Contactless RFID Safety Switches

Note: you can download the complete User Manual in different languages from our website at: **www.tesensors.com**

http://qr.tesensors.com/XCS015
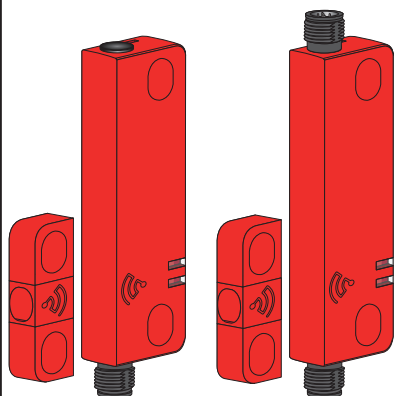
XCSRC●0M12:
Single Models for point-to-point connections

XCSRC●1●M12:
Standalone Models

XCSRC●2M12:
Daisy-chain models for series connection
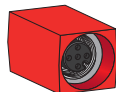
XCSRZE:
Loopback device M12

The XCSRC is to be integrated into the safety chain for the monitoring of mobile guards (swivelling, sliding or removable). The safe state is ensured when its two redundant safety outputs (OSSDs) are switched at the OFF state (guard door opened or safety switch in error mode)

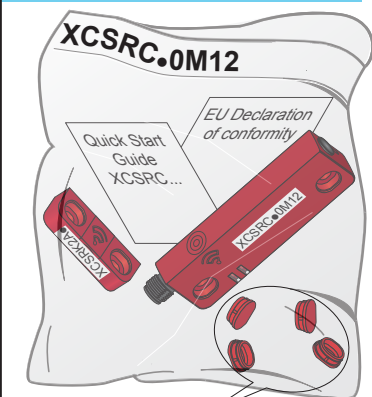|	N°:
en	QGH1315301
fr	QGH1315302
de	QGH1315303
es	QGH1315304
it	QGH1315305
pt	QGH1315306
zh	QGH1315307
ru	QGH1315308

Flash the Qr-code to access the complete User Manual

We welcome your comments about this document. You can reach us by e-mail at: **customer-support@tesensors.com**

CE   c(UL)us   TÜV NORD *Certification*   FC

Package Content *(Example)*

XCSRC●0M12

Quick Start Guide XCSRC…
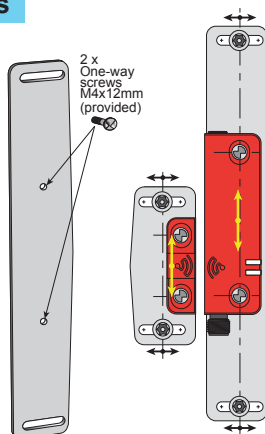
EU Declaration of conformity

Blanking plugs available Q1 2018

Accessories

Note:
. To order separately
. For fixing the mounting support on the machine, the use of M5 tamper-proof screws is strongly recommended

2 x One-way screws M4x12mm (provided)

2 x One-way screws M4x12mm (provided)
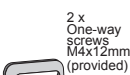
XCSRZSTK1

XCSRZSRC1

⚠ WARNING

IMPROPER SETUP OR INSTALLATION
● This equipment must only be installed and serviced by qualified personnel.
● Read, understand, and follow the compliance below and the complete XCSR User Manual before installing the XCSR Safety RFID switch.
● Do not tamper with or make alterations on the unit.
● Comply with the wiring and mounting instructions.
● Check the connections and fastening during maintenance operations.
● Disconnect all power before servicing equipments.
● The proper functioning of the XCSR Safety RFID switch and its operating line must be checked on a regular basis based on the level of security required by the application (e.g. number of operations, level of environmental pollution, etc.).
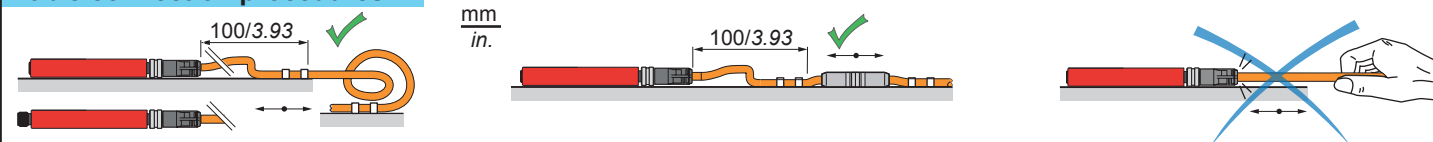
Failure to follow these instructions can result in death, serious injury, or equipment damage.

These devices have been designed to be in compliance with the standards currently in effect: EN/IEC 60947-5-2, EN/IEC 60947-5-3, EN/ISO 13849-1, IEC 61508, EN/IEC 62061, EN/ISO 14119, UL 508, CSA C22.2.
These devices can achieve up to category 4 PL=e or SIL 3 (if combined with an appropriate PREVENTA XPS safety unit PL=e / SIL 3 for Single and Daisy-chain models).
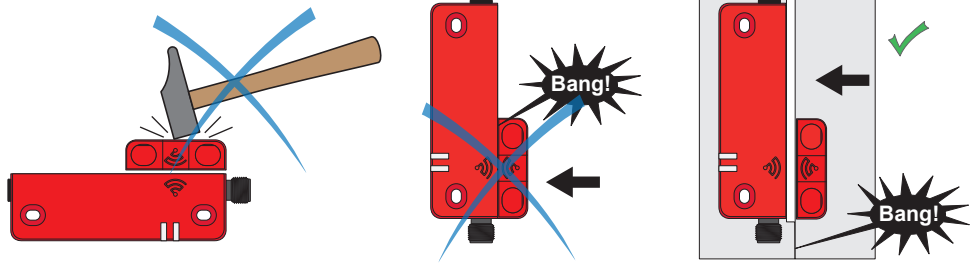
Dimensions

