Preventa™ Safety Switches Type XCSDM

Catalog Supplement to 9007CT0201

2009
Contents

Safety detection solutions

Non-contact safety interlock switches

Non-contact safety interlock switches
- Presentation, General characteristics ............................................ 2
- Plastic, ......................................................................................... 4
- Pre-cabled ................................................................................. 5
- Connector on pigtail ................................................................. 6
- Accessories .............................................................................. 6

Non-contact safety interlock systems
- Presentation, General characteristics ............................................ 14
- Plastic, solid-state PNP type output, ........................................... 16
- Pre-cabled connection ............................................................... 16
- M12 connector connection ......................................................... 17
- Accessories .............................................................................. 18
Safety detection solutions
Non-contact safety interlock switches
Plastic

**XCSDMC**
Rectangular, compact: 2.01 x 0.63 x 0.28 in (51 x 16 x 7 mm)
Pre-cabled connection  Connector on pigtail connection

**XCSDMP**
Rectangular, standard: 3.46 x 0.98 x 0.51 in (88 x 25 x 13 mm)
Pre-cabled connection  Connector on pigtail connection

**XCSDMR**
Cylindrical, diameter: 1.18 in (30 mm), length: 1.51 in (38.5 mm)
Pre-cabled connection  Connector on pigtail connection
### Characteristics

#### Safety detection solutions

**Non-contact safety interlock switches**

**Plastic**

---

### Environment

<table>
<thead>
<tr>
<th>Conformity to standards</th>
<th>Products</th>
<th>IEC/EN 60947-5-1, UL 508, CSA C22 2 n* 14</th>
</tr>
</thead>
<tbody>
<tr>
<td>Machine assemblies</td>
<td></td>
<td>IEC/EN 60204-1, EN/ISO 12100, EN 1088/ISO 14119 (XCSDMn only)</td>
</tr>
</tbody>
</table>

**Product certifications**

UL-CSA, BG

**Protective treatment**

Standard version: "TH"

**Ambient air temperature**

- **For operation**: °F (°C) -13…+185 (-25…+85)
- **For storage**: °F (°C) -40…+185 (-40…+85)

**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**

mT ≥ 0.3

**Electric shock protection**

Class II conforming to IEC 60536

**Degree of protection**

Conforming to IEC 60529

IP 66 and IP 67 for non-contact safety interlock switches with pre-cabled connection

IP 67 for non-contact safety interlock switches with connector on pigtail connection

**Materials**

Thermoplastic case (PBT)

PVC cable (ROHS)

---

### Contact block characteristics

**Rated operational characteristics**

Ue: := 24 V, le: 100 mA max.

**Rated insulation voltage (Ui)**

Ui: ::= 100 V

**Rated impulse withstand voltage (U imp)**

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 (gl)

**Connection**

- **XCSDMC**: Pre-cabled, 4 x 22 AWG, length: 2, 5 or 10 m depending on model or M8 connector on 5.95 in. (0.15 m) pigtail
- **XCSDMP 2 contact model**: Pre-cabled, 4 x 22 AWG, length: 2, 5 or 10 m depending on model or M12 connector on 5.95 in. (0.15 m) pigtail
- **XCSDMP 3 contact model**: Pre-cabled, 6 x 22 AWG, length: 2, 5 or 10 m depending on model or M12 connector on 5.95 in. (0.15 m) pigtail
- **XCSDMR**: Pre-cabled, 4 x 22 AWG, length: 2, 5 or 10 m depending on model or M12 connector on 5.95 in. (0.15 m) pigtail

**Contact material**

Rhodium

**Electrical life**

1.2 million operating cycles

**Maximum switching voltage**

V ::= 100

**Switching capacity**

- **Contact with LED**: mA 5…100
- **Contact without LED**: mA 0.1…100

**Insulation resistance**

MΩ 1000

**Maximum breaking capacity**

- **Contact with LED**: VA 3
- **Contact without LED**: VA 10

**Maximum switching frequency**

Hz 150
# Safety detection solutions

Non-contact safety interlock switches

## Plastic, pre-cabled

<table>
<thead>
<tr>
<th>Type</th>
<th>Rectangular</th>
<th>Cylindrical</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Compact</td>
<td>Standard</td>
</tr>
<tr>
<td></td>
<td>2.01 x 0.63 x 0.28 in (51 x 16 x 7 mm)</td>
<td>3.46 x 0.96 x 0.51 in (88 x 25 x 13 mm)</td>
</tr>
<tr>
<td></td>
<td>Diameter: 1.18 in (30 mm)</td>
<td>Length: 1.51 in (38.5 mm)</td>
</tr>
</tbody>
</table>

## References of switches

References of switches (1) must be used in conjunction with safety modules XPS, see pages 10 to 12. Contact states shown are with the magnet positioned in front of the switch.

