Specifications

General Characteristics for XCSDM Non-Contact Magnetic Safety Interlock Switches

Environment		
Conforming to standards	Products	IEC/EN 60947-5-1, UL 508, CSA C22 2 nº 14
	Machine assemblies	IEC/EN 60204-1, EN 1088, EN 292
Product certifications		UL, CSA, BG, CE
Ambient air temperature ▲	Operation	-13 °F to 185 °F (- 25 °C to +85 °C)
	Storage	-40 °F to 185 °F (- 40 °C to +85 °C)
Vibration resistance		10 gn (10…150 Hz) conforming to IEC 60068-2-6
Shock resistance		30 gn (11 ms) conforming to IEC 60068-2-7
Sensitivity to magnetic fields		≥ 0.3 mT
Electric shock protection		Class II conforming to IEC 60536
Degree of protection		IP 66 + IP 67 conforming to IEC 60529
Body Material		Thermoplastic case (PBT)

▲ Minimum temperature: The minimum temperatures listed are based on the absence of freezing moisture or water. Care should be taken to avoid sub-freezing temperatures where dripping or splashing water is present and to avoid bringing a cold device into a humid atmosphere and then back into sub-freezing temperatures. The water or moisture may freeze around internal or external components and prevent it from performing as intended.

Electrical Characteristics (complete switches)

Rated operational characteristics		Ue: ⎓ 24 V, Ie: 100 mA max.
Rated insulation voltage (Ui)		Ui: ⎓ 100 V
Rated impulse withstand voltage (Uimp)		2.5 kV conforming to IEC/EN 60947-5-1
Resistance across terminals	Contact with LED	57 Ω
	Contact without LED	10 Ω
Protection (not using safety relay)		External cartridge fuse: 500 mA Class CC fuse. Outside the U.S. use fuse type gG (gl)
Wiring	XCSDMC, DMR	Prewired with cable: 4 #23 AWG (0.25 mm^2), with lengths of 6.6 ft (2 m), 16.4 ft (5 m), or 32.8 ft (10 m), depending on model.
	XCSDMP	Prewired with cable: 6 #23 AWG (0.25 mm^2), with lengths of 6.6 ft (2 m), 16.4 ft (5 m), or 32.8 ft (10 m), depending on model.
Contact materials		Rhodium
Electrical life		1.2 million operating cycles
Maximum switching voltage		⎓ 100 V
Switching capacity	Contact with LED	5…100 mA
	Contact without LED	0.1…100 mA
Insulation resistance		1000 MΩ
Maximum breaking capacity	Contact with LED	3 VA
	Contact without LED	10 VA
Maximum switching frequency		150 Hz

The product life expressed is based on average usage and normal operating conditions. Actual operating life will vary with conditions. The above statements are not intended to nor shall they create any express or implied warranties as to product operation or life. For information on the limited warranty offered on this product please refer to the Square D terms and conditions of sale found in the Square D *Digest*.

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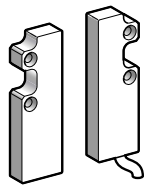
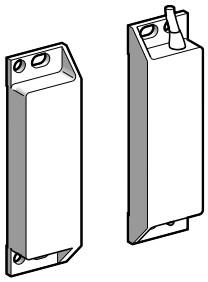
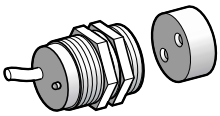


XCSDMC●●●●



XCSDMP●●●●



XCSDMR●●●●

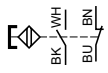
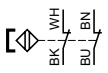
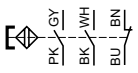
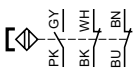
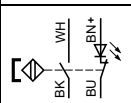
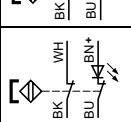
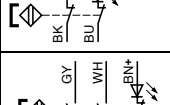
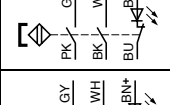
XCSDM Non-Contact Magnetic Safety Interlock Switches

References of switches

Coded magnet is included with each switch part number listed below.

■ Devices listed below are provided with 6.6 ft. (2 m) of cable. Other lengths of cable are available—see footnotes on how to order.

XCSDM safety interlocks must be used in conjunction with XPS safety relays, see pages 96 and 98.