mm / *in.*

XCSRC●2M12

XCSRC●0M12
XCSRC●1●M12

XCSRK2A1
XCSRK2A3

XCSRZE

XCSRZSTK1

XCSRZSRC1
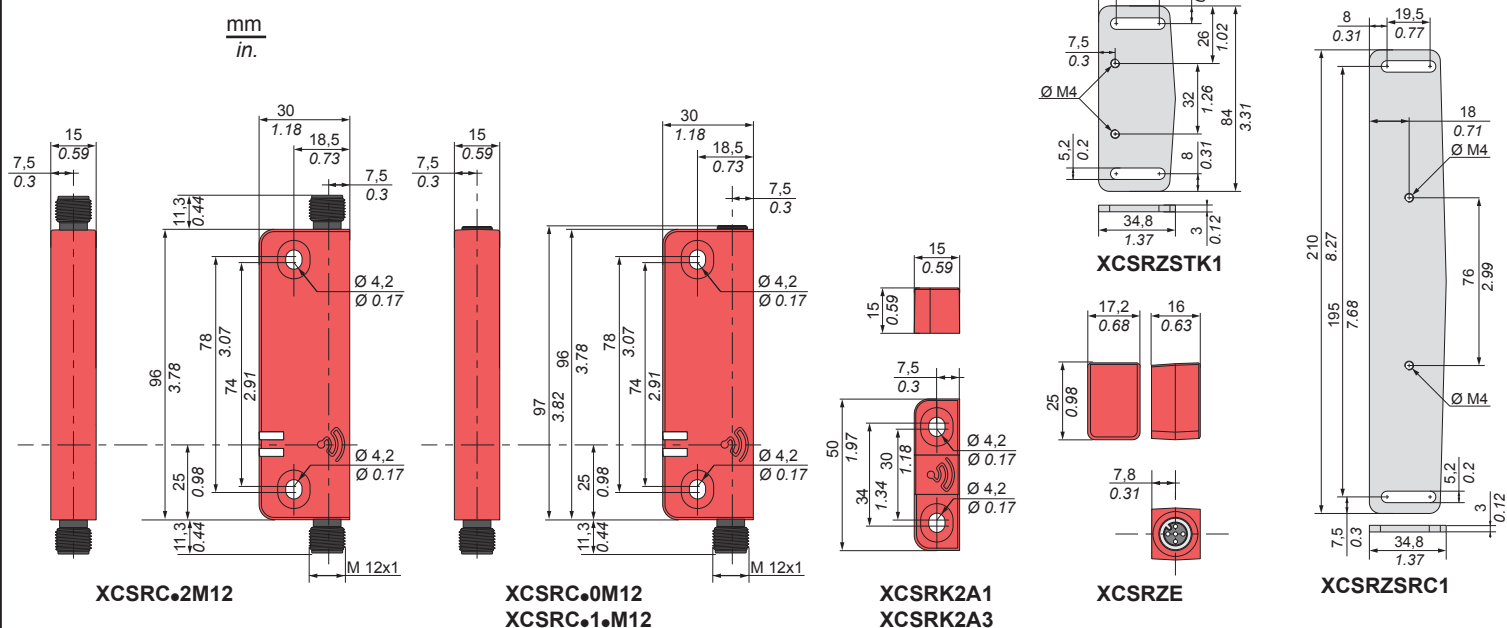
Cable connection procedures

mm / *in.*

100/*3.93* ✓

100/*3.93* ✓

✗

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⚠ CAUTION

RISK OF MATERIAL DAMAGE

- Do not use safety switch as a mechanical stop.
- Do not adjust the position of switches using a hammer or other tool likely to exceed the device's shock and vibration tolerances.

Failure to follow these instructions can result in injury or equipment damage.

Functional directions

1: Reader
2: Transponder
3: Transponder sensitive area
4: Reader sensitive area
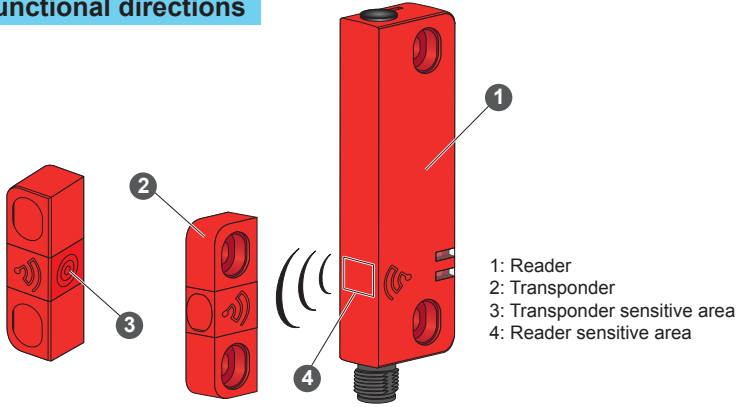
Orientation of the transponder sensitive area
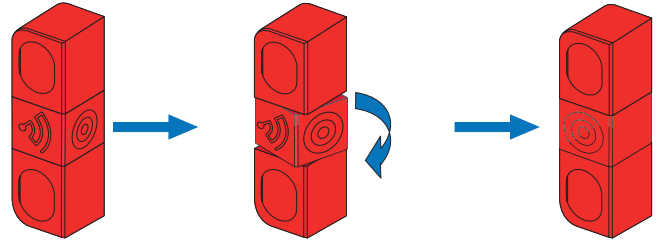
Face to Face Mounting (prefered configuration)