### 2-pole N.C. + N.O. (N.C. staggered)

- XCSDM5902
- XCSDM5901
- XCSDM59010

### 2-pole N.O. + N.O. (1 N.O. staggered)

- XCSDM7902
- XCSDM79020

### 3-pole N.C. + N.O. (1 N.C. staggered)

- XCSDM5002

### 3-pole N.C. + N.O. (2) (1 N.O. staggered)

- XCSDM7002

### 2-pole N.C. + N.O. (3) (N.C. staggered) With LED

- XCSDM5912

### 2-pole N.O. + N.O. (2) (1 N.O. staggered) With LED

- XCSDM7912

### 3-pole N.C. + N.O. (3) (1 N.C. staggered) With LED

- XCSDM5012

### 3-pole N.C. + N.O. (2) (3) (1 N.O. staggered) With LED

- XCSDM7012

### Weight oz (kg)

- 3.563 (0.101)
- 6.349 (0.180)
- 5.150 (0.146)

---

(1) Magnetic switch + coded magnet (XCSZC...).

Switch pre-cabled with 6.6 ft. (2m) long cable. For other cable lengths, replace the last number of the reference (2) by 5 for a 16.4 ft. (5 m) long cable or by 10 for a 32.8 ft. (10 m) long cable.

Example: rectangular, compact switch with N.C. + N.O. contacts and 10 m cable becomes XCSDMC59010.

(2) Only to be wired in conjunction with an XPSAF module (see page 11).

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

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

### Complementary characteristics not shown under General characteristics (catalog 9007CT0901 page 6)

<table>
<thead>
<tr>
<th>Operating zone</th>
<th>Saco: 0.20 in (5 mm)</th>
<th>Saco: 0.31 in. (8 mm)</th>
<th>Saco: 0.31 in. (8 mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Approach directions</td>
<td>3 directions</td>
<td>3 directions</td>
<td>1 direction</td>
</tr>
</tbody>
</table>

## Accessories

|-------------------------|-------------------|---------------------|-------------------|------------------------|

---

Courtesy of Steven Engineering, Inc.-230 Ryan Way, South San Francisco, CA 94080-6370-Main Office: (650) 588-9200-Outside Local Area: (800) 258-9200-www.stevenengineering.com
Non-contact safety interlock switches

Plastic, connector on pigtail

### Complementary characteristics

**Operating zone**

<table>
<thead>
<tr>
<th></th>
<th>Sao: 0.20 in (5 mm)</th>
<th>Sao: 0.31 in. (8 mm)</th>
<th>Sao: 0.31 in. (8 mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>3.563 (0.101)</td>
<td>6.349 (0.180)</td>
<td>5.150 (0.146)</td>
</tr>
</tbody>
</table>

**Approach directions**

<table>
<thead>
<tr>
<th></th>
<th>3 directions</th>
<th>3 directions</th>
<th>1 direction</th>
</tr>
</thead>
</table>

---

(1) Magnetic switch + coded magnet (XCSZC●●●●●).

(2) Only to be wired in conjunction with an XPSAF module (see page 9).

(3) The 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.
Safety detection solutions

Non-contact safety interlock switches

Accessories

Accessories for non-contact safety interlock switches

<table>
<thead>
<tr>
<th>Accessory</th>
<th>XCSDMC***2</th>
<th>XCSDMC***L</th>
<th>XCSDMP***2</th>
<th>XCSDMP***L</th>
<th>XCSDMR***2</th>
<th>XCSDMR***L</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mounting clamp</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weight oz (kg)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Additional coded magnet</td>
<td>XCSZC1</td>
<td>XCSZP1</td>
<td>XCSZR1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weight oz (kg)</td>
<td>0.317 (0.009)</td>
<td>1.764 (0.050)</td>
<td>0.635 (0.018)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-magnetic shims</td>
<td>XCSZCC (lot of 2)</td>
<td>XCSZCP (lot of 2)</td>
<td>XCSZCR</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weight oz (kg)</td>
<td>0.282 (0.008)</td>
<td>0.423 (0.012)</td>
<td>0.071 (0.002)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Pre-wired female connectors for connector version switches