Type		Rectangular		Cylindrical
		Small size 2 x 0.63 x 0.27 in (51 x 16 x 7 mm)	Large size 3.46 x 0.98 x 0.51 in (88 x 25 x 13 mm)	Diameter 30 mm Length 1.51 in (38.5 mm)
N.C. + N.O. ▼ (N.C. staggered)		XCSDMC5902	—	XCSDMR5902
N.C. + N.C. ▼† (1 N.C. staggered)		XCSDMC7902	—	XCSDMR7902
N.C. + N.O. + N.O. ▼● (1 N.C. staggered)		—	XCSDMP5002	—
N.C. + N.C. + N.O. ▼†● (1 N.C. staggered)		—	XCSDMP7002	—
N.C. + N.O. ▼★ (N.C. staggered) with LED		XCSDMC5912	—	XCSDMR5912
N.C. + N.C. ▼†★ (1 N.C. staggered) with LED		XCSDMC7912	—	XCSDMR7912
N.C. + N.O. + N.O. ▼●★ (1 N.C. staggered) with LED		—	XCSDMP5012	—
N.C. + N.C. + N.O. ▼†●★ (1 N.C. staggered) with LED		—	XCSDMP7012	—
Weight (oz.)		3.6 (0.101 kg)	6.3 (0.180 kg)	5.1 (0.146 kg)

■ The XCSDM devices listed above are available in additional cable lengths.
To order devices with a 16.4 ft. (5 m) cable, change the last character in the part number to 5.
For example: XCSDMC5912 is changed to XCSDMC5915
To order devices with a 32.8 ft. (10 m) cable, change the last character in the part number to 10
For example: XCSDMC5912 is changed to XCSDMC59110

▼ Contact states shown are with the magnet positioned in front of the switch.

† These switches are to be wired to emergency stop safety relays (XPSA••) and the XPSMP multi-function module only. Example of wiring to an XPSAF is shown in the wiring diagram on page 96. These devices are not to be used with the XPSDM modules.

★ The green LED is lit when the coded magnet is positioned in front of the switch (guard closed).

● N.O. contact PK-GY is to be used as an indicator of the device state, typically to a PLC. It is not to be used for the safety function.

Complementary Characteristics (not shown under general characteristics)

Operating Zone ♦	Sao: 0.20 in. (5 mm) Sar: 0.59 in. (15 mm)	Sao: 0.31 in. (8 mm) Sar: 0.79 in. (20 mm)	Sao: 0.31 in. (8 mm) Sar: 0.79 in. (20 mm)
Approach Directions	6 directions	6 directions	2 directions

References of Accessories

Mounting Bracket	—		XSZ-B130
Weight (oz.)	—		2.8 (0.080 kg)
Additional coded magnet	XCSZC1	XCSZP1	XCSZR1
Weight (oz.)	0.3 (0.009 kg)	1.8 (0.050 kg)	0.6 (0.018 kg)

Sao is the distance from the sensing face within which the presence of the specified target is correctly detected.
Sar is the distance from the sensing face beyond which the absence of the specified target is correctly detected. (Per IEC 60947-5-3)

♦ These sensing distances are for when non-ferrous and non-ferromagnetic materials are used for the mounting surface and mounting hardware. Using ferrous and ferromagnetic materials may reduce the published sensing distances.

When designing a door or gate guarding system, these guidelines should be followed:

- The safety interlock switch must not be used as a mechanical stop for the moving guard. A separate mechanical stop must be provided.
- Encoded magnets must be securely attached to gates, guards and doors only. They should not be attached to cables, cords or chains.

File E164353
CCN NKCR

File LR44087
Class 3211 03

CE

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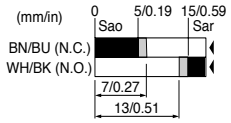
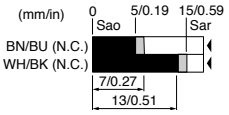
XCSDM Non-Contact Magnetic Safety Interlock Switches