⚠ WARNING

IMPROPER SETUP OR INSTALLATION

The XCSR RFID switch must always be mounted and used with respect to the assured sensing distances **Sao** and **Sar**:
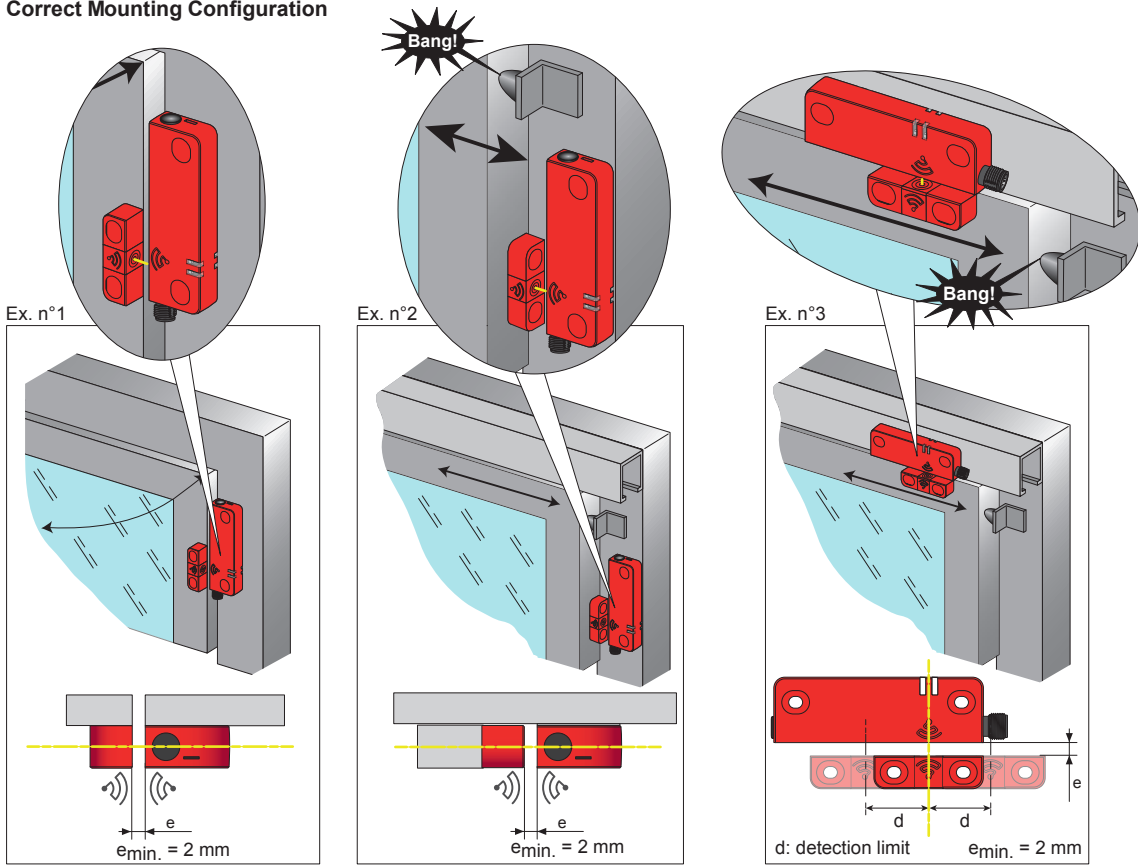- When the guard is closed, the maximum distance between the transponder and the reader must be **Sao**.
- When the guard is being opened and up to **Sar**, the protected machinery shall not present any risk of danger.
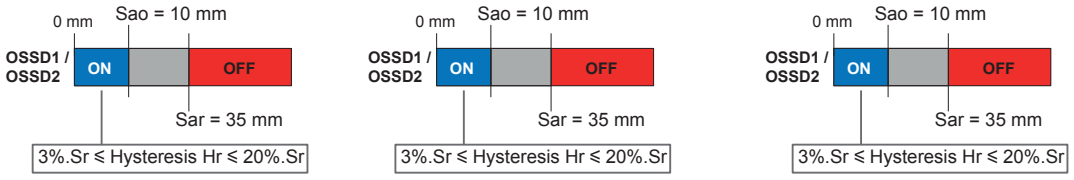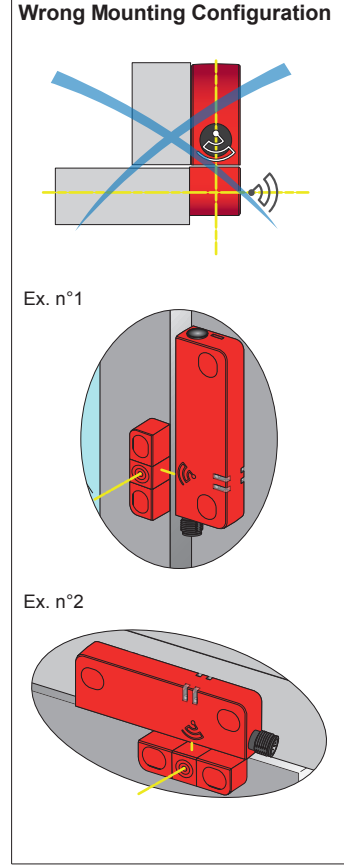
UNINTENDED EQUIPMENT OPERATION

At every power-up phase, an automatic tuning between the transponder and the reader is performed. The aim of this automatic tuning is to reduce the environmental effects on the sensing distances (e.g. material of the mounting support, room temperature).
Thus, transponder and reader must be installed in their definitive operational conditions before operating the power-up.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

Correct Mounting Configuration

Wrong Mounting Configuration

Ex. n°1

Ex. n°2

Ex. n°3

Ex. n°1

Ex. n°2

$e_{min.} = 2$ mm

$e_{min.} = 2$ mm

d: detection limit $e_{min.} = 2$ mm

0 mm	Sao = 10 mm	
OSSD1 / OSSD2	**ON**	**OFF**

Sar = 35 mm

3%.Sr ≤ Hysteresis Hr ≤ 20%.Sr

0 mm	Sao = 10 mm	
OSSD1 / OSSD2	**ON**	**OFF**

Sar = 35 mm

3%.Sr ≤ Hysteresis Hr ≤ 20%.Sr

0 mm	Sao = 10 mm	
OSSD1 / OSSD2	**ON**	**OFF**

Sar = 35 mm

3%.Sr ≤ Hysteresis Hr ≤ 20%.Sr

e = Recommended minimum mounting distance between transponder and reader.