Pre-wired connector characteristics

<table>
<thead>
<tr>
<th>Pre-wired connector type</th>
<th>XZCP0941L*, XZCP1041L*</th>
<th>XZCP29P11L*</th>
<th>XZCP1141L*, XZCP1241L*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of connection</td>
<td>Screw threaded (metal clamping ring)</td>
<td>Screw threaded (metal clamping ring)</td>
<td>Screw threaded (metal clamping ring)</td>
</tr>
<tr>
<td>Number of conductors/pins</td>
<td>4</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Degree of protection</td>
<td>IP 67 (with clamping ring correctly tightened)</td>
<td>IP 67 (with clamping ring correctly tightened)</td>
<td>IP 67 (with clamping ring correctly tightened)</td>
</tr>
<tr>
<td>Ambient air temperature</td>
<td>Static: -31…+ 194 °F (-35…+ 90 °C) Dynamic: + 23…+ 194 °F (5…+ 90 °C)</td>
<td>Static: -31…+ 194 °F (-35…+ 90 °C) Dynamic: + 23…+ 194 °F (5…+ 90 °C)</td>
<td>Static: -31…+ 194 °F (-35…+ 90 °C) Dynamic: + 23…+ 194 °F (5…+ 90 °C)</td>
</tr>
<tr>
<td>Cabling</td>
<td>Ø 0.205” (5.2 mm) cable, wire c.s.a. 4 x 22 AWG (0.34 mm²)</td>
<td>Ø 0.205” (5.2 mm) cable, wire c.s.a. 8 x 24 AWG (0.25 mm²)</td>
<td>Ø 0.205” (5.2 mm) cable, wire c.s.a. 8 x 22 AWG (0.34 mm²)</td>
</tr>
<tr>
<td>LED signalling</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Nominal voltage</td>
<td>~ 60 V, ~ 75 V</td>
<td>~ 250 V, ~ 300 V</td>
<td>~ 250 V, ~ 300 V</td>
</tr>
<tr>
<td>Nominal current</td>
<td>4 A</td>
<td>2 A</td>
<td>4 A</td>
</tr>
<tr>
<td>Insulation resistance</td>
<td>&gt; 10¹ Ω</td>
<td>&gt; 10¹ Ω</td>
<td>&gt; 10¹ Ω</td>
</tr>
<tr>
<td>Contact resistance</td>
<td>5 mΩ</td>
<td>5 mΩ</td>
<td>5 mΩ</td>
</tr>
</tbody>
</table>

References of pre-wired connectors

<table>
<thead>
<tr>
<th>Type of connector</th>
<th>Number of pins</th>
<th>For use with</th>
<th>Cable length (ft. / m)</th>
<th>Reference</th>
<th>Weight oz (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female, M8</td>
<td>4</td>
<td>XCSDMC***L</td>
<td>Straight 6.56 (2)</td>
<td>XZCP0941L2</td>
<td>2.822 (0.080)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>16.40 (5)</td>
<td>XZCP0941L5</td>
<td>6.349 (0.180)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>32.81 (10)</td>
<td>XZCP0941L10</td>
<td>12.699 (0.360)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Elbowed 6.56 (2)</td>
<td>XZCP1041L2</td>
<td>2.822 (0.080)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>16.40 (5)</td>
<td>XZCP1041L5</td>
<td>6.349 (0.180)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>32.81 (10)</td>
<td>XZCP1041L10</td>
<td>12.699 (0.360)</td>
</tr>
<tr>
<td>Female, M12</td>
<td>8</td>
<td>XCSDMP***L</td>
<td>Straight 6.56 (2)</td>
<td>XZCP29P11L2</td>
<td>3.527 (0.100)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>16.40 (5)</td>
<td>XZCP29P11L5</td>
<td>10.229 (0.290)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>32.81 (10)</td>
<td>XZCP29P11L10</td>
<td>16.579 (0.470)</td>
</tr>
<tr>
<td>Female, M12</td>
<td>4</td>
<td>XCSDMR***L</td>
<td>Straight 6.56 (2)</td>
<td>XZCP1141L2</td>
<td>3.175 (0.090)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>16.40 (5)</td>
<td>XZCP1141L5</td>
<td>6.702 (0.190)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>32.81 (10)</td>
<td>XZCP1141L10</td>
<td>13.051 (0.370)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Elbowed 6.56 (2)</td>
<td>XZCP1241L2</td>
<td>3.175 (0.090)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>16.40 (5)</td>
<td>XZCP1241L5</td>
<td>6.702 (0.190)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>32.81 (10)</td>
<td>XZCP1241L10</td>
<td>13.051 (0.370)</td>
</tr>
</tbody>
</table>

