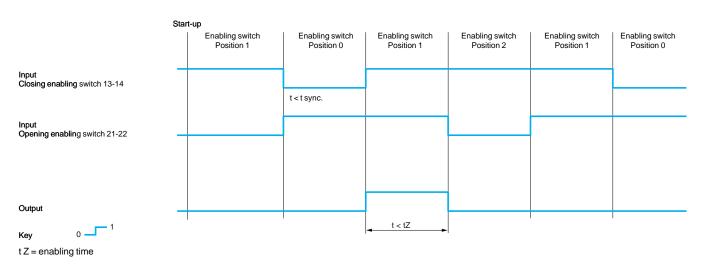
tF = free passage activation time t sync. = synchronisation time

Type XPS MC

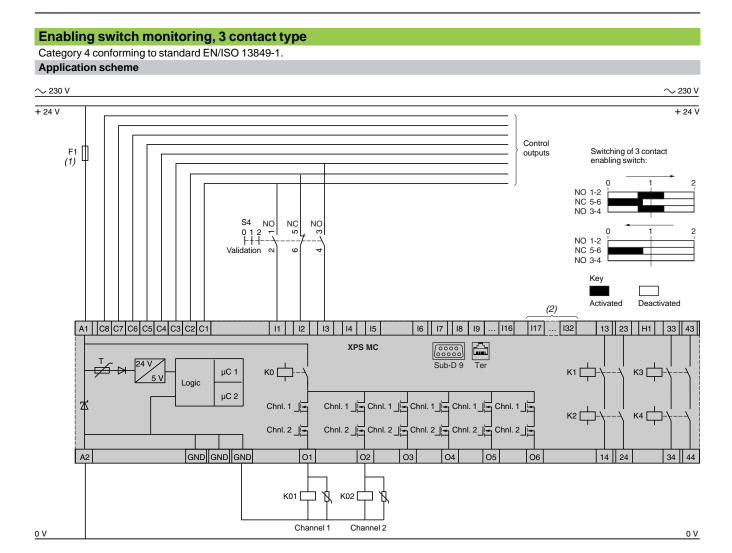


(1) Technical characteristics for maximum rating of fuses, see page 38789-EN/6. (2) Only applicable to XPS MC32Z●.

Functional diagram



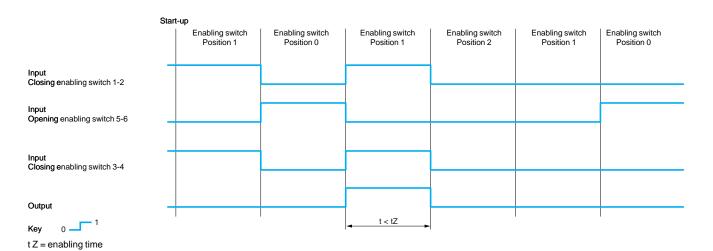
Type XPS MC



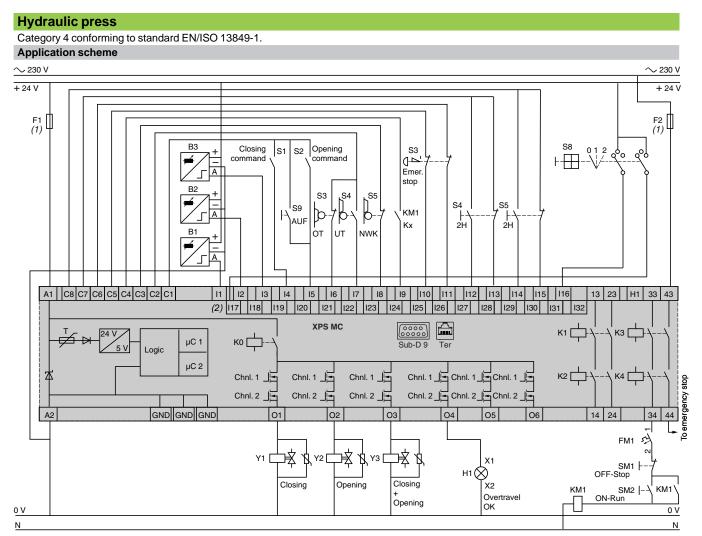
(1) Technical characteristics for maximum rating of fuses, see page 38789-EN/6.

(2) Only applicable to XPS MC32Z.

Functional diagram



Type XPS MC



S8: Operating modes: AUF = open, to be used in inching.

OT = Limit switch associated with top dead centre (TDC). 0 - stop, UT = Limit switch associated with bottom dead centre (BDC). 1 - adjust,

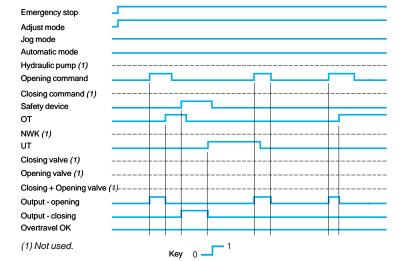
NWK = overtravel monitoring. 2 - jog.

(1) Technical characteristics for maximum rating of fuses, see page 38789-EN/6.

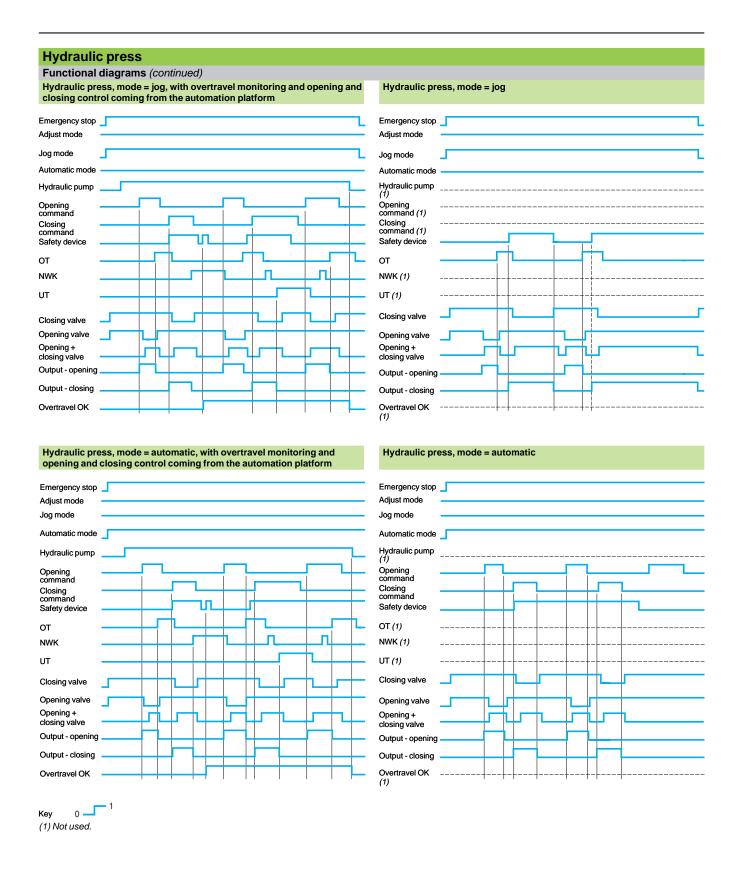
(2) Only applicable to XPS MC32Z

(I17...I32)

Functional diagram Hydraulic press, adjust mode



Type XPS MC



KM1

0 V Ν

Type XPS MC

Eccentric press

Category 4 conforming to standard EN/ISO 13849-1.

Application scheme \sim 230 V 230 V + 24 V + 24 V (Y1a) (Y1b) 0123 P > P > UN PSV1 Continuous S6 S7 Reset function Ω-deactivated NO NC NO NC Mush-room 1 0 Emer room 116 A1 C8 C7 C6 C5 C4 C3 C2 C1 | I1 16 17 18 19 110 111 112 113 114 115 13 23 H1 33 43 12 14 15 (2) 117 119 120 ко 📛-μC 1 μC 2 Chnl. 1 📙 Chnl. 2 _ Chnl. 2 _ Chnl. 2 _ GND GND GND A2 О3 14 24 (Y1b) FM1 🔁 SM1 F OFF-Stop SM2 I ON-Run PSV₁ PSV₂

- S8: Operating modes:
- 0 stop,
- 1 adjust,

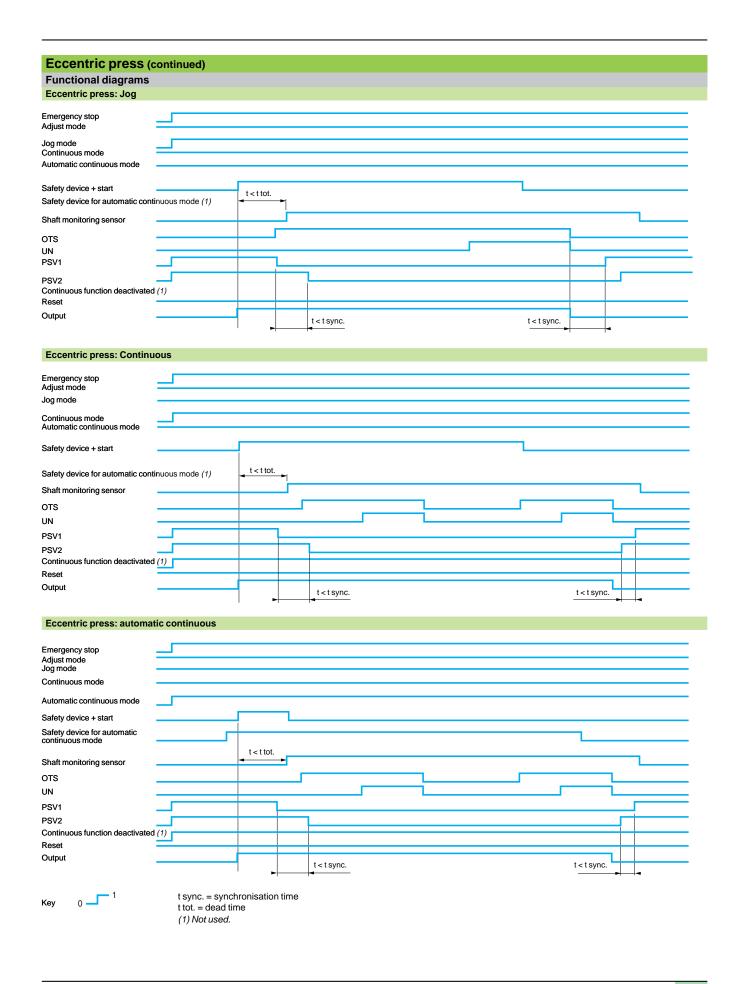
0 V

- 3 automatic continuous run.
- OTS = Limit switch associated with top dead centre (TDC)
 UN = Limit switch associated with bottom dead centre (BDC)
- PSV = safety valve
- B1 = sensor at tooth wheel in cam switch mechanism.
- (1) Technical characteristics for maximum rating of fuses, see page 38789-EN/6.
- (2) Only applicable to XPS MC32Z (I17...I32).

PSV₁

PSV₂

Type XPS MC



Type XPS MC

Foot switch monitoring **Application scheme** + 24 V Control outputs (1) Pedal 13 23 H1 33 43 A1 C8 C7 C6 C5 C4 C3 C2 C1 11 | 12 | 13 14 | 15 16 | 17 | 18 | 19 . |116 117 132 XPS MC μC 1 μC 2 Chnl. 2 Chnl. 2 Chnl. 2 GND GND GND A2 01 02 04 O5 14 | 24

(1) Technical characteristics for maximum rating of fuses, see page 38789-EN/6.

(2) Only applicable to XPS MC32Z.

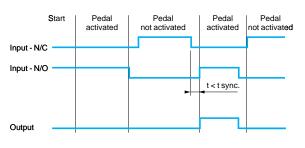
Functional diagrams Without start interlock

Start Pedal Pedal Pedal activated not activated activated Input - N/C Input - N/O t < t sync.



With start interlock

With supplementary safety device



Key

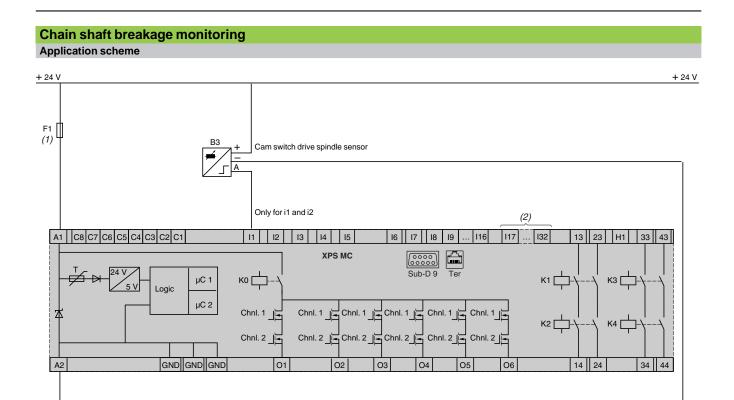
Output

t sync. = synchronisation time

0 V

0 V

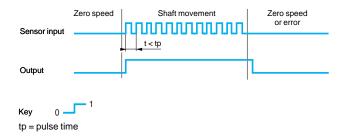
Type XPS MC



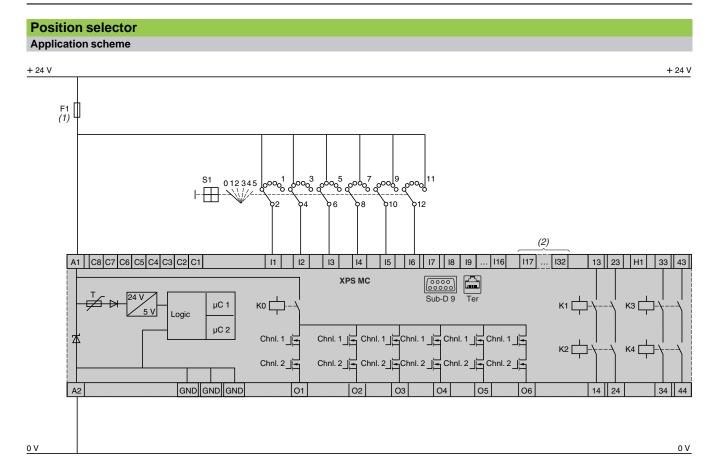
(1) Technical characteristics for maximum rating of fuses, see page 38789-EN/6. (2) Only applicable to XPS MC32Z•.

Functional diagrams

0 V



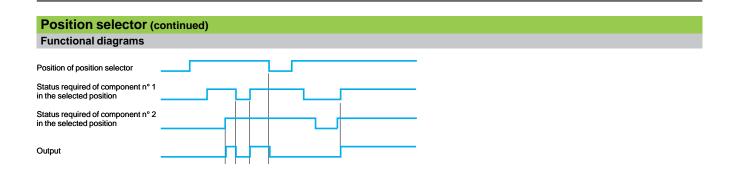
Type XPS MC

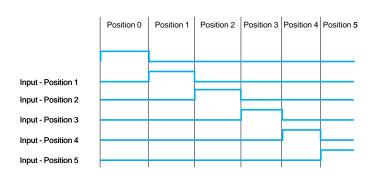


- (1) Technical characteristics for maximum rating of fuses, see page 38789-EN/6.(2) Only applicable to XPS MC32Z●.

Schneider Electric

Type XPS MC



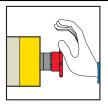


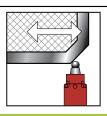
0 ____1 Key

37

Machine safety Preventa safety modules

Applications







Modules

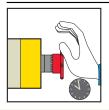
For Emergency stop and switch monitoring

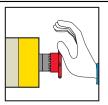




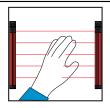


		PERSON	1000	Assessed
Maximum achievable sa	afety level	PL e/Category 4 conforming to EN/ISO 13849-1, SILCL 3 conforming to EN/IEC 61508 and EN/IEC 62061	PL e/Category 4 conforming to EN/ISO 13849-1, SILCL 3 conforming to EN/IEC 61508 and EN/IEC 62061	PL e/Category 4 (instantaneou safety outputs) and PL d/ Category 3 (time delay safety outputs) conforming to EN/ISO 13849-1, SILCL 3 (instantaneous safety outputs) and SILCL 2 (time delay safety outputs) conforming to EN/IEC 61508 and EN/IEC 62061
Conformity to standard	s	EN/IEC 60204-1, EN 1088/ISO 14119, EN/ISO 13850, EN/IEC 60947-1, EN/IEC 60947-5-1	EN/IEC 60204-1, EN 1088/ISO 14119, EN/ISO 13850, EN/IEC 60947-1, EN/IEC 60947-5-1	EN/IEC 60204-1, EN/ISO 13850, EN 1088/ISO 14119, EN/IEC 60947-1, EN/IEC 60947-5-1
Product certifications		UL, CSA, TÜV	UL, CSA, BG	UL, CSA, TÜV
Number of circuits				
	Safety	3 NO	3 NO	2 NO instantaneous + 3 NO time delay
	Additional	1 solid-state output for signalling to PLC	1 relay output for signalling to PLC	4 solid-state outputs for signalling to PLC
Display		2 LEDs	2 LEDs	4 LEDs
Supply voltage		~ and 24 V == 48 V ~ 115 V ~ 230 V ~	∼ and 24 V	∼ and 24 V 115 V ∼ 230 V ∼
Synchronisation time be	etween inputs	Unlimited	Unlimited	75 ms (automatic start)
Input channel voltage				
	24 V/48 V version	\sim and 24 V ==-/48 V \sim	24 V	24 V/-
	24 V/48 V or 110 V/120 V/230 V version	115 V ∼/230 V -	-	48 V ∼/48 V -
Module type		XPS AC	XPS AXE	XPS ATE
Dance		20770/2	20770/2	20702/2
Pages		38770/2	38770/2	38783/2











For Emergency stop and switch monitoring

For Emergency stop, switch or solid-state output safety light curtain monitoring

For Emergency stop, switch, sensing mat/ edges or solid-state output safety light curtain monitoring













PL e/Category 4 conforming to EN/ISO 13849-1, SILCL 3 conforming to EN/IEC 61508 and EN/IEC 62061	PL e/Category 4 (instantaneous safety outputs) and PL d/Category 3 (time delay safety outputs) conforming to EN/ISO 13849-1, SILCL 3 (instantaneous safety outputs) and SILCL 2 (time delay safety outputs) conforming to EN/IEC 61508 and EN/IEC 62061	PL e/Category 4 conforming to EN/ISO 13849-1, SILCL 3 conforming to EN/IEC 61508 and EN/IEC 62061	PL e/Category 4 conforming to EN/ISO 13849-1, SILCL 3 conforming to EN/IEC 61508 and EN/IEC 62061	PL e/Category 4 conforming to EN/ISO 13849-1, SILCL 3 conforming to EN/IEC 61508 and EN/IEC 62061	PL e/Category 4 conforming to EN/ISO 13849-1, SILCL 3 conforming to EN/IEC 61508 and EN/IEC 62061
EN/IEC 60204-1, EN 1088/ISO 14119, EN/ISO 13850, EN/IEC 60947-1, EN/IEC 60947-5-1	EN/IEC 60204-1, EN/IEC 60947-1, EN/IEC 60947-5-1, EN/ISO 13850, EN 1088/ISO 14119	EN/IEC 60204-1, EN 1088/ISO 14119, EN/ISO 13850, EN/IEC 60947-1, EN/IEC 60947-5-1	EN/IEC 60204-1, EN 1088/ISO 14119, EN/ISO 13850, EN/IEC 60947-1, EN/IEC 60947-5-1, EN/IEC 61496-1 (type 4)	EN/IEC 60204-1, EN 1088/ISO 14119, EN/ISO 13850, EN/IEC 60947-1, EN/IEC 60947-5-1	EN/IEC 60204-1, EN 1088/ISO 14119, EN/ISO 13850, EN/IEC 60947-1, EN/IEC 60947-5-1
UL, CSA, TÜV	UL, CSA, BG	UL, CSA, TÜV	UL, CSA, TÜV	UL, CSA, TÜV	UL, CSA, TÜV
3 NO instantaneous + 3 NO time delay	2 NO instantaneous + 1 NO time delay	3 NO		7 NO	3 NO instantaneous
3 solid-state outputs for signalling to PLC	-	-		2 NC + 4 solid-state outputs for signalling to PLC	1 NC + 4 solid-state outputs for signalling to PLC
11 LEDs	3 LEDs	3 LEDs		4 LEDs	4 LEDs
24 V	24 V 	∼ and 24 V 		\sim and 24 V $=$ 115 V \sim and 24 V $=$ 230 V \sim and 24 V $=$	~ and 24 V == 48 V ~= 110 V ~ and 24 V == 120 V ~ and 24 V == 230 V ~ and 24 V ==
Unlimited or 1.5 s (depending on wiring)	Unlimited	Unlimited			Unlimited or 2 s, 4 s (depending on wiring)
24 V ===/—	24 V/-	24 V/-		24 V ===/—	24 V/-
-	-	-		24 V ∼/24 V -	_ 24 V/24 V/24 V

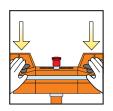
XPS AV	XPS ABV	XPS AF	XPS AFL	XPS AR	XPS AK
38783/2	38783/2	38781/2	38786/2	38791/2	38782/3

Machine safety Preventa safety modules

Applications

Modules





For enabling switch monitoring

For electrical monitoring of two-hand control stations







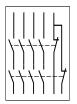
	<u> </u>			
Maximum achievable safe	ty level	PL e/Category 4 conforming to EN/ISO 13849-1, SILCL 3 conforming to EN/IEC 61508 and EN/IEC 62061	PL c/Category 1 conforming to EN/ISO 13849-1	PL e/Category 4 conforming to EN/ISO 13849-1, SILCL 3 conforming to EN/IEC 61508 and EN/IEC 62061
Conformity to standards		EN/IEC 60204-1, EN 61326, EN/IEC 60947-1, EN/IEC 60947-5-1	EN/IEC 60204-1, EN/IEC 60947-1, EN/IEC 60947-5-1, EN 574 type III A/ISO 13851	EN/IEC 60204-1, EN/IEC 60947-1, EN/IEC 60947-5-1, EN 574 type III C/ISO 13851
Product certifications		UL, CSA, TÜV	UL, CSA, TÜV	UL, CSA, BG
Number of circuits				
	Safety	2 NO	1 NO	2 NO
	Additional	2 solid-state outputs for signalling to PLC	1 NC	1 NC
Display		3 LEDs	2 LEDs	3 LEDs
Supply voltage		24 V	∼ and 24 V === 115 V ∼ 230 V ∼	∼ and 24 V 115 V ∼ 230 V ∼
Synchronisation time betw	veen inputs	-	500 ms	500 ms
Input channel voltage				
	24 V/48 V version	24 V/–	24 V/-	24 V
	115 V/230 V version	-	24 V ~/24 V	-
Module type		XPS VC	XPS BA	XPS BCE
Pages		38792/2	38790/2	38790/2
uguu		00102/2	0010012	0010012

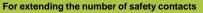


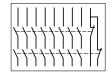
For control of 1 to 4 single-beam photo-electric sensors XU2 S (transmitterreceiver pair)



For monitoring type 2 and type 4 light curtains Compact and slim ranges

















PL e/Category 4 conforming to EN/ISO 13849-1, SILCL 3 conforming to EN/IEC 61508 and EN/IEC 62061	PL c/Category 2 conforming to EN/ISO 13849-1, SILCL 1 conforming to EN/IEC 61508 and EN/IEC 62061	PL e/Category 4 conforming to EN/ISO 13849-1, SILCL 3 conforming to EN/IEC 61508 and EN/IEC 62061	PL e/Category 4 conforming to EN/ISO 13849-1, SILCL 3 conforming to EN/IEC 61508 and EN/IEC 62061 (when connected to the appropriate module)	PL e/Category 4 conforming to EN/ISO 13849-1, SILCL 3 conforming to EN/IEC 61508 and EN/IEC 62061 (when connected to the appropriate module)
EN/IEC 60204-1, EN/IEC 60947-1, EN/IEC 60947-5-1, EN 574 type III C/ISO 13851	EN/IEC 61496-1, EN/IEC 61496-2, EN/IEC 60204-1, EN/IEC 60947-1, EN/IEC 60947-5-1	EN/IEC 61496-1, EN/IEC 61496-2, EN/IEC 60204-1, EN/IEC 60947-1, EN/IEC 60947-5-1	EN/IEC 60204-1, EN/IEC 60947-1, EN/IEC 60947-5-1	EN/IEC 60204-1, EN/IEC 60947-1, EN/IEC 60947-5-1
UL, CSA, TÜV	UL, CSA, IFA	UL, CSA, TÜV	UL, CSA, BG	UL, CSA, TÜV
2 NO	2 NO	2 solid-state	4 NO	8 NO
2 solid-state outputs for signalling to PLC	4 solid-state PNP NO outputs for signalling to PLC	1 PNP + 1 NPN output for signalling to PLC	2 NC	1 NC
3 LEDs	4 LEDs	14 LEDs + 2-digit display	2 LEDs	3 LEDs
24 V	24 V	24 V	\sim and 24 V $\overline{\dots}$	∼ and 24 V 115 V ∼ 230 V ∼
500 ms	-	3 s or infinite	-	-
24 V ===/-	-	-	-	-
-	-	-	-	-

XPS BF	XPS CM	XPS LCM	XPS ECME	XPS ECPE
38790/2	30303/2	30311/2	38775/2	38775/2

Machine safety Preventa safety modules

Applications

Pages



Modules

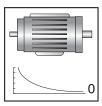
For the monitoring of applications requiring safety time delays





Maximum achievable safety level	PL d/Category 3 conforming to EN/ISO 13849-1, SILCL 2 conforming to EN/IEC 61508 and EN/IEC 62061	PL d/Category 3 conforming to EN/ISO 13849-1, SILCL 2 conforming to EN/IEC 61508 and EN/IEC 62061
Conformity to standards	EN/IEC 60204-1, EN/IEC 60947-1, EN/IEC 60947-5-1	EN/IEC 60204-1, EN/IEC 60947-1, EN/IEC 60947-5-1
Product certifications Number of circuits	UL, CSA, TÜV	UL, CSA, TÜV
Number of circuits		
Safety	1 NO time delayed	1 NO pulse type
Additional	2 NC + 2 solid-state outputs for signalli	ing to PLC
Display	4 LEDs	
Supply voltage	∼ and 24 V 115 V ∼ 230 V ∼	
Synchronisation time between inputs	-	-
Mark to the second	VD0 704	VP0 =011
Module type	XPS TSA	XPS TSW







For coded magnetic switch monitoring

For zero speed detection of AC or DC motors which produce a remanent voltage in their windings due to residual magnetism

For lift control

For 2 max.

For 6 max.









PL e/Category 4 conforming to EN/ISO 13849-1 SILCL 3 conforming to EN/IEC 61508 and EN/IEC 62061 PL e/Category 4 conforming to EN/ISO 13849-1 SILCL 3 conforming to EN/IEC 61508 and EN/IEC 62061 PL d/Category 3 conforming to EN/ISO 13849-1, SILCL 2 conforming to EN/IEC 61508 and EN/IEC 62061 PL e/Category 4 conforming to EN/ISO 13849-1, SILCL 3 conforming to EN/IEC 61508 and EN/IEC 62061

EN/IEC 60204-1, EN 1088/ISO 14119, EN/IEC 60947-1, EN/IEC 60947-5-1, EN/IEC 60947-5-3

EN/IEC 60204-1, EN 1088/ISO 14119, EN/IEC 60947-1, EN/IEC 60947-5-1, EN/IEC 60947-5-3

EN/IEC 60204-1, EN/IEC 60947-1, EN/IEC 60947-5-1 EN 81-1, EN 81-2, EN/IEC 60947-5-1, EN 12015, EN 12016

Infinite

UL, CSA, TÜV

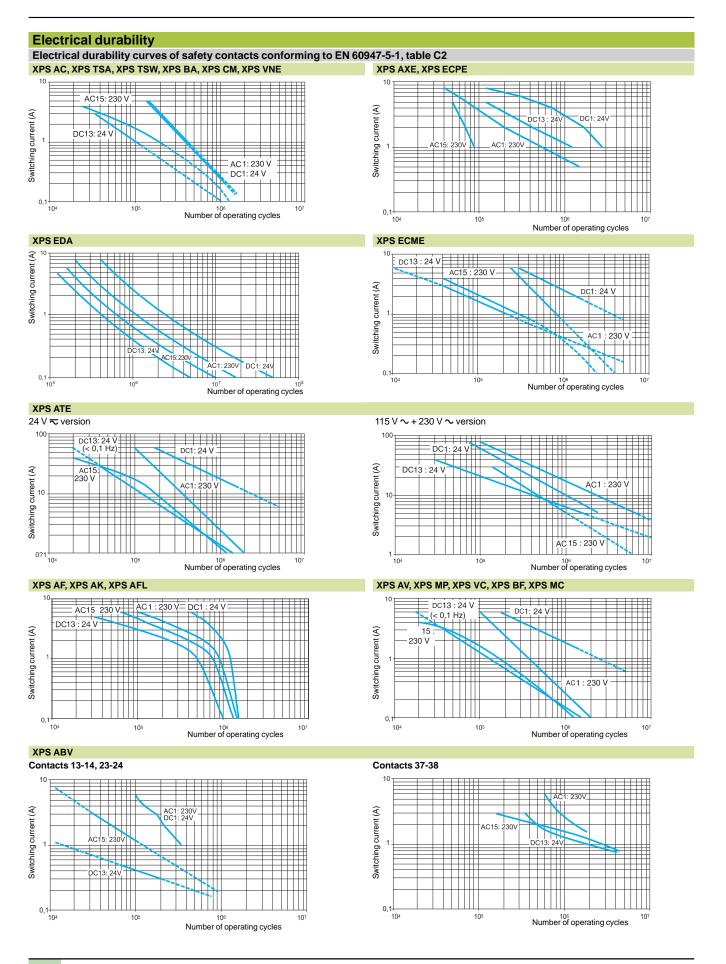
500 ms

UL, CSA, TÜV

UL, CSA, TÜV TÜV

XPS DMB	XPS DME	XPS VNE	XPS EDA
38793/2	38793/2	38777/2	38778/2

Safety automation system solutionsPreventa safety modules

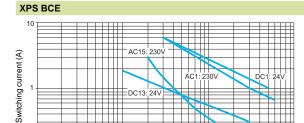


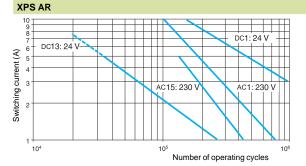
Safety automation system solutionsPreventa safety modules

Electrical durability (continued)

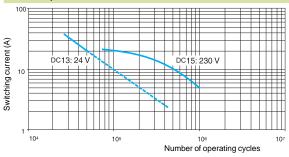
Electrical durability curves of safety contacts conforming to EN 60947-5-1, table C2

Number of operating cycles





XPS DMB, XPS DME



Definition of tests	Definition of tests											
Determination of electrical durability conforming to EN 60947-5-1 (table C2)												
Type of current	Utilisation category	Start-up	tart-up Breaking									
		Current	Voltage	Cos φ	Current	Voltage	Cos φ					
a.c. supply	AC-15	10 x le	Ue	0.7	le	Ue	0.4					
Type of current	Utilisation category	Start-up			Breaking							
		Current	Voltage	T0.95	Current	Voltage	T0.95					
d.c. supply	DC-13	le	Ue	50 ms	le	Ue	50 ms					

le: operational current measured. Ue: operational voltage measured. Cos φ: power factor. T0.95: time taken to reach 95% of nominal current.

The tests are carried out with a frequency of 6 switching operations per minute and with no additional protection of the components connected to the safety outputs.

The use of additional protection for the components connected to the safety outputs signi cantly increases the durability of the safety outputs.

Determination of the breaking capacity conforming to EN 60947-5-1 (table 4)											
Utilisation category	Start-up			Breaking			of switching operations	Switching	Switching	Minimum	
	Current	Voltage	Cos φ	Current	Voltage	Cos φ		operations per minute for 11000 switching operations	operations per minute for 10016050 switching operations	duration of switching operation	
AC-15	10 x le	Ue	0.3	le	Ue	0.3	6050	60	6	50 ms	
Utilisation category	Start-up			Breaking		Total number	Switching	Switching	Minimum		
,	Current	Voltage	T0.95	Current	Voltage	T0.95	of switching operations	operations per minute for 11000 switching operations	operations per minute for 10016050 switching operations	duration of switching operation	
DC-13	le	Ue	50 ms	le	Ue	50 ms	6050	60	6	50 ms	

le: operational current measured. Ue: operational voltage measured. Cos φ: power factor. T0.95: time taken to reach 95% of nominal current.

Notes

The maximum values for the breaking capacity of the safety outputs in the various utilisation categories are not xed and depend on the power factor and on the switching frequency. The test de nition for the "breaking capacity" and "durability" tables in the European standard EN 60947-5-1 uses different values for the power factor and the switching frequency.

The power factor $(\cos \varphi)$ in the "breaking capacity" table (0.3) is greater than that in the "durability" table (0.7).

In the "breaking capacity" table, the switching frequency of the safety outputs is higher for the rst 1000 switching operations (60 per minute) than that for 1001 to 6050 switching operations (6 per minute).

Consequently, the maximum breaking capacity values determined using the "breaking capacity" table are lower than those in the "durability" table.

Operating principle, characteristics

Safety automation solutions

Preventa safety modules types XPS AC, XPS AXE

For Emergency stop and switch monitoring

Operating principle

Safety modules XPS AC and XPS AXE are used for monitoring Emergency stop circuits conforming to standards EN/ISO 13850 and EN/IEC 60204-1 and also meet the safety requirements for the electrical monitoring of switches in protection devices conforming to standard EN 1088/ISO 14119. They provide protection for both the machine operator and the machine by immediately stopping the dangerous movement on receipt of a stop instruction from the operator, or on detection of a fault in the safety circuit itself.

To aid diagnostics, the modules have LEDs which provide information on the monitoring circuit status.

The XPS AC module has 3 safety outputs and a solid-state output for signalling to the PLC. The XPS AXE module has 3 safety outputs and a relay output for signalling to the PLC.

Characteristics				
Module type			XPS AC, XPS AC●●●P	XPS AXE••••P, XPS AXE••••C
Maximum achievable safe	ty level		PL e/Category 4 conforming to EN/ISO 13849-1, SILCL 3 conforming to EN/IEC 62061	PLe/Category 4 conforming to EN/ISO 13849-1 SILCL 3 conforming to EN/IEC 62061
Reliability data	Mean Time To dangerous Failure (MTTF _d)	Years	210.4	457
	Diagnostic Coverage (DC)	%	> 99	> 99
	Probability of dangerous Failure per Hour (PFH _d)	1/h	3.56 x 10 ⁻⁹	3 x 10 ⁻⁸
Conformity to standards			EN/IEC 60204-1, EN 1088/ISO 14119, EN/ISO 13850, EN/IEC 60947-1, EN/IEC 60947-5-1	EN/IEC 60204-1, EN 1088/ISO 14119, EN/ISO 13850, EN/IEC 60947-1, EN/IEC 60947-5-1
Product certifications			UL, CSA, TÜV	UL, CSA, BG
Supply	Voltage	٧	∼ and 24 , 48 ∼, 115 ∼, 230 ∼	∼ and 24
	Voltage limits		- 20+ 10% (24 V ~) - 20+ 20% (24 V ·) - 15+ 10% (48 V ~) - 15+ 15 % (115 V) - 15+ 10% (230 V)	- 15+ 10%
	Frequency	Hz	50/60	50/60
Consumption		W	< 1.2 (24 V)	-
		VA	<2.5 (24 V ∼) <6 (48 V ∼) <7 (115 V ∼) <6 (230 V ∼)	< 4
Start button monitoring			No	No
Control unit voltage			Identical to supply voltage	
(at nominal supply voltage)	24 V version	٧	24 ∼ (approx. 90 mA), 24 === (approx. 40 mA)	24
	48 V version	٧	48 \sim (approx. 100 mA)	-
	115 V version	٧	115 ∼ (approx. 60 mA)	-
	230 V version	٧	230 ∼ (approx. 25 mA)	-
Outputs	Voltage reference		Volt-free	Volt-free
	Number and type of safety circuits		3 NO (13-14, 23-24, 33-34)	3 NO (13-14, 23-24, 33-34)
	Number and type of additional circuits		1 solid-state	1 NC relay (41-42)
	Breaking capacity in AC-15	VA	C300: inrush 1800, maintained 180	B300
	Breaking capacity in DC-13		24 V/2 A L/R = 50 ms	24 V/1.5 A L/R = 50 ms
	Max. thermal current (Ithe)	A	6	8
	Max. total thermal current Output fuse protection, using fuses conforming to IEC/EN 947-5-1, DIN VDE 0660 part 200	A	4 gG (gl) or 6 fast acting	6 gG
	Minimum current	mA	10	10
	Minimum voltage	٧	17	17
Electrical durability			See page 38610-EN/2	
Response time on input o	pening	ms	< 100	< 80
Rated insulation voltage (Ji)	٧	300 (degree of pollution 2 conforming to IEC	/EN 60947-5-1, DIN VDE 0110 parts 1 & 2)
Rated impulse withstand voltage (Uimp)		kV	3 (overvoltage category III, conforming to IEC/EN 60947-5-1, DIN VDE 0110 parts 1 & 2)	4 (overvoltage category III, conforming to IEC/EN 60947-5-1, DIN VDE 0110 parts 1 & 2)
LED display			2	2
Operating temperature		°C	- 10+ 55	- 25+ 55
Storage temperature		°C	- 25+ 85	- 25+ 75
Degree of protection	Terminals		IP 20	IP 20
conforming to IEC/EN 60529	Enclosure		IP 40	IP 40

Schneider

Characteristics (continued), references

Safety automation solutions
Preventa safety modules types XPS AC,
XPS AXE

For Emergency stop and switch monitoring

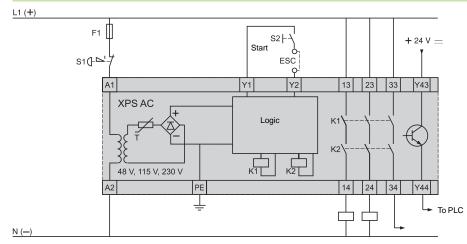
Type	Characterist	tics			/DC 4.0		XPS AC••••P	VDC AVE. D	VDC AVE	
Terminal block Integrated in module Terminals Terminal block Integrated in module Terminals Term	Module type Connection	Type	Terminals			crew clamp		XPS AXE		
1-wire connection		71 -		t	erminals		terminals	terminals		
With cable and With cable and With bezet, exible cable; 0.25,25 mm' With bezet, exible cable; 0.25,25 mm' Obte 0.25,25 mm' Cable 0.25,25 mm' Cab			Terminal block		ntegrate	d in module				trom
With cable end Without bazel, exible cable: 0.2525 mm With bazel, exible cable: 0.2525 mm Cable: 0.2515 mm Cable		1-wire connection	Without cable end					: 0.22.5 mm ²		
Captive screen Safety modules for Emergency stop and switch monitoring Safety screen			With cable end					2		
2-wire connection				١	Vith beze	el, exible	With bezel, exible	With bezel, exible	with bezel,	exible
0.14075 mm² collect cable 0.221 mm² collect cabl		0	Mish and a ship and						nm² cable: 0.25.	2.5 mm
With cable end Without bezel, exible cable: 0.51.5 mm² Double, with bezel, exible cable		2-wire connection	without cable end				0.21 mm ² ,		2 -	
Double, with bezel, exible cable: 0.51.5 mm² Double, with bezel, exible cable: 0.51 mm² Double cable: 0.51 mm² Double: 0.51										
Description Connection Number of Instantaneous cutytus Supply Reference Weigh Reference Safety modules for Emergency stop and switch Inmodule			With cable end					2		
Description				L	Jouble, v	vith bezel, (exible cable: 0.51.5	mm²	exible cab	le:
Description	Poforoncos								0.51 mm	2
Safety modules for Emergency stop and switch monitoring Safety Safety modules	relefelices	Descript	ion	Connecti	on	Number o	f Additional	Supply	Reference	Weigh
Safety modules for Captive screw Captive										kç
Captive screw clamp terminals Terminal block removable from module ABV \(\times \) XPS AC1321 0.21						circuits				
Integrated in module	新用機	Emergen	cy stop and switch	clamp terr	ninals	3	1 solid-state	\sim and 24 V $=$	XPS AC5121	0.16
115 V \(\times \) XPS AC1321 0.21	Schoolster	monitorin	ng							
230 V ~ XPS AC3421 0.21 230 V ~ XPS AC3721 0.21 230 V ~ XPS AC3721P 0.16 48 V ~ XPS AC1321P 0.21 230 V ~ XPS AC3421P 0.21 230 V ~ XPS AC3421P 0.21 230 V ~ XPS AC3721P 0.21				in module						
115 V \ XPS AC3421 0.21	四部							48 V ∼	XPS AC1321	0.21
115 V \ XPS AC3421 0.21	ADS ACasas									
230 V \ XPS AC3721 0.21	APS ACCOUNT									
Captive screw 3 1 solid-state	The same of the sa							115 V ∼	XPS AC3421	0.21
Captive screw 3 1 solid-state	1000									
Captive screw 3 1 solid-state										
Clamp terminals Terminal block removable from module	100							230 V ∼	XPS AC3721	0.21
Clamp terminals Terminal block removable from module	SHILL									
Clamp terminals Terminal block removable from module	製機構能									
Telay Name	(PS AC•••P					3	1 solid-state	\sim and 24 V $=$	XPS AC5121P	0.16
module 48 V ∼ XPS AC1321P 0.21 115 V ∼ XPS AC3421P 0.21 230 V ∼ XPS AC3721P 0.21 1 relay										
115 V \(\times \text{XPS AC3421P} \) 0.21										
230 V \(\times \text{ XPS AC3721P} \) 0.21								48 V ∼	XPS AC1321P	0.21
230 V \(\times \text{ XPS AC3721P} \) 0.21	25-6									
230 V \(\times \text{ XPS AC3721P} \) 0.21	Supplied Dr. Ant.									
Spring terminals 3 1 relay ~ and 24 V XPS AXE5120P 0.22 Terminal block removable from module PS AXE5120C To AXE5120C	O.m. O.m.							115 V ∼	XPS AC3421P	0.21
Spring terminals 3 1 relay ~ and 24 V XPS AXE5120P 0.22 Terminal block removable from module PS AXE5120C To AXE5120C	1177									
Spring terminals 3 1 relay ~ and 24 V XPS AXE5120P 0.22 Terminal block removable from module PS AXE5120C To AXE5120C	VDC AVEC400D									
Spring terminals 3 1 relay ~ and 24 V XPS AXE5120C 0.22 Terminal block removable from module	XPS AXE5120P							230 V ∼	XPS AC3721P	0.21
Spring terminals 3 1 relay ~ and 24 V XPS AXE5120C 0.22 Terminal block removable from module										
Spring terminals 3 1 relay ~ and 24 V XPS AXE5120C 0.22 Terminal block removable from module										
Terminal block removable from module	W LLL						1 relay	\sim and 24 V $=$	XPS AXE5120F	0.22
Terminal block removable from module	Segratur Segratur Segratur									
Terminal block removable from module	9									
removable from module PS AXE5120C	1111					3	1 relay	∼ and 24 V	XPS AXE51200	0.22
PS AXE5120C	WILLIAM TO THE PARTY OF THE PAR			removable						
	KPS AXE5120C			module						
Colonidar										

Safety automation solutions Preventa safety modules type XPS AC

For Emergency stop and switch monitoring

XPS AC

Module XPS AC associated with an Emergency stop button with 1 NC contact

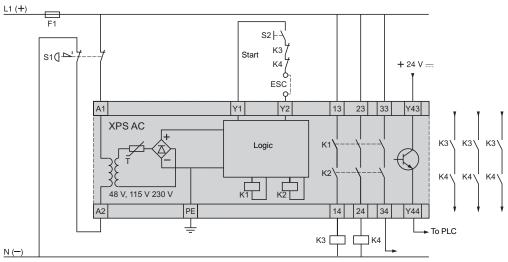


S1: Emergency stop S2: Start button

Y1-Y2: Feedback loop.

ESC: External start conditions.

Module XPS AC associated with an Emergency stop button with 2 NC contacts (recommended application)

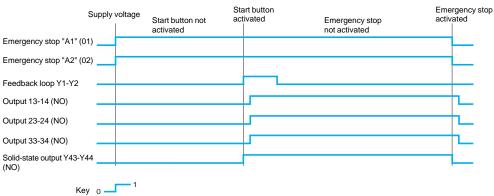


S1: Emergency stop S2: Start button

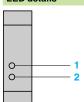
Y1-Y2: Feedback loop.

ESC: External start conditions.

Functional diagram of module XPS AC



LED details



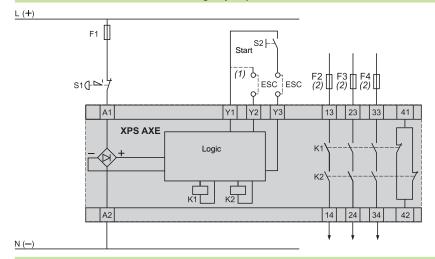
- 1 Supply voltage A1-A2.
- 2 K1-K2 status (NO safety outputs closed).

Safety automation solutions Preventa safety modules type XPS AXE

For Emergency stop and switch monitoring

XPS AXE

Module XPS AXE associated with an Emergency stop button with 1 NC contact



S1: Emergency stop

S2: Start

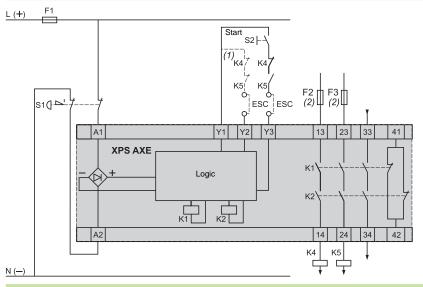
Y1-Y2: Feedback loop

ESC: External start conditions (1) Automatic reset

(2) Maximum fuse rating: see

technical characteristics.

Module XPS AXE associated with an Emergency stop button with 2 NC contacts (recommended application)



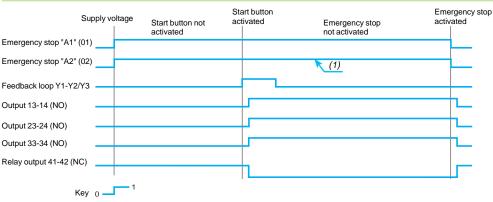
S1: Emergency stop

S2: Start

Y1-Y2: Feedback loop ESC: External start conditions
(1) Automatic reset

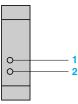
(2) Maximum fuse rating: see technical characteristics.

Functional diagram of module XPS AXE



(1) Only for Emergency stop button with 2 NC contacts.

LED details



- 1 Supply voltage A1-A2.
- 2 K1-K2 status (NO safety outputs closed).

Operating principle, characteristics

Safety automation solutions

Preventa safety modules types XPS AV, XPS ABV, XPS ATE

For Emergency stop and switch monitoring

Operating principle

Safety modules XPS AV, XPS ABV and XPS ATE are used for monitoring Emergency stop circuits conforming to standards EN/ISO 13850 and EN 60204-1 and also meet the safety requirements for the electrical monitoring of switches in protection devices conforming to standard EN 1088.

They provide protection for both the machine operator and the machine by immediately stopping the dangerous movement on receipt of a stop instruction from the operator, or on detection of a fault in the safety circuit itself.

In addition to the stop category 0 instantaneous opening safety outputs (3 for XPS AV, 2 for XPS ABV and 2 for XPS ATE), the modules incorporate stop category 1 time delay outputs (3 for XPS AV, 1 for XPS ABV and 3 for XPS ATE) which allow for controlled deceleration of the motor components until a complete stop is achieved (for example, motor braking by variable speed drive).

At the end of the preset delay, the supply is disconnected by opening the time delay output circuits. For module XPS AV, the time delay of the 3 output circuits is adjustable, in 15 preset values, between 0 and 300 seconds using selector buttons.

For module XPS ABV, the time delay of the 3 output circuits is adjustable between 0.15 and 3 seconds or 1.5 and 30 seconds, depending on the model, using a selector switch.

For module XPS ATE, the time delay of the 3 output circuits is adjustable between 0 and 30 seconds using a 12-position selector switch.

Module XPS AV also incorporates 3 solid-state signalling outputs for signalling to the process PLC. Module XPS ATE incorporates 4 solid-state signalling outputs for signalling to the process PLC. To aid diagnostics, the modules have LEDs which provide information on the monitoring circuit status.

The Start button monitoring function is con gurable depending on the wiring.

Characteristics					
Module type			XPS AV11113, XPS AV11113P	XPS ABV••••C, XPS ABV••••P	XPS ATE
Maximum achievable safety level			PL e/Category 4 conforming to EN/ISO 13849-1 SILCL 3 (instantaneous safety outputs and time delay safety outputs) conforming to EN/IEC 62061	PL e/Category 4 (instantaneous safety outputs) and PL d/Category 3 (time delay safety outputs) conforming to EN/ISO 13849-1, SILCL 3 (instantaneous safety outputs) and SILCL 2 (time delay safety outputs) conforming to EN/IEC 62061	PL e/Category 4 (instantaneous safety outputs) and PL d/Category 3 (time delay safety outputs) conforming to EN/ISO 13849-1, SILCL 3 (instantaneous safety outputs) and SILCL 2 (time delay safety outputs) conforming to EN/IEC 62061
Reliability data (instantaneous safety	Mean Time To dangerous Failure (MTTF _d)	Years	75.8	53	134.8
nstantaneous safety utputs) eliability data ime delay safety outputs)	Diagnostic Coverage (DC)	%	> 99	> 99	> 99
	Probability of dangerous Failure per Hour (PFH_d)	1/h	7.95 x 10 ⁻⁹	3 x 10 ⁻⁸	6.81 x 10 ⁻⁹
Reliability data (time delay safety outputs)	Mean Time To dangerous Failure (MTTF _d)	Years	75.8	53	54.5
	Diagnostic Coverage (DC)	%	> 99	> 60 and < 90	98.4
	Probability of dangerous Failure per Hour (PFH _d)	1/h	7.95 x 10 ⁻⁹	2 x 10 ⁻⁷	1.96 x 10 ⁻⁸
Conformity to standards			EN/IEC 60204-1, EN/IEC 60947-1, EN/IEC 60947-5-1, EN/ISO 13850, EN 1088/ISO 14119,	EN/IEC 60204-1, EN/IEC 60947-1, EN/IEC 60947-5-1, EN/ISO 13850, EN 1088/ISO 14119	EN/IEC 60204-1, EN/IEC 60947-1, EN/IEC 60947-5-1, EN/ISO 13850, EN 1088/ISO 14119
Product certifications			UL, CSA, TÜV	UL, CSA, BG	UL, CSA, TÜV
Supply	Voltage	٧	24 ===	24	\sim and 24 $=$, 115 \sim , 230 \sim
	Voltage limits		- 20+ 20%	- 15+ 10%	- 20+ 10% (24 V) - 15+ 15% (115 V) - 15+ 10% (230 V)
	Frequency	Hz	-	-	50/60
Consumption		W	< 5	<3	< 8
Module inputs fuse protec	tion		Internal, electronic		
Adjustable time delay		s	0300	0.153 or 1,530	030
Start button monitoring			Yes/No (con gurable by te	erminal connections)	
Control unit voltage (at nominal supply voltage)			Between input terminals S21-S22, S31-S32 or S11-S12	Between input terminals S11-S12, S21-S22 or S11-S31	Between input terminals S11-S12, S21-S22 or S11-B1
	24 V version	٧	24	24	24
	115 V, 230 V version	٧	-		48

38783-EN.indd

version: 7.1

Safety automation solutionsPreventa safety modules types XPS AV, XPS ABV, XPS ATE

For Emergency stop and switch monitoring

		la mu		l avez e e e	lavaces			ristics (continued)		
ATE••••P		•	ABV	AV11113P				iiiin a anniatan na Bl. bat	Module type	
I min. voltage applied is A1-A2 inals S11-S21) = tage Ue - 3 V ion) een 42 V and 45 il value = 45 V	Ue = true volta to terminals A1 U int (terminals supply voltage (24 V version) U int between with typical val (115 V, 230 V V	age applied	RL = Ue x 16 Ue = true volta to terminals A Un = nominal	ole length:	100 max. Maximum cab 2000 m	Ω	Calculation of wiring resistance RL between input terminals			
greater than the	equal to or gre true value									
atic start, termina	Approx. 0.075 For automatic s S33-Y2 and Y3		< 0.5		For guard: 1.5 For Emergend unlimited	S	Synchronisation time between inputs			
					Volt-free		uts Voltage reference		Outputs	
14, 23-24, 33-34		23-24)	2 NO (13-14, :		3 NO (03-04, 1			Number and type of insta safety circuits		
58, 67-68, 77-78	3 NO (57-58, 6		1 NO (37-38)	17-48, 57-58)	3 NO (37-38, ⁴		delay opening	Number and type of time safety circuits		
	4 solid-state		-		3 solid-state			Number and type of addit		
d 180	C300: inrush 1 maintained 18	0	C300: inrush 1800, B300: inrush 36 maintained 180 maintained 360		VA	Instantaneous outputs	Breaking capacity in AC-15			
C300: inrush 1800, maintained 180		maintained 180 maintained 360		VA	Time delay outputs					
	24 V/1.0 A L/R	t = 50 ms	24 V/1.5 A L/R	R = 50 ms	24 V/1.25 A L/		Instantaneous outputs	Breaking capacity in DC-13		
L/R = 50 ms	24 V/1.0 A L/R -	= 50 ms	24 V/1.5 A L/R -	R = 50 ms	24 V/1.25 A L/ 24 V/20 mA		Time delay outputs d-state outputs	Breaking capacity of solid		
	5		6		3.3 for all 3, or for 2, or 4 for 2	Α	Instantaneous outputs	Max. thermal current (Ithe)		
	2.5		6		3.3 for all 3, or for 2, or 4 for 2	Α	Time delay outputs			
	8		12		20	Α	nt	Max. total thermal curren		
	6 gG		6 gG	acting	4 gG or 6 fast	Α	Instantaneous outputs	Output fuse protection, using fuses conforming		
	4 gG		6 gG	acting	4 gG or 6 fast	Α	Time delay outputs	to IEC/EN 60947-5-1, DIN VDE 0660 part 200		
	10 (1)		10		10 (1)	mA		Minimum current		
	17 (1)		17	40.51/0	17 (1)	٧		Minimum voltage		
	00		000	10-EN/2	See page 386				Electrical durat	
0110 porto 1 9 0	< 20	Y/EN 60047 F 4	< 200	f nallution 2 con	< 30	ms V	ig inputs	e on instantaneous openin		
0110 parts 1 & 2 0110 parts 1 &				·		kV		withstand voltage (Uimp)	Rated insulatio	
. OTTO parts T &	4	C/LIN 00947-3-	3	category iii, ct	11	NV		withstand voltage (Onnp)	ED display	
	- 10+ 55		- 25+ 55		- 10+ 55	°C		perature	Operating temp	
	- 25+ 85		- 25+ 75		- 25+ 85	°C		•	Storage temper	
					IP 20		Terminals		Degree of prote	
					IP 40		Enclosure		conforming to IE	
rew clamp	Captive screw terminals				Type of terminals		Connections			
			om module		Integrated in module		Type of terminal block			
Solid or ble: exible cab	Solid or exible cable: 0.142.5 mm ²	2.5 mm²	e cable: 0.22	Solid or exibl	Solid or exible cable: 0.14 2.5 mm ²		Without cable end	1-wire connection		
		2	0.252.5 mm		Without bezel		With cable end			
ble: exible cab	With bezel, exible cable:	With bezel, exible cable:	With bezel, exible cable:	With bezel, exible cable:	With bezel, exible cable:					
Solid cable 0.21 mm Flexible cal 0.21.5 m	Solid or exible cable: 0.140.75 mm ²		Solid or exible cable:	Solid cable: 0.21 mm² Flexible cable:	Solid or exible cable:		Without cable end	2-wire connection		
zel, exible cab	Without bezel,	-	0.251 mm ²	exible cable:	Without bezel		With cable end			
ith bezel, exibl			Double, with b		Double, with b					
l, ble mm ble mn	exible cable 0.142.5 mm With bezel, exible cable 0.251.5 mm Solid or exible cable 0.140.75 mm Without beze 0.251 mm² Double, with	With bezel, exible cable: 0.252.5 mm ²	With bezel, exible cable: 0.251.5 mm ² Solid or exible cable: 0.21 mm ² 0.251 mm ²	exible cable: With bezel, exible cable: 0.252.5 mm² Solid cable: 0.21 mm² Flexible cable: 0.21.5 mm² exible cable:	exible cable: 0.14 2.5 mm² Without bezel, exible cable: 0.251.5 mm² Solid or exible cable: 0.140.75 mm² Without bezel,		With cable end Without cable end			

⁽¹⁾ The module is also capable of switching low power loads (17 V/10 mA) provided that the contact has not been used for switching high power loads (possible contamination or wear of the gold layer on the contact tips).

References Description

Safety modules for Emergency stop and switch monitoring

Safety automation solutions Preventa safety modules types XPS AV, XPS ABV, XPS ATE

For Emergency stop and switch monitoring

TOP COP
O O O O O O O O O O O O O O O O O O O

XPS AV11113



XPS AV11113P



XPS ABV•●●P



XPS ABV•••€C



XPS ATE5110

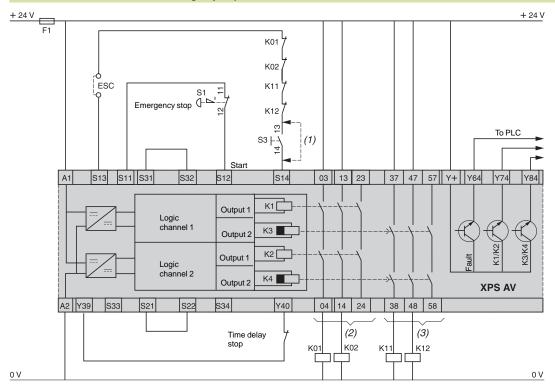
Number of safety	Additional outputs	Setting range of time delay	Supply	Connection	Reference	Weight
circuits	σαιραίο	or time delay				kg
6 NO (3 NO time delay)	3 solid-state	0300 s	24 V	Captive screw clamp terminals Terminal block integrated in module	XPS AV11113	0.32
6 NO (3 NO time delay)	3 solid-state	0300 s	24 V	Captive screw clamp terminals Terminal block removable from module	XPS AV11113P	0.32
3 NO (1 NO time delay)	-	0.153 s	24 V	Captive screw clamp terminals Terminal block removable from module	XPS ABV1133P	0.28
			24 V	Spring terminals Terminal block removable from module	XPS ABV1133C	0.27
		1.530 s	24 V	Captive screw clamp terminals Terminal block removable from module	XPS ABV11330P	0.28
			24 V	Spring terminals Terminal block removable from module	XPS ABV11330C	0.27
5 NO (3 NO time delay)	4 solid-state	030 s	~/24 V 	Captive screw clamp terminals Terminal block integrated in module	XPS ATE5110	0.28
				Captive screw clamp terminals Terminal block removable from module	XPS ATE5110P	0.28
			115 V ∼	Captive screw clamp terminals Terminal block integrated in module	XPS ATE3410	0.38
				Captive screw clamp terminals Terminal block removable from module	XPS ATE3410P	0.38
			230 V ∼	Captive screw clamp terminals Terminal block integrated in module	XPS ATE3710	0.38
				Captive screw clamp terminals Terminal block removable from module	XPS ATE3710P	0.38

Safety automation solutions

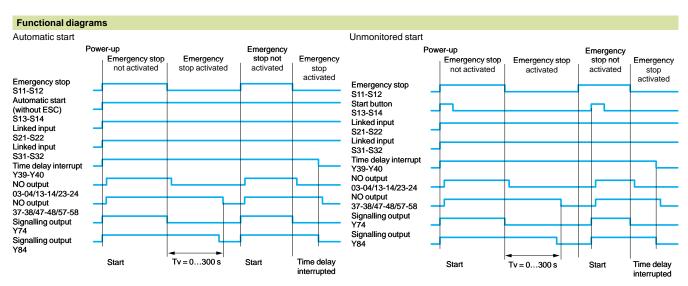
Preventa safety modules type XPS AV For Emergency stop and switch monitoring

XPS AV

Module XPS AV associated with an Emergency stop button with 1 NC contact, automatic start or unmonitored start



- (1) Link for automatic start.
- (2) Instantaneous opening safety outputs (stop category 0).
- (3) Time delay opening safety outputs (stop category 1).
- ESC = External start conditions.



Automatic start

There is no start contact or it is shunted.

Unmonitored start

The output is activated on closing of the start contact.

Monitored start

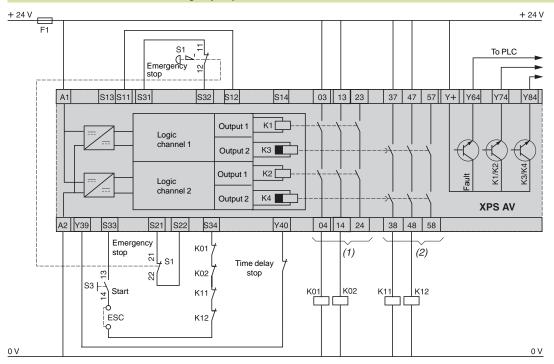
The start input is monitored so that there is no start-up in the event of the start contact being shunted or the start circuit being closed for more than 10 seconds. Start-up is triggered following activation of the start button (push-release function) on opening of the contact.

Safety automation solutions Preventa safety modules type XPS AV

For Emergency stop and switch monitoring

XPS AV

Module XPS AV associated with an Emergency stop button with 2 NC contacts, monitored start

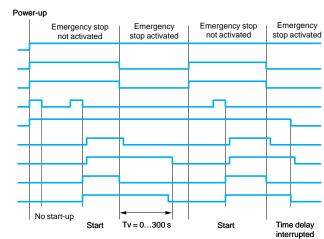


- (1) Instantaneous opening safety outputs (stop category 0).
- (2) Time delay opening safety outputs (stop category 1).
- ESC = External start conditions.

Functional diagram

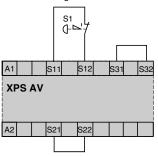
Monitored start

Linked input S11-S12 Emergency stop (channel 1) S21-S22 Emergency stop (channel 2) S31-S32 Start button S33-S34 Time delay interrupt Y39-Y40 NO output 03-04/13-14/23-24 NO output 37-38/47-48/57-58 Signalling output Y74 Signalling output Y84

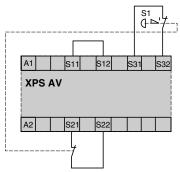


Emergency stop monitoring function configuration

1-channel wiring



2-channel wiring, with short-circuit detection

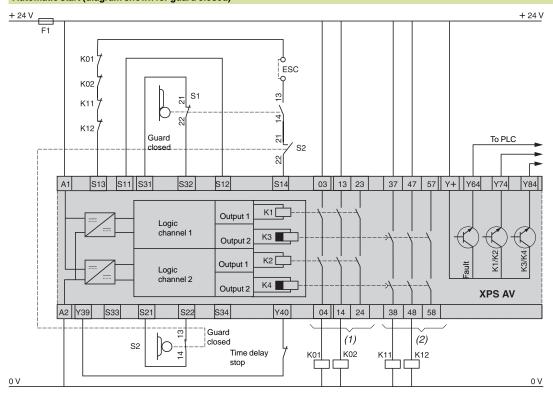


Safety automation solutions

Preventa safety modules type XPS AV For Emergency stop and switch monitoring

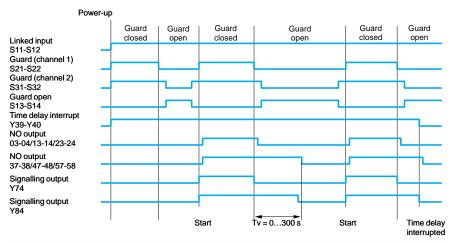
XPS AV

Monitoring of a movable guard associated with 2 switches Automatic start (diagram shown for guard closed)

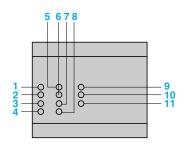


- (1) Instantaneous opening safety outputs (stop category 0).
- (2) Time delay opening safety outputs (stop category 1).
- ESC = External start conditions.

Functional diagram



LED details



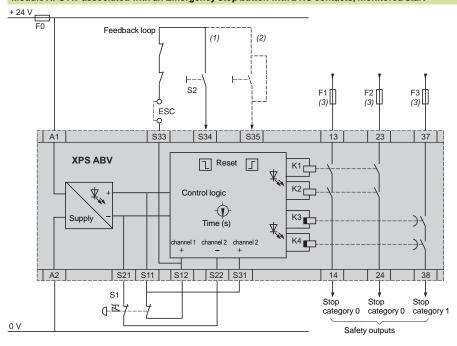
- 1 S12 input status.
- 2 S22 input status.
- 3 S32 input status.
- 4 S34 input status.
- 5 S14 input status.
- 6 Y40 input status (time delay stop).
- 7 K1/K2 status (NO instantaneous opening safety outputs).
- 8 K3/K4 status (time delay opening safety outputs).
- 9 Supply voltage A1-A2.
- 10 Fault.
- 11 Con guration mode.

Safety automation solutions Preventa safety modules type XPS ABV

For Emergency stop and switch monitoring

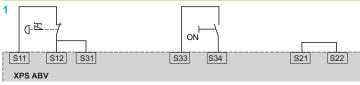
XPS ABV

Module XPS AV associated with an Emergency stop button with 2 NC contacts, monitored start



- S1: Emergency stop
- S2: Start button
- ESC = External start conditions.
- (1) With start button monitoring.
- (2) Without start button monitoring or automatic
- (3) Maximum fuse rating: see technical characteristics.

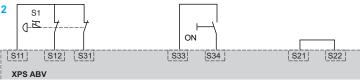
Emergency stop or switch monitoring function configurations



1-channel Emergency stop, manual start

Start with S34 button monitoring

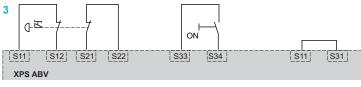
Link



Short-circuit monitoring 2-channel Emergency stop, manual start

Start with S34 button monitoring

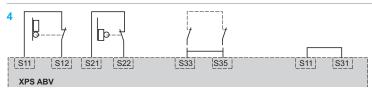
Link



Short-circuit monitoring 2-channel Emergency stop, manual start

Start with S34 button monitoring

Link



Machine guard with short-circuit monitoring, automatic start

8

Link or feedback loop for external contactors

Link

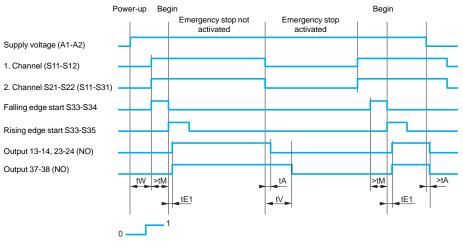
Safety automation solutions Preventa safety modules type XPS ABV

For Emergency stop and switch monitoring

XPS ABV

Functional diagrams

Emergency stop monitoring: configurations 1, 2 and 3



tW: Recovery time tE: On-delay

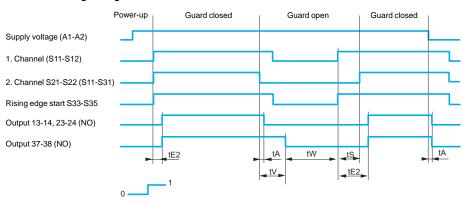
tm: Min. ON time

tA: Response time

tV: Off-delay (adjustable)

tS: Synchronisation time

Switch monitoring: configuration 4



tW: Recovery time

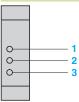
tE: On-delay tm: Min. ON time

tA: Response time

tV: Off-delay (adjustable)

tS: Synchronisation time

LED details



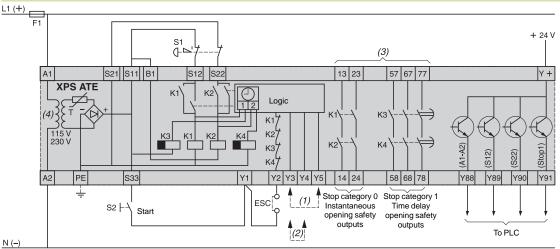
- Supply voltage A1-A2
- K1/K2 status
- 3 K3/K4 status

Safety automation solutions

Preventa safety modules type XPS ATE For Emergency stop and switch monitoring

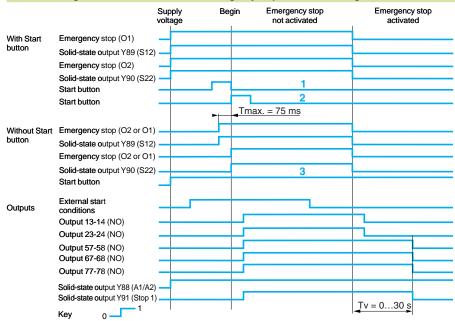
XPS ATE

Module XPS ATE associated with an Emergency stop button



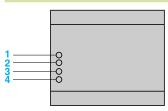
- S1: Emergency stop button with 2 NC contacts (recommended application).
- S2: Start button.
- ESC: External start conditions.
- Y1 (S33) Y2: Feedback loop.
- F1: 4 A max.
- (1) With start button monitoring.
- (2) Without start button monitoring.
- (3) The outputs must be fuse protected. Technical characteristics for establishing maximum rating of fuses, see page 38783-EN/2. (4) $115/230 \, \text{V} \sim \text{only}$.

Functional diagram of module XPS ATE with Emergency stop button monitoring



- With start button monitoring (Y3-Y5 connection).
- Without start button monitoring (Y3-Y4 connection).
- Without start button (connection Y3-Y4 and S33-Y1).
- Tv: adjustable time.

LED details



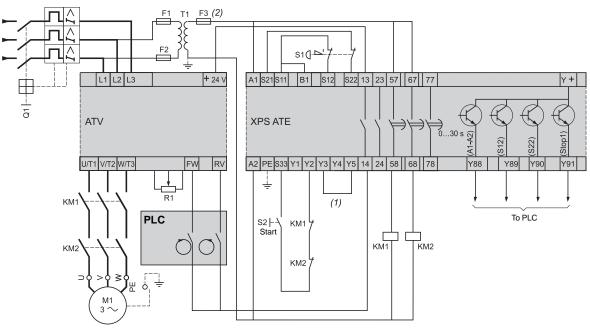
- 1 Supply voltage A1-A2, internal electronic fuse status.
- 2 S12 (A) input status.
- 3 S22 (B) input status.
- 4 Stop category 1 outputs closed.

Safety automation solutions

Preventa safety modules type XPS ATE For Emergency stop and switch monitoring

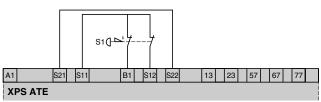
XPS ATE

Example of a safety circuit combining an Emergency stop module with a variable speed drive



- S1: Emergency stop button with 2 NC contacts (recommended application).
- S2: Start button
- (1) With start button monitoring.
- (2) Technical characteristics for establishing maximum rating of fuses, see page 38783-EN/2.

Connection with 1 Emergency stop button



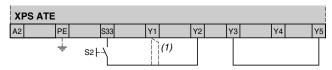
Both input channels are supplied at the same potential.

S1: Emergency stop button with 2 NC contacts

A short-circuit between the 2 inputs is not detected.

Configuration with start button monitoring

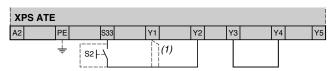
(functional diagram for Start button 1, see page 38783-EN/5)



(1) Auxiliary terminal (to be used to separate the feedback loop from the wiring to the start button).

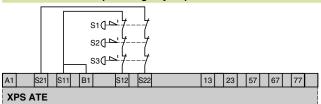
Configuration without start button monitoring

(functional diagram for Start button 2, see page 38783-EN/5)



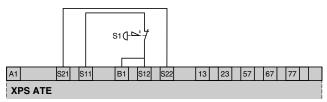
(1) Auxiliary terminal (to be used to separate the feedback loop from the wiring to the start button).

Connection with multiple Emergency stop buttons



The 2 input channels are supplied at different potentials. A short-circuit between the 2 inputs is detected.

Monitoring an Emergency stop button with 1 NC contact



S1: Emergency stop button with 1 NC contact.

Not all faults are detected: a short-circuit on the Emergency stop pushbutton is not detected.

Operating principle, characteristics

Safety automation solutions Preventa safety modules type XPS AF

Preventa safety modules type XPS AF For Emergency stop and switch monitoring

Operating principle

Safety modules XPS AF meet the requirements of Performance Level PL e/Category 4 conforming to standard EN/ISO 13849-1.

They are used for:

- Monitoring Emergency stop circuits conforming to standards EN/ISO 13850 and EN/IEC 60204-1.
- Electrical monitoring of switches activated by protection devices conforming to standard EN 1088.

Housed in a compact enclosure, the modules have 3 safety outputs.

Preventa safety modules XPS AF••••P incorporate removable terminal blocks, thus optimising machine maintenance.

To aid diagnostics, the modules have 3 LEDs on the front face which provide information on the monitoring circuit status.

The Start button monitoring function is configurable depending on the wiring.

Characteristic	S						
Module type				XPS AF5130	XPS AF5130P		
Maximum achievable	e safety level			PL e/Category 4 conforming to EN/ISO 138			
Reliability data	Mean Time To dang (MTTF _d)	gerous Failure	Years	243			
	Diagnostic Coverage	ge (DC)	%	> 99			
	Probability of dange Hour (PFH _d)	erous Failure per	1/h	4.62 x 10 ⁻⁹			
Conformity to standards				EN/IEC 60204-1, EN 1088/ISO 14119, EN/IEC 60947-5-1, EN/IEC 60947-1, EN/ISO 13850			
Product certification	s			UL, CSA, TÜV			
Supply	Voltage		٧	\sim and 24 $\overline{\dots}$			
	Voltage limits			- 15+ 10%			
	Frequency		Hz	50/60			
Consumption			VA	≤5			
Module inputs fuse p	rotection			Internal, electronic			
Start button monitor	ing			Yes/No (configurable by terminal connection	ons)		
Control unit voltage	and current			24 V ==/30 mA approx. (at nominal supply v	voltage)		
Maximum wiring resi	istance RL		Ω	90			
Synchronisation time	e between inputs A and	В		Unlimited			
Outputs	Voltage reference			Volt-free			
	Number and type of	Number and type of safety circuits		3 NO (13-14, 23-24, 33-34)			
	Breaking capacity in	Breaking capacity in AC-15		C300: inrush 1800, maintained 180			
	Breaking capacity in	n DC-13		24 V/1.5 A - L/R = 50 ms			
	Max. thermal curre	nt (Ithe)	Α	6			
	Max. total thermal of	current	Α	18			
	Output fuse protect	ion	Α	4 gG or 6 fast acting, conforming to IEC/EN	N 60947-5-1, DIN VDE 0660 part 200		
	Minimum current		mA	10			
	Minimum voltage		٧	17			
Electrical durability				See page 38610/2			
Response time on in	put opening		ms	≤40			
Rated insulation volt	age (Ui)		٧	300 (degree of pollution 2 conforming to IEC/EN 60947-5-1, DIN VDE 0110 parts 1 &			
Rated impulse withs	tand voltage (Uimp)		kV	4 (overvoltage category III, conforming to IEC/EN 60947-5-1, DIN VDE 0110 parts 1 8			
LED display				3			
Operating temperatu	ire		°C	- 25+ 60			
Storage temperature	,		°C	- 40+ 85			
Degree of protection		Terminals		IP 20			
conforming to IEC/EN	60529	Enclosure		IP 40			
Connections	Туре	Terminals		Captive screw clamp terminals	Captive screw clamp terminals		
		Terminal block		Integrated in module	Removable from module		
	1-wire connection	Without cable end		Solid or flexible cable: 0.142.5 mm ²	Solid or flexible cable: 0.22.5 mm ²		
		With cable end		Without bezel, flexible cable: 0.252.5 mn	n²		
		With cable end		With bezel, flexible cable: 0.251.5 mm ²	With bezel, flexible cable: 0.252.5 mm		
	2-wire connection	Without cable end		Solid or flexible cable: 0.140.75 mm ²	Solid cable: 0.21 mm², flexible cable: 0.21.5 mm²		
		With cable end		Without bezel, flexible cable: 0.251 mm²			
		With cable end		Double, with bezel, flexible cable: 0.51.5 mm²	Double, with bezel, flexible cable: 0.51.5 mm²		

Safety automation solutions Preventa safety modules type XPS AF

For Emergency stop and switch monitoring

References Description Type of terminal Number of safety Supply Reference Weight block connection kg Safety modules for \sim and 24 V $\overline{\dots}$ **XPS AF5130** 0.250 Integrated in module 3 Emergency stop and switch monitoring



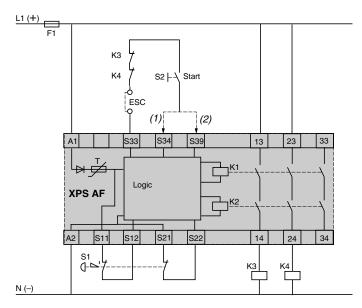
XPS AF5130

Removable from	3	\sim and 24 V $$	XPS AF5130P	0.250
modulo				

Connections

XPS AF

Module XPS AF associated with an Emergency stop button with 2 NC contacts



(1) With start button monitoring. (2) Without start button monitoring. ESC = External start conditions.

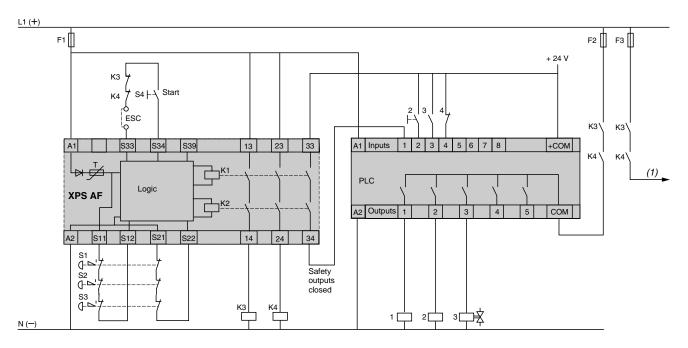
Safety automation solutions Preventa safety modules type XPS AF

For Emergency stop and switch monitoring

XPS AF Functional diagrams Emergency stop function Guard function with automatic start Guard opens Supply voltage Emergency stop Emergency stop activated Supply voltage 1st switch 2nd switch Guard Guard closed open Input A (S11-S12) Input A (S11-S12) Input B (\$21-\$22) Input B (\$21-\$22) Start button S33-S34 (N/O) (1) Link at \$33-\$39 Start button S33-S39 (NO) (2) Output 13-14 (NO) Output 13-14 (NO) Output 23-24 (NO) Output 23-24 (NO) Output 33-34 (NO) Output 33-34 (NO) Key 0 Key 0

- (1) With start button monitoring.
- (2) Without start button monitoring.

Module XPS AF with connection of multiple Emergency stop buttons, combined with a PLC



(1) Other circuits controlled by the XPS AF module. ESC = External start conditions.

Safety automation solutions Preventa safety modules type XPS AF

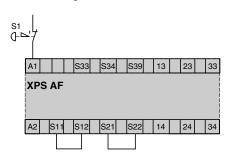
For Emergency stop and switch monitoring

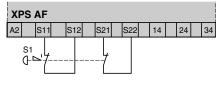
XPS AF

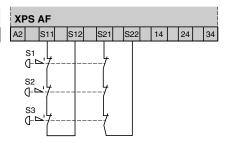
Emergency stop monitoring function configuration

1-channel wiring

2-channel wiring







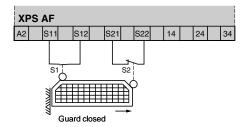
Emergency stop button with a single NC contact. Not all faults are detected: a short-circuit on the Emergency stop pushbutton is not detected.

Emergency stop button with 2 NC contacts (recommended application).

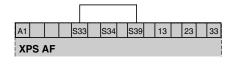
The 2 input channels are supplied at different potentials. A short-circuit between the 2 inputs is detected.

Connection of multiple Emergency stop buttons with 2 NC contacts (recommended application). The 2 input channels are supplied at different potentials. A short-circuit between the 2 inputs is detected.

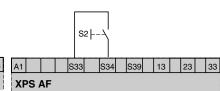
Monitoring of a movable guard associated with 2 switches with 1 contact each in combined mode (switch 1 with NO contact, switch 2 with NC contact)



Configuration with automatic or manual start





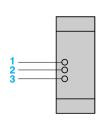


Automatic start.

Without start button monitoring, manual reset.

Function: push-release. With start button monitoring, manual reset.

LED details



- 1 Supply voltage A1-A2, fuse status.
- 2 Relay K1 energised.
- 3 Relay K2 energised.

Operating principle, characteristics

Safety automation solutions

Preventa safety modules type XPS AFL For Emergency stop, switch and safety light curtain monitoring

Operating principle

Safety modules XPS AFL meet the requirements of Performance Level PL e/Category 4 conforming to standard EN/ISO 13849-1.

They are used for:

- Monitoring Emergency stop circuits conforming to standards EN/ISO 13850 and EN/IEC 60204-1.
- Electrical monitoring of switches activated by protection devices conforming to standard EN 1088/ISO 14119.

They can also be used for monitoring type 4 light curtains conforming to EN 61496-1 that have solid-state safety outputs (for example, light curtains type XUS L, see page 30304-EN/2). This system would conform to Performance Level PL e/ Category 4 in accordance with EN/ISO 13849-1.

Housed in a compact enclosure, the modules have 3 safety outputs. Preventa safety modules XPS AFL••••P incorporate removable terminal blocks, thus optimising machine maintenance.

To aid diagnostics, the modules have 3 LEDs on the front face which provide information on the monitoring circuit status.

The Start button monitoring function is configurable depending on the wiring.

Characteris	stics					
Module type			XPS AFL5130 XPS AFL5130P			
Maximum achiev	able safety level		PL e/Category 4 conforming to EN/ISO 13849-1, SILCL 3 conforming to EN/IEC 6206			
Reliability data	Mean Time To dangerous Failure (MTTF _d)	Years	172.1			
	Diagnostic Coverage (DC)	%	> 99			
	Probability of dangerous Failure per Hour (PFH _d)	1/h	5.61 x 10 ⁻⁹			
conformity to standards			EN/IEC 60204-1, EN 1088/ISO 14119, EN/ISO 13850, EN/IEC 60947-1, EN/IEC 60947-5-1, EN/IEC 61496-1 (type 4)			
Product certifica	tions		UL, CSA, TÜV			
Supply			∼ and 24 			
	Voltage limits		- 15+ 10%			
	Frequency		50/60			
Consumption		VA	≤ 5			
Module inputs fuse protection			Internal, electronic			
Start button monitoring			No (configurable by terminal connections)			
Control unit voltage and current			24 V/30 mA approx. (at nominal supply voltage)			
Maximum wiring resistance RL		Ω	90			
Synchronisation time between inputs A and B			Unlimited			
Outputs	Voltage reference		Volt-free			
	Number and type of safety circuits		3 NO (13-14, 23-24, 33-34)			
	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			
	Max. thermal current (Ithe)	Α	6			
	Max. total thermal current	Α	18			
	Output fuse protection	Α	4 gG or 6 fast acting, conforming to IEC/EN 60947-5-1, DIN VDE 0660 part 200			
	Minimum current	mA	10			
	Minimum voltage	V	17			
Electrical durabi	lity		See page 38610/2			
Response time o	on input opening	ms	≤20			
Rated insulation	voltage (Ui)	V	300 (degree of pollution 2 conforming to IEC/EN 60947-5-1, DIN VDE 0110 parts 1			
Rated impulse w	rithstand voltage (Uimp)	kV	4 (overvoltage category III, conforming to IEC/EN 60947-5-1, DIN VDE 0110 parts 1 8			
LED display			3			
Operating tempe	erature	°C	- 10+ 55			
Storage tempera	ture	°C	- 25+ 85			
Degree of protec			IP 20			
conforming to IEC	C/EN 60529 Enclosure		IP 40			

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Safety automation solutions
Preventa safety modules type XPS AFL
For Emergency stop, switch and safety light curtain monitoring

Module type			XPS AFL5130	XPS AFL5130P		
Connection	Туре	Terminals	Captive screw clamp terminals	Captive screw clamp terminals		
		Terminal block	Integrated in module	Removable from module		
	1-wire connection	Without cable end	Solid or flexible cable: 0.142.5 mm ²	Solid or flexible cable: 0.22.5 mm²		
		With cable end	Without bezel, flexible cable: 0.252.5 mm²			
		With cable end	With bezel, flexible cable: 0.251.5 mm²	With bezel, flexible cable: 0.252.5 mm²		
	2-wire connection	Without cable end	Solid or flexible cable: 0.140.75 mm ²	Solid cable: 0.21 mm², flexible cable: 0.21.5 mm²		
		With cable end	Without bezel, flexible cable: 0.251 mm	2		
		With cable end	Double, with bezel, flexible cable: 0.51.	5 mm²		

D	ef	_	 n	^	^	_
П	CI.	C	ш	u	c	3

Description	Type of terminal block connection	Number of safety circuits	Supply	Reference	Weight kg
Safety modules for Emergency stop, switch and safety light curtain monitoring	Integrated in module	3	\sim and 24 V $\overline{\dots}$	XPS AFL5130	0.250



Removable from \sim and 24 V =XPS AFL5130P 0.250 module

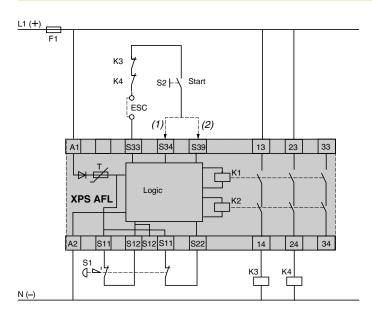
38786-EN_Ver9.2 3

Safety automation solutions Preventa safety modules type XPS AFL

For Emergency stop, switch and safety light curtain monitoring

XPS AFL

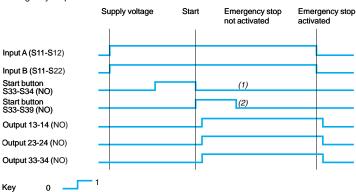
Module XPS AFL associated with an Emergency stop button with 2 NC contacts



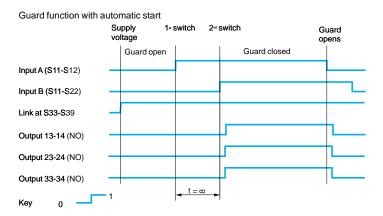
- (1) With start button monitoring.(2) Without start button monitoring.ESC: External start conditions.

Functional diagrams

Emergency stop function



- (1) With start button monitoring.
- (2) Without start button monitoring.



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2-channel wiring Emergency stop button with 2 NC contacts

S12 S12 S11

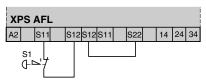
A short-circuit between the 2 inputs is not detected.

For Emergency stop, switch and safety light curtain monitoring

XPS AFL

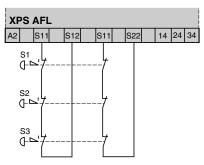
Emergency stop monitoring function configuration

1-channel wiring
Emergency stop button with a single NC contact



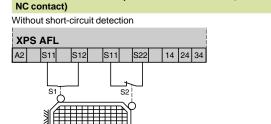
A short-circuit on the Emergency stop pushbutton is not detected.

2-channel wiring Connection of multiple Emergency stop buttons



A short-circuit between the 2 inputs is not detected.

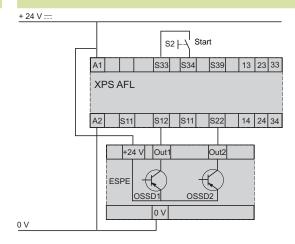
Monitoring of electro-sensitive protection equipment (ESPE)



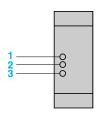
Monitoring of a movable guard associated with 2 switches with 1 contact

each in combined mode (switch 1 with NO contact, switch 2 with

Guard closed



LED details



- 1 Supply voltage A1-A2, fuse status.
- Relay K1 energised.
- 3 Relay K2 energised.

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Operating principle, characteristics

Safety automation solutions

Preventa safety modules type XPS AR For Emergency stop, switch or safety light curtain monitoring

Operating principle

Safety modules XPS AR meet the requirements of Performance Level PL e/Category 4 conforming to standard EN/ISO 13849-1 and are designed for the following safety applications:

- Monitoring Emergency stop circuits conforming to EN/ISO 13850 and EN/IEC 60204-1.
- Electrical monitoring of switches activated by protection devices conforming to standard EN 1088/ISO 14119.
- Monitoring type 4 light curtains conforming to EN/IEC 61496-1 that have solidstate safety outputs with test function (light curtains XUS L). In addition to 7 safety outputs, modules XPS AR incorporate 2 relay signalling outputs and 4 solid-state signalling outputs for signalling to the process PLC.

Safety modules XPS AR $\bullet \bullet \bullet \bullet \bullet \bullet P$ incorporate removable terminal blocks, thus optimising machine maintenance.

To aid diagnostics, the modules have 4 LEDs on the front face which provide information on the monitoring circuit status.

The Start button monitoring function is con gurable depending on the wiring.

Characte	prietics		1110 0	tart battori morntoning ranottol	ris con gurable depending on the willing.		
				XPS AR3e1144	XPS AR3•1144P		
Module type							
	hievable safety level		V	· , · · · ·	N/ISO 13849-1, SILCL 3 conforming to EN/IEC 62061		
Reliability da	Mean Time To dangerous		Years				
	Diagnostic Coverage (DC	,	%	> 99			
	Probability of dangerous F	Failure per Hour (PFH _d)	1/h	2.22 x 10 ⁻⁹			
Conformity to				EN/IEC 60204-1, EN 1088/ISO 14119, EN/ISO 13850, EN/IEC 60947-1, EN/IEC 60947-5-1			
Product certi	fications			UL, CSA, TÜV			
Supply	Voltage		٧	\sim and 24, 115 \sim , 230 \sim			
	Voltage limits	24 V ===	%	- 15+ 10			
		24 V ∼	%	- 15+ 10			
		115 V ∼	%	- 15+ 15			
		230 V \sim	%	- 15+ 10			
	Frequency		Hz	50/60			
Consumption	n			24 V \equiv version: < 4 W, 24 V \sim v	ersion: < 7 VA, 115/230 V version: < 9 VA		
Module input	ts fuse protection			Internal, electronic			
Start button r	monitoring			Yes/No (con gurable by termina	connections)		
	Control unit voltage and current (between terminals S11-S52 and S21-S22). 24 V, 115 V and 230 V version		٧	24 (20 mA approx.) (at nominal supply voltage)			
	ring resistance RL ninals S11-S52 and S21-S22)	Ω	50			
•	tion time between inputs A rt, terminals S33, S34 linked	and B	ms	100			
Safety output	ts Voltage reference			Volt-free			
	Number and type of safety	y circuits		7 NO (13-14/23-24/33-34/43-44	(53-54/63-64/73-74)		
	Number and type of addit	onal outputs		4 solid-state (Y31-Y32, Y31-Y64	, Y31-Y74, Y31-Y35)		
	Number and type of auxili	ary contacts		2 NC (81-82/91-92)			
	Breaking capacity in AC-1	5	VA	B300 (inrush: 3600, maintained:	360)		
	Breaking capacity in DC-1	3		24 V/2 A, L/R = 50 ms			
	Breaking capacity of solid	-state outputs		24 V/20mA			
	Max. thermal current (Ithe	e)	Α	10			
	Max. total thermal current		Α	40			
	Output fuse protection		Α	6 gG or 10 fast acting, conforming	g to EN/IEC 60947-5-1, DIN VDE0660 part 200		
	Minimum current		mA	170			
	Minimum voltage		٧	17			
Electrical du	rability			See page 38610-EN/2			
Response tin	ne on input opening		ms	< 20			
Rated insulat	tion voltage (Ui)		٧	300 (degree of pollution 2 confor	ming to IEC/EN 60947-5-1, DIN VDE 0110 parts 1 & 2)		
	se withstand voltage (Uimp)		kV		rming to IEC/EN 60947-5-1, DIN VDE 0110 parts 1 & 2)		
LED display				4			
Operating ter	mperature		°C	- 10+ 55			
Storage temp			°C	- 25+ 85			
Degree of pro	otection conforming to IEC 5	29		Terminals: IP 20, enclosure: IP 4	0		

Schneider Electric version: 7.0 38791-EN.indd

Characteristics, references

Safety automation solutions Preventa safety modules type XPS AR

Preventa safety modules type XPS AR For Emergency stop, switch or safety light curtain monitoring

Module type			XPS AR3•1144	XPS AR3•1144P		
Connection	Туре	Terminals	Captive screw clamp terminals	Captive screw clamp terminals		
		Terminal block	Integrated in module	Removable from module		
	1-wire connection	Without cable end	Solid or exible cable: 0.142.5 mm ² Solid or exible cable: 0.22.5 mm ²			
		With cable end	Without bezel, exible cable: 0.252.5 mm ²			
		With cable end	With bezel, exible cable: 0.251.5 mm ²	With bezel, exible cable: 0.252.5 mm ²		
	2-wire connection	Without cable end	Solid or exible cable: 0.140.75 mm ²	Solid cable: 0.21 mm², exible cable: 0.21.5 mm²		
		With cable end	Without bezel, exible cable: 0.251 mm ²			
		With cable end	Double, with bezel, exible cable: 0.51.5	5 mm²		

References

Description	Type of terminal block connection	Number of safety circuits	Additional outputs/ solid-state outputs to PLC	Supply	Reference	Weight
				٧		kg
Safety modules for Emergency stop, switch or safety light curtain monitoring	Integrated in module	7	2/4	24 ∼ 24 	XPS AR311144	0.300



XPS AR3• 1144

Removable from module	7	2/4	24 ∼ 24 	XPS AR311144P	0.300
			115 ∼ 24 	XPS AR351144P	0.400
			230 ∼ 24 	XPS AR371144P	0.400

115 ∼ 24 ...

230 ∼ 24 ... XPS AR351144

XPS AR371144

0.400

0.400

Preventa safety modules type XPS AR For Emergency stop, switch or safety light curtain monitoring

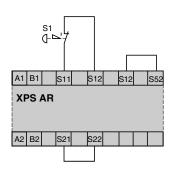
XPS AR

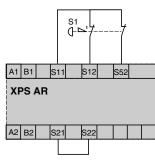
Emergency stop monitoring function configuration

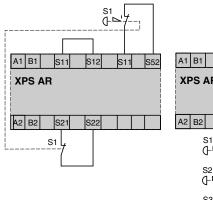
1-channel wiring Emergency stop button with a single NC contact 2-channel wiring Emergency stop button with 2 NC contacts, without short-circuit detection

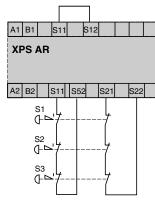
Emergency stop button with 2 NC contacts, with short-circuit detection (recommended application)

Connection of multiple Emergency stop buttons with 2 NC contacts (recommended application)







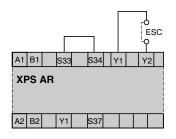


Not all faults are detected: a short-circuit on the Emergency stop pushbutton is not detected

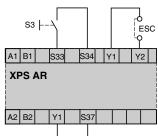
The 2 input channels are supplied at different potentials. A short-circuit between the 2 inputs is detected

Start configurations

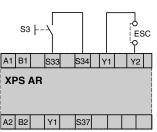
Automatic start







Without start button monitoring



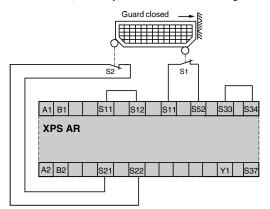
Schneider

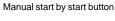
Preventa safety modules type XPS AR For Emergency stop, switch or safety light curtain monitoring

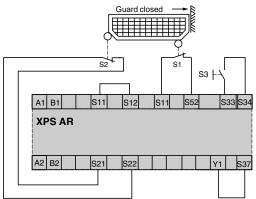
XPS AR

Monitoring of a movable guard associated with 2 switches with 1 contact each in combined mode (switch 1 with NO contact, switch 2 with NC contact)

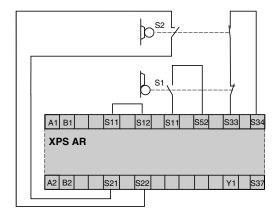
Automatic start, without synchronisation time monitoring



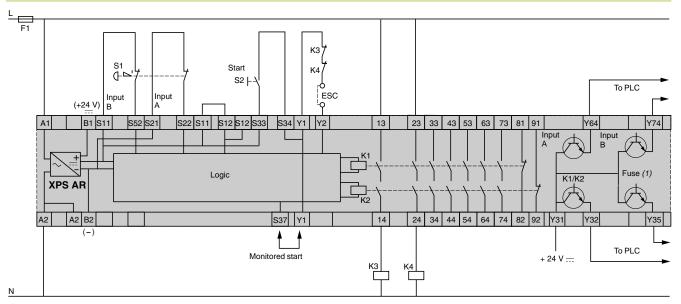




Monitoring of a movable guard associated with 2 switches in combined mode and automatic start (shown with guard open)



$\label{eq:module XPS} \mbox{ AR associated with an Emergency stop button with 2 NC contacts}$



Supply connection according to voltage:

 \sim across terminals A1/A2, or 24 V $\overline{\dots}$ across terminals B1/B2

ESC: External start conditions

(1) Operating status of internal electronic fuse

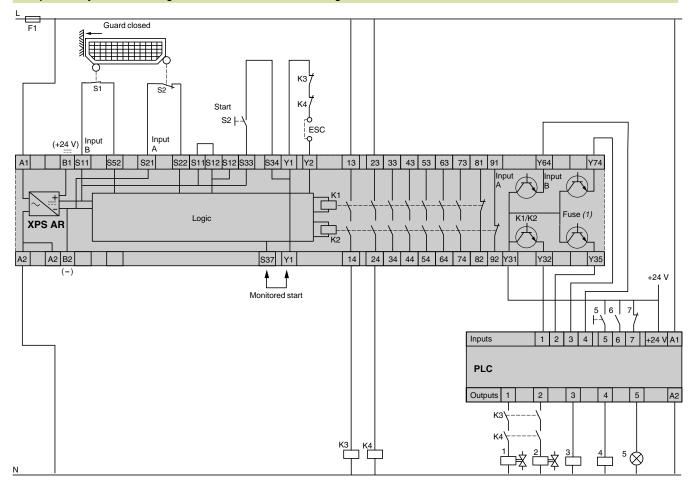
For Emergency stop, switch or safety light curtain monitoring

XPS AR Module XPS AR for monitoring electro-sensitive protection equipment (ESPE) +24 V Start 0 V S2 |- 3 To PLC OSSD2 **FSC** S12 S21 S22 S52 S34 Y1 Y2 23 33 43 53 63 Input B Logic XPS AR A2 B2 S37 14 To PLC + 24 V === K3 **(2)** Monitored start

ESC: External start conditions

- (1) Operating status of internal electronic fuse(2) ESPE indicator light deactivated

Example of safety circuit combining module XPS AR for switch monitoring and a PLC



ESC: External start conditions

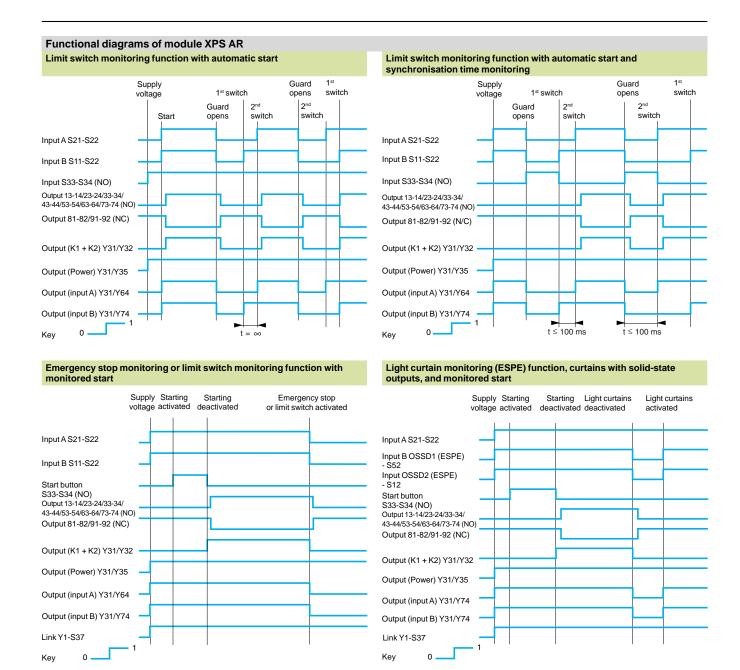
(1) Operating status of internal electronic fuse

References Connections Characteristics Principle: page 38791-EN/3 page 38791-EN/4 page 38791-EN/2 page 38791-EN/2

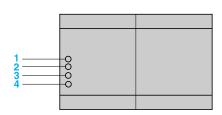
Connections (continued)

Safety automation solutions

Preventa safety modules type XPS AR For Emergency stop, switch or safety light curtain monitoring



LED details



- Supply voltage A1-A2, internal electronic fuse status
- Input S22 (A)
- 3 Input S52 (B)
- 4 K1/K2 status (NO safety outputs closed)

Operating principle, characteristics

Safety automation solutions

Preventa safety modules type XPS AK For Emergency stop, switch, sensing mat/edges or safety light curtain monitoring

Operating principle

Safety modules XPS AK meet the requirements of Performance Level PL e/Category 4 conforming to standard EN/ISO 13849-1.