Sr = Real switch-ON sensing distance
Sao: assured operating distance
Sar: assured release distance.

| *Sao, Sar, Hr values above are given without misalignment between the transponder and the reader*	*: Transient state*	*1 mm = 0.04 in.*

Detection Curves

A: Face to Face Mounting (prefered configuration)

Sao and Sar sensing distances along Y axis as function of Z
(longitudinal misalignment for X=0)
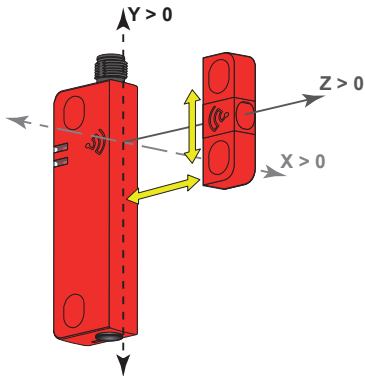
Sao and Sar sensing distances along X axis as function of Z
(transverse misalignment for Y=0)
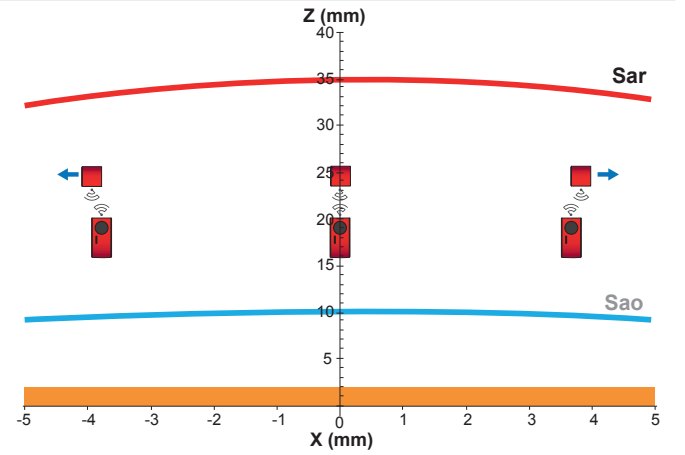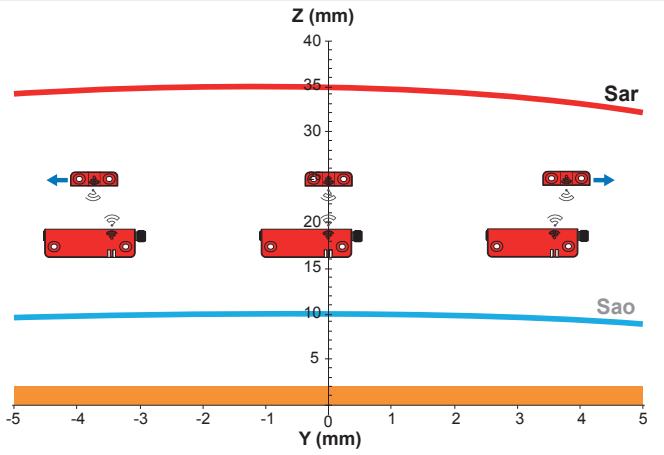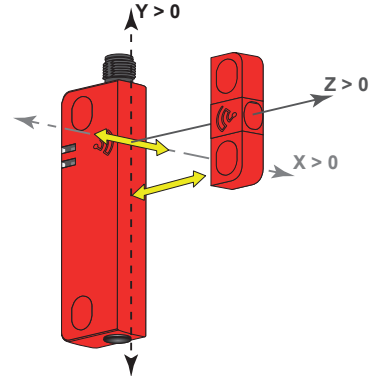
B: Side by Side Mounting

Sao and Sar sensing distances along Y axis as function of X
(longitudinal misalignment for Z=0mm)
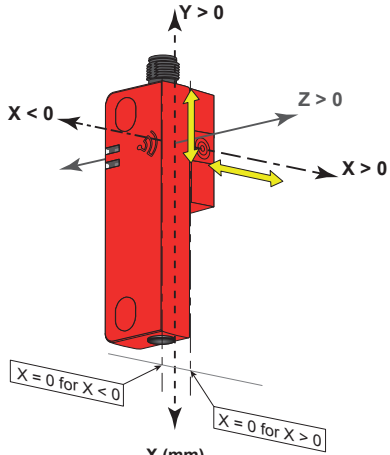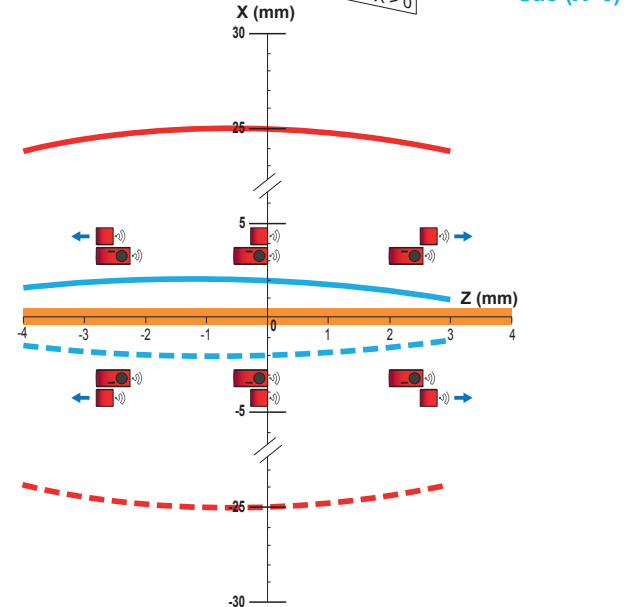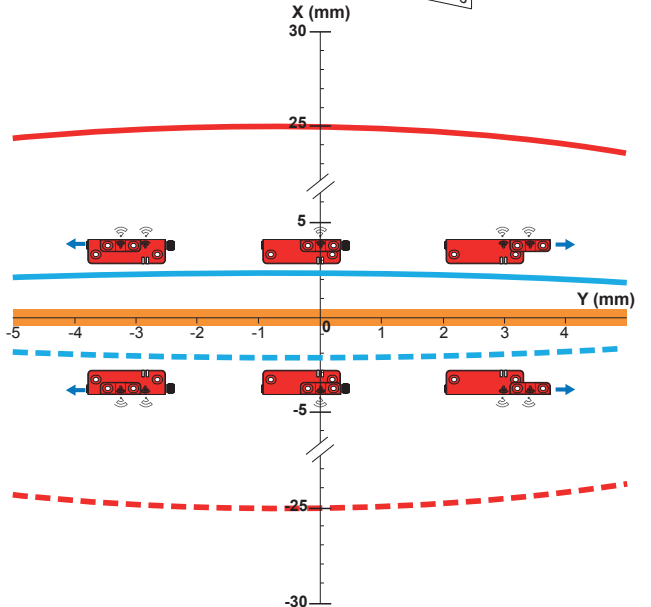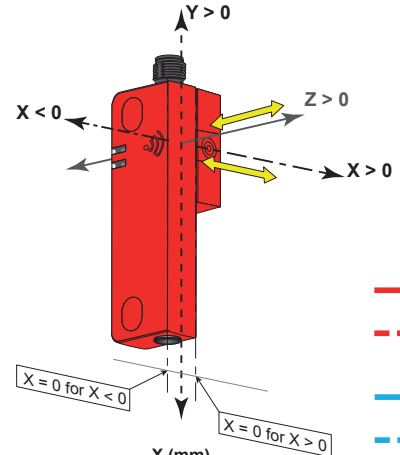