References, characteristics

Page 3

Accessories

Page 6

Dimensions

Page 8

Wiring Diagrams

Page 10

Courtesy of Steven Engineering, Inc.-230 Ryan Way, South San Francisco, CA 94080-6370-Main Office: (650) 588-9200-Outside Local Area: (800) 258-9200-www.stevenengineering.com
## Function diagrams

### Safety detection solutions

Non-contact safety interlock switches

### Function diagrams with magnet present (pre-cabled version)

<table>
<thead>
<tr>
<th>Model</th>
<th>Color</th>
<th>Function Diagram</th>
</tr>
</thead>
<tbody>
<tr>
<td>XCSDMC59</td>
<td>BN/BU</td>
<td><img src="image1" alt="Function Diagram" /></td>
</tr>
<tr>
<td>XCSDMC79</td>
<td>BN/BU</td>
<td><img src="image2" alt="Function Diagram" /></td>
</tr>
<tr>
<td>XCSDMP50</td>
<td>BK/WH</td>
<td><img src="image3" alt="Function Diagram" /></td>
</tr>
<tr>
<td>XCSDMP70</td>
<td>GY/PK</td>
<td><img src="image4" alt="Function Diagram" /></td>
</tr>
</tbody>
</table>

### Function diagrams with magnet present (connector on pigtail version)

<table>
<thead>
<tr>
<th>Model</th>
<th>Color</th>
<th>Function Diagram</th>
</tr>
</thead>
<tbody>
<tr>
<td>XCSDMC59</td>
<td>BN/BU</td>
<td><img src="image5" alt="Function Diagram" /></td>
</tr>
<tr>
<td>XCSDMC79</td>
<td>BN/BU</td>
<td><img src="image6" alt="Function Diagram" /></td>
</tr>
<tr>
<td>XCSDMP50</td>
<td>BK/WH</td>
<td><img src="image7" alt="Function Diagram" /></td>
</tr>
<tr>
<td>XCSDMP70</td>
<td>GY/PK</td>
<td><img src="image8" alt="Function Diagram" /></td>
</tr>
</tbody>
</table>

### Pin Configuration

- Pin (N.O.): 1/3
- Pin (N.C.): 4/2
- Pin (N.O.): 1/3
- Pin (N.O.): 4/2

---

Sao: specified operating distance.

Sar: specified tripping distance.

Conforming to EN/IEC 60947-5-3.

---

Contact closed

Contact open

Contact in transition
## Safety detection solutions

### Non-contact safety interlock switches

**Plastic**

<table>
<thead>
<tr>
<th>Non-contact safety interlock switches</th>
<th>Coded magnet for XCSDMC</th>
<th>Coded magnet for XCSDMP</th>
<th>Coded magnet for XCSDMR</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>XCSDMC</strong></td>
<td><strong>XCSZC1</strong></td>
<td><strong>XCSZP1</strong></td>
<td><strong>XCSZR1</strong></td>
</tr>
<tr>
<td>Pre-cabled connection</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Connector on pigtail connection</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(1) Counterbored: 0.24 x 0.14 in. (Ø 6 x 3.5 mm.)</td>
<td>(1) Counterbored: 0.24 x 0.14 in. (Ø 6 x 3.5 mm.)</td>
<td>(1) Counterbored: 0.24 x 0.14 in. (Ø 6 x 3.5 mm.)</td>
<td></td>
</tr>
<tr>
<td>(2) M8 4-pin connector.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**XCSDMP**

<table>
<thead>
<tr>
<th>Pre-cabled connection</th>
<th>Connector on pigtail connection</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) 4 or 6-pin M12 connector.</td>
<td></td>
</tr>
</tbody>
</table>

**XCSDMR**

<table>
<thead>
<tr>
<th>Pre-cabled connection</th>
<th>Connector on pigtail connection</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) M12 4-pin connector.</td>
<td>(1) 0.08 x Ø 0.17 (2 x Ø 4.3), countersunk: Ø 7.5 at 45°.</td>
</tr>
</tbody>
</table>

References: pages 4 and 5

---

### Dimensions

**INCHES**

<table>
<thead>
<tr>
<th>Dual Dimensions: MILLIMETERS</th>
</tr>
</thead>
</table>