They are used for:

- Monitoring Emergency stop circuits conforming to standards EN/ISO 13850 and EN 60204-1.
- Electrical monitoring of switches activated by protection devices, with optional selection of synchronisation time between signals.
- Monitoring 4-wire sensing mats or edges.
- Monitoring type 4 light curtains conforming to EN/IEC 61496-1 which have solidstate safety outputs with test function (light curtains XUS L).

Housed in a compact enclosure, the modules have 3 safety outputs, a relay signalling output and 4 solid-state signalling outputs for signalling to the process PLC.

Preventa safety modules XPS AK••••P incorporate removable terminal blocks, thus optimising machine maintenance.

To aid diagnostics, the modules have 4 LEDs on the front face which provide information on the monitoring circuit status.

The Start button monitoring function is con gurable depending on the wiring.

Characteris	stics					
Module type			XPS AK3•1144	XPS AK3•1144P		
Maximum achie	vable safety level		PL e/Category 4 conforming to EN/ISO 138	849-1, SILCL 3 conforming to EN/IEC 62061		
Reliability data	Mean Time To dangerous Failure (MTTF _d)	Years	154.5			
	Diagnostic Coverage (DC)	%	>99			
	Probability of dangerous Failure per Hour (PFH _d)	1/h	7.39 x 10 ⁻⁹			
Conformity to st	andards		EN/IEC 60204-1, EN 1088/ISO 14119, EN EN/IEC 60947-5-1	/ISO 13850, EN/IEC 60947-1,		
Product certifica	ations		UL, CSA, TÜV			
Supply	Voltage	٧	\sim and 24 $=$, 48 \sim , 110 \sim and 24 $=$, 120 $^{\prime}$	∼ and 24 , 230 ∼ and 24 		
	Voltage limits		- 15+ 10%			
	Frequency	Hz	50/60			
Consumption	24 V version	VA	≤5			
	110/120/230 V versions		≤6			
Module inputs fu	use protection		Internal, electronic			
Start button mor	nitoring		Yes/No (con gurable by terminal connection	ons)		
Control unit voltage and current between terminals S21-S22, S31-S32			24 V/30 mA approx. (at nominal supply v	voltage)		
Maximum wiring resistance RL between terminals S21-S22, S31-S32		Ω	28			
Synchronisation (terminals S21-S2	n time between inputs A and B 22, S31-S32)	s	Automatic start: 2 or 4 depending on wiring Manual start (start button between S33 and S34): unlimited			
Outputs	Voltage reference		Volt-free			
	Number and type of safety circuits		3 NO (13-14, 23-24, 33-34)			
	Number and type of additional circuits		1 NC (41-42) + 4 solid-state			
	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			
	Breaking capacity of solid-state outputs		24 V/20 mA, 48 V/10 mA			
	Max. thermal current (Ithe)	Α	6			
	Max. total thermal current	Α	18			
	Output fuse protection	Α	4 gG or 6 fast acting, conforming to IEC/EN	N 60947-5-1, DIN VDE 0660 part 200		
	Minimum current	mA	10			
	Minimum voltage	٧	17			
Electrical durabi	ility		See page 38610-EN/2			
Response time of	on input opening	ms	≤ 40			
Rated insulation	voltage (Ui)	٧	300 (degree of pollution 2 conforming to IEC	C/EN 60947-5-1, DIN VDE 0110 parts 1 & 2)		
		kV	4 (overvoltage category III, conforming to IEC/EN 60947-5-1, DIN VDE 0110 parts 1 & 2)			
LED display			4			
Operating temper	erature	°C	- 10+ 55			
Storage tempera	ature	°C	- 25+ 85			
Degree of	Conforming to Terminals		IP 20			
protection	IEC 60529 Enclosure		IP 40			

Characteristics, references

Safety automation solutionsPreventa safety modules type XPS AK
For Emergency stop, switch, sensing mat/edges
or safety light curtain monitoring

Character	ristics (continue	d)		
Module type			XPS AK3●1144	XPS AK3●1144P
Connections	Туре	Terminals	Captive screw clamp terminals	Captive screw clamp terminals
		Terminal block	Integrated in module	Removable from module
	1-wire connection	Without cable end	Solid or exible cable: 0.142.5 mm ² Solid or exible cable: 0.22.5 mr	
		With cable end	Without bezel, exible cable: 0.252.5 mm ²	
		With cable end	With bezel, exible cable: 0.251.5 mm ²	With bezel, exible cable: 0.252.5 mm ²
	2-wire connection	Without cable end	Solid or exible cable: 0.140.75 mm ²	Solid cable: 0.21 mm ² , exible cable: 0.21.5 mm ²
		With cable end	Without bezel, exible cable: 0.251 mm ²	
		With cable end	Double, with bezel, exible cable: 0.51.5	mm²

References



XPS AK3 • 1144

With cable end	Double, wit	h bezel, exib	le cable: 0.51.5 r	mm²		
Description	Type of terminal block connection		Outputs: Additional / Solid-state for PLC	Supply	Reference	Weight
Safety modules for Emergency stop, switch, sensing mat/edges or safety light curtain monitoring	Integrated in module	3	1/4	24 V ∼ 24 V 	XPS AK311144	0.300
				110 V ∼ 24 V ==	XPS AK361144	0.400
				120 V ~ 24 V	XPS AK351144	0.400
				230 V ∼ 24 V 	XPS AK371144	0.400
	Removable from module	3	1/4	24 V ∼ 24 V 	XPS AK311144P	0.300
				48 V ∼	XPS AK331144P	0.300
				110 V ∼ 24 V 	XPS AK361144P	0.400
				120 V ∼ 24 V 	XPS AK351144P	0.400
				230 V ∼ 24 V 	XPS AK371144P	0.400

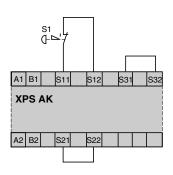
Preventa safety modules type XPS AK For Emergency stop, switch, sensing mat/edges or safety light curtain monitoring

XPS AK

Emergency stop monitoring function configuration

1-channel wiring

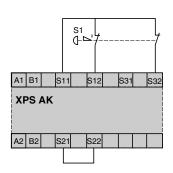
Emergency stop button with a single NC contact



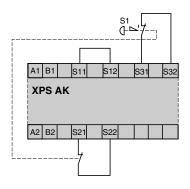
Not all faults are detected: a short-circuit on the Emergency stop pushbutton is not detected.

2-channel wiring

Emergency stop button with 2 NC contacts, without short-circuit detection

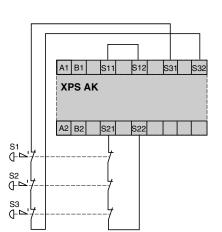


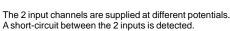
Emergency stop button with 2 NC contacts, with short-circuit detection (recommended application)



The 2 input channels are supplied at different potentials. A short-circuit between the 2 inputs is detected

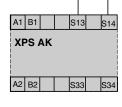
Connection of multiple Emergency stop buttons with 2 NC contacts (recommended application)



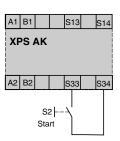


Start configurations

Automatic start

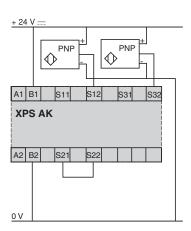


With start button monitoring

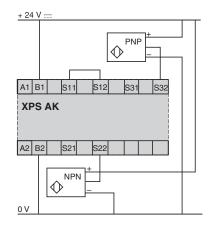


Proximity sensor monitoring

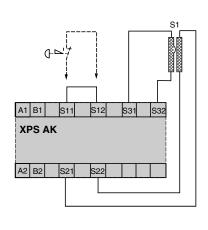
Proximity sensors with PNP outputs Without short-circuit detection



Proximity sensors with NPN and PNP outputs
With short-circuit detection



Sensing mat or edges monitoring



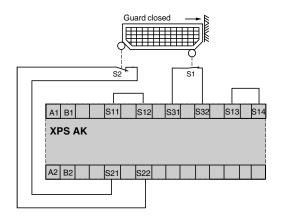
For Emergency stop, switch, sensing mat/edges or safety light curtain monitoring

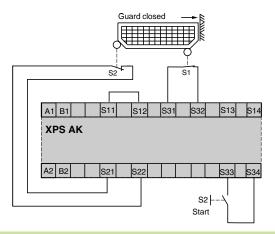
XPS AK

Monitoring of a movable guard associated with 2 switches with 1 contact each in combined mode (switch 1 with NO contact, switch 2 with NC contact)

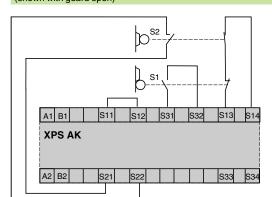
Automatic start, without synchronisation time monitoring

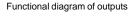
Manual start by Start button

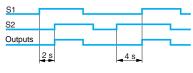




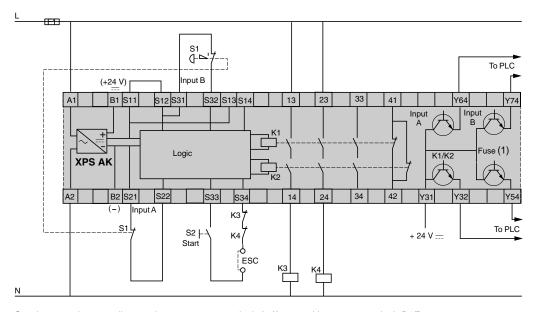
Monitoring of a movable guard associated with 2 switches and automatic start (shown with guard open)







Module XPS AK associated with an Emergency stop button with 2 NC contacts



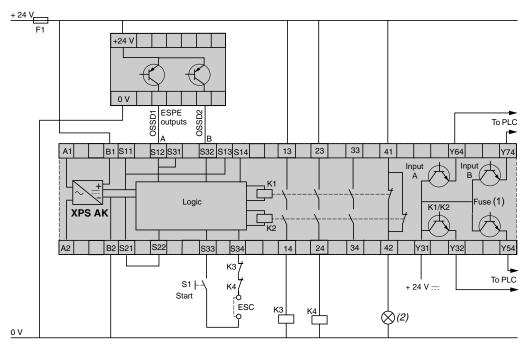
Supply connection according to voltage: \sim across terminals A1/A2, or 24 V $\overline{\dots}$ across terminals B1/B2.

(1) Operating status of internal electronic fuse. ESC: External start conditions.

For Emergency stop, switch, sensing mat/edges or safety light curtain monitoring

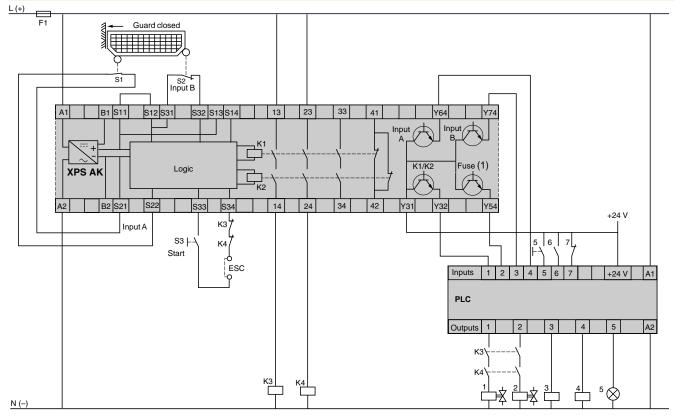
XPS AK

Module XPS AK for monitoring electro-sensitive protection equipment (ESPE)



- (1) Operating status of internal electronic fuse.
- (2) ESPE indicator light deactivated. ESC: External start conditions.

Example of safety circuit combining module XPS AK for switch monitoring and a PLC



(1) Operating status of internal electronic fuse.

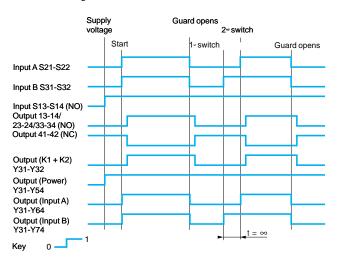
ESC: External start conditions.

Preventa safety modules type XPS AK For Emergency stop, switch, sensing mat/edges or safety light curtain monitoring

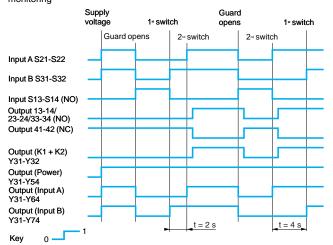
XPS AK

Functional diagrams

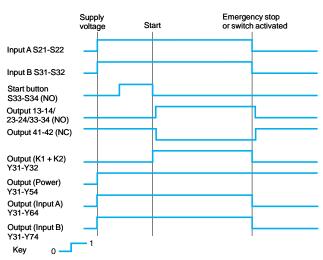
Switch monitoring function with automatic start



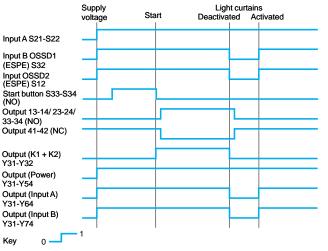
Switch monitoring function with automatic start and synchronisation time monitoring



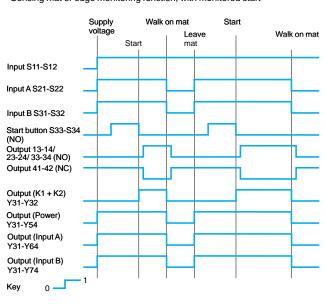
Emergency stop monitoring or switch monitoring function



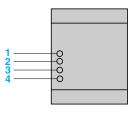
Light curtain monitoring (ESPE) function, curtains with solid-state outputs



Sensing mat or edge monitoring function, with monitored start



LED details



- Supply voltage A1-A2, fuse status.
- 2 Input S22 (A).
- 3 Input S32 (B).
- 4 K1/K2 status (NO safety outputs closed).

Operating principle, characteristics. references

Safety automation solutions

Preventa safety modules type XPS VC For enabling switch monitoring

Operating principle

The enabling grip switch system, comprising an enabling switch XY2 AU and a monitoring module XPS VC, enables authorised personnel to carry out adjustment, programming or maintenance operations within hazardous zones of machines providing certain conditions are met.

To be accessible, such operations are often carried out at reduced speed, and must be intentionally selected by authorised persons by means of a selector switch or key switch. Once the selection is made, the enabling switch system temporarily takes over from the hazardous zone's usual protection measures. Caution: The enabling switch system alone must not cause dangerous movements of the machine to be activated; a second intentional control action on the part of the operator is required. In addition, each person remaining in the hazardous zone must be provided with an individual enabling switch to ensure their own safety.

			CHADIIII	g switch to ensure their own safety.			
Characteris	stics						
Module type				XPS VC1132	XPS VC1132P		
Maximum achiev	able safety level			PL e/Category 4 conforming to EN/ISO 138	49-1, SILCL 3 conforming to EN/IEC 62061		
Reliability data	Mean Time To dand	gerous Failure (MTTF _d)	Years	50			
	Diagnostic Coverage	ge (DC)	%	> 99			
		erous Failure per Hour	1/h	1.3 x 10 ⁻⁸			
	(PFH _d)						
Conformity to sta	andards			EN/IEC 60204-1, EN 61326, EN/IEC 6094	7-1, EN/IEC 60947-5-1		
Product certifica	tions			UL, CSA, TÜV			
Supply (Ue)	Voltage		٧	24 ===			
conforming to IEC 38	Voltage limits	24 V		- 20+ 20%			
Consumption			W	< 2.5			
Module inputs fu	<u> </u>			Internal, electronic			
Maximum wiring enabling grip swite		en the module and the	Ω	100			
Control unit volta				24 V/8 mA			
Safety outputs	Safety outputs Voltage reference			Volt-free			
	Number and type o	f safety circuits		2 NO (terminals 13-14, 23-24)			
	Number and type o	f solid-state outputs		2			
	Breaking capacity i		VA	C300: inrush 1800, maintained: 180			
	Breaking capacity i	n DC-13		24 V/1.5 A L/R = 50 ms			
	Max. thermal curre		Α	4.2			
	Max. total thermal		Α	8.4			
	Output fuse protect	tion	Α	4 gG or 6 fast acting			
	Minimum current		mA	10			
	Minimum voltage		٧	17			
Electrical durabil				See page 38610-EN/2			
Response time o	n input opening		ms	< 20			
Rated insulation			٧	· · · · · · · · · · · · · · · · · · ·	C/EN 60947-5-1, DIN VDE 0110 parts 1 & 2)		
	ithstand voltage (Uir	np)	kV		C/EN 60947-5-1, DIN VDE 0110 parts 1 & 2)		
LED display				3			
Ambient air temp			°C	For operation: - 10+ 55, for storage - 25.	+ 85		
	tion conforming to IE			Terminals: IP 20, enclosure: IP 40			
Connection	Туре	Terminals		Captive screw clamp terminals	Captive screw clamp terminals		
		Terminal block		Integrated in module	Removable from module		
	1-wire connection	Without cable end		Solid or exible cable: 0.142.5 mm ²	Solid or exible cable: 0.22.5 mm ²		
		With cable end		Without bezel, exible cable: 0.252.5 mi			
		With cable end		With bezel, exible cable: 0.251.5 mm ²	With bezel, exible cable: 0.252.5 mm ²		
	2-wire connection	Without cable end		Solid or exible cable: 0.140.75 mm ²	Solid cable: 0.21 mm ² , exible cable: 0.21.5 mm ²		
		With cable end		Without bezel, exible cable: 0.251 mm ²	2		
		With cable end		With bezel, exible cable: 0.51.5 mm ²			
References							



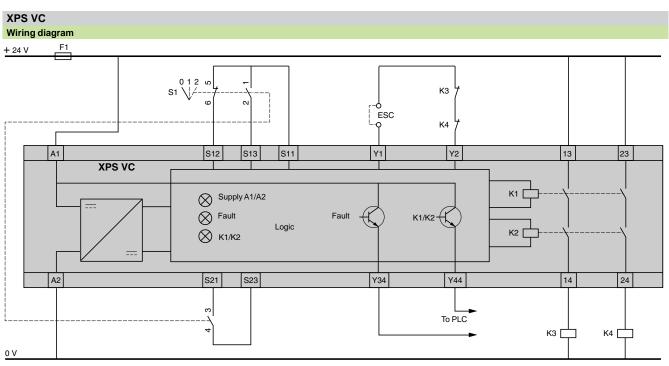
Description	Type of termina block connection	I Number of on safety circuit	Solid-state s outputs for PLC	Supply (V)	References	Weight
Safety modules for enabling switch monitoring	Integrated in module	2 NO	2	24	XPS VC1132	0.250

24 === XPS VC1132P Removable from 2 NO

XPS VC1132

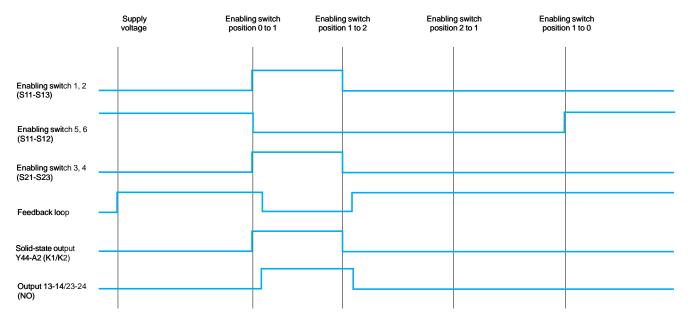
Dimensions: page 38730-EN/2

For enabling switch monitoring



ESC: External start conditions.

Functional diagram of module XPS VC



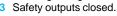


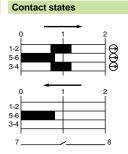
999

LED details

Supply voltage A1-A2, internal electronic fuse status.

Fault signalling.





Contact closed Contact open

NC contact with positive opening operation.

Operating principle

Safety automation solutions

Preventa safety modules types XPS BA, XPS BCE, XPS BF

For electrical monitoring of two-hand control stations

Operating principle

Two-hand control stations are designed to provide protection against hand injury. They require machine operators to keep their hands clear of the dangerous

The use of two-hand control is an individual protective measure, which can safely protect only one operator. Separate two-hand control stations must be provided for each operator in a multiple-worker environment.

Safety modules XPS BA, BCE and BF for two-hand control stations comply with the requirements of European standard EN 574/ISO 13851 for two-hand control systems.

The control stations must be designed and installed such that they cannot be activated involuntarily or easily rendered inoperative. Depending on the application, the requirements of type C standards speci c to the machinery involved must be met (additional personal protection methods may have to be considered).

To initiate a dangerous movement, both operators (two-hand control pushbuttons) must be activated within an interval ≤ 0.5 s (synchronous activation). If one of the two pushbuttons is released during a dangerous operation, the control sequence is cancelled. Resumption of the dangerous operation is possible only if both pushbuttons are returned to their initial position and reactivated within the required time interval.

The safety distance between the control units and the hazardous zone must be suf cient to ensure that when only one operator is released, the hazardous zone cannot be reached before the dangerous movement has been completed or stopped.

Connections:

Dimensions

page 38730-EN/2

Characteristics

Characteristics

Safety automation solutionsPreventa safety modules types XPS BA,
XPS BCE

For electrical monitoring of two-hand control stations

Characteris	Sucs					
Module type				XPS BA	XPS BCE	XPS BCE
Maximum achiev	able safety level			PL c/Category 1 conforming to EN/ISO 13849-1	PL e/Category 4 conform SILCL 3 conforming to E	ning to EN/ISO 13849-1, N/IEC 62061
Reliability data	Mean Time To danger	ous Failure (MTTF _d)	Years	160.8	37	
	Diagnostic Coverage		%	_	> 99	
		us Failure per Hour (PFH _d)	1/h	7.1 x 10 ⁻⁷	3 x 10 ⁻⁸	
Conformity to st		sor andro por riodi (i i rig)		EN/IEC 60204-1,	EN/IEC 60204-1,	
, , , , , , , , , , , , , , , , , , , ,				EN/IEC 60947-1, EN/IEC 60947-5-1, EN 574 type III A/ISO 13851	EN/IEC 60947-1, EN/IEC 60947-5-1, EN 574 type III C/ISO 13	8851
Product certifica	ntions			UL, CSA, TÜV	UL, CSA, BG	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,
Supply	Voltage		V	24 ~ , 115 ~ , 230 ~	24 , 24 ~, 115 ~, 230	~
,	Voltage limits			- 20+ 20% (24 V), - 20+ 10% (24 V ∼)	- 15+ 10% (24 V , 24 - 15+ 15% (115 V ∼), - 15+ 10% (230 V ∼)	
	Frequency		Hz	50/60		
Consumption			VA	< 20 (apparent power)	< 4	
/lodule inputs fu	ise protection			Internal, electronic		
nputs				S1: 1 NC + NO, S2: 1 NC + NO		
Two-hand contro Conforming to EN				III A	III C	
Synchronisation	time		s	0.5 maximum		
Control unit	24 V == version		٧	24	24	
voltage	24 V ∼, 115 V, 230 V v	version	V	24	24	
Minimum voltage	e and current			Between terminals T11-T12, T11-T13		
	U min./I min 24 V ===	version (20°C)		18 V/30 mA	_	
	U min./I min 24 V ∼, (20°C)	/115 V/230 V version		18 V/30 mA	-	
Calculation of wi	iring resistance RL (for	r XPS BCE only)	Ω	_	==	
	s S11-S13, S21-S23				n. Ue	
					$RL = \frac{Ue}{Un} \times 160-127$	- 11 4
					~	Ue = true voltage applie to terminals A1-A2
					$RL = \frac{Ue}{Un} \times 160-135$	Un = nominal supply voltage
Outputs	Voltage reference	Voltage reference		Volt-free		
-	Number and type of sa	afety circuits		1 NO (11-14)	2 NO (13-14, 23-24)	
	Number and type of a	dditional circuits		1 NC (11-12)	1 NC (31-32)	
	Breaking capacity in A	C-15	VA	C300: inrush 1800, maintained 180	B300: inrush 3600, main	tained 360
	Breaking capacity in D	C-13		24 V/1.5 A - L/R = 50 ms		
	Max. thermal current ((Ithe)	Α	5	6	
	Output fuse protection conforming to IEC/EN VDE 0660 part 200		Α	4 gG or 6 fast acting	6 gG	
	Minimum current		mA	10		
	Minimum voltage		٧	17		
Electrical durabi	lity			See page 38610-EN/2		
Response time			ms	< 25	< 50	
Rated insulation			٧	300 (degree of pollution 2 conformi	,	
Rated impulse w _ED display	rithstand voltage (Uimp	D)	kV	4 (overvoltage category III, conform 2	ing to IEC/EN 60947-5-1, [DIN VDE 0110 parts 1 & 2)
Operating tempe	erature		°C	- 10+ 55	- 25+ 55	
Storage tempera			°C	- 25+ 85	- 25+ 75	
Degree of protec		Terminals		IP 20		
conforming to IEC		Enclosure		IP 40		
Connections	Туре	Terminals		Captive screw clamp terminals	Captive screw clamp terminals	Spring terminals
	1-wire connection	Terminal block Without cable end		Integrated in module Solid or exible cable:	Removable from module Solid or exible cable: 0.	
		With coble and		0.142.5 mm ²	2.5 mm ²	
		With cable end With cable end		Without bezel, exible cable: 0.251		With bezel, exible cab
	2-wire connection	Without cable end		Solid or exible cable: 0.140.75 mm²	Solid or exible cable: 0.21 mm ²	- U.252.5 mm ⁻
		With cable end		Without bezel, exible cable: 0.25.	1 mm ²	_

Safety automation solutions
Preventa safety modules type XPS BF
For electrical monitoring of two-hand control stations

	stics					
Module type				XPS BF1132	XPS BF1132P	
Maximum achie	vable safety level			PL e/Category 4 conforming to EN/ISO 1384	49-1, SILCL 3 conforming to EN/IEC 6206	
Reliability data	Mean Time To danger	ous Failure (MTTF _d)	Years	50.1		
	Diagnostic Coverage	(DC)	%	> 99		
	Probability of dangero	ous Failure per Hour	1/h	1.3 x 10 ⁻⁸		
Conformity to s	tandards			EN 60204-1, EN 60947-1, EN 60947-5-1, EN 574 type III C/ISO 13851		
Product certific	ations			UL, CSA, TÜV		
Supply		Voltage	٧	24 ===		
		Voltage limits		- 20+ 20%		
Consumption			W	< 2.5		
Module inputs f	use protection			Internal, electronic		
nputs				S1: 1 NC + NO, S2: 1 NC + NO		
Two-hand contr	ol type			III C conforming to EN 574		
Synchronisatio	n time		s	0.5 maximum		
Control unit vol	tage		V	24 V/8 mA		
Outputs Voltage reference				Volt-free		
	Number and type of safety circuits			2 NO (13-14, 23-24)		
	Number and type of additional circuits			2 solid-state (type 24 V - 20 mA)		
	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		
	Max. thermal current (Ithe)		Α	4.2		
	Max. total thermal current		Α	8.4		
	Output fuse protection, using fuses conforming to IEC/EN 60947-5-1, VDE 0660 part 200		Α	4 gG or 6 fast acting		
	Minimum current		mA	10		
	Minimum voltage		٧	17		
Electrical durab	ility			See page 38610-EN/2		
Response time			ms	< 20		
Rated insulation	n voltage (Ui)		٧	300 (degree of pollution 2 conforming to IEC	C/EN 60947-5-1, DIN VDE 0110 parts 1 & 2	
Rated impulse v	vithstand voltage (Uimp	0)	kV	4 (overvoltage category III, conforming to IE	C/EN 60947-5-1, DIN VDE 0110 parts 1 &	
LED display				3		
Operating temp	erature		°C	- 10+ 55		
Storage temper			°C	- 25+ 85		
Degree of prote		Terminals		IP 20		
conforming to IE		Enclosure		IP 40	12	
Connection	Туре	Terminals		Captive screw clamp terminals	Captive screw clamp terminals	
		Terminal block		Integrated in module	Removable from module	
	1-wire connection	Without cable end		Solid or exible cable: 0.142.5 mm ²	Solid or exible cable: 0.22.5 mm ²	
		With cable end		Without bezel, exible cable: 0.252.5 mi		
		With cable end		With bezel, exible cable: 0.251.5 mm ²	With bezel, exible cable: 252.5 mn	
	2-wire connection	Without cable end		Solid or exible cable: 0.140.75 mm ²	Solid cable: 0.21 mm², exible cable 0.21.5 mm²	
		With cable end		Without bezel, exible cable: 0.251 mm	2	
		With cable end		Double, with bezel, exible cable: 0.51.5	5 mm²	

For electrical monitoring of two-hand control stations

Selection

Standard EN 574/ISO 13851 de nes the selection of twohand controls according to the control system category. The following table details the 3 types of two-hand control conforming to EN 574/ISO 13851.

For each type, it lists the operating characteristics and minimum requirements.

Requirements of standard EN 574/	Type I	Type II	Type III		
ISO 13851			Α	В	С
Use of both hands (simultaneous action)					
Link between input and output signals					
Output signal inhibited					
Prevention of accidental operation					
Tamper-proof					
Output signal reinitialised					
Synchronous action (speci ed time limit)					
Use of proven components (Category 1 conforming to EN/ISO 13849-1)			XPS BA••		
Redundancy with partial error detection (Category 3 conforming to EN/ISO 13849-1)				XPS BCE XPS BF	
Redundancy + Self-monitoring (Category 4 conforming to EN/ISO 13849-1)					XPS BCE XPS BF
Two-hand control station	XY2 SB●)			

Meets the requirements of standard EN 574/ISO 13851

Conforming to standard EN/ISO 13849-1

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Refere

XPS	BA5120



XPS BCE

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XPS BF1132

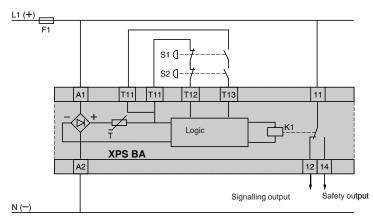
			Confor	ming to standar	d EN/ISO 13849-1			
ences								
	Description	Type conforming to standard EN 574	Connection	Number of safety circuits	Additional soutputs	Supply	Reference	Weight kg
TI TIS TIS SOMEWHALL THE XPS-SA	Safety modules for electrical monitoring of two-hand control stations	III A	Captive screw clamp terminals Terminal block integrated in module	1 NO	1 NC	∼ or 24 V 	XPS BA5120	0.200
9 One	III C	Captive screw clamp terminals Terminal block removable from module		1 NC relay	\sim and 24 V $\overline{\dots}$	XPS BCE3110P	0.272	
120					115 V ∼	XPS BCE3410P	0.322	
						230 V ∼	XPS BCE3710P	0.322
S W	HE TANKE TO SERVICE TO		Spring terminals Terminal block removable from module	2 NO	1 NC relay	\sim and 24 V $=$	XPS BCE3110C	0.272
are:	III					115 V ∼	XPS BCE3410C	0.322
0.0	Land					230 V ∼	XPS BCE3710C	0.322
••••P	XPS BCE•••€C							
0.0	AFS BUESSES	Captive screw clamp terminals Terminal block removable from	2 NO	2 solid-state	24 V	XPS BF1132	0.150	
000			module	2 NO	2 solid-state	24 V	XPS BF1132P	0.150

Preventa safety modules type XPS BA For electrical monitoring of two-hand control stations

XPS BA

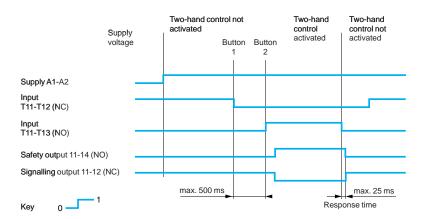
Module XPS BA associated with a two-hand control station

Type III A conforming to EN 574

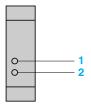


S1 and S2: pushbuttons. Must not be used for applications (presses) which require a type III C module (XPS BCE or XPS BF).

Functional diagram of module XPS BA



LED details (XPS BA)



- 1 Supply voltage A1-A2.
- 2 K1 status (NO safety output 11-14 closed).

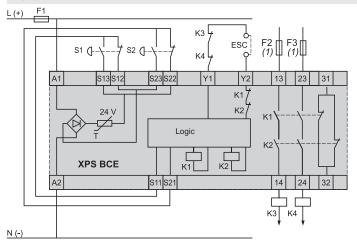
Safety automation solutionsPreventa safety modules type XPS BCE
For electrical monitoring of two-hand control stations

XPS BCE

Module XPS BCE associated with a two-hand control station

Type III C conforming to EN 574/ISO 13851

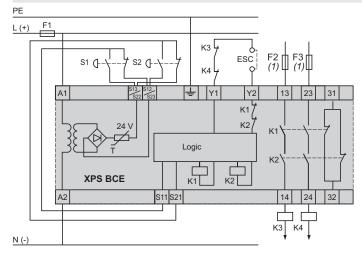
\sim and 24 V ϖ



S1, S2: Two-hand control station pushbuttons

ESC: External start conditions
(1) Maximum fuse rating: see technical characteristics.

115 \sim and 230 V

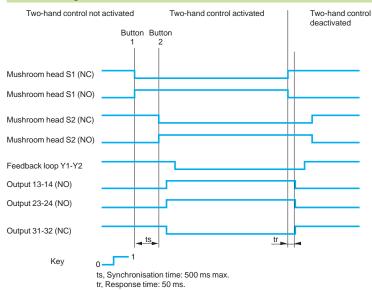


S1, S2: Two-hand control station pushbuttons ESC: External start conditions

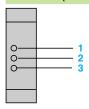
(1) Maximum fuse rating: see technical characteristics.

For electrical monitoring of two-hand control stations

Functional diagram of module XPS BCE



LED details (XPS BCE)

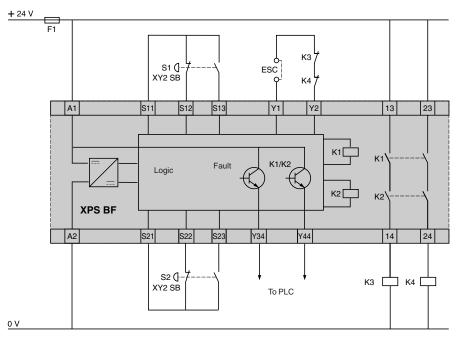


- 1 Supply voltage A1-A2.
- 2 K1 status (NO safety outputs closed).
- 3 K2 status (NO safety outputs closed).

Preventa safety modules type XPS BF For electrical monitoring of two-hand control stations

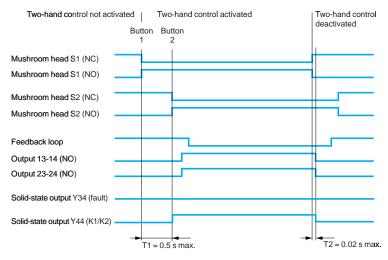
XPS BF

Module XPS BF associated with a two-hand control station



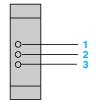
ESC: External start conditions. Y1-Y2: feedback loop

Functional diagram of module XPS BF





LED details (XPS BF)



- 1 Supply voltage A1-A2 (fuse status).
- 2 Fault signalling.
- 3 K1-K2 status (NO safety outputs closed).

Operating principle, characteristics

Safety automation solutionsPreventa safety modules types XPS ECME, **XPS ECPE**

For extending the number of safety contacts

Operating principle

Safety modules XPS ECME and XPS ECPE, for extending the number of safety contacts, are available as additions to Preventa XPS base modules (Emergency stop, limit switch, two-hand control, etc.). They are used to extend the number of safety output

			contac	cts of the base modu	les.			
Characteristics	3							
Module type				XPS ECMEP	XPS ECMEC	XPS ECPE•••P	XPS ECPE•••C	
Maximum achievable s	safety level				oforming to EN/ISO 138 to EN/IEC 62061 (whe		opropriate module)	
Reliability data	Mean Time To dange (MTTF _d)	erous Failure	Years	45		30		
	Diagnostic Coverage (DC)		%	6090		99		
	Probability of danger Hour (PFH _d)	ous Failure per	1/h	2.00 x 10 ⁻⁷		3.00 x 10 ⁻⁹		
Conformity to standar	ds			EN/IEC 60204-1, EN	I/IEC 60947-1, EN/IEC	60947-5-1		
Product certifications				UL, CSA, BG		UL, CSA, TÜV		
Supply	Voltage		٧	∼ and 24 		∼ and 24 , 115	230 ∼	
	Voltage limits			- 15+ 10%		-15+10%		
Frequency		Hz	50/60					
Consumption	24 V		VA	< 5		4		
	115 V/230 V		VA	-		6		
Module inputs fuse pr	otection			Internal, electronic		Internal PTC		
Outputs Voltage reference				Volt-free				
	Number and type of safety circuits			4 NO		8 NO		
	Number and type of additional circuits			2 NC		1 NC		
	Breaking capacity in AC-15			B300: inrush 3600, r	maintained 360			
	Breaking capacity in	DC-13		24 V/1.5 A - L/R = 50	ms	24 V/3 A - L/R = 50 r	ns	
Max. thermal current (Ithe) Max. total thermal current		(Ithe)	Α	6				
		irrent	Α	12		24		
	Output fuse protection		Α	6 gG				
	Minimum current (volt-free contact)		mA	10 (conforming to EN/IEC 60947-5-1, VDE 0660 part 200)				
	Minimum voltage (vo	· · · · · · · · · · · · · · · · · · ·	V	17 5				
Electrical durability				See page 38610/2				
Response time on inpu	ut opening		ms	< 20 10				
Rated insulation voltage	<u> </u>		V	300 (degree of pollution 2 conforming to IEC/EN 60947-5-1, DIN VDE 0110 parts 1 8			DE 0110 parts 1 & 2)	
Rated impulse withsta	- ' '		kV	4 (overvoltage category III, conforming to IEC/EN 60947-1, DIN VDE 0110 parts 1 & 2)				
LED display				2 3				
Operating temperature	9		°C	- 25+ 55 - 25+ 55				
Storage temperature			°C	- 25+ 75		- 25+ 70		
Degree of protection conforming to IEC 60529	Terminals			IP 20				
-	Enclosure			IP 40				
Connection	Туре	Terminals		Captive screw clamp terminals	Spring terminals	Captive screw clamp terminals	Spring terminals	
		Terminal block		Removable from mo	dule			
	1-wire connection			Solid or flexible cable	e: 0.22.5 mm²			
		With cable end			le cable: 0.252.5 m			
				With bezel, flexible cable: 0.251.5 mm ²	With bezel, flexible cable: 0.252.5 mm ²	With bezel, flexible cable: 0.251.5 mm ²	With bezel, flexible cable: 0.252.5 mm ²	
	2-wire connection	Without cable end		Solid or flexible cable: 0.21 mm ²	-	Solid or flexible cable: 0.21 mm ²	-	
		With cable end		Without bezel, flexible cable: 0.251 mm ²	-	Without bezel, flexible cable: 0.251 mm²	-	
				Double, with bezel, flexible cable: 0.51.5 mm ²	Double, with bezel, flexible cable: 0.51 mm²	Double, with bezel, flexible cable: 0.51.5 mm ²	Double, with bezel, flexible cable: 0.51 mm ²	

For extending the number of safety contacts



XPS ECME5131P



XPS ECME5131C



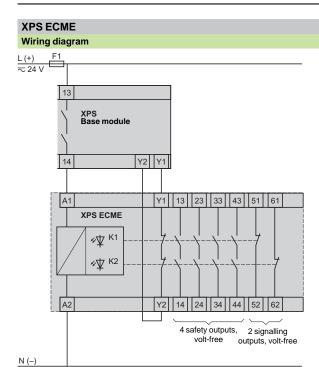
XPSECPE5131P



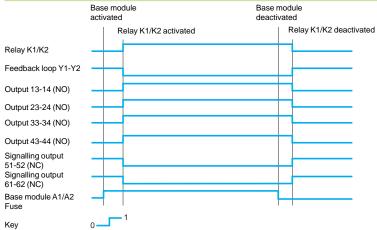
XPSECPE5131C

References Description	Number of safety circuits	Additional outputs	Supply	Connection	Reference	Weight kg
Safety modules for extending the number of safety contacts, for use with XPS base modules	4	2	∼ and 24 V . 	Captive screw clamp terminals Terminal block removable from module	XPS ECME5131P	0.270
				Spring terminals Terminal block removable from module	XPS ECME5131C	0.270
	8	1	~ and 24 V	Captive screw clamp terminals Terminal block removable from module	XPS ECPE5131P	0.550
				Spring terminals Terminal block removable from module	XPS ECPE5131C	0.650
			115230 V ∼	Captive screw clamp terminals Terminal block removable from module	XPS ECPE3910P	0.650
				Spring terminals Terminal block removable from module	XPS ECPE3910C	0.650

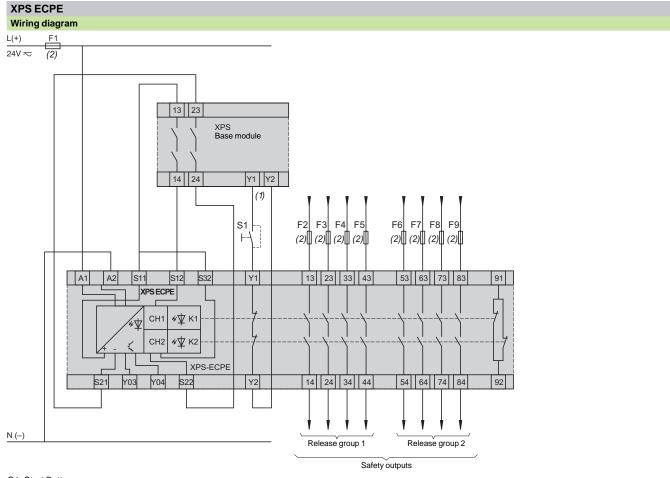
For extending the number of safety contacts





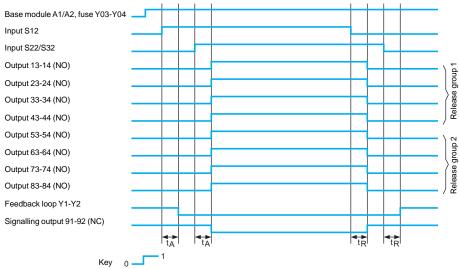


For extending the number of safety contacts



- S1: Start Button.
 (1) Feedback loop.
 (2) See technical data for maximum fuse sizes.

Functional diagram



tA: response time (K1 and K2)

tR: release time

Operating principle, characteristics

Safety automation solutionsPreventa safety modules types XPS TSA, **XPS TSW**

For safety time delays

Operating principle

Safety modules XPS TSA and XPS TSW are used in applications requiring safety time delays:

- modules XPS TSA in applications with interlocking on high inertia machines with long rundown time (guards unlocked after safety time delay has elapsed),
- modules XPS TSW in applications with a safety switchover contact (shunting contact in association with XPS VN modules for zero speed detection, solenoid valve monitoring, etc.).

The time delay of safety circuits can be set to 16 preset values, using 2 selectors located on the front face of the modules.

To aid diagnostics, the modules have LEDs which provide information on the monitoring circuit status and 2 solid-state outputs for signalling to the process PLC. In addition, their removable terminal blocks optimise machine maintenance.

Characteristics							
Module type			XPS TSA	XPS TSW			
Maximum achievable safet	y level		PL d/Category 3 conforming to EN/ISO 1384	49-1, SILCL 2 conforming to EN/IEC 62061			
Reliability data	Mean Time To dangerous Failure (MTTF _d)	Years	126				
	Diagnostic Coverage (DC)	%	6090				
	Probability of dangerous Failure per Hour (PFH _d)	1/h	1.3 x 10 ⁻⁷				
Conformity to standards			EN/IEC 60204-1, EN/IEC 60947-1, EN/IEC 60947-5-1				
Product certifications			UL, CSA, TÜV				
Supply	Voltage	٧	\sim and 24 $=$, 115 \sim , 230 \sim				
	Voltage limits		- 15+ 15% (24 V) - 20+ 10% (24 V ~) - 15+ 15% (115 V) - 15+ 10% (230 V)				
	Frequency	Hz	50/60				
Consumption	24	VA	< 2.3				
	24 V ∼		< 4.3				
	115 ∼		< 6.5				
230 V ∼			< 5.5				
Module inputs fuse protection			Internal, electronic				
Time delay		s	131 (16 positions)	-			
Pulse time		s	-	0.13.1 (16 positions)			
Outputs	Voltage reference		Volt-free				
	Number and type of safety circuits		1 NO (17-18) + 2 NC (25-26, 35-36)				
	Number and type of additional circuits		2 solid-state (Y53-Y54, Y63-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				
	Breaking capacity of solid-state outputs		24 V/20 mA, 48 V/10 mA				
	Max. thermal current (Ithe)	Α	6				
	Output fuse protection	Α	4 gG (gl) or 6 fast acting, conforming to IEC	C/EN 60947-5-1, DIN VDE 0660 part 200			
	Minimum current	mA	10				
	Minimum voltage	٧	17				
Electrical durability			See page 38610-EN/2				
Rated insulation voltage (L	Ji)	٧	300 (degree of pollution 2 conforming to IEC	C/EN 60947-5-1, DIN VDE 0110 parts 1 & 2)			
Rated impulse withstand v	oltage (Uimp)	kV	4 (overvoltage category III, conforming to I	EC 60947-5-1, DIN VDE 0110 parts 1 & 2)			
LED display			4				
Operating temperature		°C	- 10+ 55				
Storage temperature		°C	- 25+ 85				
Degree of protection	Terminals		IP 20				
conforming to IEC/EN 60529	Enclosure		IP 40				

Schneider Electric

XPS TSW

For safety time delays

Module type			XPS TSA	XPS TSW		
Connection	Туре	Terminals	Captive screw clamp terminals			
		Terminal block	Removable from module			
	1-wire connection	Without cable end	Solid or exible cable: 0.22.5 mm ²			
		With cable end	Without bezel, exible cable: 0.252.5 mm ²			
		With cable end	With bezel, exible cable: 0.252.5 mm ²			
	2-wire connection	Without cable end	Solid cable: 0.21 mm², exible cable: 0.21.5 mm²			
		With cable end	Without bezel, exible cable: 0.251 mm ²			
		With cable end	Double, with bezel, exible cable: 0.51.5 mm ²			

References



Description	Number of safety circuits	Number of additional outputs	Supply	Reference	Weight kg
Safety modules for applications with interlocking on high inertia machines	1 delayed	2 NC + 2 solid-state to PLC	\sim and 24 V $\overline{\dots}$	XPS TSA5142P	0.250

XPS TSA3442P

XPS TSA3742P

0.360

0.360

0.250

0.360

XPS TSA•••P



Safety modules for
applications with safety
switchover contact

2 NC + 2 solid-state to PLC

1 pulse type

 \sim and 24 V =XPS TSW5142P

115 V ∼

230 V \sim

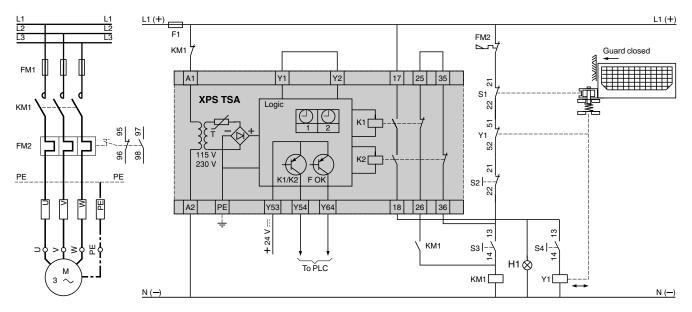
115 V ∼ XPS TSW3442P

230 V ∼ XPS TSW3742P 0.360

XPS TSW•••P

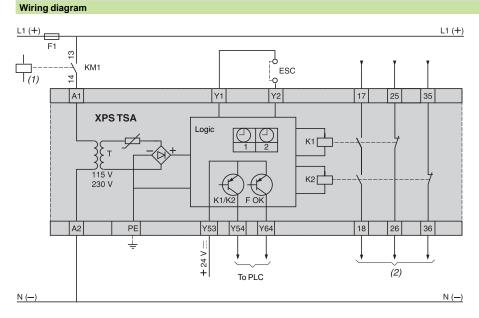
Connections

Delayed unlocking of a guard application



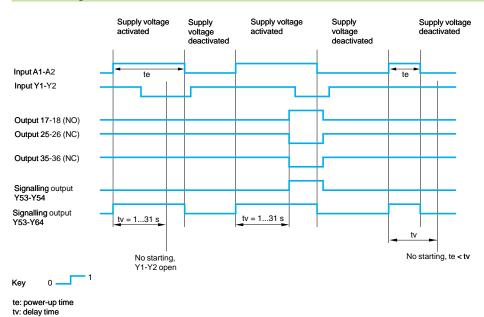
For safety time delays

XPS TSA

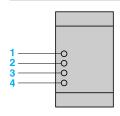


- (1) Signal to be delayed. (2) Volt-free relay outputs with on-delay. ESC: External start conditions.

Functional diagram of module XPS TSA

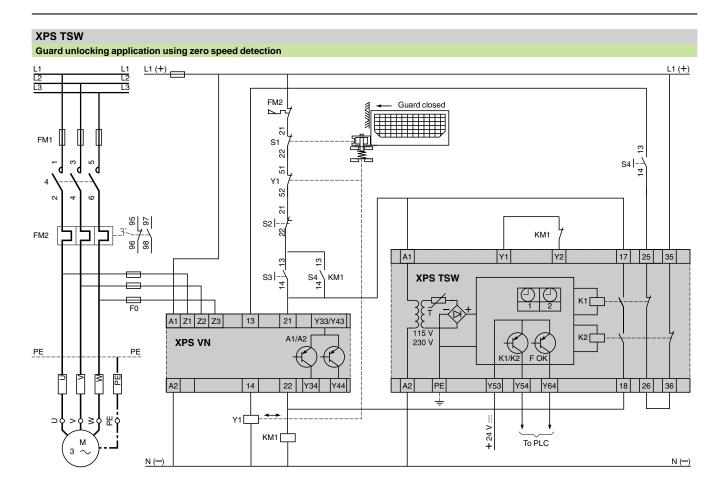


LED details (XPS TSA, XPA TSW)



- Supply voltage A1-A2 (fuse status).
- 2 Safety output closed.
- 3 Feedback loop Y1-Y2 status.
- 4 Time function active.

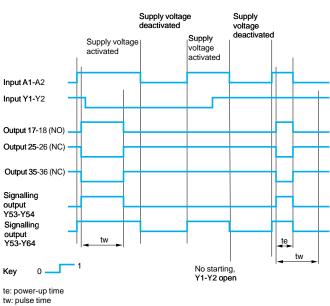
For safety time delays



Wiring diagram L1 (+) KM1 ESC 4 25 35 **XPS TSW** Logic K2[230 V A2 26 36 + 24 V == To PLC (2) <u>N (—)</u> N (-)

(1) Control signal. (2) Volt-free relay outputs with pulse time delay. ESC: External start conditions. LED details: see page 38785-EN/4.

Functional diagram of module XPS TSW



5

Operating principle, characteristics

Safety automation solutions

Preventa safety modules types XPS DMB, XPS DME

For coded magnetic switch monitoring

Operating principle

Safety modules XPS DMB and XPS DME are specifically designed for monitoring coded magnetic safety switches. They incorporate two safety outputs and two solid-state outputs for signalling to the process PLC. Conforming to Performance Level PLe/Category 4 conforming to EN/ISO 13849-1, modules XPS DMB can monitor two independent sensors and modules XPS DME can monitor up to six independent sensors.

To monitor a higher number of magnetic switches using these safety modules, the magnetic switches can be connected in series parallel, while meeting the requirements of Performance Level PL d/Category 3 conforming to standard EN/ISO 13849-1.

Safety modules XPS DM•••••P incorporate removable terminal blocks, thus optimising machine maintenance.

To aid diagnostics, the modules have LEDs on the front face which provide information on the monitoring circuit status.

Characteristi	cs							
Module type				XPS DMB1132	XPS DMB1132P	XPS DME1132	XPS DME1132P	
Maximum achievab	le safety level			PL e/Category 4 conf		49-1, SILCL 3 conform	ing to EN/IEC 62061	
Reliability data	Mean Time To dangero	ous Failure (MTTF _d)	Years	83.1	g	82.4		
,	Diagnostic Coverage (%	> 99		> 99		
	Probability of dangerou (PFH _d)	· · · · · · · · · · · · · · · · · · ·	1/h	3.92 x 10 ⁻⁹		3.97 x 10 ⁻⁹		
Conformity to stand	/			EN/IEC 60204-1, EN 1088/ISO 14119, EN/IEC 60947-1, EN/IEC 60947-5-1, EN/IEC 60947-5-3				
Product certification	ns			UL, CSA, TÜV				
Supply (Ue)	Voltage		٧	24 ===				
conforming to IEC 38	Voltage limits	24 V ===		- 20+ 20%				
Consumption	-		w	< 2.5		< 3.5		
Module inputs fuse	protection			Internal, electronic				
Maximum wiring res	sistance RL between the	e module and the	Ω	Ω 100				
Control unit voltage	and current			28 V/8 mA				
Synchronisation tin	ne between magnetic s	switch inputs	s	< 0.5				
Safety outputs Voltage reference				Volt-free				
	Number and type of safety circuits			2 NO				
	Number and type of solid-state outputs			2				
	Breaking capacity in AC-15			C300: inrush 1800, maintained: 180				
	Breaking capacity in DC-13			24 V/1.5 A, L/R = 50 ms				
	Max. thermal current (Ithe)			6				
	Max. total thermal curr	ent	Α	12				
	Output fuse protection		Α	4 gG or 6 fast acting				
	Minimum current		mA	10				
	Minimum voltage		٧	17				
Electrical durability				See page 38610-EN/2				
Response time on i	nput opening		ms	< 20				
Rated insulation vo	Itage (Ui)		٧	300 (degree of pollution 2 conforming to IEC/EN 60947-5-1, DIN VDE 0110 parts 1 & 2)				
Rated impulse with:	stand voltage (Uimp)		kV	4 (overvoltage category III, conforming to IEC/EN 60947-5-1, DIN VDE 0110 parts 1 & 2				
LED display				3		15		
Ambient air	For operation		°C	- 10+ 55				
temperature	For storage		°C	- 25+ 85				
Degree of protectio	n conforming to EN/IEC	60529		Terminals: IP 20, enc	losure: IP 40			
Connection	Туре	Terminals		Captive screw clamp	terminals			
		Terminal block		Integrated in module	Removable from module	Integrated in module	Removable from module	
	1-wire connection	Without cable end		Solid or exible cable: 0.142.5 mm ²	Solid or exible cable: 0.22.5 mm ²	Solid or exible cable: 0.142.5 mm ²	Solid or exible cable: 0.142.5 mn	
		With cable end		Without bezel, exible	e cable: 0.252.5 mm	2		
		With cable end		With bezel, exible cable: 0.251.5 mm ²	With bezel, exible cable: 0.252.5 mm ²	With bezel, exible cable: 0.251.5 mm ²	With bezel, exible cable: 0.252.5 mm	
	2-wire connection	Without cable end		Solid or exible cable: 0.140.75 mm ²	Solid cable: 0.21 mm², exible cable: 0.21.5 mm²	Solid or exible cable: 0.140.75 mm ²	Solid cable: 0.21 mm², exible cable: 0.21.5 mm	
		With cable end		Without bezel, exible	e cable: 0.251 mm²			
		With cable end		With bezel, exible ca	able: 0.51.5 mm²			

For coded magnetic switch monitoring



XPS DMB1132

References						
Description	Type of terminal block connection	Number of safety circuits	Solid-state outputs for PLC	Supply	Reference	Weight
				V		kg
Safety module for monitoring 2 coded magnetic switches	Integrated in module	2 NO	2	24	XPS DMB1132	0.250

Safety module for monitoring 6 coded magnetic switches	Integrated in module	2 NO	2	24	XPS DME1132	0.300



XPS DME1132

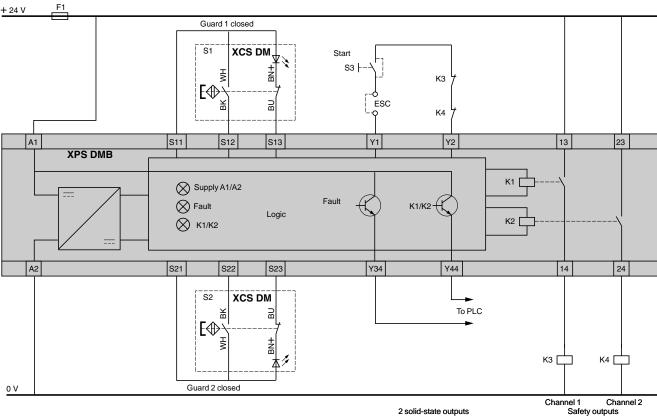
Safety module for monitoring 2 coded magnetic switches	Removable from module	2 NO	2	24	XPS DMB1132P	0.250
Safety module for monitoring 6 coded magnetic switches	Removable from module	2 NO	2	24	XPS DME1132P	0.300

Schneider Belectric

For coded magnetic switch monitoring

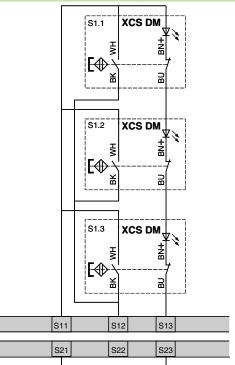
XPS DMB

Wiring to category 4 conforming to EN/ISO 13849-1. Example with NC + NO (NC staggered) contact. For example with 3-pole NC + NC + NO contact, see page 32942/4



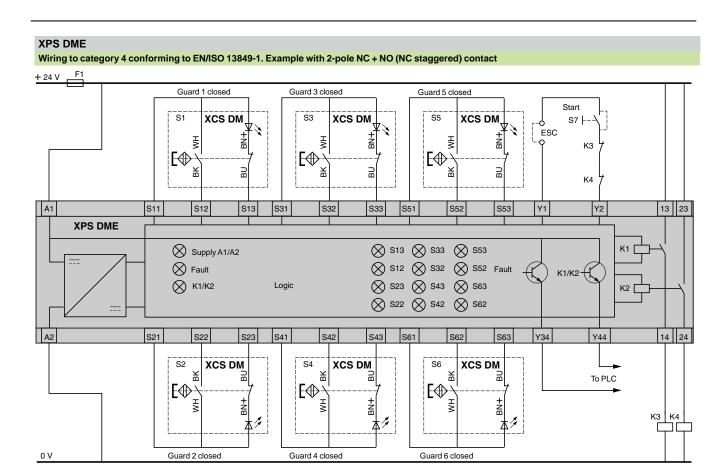
ESC: External start conditions.

Wiring to category 3 conforming to EN/ISO 13849-1. Example with 3 switches with 2-pole NC + NO (NC staggered) contacts



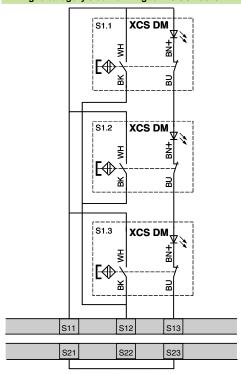
Input: S11, S12, S13 or S21, S22, S23. Input not used: terminals S21-S23 linked

For coded magnetic switch monitoring



FSC: External start conditions

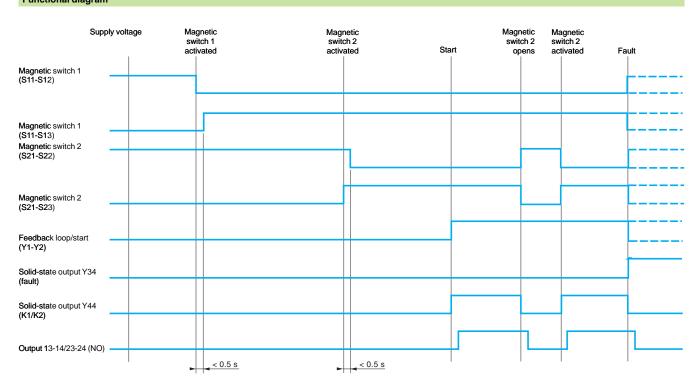
Wiring to category 3 conforming to EN/ISO 13849-1. Example with 3 switches with 2-pole NC + NO (NC staggered) contacts



Input: S11, S12, S13 or S21, S22, S23 or S31, S32, S33 or S41, S42, S43 or S51, S52, S53 or S61, S62, S63. Input not used: terminals So 1-So 3 (S21-S23, S31-S33, S41-S43, S51-S53, S61-S63) linked.

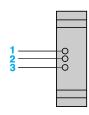
For coded magnetic switch monitoring

XPS DMB Functional diagram





LED details



- 1 Supply voltage A1-A2, internal electronic fuse status.
- 2 Fault signalling.
- 3 Safety outputs closed.

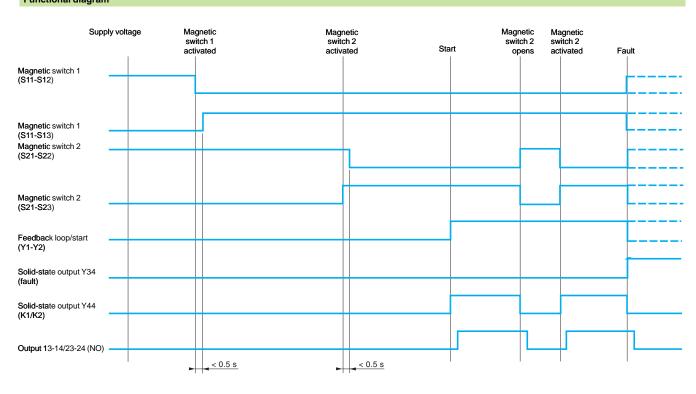
Functional diagrams (continued)

Safety automation solutionsPreventa safety modules types XPS DMB,

XPS DME

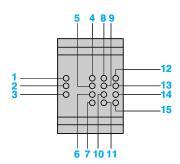
For coded magnetic switch monitoring

XPS DME Functional diagram





LED details



- Supply voltage A1-A2, internal electronic fuse status.
- 2 Fault signalling.
- Safety outputs closed.
- Magnetic switch 1 activated.
- Magnetic switch 1 deactivated.
- Magnetic switch 2 activated.
- Magnetic switch 2 deactivated.
- Magnetic switch 3 activated.
- Magnetic switch 3 deactivated.
- 10 Magnetic switch 4 activated.
- 11 Magnetic switch 4 deactivated.
- 12 Magnetic switch 5 activated.
- 13 Magnetic switch 5 deactivated.
- 14 Magnetic switch 6 activated.
- 15 Magnetic switch 6 deactivated.

Operating principle characteristics

Safety automation solutions

Preventa safety modules type XPS VNE For zero speed detection

Operating principle

Preventa safety modules XPS VNE for zero speed detection are used to detect the stop condition of electric motors. Their most common applications include: providing the unlock signal for electrically interlocked sliding or removable machine guards, controlling rotation direction signals for reversing motors and engaging locking brakes after a motor has come to a standstill.

As electric motors run down, a remanent voltage is produced in the windings of the motor due to residual magnetism. This voltage is proportional to the speed of the motor and, therefore, decreases as the motor comes to a standstill.

This remanent voltage is measured in a redundant manner so as to detect the stop condition of the motor. The cabling between the motor windings and the inputs of the XPS VNE module is also monitored to prevent a cabling breakage or fault being seen as a stopped motor.

A transformer should not be used to connect the motor to terminals Z1, Z2 and Z3 since there is no monitoring of the connection with the motor winding via the resistance monitoring.

Modules XPS VNE are suitable for detecting the stop condition of all types of AC or DC motor driven machines which, when the motor runs down, produce a remanent voltage in the windings due to residual magnetism. These machines can be controlled by electronic devices, such as variable speed drives or DC injection brakes. The input lters for standard XPS VNE modules are designed for a frequency of up to 60 Hz.

For motors operating at a frequency higher than 60 Hz, which therefore produce a high frequency remanent voltage, special modules XPS VNE••••HS should be used.

Modules XPS VNE have 2 potentiometers mounted on the front face of the module which allow independent adjustment of the switching threshold for each input circuit. This allows adjustment for different types of motors and application requirements.

To aid diagnostics, modules XPS VNE have 4 LEDs and 2 solid-state outputs to provide information on the status of the zero speed detection circuit.

Characteri	stics				
Module type			XPS VNE		
Maximum achievable safety level			PLd/Category 3 conforming to EN/ISO 13849-1, SILCL 2 conforming to EN/IEC 62061		
Reliability data	Mean Time To dangerous Failure (MTTF _d)	Years	124.1		
	Diagnostic Coverage (DC)	%	> 99		
	Probability of dangerous Failure per Hour (PFH _d)	1/h	9.26 x 10 ⁻⁹		
Conformity to standards			EN/IEC 60204-1, EN/IEC 60947-1, EN/IEC 60947-5-1		
Product certific	ations		UL, CSA, TÜV		
Supply Voltage		V	24 115 ∼ 230 ∼		
	Voltage limits		- 15+ 10% (24 V) - 15+ 15% (115 V ∼) - 15+ 10% (230 V ∼)		
	Frequency	Hz	50/60 (115 V, 230 V)		
Consumption		W	≤ 3.5 (24 V)		
		VA	≤7.5 (115 V ∼), ≤7 (230 V ∼)		
Frequency of m	otor power supply	Hz	≤ 60 Hz (XPS VN●●42), > 60 Hz (XPS VN●●42HS)		
Inputs	Maximum voltage between terminals Z1 - Z2 - Z3	٧	500 rms		
	Detection threshold	٧	0.01 - 0.1 (adjustable)		

Schneider

For zero speed detection

Module type				XPS VNE	
Outputs	Voltage reference			Volt-free	
•	Number and type of saf	ety circuits		1 NO (13-14), 1 NC (21-22)	
	Number and type of add	•		2 solid-state	
	Breaking capacity in AC	C-15		C300 (inrush: 1800 VA/maintained: 180 VA)	
	Breaking capacity in DC	C-13		24 V/1.5 A - L/R = 50 ms (contact 13-14) 24 V/1.2 A - L/R = 50 ms (contact 21-22)	
	Breaking capacity of so	lid-state outputs		24 V/20 mA, 48 V/10 mA	
	Max. thermal current (Ithe)		Α	2.5	
	Output fuse protection	Output fuse protection		4 gG, conforming to IEC/EN 60947-5-1, DIN VDE 0660 part 200	
	Minimum current (volt-f	Minimum current (volt-free contact)		10 (1)	
	Minimum voltage (volt-f	ree contact)	٧	17 (1)	
Electrical durability			See page 38610-EN/2		
Rated insulation	on voltage (Ui)		٧	300 (degree of pollution 2 conforming to IEC/EN 60947-5-1, DIN VDE 0110 parts 1 & 2	
Rated impulse	withstand voltage (Uimp)	kV	4 (overvoltage category III, conforming to IEC/EN 60947-5-1, DIN VDE 0110 parts 1 & 2	
LED display				4	
Operating tem	perature		°C	- 10+ 55	
Storage tempe	erature		°C	- 25+ 85	
Degree of prot		Terminals		IP 20	
Conforming to E	EN/IEC 60529	Enclosure		IP 40	
Connection	Туре	Terminals		Captive screw clamp	
		Terminal block		Removable from module	
	1-wire connection	Without cable end		Solid or exible cable: 0.22.5 mm ²	
		With cable end		Without bezel, solid or exible cable: 0.252.5 mm ²	
				With bezel, solid or exible cable: 0.252.5 mm ²	
	2-wire connection	Without cable end		Solid cable: 0.21 mm², exible cable: 0.21.5 mm²	
		With cable end		Without bezel, exible cable: 0.251 mm ²	
				With bezel, exible cable: 0.51.5 mm ²	
			(4) =1	111111111111111111111111111111111111111	

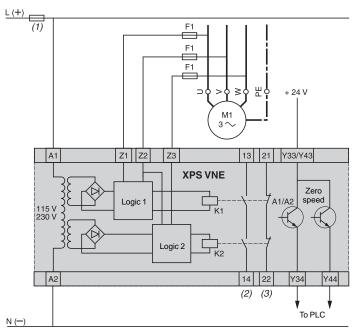
⁽¹⁾ The module is also capable of switching low power loads (17 V/10 mA) provided that the contact has not been used for switching high power loads (possible contamination or wear of the gold layer on the contact tips).

References Description Number of Solid-state Supply Frequency of Reference Weight outputs for PLC motor power supply safety circuits 24 V XPS VNE1142P Safety modules for zero ≤ 60 Hz 0.500 speed detection > 60 Hz XPS VNE1142HSP 0.500 115 V ∼ XPS VNE3442P 0.600 ≤ 60 Hz > 60 Hz XPS VNE3442HSP 0.600 230 V ∼ ≤ 60 Hz XPS VNE3742P 0.600 XPS VNE > 60 Hz XPS VNE3742HSP 0.600

For zero speed detection

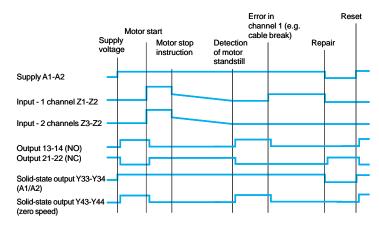
XPS VNE

Wiring diagram



- (1) Technical characteristics for establishing maximum rating of fuses, see page 38777-EN/2
- (2) Disengagement in event of stop.
- (3) Motor running. F1 = 2 A

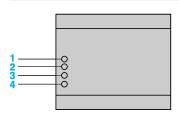
Functional diagram of module XPS VNE



Key 0_

The voltages at terminals Z1, Z2 and Z3 are indicated solely for the purposes of schematic diagram representation.

LED details

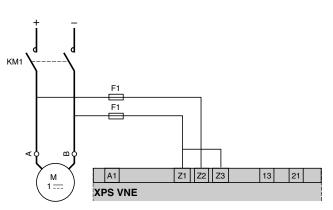


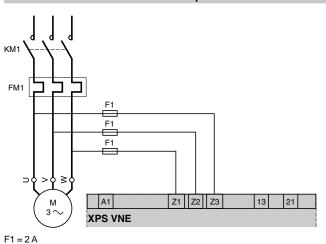
- Supply voltage A1-A2.
- Stop detected by channel 1.
- Stop detected by channel 2.
- Motor stop condition detected by both channels within time window.

For zero speed detection

Module XPS VNE associated with a DC motor

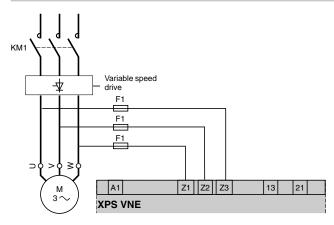
Module XPS VNE associated with a 3-phase motor





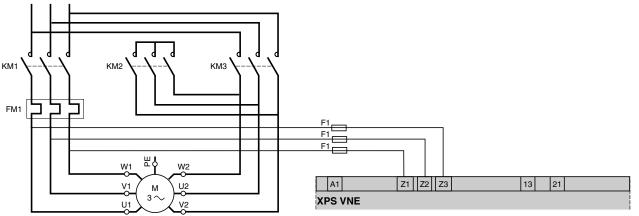
F1 = 2A

Module XPS VNE associated with a 3-phase motor + variable speed drive



F1 = 2A

Module XPS VNE associated with a 3-phase motor with star-delta starting



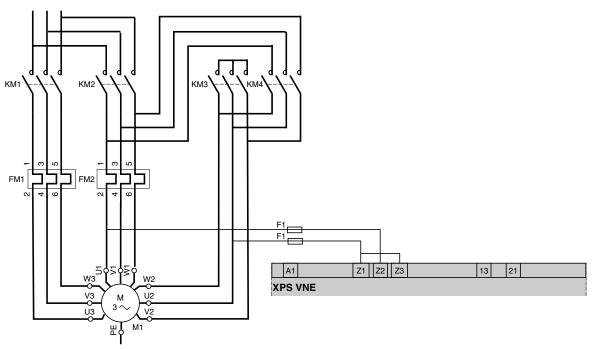
F1 = 2 A KM1: Fast rotation speed KM2: Slow rotation speed

KM3: Star

The "Star" contactor (KM3) must be closed after the motor is de-energised, in order to allow detection of zero speed.

For zero speed detection

Module XPS VNE associated with a 3-phase motor with variable number of poles and star-delta starting

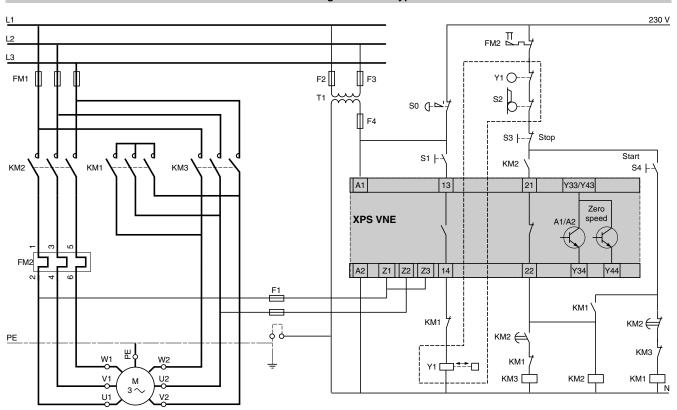


F1 = 2 A KM1: Fast rotation speed

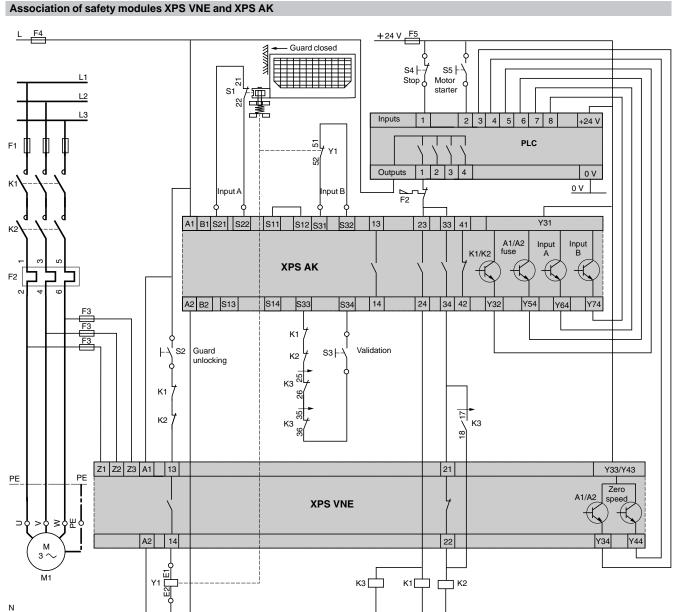
KM2: Slow rotation speed

KM3: Star KM4: Delta

Module XPS VNE associated with a star-delta motor starter and guard switch type XCS E



For zero speed detection

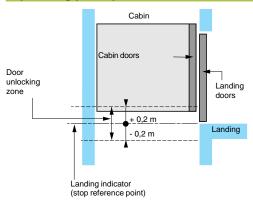


Pulse on de-energisation relay XPS TSW

Safety automation system solutions

Preventa safety module type XPS EDA For lift control

Operating principle



When the cabin is parked at a landing, with the doors open, some lifts automatically correct their level (isolevelling) in relation to the landing in order to compensate for any differences generated by modi cation of the load in the cabin.

During this operation, European standard EN-81 recommends that the presence of the cabin be checked within a zone of +/- 0.2 m around the landing (door unlocking zone), by means of a safety circuit which will cause the cabin to stop if it moves out of the speci ed zone.

The use of the safety module XPS EDA, which checks the presence of the cabin in the speci ed zone at two points, meets this requirement.

The module incorporates two safety outputs and two solid-state outputs for signalling functions. Four LEDs on the front face of the module provide visual indication of the status of the safety circuit.

The position of the cabin in relation to the landing is detected by two limit switches in the lift shaft. It is also possible to use non-contact sensors (magnetic sensors with reed contact).

When the cabin reaches the preset position and when it is within the permissible tolerances in relation to the landing, the two safety circuits in safety module XPS EDA close and allow isolevelling of the cabin with the doors open. Any change in one of the input signals (cabin outside the specied zone) or detection of a fault (break in the wiring, short-circuit, etc.) causes immediate opening of the safety outputs in the XPS EDA module and subsequent stopping of the cabin.

Module type			XPS EDA
Maximal level of safety rea	nches		PL e/Catégorie 4 according to EN/ISO 13849-1, SIL CL3 according to EN/IEC 62061
Conformity to standards			EN 81-1, EN 81-2, EN/IEC 60947-5-1, EN 50082-2, EN 12015, EN 12016
Product certifications			TÜV
Supply	Voltage	٧	∼ and == 24 (50/60 Hz)
	Voltage limits		- 15+ 10% (∼ 24 V), - 15+ 15% (= 24 V)
	Frequency	Hz	50/60
Maximum consumption	∼24 V	VA	≤3.5
	24 V	W	≤2.5
Module inputs fuse protec	tion		Internal, electronic
Control unit voltage betwe	en S11-S12, S21-S22	٧	24
Nominal contact current		mA	10
Maximum wiring resistance			Wiring resistance should not exceed 1 kΩ
Synchronisation time bety	veen inputs S1 and S2		In nite
Outputs	Voltage reference		Volt-free
	Number and type of safety circuits		2 N/O (13-14, 23-24)
	No. and type of additional circuits		2 solid-state
	Breaking capacity in AC-15	VA	C300: inrush 1800, maintained 180
	Breaking capacity in DC-13		24 V/2 A - L/R = 50 ms
	Breaking capacity of solid-state outputs		24 V/20 mA
	Max. thermal current (Ithe)	Α	2.5
	Output fuse protection		6 A fast acting, 4 A gG, conforming to EN/IEC 60947-5-1, DIN VDE 0660 part 200
	Minimum current (volt-free contact)	mA	10
	Minimum voltage (volt-free contact)	٧	17
	Max. total thermal current	Α	5
Electrical durability			See page 38610/2
Response time on input o	pening	ms	< 50
Rated insulation voltage (Ji)	٧	300 (degree of pollution 2 conforming to IEC/EN 60947-5-1, EN/IEC 60664-1
Rated impulse withstand v	voltage (Uimp.)	kV	4 (overvoltage category III, conforming to IEC/EN 60947-5-1, EN/IEC 60664-1
.ED display			4
Operating temperature		°C	- 20+ 65
Storage temperature		°C	- 25+ 85
Degree of protection confo	orming to IEC 60529		Terminals: IP 20 Enclosure: IP 40
Connection max.	Type	mm²	Captive screw clamp terminals: without cable end 1 x 2.5 mm ² , with cable end 2 x 1.5

For lift control



References							
Description	Number of safety circuits	Solid-state outputs for PLC	Connection	Supply	Reference	Weight kg	
Safety module for lift control	2	2	Captive screw clamp terminals	\sim and $$ 24 V	XPS EDA5142 ▲	0.180	

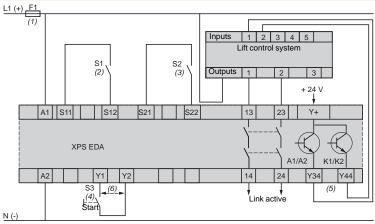
XPS EDA5142

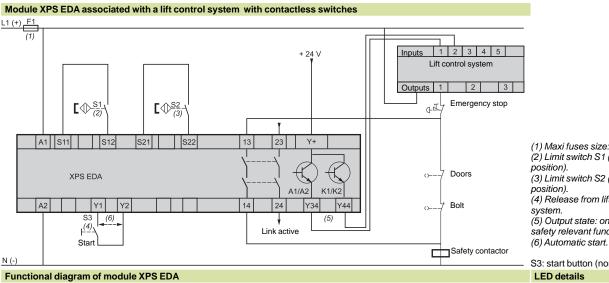
(A1/A2) Y+ -Y34

▲ Available: 4th Quarter 2011

Connections

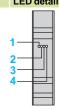
Module XPS EDA associated with a lift control system with limit switches





- (1) Maxi fuses size: 6A. (2) Limit switch S1 (cabin position). (3) Limit switch S2 (cabin position).
- (4) Release from lift control system. (5) Output state: only for non safety relevant functions.
- S3: start button (non monitored).

LED details



- 1 Supply voltage A1/A2. Fuse state.
- 2 First input circuit (terminals S11/S12).
- Second input circuit (terminals S21/S22).
- Safety outputs circuit (K1/ K2).

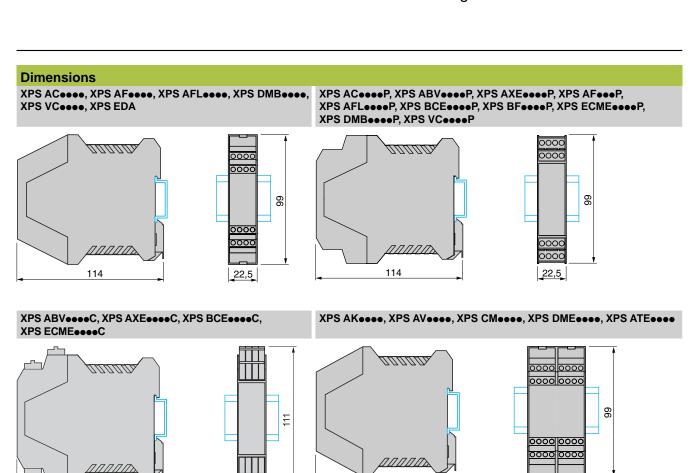
Start release

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Safety automation system solutionsPreventa safety modules

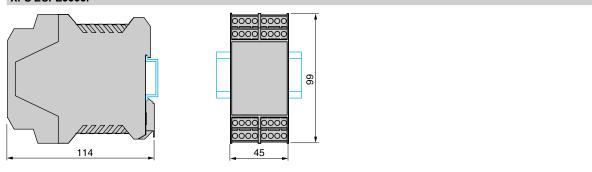
45

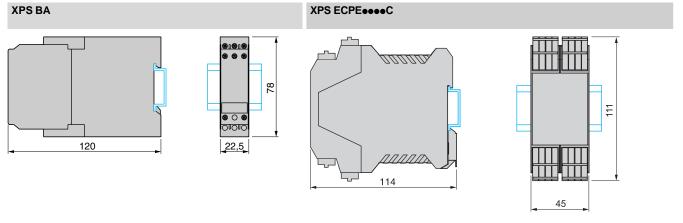
AM1 DP200 rail mounting



XPS AKeeeeP, XPS AVeeeeP, XPS CMeeeeP, XPS TSAeeeP, XPS TSWeeeeP, XPS DMEeeeeP, XPS ATEeeeeP, XPS VNEeeeeP, XPS ECPE

22,5

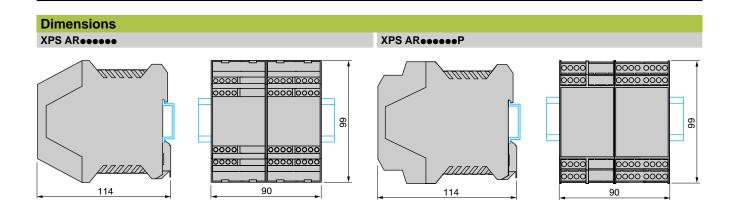




Dimensions, mounting

Safety automation system solutionsPreventa safety modules

AM1 DP200 rail mounting



Mounting

All safety modules: 35 mm rail xing.

Applications

Safety monitors on AS-Interface cabling system

Safety interfaces on AS-Interface cabling system











AS-Interface "Safety at work"

Safety is incorporated into the AS-Interface cabling system by adding a monitor and a safety interface connected together with other standard AS-Interface components on the AS-Interface line



7.F





Emergency stop interfaces



runctions	
AS-Interface profile	

Safety applications integrated on the AS-Interface line Emergency stop, safety switches and light curtain monitoring

> Metal Plastic 0.B.F.F 0.B.F.F

Addressing

Using con guration software ASISWIN2

PL e/Category 4 conforming to EN/ISO 13849-1,

Using adjustment terminal ASI TERV2 and adaptor ASI SAD1

safety level Conformity to standards

SILCL 3 conforming to EN/IEC 61508 EN 50295, EN/IEC 60204-1, EN/IEC 61496-1, EN 574/ISO 13851, EN/IEC 60947-1, EN/IEC 60947-5-1

PL e/Category 4 conforming to EN/ISO 13849-1, SILCL 3 conforming to EN/IEC 62061

EN 50295, EN/ISO 13850, EN/IEC 60204-1, EN/IEC 60947-1, EN/IEC 60947-5-1

Product certifications

UL, CSA, TÜV

UL, CSA, TÜV

Number of safety circuits **Number of additional circuits**

Supply voltage

2 NO 2 x 2 NO 1 solid-state output for 2 solid-state outputs signalling to PLC 5 LEDs 8 LEDs 24 V

2 LEDs By AS-Interface line

Type

ASI SAFEMON1. ASI SAFEMON2. ASI SSLB.

38171-EN/4

38172-EN/4



38172-EN/4





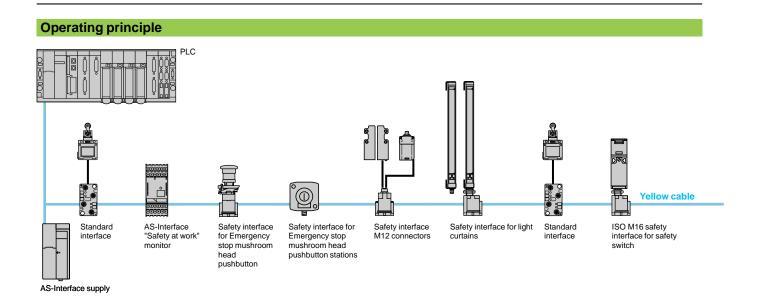






38172-EN/4

Safety automation solutions Safety solutions on AS-Interface cabling system AS-Interface "Safety at work" monitors



AS-Interface, the recognised cabling system for sensors and actuators, has evolved. Standard process information and information relating to safety can now be transmitted over the same cable.

Capable of managing safety functions up to Performance Level PL e/Category 4 conforming to standard EN/ISO 13849-1 and SILCL 3 conforming to standard EN/IEC 61508, the AS-Interface "Safety at work" system meets the needs of the most common safety applications, such as:

- monitoring of Emergency stops with instantaneous opening contacts (stop category 0),
- monitoring of Emergency stops with time delay opening contacts (stop category 1),
- monitoring of switches with and without interlocking,
- monitoring of light curtains, etc.

Parameters for options relative to the selected safety function (for example, start button monitoring) may be set for all pre-de ned, certi ed functions. Safety is incorporated into the AS-Interface cabling system by adding a safety monitor and safety interfaces connected together with other standard AS-Interface components on the yellow cable.

Safety information is exchanged only between the safety monitor, the AS-Interface line master and the safety interfaces. This is transparent for the other standard AS-Interface components.

Based on this principle, AS-Interface cabling systems that are already installed can be updated with safety functions without having to replace the existing components (masters, I/O interfaces, power supplies, etc.). Safety circuits are diagnosed readily, and with no additional wiring, by the standard AS-Interface cabling system master communicating with the safety monitor(s) via the yellow cable.

The AS-Interface "Safety at work" system is con gured using software ASI SWIN2 running on Windows. A library of pre-de ned and certi ed safety functions is made available by the software and the user can graphically select the desired safety functions, even at the last minute, using the "Drag and drop" method in the con guration software. Knowledge of a programming language or speci c tools is not necessary to parameter the system. The con guration is loaded into the safety monitor(s) by means of a PC by carrying out a secure serial transmission and using the parameter setting connector on the front face of the monitor.

To meet the various safety requirements, the AS-Interface "Safety and work" monitor is available in two versions:

- monitors for basic monitoring of safety devices,
- monitors for enhanced monitoring of safety devices.

AS-Interface "Safety at work" monitors for basic and enhanced monitoring are available with:

- 1 safety output with 2 contacts, or
- 2 independent safety outputs with 2 x 2 contacts.

In addition to safety outputs with volt-free contacts, AS-Interface "Safety at work" safety monitors are equipped, depending on the model, with one or two solid-state signalling outputs and LEDs on the front face indicating the status of the system and of the monitoring circuits. To monitor more safety functions simultaneously or to stop several safety circuits at different locations, an increased number of safety monitors can be used in an AS-Interface cabling system.

The safety interfaces are connected directly on the yellow cable via an insulation displacement connector (IDC). Their addressing is carried out using self-addressing via the AS-Interface cabling system master or manually, using addressing terminal ASISTERV2.

The compactness of the safety interfaces enables their direct attachment to control devices such as Emergency stop buttons or switches. In addition to interfaces that can be attached to products, versions with 1 or 2 M12 connectors are also available.

38171-EN_Ver10.0

Schneider

Safety automation solutionsSafety solutions on AS-Interface cabling system AS-Interface "Safety at work" monitors

	AS-Interface "Safety at work" monitors	
	For basic monitoring of safety devices ASI SAFEMON1, ASI SAFEMON2	For enhanced monitoring of safety devices ASI SAFEMON1B, ASI SAFEMON2B
Monitoring of safety devices	■ Emergency stops■ Safety switches■ Safety light curtains	 Emergency stops Safety switches Safety light curtains Button for validation of linked devices Conditionally dependent devices Devices with bouncing contacts
Logic functions	■ "OR" (up to 2 devices)	■ "OR" (up to 6 devices) ■ "AND" ■ "FLIP FLOP" ■ On-delay ■ Off-delay ■ "PULSE" on positive edge
External device monitoring (EDM)	■ Feedback loop	■ Feedback loop ■ Feedback loop monitoring over the AS-Interface cabling system
Start devices	 Automatic start Start monitored by the AS-Interface cabling system slave Start monitored by connection to monitor Start monitored by the safety interface 	 Automatic start Start monitored by the AS-Interface cabling system slave Start monitored by connection to monitor Start monitored by the safety interface
Output devices	■ Stop category 1 ■ Stop category 0	■ Stop category 1 ■ Stop category 0

Characteristics			
AS-Interface "Safety at work	t" monitor type		ASI SAFEMON1, ASI SAFEMON1B ASI SAFEMON2, ASI SAFEMON2B
Maximum achievable safety l	evel		PL e/Category 4 conforming to EN/ISO 13849-1, SILCL 3 conforming to EN/IEC 61508
Reliability data	Mean Time To dangerous Failure (MTTF _d) Plagmastic Coupage (DC) 94 > 00		451
	Diagnostic Coverage (DC)	%	> 99
	Probability of dangerous Failure per Hour (PFH _d)	1/h	9 x 10 ⁻⁹
Conformity to standards			EN 50295, EN/IEC 60204-1, EN/IEC 61496-1, EN 574/ ISO 13851, EN/IEC 60947-1, EN/IEC 60947-5-1
Product certifications			UL, CSA, TÜV
AS-Interface profile			7.F
Consumption on AS-Interfac	e line	mA	44
	Type of protection (suitable only for use in electronic rooms/ electrical enclosures with a minimum IP 54 degree of protection)		IP 20
Operating voltage Ub		٧	24 ± 15%
Rated operating current		mA	150: ASI SAFEMON1, ASI SAFEMON1B 200: ASI SAFEMON2, ASI SAFEMON2B
Response duration		ms	< 40
Pick-up delay		s	<10
Inputs	"Start"		Opto-electronic coupler input (active when High), input current approximately 10 mA at 24 V
	"Protection control (EDM)"		Opto-electronic coupler input (active when High), input current approximately 10 mA at 24 V
Outputs	"Safety on" indication		PNP transistor output, 200 mA
	Safety		Volt-free NO contacts, max. contact load
Fuse protection			External, with max. of 4 A MT
Operating temperature		°C	- 20+ 60
Storage temperature		°C	-30+70
Enclosure	Material		Polyamide PA66
	Mounting		Clip-on xing on ur rail conforming to EN 50022
Note: The impedance of a safe	ety monitor must be taken into accou	nt when	selecting the number of interfaces on the AS-Interface cabling system, even if it is used

Note: The impedance of a safety monitor must be taken into account when selecting the number of interfaces on the AS-Interface cabling system, even if it is used

The technical details of the system are described in the Schneider Electric AS-Interface guide, in the safety monitor hardware and software manuals and in the configuration software on "schneider-electric.com".

Safety automation solutionsSafety solutions on AS-Interface cabling system AS-Interface "Safety at work" monitors



ASI SAFEMON•

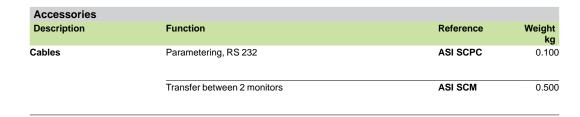
References					
AS-Interface "Safety at v	work" monitors				
Туре	Number of safety circuits	Solid-state outputs for PLC	Supply	Reference	Weight kg
For basic monitoring of safety devices	2 NO	1	24 V 	ASI SAFEMON1	0.350
	2 x 2 NO	2	24 V	ASI SAFEMON2	0.450
For enhanced monitoring of safety devices	2 NO	1	24 V	ASI SAFEMON1B	0.350
	2 x 2 NO	2	24 V ===	ASI SAFEMON2B	0.450

Configuration software

line analyser

- Reference ASI SWIN2 is the full version of con guration software AS-Interface "Safety at work" version 2+ and must be installed if no previous version of this software has been installed.
- Reference SSVASISWINUP is an update for con guration software AS-Interface "Safety at work" and can be used if ASI SWIN2 has been installed using Safety Suite V1. An update from version 2.03 to version 2+ for the con guration software AS-Interface "Safety at work" will then be performed.