Sar (X>0)
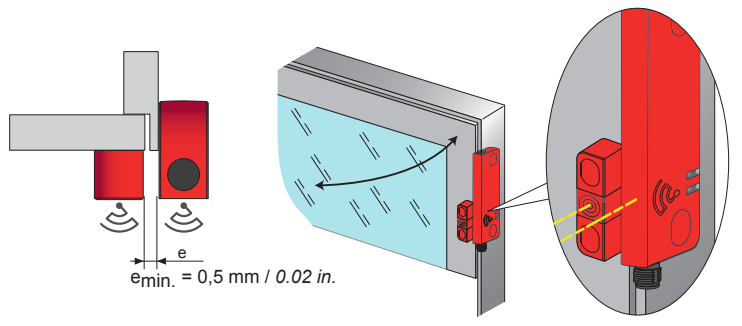Sar (X<0)
Sao (X>0)
Sao (X<0)

Sao and Sar sensing distances along Z axis as function of X
(transverse misalignment for Y=0mm)

Sar (X>0)
Sar (X<0)
Sao (X>0)
Sao (X<0)

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Side by Side Mounting (specification)

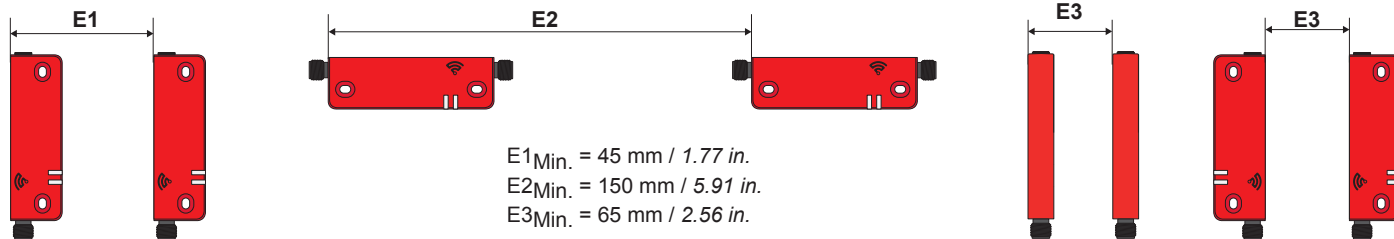| Correct Mounting Configuration	Wrong Mounting Configuration

$e_{min.}$ = 0,5 mm / 0.02 in.

e = Recommended minimum mounting distance between transponder and reader.
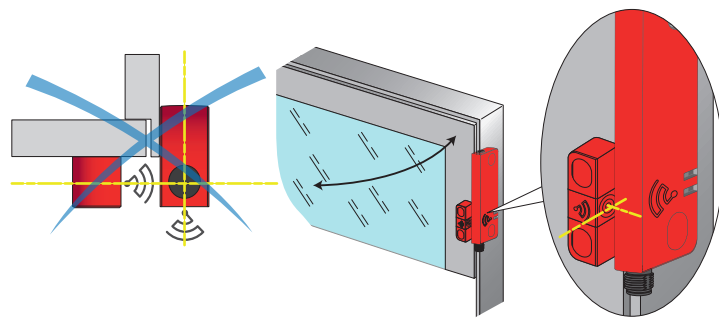
Minimum mounting clearances between safety switches

E1

E2

E3   E3

$E1_{Min.}$ = 45 mm / 1.77 in.
$E2_{Min.}$ = 150 mm / 5.91 in.
$E3_{Min.}$ = 65 mm / 2.56 in.