**Courtesy of Steven Engineering, Inc.-230 Ryan Way, South San Francisco, CA 94080-6370-Main Office: (650) 588-9200-Outside Local Area: (800) 258-9200-www.stevenengineering.com**
**Safety detection solutions**
Non-contact safety interlock switches
Plastic

**Accessories**

<table>
<thead>
<tr>
<th>Mounting clamp</th>
<th>Non-magnetic shims</th>
</tr>
</thead>
<tbody>
<tr>
<td>XSZ B130</td>
<td>XSZCC</td>
</tr>
<tr>
<td></td>
<td>XSZCP</td>
</tr>
<tr>
<td></td>
<td>XSZCR</td>
</tr>
</tbody>
</table>

(1) 2 elongated holes Ø 4 x 8

**Pre-wired female connectors**

<table>
<thead>
<tr>
<th>XZ CP0941Le</th>
<th>XZ CP1041Le</th>
<th>XZ CP1141Le</th>
<th>XZ CP1241Le</th>
<th>XZ CP29P11Le</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Wiring diagrams**

<table>
<thead>
<tr>
<th>M8 pre-wired female connector</th>
<th>M12 pre-wired female connector</th>
</tr>
</thead>
<tbody>
<tr>
<td>XZ CP0941Le</td>
<td>XZ CP1141Le, XZ CP1241Le</td>
</tr>
<tr>
<td>XZ CP29P11Le</td>
<td></td>
</tr>
</tbody>
</table>

**Mounting**

<table>
<thead>
<tr>
<th>XCSDMC</th>
<th>XCSDMP</th>
<th>XCSDMR</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>XCS</th>
<th>a</th>
<th>b</th>
<th>c</th>
<th>d</th>
<th>e</th>
</tr>
</thead>
<tbody>
<tr>
<td>DMC</td>
<td>1.57 (40)</td>
<td>13 min.</td>
<td>–</td>
<td>3.19 x 2.17 (81 x 55)</td>
<td>–</td>
</tr>
<tr>
<td>DMP</td>
<td>3.94 (100)</td>
<td>10 min.</td>
<td>–</td>
<td>4.65 x 2.17 (118 x 55)</td>
<td>–</td>
</tr>
<tr>
<td>DMR</td>
<td>1.57 (40)</td>
<td>12 min.</td>
<td>&gt; 0.39 (10)</td>
<td>Ø 1.77 (45)</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>&gt; 0.39 (10)</td>
<td>Ø 1.77 (45)</td>
<td>13</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>&lt; 0.39 (10)</td>
<td>–</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>&lt; 0.39 (10)</td>
<td>–</td>
<td>17</td>
</tr>
</tbody>
</table>

**Non-magnetic shims**

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>XSZCC</td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>XSZCP</td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>XSZCR</td>
<td></td>
</tr>
</tbody>
</table>

Courtesy of Steven Engineering, Inc.-230 Ryan Way, South San Francisco, CA 94080-6370-Main Office: (650) 588-9200-Outside Local Area: (800) 258-9200-www.stevenengineering.com
Safety detection solutions
Non-contact safety interlock switches
Plastic, pre-cabled

XCSDMP5ppp with XPSDMB
Wiring to category 4 conforming to EN 954-1/ISO 13849-1. Example with 3-pole N.C. + N.C. + N.O. (1 N.C. staggered) contact.

ESC: External start conditions.
• Inputs: S11, S12, S13 or S21, S22, S23.
• Unused inputs must be jumpered from S1 to S3. For example: S21 to S23.
• The order in which the inputs are wired or jumpered will not affect device operation.

XCSDMC5ppp, XCSDMP5ppp, XCSDMR5ppp with XPSDME
Wiring to category 4 conforming to EN 954-1/ISO 13849-1. Example with 2-pole N.C. + N.O. (N.C. staggered) contact.

ESC: External start conditions.
• Inputs: S1, S2, S3.
• Unused inputs must be jumpered from S1 to S3. For example if input S61, S62, S63 is not used, then terminals S61 and S63 must be jumpered.
• The order in which the inputs are wired or jumpered will not affect device operation.