Contact Status Relative to Coded Magnet Position ■

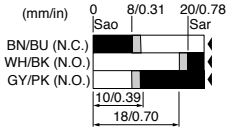
XCSDMC59●●



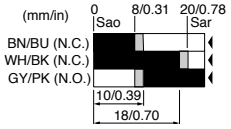
XCSDMC79●●



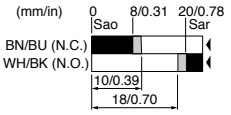
XCSDMP50●●



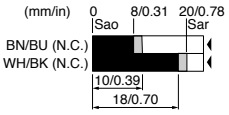
XCSDMP70●●



XCSDMR59●●



XCSDMR79●●



Contact closed

Contact open

Transition state

Sao is the distance from the sensing face within which the presence of the specified target is correctly detected.
Sar is the distance from the sensing face beyond which the absence of the specified target is correctly detected.
(Per IEC 60947-5-3)

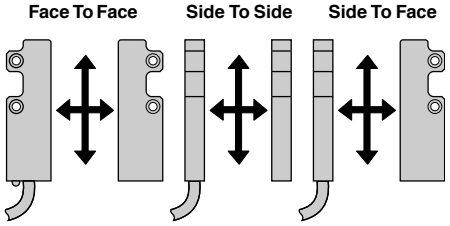
■ The contact status and magnet positions above are for when non-ferrous and non-ferromagnetic materials are used for the mounting surface and mounting hardware. Using ferrous and ferromagnetic materials may reduce the published sensing distances.

Approach Directions of the Coded Magnet

All of the XCSDM devices are designed for the coded magnet to approach the switch in a perpendicular direction and a parallel direction.

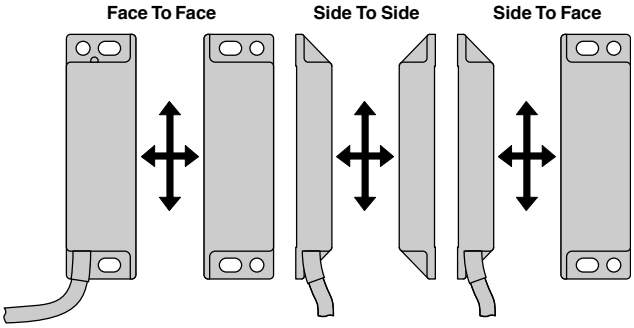
XCSDMC

6 approach directions/configurations



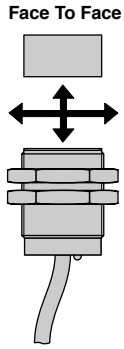
XCSDMP

6 approach directions/configurations

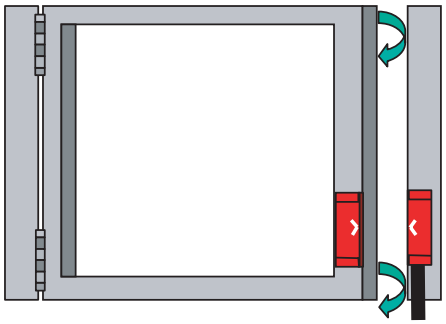


XCSDMR

2 approach directions/configurations



All of the XCSDM devices can also be used on hinged gates or doors as shown in the diagram below.