Description	For use with	Operating system	Language	Reference	Weight kg
AS-Interface "Safety at work" configuration software CD-ROM + user manual	□ Safety monitors ASI SAFEMON1/2 for basic monitoring of safety devices □ Safety monitors ASI SAFEMON●B for enhanced monitoring of safety devices	Windows 95, Windows 98, Windows ME, Windows NT®, Windows 2000, Windows XP	FR, EN, DE, IT, ES, PT	ASI SWIN2 Software available on Safety Suite V2 software pack	0.520
ASI SWIN2 software update CD-ROM + user manual	□ Safety monitors ASI SAFEMON1/2 for basic monitoring of safety devices □ Safety monitors ASI SAFEMON●B for enhanced monitoring of safety devices	Windows 95, Windows 98, Windows ME, Windows NT®, Windows 2000, Windows XP	FR, EN, DE, IT, ES, PT	SSVASISWINUP Software update available on Safety Suite V2 software pack	0.520
Setting-up and diagnosti	c tools				
Description	Application			Reference	
Adjustment terminal	Addressing and diagnostics AS-Interface I/O test whilst AS-Interface interface diagr	2.1 interfaces	ASI TERV2	0.500	
AS-Interface	Identi cation of transmissio	Interface line	ASI SA01	0.160	





ASITERV2

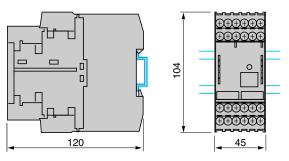


ASI SA01

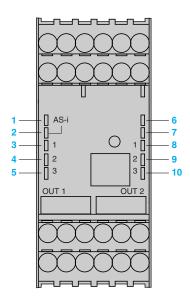
Safety automation solutionsSafety solutions on AS-Interface cabling system
AS-Interface "Safety at work" monitors

Dimensions

ASI SAFEMON●, ASI SAFEMON●B



LED details



ASI SAFEMON1, ASI SAFEMON1B

- AS-Interface line supply (green)
- AS-Interface line fault (red)
- 3 Restart signal (yellow)
- Safety outputs closed (green)
- 5 Safety outputs open (red) or output error (ashing red)

ASI SAFEMON2, ASI SAFEMON2B

Output 1

- 1 AS-Interface line supply (green)
- 2 AS-Interface line fault (red)
- 3 Restart signal (yellow)
- 4 Safety outputs closed (green)
- 5 Safety outputs open (red) or output error (ashing red)

- AS-Interface line supply (green)
- AS-Interface line fault (red)
- 8 Restart signal (yellow)
- 9 Safety outputs closed (green)
- 10 Safety outputs open (red) or output error (ashing red)

Operating principle

Safety is incorporated into the AS-Interface cabling system by adding a safety monitor and safety interfaces connected together with other standard AS-Interface components on the yellow cable.

Safety information is exchanged only between the safety monitor, the AS-Interface line master and the safety interfaces. This is transparent for the other standard AS-Interface components. Based on this principle, AS-Interface cabling systems that are already installed can be updated with safety functions without having to replace the existing components (master, I/O interfaces, power supplies, etc.).

Safety circuits are diagnosed readily, and with no additional wiring, by the standard AS-Interface cabling system master communicating with the safety monitor via the yellow cable.

Presentation

Interfaces for Harmony® Ø 22 mm Emergency stop





Plastic

Interfaces for products with M12 connector





Interfaces for products with ISO entry



ISO M16 or M20 entry

Interfaces premounted in Emergency stop mushroom head pushbutton stations XAL K, with M12 entry





"Turn to release

Key release (n° 455)

Interfaces for mounting in enclosure for Harmony® Ø 22 Emergency stop mushroom head pushbuttons



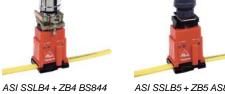




Safety interface type			ASI SSLB4	ASI SSLB5	ASI SSLC1	ASI SSLC2	ASI SSLLS	ASI SEA1C	ASI SEK1C	ASI SSLE4	ASI SSLE
Environment											
Maximum achievable safety l	evel		PL e/Ca	tegory 4 co	nforming	to EN/ISC	13849-1	, SILCL 3	conformin	g to EN/IE	C 6206
Reliability data	Mean Time To dangerous Failure (MTTF _d)	Years	103.4		103.6	103.6		103.9			
	Diagnostic Coverage (DC)	%	> 99		> 99			> 99			
	Probability of dangerous Failure per Hour (PFH _d)	1/h	1.82 x 10 ⁻⁸		1.82 x 1	0-8		1.82 x 1	0-8		
Conformity to standards			EN/IEC		EN 108/ EN 574/ EN/IEC EN/IEC EN/IEC	95, 60204-1, 8/ISO 141 /ISO 1385 61496-1, 60947-5-(60947-5-1	1, '	EN/IEC		I	
Product certifications			UL, CSA	, TÜV				UL, CSA	A, TÜV		
Degree of protection	Conforming to IEC 529		IP 20		IP 67			IP 65		IP 00	
AS-Interface profile	-		0.B.F.F								
Addressing			Using adjustment terminal ASI TERV2								
Ambient air temperature	For operation	°C	- 10+	 55							
-	For storage	°C	- 25+	85							
Mechanical characte	eristics										
Mechanical durability	In thousands of operating cycles		0.3		-		-	0.3		-	
Shock resistance			10 gn								
Vibration resistance			5 gn								
Electrical character	istics										
Supply by AS-Interface line	Voltage	٧	Via AS-I	nterface 24	l 						
	Voltage limits		- 15+	15%							
Consumption		w	1.2								
Consumption on AS-Interface	e line	mA	45								
Connection on AS-Interface line	IDC (Insulation Displacement Connector)		•		-		•	-		-	
	Connector (type)		-		■ (M12)		-	■ (M12)		-	

Note: The technical details of the system are described in the Schneider Electric AS-Interface guide, in the safety monitor hardware and software manuals and in the configuration software on "schneider-electric.com".







ASI SSLB5 + ZB5 AS844





ASI SSLLS





ASI SEA1C

ASI SSLE4



ASI SSLE5



References								
Interfaces for Ø 22 Emergency stop								
Туре	Type of contact	Connection on AS-Interface line	Reference	Weight kg				
Metal	NC + NC	IDC	ASI SSLB4	0.080				
Plastic	NC + NC	IDC	ASI SSLB5	0.040				

Interfaces for products with connector							
Туре	Number of contacts	Connection on AS-Interface line	Reference	Weight kg			
1 x M12 entry (1)	2	Connector	ASI SSLC1	0.040			
2 x M12 entries (1) (2)	2	Connector	ASI SSLC2	0.050			

	Interfaces for product	s with ISO en	itry		
Type Number of Connection on Reference Weig contacts AS-Interface line					
	1 x ISO M16 entry (1) (3)	2	IDC	ASI SSLLS	0.040

Interfaces premounted in Emergency stop mushroom head pushbutton stations XAL K						
Туре	Number of contacts	Connection on AS-Interface line	Reference	Weight kg		
"Turn to release"	2	Connector	ASI SEA1C	0.170		
Kev release (n° 455) (4)	2	Connector	ASI SEK1C	0.190		

Interfaces for mounting in enclosure for Harmony® Ø 22 Emergency stop mushroom head pushbuttons						
Туре	Number of contacts	Connection on AS-Interface line	Reference	Weight kg		
Metal	2	Connector	ASI SSLE4	0.060		
Plastic	2	Connector	ASI SSLE5	0.025		

Addressing accessories				
Description	Application	Reference		
Adaptor specifically for safety interfaces type ASI SSLB., ASI SSLC., ASI SSLLS	Connection to adjustment terminal ASI TERV2	ASI SAD1	0.060	

7101 00220			
Setting-up and diagr	nostic tools		
Description	Application	Reference	
Adjustment terminal	Addressing and diagnostics of AS-Interface V2.1 interfaces AS-Interface I/O test whilst powered-up AS-Interface interface diagnostics	ASI TERV2	0.500
AS-Interface line analyser	Identi cation of transmission errors on the AS-Interface line	ASI SA01	0.160

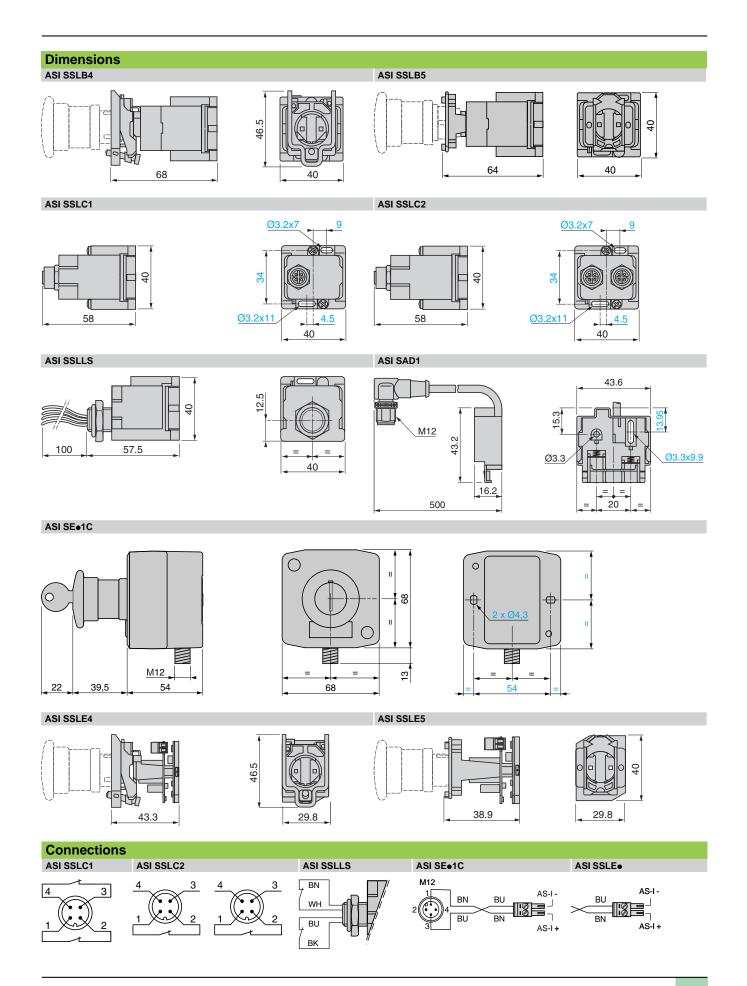
Accessories			
Туре	Material	Unit reference	Weight kg
Adaptor for ISO M20 (sold in lots of 5)	Metal	DE9 RI2016	0.040
Ø 40 red mushroom head Emergency stop buttons, turn to release (4)	Metal	ZB4 BS844	0.060
	Plastic	ZB5 AS844	0.050
Ø 40 red mushroom head Emergency	Metal	ZB4 BS944	0.098
stop buttons, key release (n° 455) (4)	Plastic	ZB5 AS944	0.071

⁽¹⁾ To be used with yellow AS-Interface "standard" version cable XZ CB••••.

The yellow AS-I "TPE" version cable XZ CB••••H cannot be used with the safety interfaces ASI SSLC• and ASI SSLLS.

- (2) Only use pre-wired connectors XZ CP1541L.

 ⁽³⁾ For ISO M20 product, see adaptor.
 (4) For other "mushroom head" buttons, please refer to our "Control and signalling components" catalogue.



Safety detection solutions Safety switches Preventa XCS

Switch type	Preventa XCS safety limit switches		
Applications	Protection of operators by stopping the machine when the gate is opened All machines with quick rundown time.		
Design	Miniature format	Compact format	
	Metal, pre-cabled	Plastic or metal, with 1 cable entry	





Enclosure		Metal	Plastic	Metal
Features		-		
Conformity to standards	Products	EN/IEC 60947-5-1, EN/ISO 13849-1, EN/IEC 6	62061, UL 508, CSA C22	?-2 n° 14
	Machine assemblies	EN/IEC 60204-1, EN/ISO 14119		
Product certifications		UL, CSA		
Dimensions (w x h x d) in mm	Switch	30 x 50 x 16	31 x 34 x 89	
(w x ii x u) iii iiiii	Fixings	Centres: 20	Centres: 20/22	
Head		Plunger or rotary head Head adjustable in 15° steps throughout 360° Linear (plunger) or rotary (lever) actuation.		
Contact blocks		NC contacts with positive opening operation		
		2 NC + 1 NO break before make, slow break 2 NC + 1 NO and 2 NC + 2 NO snap action	2 NC + 1 NO break be snap action	fore make, slow break or
Degree of protection		IP 66, IP 67 and IP 68	IP 66 and IP 67	
Ambient air temperature	For operation	-25+70 °C		
Connection	Screw terminals (cable entry via cable gland)	-	Tapped entry for Pg 13. or tapped 1/2" NPT	5, ISO M20 cable gland
	Pre-cabled	L=1,2 or 5 m	-	
Type reference		XCS M	XCS P	XCS D
Pages		37630/2	38118/2	

Preventa XCS lever or spindle operated switches

Protection of operators by stopping the machine when the operating lever (attached to hinged machine guard) is displaced by 5°.

All light industrial machines fitted with hinged or rotary protective covers

with small opening radius.

Protection of operators by stopping the machine when the guard hinge rotates through 5°.

All light industrial machines fitted with hinged access doors.

Compact format

Plastic with 1 or 2 cable entries









Plastic, double insulated

2 types of lever: straight or elbowed (flush with rear of switch)

3 lever positions: to left, centred or to right

2 types of spindle: length 30 mm or 80 mm

EN/IEC 60947-5-1, EN/ISO 13849-1, EN/IEC 62061, UL 508, CSA C22-2 n°14, JIS C4520

EN/IEC 60204-1, EN/ISO 14119

UL, CSA, BG

30 x 87.5 x 30	52 x 108.4 x 30	30 x 96 x 30	52 x 117 x 30
Centres: 20/22	Centres: 20/22 or 40.3	Centres: 20/22	Centres: 20/22 or 40.3

Turret head: 4 positions Rotary actuation (lever)

Turret head: 4 positions Rotary actuation (spindle)

Slow break safety contacts with positive opening operation NC contacts open when lever or spindle displaced by more then 5°

1 NC + 1 NO break before make	1 NC + 2 NO break before make	1 NC + 1 NO break before make	1 NC + 2 NO break before make
2 NC	2 NC + 1 NO break before make		2 NC + 1 NO break before make
1 NC + 2 NO break before make	3 NC	1 NC + 2 NO break before make	3 NC
2 NC + 1 NO break before make		2 NC + 1 NO break before make	

IP 67

-25...+70 °C

1 tapped entry for Pg 11, ISO M16 cable gland or tapped 1/2" NPT	2 tapped entries for Pg 11, ISO M16 cable gland or tapped 1/2" NPT	1 tapped entry for Pg 11, ISO M16 cable gland or tapped 1/2" NPT	2 tapped entries for Pg 11, ISO M16 cable gland or tapped 1/2" NPT
-	-	-	-

XCS PL	XCS TL	XCS PR	XCS TR

32912/2

Safety detection solutions Safety switches Preventa XCS

Switch type **Applications** Design

Preventa XCS key operated switches

Protection of operators by stopping the machine when the actuator (attached to machine guard) is withdrawn from the head of the switch. All light industrial machines, with quick rundown time (1).

Miniature format	Compact format
Plastic, pre-cabled	Plastic with 1 or 2 cable entries







		CC 2 de 1 de 1 de 1 de	Constitution (Constitution of Constitution of	XCS State of the		
Enclosure		Plastic				
Features		Without locking of actuator.	Without locking of actuator. Optional accessory: guard reta	nining device.		
Conformity to standards Products		EN/IEC 60947-5-1, EN/ISO 13	3849-1, EN/IEC 62061, UL 508, C	CSA C22-2 n° 14 and JIS C4520		
	Machine assemblies	119	9			
Product certifications		cULus, BG	UL, CSA			
Dimensions (w x h x d) in mm	Switch	30 x 87 x 15	30 x 93.5 x 30	52 x 114.5 x 30		
	Fixings	Centres: 20/22	Centres: 20/22	Centres: 20/22 or 40.3		
Head		Fixed head: 2 positions for insertion of actuator.	Turret head: 8 positions for insertion of actuator.			
Contact blocks		Safety contacts actuated by the actuator. Slow break and positive opening operation.				
		1 NC + 1 NO break before make 2 NC 2 NC + 1 NO break before make 3 NC	1 NC + 1 NO slow break contacts, break before make or make before break, or snap action 2 NC slow break or snap action 2 NC + 1 NO slow break contacts, break before make, or snap action 1 NC + 2 NO slow break contacts, break before make, or snap action	1 NC + 2 NO break before make 2 NC + 1 NO break before make 3 NC		
Degree of protection		IP 67				
Ambient air temperature	For operation	- 25+70 °C	25+70 °C			
Connection Screw terminals (cable entry via cable gland)		-	Tapped entry for Pg 11, ISO M16 cable gland or tapped 1/2" NPT			
	Pre-cabled	L = 2, 5 or 10 m	-	-		
Type reference		XCS MP	XCS PA	XCS TA		
Pages		32938/2 (1) Stopping time of machine le	32935/2 ess than time taken for operator to	access hazardous zone.		

All heavy industrial machines, with quick rundown time (1)

Industrial format with or without locking

Metal with 1 cable entry, without locking

Metal with 1 cable entry, with manual locking/unlocking





Metal

Without locking of actuator.

Manual locking and unlocking of actuator by pushbutton or key operated lock (can be mounted on left or right-hand side of switch head).

EN/IEC 60947-5-1, EN/ISO 13849-1, EN/IEC 62061, UL 508, CSA C22-2 n°14 and JIS C4520

EN/IEC 60204-1, EN/ISO 14119

UL, CSA

40 x 113.5 x 44 52 x 113.5 x 44

30 x 60

Turret head: 8 positions for insertion of actuator.

Turret head: 8 positions for insertion of actuator.

Safety contacts actuated by the actuator.

Slow break and positive opening operation.

Slow break and positive opening operation.

ANO 12 NO break before make

1 NC + 2 NO break before make
2 NC + 1 NO break before make
2 NC + 1 NO break before make
3 NC
3 NC

,

IP 67

25...+70 °C

Screw clamp terminals. Tapped entry for Pg 13.5, ISO M20 cable gland or tapped 1/2" NPT $\,$

Screw clamp terminals. Tapped entry for Pg 13.5 cable gland, ISO M20 or tapped 1/2" NPT.

130 WZ0 01 tapped 1/2 NF I

XCS A XCS B, XCS C

32923/2

Safety detection solutions Safety switches Preventa XCS

Switch type		Preventa XCS key operated switches, locking and unlocking by solenoid					
Applications		machine guard) is wi	Protection of operators by stopping the machine when the actuator (attached to machine guard) is withdrawn from the head of the switch. All industrial machines, with slow rundown time (1)				
Design		Slim format	•				
		Plastic with 3 cable e	ntries	Metal with 3 o	cable entries		
		and the state of t	000000	Table 1971 Control of the Control of	1 Section 1		
Enclosure		Plastic		Metal			
Features		Locking and unlocking	of actuator by solenoid or on de-energisation). ng tool) of actuator in	Locking and u (either on ener Manual unlock abnormal conditions) Temperature and the second	y unlocking mushroom head nly for XCS LF••••4•• and		
Conformity to standards Products		EN/IEC 60947-5-1, EN/ISO 13849-1, EN/IEC 62061, UL 508 and CSA C22-2 n° 14					
	Machine assemblies	EN/IEC 60204-1, EN/I	SO 12100				
Product certifications		UL, CSA, TÜV (pendin	g)				
Dimensions (w x h x d or Ø) in mm	Switch	51 x 205 x 43.5					
•	Fixings		Centres: 30 x 153.3				
Head		Turret head: 8 positions	s for insertion of actuator.				
Contact blocks or outputs		Safety contacts actuat	ed by the actuator. Slow	break and posit	ive opening operation.		
		1 NC + 1 NO break bet 2 NC 1 NC + 2 NO break bet 2 NC + 1 NO break bet 3 NC + auxiliary contact 1 NC + 1 NO break bet 2 NC 1 NC + 2 NO break bet 2 NC + 1 NO break bet 3 NC with positive ope	fore make fore make cts controlled by the sole fore make fore make fore make	noid,			
Degree of protection		IP 66/IP 67					
Ambient air temperature	For operation	-25+60 °C					
	Terminals	Spring terminals, 3 cata Tapped entry for ISO N	ole entries. 1/20 cable gland or tappe	d 1/2" NPT.			
Connection		- M23 (15 + 1 PE or 18 + 1 PE)					
Connection	Pre-cabled Connector	– M23 (15 + 1 PE or 18 +	- 1 PE)				
Connection Type reference	- 	M23 (15 + 1 PE or 18 + XCS LE	- 1 PE)	XCS LF			

Preventa XCS coded magnetic switches for detection without contact Protection of operators by stopping the machine when the gate is opened All light industrial machines fitted with access gates with imprecise guidance and/or subjected to frequent washing Miniature rectangular format Compact rectangular format Cylindrical format Coded magnetic systems with dedicated transmitter Plastic, pre-cabled or M8 connector on flying lead Plastic, pre-cabled or M12 connector on flying lead Plastic, pre-cabled or M12 connector on flying lead



Key operated switches

Refer to standards EN/ISO 12100 and EN/ISO 14119

Removable or movable protective guards for potentially dangerous machine functions must be used in conjunction with locking or interlocking devices.

Application requiring an interlocking device: high inertia (long rundown time)

An interlocking device must be used when the rundown time is greater than the time it takes for a person to reach the danger zone.

This device ensures that the guard remains locked until the potentially dangerous movement has stopped.

Safety interlock switches

The safety interlock switches, specifically designed for machine guarding applications, provide an ideal solution for the locking or interlocking of movable guards associated with industrial machinery. They meet the requirements of standards EN/ISO 12100, IEC/ISO 13852, EN/ISO 14119 and EN/IEC 60204-1.

They contribute to the protection of operators working on potentially dangerous machines by breaking the start control circuit of the machine when a protective guard is opened or removed, using **positive opening operation contacts**, thus stopping the dangerous movement of the machine.

The removal/opening of the guard (after the dangerous movement has stopped) can either be:

- at the time the machine is switched-off for low inertia machines (machines where the rundown time is less than the time it takes for the operator to access the hazardous zone), or
- delayed for high inertia machines (machines where the rundown time is greater than the time it takes for the operator to access the hazardous zone).

Control circuit categories

The safety interlock switch if used in conjunction with a Preventa safety module enables designers to achieve PL=e, category 4 control systems with reference to EN/ISO 13849-1 and SIL CL3 with conforming to EN/IEC 62061. When used on their own or combined with another switch, they can achieve up to category 1, 2 or 3 control circuit.

Safety related parts of control systems should be developed taking into account the results of an appropriate Risk Assessment.

Safety of personnel

The start command for the machine can only be initiated following correct operation of the safety interlock switch.

On its release, the NC safety contacts are opened by **positive action** or, for coded magnetic switches, change state (**must be monitored using a Preventa safety module**).

Safety of operation

The safety interlock switches incorporate slow break or snap action contacts with **positive opening operation** (except for coded magnetic switches where this is not possible). For mechanical safety interlock switches, on closing of the guard the actuator fitted to it enters the head of the switch, operates the multiple interlock device and closes the NC contacts. For coded magnetic switches, the presence of the magnet causes the contacts to change state.

Safety in use

All safety interlock switches are designed to accept a few millimetres of misalignment between the actuator and the switch in order to compensate for mechanical play, vibration, etc.

Design to minimise defeat

Both mechanically and magnetically actuated safety interlock switches are designed to be operated by specific actuators so that they cannot be defeated in a simple manner using common tools, rods, metal plates, simple magnets, etc. When loosening the fixing screws for re-orientation of the turret head on safety interlock switches, the head itself remains attached to the switch body and the contact states remain unchanged. All safety interlock switches and safety limit switches are designed to avoid any adjusments in the head setting, removing the key actuator or to access the safety contacts without using the appropriate tool.

There are various methods for obtaining a higher level of tamper proofing, for example:

- using a cage device to prevent the insertion of a spare actuator or magnet, or any other foreign body,
- fixing the actuator or coded magnet to the guard by means that make it very difficult to remove (riveting or welding).

Key operated switches

Metal key operated switches case

Without locking of actuator



Metal key operated switches case for use on machines with low inertia and operating in **normal conditions** (no vibration or shock and guard mounted vertically, without risk of rebound on closing), thus eliminating unintentional opening of the guard.

With locking of actuator and manual unlocking

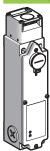




Metal key operated switches case for use on heavy machines **with low inertia** and operating in **arduous conditions** (shock or vibration exist), whereby the guard could open unintentionally.

A key operated lock or a pushbutton enables the positive locking of the guard and its subsequent unlocking.

With interlocking and locking of actuator by solenoid



Metal safety interlock switches case for use on machines with high inertia or with a controlled opening of the protective guard.

The locking of the moving guard can either be on de-energisation or energisation of the solenoid.

A key operated lock enables manual unlocking of the guard in the event of an interlocking circuit malfunction, and also provides extra safety for maintenance personnel likely to be working on the machine.

The switches incorporate 2 LEDs: one indicating guard "open/closed" and the other, guard "locked/unlocked".

Metal safety interlock switches case, mushroom head pushbutton for escape release on XCS LF

With interlocking and locking of actuator by solenoid



Safety interlock switches type XCS LF are available with a mushroom head pushbutton mounted on the rear of the switch for unlocking the machine guard whilst being held in the locked position by the solenoid.

This manual unlocking using the mushroom head pushbutton for escape release is useful in the following cases:

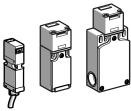
- whilst the machine or a group of machines is undergoing maintenance, enabling operation at reduced speed or whilst stopped with the guard(s) closed. The safety of maintenance personnel is thus improved in the event of:
- a power failure,
- an interlocking circuit malfunction,
- personnel finding themselves in a dangerous situation.

Unlocking using the escape release mushroom head pushbutton takes priority over any other action. It therefore enables a person to leave the zone if the need arises

The re-initialisation of this function is performed by turning (with or without key) the escape release mushroom head.

Plastic case guard switches with mechanical actuator

Without locking of actuator



Plastic safety interlock switches case for use on light machines with low inertia. For use in arduous conditions (shock or vibration exist, guard not vertical or risk of rebound on closing) where the guard could open unintentionally, a guard retaining device (XCS PA or XCS TA) is available as an accessory.

With interlocking and locking of actuator by solenoid



Plastic safety interlock switches case for use on machines with high inertia or with a controlled opening of the protective guard.

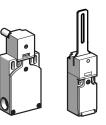
The locking of the moving guard can either be on de-energisation or energisation of the solenoid.

A special tool enables manual unlocking of the guard in the event of an interlocking circuit malfunction, and also provides extra safety for maintenance personnel likely to be working on the machine.

Lever or spindle operated switches, safety limit switches and coded magnetic systems

Rotary lever and spindle operated switches for hinged guards

With head for rotary movement (lever or spindle)



Plastic case guard switches with straight or elbowed operating lever or spindle operator.

Specifically designed for small industrial machines fitted with small sized **hinged doors**, **covers or**

protective guards.

They protect the operator by immediately stopping

They protect the operator by immediately stopping the dangerous movement of the machine as soon as the rotary lever or spindle displacement reaches an angle of 5°.

Safety limit switches

With head for linear movement (plunger) or rotary movement (lever)

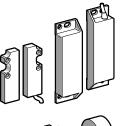




Metal or plastic case limit switches. For use on machines with low inertia and also on machines with high inertia, when used in conjunction with actuator operated guard switches, for monitoring access doors and/or guards. When used on their own, they are always installed in "positive mode" or combined in pairs, with one switch being in "positive mode" and the other in "negative mode".

Coded magnetic switches

With an associated coded magnet



Plastic case guard switches for use on machines with low inertia.

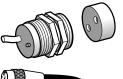
Specifically designed for industrial machines fitted with

doors, covers or guards with imprecise guiding.
They are ideally suited for machines subjected to

frequent washing or liquid spray.

They protect the operator by immediately stopping any dangerous movement, as soon as the distance between the switch and its magnet is greater than 8 or

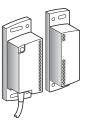
5 mm, depending on the switch model.





Coded magnetic systems

With dedicated transmitter





These self-contained SIL 2/category 3, PL=d or SIL 3/category 4, PL=e systems protect the operator by immediately stopping any dangerous movement, as soon as the distance between the transmitter and the receiver exceeds 10 mm.

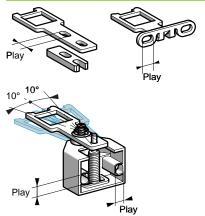
Plastic case system for use on machines with low inertia. Specifically designed for industrial machines fitted with one or more doors, covers or guards with imprecise guiding.

They are ideally suited for machines subjected to frequent washing or liquid spray and that are not necessarily equipped with an enclosure or control cabinet.

Metal case key operated switches

Key actuators

The key actuators are common to all metal and plastic safety interlock switches case types XCS LF and XCS LE



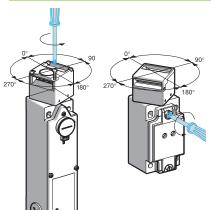
Their oblong fixing holes enable simple adjustment when mounting on moving guards.

A pivoting actuator (both horizontally and vertically) is available when using safety interlock switches in conjunction with hinged guards or guards with imprecise guiding.

Straight actuators are supplied with an adaptor shank for simple replacement of an XCS L safety interlock switch by an XCS switch, without the need to drill additional fixing holes for the switch or the key actuator.

Turret head

All metal safety interlock switches case are fitted with a square turret head which can be rotated through 360° in 90° steps



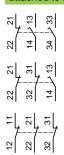
8 directions of actuation are possible for the actuator:

- 4 in the horizontal plane
- 4 from above the switch (4 alternative positions of the actuator slot, depending on the orientation of the head).

When loosening the fixing screw for re-orientation of the operating head, the head itself remains attached to the body and the contact states remain unchanged.

Safety contacts

Metal safety interlock switches case incorporate a **3-pole contact block** with positive opening operation, which is actuated by insertion or withdrawal of the actuator attached to the guard.



The withdrawal of the key actuator opens the NC safety contact(s), even in the event of the contact sticking or welding.

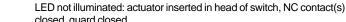
The 3-pole contact block enables redundant safety circuits to be established (for example: NC + NC or NC + NO) and also, to provide signalling (for example: PLC, illuminated beacon, etc.).

LED indicators

An orange LED (optional for key operated switches type XCS A, XCS B and XCS C, standard for safety interlock switches type XCS LF and XCS LE) **indicates the position of the machine guard**:

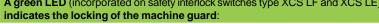


LED illuminated: actuator not inserted in head of switch, NC contact(s) open, guard open.



closed, guard closed.

A green LED (incorporated on safety interlock switches type XCS LF and XCS LE)





LED not illuminated: actuator not inserted in head of switch. The machine cannot be operated.



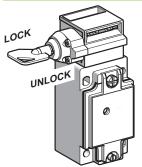
LED illuminated: actuator inserted in head of switch **and actuator locked**. The machine is either ready for starting, running or decelerating to a standstill.

Note: LED wiring must be done according to schematics indicated in the instruction sheet or in the catalogue pages.

Metal case key operated switches

Manual locking/unlocking by pushbutton or key operated lock on XCS B and XCS C

The pushbutton or key operated lock fitted to key operated switches type XCS B and XCS C allows manual locking/unlocking of the machine guard



Their use is not necessary for the normal operation of the guard switch.

For ease of access, the pushbutton or lock may be mounted on the right or the left of the key operated switch head.

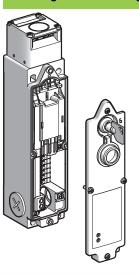
For key operated switches type XCS C, when the machine guard is locked (key in position "LOCK"), the resistance to forcible withdrawal of the actuator fitted to the guard is **150 daN**.

The key is removable from the locking device in

The key is removable from the locking device in the "LOCK" position.

Locking/unlocking by solenoid on XCS LF

Safety interlock switches type XCS LF incorporate a solenoid for locking/ unlocking of the machine guard



With the machine guard closed and locked, the resistance to forcible withdrawal of the actuator fitted to the guard is Fzh 2300 N according to the verification principle GS-ET19 (Fzh=Fmax/1.3). In addition to the 3-pole contacts, positively operated by the actuator fitted to the guard, safety interlock switches XCS LF incorporate

NC + NO or 2 NC or 1 NC + 2 NO or 2 NC + 1NO or 3NC contact blocks mechanically linked to the solenoid.

The NC contact(s) are for use in the safety circuit of the machine and the NO contact for signalling the status of the solenoid.

Key operated lock on XCS LF

Safety interlock switches type XCS LF are fitted with a key operated lock allowing the unlocking of the machine guard whilst being held in the lock position by the solenoid (for use by authorised personnel only)



The manual unlocking of the guard using the key operated lock is useful in the following cases:

- whilst the machine is undergoing maintenance (with the key turned to the "UNLOCK" position and then removed, the level of protection is higher in preventing an accidental machine start. The safety for maintenance personnel is thus improved):
 - in the event of a power failure
- in the event of an interlocking circuit malfunction (interlocked condition maintained: positive safety).

The electrical supply providing the unlocking via the solenoid always takes priority over manual unlocking using the key operated lock. The lock fitted to standard safety interlock switches has key withdrawal from the "LOCK" and "UNLOCK" positions.

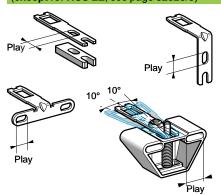
Safety detection solutions Metal case key operated switches

Example of operation for an XCS LF key operated switch with locking on de-energisation of solenoid						
Machine status	Stopped, de-energised	Stopped, energised	Stopped, ready to start	Running	Stopping sequence	Stopped, energised
Guard position	Open	Open	Closed	Closed	Closed	Closed
Guard status	Free	Free	Free	Locked	Locked	Free
Solenoid status	"O" (de-energised)	"1" (energised)	"1" (energised)	"O" (de-energised)	"O" (de-energised)	"1" (energised)
2-pole contact state for XCS LF25	22 21 14 113	22 21 14 13	22 44 13	22 44 13	22 21 4 - 4 - 13	22 44 13
2-pole contact state for XCS LF27	22 21 12 14 14	22 12 14 14	22 21 12 -11	22 21 12 -11	22 21 12 11	22 21 12 11
3-pole contact state for XCS LF35•••	22 21 14 14 14 13 13	22 21 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	22 14 14 13 34 133	22 14 14 13 34 133	22 14 14 13 14 13 14 13	22 24 14 14 13 34 133
3-pole contact state for XCS LF37●●●	22 21 31 14 113	22 21 41 41 13	22 23 4 4 7 13 13	22 22 32 32 34 14 14 13	22 21 32 32 34 14 14 13	22 22 32 32 34 14 14 13
3-pole contact state for XCS LF38●●●	12 22 23 23 24 24 25 24 25 25 25 25	32 22 21 11	12 12 13 14 14 15 15 15 15 15 15	12 22 23 14 14 14 14 14 15 15 15	22 23 24 14 14 14 15 15 15 15 1	12 22 23 14 14 14 15 15 15 15 15
Functions	Machine at rest.	Machine cannot be operated.	Guard closed, actuator can be locked. It will be locked as soon as the start instruction is given.	Start instruction given, the machine is running.	Stop instruction given, the machine stops gradually (deceleration then complete stop of motor).	Machine has stopped. The guard can be opened.
Solenoid contact states						
2-pole contact state for XCS LF••25•••	34 42 41 41	34 42 41 41	42 44 41	34 42 41 41	34 42 41	34 42 41
2-pole contact state for XCS LF••27•••	32 4 41 41	32 42 47 41 41 41	32 42 47 14 14	32 31	32 31 42 41 41	32 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4
3-pole contact state for XCS LF••35•••	54 4 61	54 44 61 54 44 61	2	26	2 4 EE	2 2 2
	62 44 54	62 44 44	62 44 62	62 44 54	62 44 54	62 44 54
3-pole contact state for XCS LF••37•••	52 - 141 66 64 - 163 55 64	42 7 41 6 52 7 51 4 6 64 7 63 5	52 - 141 62 - 51 44 64 - 63 54	25	52 - 41 - 62 - 63 - 64 - 63 - 64 - 63 - 64 - 63 - 64 - 64	52 - 41 64 - 63 64 - 63 65 - 63
state for	4 5 8	4 2 8	4 2 8	4 2 8	77	4 2 8
state for XCS LF••37••• 3-pole contact state for	41 42 41 51 61 64 64 63	41 42 42 42 64 64 64 64 64 64 64 64 64 64	64 152 44 64 153 44 64 163 44	24 28 49 44 44 44 44 44 44 4	4 2 8 4 5 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7	61 62 41
state for XCS LF••37••• 3-pole contact state for XCS LF••38•••	42 41 42 41 52 51 52 51 62 61 64 63	41 42 42 42 64 64 64 64 64 64 64 64 64 64	42 41 42 41 52 51 52 51 62 61 64 663	52 51 52 51 64 63 64 64 63 64 64 63 64 64 64 64 64 64 64 64 64 64 64 64 64	42 41 42 42 52 51 64 64 64 64 64	42 41 42 41 62 61 64 64 63 64 63

Plastic case key operated switches

Key actuators

The key actuators are common to all plastic case key operated switches (except for XCS LE, see page 32920/5)



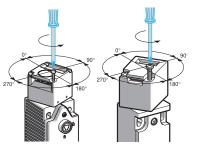
Their oblong fixing holes enable simple adjustment when mounting on moving guards.

A pivoting actuator (both horizontally and vertically) is available when using guard switches in conjunction with hinged guards or guards with imprecise guiding.

Straight actuators are supplied with an adaptor shank for simple replacement of an XCK P key operated switch by an XCS PA switch, or an XCK T key operated switch by an XCS TA switch, without the need to drill additional fixing holes for the switch or the actuator.

Turret head

Guard switches XCS PA, XCS TA and XCS LE are fitted with a square turret head which can be rotated through 360° in 90° steps. Guard switches XCS MP have a fixed head



8 directions of actuation are possible for the actuator: 4 in the horizontal plane (1 for **XCS MP**), 4 from above the switch (1 for **XCS MP**), (4 alternative positions of the actuator slot, depending

on the orientation of the head).

When loosening the 2 fixing screws or the 4 fixing screws (**XCSLE**) for re-orientation of the operating head, the head itself remains attached to the body and

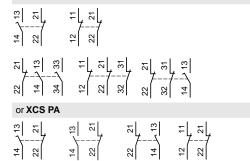
the contact states remain unchanged (XCS PA,

Safety contacts

The key operated switches incorporate either a 2-pole contact block (XCS MP, XCS PA and XCS LE) or a 3-pole contact block (XCS MP, XCS PA and XCS TA and XCS LE), with positive opening operation, which is actuated by insertion or withdrawal of the key actuator attached to the guard

XCS TA).

XCS LE



or XCS PA, XCS TA



or XCS MP



In addition, safety interlock switches type XCS LE incorporate 1 NC or 2 NC contacts (with positive opening operation) actuated by the solenoid. The NC contact(s) are for use in the safety circuit of the NC contact(s) are for use in the safety circuit of the NC contact(s) are for use in the safety circuit of the NC contact(s) are for use in the safety circuit of the NC contact(s) are for use in the safety circuit of the NC contact (s) are for use in the safety circuit of the NC contact (s) are for use in the safety circuit of the NC contact (s) are for use in the safety circuit of the NC contact (s) are for use in the safety circuit of the NC contact (s) are for use in the safety circuit of the NC contact (s) are for use in the safety circuit of the NC contact (s) are for use in the safety circuit of the NC contact (s) are for use in the safety circuit of the NC contact (s) are for use in the safety circuit of the NC contact (s) are for use in the safety circuit of the NC contact (s) are for use in the safety circuit of the NC contact (s) are for use in the safety circuit of the NC contact (s) are for use in the safety circuit of the NC contact (s) are for use in the safety circuit of the NC contact (s) are for use in the safety circuit of the NC contact (s) are for use in the safety circuit of the NC contact (s) are for use in the safety circuit of the NC contact (s) are for use in the safety circuit of the NC contact (s) are for use in the NC contact (s) are for use in the NC contact (s) are for use in the Safety circuit of the NC contact (s) are for use in the NC contact (s)

The NC contact(s) are for use in the safety circuit of the machine. The withdrawal of the key actuator opens the NC safety contact(s), even in the event of the contact sticking or welding.

The two-pole **2 NC** or three-pole **2 NC** + **1 NO** or **3 NC** (XCS TA/ XCS MP, XCS PA and XCS LE only) contact block enables up to PL = d, category 3 control circuit to be established conforming to EN/ISO 13849-1, by using both NC safety contacts in redundancy, or up to PL = b, category 1 control circuit by using one NC contact in the safety circuit and the NO other contact for signalling (for example: PLC, illuminated beacon, etc.).

Plastic case key operated switches

Guard retaining device

The guard retaining device XCS Z21 can be used with all plastic key operated switches case type XCS PA and XCS TA that are used in conjunction with either the wide (XCS Z12) or pivoting (XCS Z13) actuator

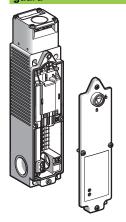
It assists in holding the guard closed by providing an extra retaining force of 5 daN.

It is specially suited for use with light machines operating in arduous conditions (vibration, mechanical shock, guard not vertical, risk of guard rebound on closing, etc.).

It can be used for horizontal actuator actuation directions as well as those from above.



Safety interlock switches type XCS LE incorporate a solenoid for locking/unlocking of the machine quard



With the machine guard closed and locked, the resistance to forcible withdrawal of the actuator fitted to the guard is **Fzh 1100 N** according to the verification principle GS-ET 19 (Fzh =Fmax/1.3) with F max = 1400N. In addition to the 2-pole or 3-pole contact block, positively operated by the actuator fitted to the guard, the switches incorporate **1 or 2 NC contacts mechanically linked to the solenoid**.

The NC contact(s) are for use in the safety circuit of the machine.

Unlocking by special tool for XCS LE

Safety interlock switches type XCS LE are supplied with a special tool 1 that enables unlocking of the machine guard whilst being held in the locked position by the solenoid (for use by authorised personnel only)



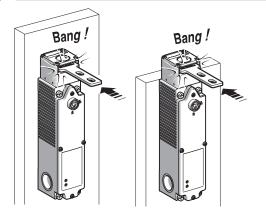
The manual unlocking of the guard using the tool 1 is useful in the following cases:

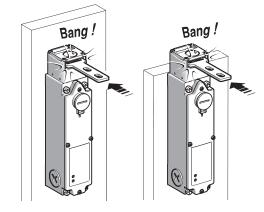
- whilst the machine is undergoing maintenance (with the tool turned to the "UNLOCK" position and then removed, the level of protection is higher in preventing an accidental machine start. The safety for maintenance personnel is thus improved),
- in the event of a power failure,
- in the event of an interlocking circuit malfunction (interlocked condition maintained: positive safety). The electrical supply providing the unlocking via the solenoid always takes priority over manual unlocking using the special tool.

Resilience XCS LE / XCS LF

XCS LE against the partition: max = 1.2 J XCS LE without partition: max = 4.9 J

XCS LF against the partition: max = 9.6 J XCS LE without partition: max = 6.4 J





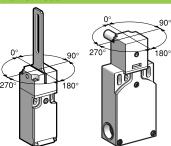
Safety detection solutionsPlastic case key operated switches

Example of operation for an XCS LE key operated switch with locking on de-energisation of solenoid							
Machine status	Stopped, de-energised	Stopped, energised	Stopped, ready to start	Running	Stopping sequence	Stopped, energised	
Guard position	Open	Open	Closed	Closed	Closed	Closed	
Guard status	Free	Free	Free	Locked	Locked	Free	
Solenoid status	"O" (de-energised)	"1" (energised)	"1" (energised)	"O" (de-energised)	"O" (de-energised)	"1" (energised)	
2-pole contact state for XCS LE25•••	22 21 14 13	22 21 14 113	22 4 13 13	22 4 7 7 13	22 4	22 4-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1	
2-pole contact state for XCS LE27•••	22 21 11 11	22 21 12 11 11	22 12 12 11 12 11	22 21 12 11	22 21 12 11	22 21 11 12 11	
3-pole contact state for XCS LE35•••	22 21 14 13 34 133	22 21 4 14 13 33 34 13 13	22 14 14 14 13 13 13 13	22 21 4 7 13 34 7 33	22 24 14 13 34 133 14 133	22 21 14 13 34 J 33	
3-pole contact state for XCS LE37	22 21 32 31 14 14 14	22 21 31 41 14 113	25 25 4 4 23 21 13 13 12	22 21 32 14 14 14 17 13	22 23 32 14 14 14 15 13	22 21 32 31 14 13	
3-pole contact state for XCS LE38●●●	12 22 22 31 11 11	12 22 23 23 24 24 25 24 24 24 24 24	15 15 17 17 17 17 17 17	12 22 23 23 24 14 14 14 14 14 14 14	12 22 23 23 24 14 14 14 14 14 14 14	12 12 14 14 15 15 15 15 15 15	
Functions	Machine at rest.	Machine cannot be operated.	Guard closed, actuator can be locked. It will be locked as soon as the start instruction is given.	Start instruction given, the machine is running.	Stop instruction given, the machine stops gradually (deceleration then complete stop of motor).	Machine has stopped. The guard can be opened.	
Solenoid contact states							
2-pole contact state for XCS LE••25•••	34 42 41 41	34 42 41 41	33	42 41 41	34 42 41 41	34 42 41	
2-pole contact state for XCS LE••27•••	32 31 42 41	32 31 42 41	35 	32 31	32 31 42 41	32 31 42 41	
3-pole contact state for XCS LE••35•••	62 64 44 43 54 54 54 53	62 64 44 44 43 54 54 54 53	62 64 44 43 54 54 55 54 53	62 64 44 44 43 54 54 55 54 55 54 55 54 55 56 56 56 56 56 56 56 56 56 56 56 56	62 64 44 43 54 54 55 54 55 54	62 64 44 44 43 54 54 54	
3-pole contact state for XCS LE••37•••	52 / 51	52 / 41 64 / 63	52 7 51	42 41 52 51 64 7 63	42 41 52 51 64 7 63	52 / 51 64 / 63	
3-pole contact state for XCS LE••38•••	42 41 52 51 62 61	42 41 52 51 62 61	42 42 52 52 61 61	42 41 52 51 64 63	42 41 52 51 64 63	42 41 52 51 62 61	
Orange LED	\otimes	**	\otimes	\otimes	\otimes	\otimes	
Green LED	\otimes	\otimes	8	—————————————————————————————————————		\otimes	
Safety circuit of the machine	Open	Open	Open	Closed	Closed	Open	

Rotary lever and spindle operated safety switches

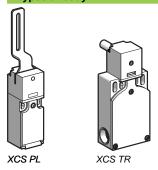
Presentation

Turret head



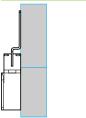
Safety switches for hinged covers or guards, featuring a hinged lever or spindle operator, incorporate a turret head that can be rotated through 360° in 90° steps. Two additional self-locking screws are included with each switch for positive fixing of the head.

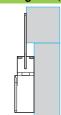
2 types of body



- Plastic case, narrow, with 1 cable entry for XCS PL and XCS PR
- Plastic case, wide, with 2 cable entries for **XCS TL** and **XCS TR**.

2 types of operating lever, 2 spindle lengths





■ Levers

Straight or elbowed (flush with rear of switch), making the lever switches suitable for use with all types of hinged guards, whether:

- flush with the machine framework (use a switch with an elbowed flush lever),
- overhanging in relation to the machine framework (use a switch with a straight lever).

3 alternative operating lever positions allow the switches to be used with guards that open to the left, centre or right.

■ Spindle operators

2 spindle lengths: 30 or 80 mm.

Safety contacts





Safety switches **XCS PL** and **XCS PR** incorporate a 2-pole or 3-pole contact block, with positive opening operation. The contact arrangements can be: NC + NO break before make, 2 NC, 1 NC + 2 NO break before make or 2 NC + 1 NO break before make.

Safety switches **XCS TL** and **XCS TR** incorporate a 3-pole contact block, with positive opening operation. The contact arrangements can be:

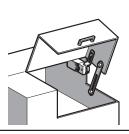
1 NC + 2 NO break before make or 2 NC + 1 NO break before make. Opening of the NC safety contact(s) occurs when the operating lever or spindle is displaced by an angle equal to or greater than 5°.

Applications

These safety switches provide a solution for monitoring **hinged protective guards** with small opening radius on machines with low inertia (no rundown time).

They are specially suitable for existing machines which need to be brought in-line with the latest standards and directives since they can be used in conjunction with existing covers, including those whose mounting is somewhat imprecise.

Mounting of the safety switch improves the machine operator's level of safety by limiting the opening of the protective guard and reducing the risk of touching any moving parts before they have come to a stop.

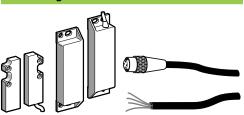




Coded magnetic guard switches and systems

Presentation

Coded magnetic switches





3 types of case

- PBT plastic body.
- Compact rectangular, XCS DMC
- Standard rectangular, XCS DMP
- Cylindrical Ø 30, XCS DMR
- Pre-cabled, length 2 m, 5 m or 10 m.
- Connector on flying lead connection:
 - M8: DMC
 - M12: DMP, DMR

Contacts

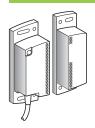
Coded magnetic switches are fitted with 2-pole (XCS DMC/XCS DMR/XCS DMP) or 3-pole (XCS DMP) Reed type contacts and are available with or without a "guard closed" LED indicator.

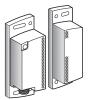
The NC and NO contacts change state as soon as the magnet is at a distance from the sensor of approximately 8 mm for types XCS DMP and XCS DMR and approximately 5 mm for type XCS DMC

Connection

When used in safety circuits, the Reed technology contacts must always be used in conjunction with a Preventa safety module.

Coded magnetic systems with dedicated transmitter





1 type of case

- PBT plastic body.
- Self-contained range: SIL2/PL=d, category 3 XCS DM3 and SIL3/PL=e, category 4 XCS DM4.
- Pre-cabled, length 2 m, 5 m or 10 m.
- Flying lead with M12 connector.

Technology

Coded "Hall effect" detection.

PNP safety outputs

Integrated self-monitoring using micro-processors. Detection distance from 0 to 10 mm obtained on approach of dedicated transmitter **XCS DMT**.

Functions

- Dynamic EDM (External Device Monitoring) only for **XCS DM4**.
- Fault and short-circuit detection.
- Output diagnostics (non safety related) only for **XCS DM4**.
- LED indicator.
- Possible chaining of up to a maximum of 32 systems for **XCS DM3** only.

Applications



These switches provide a solution for monitoring moveable machine guards fitted to machines with quick rundown times.

They are particularly suitable for guards without accurate guidance and for use in difficult environments (dust, liquids, etc.).

Installing self-contained coded magnetic systems provides an optimum solution (no control system required). They enable:

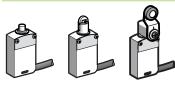
- monitoring of one or several guards (opening, closing) on small machines,
- savings in space and the elimination of enclosures and/or control cabinets.

Safety detection solutions Safety limit switches

Presentation

Safety limit switches XCS M

With head for linear movement (plunger) or rotary movement (lever)



- Narrow metal case XCS M.
- With protective plate, preventing both access to the fixing screws or adjustment of the head by non authorised personnel.
- Torx fixing screws.
- A removable cable entry to facilitate wiring.

Contacts

XCS M3 limit switches are fitted with 3-pole contacts and XCS M4 switches are fitted with 4-pole contacts. 4 versions of complete switches are available incorporating these contacts:

- metal end plunger,
- roller plunger,
- thermoplastic roller lever,
- diameter 19 mm steel roller lever.

Connection

Pre-cabled switches, either 7 x 0.5 mm² or 9 x 0.34 mm².

Safety limit switches XCS D and XCS P

With head for linear movement (plunger) or rotary movement (lever)







- Compact metal case XCS D and plastic case XCS P.
- With protective plate, preventing both access to the fixing screws or adjustment of the head by non authorised personnel.
- Torx fixing screws.
- A removable cable entry to facilitate wiring.

XCS P3•••• and XCS D3•••• limit switches are fitted with 3-pole contacts.

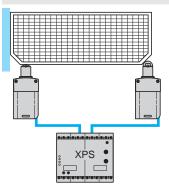
4 versions of complete switches are available incorporating these contacts:

- metal end plunger,
- roller plunger,
- thermoplastic roller lever,
- diameter 19 mm steel roller lever.

Applications

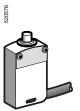
These switches provide a solution for monitoring covers, guards or grilles on machines with low inertia (quick rundown time), either in conjunction with key operated switches or not.

When used on their own, they are always installed in "positive mode" or combined in pairs, with one switch being in "positive mode" and the other in "negative mode", and can, when connected to Preventa safety modules, achieve a PL=e, category 4/SIL 3 system.



Limit switches Miniature design, metal, type XCS M

XCS M pre-cabled With head for linear movement (plunger). Fixing by the body



Page 37616/2

With head for rotary movement (lever). Fixing by the body



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Miniature design, metal, type XCS M

Conformity to standards	Products	EN/IEC 60947-5-1, UL 508, CSA C22-2 n° 14		
•	Machine assemblies	EN/IEC 60204-1, EN/ISO 14119		
Product certifications		UL, CSA		
Maximum safety level (1)		PL=e, category 4 conforming to EN/ISO 13849-1 and SIL CL3 conforming to EN/IEC 62061		
Reliability data B _{10d}		50 000 000 (value given for a service life of 20 years, limited by mechanical or contact wear)		
Protective treatment		Standard version: "TC"		
Ambient air temperature		For operation: -25+70°C For storage: -40+70°C		
Vibration resistance		XCS M snap action: 5 gn. XCS M slow break: 25 gn (10500 Hz) conforming to EN/IEC 60068-2-6		
Shock resistance		25 gn (18 ms) conforming to EN/IEC 60068-2-27		
Electric shock protection		Class I conforming to IEC 6140		
Degree of protection		IP 66, IP 67 and IP 68 (1) conforming to EN/IEC 60529; IK 06 conforming to EN 50102		
Materials		Body: Zamak. Head: Zamak. Protective plate: steel, secured by 5-lobe torque safety screw		
Repeat accuracy		0.05 mm on the tripping points, with 1 million operating cycles for head with end plunger		
Contact block char	racteristics			
Rated operational characte	ristics	~ AC-15; B300 (Ue = 240 V, le = 1.5 A) DC-13; R300 (Ue = 250 V, le = 0.1 A), conforming to EN/IEC 60947-5-1 Appendix A		
Rated insulation voltage		Ui = 400 V degree of pollution 3 conforming to EN/IEC 60947-5-1 Ui = 300 V conforming to UL 508, CSA C22-2 n° 14		
Rated impulse withstand vo	oltage	U imp = 4 kV conforming to EN/IEC 60947-1, EN/IEC 60664		
Positive operation (dependi	ng on model)	NC contacts with positive opening operation conforming to IEN/IEC 60947-5-1 Appendix K		
Resistance across terminal	s	\leq 25 m Ω conforming to EN/IEC 60255-7 category 3		
Short-circuit protection		6 A cartridge fuse type gG (gl)		
Minimum actuation speed		Snap action contact: 0.01 m/minute, Break before make, slow break contact: 6 m/minute		

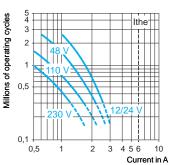
Electrical durability

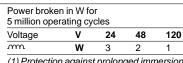
- Conforming to EN/IEC 60947-5-1 Appendix C
- Utilisation categories AC-15 and DC-13
- Maximum operating rate: 3600 operating cycles/hour
 Load factor: 0.5

AC supply 50/60 Hz ∼ m inductive circuit

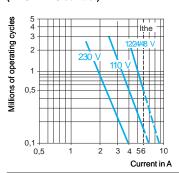
DC supply ...

XCSM snap action (2 NC + 1 NO, 2 NC + 2 NO contact)





XCSM slow break (2 NC + 1 NO contact)



Power broken in W for 5 million operating cycles 48 Voltage w

(1) Protection against prolonged immersion: the test conditions are subject to agreement between the manufacturer and the user.

Safety detection solutions Safety limit switches Miniature design, metal, type XCS M Pre-cabled

Type of head		Plunger (fixing by the	ne body)	Rotary (fixing by the body)	
-76-0		ge. (g 2) ti			,,
Type of operator		Metal end plunger	Roller plunger	Thermoplastic roller lever	Steel roller lever
References					
#W-A HW-QN-AE HW-QN-AE HW-GN-	3-pole 2 NC + 1 NO snap action contact	XCS M3910L1 1,8 4,2(P) 1,8	XCS M3902L1 → SK-SK-WH BK-SK-WH BK-SK-WH BK-SK-WH BN-BU 0 1,4	XCS M3915L1 → 25° 70°(P) BK-BK-WH RD RD WH RD RD WH BN-BU 90° 12°	XCS M3916L1 ⊕ 25° 70°(P) BK-BK-WH RP BR-BW-H BR-BW-
BN-WH BN-GN-HW-HW-GN-HW-HW-GN-HW-HW-GN-HW-HW-GN-HW-HW-GN-HW-HW-HW-HW-HW-HW-HW-HW-HW-HW-HW-HW-HW-	3-pole 2 NC + 1 NO break before make, slow break contact	XCS M3710L1 1,8 3,1(P) BK-BK-WH BN-BU 0 2,6 5 mm	XCS M3702L1 3,1(A) 5,6(P) BN-BU 0 4,6 mm	XCS M3715L1	XCS M3716L1
BN-WH BN-TV BN-TV BN-TE	4-pole 2 NC + 2 NO snap action contact	XCS M4110L1 1,8	XCS M4102L1 → 3,1(A) 7(P) BB BB CW WH BB BB CW WH TY WH BB BB CW WH TY W	XCS M4115L1	XCS M4116L1 ⇒ 25° 70°(P) BK-BK-WH BR-BR-WH BR-BR-W
Weight (kg)		0.165	0.170	0.205	0.210
Contact operation		closed open		 (A) = cam displacement (P) = positive opening p → NC contact with open 	oint
Complementary	characteristics not shown u	nder general charact	teristics (page 3763)	0/3)	
Switch actuation		On end	By 30° cam		
Type of actuation					
Maximum actuation speed	d	0.5 m/s	0.5 m/s	1.5 m/s	
Mechanical durability		10 million operating cy	cles		
Minimum force or torque	Tripping	8.5 N	7 N	0.5 N.m	
	Positive opening	42.5 N	35 N	0.1 N.m	
Cabling	3-pole contacts	PvR pre-cabled, 7 x 0.5			
	4-pole contacts	PvR pre-cabled, 9 x 0.3	34 mm ² , length 1 m (1)		

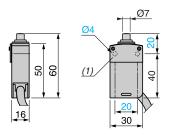
⁽¹⁾ For a 2 m long cable, replace L1 with L2. For a 5 m long cable, replace L1 with L5.

Safety detection solutions Safety limit switches

Safety limit switches Miniature design, metal, type XCS M Pre-cabled

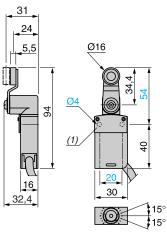
Dimensions

XCSM ••10L1

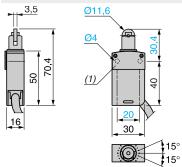


(1) Protective plate fixed by 5-lobe torque safety screws.

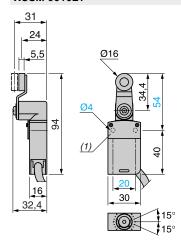
XCSM ••15L1







XCSM ••16L1

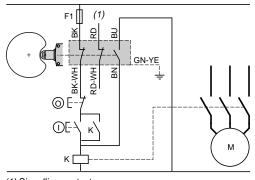


(1) Protective plate fixed by 5-lobe torque safety screws.

Connections

Wiring up to PL = b, category 1 conforming to EN/ISO 13849-1

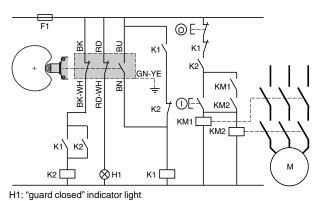
Example with 3-pole 2 NC + 1 NO contact and protection fuse to prevent shunting of the N/C contacts, either by cable damage or by tampering.



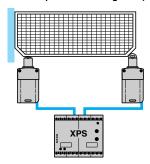
(1) Signalling contact

Wiring up to PL = d, category 3 conforming to EN/ISO 13849-1

Example with 3-pole 2 NC + 1 NO contact with mixed redundancy of the contacts and the associated control relyas. Opening and closing of the guard necessary to activate K1.



Example of guard monitoring using 2 switches and 1 safety module (PL=e, category 4 conforming to EN/ISO 13849-1) Operation in positive and negative (combined) mode



Compact design, metal, type XCS D Compact design, plastic, type XCS P

■ XCS D, XCS P

with 1 cable entry Conforming to standard EN 50047

☐ With head for linear movement (plunger)

XCS P









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Page 38121-EN/2

☐ With head for rotary movement (lever)

XCS D

XCS P









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Page 38121-EN/2

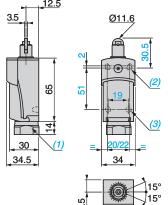
Compact design, metal, type XCS D Compact design, plastic, type XCS P

Conformity to standards Product certifications		1		
Product certifications	Products	EN/IEC 60947-5-1, UL 508, CSA C22-2 n° 14	4	
Product certifications	Machine assemblies	EN/IEC 60204-1, EN/ISO 14119		
		UL, CSA		
Maximum safety level (1)		PL=e, category 4 conforming to EN/ISO 138	49-1 and SIL 3 conforming to EN/IEC 61508	
Reliability data B _{10d}		50 000 000 (data value for a service life of 10 wear)	years can be limited by contact and mechanica	
Protective treatment	Standard version	"TC"		
Ambient air temperature	For operation	- 25+ 70°C		
	For storage	- 40+ 70°C		
Vibration resistance	Conforming to EN/IEC 60068-2-6	25 gn (10500 Hz)		
Shock resistance	Conforming to EN/IEC 60068-2-27	50 gn (11 ms)		
Electric shock protection		Class I conforming to IEC 61140 for XCS D		
		Class II conforming to IEC 61140 for XCS P		
Degree of protection	Conforming to EN/IEC 60529 Conforming to EN 50102	IP 66 and IP 67 IK 06 for XCS D IK 04 for XCS P		
Repeat accuracy		0.1 mm on the tripping points, with 1 million of	pperating cycles for head with end plunger	
Cable entry	Depending on model	Tapped entry for 13.5 cable gland, tapped IS		
Materials		XCS D: zamak bodies and heads, XCS P: pl Plastic protective cover, secured by 5-lobe to		
Contact block chara	acteristics			
Rated operational characteristics		~ AC-15; B300 (Ue = 240 V, Ie = 1.5 A); Ithe DC-13; R300 (Ue = 250 V, Ie = 0.1 A), con		
Rated insulation voltage		Ui = 400 V degree of pollution 3 conforming to IEN/IEC 60947-1 Ui = 300 V conforming to UL 508, CSA C22-2 n° 14		
Rated impulse withstand voltage		U imp = 4 kV conforming to EN/IEC 60947-1, EN/IEC 60664		
Positive operation (depending on model)			conforming to IEN/IEC 60947-5-1 Appendix K	
Resistance across terminals	<u> </u>	≤ 25 mΩ conforming to EN/IEC 60255-7 category 3		
Short-circuit protection		6 A cartridge fuse type gG (gl)		
Connection		Clamping capacity, min: 1 x 0.34 mm ² , max: 1 x 1 mm ² or 2 x 0.75 mm ²		
(screw clamp terminals) Minimum actuation speed	Snap action	0.01 m/minute		
(for head with end plunger)	Slow break	6 m/minute		
(1) Using an appropriate and c	orrectly connected control system.			
Electrical durability		 Conforming to EN/IEC 60947-5-1 Append Utilisation categories AC-15 and DC-13 Maximum operating rate: 3600 operating Load factor: 0.5 		
		E Load lactor. 0.5		
	AC supply 50/60 Hz ∼	Snap action contacts	Slow break contacts	
	AC supply 50/60 Hz ∼ .m. inductive circuit			
	50/60 Hz ∼	Snap action contacts Snap action contacts	Sep 5 4 3 4 5 10 1the 12/24/48 V 230 V 112/24/48 V 230 V 110	

Compact design, metal, type XCS D Complete switches with 1 cable entry

Type of head		Plunger		Rotary	
Type of operator		Metal end plunger	Steel roller plunger	Thermoplastic roller lever	Steel roller lever
References of comp	lete switches with 3-p	ole 2 NC + 1 NO	snap action con		
With ISO M20 x 1.5 cable	entry				
W. 5 40 5 11		XCS D3910P20 →	XCS D3902P20 ⊖	XCS D3918P20 ⊖	XCS D3919P20 ⊖
With Pg 13.5 cable entry		XCS D3910G13 ⊖	XCS D3902G13	XCS D3918G13 ⊖	XCS D3919G13 ⊖
With 1/2" NPT cable entry	•				
		XCS D3910N12 ⊖	XCS D3902N12	XCS D3918N12	XCS D3919N12
Weight (kg)		0.215	0.220	0.255	0.255
Contact function dia	_				
28 2 4 5 Snap action 3-pole 2 NC + 1 snap action	NO	1.8 4.5(P)	3.1(A) 7.8(P) 3.1(2) 7.8(P) 13.14 0 mm	25° 70°(P)	25° 70°(P)
Contact operation		closedopenNC contact with po	(A) = cam displacemer (P) = positive opening p sitive opening operation	point	
Characteristics					
Switch actuation		On end	By 30° cam		
Type of actuation		⊎	= 6	- 0	
Maximum actuation speed		0.5 m/s		1.5 m/s	
Mechanical durability (in millions of operating cycles)		15	10		
Minimum force or torque	For tripping	15 N	12 N	0.1 N.m	
	For positive opening	45 N	36 N	0.25 N.m	
Cable entry		1 entry tapped Pg 13.	1.5 mm for ISO cable gla 5 for cable gland, clampi NPT (USAS B2-1) cond	ng capacity 9 to 12 mm	to 13 mm
Dimensions					
		XCS D3•10•••		XCS D3•02•••	
		12.5	Ø7	3.5	Ø11.6

- (1) Tapped entry for ISO M20 x 1.5 or Pg 13.5 cable gland or tapped 1/2" NPT.
 (2) 2 elongated holes Ø 4.3 x 6.3 mm on 22 mm centres, 2 holes Ø 4.3 on 20 mm centres.
 (3) 2 x Ø 3 holes for support studs, depth 4 mm.



65

34

30

34.5

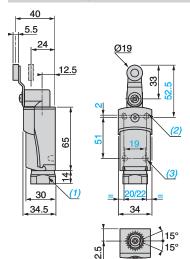
References, characteristics, dimensions (continued)

Safety detection solutions Limit switches

Compact design, metal, type XCS D Complete switches with 1 cable entry

Type of head		Plunger		Rotary	Rotary	
Type of operator		Metal end plunger	Steel roller plunger	Thermoplastic roller lever	Steel roller lever	
References of comp	lete switches with 3	3-pole 2 NC + 1 NO	break before ma	ake, slow break o	contact	
With ISO M20 x 1.5 cable	entry					
		XCS D3710P20	XCS D3702P20 →	XCS D3718P20 →	XCS D3719P20 →	
With Pg 13.5 cable entry						
		XCS D3710G13	XCS D3702G13	XCS D3718G13	XCS D3719G13	
With 1/2" NPT cable entry	1				,	
		XCS D3710N12	XCS D3702N12	XCS D3718N12	XCS D3719N12	
Weight (kg)		0.215	0.220	0.255	0.255	
Contact function dia						
\(\cappa_{\cappa\cappa_{\cappa\cappa_{\cappa_{\cappa_{\cappa\cappa_{\cappa_{\cappa_{\cappa_{\cappa\cappa_{\cappa\cappa\cappa_{\cappa\cappa_{\cappa\cappa\cappa\cappa\cappa_{\cappa\capp	NO ake, slow break	1.8 3.2(P)	3.1(A) 5.6(P) 21:22 13:13 0 5.2 mm	25° 70°(P) 31:32 13:14 0 42° 90°	25° 70°(P) 21°22° 13°14° 0 42° 90°	
Contact operation		closed pen NC contact with po	(A) = cam displacement (P) = positive opening sistive opening operation	point		
Characteristics		,				
Switch actuation		On end	By 30° cam			
Type of actuation		₩ C	-	- 0		
Maximum actuation speed		0.5 m/s		1.5 m/s		
Mechanical durability (in millions of operating cycles)		15	10			
Minimum force or torque	For tripping	15 N 45 N	12 N 36 N	0.1 N.m 0.25 N.m		
Cable entry	For positive opening	1 entry tapped M20 x 1 entry tapped Pg 13.	1 entry tapped M20 x 1.5 mm for ISO cable gland, clamping capacity 7 to 13 mm 1 entry tapped Pg 13.5 for cable gland, clamping capacity 9 to 12 mm 1 entry tapped for 1/2" NPT (USAS B2-1) conduit			
Dimensions						
		VCC D2-19 V	00.00.40			

XCS D3e18eee, XCS D3e19eee

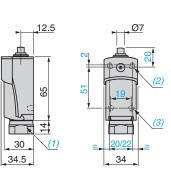


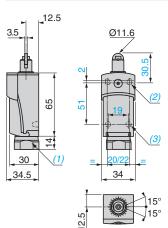
⁽¹⁾ Tapped entry for ISO M20 x 1.5 or Pg 13.5 cable gland or tapped 1/2" NPT.
(2) 2 elongated holes Ø 4.3 x 6.3 mm on 22 mm centres, 2 holes Ø 4.3 on 20 mm centres.
(3) 2 x Ø 3 holes for support studs, depth 4 mm.

Compact design, plastic, type XCS P Complete switches with 1 cable entry

Type of head		Plunger		Rotary	
Type of operator		Metal end plunger	Steel roller plunger	Thermoplastic roller lever	Steel roller lever
References of comp	lete switches with 3-	pole 2 NC + 1 NO	snap action cor	ntact	
With ISO M20 x 1.5 cable	entry				
		XCS P3910P20 →	XCS P3902P20 →	XCS P3918P20 →	XCS P3919P20 →
With Pg 13.5 cable entry					
		XCS P3910G13	XCS P3902G13	XCS P3918G13 ⊖	XCS P3919G13 ⊖
With 1/2" NPT cable entry	1				
		XCS P3910N12	XCS P3902N12	XCS P3918N12 ⊖	XCS P3919N12
Weight (kg)		0.215	0.220	0.255	0.255
Contact function dia					
		1.8 4.5(P)	3.1(A) 7.8(P) 31.32 31.3	25° 70°(P)	25° 70°(P)
Contact operation		closed □ open → NC contact with po	(A) = cam displaceme (P) = positive opening ositive opening operation	point	
Characteristics		,	, 5,		
Switch actuation		On end	By 30° cam		
Type of actuation					
Maximum actuation speed		0.5 m/s		1.5 m/s	
Mechanical durability (in millions of operating cycles)		15	10		
Minimum force or torque	For tripping	15 N	12 N	0.1 N.m	
	For positive opening	45 N	36 N	0.25 N.m	
Cable entry		1 entry tapped Pg 13	1.5 mm for ISO cable glassifier cable gland, clamp "NPT (USAS B2-1) cond	ing capacity 9 to 12 mm	to 13 mm
Dimensions					
		XCS P3e10eee		XCS P3•02•••	
		12.5	Ø7	3.5	Ø11.6

- (1) Tapped entry for ISO M20 x 1.5 or Pg 13.5 cable gland or tapped 1/2" NPT.
 (2) 2 elongated holes Ø 4.3 x 6.3 mm on 22 mm centres, 2 holes Ø 4.3 on 20 mm centres.
 (3) 2 x Ø 3 holes for support studs, depth 4 mm.



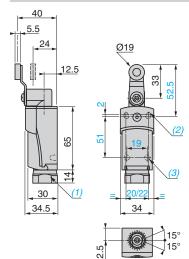


References, characteristics, dimensions (continued)

Safety detection solutions Limit switches

Compact design, plastic, type XCS P Complete switches with 1 cable entry

Type of head		Plunger		Rotary	
Type of operator		Metal end plunger	Steel roller plunger	Thermoplastic roller lever	Steel roller lever
References of comp	lete switches with 3-p	ole 2 NC + 1 NO	break before ma	1 1	contact
With ISO M20 x 1.5 cable					
	·	XCS P3710P20 →	XCS P3702P20 →	XCS P3718P20 →	XCS P3719P20 →
With Pg 13.5 cable entry					
		XCS P3710G13	XCS P3702G13	XCS P3718G13	XCS P3719G13
With 1/2" NPT cable entry	1				
		XCS P3710N12	XCS P3702N12	XCS P3718N12	XCS P3719N12
Weight (kg)		0.215	0.220	0.255	0.255
Contact function dia 3-pole 2 NC + 1 break before m	_	1.8 3.2(P)	3.1(A) 5.6(P) \$1.35 0 5.2 mm	25° 70°(P) 21:22 31:23 13:14 0 42° 90°	25° 70°(P) 21:32 13:14 0 42° 90°
Contact operation		closed	(A) = cam displacemen (P) = positive opening sitive opening operation		
Characteristics					
Switch actuation		On end	By 30° cam		
Type of actuation				- 0	
Maximum actuation speed		0.5 m/s		1.5 m/s	
Mechanical durability (in millions of operating cycles)		15	10	T	
Minimum force or torque	For tripping	15 N	12 N	0.1 N.m	
Cable entry	For positive opening	1 entry tapped Pg 13.5	36 N 1.5 mm for ISO cable gla 5 for cable gland, clampi NPT (USAS B2-1) cond	0.25 N.m and, clamping capacity 7 ng capacity 9 to 12 mm duit	to 13 mm
Dimensions					
		XCS P3e18eee, X	CS P3e19eee		



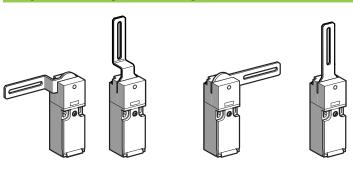
⁽¹⁾ Tapped entry for ISO M20 x 1.5 or Pg 13.5 cable gland or tapped 1/2" NPT.
(2) 2 elongated holes Ø 4.3 x 6.3 mm on 22 mm centres, 2 holes Ø 4.3 on 20 mm centres.
(3) 2 x Ø 3 holes for support studs, depth 4 mm.

Safety detection solutions Lever or spindle operated switches

Lever or spindle operated switches Plastic, double insulated, turret head, types XCS PL, XCS TL, XCS PR and XCS TR

XCS PL with 1 cable entry

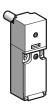
With rotary operating head, with elbowed lever (flush with rear of switch) or straight lever, for hinged covers and guards



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XCS PR with 1 cable entry

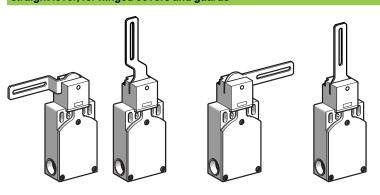
With rotary operating head, with spindle operator, for hinged covers and guards



Page 32913/2

XCS TL with 2 cable entries

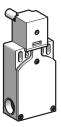
With rotary operating head, with elbowed lever (flush with rear of switch) or straight lever, for hinged covers and guards



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XCS TR with 2 cable entries

With rotary operating head, with spindle operator, for hinged covers and guards



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Safety detection solutions Lever or spindle operated switches

Plastic, double insulated, turret head, types XCS PL, XCS TL, XCS PR and XCS TR

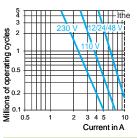
Conformity to standards	Products	EN/IEC 60947-5-1, EN/IEC 60947-5-4, UL 508, CSA C22-2 n° 14		
oomormity to standards	Machine assemblies	EN/IEC 60204-1, EN/ISO 14119		
Product certifications		UL, CSA, BG		
Maximum safety level (1)		PL=e, category 4 conforming to EN/ISO 13849-1 and SIL CL3 conforming to EN/IEC 62061		
Reliability data B _{10d}		5 000 000 (value given for a service life of 20 years, limited by mechanical or contact wear)		
Protective treatment		Standard version: "TC" and "TH"		
Ambient air temperature	For operation	- 25+ 70°C		
	For storage	-40+70°C		
Vibration resistance		50 gn (10500 Hz) conforming to EN/IEC 60068-2-6		
Shock resistance		50 gn (duration 11 ms) conforming to EN/IEC 60068-2-27		
Electric shock protection		Class 2 conforming to EN/IEC 60536		
Degree of protection		IP 67 conforming to EN/IEC 60529		
Cable entry		XCS Pe: 1 entry tapped M16 x 1.5 for ISO cable gland (clamping capacity 4.5 to 10 mm) or for n° 11 (Pg 11) cable gland conforming to NF C 68-300 (DIN Pg 11) (clamping capacity 7 to 10 mm) or tapped for 1/2" NPT (USAS B2-1) conduit. XCS Te: 2 entries tapped M16 x 1.5 for ISO cable gland (clamping capacity 4.5 to 10 mm) or for n° 11 (Pg 11) cable gland conforming to NF C 68-300 (DIN Pg 11) (clamping capacity 7 to 10 mm) or for 1/2" NPT conduit using adaptor DE9 RA1012 in one of the n° 11 tapped entries and a blanking plug in the other.		
Materials		Polyamide PA66 fibreglass impregnated case. Stainless steel lever and fixings		
Contact block character	ristics			
Rated operational characteristics	2 and 3 contact versions slow break	XCS PL, XCS TL, XCS PR and XCS TR: \sim AC-15, A300: Ue = 240 V, Ie = 3 A or Ue = 120 V, Ie = 6 A All models: DC-13, Q300: Ue = 250 V, Ie = 0.27 A or Ue = 125 V, Ie = 0.55 A conforming to IEC/EN 60947-5-1		
Rated insulation voltage	2 and 3 contact versions	XCS PL, XCS TL, XCS TR: Ui = 500 V conforming to IEC/EN 60947-1 Ui = 300 V conforming to UL 508, CSA C22-2 n° 14		
	3 contact version	XCS PL, XCS PR: Ui = 400 V degree of pollution 3 conforming to EN/IEC 60947-1 Ui = 300 V conforming to UL 508, CSA C22-2 n° 14		
Rated impulse withstand voltage	2 and 3 contact versions	XCS PL, XCS TL, XCS PR, XCS TR: Uimp = 6 kV conforming to EN/IEC 60947-5-1		
	3 contact version	XCS PL, XCS PR: Uimp = 4 kV conforming to EN/IEC 60947-5-4		
Positive operation		NC contacts with positive opening operation conforming to EN/IEC 60947-5-1, Section 3		
Resistance across terminals		\leq 30 m Ω conforming to EN/IEC 60947-5-4		
Short-circuit protection	2 and 3 contact versions	XCS PL, XCS TL, XCS PR, XCS TR: 10 A cartridge fuse type gG (gl)		
	3 contact version	XCS PL, XCS PR: 6 A cartridge fuse type gG (gl)		
Connection	2 contact version	XCS PL, XCS TL, XCS PR, XCS TR: Clamping capacity, min: 1 x 0.5 mm², max: 2 x 1.5 mm² with or without cable end		
	3 contact version	XCS PL, XCS PR: Clamping capacity, min: 1 x 0.34 mm², max: 1 x 1 mm² or 2 x 0.75 mm²		
Minimum actuation speed	3 contact version	0.01 m/second		
Complementary charac	teristics			
Tripping angle		5°		
Mechanical durability		1 million operating cycles		
Minimum torque		For tripping: 0.1 N.m, for positive opening: 0.25 N.m (XCS PL and XCS PR). 0.45 N.m (XCS TL and XCS TR)		

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

Electrical durability

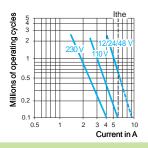
Conforming to EN/IEC 60947-5-1 Appendix C. Utilisation categories AC-15 and DC-13. Load factor: 0.5 2 and 3 slow break contact versions

AC supply 50/60 Hz ∼ m inductive circuit



Maximum operating rate: 3600 operating

3 slow break contact version (XCS PL/PR)



DC supply ...

Power broken in W for 1 million operating cycles

voitage	V	24	40	120
m	W	13	9	7

Lever or spindle operated switches Plastic, double insulated, turret head (1), types XCS PL, XCS TL, XCS PR and XCS TR 1 or 2 cable entries

References of complete switches () NC contact with positive opening operation) with 1 cable entry tapped ISO M16 x 1.5 2-pole 1 NC +1 NO 1 NC +2 NO 1 NC +2 NO 1 NC +1 NO 1 NC +2 NO 1 NC +1 NO 1 NC +2 NO 1 NC +2 NO 1 NC +1 NO 1 NC +2 NO 1 NC +1 NO 1 NC +2 NO 1 NC +2 NO 1 NC +2 NO 1 NC +1 NO 1 NC +2 NO 1 NC +1 NO 1 NC +2 NO 1 NC +2 NO 1 NC +1 NO 1 NC +2 NO 1 NC +1 NO 1 NC +2 NO 1 NC +2 NO 1 NC +1 NO 1 NC +2 NO 1 NC +1 NO 1 NC +2 NO 1 NC +1 NC +2 NO 1 NC +2 NO 1 NC +1 NC +2 NC +1 NC 1 NC +1 NC +2 NO 1 NC +1 NC +2 NC +1 NC 1 NC +1 NC +2 N	Туре		Elbowed lever (fl	ush with rear o	f switch)	Straight lever		Spindle
References of complete switches NC contact with positive opening operation) with 1 cable entry tapped ISO M16 x 1.5 2-pole This is a state of the state of t					Del	Do.		
2-pole TNC+1 NC + 1 NC	Operator		1				1	-
ThC + 1NO break before make, slow break slow break slow break before make, slow break before make, slow break	References of comp	olete switches (→ NC contact with	positive openii	ng operation) wit	h 1 cable entry ta	pped ISO M16 x	1.5
Department before make, silow break isolow break is	2-pole	72 2	XCS PL592	XCS PL582	XCS PL572	XCS PL562	XCS PL552	XCS PR552
2-pole	1 NC + 1 NO break before make, slow break	4 22	Θ	Θ	Θ	Θ	Θ	Θ
Slow break 3-pole 7 NC + 2 NO preak before make, slow break slow break before make, slow break before make, slow break 3-pole 2 NC + 1NO preak before make, slow break slow break slow break slow break slow break before make, slow break slo	2-pole	<u> </u>	XCS PL792	XCS PL782	XCS PL772	XCS PL762	XCS PL752	XCS PR752
To left Centred To right To right OR to left Centred Length 30 mm (2) References of complete switches (○ NC contact with positive opening operation) with 2 cable entries tapped ISO M16 x 1.5 3-pole 2 NC + 1NO No preak before make, slow break Solve break before make, slow break slo	slow break	2 2	Θ	Θ	Θ	Θ	Θ	Θ
break before make, \$\frac{\pi}{2} \frac{\pi}{2}\$ \$\frac{\pi}{2}\$ \$\frac{\pi}{2}	3-pole	13 33	-	-	-	XCS PL862	-	XCS PR852
2 NC + 1NO break before make, slow break Slow break Weight (kg) Operator To left Centred To right To right OR to left To right To right OR to left To right To right OR to left To right To right To right OR to left To right	1 NC + 2 NO break before make, slow break	7-77				Θ		Θ
Departed Property Signature (Signature) Signature	3-pole	31	-	XCS PL982	-	XCS PL962	-	XCS PR952
Operator To left Centred To right To right OR to left Centred Length 30 mm (2) References of complete switches (NC contact with positive opening operation) with 2 cable entries tapped ISO M16 x 1.5 3-pole 7	break before make, slow break	8 8 4		Θ		Θ		Θ
Operator To left Centred To right To right OR to left Centred Length 30 mm (2) References of complete switches (→ NC contact with positive opening operation) with 2 cable entries tapped ISO M16 x 1.5 3-pole 1 NC + 2 NO break before make, slow break 3-pole 2 NC + 1 NO break before make, slow break 3-pole 3	Weight (kg)		0.095	0.095	0.095	0.095	0.095	0.105
References of complete switches (NC contact with positive opening operation) with 2 cable entries tapped ISO M16 x 1.5 3-pole 1 NC + 2 NO break before make, slow break 3-pole 2 NC + 1 NO break before make, slow break 3-pole 3-pol								
3-pole 1 NC + 2 NO break before make, slow break 2 NCS TL592 3 YCS TL582 3 YCS TL572 3 YCS TL562 3 YCS TL552 3 YCS TL752 3 YCS TL772 3 YCS TL772 3 YCS TL762 3 YCS TL752 3 YCS TL852	Operator		<u> </u>		-		1	
1 NC + 2 NO break before make, slow break 3-pole 2 NC + 1 NO break before make, slow break 3-pole 3				1				
break before make, slow break □ <td< td=""><td>3-pole 1 NC + 2 NO</td><td>13 13 13</td><td>XCS TL592</td><td>XCS TL582</td><td>XCS TL572</td><td>XCS TL562</td><td>XCS TL552</td><td>XCS TR552</td></td<>	3-pole 1 NC + 2 NO	13 13 13	XCS TL592	XCS TL582	XCS TL572	XCS TL562	XCS TL552	XCS TR552
2 NC + 1 NO break before make, slow break 2 NC + 1 NO 3 NC slow break 3 NC slow break 2 NCS TL892 XCS TL882 XCS TL872 XCS TL862 XCS TL852 XCS TL852 XCS TR852 XCS TR852 XCS TR852	break before make, slow break	22 4 4 8		Θ			Θ	Θ
break before make, slow break g	3-pole	13 ¹ 24	XCS TL792	XCS TL782	XCS TL772	XCS TL762	XCS TL752	XCS TR752
3 NC $2 \times 2 $	break before make, slow break	8 8 4		Θ			Θ	Θ
slow break $2 \left \begin{array}{ccc} 7 & -7 & -7 \\ 2 \left \begin{array}{ccc} 8 \end{array} \right \end{array} \right $ Θ Θ	3-pole	[2 8	XCS TL892	XCS TL882	XCS TL872	XCS TL862	XCS TL852	XCS TR852
Weight (kg) 0.145 0.145 0.145 0.145 0.145 0.155	3 NC slow break	777		Θ	Θ	Θ		Θ
	Weight (kg)		0.145	0.145	0.145	0.145	0.145	0.155

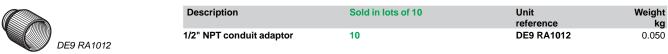
References of complete switches with 1 or 2 cable entries tapped n° 11 (Pg 11)

To order a complete switch with 1 or 2 Pg 11 cable entries, replace the last number in the reference (2) by 1. Example: XCS TL592 becomes XCS TL591.

References of complete switches with 1 or 2 cable entries for 1/2" NPT conduit

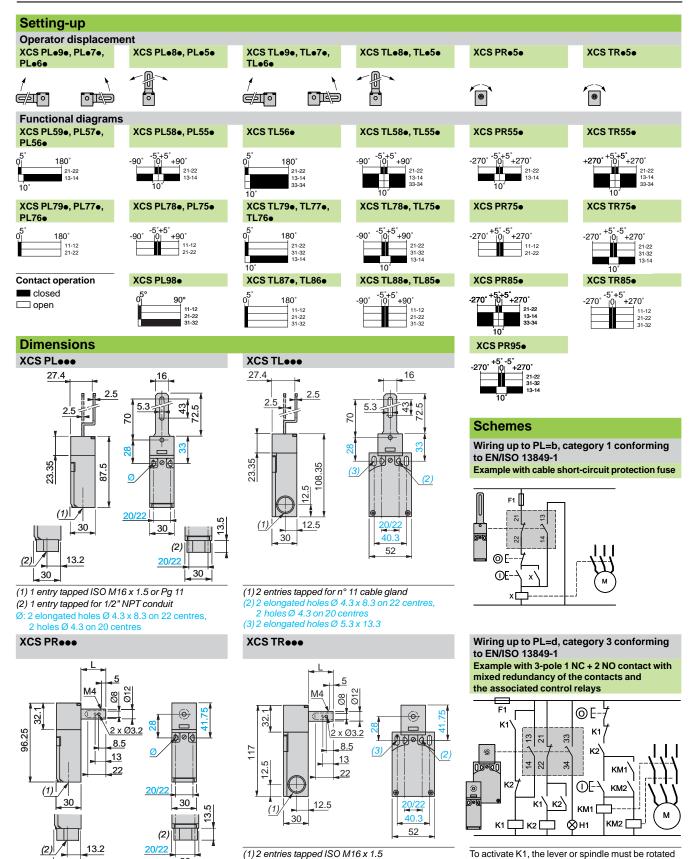
To order a complete type XCS PL••• or XCS PR ••• switch with 1 cable entry for 1/2" NPT conduit, replace the last number in the reference (2) by 3. Example: XCS PL592 becomes XCS PL593.

For a complete switch type \mathbf{XCS} \mathbf{TL} or \mathbf{XCS} \mathbf{TR} with 2 entries for 1/2" NPT conduit, use adaptor DE9 RA1012.



(1) Head adjustable in 90° steps throughout 360°. Switches supplied with 2 additional self-locking screws for positive fixing of the head.
(2) For switches with 80 mm spindle: replace the 2nd number in the reference (5) by 6. Example: **XCS PR561**. The weight increases by 0.032 kg. **Other versions: please consult our Customer Care Centre.**

Lever or spindle operated switches Plastic, double insulated, turret head, types XCS PL, XCS TL, XCS PR and XCS TR 1 or 2 cable entries



30 or tapped for n° 11 (Pg 11) cable gland when the supply is switched on. (1) 1 entry tapped for n° 11 cable gland H1: "lever or spindle displaced from initial position"

(2) 2 elongated holes Ø 4.3 x 8.3 on 22 centres, 2 holes Ø 4.3 on 20 centres

(3) 2 elongated holes Ø 5.3 x 13.3

2 elongated holes Ø 4.3 x 8.3 on 22 centres, noles Ø 4.3 on 20 centres L = 30 (XCS TR•5•) or 80 (XCS TR•6•) L = 30 (XCS PR•5•) or 80 (XCS PR•6•)

(2) 1 entry tapped for 1/2" NPT conduit

30

indicator. When used in conjunction with an XPS

or spindle operated switch can provide locking protection to PL=d, category 3 or PL=e, category 4

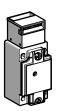
conforming to EN/ISO 13849-1.

module and another safety switch, the rotary lever

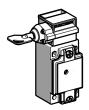
Metal, turret head, types XCS A, XCS and XCS C Plastic, double insulated, turret head, types XCS MP or XCS PA and XCS TA

Metal, types XCS A, XCS B, XCS C

Key operated switches with or without locking of the actuator



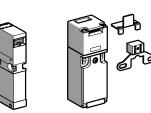


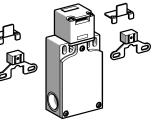


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Plastic, types XCS MP, XCS PA XCS TA

Key operated switches with or without locking of the actuator





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Environment charact	eristics			
Key operated switch type		XCS A, XCS B, XCS C (metal)	XCS MP, XCS PA, XCS TA (plastic)	
Conformity to standards	Products	EN/IEC 60947-5-1, UL 508, CSA C22-2 n° 14		
	Machine assemblies	EN/IEC 60204-1, EN/ISO 14119		
Product certifications		UL, CSA	UL, CSA (cULus for XCS MP)	
Maximum safety level (1)		PL=e, category 4 conforming to EN/ISO 13849	9-1 and SIL CL3 conforming to EN/IEC 62061	
Reliability data B _{10d}		5 000 000 (value given for a service life of 20 year	ars, limited by mechanical or contact wear)	
Protective treatment		Standard version: "TC"		
Ambient air temperature	For operation	- 25+ 70°C		
	For storage	- 40+ 70°C (- 25+ 80°C for XCS MP)		
Vibration resistance		5 gn (10500 Hz) conforming to EN/IEC 60068-2-6 (6 gn (1055 Hz) for XCS MP)		
Shock resistance		10 gn (duration 11 ms) conforming to EN/IEC 60068-2-27 (50 gn (duration 11 ms) for XCS MP)		
Electric shock protection		Class 1 conforming to EN/IEC 60536	Class 2 conforming to EN/IEC 60536	
Degree of protection		IP 67 conforming to EN/IEC 60529 and EN/IE	EC 60947-5-1 (2)	
Cable entry		1 entry tapped ISO M20 x 1.5 (clamping capacity 7 to 13 mm) or tapped for n° 13 (Pg 13.5) cable gland conforming to NFC 68-300 (clamping capacity 9 to 12 mm) or for 1/2" NPT (USAS B2-1) conduit	1 entry (XCS PA) or 2 entries (XCS TA) tapped for ISO M16 x 1.5 cable gland (clamping capacity 4.5 to 10 mm) or for n° 11 (Pg 11) cable gland, or tapped 1/2" NPT, or for 1/2" NPT (USAS B2-1) conduit using metal adaptor DE9 RA1012) for XCS TA (other entry fitted with blanking plug).	
Connecting cable		-	Pre-cabled, either 4 x 0.5 mm ² or 6 x 0.5 mm ² (XCS MP)	
Materials		XCS A/B/C Zamak case XCS MP/PA/TA Polyamide PA66 fibreglass impregnated ca		
		Actuators (all types): steel XC60, surface treated		

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

⁽²⁾ Live parts of these switches are protected against the penetration of dust and water. However, when installing take all necessary precautions to prevent the penetration of solid bodies, or liquids with a high dust content, into the actuator aperture. Not recommended for use in saline atmospheres.

Key operated switches

Metal, turret head, types XCS A, XCS and XCS C Plastic, double insulated, turret head, types XCS MP or XCS PA and XCS TA

Rated operation	nal	2 and 3 contact, slow break	XCS A, XCS B, XCS C, XCS TA, XCS PA: ~ AC-15, A300: Ue = 240 V, Ie = 3 A or	
characteristics		2 and 3 contact, slow break	Ue = 120 V, le = 6 A	
			XCS MP : \sim AC-15, C300: Ue = 240 V, Ie = 0.75 A or Ue = 120 V, Ie = 1.5 A All models: DC-13, Q300: Ue = 250 V, Ie = 0.27 A or Ue = 125 V, Ie = 0.55 A conforming to EN/IEC 60947-5-1	
		2 contact, snap action	XCS PA: ~ AC-15, A300: Ue = 240 V, Ie = 3 A; Ithe = 10 A DC-13, Q300: Ue = 250 V, Ie = 0.27 A or Ue = 125 V, Ie = 0.55 A conforming to EN/IEC 60947-5-1	
		3 contact, snap action	XCS PA: ~ AC-15, B300: Ue = 240 V, Ie = 1.5 A; Ithe = 6 A DC-13, R300: Ue = 250 V, Ie = 0.1 A or Ue = 125 V, Ie = 0.55 A conforming to EN/IEC 60947-5-1	
Conventional tl	nermal currer	nt in enclosure	XCS A, XCS B, XCS C, XCS PA (2 & 3 slow break contact and 2 snap action contact versions) XCS PA (3 snap action contact version): Ithe = 6 A XCS MP: Ithe = 2.5 A	
Rated insulation voltage		2 and 3 contact	3 contact (XCS A, XCS B, XCS C, XCS TA), 2 contact (XCS PA), 2 and 3 contact (XCS MP): Ui = 500 V conforming to EN/IEC 60947-1; Ui = 300 V conforming to UL 508, CSA C22-2 n° 14	
		3 contact	XCS PA: Ui = 400 V degree of pollution 3 conforming to EN/IEC 60947-1 Ui = 300 V conforming to UL 508, CSA C22-2 n° 14	
Rated impulse voltage	withstand	2 and 3 contact	3 contact (XCS A, XCS B, XCS C, XCS TA), 2 contact (XCS PA), 2 and 3 contact (XCS MP): Uimp = 6 kV conforming to EN/IEC 60947-5-1	
		3 contact	XCS PA: Uimp = 4 kV conforming to EN/IEC 60947-5-4	
Positive operat	ion		NC contacts with positive opening operation conforming to EN/IEC 60947-5-1, Section 3	
Resistance acr			\leq 30 m Ω conforming to EN/IEC 60947-5-4	
Short-circuit pr	otection	2 and 3 contact	3 contact (XCS A, XCS B, XCS C, XCS TA), 2 contact (XCS PA), 2 and 3 contact (XCS MP): 10 A cartridge fuse type gG (gl)	
		3 contact	XCS PA: 6 A cartridge fuse type gG (gI)	
Connection	Pre-cabled	I	4 x 0.5 mm ² or 6 x 0.5 mm ² (XCS MP). PVC	
	Screw clar terminals	np 2 contact, snap action	XCS PA, XCS TA: Clamping capacity, min: 1 x 0.34 mm², max: 2 x 1.5 mm²	
		2 and 3 contact	3 contact (XCS A, XCS B, XCS C, XCS TA), 2 contact (XCS PA): Clamping capacity, min: 1 x 0.5 mm², max: 2 x 1.5 mm² with or without cable end	
		3 contact	XCS PA: clamping capacity, min: 1 x 0.34 mm ² , max: 1 x 1 mm ² or 2 x 0.75 mm ²	

Conforming to EN/IEC 60947-5-1 Appendix C. Utilisation categories AC-15 and DC-13. Maximum operating rate: 3600 operating cycles/hour. Load factor: 0.5

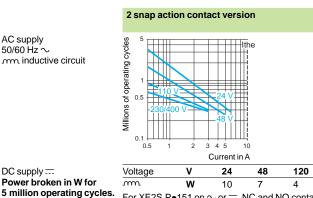
Only applicable to **XCS MP**:

Conforming to EN/IEC 60947-5-1 Appendix C. Utilisation categories AC-15 and DC-13. Maximum operating rate: 900 operating cycles/hour.

3 contact version XCS A/B/C/TA

and 2 slow break contact version

AC supply m inductive circuit



Millions of operating cycles 0.5

0.1

0.5

Current in A Voltage 24 48 120 m 13

3 4 5

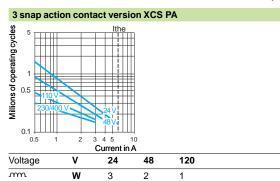
3 slow break contact version XCS PA

For XE2S P●151 on ~ or ==, NC and NO contacts simultaneously loaded to the values shown with reverse polarity.

AC supply 50/60 Hz \sim m inductive circuit

Power broken in W for

DC supply ===



Millions of operating cycles 0.5 0.5 Current in A Voltage 120 24 48 2 w 3

DC supply === Power broken in W for 5 million operating cycles.