References:
pages 4 and 5
Connection of up to 3 non-contact safety interlock switches, with an LED on one input, with XPSDM (1)

Wiring to category 3 conforming to EN 954-1/ISO 13849-1

Example with 2-pole N.C. + N.O. contact

Example with 3-pole N.C. + N.C. + N.O. contact

(XCSDM) with XPSAF

Wiring to category 4 conforming to EN 954-1/ISO 13849-1. Example with 2-pole N.C. + N.C. contact (not conforming to standard EN 1088/ISO 14119)

(1) (2)

With start button monitoring.
Without start button monitoring.
ESC: External start conditions.
Safety detection solutions
Non-contact safety interlock switches
Plastic, connector on pigtail

XCSDMP5** with XPSDMB
Wiring to category 4 conforming to EN 954-1/ISO 13849-1. Example with 3-pole N.C. + N.C. + N.O. (1 N.C. staggered) 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.

XCSDMC5**, XCSDMP5**, XCSDMR5** with XPSDME
Wiring to category 4 conforming to EN 954-1/ISO 13849-1. Example with 2-pole N.C. + N.O. (N.C. staggered) contact.

ESC: External start conditions.
• Inputs: S_1, S_2, S_3
• Unused inputs must be jumpered from S_1 to S_3. For example if input S61, S62, S63 is not used, then terminals S61 and S63 must be jumpered.
• The order in which the inputs are wired or jumpered will not affect device operation.

References:
pages 4 and 5
Wiring diagrams (continued)

Safety detection solutions
Non-contact safety interlock switches
Plastic, connector on pigtail

Connection of up to 3 non-contact safety interlock switches, with an LED on one input, with XPSDM

Example with 2-pole N.C. + N.O. contact
Example with 3-pole N.C. + N.C. + N.O. contact

Wiring to category 3 conforming to EN 954-1/ISO 13849-1

Example with 2-pole N.C. + N.O. contact
Example with 3-pole N.C. + N.C. + N.O. contact

Wiring to category 4 conforming to EN 954-1/ISO 13849-1. Example with 2-pole N.C. + N.C. contact (not conforming to standard EN 1088/ISO 14119)

(1) Input: S11, S12, S13 or S21, S22, S23.

XCSDM with XPSAF

(1) With start button monitoring.
(2) Without start button monitoring.
ESC: External start conditions.
Non-Contact safety interlock switches
Pre-cabled connection

SIL 2 and 3/Categories 3 and 4
XCSDM3791 / XCSDM4801

Non-Contact safety interlock switches
M12 connector connection

SIL 2 and 3/Categories 3 and 4
XCSDM3791M12 / XCSDM4801M12
Characteristics

Non-Contact safety interlock type | SIL2/Category 3 | SIL3/Category 4
---|---|---
XCSDM3 | XCSDM4

Environment

<table>
<thead>
<tr>
<th>Environment</th>
<th>SIL2/Category 3</th>
<th>SIL3/Category 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conformity to standards</td>
<td>IEC 61508, EN/IEC 62061 (SIL2 and SIL3), EN 13849-1 (Category 3 and Category 4), EN 1088/ISO 14119, EN/IEC 60947-5-1; EN/IEC 60947-5-2; EN/IEC 60947-5-3</td>
<td>IEC 61508, EN/IEC 62061 (SIL3), EN 13849-1 (Category 3 and Category 4), EN 1088/ISO 14119, EN/IEC 60947-5-1; EN/IEC 60947-5-2; EN/IEC 60947-5-3</td>
</tr>
</tbody>
</table>

Product certifications

| Product certifications | CC, UL, CSA, TÜV |

Ambient air temperature

<table>
<thead>
<tr>
<th>Amb. air</th>
<th>SIL2</th>
<th>SIL3</th>
</tr>
</thead>
<tbody>
<tr>
<td>For operation</td>
<td>-13...+158 (-25...+70) °F</td>
<td>-40...+185 (-40...+85) °F</td>
</tr>
<tr>
<td>For storage</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Vibration resistance

Conforming to IEC 60068-2-6

10 gn (10...500 Hz)

Shock resistance

Conforming to IEC 60068-2-7

30 gn, 11 ms

Sensitivity to magnetic fields

mT

0,5

Electric shock protection

Class III

Degree of protection

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 : 36V

Rated impulse withstand voltage (U imp)

Conforming to EN 60947-5-1

kV

2,5

Integrated output protection

Overload and short-circuit protection

Connection

Conforming to IEC 60068-2-6

Pre-cabled, 6 x 22 AWG (0.25 mm²), length: 6.6, 16.4 or 32.8 ft. (2, 5, or 10 m) depending on model or M12 connector (A coding)