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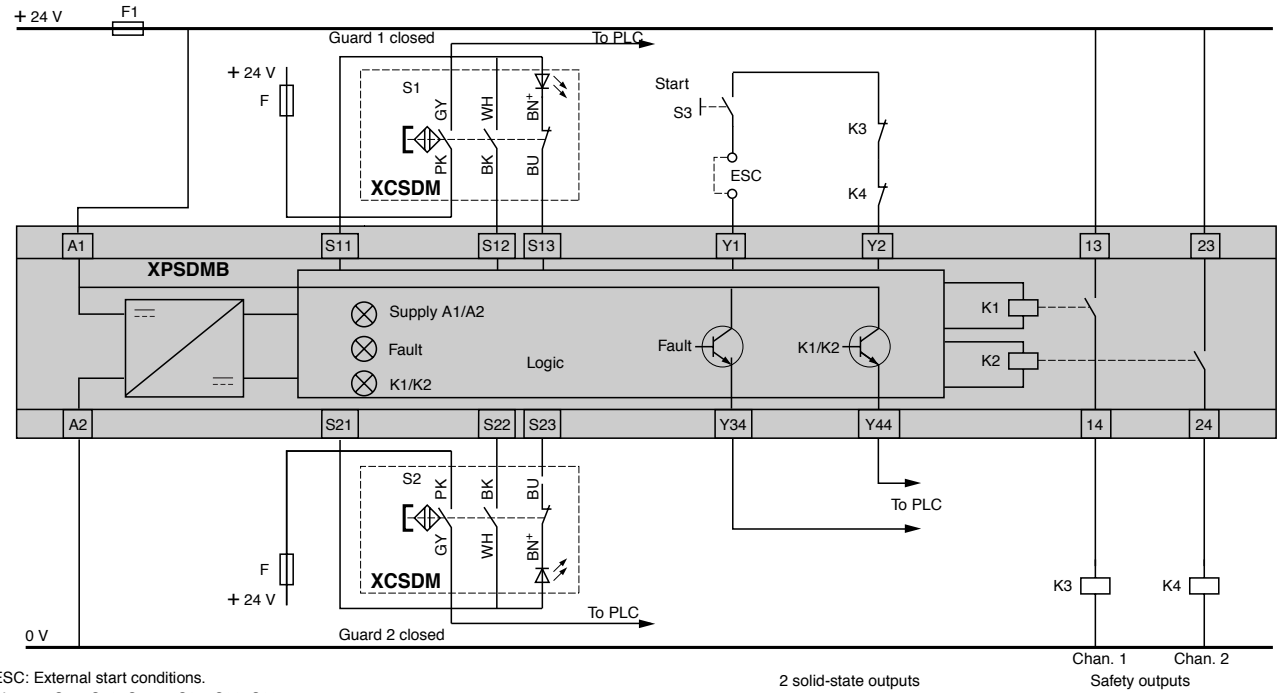
XCSDM Non-Contact Magnetic Safety Interlock Switches
XCSDMP5··· with XPSDMB (category 4) with 2 guard operation

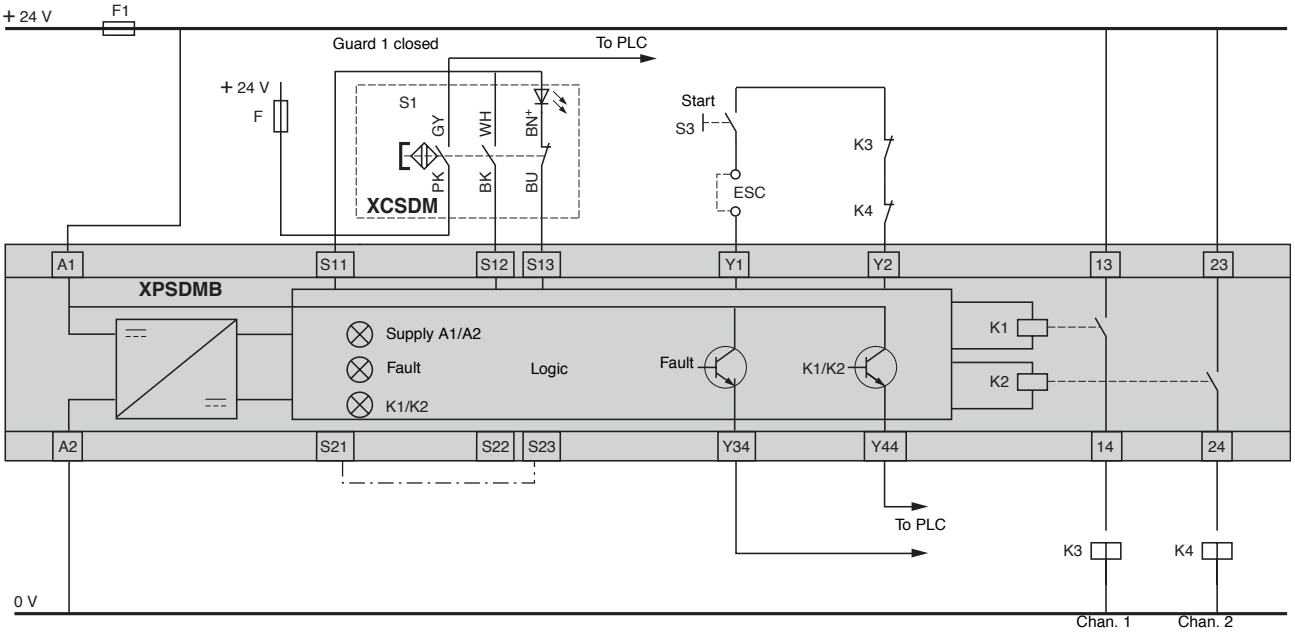
Categories 3 and 4 connection conforming to EN 954-1. Example with N.C. + N.O. + N.O. contact



ESC: External start conditions.
- Inputs: S11, S12, S13 or S21, S22, S23
- Unused inputs must be jumpered from S_1 to S_3. For example: S21 to S23.
- The order in which the inputs are wired or jumpered will not affect device operation.