Key operated switches Plastic, fixed head, type XCS MP Pre-cabled, length 2 m, 5 m or 10 m

Type of switch Without locking of actuator References of switches without actuator (NC contact with positive opening operation) (1) (3) 2-pole 1 NC + 1 NO XCS MP59L● В break before make, slow break (2) Θ OG/WH BUWH XCS MP79L● 2-pole 2 NC ဗ 교 slow break (2) Θ OG/WH BUWH XCS MP70L● 3-pole 2 NC + 1 NO 읾 駋, break before make, slow break (2) Θ BNWH BUWH 3-pole 3 NC XCS MP80L● 릶 BN slow break (2) Θ BN/WH Weight (kg) 0.110 Complementary characteristics not shown under general characteristics (page 32921/2) **Actuation speed** Maximum: 1.5 m/s, minimum: 0.05 m/s Resistance to forcible withdrawal of actuator 8 N Mechanical durability > 1 million operating cycles Pre-cabled connection $4 \times 0.5 \text{ mm}^2 \text{ or } 6 \times 0.5 \text{ mm}^2$ For maximum durability: 1200 operating cycles per hour Maximum operating rate Minimum force for extraction of actuator ≥8N References of actuators Pivoting actuator Description Straight actuator Right-angled actuator For right-hand door For left-hand door **(** For guard switches XCS MP XCS Z81 XCS Z84 XCS Z83 XCS Z85 0.015 0.025 0.085 0.085 Weight (kg) Separate components

Blanking plugs for operating head slot

Description

2

Unit reference

XCS Z29

Weight kg

32938-EN_Ver5.0

0.005

Dimensions:	Setting-up:	Schemes:
page 32938/3	page 32938/4	page 32938/5

⁽Sold in lots of 10)
(1) Blanking plug for operating head slot included with switch.

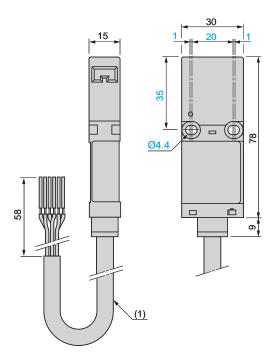
⁽²⁾ Schematic diagrams shown represent the contact states whilst the actuator is inserted in the head of the switch.

⁽³⁾ Basic reference, to be completed: replace the dot by 2 for a 2 m long cable, by 5 for a 5 m long cable or by 10 for a 10 m long cable. Example: XCS MP59L• becomes XCS MP59L10 for a switch with a 10 m long cable.

Key operated switches
Plastic, fixed head, type XCS MP
Pre-cabled, length 2 m, 5 m or 10 m

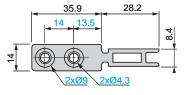
Dimensions

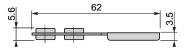
XCS MP



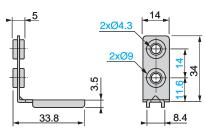
(1) Ø 7.6, length 2, 5 or 10 m.

XCS Z81

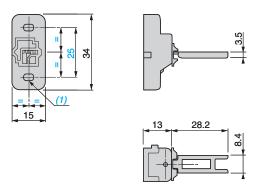




XCS Z84

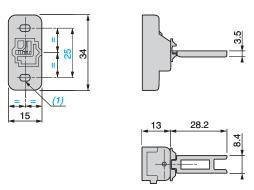


XCS Z83



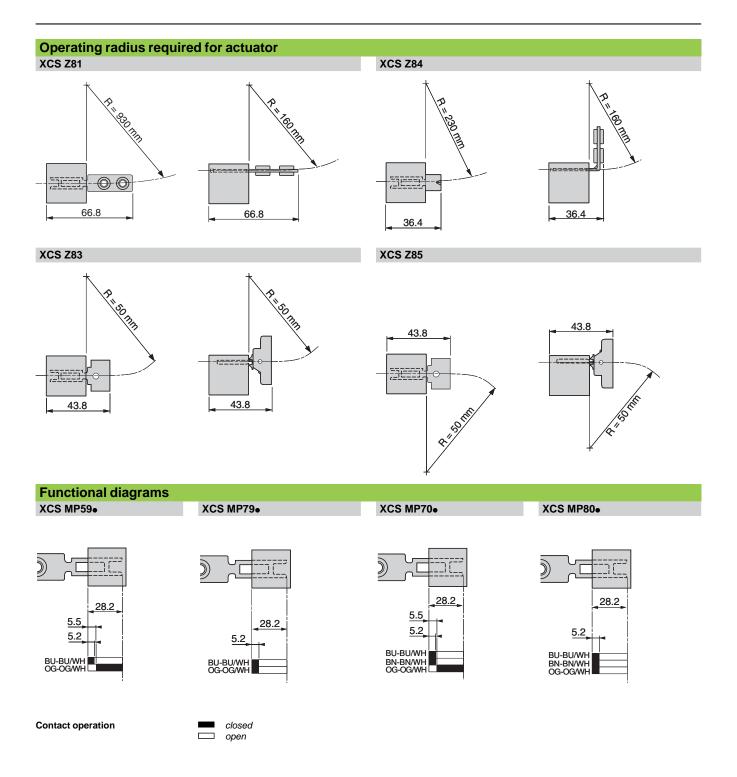
(1) 2 elongated holes Ø 4.2 x 6.

XCS Z85



(1) 2 elongated holes Ø 4.2 x 6.

Key operated switches
Plastic, fixed head, type XCS MP
Pre-cabled, length 2 m, 5 m or 10 m



Key operated switches Plastic, fixed head, type XCS MP Pre-cabled, length 2 m, 5 m or 10 m

Schemes Note: These schemes are given as examples only, the designer must refer to the relevant safety standards for guidance.

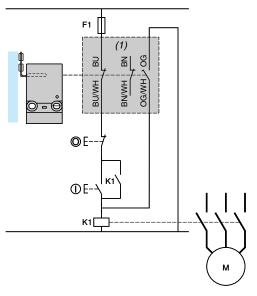
Wiring up to PL=b, category 1 conforming to EN/SO 13849-1

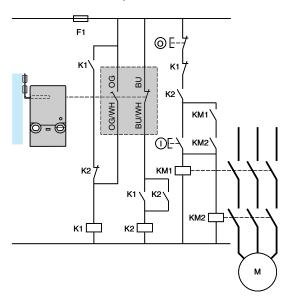
Example with 3-pole 2 NC + 1 NO contact and protection fuse to prevent shunting of the NC contact, either by cable damage or by tampering.

Wiring up to PL=d, category 3 conforming to EN/ISO 13849-1

Example with 2-pole 1 NC + 1 NO contact with mixed redundancy of the contacts and the associated control relays.

To activate K1, it is necessary to remove and re-insert the actuator when the supply is switched on.





(1) Signalling contact

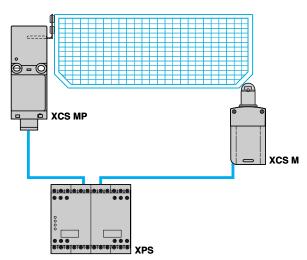
Wiring to PL=e, category 4 conforming to EN/ISO 13849-1 and SIL CL3 conforming to EN/IEC 62061. Wiring method used in conjunction with Preventa safety module.

(The guard switch should be used in conjunction with a safety limit switch to give electrical/mechanical redundancy).

Method for machines with quick rundown time (low inertia)

Locking or interlocking device based on the principle of redundancy and self-monitoring

The safety modules ensure these functions.



Locking of actuator and operation in positive mode associated with a safety module.

Plastic, turret head (1), types XCS PA and XCS TA 1 or 2 cable entries

Type of switch

Without locking of actuator





References of switches wi	ithout actuator (⊖ NC c	ontact with positive o	pening operation	n) with 1 or 2 cable entrie	s tapped ISO M16 x 1.5
2-pole 1 NC + 1 NO (2) break before make, slow break	22 41 13 13 14 13 14 15 15 15 15 15 15 15	XCS PA592	Θ	-	
2-pole 1 NC + 1 NO (2) snap action	22 13 13 13 13 13 13 13	XCS PA192	Θ		
2-pole 1 NO + 1 NC (2) make before break, slow break	25 - 4- 13 - 12 13 - 12	XCS PA692	Θ	-	
2-pole 2 NC (2) slow break	2 2 2 1	XCS PA792	⊖	-	
2-pole 2 NC (2) snap action	21 ZZ	XCS PA292	Θ		
3-pole 1 NC + 2 NO (2) break before make, slow break	2	XCS PA892	Θ	XCS TA592	⊖
3-pole 1 NC + 2 NO (2) snap action	44 12 13 13 13 13 13 13 13	XCS PA392	Θ	-	
3-pole 2 NC + 1 NO (2) break before make, slow break	2 2 4 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	XCS PA992	Θ	XCS TA792	⊖
3-pole 2 NC + 1 NO (2) snap action	2 2 4 5 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7	XCS PA492	Θ	-	
3-pole 3 NC (2) slow break	2	-		XCS TA892	⊖
Weight (kg)		0.110		0.160	

References of switches without actuator (\bigcirc NC contact with positive opening operation) with 1 or 2 cable entries tapped Pg 11 or 1/2" NPT

To order a switch with 1 or 2 cable entries for n° 11 (Pg 11) cable gland (clamping capacity 7 to 10 mm), replace the last number (2) by 1 in the selected reference. Example: XCS PA592 becomes XCS PA591.

To order a switch with 1 or 2 cable entries for 1/2" NPT conduit (one n° 11 tapped entry fitted with metal adaptor DE9 RA1012), replace the last number (2) by 3 in the selected reference. Example: XCA TA592 becomes XCS TA593.

the selected reference. Example: NOA 1A392 becomes NO3 1	
Complementary characteristics not shown under g	eneral characteristics (page 32921/2)
Actuation speed	Maximum: 0.5 m/s, minimum: 0.01 m/s
Resistance to forcible withdrawal of actuator	XCS PA, XCS TA: 10 N (50 N using actuators XCS Z12 or XCS Z13 together with guard retaining device XCS Z21)
Mechanical durability	XCS PA, XCS TA: > 1 million operating cycles
Maximum operating rate	For maximum durability: 600 operating cycles per hour
Minimum force for positive opening	≥15 N
Cable entry	XCS PA: 1 entry tapped M16 x 1.5 for ISO cable gland. XCS TA: 2 entries tapped M16 x 1.5 for ISO cable gland.
Materials	Body and head: polyamide PA66, fibreglass impregnated

References of accessories





Description	For use with	Unit reference	Weight kg
Blanking plugs for operating head slo (Sold in lots of 10)	t XCS PA, XCS TA	XCS Z28	0.050
Padlocking device to prevent insertion of actuator, for up to 3 padlocks (padlocks not included)	XCS PA, XCS TA	XCS Z91	0.053
Actuator centring device (3) (Fixing screws included)	XCS PA, XCS TA	XCS Z200	0.022

⁽¹⁾ Head adjustable in 90° steps throughout 360°. Blanking plug for operating head slot included with switch. (2) Schematic diagrams shown represent the contact states whilst the actuator is inserted in the head of

Other versions: please consult our Customer Care Centre.

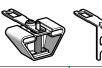
⁽³⁾ Do not use with XCS Z91.

Key operated switches
Plastic, turret head, types XCS PA and XCS TA
1 or 2 cable entries

References of actuators and guard retaining device









Description	Straight actuator	Actuator w fixing (1)	vith wide	Pivoting actuator	Right-angled actuator	Guard retaining device (2)
For key operated switches XCS PA, TA	XCS Z11	XCS Z12	XCS Z15	XCS Z13	XCS Z14	XCS Z21
Weight (kg)	0.015	0.015	0.012	0.085	0.025	0.080

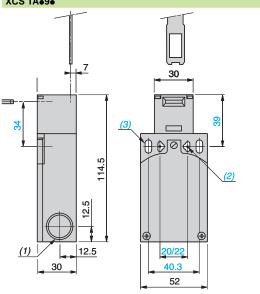
(1) 2 actuator lengths, XCS Z12: L = 40 mm, XCS Z15: L = 29 mm.

(2) Only for use with key operated switches XCS PA and XCS TA (without actuator centring device XCS Z200) used in conjunction with actuators XCS Z12, XCS Z13 or XCS Z15.

Dimensions XCS PA=91, XCS PA=92 XCS PA=93 XCS PA=93 (1) 13.2 = 20/22 = 30

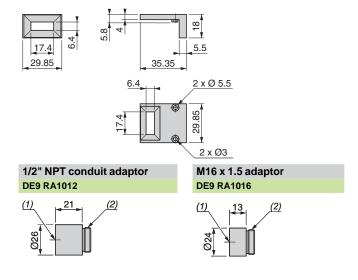
- (1) 1 tapped entry for cable gland
- Ø: 2 elongated holes Ø 4.3 x 8.3 on 22 centres, 2 holes Ø 4.3 on 20 centres
- (1) 1 tapped entry tapped for 1/2" NPT conduit
- Ø: 2 elongated holes Ø 4.3 x 8.3 on 22 centres, 2 holes Ø 4.3 on 20 centres

XCS TA•9•



- (1) 2 tapped entries for cable gland or 1/2" NPT conduit adaptor
- (2) 2 elongated holes Ø 4.3 x 8.3 on 22 centres, 2 holes Ø 4.3 on 20 centres
- (3) 2 elongated holes Ø 5.3 x 13.3

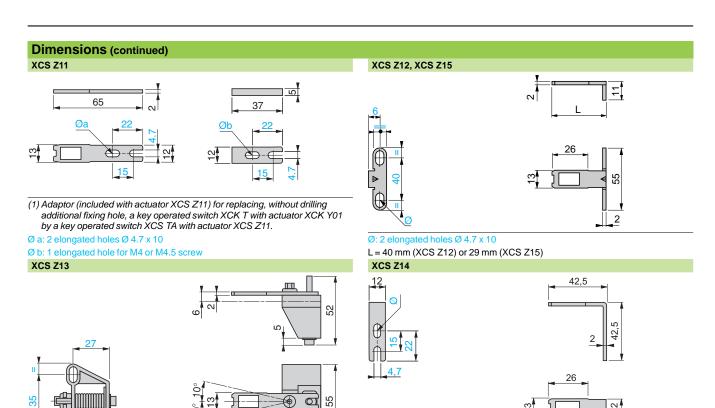
Actuator centring device XCS Z200



- (1) Tapped entry for 1/2" NPT conduit
- (2) Pg 11 threaded shank
- (1) M16 x 1.5 tapped entry
- (2) Pg 11 threaded shank

References: Schemes: page 32935/2 page 32935/5

Plastic, turret head, types XCS PA and XCS TA 1 or 2 cable entries



23

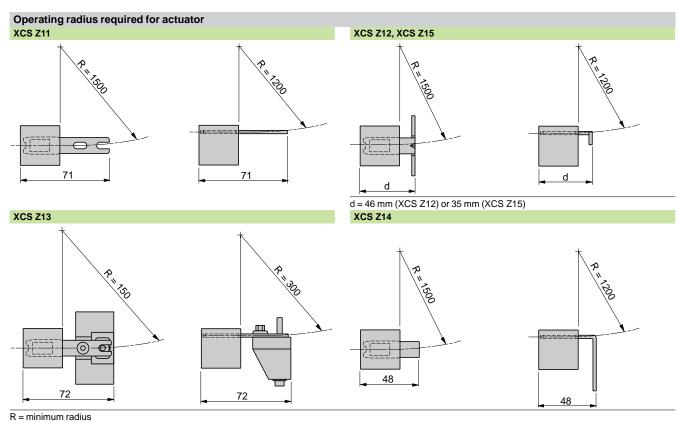
28.5

66

Ø: 2 elongated holes Ø 4.7 x 10

32

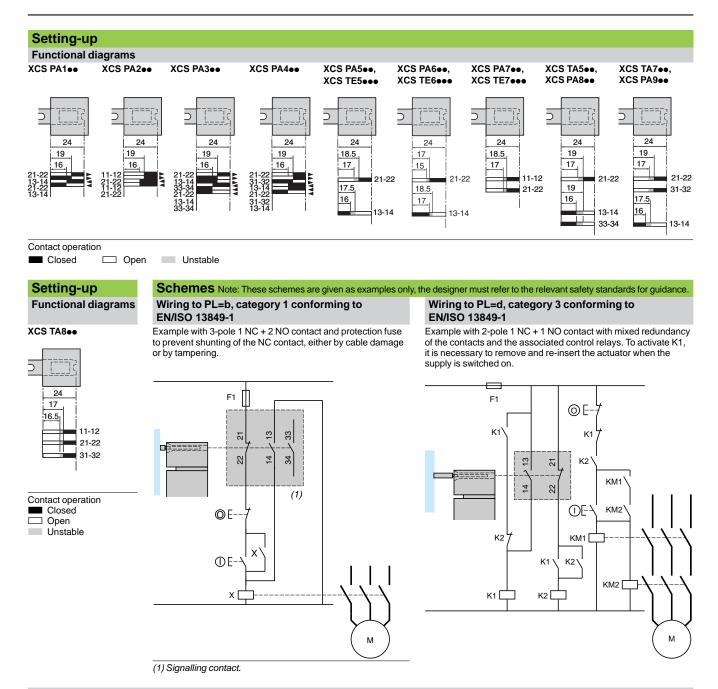




Schemes: page 32935/5

References: page 32935/2

Key operated switches
Plastic, turret head, types XCS PA and XCS TA
1 or 2 cable entries

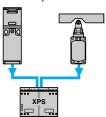


Wiring to PL=e, category 4 conforming to EN/ISO 13849-1 and SIL CL3 conforming to EN/IEC 62061 Wiring method used in conjunction with safety module

(The key operated switch should be used in conjunction with a safety limit switch to give electrical/mechanical redundancy)

Method for machines with quick rundown time (low inertia)

Locking or interlocking device based on the principle of redundancy and self-monitoring. The safety modules ensure these functions.



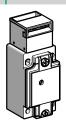
Locking of actuator and operation in positive mode associated with a safety module.

Key operated switches Metal, turret head (1), types XCS A, XCS B and XCS C 1 cable entry

Type of switch

Without locking of actuator

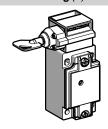
With locking of actuator, manual unlocking (2)



Without



Without



LED indication on opening of NC contacts

1 orange LED 24/48 V ≂ 1 orange LED 110/ 240 V ~

1 orange LED 24/ 48 V ≂ 1 orange LED Without 110/ 240 V \sim

1 orange LED 24/48 V ≂

1 orange LED 110/ 240 V ~

References of switches without actuator (→ NC contact with positive opening operation) with 1 cable entry tapped ISO M20 x 1.5

With a Gabie Gill	, appeare	• <u> </u>								
3-pole 1 NC + 2 NO	33 13 14	XCS A502	XCS A512	XCS A522	XCS B502	XCS B512	XCS B522	XCS C502	XCS C512	XCS C522
break before make, slow break (3)	2 4 8	⊖	⊖	⊖	⊖	⊖	⊖	⊖	⊖	⊖
3-pole	13 31	XCS A702	XCS A712	XCS A722	XCS B702	XCS B712	XCS B722	XCS C702	XCS C712	XCS C722
2 NC + 1 NO break before make, slow break (3)	2 2 2 4	Θ	⊖	Θ	⊖	⊖	⊖	⊖	⊖	⊖
3-pole	두	XCS A802	-	-	XCS B802	-	-	XCS C802	-	-
3 NC slow break (3)	2 8 8	\ominus			⊖			⊖		
Weight (kg)		0.440	0.440	0.440	0.475	0.475	0.475	0.480	0.480	0.480

References of switches without actuator (→ NC contact with positive opening operation) with 1 cable entry tapped Pg 13.5

To order a switch with a Pg 13.5 cable entry, replace the last number (2) by 1 in the selected reference. Example: XCS A502 becomes **XCS A501**.

References of switches without actuator (○ NC contact with positive opening operation) with 1 cable entry tapped 1/2" NPT

To order a switch with a 1/2" NPT cable entry, replace the last number (2) by 3 in the selected reference. Example: XCS A502 becomes XCS A503.

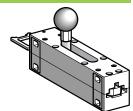
Complementary characterist	tics not shown under general characteristics (page 32921/3)
Actuation speed	Maximum: 0.5 m/s, minimum: 0.01 m/s
Resistance to forcible withdrawal of actuator	XCS B and XCS C: 1500 N
Mechanical durability	XCS A: > 1 million operating cycles XCS B and XCS C: 0.6 million operating cycles
Maximum operating rate	For maximum durability: 600 operating cycles per hour
Minimum force for extraction of actuator	≥20 N
Cable entry	XCS A, XCS B, XCS C: 1 cable entry Entry tapped ISO M20 x 1.5, clamping capacity 7 to 13 mm
Materials	Body: Zamak. Head: Zamak. Safety screws: 5-lobe torque. Protective plate: steel.

References of actuators









Description	Straight actuator	Actuator with wide fixing	Pivoting actuator	Latch for sliding doors
For key operated switches XCS A, B, C, E	XCS Z01	XCS Z02	XCS Z03	XCS Z05
Weight (kg)	0.020	0.020	0.095	0.600

⁽¹⁾ Head adjustable in 90° steps throughout 360°. Blanking plug for operating head slot included with switch.

Dimensions: page 32923/3

Schemes: page 32923/5

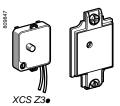
⁽²⁾ Unlocking by pushbutton for XCS Beee and by key operated lock for XCS Ceee (2 keys included with switch).
(3) Schematic diagrams shown represent the contact states whilst the actuator is inserted in the head of the switch.

Other versions: please consult our Customer Care Centre.

Key operated switches

Metal, turret head, types XCS A, XCS B and XCS C
1 cable entry

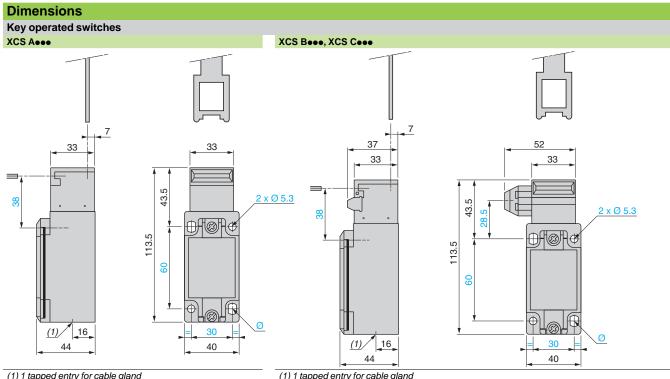
Separate components



Description	For use with	Supply voltage	Reference	Weight kg
1 orange LED indicator module	XCS A XCS B	\sim or 24/48 V $\overline{\dots}$	XCS Z31	0.040
with cover, seal and 2 fixing screws	XCS C	110/240 V ∼	XCS Z32	0.040

Description	For use with	Unit reference	Weight kg
Blanking plugs for operating head slot (Sold in lots of 10)	XCS A, XCS B, XCS C	XCS Z27	0.050
Keys for interlock "forced opening" device (Sold in lots of 10)	XCS B, XCS C	XCS Z25	0.100
Padlocking device to prevent prevent insertion of actuator, for up to 3 padlocks (padlocks not included)	XCS A, XCS B, XCS C	XCS Z90	0.055



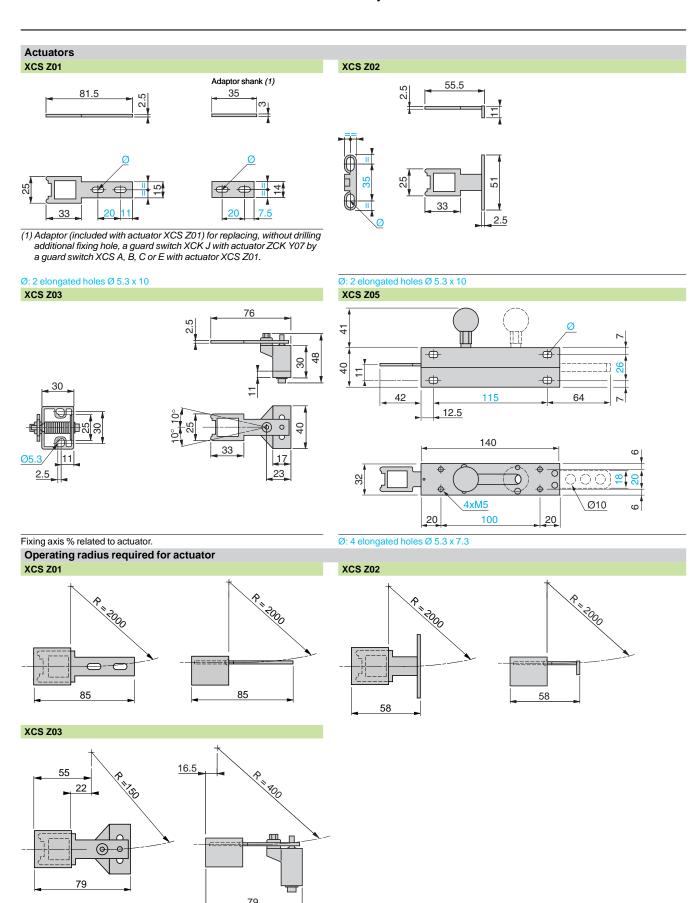


(1) 1 tapped entry for cable gland Ø: 2 elongated holes Ø 5.3 x 7.3

(1) 1 tapped entry for cable gland Ø: 2 elongated holes Ø 5.3 x 7.3

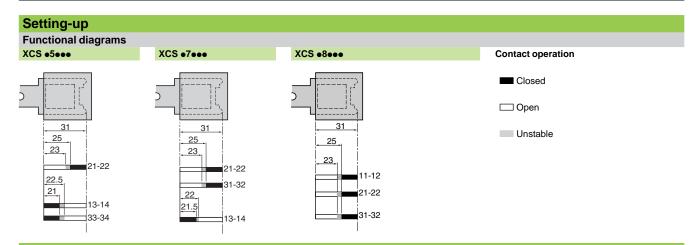
Metal, turret head, types XCS A, XCS B and XCS C 1 cable entry

32923-EN_Ver11.0



R = minimum radius

Key operated switches Metal, turret head, types XCS A, XCS B and XCS C 1 cable entry



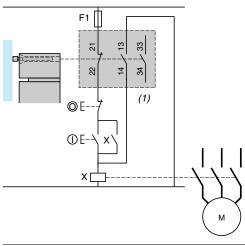
Schemes Note: These schemes are given as examples only, the designer must refer to the relevant safety standards for guidance.

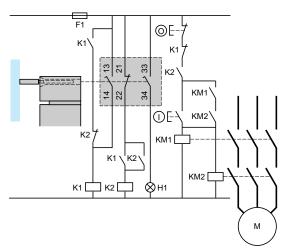
Wiring up to PL=b, category 1 conforming to EN/SO 13849-1

Example with 3-pole 1 NC + 2 NO contact and protection fuse to prevent shunting of the NC contact, either by cable damage or by tampering.

Wiring up to PL=d, category 3 conforming to EN/ISO 13849-1

Example with 3-pole 1 NC + 2 NO contact with mixed redundancy of the contacts and the associated control relays. To activate K1, it is necessary to remove and re-insert the actuator when the supply is switched on.





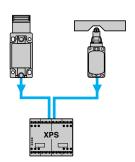
(1) Signalling contact

H1: "actuator not inserted" indicator

Wiring to PL=e, category 4 conforming to EN/ISO 13849-1 and SIL CL3 conforming to EN/IEC 62061. Wiring method used in conjunction with Preventa safety module. (The key operated switch should be used in conjunction with a safety limit switch to give electrical/mechanical redundancy).

Method for machines with quick rundown time (low inertia)

Locking device based on the principle of redundancy and self-monitoring. The safety modules ensure these functions.



Locking of actuator and operation in positive mode associated with a safety module.

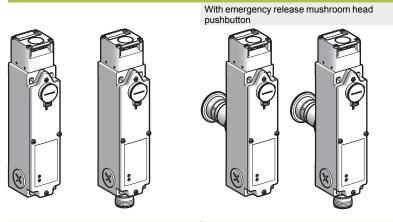
References: page 32923/2 Dimensions: page 32923/3

Safety detection solutions Safety interlock switches

Safety interlock switches by actuator, with solenoid, turret head Metal, type XCS LF Plastic, type XCS LE

Metal, type XCS LF

Safety interlock switches operating by actuator

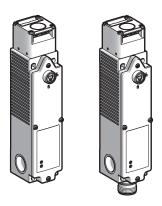


Pages 32939/4 and 32939/5

Pages 32939/6 and 32939/7

Plastic, type XCS LE

Safety interlock switches operating by actuator



Pages 32939/8 and 32939/9

Environment charac	teristics				
Guard switch type		XCS LF (metal)	XCS LE (plastic)		
Conformity to standards	Products	EN/IEC 60947-5-1, EN/ISO 13849-1, EN/IEC	62061, UL 508, CSA C22-2 n° 14		
	Machine assemblies	EN/IEC 60204-1, EN/ISO 14119, EN/ISO 1210	00		
Product certifications		UL (1), CSA, TÜV (pending)			
Maximum safety level (2)		PL=e, category 4 conforming to EN/ISO 13849	9-1 and SIL CL3 conforming to EN/IEC 62061		
Reliability data B _{10d}		5 500 000 (value given for a service life of 20 years, limited by mechanical or contact wear)			
Protective treatment		Standard version: "TC"			
Ambient air temperature For operation		- 25+ 60°C			
	For storage	- 40+ 70°C			
Vibration resistance		5 gn (10500 Hz) conforming to EN/IEC 60068-2-6			
Shock resistance		10 gn (duration 11 ms) conforming to EN/IEC 6	60068-2-27		
Electric shock protection		Class I conforming to EN/IEC 60536	Class II conforming to EN/IEC 60536		
Degree of protection		IP 66 and IP 67 (IP 66 for XCS LF••••4•• and EN/IEC 60529 and EN/IEC 60947-5-1 (3)	for XCS LF••••6••) conforming to		
Connection		3 cable entries tapped M20 x 1.5 for ISO cable gland. Clamping capacity 7 to 13 mm or entri tapped for 1/2" NPT (USAS B2-1) conduit or 1 M23 connector output, 15 + 1 PE or 18 +1 PE 24 V versions.			
Material		Zamak case	Polyamide case		
		Actuators (all types): steel XC60, surface treat	ed		

- (1) The safety function on this device has not been tested by the UL.
- (2) Using an appropriate and correctly connected control system.
- (3) Live parts of these switches are protected against the penetration of dust and water. However, when installing take all necessary precautions to prevent the penetration of solid bodies, or liquids with a high dust content, into the actuator aperture. Not recommended for use in saline atmospheres.

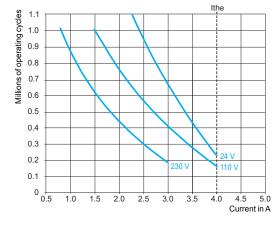
Characteristics

Safety detection solutions Safety interlock switches

Safety interlock switches by actuator, with solenoid, turret head Metal, type XCS LF Plastic, type XCS LE

Rated operational characteristics	AC-15 \sim , C300: Ue = 240 V, le = 0.75 A
	DC-13, R300: Ue = 250 V, le = 0.1 A conforming to EN/IEC 60947-5-1
Conventional thermal current in enclosure	Ithe = 4 A (sum of the thermal currents = < 15 A)
Rated insulation voltage	Ui = 250 V degree of pollution 3 conforming to EN/IEC 60947-1 Ui = 300 V conforming to UL 508, CSA C22-2 no. 14
Rated impulse withstand voltage	Uimp = 4 kV conforming to EN/IEC 60947-1
Positive operation	Contacts with positive opening operation conforming to EN/IEC 60947-5-1
Minimum switching current	10 mA at 20 V
Minimum switching voltage	17 V
Short-circuit protection	4 A cartridge fuse gG (gI) or 6 A fast-blow fuse fuse
Connection	Clamping capacity to spring terminals: 2 x 0.5 mm² stripped flexible cables, 13 mm long 1 x 1.5 mm² flexible or rigid cable
Additional characteristics	
Actuation speed	Maximum: 0.5 m/s, minimum: 0.01 m/s
Resistance to forcible withdrawal of actuator	XCS LF: F max = 3000 N XCS LE: F max = 1400 N
Shock resistance	XCS LE: 1.2 J max. or 4.9 J depending on installation (see page 32920/9) XCS LF: 6.4 J max. or 9.6 J (see page 32920/9)
Mechanical durability	XCS LF and XCS LE: > 1 million operating cycles Emergency release mushroom head pushbutton on XCS LF: 30,000 operating cycles
Maximum operating rate	For maximum durability: 600 operating cycles per hour
Minimum force for extraction of actuator (not locked)	≥ 20 N

Electrical durability conforming to EN/IEC 60947-5-1 Appendix C Utilization categories AC-15 and DC-13 Maximum operating rate: 3600 operating cycles/hour Load factor: 0.5 AC supply 50/60 Hz **∼** m inductive circuit



DC supply ...

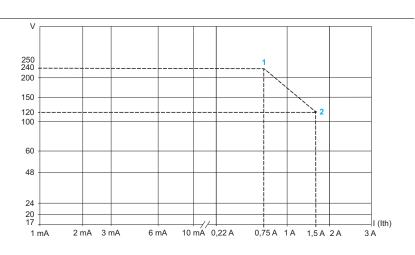
Power broken for 1 million operating cycles

Voltage	٧	24	48	120
m	W	16	28	38

Switching capacity conforming to EN/IEC 60947-5-1 Appendix C Utilization categories AC-15 and DC-13

Switching capacity 1: C300 240 V 0.75 A R300 250 V 0.1 A

Switching capacity 2: C300 120 V 1.5 A R300 125 V 0.22 A



Safety interlock switches by actuator, with solenoid, turret head (1) With 3 cable entries Metal, type XCS LF

Type of switch		Locking on de-	energization an	d unlocking on	energization of	solenoid (2)
LED indication			ird open" indication d closed and locked	" indication		
Power supply for the solenoid and the	he LEDs	24 V == or ∼ (50/6	60 Hz on ∼)			
Type of contact on solenoid		1 NC + 1 NO break before make	2 NC simultaneous	1 NC + 2 NO break before make	2 NC + 1 NO break before make	3 NC simultaneous
References of switches with 3 cable entries tapp		NC contact with	h positive openi	ng operation)		
2-pole contact 1 NC + 1 NO break before make, slow break (3)	22 - 13 - 21 - 13	XCS LF2525312 ⊖	-	-	-	-
2-pole contact 2 NC simultaneous, slow break (3)	22 - 21	XCS LF2725312 ⊖	XCS LF2727312 ⊖	-	-	-
3-pole contact 1 NC + 2 NO break before make, slow break (3)	22 24 45 12 12 12 12 12 12 12 1	-	-	XCS LF3535312 ⊖	-	-
3-pole contact 2 NC + 1 NO break before make, slow break (3)	12 52 51 14 17 13 14 13 14 13 14 13 14 15 15 15 15 15 15 15 15 15 15 15 15 15	-	-	-	XCS LF3737312 ⊖	-
3-pole contact 3 NC simultaneous, slow break (3)	2 2 2 2 2 2 2 2 2 2	-	-	-	-	XCS LF3838312 ⊖
Weight (kg)		1.100	1.100	1.100	1.100	1.100
Solenoid and LED chara	cteristics		·	·		•
Load factor		100%				
Rated operational voltage (4)		24 V == or ∼ or 12	0 V ∼ or 230 V ∼			
Voltage limits	Conforming to EN/IEC 60947-1	- 15%, + 10% of the rated operational voltage (including ripple on)				
Consumption		< 5.4 W at 20°C ar	nd max. voltage			

References of complete switches with solenoid supply voltage of 120 V or 230 V

To order a switch with a solenoid voltage of 110/120 V \sim , replace the 6th number in the selected reference with 3.

Example: XCS LF3535312 becomes XCS LF3535332.

To order a switch with a solenoid voltage of 220/240 V \sim , replace the 6th number in the selected reference with 4. Example: XCS LF3535312 becomes **XCS LF3535342**.

References of switches with locking on energization and unlocking on de-energization

To order a guard switch with locking on energization and unlocking on de-energization of the solenoid, replace the 5th number in the selected reference with 5. Example: XCS LF3535312 becomes XCS LF3535512.

References of complete switches with 3 cable entries tapped for 1/2" NPT conduit

To order a switch with 3 1/2" NPT cable entries, replace the last number in the reference with 3. Example: XCS LF3535312 becomes XCS LF3535313.

References of actuators and separate parts

See page 32939/10.

- (1) Head adjustable in 90° steps throughout 360°. Blanking plug for operating head slot included with switch.
 (2) A key operated lock (2 keys included with switch) enables forced opening of the interlocking mechanism, by authorized personnel, allowing withdrawal of the actuator and subsequent opening of the NC safety contacts.
- (3) Schematic diagrams shown represent the contact states whilst the actuator is inserted in the head of the switch.
- (4) Common power supply for the solenoid and the LEDs.

Other versions: consult your Customer Care Centre.

Presentation:	Characteristics:	Dimensions:	Schemes:	
page 32939/2	page 32939/3	page 32939/13	page 32939/16	

References, characteristics

Safety detection solutions

Safety interlock switches by actuator, with solenoid, turret head (1) Connector output Metal, type XCS LF

Type of switch Locking on de-energization and unlocking on energization of solenoid (2) LED indication Orange LED: "guard open" indication Green LED: "guard closed and locked" signalling Power supply for the solenoid and the LEDs 24 V = or \sim (50/60 Hz on \sim) 1 NC + 1 NO 1 NC + 2 NO 2 NC + 1 NO Type of contact on solenoid 3 NC break before break before break before simultaneous make make make 5 4 9 References of switches without actuator (NC contact with positive opening operation), 16-pin (4 contacts) or 19-pin (6 contacts) M23 connector output 2-pole contact XCS LF252531M2 1 NC + 1 NO break before make, slow break (3) 2-pole contact XCS LF272531M2 XCS LF272731M2 simultaneous, slow break (3) XCS LF353531M3 ⊖ 3-pole contact 1 NC + 2 NO break before make, slow break (3) XCS LF373731M3 ⊖ 3-pole contact 2 NC + 1 NO break before make, slow break (3) XCS LF383831M3 ⊖ 3-pole contact simultaneous, slow break (3) \blacksquare Weight (kg) 1.100 1.100 1.100 1.100 1.100 Solenoid and LED characteristics 100% Load factor Rated operational voltage (4) 24 V = or \sim Voltage limits Conforming to - 15%, + 10% of the rated operational voltage (including ripple on ==)

References of switches with locking on energization and unlocking on de-energization

To order a guard switch with locking on energization and unlocking on de-energization of the solenoid, replace the 5th number in the selected reference with 5. Example: XCS LF272731M2 or XCS LF353531M3 becomes XCS LF272751M2 or XCS LF353551M3.

< 5.4 W at 20°C and max. voltage

References of actuators and separate parts

See page 32939/10.

Consumption

(1) Head adjustable in 90° steps throughout 360°. Blanking plug for operating head slot included with switch.

EN/IEC 60947-1

- (2) A key operated lock (two keys included with switch) enables forced opening of the interlocking mechanism, by authorized personnel, allowing withdrawal of the actuator and subsequent opening of the NC safety contacts.
- (3) Schematic diagrams shown represent the contact states whilst the actuator is inserted in the head of the switch.
- (4) Common power supply for the solenoid and the LEDs.

Note: Due to existing cable connections and to ensure your personal safety, safety screws have been used in front of the product to prevent unauthorized access.

Other versions: consult your Customer Care Centre.

▲: Available 4th quarter 2011.

References. characteristics (continued)

Safety detection solutions

Safety interlock switches by actuator, with solenoid, turret head (1) With 3 cable entries Metal, type XCS LF

Type of switch Locking on de-energization and unlocking on energization of solenoid (2) or in emergency by mushroom head pushbutton (3)



LED indication	Orange LED: "guard open" indication Green LED: "guard closed and locked" indication		
Power supply for the solenoid and the LEDs	24 V == or ∼ (50/60 Hz on ∼)		
Type of contact on solenoid	1 NC + 2 NO break before make □	2 NC + 1 NO break before make	

References of switches without actuator (NC contact with positive opening operation) with trigger action mushroom head pushbutton, diameter 40 mm, "turn to release" reset, with 3 entries tapped ISO M20 x 1.5

3-pole contact 1 NC + 2 NO break before make, slow break (4)	2 4 4 2 2 2 2 2 2 2	XCS LF3535412	-
3-pole contact 2 NC + 1 NO break before make, slow break (4)	13 25 4 13 14 15 15 15 15 15 15 15	-	XCS LF3737412 ⊕ ▲
Weight (kg)		1.220	1.220

Solenoid and LED	characteristics	
Load factor		100%
Rated operational voltage (5)		24 V $=$ or \sim or 120 V \sim or 230 V \sim
Voltage limits	Conforming to EN/IEC 60947-1	- 15%, + 10% of the rated operational voltage (including ripple on)
Consumption		< 5.4 W at 20°C and max. voltage

References of switches with trigger action mushroom head pushbutton, diameter 40 mm, key no. 455 reset

To order a switch with trigger action mushroom head pushbutton, key no. 455 release, diameter 40 mm at the rear of the product, replace the 5th number in the selected reference with 6.

Example: XCS LF3535412 becomes XCS LF3535612.

References of complete switches with solenoid supply voltage of 120 V or 230 V

To order a switch with a solenoid voltage of 110/120 V \sim , replace the 6^{th} number in the selected reference with 3. To order a switch with a solenoid voltage of 220/240 V \sim , replace the 6th number in the selected reference with 4.

References of complete switches with 3 cable entries tapped for 1/2" NPT conduit

To order a switch with 3 1/2" NPT cable entries, replace the last number in the reference with 3. Example: XCS LF3737412 becomes XCS LF3737413.

References of actuators and separate parts

See page 32939/10.

- (1) Head adjustable in 90° steps throughout 360°. Blanking plug for operating head slot included with switch.
- (2) A key operated lock (2 keys included with switch) enables forced opening of the interlocking mechanism, by authorized personnel, allowing withdrawal of the actuator and subsequent opening of the NC safety contacts.
 (3) Trigger action, diameter 40 mm, "turn to release" or "key no. 455" reset type.
- (4) Schematic diagrams shown represent the contact states whilst the actuator is inserted in the head of the switch.
- (5) Common power supply for the solenoid and the LEDs.

Other versions: consult your Customer Care Centre.

▲ : Available 4th quarter 2011.

Presentation:	Characteristics:	Dimensions:	Schemes:	
page 32939/2	page 32939/3	page 32939/13	page 32939/16	

References, characteristics (continued)

Safety detection solutions

Safety interlock switches by actuator, with solenoid, turret head (1) Connector output Metal, type XCS LF

Type of switch Locking on de-energization and unlocking on energization of solenoid (2) or in emergency by mushroom head pushbutton (3)



LED indication	Orange LED: "guard open" indication			
	Green LED: "guard closed and locked" indication	n		
Power supply for the solenoid and the LEDs	24 V == or ∼ (50/60 Hz on ∼)			
Type of contact on solenoid	1 NC + 2 NO break before make	2 NC + 1 NO break before make		
	2 0 0 5 0	0 2 4 - 4 - 7 0 5		

References of switches without actuator (→ NC contact with positive opening operation) with trigger action mushroom head pushbutton, diameter 40 mm, "turn to release" reset, 19-pin M23 connector output (6 contacts)

3-pole contact 1 NC + 2 NO break before make, slow break (4)	2/ 4/ ±/ -/ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\	XCS LF353541M3 ⊕	-
3-pole contact 2 NC + 1 NO break before make, slow break (4)	4 <u> </u>	-	XCS LF353541M3 ⊖ ▲
Weight (kg)		1.220	1.220

Solenoid and LED	O characteristics	
Load factor		100%
Rated operational voltage	(5)	24 V or ∼
Voltage limits	Conforming to EN/IEC 60947-1	- 15%, + 10% of the rated operational voltage (including ripple on)
Consumption		< 5.4 W at 20°C and max. voltage

References of switches with trigger action mushroom head pushbutton, diameter 40 mm, key no. 455 reset

To order a switch with trigger action mushroom head pushbutton, unlocked by key no. 455, diameter 40 mm at the rear of the product, replace the 5th number in the selected reference with 6.

Example: XCS LF353541M3 becomes XCS LF353561M3

References of actuators and separate parts

See page 32939/10.

- $(1) \textit{Head adjustable in } 90^{\circ} \textit{steps throughout } 360^{\circ}. \textit{Blanking plug for operating head slot included with switch.}$
- (2) A key-operated lock (two keys included with switch) enables forced opening of the interlocking mechanism, by authorized personnel, allowing withdrawal of the actuator and subsequent opening of the NC safety contacts.
- (3) Trigger action, diameter 40 mm, "turn to release" or "key no. 455" reset type.
- (4) Schematic diagrams shown represent the contact states whilst the actuator is inserted in the head of the switch.
- (5) Common power supply for the solenoid and the LEDs.

Note: Due to existing cable connections and to ensure your personal safety, safety screws have been used in front of the product to prevent unauthorized access.

Other versions: consult your Customer Care Centre.

▲ : Available 4th quarter 2011.

Safety detection solutions

Safety interlock switches by actuator, with solenoid, turret head (1) With 3 cable entries, double insulated Plastic, type XCS LE

Type of switch		Locking on de-	energization an	d unlocking on	energization of	solenoid (2)
LED indication			rd open" indication d closed and locked	I" indication		
Power supply for the solenoid and th	ne LEDs	24 V == or ∼ (50/6				
Type of contact on solenoid		1 NO + 1 NC break before make	2 NC simultaneous	1 NC + 2 NO break before make	2 NC + 1 NO break before make	3 NC simultaneous
		24 	45 47 47 47 47 47 47 47	62 64 7 7 7 84 7 84 7 85 84 85 85 85 85 85 85 85 85 85 85 85 85 85	42 42 52 52 54 64 54 64 56 56	42 41 62 62 62 63 64 64
References of switches with 3 cable entries tappe	•	NC contact with	h positive openi	ng operation)		
2-pole contact 1 NC + 1 NO break before make, slow break (3)	22 4 22 13	XCS LE2525312 ⊖	-	-	-	-
2-pole contact 2 NC simultaneous, slow break (3)	22	-	XCS LE2727312 ⊖	-	-	-
3-pole contact 1 NC + 2 NO break before make, slow break (3)	22 24 24 13 33 13 12 12 12 13	-	-	XCS LE3535312 ⊖	-	-
3-pole contact 2 NC + 1 NO break before make, slow break (3)	22 21 21 4 7 13	-	-	-	XCS LE3737312 ⊖	-
3-pole contact 3 NC simultaneous, slow break (3)	32 22 21 33 33 34 34 34 34 34 34 34 34 34 34 34	-	_	-	-	XCS LE3838312 ⊖
Weight (kg)		0.530	0.530	0.530	0.530	0.530
Solenoid and LED charac	cteristics			I	I	
Load factor		100%				
Rated operational voltage (4)		24 V == or ∼ or 12	0 V \sim or 230 V \sim			
Voltage limits	Conforming to EN/IEC 60947-1	- 15%, + 10% of th	e rated operational	voltage (including r	ipple on)	
Consumption		< 5.4 W at 20°C ar	nd max. voltage			
References of complete	switches with sole	noid supply	voltage of 12	0 V or 230 V		

References of complete switches with solenoid supply voltage of 120 V or 230 V

To order a switch with a solenoid voltage of 110/120 V \sim , replace the 6th number in the selected reference with 3. Example: XCS LE2525312 becomes **XCS LE2525332**. To order a switch with a solenoid voltage of 220/240 V \sim , replace the 6th number in the selected reference with 4. Example: XCS LE2525312 becomes **XCS LE2525342**.

References of switches with locking on energization and unlocking on de-energization

To order a guard switch with locking on energization and unlocking on de-energization of the solenoid, replace the 5th number in the selected reference with 5. Example: XCS LE2525312 becomes XCS LE2525512

References of complete switches with three cable entries tapped for 1/2" NPT conduit

To order a switch with 1/2" NPT cable entries, replace the last number in the reference with 3. Example: XCS LE2727312 becomes XCS LE2727313.

References of actuators and separate parts

See page 32939/10.

- (1) Head adjustable in 90° steps throughout 360°. Blanking plug for operating head slot included with switch.
- (2) A special tool included with the guard switch enables forced opening of the interlocking mechanism, by authorized personnel, allowing withdrawal of the actuator and subsequent opening of the NC safety contacts.
- (3) Schematic diagrams shown represent the contact states whilst the actuator is inserted in the head of the switch.

(4) Common power supply for the solenoid and the LEDs.

Other versions: consult your Customer Care Centre.

Presentation:	Characteristics:	Dimensions:	Schemes:	
page 32939/2	page 32939/3	page 32939/13	page 32939/16	

References, characteristics

Safety detection solutions

Safety interlock switches by actuator, with solenoid, turret head (1) Connector output, double insulated Plastic, type XCS LE

Type of switch

Locking on de-energization and unlocking on energization of solenoid (2)



LED indication		Orange LED: "guard open" indication Green LED: "guard closed and locked" indication				
Power supply for the solenoid and t	he LEDs	24 V or ∼ (50/6	60 Hz on ∼)			
Type of contact on solenoid		1 NO + 1 NC break before make	2 NC simultaneous	1 NC + 2 NO break before make	2 NC + 1 NO break before make	3 NC simultaneous
		8 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	8 0 1 - 0 1 - 0 6 1	4 0 0 5 7 - 7 0	8 0 1 2 0 4 6 1 1 1 1 1	7 - 41 - 13 - 13 - 13 - 13 - 13 - 13 - 13
References of switches	•			ng operation),		
16-pin (4 contacts) or 19						
2-pole contact 1 NC + 1 NO break before make, slow break (3)	<u>τ</u>	XCS LE252531M2 ⊖ ▲	-	-	-	-
2-pole contact 2 NC simultaneous, slow break (3)	4 1	-	XCS LE272731M2 ⊖ ▲	-	-	-
3-pole contact 1 NC + 2 NO break before make, slow break (3)	2/ 4/ E - \oldsymbol{\oldsymbol	-	-	XCS LE353531M3 ⊖ ▲	-	-
3-pole contact 2 NC + 1 NO break before make, slow break (3)	4 <u>† 2</u> 8	-	-	-	XCS LE373731M3 ⊖ ▲	-
3-pole contact 3 NC simultaneous, slow break (3)	2/ 4/ E/ E/ &/ &/	-	-	-	-	XCS LE383831M3
Weight (kg)		0.530	0.530	0.530	0.530	0.530
Solenoid and LED chara	cteristics					1
Load factor		100%				
Rated operational voltage (4)		24 V or ∼				
Voltage limits	Conforming to EN/IEC 60947-1	- 15%, + 10% of th	e rated operational	voltage (including r	ipple on ===)	
Consumption		< 5.4 W at 20°C a	nd max. voltage			

References of switches with locking on energization and unlocking on de-energization

To order a guard switch with locking on energization and unlocking on de-energization of the solenoid, replace the 5th number in the selected reference with 5. Example: XCS LE252531M2 becomes XCS LE252551M2 and XCS LE353531M3 becomes XCS LE353551M3

References of actuators and separate parts

See page 32939/10.

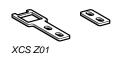
- (1) Head adjustable in 90° steps throughout 360°. Blanking plug for operating head slot included with switch.
 (2) A special tool included with the guard switch enables forced opening of the interlocking mechanism, by authorized personnel, allowing withdrawal of the actuator and subsequent opening of the NC safety contacts.
- (3) Schematic diagrams shown represent the contact states whilst the actuator is inserted in the head of the switch.
- (4) Common power supply for the solenoid and the LEDs.

Note: Due to existing cable connections and to ensure your personal safety, safety screws have been used in front of the product to prevent unauthorized access.

Other versions: consult your Customer Care Centre.

▲: Available 4th quarter 2011.

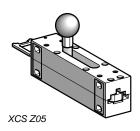
Safety detection solutions
Safety interlock switches
by actuator, with solenoid, turret head
Metal, type XCS LF and plastic, type XCS LE Accessories





XCS Z02





Actuator reference	S		
Description	Used for	Unit reference	Weight kg
Straight actuator	XCS LF, XCS LE	XCS Z01	0.020
Actuator with wide fixing	XCS LF, XCS LE	XCS Z02	0.020
Pivoting actuator	XCS LF, XCS LE	XCS Z03	0.095
Latch for sliding doors	XCS LF, XCS LE	XCS Z05	0.600



Separate parts			
Description	Used for	Unit reference	Weight kg
Blanking plugs for operating head slot (Sold in lots of 10)	XCS LF, XCS LE	XCS Z30	0.050
Keys for interlock "forced opening" device (Sold in lots of 10)	XCS LF	XCS Z25	0.100
Padlocking device to prevent insertion of actuator, for up to 3 padlocks (padlocks not included)	XCS LF, XCS LE	XCS Z90	0.055
Tool for forced opening of interlocking device (Sold in lots of 10)	XCS LE	XCS Z100	0.050
Cover safety kit consisting of: 4 x 5-lobe torque screws 1 magnetic screwdriver bit	XCS LF	XCS Z210	0.020
- I magnetic solewanien bit	XCS LE	XCS Z211	0.020

References (continued), characteristics, dimensions, connections

Safety detection solutions Safety interlock switches

Safety interlock switches
by actuator, with solenoid, turret head
Metal, type XCS LF and plastic, type XCS LE
Cabling accessories

MOO	
M23 connectors	
Characteristics	
Type of connection	Screw threaded (metal clamping ring)
Degree of protection	IP 65 (with clamping ring correctly tightened)
Ambient air temperature	- 25+ 110°C
Connection	To solder terminals. Maximum conductor c.s.a.: 1 mm² Cable gland: no. 13 metal (Pg 13.5) Clamping capacity: 9 to 12 mm
LED signalling	-
Nominal voltage	60 V ∼, 75 V
Nominal current	7.5 A
Insulation resistance	> 10 ¹² Ω
Contact resistance	≤5 mΩ

References

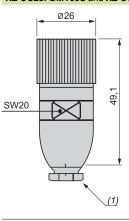




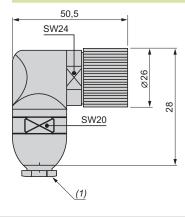
Type of connector	Number of contacts	Cable connection	Туре	Reference	Weight kg
Female, M23	16	To solder terminals	Straight	XZ CC23FDM160S	0.080
			Elbowed	XZ CC23FCM160S	0.150
	19	To solder terminals	Straight	XZ CC23FDM190S	0.080
			Elbowed	XZ CC23FCM190S	0.150

Dimensions

XZ CC23FDM160S and XZ CC23FDM190S



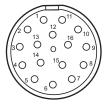
XZ CC23FCM160S and XZ CC23FCM190S



(1) No. 13 metal cable gland

Connections

XZ CC23FeM160S



XZ CC23FeM190S



References (continued), characteristics, dimensions, connections

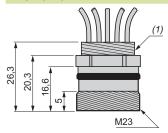
Safety detection solutions Safety interlock switches

Safety interlock switches by actuator, with solenoid, turret head Metal, type XCS LF and plastic, type XCS LE Cabling accessories

Connector adaptors							
Characteristics							
Type of connection		Screw threa	ded				
Degree of protection		IP 67					
Ambient air temperature		- 25+ 80°0	3				
Connection		Via 100 mm	long wires				
	Conductor c.s.a.	XZC E03M2 XZC E03M2					
LED signalling		-					
Max. voltage		36 V ∼ ==					
Nominal current		4 A					
Insulation resistance		> 10 ⁹ Ω					
Contact resistance		≤5 m Ω					
References							
		Adaptor type	Number of contacts	Size of tapped hole	Number of wires	Reference	Weight kg
		M23, male	5	M20 x 1.5	16	XZC E03M2316M	0.100
		Metal body			19	XZC E03M2319M	0.100

Dimensions

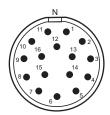
XZ CE20M231●M



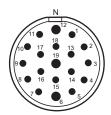
(1) M20 x 1.5

Connections

XZ CE 20M2316M



XZ CE20M2319M



Safety detection solutions Safety interlock switches

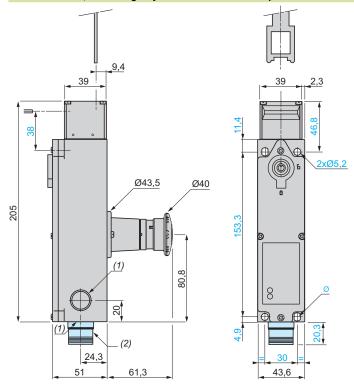
Safety interlock switches by actuator, with solenoid, turret head Metal, type XCS LF Plastic, type XCS LE

Dimensions

Metal safety interlock switches

43,6

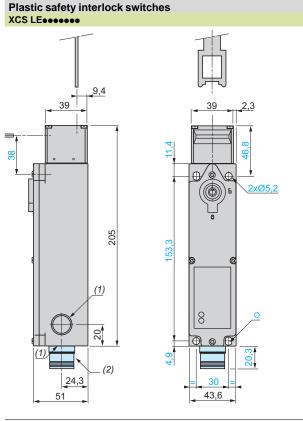
XCS LF••••••, with emergency release mushroom head pushbutton



Ø: 2 elongated holes Ø 7 x 5.2

51

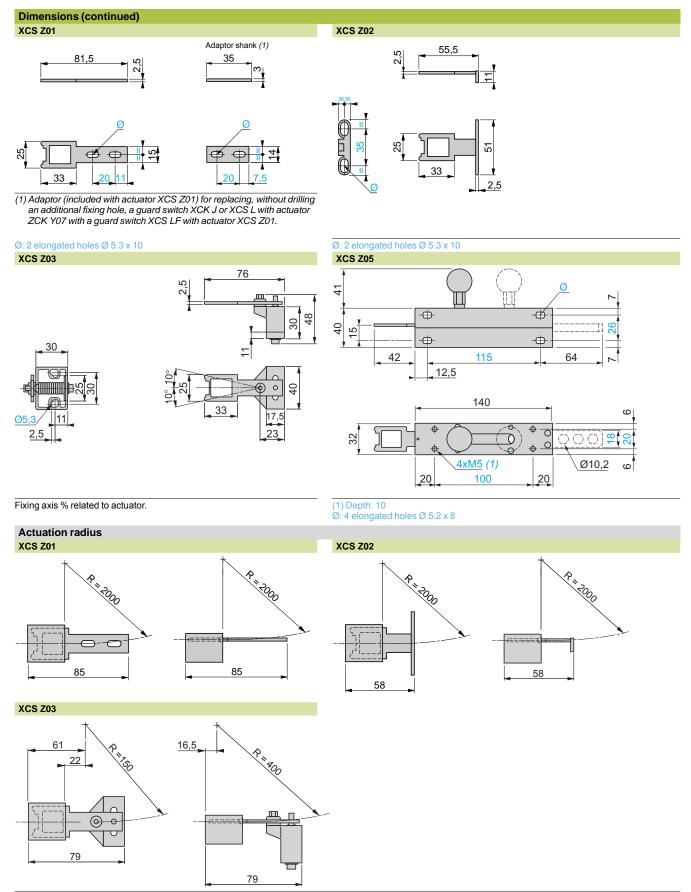
Ø: 2 elongated holes Ø 7 x 5.2



- Ø: 2 elongated holes Ø 6.2 x 4.2
- (1) 3 tapped entries for cable gland.
- (2) Version with M23 connector.

Safety detection solutions Safety interlock switches

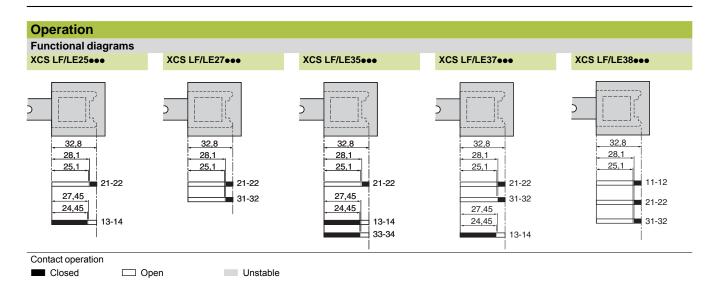
Safety interlock switches by actuator, with solenoid, turret head Metal, type XCS LF Plastic, type XCS LE



Operation, connections

Safety detection solutions Safety interlock switches

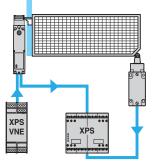
Safety interlock switches by actuator, with solenoid, turret head Metal, type XCS LF Plastic, type XCS LE



Connections

Wiring to PL=e, category 4 conforming to EN/ISO 13849-1 and SIL CL3 conforming to EN/IEC 62061. Wiring method used in conjunction with Preventa safety module (the safety interlock switch should be used in conjunction with a safety limit switch to achieve electrical/mechanical redundancy).

Method for machines with long rundown time (high inertia)



Interlocking device for actuator fitted on guard and zero speed detection.

Safety detection solutions Safety interlock switches

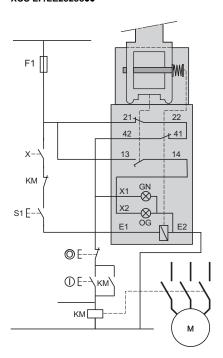
Safety interlock switches by actuator, with solenoid, turret head Metal, type XCS LF Plastic, type XCS LE

Wiring up to PL=b, category 1 conforming to EN/ISO 13849-1

Wiring example with protection fuse to prevent shunting of the NC contact, either by cable damage or by tampering.

1 NC + 1 NO locking on de-energization and 1 NC + 1 NO auxiliary contacts

XCS LF/LE25253●●



E1-E2: Solenoid supply
13-14: Safety contact, available for redundancy
13-X2/E2: LED (orange): actuator withdrawn
41-X1/E2: LED (green): actuator inserted and locked
22-41: Safety pre-wiring obligatory

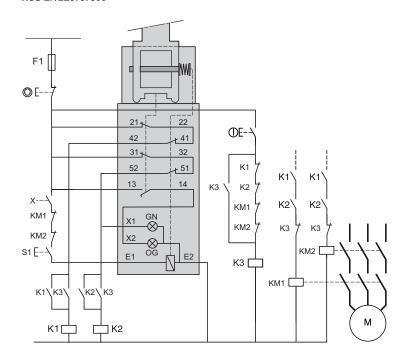
22-41 : Safety pre-wiring ob S1: Manual release button X: Unlocking signal

Wiring up to PL=d, category 3 conforming to EN/ISO 13849-1

Wiring example with redundancy for the guard switch contacts, without monitoring or redundancy in the power circuit.

2 NC + 1 NO locking on de-energization and 2 NC + 1 NO auxiliary contacts

XCS LF/LE37373●●



E1-E2: Solenoid supply

21-22 and 31-32: Safety contacts, available for redundancy

13-X2/E2: LED (orange): actuator withdrawn

51-X1/E2: LED (green): actuator inserted and locked

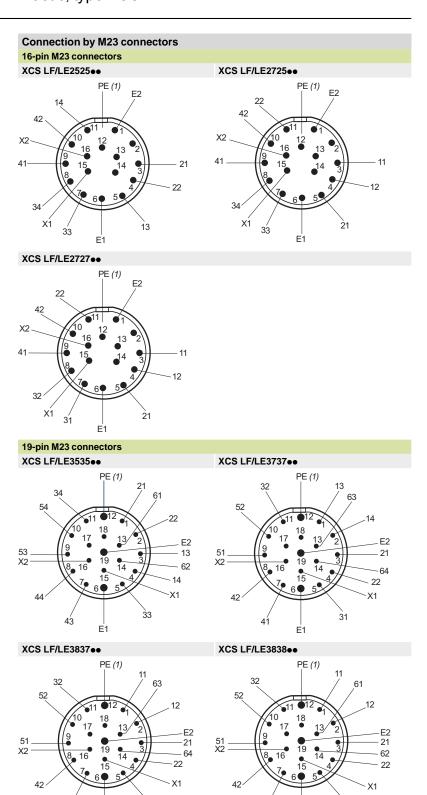
22-41 and 32-51: Safety pre-wiring obligatory

S1: Manual release button

X: Zero speed or unlocking signal

Safety detection solutions Safety interlock switches

Safety interlock switches by actuator, with solenoid, turret head Metal, type XCS LF Plastic, type XCS LE



(1) PE connection for XCS LF only.

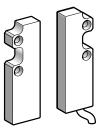
Plastic

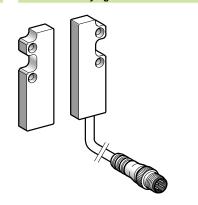
XCS DMC

Rectangular, compact: 51 x 16 x 7

Pre-cabled connection

Connector on flying lead connection





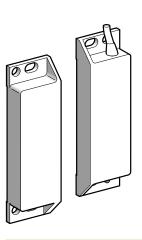
Page 32942/2

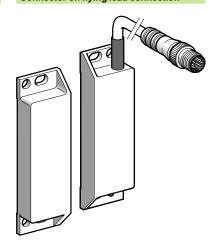
XCS DMP

Rectangular, standard: 88 x 25 x 13

Pre-cabled connection

Connector on flying lead connection





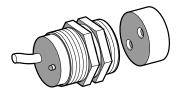
Page 32942/2

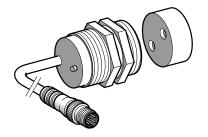
XCS DMR

Cylindrical, diameter: 30, length: 38.5

Pre-cabled connection

Connector on flying lead connection





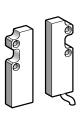
Page 32942/2

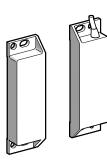
Maximum safety level (1) Reliability data B _{10d} Protective treatment Ambient air temperature Vibration resistance Shock resistance Sensitivity to magnetic fields Electric shock protection Degree of protection Materials Contact block characteris: Rated operational characteristics	Products Machine assemblies For operation For storage	°C	EN/IEC 60947-5-1, UL 508, CSA C22-2 n° 14 EN/IEC 60204-1, EN/ISO 14119 UL, CSA, BG PL=e, category 4 conforming to EN/ISO 13849-1 and SIL 3 conforming to EN/IEC 61508 50 000 000 (value given for a service life of 20 years, limited by mechanical or contact wear) Standard version: "TH" - 25+ 85 - 40+ 85
Shock resistance Sensitivity to magnetic fields Electric shock protection Degree of protection Materials Contact block characteristics	For operation		UL, CSA, BG PL=e, category 4 conforming to EN/ISO 13849-1 and SIL 3 conforming to EN/IEC 61508 50 000 000 (value given for a service life of 20 years, limited by mechanical or contact wear) Standard version: "TH" -25+85
Maximum safety level (1) Reliability data B _{10d} Protective treatment Ambient air temperature Vibration resistance Shock resistance Sensitivity to magnetic fields Electric shock protection Degree of protection Materials Contact block characteris: Rated operational characteristics	· 		PL=e, category 4 conforming to EN/ISO 13849-1 and SIL 3 conforming to EN/IEC 61508 50 000 000 (value given for a service life of 20 years, limited by mechanical or contact wear) Standard version: "TH" -25+85
Reliability data B _{10d} Protective treatment Ambient air temperature Vibration resistance Shock resistance Sensitivity to magnetic fields Electric shock protection Degree of protection Materials Contact block characteristics	· 		EN/IEC 61508 50 000 000 (value given for a service life of 20 years, limited by mechanical or contac wear) Standard version: "TH" - 25+ 85
Protective treatment Ambient air temperature Vibration resistance Shock resistance Sensitivity to magnetic fields Electric shock protection Degree of protection Materials Contact block characteristics	· 		wear) Standard version: "TH" - 25+ 85
Ambient air temperature Vibration resistance Shock resistance Sensitivity to magnetic fields Electric shock protection Degree of protection Materials Contact block characteris: Rated operational characteristics	· 		Standard version: "TH" - 25+ 85
Vibration resistance Shock resistance Sensitivity to magnetic fields Electric shock protection Degree of protection Materials Contact block characteristics	· 		
Shock resistance Sensitivity to magnetic fields Electric shock protection Degree of protection Materials Contact block characteristics	For storage	°C	- 40+ 85
Materials Contact block characteristics Rated operational characteristics			
Sensitivity to magnetic fields Electric shock protection Degree of protection Materials Contact block characteris: Rated operational characteristics			10 gn (10150 Hz) conforming to EN/IEC 60068-2-6
Electric shock protection Degree of protection Materials Contact block characteristics			30 gn (11 ms) conforming to EN/IEC 60068-2-7
Degree of protection Materials Contact block characteristics Rated operational characteristics		mT	≥ 0.3
Materials Contact block characteristics Rated operational characteristics			Class II conforming to EN/IEC 60536
Contact block characteristics	Conforming to IEC 60529		IP 66 and IP 67 for coded magnetic switches with pre-cabled connection IP 67 for coded magnetic switches with connector on flying lead connection
Rated operational characteristics			Thermoplastic case (PBT) PVC cable (ROHS)
<u> </u>	tics		
Pated insulation voltage (Lii)			Ue: 24 V, le: 100 mA max.
Rated insulation voltage (Ui)			Ui: 100 V ==
Rated impulse withstand voltage (U im	np)	kV	2.5 conforming to EN/IEC 60947-5-1
Resistance across terminals	Contact with LED	Ω	57
	Contact without LED	Ω	10
Protection (not using safety module)			External cartridge fuse: 500 mA gG (gI)
Connection XCS DI	MC 2 contact model		Pre-cabled, 4 x 0.25 mm ² , length: 2, 5 or 10 m depending on model or M8 connector on 0.15 m flying lead
XCS DI	MP 2 contact model		Pre-cabled, 4 x 0.25 mm², length: 2, 5 or 10 m depending on model or M12 connector on 0.15 m flying lead
	3 contact model		Pre-cabled, 6 x 0.25 mm², length: 2, 5 or 10 m depending on model or M12 connector on 0.15 m flying lead
XCS DI	MR 2 contact model		Pre-cabled, 4 x 0.25 mm², length: 2, 5 or 10 m depending on model
Contact material			or M12 connector on 0.15 m flying lead Rhodium
Electrical durability			1.2 million operating cycles
Maximum switching voltage		٧	100
Switching capacity	Contact with LED	mA	5100
	Contact without LED	mA	0.1100
Insulation resistance		MΩ	1000
Maximum breaking capacity	Contact with LED	VA	3
		VA	
Maximum switching frequency	Contact without LED		10

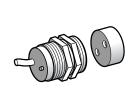
⁽¹⁾ Using an appropriate and correctly connected control system.

Plastic, pre-cabled

Туре	Rectangular		Cylindrical
	Compact	Standard	Diameter 30
	51 x 16 x 7	88 x 25 x 13	Length 38.5







References of switches (1) \(\triangle \) must be used in conjunction with safety modules XPS (see page 32942/8)

Contact states shown are with the magnet positioned in front of the switch

2-pole 1 NC + 1 NO (staggered)	[◆	XCS DMC5902	XCS DMP5902	XCS DMR5902
2-pole 2 NC (2) (staggered)	[◆	XCS DMC7902	XCS DMP7902	XCS DMR7902
3-pole 1 NC + 2 NO (1 NO staggered)	[_	XCS DMP5002	-
3-pole 2 NC + 1 NO <i>(2)</i> (1 NC staggered)		_	XCS DMP7002	_
2-pole 1 NC + 1 NO (staggered)		XCS DMC5912	XCS DMP5912	XCS DMR5912
2-pole 2 NC (2) (staggered)	[\$\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	XCS DMC7912	-	XCS DMR7912
3-pole 1 NC + 2 NO (1 NO staggered)		-	XCS DMP5012	-
3-pole 2 NC + 1 NO (2) (1 NC staggered)		-	XCS DMP7012	-
Weight (kg)		0.101	0.180	0.146

(1) Magnetic switch + coded magnet (XCS ZC••••).

Switch pre-cabled with 2 m long cable. For other cable lengths, replace the last number of the reference (2) by 5 for a 5 m long cable or by 10 for a 10 m long cable.

Example: rectangular, compact switch with 1 NC + 1 NO contacts and 10 m cable becomes XCS DMC59010.

(2) Only to be wired in conjunction with an XPS AF module (see page 32942/9).

Complementary characteristics not shown under general characteristics (page 32941/3)				
Operating zone		Sao: 8 mm Sar: 20 mm	Sao: 8 mm Sar: 20 mm	
Approach directions	3 directions	3 directions	1 direction	

Accessories (page 32942/4)

Plastic, connector on flying lead

Туре	Rectangular		Cylindrical
	Compact	Standard	Diameter 30
	51 x 16 x 7	88 x 25 x 13	Length 38.5
	M8 connector	M12 connector	M12 connector

References of switches (1) A must be used in conjunction with safety modules XPS (see page 32942/8)

Contact states shown are with the magnet positioned in front of the switch

2-pole 1 NC + 1 NO (staggered)	[XCS DMC590L01M8	XCS DMP590L01M12	XCS DMR590L01M12
2-pole 2 NC <i>(2)</i> (staggered)	[XCS DMC790L01M8	XCS DMP790L01M12	XCS DMR790L01M12
3-pole 1 NC + 2 NO (1 NO staggered)	[4 6 6 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7	-	XCS DMP500L01M12	-
3-pole 2 NC + 1 NO <i>(2)</i> (1 NC staggered)	[-	XCS DMP700L01M12	-
2-pole 1 NC + 1 NO (staggered)		XCS DMC591L01M8	XCS DMP591L01M12	XCS DMR591L01M12
2-pole 2 NC <i>(2)</i> (staggered)	[XCS DMC791L01M8	XCS DMP791L01M12	XCS DMR791L01M12
3-pole 1 NC + 2 NO (NO staggered)	[-	XCS DMP501L01M12	-
3-pole 2 NC + 1 NO (2) (NC staggered)		-	XCS DMP701L01M12	-
Weight (kg)		0.101	0.180	0.146

⁽¹⁾ Magnetic switch + coded magnet (XCS ZC••••).
(2) Only to be wired in conjunction with an XPS AF module (see page 32942/9).

Complementary characteristics not shown under general characteristics (page 32941/3)				
Operating zone	Sao: 5 mm Sar: 15 mm		Sao: 8 mm Sar: 20 mm	
Approach directions	3 directions	3 directions	1 direction	

Accessories (page 32942/4)

Safety detection solutions Coded magnetic switches Accessories

Accessories for coded magnetic switches	XCS DMC•••2 XCS DMC•••L	XCS DMP•••2 XCS DMP•••L	XCS DMR•••2 XCS DMR•••L
Fixing clamp	_		XSZ B130
Weight (kg)	-		0.080
Additional coded magnet	XCS ZC1	XCS ZP1	XCS ZR1
Veight (kg)	0.009	0.050	0.018
Non-magnetic shims	XCS ZCC (lot of 2)	XCS ZCP (lot of 2)	XCS ZCR
Weight (kg)	0.008	0.012	0.002

Pre-wired female connectors for		tor version switches		
Pre-wired connector characteri	Stics			
Pre-wired connector type		XZ CP0941Le, XZ CP1041Le	XZ CP29P11L●	XZ CP1141Le, XZ CP1241Le
.,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		Screw threaded (metal clamping ring)	Screw threaded (metal clamping ring)	Screw threaded (metal clamping ring)
Number of contacts		4	8	4
Degree of protection	•	IP 67 (with clamping ring correctly tightened)		
Ambient air temperature Static		- 35+ 90°C	- 35+ 90°C	- 35+ 90°C
	Dynamic	- 5+ 90°C	-5+90°C	-5+90°C
Cabling		Ø 5.2 mm cable, wire c.s.a.: 4 x 0.34 mm ²	Ø 5.2 mm cable, wire c.s.a.: 8 x 0.25 mm ²	Ø 5.2 mm cable, wire c.s.a.: 4 x 0.34 mm ²
LED signalling		-	-	-
Nominal voltage	Nominal voltage		30 V ∼, 36 V 	250 V ∼, 300 V
Nominal current		4 A	2 A	4 A
Insulation resistance		> 10 ⁹ Ω	> 10 ⁹ Ω	> 10 ⁹ Ω
Contact resistance		≤ 5 mΩ	≤ 5 mΩ	≤ 5 mΩ

References of pre-	wired connectors							
		Type of connector	Number of pins	For use with	Туре	Cable length m	Reference	Weight kg
23627	203626	Female, M8	4	XCS DMC●●●L	Straight	2	XZ CP0941L2	0.080
	× "MO					5	XZ CP0941L5	0.180
						10	XZ CP0941L10	0.360
					Elbowed	12	XZ CP1041L2	0.080
XZ CP0941L●	\Box					5	XZ CP1041L5	0.180
						10	XZ CP1041L10	0.360
	4/	Female, M12	8	XCS DMP•••L	Straight	2	XZ CP29P11L2	0.100
XZ CP1041L•					5	XZ CP29P11L5	0.290	
8 //						10	XZ CP29P11L10	0.470
		Female, M12	4	XCS DMR•••L/	Straight	2	XZ CP1141L2	0.090
	2009			XCS DMP●●●L	_	5	XZ CP1141L5	0.190
XZ CP29P11L●	s ()					10	XZ CP1141L10	0.370
					Elbowed	12	XZ CP1241L2	0.090
						5	XZ CP1241L5	0.190
						10	XZ CP1241L10	0.370
	<u></u>							
XZ CP1141L●	XZ CP1241L●							

Function diagrams with magnet present (pre-cabled version)

XCS DMC59 ••

XCS DMC79●●

Sar

XCS DMP50●●

XCS DMP70●●

















XCS DMR59ee/XCSDMP59ee

XCS DMR79●●/CS DMP79●●









Function diagrams with magnet present (connector on flying lead version)

XCS DMC59ee

XCS DMC79●●

XCS DMP50●●

XCS DMP70●●



(NC): 1/3 (NO): 4/2







(NC): 1/3 (NO): 4/2 (NO: 6/7



(NC): 1/3 (NC): 4/2 (NO): 6/7

XCS DMR59ee/XCSDMP59ee

XCS DMR79ee/CS DMP79ee



(NC): 1/3 (NO): 4/2



(NC): 1/3 (NC): 4/2



Contact closed

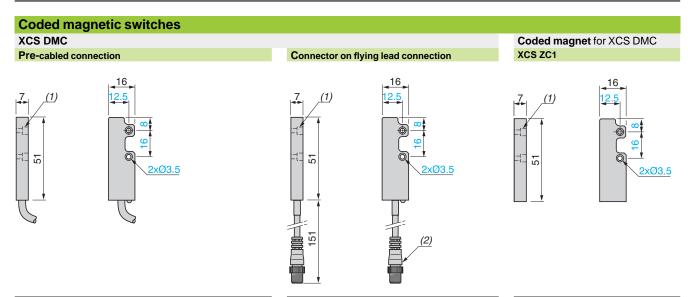


Contact open

Contact unstable

Sao: assured operating distance. **Sar**: assured tripping distance. Conforming to EN/IEC 60947-5-3

Plastic



(1) Counterbored: Ø 6 x 3.5 mm.

(1) Counterbored: Ø 6 x 3.5 mm. (2) M8 4-pin connector.

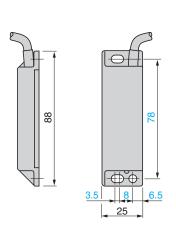
(1) Counterbored: Ø 6 x 3.5 mm.

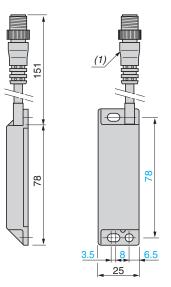
XCS DMP

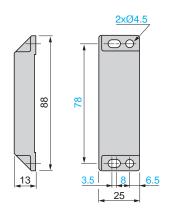
Pre-cabled connection

Connector on flying lead connection









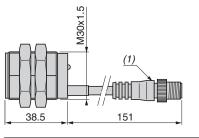
(1) M12 4 or 6-pin connector.

XCS DMR

Pre-cabled connection

38.5

Connector on flying lead connection



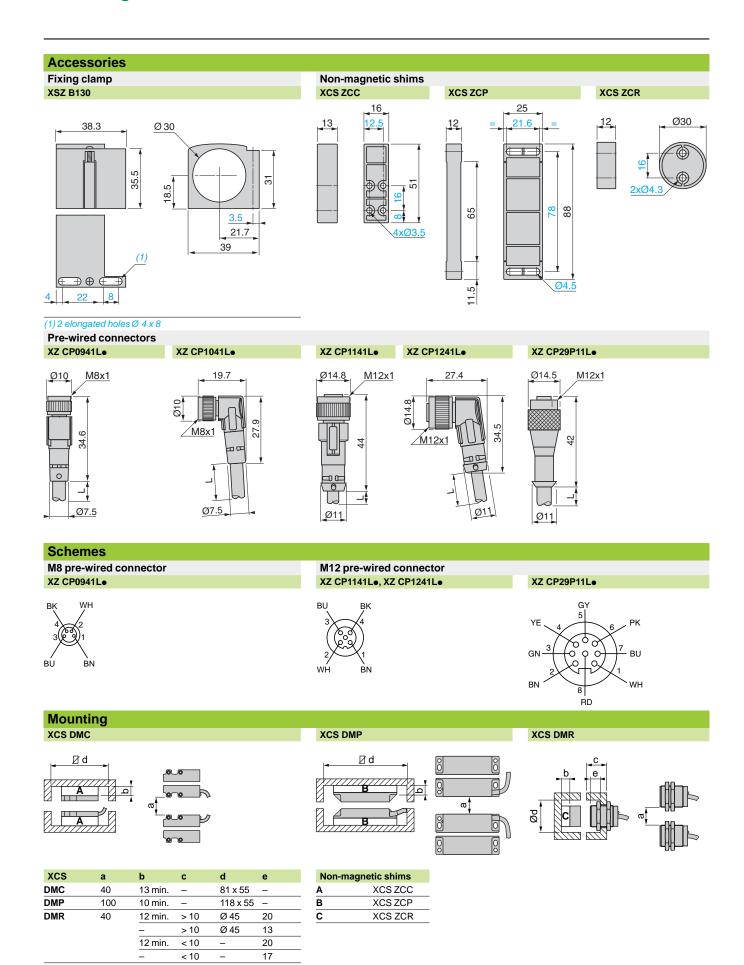
(1) M12 4-pin connector.

Coded magnet for XCS DMR XCS ZR1



(1) 2 x Ø 4.3, countersunk: Ø 7.5 at 45°.

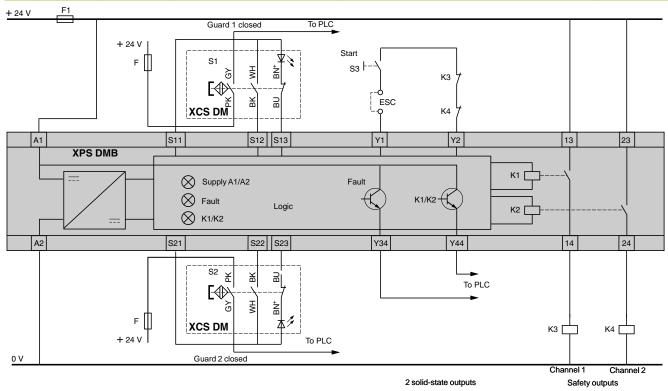
Plastic



Plastic, pre-cabled

XCS DMP5 • • • with XPS DMB

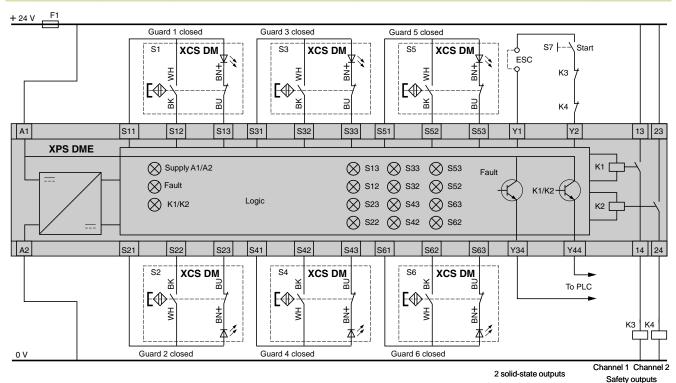
Wiring to PL=e, category 4 conforming to EN/ISO 13849-1 and SIL 3 conforming to EN/IEC 61508. Example with 3-pole 1 NC + 2 NO (1 NO staggered) contact.



ESC: External start conditions.

XCS DMC5000, XCS DMP5000, XCS DMR5000 with XPS DME

Wiring to PL=e, category 4 conforming to EN/ISO 13849-1 and SIL 3 conforming to EN/IEC 61508. Example with 2-pole 1 NC + 1 NO (staggered) contact.



Schneider

ESC: External start conditions.

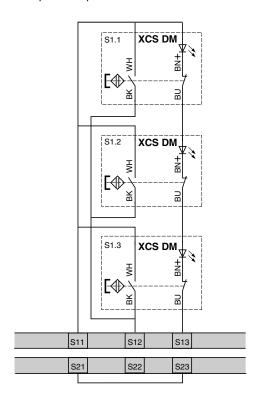
Plastic, pre-cabled

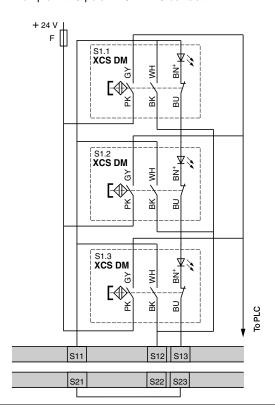
Connection of up to 3 magnetic switches, with an LED on one input, with XPS DM● (1)

Wiring up to PL=d, category 3 conforming to EN/ISO 13849-1 and SIL 2 conforming to EN/IEC 61508

Example with 2-pole 1 NC + 1 NO contact

Example with 3-pole 1 NC + 2 NO contact

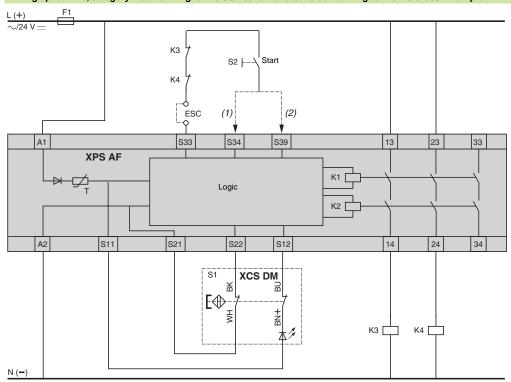




(1) Input: S11, S12, S13 or S21, S22, S23.

XCS DMe7●●● with XPS AF

Wiring up to PL=e, category 4 conforming to EN/ISO 13849-1 and SIL 3 conforming to EN/IEC 61508. Example with 2-pole 2 NC contact



(1) With start button monitoring.

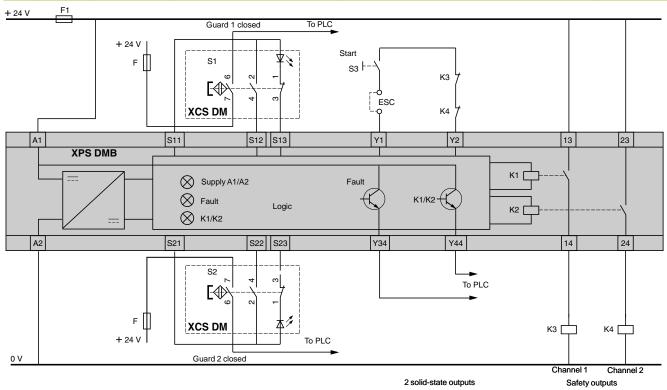
(2) Without start button monitoring.

ESC: External start conditions.

Coded magnetic switches Plastic, connector on flying lead

XCS DMP5 • • • with XPS DMB

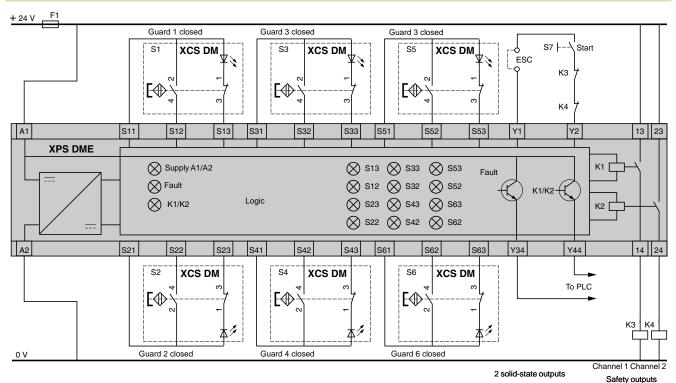
Wiring to PL=e, category 4 conforming to EN/ISO 13849-1 and SIL 3 conforming to EN/IEC 61508. Example with 3-pole 1 NC + 2 NO (1 NO staggered) contact.



ESC: External start conditions.

XCS DMC5eee, XCS DMP5eee, XCS DMR5eee with XPS DME

Wiring to PL=e, category 4 conforming to EN/ISO 13849-1 and SIL 3 conforming to EN/IEC 61508. Example with 2-pole 1 NC + 1 NO (staggered) contact.



Schneider

ESC: External start conditions.

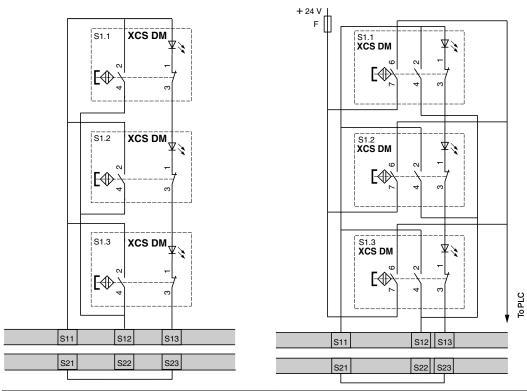
Plastic, connector on flying lead

Connection of up to 3 magnetic switches, with an LED on one input, with XPS DM● (1)

Wiring to PL=d, category 3 conforming to EN/ISO 13849-1 and SIL 2 conforming to EN/IEC 61508

Example with 2-pole 1 NC + 1 NO contact

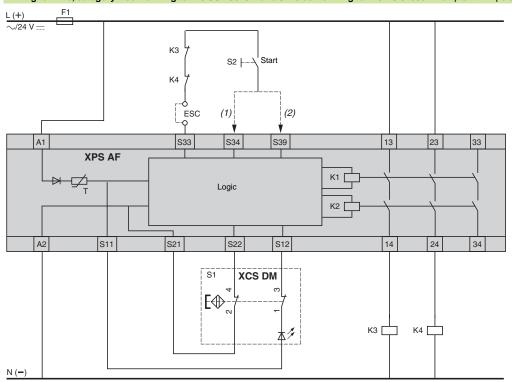
Example with 3-pole 1 NC + 2 NO contact



(1) Input: S11, S12, S13 or S21, S22, S23.

XCS DMe7●●● with XPS AF

Wiring to PL=e, category 4 conforming to EN/ISO 13849-1 and SIL 3 conforming to EN/IEC 61508. Example with 2-pole 2 NC contact

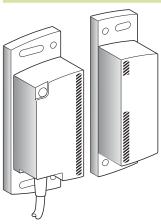


(1) With start button monitoring.

(2) Without start button monitoring. ESC: External start conditions.

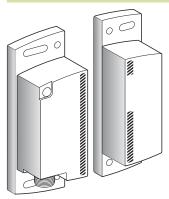
Coded magnetic system Pre-cabled connection

SIL 2/PL=d, category 3 and SIL 3/PL=e, category 4 XCS DM3791 • • /XCS DM4801 • •



Page 32943/4

Coded magnetic system M12 connector connection SIL 2/PL=d, category 3 and SIL 3/PL=e, category 4 XCS DM3791M12/XCS DM4801M12



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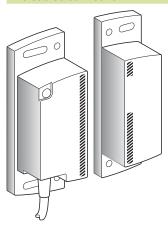
Coded magnetic system type			SIL 2/PL= d, category 3 XCS DM3	SIL 3/PL=e, category 4 XCS DM4	
Environment					
Conformity to standards			EN/IEC 60947-5-1; EN/IEC 60947-5-2; EN EN/ISO 14119	V/IEC 60947-5-3	
Product certifications			C€, UL, CSA, TÜV		
Maximum safety level (1)			SIL 2 conforming to EN/IEC 61508,PL=d, category 3 conforming to EN/ISO 13849-1	SIL 3 conforming to EN/IEC 61508, PL=e category 4 conforming to EN/ISO 13849-1	
Reliability data			MTTF _d = 182 years PFH = 3.94E ⁻⁹ /PFD = 1.15E ⁻⁵ SFF = 92.5%/HFT = 1		
Ambient air temperature	For operation	°C	- 25+ 70°C		
	For storage	°C	- 40+ 85°C		
Vibration resistance	Conforming to EN/IEC 60068-2-6		10 gn (10500 Hz)		
Shock resistance	Conforming to EN/IEC 60068-2-7		30 gn, 11 ms		
Sensitivity to magnetic fields		mT	≤ 0.5		
Electric shock protection	Conforming to EN/IEC 61140		Class III		
Degree of protection	Conforming to EN/IEC 60529		Pre-cabled version: IP 66, IP 67 Connector version: IP 67		
	Conforming to DIN 40050		Pre-cabled version: IP 69K		
Materials			Thermoplastic case (PBT); PVC cable		
Characteristics					
Rated operational characteristics			Ub: 24 V + 10% - 20%		
Rated insulation voltage (Ui)			Ui: 36 V		
Rated impulse withstand voltage (U imp)	Conforming to EN/IEC 60947-5-1	kV	2.5		
Integrated output protection			Overload and short-circuit protection		
Connection	Conforming to EN/IEC 60947-5-2-A3 and EN/IEC 61076		Pre-cabled, 6 x 0.25 mm², length: 2, 5 or 10 m depending on model or M12 connector (A coding)	Pre-cabled, 8 x 0.25 mm², length: 2, 5 or 10 m depending on model or M12 connector (A coding)	
Cable diameter		mm	6.1 +/-0.3		
Cable resistance		mΩ/m	90		
Safety outputs OSSD (Output Signal Switching Devices)			2 PNP type (NO) solid-state outputs, 1.5 A protected)	(2 A up to 60° C) 24 V (short-circuit	
Alarm output			-	1 solid-state output, 0.5 A, 24 V, PNP	
Signalling			LED (green/red/orange)		
Maximum switching frequency		Hz	3		
Activation delay		ms	100		
Discordance time		s	2		
HFT (Hardware Fault Tolerance)			1 Test interval: 12 months		
Tightening torque		Nm			
Chaining in series			32 maximum with 2 m long cable	-	
Functions					
Functions			- LED status signalling	- Auto/Manual start via "Start"input - Monitoring of external switching devices (EDM: External Device Monitoring) - Display of operating modes (LED) - Monitoring of the function (open or closed) as well as the response time of the power components.	

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

Safety detection solutions Coded magnetic systems Plastic, solid-state PNP type output

Magnetic system with dedicated transmitter Type

Pre-cabled connection



References				
Description	Type of connection	SIL 2/PL=d, category 3	SIL 3/PL=e, category 4	Weight kg
Coded magnetic system with dedicated transmitter (1)	Pre-cabled L = 2 m	XCS DM379102	XCS DM480102	0.320
	Pre-cabled, L = 5 m	XCS DM379105	XCS DM480105	0.480
	Pre-cabled, L = 10 m	XCS DM379110	XCS DM480110	0.745

⁽¹⁾ Self-contained system not requiring the use of a safety module or non-magnetic shim.

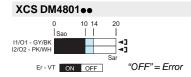
Detection characteristics		
Assured operating distance	Sao: 10 mm	
Assured tripping distance	Sar: 20 mm	
Approach directions	9	
Approach speed	0.01 m/s min.	

Output status (pre-cabled connection)

Output states shown are with the dedicated transmitter positioned in front of the receiver

XCS DM3791●●

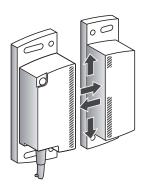


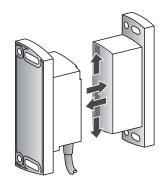


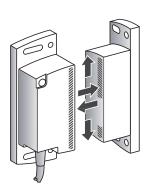
Output closed Output open Transitional state

Sao: Assured operating distance **Sar**: Assured tripping distance Conforming to EN/IEC 60947-5-3

Approach directions

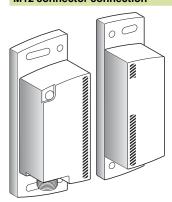






Plastic, solid-state PNP type output

Magnetic system with dedicated transmitter Type M12 connector connection



References				
Description	Type of connection	SIL 2/PL=d, category 3	SIL 3/PL=e, category 4	Weight kg
Magnetic system with dedicated transmitter (1)	M12 connector	XCS DM3791M12	XCS DM4801M12	0.215

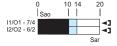
⁽¹⁾ Self-contained system not requiring the use of a safety module or non-magnetic shim.

Detection characteristics		
Assured operating distance	Sao: 10 mm	
Assured tripping distance	Sar: 20 mm	
Approach directions	9	
Approach speed	0.01 m/s min.	