Pre-cabled, 8 x 22 AWG (0.25 mm²), length: 6.6, 16.4 or 32.8 ft. (2, 5, or 10 m) depending on model or M12 connector (A coding)

Cable diameter

in. (mm)

0.24 (6.1 +/- 0.3)

Cable resistance

mΩ/m

90

Safety outputs (OSSD)

2 PNP type (NO) solid-state outputs, 1.5 A (2 A up to 140 °F (60°C)), 24 V (short-circuit protected)

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

lb-ft (Nm)

1.327 (1.8) maximum

Maximum series mounting

32 maximum with 6.6 ft. (2 m) long cable

Functions

- LED status signalling

- Auto/Manual start via "Start" input

- Monitoring of external switching devices (EDM: External Devices Monitoring)

- Display of operating modes (LED)

- Monitoring of the function (open or closed) as well as the response time of the power components.
Type: Non-Contact safety interlock switches with dedicated transmitter
Pre-cabled connection

References

<table>
<thead>
<tr>
<th>Description</th>
<th>Type of connection</th>
<th>SIL2/Category 3</th>
<th>SIL3/Category 4</th>
<th>Weight (oz) (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Magnetic system with dedicated transmitter (1)</td>
<td>Pre-cabled, L = 6.6 ft (2 m)</td>
<td>XCSDM379102</td>
<td>XCSDM480102</td>
<td>11.288 (0.320)</td>
</tr>
<tr>
<td></td>
<td>Pre-cabled, L = 16.4 ft (5 m)</td>
<td>XCSDM379105</td>
<td>XCSDM480105</td>
<td>16.932 (0.480)</td>
</tr>
<tr>
<td></td>
<td>Pre-cabled, L = 32.8 ft (10 m)</td>
<td>XCSDM379110</td>
<td>XCSDM480110</td>
<td>26.279 (0.745)</td>
</tr>
</tbody>
</table>

(1) Self-contained system not requiring use of 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 mini

Output status (pre-cabled connection)

Output states shown are with the dedicated transmitter positioned in front of the receiver.

Output closed  
Sao : Specified operating distance.

Output open  
Sar : Specified tripping distance.

Transitional state  
Conforming to EN/IEC 60947-5-3

Approach directions

References, characteristics
## References, characteristics (continued)

### Safety detection solutions
Non-contact safety interlock switches
Plastic, solid-state PNP type output

<table>
<thead>
<tr>
<th>Type</th>
<th>Non-contact safety interlock with dedicated transmitter</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M12 connector connection</td>
</tr>
</tbody>
</table>

### References

<table>
<thead>
<tr>
<th>Description</th>
<th>Type of connection</th>
<th>SIL2/Category 3</th>
<th>SIL3/Category 4</th>
<th>Weight oz (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-Contact safety interlock switches with dedicated transmitter (*)</td>
<td>M12 connector</td>
<td>XCSDM3791M12</td>
<td>XCSDM4801M12</td>
<td>7.584 (0.215)</td>
</tr>
</tbody>
</table>

(*) Self-contained system not requiring use of safety module or non-magnetic shim.

### Detection characteristics

| Assured operating distance | Sao : 0.39 in. (10 mm) |
| Assured tripping distance  | Sar : 0.79 in. (20 mm) |
| Approach directions        | 9                      |
| Approach speed             | 0.03 ft./s (0.01 m/s) mini |

### Output status (pre-cabled connection)

Output states shown are with the dedicated transmitter positioned in front of the receiver.

<table>
<thead>
<tr>
<th>XCSDM3791M12</th>
<th>XCSDM4801M12</th>
</tr>
</thead>
<tbody>
<tr>
<td>( I_{1}/O_{1} - 7/4 ) (NO)</td>
<td>( I_{2}/O_{2} - 6/2 ) (NO)</td>
</tr>
<tr>
<td>( I_{1}/O_{1} - 5/4 ) (NO)</td>
<td>( E_{r} - 7/N(C) ) (NC)</td>
</tr>
</tbody>
</table>

**Output closed**

**Output open**

**Transitional state**

Sao : Specified operating distance.
Sar : Specified tripping distance.
Conforming to EN/IEC 60947-5-3
### Safety detection solutions
#### Non-contact safety interlock switches