XCSDMP5··· with XPSDMB (category 4) with single guard operation

Categories 3 and 4 connection conforming to EN 954-1. Example with N.C. + N.O. + N.O. contact



ESC: External start conditions.
- Inputs: S11, S12, S13 or S21, S22, S23
- Unused inputs must be jumpered from S_1 to S_3 as shown by this dashed line — · — · — .
- The order in which the inputs are wired or jumpered will not affect device operation.

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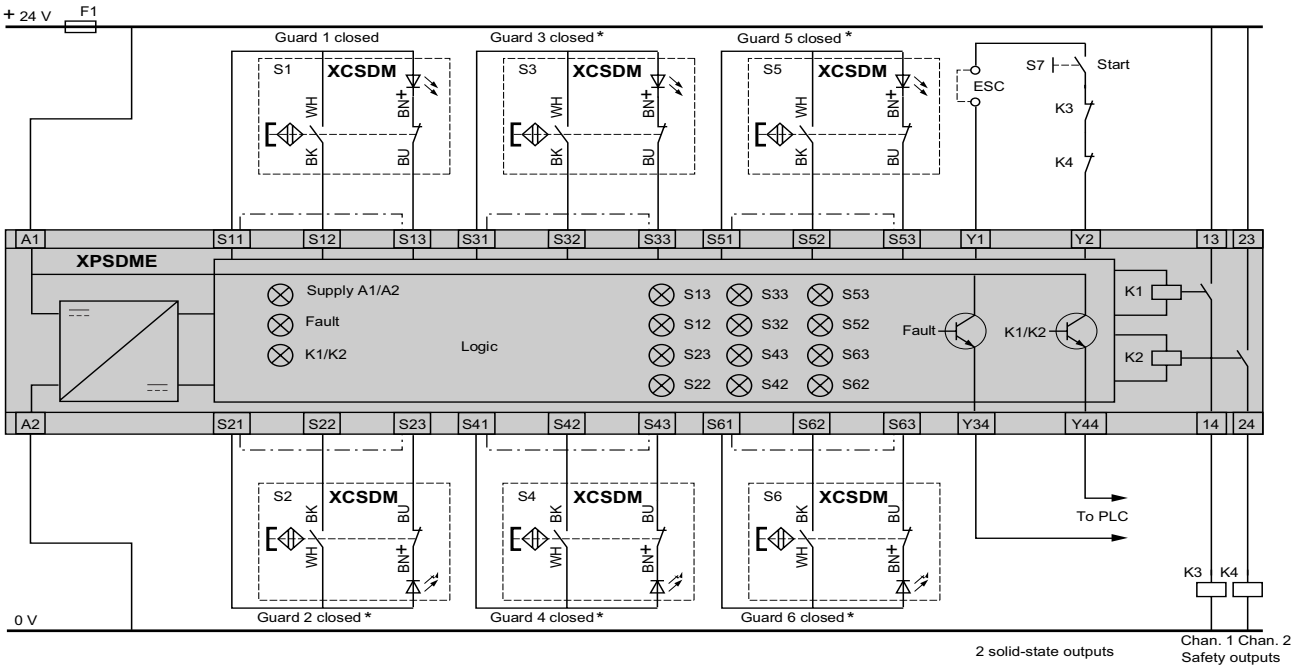
XCSDM Non-Contact Magnetic Safety Interlock Switches
XCSDMC5···, XCSDMR5··· with XPSDME (category 4)

Categories 3 and 4 connection conforming to EN 954-1. Example with N.C. + N.O. contact



ESC: External start conditions.

• Inputs: S_1, S_2, S_3

• Unused inputs must be jumpered from S_1 to S_3 as shown by this dashed line — · — · — . for example if input S61, S62, S63 is not used, then terminals S61 and S63 must be jumpered. Terminals to be jumpered if the input is not used are: S11 to S13, S21 to S23, S31 to S33, S41 to S43, S51 to S53, and S61 to S63. See page 96 for a jumper example.