Tightening torque, tightening capacity

A < 1,5 Nm (13 lb-in)

B < 1 Nm (8.85 lb-in)

M4

M4

(*) : Blanking plugs available Q1 2018

Possible use of one-way screws		One-Way Screw reference	Screw size	Sold in lots of
	to be ordered separately	**XCSZ71**	∅4mm x L14mm	10
		XCSZ72	∅4mm x L35mm	

Electrical Connections

M12, 5-pin (**XCSRC•0M12**)

M12, 8-pin (**XCSRC•1•M12**)

M12, 5-pin (**XCSRC•2M12**)
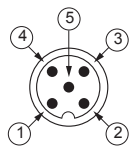
Output Connector   Input Connector
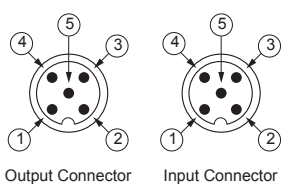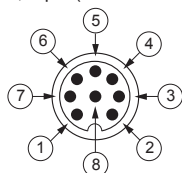
XCSRC•2M12

Pin Number	Description			
	XCSRC•0M12	XCSRC•2M12		XCSRC•1•M12
		Connector "OUT"	Connector "IN"	
①	+24 Vdc	+24 Vdc	+24 Vdc	+24 Vdc
②	OSSD2	OSSD2 (O2)	INPUT2 (I2)	OSSD2
③	0 Vdc	0 Vdc	0 Vdc	0 Vdc
④	OSSD1	OSSD1 (O1)	INPUT1 (I1)	OSSD1
⑤	NC	Diagnosis Out (Do)	Diagnosis In (Di)	EDM_ST_1
⑥				EDM_ST_2
⑦				NC
⑧				NC

NC : Not connected

Pre-Wired Female Connectors

M12, 5 pins
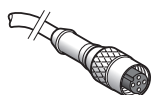
XZCP11V12L2
XZCP11V12L5
XZCP11V12L10
XZCP11V12L20
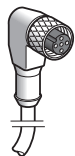
XZCP12V12L2
XZCP12V12L5
XZCP12V12L10
XZCP12V12L20

M12, 8 pins
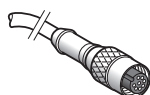
XZCP29P12L2
XZCP29P12L5
XZCP29P12L10
XZCP29P12L20
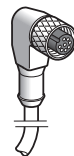
XZCP53P12L2
XZCP53P12L5
XZCP53P12L10
XZCP53P12L20

M12/M12 Female Jumpers
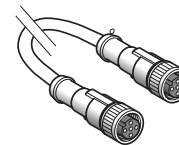
XZCR1111064D03
XZCR1111064D3
XZCR1111064D5
XZCR1111064D10
XZCR1111064D25

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Wiring diagram

Cat. 4 / PL=e (EN/ISO 13849-1) / SIL3 (IEC 61508) / SILCL3 (IEC 62061)
(if combined with an appropriate PREVENTA XPS safety unit PL=e / SIL 3 for Single and Daisy-chain models)

⚠ WARNING

UNINTENDED EQUIPMENT OPERATION

The external KM1 and KM2 contactors must have force-guided contacts.

IMPROPER CONNECTION

● The XCSR RFID Safety switches must be powered by a dedicated safety extra low voltage (SELV) or a protected extra low voltage (PELV).
● The XCSR RFID Safety Switches operate directly from a 24 Vdc power supply. The power supply must meet the requirements of IEC 60204-1. The SELV Schneider Electric part number ABL8RPS24●●● is recommended.
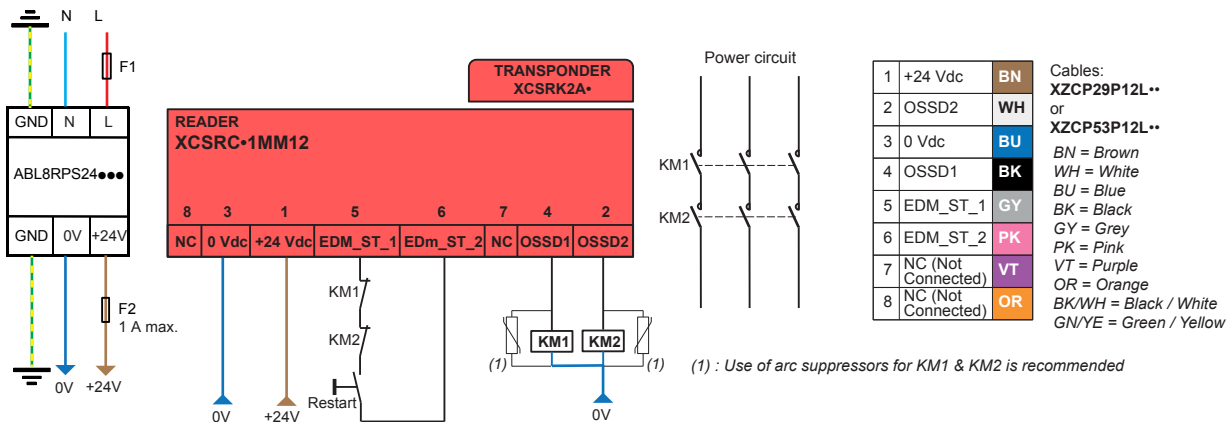● The XCSR RFID Safety Switches must be connected using both safety outputs. A single safety output, if it fails, may not stop the machine.

Failure to follow these instructions can result in death, serious injury or equipment damage.

Standalone models

1	+24 Vdc	BN
2	OSSD2	WH
3	0 Vdc	BU
4	OSSD1	BK
5	EDM_ST_1	GY
6	EDM_ST_2	PK
7	NC (Not Connected)	VT
8	NC (Not Connected)	OR

Cables:
XZCP29P12L••
or
XZCP53P12L••

BN = Brown
WH = White
BU = Blue
BK = Black
GY = Grey
PK = Pink
VT = Purple
OR = Orange
BK/WH = Black / White
GN/YE = Green / Yellow