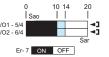
Output status (M12 connector connection)

Output states shown are with the dedicated transmitter positioned in front of the receiver

XCS DM3791M12







XCS DM4801M12

Sao: Assured operating distance Sar: Assured tripping distance Conforming to EN/IEC 60947-5-3

"OFF" = Error

Output closed Output open Transitional state

Safety detection solutions Coded magnetic systems Accessories

ories				
	Description	For use with	Reference	Weight kg
	Replacement dedicated transmitter	XCS DM3/4●●02/05/10 XCS DM3/4●●M12	XCS DMT	0.100
	Arc suppressor (pair)	XCS DM3/4•••02/05/10 XCS DM3/4•••M12	XUS LZ500	0.020

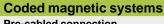
Pre-wired female conn	nectors for connect	or vers	ion coded magnetic systems
Pre-wired connector charac	teristics		
Pre-wired connector type			XZ CP29P12L●
Type of connection			Screw threaded (metal clamping ring)
Number of contacts			8
Degree of protection			IP 67 (with clamping ring correctly tightened)
Ambient air temperature	Operation	°C	- 25+ 70
	Storage	°C	- 40+ 85
Cabling	Conforming to EN/IEC 60947-5-2		PUR cable, Ø 6.1 mm wire c.s.a.: 8 x 0.25 mm ²
LED signalling			-
Nominal current		Α	2
Insulation resistance		Ω	> 10 ⁹
Contact resistance		mΩ	<5

References of pre-wired connectors



Type of connector	Number of pins	For use with	Туре	Cable length m	Reference	Weight kg
Female, M12 (A coding)	8	XCS DM3/4•••02 XCS DM3/4•••05	Straight	2	XZ CP29P12L2	0.100
		XCS DM3/4●●10		5	XZ CP29P12L5	0.290
				10	XZ CP29P12L10	0.470

Plastic



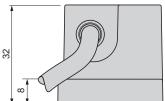
Pre-cabled connection

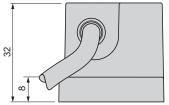
XCS DM3/4 • • • 02/05/10

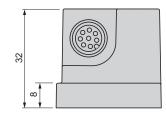


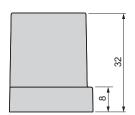
Accessory Replacement dedicated transmitter

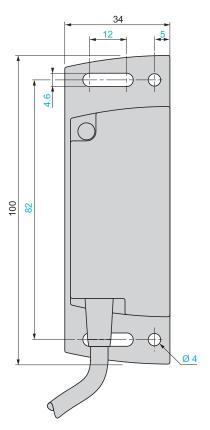
XCS DMT

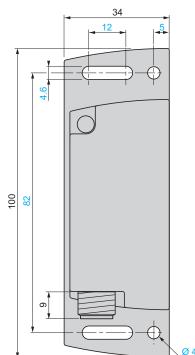


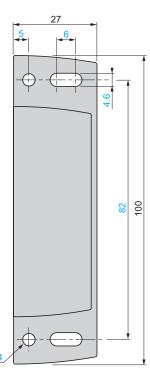






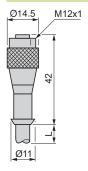






Pre-wired connectors

XZ CP29P12Le



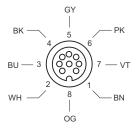
Connections, mounting

Safety detection solutions Coded magnetic systems

Connection

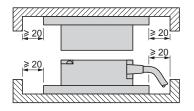
M12 pre-wired female connector

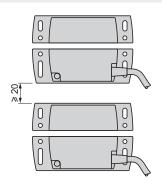
XZ CP29P12L●

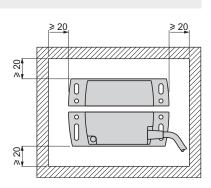


Mounting

XCS DM3/DM4







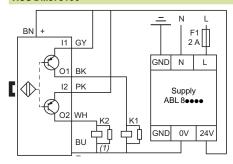
Version: 5.0

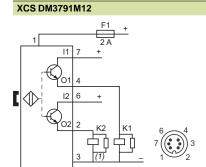
Category 3 (this scheme can achieve SIL 2/PL=d, category 3)

Pre-cabled connection

M12 connector (A coding) connection

XCS DM3791●●

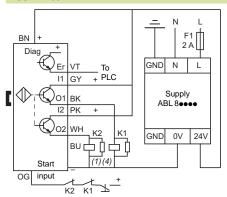




SIL 3/PL=e, category 4

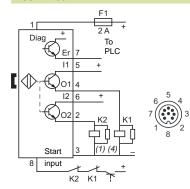
Pre-cabled connection

XCS DM4801●●



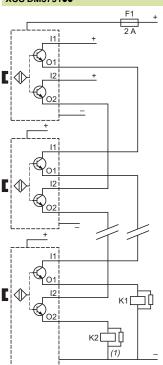
M12 connector (A coding) connection

XCS DM4801M12



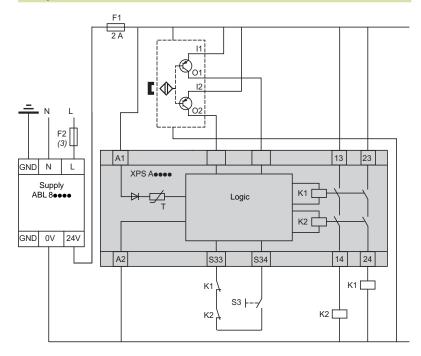
Chaining coded magnetic systems (2)

XCS DM3791●●



Wiring to SIL 3/PL=e, category 4 with Preventa module

Example: XCS DM3 ••• + XPS AFL5130



- (1) The K1 and K2 coils must be protected with arc suppressors. (2) Maximum chaining: 32 maximum with 2 m long cable.
- (3) 2 A max.
- (4) Mechanically linked contacts.

Safety detection solutions Preventa safety mats

Type XY2 TP

Applications

Packaging, conveying, material handling, warehousing, stocking, etc.

Function

Zone protection: by stopping dangerous machine movements following detection of intrusion into the hazardous zone.





Maximum achievable safety level

PL=d/Category 3 conforming to EN/ISO 13849-1, SIL 2 conforming to EN/IEC 61508

Conformity to product standards

EN/IEC 60947-5-1, EN 1760-1/ISO 13856-1, UL 508, CSA C22-2 n°14

Product certifications

BG, with safety modules XPS AK and safety controllers XPS MP/MC

Degree of protection

IP 67

Dimensions (mm)

500 x 500 500 x 750

Response time

 \leq 40 ms with XPS AK, \leq 30 ms with XPS MP/MC

Connection

2 x 2-core ying leads tted with Ø 8 connector (1 male, 1 female) diameter 8

Sensitivity

Single mat: > 20 kg Group of mats: > 35 kg

Maximum supply voltage

--- 30 V

Type reference

XY2 TP1

XY2 TP2

Pages

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PL=d/Category 3 conforming to EN/ISO 13849-1, SIL 2 conforming to EN/IEC 61508

EN/IEC 60947-5-1, EN 1760-1/ISO 13856-1, UL 508, CSA C22-2 n°14

BG, with safety modules XPS AK and safety controllers XPS MP/MC

IP 67

 \leq 40 ms with **XPS AK**, \leq 30 ms with **XPS MP/MC**

 $2\,x\,2\text{-core}\,$ ying leads $\,$ tted with Ø 8 connector (1 male, 1 female) diameter 8

Single mat: > 20 kg Group of mats: > 35 kg

== 30 V

XY2 TP3 XY2 TP4

38161/5

3

Safety detection solutions

Preventa safety mats Type XY2 TP

Presentation

Zone protection

The equipment comprises safety mats, installed in front of or around potentially dangerous machines and/or robots. They provide a protection zone by detecting the presence of operators on these installations.

The safety mats therefore form protection zones that are mainly designed to ensure the safety of personnel.

They thus supplement safety devices in allowing access required for machine loading/unloading.

The safety mats are used either in conjunction with safety modules or combined with other zone protection systems. They are suitable for use in polluted environments (dust, oil, etc.).

"Protect Area Design" configuration software (1) enables design and setting-up of installations.

Applications

Safety mats are mainly used in:

- □ assembly and packaging lines,
- □ conveying and handling lines,
- □ warehousing and stocking systems.

Description

- □ A safety mat comprises:
 - a sensing zone 1,
 - a border comprising aluminium rails 2,
 - and rail corners which secure the assembly 3.
- □ Safety mats can be mounted in order to define the safety zone.
- ☐ Mats are electrically interconnectable, without loss of sensitivity.

1 2

Operating principle

Safety modules type XPS AK and safety controllers XPS MP/MC used in conjunction with safety mats XY2 TP establish a safety-related part of the control system that can reach safety level PL=d (category 3), in accordance with the standard EN/ISO 13849-1 and SIL 2 in accordance with the standard EN/IEC 61508.

- The hazardous zone 1 is defined by the dangerous movement of the machine.
- The safety zone 2, defined in accordance with standard EN 999/ISO 13855, comprises one or several juxtaposed safety mats 3 (10 maximum for XPS AK and 30 maximum for XPS MP/MC).
- Safety mats are used for detecting persons stepping onto the mat or falling objects in accordance with standard EN 1760-1/ISO 13856:
 - weight > 20 kg for a single mat,
 - weight > 35 kg for a group of mats.
- Any detection of movement on the safety mat immediately instigates the stopping of the dangerous movement of the machine to be made safe. The resetting of the machine can be performed manually or automatically, depending on the wiring configuration of the safety module within the process.
- The safety mats can also be used for detection applications not related to safety.

Directives and standards

- The safety mats conform to the following standards:
- □ PrEN/ISO 12100,
- □ EN/IEC 61508,
- □ EN/IEC 60947-5-1,
- □ EN/ISO 13849-1,
- □ EN 1760-1/ISO 13856-1,
- □ EN/IEC 60204-1,
- □ UL 508,
- □ CSA C22-2 n° 14.
- Used in conjunction with safety modules XPS AK and safety controllers XPS MP/MC, the safety mats are cULus and BG certified and approved.

(1) See pages 38161/8 and 38161/9.

3

Safety detection solutions

Preventa safety mats Type XY2 TP

Hazardous zone S Mat Mat Mat

S = minimum distance between the hazardous zone and the detection limit.

Safety zone

Installation precautions

Standard EN 999/ISO 13855 defines:

- the minimum distance between the hazardous zone and the detection limit of the device furthest away from the hazardous zone, see calculation below,
- the body approach speed.

Standard EN 1760-1/ISO 13856 states the following requirements:

- surface layout drawing,
- surface preparation,
- handling and connection,
- starting and testing.

Safety rules

Detect failures liable to compromise safety and stopping of the machine

The design of the machine and its control system must be the same level of safety as the safety mat system in order to ensure the immediate stopping of the machines dangerous movement as soon as the hazardous zone is accessed.

It must not be possible to access the protected zone without tripping the protection system. Therefore, safety mats must be installed in such a way that they cannot be avoided

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

Calculation of the minimum safety distance according to the application

Standard EN 999/ISO 13855 states the following calculation of distance:

- Safety mat installed on a flat surface:
 - S = (1600 mm/s x (t1 + t2)) + 1200 mm.
- Safety mat installed on a step: S = (1600 mm x (t1 + t2)) + (1200 mm - 0.4 H).

S = minimum distance in mm, in a horizontal plane, between the hazardous zone and the detection limit of the device furthest away from the hazardous zone.

T = overall response time = t1 + t2.

t1 = maximum time in seconds between activation of the detection function (safety mat) and the changeover of the output signal switching devices to the inhibited state (e.g. safety module type XPS AK).

t2 = response time of machine in seconds. Time required to stop the dangerous movement of the machine.

H = distance above reference plane (e.g. height of step in mm).

Note: In all cases S > 750 mm.

Example of an application processed using "Protect Area Design" software (1)

- Unintentional access to the hazardous zone of a machine must be detected by a safety device.
- The estimated risk combined with a very dusty environment indicates that a floor mounted sensing device (safety mat) would be appropriate.
- The stopping time of the machine is 300 ms and the response time of the sensing device is \leq 40 ms.

Calculation formula: S = (1600 mm/s x T) + (1200 mm - 0.4 x H) = (1600 x 0.34) + (1200 - 0) = 1744 mm.

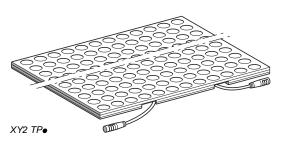
(1) See pages 38161/8 and 38161/9.

Safety detection solutions Preventa safety mats Type XY2 TP

F			
Environment			
Conformity to standards	Products		EN/IEC 60947-5-1, EN 1760-1/ISO 13856-1, UL 508, CSA C22-2 n°14
	Machine assemblies		IEC/EN 60204-1, EN 999/ISO 13855, PrEN/ISO 12100
Product certifications			BG with safety modules XPS AK and safety controllers XPS MP/MC, cULus
Maximum safety level			PL=d/Category 3 conforming to EN/ISO 13849-1, SIL 2 conforming to EN/IEC 61508 using the appropriate and correctly wired monitoring system.
Reliability data			PFH = 2.17 10-8 1/h conforming to EN/IEC 61508
Ambient air temperature	For operation	°C	+ 5+ 55 (single mat > 20 kg); - 20+ 55 (single or group of mats > 35 kg)
	For storage	°C	-20+70
Sensitivity	Single mat	kg	> 20
	Group of mats	kg	> 35
Electric shock protection		- 3	Class III conforming to EN/IEC 61140
Degree of protection			IP 67 conforming to IEC 60529
Type of covering			NBR, pelleted appearance
Materials of mounting accessories	Rail connectors and corners	_	Polyacetal
Electrical charact	eristics		
Rated operational charact			30 V/100 mA
Contact	Material		Aluminium
Contact			
	Type		NO (1-3)
	Resistance	Ω	≤ 5 (closed state)
		MΩ	10 (open state)
March 2 2 2 2 1 1 2 2 1 1 1 2 2 2 2 2 2 2 2	Response time	ms	20
Mechanical durability	In millions of operating cycles		>1
Connection			2 PUR flying leads (length 100 mm, 2 x 0.25 mm 2 conductors) with Ø 8 male/female, IP 67 connector
Mechanical chara	cteristics		
Maximum permissible loa	d on mat	N/cm²	2000
Compression			5 tonnes max.
Rated impulse withstand v	voltage		U imp = 6 kV conforming to IEC 60947-1, IEC 60664
Vlaximum number of mats	per safety module		10
Tensile strength		N/mm²	7
Resistance to friction		mg	120
Shore A hardness			70±5
	Shore A hardness		1010
Amount of stretch to tear		%	250
		%	250
Behaviour in fire (DIN 4102	•	%	B2
Behaviour in fire (DIN 4102	•	%	
Behaviour in fire (DIN 4102 Resistance to incandesce	•	%	B2
Behaviour in fire (DIN 4102 Resistance to incandesce	nt materials Acetone Citric acid	%	B2 Resistant
Behaviour in fire (DIN 4102 Resistance to incandesce	nt materials Acetone	%	B2 Resistant
Behaviour in fire (DIN 4102 Resistance to incandesce	nt materials Acetone Citric acid	%	B2 Resistant
Behaviour in fire (DIN 4102 Resistance to incandesce	nt materials Acetone Citric acid Hydrochloric acid, 10% solution	%	B2 Resistant
Behaviour in fire (DIN 4102 Resistance to incandesce	Acetone Citric acid Hydrochloric acid, 10% solution Methylated spirits	%	B2 Resistant
Behaviour in fire (DIN 4102 Resistance to incandesce	Acetone Citric acid Hydrochloric acid, 10% solution Methylated spirits Ammonia	%	B2 Resistant
Behaviour in fire (DIN 4102 Resistance to incandesce	Acetone Citric acid Hydrochloric acid, 10% solution Methylated spirits Ammonia Water	%	B2 Resistant
Behaviour in fire (DIN 4102 Resistance to incandesce	Acetone Citric acid Hydrochloric acid, 10% solution Methylated spirits Ammonia Water Alkaline washing water	%	B2 Resistant
Behaviour in fire (DIN 4102 Resistance to incandesce	Acetone Citric acid Hydrochloric acid, 10% solution Methylated spirits Ammonia Water Alkaline washing water Petrol	%	B2 Resistant
Behaviour in fire (DIN 4102 Resistance to incandesce	Acetone Citric acid Hydrochloric acid, 10% solution Methylated spirits Ammonia Water Alkaline washing water Petrol Greases	%	B2 Resistant
Behaviour in fire (DIN 4102 Resistance to incandesce	Acetone Citric acid Hydrochloric acid, 10% solution Methylated spirits Ammonia Water Alkaline washing water Petrol Greases Oil, ASTM N° 1/2/3	%	B2 Resistant
Behaviour in fire (DIN 4102 Resistance to incandesce	Acetone Citric acid Hydrochloric acid, 10% solution Methylated spirits Ammonia Water Alkaline washing water Petrol Greases Oil, ASTM N° 1/2/3 Resistance to ultraviolet rays	%	B2 Resistant
Behaviour in fire (DIN 4102 Resistance to incandesce	Acetone Citric acid Hydrochloric acid, 10% solution Methylated spirits Ammonia Water Alkaline washing water Petrol Greases Oil, ASTM N° 1/2/3 Resistance to ultraviolet rays Caustic potassium solution	%	B2 Resistant Resistant
Behaviour in fire (DIN 4102 Resistance to incandesce	Acetone Citric acid Hydrochloric acid, 10% solution Methylated spirits Ammonia Water Alkaline washing water Petrol Greases Oil, ASTM N° 1/2/3 Resistance to ultraviolet rays Caustic potassium solution Acetic acid	%	B2 Resistant Resistant
Behaviour in fire (DIN 4102 Resistance to incandesce	Acetone Citric acid Hydrochloric acid, 10% solution Methylated spirits Ammonia Water Alkaline washing water Petrol Greases Oil, ASTM N° 1/2/3 Resistance to ultraviolet rays Caustic potassium solution Acetic acid Methyl alcohol	%	B2 Resistant Resistant
Behaviour in fire (DIN 4102 Resistance to incandesce	Acetone Citric acid Hydrochloric acid, 10% solution Methylated spirits Ammonia Water Alkaline washing water Petrol Greases Oil, ASTM N° 1/2/3 Resistance to ultraviolet rays Caustic potassium solution Acetic acid Methyl alcohol Cutting compound	%	B2 Resistant Resistant
Behaviour in fire (DIN 4102 Resistance to incandesce Chemical resistance (1)	Acetone Citric acid Hydrochloric acid, 10% solution Methylated spirits Ammonia Water Alkaline washing water Petrol Greases Oil, ASTM N° 1/2/3 Resistance to ultraviolet rays Caustic potassium solution Acetic acid Methyl alcohol Cutting compound Sodium hydroxide	%	B2 Resistant Resistant

⁽¹⁾ The resistance of the covering to the products listed is valid for an ambient temperature of 23 °C, provided there is no surface deterioration.

Safety detection solutions Preventa safety mats Type XY2 TP



Safety mats		
Dimensions	Reference	Weight
mm		kg
500 x 500 x 11	XY2 TP1	4.400
500 x 750 x 11	XY2 TP2	6.600
750 x 750 x 11	XY2 TP3	9.800
750 x 1250 x 11	XY2 TP4	16.400



Accessories for grou	iping mat	S		
Description	Length	Sold in lots of	Unit reference	Weight
	mm			kg
Rails	194	2	XY2 TZ10	0.450
	394	2	XY2 TZ20	0.500
	444	2	XY2 TZ30	0.710
	494	2	XY2 TZ40	0.770
	644	2	XY2 TZ50	1.000
	694	2	XY2 TZ60	1.080
	744	2	XY2 TZ70	1.100
	1194	2	XY2 TZ80	1.860
	1244	2	XY2 TZ90	2.000
Rail connectors (1)	56	2	XY2 TZ1	0.150
	6	2	XY2 TZ2	0.050
External corner (1)	_	4	XY2 TZ4	0.100
Kit comprising: 1 internal corner + 1 external corner XY2 TZ4 (1)	-	1	XY2 TZ5	0.050







XY2 TZ4





Protect Area Design software							
Description	Compatibility	Language	Weight kg				
Protect Area Design V2 configuration software, downloadable from www.schneider-electric.com	Windows 98/NT/2000 and XP	French/English	_				

⁽¹⁾ With 2 knock-out cable entries.

Characteristics, references, connections

Safety detection solutions Preventa safety mats

Jumper cables Ø 8 mm-M8 and M8-M8

Type of connection			Clip-in male and female connectors (without locking)
.,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,			The management of the second o
Degree of protection			IP 67 (with connectors correctly clipped together)
Ambient air temperature	For operation and storage	°C	- 30+ 90
Conductor c.s.a.		mm²	3 x 0.25
Cable diameter		mm	4.4
Nominal voltage		٧	and ∼ 60
Nominal current		Α	4
Insulation resistance		Ω	> 109
Contact resistance		$\mathbf{m}\Omega$	≤5

References



XZC RTPA

Description	Number of conductors	Length of PUR cable	Reference	Weight
		m		kg
Male-female jumper cable, M8, straight (1)	3	0.33	XZC RTPA1	0.005
For connection between mats in rail or to another cable		0.54	XZC RTPA2	0.005
		0.79	XZC RTPA3	0.010
		1.08	XZC RTPA4	0.010
		1.29	XZC RTPA5	0.020
		1.33	XZC RTPA6	0.020
		1.58	XZC RTPA7	0.020
		2.58	XZC RTPA8	0.060
1 pre-wired female connector - 1 pre-wired male connector,	+ 3	2	XZC PTP0104L2	0.050
Ø 8 mm straight For connection to the safety		5	XZC PTP0205L5	0.110
module		10	XZC PTP0306L10	0.215



(1) The maximum number of jumper cables that can go through a rail is 4.

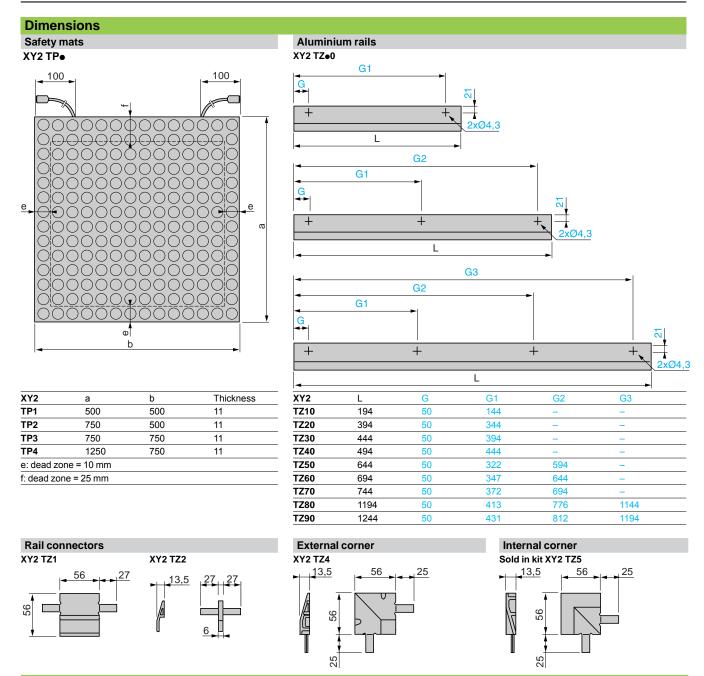
Connections



BU: (-) blue BN: (+) brown

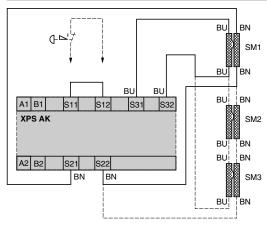
Safety detection solutionsPreventa safety mats

Type XY2 TP



Connections

Wiring example to level PL=d (category 3), SIL 2 with an XPS AK module



Safety detection solutions Protect Area Design

Software configurator for safety installations incorporating safety mats

Presentation

Preparation and standards

Before using the configurator, it is necessary to perform the following 2 procedures: risk assessment and risk reduction in accordance with PrEN/ISO 12100 in order to select the required safety level for the control system.

The Protect Area Design software

Protect Area Design software is a configurator that enables selection of the zone protection device (safety mats) required for safety applications.

This software enables the user, via a graphic interface, to create, test or modify a safe working environment within the vicinity of a potentially dangerous machine. Having established the predefined fields (selection the control system safety level, dimensions of the machine, etc.), the Protect Area Design software calculates the safety distance in relation to the reaction time of the machine and the approach direction for gaining access to the hazardous zone. It then displays the optimum safety protection solution and creates the list of products (references, quantities and accessories to be used).

Protect Area Design software is user-friendly and compatible with Windows 98, NT, 2000 and XP.

Home screen

Main functions of the software

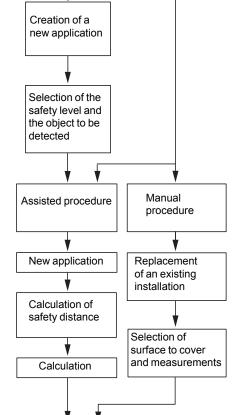
The software enables creation of an application using the procedures stated (see next page) or selection from applications previously established. The procedure is manual or assisted.

Protect Area Design software							
Description	Compatibility	Language	Weight kg				
Protect Area Design V2 software configurator, downloadable from www.schneider-electric.com	Windows 98/NT/2000 and XP	French/English	_				

Safety detection solutionsProtect Area Design

Software configurator for safety installations incorporating safety mats





Configuration diagram of safety mats

Design of application with references, accessories and quantities of products

Configuration of safety mats

The Protect Area Design software enables determination of the shape to be covered and optimisation of the use of mats using the following proposed solutions: "Coverage of the zone to be protected" or "Optimised coverage of the zone to be protected"

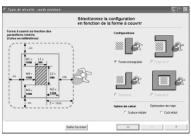
- For configuration in "Assisted procedure" mode the software enables access to the following menus:
- □ description of the installation: description of the machine, reaction time,
- □ description of the structure and access to the hazardous zone,
- □ selection of configuration according to the zone to cover,
- calculation.
- For configuration in "Manual procedure" mode the software enables access to the following menus:
- □ replacement of an existing installation,
- □ selection of surface to cover and measurements.



Control system safety level and its sensitivity



Description of the installation



Configuration according to the zone to cover

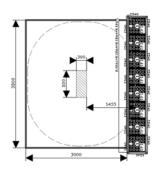
On-screen results

After the safety distance calculation, the software displays the following results:

- component selection (description of products),
- graphical representation of the configuration,
- list of selected components (references and quantities).



List of products



Graphical representation of the sensing mat configuration

Safety detection solutions Safety light curtains

Applications







Press

Woodworking/ cutting machine Textile

Protection

Type of recommended light curtains

Finger protection (14 mm) or hand protection (30 mm)

Type 4







Characteristics	Finger protection	Hand protection	Finger protection	Hand protection
Distance	0.33 m or 0.3 m7 m	0.38 m or 0.320 m	0.33 m or 0.3 m7 m	0.38 m or 0.320 m
Height protected	2801360 mm	3202120 mm	2802560 mm (with segments)	3205120 mm (with segments)
Detection capacity	14 mm	30 mm	14 mm	30 mm
Type of outputs	2 safety PNP 1 auxiliary PNP or NPN	1		
Integrated functions				
Blanking	-		•	
Floating blanking	-		•	
External device monitoring	•		•	
Test input	•		•	
Cascadable segments	-		Up to 256 beams - up t	to 4 segments
Muting	Via external module type XPS LCM1150		Integrated when using XPS LCM1 or via exte XPS LCM1150	
Automatic/manual start	•		•	

30314/2 and 30315/2

Pages

XPS LCM1

Applications



3

Safety light curtains

Presentation

Protection of personnel

Safety light curtains are electro-sensitive protection equipment (ESPE) designed for the protection of 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 provide protection to ensure the **safety of personnel** operating dangerous machinery (annex IV of 98/37/EC) but they are equally suitable for use with many other types of machines. They make it possible to protect personnel whilst allowing free access to machines.

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

Directives and standards

Conformity to standards

These light curtains conform to:

- European Machinery Safety Directive 98/37/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 positioning).

These light curtains are UL, CSA and TÜV certi ed.

Application sectors

Main applications

- Application sectors 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 centres),
 - woodworking machines (planing machines, lathes, spindle moulding machines, side and face milling cutters).
 - textile machinery (carding machines, weaving looms, steam rooms),
 - assembly machines,
 - assembly robots.

Safety rules

Detection of failures

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

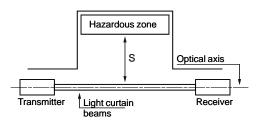
The design of the machine and its control system must be to the same level of safety as that of the safety light curtain in order to ensure the immediate stopping of the machines dangerous movement as soon as the hazardous zone, protected by the light curtain, is entered.

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

The machine can only be restarted if no 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.

Safety light curtains

Installation rules



These are defined in standard EN 999/ISO 13855. In particular:

- the safety distance between the light curtain and the hazardous zone,
- the body approach speed,
- multiple single-beam devices,
- multi-beam light curtains.

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

S = K(t1 + t2) + C (general formula)

S = minimum distance in mm

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

t1 = response time of protection device in s

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

C = additional distance in mm

■ For single-beam light curtains:

K = 1600 mm/s

C = 1200 mm for a single beam

C = 850 mm for several beams

The heights protected are as follows:

Number of beams	Heights protected (mm)
4	300, 600, 900, 1200
3	300, 700, 1100
2	400, 900
1	750

■ For multi-beam light curtains:

K = 2000 mm/s

C = 8 (d - 14) where d = detection capacity of the light curtain

Special rules for presses

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

The standards specify that only safety light curtains or mechanical protectors must be used as safety devices so that, if a person enters the protective eld whilst 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 a fault occurs in the safety device, the potentially dangerous machine must be stopped automatically.

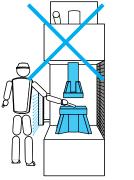
Once the protected zone is clear, the movement which was started and then interrupted by entry into the zone must not resume its normal travel, even after a Reset button has been pressed. Resetting must restart the movement from the beginning of the cycle. **The safety light curtain must only allow starting 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 reactivated.

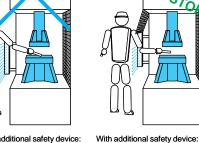
The safety distance S is calculated in a special way for:

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

Safety light curtains

Prevention of access over top of light curtain

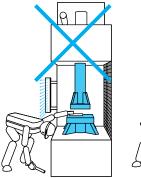




Without additional safety device: insuf cient degree of protection

light beam(s) broken, the machine

Prevention of access from beneath the light curtain





Without additional safety device: insuf cient degree of protection

With additional safety device: light beam(s) broken, the machine

Additional safety devices

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

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

Clearing of the light curtain must not result in restarting of moving parts.

Subsequent restarting must only be possible by means of deliberate operation of the appropriate control device, after having checked that there is no longer any danger.

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

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

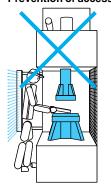
(if possible, screwed or welded to the machine),

or moving

(with continuous monitoring of their position if they have to open).

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

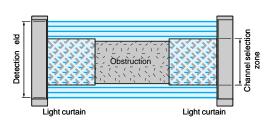
Prevention of access from rear of light curtain





Without additional safety device: insuf cient degree of protection

With additional safety device: light beam(s) broken, the machine



Addition of solid protection to the light curtain when using channel

Protection for Blanking, Floating blanking or Monitored blanking functions

The Blanking (inhibition of light beams), Floating blanking (oating inhibition of light beams) or Monitored blanking (xed and oating inhibition/disinhibition of light beams) functions create non protected areas in the detection eld. These non protected areas are required for some applications. If an obstruction does not completely II 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 lled by an obstruction must be guarded by a solid protection method (mechanical barrier: metal plate or unfolded structure).

Safety light curtains

Installation precautions

Re ective surface 12,5° 10,2,2,2,2° 10,2,2,2,2° 10,2,2,2,2° 10,2,2,2,2° 10,2,2,2,2° 10,2,2,2,

Reflective surface

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

The aperture angle of the optics and transmitter/receiver alignment tolerance are $\pm 2.5^{\circ}$.

Re ective surfaces located alongside the optical axis could result in stray re ections interfering with the beams which are the furthest away from the axis and, in consequence, prevent detection of an object entering the hazardous zone. The direct beam could then be joined by a stray re ected beam and this latter beam would not be broken when the object is in the axis.

For this reason, prEN 50100-1 and 2 and EN/IEC 61496-1 specify a minimum distance **D** whereby:

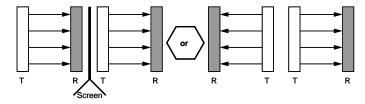
- for 0 < L < 3 m, **D = 131 mm**,
- for L > 3 m, $D = (0.035 \times L) + 5$ (with a minimum limit value of 131 mm).

 ${f D}=$ minimum distance between the light curtain and re ective surface in mm ${f L}=$ sensing distance of the light curtain in mm

Mutual interference

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

In cases where the products used do not have a light beam coding system it is recommended that their installation is as indicated below.



Environments subject to interference

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

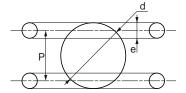
■ Electromagnetic interference generated by the proximity of variable speed drives, welding machines or walkie-talkies.

The products in the XUS L range are designed to be immune to such interference. They conform to:

- level 3 according to EN/IEC 61496-1,
- resistance to interference caused by variable speed drives.
- Light interference (conformity to standard EN/IEC 61496-2).

Safety light curtains

Definitions



Detection capacity (d)

This is the smallest diameter (object) that a type 4 safety light curtain is capable of detecting with absolute certainty.

d = P + e

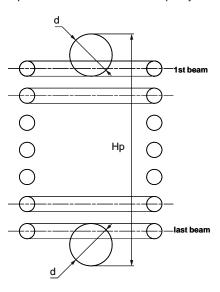
P: distance between the axis of 2 adjacent beams

e: diameter of the beams

XUS L range	P (mm)	e (mm)	d (mm)	
XUS L● Finger protection	10	3.3	14	
XUS L● Hand protection	20	9	30	

Protected height (Hp)

According to prEN 50100-2, this is the zone (or height) within which an object of equal diameter to the detection capacity **d** is detected with absolute certainty.



Response time

European standard EN 999/ISO 13855 fully incorporates the various aspects of "response time" in the formula for calculating the minimum safety distance (see page 38131-EN/3):

S = K(t1 + t2) + C

with, in particular:

- t1: response time of the protection device (in s). This is the time indicated for the XPS CE and XUS L ranges. It is the total time between detection by the device and switching of the output component.
- t2: stopping time of the machine and, in particular, of its dangerous movements (in s). This information is supplied by the machine manufacturer. It is the time between the stop instruction and the actual stop of the dangerous mechanical components.

Safety light curtains

Functions

Protection mode

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

in AUTO mode: on power-up or after the beams have been cleared, the light curtain resets itself automatically (closing of the OSSD output safety circuits).

■ in MANUAL mode: on 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 cause actual resetting of the light curtain (and closing of its OSSD output safety circuits).

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

Monitoring of external switching devices

Also called EDM (External Device Monitoring) by standard EN/IEC 61496, this consists of monitoring the function (open or closed), together with the time taken to reach that condition, of the machines power switching components.

Auxiliary output

This is a low power solid-state output for signalling, when con gurable (XUS LP/XUS LB/XUS LDM), 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 signalling to the automation system. This output closes when the light curtain switches to alarm mode.

Signalling

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 (photo-electric or other). When activated, a signal is sent to the automation system. This function is used to allow objects to access the hazardous zone during the process. Signalling informs the operator or operators that they are not protected.

Reduction of resolution

This function enables the resolution of the light curtain to be reduced by inhibiting 1 or 2 adjacent light beams, anywhere within the protected height. This function is mainly used for ignoring metal plate guide rails and metal plates of varying thickness on folding or cutting presses.

Blanking

This function makes it possible to inhibit detection by a selected group of light beams in the light curtain (and not all the beams as with muting). This function (adapted to the size of the objects) allows the presence of objects during process operations. Caution when using: the detection capacity changes. This imposes a greater safety distance. In addition, the use of additional protection each side of the object present must be included, 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 con guration is used, for example, for metal plate feeding applications on folding presses or shears.

Monitored blanking

This function makes it possible to inhibit a group of light beams when a predetermined object enters the light curtain and disinhibit the same group of light beams after completing its movement and exiting the light curtain, without switching it to the stop mode and halting the dangerous movement of the machine.

Blanking plus floating blanking and Monitored blanking plus floating blanking

The Blanking (xed inhibition of light beams) and Floating blanking (moving inhibition of one or two light beams) functions can be combined as can the Monitored blanking and Floating blanking functions.

Caution, these applications require complementary safety measures.

Multi-Seaments

The "multi-segments" enable the protection of zones using a single connection. Only the rst segment (XUS LDM...), also called the "master", has to be connected to the enclosure or control cabinet. This rst segment, which can either be for nger 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 con gured in the rst segment. Caution: 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.

Adjustment of response time (only available on light curtains XUS LD)

This function enables the user to reduce the scanning frequency of the safety light curtain in order to improve its immunity to interference associated to the environment. When low frequency is activated, an additional 9 ms to 40 ms (16 light beams to 256 light beams) is added to the normal response time. This function can be used in dif cult environmental conditions where electrical interference, smoke/fumes, dust or other particles can disrupt the operation of the safety light curtain.

WARNING: The activation of this function requires recalculation of the safety distance to compensate for the added response time. The safety distance must be increased. Ignoring this essential requirement could lead to serious injury, death or damage to material.

Safety light curtains, type 4 Light curtains basic XUS LB and advanced XUS LDM with solid-state output

Light curtain type			XUS LBQ6A•••• XUS LDMQ6A•••• (14 mm)	XUS LBR5A•••• (30 mm)	XUS LDMY5A•••• (30 mm)
Environment charac	teristics		(14 mm)		
Conformity to standards			ANSI/RIA R15.06, ANSI B11:19-1990, OSHA 1910.217(C), OSHA 1910.212,		
				EC 61496-2 and IEC 61508-1	I, 2 (Type 4 ESPE)
Certifications			C€, TUV, UL, CSA		00/055/550
European directives			Machinery directive 98/37/ EMC directive 89/336 EEC ROHS directive 2002/95/E		e 89/655/EEC and
Maximum safety level (1) Reliability data			PL = e/category 4 conforming SIL 3 conforming to EN/IEC	61508	
			PFH _d = 4.9E ⁻⁸ 1/h conformi	1g to EN/IEC 61508	
Ambient air temperature	Operating	°C	- 10+ 55		
	For storage	°C	- 25+ 75		
Relative humidity			95% maximum, without cor	ndensation	
Degree of protection			IP 65		
Shock and vibration esistance	Conforming to IEC 61496-1			55 Hz, amplitude: 0.35 ± 0.05	
Materials				ctrostatically applied red (RA mpregnated polycarbonate.	L 3000) polyester paint n
ixings			End brackets (included)		
Optical characteristi	cs				
Minimum detection capacity		mm	14 (nger)	30 (hand)	
Nominal sensing distance (Sn			0.37 or 3 m with PDM (2)	0.320 or 8 m with PDM <i>(2)</i>	
Height protected		mm	2801360	3202120	
Effective aperture angle (EAA))		2.5° at 3 m (3° when used with IP 67 protection tube)		
Light source			GaAIAs LED, 880 nm		
mmunity to ambient light			Conforming to IEC/EN 614	96-2	
Electrical characteris	stics				
Response time		ms	2341	2332	
Power supply			24 V ± 20% 2 A conform	ing to EN/IEC 61496 and EN	I/IEC 60204-1
	Transmitter	mA	285 (SELV: Safety Extra Lo	ow Voltage)	
	Receiver	Α	1.8 (with maximum load)		
Maximum current	Transmitter	mA	285		
consumption (no-load)	Receiver	mA	450		
mmunity to interference			Conforming to EN 61496-1		
Safety outputs OSSD (Output S	Signal Switching Devices)		2 solid-state PNP (N/O) ou	tputs ≤ 625 mA, 24 V (Sho	ort-circuit protected)
Auxiliary output			1 solid-state output 100 m/	A, == 24 V, PNP or NPN (depe	ending on model)
Monitoring activation of outpu (MPCE/EDM)	t switching devices		50 mA, == 24 V and start/re	start 10 mA	
Signalling	Transmitter		1 LED (power supply)		
	Receiver		4 LEDs (stop, run, interlock	x, ECS/B Blanking or FB Floa	ting Blanking)
Connections (3)					
Light curtains	Transmitter Receiver		M12, 5-pin, female connec		
Segments XUS LDS	Transmitter-receiver		M12, 4-pin, female connec		
Connection box XPS LCM1	Receiver		M12, 4-pin, female connec		
Pre-wired connectors c.s.a.	Transmitter-receiver	mm²	0.32 conductors with M12,		
	Receiver	mm²	0.32 conductors with M12,	· ·	
Jumper cables c.s.a.	Transmitter-receiver	mm²	+	4-pin, male/female connecto	rs
Cable resistance of pre-wired connectors		Ω	0.055 per metre for 0.32 m		
Cable lengths		m		cable lengths of 5, 10, 15 and cable length is 60 m, depending	

⁽¹⁾ Using an appropriate and correctly connected control system.
(2) PDM: Programming and Diagnostic Module, available as option, see page 30314/8.
(3) Pre-wired connectors to be ordered separately, see page 30314/8.

Characteristics (continued)

Safety detection solutions **Preventa**

Safety light curtains, type 4 Light curtains basic XUS LB and advanced XUS LDM with solid-state output

Light curtain type		XUS LBeeeee	XUS LDM•••••
Functions			
Functions	Accessible by cabling alone (1)	□ Automatic start □ Auxiliary output (PNP, status signalling □ Test (MTS: Monitoring Test Signal) □ Alignment aid by display of each light l □ LED display of operating modes and face.	beam broken
	Accessible via programming and diagnostic module	□ Auto/Manual □ Monitoring of external switching devices (EDM: External Device Monitoring) □ Light beam coding (A or B) □ Sensing distance (short, long) □ Programming and downloading of con guration settings, via programming and diagnostic module (PDM) □ Display of operating modes and faults by LED and/or PDM (2)	□ Auto/Manual, manual 1st cycle □ Monitoring of external switching devices (EDM: External Device Monitoring) □ Blanking (ECS/B) □ Monitored Blanking □ Floating Blanking (FB) □ Reduction of resolution □ Response time (normal, slow) □ Light beam coding (A or B) □ Sensing distance (short, long) □ Auxiliary output (alarm or status signalling, PNP or NPN) □ Start button (N/O or N/C, 0 V or 24 V) □ Muting (see page 30315/2) □ Cascadable versions with up to 4 segments total (256 light beams max., modular nger/hand) using segments XUS LDS □ Programming and downloading of con guration settings, via programming and diagnostic module (PDM) □ Display of operating modes and faults by LED and/or PDM (2)
Monitoring of external (EDM = External Device		Monitoring of the function (open or closed components.	d) as well as the response time of the power
"Test" function		Instigates the stop instruction of the light intrusion)	curtain by opening the contact (simulated
"Muting" function (inhi	bition)	□ With external module XPS LCM1150	☐ Integrated when using connection box XPS LCM1 for connecting sensors and "muting" indicator light ☐ or with module XPS LCM1150

3

⁽¹⁾ Not requiring use of PDM. (2) PDM: Programming and Diagnostic Module, available as option, see page 30314/8.

Safety light curtains, type 4
Basic light curtains XUS LB with solid-state output



XUS LBQ6A••••



★ Products available in stock

Transmitter-receiver pairs for finger protection (1) Detection capacity 14 mm. Sensing distance 0.3 to 7 m (or 3 m with PDM).

■ 2 PNP safety outputs

Height protected	Response time	Number of light beams	Auxiliary output	Reference (2)	Weight
mm	ms				kg
280	23	24	PNP	XUS LBQ6A0280 ★	1.790
320	23	32	PNP	XUS LBQ6A0320	1.970
360	23	36	PNP	XUS LBQ6A0360 ★	2.150
440	23	44	PNP	XUS LBQ6A0440 ★	2.500
520	23	52	PNP	XUS LBQ6A0520 ★	2.870
600	23	60	PNP	XUS LBQ6A0600 ★	3.220
720	32	72	PNP	XUS LBQ6A0720 ★	3.760
760	32	76	PNP	XUS LBQ6A0760	3.940
880	32	88	PNP	XUS LBQ6A0880 ★	4.470
920	32	92	PNP	XUS LBQ6A0920	4.650
960	32	96	PNP	XUS LBQ6A0960	4.830
1040	32	104	PNP	XUS LBQ6A1040	5.190
1120	32	112	PNP	XUS LBQ6A1120	5.540
1200	32	120	PNP	XUS LBQ6A1200	5.900
1360	41	136	PNP	XUS LBQ6A1360	6.180

Transmitter-receiver pairs for hand protection (1) Detection capacity 30 mm. Sensing distance 0.3 to 8 m (or 20 m with PDM).

2 PNP safety outputs

Height protected	Response time	Number of light beams	Auxiliary output	Reference (2)	Weight
mm	ms				kg
320	23	16	PNP	XUS LBR5A0320	1.970
360	23	18	PNP	XUS LBR5A0360 ★	2.150
440	23	22	PNP	XUS LBR5A0440	2.500
520	23	26	PNP	XUS LBR5A0520 ★	2.870
600	23	30	PNP	XUS LBR5A0600	3.220
680	23	34	PNP	XUS LBR5A0680 ★	3.580
760	23	38	PNP	XUS LBR5A0760	3.940
880	23	44	PNP	XUS LBR5A0880 ★	4.470
920	23	46	PNP	XUS LBR5A0920	4.650
1040	23	52	PNP	XUS LBR5A1040 ★	5.190
1200	23	60	PNP	XUS LBR5A1200 ★	5.900
1360	23	68	PNP	XUS LBR5A1360	6.620
1400	23	70	PNP	XUS LBR5A1400 ★	6.800
1520	32	76	PNP	XUS LBR5A1520	7.330
1560	32	78	PNP	XUS LBR5A1560 ★	7.500
1640	32	82	PNP	XUS LBR5A1640	7.870
1720	32	86	PNP	XUS LBR5A1720	8.230
1800	32	88	PNP	XUS LBR5A1800	8.590
1920	32	96	PNP	XUS LBR5A1920	9.120
2120	32	106	PNP	XUS LBR5A2120	10.020

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

Programming and Diagnostic Module (if required) and pre-wired connectors to be ordered separately, see page 30314/8.

Example: reference XUS LBR5A0320 becomes **XUS LBR5A0320R** for the receiver only. To order a transmitter only, add the letter **T** to the end of the reference for the corresponding transmitter-receiver pair.

Example: reference XUS LBR5A0320 becomes **XUS LBR5A0320T** for the transmitter only.

Other versions

Combining type 4 safety light curtains with external module for muting function.

See pages 30311/2 to 30311/9.

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

Safety light curtains, type 4 Advanced light curtains XUS LDM with solid-state output







★ Products available in stock

Transmitter-receiver pairs for finger protection (1) Detection capacity 14 mm. Sensing distance 0.3 to 7 m (or 3 m with PDM).

2 PNP safety outputs

Height protected	Response time		Number of light beams	Auxiliary output	Reference (2)	Weight
	Normal	Slow				
mm	ms	ms				kg
280	23	38	24	PNP/NPN	XUS LDMQ6A0280 ★	1.790
320	23	38	32	PNP/NPN	XUS LDMQ6A0320 ★	1.970
360	23	38	36	PNP/NPN	XUS LDMQ6A0360	2.150
440	23	38	44	PNP/NPN	XUS LDMQ6A0440 ★	2.500
520	23	38	52	PNP/NPN	XUS LDMQ6A0520 ★	2.900
600	23	38	60	PNP/NPN	XUS LDMQ6A0600	3.220
720	32	53	72	PNP/NPN	XUS LDMQ6A0720 ★	3.760
760	32	53	76	PNP/NPN	XUS LDMQ6A0760	3.940
880	32	53	88	PNP/NPN	XUS LDMQ6A0880 ★	4.470
920	32	53	92	PNP/NPN	XUS LDMQ6A0920	4.650
960	32	53	96	PNP/NPN	XUS LDMQ6A0960	4.830
1040	32	53	104	PNP/NPN	XUS LDMQ6A1040	5.190
1120	32	53	112	PNP/NPN	XUS LDMQ6A1120	5.540
1200	32	53	120	PNP/NPN	XUS LDMQ6A1200	5.900
1360	41	68	136	PNP/NPN	XUS LDMQ6A1360	6.620

Transmitter-receiver pairs for hand protection (1)

Detection capacity 30 mm. Sensing distance 0.3 to 20 m (or 8 m with PDM).

■ 2 PNP safety outputs

Height protected	Response time				Auxiliary output	Reference (2)	Weight
	Normal	Slow					
mm	ms					kg	
320	23	38	16	PNP/NPN	XUS LDMY5A0320	1.970	
360	23	38	18	PNP/NPN	XUS LDMY5A0360 ★	2.150	
440	23	38	22	PNP/NPN	XUS LDMY5A0440	2.500	
520	23	38	26	PNP/NPN	XUS LDMY5A0520 ★	2.870	
600	23	38	30	PNP/NPN	XUS LDMY5A0600	3.220	
680	23	38	34	PNP/NPN	XUS LDMY5A0680 ★	3.580	
760	23	38	38	PNP/NPN	XUS LDMY5A0760	3.940	
880	23	38	44	PNP/NPN	XUS LDMY5A0880 ★	4.470	
920	23	38	46	PNP/NPN	XUS LDMY5A0920	4.650	
1040	23	38	52	PNP/NPN	XUS LDMY5A1040 ★	5.190	
1200	23	38	60	PNP/NPN	XUS LDMY5A1200	5.900	
1360	23	38	68	PNP/NPN	XUS LDMY5A1360	6.620	
1400	23	38	70	PNP/NPN	XUS LDMY5A1400 ★	6.800	
1520	32	53	76	PNP/NPN	XUS LDMY5A1520	7.330	
1560	32	53	78	PNP/NPN	XUS LDMY5A1560	7.500	
1640	32	53	82	PNP/NPN	XUS LDMY5A1640	7.870	
1720	32	53	86	PNP/NPN	XUS LDMY5A1720	8.230	
1800	32	53	88	PNP/NPN	XUS LDMY5A1800	8.590	
1920	32	53	96	PNP/NPN	XUS LDMY5A1920	9.120	
2120	32	53	106	PNP/NPN	XUS LDMY5A2120	10.020	

Example: reference XUS LDMY5A0320 becomes XUS LDMY5A0320R for the receiver only. To order a transmitter only, add the letter **T** to the end of the reference for the corresponding

transmitter-receiver pair.

Example: reference XUS LDMY5A0320 becomes XUS LDMY5A0320T for the transmitter only.

Other versions

Combining type 4 safety light curtains with external module for muting function. See pages 30311/2 to 30311/9.

General: Characteristics: Dimensions: pages 38131/2 to 38131/7 pages 30314/2 and 30314/3 pages 30314/10 and 30314/11 Connections:

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

Programming and Diagnostic Module (if required) and pre-wired connectors to be ordered separately, see page 30314/8.

(2) To order a receiver only, add the letter R to the end of the reference for the corresponding

transmitter-receiver pair.

Safety light curtains, type 4 Segments XUS LDS for advanced light curtains XUS LDM



XUS LDM + XUS LDS

Universal XUS LDM light curtains, cascadable versions

Cascadable versions with up to 4 segments total (256 light beams max., modular nger/hand) using segments XUS LDS $\,$

Configuration of segments XUS LDS							
Two segments							
Number of light beams Response time							
ms							
0 to 65	23						
66 to 120	32						
121 to 174 41							
175 to 229	50						
230 to 256 59							

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

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

Schneider Electric

Safety light curtains, type 4 Segments XUS LDS for advanced light curtains XUS LDM



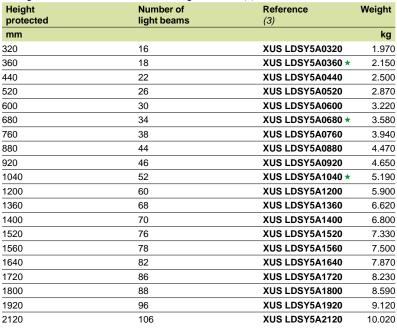
XUS LDSQ6A••••

Transmitter-receiver pairs for finger protection (1) Detection capacity 14 mm. Sensing distance depending on XUS LDM light curtain used ■ Segments for cascadable Universal light curtains (2) Height Process Westerness Westerness

Height protected	Number of light beams	Reference (3)	Weight
mm			kg
280	24	XUS LDSQ6A0280	1.790
320	32	XUS LDSQ6A0320	1.970
360	36	XUS LDSQ6A0360	2.150
440	44	XUS LDSQ6A0440	2.500
520	52	XUS LDSQ6A0520	2.870
600	60	XUS LDSQ6A0600	3.220
720	72	XUS LDSQ6A0720	3.760
760	76	XUS LDSQ6A0760	3.940
880	88	XUS LDSQ6A0880	4.470
920	92	XUS LDSQ6A0920	4.650
960	96	XUS LDSQ6A0960	4.830
1040	104	XUS LDSQ6A1040	5.190
1120	112	XUS LDSQ6A1120	5.540
1200	120	XUS LDSQ6A1200	5.900

Transmitter-receiver pairs for hand protection (1) Detection capacity 30 mm. Sensing distance depending on XUS LDM light curtain used

■ Segments for cascadable Universal light curtains (2)





XUS LDSY5A••••

Jumper cables to be ordered separately, see page 30314/8.

Example: reference XUS LDSY5A0320 becomes **XUS LDSY5A0320R** for the receiver only. To order a transmitter only, add the letter **T** to the end of the reference for the corresponding transmitter-receiver pair.

Example: reference XUS LDSY5A0320 becomes **XUS LDSY5A0320T** for the transmitter only.

[★] Products available in stock

⁽¹⁾ Supplied with 2 sets of 2 brackets and fixings.

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

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

Safety light curtains, type 4 Light curtains basic XUS LB and advanced XUS LDM/LDS with solid-state output

Separate components

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





★ Products available in stock

See pages 30308/2 to 30308/9.				
Accessories				
Description	For use with	Length m	Reference	Weight kg
Programming and Diagnostic Module (PDM)	Light curtains XUS LB/LDM	-	XUS LPDM ★	0.280
Holder fixing	Programming and diagnostic module XUS LPDM	-	XUS LZPDM ★	0.040
Pre-wired connectors	Transmitter type	5	XSZ BCT05 ★	0.390
for light curtains XUS LB/XUS LDM		10	XSZ BCT10 ★	0.690
XOO ED/XOO EDIN		15	XSZ BCT15 ★	1.030
		30	XSZ BCT30 ★	1.930
	Receiver type	5	XSZ BCR05 ★	0.450
		10	XSZ BCR10 ★	0.780
		15	XSZ BCR15 ★	1.100
		30	XSZ BCR30 ★	2.280
Jumper cables	Transmitter type	0.3	XSZ DCT003 ★	0.050
for segments XUS LDS M12 male/female,		0.5	XSZ DCT005 ★	0.070
4-pin, straight		1	XSZ DCT010 ★	0.110
		2	XSZ DCT020	0.210
		3	XSZ DCT030	0.300
		5	XSZ DCT050	0.490
	-	10	XSZ DCT100	0.950
	Receiver type	0.3	XSZ DCR003 ★	0.050
		0.5	XSZ DCR005 ★	0.070
		1	XSZ DCR010 ★	0.110
		2	XSZ DCR020	0.210
		3	XSZ DCR030	0.300
		5	XSZ DCR050	0.490
		10	XSZ DCR100	0.960
Jumpers for replacement of light curtains XUS LT by XUS LB or XUS LDM	Transmitter type Male/Female 5 pins	0,3	XSZ TBDMCT003 ★	0.060
	Receiver type Male/Female 8 pins	0,3	XSZ TBDMCR003 ★	0.060
Description	For use with		Unit reference	Weight kg
Replacement caps for M12 connector (Sold in lots of 10)	Light curtains XUS and segments XUS		XUS LZ600 ★	0.001
Replacement caps for M8 connector (programming and diagnostic module XUS LPDM connection to light curtains) (Sold in lots of 10)	Light curtains XUS LB/LDM and segments XUS LDS		XUS LZ610 ★	0.010
Fixings kit (2 brackets)	Light curtains XUS and segments XUS		XUS LZ228★	0.100
Sliding nuts (4 nuts) for rear or side xing with XUS LZ228	Light curtains XUS LB/LDM		XUS LZ330 ★	0,040
Arc suppressor (pair)	All types of light cur	tain	XUS LZ500 ★	0.020
IP 67 protection tube (see page 30314/9)				_
User guide on CD-ROM	All types of light cur	tain	XUS LZ450	0.010
Connection box for sensors and Muting indicator light (see page 30315/2)	Light curtains XUS	LDM	XPS LCM1 ★	0.190

Characteristics, references

Safety detection solutions Preventa

Safety light curtains, type 4
Protection tubes for light curtains with solid-state output
XUS LB/XUS LDM and segments XUS LDS

IP 67 protection tube and segments XUS L	s for light curtains XUS LB/XUS LDM DS		XUS LZD7••••
Environment c	haracteristics		
Air temperature	For operation	°C	0+ 40
	For storage	°C	- 25+ 70
Degree of protection			IP 67 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	Adverse weather, sunlight (UV)		Resistant
resistance	Humidity		
	Immersion in water		

References of IP 67 protection tubes

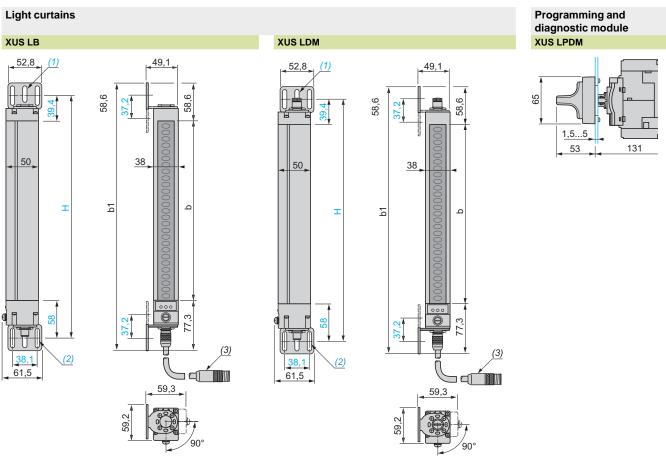


Description
IP 67 protection tubes for XUS LB/LDM transmitter- receiver pair and segments XUS LDS••• (0.90 Sn) (1) (Sold in lots of 2)

For use with	Height mm	Reference	Weight kg
XUS L●●6A0280	284.4	XUS LZD70280	2.650
XUS L●●●A0320	324.8	XUS LZD70320	2.810
XUS L●●●A0360	364.5	XUS LZD70360	2.960
XUS L●●●A0440	443.9	XUS LZD70440	3.270
XUS L●●●A0520	523.4	XUS LZD70520	3.580
XUS L●●●A0600	604.1	XUS LZD70600	3.890
XUS L●●5A0680	683.6	XUS LZD70680	4.190
XUS L●●6A0720	724	XUS LZD70720	4.350
XUS L●●●A0760	763	XUS LZD70760	4.500
XUS L●●●A0880	882.8	XUS LZD70880	4.960
XUS L●●●A0920	922.5	XUS LZD70920	5.120
XUS L●●6A0960	963.6	XUS LZD70960	5.270
XUS L●●●A1040	1042.9	XUS LZD71040	5.580
XUS L●●6A1120	1122.3	XUS LZD71120	5.890
XUS L●●●A1200	1203.8	XUS LZD71200	6.200
XUS L●●●A1360	1362	XUS LZD71360	6.810
XUS L●●5A1400	1401.7	XUS LZD71400	6.970
XUS L●●5A1520	1521.5	XUS LZD71520	7.430
XUS L●●5A1560	1563.3	XUS LZD71560	7.580
XUS L●●5A1640	1641.3	XUS LZD71640	7.890
XUS L●●5A1720	1720.8	XUS LZD71720	8.200
XUS L●●5A1800	1802.9	XUS LZD71800	8.510
XUS L●●5A1920	1922.8	XUS LZD71920	8.970
XUS L●●5A2120	2120.7	XUS LZD72120	9.740

⁽¹⁾ Sensing distance reduction coefficient to be taken into account for each pair of IP 67 protection tubes used.

Safety light curtains, type 4 Light curtains basic XUS LB and advanced XUS LDM with solid-state output



xus	b	b1	Н	Height protected
LB•••0280	284.4	420.4	381.7	280
LB•••0320	324.8	460.8	422.1	320
LB•••0360	364.5	500.5	461.8	360
LB•••0440	443.9	579.9	541.2	440
LB•••0520	523.4	659.4	620.7	520
LB•••0600	604.1	740.1	701.4	600
LB•••0680	683.6	819.6	780.9	680
LB•••0720	724	860	821.3	720
LB•••0760	763	899	860.3	760
LB•••0880	882.8	1018.8	980.1	880
LB•••0920	922.5	1058.5	1019.8	920
LB•••0960	963.6	1099.6	1060.9	960
LB•••1040	1042.9	1178.9	1140.2	1040
LB•••1120	1122.3	1258.3	1219.6	1120
LB•••1200	1203.8	1339.8	1301.1	1200
LB•••1360	1362	1498	1459.3	1360
LB•••1400	1401.7	1537.7	1499	1400
LB•••1520	1521.5	1657.5	1618.8	1520
LB•••1560	1563.3	1699.3	1660.6	1560
LB•••1640	1641.3	1777.3	1738.6	1640
LB•••1720	1720.8	1856.8	1818.1	1720
LB•••1800	1802.9	1938.9	1900.2	1800
LB•••1920	1922.8	2058.8	2020.1	1920
LB•••2120	2120.7	2256.7	2217.3	2120

XUS	b	b1	Н	Height protected
LDM••0280	284.4	420.4	381.7	280
LDM••0320	324.8	460.8	422.1	320
LDM••0360	364.5	500.5	461.8	360
LDM••0440	443.9	579.9	541.2	440
LDM••0520	523.4	659.4	620.7	520
LDM••0600	604.1	740.1	701.4	600
LDM••0680	683.6	819.6	780.9	680
LDM••0720	724	860	821.3	720
LDM••0760	763	899	860.3	760
LDM••0880	882.8	1018.8	980.1	880
LDM••0920	922.5	1058.5	1019.8	920
LDM••0960	963.6	1099.6	1060.9	960
LDM••1040	1042.9	1178.9	1140.2	1040
LDM••1120	1122.3	1258.3	1219.6	1120
LDM••1200	1203.8	1339.8	1301.1	1200
LDM••1360	1362	1498	1459.3	1360
LDM••1400	1401.7	1537.7	1499	1400
LDM••1520	1521.5	1657.5	1618.8	1520
LDM••1560	1563.3	1699.3	1660.6	1560
LDM••1640	1641.3	1777.3	1738.6	1640
LDM••1720	1720.8	1856.8	1818.1	1720
LDM••1800	1802.9	1938.9	1900.2	1800
LDM••1920	1922.8	2058.8	2020.1	1920
LDM••2120	2120.7	2256.7	2217.3	2120

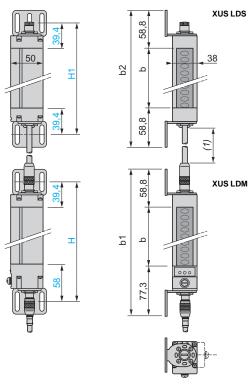
10

^{(1) 2} elongated holes 18.5 x 6.8 mm. (2) 4 elongated holes 23.2 x 6.8 mm.

⁽³⁾ M12 male connector on 0.27 m flying lead.

Safety light curtains, type 4 Segments XUS LDS for advanced XUS LDM light curtains. Protection tube

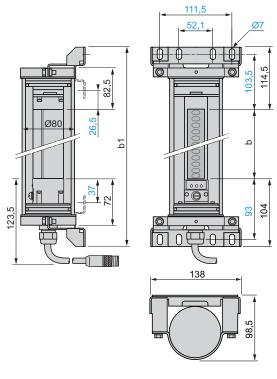
Cascadable segments XUS LDS



xus	b	b1	b2	Н	H1	Height protected
LDS•••0280	284.4	420.4	401.5	381.7	363.1	280
LDS•••0320	324.8	460.8	442.3	422.1	403.5	320
LDS•••0360	364.5	500.5	482	461.8	443.2	360
LDS•••0440	443.9	579.9	561.4	541.2	522.6	440
LDS•••0520	523.4	659.4	640.9	620.7	602.1	520
LDS•••0600	604.1	740.1	721.6	701.4	682.8	600
LDS•••0680	683.6	819.6	801.1	780.9	762.3	680
LDS•••0720	724	860	841.5	821.3	802.7	720
LDS•••0760	763	899	880.5	860.3	841.7	760
LDS•••0880	882.8	1018.8	1000.3	980.1	961.5	880
LDS•••0920	922.5	1058.5	1040	1019.8	1001.2	920
LDS•••0960	963.6	1099.6	1081.1	1060.9	1042.3	960
LDS•••1040	1042.9	1178.9	1160.4	1140.2	1121.6	1040
LDS•••1120	1122.3	1258.3	1239.8	1219.6	1201	1120
LDS•••1200	1203.8	1339.8	1321.3	1301.1	1282.5	1200
LDS•••1360	1362	1498	1479.5	1459.3	1440.7	1360
LDS•••1400	1401.7	1537.7	1519.2	1499	1480.4	1400
LDS•••1520	1521.5	1657.5	1639	1618.8	1600.2	1520
LDS•••1560	1563.3	1699.3	1680.8	1660.6	1679.2	1560
LDS•••1640	1641.3	1777.3	1758.8	1738.6	1720	1640
LDS•••1720	1720.8	1856.8	1838.3	1818.1	1799.5	1720
LDS•••1800	1802.9	1938.9	1920.4	1900.2	1881.6	1800
	1922.8	2058.8	2040.3	2020.1	2001.5	1920
LDS•••1920	1322.0	2000.0	2010.0		2001.0	1020

(1) Flexible 0.11 m long cable.

Protection tube for light curtains XUS LB/XUS LDM and segments XUS LDS XUS LZD7••••

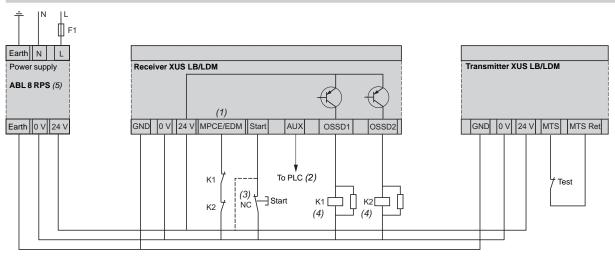


XUS	b	b1	
LZD70280	284.4	502.8	
LZD70320	324.8	543.2	
LZD70360	364.5	582.9	
LZD70440	443.9	662.3	
LZD70520	523.4	741.8	
LZD70600	604.1	822.5	
LZD70680	683.6	902	
LZD70720	724	942.4	
LZD70760	763	981.4	
LZD70880	882.8	1101.2	
LZD70920	922.5	1140.9	
LZD70960	963.6	1182	

XUS	b	b1
LZD71040	1042.9	1261.3
LZD71120	1122.3	1340.7
LZD71200	1203.8	1422.2
LZD71360	1362	1580.4
LZD71400	1401.7	1620.1
LZD71520	1521.5	1739.9
LZD71560	1563.3	1781.7
LZD71640	1641.3	1859.2
LZD71720	1720.8	1939.2
LZD71800	1802.9	2021.2
LZD71920	1922.8	2141.2
LZD72120	2120.7	2338.4

Safety light curtains, type 4 Light curtains basic XUS LB and advanced XUS LDM with solid-state output

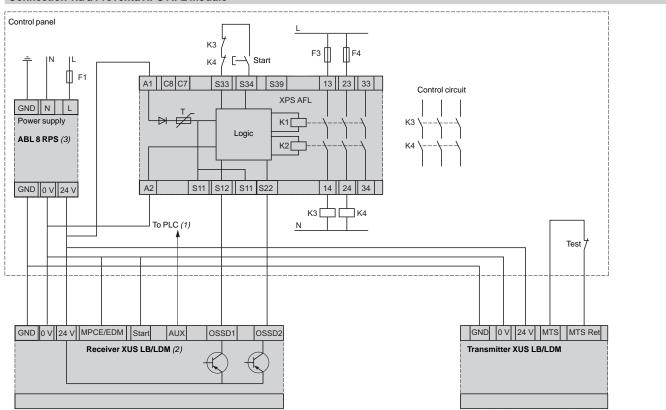
Direct connection with XUS LB/LDM •••



- (1) For testing prior to installation, the user can select MPCE/EDM OFF (default factory setting). In this 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 mounting kit. (5) The power supply must conform to EN/IEC 61496 and EN/IEC 60204-1 standards.

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

Connection via a Preventa XPS AFL 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.
- (3) The power supply must conform to EN/IEC 61496 and EN/IEC 60204-1 standards.

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

Safety light curtains, type 4 Light curtains basic XUS LB and advanced XUS LDM with solid-state output

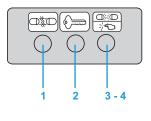
Transmitter Transmitter connector MTS return (1) BR WH GR Transmitter status indicator 1 Yellow LED

(1) Light curtain test input.

Receiver

Auxiliary Output Neceiver connector Start YE OSSD2 WH GR JI BN ---- + 24 V BK BV ---- 0 V

Receiver status indicator



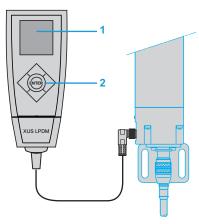
- 1 Blanking: Orange LED
- 2 Interlock or Alarm: Yellow LED
- 3-4 Machine run: Green LED Machine stop: Red LED

Programming and diagnostic module

OSSD1

Description and connection to light curtains XUS LB/LDM

XUS LPDM



- 1 Screen
- 2 Navigation button for displaying menus and selecting functions

Substitution table

Light curtains with closest functionalities

Safety detection solutions Preventa

Safety light curtains, type 4 Light curtains basic XUS LB and advanced XUS LDM with solid-state output

Basic light curtains	
Detection capacity 14 mm	
Old light curtain	New light curtain
XUS LTQ6A0260, XUS LTQ6B0260	XUS LBQ6A0280
XUS LTQ6A0350, XUS LTQ6B0350	XUS LBQ6A0320, XUS LBQ6A0360
XUS LTQ6A0435, XUS LTQ6B0435	XUS LBQ6A0440
XUS LTQ6A0520, XUS LTQ6B0520	XUS LBQ6A0520
XUS LTQ6A0610, XUS LTQ6B0610	XUS LBQ6A0600
XUS LTQ6A0700, XUS LTQ6B0700	XUS LBQ6A0720
XUS LTQ6A0785, XUS LTQ6B0785	XUS LBQ6A0760
XUS LTQ6A0870, XUS LTQ6B0870	XUS LBQ6A0880, XUS LBQ6A0920
XUS LTQ6A0955, XUS LTQ6B0955	XUS LBQ6A0960
XUS LTQ6A1045, XUS LTQ6B1045	XUS LBQ6A1040
XUS LTQ6A1130, XUS LTQ6B1130	XUS LBQ6A1120
XUS LTQ6A1215, XUS LTQ6B1215	XUS LBQ6A1200
XUS LTQ6A1305, XUS LTQ6B1390, XUS LTQ6A1390, XUS LTQ6B1390	XUS LBQ6A1360
Detection capacity 30 mm	
Old light curtain	New light curtain
XUS LTR5A0350, XUS LTR5B0350	XUS LBR5A0320, XUS LBR5A0360, XUS LBR5A0440
XUS LTR5A0520, XUS LTR5B0520	XUS LBR5A0520, XUS LBR5A0600
XUS LTR5A0700, XUS LTR5B0700	XUS LBR5A0680, XUS LBR5A0760
XUS LTR5A0870, XUS LTR5A0870,	XUS LBR5A0880, XUS LBR5A0920
XUS LTR5A1045, XUS LTR5B1045	XUS LBR5A1040
XUS LTR5A1215, XUS LTR5B1215	XUS LBR5A1200, XUS LBR5A1360
XUS LTR5A1390, XUS LTR5B1390	XUS LBR5A1400, XUS LBR5A1520
XUS LTR5A1570, XUS LTR5B1570	XUS LBR5A1560, XUS LBR5A1640
XUS LTR5A1745, XUS LTR5B1745	XUS LBR5A1720, XUS LBR5A1800
XUS LTR5A1920, XUS LTR5B1920	XUS LBR5A1920
XUS LTR5A2095, XUS LTR5B2095	XUS LBR5A2120

Note: Caution, the characteristics of the ranges (optics, connections, dimensions, fixings,

ranges (opines, coninections, dimensions, names, functions, etc.) are not exactly the same.

Please refer to the detailed characteristics of the XUS LB•••••• and XUS LD••••••

ranges and associated accessories when replacing a light curtain from the XUS LT•••••• range.

Substitution table

Light curtains with closest functionalities

Safety detection solutions Preventa

Safety light curtains, type 4 Light curtains basic XUS LB and Advanced XUS LDM with solid-state output

Advanced light curtains	
Detection capacity 30 mm	
Old light curtain	New light curtain
XUS LTY5A0350, XUS LTY5B0350	XUS LDMY5A0320, XUS LDMY5A0360, XUS LDMY5A0440
XUS LTY5A0520, XUS LTY5B0520	XUS LDMY5A0520, XUS LDMY5A0600
XUS LTY5A0700, XUS LTY5B0700	XUS LDMY5A0680, XUS LDMY5A0760
XUS LTY5A0870, XUS LTY5B0870	XUS LDMY5A0880, XUS LDMY5A0920
XUS LTY5A1045, XUS LTY5B1045	XUS LDMY5A1040
XUS LTY5A1215, XUS LTY5B1215	XUS LDMY5A1200, XUS LDMY5A1360
XUS LTY5A1390, XUS LTY5B1390	XUS LDMY5A1400, XUS LDMY5A1520
XUS LTY5A1570, XUS LTY5B1570	XUS LDMY5A1560, XUS LDMY5A1640
XUS LTY5A1745, XUS LTY5B1745	XUS LDMY5A1720, XUS LDMY5A1800
XUS LTY5A1920, XUS LTY5B1920	XUS LDMY5A1920
XUS LTY5A2095, XUS LTY5B2095	XUS LDMY5A2120

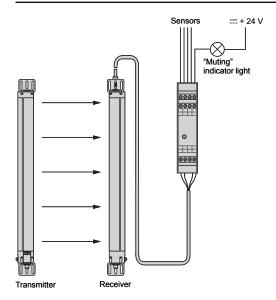
Note: Caution, the characteristics of the ranges (optics, connections, dimensions, fixings, functions, etc.) are not exactly the same.

Please refer to the detailed characteristics of the XUS LB•••••• and XUS LD•••••• ranges and associated accessories when replacing a light curtain from the XUS LT•••••• range.

Operating principle

Safety detection solutions

Connection box Preventa XPS LCM1 For "muting" function on light curtains type XUS LDM



Operating principle

Universal XUS LDM light curtains have an integrated "muting" function that is configurable using the programming and diagnostic module XUS LPDM. 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 safety light curtain, a connection box XPS LCM1, which is connected directly to the top of the light curtain receiver, enables the cabling of 2 to 4 "muting" sensors as well as an indicator light. In the event of a sequence error the "muting" indicator light flashes (1 second interval) and turning the Start key switch off and back 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 XUS LDM light curtain (solid-state safety outputs). In addition to the safety outputs, the light curtain incorporates signalling LEDs and an auxiliary output (alarm or status signalling) for sending system status information to the PLC. Four LEDs on the light curtain and one on the front face of connection box XPS LCM1 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, if included in the light curtain configuration, the Start key switch operated.

The "muting" function cannot be activated by supplying 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 milliseconds to 5 seconds in increments of 50 milliseconds). 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. Whilst the "muting" function is activated, a "muting" status indicator light is controlled by the connection box XPS LCM1. 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.

Entry direction Entry direction Materials trolley A B O O O Materials trolley A B O O O Materials trolley

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: XUK 0ARCTL2 (sensing distance 30 m) + XUK 0ARCTL2T □ polarised reflex: XUK 0ARCTL2 (sensing distance 5 m) + reflector XUZ C50 or mechanical limit switches with contacts.
- \blacksquare dM \le 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 connection box XPS LCM1.
- 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

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Safety detection solutions Connection box Preventa XPS LCM1 For "muting" function on light curtains type XUS LDM

Connection box type			XPS LCM1
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	For operation	°C	0+ 55
	For storage	°C	-25+75
Degree of protection	Terminals		IP 20
conforming to IEC 60529	Enclosure		IP 20
Power supply by light curtain	Voltage	٧	24 (- 20+ 20 %)
XUS LDM	Maximum current	mA	30
Maximum consumption		W	0.7
Rated insulation voltage (Ui)		V	500
Rated impulse withstand volta	ige (Uimp)	kV	1.1
Shock resistance	Conforming to IEC 60068-2-6	gn	6 (1055 Hz)
Vibration resistance	Conforming to IEC 60068-2-29	gn	10 (16 ms)
Number of light curtains that o	an be connected		1 transmitter-receiver pair
Inputs for "muting" sensors	- d		Oha Amarikan William William
 number of inputs to be monitore supply voltage of sensors 	eu	V	2 to 4 per "muting" function
- output current of each sensor		mA	< 20
		IIIA	
Type of "muting" sensors Synchronisation time of "muti			Thru-beam, polarised reflex or sensors with volt-free contacts 50 to 500 (configurable in light curtain XUS LDM in increments of 50 ms)
•	ing" sensors	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 outpu	t		1 NPN
"Muting" indicator light power		w	1 to 7 max.
"Muting" indicator light type			LED or filament bulb
Signalling			1LED
Connection	Туре		Captive screw clamp terminals, non removable
1-wire connection	Without cable end		Solid or flexible cable: 0.140.2.5 mm ²
	With cable end		Without bezel, flexible cable: 0.252.5 mm ²
	With cable end		With bezel, flexible cable: 0.251.5 mm ²
2-wire connection	Without cable end		Without bezel, flexible cable: 0.251 mm ²
	Without cable end		Double, with bezel, flexible cable: 0.51.5 mm ²

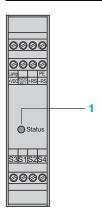
Presentation: page 30315/2 References: page 30315/4 Dimensions: pages 30315/4 Connections: pages 30315/5 to 30315/7

version: 3.0

Schneider

Description, references, dimensions

Safety detection solutions Connection box Preventa XPS LCM1 For "muting" function on light curtains type XUS LDM



Description

XPS LCM1

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

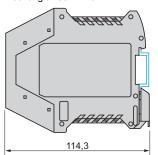
References	5				
Connection b	ох				
Description	Type of terminal block connection	"Muting" indicator light output	Supply	Reference	Weight kg
Connection box for "muting" function	Non removable	1 NPN	24 V	XPS LCM1	0.190

Connection cables			
Description	Length m	Reference	Weight kg
Pre-wired connectors for connection	10	XSZ DCRM10	0.690
between the XPS LCM1 module and the	15	XSZ DCRM15	1.030
XUS LD receiver	30	XSZ DCRM30	1.930

Dimensions

XPS LCM1

Mounting on 35 mm rail





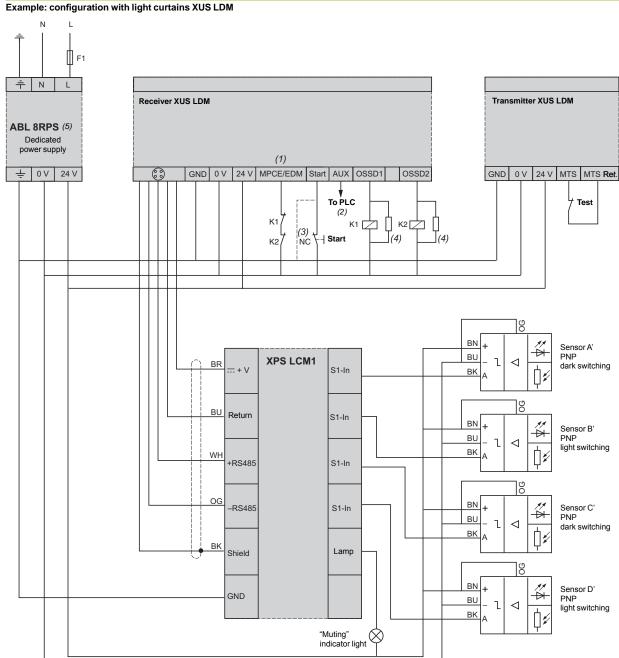
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Schneider

Safety detection solutions Connection box Preventa XPS LCM1

Connection box Preventa XPS LCM1 For "muting" function on light curtains type XUS LDM

Connection of light curtains XUS LDM with connection box XPS LCM1



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

Presentation:	Characteristics:	References:	Dimensions:	
page 30315/2	page 30315/3	page 30315/4	page 30315/4	
30315-EN.indd		Schneider	version: 3.0	5

⁽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.

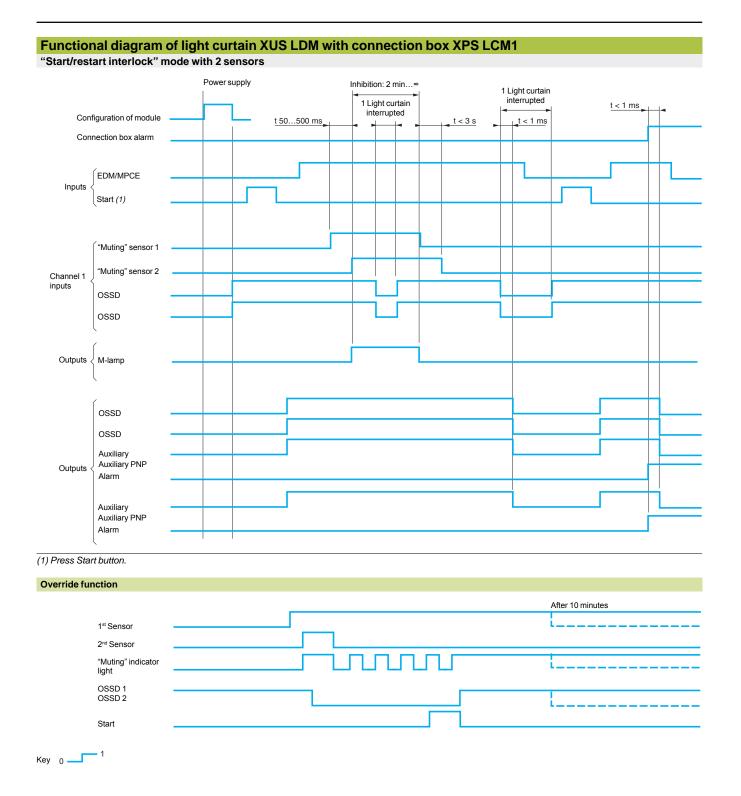
⁽⁴⁾ The K1 and K2 coils must be protected using the arc suppressors included in the mounting kit.

⁽⁵⁾ The power supply must conform to EN/IEC 61496 and EN/IEC 60204-1 standards.

Functional diagrams

Safety detection solutions Connection box Preventa XPS LCM1

Connection box Preventa XPS LCM1 For "muting" function on light curtains type XUS LDM

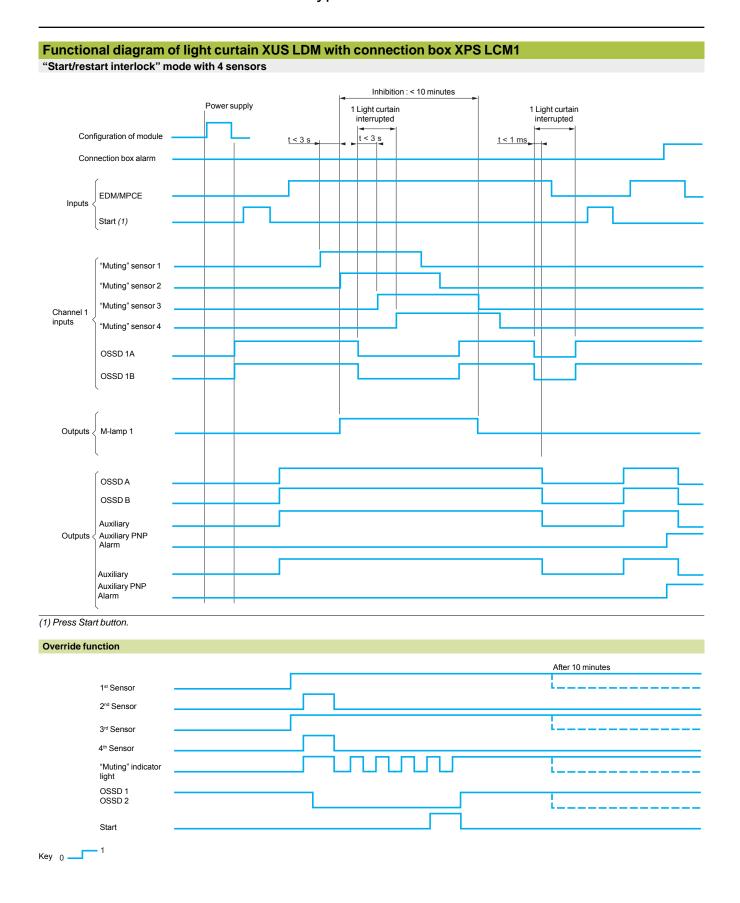


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Functional diagrams (continued)

Safety detection solutions Connection box Preventa XPS LCM1

Connection box Preventa XPS LCM1 For "muting" function on light curtains type XUS LDM



Presentation: Characteristics: References: Dimensions: page 30315/2 page 30315/4 page 30315/4

30315-EN.indd Schneider version: 3.0 7

Safety light curtains, type 4 Compact light curtains XUS LP with solid-state output

Conformity to standards Conformity to standards Conformity to standards European directives Machinery directive 98/37/EC, Work equipment directive 89/65/EEC and EMC directive 98/38/EC, Work equipment directive 89/65/EEC and EMC directive 98/38/EEC, Work equipment directive 98/65/EEC and EMC directive 98/65/EEC and	Light curtain type			XUS LP••••
Centifications Certifications Enter See 1489-12 to 1994 at 1896 Enterpean directive 89/35/CL, Work equipment directive 89/35/SEC and EMC directive 99/33/SE ECC Maximum safety level (1) Reliability data PFI4 = 2/EF-1/N conforming to ENISO 13/849-1 SIL 3 conforming to ENISO 14/849-1 SIL 3 co		racteristics		
ENIDEC 61498-1-2 for type 4 ESPE				ANSI/RIA R15.06, ANSI B11:19-1990, OSHA 1910.217(C), OSHA 1910.212,
Machineny directives 98/37/ECN, Work equipment directives 99/65/EEC and EMC directives 98/33/ECN, Work equipment directives 99/65/EEC and EMC directives 98/33/ECN, Work equipment directives 99/65/EEC and EMC directives 98/33/EECN, Work equipment directives 99/65/EEC and EMC directives 98/33/EECN, Work equipment directives 99/65/EEC and EMC directives 98/33/EECN per services 98/EEC 6149/65				
directive 80-336 EEC				
Reliability data Ambient air temperature Operating 'C' O + 55 For storage 'C' O + 55 Relative humidity Degree of protection Shock and vibration Conforming to EC 61496-1 Shock resistance: 10 gn. impulse 16 ms. Shock and vibration resistance Shock and vibration Conforming to EC 61496-1 Vibration resistance: 10 57 Hz. amplitude: 0.35 ± 0.05 mm Materials Casing: aluminium with electrostatically applied red (RAL 3000) polyester paint risis end capse. 20% bregistas impregnated polyarabronate. From face: acrylic. Optical Characteristics Minimum detection capacity Nominal sensing distance (Sn) mm 300, 400, 500, 800 and single beam (Body protection) Optical Characteristics Minimum detection capacity Nominal sensing distance (Sn) mm 300, 400, 500, 800 and single beam (Body protection) Optical Characteristics Relight protected Effective aperture angle (EAA) U. 2.7 ± 4.3 m U. 2.9 ± 3.1 m U. 2.9 ± 3.	European directives			
Ambient air temperature	Maximum safety level (1)			
For storage Relative humidity Degree of protection Shock and vibration Conforming to IEC 61496-1 Vibration resistance: 10 gn, impulse 16 ms, vibration resistance with the storage authoritum with electrostatically appeider and (RAL 3000) polyestar paint his relations. Casing authoritum with electrostatically appeider and (RAL 3000) polyestar paint his relations. Casing authoritum with electrostatically appeider and (RAL 3000) polyestar paint his relations. Casing authoritum with electrostatically appeider and (RAL 3000) polyestar paint his relations. Casing authoritum with electrostatically appeider and (RAL 3000) polyestar paint his relations. Casing authoritum with electrostatically appeider and (RAL 3000) polyestar paint his relations. Casing authoritum with electrostatically appeider and (RAL 3000) polyestar paint his relationship. Optical characteristics Minimum detection capacity mm 300, 400, 500, 600 and single beam (Body protection) Nominal sensing distance (Sn) mm 300, 400, 500, 600 and single beam (Body protection) Nominal sensing distance (Sn) mm 301, 400, 500, 600 and single beam (Body protection) Nominal sensing distance (Sn) mm 301, 400, 500, 600 and single beam (Body protection) Nominal sensing distance (Sn) mm 301, 400, 500, 600 and single beam (Body protection) Nominal sensing distance (Sn) mm 302, 400, 500, 600 and single beam (Body protection) Nominal sensing distance (Sn) mm 303, 400, 500, 600 and single beam (Body protection) Nominal sensing distance (Sn) mm 304, 400, 500, 600 and single beam (Body protection) Nominal sensing distance (Sn) mm 304, 400, 500, 600 and single beam (Body protection) Nominal sensing distance (Sn) mm 304, 400, 500, 600 and single beam (Body protection) Note of the sensitive sen	Reliability data			PFH _d = 2.7E ⁻⁹ 1/h conforming to EN/IEC 61508
Relative humidity 95% maximum, without condensation 196	Ambient air temperature	Operating	°C	0+ 55
Pege of protection		For storage	°C	- 25+ 75
Shock and vibration Conforming to IEC 61496-1 Shock resistance: 10 gp, impulse 16 ms, vibration resistance Shock resistance: 10 gp, impulse 16 ms, vibration resistance: 10 ms, 20 Hz, amplitude: 0.35 ± 0.05 mm Vibration resistance: 10 ms, 20 Hz, amplitude: 0.35 ± 0.05 mm Vibration resistance: 10 ms, 20 Hz, amplitude: 0.35 ± 0.05 mm Vibration resistance: 10 ms, 20 Hz, amplitude: 0.35 ± 0.05 mm Vibration resistance: 10 ms, 20 Hz, amplitude: 0.35 ± 0.05 mm Vibration resistance: 10 ms, 20 Hz, amplitude: 0.35 ± 0.05 mm Vibration resistance: 10 ms, 20 Hz, amplitude: 0.35 ± 0.05 mm Vibration resistance: 10 ms, 20 Hz, amplitude: 20 Hz, am	Relative humidity			95% maximum, without condensation
Vibration resistance: \(\)	Degree of protection			IP 65 and IP 67
end caps: 20% breglass impregnated polycarbonate. Front face: acrylic.		Conforming to IEC 61496-1		
Optical characteristics Minimum detection capacity mm 300, 400, 500, 600 and single beam (Body protection) Nominal sensing distance (Sn) m 3,8 to 20 or 0.8 to 70 depending on con guration and 0.8 to 8 m for light cutrains with passive receiver Height protected Depending on number of light beams, see table on page 38131-EN/3 Effective aperture angle (EAA) 2.5° at 3 m Light source GaAIAS LED, 850 nm Immunity to ambient light Conforming to EN/IEC 61496-2 Electrical characteristics Response time ms < 16< 24 depending on light beam coding selected Esponse time ms < 16< 24 depending on light beam coding selected Power supply Transmitter mA 100 (SELV: Salety Extra Low Voltage) Receiver A 1.8 (with maximum load) Maximum current Transmitter mA 100 (SELV: Salety Extra Low Voltage) Conforming to EN/IEC 61496-1 Salety output SoSD (Cutput Signal Switching Devices) 2 solid-state output 100 mA, ::::24 V (Short-circuit protected) Auxiliary output 1 solid-state output 100 mA, ::::24 V (Short-circuit protected) MIZE-Spin, male connector or terminal block MRC	Materials			Casing: aluminium with electrostatically applied red (RAL 3000) polyester paint nish end caps: 20% breglass impregnated polycarbonate. Front face: acrylic.
Minimum detection capacity mm 300, 400, 500, 600 and single beam (Body protection) m 0.8 to 20 or 0.8 to 70 depending on con guration and 0.8 to 8 m for light cutarians with passive receiver depth protected Depending on number of light beams, see table on page 38131-EN/3 Effective aperture angle (EAA) 2.5° at 3 m Depending on number of light beams, see table on page 38131-EN/3 Effective aperture angle (EAA) 2.5° at 3 m Conforming to EN/IEC 61496-2 Electrical characteristics	Fixings			End brackets (included)
Minimum detection capacity mm 300, 400, 500, 600 and single beam (Body protection) m 0.8 to 20 or 0.8 to 70 depending on con guration and 0.8 to 8 m for light cutarians with passive receiver depth protected Depending on number of light beams, see table on page 38131-EN/3 Effective aperture angle (EAA) 2.5° at 3 m Depending on number of light beams, see table on page 38131-EN/3 Effective aperture angle (EAA) 2.5° at 3 m Conforming to EN/IEC 61496-2 Electrical characteristics	Optical characteris	tics		
Mominal sensing distance (Sn)			mm	300, 400, 500, 600 and single beam (Body protection)
Depending on number of light beams, see table on page 38131-EN/3			_	0.8 to 20 or 0.8 to 70 depending on con guration and
Light source GaAIAs LED, 850 nm Conforming to EN/IEC 61496-2	Height protected			·
Immunity to amblent light Conforming to EN/IEC 61496-2	Effective aperture angle (EA	A)		2.5° at 3 m
Securical characteristics	Light source			GaAlAs LED, 850 nm
Response time ms < 16< 24 depending on light beam coding selected				Conforming to EN/IEC 61496-2
Power supply Transmitter Receiver A 1.6 (with maximum load)	Electrical characte	ristics		
Transmitter Receiver A 1.6 (with maximum load)	Response time		ms	< 16< 24 depending on light beam coding selected
Receiver Transmitter mA 1.6 (with maximum load)	Power supply			=== 24 V ± 20% 2 A conforming to EN/IEC 61496 and EN/IEC 60204-1
Maximum current consumption (no-load) Transmitter Receiver mA 100 Immunity to interference 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 Signalling 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 Conductor c.s.a. Transmitter-receiver pre-wired connector 0.35. Tinned wires. Cable resistance Transmitter-receiver Ω Cable lengths Transmitter-receiver Ω O.955 per metre for 0.35 mm² c.s.a. cable Pre-wired connectors with cable lengths of 5, 10, 15 and 30 m are available separately. The maximum cable length is 120 m, depending on the load current and power supply. Functions Functions Start:				` ' '
consumption (no-load) Receiver mA 300 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 (MPCE/EDM) Transmitter 1 LED (power supply) Signalling Transmitter 1 LED (stop, run, interlock) and a 2-digit display for diagnostics Connections (2) Transmitter M12, 8-pin, male connector or terminal block Receiver M12, 8-pin, male connector or terminal block Conductor c.s.a. Transmitter-receiver pre-wired connectors with cable lengths of 5, 10, 15 and 30 m are available separately. The maximum cable length is 120 m, depending on the load current and power supply. Functions Functions Start:				
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 (MPCE/EDM) 50 mA, 24 V Signalling Transmitter 1 LED (power supply) Receiver 3 LEDs (stop, run, interlock) and a 2-digit display for diagnostics Connections (2) Transmitter receiver (Pre-wired connector or terminal block) Conductor c.s.a. Transmitter-receiver pre-wired connector or terminal block Cable resistance Transmitter-receiver 0 .0.55 per metre for 0.35 mm² c.s.a. cable Cable lengths Pre-wired connectors with cable lengths of 5, 10, 15 and 30 m are available separately. The maximum cable length is 120 m, depending on the load current and power supply. Functions Start:		Receiver	MA	1111
Auxiliary output 1 solid-state output 100 mA, 24 V, PNP	-	ut Signal Switching Devices)		-
Monitoring activation of output switching devices (MPCE/EDM) 50 mA, == 24 V		it digital dwitterining Devices)		
Receiver 3 LEDs (stop, run, interlock) and a 2-digit display for diagnostics	Monitoring activation of out	put switching devices		
Connections (2) Transmitter Receiver M12, 5-pin, male connector or terminal block Conductor c.s.a. Transmitter-receiver pre-wired connector mm² 0.35. Tinned wires. Cable resistance Transmitter-receiver Ω 0.055 per metre for 0.35 mm² c.s.a. cable Cable lengths m Pre-wired connectors with cable lengths of 5, 10, 15 and 30 m are available separately. The maximum cable length is 120 m, depending on the load current and power supply. Functions Functions Start:	Signalling	Transmitter		1 LED (power supply)
Receiver M12, 8-pin, male connector or terminal block		Receiver		3 LEDs (stop, run, interlock) and a 2-digit display for diagnostics
Conductor c.s.a. Transmitter-receiver pre-wired connector mm² 0.35. Tinned wires. Cable resistance Transmitter-receiver Ω 0.055 per metre for 0.35 mm² c.s.a. cable Cable lengths m Pre-wired connectors with cable lengths of 5, 10, 15 and 30 m are available separately. The maximum cable length is 120 m, depending on the load current and power supply. Functions Functions Start:	Connections (2)			
Cable resistance Transmitter-receiver Ω 0.055 per metre for 0.35 mm² c.s.a. cable Cable lengths m Pre-wired connectors with cable lengths of 5, 10, 15 and 30 m are available separately. The maximum cable length is 120 m, depending on the load current and power supply. Functions Start:				
Test" functions Pre-wired connectors with cable lengths of 5, 10, 15 and 30 m are available separately. The maximum cable length is 120 m, depending on the load current and power supply. Pre-wired connectors with cable lengths of 5, 10, 15 and 30 m are available separately. The maximum cable length is 120 m, depending on the load current and power supply. Start:	Conductor c.s.a.		mm²	0.35. Tinned wires.
Start:	Cable resistance	Transmitter-receiver	Ω	·
Functions Start: - Auto/Manual, manual 1st cycle, - Monitoring of external switching devices (EDM: External Devices Monitoring), - Test (MTS: Monitoring Test Signal) for XUS LPZ only, - Alignment aid by display of each light beam broken, - 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 con guration switches. 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 Parameterable using con guration switches. "Test" function Instigates the stop instruction of the light curtain by opening the contact (simulated	Cable lengths		m	separately. The maximum cable length is 120 m, depending on the load current and
Functions Start: - Auto/Manual, manual 1st cycle, - Monitoring of external switching devices (EDM: External Devices Monitoring), - Test (MTS: Monitoring Test Signal) for XUS LPZ only, - Alignment aid by display of each light beam broken, - 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 con guration switches. 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 Parameterable using con guration switches. "Test" function Instigates the stop instruction of the light curtain by opening the contact (simulated	Functions			
- Auto/Manual, manual 1st cycle, - Monitoring of external switching devices (EDM: External Devices Monitoring), - Test (MTS: Monitoring Test Signal) for XUS LPZ only, - Alignment aid by display of each light beam broken, - 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 con guration switches. 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. Parameterable using con guration switches. "Test" function Instigates the stop instruction of the light curtain by opening the contact (simulated				Start ⁻
(EDM = External Devices Monitoring) components. Parameterable using con guration switches. "Test" function Instigates the stop instruction of the light curtain by opening the contact (simulated	i dilotiono			- Auto/Manual, manual 1st cycle, - Monitoring of external switching devices (EDM: External Devices Monitoring), - Test (MTS: Monitoring Test Signal) for XUS LPZ only, - Alignment aid by display of each light beam broken, - Display of operating modes and alarm by LEDs and 2-digit display. Selection of Auto/Manual, relay monitoring, alarm or auxiliary output functions, light
	"Test" function			

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

⁽²⁾ Pre-wired female connectors to be ordered separately, see page 30313-EN/5.