• The order in which the inputs are wired or jumpered will not affect device operation.

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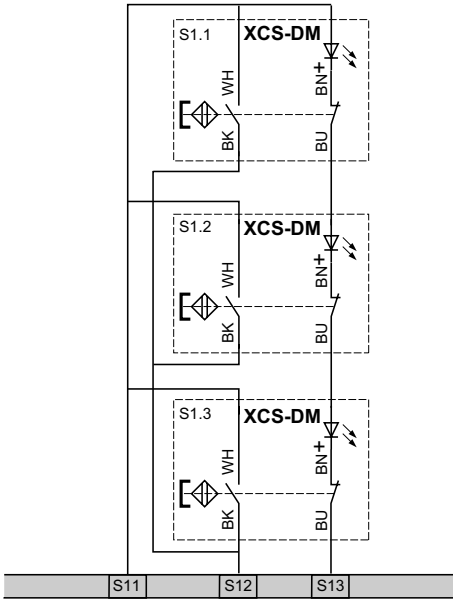
XCSDM Non-Contact Magnetic Safety Interlock Switches

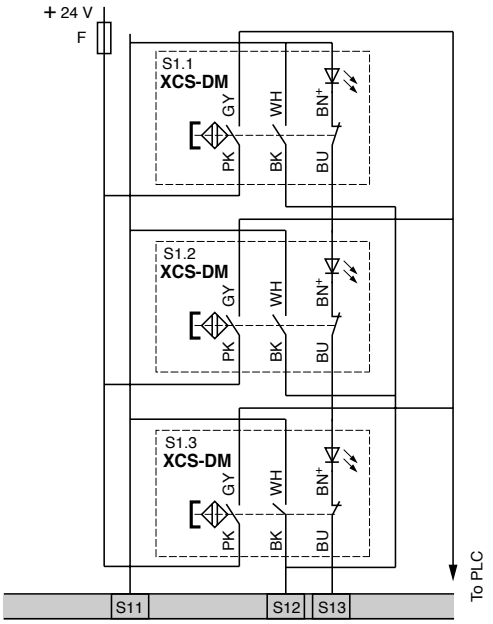
Wiring Diagrams

Connection of up to 3 magnetic switches with an LED on one input, with XPSDM• (category 3)

Example with N.C. + N.O. contact



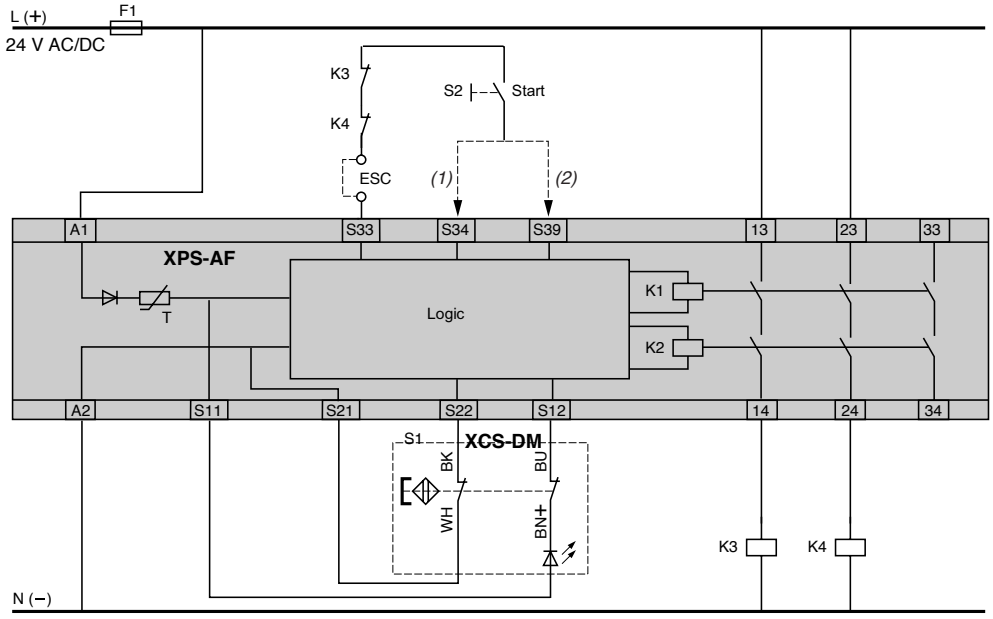
Example with N.C. + N.O. + N.O. contact



• Input: S11, S12, S13 or S21, S22, S23.
* Unused inputs must be jumpered from S_1 to S_3 as shown on page 96.
The maximum number of XCSDM devices wired in series per input of an XPSDM safety relay:
XCSDM with LED: Maximum of 3
XCSDM without LED: Maximum of 6