(1) : Use of arc suppressors for KM1 & KM2 is recommended

Single models Connection to a safety relay XPSAK

(1) Operating status of internal electronic fuse

(2) H1:XCSR Indicator light deactivated

ESC: External start conditions

1	+24 Vdc	BN
2	OSSD2	WH
3	0 Vdc	BU
4	OSSD1	BK
5	NC (Not Connected)	GY

Cables:
XZCP11V12L••
or
XZCP12V12L••
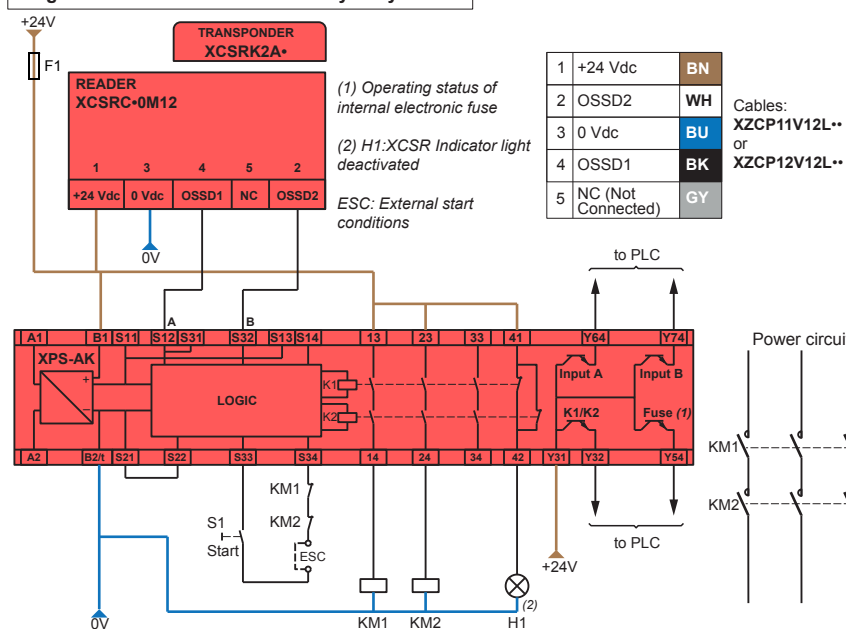
Single models Connection to a safety controller XPSMCM

1	+24 Vdc	BN
2	OSSD2	WH
3	0 Vdc	BU
4	OSSD1	BK
5	NC (Not Connected)	GY

Cables:
XZCP11V12L••
or
XZCP12V12L••
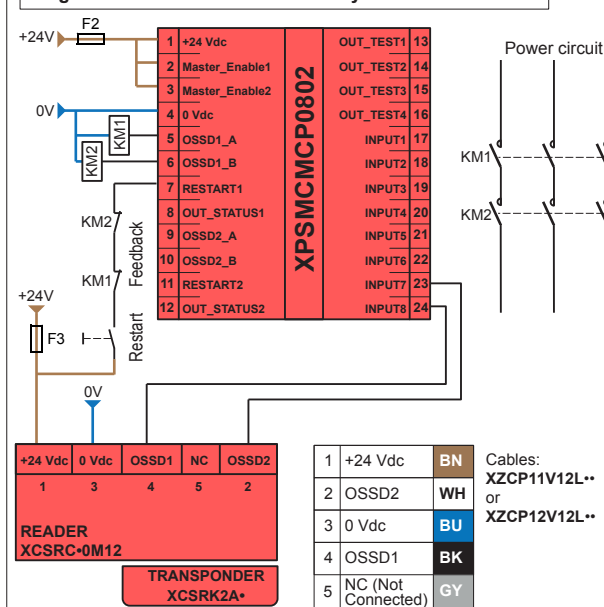
Daisy-chain models - Series connection

1	+24 Vdc	BN
2	OSSD2	WH
3	0 Vdc	BU
4	OSSD1	BK
5	Diagnosis	GY

Cables:
XZCP11V12L••
or
XZCP12V12L••

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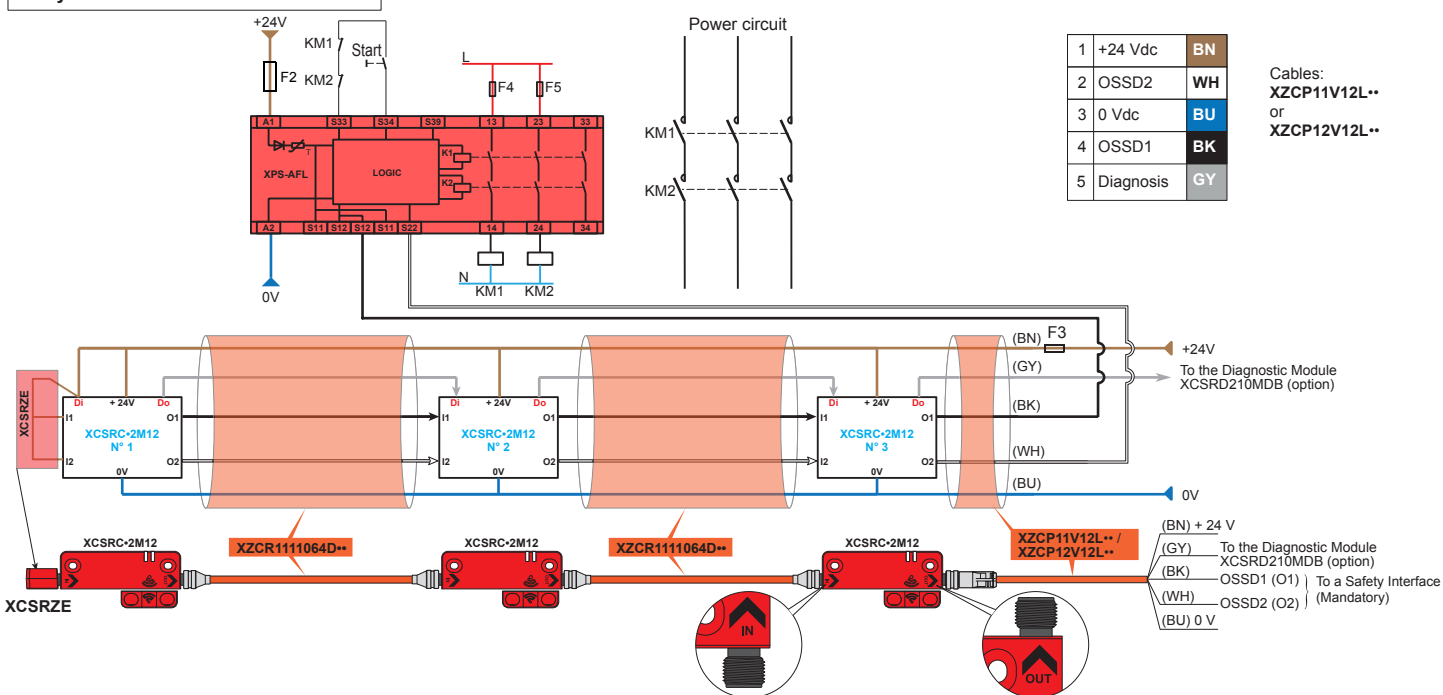
Operating and output States, LED meaning
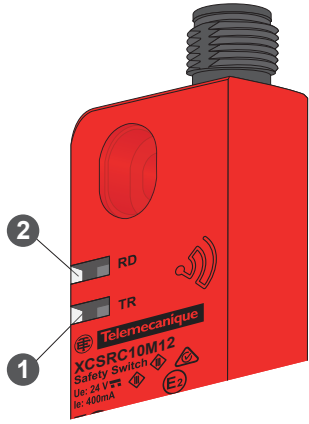
LED1 (TR): Transponder state
LED2 (RD): Reader/Output state