#### Accessories

<table>
<thead>
<tr>
<th>Description</th>
<th>For use with</th>
<th>Reference</th>
<th>Weight oz (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Replacement dedicated transmitter</td>
<td>XCSDM3/4***02/05/10</td>
<td>XCSDMT</td>
<td>3.527</td>
</tr>
<tr>
<td></td>
<td>XCSDM3/4***M12</td>
<td></td>
<td>(0.100)</td>
</tr>
<tr>
<td>Arc suppressor (pair)</td>
<td>XCSDM3/4***02/05/10</td>
<td>XUSLZ500</td>
<td>0.706</td>
</tr>
<tr>
<td></td>
<td>XCSDM3/4***M12</td>
<td></td>
<td>(0.020)</td>
</tr>
</tbody>
</table>

#### Pre-wired female connectors for connector version Non-contact safety interlock switches

**Pre-wired connector characteristics**

<table>
<thead>
<tr>
<th>Pre-wired connector type</th>
<th>XZ CP29P12L£</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of connection</td>
<td>Screw threaded (metal clamping ring)</td>
</tr>
<tr>
<td>Number of contacts</td>
<td>8</td>
</tr>
<tr>
<td>Degree of protection</td>
<td>IP 67 (with clamping ring correctly tightened)</td>
</tr>
<tr>
<td>Ambient air temperature</td>
<td>°F (°C)</td>
</tr>
<tr>
<td></td>
<td>operation: -13...+158 (-25...+70)</td>
</tr>
<tr>
<td></td>
<td>storage: -40...+185 (-40...+85)</td>
</tr>
<tr>
<td>Cabling</td>
<td>Conforming to IEC 60947-5-2</td>
</tr>
<tr>
<td>LED signalling</td>
<td>–</td>
</tr>
<tr>
<td>Nominal current</td>
<td>2 A</td>
</tr>
<tr>
<td>Insulation resistance</td>
<td>&gt; 105Ω</td>
</tr>
<tr>
<td>Contact resistance</td>
<td>≤ 5 mΩ</td>
</tr>
</tbody>
</table>

**References of pre-wired connectors**

<table>
<thead>
<tr>
<th>Type of connector</th>
<th>No. of contacts</th>
<th>For use with</th>
<th>Type</th>
<th>Cable length ft. (m)</th>
<th>Reference</th>
<th>Weight oz (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female, M12</td>
<td>8</td>
<td>XCSDM3/4***02/05/10</td>
<td>Straight 6.6 (2)</td>
<td>XZCP29P12L2</td>
<td>3.527</td>
<td>(0.100)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>XCSDM3/4***06</td>
<td></td>
<td>XZCP29P12L5</td>
<td>10.229</td>
<td>(0.290)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>XCSDM3/4***10</td>
<td></td>
<td>XZCP29P12L10</td>
<td>16.579</td>
<td>(0.470)</td>
</tr>
</tbody>
</table>

---

*References, characteristics (continued)*
Dimensions

Safety detection solutions
Non-contact safety interlock switches
Plastic

Non-contact safety interlock switches
Pre-cabled connection
XCSDM3/4●●02/05/10

M12 connector (Coding A) connection
XCSDM3/4●●M12

Accessory
Replacement dedicated transmitter
XCSDMT

Pre-wired female connectors
XZ CP29P12L●

INCHES
Dual Dimensions:
Millimeters
Wiring diagrams, mounting

Safety detection solutions
Non-contact safety interlock switches

Wiring diagram
M12 pre-wired female connector
XZ CP29P12L

Mounting
XCSDM3/DM4
Wiring diagrams

Safety detection solutions
Non-contact safety interlock switches

Wiring diagrams

Category 3 (this Category 3 wiring can attain SIL2)
Pre-cabled connection

M12 connector (A coding) connection
XCSDM3791

Pre-cabled connection

M12 connector (A coding) connection
XCSDM3791M12

SIL3/Category 4
Pre-cabled connection

M12 connector (A coding) connection
XCSDM4801

Series mounting non-contact safety interlock switches (2)

Wiring to SIL3/Category 4 with safety relay module
Example: XCSDM3791 + XPSAFL5130

(1) Mechanically linked contacts
(2) Maximum series mounting: 32 maximum with 6.6 ft. (2 m) long cable.
(3) 2A maximum

Courtesy of Steven Engineering, Inc.-230 Ryan Way, South San Francisco, CA 94080-6370-Main Office: (650) 588-9200-Outside Local Area: (800) 258-9200-www.stevenengineering.com
Due to evolution of standards and equipment, the characteristics indicated in texts and images of this document do not constitute a commitment on our part without confirmation.

Design: Schneider Electric
Photos: Schneider Electric

© 2009 Schneider Electric. All rights reserved.