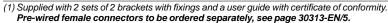
Safety light curtains, type 4
Compact light curtains XUS LP with solid-state output,
with connector

Transmitter-receiver pairs for body protection (1)

Detection capacity 300, 400, 500, 600 mm and single beam. Sensing distance 0.8 to 20 m and 0.8 to 70 m (depending on configuration)

■ 2 PNP safety outputs

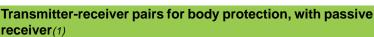
Detection capacity		onse ti beam d		Number of light beams	Auxiliary output	Reference (2)	Weight
	Α	В	С				
mm	ms	ms	ms				kg
_	< 24	< 20	< 16	1	PNP	XUS LPZ1AM	4.500
500	< 24	< 20	< 16	2	PNP	XUS LPZ2A0500M	6.300
600	< 24	< 20	< 16	2	PNP	XUS LPZ2A0600M	6.700
400	< 24	< 20	< 16	3	PNP	XUS LPZ3A0400M	7.200
500	< 24	< 20	< 16	3	PNP	XUS LPZ3A0500M	8.600
300	< 24	< 20	< 16	4	PNP	XUS LPZ4A0300M	8.200
300	< 24	< 20	< 16	5	PNP	XUS LPZ5A0300M	9.500
300	< 24	< 20	< 16	6	PNP	XUS LPZ6A0300M	10.400



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

Example: reference XUS LPZ2A0600M becomes XUS LPZ2A0600MR for the receiver only. To order a transmitter only, add the letter **T** to the end of the reference for the corresponding transmitter-receiver pair.

Example: reference XUS LPZ2A0600M becomes XUS LPZ2A0600MT for the transmitter only.



Detection capacity 500 and 600 mm. Sensing distance 0.8 to 8 m

■ 2 PNP safety outputs

Detection capacity	Response time Light beam coding		Number of light beams	Auxiliary output	Reference (2)	Weight	
	A	В	С				
mm	ms	ms	ms				kg
500	< 24	< 20	< 16	2	PNP	XUS LPB2A500M	6.300
600	< 24	< 20	< 16	2	PNP	XUS LPB2A600M	6.700

(1) Supplied with 2 sets of 2 brackets with fixings and a user guide with certificate of conformity. **Pre-wired female connectors to be ordered separately, see page 30313-EN/5.**

(2) To order a passive receiver, replace the letter M by the letter P to the end of the reference for the corresponding transmitter-receiver pair.

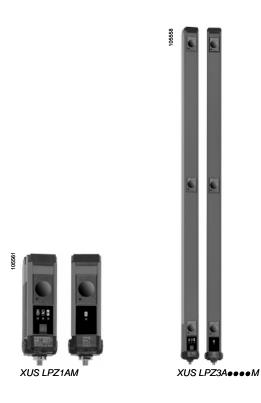
Example: reference XUS LPB2A500M becomes XUS LPB2A500P for the passive receiver. To order a transmitter only, add the letter **R** to the end of the reference for the corresponding transmitter-receiver pair.

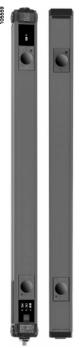
Example: reference XUS LPB2A600M becomes XUS LPB2A600MR for the transmitter only.

Other versions

Combining type 4 safety light curtains with external module for muting function.

See pages 30311/2 to 30311/9.





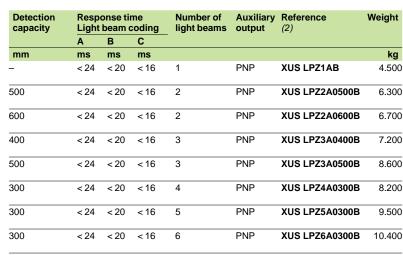
XUS LPB2●●

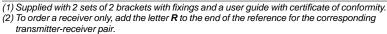
Safety light curtains, type 4 Compact light curtains XUS LP with solid-state output, with terminal block

Transmitter-receiver pairs for body protection (1)

Detection capacity 300, 400, 500, 600 mm and single beam. Sensing distance 0.8 to 20 m and 0.8 to 70 m (depending on configuration)

■ 2 PNP safety outputs





Example: reference XUS LPZ2A0600B becomes XUS LPZ2A0600BR for the receiver only. To order a transmitter only, add the letter ${m T}$ to the end of the reference for the corresponding transmitter-receiver pair.

Example: reference XUS LPZ2A0600B becomes XUS LPZ2A0600BT for the transmitter only.



Combining type 4 safety light curtains with external module for muting function.

See pages 30311/2 à 30311/9.



Other versions

General pages 38131-EN/2 to 38131Characteristics: page 30313-EN/2

Dimensions: pages 30313-EN/6 and 30313-

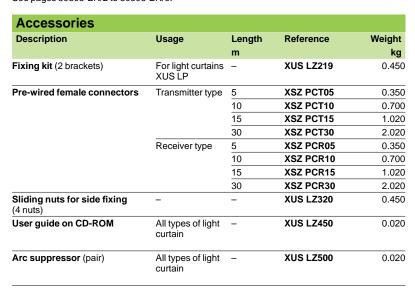
Connections: pages 30313-EN/8 and 30313-

Safety light curtains, type 4
Accessories for compact light curtains XUS LP

Separate components

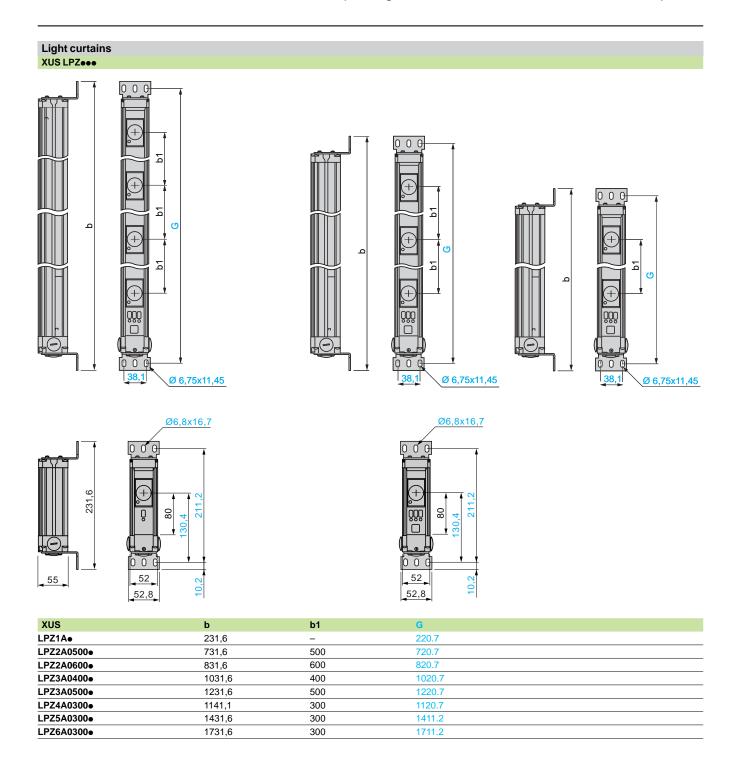
Power supplies, 90° mirror adaptors, protective covers, anti-vibration kit, fixing bases

See pages 30308-EN/2 to 30308-EN/9.

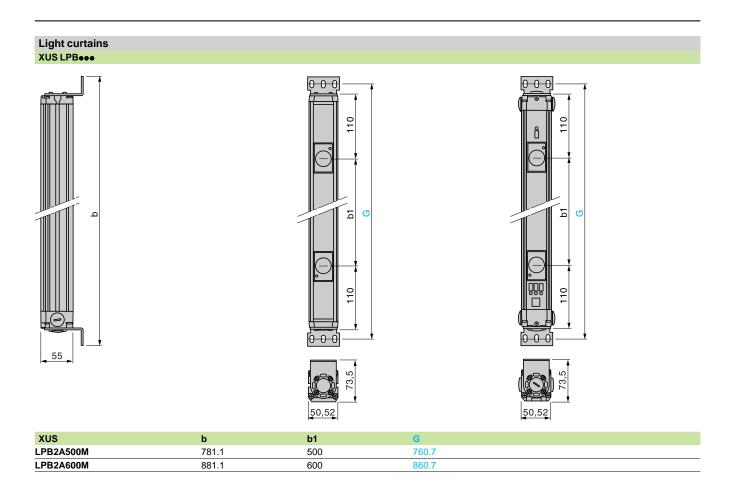




Safety light curtains, type 4 Compact light curtains XUS LP with solid-state output

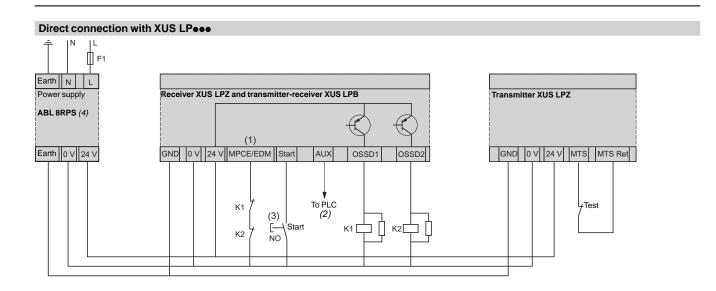


Safety light curtains, type 4
Compact light curtains XUS LP with solid-state output



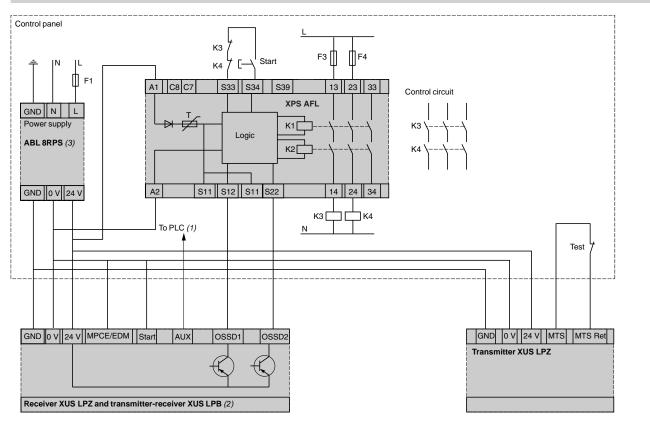
30313-EN_Ver6.1.indd

Safety light curtains, type 4 Compact light curtains XUS LP with solid-state output



- (1) For testing prior to installation, the user can select MPCE/EDM OFF (default factory setting). In this 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 power supply must conform to EN/IEC 61496 and EN/IEC 60204-1 standards.

Connection via a Preventa XPS AFL module



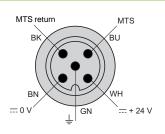
- (1) The auxiliary output connects to a PLC (optional).
- (2) The light curtain must be configured with MPCE/EDM OFF and with automatic start.
- (3) The power supply must conform to EN/IEC 61496 and EN/IEC 60204-1 standards.

Safety light curtains, type 4 Compact light curtains XUS LP with solid-state output

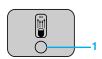


Transmitter

Pre-wired connector of transmitter (XUS LPZ)



Transmitter status indicator



1 Yellow LED

Configuration indicator XUS LPZ

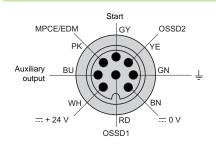


Configuration indicator XUS LPB

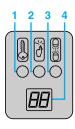


Receiver

Pre-wired connector of receiver (XUS LPZ) and pre-wired connector of transmitter-receiver (XUS LPB)



Receiver status indicator



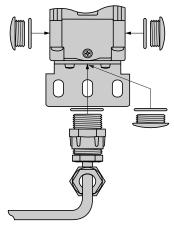
-
 - Interlock or Alarm yellow LED
 Machine stop
 - red LED

 3 Machine run
 - green LED
 4 2-digit display





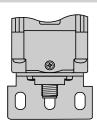
Connection to terminal block





Connection to M12 connector





Safety light curtains, type 2 Slim, compact light curtains XUS LN with solid-state output

Light curtain type			XUS LNG•••• (30 mm)
Environmental char	acteristics		
Conformity to standards			IEC 61496-1 and IEC 61496-2 (Type 2 ESPE)
Certifications			CE, TUV, UL, CSA
European directives			Machinery directive 98/37/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	°C	0+ 55
	For storage	°C	- 25+ 75
Relative humidity			95% maximum, without condensation
Degree of protection			IP 65
Shock and vibration	Conforming to IEC 61496-1		Shock resistance: 10 gn, impulse 16 ms,
esistance			Vibration resistance: 1055 Hz, amplitude: 0.35 ± 0.05 mm
Materials			Casing: aluminium with electrostatically applied red (RAL 3000) polyester paint nish end caps: 30% breglass impregnated nylon; front face: acrylic.
Fixings			End brackets (included)
Optical characterist	ics		
Minimum detection capacity		mm	30 (Hand)
lominal sensing distance (Sr	n)	m	0.315
leight protected		mm	1501500
ffective aperture angle (EAA	A)		5° at 3 m conforming to IEC 61496-1 and IEC 61496-2 (Type 2 ESPE)
ight source			GaAlAs LED, 880 nm
mmunity to ambient light			Conforming to IEC/EN 61496-2
Electrical characteri	istics		
Response time		ms	1424
Power supply			$\frac{1}{100}$ = 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	Α	1.09 (with maximum load)
Maximum current	Transmitter	mA	50
consumption (no-load)	Receiver	mA	90
mmunity 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)
Signalling	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 c.s.a.	Transmitter-receiver	mm²	0.25. Tinned wires.
Cable resistance	Transmitter-receiver	Ω	0.093 per metre for 0.25 mm ² c.s.a. cable
Cable lengths		m	Pre-wired connectors with cable lengths of 3, 10 and 30 m are available separately. The maximum cable length is 50 m, depending on the load current and power supply
Functions			
Functions			■ Start: □ Automatic: model XUSLNG5C □ Manual: model XUSLNG5D ■ Alignment aid using 2 LEDs ■ LED display of operating modes ■ Monitoring of external switching devices EDM/MPCE

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

⁽²⁾ Pre-wired female connectors to be ordered separately, see page 30312-EN/3.

Safety light curtains, type 2

Slim, compact light curtains XUS LN with solid-state output



Transmitter-receiver system for hand protection (1) Detection capacity 30 mm. Sensing distance 0.3 to 15 m.

■ 2 PNP safety outputs - Automatic start

Height protected	Response time	Number of light beams	Alarm output	Reference (2)	Weight
mm	ms				kg
150	14	7	PNP	XUS LNG5C0150	2.700
300	15	14	PNP	XUS LNG5C0300	2.900
450	16	21	PNP	XUS LNG5C0450	3.200
600	17	28	PNP	XUS LNG5C0600	3.400
750	18	35	PNP	XUS LNG5C0750	3.600
900	19	42	PNP	XUS LNG5C0900	3.900
1050	20	49	PNP	XUS LNG5C1050	4.100
1200	21	56	PNP	XUS LNG5C1200	4.300
1350	22	63	PNP	XUS LNG5C1350	4.500
1500	23	70	PNP	XUS LNG5C1500	4.800

■ 2 PNP safety outputs - Manual start

Height protected	Response time	Number of light beams	Alarm output	Reference (2)	Weight
mm	ms				kg
150	14	7	PNP	XUS LNG5D0150	2.700
300	15	14	PNP	XUS LNG5D0300	2.900
450	16	21	PNP	XUS LNG5D0450	3.200
600	17	28	PNP	XUS LNG5D0600	3.400
750	18	35	PNP	XUS LNG5D0750	3.600
900	19	42	PNP	XUS LNG5D0900	3.900
1050	20	49	PNP	XUS LNG5D1050	4.100
1200	21	56	PNP	XUS LNG5D1200	4.300
1350	22	63	PNP	XUS LNG5D1350	4.500
1500	23	70	PNP	XUS LNG5D1500	4.800

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

Pre-wired female connectors to be ordered separately, see below.

(2) To order a transmitter only, replace the letter C or D by E and add the letter T to the end of the reference for the corresponding transmitter-receiver pair. Example: reference XUS LNG5C0150 becomes XUS LNG5E0150T for the transmitter only.

Example: reference XUS LNG5C0150 becomes **XUS LNG5E0150T** for the transmitter only. To order a receiver only, add the letter **R** to the end of the reference for the corresponding transmitter-receiver pair.

Example: reference XUS LNG5C0150 becomes XUS LNG5C0150R for the receiver only.

Other versions

Combining type 2 safety light curtains with external module for muting function and monitoring 2 to 4 light curtains. See pages 2/220 to 2/225.

Accesso	ries				
Description		For use with	Length m	Reference	Weight kg
Fixings kit (2 brackets)		Light curtains XUS LN	-	XUS LZ218	0.450
Pre-wired	Transmitter	Light curtains	3	XSZ NCT03	0.680
female	type	XUS LN	10	XSZ NCT10	0.910
connectors			30	XSZ NCT30	1.360
	Receiver	Light curtains	3	XSZ NCR03	0.680
	type	XUS LN	10	XSZ NCR10	0.910
			30	XSZ NCR30	1.360
Arc suppress	or (pair)	All types of light curtain	-	XUS LZ500	0.020
User guide on CD-ROM		All types of light curtains and accessories	_	XUS LZ450	0.020

XSZ NCR••

Separate components

Power supplies, 90° mirror adaptors, anti-vibration kit and fixing bases

See pages 30308-EN/2, 30308-EN/4 and 30308-EN/5

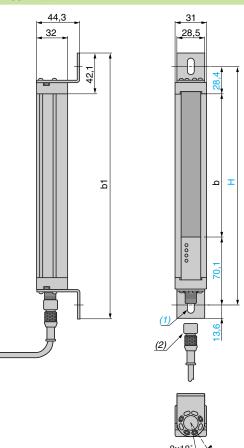
XSZ NCT ••

Safety light curtains, type 2 Slim, compact light curtains XUS LN with solid-state output

Dimensions

Slim, compact light curtains

XUS LNees



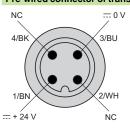
XUS	b	b1	H	Height protected
LN•••0150	147	272	245.6	150
LNeee0300	294	419	392.6	300
LN•••0450	441	566	539.5	450
LN•••0600	588	713	686.6	600
LN•••0750	735	860	833.6	750
LN•••0900	882	1007	980.6	900
LN•••1050	1029	1154	1127.6	1050
LN•••1200	1176	1301	1274.6	1200
LN•••1350	1323	1448	1421.6	1350
LNeee1500	1470	1595	1568.6	1500

(2) M12 male connector.

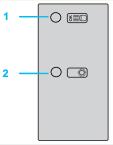
Connections

Transmitter

Pre-wired connector of transmitter XSZ NCT



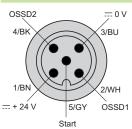
Transmitter status indicator



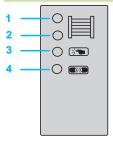
- 1 Interlock or Alarm yellow LED
- 2 Switch-on/Machine run green LED

Receiver

Pre-wired connector of receiver XSZ NCR



Receiver status indicator



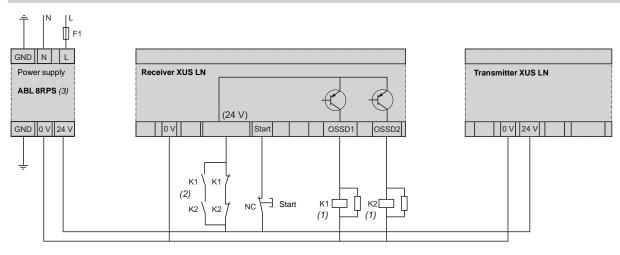
- Top alignment yellow LED
- 2 Bottom alignment yellow LED
- 3 Stop red LED
- 4 Run green LED

Characteristics: page 30312-EN/2 References: page 30312-EN/3

^{(1) 1} elongated hole Ø 6.75 x 16.75 mm.

Safety light curtains, type 2 Slim, compact light curtains XUS LN with solid-state output

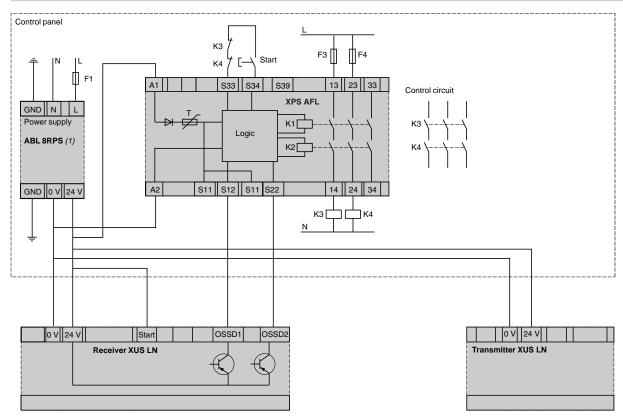
Connections (continued) Direct connection with XUS LNG5D •••



- (1) The K1 and K2 coils must be protected using the arc suppressors included in the mounting kit.
 (2) For the EDM function, contactors LC1D●●BD and control relays CAD●●BD, CA4KN●●BW3 and CA3KN●●BD are recommended (for more information on contactors and control relays, please refer to our "Motor starter solutions" catalogue).
- (3) The power supply must conform to EN/IEC 61496 and EN/IEC 60204-1 standards.

Note: Never connect the 0 V dc to earth ground.

Connection of light curtain XUS LN5C●●● via a Preventa XPS AFL module



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

Note: Never connect the 0 V dc to earth ground.

Accessories for safety light curtains types 2 and 4

	00 0-1 (4)						
Glass mirror (0	, , ,						
Description	For use with light curta			_ Height (2)	Reference	Weight	
	XUS LB/LDM	XUS LP	XUS LN	mm	VII.0 =110.100	kg	
90° mirror adaptor with rotatable xing		XUS LPZ1A●		_ 140	XUS ZM0102	1.040	
with totalable xing		- =		_ 191	XUS ZM0152	1.300	
	XUS LB/LDM0280	-	XUS LN•••0150	_ 343	XUS ZM0305	1.900	
	XUS LB/LDM0320 XUS LB/LDM0360	_	XUS LN●●0300	495	XUS ZM0457	2.500	
	XUS LB/LDM0440	_	XUS LN•••0450	546	XUS ZM0508	2.800	
	XUS LB/LDM0520	XUS LP●2A500●	_	648	XUS ZM0610	3.200	
> n	XUS LB/LDM0600/0680	XUS LP•2A0600●	XUS LN•••0600	749	XUS ZM0711	3.700	
•	XUS LB/LDM0720	_	_	800	XUS ZM0762	3.800	
	XUS LB/LDM0760	_	XUS LN●●0750	851	XUS ZM0813	4.000	19
	XUS LB/LDM0880	XUS LPZ3A0400●		953	XUS ZM0914	4.500	
	XUS LB/LDM0920/0960		XUS LN●●0900	1054	XUS ZM1016	5.000	
	XUS LB/LDM1040	XUS LPZ3A0500●		1105	XUS ZM1067	5.200	
	XUS LB/LDM1120	XUS LPZ4A0300•	XUS LN•••1050	1257	XUS ZM1219	5.900	
	XUS LB/LDM1200	XUS LPZ5A0300●		1359	XUS ZM1321	6.300	
	XUS LB/LDM1360	_	XUS LN•••1350	1410	XUS ZM1372	6.500	
	XUS LB/LDM1400			1461	XUS ZM1422	6.700	
	XUS LB/LDM1520	· <u> </u>	XUS LN●●1500	1562	XUS ZM1524	7.200	
	XUS LB/LDM1560	XUS LPZ6A0300●		1664	XUS ZM1626	7.600	
	XUS LB/LDM1640/1720			1867	XUS ZM1830	8.500	
	XUS LB/LDM1800			1867	XUS ZM1830	8.500	
	XUS LB/LDM1920/2120			2172	XUS ZM2134	9.800	
Stainless steel	mirror (0.82 Sn) (1)						
Description	For use with light curta	ins		Height (2)	Reference	Weight	
	XUS LB/LDM	XUS LP	XUS LN	mm		kg	
90° mirror adaptor	_	XUS LPZ1A●	_	140	XUS ZA0102	1.090	
with rotatable xing	<u> </u>	_	_				
9	' <u>– </u>			191	XUS ZA0152	1.300	
	XUS LB/LDM0280		XUS LN●●0150	191 343	XUS ZA0152 XUS ZA0305	2.000	
9	XUS LB/LDM0280 XUS LB/LDM0320	- 	XUS LN•••0150 XUS LN•••0300				
	XUS LB/LDM0280	. -		343	XUS ZA0305	2.000	
	XUS LB/LDM0280 XUS LB/LDM0320 XUS LB/LDM0360	. -	XUS LN•••0300	343 495	XUS ZA0305 XUS ZA0457	2.000	
	XUS LB/LDM0280 XUS LB/LDM0320 XUS LB/LDM0360 XUS LB/LDM0440		XUS LN•••0300 XUS LN•••0450 —	343 495 546	XUS ZA0305 XUS ZA0457 XUS ZA0508	2.000 2.700 3.000	
	XUS LB/LDM0280 XUS LB/LDM0320 XUS LB/LDM0360 XUS LB/LDM0440 XUS LB/LDM0520		XUS LN•••0300 XUS LN•••0450 —	343 495 546 648	XUS ZA0305 XUS ZA0457 XUS ZA0508 XUS ZA0610	2.000 2.700 3.000 3.500	
	XUS LB/LDM0280 XUS LB/LDM0320 XUS LB/LDM0360 XUS LB/LDM0440 XUS LB/LDM0520 XUS LB/LDM0600/0680	 	XUS LN•••0300 XUS LN•••0450 —	343 495 546 648 749	XUS ZA0305 XUS ZA0457 XUS ZA0508 XUS ZA0610 XUS ZA0711	2.000 2.700 3.000 3.500 3.900	
	XUS LB/LDM0280 XUS LB/LDM0320 XUS LB/LDM0360 XUS LB/LDM0440 XUS LB/LDM0520 XUS LB/LDM0600/0680 XUS LB/LDM0720	XUS LP•2A500• XUS LP•2A0600•	XUS LN•••0300 XUS LN•••0450	343 495 546 648 749 800	XUS ZA0305 XUS ZA0457 XUS ZA0508 XUS ZA0610 XUS ZA0711 XUS ZA0762	2.000 2.700 3.000 3.500 3.900 4.200	
	XUS LB/LDM0280 XUS LB/LDM0320 XUS LB/LDM0360 XUS LB/LDM0440 XUS LB/LDM0520 XUS LB/LDM0600/0680 XUS LB/LDM0720 XUS LB/LDM0760	XUS LP•2A500• XUS LP•2A0600•	XUS LN•••0300 XUS LN•••0450	343 495 546 648 749 800 851	XUS ZA0305 XUS ZA0457 XUS ZA0508 XUS ZA0610 XUS ZA0711 XUS ZA0762 XUS ZA0813	2.000 2.700 3.000 3.500 3.900 4.200 4.400	
	XUS LB/LDM0280 XUS LB/LDM0320 XUS LB/LDM0360 XUS LB/LDM0440 XUS LB/LDM0520 XUS LB/LDM0600/0680 XUS LB/LDM0720 XUS LB/LDM0760 XUS LB/LDM0760 XUS LB/LDM0880	XUS LP•2A500• XUS LP•2A0600•	XUS LN•••0300 XUS LN•••0450 - XUS LN•••0600 - XUS LN•••0750	343 495 546 648 749 800 851 953	XUS ZA0305 XUS ZA0457 XUS ZA0508 XUS ZA0610 XUS ZA0711 XUS ZA0762 XUS ZA0813 XUS ZA0914	2.000 2.700 3.000 3.500 3.900 4.200 4.400 4.500	
	XUS LB/LDM0280 XUS LB/LDM0320 XUS LB/LDM0360 XUS LB/LDM0440 XUS LB/LDM0520 XUS LB/LDM0600/0680 XUS LB/LDM0720 XUS LB/LDM0760 XUS LB/LDM0880 XUS LB/LDM0920/0960	XUS LP•2A500• XUS LP•2A0600•	XUS LN•••0300 XUS LN•••0450 - XUS LN•••0600 - XUS LN•••0750 - XUS LN•••0900 -	343 495 546 648 749 800 851 953 1054 1105	XUS ZA0305 XUS ZA0457 XUS ZA0508 XUS ZA0610 XUS ZA0711 XUS ZA0762 XUS ZA0813 XUS ZA0914 XUS ZA1016 XUS ZA1016	2.000 2.700 3.000 3.500 3.900 4.200 4.400 4.500 5.400 5.600	
	XUS LB/LDM0280 XUS LB/LDM0320 XUS LB/LDM0360 XUS LB/LDM0440 XUS LB/LDM0520 XUS LB/LDM0600/0680 XUS LB/LDM0720 XUS LB/LDM0760 XUS LB/LDM0920/0960 XUS LB/LDM1040 XUS LB/LDM1120	XUS LP•2A500• XUS LP•2A0600•	XUS LN•••0300 XUS LN•••0450 - XUS LN•••0600 - XUS LN•••0750 - XUS LN•••0900 - XUS LN•••1050	343 495 546 648 749 800 851 953 1054	XUS ZA0305 XUS ZA0457 XUS ZA0508 XUS ZA0610 XUS ZA0711 XUS ZA0762 XUS ZA0813 XUS ZA0914 XUS ZA1016 XUS ZA1067 XUS ZA1219	2.000 2.700 3.000 3.500 3.900 4.200 4.400 4.500 5.400	
	XUS LB/LDM0280 XUS LB/LDM0320 XUS LB/LDM0360 XUS LB/LDM0440 XUS LB/LDM0520 XUS LB/LDM0600/0680 XUS LB/LDM0720 XUS LB/LDM0760 XUS LB/LDM0920/0960 XUS LB/LDM1040 XUS LB/LDM1120 XUS LB/LDM1120	XUS LP@2A500@ XUS LP@2A0600@ XUS LPZ3A0400@ XUS LPZ3A0500@ XUS LPZ4A0300@	XUS LN•••0300 XUS LN•••0450 - XUS LN•••0600 - XUS LN•••0750 - XUS LN•••1050 XUS LN•••1050 XUS LN•••1200	343 495 546 648 749 800 851 953 1054 1105 1257	XUS ZA0305 XUS ZA0457 XUS ZA0508 XUS ZA0610 XUS ZA0711 XUS ZA0762 XUS ZA0813 XUS ZA0914 XUS ZA1016 XUS ZA1067 XUS ZA1219 XUS ZA1321	2.000 2.700 3.000 3.500 3.900 4.200 4.400 4.500 5.400 5.600 6.400 6.800	
	XUS LB/LDM0280 XUS LB/LDM0320 XUS LB/LDM0360 XUS LB/LDM0440 XUS LB/LDM0520 XUS LB/LDM0600/0680 XUS LB/LDM0720 XUS LB/LDM0760 XUS LB/LDM0920/0960 XUS LB/LDM1040 XUS LB/LDM1120 XUS LB/DM1200 XUS LB/LDM1360	XUS LP@2A500@ XUS LP@2A0600@ XUS LPZ3A0400@ XUS LPZ3A0500@ XUS LPZ4A0300@ XUS LPZ5A0300@	XUS LN•••0300 XUS LN•••0450 - XUS LN•••0600 - XUS LN•••0750 - XUS LN•••0900 - XUS LN•••1050	343 495 546 648 749 800 851 953 1054 1105 1257 1359 1410	XUS ZA0305 XUS ZA0457 XUS ZA0508 XUS ZA0610 XUS ZA0711 XUS ZA0762 XUS ZA0813 XUS ZA0914 XUS ZA1016 XUS ZA1067 XUS ZA1219 XUS ZA1321 XUS ZA1372	2.000 2.700 3.000 3.500 3.900 4.200 4.400 4.500 5.400 5.600 6.400 6.800 7.000	
	XUS LB/LDM0280 XUS LB/LDM0320 XUS LB/LDM0360 XUS LB/LDM0440 XUS LB/LDM0520 XUS LB/LDM0600/0680 XUS LB/LDM0720 XUS LB/LDM0760 XUS LB/LDM0920/0960 XUS LB/LDM1040 XUS LB/LDM1120 XUS LB/LDM1360 XUS LB/LDM1360 XUS LB/LDM1360 XUS LB/LDM1400	XUS LP@2A500@ XUS LP@2A0600@ XUS LPZ3A0400@ XUS LPZ3A0500@ XUS LPZ4A0300@ XUS LPZ5A0300@	XUS LN•••0300 XUS LN•••0450 XUS LN•••0600 XUS LN•••0750 XUS LN•••1050 XUS LN•••1200 XUS LN•••1350	343 495 546 648 749 800 851 953 1054 1105 1257 1359 1410 1461	XUS ZA0305 XUS ZA0457 XUS ZA0508 XUS ZA0610 XUS ZA0711 XUS ZA0762 XUS ZA0813 XUS ZA0914 XUS ZA1016 XUS ZA1067 XUS ZA1219 XUS ZA1321 XUS ZA1372 XUS ZA1422	2.000 2.700 3.000 3.500 3.900 4.200 4.400 5.400 5.600 6.400 6.800 7.000 7.300	
	XUS LB/LDM0280 XUS LB/LDM0320 XUS LB/LDM0360 XUS LB/LDM0440 XUS LB/LDM0520 XUS LB/LDM0600/0680 XUS LB/LDM0720 XUS LB/LDM0760 XUS LB/LDM0920/0960 XUS LB/LDM1040 XUS LB/LDM1120 XUS LB/LDM1200 XUS LB/LDM1360 XUS LB/LDM1400 XUS LB/LDM1400 XUS LB/LDM1520	XUS LP@2A500@ XUS LP@2A0600@ XUS LPZ3A0400@ XUS LPZ3A0500@ XUS LPZ4A0300@ XUS LPZ5A0300@	XUS LN•••0300 XUS LN•••0450 XUS LN•••0600 XUS LN•••0750 XUS LN•••1050 XUS LN•••1200 XUS LN•••1350 XUS LN•••1500	343 495 546 648 749 800 851 953 1054 1105 1257 1359 1410 1461 1562	XUS ZA0305 XUS ZA0457 XUS ZA0508 XUS ZA0610 XUS ZA0711 XUS ZA0762 XUS ZA0813 XUS ZA0914 XUS ZA1016 XUS ZA1067 XUS ZA1219 XUS ZA1321 XUS ZA1322 XUS ZA1422 XUS ZA1524	2.000 2.700 3.000 3.500 3.900 4.200 4.400 5.400 5.600 6.400 6.800 7.000 7.300 7.800	
	XUS LB/LDM0280 XUS LB/LDM0320 XUS LB/LDM0360 XUS LB/LDM0440 XUS LB/LDM0520 XUS LB/LDM0600/0680 XUS LB/LDM0720 XUS LB/LDM0760 XUS LB/LDM0920/0960 XUS LB/LDM1040 XUS LB/LDM1120 XUS LB/LDM1200 XUS LB/LDM1360 XUS LB/LDM1400 XUS LB/LDM1520 XUS LB/LDM1520 XUS LB/LDM1560	XUS LP@2A500@ XUS LP@2A0600@ XUS LPZ3A0400@ XUS LPZ3A0500@ XUS LPZ4A0300@ XUS LPZ5A0300@ XUS LPZ5A0300@ XUS LPZ5A0300@	XUS LN•••0300 XUS LN•••0450 - XUS LN•••0600 - XUS LN•••0750 - XUS LN•••1050 XUS LN•••1200 XUS LN•••1350 - XUS LN•••1500 -	343 495 546 648 749 800 851 953 1054 1105 1257 1359 1410 1461 1562 1664	XUS ZA0305 XUS ZA0457 XUS ZA0508 XUS ZA0610 XUS ZA0711 XUS ZA0762 XUS ZA0813 XUS ZA0914 XUS ZA1016 XUS ZA1067 XUS ZA1219 XUS ZA1321 XUS ZA1322 XUS ZA1422 XUS ZA1524 XUS ZA1626	2.000 2.700 3.000 3.500 3.900 4.200 4.400 5.400 5.600 6.400 6.800 7.000 7.300 7.800 8.300	
	XUS LB/LDM0280 XUS LB/LDM0320 XUS LB/LDM0360 XUS LB/LDM0440 XUS LB/LDM0520 XUS LB/LDM0600/0680 XUS LB/LDM0720 XUS LB/LDM0760 XUS LB/LDM0920/0960 XUS LB/LDM1040 XUS LB/LDM1120 XUS LB/LDM1200 XUS LB/LDM1360 XUS LB/LDM1400 XUS LB/LDM1520 XUS LB/LDM1520 XUS LB/LDM1560 XUS LB/LDM1560 XUS LB/LDM1640/1720	XUS LP@2A500@ XUS LP@2A0600@ XUS LPZ3A0400@ XUS LPZ3A0500@ XUS LPZ4A0300@ XUS LPZ5A0300@ XUS LPZ5A0300@ XUS LPZ5A0300@	XUS LN•••0300 XUS LN•••0450 XUS LN•••0600 XUS LN•••0750 XUS LN•••1050 XUS LN•••1200 XUS LN•••1350 XUS LN•••1500	343 495 546 648 749 800 851 953 1054 1105 1257 1359 1410 1461 1562 1664 1867	XUS ZA0305 XUS ZA0457 XUS ZA0508 XUS ZA0610 XUS ZA0711 XUS ZA0762 XUS ZA0813 XUS ZA0914 XUS ZA1016 XUS ZA1067 XUS ZA1219 XUS ZA1321 XUS ZA1321 XUS ZA1322 XUS ZA1422 XUS ZA1524 XUS ZA1626 XUS ZA1830	2.000 2.700 3.000 3.500 3.900 4.200 4.400 5.400 5.600 6.400 6.800 7.000 7.300 7.800 8.300 9.200	
	XUS LB/LDM0280 XUS LB/LDM0320 XUS LB/LDM0360 XUS LB/LDM0440 XUS LB/LDM0520 XUS LB/LDM0600/0680 XUS LB/LDM0720 XUS LB/LDM0760 XUS LB/LDM0920/0960 XUS LB/LDM1040 XUS LB/LDM1120 XUS LB/LDM1200 XUS LB/LDM1360 XUS LB/LDM1520 XUS LB/LDM1520 XUS LB/LDM1520 XUS LB/LDM1560 XUS LB/LDM1640/1720 XUS LB/LDM1640/1720 XUS LB/LDM1640/1720 XUS LB/LDM1640/1720 XUS LB/LDM1800	XUS LP@2A500@ XUS LP@2A0600@ XUS LPZ3A0400@ XUS LPZ3A0500@ XUS LPZ4A0300@ XUS LPZ5A0300@	XUS LN•••0300 XUS LN•••0450 - XUS LN•••0600 - XUS LN•••0750 - XUS LN•••1050 XUS LN•••1200 XUS LN•••1350 - XUS LN•••1500	343 495 546 648 749 800 851 953 1054 1105 1257 1359 1410 1461 1562 1664 1867 1867	XUS ZA0305 XUS ZA0457 XUS ZA0508 XUS ZA0610 XUS ZA0711 XUS ZA0762 XUS ZA0813 XUS ZA0914 XUS ZA1016 XUS ZA1067 XUS ZA1219 XUS ZA1219 XUS ZA1321 XUS ZA1322 XUS ZA1422 XUS ZA1524 XUS ZA1830 XUS ZA1830	2.000 2.700 3.000 3.500 3.900 4.200 4.400 5.400 5.600 6.800 7.000 7.300 7.800 8.300 9.200	
	XUS LB/LDM0280 XUS LB/LDM0320 XUS LB/LDM0360 XUS LB/LDM0440 XUS LB/LDM0520 XUS LB/LDM0600/0680 XUS LB/LDM0720 XUS LB/LDM0760 XUS LB/LDM0920/0960 XUS LB/LDM1040 XUS LB/LDM1120 XUS LB/LDM1120 XUS LB/LDM1200 XUS LB/LDM1560 XUS LB/LDM1560 XUS LB/LDM1560 XUS LB/LDM1560 XUS LB/LDM1640/1720 XUS LB/LDM1800 XUS LB/LDM1800 XUS LB/LDM1800 XUS LB/LDM1920/2120	XUS LP@2A500@ XUS LP@2A0600@ XUS LPZ3A0400@ XUS LPZ3A0500@ XUS LPZ4A0300@ XUS LPZ5A0300@	XUS LN•••0300 XUS LN•••0450 - XUS LN•••0600 - XUS LN•••0750 - XUS LN•••1050 XUS LN•••1200 XUS LN•••1350 - XUS LN•••1500 -	343 495 546 648 749 800 851 953 1054 1105 1257 1359 1410 1461 1562 1664 1867	XUS ZA0305 XUS ZA0457 XUS ZA0508 XUS ZA0610 XUS ZA0711 XUS ZA0762 XUS ZA0813 XUS ZA0914 XUS ZA1016 XUS ZA1067 XUS ZA1219 XUS ZA1321 XUS ZA1321 XUS ZA1322 XUS ZA1422 XUS ZA1524 XUS ZA1626 XUS ZA1830	2.000 2.700 3.000 3.500 3.900 4.200 4.400 5.400 5.600 6.400 6.800 7.000 7.300 7.800 8.300 9.200	
Accessories Description	XUS LB/LDM0280 XUS LB/LDM0320 XUS LB/LDM0360 XUS LB/LDM0440 XUS LB/LDM0520 XUS LB/LDM0600/0680 XUS LB/LDM0720 XUS LB/LDM0760 XUS LB/LDM0920/0960 XUS LB/LDM1040 XUS LB/LDM1120 XUS LB/LDM1120 XUS LB/LDM1200 XUS LB/LDM1560 XUS LB/LDM1560 XUS LB/LDM1560 XUS LB/LDM1560 XUS LB/LDM1640/1720 XUS LB/LDM1800 XUS LB/LDM1800 XUS LB/LDM1800 XUS LB/LDM1920/2120	XUS LP@2A500@ XUS LP@2A0600@ XUS LPZ3A0400@ XUS LPZ3A0500@ XUS LPZ4A0300@ XUS LPZ5A0300@	XUS LN•••0300 XUS LN•••0450 - XUS LN•••0600 - XUS LN•••0750 - XUS LN•••1050 XUS LN•••1200 XUS LN•••1350 - XUS LN•••1500	343 495 546 648 749 800 851 953 1054 1105 1257 1359 1410 1461 1562 1664 1867 1867	XUS ZA0305 XUS ZA0457 XUS ZA0508 XUS ZA0610 XUS ZA0711 XUS ZA0762 XUS ZA0813 XUS ZA0914 XUS ZA1016 XUS ZA1067 XUS ZA1219 XUS ZA1219 XUS ZA1321 XUS ZA1322 XUS ZA1422 XUS ZA1524 XUS ZA1830 XUS ZA1830	2.000 2.700 3.000 3.500 3.900 4.200 4.400 5.400 5.600 6.800 7.000 7.300 7.800 8.300 9.200	

90° mirror adaptor for light curtains



ABL 8RPS24050

All types of light curtain

kg

0.340

XUS LAT1

Laser alignment tool

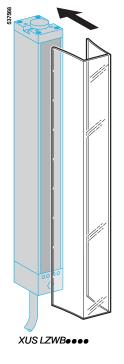
Power supplies for light curtains XUS L● (3) Conforming to standard Input voltage Secondary Reference Weight Reset EN 61000-3-2 kg voltage Single phase (N-L1) or 2-phase (L1-L2) connection ~ 100...120 V - 200...500 V 72 W 3 A ABL 8RPS24030 0.300 Auto/manu Yes 24...28,8 V 120 W - 15 %,+ 10 % 5 A Auto/manu Yes **ABL 8RPS24050** 0.700 50/60 Hz ABL 8RPS24100 240 W 10 A Auto/manu Yes 1.000

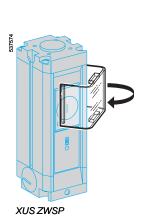
⁽¹⁾ Sensing distance reduction coefficient to be taken into account for each 90° mirror adaptor used.

⁽²⁾ Usable reflective height.
(3) For full information, please refer to www.schneider-electric.com.

Accessories for safety light curtains types 2 and 4

Protective covers for light curtains XUS LB/XUS LDM/XUS LP			XUS ZWS••••
Environmental	characteristics		
Air temperature	For operation	°C	0+ 55
	For storage	°C	- 25 + 70
Material			Lexan
Sensing distance (Sn) ı			0.91 (1)
Environmental	chemicals		
	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		





Description	
Lexan protective covers for transmitter-receiver pair (0.91 Sn) (1) (Sold in sets of 2)	

For use with	Height	Reference	Weight
VIIIO I D/DM000	mm	VIIC I ZWD0000	kg
XUS LB/DM280	310	XUS LZWB0280	0.282
XUS LB/DM320	350	XUS LZWB0320	0.318
XUS LB/DM360	390	XUS LZWB0360	0.354
XUS LB/DM440	470	XUS LZWB0440	0.426
XUS LB/DM520	550	XUS LZWB0520	0.497
XUS LB/DM600	630	XUS LZWB0600	0.569
XUS LB/DM680	710	XUS LZWB0680	0.641
XUS LB/DM720	750	XUS LZWB0720	0.677
XUS LB/DM760	790	XUS LZWB0760	0.713
XUS LB/DM880	910	XUS LZWB0880	0.821
XUS LB/DM920	950	XUS LZWB0920	0.857
XUS LB/DM960	990	XUS LZWB0960	0.893
XUS LB/DM1040	1070	XUS LZWB1040	0.965
XUS LB/DM1120	1150	XUS LZWB1120	1.037
XUS LB/DM1200	1230	XUS LZWB1200	1.108
XUS LB/DM1360	1390	XUS LZWB1360	1.252
XUS LB/DM1400	1430	XUS LZWB1400	1.288
XUS LB/DM1520	1550	XUS LZWB1520	1.396
XUS LB/DM1560	1590	XUS LZWB1560	1.432
XUS LB/DM1640	1670	XUS LZWB1640	1.504
XUS LB/DM1720	1750	XUS LZWB1720	1.576
XUS LB/DM1800	1830	XUS LZWB1800	1.648
XUS LB/DM1920	1950	XUS LZWB1920	1.756
XUS LB/DM2120	2150	XUS LZWB2120	1.935

Description	For use with	Height mm	Reference	weight kg
Lexan protective covers for single beam device	XUS LP	62,48	XUS ZWSP	0.100

(0.91 Sn) (1) (Sold in sets of 2)

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

Accessories for safety light curtains types

Selection according to weigh	tht and applic	ation									
Weight classes		u.i.u.i.									
Light curtain type	Height	Weig	tht class	3		Type of mirror	Height	We	ight c	lass	
3	mm	1	2	3	4	adaptors	mm	1	2	3	4
XUS LN	150600	•				XUS ZM (1)	102	•			
	7501500		•			_	305457		•		
XUS LB/LDMQ/LDSQ	2801040		•			_	508711			•	
	11201360			•		_	8131016				•
XUS LBR/LDMY/LDSY	3201040		•			XUS ZA	102	•			
	11202120			•		_	3051067		•		
XUS LPZ1A	_			•		_	12191626			•	
XUS LPZ2A0500 et XUS LPZ2A0600	_			•		_	18302134				•
XUS LPZ3A0400	_			•		(1) Use of the anti-				d for n	nirror
XUS LPZ3A0500	_				•	adaptors greate	er than 1016 mm in	height.			
XUS LPZ4A0300	_			•		_					
XUS LPZ5A0300 et XUL LPZ6A0300	-				•	_					
XUS LPB2A500 et XUS LPB2A600	_			•		_					
Applications											

Applications								
Weight class	Anti-shock a	pplications (1)			Anti-vibration	on applications	(2)	
	Shear moun	Shear mounted		Compression mounted		Shear mounted		n mounted
	Number of fixings per head (3)	Reference	Number of fixings per head (3)	Reference	Number of fixings per head (3)	Reference	Number of fixings per head (3)	Reference
1	2	XSZ SMK	Not		2 or 4	XSZ SMK	2	XSZ SMK1
	2	XSZ SMK1	recommended	d	2 or 4	XSZ SMK1		
2	2 or 4	XSZ SMK	2	XSZ SMK1	2 or 4	XSZ SMK	2	XSZ SMK
	2 or 4	XSZ SMK1			2 or 4	XSZ SMK1	2 or 4	XSZ SMK1
					2	XSZ SMK2		
3	4	XSZ SMK	2	XSZ SMK	2 or 4	XSZ SMK	2 or 4	XSZ SMK
	4	XSZ SMK1	2 or 4	XSZ SMK1	4	XSZ SMK1	4	XSZ SMK1
	2 or 4	XSZ SMK2			2 or 4	XSZ SMK2		
4	4	XSZ SMK	2	XSZ SMK	4	XSZ SMK	2	XSZ SMK
	4	XSZ SMK1	4	XSZ SMK1	4	XSZ SMK1	4	XSZ SMK1
	2	XSZ SMK2			2 or 4	XSZ SMK2		

- (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.

References of anti-vibration kits

Shock absor	rber characte	eristics					
Characteristic	s	Compression mor	Compression mounted				
per shock absorber		Maximum load Torque		Natural frequency			
		kg	Nm	Hz			
Pour kit	XSZ SMK	8.16	25.16	11			
antivibrations	XSZ SMK1	2.177	10.86	14			
	XSZ SMK2	24.94	107.39	13			

Shear mounted		
Maximum load	Torque	Natural frequency
kg	Nm	Hz
1.36	3.13	9.5
1.13	2.34	9
10.43	14.94	7.5

(G_(G)

Description	For use with	Reference	Weight kg
Anti-vibration kit comprising 8 shock absorbers, stud xing.	All types of light curtain and 90° mirror adaptors (see tables above)	XSZ SMK	0.030
16 washers and 16 nuts included with kit.		XSZ SMK1	0.020
		XSZ SMK2	0.045
Fixing kit for XUS LN (2 brackets)	Anti-vibration kit	XUS LZ227	0.450



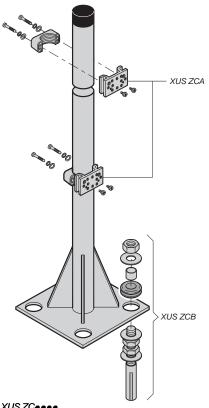
XUS LZ227

Dimensions : page 30308/7

Accessories for safety light curtains types 2 and 4

Fixing bases for lig	ht curtains and mirrors		XUS ZC••••
Environmental cha	racteristics		
Ambient air temperature	Operating	°C	- 25+ 70
	For storage	°C	- 25+ 70
Materials			Fixing base: steel End protection: black polycarbonate, 20% breglass

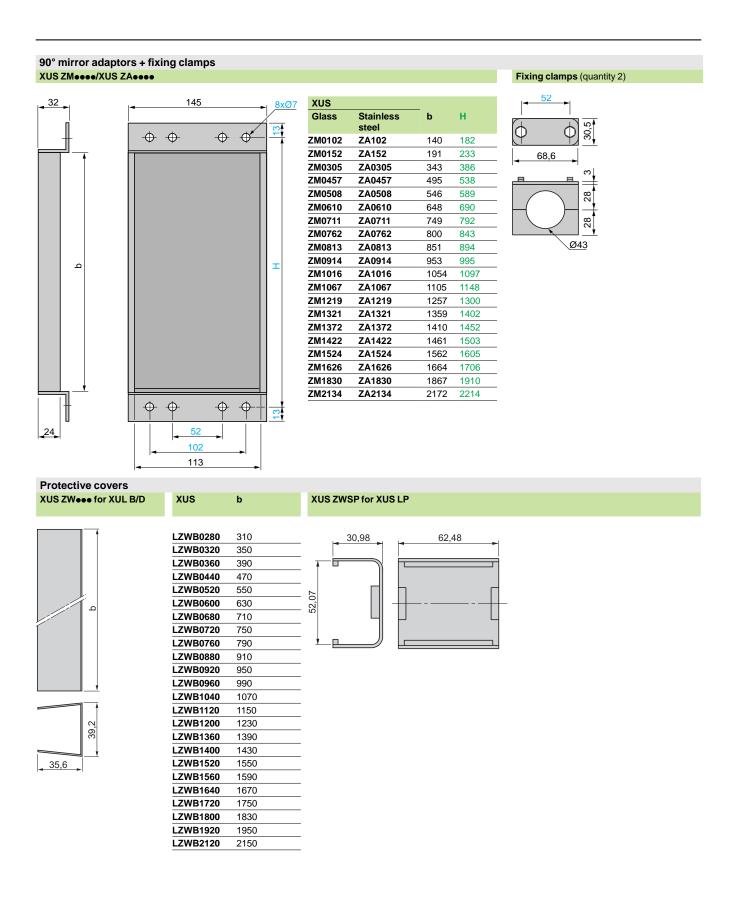
References



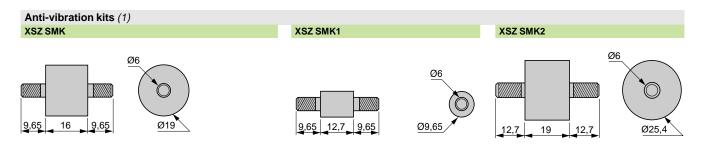
Fixing base	s					
Description	For use with	1		Height	Reference	Weight
	Light curtains	Mirrors	IP 67 tube	protected		
	Height	Height	Height			
	mm	mm	mm	mm		kg
Fixing base XUS ZC••••	150900	182894	503981	1200	XUS ZC1200	11.340
	9201500	9951503	11021620	1800	XUS ZC1800	15.880
	15201800	16051706	17401939	2100	XUS ZC2100	20.410
	19202095	1910	20212141	2400	XUS ZC2400	27.220
	_	2240	2336	3100	XUS ZC3100	29.940

Accessories			
Description	For use with	Reference	Weight kg
Fixing kit (sold in lots of 2)	Fixing base XUS ZC••••	XUS ZCA	0.450
Floor fixing kit comprising: 4 bolts, 4 rawplugs, 12 washers, 8 standard nuts, 4 lock nuts, 4 rubber insulators, 4 spacers (tube)	Fixing base XUS ZC••••	XUS ZCB	0.450

Accessories for safety light curtains types 2 and 4



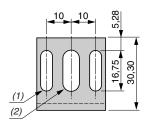
Accessories for safety light curtains types 2 and 4

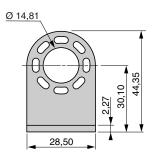


(1) The anti-vibration kit comprises 8 shock absorbers, 16 washers and 16 nuts.

Fixing brackets for anti-vibration kits

XUS LZ227 pour XUS LN



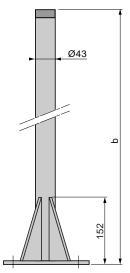


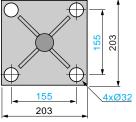
^{(1) 2} elongated holes Ø 5.10 x 16.75 mm. (2) 1 elongated hole Ø 6.75 x 16.75 mm.

Schneider Electric

Accessories for safety light curtains types 2 and 4

Fixing base XUS ZC••••

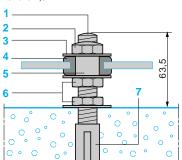




XUS	b
ZC1200	1200
ZC1800	1800
ZC2100	2100
ZC2400	2400
ZC3100	3100

Floor fixing kit (quantity 4) for fixing base XUS ZC••••

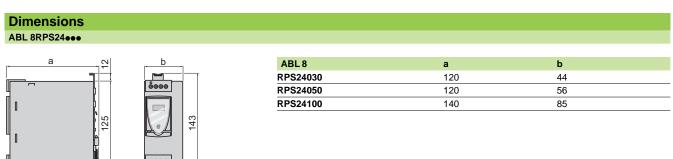
Echelle 2,5

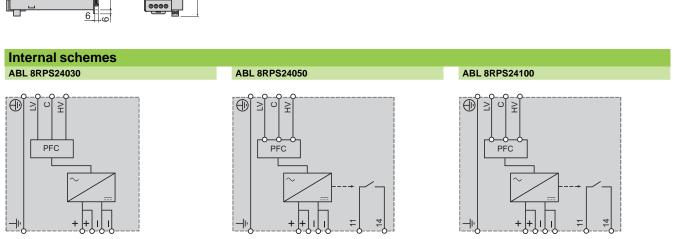


- 1 Bolt,
- 1 lock nut,
- 3 washers,
- Rubber insulator,
- 5 Spacer (tube),
- 2 standard nuts,
- 7 Rawplug.

Schneider Electric

Accessories for safety light curtains types 2 and 4





Safety detection solutions

Preventa safety modules and single-beam photo-electric sensors

With a test input associated with a built-in "muting" function

Operating principle

XPS CM safety modules used in conjunction with XU2 S single-beam photo-electric sensors (periodically tested), establish a category 2 light curtain conforming to IEC/EN 61496 parts 1 and 2.

The connection of 1 to 4 pairs of XU2 S photo-electric sensors makes it possible to create a protected zone up to 1200 mm high conforming to EN 999/ISO 13855 and 8 m long.

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

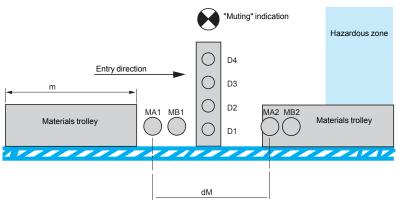
When the system is switched on by the start command (in series with the main circuit feedback loop) and the light protection is not interrupted, the main circuit is closed by the two safety relays of the XPS CM module.

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 XPS CM front panel changes from green to red. The "open" state is maintained until the module is restarted using the start button.

The "muting" function allows the light curtain protection to be inhibited. This can be used to authorise the passage a materials trolley through the light curtain without tripping the main circuit. 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. This synchronisation 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" process, a light indicating the "muting" status is controlled by the XPS CM module. An fault at indicator light level (short-circuit, open circuit) will be immediately recognised and deactivate the "muting" function. The indicator light comes on when a "muting" signal is generated and indicates the inhibition of the protection function.



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

Conditions to be observed for the "muting" function

- The "muting" sensors must either be thru-beam type XU2 M18PP340, polarised reflex type XU9 M18PP340 or mechanical limit switches with contacts.
- \blacksquare dM \le 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 CM 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.

Safety detection solutions
Preventa safety modules and single-beam photo-electric sensors

With a test input associated with a built-in "muting" function

Characteristics of safe	ty modules				
Module type			XPS CM1144	XPS CM1144P	
Maximum achievable safety level	(1)		PL c/Category 2 conforming to EN/ISO 138 IEC 62061	349-1, SILCL 1 conforming to EN/	
Reliability data	Mean Time To dangerous Failure (MTTF _d)	Years	16.6		
	Diagnostic Coverage (DC)	%	95.5		
	Probability of dangerous	1/h	3.12 x 10 ⁻⁷		
Failure per Hour (PFH _d) Conformity to standards			EN/IEC 61496-1, EN/IEC 61496-2, EN/IEC 6N/IEC 60947-5-1	60204-1, EN/IEC 60947-1,	
Product certifications			UL, CSA, IFA		
Ambient air temperature		°C	For operation: - 10+ 55, for storage: - 25	+ 85	
Degree of protection conforming to	o IEC 60529		Terminals: IP 20 Enclosure: IP 40		
Supply	Voltage	٧	24, voltage limits: - 20 + 20%		
Maximum consumption		w	< 15, with thru-beam photo-electric sensor	s and "muting" signalling	
Module fuse protection			Internal, electronic		
Rated insulation voltage (Ui)		V	300 (degree of pollution 2 conforming to EN DIN VDE 0110 parts 1 and 2)	/IEC 60947-5-1,	
Rated impulse withstand voltage	(Uimp)	kV	4 (overvoltage category III, conforming to IEI	N/IEC 60947-5-1,	
nputs for sensors			DIN VDE 0110 parts 1 and 2)		
number of inputs to be monitored			4 (terminals Z1, Z2, Z3, Z4)		
input voltage		٧	24		
supply voltage of sensors		٧	24 (terminal U+/U-)		
supply current of sensors		mA	< 200		
nputs for	Number of "muting" inputs		2 (terminals MA, MB)		
muting" function	Input voltage	٧	24 (terminal U+/U-)		
	Maximum current	mA	< 200		
	Synchronisation time	s	3 (+/- 20 %) for activation of the MA/MB "m	uting" signal	
		-			
nonitoring inputs Z1-Z2-Z3-Z4 sensors authorised for the protect		S	60 (- 10+ 30%) XU2 S18PP340••• (infrared)		
nonitoring inputs Z1-Z2-Z3-Z4 sensors authorised for the protect "muting" sensors	ectric sensors authorised for		XU2 S18PP340 •• (infrared) XU2 M18PP340 •• or XU9 M18PP340 ••	 photo-electric sensors or XC limit switched 	
monitoring inputs Z1-Z2-Z3-Z4 sensors authorised for the protect "muting" sensors Gensor supply resistivity	ectric sensors authorised for	Ω	XU2 S18PP340●●● (infrared)	 photo-electric sensors or XC limit switched 	
nonitoring inputs Z1-Z2-Z3-Z4 sensors authorised for the protect "muting" sensors Sensor supply resistivity Safety outputs	ectric sensors authorised for		XU2 S18PP340 •• (infrared) XU2 M18PP340 •• or XU9 M	 photo-electric sensors or XC limit switche 	
monitoring inputs Z1-Z2-Z3-Z4 sensors authorised for the protect "muting" sensors Sensor supply resistivity Safety outputs number and type	ectric sensors authorised for ion field (4 max.)		XU2 S18PP340 •• (infrared) XU2 M18PP340 •• or XU9		
nonitoring inputs Z1-Z2-Z3-Z4 sensors authorised for the protect "muting" sensors Sensor supply resistivity Safety outputs number and type breaking capacity of solid-state ou	ectric sensors authorised for ion field (4 max.)	Ω	XU2 S18PP340 •• (infrared) XU2 M18PP340 •• or XU9 M		
nonitoring inputs Z1-Z2-Z3-Z4 sensors authorised for the protect "muting" sensors Gensor supply resistivity Gafety outputs number and type breaking capacity of solid-state outpreaking capacity in AC-15	ectric sensors authorised for ion field (4 max.)		XU2 S18PP340 • • (infrared) XU2 M18PP340 • • or XU9 M18PP340 • or XU9 M1		
nonitoring inputs Z1-Z2-Z3-Z4 sensors authorised for the protect "muting" sensors Gensor supply resistivity Gafety outputs number and type breaking capacity of solid-state outpreaking capacity in AC-15 breaking capacity in DC-13	ectric sensors authorised for ion field (4 max.)	Ω VA	XU2 S18PP340 •• (infrared) XU2 M18PP340 •• or XU9 M		
monitoring inputs Z1-Z2-Z3-Z4 sensors authorised for the protect "muting" sensors Gensor supply resistivity Gafety outputs number and type breaking capacity of solid-state oubreaking capacity in AC-15 breaking capacity in DC-13 maximum thermal current (Ithe)	ectric sensors authorised for ion field (4 max.)	Ω VA A	XU2 S18PP340 •• (infrared) XU2 M18PP340 •• or XU9		
monitoring inputs Z1-Z2-Z3-Z4 sensors authorised for the protect "muting" sensors Sensor supply resistivity Safety outputs number and type breaking capacity of solid-state oubreaking capacity in AC-15 breaking capacity in DC-13 maximum thermal current (Ithe) sum of maximum thermal current	ectric sensors authorised for ion field (4 max.)	Ω VA A A	XU2 S18PP340 •• (infrared) XU2 M18PP340 •• or XU9		
monitoring inputs Z1-Z2-Z3-Z4 sensors authorised for the protect "muting" sensors Sensor supply resistivity Safety outputs number and type breaking capacity of solid-state oubreaking capacity in AC-15 breaking capacity in DC-13 maximum thermal current (Ithe) sum of maximum thermal current minimum current (volt-free contact	ectric sensors authorised for ion field (4 max.) utputs	Ω VA A A mA	XU2 S18PP340 •• (infrared) XU2 M18PP340 •• or XU9 M18P9340 •• or XU9		
monitoring inputs Z1-Z2-Z3-Z4 - sensors authorised for the protect - "muting" sensors Sensor supply resistivity Safety outputs - number and type - breaking capacity of solid-state ou - breaking capacity in AC-15 - breaking capacity in DC-13 - maximum thermal current (Ithe) - sum of maximum thermal current - minimum current (volt-free contact - minimum voltage (volt-free contact	ectric sensors authorised for ion field (4 max.) utputs	Ω VA A A	XU2 S18PP340 •• (infrared) XU2 M18PP340 •• or XU9 M18P9340 •• or XU9	3-Y54, Y33-Y64)	
Single-beam thru-beam photo-elemonitoring inputs Z1-Z2-Z3-Z4 - sensors authorised for the protect - "muting" sensors Sensor supply resistivity Safety outputs - number and type - breaking capacity of solid-state outpreaking capacity in AC-15 - breaking capacity in DC-13 - maximum thermal current (Ithe) - sum of maximum thermal current - minimum current (volt-free contactions) - short-circuit protection	ectric sensors authorised for ion field (4 max.) utputs	νΑ A A MA V	XU2 S18PP340 •• (infrared) XU2 M18PP340 •• or XU9 M18P9340 •• or XU9	3-Y54, Y33-Y64)	
monitoring inputs Z1-Z2-Z3-Z4 sensors authorised for the protect muting" sensors Sensor supply resistivity Safety outputs number and type breaking capacity of solid-state ou breaking capacity in AC-15 breaking capacity in DC-13 maximum thermal current (Ithe) sum of maximum thermal current minimum current (volt-free contact minimum voltage (volt-free contact short-circuit protection	ectric sensors authorised for ion field (4 max.) utputs tt) ncandescent lamp	VA A A V A	XU2 S18PP340 •• (infrared) XU2 M18PP340 •• or XU9 M18P9340 •• or XU9 M18P9340 •• or XU9	3-Y54, Y33-Y64)	
monitoring inputs Z1-Z2-Z3-Z4 sensors authorised for the protect muting" sensors Sensor supply resistivity Safety outputs number and type breaking capacity of solid-state oubreaking capacity in AC-15 breaking capacity in DC-13 maximum thermal current (Ithe) sum of maximum thermal current minimum current (volt-free contact minimum voltage (volt-free contact short-circuit protection 'Muting" signalling sensors for in	ectric sensors authorised for ion field (4 max.) utputs tt) ncandescent lamp	νΑ A A MA V	XU2 S18PP340 •• (infrared) XU2 M18PP340 •• or XU9	3-Y54, Y33-Y64) to EN/IEC 60947-5-1 and DIN VDE 0660 part	
monitoring inputs Z1-Z2-Z3-Z4 sensors authorised for the protect "muting" sensors Sensor supply resistivity Safety outputs number and type breaking capacity of solid-state oubreaking capacity in AC-15 breaking capacity in DC-13 maximum thermal current (Ithe) sum of maximum thermal current minimum current (volt-free contact minimum voltage (volt-free contact short-circuit protection 'Muting" signalling sensors for in Response time on input change of	ectric sensors authorised for ion field (4 max.) utputs tt) ncandescent lamp	VA A A V A	XU2 S18PP340 •• (infrared) XU2 M18PP340 •• or XU9	3-Y54, Y33-Y64) to EN/IEC 60947-5-1 and DIN VDE 0660 par	
monitoring inputs Z1-Z2-Z3-Z4 sensors authorised for the protect "muting" sensors Sensor supply resistivity Safety outputs number and type breaking capacity of solid-state oubreaking capacity in AC-15 breaking capacity in DC-13 maximum thermal current (Ithe) sum of maximum thermal current minimum current (volt-free contact minimum voltage (volt-free contact short-circuit protection 'Muting" signalling sensors for in Response time on input change of Electrical durability Display	ectric sensors authorised for ion field (4 max.) utputs tt) ncandescent lamp	VA A A V A	XU2 S18PP340 •• (infrared) XU2 M18PP340 •• or XU9	3-Y54, Y33-Y64) to EN/IEC 60947-5-1 and DIN VDE 0660 par lutions using Preventa Captive screw clamp terminals,	
monitoring inputs Z1-Z2-Z3-Z4 sensors authorised for the protect "muting" sensors Sensor supply resistivity Safety outputs number and type breaking capacity of solid-state ou breaking capacity in AC-15 breaking capacity in DC-13 maximum thermal current (Ithe) sum of maximum thermal current minimum current (volt-free contact minimum voltage (volt-free contact short-circuit protection 'Muting" signalling sensors for in Response time on input change of Electrical durability Display Connection	ectric sensors authorised for ion field (4 max.) utputs tt) ncandescent lamp of state Type	VA A A V A	XU2 S18PP340 ● ● (infrared) XU2 M18PP340 ● ● or XU9 M18PP340 ● ● 10 max. 2 NO (terminals 13-14, 23-24), volt-free 4 NO 24 V/20 mA, (Y33-Y34, Y33-Y44, Y3 C300: inrush 1800, maintained 180 24 V/1.5 A, L/R = 50 ms 5.6 11 10 17 4 gG or 6 fast acting cartridge fuse, conforming 200 Number: 1 (terminal H1), maximum power: 6.5 W/24 V, minimum power: 4 W/24 V, minimum power: 4 W/24 V < 25 See our catalogue Safety functions and so 4 LEDs Captive screw clamp terminals	3-Y54, Y33-Y64) to EN/IEC 60947-5-1 and DIN VDE 0660 par lutions using Preventa Captive screw clamp terminals, removable terminal block	
monitoring inputs Z1-Z2-Z3-Z4 sensors authorised for the protect "muting" sensors Sensor supply resistivity Safety outputs number and type breaking capacity of solid-state ou breaking capacity in AC-15 breaking capacity in DC-13 maximum thermal current (Ithe) sum of maximum thermal current minimum current (volt-free contact minimum voltage (volt-free contact short-circuit protection 'Muting" signalling sensors for in Response time on input change of Electrical durability Display Connection	ectric sensors authorised for ion field (4 max.) utputs tt) ct) ncandescent lamp	VA A A V A	XU2 S18PP340 ● ● (infrared) XU2 M18PP340 ● ● or XU9 M18PP340 ● ● 10 max. 2 NO (terminals 13-14, 23-24), volt-free 4 NO 24 V/20 mA, (Y33-Y34, Y33-Y44, Y3 C300: inrush 1800, maintained 180 24 V/1.5 A, L/R = 50 ms 5.6 11 10 17 4 gG or 6 fast acting cartridge fuse, conforming 200 Number: 1 (terminal H1), maximum power: 6.5 W/24 V, minimum power: 4 W/24 V < 25 See our catalogue Safety functions and so 4 LEDs Captive screw clamp terminals Solid or flexible cable: 0.142.5 mm² Without bezel, flexible cable: 0.252.5	3-Y54, Y33-Y64) to EN/IEC 60947-5-1 and DIN VDE 0660 par lutions using Preventa Captive screw clamp terminals, removable terminal block Solid or flexible cable: 0.22.5 mm² Without bezel, flexible cable: 0.252.5	
monitoring inputs Z1-Z2-Z3-Z4 - sensors authorised for the protect - "muting" sensors Sensor supply resistivity Safety outputs - number and type - breaking capacity of solid-state ou - breaking capacity in AC-15 - breaking capacity in DC-13 - maximum thermal current (Ithe) - sum of maximum thermal current - minimum current (volt-free contact - minimum voltage (volt-free contact - short-circuit protection	ectric sensors authorised for ion field (4 max.) utputs tt) ncandescent lamp of state Type Without cable end With cable end	VA A A V A	XU2 S18PP340 •• (infrared) XU2 M18PP340 •• or XU9	3-Y54, Y33-Y64) to EN/IEC 60947-5-1 and DIN VDE 0660 part lutions using Preventa Captive screw clamp terminals, removable terminal block Solid or flexible cable: 0.22.5 mm² Without bezel, flexible cable: 0.252.5 mm²	
monitoring inputs Z1-Z2-Z3-Z4 - sensors authorised for the protect - "muting" sensors Sensor supply resistivity Safety outputs - number and type - breaking capacity of solid-state ou - breaking capacity in AC-15 - breaking capacity in DC-13 - maximum thermal current (Ithe) - sum of maximum thermal current - minimum current (volt-free contact - minimum voltage (volt-free contact - short-circuit protection "Muting" signalling sensors for in Response time on input change of Electrical durability Display Connection	ectric sensors authorised for ion field (4 max.) utputs tt) candescent lamp of state Type Without cable end	VA A A V A	XU2 S18PP340 ● ● (infrared) XU2 M18PP340 ● ● or XU9 M18PP340 ● ● 10 max. 2 NO (terminals 13-14, 23-24), volt-free 4 NO 24 V/20 mA, (Y33-Y34, Y33-Y44, Y3 C300: inrush 1800, maintained 180 24 V/1.5 A, L/R = 50 ms 5.6 11 10 17 4 gG or 6 fast acting cartridge fuse, conforming 200 Number: 1 (terminal H1), maximum power: 6.5 W/24 V, minimum power: 4 W/24 V < 25 See our catalogue Safety functions and so 4 LEDs Captive screw clamp terminals Solid or flexible cable: 0.142.5 mm² Without bezel, flexible cable: 0.252.5	3-Y54, Y33-Y64) to EN/IEC 60947-5-1 and DIN VDE 0660 part lutions using Preventa Captive screw clamp terminals, removable terminal block Solid or flexible cable: 0.22.5 mm² Without bezel, flexible cable: 0.252.5	
monitoring inputs Z1-Z2-Z3-Z4 - sensors authorised for the protect - "muting" sensors Sensor supply resistivity Safety outputs - number and type - breaking capacity of solid-state ou - breaking capacity in AC-15 - breaking capacity in DC-13 - maximum thermal current (Ithe) - sum of maximum thermal current - minimum current (volt-free contact - minimum voltage (volt-free contact - short-circuit protection "Muting" signalling sensors for in Response time on input change of Electrical durability Display Connection - 1-wire connection	ectric sensors authorised for ion field (4 max.) utputs tt) ncandescent lamp of state Type Without cable end With cable end With cable end	VA A A V A	XU2 S18PP340 •• (infrared) XU2 M18PP340 •• or XU9	lutions using Preventa Captive screw clamp terminals, removable terminal block Solid or flexible cable: 0.22.5 mm² Without bezel, flexible cable: 0.252.5 mm² With bezel, flexible cable: 0.252.5 mm Solid cable: 0.21 mm², flexible cable:	

⁽¹⁾ Using an appropriate and correctly connected control system, associated with the safety module XPS CM1144.

Characteristics (continued), references

Safety detection solutionsPreventa safety modules and single-beam photo-electric sensors

With a test input associated with a built-in "muting" function

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	For operation	°C	- 25+ 55 (infrared transmission sensors)
	For storage	°C	- 40+ 70
Vibration resistance			7 gn (f = 1055 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 IEC/EN 60529
Connection	Pre-cabled		PVC cable, diameter 5 mm, length 5 m, wire c.s.a: 4×0.34 mm 2 (3×0.34 mm 2 for thru-beam transmitter)
	Connector		M12, 4-pin male connector (suitable 4-pin female connectors, including pre-wired versions)
Materials			Case: nickel plated brass (infrared transmission sensors). Lenses: PMMA
Nominal sensing distance		m	8 (infrared transmission sensors)
Rated supply voltage		٧	1224 == (with protection against reverse polarity)
Voltage limits		٧	1030 == (including ripple)
Switching capacity (sealed)		mA	≤ 100 (with overload and short-circuit protection)
Voltage drop, closed state		٧	≤1.5
Current consumption, no-load	1	mA	≤ 35
Maximum switching frequency	у	Hz	500
Delays		ms	Response: ≤ 1 Recovery: ≤ 1

⁽¹⁾ Using an appropriate and correctly connected control system, associated with the safety module XPS CM1144e.

Safety modules Description Type of **Number Additional Supply** Reference Weight terminal of safety outputs block circuits connection kg Safety modules Integrated 24 V **XPS CM1144** 0.350 for monitoring single-beam photo-electric sensors, with a built-in "muting" XPS CM1144• function Removable 24 V XPS CM1144P 0.350 from module

Safety detection solutionsPreventa safety modules and single-beam photo-electric sensors

Single-heam photo-electric sensors with test input

With a test input associated with a built-in "muting" function



XU2 S18 P340L5



XU2 S18 P340WL5



XU2 S18KP340L5T



XU2 S18KP340WL5T



XU2 S18PP340DR



XU2 S18PP340WL5R

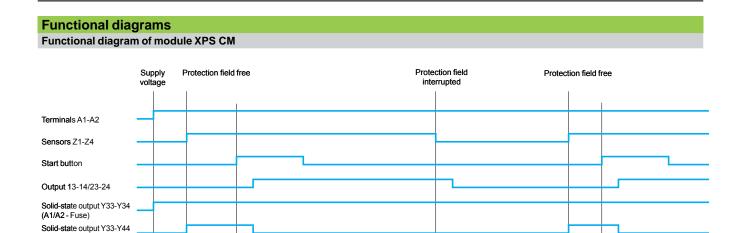
Single-bea	m photo-e	lectric s	ensors with	test input	
Description	Transmission type	Line of sight	Connection	Reference	Weight kg
PNP thru-beam pair (transmitter + receiver) Light or dark programmable	Infrared Sensing distance: 8 m	Along case axis	Pre-cabled, L = 5 m	XU2 S18PP340L5	0.485
switching			M12 connector	XU2 S18PP340D	0.155
		90° to case axis	Pre-cabled, L = 5 m	XU2 S18PP340WL5	0.485
			M12 connector	XU2 S18PP340WD	0.155
Thru-beam transmitter only (for XPS CM1144•)	Infrared	Along case axis	Pre-cabled, L = 5 m	XU2 S18KP340L5T	0.235
			M12 connector	XU2 S18KP340DT	0.075
		90° to case axis	Pre-cabled, L = 5 m	XU2 S18KP340WL5T	0.235
			M12 connector	XU2 S18KP340WDT	0.155
PNP thru-beam, receiver only (for XPS CM1144•)	Infrared	Along case axis	Pre-cabled, L = 5 m	XU2 S18PP340L5R	0.250
			M12 connector	XU2 S18PP340DR	0.080
		90° to case axis	Pre-cabled, L = 5 m	XU2 S18PP340WL5R	0.250
			M12 connector	XU2 S18PP340WDR	0.080
Other versions			ensors with other sult our Customer		

Schneider Electric

Safety detection solutions

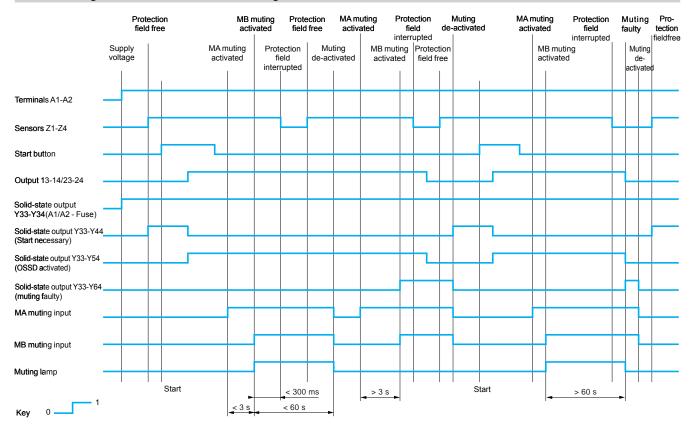
Preventa safety modules and single-beam photo-electric sensors

With a test input associated with a built-in "muting" function



Functional diagram of module XPS CM with "muting" function

Start

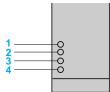




6

(Start necessary)
Solid-state output Y33-Y54
(OSSD activated)
Solid-state output Y33-Y64
(muting faulty)

Key



- Supply voltage A1-A2, internal electronic fuse status
- 2 Signalling for restarting
- 3 Safety output closed
- 4 Safety output open

Start

Operation, curves, dimensions, connections

Safety detection solutions

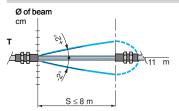
Preventa safety modules and single-beam photo-electric sensors

With a test input associated with a built-in "muting" function

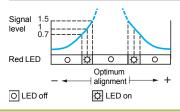
Operation Light switching Dark switching No object present in the beam Object present Object present No object present Output state (PNP) indicator: in the beam in the beam in the beam yellow LED (illuminated when sensor output is ON) -\\(\(\)\(\) \otimes \otimes

Curves

Infrared detection curve

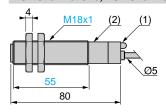


Verification of correct operation



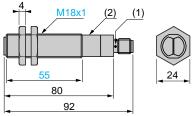
Dimensions

XU2 S18PP340L5, XU2 S18PP340L5L





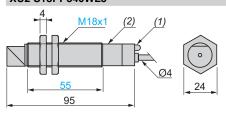
XU2 S18PP340D



Fixing nut tightening torque: 24 N.m Connector tightening torque: 2 N.m

XU2 S18PP340WD

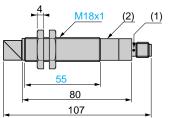
(2) Potentiometer XU2 S18PP340WL5





(1) LED

(2) Potentiometer



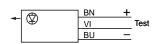


Fixing nut tightening torque: 24 N.m Connector tightening torque: 2 N.m

Wiring schemes (3-wire ==)

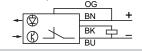
Pre-cabled version

Transmitter



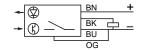
Receiver

Light switching (no object present). PNP output



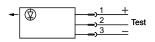
Receiver

Dark switching (no object present). PNP output



Connector version

Transmitter

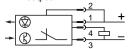


Cable connections

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

Receive

Light switching (no object present). PNP output



Connector schemes

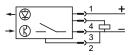
Sensor connector pin view Transmitter Receiver





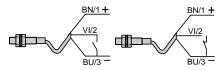
Receiver

Dark switching (no object present). PNP output



Beam break test (for transmitter only)

Beam made Beam broken



Safety detection solutions

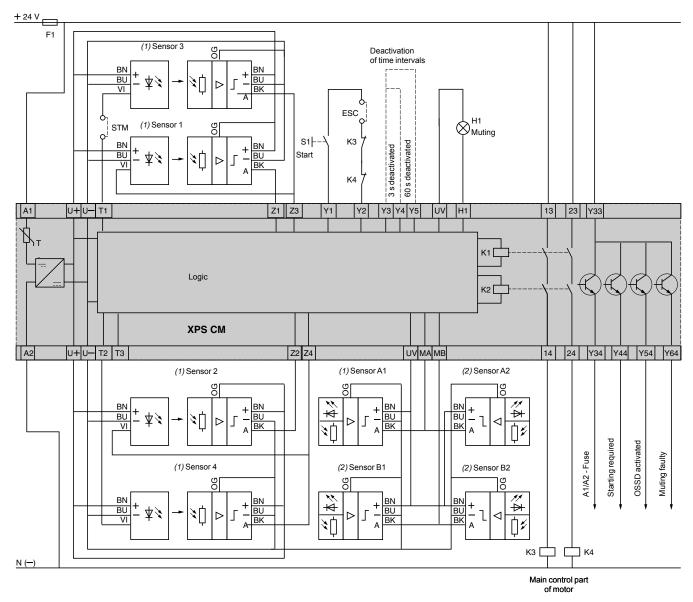
Preventa safety modules and single-beam photo-electric sensors

With a test input associated with a built-in "muting" function

Connections

Connection of module XPS CM with 4 pairs of XU2 S single-beam sensors

(Connection of 1 to 4 pairs of XU2 S single-beam sensors to XPS CM, see page 30303-EN/9)



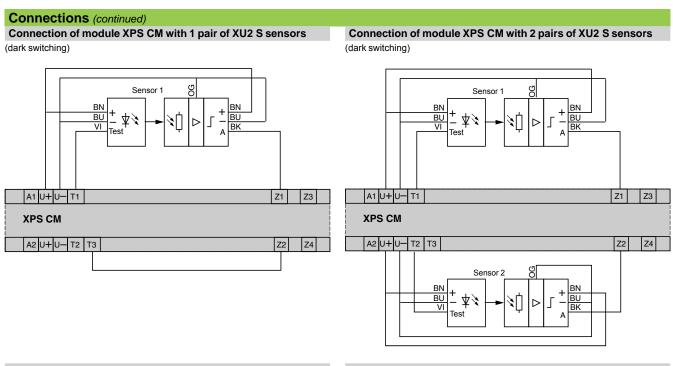
XU2 S sensors can be programmed for light switching or dark switching (for example: dark switching with sensors 1 and 3 and light switching with sensors 2 and 4). ESC: external start conditions.

- Y1-Y2: feedback loop.
- STM: For stopping time measurement.
- (1) Protection field sensors.
- (2) Muting sensors.

Safety detection solutions

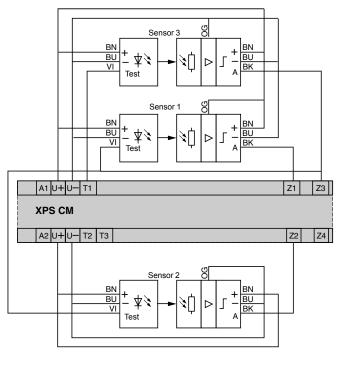
Preventa safety modules and single-beam photo-electric sensors

With a test input associated with a built-in "muting" function



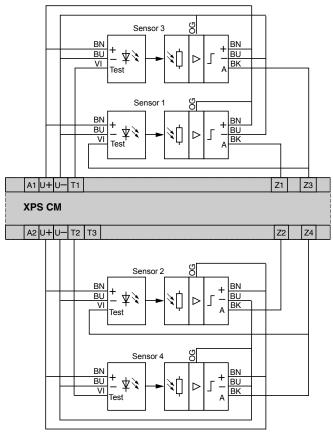
Connection of module XPS CM with 3 pairs of XU2 S single-beam sensors

(2 for dark switching, 1 for light switching)



Connection of module XPS CM with 4 pairs of XU2 S single-beam sensors $\,$

(2 for dark switching, 2 for light switching)



9

Safety monitoring module Preventa XPS LCM

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

Operating principle

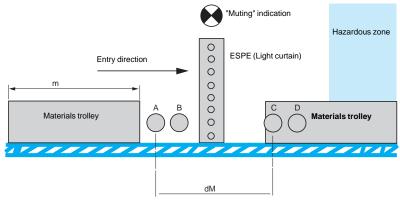
XPS LCM safety modules are used with type 4 light curtains conforming to EN/ IEC 61496-1 to provide a system inhibiting the light curtain protection, i.e. "muting". This function enables the automatic passage of parts for machining or loaded pallets, without interrupting the transportation movement within 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 eld 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 eld 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 re ex type XUB 0BPSNL2 + XUC Z50 or mechanical limit switches with contacts.
- dM ≤ 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 eld and cease it once it has cleared all the sensors of the protection eld on exiting.

Schneider

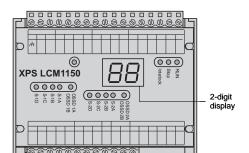
Safety automation solutions
Safety monitoring module
Preventa XPS LCM
for the "muting" function of type 2 and type 4 safety light curtains

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	Terminals		IP 20
conforming to IEC 60529	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 - number of inputs to be monite	ored		2 to 4 per "muting" function
 supply voltage of sensors 		V	24
- output current of each senso	r	mA	<20
Type of "muting" sensors			Thru-beam, polarised re ex or sensors with volt-free contacts
Synchronisation time of "mu	ting" sensors	s	3 or unlimited
Maximum "muting" time		min	2 or unlimited
Safety outputs			
 number and type 			2 PNP (terminals 1 and 2), 0.625 A at 24 V
- max. thermal current (Ithe)	1 output	Α	-
	2 outputs	Α	2 x 0.108
	3 outputs	Α	-
	3 contacts	Α	-
Auxiliary outputs			1 PNP (terminal 5) + 1 NPN (terminal 6)
 breaking capacity of solid-sta 	•	mA	24 V/500
 breaking capacity of solid-sta 	ate NPN outputs	mA	24 V/100
"Muting" indicator light pow	er	W	1 to 7 max.
Response time on input char	nge of state	ms	1
Signalling			14 LEDs plus 2-digit display
Connection	Туре		Captive screw clamp terminals, removable terminal block
1-wire connection	Without cable end		Solid cable: 4 mm ²
	Without cable end		Flexible cable: 0.141.5 mm ²
	With cable end		Without bezel, exible cable: 0.141.5 mm ²
2-wire connection	Without cable end		Solid cable: 0.141.5 mm ²
	Without cable end		Flexible cable: 0.140.7.5 mm ²

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

Safety monitoring module Preventa XPS LCM

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



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.



XPS LCM1150

Reference	s					
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	XPS LCM1150	0.660

Spare parts			
Description	Power	Reference	Weight
	W		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

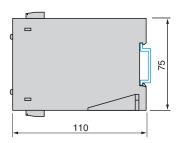
Safety automation solutions Safety monitoring module Preventa XPS LCM

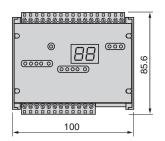
for the "muting" function of type 2 and type 4 safety light curtains

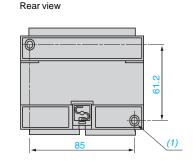
Dimensions

XPS LCM1150

Mounting on 35 mm rail

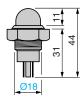


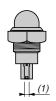




(1) 2 elongated holes Ø 4 x 5.7.

"Muting" indicator light kit XSZ CM01





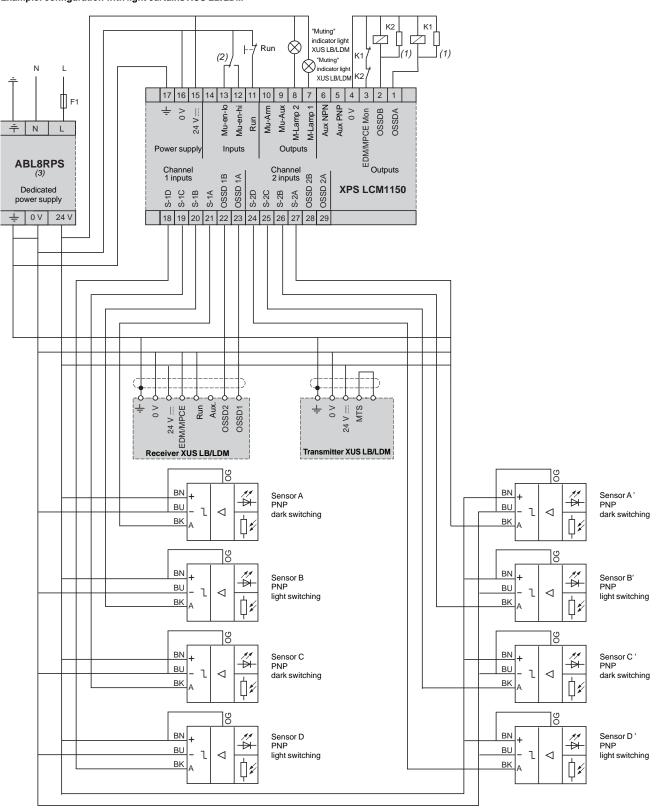
(1) Faston connector 4.7.

Safety monitoring module Preventa XPS LCM

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

Connection via the safety monitoring module XPS LCM1150

Example: configuration with light curtains XUS LB/LDM



⁽¹⁾ Arc suppressor.

Presentation: Characteristics: References: Dimensions: page 30311-EN/2 page 30311-EN/3 page 30311-EN/4 page 30311-EN/5

⁽²⁾ Muting activation/deactivation key switch.

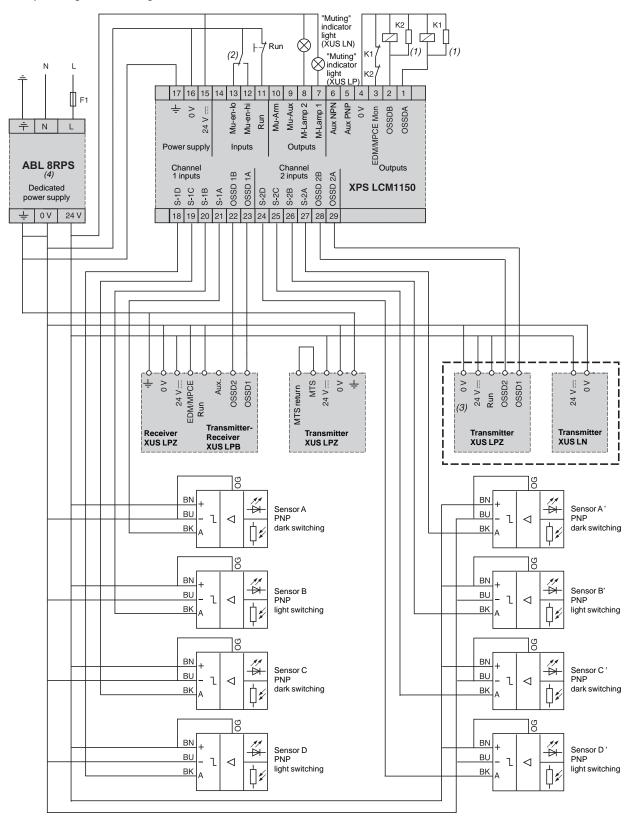
⁽³⁾ The power supply must conform to EN/IEC 61496 and EN/IEC 60204-1 standards.

Safety monitoring module Preventa XPS LCM

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

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.

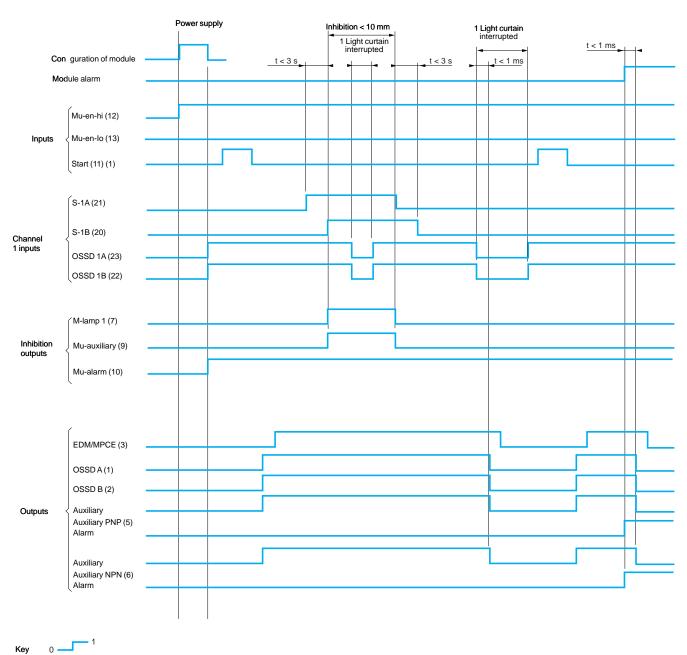
⁽⁴⁾ The power supply must conform to EN/IEC 61496 and EN/IEC 60204-1 standards.

Safety monitoring module Preventa XPS LCM

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

Functional diagram of safety monitoring module XPS LCM1150

"Start/restart interlock" mode with 2 sensors



(1) Press Start button.

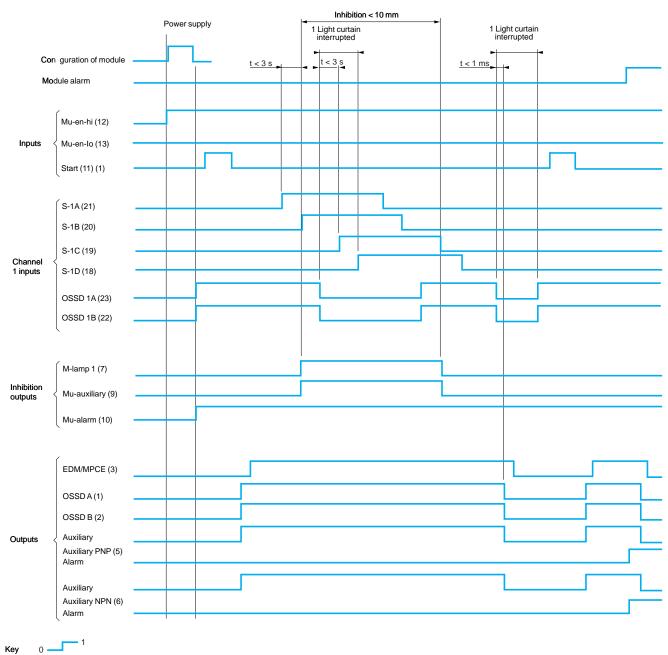
Functional diagrams (continued)

Safety automation solutions

Safety monitoring module Preventa XPS LCM for the "muting" function of type 2 and type 4 safety light curtains

Functional diagram of safety monitoring module XPS LCM1150

"Start/restart interlock" mode with 4 sensors



(1) Press Start button.