XCSDM•7••• with XPSAF (category 4)

Categories 3 and 4 connection conforming to EN 954-1. Example with N.C. + N.C. contact



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

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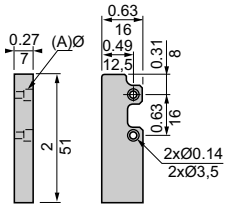
XCSDM Non-Contact Magnetic Safety Interlock Switches

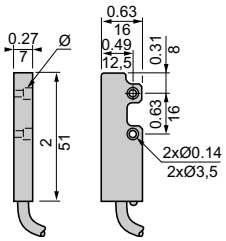
Dimensions

XCSDMC
Magnet
(XCSZC1)

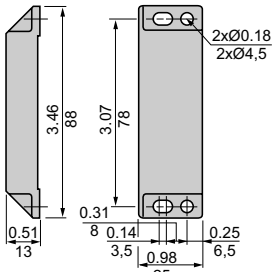


(A) Counterbored: Ø 0.24" (6 mm) x 0.14" (3.5 mm)

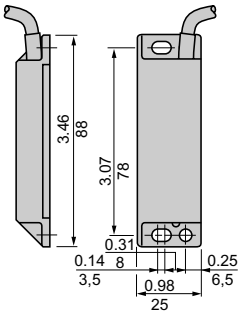
Sensor



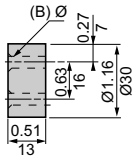
XCSDMP
Magnet
(XCSZP1)



Sensor

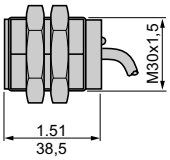


XCSDMR
Magnet
(XCSZR1)

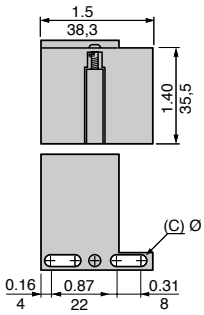


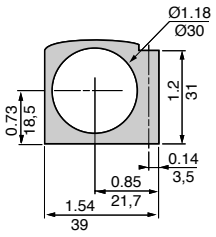
(B) Countersunk holes: Ø 0.27" (7 mm) at 90°.

Sensor



Accessories
XSZB130





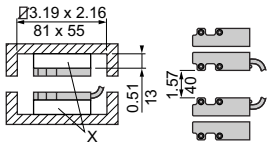
(C) 2 elongated holes 0.16" (4 mm) x 0.31" (8 mm)

Dual Dimensions: INCHES / Millimeters

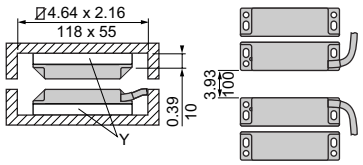
Mounting

- When mounting on steel or other ferromagnetic materials, a non-magnetic shim (X, Y, Z) must be used between the switch and mounting surface, and mounted per the diagram below.
- Non-ferrous, non-magnetic mounting hardware is recommended. Using ferrous mounting hardware may reduce the published sensing distances.

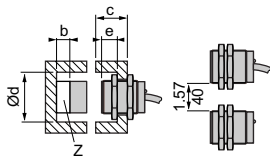
XCSDMC



XCSDMP



XCSDMR



When designing a door or gate guarding system, these guidelines should be followed:

- The safety interlock switch must not be used as a mechanical stop for the moving guard. A separate mechanical stop must be provided.
- Encoded magnets must be securely attached to gates, guards and doors only. They should not be attached to cables, cords or chains

	b min.	c	d	e
XCSDMR	0.47/12	> 0.39/10	Ø 1.77/45	0.78/20
	–	> 0.39/10	Ø 1.77/45	0.51/13
	0.47/12	< 0.39/10	–	0.78/20
	–	< 0.39/10	–	0.67/17

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