Operating state	Color LED1 (TR)	Color LED2 (RD)	OSSDs	LEDs meaning	Comment
OFF	OFF	OFF	OFF	XCSR reader is unpowered	
Initialization	Orange	Orange	OFF	XCSR reader initialization in progress	
Configuration	Orange Fast blinking	Orange Fast blinking	OFF	XCSR reader is in configuration mode	
	Green	Orange Fast blinking	OFF	Pairing with new transponder done: New power-up required	Only for "re-pairing enabled models"
	Orange blinking	Red	OFF	Maximum of pairing reached	
	Red blinking	Red	OFF	Invalid transponder detected	Transponder not blank or not Telemecanique transponder
	Orange Fast blinking	Red	OFF	Pairing process unsuccessful	Only for "re-pairing enabled models"
Run	Green	Orange blinking	OFF	Paired transponder detected: waiting for the start condition and/or KM1_KM2 feedback (EDM)	Only for standalone versions
	Green	Green	ON	Paired transponder detected and all other operating conditions are correct	Door closed
	Green	Red	OFF	Paired transponder detected but the safety inputs are at the OFF state.	For Daisy-Chain models: At least one of the previous readers has its OSSDs at the OFF state (door opened, error detected or OFF state)
	OFF	Red	OFF	No transponder in the field	Door opened
Error	Red blinking	Red blinking	OFF	Invalid transponder or non-paired transponder detected: New power-up required after fault clearance	Possible attempted fraud or transponder damaged
	Green or OFF	1,2 3 or 4 red flashes	OFF	Internal error detected. Contact the customer support of your country	The color of the LED1 depends on the presence of the transponder: ● Green: transponder detected ● OFF: no transponder detected

NOTE: The safe state is ensured when the two redundant safety outputs (OSSDs) are switched at the OFF state (i.e. guard door opened or safety switch in error mode).

Characteristics

Product certifications	CE, cULus *(The safety function of this device has been evaluated by TüV nord, not by UL)*, TüV, FCC, EAC, IC, RCM, E2
Maximum Safety Level	Up to category 4 PL=e or SIL 3 (if combined with an appropriate PREVENTA XPS safety unit PL=e / SIL 3 for Single and Daisy-chain models).
Assured operating distance (Sao)	10 mm (values above are given without misalignment between the transponder and the reader for face to face mounting)
Assured release distance (Sar)	35 mm (values above are given without misalignment between the transponder and the reader for face to face mounting)
Ambient air temperature	Operation: - 25…70 °C (- 13 °F to 158 °F) without blanking plugs or - 25…45 °C (- 13 °F to 113 °F) with blanking plugs Storage: - 40…85 °C (- 40 °F to 185 °F)
Degree of protection	Conforming EN/IEC 60529: IP65, IP66 & IP67; Conforming DIN 40050: IP69K. Enclosure type 4, 4X according to UL 50E
Vibration resistance	10 gn (10-150 Hz) conforming to EN/IEC 60068-2-6
Shock resistance	30 gn (11 ms) conforming to EN/IEC 60068-2-27
Protection against electric shock	Class III conforming to EN/IEC 61140
Rated operating characteristics	**Ue = 24 V ⎓ Ie = 60 mA** The power supply must meet the requirements of EN/IEC 60204-1 relative to SELV/PELV power supply
Repeat accuracy	≤ 10 % .Sr
Hysteresis	3% ≤ Hr ≤ 20%.Sr (given without misalignment between the transponder and the reader for face to face mounting)
Switching frequency	< 0,5 Hz
Risk Time	< 120 ms (+18 ms per additional switch in Daisy-chain configuration)
Response time	Typical: = 120 ms (+50 ms per additional switch in Daisy-chain configuration) and < 250 ms (for the Standalone models)
First-up time	< 5 s
Pairing mode time	10 s (after First-up time)
Number of switches in series connection (Daisy-chain)	≤ 20 XCSRC●2M12
PFH$_D$ (according to EN/ISO 13849-1 and EN/IEC 62061)	5.10^{-10}
Mission Time (TM)	20 years
OSSD	Standalone XCSRC●1●M12 Imax=400 mA per output at 24 Vdc Drop out voltage < 2 Vdc, Leakage current (OFF state) < 1 mA Maximum Load capacitance: 40 nF under 24 Vdc

Single and Daisy-chain XCSRC●0M12 and XCSRC●2M12 Imax=200 mA per output at 24 Vdc Drop out voltage < 2 Vdc, Leakage current (OFF state) < 1 mA Maximum Load capacitance: 40 nF under 24 Vdc |