9

Control and signalling units for safety applications

Dialogue components

Applications

Trip wire switches for:

- conveyor systems,
- materials handling, machine tools,
- electrical testing stations

Foot switches for:

- bending machines, dosing machines, assembly stations, packaging machines, cutting presses, stamping presses,
- machine tools (numerical control, lathes, milling machines, grinders, machining centres),
 guillotines, cutters, folders, saws,
 forging machines, rolling machines, cold metal forming machines

Enabling grip switch

- robots,
- machine tools,
- labellers

Ergonomic two-hand control stations for machine tool control



Uimp = 2.5 kV

XY2 AU

Please consult our catalogue: "Safety solutions using Preventa"

Uimp = 6 kV

XY2 SB



XY2 CH, XY2 CE: Uimp = 4 kV

XY2 CB: Uimp = 6 kV

38145-EN_Ver16.1/3

XY2 C

withstand voltage

conforming to EN/IEC 60947-1 Type references

Pages







	Φ 4						
Features	Length of protected zone: 15 to 100 metres. Can be tripped by the operator at any point in the work zone	Metal, with or without protective cover. Single or double pedal	Plastic, with or without protective cover. Single pedal	Plastic enclosure	2 control pushbuttons and 1 Emergency stop pushbutton		
Conformity to standards	XY2 CH, XY2 CE: EN/IEC 60947-5-1, EN/ISO 13850:2006, UL 508 and CSA C22-2 n° 14 (when speci ed H7) XY2 CB: EN/IEC 60947-5-1, EN/ISO 13850:2006, CSA C22-2 n° 14 (when speci ed H2)	Without protective cover: EN/IEC 60947-5-1, CSA C22-2 n° 14 With protective cover: NF E 09-031	XPE B, G: EN/IEC 60947-5-1, UL 508, CSA C22-2 n°14 XPE A, Y: EN/IEC 60947-5-1	EN/IEC 60947-1, EN/IEC 60947-5-1, EN/IEC 60204-1, cUL us 508, CSA C22-2 n° 14	EN/IEC 60947-5-1, EN 574/ISO 13851		
Protective treatment	Special version, "TH"		Standard version, "TC"				
Ambient temperature For operation	- 25+ 70 °C		XPE B, G : - 25+ 70 °C XPE A, Y : - 25+ 55 °C	- 10+ 60 °C	- 25+ 70 °C		
For storage	-40+70°C						
Electric shock protection conforming to EN/IEC 61140	Class I	Class II	Class I				
Degree of protection conforming to EN/IEC 60529	XY2 CH, XY2 CE: IP 65 XY2 CB: enclosure IP 22, contact housing IP 65	IP 66, IP 669 (with protective cover)	XPE B, G: IP 66 XPE Y: IP 55 XPE A: IP 43	IP 66 IP 65 with pushbutton	IP 65		
Positive operation conforming to EN/IEC 60947-5-1 Appendix K	N/C contacts with positive openin	2-contact, 3-position with positive opening operation	N/C contacts with positive opening operation				
Rated insulation voltage	XY2 CH, XY2 CE: Ui = 400 V degree of pollution 3 conforming to EN/IEC 60947-1, Ui = 300 V conforming to UL 508, CSA C22-2 n° 14 XY2 CB: Ui = 500 V degree of pollution 3 conforming to EN/IEC 60947-1, Ui = 600 V conforming to CSA C22-2 n° 14	Ui = 500 V, degree of pollution 3 conforming to EN/IEC 60947-1, group C conforming to NF C 20-040 and VDE 0110 Ui = 300 V conforming to UL 508, CSA C22-2 n° 14		Ui = 250 V Ui = 125 V for pushbutton conforming to EN/IEC 60947-1	Ui = 600 V, degree of pollution 3 conforming to EN/IEC 60947-1		

Uimp = 6 kV

XPE M, XPE R XPE A, XPE B,

38146-EN_Ver14.1/3 38159-EN_Ver6.1/3

XPE G, XPE Y

Control stations for: Beacons and indicator **Emergency stop** Rotating mirror beacons **Emergency stop Sirens** pushbuttons for: pushbuttons for: assembly and banks for long distance for long distance assembly and packaging machines, signalling applications signalling machine tools, foundries, presses, packaging machines, paper, cardboard and applications automobile industry paper, cardboard and oodworking machines, - food/beverage processing, chemical and automobile industries, woodworking machines, food/beverage processing and chemical industries mechanical presses



Control and signalling units for safety applications

Emergency stop trip wire switches, type XY2 C

Presentation

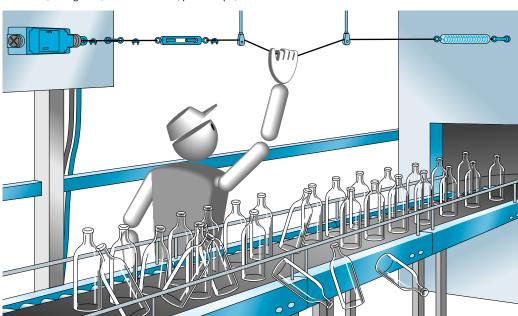
Emergency stop trip wire switches

Emergency stop trip wire switches are designed to:

- avert hazards (dangerous phenomena) at the earliest possible moment, or to reduce risks which could cause injury to persons or damage either to machines or work in progress,
- be tripped by a single human action when a normal Emergency stop function is not available,
- trip in the event of the trip wire breaking.

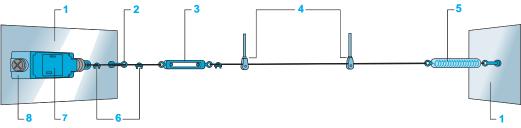
Emergency stop trip wire switches are essential in premises and on machines that are potentially dangerous when in operation. The operator must be able to trigger the stop instruction at any point within their working area.

Application examples: woodworking machines, shears, conveyor systems, transfer machines, printing machines, textile machines, rolling mills, test laboratories, paint shops, surface treatment works.



Installation

Typical installation



- 1 Fixing support
- 2 First cable support
- 3 Turnbuckle

- 4 Pulley supports and pulleys
- 5 End spring
- 6 Cable grips

- 7 Switch adjustment
- 8 Emergency stop

Notes regarding installation

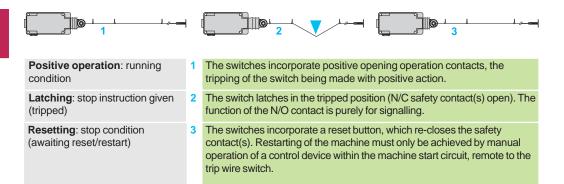
- All XY2 CH/CE/CB trip wire switches can be tted with a pilot light to indicate their tripped condition.
- Cable tension adjustment can be performed using:
- $\hfill\Box$ a turnbuckle (to be ordered separately, see page 38145/7),
- □ a tensioner (integrated in certain XY2 CH models, see page 38145/5).
- This adjustment is simplied by:
- □ a cable tension indicator that is available on all models XY2 CH,
- □ the availability of versions with a "cable tension indicator" window by stating its reference on the order form (see page 38145/5). Example: reference XY2 CE1A250 becomes XY2 CE1D250.
- The use of an end spring is strongly advised for conveyor system applications to ensure operation of the Emergency stop in the event of the cable being pulled towards the switch.
- It is essential that pulleys be used with trip wires that deviate from a straight run, i.e. angled to form a protected zone.
- Important: switches XY2 CB must not be used if the installation requires that the trip wire be angled. Switches XY2 CH and XY2 CE can be used if the installation requires that the trip wire be angled. In this case, the total sum of the angles through which the trip wire bends must not exceed 180° (For further information on instructions to be adhered to, please refer to the installation manual).

Schneider

Control and signalling units for safety applications

Emergency stop trip wire switches, type XY2 C

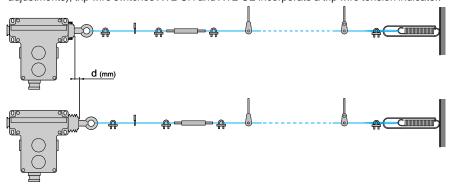
Main features



Trip wire expansion and contraction: d

Temperature variations likely to be encountered in the protected zone will obviously cause the trip wire to expand or contract.

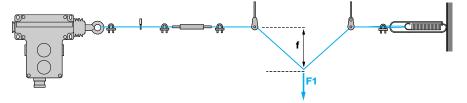
To enable instant veri cation that the trip wire is at its correct tension (and for making any necessary adjustments), trip wire switches XY2 CH and XY2 CE incorporate a trip wire tension indicator.



Tripping force: F1 Tripping deflection: f

The tripping force **F1** is the force necessary on the trip wire to cause the switch to trip.

The tripping de ection **f** is the distance that the trip wire has to be de ected from its taut position to the point at which the switch trips.



Adjustment values (with end spring)

For Emergency stop trip wire switches type XY2 CE: the adjustment values depend on the positions of the cam located inside the switch. Adjustment is made by rotating the cam after the switch has been installed. Each notched position of the cam is referenced by the letters A to F, and the selected letter is visible through a viewing port.

Temperature range: < 25 °C.

Туре	Posi- tion	Max. length	End spring	between cable supports and cable used								
	of	of		Force F1 (daN)			Deflection f (mm) for:				
	cam	cable		Standard		Light		Standard	force	Light force	е	
				Cable Ø 3.2 mm	Cable Ø 5 mm	Cable Ø 3.2 mm	Cable Ø 5 mm	Cable Ø 3.2 mm	Cable Ø 5 mm	Cable Ø 3.2 mm	Cable Ø 5 mm	
XY2 CH	_	15 m	XY2 CZ703	2.4	3	-	-	190	230	-	_	
XY2 CE	Α	50 m	XY2 CZ702	7	7	4	4.4	270	260	240	250	
	В			8.6	8.4	4.4	4.8	300	280	250	270	
	С			10.1	9.6	4.8	5.1	320	300	270	270	
	D			11	10.2	4.6	5.3	330	320	280	280	
	E			12.5	12.3	5.8	6	360	340	310	290	
	F			14.4	13.3	6.4	6.6	390	360	330	320	
XY2 CB	_	100 m	XY2 CZ702	4.5	-	-	-	325	-	_	-	

Standards

Trip wire switches XY2 CH, XY2 CE and XY2 CB meet all the requirements of the harmonised European standard **EN/ISO 13850**, relating to Emergency stop devices.

All the trip wire switches are C€ marked and supplied with an EC declaration of conformity.

Control and signalling units for safety applications Emergency stop trip wire switches, type XY2 C

Environment											
Conformity to standards	Products	XY2 CH, XY2 CE: EN/IEC 60947-5-5, EN/ISO 1	13850: 2006, UL 508								
		and CSA C 22-2 n° 14 (with suf x H7)	447 % (110)								
	Machine accomplies	XY2 CB: EN/IEC 60947-5-1, CSA C 22-2 n° 1	, ,								
	Machine assemblies	XY2 CH, XY2 CE, XY2 CB: EN/IEC 60204-1. Work equipment directive: 89/655/EEC	, Machinery directive: 2006/42/EC,								
Product certifications		XY2 CH: UL-CSA (with suf x H7), CCC (1)									
		XY2 CE: UL-CSA A 300-Q 300 (with suf x H7	7), CCC								
			XY2 CB: CSA A 600-Q 600 (with suf x H2)								
Maximum safety level (2)		PL e, category 4 conforming to EN/ISO 13849	C								
Reliability data B10d Protective treatment	Cton days version	"TC"	rs: can be limited by contact and mechanical wear								
Protective treatment	Standard version Special version	"TH"									
Ambient air temperature	For operation	- 25+ 70 °C									
7po	For storage	- 40+ 70 °C									
Vibration resistance		XY2 CH: 10 gn (10150 Hz)									
		XY2 CE: 10 gn (10300 Hz) conforming to E	EN/IEC 60068-2-6								
Shock resistance		XY2 CH, XY2 CE: 50 gn (duration 11 ms) con	nforming to EN/IEC 60068-2-27								
Electric shock protection		Class I conforming to IEC 61140									
Degree of protection		XY2 CH, XY2 CE: IP 65 XY2 CB: enclosure IP 22, contact housing IP	165 conforming to IEC 60529								
Mechanical life		XY2 CH, XY2 CE (Emergency stop), XY2 CB									
Length of protected zone (tr	ip wire)	XY2 CH: ≤ 15 metres, XY2 CE: ≤ 50 metres,									
Distance between cable sup	<u> </u>	5 m									
Cable entries		See dimensions, page 38145/9.									
Contact block char	acteristics										
Rated operational character		XY2 CH, XY2 CE:									
		AC-15: A300 or Ue = 240 V, le = 3 A									
		DC-13: Q300 or Ue = 250 V, le = 0.27 A confo	rming to EN/IEC 60947-5-1 Appendix A								
		XY2 CB: AC-15: A600 or Lie = 600 V ie = 1.2 A	AC-15: A600 or Ue = 600 V, le = 1.2 A								
		DC-13: Q 600 or Ue = 600 V, le = 0.1 A conforming to EN/IEC 60947-5-1 Appendix A									
Nominal thermal current		10 A									
Rated insulation voltage			tion 3 conforming to EN/IEC 60947-1, Ui = 300 V								
		conforming to UL 508, CSA C22-2 n° 14 XY2 CB: Ui = 500 V degree of pollution 3 control	forming to ENVEC 60047.1. Hi = 600 V								
		conforming to CSA C22-2 n° 14	101111111g to E14/1EC 60947-1, 01 = 600 V								
Rated impulse withstand vol	Itage	XY2 CH, XY2 CE: Uimp = 6 kV, XY2 CB: Uimp	o = 6 kV conforming to EN/IEC 60947-1								
Positive operation		NC contact with positive opening operation co	NC contact with positive opening operation conforming to EN/IEC 60947-5-1 Section 3								
Contact operation		XY2 CH, XY2 CE (Emergency stop), XY2 CB	3: NC + NC or NC + NO slow break								
Resistance across terminals	S	≤ 25 mΩ conforming to NF C 93-050 method	A or EN/IEC 60255-7 category 3								
Terminal referencing		Conforming to CENELEC EN 50013									
Short-circuit protection		XY2 CH, XY2 CE, XY2 CB: 10 A cartridge fus									
Rated operational power		XY2 CH, XY2 CE Conforming to EN/IEC 60947-5-1 Appendix C	XY2 CB Conforming to EN/IEC 60947-5-1 Appendix C								
(Electrical durability)		Utilisation categories AC-15 and DC-13	Utilisation categories AC-15 and DC-13								
Operating rate: 3600 operating Load factor: 0,5	g cycles/nour	AC supply \sim 50/60 Hz	AC supply \sim 50/60 Hz Power broken in VA (1)								
		.m. Inductive circuit	m Inductive circuit								
			Voltage V 24 48 127 220								
		lthe	m VA 250 250 500 500								
		12/24/48 V									
		5 0,5									
		220 V									
		0 127 \dot{V}									
		Sel 0 1									
		≥									
		- 									
		_									
		0,1	DC supply :								
			DC supply Power broken in W (1)								
		0,1 1 2 3 4 5 10A									
		0,1 2 3 4 5 10A Current in A	Power broken in W (1) m Inductive circuit Voltage V 24 48 120								
		0,1 1 2 3 4 5 10A Current in A	Power broken in W (1) m Inductive circuit								
		0,1 2 3 4 5 10A Current in A Voltage V 24 48 120	Power broken in W (1) m Inductive circuit Voltage V 24 48 120								
Contact connection		0,1 2 3 4 5 10A Current in A Voltage V 24 48 120 M W 15 23 30 (1) For 1 million operating cycles. Screw clamp terminals	Power broken in W (1) m Inductive circuit Voltage V 24 48 120 m W 50 100 100								
Contact connection		0,1 2 3 4 5 10A Current in A Voltage V 24 48 120	Power broken in W (1) m Inductive circuit Voltage V 24 48 120 m W 50 100 100								

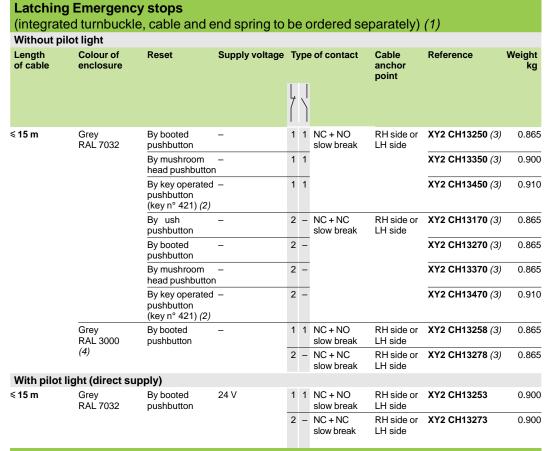
⁽¹⁾ Only products XY2 CH without pilot light are CCC and UL-CSA approved. (2) Using an appropriate and correctly connected control system.

General: page 38148/2 References: page 38145/3 Dimensions: page 38145/9

Control and signalling units for safety applications

Emergency stop trip wire switches, type XY2 C







(turnbuckle, cable and end spring to be ordered separately) (1)

Without pilot light

≤ 50 m	Grey RAL 7032	2 By booted - pushbutton	- 1 1	1	NC + NO	RH side	XY2 CE1A250 (6)	1.450	
(5)	body and stainless steel					slow break	LH side	XY2 CE2A250 (6)	1.450
	cover		2 -	-	NC + NC	RH side	XY2 CE1A270 (6)	1.450	
						slow break	LH side	XY2 CE2A270 (6)	1.450
		By key switch	_	1	1	NC + NO	RH side	XY2 CE1A450 (6)	1.465
		(key n° 421) <i>(7)</i>		slow break	slow break	LH side	XY2 CE2A450 (6)	1.465	
				2	_	NC + NC	RH side	XY2 CE1A470 (6)	1.470
						slow break	LH side	XY2 CE2A470 (6)	1.470
With LED pi	lot light (direc	t supply)							
≤ 50 m	Grey RAL 7032		24 to 130 V	2	2	NC + NO	RH side	XY2 CE1A296	1.470
(5)	body and stainless steel cover	pushbutton				slow break	LH side	XY2 CE2A296	1.470
			230 to 240 V	2	2	NC + NO	RH side	XY2 CE1A297	1.470

Other versions

See order forms on page 38145-EN/4.

XY2 CE with reset by Ø 40 mm mushroom head pushbutton or with integral cable tensioner and support.

slow break

LH side

XY2 CE2A297

1.470

Please consult our Customer Care Centre.





⁽¹⁾ See separate components, page 38145/6.

⁽²⁾ Ø 30 spring return key operated pushbutton. Locking and key withdrawal in the rest (unactuated) position

⁽³⁾ For ISO M20 threaded cable entry version, add H29 to the end of the reference selected. Example: XY2 CH13250 becomes XY2 CH13250H29.

⁽⁴⁾ Only available on Emergency stop enclosures type XY2 CH1325● and XY2 CH1327● for standard, H29 and TK versions.

⁽⁵⁾ Available with window for viewing cable tension indicator, for adjustment whilst the cover is closed (see versions XY2 CE•D••• and XY2 CE•E••• on the order form, page 38145/6).

⁽⁶⁾ ATEX version available (products for explosive atmospheres): To order, add EX to the end of the reference. Example: XY2 CE1A250 becomes XY2 CE1A250EX.

⁽⁷⁾ Key switch, 2 position spring return. Locking and key withdrawal in the rest (unactuated) position.

Control and signalling units for safety applications Emergency stop trip wire switches, type XY2 C

_	m m	
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XY2 CB30

_	j Emergend ng included		and cable to	be c	or	dered sen	arately)	(1)	
Without pil		,						-/	
Length of cable	Colour of enclosure	Reset		Typ L	эе 	of contact	Cable anchor point	Reference	Weight kg
≤ 100 m	Blue	From inside 6	From inside enclosure		1	NC + NO slow break	LH side	XY2 CB10 (2)	18.750
							RH side	XY2 CB20 (2)	18.750
				2	-	NC+NC slow break	LH side	XY2 CB104	18.750
							RH side	XY2 CB204	18.750
≤ 2 x 100 m	Blue	From inside 6	enclosure	1	1	NC + NO slow break	RH and LH sides	XY2 CB30 (2)	29.250
				2	-	NC + NC slow break	RH and LH sides	XY2 CB304	29.250
With pilot I	ight								
Length of cable	Colour of enclosure	Reset	Supply voltage	Typ L	ре 	of contact	Cable anchor point	Reference	Weight kg
■ Direct sup			2414					V0/2 05/4	
≤ 100 m	Blue	From inside enclosure	24 V	1	1	NC + NO slow break	LH side	XY2 CB11	19.550
							RH side	XY2 CB21	19.550
			48 V	1	1	NC + NO slow break	LH side	XY2 CB12	19.550
							RH side	XY2 CB22	19.550
≤ 2 x 100 m	Blue	From inside enclosure	24 V	1	1	NC + NO slow break	RH and LH sides	XY2 CB31	25.600
			48 V	1	1	NC + NO slow break	RH and LH sides	XY2 CB32	30.050
■ Supply vi	a integral trans	former (3)							
≤ 100 m	Blue	From inside enclosure	127 V/6 V	1	1	NC + NO slow break	LH side	XY2 CB13	15.600
							RH side	XY2 CB23	15.600
			220 V/6 V	1	1	NC + NO slow break	LH side	XY2 CB14	15.600
							RH side	XY2 CB24	15.600
≤ 2 x 100 m	Blue	From inside enclosure	127 V/6 V	1	1	NC + NO slow break	RH and LH sides	XY2 CB33	25.600
			220 V/6 V	1	1	NC + NO slow break	RH and LH sides	XY2 CB34	25.600

⁽¹⁾ See separate components, page 38145/7. End spring XY2 CZ702 included.
(2) For 1/2" NPT threaded cable entry version, add the suffix H2 to the reference selected. Example: XY2 CB10 becomes XY2 CB10H2.
(3) Bulb DL1 CB006 included.

Order form (specimen suitable for photocopying) Control and signalling units for safety applications Emergency stop trip wire switches, type XY2 C

Complete units, pre-assembled

Customer		Schneider Electric Industries SA			
Company	Order N°	Delivery date	Sales of ce - Subsidiary Co.	Order N°	

How to use this form:

- indicate the number of Emergency stop switches required,
- complete the basic reference.

Reference								
Number of identical Emergency stops	XY	2 CH						
Model								
Emergency stop (latching)		1						
Degree of protection								
IP 65 (standard bellows) withou	ıt tonoionor		1					
IP 65 (silicone bellows) without			2					
IP 65 (standard bellows) with in			3					
IP 65 (silicone bellows) with inte			4					
1 03 (Silicone bellows) with inte	egrai terisionei							
Type of reset								
Emergency stop (1)	Flush			1				
Reset by spring return	Booted			2				
oushbutton	Mushroom head, Ø 30)		3				
	Key operated mushroom head, Ø 30 (key n° 421)			4				
	Key operated mushroom head, Ø 30 (key n° 455)			5				
	Key operated mushro	om head, Ø 30	(2)	9				
Contact blocks for Emergence	cy stop function (3)							
Slow break	1 NC + NO (NO stagg	ered)			5			
	1 NC + NC				7			
Pilot light								
Without pilot light						0		
With 24 V direct supply pilot ligh	nt					3		
With 48 V direct supply pilot light								
With 130 V direct supply pilot light								
With 230 V direct supply pilot lig	<u> </u>					7		
1/2" NPT tapped cable entries	2:::					•	H7 (4)	
ISO M20 tapped cable entries							H29	
Increased protective treatment	against corrosion							TK (5

- (1) Opening of a circuit + mechanical latching in the open position. (2) Other key numbers: 458A, 520E, 1242A, 1243E, 1344A, 1422A, 1431E, 2123E and 2132E.

- (3) Emergency stop trip wire switches can only be fitted with slow break contact blocks.
 (4) Only for versions without pilot light. For versions with pilot light, order an H4 version.
 (5) Protective treatment TK is only possible for switches with silicone bellows (XY2 CH12•••TK, XY2 CH14•••H29TK...).

Order form (specimen suitable for photocopying) Control and signalling units for safety applications Emergency stop trip wire switches, type XY2 C

Complete units, pre-assembled

Customer		Schneider Electric Industries SA			
Company	Order N°	Delivery date	Sales of ce - Subsidiary Co.	Order N°	

How to use this form:

- indicate the number of Emergency stop switches required,
 complete the basic reference.

Reference								
Number of identica Emergency stops	XY2 CE							
Model								
mergency stop	Anchor point on RH side, standard force	1						
latching)	Anchor point on LH side, standard force	2						
	Anchor point on RH side, light force	5						
	Anchor point on LH side, light force	6						
	Anchor point on RH side, standard force (1)	F						
	Anchor point on LH side, standard force (1)	G						
	Anchor point on RH side, light force (1)	J						
	Anchor point on LH side, light force (1)	K						
	tion and "cable tension indicator" window llows) without "cable tension indicator"		Α					
P 65 (standard be vindow								
P 65 (silicone bello window	ows) without "cable tension indicator"		С					
P 65 (standard be	llows) with "cable tension indicator" window		D					
P 65 (silicone bell	ows) with "cable tension indicator" window		E					
Type of reset								
Emergency stop (2)) Flush			1				
Reset by spring	Booted			2				
eturn pushbutton	Mushroom head, Ø 30			3				
Emergency stop (2)	<u>'</u>			4				
Reset by key switch	hKey n° 455			5				
	Key 458 A or 520E			9				
	or Emergency stop function (3)							
Slow break	1 NC + NO				5			
	1 NC + NC				7			
	2 NC + NO (compulsory with pilot light) (4)	2 NC + NO (compulsory with pilot light) (4)						
Pilot light								
Without pilot light								
With 24 to 130 V di	rect supply LED pilot light (provide for 2 conta	ct blocks	s)			6		
With 230 to 240 V	direct supply LED pilot light (provide for 2 cont	act bloc	ks)			7		
			,				H7	
1/2" NPT tapped cable entries (the LED pilot light will be red) Increased protective treatment against corrosion								

Schneider Belectric

⁽¹⁾ With cable tensioner. (2) Opening of NC contact + mechanical latching in the open position.

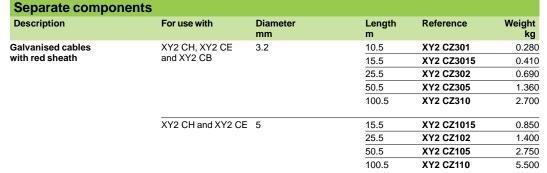
⁽³⁾ Emergency stop trip wire switches can only be fitted with slow break contact blocks.

⁽⁴⁾ The use of a pilot light means selecting a switch fitted with 2 NC + NO contacts: XY2 CE•••9
(5) Protective treatment TK is only possible for switches with silicone bellows (XY2 CE•C•••TK, XY2 CE•E•••H7TK).

Control and signalling units for safety applications Emergency stop trip wire switches,

type XY2 C



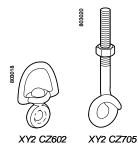




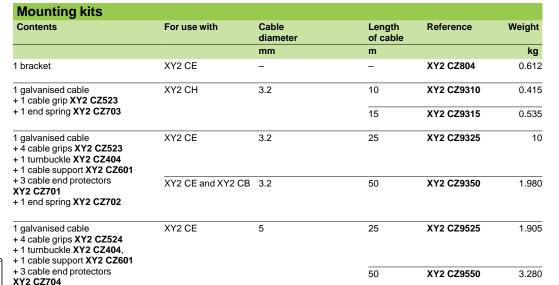
XY2 CZ524

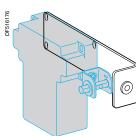


Description	Туре	For use with	Sold in lots of	Unit reference	Weight kg
Turnbuckles	M6 x 60 + locknut	All models (1)	1	XY2 CZ402	0.060
	M8 x 70 + locknut	All models (1)	1	XY2 CZ404	0.100
Cable grips	Single	Cable Ø 3 to 5 mm	10	XY2 CZ503	0.007
	Double	Cable Ø 3 to 5 mm	10	XY2 CZ513	0.016
	Clamp	Cable Ø 3.2 mm	10	XY2 CZ523	0.050
		Cable Ø 5 mm	10	XY2 CZ524	0.080
Cable supports	Fixed	All models	10	XY2 CZ601	0.030
	Swivelling	All models	1	XY2 CZ602	0.130
	Pulley support	XY2 CH and XY2 CE	1	XY2 CZ705	0.060
Pulley	Cable Ø 5 mm max.	XY2 CH and XY2 CE	1	XY2 CZ708	0.002
Cable end protectors		Cable Ø 3.2 mm	10	XY2 CZ701	0.002
		Cable Ø 5 mm	10	XY2 CZ704	0.010
End springs		XY2 CH	1	XY2 CZ703	0.035
		XY2 CE and XY2 CB	1	XY2 CZ702	0.080









+ 1 end spring XY2 CZ702.

XY2 CZ702

XY2 CZ804

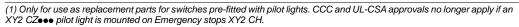
Documentation			
Description	For use with	Reference	Weight kg
Installation manual	XY2 CH and XY2 CE	XCOM2512	0.200

⁽¹⁾ Emergency stop trip wire switches XY2 CH13... and XY2 CH14... incorporate a cable tensioner as standard. Therefore, there is no need to order a turnbuckle.

Replacement parts

Control and signalling units for safety applications Emergency stop trip wire switches, type XY2 C

Description	For use with	Туре		Reference	Weight kg
Reset pushbutton (blue),	XY2 CH	Flush with "R" m	arked on push	ZA2 BA639	0.030
spring return For XY2 CH and XY 2 CE		Booted		ZA2 BP6	0.025
		Mushroom head	I, Ø 30	ZA2 BC64	0.045
	XY2 CE	Flush with "R" m	arked on push	ZB5 AA639	0.018
		Booted		ZB5 AP6S	0.021
		Mushroom head	I, Ø 30	ZB5 AC64	0.027
Key switch	XY2 CE	With key n° 421		ZB5 AG612R26	0.064
		With key n° 455		ZB5 AG6R26	0.064
Keys for reset button	All types of Emergency stop	N° 421		Q99900911	0.006
		N° 455		Q99900901	0.006
Pilot light head assembly	XY2 CH	Orange		ZA2 BV05	0.015
	XY2 CE	Orange		XY2 CZ800	0.015
		Red		XY2 CZ801	0.015
Pilot light lens	XY2 CH	Orange		ZB2 BV015	0.003
Fixing nut, plastic, black	XY2 CH	_		ZA2 BZ901	0.002
	XY2 CE	_		ZB5 AZ901	0.002
Fixing nut tightening key,	XY2 CH - For xing nut ZA2 BZ	901		ZA2 BZ905	0.060
plastic, black	XY2 CE - For xing nut ZB5 AZ9	901		ZB5 AZ905	0.016
Description	For use with	Voltage	Sold in lots of	Unit reference	Weight kg
Pilot lights	XY2 CH Colour: orange	24 V	1	XY2 CZ0024 (1)	0.035
With bulb DL1 AA••• included		48 V	1	XY2 CZ0048 (1)	0.035
		130 V	1	XY2 CZ0130 (1)	0.035
		230 V	1	XY2 CZ0230 (1)	0.035
	XY2 CB	24 V	1	9001 KP35R9	0.134
	Colour: red	48 V	1	9001 KP36R9	0.134
		120 V	1	9001 KP1R9	0.210
		230 V	1	9001 KP7R9	0.210
Supply on LED	XY2 CE	24 to 130 V	1	ZAL VBG4	0.015
	Colour: red	230 to 240 V	1	ZAL VM4	0.015
	XY2 CE	24 to 130 V	1	ZAL VBG5	0.015
	Colour: orange	230 to 240 V	1	ZAL VM5	0.015
Incandescent bulbs,	XY2 CH	24 V - 6 W	10	DL1 AA024	0.004
screw base fitting		48 V - 6 W	10	DL1 AA048	0.004
		130 V - 6 W	10	DL1 AA127	0.004
		230 V - 6 W	10	DL1 AA220	0.004
Incandescent bulbs,	XY2 CB	24 V - 2.6 W	10	DL1 CE024	0.002
BA 9s base fitting		48 V - 2.6 W	10	DL1 CE048	0.002
	XY2 CB 120 V and 230 V	6 V - 1.2 W	10	DL1 CB006	0.002
Packet of 5 collars	For mounting DL1 AA127 and DL1 AA220 bulbs in pilot lights XY2 CZ•••	-	5	XY2 CZ908	0.018
ISO M20 adaptor	XY2 CB	_	5	DE9 RP13520	0.050

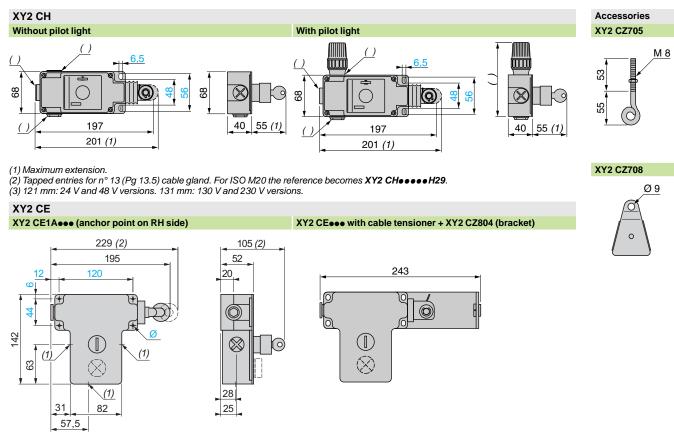




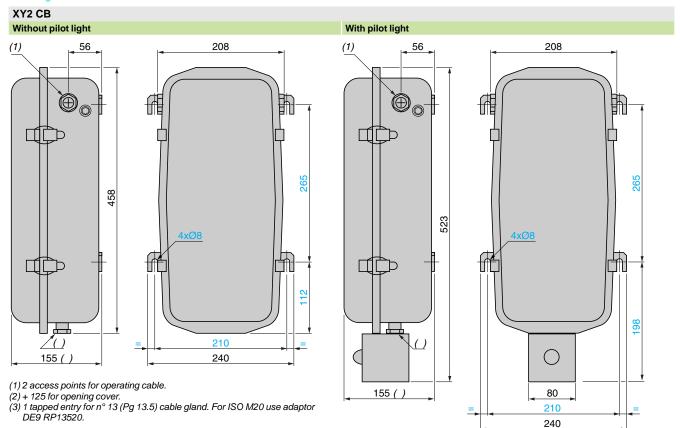


General: page 38148/2 Characteristics: page 38145/2 Dimensions: page 38145/9

Control and signalling units for safety applications Emergency stop trip wire switches, type XY2 C



- (1) 3 plain holes for n° 13 (Pg 13.5) or ISO M20 cable gland. (2) Maximum extension.



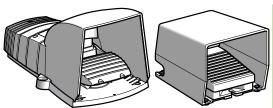
Control and signalling units for safety applications

Foot switches, Harmony type XPE

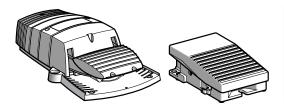
Presentation

Foot switches type XPE are an ideal solution for providing start and stop instructions for many types of industrial machines, running in various operating modes: normal (pulsed) start, inching, hold to run.

The range comprises metal case foot switches (heavy duty, high risk) complying to very strict regulations, and plastic case foot switches (light duty, low risk).



Fitted with a protective cover, the foot switches are for applications where, for each issuing of the start instruction, a high level of danger exists (high risk).



Foot switches **without a protective cover** are suitable for applications where the issuing of the start instruction presents a **reduced level of danger**.

Contact

Switches incorporate snap action contacts with positive opening operation

The foot switches can incorporate one or two N/C + N/O contact blocks.

Positive opening operation on release of pedal: the hold down or return to the rest position of the pedal (machine stop) is positive acting.

Terminology

Positive opening operation

A switch meets this requirement when all its N/C contacts can be switched to the open position with certainty, i.e. there are no exible links between the moving contacts and the actuator to which the operating force is applied.

All pedal operated foot switches incorporate a snap action N/C + N/O contact block with positive opening operation, and conform fully to standard IEC 60947-5-1 Section 3.

Snap action contact (quick break)

The displacement speed of the moving contacts is not related to the speed at which the contact actuator is operated. This feature gives consistent electrical performance, even when the contact actuator device is operated at low speeds.

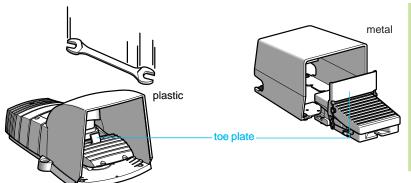
38159-EN_Ver6.1/3

Control and signalling units for safety applications

Foot switches, Harmony type XPE

Start instructions

Foot switches XPE with protective cover are ideally suited for issuing a safety "Start" instruction for potentially dangerous machines.



The protective cover over the operating pedal avoids the risk of accidental operation, either by human action or by falling objects, which could result in unintentional starting of the machine.

A trigger mechanism (toe plate) enables locking of the pedal in the rest (released) position.





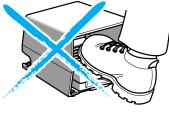
Positive action is required on the toe plate 1 before the pedal 2 can be depressed to start the machine.

On releasing the pedal to stop the machine, the trigger mechanism re-engages and locks the pedal in the rest position.

Normal stop instructions

All foot switches of the XPE range can be used for issuing a normal stop instruction to a machine.







Never use the protective cover nor the trigger mechanism for this type of application. Access to the stop control must be as unrestricted as possible and without any constraints.

For machine stop instructions, use the N/C contact(s).

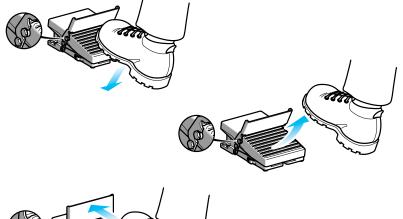
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Control and signalling units for safety applications

Foot switches, Harmony type XPE

Pedal latching device when depressed

Foot switches with pedal latching device are particularly suited for the control of "hold to run" machines and also, for adjustment operations.



Pressing the pedal issues the machine start instruction and, when the pedal reaches its stop, it latches in the operated position.

Removing the foot from the pedal will not stop the "machine" cycle (hold to run), the pedal remains latched.

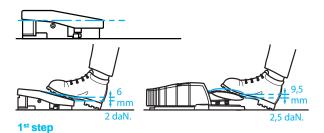


For issuing a normal stop instruction, the foot is replaced on the pedal and the toe plate operated: this returns the pedal to the rest position.

Switches with 2 step contact operation

Foot switches featuring 2 step contact operation are ideal for applications involving 2-speed machines. **Examples:**

- First speed: low (used for setting-up, adjustment or tool maintenance).
- Second speed: fast (normal machine operating speed).



The rst step, at 6 mm pedal travel and light foot pressure (2 daN), actuates a N/C + N/O contact block.



The second step, at maximum pedal travel (12 mm) and required foot pressure (9 daN), actuates a second N/C + N/O contact block.

Applications

Many types of machines are fitted with foot switches

- Bending machine
- Dosing machine
- Assembly station
- Packaging machines
- Cutting presses, stamping presses
- Machine tools (numerical control, lathes, milling machines, grinders, machining centres)
- Guillotines, cutters, folders, saws
- Forging machines, rolling machines, cold metal forming machines

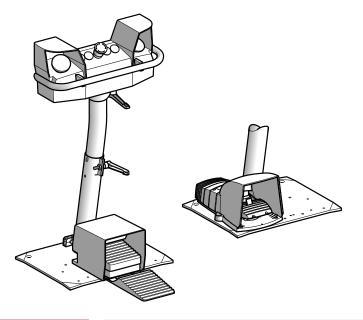
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Control and signalling units for safety applications

Foot switches, Harmony type XPE

Foot switches used in conjunction with two-hand control stations

Foot switches XPE can be mounted directly on the baseplate (without drilling additional fixing holes) of the pedestal XY2 SB90 for two-hand control stations XY2 SB7●.



The baseplate of the two-hand control station pedestal XY2 SB90 is pre-drilled with xing holes to suit the mounting of either:

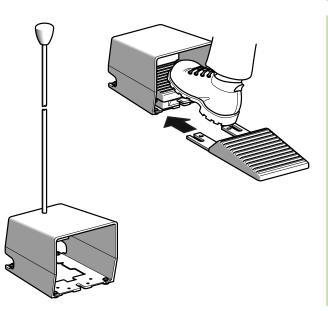
- One XPE foot switch, with or without protective cover
- Two XPE R foot switches, each with its own protective cover or tted with a common (double) cover.

Ergonomic

The protective cover is very strong and is sufficiently dimensioned to accommodate all types of footwear (large size, safety boots, etc.).



The foot switch is designed such that the operating pedal is close to the ground and at a comfortable angle.



Various accessories improve the working comfort for machine operators and help to avoid discomfort in the base of the spine due to unbalanced positioning of the pelvis:

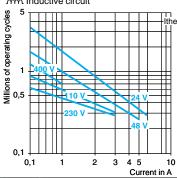
- Heel rest (metal XPE).
- Hand grip for mounting on protective cover.

Harmony types XPE M/R

Environment			
Conformity to standards	Without protective cover		EN/IEC 60947-5-1, CSA C22 2 n° 14 (if H2 speci ed)
	With protective cover		NF E 09-031
Product certifications	Standard version		FI, CSA A300 - Q300 with tapped entries for cable gland
	Special version		CSA A300 - Q300 with 1/2" NPT adaptor
Maximum safety level (1)			PL e, category 4 conforming to EN/ISO 13849-1 and SIL 3 conforming to EN/IEC 61508
Reliability data B10d	Contact block XE2 SP4151		NC positive opening switch: 75,000,000 NO switch: 30,000,000 (data value for a service life of 10 years: can be limited by contact and mechanical wear)
Protective treatment	Standard version		"TC"
	Special version		"TH"
Ambient air temperature	For operation	°C	- 25+ 70
	For storage	°C	- 40+ 70
Vibration resistance			15 gn (10500 Hz) conforming to IEC 60068-2-6
Shock resistance			20 gn conforming to IEC 60068-2-27 (150 gn conforming to NF E 09-031)
Electric shock protection			Class I conforming to IEC 61140
Mechanical life			15 million operating cycles
Degree of protection			IP 66 conforming to IEC 60529 and IP 669
Cable entries			See dimensions, page 38146-EN/5
Contact block char	acteristics		
Rated operational	∼ AC-15		A300 or Ue = 240 V, Ie = 3 A
characteristics	DC-13		Q300 or Ue = 250 V, le = 0.27 A conforming to EN/IEC 60947-5-1 Appendix A
Rated insulation voltage		V	Ui = 500, degree of pollution 3 conforming to EN/IEC 60947-1, group C conforming to NF C 20-040 and VDE 0110
			Ui = 300 conforming to UL 508, CSA C22-2 n° 14
Rated impulse withstand vo	Itage	kV	Uimp = 6 conforming to EN/IEC 60947-1
Positive operation			N/C contact with positive opening operation conforming to EN/IEC 60947-5-1 Appendix K
Resistance across terminals mΩ		$\mathbf{m}\Omega$	≤ 25 conforming to NF C 93-050 method A or IEC 60255-7 category 3
Short-circuit protection			10 A cartridge fuse type gG (gl) conforming to EN/IEC 60947-5-1
Foot switches	Operational power		Conforming to EN/IEC 60947-5-1 Appendix C
with snap action contacts	Utilisation categories		AC-15 and DC-13
	Operating rate		3600 operating cycles/hour. Load factor: 0.5

a.c. supply \sim 50-60 Hz

m Inductive circuit

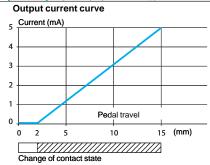


d.c. supply ...

Power broken in W for 5 million operating

cycles					
Voltage	V	24	48	120	
m	W	10	7	4	

Foot switches with analogue output Nominal supply voltage --- 24...48 Voltage limits 19...58 Current consumption, no-load mΑ Output current drift (IS) in 0...+ 50 °C: + 2...- 6% relation to temperature - 25...+ 70 °C: + 2...- 12%



BN (brown) 1	+
D -	BK (black)
BU (blue) 3	,

38146-EN_Ver14.3

Wiring scheme

Connection Screw clamp terminals Maximum clamping capacity: 1 x 2.5 mm² or 2 x 1.5 mm² with or without cable end

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

Harmony types XPE M/R

Single and double pedal foot switches with protective cover

1 step

1 step

1 step

output

1 step

1 step

+1 step

Single

Double

Single

Single

Double



XPE M510

Description	
Metal With trigger mechanism requiring positive action to allow pedal operation	1

Pedal	Contact opera	tion	Colour	Reference
Single	1 step	1 N/C + N/O	Blue	XPE M510
Double	1 step	2 x 1 N/C + N/O	Blue	XPE M5100D
Single	1 step	1 N/C + N/O	Orange	XPE R510
Double	1 step	2 x 1 N/C + N/O	Orange	XPE R5100D

Weight

2.570

6.070

2.570

6.070

2.590

6.090

2.590

6.090

2.590

2.590

2.600

2.600

2.420

5.920



XPE R5100D



Double 2 x 2 N/C + N/O XPE R5110D 1 step Orange Single 2 N/C + N/O **XPE M711** 2 step Blue Orange **XPE R711** 1 step with analogue Single 2 N/C + N/O Blue XPE M529

2 N/C + N/O

2 N/C + N/O

2 x 2 N/C + N/O

Blue

Blue

Orange

Orange

Orange

Orange

XPE M511

XPE R511

XPE R529

XPE R311

XPE R3110D

XPE M5110D



XPE M310

Metal Without trigger mechanism



2 N/C + N/O

2 x 2 N/C + N/O

+ 1 N/C + N/O



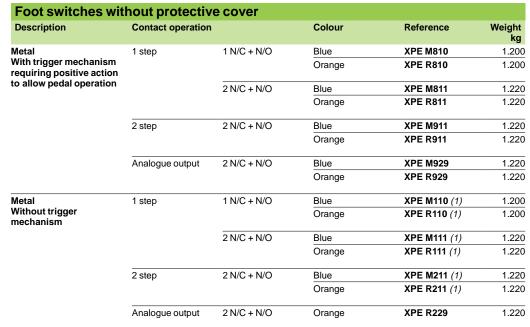
XPE R3100D

Single	1 step latching	1 N/C + N/O	Blue	XPE M410	2.400
			Orange	XPE R410	2.420
Single	2 step	2 N/C + N/O	Blue	XPE M611	2.420
			Orange	XPE R611	2.420
Single	1 step with analogue output	2 N/C + N/O	Blue	XPE M329	2.420
Double	2 step	2 x 1 N/C + N/O	Blue	XPE M6210D	5.900

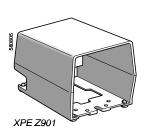
Harmony types XPE M/R

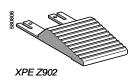


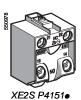
XPE R810











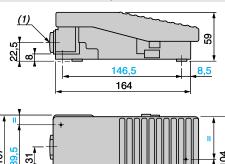
Accessories					
Description	For use with	Unit reference Wei			
Single protective cover	XPE M	XPE Z901	1.200		
	XPE R	XPE Z911	1.200		
Double protective cover	XPE M	XPE Z921	1.200		
	XPE R	XPE Z931	1.200		
Hand grip for protective cover	XPE Z901 or XPE Z911	XPE Z913	0.450		
Heel rest	XPE M	XPE Z902	0.240		
	XPE R	XPE Z912	0.240		
Trigger mechanism	XPE M or XPE R	XPE Z903	0.170		
Latching device (replacement for foot switches with this feature)	XPE M or XPE R	XPE Z904	0.170		
Cable clamp	XPE M or XPE R	XPE Z905	0.010		
Contact blocks Snap action	1 step switches: 1st or 2nd N/C + N/O 2 step switches: 1st N/C + N/O	XE2S P4151	0.020		
	2 step switches: 2 nd N/C + N/O	XE2S P4151B	0.020		
ISO M20 adaptor (Sold in lots of 5)	XPE M or XPE R	DE9 RA1620	0.050		

⁽¹⁾ To order an ATEX D version of the product (protection against dust), add EX to the end of the reference. Example: XPE M110EX.

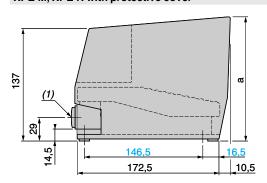
Schneider Belectric

Harmony types XPÉ M/R

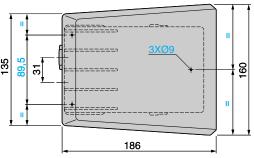
XPE M, XPE R without protective cover



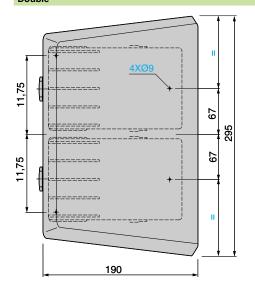
XPE M, XPE R with protective cover



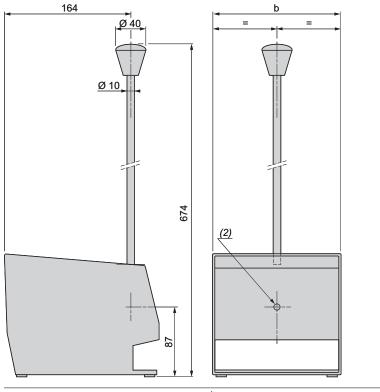
Single



Double



XPE Z913



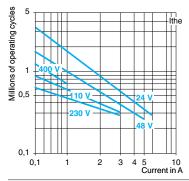
	а	b	
Single pedal	152	160	
Double pedal	155	295	

. (1) 2 tapped entries for n° 16 (Pg 16) cable gland. For ISO M20, use adaptor DE9 RA1620. (2) 1 Ø 6 plain hole.

Harmony types XPE A/B/G/Y

Conformity to standards			XPE A, XPE B, XPE G, XPE Y without protective cover: IEC/EN 60947-5-1 XPE B, XPE G: UL 508, CSA C22-2 n° 14
			XPE B, XPE G with protective cover: NF E 09-031
Product certifications	Standard version		XPE B, XPE G: UL, CSA A300 - Q300 with knock-out entries for ISO M20 cable glan
Maximum safety level (1)			PL e, category 4 conforming to EN/ISO 13849-1 and SIL 3 conforming to EN/IEC 6150
Reliability data B10d	Contact block XE2 SP4151		NC positive opening switch: 75,000,000 NO switch: 30,000,000 (data value for a service life of 10 years: can be limited by contact and mechanical wea
Protective treatment	Standard version		"TH"
Ambient air temperature	For operation	°C	XPE B, XPE G: -25+70 XPE A, XPE Y: -25+55
	For storage	°C	-40+70
/ibration resistance	Conforming to IEC 60068-2-6		5 gn (10500 Hz)
Shock resistance	Conforming to IEC 60068-2-27		XPE A : 25 gn, XPE B, XPE G, XPE Y : 30 gn
Electric shock protection	Conforming to IEC/EN 61140 and NF C 20-030		Class II
Mechanical life			XPE A: 2 million operating cycles XPE Y: 5 million operating cycles XPE B, XPE G: 10 million operating cycles
Degree of protection			XPE A: IP 43 conforming to IEC 60529 XPE Y: IP 55 conforming to IEC 60529
			XPE B, XPE G: IP 66 conforming to IEC 60529
Cable entries			See dimensions, pages 38159-EN/4 and 38159-EN/5
Contact block char	acteristics		
Rated operational character	istics		\sim AC-15; A 300 or Ue = 240 V, le = 3 A
			DC-13; Q 300 or Ue = 250 V, Ie = 0.27 A conforming to IEC/EN 60947-5-1 Appendix A
Rated insulation voltage			Ui = 500 V degree of pollution 3 conforming to IEC/EN 60947-1, group C conforming to NF C 20-040 and VDE 0110
			Ui = 300 V conforming to UL 508, CSA C22-2 n° 14
Rated impulse withstand vol	Itage		Uimp = 6 kV conforming to IEC/EN 60947-1
Positive operation			N/C contact with positive opening operation conforming to IEC/EN 60947-5-1 Appendix K
Resistance across terminals	S		\leq 25 m Ω conforming to NF C 93-050 method A or IEC 60255-7 category 3
Short-circuit protection			10 A cartridge fuse type gG (gl) conforming to IEC/EN 60947-5-1, VDE 0660-200
Operational power	- 1 Appendix C		switches with snap action contacts
conforming to IEC/EN 60947-5-1 Appendix C		Operat	ion categories AC-15 and DC-13 ing rate: 3600 operating cycles/hour actor: 0.5

m Inductive circuit



d.c. supply ...

Power broker	n in W fo	or 5 mill	on operating	cycles
Voltage V	24	48	120	

V	oltage	V	24	48	120
	m	W	10	7	4

Connection	Screw clamp terminals
	Maximum clamping capacity: 1 x 2.5 mm ² or 2 x 1.5 mm ² with or without cable end

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

Harmony types XPE A/B/G/Y



XPE ●510



XPE •310



XPE G810



XPE ●110



XPE A110



XE2S P4151

Description	Contact opera	tion	Housing	Reference	Weight
Description	Contact opera	tion	colour	Reference	kg
With trigger	1 step	1 N/C + N/O	Yellow	XPE Y510 (1)	0.700
mechanism			Blue	XPE B510	0.700
requiring positive action to allow pedal operation			Grey	XPE G510	0.700
		2 N/C + N/O	Yellow	XPE Y511 (1)	0.700
			Blue	XPE B511	0.700
			Grey	XPE G511	0.700
	2 step 2 N/C + N/C	2 N/C + N/O	Yellow	XPE Y711 (1)	0.700
			Blue	XPE B711	0.700
			Grey	XPE G711	0.700
Without trigger	1 step	1 N/C + N/O	Yellow	XPE Y310	0.690
mechanism			Blue	XPE B310	0.690
			Grey	XPE G310	0.690
		2 N/C + N/O	Yellow	XPE Y311 (1)	0.690
			Blue	XPE B311	0.690
			Grey	XPE G311	0.690
	2 step	2 N/C + N/O	Yellow	XPE Y611 (1)	0.690
			Blue	XPE B611	0.690
			Grey	XPE G611	0.690

Foot switche	s without	protective c	over		
Description	Contact oper	ration	Housing colour	Reference	Weight kg
With trigger mechanism	1 step	1 N/C + N/O	Grey	XPE G810	0.580
requiring positive action to allow pedal operation	2 step	2 N/C + N/O	Grey	XPE G911	0.580
Without trigger mechanism	1 step	1 N/C + N/O	Yellow	XPE Y110 (1)	0.570
			Blue	XPE B110	0.570
			Grey	XPE G110	0.570
			Black	XPE A110	0.275
	2 N/C + N/C	2 N/C + N/O	Blue	XPE B111	0.570
			Grey	XPE G111	0.570
			Black	XPE A111	0.295
	2 step	2 N/C + N/O	Yellow	XPE Y211 (1)	0.570
			Blue	XPE B211	0.570
			Grey	XPE G211	0.570

Accessories	for foot switches,	with or with	out protective	cover
Description	For use with	Sold in lots of	Unit reference	Weight kg
M20 x 1.5 cable gland	Cable Ø 510 mm	5	DE9RA200612	0.014
	Cable Ø 713 mm	5	DE9RA201014	0.014
Contact blocks, snap action	1 or 2 step switches	1	XE2S P4151	0.020

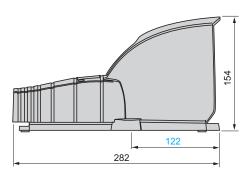
⁽¹⁾ IP 55, not UL, CSA approved.

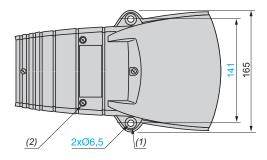
Schneider BElectric

Harmony types XPE B/G/Y

XPE B, XPE G, XPE Y

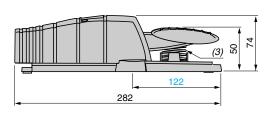
With protective cover

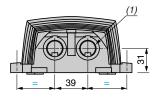


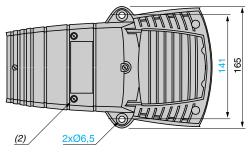


- (1) Ø 16 x 4 counterbored hole. (2) 4 cover fixing screws: stainless steel. Tightening torque: 1 N.m.

Without protective cover



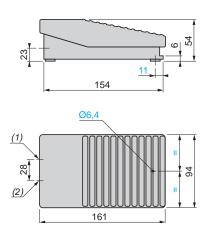




- (1) 2 plain holes for ISO M20 or n° 13 (Pg 13.5) cable gland. (2) 4 cover fixing screws: stainless steel. Tightening torque: 1 N.m. (3) Return spring: stainless steel.

Harmony type XPE A

XPE A



(1) 1 plain hole for ISO M20 or n° 13 (Pg 13.5) cable gland. (2) 1 plain hole for ISO M20 or n° 9 (Pg 11) cable gland.

Operating principle, characteristics

Safety dialogue solutions

Enabling switches For safety circuits

Operating principle

Enabling switches, comprising an XY2 AU grip and an XPS VC monitoring module, allow authorised personnel to undertake adjustment, programming or maintenance operations near machine equipment hazardous zones, providing certain conditions are met.

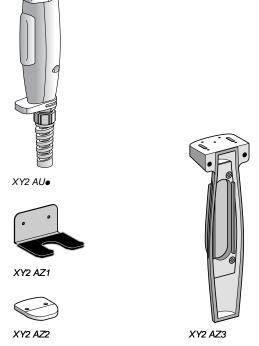
In effect, to gain access, these operations, often performed at reduced speed, must be selected by authorised personnel using selectors, with or without keys. Once selection is made, the enabling switch temporarily assumes control of the hazardous zone's usual protection measures. Important note: the enabling switch alone must not lead to the actuation of any dangerous movements associated with the machine; a secondary, intentional control action is required from the operator. In addition, each person in the hazardous zone must be provided with an enabling switch to ensure their own safety.

Environment			
Conforming to standards	Products		IEC/EN 60947-1 , IEC/EN 60947-5-1, cUL us 508 and CSA C22-2 n° 14
	Machine assemblies		IEC/EN 60204-1
Maximum safety level (1)			PLe, category 4 conforming to EN/ISO 13849-1 and SIL3 conforming to EN/IEC 61508
Reliability data B10d			5,000,000 (data value for a service life of 10 years: can be limited by contact and mechanical wear)
Protective treatment			Standard version: "TC"
Ambient air temperature	Operation	°C	-10+60
	Storage	°C	-40+70
Vibration resistance			6 gn (555 Hz) conforming to IEC 60068-2-6
Shock resistance			10 gn (11 ms) conforming to IEC 60068-2-27
Electric shock protection			Class II conforming to IEC/EN 61140
Degree of protection			IP 66 conforming to IEC 60529, IP 65 with a pushbutton, IK 06 conforming to EN 50102
Mechanical durability		Op. cycle	1 million
Enclosure			Double insulated enclosure made of PA66
Cable diameter		mm	713
Contact block chara	cteristics		
Rated operational characteris	tics		\sim AC-15 : C300 or Ue = 250 V, Ie = 1.5 A or Ue = 125 V, Ie = 0.75 A DC-13 : R300 or Ue = 250 V, Ie = 0.1 A or Ue = 125 V, Ie = 0.22 A conforming to IEC 60947-5-1 Appendix A
Thermal current (Ithe)		A	5
Rated insulation voltage (Ui)		V	250, degree of pollution III (II inside) conforming to IEC 60947-1 125, contact 7-8
Rated impulse withstand volta	age (Uimp)	kV	2.5 conforming to EN 60947-1
Positive operation			2 3-position contacts with positive opening operation conforming to IEC 60947-5-1 appendix K
Contact operation			
отпольной при			Slow break
Resistance across terminals		m Ω	Slow break ≤ 50
		m Ω	
Resistance across terminals		mΩ	≤ 50 12: 12 N
Resistance across terminals Actuation force		mΩ	≤ 50 12: 12 N 23: 50 N

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

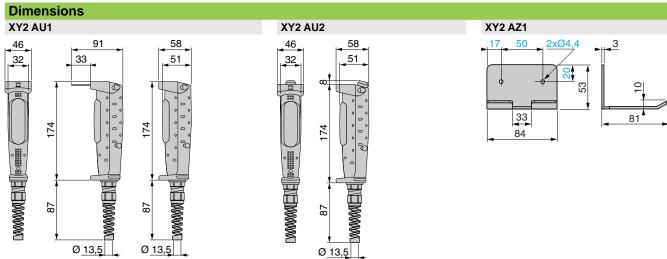
Safety dialogue solutions Enabling switches

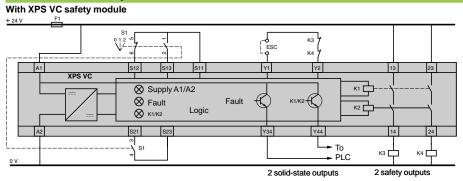
For safety circuits



References				
Number of contacts	Contact type	Contact blocks and scheme	Reference	Weight kg
3	2 enabling 3 positions + 1 N/C	E - 2 - 4 0 0 0 1 2 - 1 0 0	XY2 AU1	0.310
	2 enabling 3 positions + 1 N/C + 1 N/O supplementary contact	E	XY2 AU2	0.320

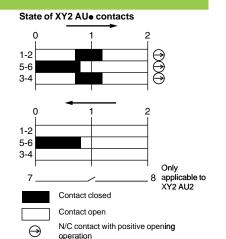
Separate components and spare par	ts	
Description	Reference	Weight kg
Grip support	XY2 AZ1	0.215
Cover kit for key actuator XCS Z01 or XCS Z11 only applicable to XY2 AU1	XY2 AZ2	0.015
Cover	XY2 AZ3	0.060





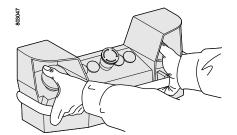


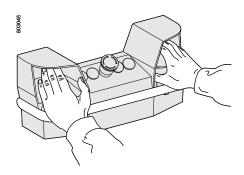
Connection example

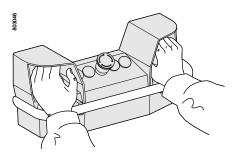


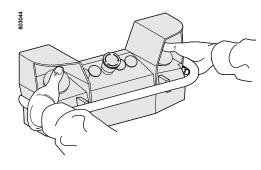
Safety dialogue solutions

Two-hand ergonomic control stations
With Harmony XB4 B control units









Presentation

The design of the control station incorporates features to signic antly reduce occupational illnesses associated with repetitive movements of the hands, particularly "carpal tunnel syndrome".

The health and comfort of the machine operator is assured by:

- the numerous alternative hand positions for operating the 2 pushbutton actuators, see diagrams to left,
- a hand rail,
- simple and fast adjustments of control station position.

This two-hand control station protects machine operators against both industrial accidents and illnesses related to their occupation.

It conforms to the following European safety standards:

- EN 574/ISO 13851 (two-hand control),
- EN 999 (approach speeds of parts of the human body and positioning of safety devices).

The control station can be mounted:

- directly on the machine housing,
- on a pedestal, enabling 3 directional adjustment:
- □ height,
- □ rake,
- □ skew.

The use of a two-hand control station in conjunction with a safety module type XPS BCE or XPS BF provides type IIIC two-hand control conforming to EN 574/ISO 13851 and PL e / Category 4 according to EN/ISO 13859-1.

The range comprises:

- two-hand control stations with or without pre-wired terminal blocks,
- kits (control station + pedestal), with or without pre-wired terminal blocks.

The products are supplied with an installation manual, which is also available as a separate item.

Schneider

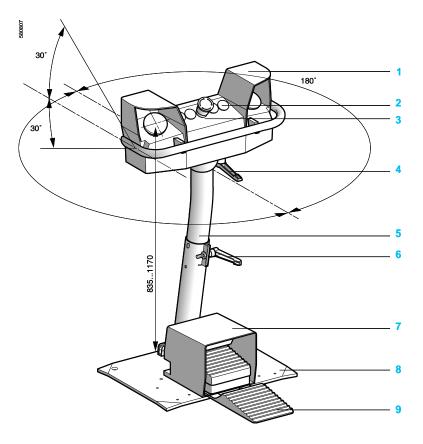
Description

The control station 1 has ve cut-outs (Ø 22 mm) 2 as standard. Five additional cutouts are possible 3.

Its pedestal 5 enables the following quick and simple adjustments:

- Control station rake (± 30°) using handle 4.
- Control station skew (± 180°) using handle 6.
- Control station height (835 to 1170 mm) using handle 6.

The baseplate 8 can be tted with safety foot switches XPE R 9, together with their protective covers 7. See page 38146-EN/3.



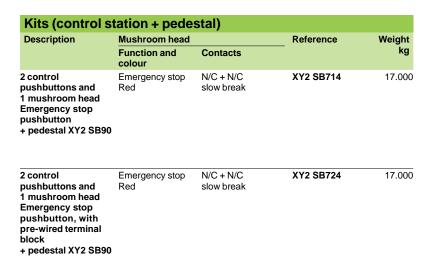
Characteristics					
Environment					
Conformity to standards			EN/IEC 60947-5-1, EN 574	/ISO 13851	
Maximum safety level (1)			PL e, category 4 conforming	to EN/ISO 13849-1 and SIL 3	3 conforming to EN/IEC 61508
Reliability data B10d	Contact block Harmony XB4B		25,000,000 (data value for a mechanical wear)	be limited by contact and	
Colour			Orange RAL 2008		
Protective treatment	Standard version		"TC"		
Ambient air temperature	For operation	°C	- 25+ 70		
	For storage	°C	- 40+ 70		
Vibration resistance	Conforming to EN/IEC 60068-2-6		5 gn (2500 Hz)		
Shock resistance	Conforming to EN/IEC 60068-2-27		10 gn (duration 11 ms)		
Electric shock protection	Conforming to EN/IEC 61140		Class I		
Degree of protection	Conforming to EN/IEC 60529		IP 65		
Mechanical life	Number of operating cycles		1 million		
Cable entries			See dimensions, page 3814	17-EN/7	
Contact block characteris	stics				
Rated operational characteristics	∼ AC-15		A600 or Ue = 240 V and Ie =	= 3 A	
	DC-13		Q600 or Ue = 250 V and le =	0.27 A conforming to EN/IEC	60947-5-1 Appendix A
Rated insulation voltage	Conforming to EN/IEC 60947-1	V	Ui = 600, degree of pollution	n 3	
	Conforming to UL 508 and CSA C22-2 n° 14	V	Ui = 600		
Rated impulse withstand voltage	Conforming to EN/IEC 60947-1	kV	Uimp = 6		
Contact operation	Slow break, with positive opening operation			ke on each black actuator pu Emergency stop pushbuttor ke on Lock out pushbutton	
Positive operation	Conforming to EN/IEC 60947-5-1 Appendix K		N/C contact with positive op	pening operation	
Terminal referencing			Conforming to CENELEC E	N 50013	
Short-circuit protection	Conforming to EN/IEC 269		10 A cartridge fuse type gG	(gl)	
Connection	Screw clamp terminals	mm²	Minimum clamping capacity Maximum clamping capacit	y: 1 x 0.22 or 1 x 0.22 + 1 x 0. y: 1 x 2.5 or 2 x 1.5	34
Electrical durability Conforming to	a.c. supply for 1 million operating cycles	٧	24	120	230
EN/IEC 60947-5-1 Appendix C Operating rate: 3600 operating	utilisation category AC-15	A	4	3	2
cycles/hour. Load factor: 0.5	d.c. supply for 1 million operating cycles	٧	24	110	
	utilisation category DC-13	A	0.5	0.2	
Electrical reliability	Failure rate According to EN/IEC 60947-5-4		At 17 V and 5 mA, λ < 10 ⁻⁸ At 5 V and 1 mA, λ < 10 ⁻⁶		

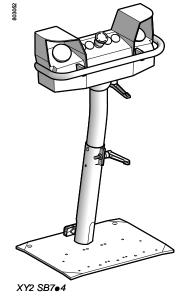
⁽¹⁾ Using an appropriate and correctly connected control system.



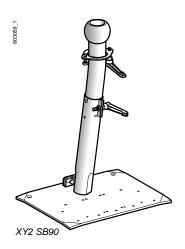
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х 1	'	3B/

Two-hand control stations - painted						
Description	Mushroom head	Mushroom head		Weight		
	Function and colour	Contacts		kg		
2 control pushbuttons with N/C + N/O break before make contacts and	Emergency stop Red	N/C + N/C slow break	XY2 SB71	4.000		
1 mushroom head pushbutton	Lock out (Schaltsperre) Yellow	N/C + N/O break before make	XY2 SB75	4.000		
2 control pushbuttons with N/C + N/O break before make contacts and	Emergency stop Red	N/C + N/C slow break	XY2 SB72	4.000		
1 mushroom head pushbutton, with pre-wired terminal block	Lock out (Schaltsperre) Yellow	N/C + N/O break before make	XY2 SB76	4.000		

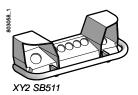




Documentation				
Description	For use with	Reference	Weight kg	
Installation manual	All control stations XY2 SB7●●	XCO M2514	0.200	















Various accessories				
Description	For use with	Colour	Unit reference	Weight kg
Metal pedestal adjustable height	XY2 SB●●	Orange	XY2 SB90	13.000
Collar for guard rail (welded xing)	XY2 SB90	Orange	XY2 SB98	0.800
Control station top without control devices	-	Orange	XY2 SB511	2.500
Control station base	-	Orange	XY2 SB531	1.200
Double protective metal cover	Metal pedestal XY2SB90 and foot switches type XPE R	Orange	XY2 SB96	4.370
Replacement handle (sold in lots of 5)	Metal pedestal XY2SB90	Black	XY2 SB93	0.155
Replacement seals	-	-	XY2 SB99	0.300
Adaptor (sold in lots of 5)	ISO M25	_	DE9 RA2125	0.010
Fixing nut (sold in lots of 5)	Adaptor	-	DE9 EC21	0.005
Control units (1)				
Description	Component part	Colour	Reference	Weight kg

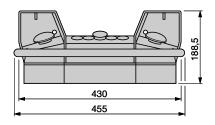
Control units (1)				
Description	Component part	Colour	Reference	Weight kg
Pushbutton actuator	Ø 60 mm mushroom head	Black	ZB4 BR216	0.095
	N/C + N/O body/contact assembly	-	ZB4 BZ105	0.055
Emergency stop pushbutton	Ø 40 mm mushroom head	Red	ZB4 BS844	0.060
	N/C + N/C body/contact assembly	-	ZB4 BZ104	0.055
Lock out pushbutton	Ø 40 mm mushroom head	Yellow, marked "Schaltsperre"	ZB4 BS845S	0.060
	N/C + N/O body/contact assembly	-	ZB4 BZ105	0.055

⁽¹⁾ Other XB4 B control and signalling units are suitable for use on the control stations. Please refer to our "Human Machine Interface catalogue".

Dimensions

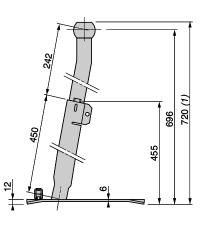
Safety dialogue solutions Two-hand ergonomic control stations With Harmony XB4 B control units

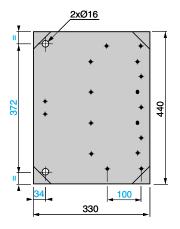
Control station XY2 SB7e 2xØ28,5 \Box



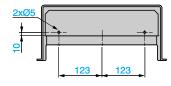
137

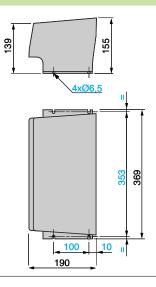
Pedestal XY2 SB90





Double protective cover XY2 SB96





(1) Adjustable height of pedestal 720 to 1060 mm.

^{(1) 2} plain holes for n° 13 (PG13.5) or ISO M20 cable gland. (2) Ø 56 mm knock-out specifically for mounting on pedestral. (3) 1 plain hole for n° 21 (PG21) cable gland. For ISO M25, use adaptator DE9 RA2125 and fixing nut DE9 EC21.

Safety dialogue solutions Harmony® XB4, metal

Harmony® XB4, metal Emergency stop mushroom head pushbuttons Ø 22 trigger action Chromium plated metal bezel

Environment					
Maximum safety level (1)			PL e categor	4 conformi	ng to EN/ISO 13849-1 and SIL 3 conforming to EN/IEC 61508
Reliability data B10d			1,500,000		by contact and mechanical wear)
Protective treatment	Standard version		"TH"		.,
Ambient air temperature	For storage	°C	- 40+ 70		
around the device	For operation	°C	- 25+ 70 un	ess otherw	ise stated
Electric shock protection	Conforming to IEC/EN 61140		Class I		
Degree of protection	Conforming to IEC 60529		IP 66 unless of	therwise st	ated
	Conforming to NEMA		NEMA 4X and	13, unless	otherwise stated
Mechanical shock protection	Conforming to EN 50102		IK 03		
Conformity to standards	Ü			0:2006 and	60947-5-1, IEC/EN 60947-5-4, IEC/EN 60947-5-5, IEC/EN 60204-1(trigger action and mechanical latching)
Product certifications	UL Listed, CSA		Standard con	act with scr	rew clamp terminals: A600; Q600
	BV, RINA, LROS, DNV, GL		Standard con	act with scr	rew clamp terminals
Terminal referencing			Conforming to	EN 50005	and EN 50013
Contact function and	d complete unit charac	terist	ics		
Mechanical characteristic	s				
Contact operation	N/C or N/O		Slow break		
Positive operation	Conforming to		All functions in	ncorporating	g a N/C contact are positive opening operation
·	IEC/EN 60947-5-1 Appendix K			, ,	
Operating force		N	Emergency st ■ Push-Pull ■ Turn to rel	trigger acti	
		N	Additional cor N/C conta	ct: 2 `	to change state)
Mechanical durability	Emergency stop pushbutton		0.3		
(in millions of operating cycles)	Standard block only		5		
Vibration resistance	Conforming to IEC 60068-2-6		Frequency: 2.	500 Hz: 5	gn
Shock resistance	Conforming to IEC 60068-2-27		Half sine wave	e accelerati	on 11 ms: 10 gn
Electrical characteristics			1		
Cabling capacity	Conforming to IEC 60947-1	mm²		without cab	ross head screws (Pozidriv type) le end (1 x 0.34 for linking) nd
Contact material	Silver alloy (Ag/Ni)		Standard bloc	k with screv	v clamp terminals
Short-circuit protection	Conforming to IEC/EN 60947-5-1	Α			w clamp terminals: 10 ming to IEC 60269-1)
Rated insulation voltage	Conforming to IEC/EN 60947-1	٧	Standard bloc	k with screv	w clamp terminals: Ui = 600, degree of pollution 3
Rated impulse withstand voltage	Conforming to IEC/EN 60947-1	kV	Standard bloc	k with screv	w clamp terminals: Uimp = 6
Rated operational	a.c. supply:				w clamp terminals:
characteristics Conforming to	utilisation category AC-15				= 1.2 A or Ue = 240 V and le = 3 A or Ue = 120 V and le = 6 A
IEC/EN 60947-5-1	d.c. supply: utilisation category DC-13				w clamp terminals: = 0.1 A or Ue = 250 V and Ie = 0.27 A or Ue = 125 V and
Electrical durability	a.c. supply for 1 million		Standard bloc	k with screv	w clamp terminals:
Conforming to	operating cycles	V	24	120	230
EC/EN 60947-5-1 Appendix C Operating rate: 3600 operating	utilisation category AC-15	Α	4	3	2
cycles/hour	d.c. supply for 1 million		Standard block with screw clamp terminals:		v clamp terminals:
Load factor: 0.5	operating cycles	V			
	utilisation category DC-13	Α	0.5	0.2	
Electrical reliability	Failure rate (according to IEC/EN 60947-5-4)		Standard bloc At 17 V ar At 5 V and	d 5 mA, λ <	< 10 ⁻⁸

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

Safety dialogue solutions
Harmony® XB4, metal
Emergency stop mushroom head pushbuttons
Ø 22 trigger action Chromium plated metal bezel







XB4 BS8445



XB4 BS9445





Emergency	y stop mushroom he	ad pu	shbutt	tons (colour: red)	
Screw clamp	terminal connections				
Shape of head	Type of push	Type of o	contact	Reference	Weight
		1	7		
		N/O	N/C		kg
	Trigger action Push-pull Ø 40	1	1	XB4 BT845 (ZB4 BZ105 + ZB4 BT84)	0.136
	Trigger action Turn to release Ø 40	1	1	XB4 BS8445 (ZB4 BZ105 + ZB4 BS844)	0.130
	Trigger action Key release (n° 455) Ø 40	1	1	XB4 BS9445 (ZB4 BZ105 + ZB4 BS944)	0.170

Legend ho	older, 30 x 40 mm		
Description	White marking on red background	Reference	Weight kg
With 8 x 27 mm legend	EMERGENCY STOP	ZBY 2330	0.002
	ARRET D'URGENCE	ZBY 2130	0.002
	NOT-AUS	ZBY 2230	0.002

Circular	iegenas		
Diameter	Marking, on yellow background	Reference	Weight
mm			kg
60	EMERGENCY STOP	ZBY 9330	0.004
	ARRET D'URGENCE	ZBY 9130	0.004
	NOT-AUS	ZBY 9230	0.004
90	EMERGENCY STOP	ZBY 8330	0.008
	ARRET D'URGENCE	ZBY 8130	0.008
	NOT-AUS	ZBY 8230	0.008

3

Safety dialogue solutions Harmony® XB4, metal

Emergency stop mushroom head pushbuttons Ø 22 trigger action

Chromium plated metal bezel





ZB4 BT84



ZB4 BS834



ZB4 B sub-assemblies for user assembly: bodies + heads Complete bodies (xing collar + single contact block) Description Type of contact Reference Weight N/O N/C kg Screw clamp terminal connections ZB4 BZ102 0.053 1 2 ZB4 BZ104 0.062 ZB4 BZ105 0.062 1 1 ZB4 BZ141 0.072 2

Mushroon	n heads for latching pu	ushbuttons	(Emergend	y stop: red)	
Shape	Type of push	Push		Reference	Weight
of head		Ø	Colour	_	
		mm			kg
	Trigger action Push-pull (2)	40	Red	ZB4 BT84	0.077

	Trigger action Turn to release (2)	30	Red	ZB4 BS834	0.068
_		40	Red	ZB4 BS844	0.073

	Trigger action Key release (n° 455) (2)	30	Red	ZB4 BS934		0.094
<u> </u>		40	Red	ZB4 BS944	(1)	0.098
		60	Red	ZB4 BS964		0.118

(1) Other key numbers: Key n° 421E: add the suffix **12** to the reference. Key n° 458A: add the suffix **10** to the reference.

Key n° 520E: add the suffix 14 to the reference.

Key n° 3131A: add the suffix 20 to the reference.

Example: the reference for a Ø 40 red mushroom head for a trigger action latching pushbutton with release by key n° 421E becomes: **ZB4 BS94412**.

(2) Maximum number of contact blocks fitted to associated body: 4.

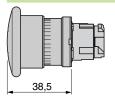
Safety dialogue solutions Harmony® XB4, metal Emergency stop mushroom head pushbuttons Ø 22 trigger action Chromium plated metal bezel

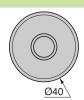
Emergency stop mushroom head pushbuttons (complete units) **XB4 BT845** XB4 BS8445 XB4 BS9445 Common face view 46,5 38,5 39,5 22 39,5 Ø40

e: support panel thickness 1 to 6 mm.

Heads for latching mushroom head pushbuttons

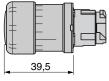
Push-pull ZB4 BT84





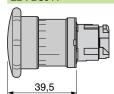
Turn to release

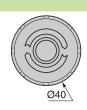
ZB4 BS834





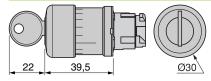
ZB4 BS844



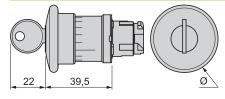


Key release

ZB4 BS934



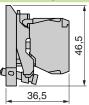




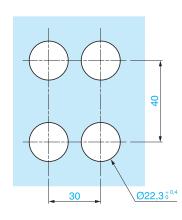
ZB4	Ø
BS944	40
BS964	60

Bodies for pushbuttons, screw clamp terminal connections

ZB4 BZ10●, BZ141



Panel cut-out and mounting centres



Safety dialogue solutions Harmony® XB5, plastic

Harmony® XB5, plastic Emergency stop mushroom head pushbuttons Ø 22 trigger action Plastic bezel

Environment			
Maximum safety level (1)			PL e, category 4 conforming to EN/ISO 13849-1 and SIL 3 conforming to EN/IEC 61508
Reliability data B10d			1,500,000 (data value can be limited by contact and mechanical wear)
Protective treatment	Standard version		"TH"
Ambient air temperature	For storage	°C	- 40+ 70
around the device	For operation	°C	- 25+ 70 unless otherwise stated
Electric shock protection	Conforming to IEC/EN 61140		Class II
Degree of protection	Conforming to IEC 60529		IP 66
	Conforming to NEMA		NEMA 4X and 13, unless otherwise stated
Mechanical shock protection	Conforming to EN 50102		IK 03
Conformity to standards			IEC/EN 60947-1, IEC/EN 60947-5-1, IEC/EN 60947-5-4, IEC/EN 60947-5-5, EN/ISO 13850:2006 and IEC/EN 60204-1(trigger action and mechanical latching) JIS C 4520 UL 508, CSA C22-2 n° 14
Product certifications	UL Listed, CSA		Standard contact with screw clamp terminals: A600; Q600
	BV, RINA, LROS, DNV, GL		Standard contact with screw clamp terminals
Terminal referencing			Conforming to EN E0005 and EN E0012
reminarreferencing			Conforming to EN 50005 and EN 50013
Contact function and	d complete unit charac	terist	ics
Mechanical characteristic	•		
Contact operation	N/C or N/O		Slow break
Positive operation	Conforming to IEC/EN 60947-5-1 Appendix K		All functions incorporating a N/C contact are positive opening operation
Operating force		N	Emergency stop with N/C + N/O: Push-Pull: trigger action: 50 Turn to release (with and without key unlocking): trigger action: 44
		N	Additional contact (extra to change state) N/C contact: 2 N/O contact: 2.3
Mechanical durability	Emergency stop pushbutton		0.3
(in millions of operating cycles)	Standard block only		5
Vibration resistance	Conforming to IEC 60068-2-6		Frequency: 2500 Hz: 5 gn
Shock resistance	Conforming to IEC 60068-2-27		Half sine wave acceleration 11 ms: 10 gn
Electrical characteristics			
Cabling capacity	Conforming to IEC 60947-1	mm²	Screw clamp terminals; cross head screws (Pozidriv type) Min.: 1 x 0.22 without cable end (1 x 0.34 for linking) Max.: 2 x 1.5 with cable end
Contact material	Silver alloy (Ag/Ni)		Standard block with screw clamp terminals
Short-circuit protection	Conforming to IEC/EN 60947-5-1	Α	Standard block with screw clamp terminals: 10 (gG cartridge fuse conforming to IEC 60269-1)
Rated insulation voltage	Conforming to IEC/EN 60947-1	V	Standard block with screw clamp terminals: Ui = 600, degree of pollution 3
Rated impulse withstand voltage	Conforming to IEC/EN 60947-1	kV	Standard block with screw clamp terminals: Uimp = 6
Rated operational characteristics	a.c. supply: utilisation category AC-15		Standard block with screw clamp terminals: A600: Ue = 600 V and le = 1.2 A or Ue = 240 V and le = 3 A or Ue = 120 V and le = 6 A
Conforming to IEC/EN 60947-5-1	d.c. supply: utilisation category DC-13		Standard block with screw clamp terminals: Q600: Ue = 600 V and Ie = 0.1 A or Ue = 250 V and Ie = 0.27 A or Ue = 125 V and Ie = 0.55 A
Electrical durability	a.c. supply for 1 million		Standard block with screw clamp terminals:
Conforming to	operating cycles	V	24 120 230
IEC/EN 60947-5-1 Appendix C Operating rate: 3600 operating cycles/hour	utilisation category AC-15	Α	4 3 2
Load factor: 0.5	d.c. supply for 1 million		Standard block with screw clamp terminals:
	operating cycles	V	24 110
	utilisation category DC-13	Α	0.5 0.2
Electrical reliability	Failure rate (according to IEC/EN 60947-5-4)		Standard block in clean environment: ■ At 17 V and 5 mA, λ < 10 ⁻⁸ ■ At 5 V and 1 mA, λ < 10 ⁻⁶

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

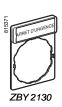
Safety dialogue solutions
Harmony® XB5, plastic
Emergency stop mushroom head pushbuttons
Ø 22 trigger action Plastic bezel







XB5 AS9445





	ncy stop mushroom mp terminal connections				,
Shape of head	Type of push	Type of (contact	Reference	Weight
		N/O	N/C		kg
	Trigger action Push-pull Ø 40	1	1	XB5 AT845 (ZB5 AZ105 + ZB5 AT84)	0.076
	Trigger action Turn to release Ø 40	1	1	XB5 AS8445 (ZB5 AZ105 + ZB5 AS844)	0.072
	Trigger action Key release (n° 455) Ø 40	1	1	XB5 AS9445 (ZB5 AZ105 + ZB5 AS944)	0.112

Legend ho	lder, 30 x 40 mm		
Description	White marking on red background	Reference	Weight kg
With 8 x 27 mm legend	EMERGENCY STOP	ZBY 2330	0.002
	ARRET D'URGENCE	ZBY 2130	0.002
	NOT-AUS	ZBY 2230	0.002

Circular	iegenas		
Diameter	Marking, on yellow background	Reference	Weight
mm			kg
60	EMERGENCY STOP	ZBY 9330	0.004
	ARRET D'URGENCE	ZBY 9130	0.004
	NOT-AUS	ZBY 9230	0.004
90	EMERGENCY STOP	ZBY 8330	0.008
	ARRET D'URGENCE	ZBY 8130	0.008
	NOT-AUS	ZBY 8230	0.008

3

Safety dialogue solutions Harmony® XB5, plastic

Emergency stop mushroom head pushbuttons Ø 22 trigger action Plastic bezel









ZB5 B sub-assemblies for user assembly: bodies + heads						
Complete bodies (xing collar + single contact block)						
Description	Type of contact		Reference	Weight		
	1	Ļ				
	N/O	N/C		kg		
Screw clamp terminal connections	-	1	ZB5 AZ102	0.021		
	-	2	ZB5 AZ104	0.030		
	1	1	ZB5 AZ105	0.030		
	1	2	ZB5 AZ141	0.040		

Mushroor	n heads for latching pւ	ushbuttons	(Emergenc	y stop: red)	
Shape	Type of push	Push		_ Reference	Weight
of head		Ø	Colour		
		mm			kg
	Trigger action Push-pull (2)	40	Red	ZB5 AT84	0.050

	Trigger action Turn to release (2)	30	Red	ZB5 AS834	0.042
_		40	Red	ZB5 AS844	0.046

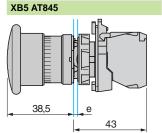
Trigger action Key release (n° 455) (2)	Key release (n° 455)	30	Red	ZB5 AS934		0.068
		40	Red	ZB5 AS944	(1)	0.071
		60	Red	ZB5 AS964		0.092
	Trigger action Key release (n° 4A185) (2)	40	Red	ZB5 AS944D		0.071

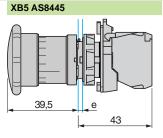
⁽¹⁾ Other key numbers:
Key n° 421E: add the suffix 12 to the reference.
Key n° 458A: add the suffix 10 to the reference.
Key n° 520E: add the suffix 14 to the reference.
Key n° 3131A: add the suffix 20 to the reference.
Example: the reference for a Ø 40 red mushroom head for a trigger action latching pushbutton

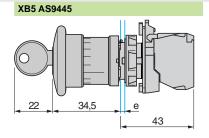
with release by key n° 421E becomes: **ZB5 AS94412**.
(2) Maximum number of contact blocks fitted to associated body: 4.

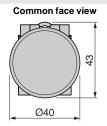
Safety dialogue solutions Harmony® XB5, plastic Emergency stop mushroom head pushbuttons Ø 22 trigger action Plastic bezel

Emergency stop mushroom head pushbuttons (complete units)





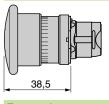


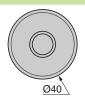


e: support panel thickness 1 to 6 mm.

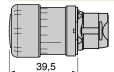
Heads for latching mushroom head pushbuttons

Push-Pull ZB5 AT84



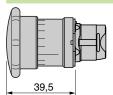


Turn to release **ZB5 AS834**





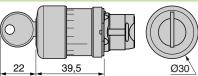




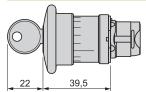


Key release

ZB5 AS934



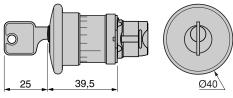






ZB5	Ø
AS944	40
A COC 4	60

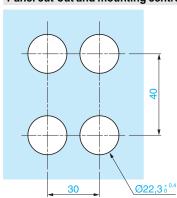
ZB5 AS944D



Bodies for pushbuttons, screw clamp terminal connections ZB5 AZ10●, AZ141



Panel cut-out and mounting centres



Safety dialogue solutionsXAL control stations for Ø 22 trigger action
Emergency stop mushroom head pushbuttons

Environment						
Maximum safety level (1)			PL e, category 4 conforming to EN/ISO 13849-1 and SIL 3 conforming to EN/IEC			
Reliability data B10d			1,500,000 (data value can be limited by contact and mechanical wear)			
Protective treatment	Standard version		"TH"			
Ambient air temperature	For storage	°C	- 40+ 70			
around the device	For operation	°C	- 25+ 70 unless otherwise stated			
Electric shock protection	Conforming to IEC/EN 61140		Class II			
Degree of protection	Conforming to IEC 60529		IP 66			
	Conforming to NEMA		NEMA 4X and 13			
Mechanical shock protection	Conforming to EN 50102		IK 03			
Conformity to standards			IEC/EN 60947-1, IEC/EN 60947-5-1, IEC/EN 60947-5-4, IEC/EN 60947-5-5, EN/ISO 13850:2006 and IEC/EN 60204-1(trigger action and mechanical latchir JIS C 4520 UL 508, CSA C22-2 n° 14			
Product certifications	UL Listed, CSA		Standard contact with screw clamp terminals: A600; Q600			
Terminal referencing			Conforming to EN 50005 and EN 50013			
Material and colours			Polycarbonate, yellow RAL 1012 lid and light grey RAL 7035 base			
Cable entries			Knock-out entries for n° 13 (CM12, Pg 13.5) cable gland and tapped ISO 20			
Contact function cha	aracteristics					
Mechanical characteristic	s					
Contact operation	N/C or N/O		Slow break			
Positive operation	Conforming to		All functions incorporating a N/C contact are positive opening operation			
	IEC/EN 60947-5-1 Appendix K					
Operating force		N	Emergency stop with N/C + N/O: Push-Pull: trigger action: 50 Turn to release (with and without key unlocking): trigger action: 44			
		N	Additional contact (extra to change state) N/C contact: 2 N/O contact: 2.3			
Mechanical durability (in millions of operating cycles)			0.1			
Vibration resistance	Conforming to IEC 60068-2-6		Frequency: 2500 Hz: 5 gn			
Shock resistance	Conforming to IEC 60068-2-27		Half sine wave acceleration 11 ms: 10 gn			
Electrical characteristics						
Cabling capacity	Conforming to IEC 60947-1	mm²	Screw clamp terminals; cross head screws (Pozidriv type) Min.: 1 x 0.22 without cable end (1 x 0.34 for linking) Max.: 2 x 1.5 with cable end			
Contact material	Silver alloy (Ag/Ni)		Standard block with screw clamp terminals			
Short-circuit protection	Conforming to IEC/EN 60947-5-1	Α	Standard block with screw clamp terminals: 10 (gG cartridge fuse conforming to IEC 269-1)			
Rated insulation voltage	Conforming to IEC/EN 60947-1	V	Standard block with screw clamp terminals: Ui = 600, degree of pollution 3			
Rated impulse withstand voltage	Conforming to IEC/EN 60947-1	kV	Standard block with screw clamp terminals: Uimp = 6			
Rated operational characteristics	a.c. supply: utilisation category AC-15		A600: Ue = 600 V and le = 1.2 A or Ue = 240 V and le = 3 A or Ue = 120 V and le			
Conforming to IEC/EN 60947-5-1	d.c. supply: utilisation category DC-13		Q600: Ue = 600 V and le = 0.1 A or Ue = 250 V and le = 0.27 A or Ue = 125 V ar le = 0.55 A			
Electrical durability	a.c. supply for 1 million		Standard block with screw clamp terminals:			
Conforming to EC/EN 60947-5-1 Appendix C	operating cycles utilisation category AC-15	V	24 120 230			
Operating rate: 3600 operating		Α	Standard block with scrow clamp terminals:			
cycles/hour Load factor: 0.5	d.c. supply for 1 million operating cycles	v	Standard block with screw clamp terminals: 24 110			
Luau Idului. U.S	utilisation category DC-13	A				
Electrical reliability	Failure rate (according to IEC/ EN 60947-5-4)	A	0.4 0.15 Standard block in clean environment: ■ At 17 V and 5 mA, λ < 10-8 ■ At 5 V and 1 mA, λ < 10-6			

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

Safety dialogue solutionsXAL control stations for Ø 22 trigger action
Emergency stop mushroom head pushbuttons
Complete stations (screw clamp terminal connections)





XAL K188●

Description	Туре	Type of o	contact	Reference	Weight
		1	Ļ		
		N/O	N/C		kg
Without marking					
I mushroom head oushbutton Ø 40 mm red Furn to release	Trigger action	-	2	XAL K178F	0.194
		1	1	XAL K178E	0.194
		1	2	XAL K178G	0.194
mushroom head ushbutton Ø 40 mm ed ey release (n° 455)	Trigger action	-	2	XAL K188F	0.188
		1	1	XAL K188E	0.188
		1	2	XAL K188G	0.188

Safety dialogue solutionsXAL control stations for Ø 22 trigger action
Emergency stop mushroom head pushbuttons Separate components for user assembly

Empty enclosures			
Description	Number of cut-outs	Reference	Weight kg
For normal environments	(with stainless steel lid	xing screws)	
Yellow lid "RAL 1012" Light grey base "RAL 7035"	1	XAL K01	0.136

For normal environments, CSA + UL certifica	tions (1)	
(with stainless steel lid xing screws)		
Yellow lid "RAL 1012" 1 Light grey base "RAL 7035"	XAL K01H7	0.136

Electrical blocks (fo	r mounting on	metal plate	at back of enclosu	re)
Description	Туре	Sold in lots of	Unit reference	Weight kg
Electrical blocks with so	rew clamp terr	ninal conne	ections	
Standard contact blocks (2)	N/O contact	5	ZEN L1111	0.015
	N/C contact	5	ZEN L1121	0.015

Shape	Type of push	Push		Reference	1	Weight
of head		Ø	Colour			
		mm				kg
Trigger ac	tion latching mu	shroom h	eads			
	Push-pull	40	Red	ZB5 AT84		0.050
	Turn to release	30	Red	ZB5 AS834		0.042
		40	Red	ZB5 AS844		0.046
	Key release (n° 455)	30	Red	ZB5 AS934		0.068
		40	Red	ZB5 AS944	(3)	0.071
		60	Red	ZB5 AS964		0.092
(Key release (n° 4A185)	40	Red	ZB5 AS944D		0.071

Legend holder			
Description	White marking on red background	Reference	Weight kg
Legend holder 30 x 40 mm	EMERGENCY STOP	ZBY 2130	0.002
with 8 x 27 mm legend	ARRET D'URGENCE	ZBY 2113	0.002
	NOT-AUS	ZBY 2230	0.002

Example: the reference for a Ø 40 red mushroom head for a trigger action latching pushbutton with release by key n° 421E becomes: **ZB5 AS94412**.





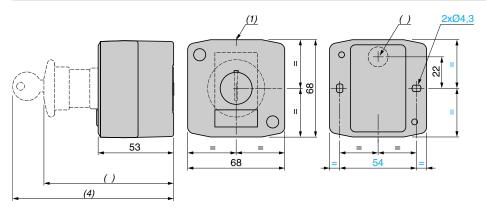




⁽¹⁾ Volt-free commoning/earth terminal included.
(2) A maximum of 3 electrical blocks can be fitted per associated head.
(3) Other key numbers:
Key n° 421E: add the suffix 12 to the reference.
Key n° 458A: add the suffix 10 to the reference.
Key n° 520E: add the suffix 14 to the reference.
Key n° 3131A: add the suffix 20 to the reference.
Evample: the reference for a Ø 40 red mushroom head for a trigger.

Safety dialogue solutions
XAL control stations for Ø 22 trigger action
Emergency stop mushroom head pushbuttons Separate components for user assembly

Single-way control stations XAL K



- (1) Knock-out entry for n° 13 cable gland.

- (2) 2 knock-outs for cable entry.
 (3) 91 mm for latching mushroom head pushbuttons.
 (4) 113 mm for latching mushroom head pushbuttons with key release.

Mini-VARIO and VARIO switch disconnectors

Applications

Mini-Vario and Vario rotary switch disconnectors from 12 to 175 A are suitable for on-load making and breaking of resistive or mixed resistive and inductive circuits where frequent operation is required. They can also be used for direct switching of motors in utilisation categories AC-3 and DC-3 specific to motors.

Vario switch disconnectors are suitable for isolator applications with fully visible breaking (since the handle cannot indicate the "open" position unless all the contacts are actually open and separated by the appropriate isolating distance) and it is possible to padlock the handles in the open position.



Application	Standard applicat	ions			
7.ppnouton	Otalidara applicat				
Presentation	Bare switches			S	
Assembly	Pre-assembled		For customer assembly	Pre-assembled	For customer assembly
Thermal current	12 and 20 A			1032 A	10 and 16 A
Operational current AC-23 at 400 V	8.1 and 11 A			8.129 A	8.111 A
Number of poles	3		35	3	35
Number of auxiliary contacts	-		1 or 2	-	1 or 2
Reversible terminal blocks	Yes				
Mounting	On door	At back of enclosure	On door or at back of enclosure	-	
Operator	Direct	Offset with door interlock mechanism	Direct or offset with door interlock mechanism	Direct	
Switch type	VCDN 12 VCDN 20	VCCDN 12 VCCDN 20	VN 12 VN 20	VCFN 12GE to VCFN 40GE	VN 12, VN 20 + VCFX GE1
Pages	23050-EN/2		23050-EN/3	23053-EN/2	23053-EN/3 to 23054-EN/3

Mini-Vario and Vario rotary switch disconnectors from 12 to 175 A are suitable for on-load making and breaking of resistive or mixed resistive and

inductive circuits where frequent operation is required.

They can also be used for direct switching of motors in utilisation categories AC-3 and DC-3 specific to motors.

Vario switch disconnectors are suitable for isolator applications with fully visible breaking (since the handle cannot indicate the "open" position unless all the contacts are actually open and separated by the appropriate isolating distance) and it is possible to padlock the handles in the open position.









High	norformano	e applications

Bare switches				Enclosed switches	
Pre-assembled			For customer assembly	Pre-assembled	For customer assembly
12175 A				10140 A	1063 A
8.183 A					8.141 A
3			36 (up to 80 A) 3 (for 125 and 175 A ratings)	3	3 6
-			1 or 2	-	2
Yes					
On door	At back of enclosure	In enclosure or modular distribution boards	On door, at back of enclosure, in enclosure or modular distribution boards	-	
Direct	Indirect with door interlock mechanism	Direct	Direct or indirect with door interlock mechanism	Direct	
VC• 02 to VC• 6	VCC• 02 to VCC• 6	VVE 0 to VVE 4	V02 to V6	VCF 02GE to VCF 6GE	V02 to V4 + VCFX GE1 to VCFX GDXE
23051-EN/2			23051-EN/3 to 23052- EN/5	23053-EN/2	23053-EN/3

Safety control and protection solutions Mini-VARIO and VARIO switch disconnectors

Environment				Leave	Leave	Leave	Learn	Learn	Lean	Lec	1	
Switch type (bare t	ype)			VN 12 VZN 12	V02 VZ 02	VN 20 VZN 20	V01 VZ 01	V0 VZ 0	VVD 0 VVE 0	V1 VZ 1	VVD ·	
Conforming to stan	dards			IEC 6094	7-3					•		
Product certification	ns			UL, CSA,	, GL							
Protective treatmen	it			"TC"								
Degree of protection with protection shrou				IP 20 con	forming to	IEC 60529						
Ambient air tempera	ature		° C	- 20+ 5	0							
Flame resistance			° C	960 confo	orming to	EC 60695-2	2-1					
Shock resistance 1/2 sine wave = 11 ms	s conforming to IE0	C60068-2-27	gn	15	30	15	30					
Vibration resistance 10150 Hz conforming to IEC 60068-2-6			gn	5	1							
Electrical charac	cteristics, a.c. o	pperation										
Switch type (bare t	ype)			VN 12 VZN 12	V02 VZ 02	VN 20 VZN 20	V01 VZ 01	V0 VZ 0	VVD 0 VVE 0	V1 VZ 1	VVD VVE	
Rated operational v	oltage (Ue)		V	690								
Rated impulse with	stand voltage (Ui	mp)	kV	6	8	6	8					
Conventional therm and rated uninterru		e air (Ith)	Α	12		20	•	25		32		
Conventional therm	nal current in enc	losure (Ithe)	Α	10		16		20		25		
oower and current	AC-21A/22A	230690 V	Α	12 20 25			32					
	AC-23A	230 V	A/kW	10.6/3 14/4		19.7/5.5						
		240 V	A/kW	10.6/3		14/4	14/4		5	18.9/5.	5	
		400 V	A/kW	8.1/4		11/5.5		14.5/7.5	5	21.8/11		
		415 V	A/kW	8.1/4		11/5.5		14/7.5		21/11		
		500 V	A/kW	8.9/5.5		11.9/7.5	16.7/11					
		690 V	A/kW	8.6/7.5		12.3/11	17.5/15					
Rated power	AC -3	230/240 V	kW	1.5		3		4				
perational power		400/415 V	kW	3		4	5.5		7.5			
		500 V	kW	4		5.5 7.5						
		690 V	kW	4	5.5		7.5	11				
ntermittent duty cla	ass			30	<u> </u>							
Characteristics n normal operating conditions	Rated making ca AC-21A/22A/23A		A/ 400 V	120		200	200		250		320	
JOHNIH THE	Rated breaking of AC-21A/22A/23A		A/ 400 V	120		200				250		
Short-circuit characteristics	Permissible rms	short time rating (Icw)	A/ 400 V/1 s	140	300	140	300	300		384		
	Rated making ca	apacity under ditions (Icm) I peak	kA/ 400 V	0.5	1	0.5	1					
	Rated conditional short-circuit current with a M/aG fuse	ent (I rms)	kA/ 400 V	6	10	6	10					
	with aM/gG fuses	5	Α	12		20		25		35		

/2 /Z 2	VVD 2 VVE 2	V3 VZ 3	VVD 3	V4	VVD 4	V5	V6	VZ7 VZ2 0	VZN 05		
EC 60947-3		VZ 3	VVE 3	VZ 4	VVE 4			IEC 60947-	VZN 06		
JL, CSA, GI	-										
"TC"											
IP 20 confor	ming to IEC 605	529									
- 20+ 50	: IEO 000	NT 0 4									
	ing to IEC 6069	95-2-1 									
30								-			
1								-			
V2 VZ 2	VVD 2 VVE 2	V3 VZ 3	VVD 3 VVE 3	V4 VZ 4	VVD 4 VVE 4	V5	V6	VZ7 VZ2 0	VZN 05 VZN 06		
690	1112	1423	11123	1024	11124			1220	7211 00		
8									6		
40		63		80		125	175	12	6		
32		50		63		100	140	10	4		
40		63		80		125	160	le/AC-15			
25.8/7.5		50.3/15		61.2/18.5		71.9/22	96.6/30	6 A			
24.8/7.5		48.2/15		58.5/18.5		68/22	92.7/30	6 A			
29/15		41.5/22		57/30		68.5/37	83/45	4 A			
28/15		40/22		55/30		66/37	80/45	4 A			
28.5/18.5		44/30		54/37		64.5/45	79/55	2 A			
17.5/15		25/22		33/30		42/37	49/45	1 A			
5.5		11		15		22	30				
11		18.5		22		30	37	-			
15	22		5			30		37	45	_	
11		18.5				30	37	-			
30								-			
400		630		800		1250	1750	-			
200		500		040		4000	4.400				
320		500		640		1000	1400	-			
480		756		960		1500	2100	_			
1		2.1				2.8					
		2.1				2.0					
10								1			
		63		80		125	200	16	1.6		

Mini-VARIO and VARIO switch disconnectors

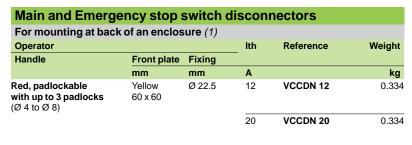
Characteris Electrical char	acteristics, d.c.	operation									
Switch type (bar		- оронинон		VN 12 VZN 12	V02 VZ 02	VN 20 VZN 20	V01 VZ 01	V0 VZ 0	VVD 0 VVE 0	V1 VZ 1	VVD 1 VVE 1
Rated	24 V	1 contact	Α	12		20		25		32	
perational curre	nt	2 contacts	Α	12		20		25		32	
0C-1 (L/R = 1ms)		3 contacts	Α	12		20		25		32	
Y	48 V	1 contact	Α	12		20		25		32	
		2 contacts	Α	12		20		25		32	
		3 contacts	Α	12		20		25		32	
/	60 V	1 contact	Α	12		20		25		32	
		2 contacts	Α	12		20		25		32	
, n		3 contacts	Α	12		20		25		32	
·	110 V	1 contact	Α	1.5		2		9		10	
└ ── ∤		2 contacts	Α	8		10		12		16	
		3 contacts	Α	12		20		25		32	
	220 V	1 contact	Α	1.5		2		2.5		3	
		2 contacts	Α	7		8		10		12	
		3 contacts	Α	10		14	4 16		20		
	250 V	1 contact	Α	0.6		0.7		0.8		1	
		2 contacts	Α	3		4		6		8	
		3 contacts	Α	8		10		12		16	
Rated operational current OC-2 to DC-5 L/R = 1ms)	24 V	1 contact	Α	12		20		25		32	
	nt	2 contacts	Α	12		20		25		32	
		3 contacts	Α	12		20		25		32	
	48 V	1 contact	Α	12		20		25		32	
		2 contacts	Α	12		20		25		32	
		3 contacts	Α	12		20		25		32	
	60 V	1 contact	Α	10		14		16		20	
		2 contacts	Α	12		20		25		32	
		3 contacts	Α	12		20		25		32	
	110 V	1 contact	Α	1.5		2		2.5		3	
		2 contacts	Α	3		4		5		6	
		3 contacts	Α	12		20		25		32	
	220 V	1 contact	Α	0.4		0.5		0.5		0.8	
		2 contacts	Α	1.4		1.5		1.5		2	
		3 contacts	Α	1		2		3		4	
	250 V	1 contact	Α	0.3		0.4		0.5		0.8	
		2 contacts	Α	0.4		0.6		0.8		1	
		3 contacts	Α	1.2		2.4		1.6		2	
Other characte											
Switch type (bare	e type)			VN 12 VZN 12	V02 VZ 02	VN 20 VZN 20	V01 VZ 01	V0 VZ 0	VVD 0 VVE 0	V1 VZ 1	VVD 1 VVE 1
Mechanical durat	oility			0.05	0.1	0.05	0.1		,,		
millions of operation				0.05	0.1	0.05	0.1				
millions of operation				0.05	0.1	0.05	0.1				
	ity in cat. DC-1 to	5		30 000							
operating cycles) Suitable for isolat	tion			Yes							
Cabling	Flexible cable -	+ cable end	mm²	4	6	4	6				
	-					4					
	Solid cable		mm ²	4	10		10				
ightening torque	_		N.m	0.7	2.1	0.7	2.1				

V2 VZ 2	VVD 2 VVE 2	V3 VZ 3	VVD 3 VVE 3	V4 VZ 4	VVD 4 VVE 4	V5	V6	VZ7 VZ2 0	VZN 05 VZN 06
10	*****	63	11123	80	11124	125	175	8 (le/DC-11)	
0		63		80		125	175	_ `	
0		63		80		125	175	-	
10		63		80		125	175	8 (le/DC-11)	
0		63		80		125	175	_ `	
0		63		80		125	175	-	
5		40		50		60	70	4 (le/DC-11)	
0		63		80		125	175	-	
0		63		80		125	175	-	
2		20		25		30	12	2 (le/DC-11)	
0		63		80		125	175	_ `	
0		63		80		125	175	-	
		6		8		12	15	1 (le/DC-11)	
4		25		30		40	50	- ′	
5		30		40		80	100	-	
		4		5		3	10	0.8 (le/DC-1	1)
2		20		25		30	40	- `	
0		30		40		50	61	-	
.0		63		80		125	175	-	
0		63		80		125	175	-	
10		63		80		125	175	-	
10		63		80		125	175	-	
10		63		80		125	175	-	
10		63		80		125	175	-	
25		40		50		60	70	-	
10		63		80		125	175	_	
10		63		80		125	175	-	
5		6		8		10	12	-	
3		10		20		22	24	-	
10		50		63		70	80	-	
		1.5		2		2.2	2.4	-	
}		4		6		7	8	-	
7		10		15		16	13	-	
		1.2		1.5		1.6	1.8	_	
2		3		6		7	8	_	
3		8		10		12	14	-	
10	LVVD 2	V3	VVD 3	V4	VVD 4	I VE	V6	VZ7	VZN 05
/2 /Z 2	VVD 2 VVE 2	VZ 3	VVD 3	VZ 4	VVE 4	V5	Vo	VZ2 0	VZN 06
).1		0.03						0.1	0.05
.1		0.03						0.1 (AC-15)	0.05
0 000								30 000 (DC-	11)
es								-	,
i		16				70		2 x 0.751.	5
_		25				95		2 x 12.5	
0		-"							

Mini-VARIO switch disconnectors for standard applications Complete units

- 3-pole rotary switch disconnectors, 12 to 20 A
- Padlockable operating handle (padlocks not supplied).
- Degree of protection IP 65.
- Marking on operator O. ...

Main and Emerge	ency stop	switch o	discon	nectors	
For door mounting					
Operator			lth	Reference	Weight
Handle	Front plate	Fixing	_		
	mm	mm	Α		kg
Red, padlockable with up to 3 padlocks (Ø 4 to Ø 8)	Yellow 60 x 60	Ø 22.5	12	VCDN 12	0.177
			20	VCDN 20	0.177



(1) Switches supplied with a shaft extension VZN 17 and a door interlock plate KZ 32.





Mini-VARIO switch disconnectors for standard applications For customer assembly







VZN 14

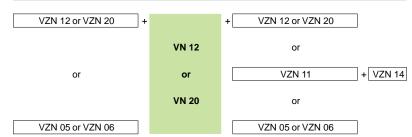


VZN 05

Switch bodies			
Description	Rating A	Reference	Weight kg
3-pole switch disconnectors	12	VN 12	0.110
	20	VN 20	0.110

Add-on modules			
Description	Rating A	Reference	Weight kg
Main pole modules	12	VZN 12	0.020
	20	VZN 20	0.020
Neutral pole module with early make and late break contacts	12 and 20	VZN 11	0.020
Earthing module	12 and 20	VZN 14	0.016
Auxiliary contact block modules	1 N/O late make contact	VZN 05	0.020
	1 N/C early break contact	VZN 06	0.020
Input terminal protection shrouds	For add-on pole modules or auxiliary contact block modules (single-pole shroud)	VZN 26	0.004
	For switch bodies (3-pole shroud)	VZN 08	0.007

Maximum number of add-on modules that can be fitted on a switch body



Schneider Electric

VARIO switch disconnectors for high performance applications Complete units



VCF 0



VCF 5



VCCF 0



- 3-pole rotary switch disconnectors, 12 to 175 A
- Marking on operator O. .
- Padlockable operating handle (padlocks not supplied).

 Degree of protection IP 65.

Main and	Emergend	cy stop sw	itch disco	nnectors	
For door me	ounting				
Handle	Front plate mm	Fixing	Rating A	Reference	Weight kg
Red,	Yellow	Ø 22.5	12	VCD 02	0.215
padlockable with up to 3 padlocks (Ø 4 to Ø 8)	60 x 60		20	VCD 01	0.215
			25	VCD 0	0.215
			32	VCD 1	0.215
			40	VCD 2	0.215
		4 screws	12	VCF 02	0.250
			20	VCF 01	0.250
			25	VCF 0	0.250
			32	VCF 1	0.250
			40	VCF 2	0.250
			63	VCF 3	0.560
			80	VCF 4	0.560
Red, long,	Yellow	4 screws	125	VCF 5	1.200
padlockable with up to 3 padlocks (Ø 4 to Ø 8)	90 x 90		175	VCF 6	1.200

For mounting at back of an enclosure (1)								
Handle	Front plate mm	Fixing	Rating A	Reference	Weight kg			
Red,	Yellow	Ø 22.5	12	VCCD 02	0.392			
padlockable	60 x 60		20	VCCD 01	0.392			
with up to 3 padlocks			25	VCCD 0	0.392			
(Ø 4 to Ø 8)			32	VCCD 1	0.392			
,			40	VCCD 2	0.392			
		4 screws	12	VCCF 02	0.527			
			20	VCCF 01	0.527			
			25	VCCF 0	0.527			
			32	VCCF 1	0.527			
			40	VCCF 2	0.527			
			63	VCCF 3	0.440			
			80	VCCF 4	0.680			
Red, long,	Yellow	4 screws	125	VCCF 5	1.320			
padlockable with up to 3 padlocks (Ø 4 to Ø 8)	90 x 90		175	VCCF 6	1.320			

For mounting	ig in an enclo	osure or for	modular distr	ibution boards	
Handle	Front plate mm	Fixing	Rating A	Reference	Weight kg
Red,	Yellow		25	VVE 0	0.250
padlockable	45 x 45		32	VVE 1	0.250
with 1 padlock (Ø 4 to Ø 6)			40	VVE 2	0.250
(241020)			63	VVE 3	0.530
			80	VVE 4	0.530

⁽¹⁾ Switches supplied with a shaft extension VZN 17 and a door interlock plate KZ 32 or KZ 74 (see page 23052-EN/4).

Schneider Belectric

VARIO switch disconnectors for high performance applications Complete units















Switch bodies			
Description	Rating A	Reference	Weight kg
3-pole switch disconnectors (1)	12	V02	0.200
	20	V01	0.200
	25	VO	0.200
	32	V1	0.200
	40	V2	0.200
	63	V3	0.500
	80	V4	0.500
	125	V5	0.900
	175	V6	0.900
Add-on modules			

Description	Rating A	Reference	Weight kg
Main pole modules	12	VZ 02	0.050
	20	VZ 01	0.050
	25	VZ 0	0.050
	32	VZ 1	0.050
	40	VZ 2	0.050
	63	VZ 3	0.100
	80	VZ 4	0.100
Neutral pole modules	12 to 40	VZ 11	0.050
vith early make and	63 to 80	VZ 12	0.100
ate break contacts (1)	125 and 175	VZ 13	0.250
Earthing modules	12 to 40	VZ 14	0.050
	63 and 80	VZ 15	0.100
	125 and 175	VZ 16	0.250

modules with 2 auxil. contacts $\frac{1}{N/O + N/O}$ 0.050 Maximum no. of add-on modules that can be fitted on a switch body 1 add-on module on each side of the switch body

VZ 7

VZ 20

0.050

N/O + N/C (2)

VZ 7 or VZ 20 +	V0∙	+ VZ 7 or VZ 20	VZ 7 +		+ VZ7
or		or	or	V5	or
VZ 11 or VZ 12 +	V0	+ VZ 11 or VZ 12	VZ 20 +		+ VZ 20
or		or	or	or	or
VZ 14 or VZ 15 +	to	+ VZ 14 or VZ 15	VZ 13 +		+ VZ 13
or		or	or	V6	or
VZ 0•/VZ 0 to VZ 4 +	V4	+ VZ 0•/VZ 0 to VZ 4	VZ 16 +		+ VZ 16
2 add-on modules	on eacl	side of the switch bo	odv		

VZ 0● + VZ 0● + V0	+ VZ 0• + VZ 7	or VZ 20 or VZ 11 or VZ 14
VZ 0 + VZ 0 + V (+ VZ 0 + VZ 7	or VZ 20 or VZ 11 or VZ 14
VZ 1 + VZ 1 + V 1	+ VZ 1 + VZ 7	or VZ 20 or VZ 11 or VZ 14
VZ 2 + VZ 2 + V 2	+ VZ 2 + VZ 7	or VZ 20 or VZ 11 or VZ 14
VZ 3 + VZ 3 + V3	+ VZ 3 + VZ 7	or VZ 20 or VZ 12 or VZ 15
VZ 4 + VZ 4 + V 4	+ VZ 4 + VZ 7	or VZ 20 or VZ 12 or VZ 15

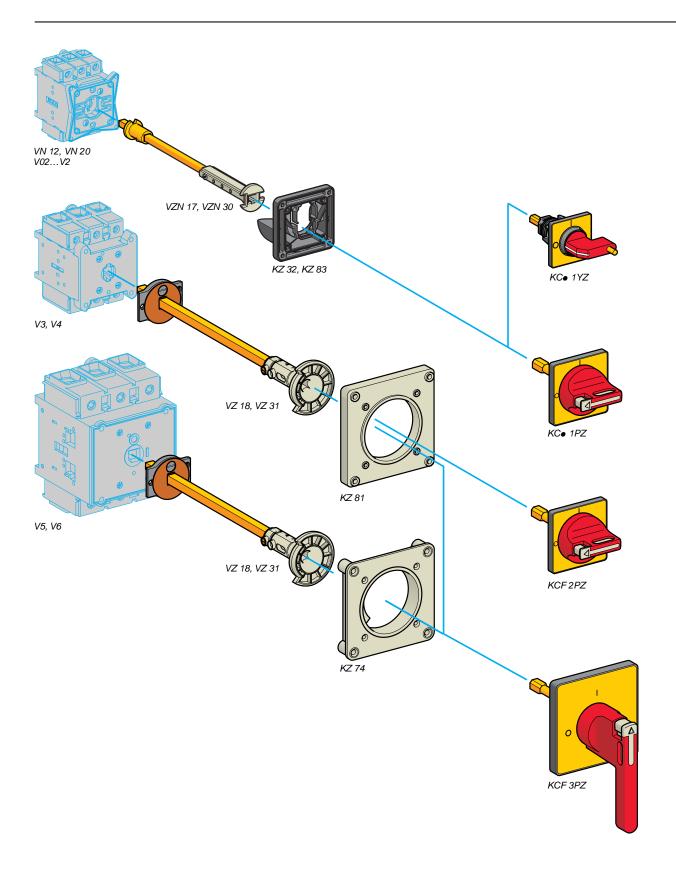
Note: The add-on modules mounted next to the switch body are main poles. Maximum of 3 main pole modules per switch body.

Auxiliary contact block

⁽¹⁾ Protection shrouds are available if required: see page 23052-EN/4.

⁽²⁾ Late make N/O, early break N/C contacts

Safety control and protection solutions Mini-VARIO and VARIO switch disconnectors



Mini-VARIO and VARIO switch disconnectors Operators, handles and front plates (for customer assembly)

- Padlockable operating handle (padlocks not supplied).
- Degree of protection IP 65.

	and front p sconnecto		ain and Er	mergency stop)
For Operator Switch Handle body		Front plate	Front plate		Weight
body		Dimensions	Fixing		
		mm			kg
VN 12, VN 20 V02V2	Red, padlockable with up to	Yellow 45 x 45	Ø 22.5	KCC 1YZ	0.050
1 padlock (Ø 4 to Ø 6)		4 screws	KCE 1YZ	0.040	
	Red, padlockable with up to	Yellow 60 x 60	Ø 22.5	KCD 1PZ	0.082
	3 padlocks (Ø 4 to Ø 8)		4 screws	KCF 1PZ	0.075
V3 and V4	Red, padlockable with up to 3 padlocks (Ø 4 to Ø 8)	Yellow 60 x 60	4 screws	KCF 2PZ	0.070
V5 and V6	Red, long, padlockable with up to 3 padlocks (Ø 4 to Ø 8)	Yellow 90 x 90	4 screws	KCF 3PZ (1)	0.160

⁽¹⁾ For door mounting of 63 and 80 A switch disconnectors, adapter plate KZ 106 must be ordered separately (see page 23052-EN/4).

Mini-VARIO and VARIO switch disconnectors Accessories





VZ 26







Input terminal prot	ection shrouds		
Description	For use on	Reference	Weight kg
For switch bodies (3-pole shroud)	V02V2	VZ 8	0.015
	V3 and V4	VZ 9	0.020
	V5 and V6	VZ 10	0.060
For add-on pole modules (single-pole shroud)	VZ 02VZ 2, VZ 11, VZ 14	VZ 26	0.005
	VZ 3, VZ 4, VZ 12, VZ 15	VZ 27	0.007
	VZ 13, VZ 16	VZ 28	0.020
For contact blocks with 2 auxiliary contacts	-	VZ 29	0.005

Compone	ents for doc	r interlocki	ng		
	ng switch disc a direct operat		ounted at t	the back of an enc	losure, in
Description	For use on	Distance enc.back/door	Sold in lots of	Unit reference	Weight
		mm			kg
Shaft extensions	VN 12, VN 20 V02V2	300330	1	VZN 17 (1)	0.100
V		400430	1	VZN 30 (1)	0.130
	V02V2	300330	1	VZ 17	0.075
		400430	1	VZ 30	0.125
	V3 and V4	300320	1	VZ 18	0.170
		400420	1	VZ 31	0.215
	V5 and V6	330350	1	VZ 18	0.170
		430450	1	VZ 31	0.215
Door interlock plates	VN 12, VN 20 V02V2	-	5	KZ 32	0.177
•	V3V6	_	5	KZ 74	0.020

Description	For use on	Front plate dimensions	Sold in lots of	Unit reference	Weight
		mm			kg
Plates for door mounting of handles with	VN 12, VN 20 V02V2	45 x 45 or 60 x 60	5	KZ 83	0.205
4 screw fixing	V3V6	60 x 60 or 90 x 90	5	KZ 81	0.010
Adapter plate for switch disconnectors	V3 and V4	90 x 90	5	KZ 106	0.075

⁽¹⁾ Can be used with V02 to V2 switches.

Schneider Electric

Mini-VARIO and VARIO switch disconnectors Accessories





KZ 67



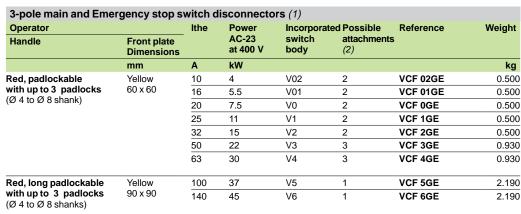
Description	ies for ope	Front plate	Sold in	Unit reference	Weight
Description	use on	dimensions	lots of	Officielefelice	weigin
		mm			kg
Legend holder with silver coloured	Front plate	45 x 45	5	KZ 13	0,060
blank legend plate		60 x 60	5	KZ 15	0,065
		90 x 90	5	KZ 103	0,070
Legend holders without	Front plate	45 x 45	20	KZ 14	0,060
legend plate		60 x 60	10	KZ 16	0,065
		90 x 90	5	KZ 101	0,070
Silver coloured blank legend	KZ 14	_	20	KZ 76	0,020
plates for engraving by customer	KZ 16	_	10	KZ 77	0,010
	KZ 101	_	5	KZ 100	0,005
Seals	VN 12, VN 20	45 x 45	5	KZ 65	0,037
	V02V2	60 x 60	5	KZ 66	0,033
	V3 and V4	60 x 60	5	KZ 62	0,033
	V3V6	90 x 90	5	KZ 67	0,064
Tightening tool	For operators with Ø 22.5 xing	_	5	Z01	0,050

Schneider Electric

VARIO enclosed switch disconnectors (pre-assembled)

Enclosed switch disconnectors for high performance applications

- 3-pole rotary switch disconnectors from 10 to 140 A
- Padlockable operating handle (padlock not included).
- IP 65 degree of protection enclosures, sealable and lockable.
- Cover lockable in position "I" (ON) up to 63 A rating.





VCF 0GE

VCF 3GE

Enclosed switch disconnectors for standard applications

- 3-pole rotary switch disconnectors from 10 to 32 A
- Degree of protection IP 55.



VCFN 12GE

3-pole main and Em	ergency stop s	witch d	lisconnector	's (1)			
Operator		Ithe	Power AC-	Incorporated	Possible	Reference	Weight
Handle	Front plate Dimensions	-	23 at 400 V	switch body	attachments (2)		
	mm	Α	kW				kg
Red, padlockable with 1 padlock	Yellow 60 x 60	10	4	VN 12	2	VCFN 12GE (2)	0.422
(Ø 8 shank)		16	5.5	VN 20	2	VCFN 20GE (2)	0.422
or up to 3 padlocks (Ø 6 shank)		20	7.5	V0	0	VCFN 25GE	0.512
(D O SHAHK)		25	11	V1	0	VCFN 32GE	0.512
		32	15	V2	0	VCFN 40GE	0.512

(1) Switch disconnector characteristics, see pages 23011-EN/2 to 23011-EN/4.

(2) For enclosures VCF and VCFN, see page 23054-EN/2

VARIO enclosed switch disconnectors (assembled by the user)



VCFX GE2

Empty enclosure	es			
IP 65 enclosure with (for mounting a main o		ndle operator and yellow front plate vitch disconnector)	•	
For switch body type	Ithe	Possible attachments (1)	Reference	Weight
	A			kg
VN 12, VN 20 V02V2	1032	2	VCFX GE1	0.340
V02V2	1032	4	VCFX GE4	0.660
V3 and V4	5063	3	VCFX GE2	0.660
		4	VCFX GDXE	0.660

Switch bodies for	or standard applications (2)		
Description	Rating	Reference	Weight
	A		kg
3-pole switch disconnectors	10	VN 12	0.110
	16	VN 20	0.110



Description	Rating	Reference	Weight
	A		kg
3-pole switch disconnectors	10	V02	0.200
	16	V01	0.200
	20	VO	0.200
	25	V1	0.200
	32	V2	0.200
	50	V3	0.200
	63	V4	0.200

⁽¹⁾ See page 23054-EN/2. (2) Switch disconnector characteristics, see pages 23011-EN/2 to 23011-EN/2.

VARIO enclosed switch disconnectors Add-on modules





VZ 11

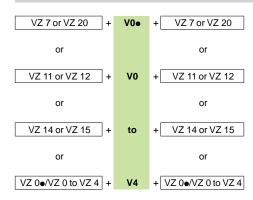




Description	Rating	Reference	Weight
	A		kg
Main pole modules	10	VZ 02	0.050
(mounted in enclosure)	16	VZ 01	0.050
	20	VZ 0	0.050
	25	VZ 1	0.050
	32	VZ 2	0.050
	50	VZ 3	0.100
	63	VZ 4	0.100
Neutral pole modules	10 to 32	VZ 11	0.050
with early make and	50 and 63	VZ 12	0.100
late break contacts	100 and 140	VZ 13	0.250
Earthing modules	10 to 32	VZ 14	0.050
	50 and 63	VZ 15	0.100
	100 and 140	VZ 16	0.250
Auxiliary contact block	N/O + N/C (1)	VZ 7	0.050
modules with 2 auxiliary contacts	N/O + N/O	VZ 20	0.050

Maximum number of add-on modules that can be fitted on a switch body

1 add-on module on each side of the switch body



2 2 4 4 2 2	 aaab aida d	of the switch body	
/ ann-on			

VZ 0● + VZ 0● +	V0∙	+ VZ 0• + VZ 7 or VZ 20 or VZ 11 or VZ 14
VZ 0 + VZ 0 +	V0	+ VZ 0 + VZ 7 or VZ 20 or VZ 11 or VZ 14
VZ 1 + VZ 1 +	V1	+ VZ 1 + VZ 7 or VZ 20 or VZ 11 or VZ 14
VZ 2 + VZ 2 +	V2	+ VZ 2 + VZ 7 or VZ 20 or VZ 11 or VZ 14
VZ 3 + VZ 3 +	V3	+ VZ 3 + VZ 7 or VZ 20 or VZ 12 or VZ 15
VZ 4 + VZ 4 +	V4	+ VZ 4 + VZ 7 or VZ 20 or VZ 12 or VZ 15

Note : The add-on modules mounted next to the switch body are main pole modules. Maximum of 3 main pole modules per switch body.

(1) Late make N/O, early break N/C contacts

Mini-VARIO enclosed switch disconnectors Add-on modules



VZN 11



VZN 14



VZN 05

Add-on modules i	or enclosures VCFN 1	ZGE and ZU G	
Description	Rating	Reference	Weight
	A		kg
Main pole modules	10	VZN 12	0.020
	16	VZN 20	0.020
Neutral pole module with early make and late break contacts	10 and 16	VZN 11	0.020
Earthing module	10 and 16	VZN 14	0.016
Auxiliary contact block modules	1 late make N/O contact	VZN 05	0.020
	1 early break N/C contact	VZN 06	0.020

Maximum number of add-on modules that can be fitted on a switch body

VZN 12 or VZN 20 +	-	+ VZN 12 or VZN 20
	VN 12	or
		VZN 11
or	or	or
	VN 20	VZN 05 or VZN 06
		or
VZN 05 or VZN 06		VZN 14

Mini-VARIO switch disconnectors, 12 and 20 A

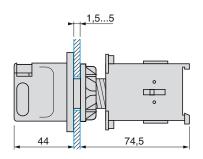
Dimensions Switch disconnectors Add-on modules VZN 11, VZN 14 VZN 05 and VZN 06 Switch bodies VN 12, VN 20 Add-on modules VZN 12, VZN 20 0 0 46,5 45,5 45,5 \Box 0 0 8 8 39 12 39 62 48

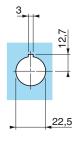
Mounting

Switch disconnector mounted on enclosure door

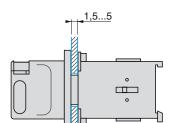
56

VN 12, VN 20 Single hole fixing



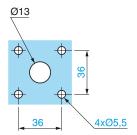




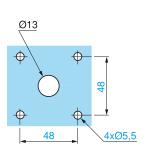


62,5





60 x 60 front plate



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Mini-VARIO switch disconnectors, 12 and 20 A

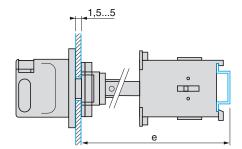
Mounting (continued)

Switch disconnector mounted at back of enclosure with shaft extension VZN 17 or VZN 30 (clip-on mounting on ⊔ rail) VN 12, VN 20

Single hole fixing



4 screw fixing

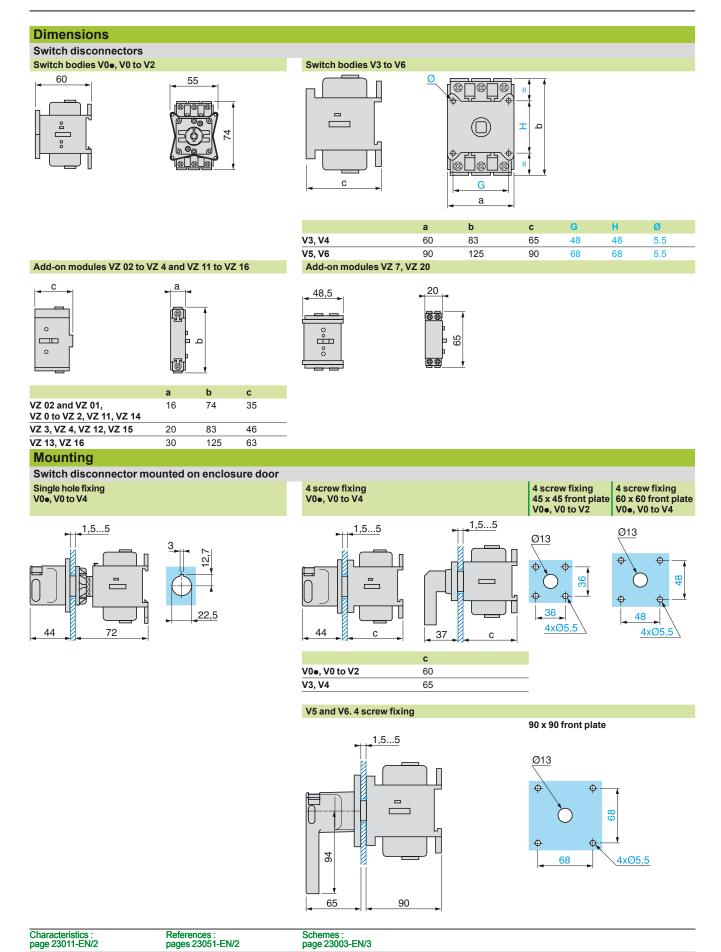


	Shaft extension	Distance (e) enclosure back/door mm
VN 12, VN 20	VZN 17	300330
	VZN 30	400430

Schemes				
Switch body VN 12, VN 20	Main pole module VZN 12, VZN 20	Neutral pole module VZN 11	Auxiliary contact VZN 05	VZN 06
7.71 7.72 7.73 7.73 7.73 7.73 7.73	\ \		14 / 13	22 21

3

VARIO switch disconnectors, 12 to 175 A



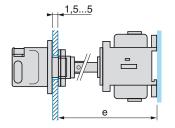
VARIO switch disconnectors, 12 to 175 A

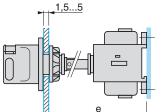
Mounting (continued) Switch disconnector mounted at back of enclosure 4 screw fixing

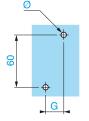
4 screw fixing V0●, V0 to V2 with shaft extension VZ 17 or VZ 30 (clip-on mounting on ∟ rail possible for V0● to V2)

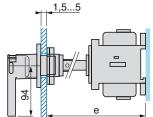
Single hole fixing V3 to V4 with shaft extension VZ 18 or VZ 31

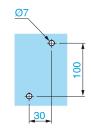
V5 and V6 with shaft extension VZ 18 or VZ 31











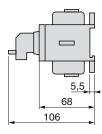
	Shaft extension	Distance (e) enc.back/door	Ø	G	
		mm			
V02 and V01	VZ 17	300330	2 x 4.2	15	
V0 to V2	VZ 30	400430	2 x 4.2	15	
V3 and V4	VZ 18	300320	2 x 5	20	
	VZ 31	400420	2 x 5	20	

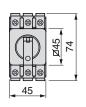
	Shaft extension	Distance (e) enc. back/door mm
V5 and V6	VZ 18	300350
	VZ 31	430450

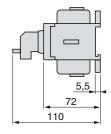
Switch disconnectors for modular distribution boards

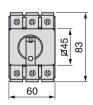
VVe 0 to VVe 2









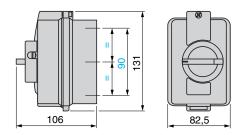


Schemes				
Switch body	Main pole module	Neutral pole module	Auxiliary contact	t blocks
V02 and V01 V0 to V6	VZ 02 and VZ 01 VZ 0 to VZ 4	VZ 11 to VZ 13	VZ 7	VZ 20
F. 172 F. 172 F. 172 F. 173 F. 174 F.	Š		22 Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z	4 4 2 2 2 2 2 2 2 2

VARIO enclosed switch disconnectors

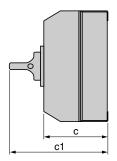
Dimensions

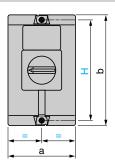
VCFN 12GE to VCFN 40GE



Cable glands: 2 x 16 P top and bottom

VCF 02GE to 4GE, VCFX GE1 to GE4

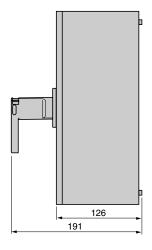




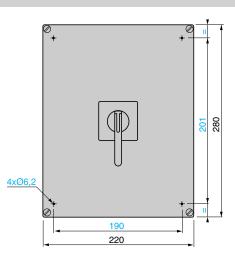
	а	b	С	c1	Н
VCF 02GE to VCF 2GE, VCFX GE1 (1)	90	146	85	131	130
VCF 3GE and VCF 4GE (2)	150	170	106	152	164
VCFX GE2 and VCFX GE4 (2)	150	170	106	152	164

(1) Cable glands: 2 x 16 P top and bottom (2) Cable glands: 2 x 16/21/29 P top and bottom

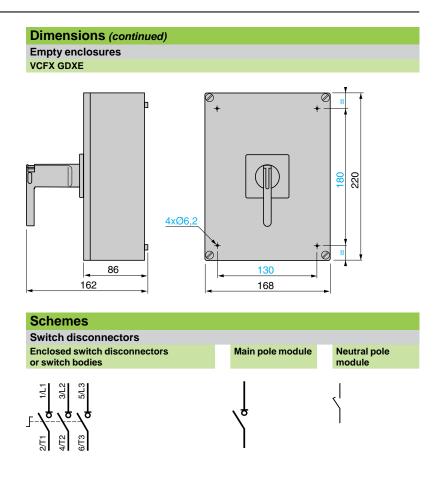
VCF 5GE and 6GE



Schneider Electric



VARIO enclosed switch disconnectors (assembled by the user)



Auxiliary contac	ct blocks		
VZ 7	VZ 20	VZN 05	VZN 06
22 21 21	24 45 7 7 7 7 7 7 7 7 7	14 / 13	22

TeSys contactors From 6 to 16 A

Applications

Simple automation systems





Rated operational current	le max AC-3 (Ue ≤ 440 V)	6 A	6 A	
	le AC-1 (θ ≤ 40 °C)	12 A	-	
Rated operational voltage		690 V		
Number of poles		2 or 3	3	
Rated operational power in category AC-3	220/240 V	1.1 kW	1.5 kW	
oatogory/ico	380/400 V	2.2 kW	2.2 kW	
	415/440 V	2.2 kW	2.2/3 kW	
	500 V	-	3 kW	
	660/690 V	-	3 kW	
	1000 V	-	-	
Add-on auxiliary contact blocks	Front	Up to 2 N/C or N/O	Up to 4 N/C or N/O	
	Side	-	-	
	Front time delay	-	1 N/C	
	Front dust and damp protected	-	-	
Associated manual-auto thermal overload relays	Class 10 A	-	0.1116 A	
	Class 20 A	-	-	
Suppressor modules		Varistor or diode	Varistor, diode + Zener diode or RC circuit	
Contactor type references	~	LC1 SK	LC1 or LC7 K06	
	=	LP1 SK	LP1 K06	
Reversing contactor with mechanical interlock	~	-	LC2 or LC8 K06	
type references	=	-	LP2 K06	
Pages	Contactors	22101/2 and 22101/3	24402/2 to 24403/3	
	Reversing contactors	-	24404/2 to 24405/3	



9 A	12 A	16 A
20 A	-	-
3 or 4		
2.2 kW	3 kW	3 kW
4 kW	5.5 kW	7.5 kW
4 kW	5.5 kW	7.5 kW
4 kW	4 kW	5.5 kW
4 kW	4 kW	4 kW
-	-	-

LC1 or LC7 K09	LC1 or LC7 K12	LC1 K16	
LP1 K09	LP1 K12	-	
LC2 or LC8 K09	LC2 or LC8 K12	LC2 K16	
LP2 K09	LP2 K12	-	

TeSys contactorsTeSys D low consumption contactors

Applications		Automation systems		
		School Sc	Schulidaria Schulidaria 200 and Schulidaria	Schyrider
Rated operational current	le max AC-3 (Ue ≤ 440 V)	9A	12 A	18 A
	le AC-1 (θ ≤ 60 °C)	20/25 A	20/25 A	25/32 A
Rated operational voltage		690 V		
Number of poles		3 or 4	3 or 4	3 or 4
Rated operational	220/240 V	2.2 kW	3 kW	4 kW
ower mad o	380/400 V	4 kW	5.5 kW	7.5 kW
	415/440 V	4 kW	5.5 kW	9 kW
	500 V	5.5 kW	7.5 kW	10 kW
	660/690 V	5.5 kW	7.5 kW	10 kW
Coil consumption		2.4 W (100 mA - 24 V)		
Operating ranges		0.71.25 Uc		
Operating time at 20 °C and at Uc	Closing	70 ms		
	Opening	25 ms		
Auxiliary contact block mod	dules		eous contacts incorporated in the e, comprising up to 2 N/C or 2 N/C	
Interference suppression		Built-in suppression as sta	ndard, by bi-directional peak limiti	ng diode
Contactor type	3-pole	LC1 D09	LC1 D12	LC1 D18
	4-pole	LC1 DT20/D098	LC1 DT25/D128	LC1 DT32/D188
Reversing contactor type	3-pole	LC2 D09	LC2 D12	LC2 D18
	4-pole	LC2 DT20	LC2 DT25	LC2 DT32
Pages	Contactors	24501/2 to 24502/5		

(2) With 2 low consumption kits **LA4 DBL** (see page 24511/7).







25 A	32 A	38 A	40 A	50 A	65 A
25/40 A	50 A	50 A	60 A	-	80 A
2021/			000 1/		
690 V			690 V		
3 or 4	3	3	3	3	3
5.5 kW	7.5 kW	9 kW	11 kW	15 kW	18.5 kW
11 kW	15 kW	18.5 kW	18.5 kW	22 kW	30 kW
11 kW	15 kW	18.5 kW	22 kW	25/30 kW	37 kW
15 kW	18.5 kW	18.5 kW	22 kW	30 kW	37 kW
15 kW	18.5 kW	18.5 kW	30 kW	33 kW	37 kW
2.4 W (100 mA - 24 V)			0.6 W (25 mA - 24 V) for r contactor coil	relay LA4 DFB + the power	consumed by the
0.71.25 Uc			-	-	-
70 ms			-	-	-
25 ms			-	-	-

1 N/C and 1 N/O instantaneous contacts incorporated in the contactors, with add-on blocks common to the whole range, comprising up to 2 N/C or 2 N/O instantaneous standard contacts

Built-in suppression as standard, by bi-directional peak limiting diode

LC1 D25	LC1 D32	LC1 D38	LC1 D40A (1)	LC1 D50A (1)	LC1 D65A (1)
LC1 DT40/D258			-	-	-
LC2 D25	LC2 D32	LC2 D38	LC2 D40A (2)	LC2 D50A (2)	LC2 D65A (2)
LC2 DT40					

24501/2 to 24502/5

24503/2 to 24510/3

TeSys protection components Thermal-magnetic motor circuit-breakers

Applications

Protection of motors against short-circuits and overloads

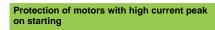








Tripping threshold on short-circuit	13 ln			
Standard motor power ratings in AC-3, 415 V	Up to 15 kW		Up to 30 kW	37 kW
Operational current at 415 V	0.132 A		965 A	5680 A
Breaking capacity at 415 V (Icu) to IEC 60947-2	10100 kA	35100 kA	50100 kA	15 kA
Door interlock mechanism	Without	With	With	Without
Circuit-breaker type	GV2 ME	GV2 P	GV3 P	GV3 ME80
Pages	24508/2 and 24508/3	24508/4	24508/4	24508/4



3







		20 In
7.5110 kW		Up to 11 kW
12220 A		0.2523 A
35 and 36 kA	70 kA	15100 kA
With		With
GV7 RE	GV7 RS	GV2 RT
24508/5		24508/6 and 24508/7

Related products Variable speed drives for asynchronous and synchronous motors

0621Q-EN_ver1.0

Application		Variable speed drives without sensor (velocity control)	Variable speed drive
		For material handling (conveyors), transfer	For hoisting, material handling, packaging,
		machines, packaging machines, hoisting,	textile machines, wood-working machines,
		special machines (textile, transfer), wood- working or metal processing machines, etc.	process machines
			Segregation and Part of the Pa
Power range for 50	060 Hz (kW) line supply Single-phase 100120 V (kW)	0.1815	0.37630
	Single-phase 200240 V (kW)	0.182.2	0.375.5
	Three-phase 200230 V (kW)	-	_
	Three-phase 200240 V (kW)	_	0.3775
	Three-phase 380480 V (kW)	_	0.75500
	Three-phase 380500 V (kW)	0.3715	-
	Three-phase 500600 V (kW)	-	1.57.5
	Three-phase 525600 V (kW)	-	-
	Three-phase 500690 V (kW)	-	1.5630
	. , ,	ID 00	
Degree of protecti	on	IP 20	IP 20
Type of cooling		Heatsink	Heatsink, base plate or water-cooled circuit
Drive system	Output frequency	0.1599 Hz	0.1500 Hz across the entire range 0.1599 Hz up to 37 kW at 200240 V ∼ and 380480 V ∼
	Type of control Asynchronous motor	Voltage/frequency ratios: U/f and 5-point U/f Sensorless flux vector control ratio Kn² quadratic ratio (pump/fan) Energy saving ratio	Flux vector control with or without sensor Voltage/frequency ratio (2 or 5 points). ENA System
	Synchronous motor Transient overtorque	Ratio for synchronous motor without sensor 170200% of the nominal motor torque	Vector control with or without speed feedback 220% of nominal motor torque for 2 seconds,
			170% for 60 seconds
Functions (numbe	•	150	> 150
Safety functions	Integrated	1: STO (Safe Torque Off)	"Power removal" (PWR) safety function
	Available as an option	3 : SLS (Safe Limited Speed), SDI (Safe Direction Information), SS1 (Safe Stop 1)	-
Number of preset s	peeds	_	16
Number	Analog inputs	3	24
of I/O	Logic inputs	6	620
	Analog outputs	1 : configurable as voltage (0-10 V) or current (0-20 mA)	13
	Logic outputs	1	08
	Relay outputs	2	24
Communication	Integrated Available as an option	Modbus, CANopen DeviceNet, PROFIBUS DP V1, EtherNet/IP, Modbus TCP, EtherCat	Modbus, CANopen Modbus TCP Daisy Chain, Modbus/Uni- Telway, EtherNet/IP, DeviceNet, PROFIBUS DP V0 and V1, INTERBUS, CC-Link
	Bluetooth link®	Integrated	-
Options		Filters, braking resistors, line chokes	ATVIMC integrated controller card, interface cards for incremental, resolver, SinCos, SinCos Hiperface®, EnDat® or SSI encoders, I O extension cards, "Controller Inside" programmable card
Dialogue tools		IP 54 or IP 55 drive navigator IP 54 or IP 55 remote graphic display terminal	IP 54 or IP 65 remote graphic display terminal
Configuration	Setup software Configuration tools	SoMove Simple Loader, Multi-Loader	SoMove Simple Loader, Multi-Loader
Standards and cer	· ·	IEC 61800-5-1, IEC 61800-3 (environments 1	IEC 61800-5-1, IEC 61800-3 (environments 1
		and 2, category C2), UL508C, EN 954- 1 category 3, ISO/EN 13849-1/- 2 category 3 (PL e), IEC 61508 (parts 1 & 2) SIL 3 level, draft standard EN 50495E, IEC 60 721-3-3 classes 3C3 and 3S2	and 2, categories C1 to C3), IEC 61000-4-2/4-3/4-4/4-5/4-6/4-11
		C€, UL, CSA, C-Tick, NOM, GOST	C€, UL, CSA, DNV, C-Tick, NOM, GOST
		ATVAO	ATV 74
References		ATV 32	ATV 71

Related products

Motion control Lexium 32

Application areas

Common

Specific

Technology type

Printing, material handling, conveying, etc.), transfer machines, packaging, textiles, etc.

Clamping, cutting, cutting to length, flying shear, rotary knife, Pick & Place, winding, marking, etc.

Lexium 32 servo drives with sensor feedback (position control)













Power range for 5060 Hz (kW) line supply	
	Single-phase 100120 V (kW)
	Single-phase 200240 V (kW)
	Three-phase 380480 V (kW)
	Three-phase 380 500 V (kW)

Motor speed

Drive system

Options

Ť	·	
	Type of control	Asynchronous moto

Synchronous motor

Motor sensor
Integrated
Available as an option

Transient overtorque
Peak current

Number of functions	
Safety functions	Integrated
	Available as an option

Number of I/O	Inputs	Analog Logic
	Outputs	Analog
		Logic
	Relay outputs	

Communication	Integrated
	Available as an option
	Bluetooth link®

Standards and certifications	

References

Catalogue

0.15...7 0.15...0.8 0.3...1.6 0.4...7

Nominal speed:

- BMH servo motors: continuous stall torque range between 1.2...84 Nm for nominal speeds between 1200 and 5000 rpm
- BSH servo motors: continuous stall torque range between 0.5...33.4 Nm for nominal speeds between 2500 and 6000 rpm

Synchronous motor with sensor feedback for BMH and BSH servo motors	
SinCos Hiperface® sensor	
-	Resolver encoder Analog encoder (motor and machine) Digital encoder (machine only)

Peak current, up to 4 times the drive direct current for 1 second

1: STO (Safe Torque Off)

4 : SLS (Safe Limited Speed), SS1 (Safe Stop 1), SS2 (Safe Stop 2), SOS (Safe Operating Stop)

2	_	_
6	1 capture input	6 (2 of which can be used as a capture input)
-	-	-
5	-	3
-	-	-
Modbus	Modbus, CANopen, CANmotion	Modbus
-	-	CANopen, CANmotion, DeviceNet, EtherNet/IP, PROFIBUS DP V1, EtherCat

Available as an option

Available as an option

SoMove setup software Multi-Loader configuration tool IP 54 remote graphic display terminal Filters, braking resistors, line chokes

Available as an option

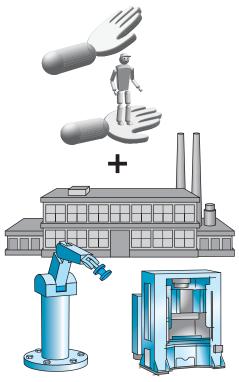
IEC 61800-5-1, IEC 61800-3 (environments 1 and 2, categories C2 and C3) IEC 61000-4-2/4-3/4-4/4-5, ISO/EN13849-1 (PL e), IEC 61508 SIL 3 level

C€, UL, CSA

LXM 32A LXM 32M

Please consult our website www.schneider-electric.com

Introduction - European legislation



Safety and process reliability

Introduction

Safety has become a key issue for businesses.

Social developments in association with technological progress have had a profound impact on legislation and on regulations for the use of building electrical automation equipment.

Social issues

The safety-conscious nature of our western societies has led the legislature to increase the number of requirements and establish stricter rules, while the high cost of accidents has prompted companies to make efforts in the same direction.

Technological issues

- Increasing levels of automation have led to new restrictions. In some case it is difficult, if not dangerous, to stop a machine suddenly and it is necessary to perform a safe shut down sequence before allowing personnel to enter into a production cell.
- The increasingly widespread use of electronics and software has required a different approach to the solutions adopted; empirical rules are no longer enough. Selection includes a reliability calculation to determine the behaviour of the system.

In this context, the specification and design phase are crucial. Studies show that more than 2/3rds of incidents are due to bad design and inadequate specifications. At this stage it is therefore necessary to estimate potential risks and select the most appropriate solutions to reduce their consequences. Standards are available to assist and quide the designer.

Manufacturers of components and solutions help their customers by offering complete, ready-to-use functions which, when combined in accordance with the regulations, satisfy the customer's needs and meet legislative requirements.

In this chapter, we will present a simplified process. To make a choice, the customer will then be able to refer to the safety functions chapter and to the safety products chapters.

European legislation

European legislation requires that preventive action be taken to preserve and protect the quality of the environment and human health. To achieve these objectives, European Directives have been prepared which must be applied by plant operators and by manufacturers of equipment and machines. It also assigns responsibility for possible accidents.

- Notwithstanding the constraints, machine safety has the following positive repercussions:
- prevention of industrial accidents,
- protection of workers and personnel by means of suitable safety measures that take into account the machine's application and the local environment.
- This makes it possible to reduce direct and indirect related costs:
- by reducing physical harm,
- by reducing insurance premiums,
- by reducing production losses and possible delay penalties,
- by limiting damages and costs for maintenance.
- Safe operation involves two principles: safety and reliability of the process:
- safety is the ability of a device to keep the risk incurred by persons within acceptable limits,
- reliability of operation is the ability of a system or device to perform its function at any moment in time and for a specified duration.
- Safety must be taken into account right from the beginning of the design stage and kept in place throughout all stages of a machine's life cycle: transport, installation, commissioning, maintenance, dismantling.

Safety of personnel and equipment Industrial accidents

Industrial accidents

An industrial accident occurs through work or in the workplace and causes minor to serious injury to a person using a machine, feeding it or carrying out special work on it (fitter, operator, maintenance personnel, etc.).

Causes of accidents in the workplace

- Human-related factors (designers, users):
- poor grasp of machine design,
- over-familiarity with danger through habit and failure to take dangerous situations seriously,
- underestimation of hazards, causing people to ignore safe working procedure,
- loss of concentration on tasks to be performed (e.g. fatigue),
- failure to comply with procedures,
- stressful working conditions (noise, work rates, etc.),
- uncertainty of employment which can lead to inadequate training,
- inadequate or bad maintenance, generating unsuspected hazards.

■ Machine-related factors:

- inadequate guards,
- inherent machine hazards (e.g. reciprocal motion of a machine, unexpected
- machines not suited to the application or environment (e.g. sound alarms deadened by the noise of surrounding machinery).

■ Plant-related factors:

- movement of personnel from machine to machine (automated production line),
- machinery from different manufacturers and using different technologies,
- flow of materials or products between machines.

Risk of varying degrees of physical injury to the user,

- stoppage of the machine involved,
- stoppage of similar machine installations for inspection, for example by health and safety inspectors,
- if necessary, modifications to make machinery safe,
- change of personnel and training new personnel for the job,
- damage to the company brand image.

Conclusion

Consequences

Damages for physical injuries are equivalent to about 20 thousand million euro paid out each year in the European Union. Decisive action is required to reduce the number of accidents in the workplace. The first essentials are adequate company policies and efficient organisation.

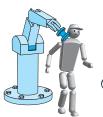
Reducing the number of industrial accidents and injuries depends on the safety of machines and equipment.

Types of potential hazard

The potential hazards of a machine can be classified into three main groups, as illustrated below:









Mechanical hazards

Puncturing, cutting, shearing, fractures, severing

Catching, entanglement, drawing in, trapping

Impact

Crushing







Electrical hazards

Electric shock electrocution. burns Physical and chemical hazards Discharge of dangerous substances

Burns

European legislation and the standards

European legislation and the standards

The main purpose of the Machinery Directive 2006/42/EC is to compel manufacturers to guarantee a minimum safety level for machinery and equipment sold within the European Union. This version has been replacing the 98/37/EC version since January 2010.

To allow free circulation of machinery within the European Union, the C€ marking must be applied to the machine and an EC declaration of conformity is issued to the purchaser. This directive came into effect in January 1995 and has been enforced since January 1997 for all machines.

The user has obligations defined by the Use of Work Equipment directive 89/655/EEC which can in most cases be met by using machinery compliant with relevant standards.

These standards are complex. After a brief presentation of the structure of the standards system, we will provide the reader with a practical guide to the typical standards to be applied according to the selected control system design.

Standards

The harmonised European safety standards establish technical specifications which comply with the minimum safety requirements defined in the related directives. Compliance with all applicable harmonised European standards **can be assumed to ensure** compliance with the related directives. The main purpose is to guarantee a minimum safety level for machinery and equipment sold within the EU market and allow the free circulation of machinery within the European Union.

The 3 groups of European standards

■ Type A standards

Basic safety standards which specify the basic concepts, design principles and general aspects valid for all types of machine: e.g. PrEN/ISO 12100.

■ Type B standards

Standards relating to specific aspects of safety or to a particular device that can be used on a wide range of machines.

□ Type B1 standards

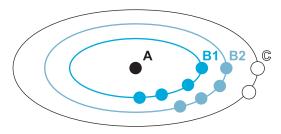
Standards relating to specific safety aspects of machines: e.g. EN/IEC 60204-1 Electrical equipment of machines.

□ Type B2 standards

Standards relating to specific products such as two-hand control stations (EN 574), guard switches (EN 1088/ISO 14119), emergency stops (EN/ISO 13850), etc.

■ Type standards

Standards relating to various families or groups of machines (e.g.: hydraulic presses EN 693, robots, ...) and giving detailed applicable requirements.



Safety of personnel and equipment European legislation and the standards

(continued)

European legislati A selection of standard		ualus (conunucu)
Standards	Туре	Subject
PrEN/ISO 12100	A	Machinery safety - General principles for design, risk assessment and risk
EN E74		reduction
EN 574	В	Two-hand control devices - Functional aspects and design principles
EN/ISO 13850	В	Emergency stop - Principles for design
EN/IEC 62061	В	Functional safety of safety-related electrical, electronic and electronic programmable control systems
EN/ISO 13849-1 (EN 954-1)	В	Machinery safety - Safety-related parts of control systems - Part 1 general principles for design
EN 349	В	Minimum gaps to avoid crushing parts of the human body
EN 294	В	Safety distances to prevent hazardous zones being reached by upper limbs
EN 811	В	Safety distances to prevent hazardous zones being reached by lower limbs
EN/IEC 60204-1	В	Machinery safety - Electrical equipment of machines - Part 1: general requirements
EN 999/ISO 13855	В	Positioning of protective equipment in respect of approach speeds of body parts
EN 1088/ISO 14119	В	Interlocking devices associated with guards - Principles for design and selection
EN/IEC 61496-1	В	Electro-sensitive protective equipment
EN/IEC 60947-5-1	В	Electromechanical control circuit devices
EN 842	В	Visual danger signals - General requirements, design and testing
EN 1037	В	Prevention of unexpected start-up
EN 953	В	General requirements for the design and construction of fixed and movable guards
EN 201	C	Machinery for plastics and rubber - Injection moulding machines - Safety requirements
EN 692	C	Mechanical presses - Safety requirements
EN 693	C	Hydraulic presses - Safety requirements
EN 289	C	Machinery for plastics and rubber - Presses - Safety requirements
EN 422	C	Blow moulding machines for producing hollow parts - Design and construction requirements
EN/ISO 10218-1	C	Manipulating industrial robots - Safety requirements
EN 415-4	C	Safety of packaging machines - Part 4: palletisers and depalletisers
EN 619	C	Safety and EMC requirements for equipment for mechanical handling of unit loads
EN 620	C	Safety and EMC requirements for fixed belt conveyors for bulk material
EN 746-3	C	Industrial thermo processing equipment - Part 3: safety requirements for the generation and use of atmosphere gases

Standards to be applied

Standards to be applied

The process

European Machinery Directive 2006/42/EC

Compliance with the following standards ensure compliance with the Machinery Directive (this new version of the Machinery Directive 2006/42/EC has been replacing 98/37/EC since January 2010).

Machinery safety
General principles for design, risk assessment
and risk reduction
PrEN/ISO 12100 :2009

European Machinery Directive 2006/42/EC

PrEN/ISO 12100 :2009: General principles for design, risk assessment and risk reduction.

See page 38816-EN/7.

The purpose of this standard is to provide designers with an overall framework and guidance to enable them to produce machines that are safe for their intended use.

EN/ISO 13849-1

Machinery safety Safety-related parts of control systems

EN/IEC 62061

Machinery safety

Functional safety of safety-related electrical, electronic and programmable electronic control systems $\bf Standards$ to be apply according to the design selected for the safety-related machine control system.

See page 38816-EN/10.

Remarks:

The use of one of these 2 standards gives presumption of conformity to the new 2006/42/EC directive.

Machinery safety EN/IEC 60204-1 Electrical equipment of machines EN/IEC 60204-1: Electrical equipment of machines

Standard EN/IEC 60204-1 completes the safety standards by giving setting-up rules for each component of a machine's electrical functions.

It specifies, amongst other things:

- the type of connection terminals and disconnection and breaking devices,
- the type of electric shock protection,
- the type of control circuits,
- the type of conductors and wiring rules,
- the type of motor protection.

Certification and **C€** marking in accordance with the Machinery Directive

See page 38816-EN/21.

Standards to be applied for the design of machines

Standards to be applied (continued)

Residual risk Acceptable risk Initial risk Level of risk Risk reduction necessary Actual risk reduction

Achieved by design measures, safety-related systems and by external risk reduction devices

Reduction of risk to an acceptable level

Standards to be applied (continued)

Risk and safety

Safety is the absence of risks which could cause injury to or damage the health of persons. Functional safety is a part of safety that depends on the correct operation of safety functions.

According to the requirements of standard PrEN/ISO 12100:2009, the machine designer's job is to reduce all risks to a value lower than the acceptable risk. For more details concerning the sources of accidents and risk prevention, the reader is referred on page 38816-EN/3.

This standard recognises two sources of hazardous phenomena:

- moving transmission parts,
- moving parts contributing to the work.

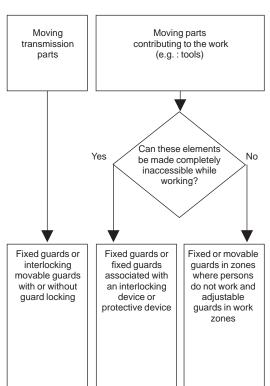
It gives guidelines for the selection and installation of devices which can be used to protect persons and identifies those measures that are implemented by the machine designer and those dependent on its user.

The measures taken by the machine designer may be:

- inherent in the design,
- selection of guards and additional measures, including control systems,
- information for the user.

The measures taken by the user may be (non-exhaustive list):

- organisation, procedures, etc.,
- personal protective equipment,
- training.



Selection of the protection system (PrEN/ISO 12100:2009)

Assessment of machinery related risk

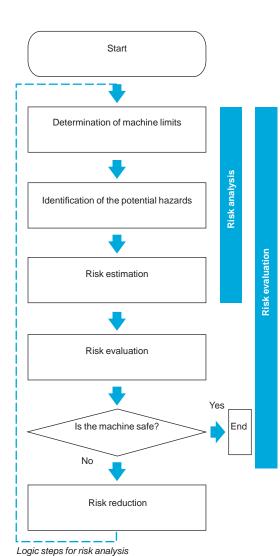
Risk related to the potential hazard = Severity of the potential harm | X | Probability of the occurrence of an event that could cause the harm | Definition of risk

Assessment of machinery related risk

European legislation

■ Machines are sources of potential risk and the Machinery Directive requires a risk assessment to ensure that any potential risk is reduced to less than the acceptable risk

Standard PrEN/ISO 12100:2009 defines risk as follows: risk is the severity multiplied by the possibility of occurrence. It defines an iterative process for achieving machine safety, which states that the risks for each potential hazard can be determined in four stages. This method provides the basis for the requisite risk reduction.



Risk assessment

Risk assessment consists of a series of logic steps which make it possible to systematically analyse and evaluate machinery-related risks.

Risk assessment is followed, whenever necessary, by a reduction of the risk. This definition taken from standard PrEN/ISO 12100 :2009 is based on an iterative process represented in the diagram opposite.

Determination of machine limits

Risk assessment starts by determining the limits of the machine at all stages of its life cycle:

- transport, assembly, installation,
- commissioning,
- use,
- de-commissioning, dismantling.

The use limitations must then be specified:

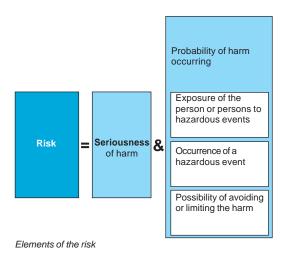
- operating modes,
- level of training required,
- space limits (amplitude, movement...),
- time limits (life cycle, frequency of maintenance...).

Identification of the potential hazard

If a potential hazard exists, a hazardous phenomenon will cause harm if measures are not taken. All the tasks associated with the machine's life cycle must be identified, such as:

- assembly, transport and installation,
- adjustment, testing,
- learning, programming,
- tool changing,
- feeding, removal of product from the machine,
- starting, stopping,
- emergency stops, restarting after an unexpected stop,
- maintenance, cleaning, etc.

Assessment of machinery related risk (continued)



Assessment of machinery related risk (continued)

Risk assessment (continued)

Risk estimation

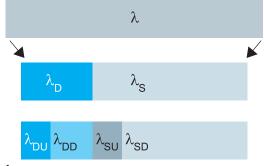
The risk is a function of the severity of the harm and the probability that this harm will occur.

- The severity of the harm takes into account:
- the severity of injuries (slight, serious, death),
- the extent of the harm (number of persons).
- The probability of the harm occurring takes into account:
- exposure to the hazard (nature of access, time spent in the hazardous zone, number of persons exposed, frequency of access...),
- the occurrence of a hazardous event (accident history, comparison of risks, ...),
- the possibility of avoiding or limiting the harm (experience, awareness of the risk, ...).

Risk evaluation

On the basis of the risk assessment, the designer has to define the safety related control system. To achieve that, the designer will chose one of the two standards appropriate to the application:

- either standard EN/ISO 13849-1, which defines performance levels (PL),
- or standard EN/IEC 62061, which defines safety integrity levelS (SIL).



- λ rate of control system failures
- $\lambda_{_{D}}$ $\,$ rate of dangerous failures
- $\lambda_{_{\text{DU}}}$ rate of undetected dangerous failures
- $\lambda_{_{\text{DD}}}$ rate of detected dangerous failures
- $\lambda_{_{S}}$ $\,$ rate of safe failures
- $\lambda_{_{\text{SU}}}$ rate of undetected safe failures
- $\lambda_{_{SD}}$ rate of detected safe failures

Breakdown of the probability of failures

Risk reduction

The process of risk reduction for dangerous events starts by:

- intrinsic prevention (inherently safe design),
- definition of the appropriate protective means (guards, carters, fix fences, ...),
- personal training.

If the selected preventive measure depends on a safety related control system, the designer has to perform an iterative process for the design of the safety relative control system.

- The first stage is to define the necessary safety-related control functions:
- either through the choice of components,
- or by adapting the control system architecture. Redundancy (double circuit components), for example, significantly increases the reliability of the solution.
- Once the limits of available technologies have been reached, it will not be possible to further reduce the rate of dangerous failures. To achieve the required level of safety, it will be necessary to use a diagnostic system that allows dangerous failures to be detected.

Standard to be applied according to the design selected for the safety-related machine control system

Standard to be applied according to the design selected for the safety-related machine control system

Safety standards to be applied according to type of architecture selected

Based on the generic definition of the risk, the standards classify necessary safety levels in different discrete levels corresponding for each one to a probability of dangerous failure per hour:

- PL (Performance Level) for standard EN/ISO 13849-1,
- SIL (Safety Integrity Level) for standard EN/IEC 62061.

The table below gives **the relationship** between the performance level (PL) and the Safety Integrity Level (SIL).

PL	ISL	Probability of dangerous failures per hour 1/h
а	No correspondance	≥ 10 ⁻⁵ < 10 ⁻⁴
b	1	≥3 x 10 ⁻⁶ < 10 ⁻⁵
С	1	≥10 ⁻⁶ < 3 x 10 ⁻⁶
d	2	≥ 10 ⁻⁷ < 10 ⁻⁶
е	3	≥ 10 ⁻⁸ < 10 ⁻⁷

In order to be able to select the applicable standard, a common table in both standards gives indications which are summarised in the table below:

	EN/ISO 13849-1	EN/IEC 62061
Technology used	max. PL	max. SIL
Non electric only, for example hydraulic	е	Not covered
Including some electromechanical, for example relays and/or non complex electronics	e (1)	3
Including complex electronics, for example programmable	d	3

(1) For designated architectures only.

For building specific complex sub-systems or for higher level requirements including software, standard EN/IEC 61508 relating to systems must be used.

Standard to be applied according to the design selected for the safety-related machine control system (continued)

Standard to be applied according to the design selected for the control system (continued)

Designing a safety-related control system taking into account the requirements of safety standards may seem rather complex. We will guide the reader through this process by presenting:

- the basis and development of the standards,
- the safety standards to be applied according to the type of architecture selected,
- machine equipment and wiring.

Basis and development of the standards

In a complex system, such as a refinery, it is no longer sufficient to consider only the sub-systems to ensure protection; failure of a sub-system could be catastrophic for persons and the environment.

The approach is therefore more global. Taking into account the whole safety life cycle, standard EN/IEC 61508 deals with safety-related control systems, and includes safety rules, technical specifications, management and training of personnel.

The use of more complex saftey-related control systems based on electronics and software highlights the weaknesses of standard EN 954-1:

- the reliability of components is not taken into account,
- insufficient requirements for programmable products,
- combining components with a category certification is not enough to "guarantee" the required level of risk reduction.

Based on experience gained with systems, the standards body has, in line with standard EN/IEC 61508, developed standard EN/IEC 62061 which applies the principles of functional safety to the design of safety-related control systems for machinery.

This standard offers two important advantages:

- it incorporates the new electronic and electronic programmable technologies to provide the safety functions,
- it is consistent with the basic standard EN/IEC 61508 and is therefore being specified more and more for machines by users.

At the same time, standard EN/ISO 13849-1, effective since 2006, has completely been replacing the standard EN 954-1 since January 2010, which brings several improvements and, above all, is consistent with safety standards in general.

Standard EN/ISO 13849-1 Machinery safety - Safety-related parts of

control systems (SRP/CS)

Machinery safety - Safety-related parts of control systems Standard EN/ISO 13849-1 is a development of standard EN 954-1. For clarity, only a simplified analysis of this new version will be presented here. Field of application of the standard

Standard EN/ISO 13849-1

This standard gives safety requirements and advice relating to principles for the design and integration of safety-related parts of control systems (SRP/CS), including software design. For these parts, it specifies the characteristics, including the performance level, needed to achieve these safety functions. It applies to the SRP/ CS of all types of machine, regardless of the technology and type of energy used (electric, hydraulic, pneumatic, mechanical, etc.).

Process

Risk assessment as defined in standard PrEN/ISO 12100:2009 (see page 38816-EN/6.) leads to decisions on risk reduction measures. If these measures depend on a control system, then PrEN/ISO 12100:2009 can apply. It defines a 6-stage design

- 1 Selection of the essential safety functions that SRP/CS must perform. For each safety function, specify the required characteristics.
- 2 Determine the required performance level (PLr).
- 3 Design and technical creation of safety functions: identify the parts that perform the safety function.
- 4 Evaluate the performance level PL for each safety-related part.
- 5 Check that the performance level PL achieved is greater than or equal to the required level (PLr).
- 6 Check that all requirements are satisfied.

We will now illustrate these stages, taking as an example a safety function that stops operation of a machine motor when a safety guard is opened. The machine is potentially dangerous, there is a risk of the operator's arm being amputated if there is no guard.

Stage 1 - Selection of safety functions

The diagram opposite shows a safety function which consists of several parts:

- the input actuated by opening of the guard (SRP/CSa),
- the control logic, limited in this example to opening or closing of a contactor coil (SRP/CSb),
- the power output that controls the motor (SRP/CSc),
- the connections (lab, lbc).

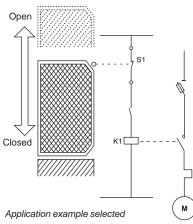
Stage 2 - Estimation of required performance level (PLr)

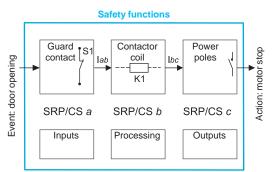
For our safety function, this is estimated using the risk graph.

The parameters to be considered are:

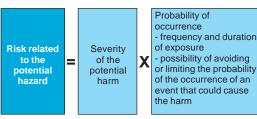
- □ S severity of the injury
- S1 slight injury, normally reversible,
- S2 Serious, normally irreversible, including death.
- $\ \square$ **F** frequency and/or duration of exposure to the hazardous phenomenon.
- F1 rare to fairly frequent and/or short duration of exposure.
- F2 frequent to permanent and/or long duration of exposure.
- □ **P** possibility of avoiding the hazardous phenomena or limiting the harm.
- P1 possible under certain circumstances,
- P2 virtually impossible.

The result of the estimation (in blue on the drawing on the next page) gives a required performance level PLr = e.





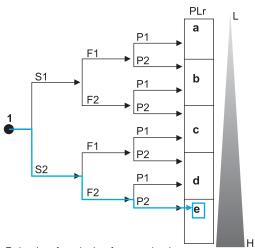
Representation of the safety function



Risk analysis

Safety of personnel and equipment Standard EN/ISO 13849-1

Machinery safety - Safety-related parts of control systems (SRP/CS) (continued)



Estimation of required performance level

1	Starting point for estimation
L	Low contribution to risk reduction
PL r	Performance Level required
Н	High contribution to risk reduction
	Estimation

Key:

OTE

, .	
<i>i</i> m	Interconnecting means
С	Cross monitoring
I, I1, I2	Input device, e.g. sensor
L, L1, L2	Logic
m	Monitoring
0, 01, 02	Output device, e.g. main contactor
TE	Test equipment

Output of TE

Standard EN/ISO 13849-1

Machinery safety - Safety-related parts of control systems

Process (continued)

Stage 3

Design and creation of the safety functions

At this point, we need to describe the PL calculation method.

The PL is defined in terms of the probability of a dangerous failure per hour:

PL	Probability of a dangerous failure per hour
а	≥10 ⁻⁵ < 10 ⁻⁴
b	≥3 x 10 ⁻⁶ < 10 ⁻⁵
С	≥ 10 ⁻⁶ < 3 x 10 ⁻⁶
d	≥10 ⁻⁷ < 10 ⁻⁶
е	≥10 ⁻⁸ < 10 ⁻⁷

For a SRP/CS (or a combination of SRP/CS) designed according to the requirements of the article 6, PL could be estimated with the figure shown on the next page, after estimation of several factors such as :

- hardware and software system structure (categories),
- mechanism of failures, diagnostic coverage (DC),
- components reliability, Mean Time To dangerous Failure (MTTF_d),
- Common Cause Failure (CCF).

■ Categories (Cat.) and designated architectures

The table below summarises system behaviour in the event of a failure and the principles used to achieve the safety, for the 5 categories defined

Cat.	System behaviour	Designated architectures
В	A fault can lead to loss of the safety function	I im O
1	As for category B but the probability of this occurence is lower than for the category B	
2	A fault can lead to loss of the safety function between two periodic inspections and loss of the safety function is detected by the control system at the next test.	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$
3	For a single fault, the safety function is always ensured. Only some faults will be detected. The accumulation of undetected faults can lead to loss of the safety function.	$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$
4	When faults occur, the safety function is always ensured. Faults will be detected in time to prevent loss of the safety function	$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$

■ MTTF_d (Mean Time To dangerous Failure)

The value of the MTTF_d of each channel is given in 3 levels (see table below) and shall be taken into account for each channel (e.g. single channel, each channel of a redundant system) individually.

Reliability levels of components	
Index	Range
Low	3 years ≤ MTTF _d < 10 years
Medium	10 years ≤ MTTF _d < 30 years
High	30 years ≤ MTTF _d < 100 years

A MTTF_d of less than 3 years should never be found, because this would mean that after one year in operation, 30% of all those components in use would have failed to a dangerous state. The maximum value is limited to 100 years because devices dealing with a significant risk should not depend on the reliability of a single component. Additional measures such as redundancy and tests are required.

Safety of personnel and equipment Standard EN/ISO 13849-1

Machinery safety - Safety-related parts of control systems (SRP/CS) (continued)

Standard EN/ISO 13849-1

Machinery safety - Safety-related parts of control systems

Process continued)

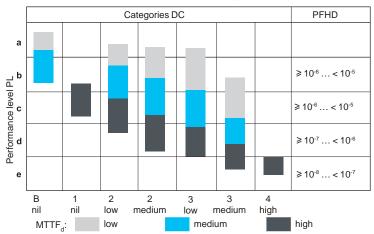
Stage 3- (continued)

■ Diagnostic coverage: this term is expressed as a percentage and quantifies the ability to diagnose a dangerous failure.

For example, in the event of welding of a N/C contact in a relay, the state of the N/O contact could incorrectly indicate the opening of the circuit, unless the relay has mechanically linked N/O and N/C contacts, when the fault can be detected. The standard recognises four levels:

Diagnostic coverage	
Denotation	Range
Nil	DC < 60%
Low	60% ≤ DC < 90%
Medium	90% ≤ DC < 99%
High	99% ≤ DC

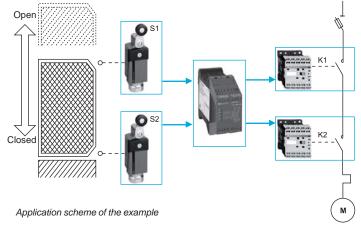
■ Relationship between Categories, DC and MTTF_d of each channel and the PL



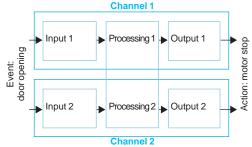
- ☐ In our example, to reach the PL = e, the solution will therefore have to correspond to category 4 with redundant circuit; the function scheme is shown opposite with two channels in parallel,
- □ a high diagnostic capability,
- □ a high MTTF_d.

For our application, we could suggest a redundant relay scheme but it is nowadays easier to use safety function blocks.

The solution is illustrated below.



The process suggested by the standard is iterative and a few estimations are therefore necessary in order to obtain the expected result. In view of the required performance level, we have chosen a solution with redundant circuit.



Functional diagram of the example

Standard EN/ISO 13849-1

Machinery safety - Safety-related parts of control systems (SRP/CS) (continued)

Standard EN/ISO 13849-1

Machinery safety - Safety-related parts of control systems (continued)

Process (continued)

Stage 4 - Evaluate the performance level PL for each safety-related part

Based on the information in the supplier's catalogue and Annex E of the standard, we obtain the following values:

Example	B ₁₀ (number of operations) / % dangerous failure	MTTF _d	DC
SRP/CS _a : Safety limit switches	10.000.000 / 20% dangerous failure	7102	99%
SRP/CS _b : XPS AK safety module	-	154.5	99,99%
SRP/CS _c : LCK contactor	1.000.000 / 73% dangerous failure	194	99%

For electromechanical products,

the MTTF_d is calculated on the basis of the total number of operations that the product can perform, using **B**_{10d} values:

In our case, the machine operates for 220 days per year, 8 hours per day with a cycle of 90 s.

 $N = 220 \times 8 \times (3600 / 90) = 70400 \text{ operations/year}$

MTTF_d = B_{10d} / (0.1 x N) and B_{10d} = B_{10} / % dangerous failure.

For the safety switches,

the MTTF_d = $(1/0.20 \times 10000000)/(0.1) \times 70400 = 7102$ years

For the contactors,

the MTTF $_d$ = (1 / 0.73 x 1 000 000) / (0.1) x 70 400 = 194 years The MTTF $_d$ for each channel will then be calculated using the formula:

$$\frac{1}{MTTF_d} = \frac{1}{MTTF_{da}} + \frac{1}{MTTF_{db}} + \frac{1}{MTTF_{dc}}$$

i.e. 85 years for each channel.

A similar formula is used to calculate the diagnostic capability

$$DC_{avg} = \frac{\frac{DC_a}{MTTF_{da}}^{+} \frac{DC_b}{MTTF_{db}}^{+} \frac{DC_c}{MTTF_{dc}}^{-}}{\frac{1}{MTTF_{dc}}^{+} \frac{1}{MTTF_{dc}}^{+}}$$

The result of the calculation in our example gives a value of 99%

Stage 5 - Checking that required performance level is achieved

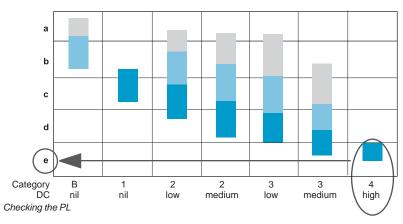
The result of the above calculations is summarised below:

 $\hfill \square$ a redundant architecture: category 4,

□ a mean time to failure > 30 years: high MTTF_d,

□ a diagnostic capability of 99%: high DC.

Looking at this table, we confirm that PL level e is achieved:



Stage 6 - Validation of the required performance level

The design of SRP/CS must be validated and must show that the combination of SRP/CS performing each safety function satisfies all the applicable requirements of EN/ISO 13849.

Standard EN/IEC 62061 Machinery safety - Safety-Related Electrical Control systems (SRECS)

Standard EN/IEC 62061

Machinery safety - Safety-Related Electrical Control systems (SRECS)

Functional Safety of safety-related electrical, electronic and electronic programmable control systems

Field of application of the standard

Safety-related electrical control systems in machines (**SRECS**) are playing an increasing role in ensuring the overall safety of machines and are more and more frequently using complex electronic technology.

This standard is specific to the machine sector within the framework of EN/IEC 61508. It gives rules for the integration of sub-systems designed in accordance with EN/ISO 13849. It does not specify the operating requirements of non-electrical control components in machines (for example: hydraulic, pneumatic).

Functional approach to safety

As with EN/ISO 13849-1, the process starts with analysis of the risks (PrEN/ISO 12100 :2009) in order to be able to determine the safety requirements.

A particular feature of this standard is that it prompts the user to make a functional analysis of the architecture, then split it into sub-functions and analyse their interactions before deciding on a hardware solution for them (the SRECS).

- A functional safety plan must be drawn up and documented for each design project. It must include:
- \Box a specification of the safety requirements for the safety functions (**SRCF**) that is in two parts:
- a description of the functions and interfaces, operating modes, function priorities, frequency of operation, etc.
- specification of the safety integrity requirements for each function, expressed in terms of **SIL** (Safety Integrity Level).

The table below gives the target maximum failure values for each level.

SIL	Probability of a dangerous failure per hour (PFHd)
3	≥ 10 ⁻⁸ < 10 ⁻⁷
2	≥ 10 ⁻⁷ < 10 ⁻⁶
1	≥ 10 ⁻⁶ < 10 ⁻⁵

- ☐ The structured and documented design process for electrical control systems (SRECS).
- □ the procedures and resources for recording and maintaining appropriate information.
- □ the process for management and modification of the configuration, taking into account organisation and authorised personnel,
- ☐ the verification and validation plan.

■ Functional safety

The decisive advantage of this approach is that of being able to offer a failure calculation method that incorporates all the parameters that can affect the reliability of electrical systems, whatever the technology used.

The method consists of assigning a SIL to each function, taking into account the following parameters:

- the probability of a dangerous failure of the components (PFHd),
- the type of architecture; with or without redundancy, with or without diagnostic device making it possible to avoid some of the dangerous failures,
- common cause failures (power cuts, overvoltage, loss of communication network, etc.) (**CCF**).
- the probability of a dangerous transmission error where digital communication is used,
- electromagnetic interference (EMC).

Standard EN/IEC 62061
Machinery safety - Safety-Related Electrical
Control systems (SRECS) (continued)

Standard EN/IEC 62061

Machinery safety - Safety-Related Electrical Control systems (SRECS) (continued)

Process

Designing a system is split into 5 stages after having drawn up the functional safety plan:

- 1 based on the safety requirements specification (SRS), assign a safety level (SIL) and identify the basic structure of the electrical control system (SRECS), describe each related function (SRCF),
- 2 break down each function into a function block structure (FB),
- **3** list the safety requirements for each function block and assign the function blocks to the sub-systems within the architecture,
- 4 select the components for each sub-system,
- **5** design the diagnostic function and check that the specified safety level (**SIL**) is achieved.

We will retain the previous example which consists of stopping the operation of a motor when the safety guard is opened. In the event of an incident, there is a risk of an harm being amputated or fracture of a limb.

■ Stage 1 - Assign a safety integrity level (SIL) and identify the structure of the SRECS

Based on the risk assessment performed in accordance with standard PrEN/ISO 12100:2009, estimation of the required **SIL** is performed for each hazardous phenomenon and is broken down into parameters, see illustration opposite.

□ Severity Se

The severity of injuries or damage to health can be estimated by taking into account reversible injuries, irreversible injuries and death.

The classification is shown in the table below.

Consequence	Severity Se
Irreversible: death, loss of an eye or an arm	4
Irreversible: shattered limb, loss of a finger	3
Reversible: requires the attention of a medical practitioner	2
Reversible: requires first aid	1

□ Probability of the harm occurring

Each of the three parameters **Fr**, **Pr**, **Av** must be estimated separately using the most unfavourable case. It is strongly recommended that a task analysis model be used in order to ensure that estimation of the probability of the harm occurring is correctly taken into account.

- Frequency and duration of exposure Fr

The level of exposure is linked to the need to access the hazardous zone (normal operation, maintenance, ...) and the type of access (manual feeding, adjustment, ...). It must then be possible to estimate the average frequency of exposure and its duration.

The classification is shown in the table below:

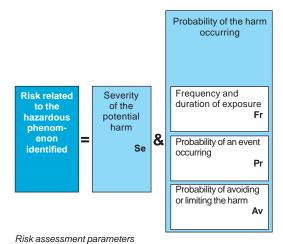
Frequency of dangerous exposure	Fr
≤1 hour	5
>1 hour ≤ 1 day	5
> 1 day ≤ 2 weeks	4
2 weeks ≤ 1 year	3
> 1 year	2

- Probability of occurrence of a hazardous event Pr.

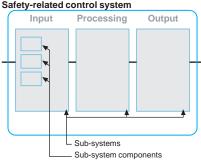
Two basic concepts must be taken into account:

- the predictability of the dangerous components in the various parts of the machine in its various operating modes (normal, maintenance, troubleshooting), paying particular attention to unexpected restarting,
- behaviour of the persons interacting with the machine, such as stress, fatigue, inexperience, etc.

Probability of occurrence of a dangerous event	Pr
Very high	5
Probable	4
Possible	3
Almost impossible	2
Negligible	1



SRECS



Stage 1: Basic structure of the electrical control system

Standard EN/IEC 62061
Machinery safety - Safety-Related Electrical
Control systems (SRECS) (continued)

Standard EN/IEC 62061

Machinery safety - Safety-Related Electrical Control systems (SRECS) (continued)

Process (continued)

■ Stage 1 -(continued)

- Probability of avoiding or limiting the harm Av.

This parameter is linked to the design of the machine. It takes into account the suddenness of the occurrence of the hazardous event, the nature of the dangerous component (cutting, temperature, electrical) and the possibility for a person to identify a hazardous phenomenon.

Probability of avoiding or limiting the harm	Av
Impossible	5
Almost impossible	3
Probable	1

□ Assignment of the SIL

Estimation is made with the help of the table below.

In our example, the degree of severity is 3 because there is a risk of a finger being amputated; this value is shown in the first column of the table.

All the other parameters must be added together in order to select one of the classes (vertical columns in the table below), which gives us:

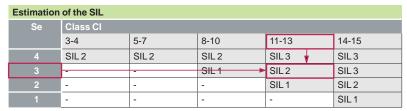
Fr = 5 accessed several times a day

Pr = 4 hazardous event probable

Av = 3 probability of avoiding almost impossible

Therefore a class CI = 5 + 4 + 3 = 12

A level of SIL 2 must be achieved by the safety-related electrical control system(s) (SRECS) on the machine.



□ Basic structure of the SRECS

Without going into detail about the hardware components to be used, the system is broken down into sub-systems. In our case, we find the 3 sub-systems that will perform the input, processing and output functions. The figure opposite illustrates this stage, using the terminology given in the standard.

■ Stage 2 - Break down each function into a function block structure (FB) A function block (FB) is the result of a detailed break down of a safety-related function.

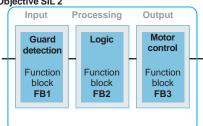
The function block structure gives an initial concept of the SRECS architecture. The safety requirements of each block are deduced from the specification of the safety requirements of the system's function.

■ Stage 3 - List the safety requirements for each function block and assign the function blocks to the sub-systems within the architecture

Each function block is assigned to a sub-system in the SRECS architecture. A failure of any sub-system will lead to the failure of the safety-related control function. More than one function block may be assigned to each sub-system. Each sub-system may include sub-system elements and, if necessary, diagnostic functions in order to ensure that anomalies can be detected and the appropriate action taken.

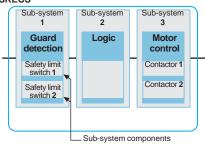
These diagnostic functions (D) are considered as separate functions; they may be performed within the sub-system, by another internal or external sub-system.

SRECS Objective SIL 2



Stage 2: Break down into function blocks

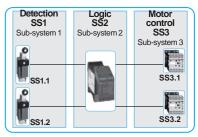
SRECS



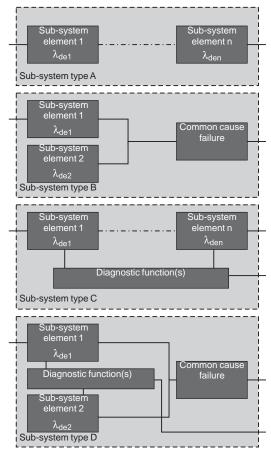
Stage 3: Assignment of function blocks

Standard EN/IEC 62061

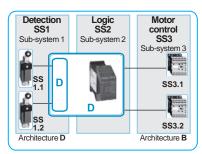
Machinery safety - Safety-Related Electrical Control systems (SRECS) (continued)



Stage 4: Component selection



Types of sub-system architecture



Stage 5: Design of the diagnostic function

Standard EN/IEC 62061

Machinery safety - Safety-Related Electrical Control systems (SRECS) (continued)

Process (continued)

■ Stage 4 - Select the components for each sub-system

The products shown in the illustration opposite are selected. If the sensors and contactors are the same as in the previous example, a safety module XPS AK will be chosen. In this example, we take a cycle of 450s which means the duty cycle ${\bf C}$ is 8 operations per hour.

As the safety integrity level required for the entire system is SIL 2, each of the components must achieve this level.

The manufacturer's catalogue gives the following values:

Safety limit switches 1 and 2: $B_{10} = 10000000$ operations, the proportion of dangerous failures is 20%, lifetime is 10 years.

- Safety module: PFH $_d$ = 7.389 10⁻⁹ Contactors 1 and 2: B_{10} = 1 000 000 operations, the proportion of dangerous failures = 73%, lifetime is 20 years.

■ Stage 5 - Design the diagnostic function

The SIL of the sub-system depends not only on the components, but also on the architecture selected. For our example, we will choose architectures B and D of the standard.

In our architecture, the safety module performs diagnostics not only on itself, but also on the safety limit switches.

We have three sub-systems for which the safety levels must be determined:

□ SS1: two redundant safety limit switches in a sub-system with a type D architecture.

□ SS2: a SIL 3 safety module (obtained on the basis of the PFH provided by the manufacturer).

☐ SS3: two redundant contactors built in accordance with a type B architecture.

The calculation method is quite complex, so we will only give the final result. This method takes into account the following parameters:

- **B**₁₀: number of operations at which 10% of the population fail
- **C**: Duty cycle (number of operations per hour)
- $\lambda_{\rm D}$: rate of dangerous failures ($\lambda_{\rm D} = \lambda x$ portion of dangerous failures in %)
- β: common cause failure coefficient, which is 10 % here and 10% is the worst case: see Annex F.
- T1: Proof Test Interval or life time whichever is smaller, as provided by the supplier
- T2: diagnostic test interval
- **DC**: Diagnostic coverage rate = λ_{DD}/λ_{D} , ratio between the rate of detected failures and the rate of dangerous failures.

We obtain:

- for SS1 PFH_d = $1.6 E^{-9}$ for SS3 PFH_d = $1.06 E^{-7}$

The total probability of dangerous failures per hour is:

- PFH_{DSRECS} = PFH_{DSS1} + PFH_{DSS2} + PFH_{DSS3}
- **PFH**_{DSRECS} = $1.6 \cdot 10^{-9} + 7,38 \cdot 10^{-9} + 1.06 \cdot E^{-7} = 1.15 \cdot E^{-7}$

Which corresponds to the expected result (table below) of a SIL = 2.

Comment: A level of SIL 3 could have been achieved by using mirror contacts to create a feedback loop on the contactors, i.e. a sub-system architecture type D.

Checking the required SIL	
SIL	Probability of dangerous failures per hour (PFHd)
3	≥ 10 ⁻⁸ < 10 ⁻⁷
2	≥ 10 ⁻⁷ < 10 ⁻⁶
1	≥ 10 ⁻⁶ < 10 ⁻⁵

Safety of personnel and equipment Certification and CE marking

There are 6 stages in the process for certification and affixing of the CE marking on machines:

- 1 apply all the relevant directives,
- 2 conform to the essential health and safety requirements,
- 3 draw up the technical documentation,
- 4 if applicable proceed with the conformity examination,
- 5 draw up the Declaration of Conformity,
- 6- affix the C€ marking.

The Machinery Directive

The Machinery Directive is an example of the "New approach" for the harmonisation of products in terms of technical specifications and standards. It is based on:

- essential health and safety requirements which must be complied with before the machine is put on the market,
- a voluntary harmonisation process of standards undertaken by the European Standards Committee (CEN) and the European committee for electro-technical standardisation (CENELEC).
- conformity of evaluation procedures adapted to the types of risk and associated with machine types,
- the C€ marking, affixed by the manufacturer to indicate that the machine conforms to the applicable directives; machines bearing this marking can circulate freely within the European Union.

The directive has considerably simplified the multiple national legislations which were in force and has therefore removed many barriers which made trading difficult in the European Union. This has also made it possible to reduce the social cost of accidents. The directives do not apply to pre-existing machines within the EU unless they are substantially modified.

A list of the machines requiring special attestation procedures can be found in the Machinery Directive Annex 4.

The essential requirements

Annexe I of the Machinery Directive groups together the essential health and safety requirements, for putting machines and safety components on the market and into service in Europe.

It follows that:

- if all the requirements of the directive are complied with, no member state of the European Union can oppose circulation of this product.
- if the requirements of the directive are not complied with, putting the product on the market may be prohibited or withdrawal of the product from the market may be required.

In the European Union, this concerns not only manufacturers or their distributors, but also importers and resellers who import these machines or put them into service. Second-hand machines within the EU are not covered, but used machines that have been modified or refurbished can be considered to be new machines.

The harmonised standards

The simplest way to demonstrate conformity with the directives is to conform to the European Harmonised Standards. When, for a product listed in Annex 4 of the Machinery Directive, there is no harmonised standard, or the existing standards are not relevant to cover the essential health and safety requirements, or if the manufacturer considers that these standards are not applicable to their product, they can apply for approval by an outside Notified Body.

These bodies are approved by the Member States after having shown that they have the recognised expertise to give such an opinion (TÜV, BGIA, INRS, BSI Product Services, etc.).

Although the Notified Body has a certain number of responsibilities under the Directive, it is always the manufacturer or their representative who remain responsible for conformity of the product.

Certification and C€ marking (continued)

Certification and C€ marking (continued)

Declaration of conformity

In accordance with Article 1 of the Machinery Directive, the manufacturer or their authorised representative established in the European Union must draw up a European Declaration of Conformity for each machine (or safety component). This is in order to certify that the machine or safety component conforms to the Directive.

Before putting a product on the market, the manufacturer or their representative must be able to prepare a technical file.

C€ marking

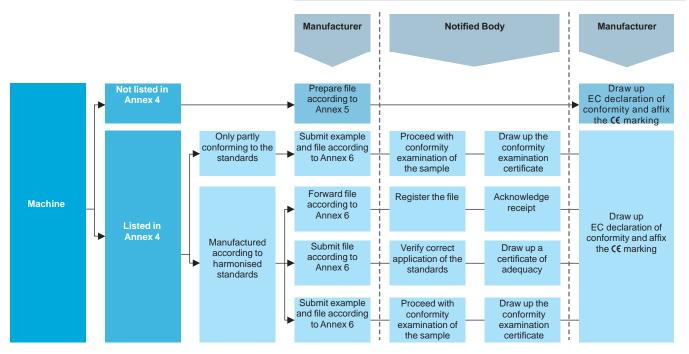
Finally, the CE mark must be affixed to the machine by the manufacturer or their authorised representative in the European Union. This marking has been obligatory since 1st January 1995 and can only be affixed if the machine conforms to all the applicable directives, such as:

- the Machinery Directive 2006/42/ECC,
- the Electromagnetic Compatibility (EMC) directive 2004/108/EC,
- the Low Voltage Directive 2006/95/EC.

There are other directives such as the protection of persons, lifts, medical equipment, etc., which may also be applicable.

The **CC** marking is the machine's passport in the European Union, which allows it to be marketed in all countries within the Union without taking into account regulations in each individual country.

C€ marking procedure



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