Preventa™
XPSMC Safety Controllers

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Preventa™ XPSMC Safety Controllers
Selection

### Applications
Controllers for several independent safety functions, with selection of safety functions by configuration software running on Windows. 16 or 32 inputs and 8 independent safety outputs.
Monitoring of emergency stops, limit switches, safety interlocks, two-hand controls, light curtains with or without "muting" function, enabling switches, non-contact safety interlocks, safety mats, solenoid valves on hydraulic presses, safety stop at top dead center on eccentric presses and zero speed detection.

### Modules

#### Conformity to Standards
- EN 954-1 - category 4/ISO 13849-1,
- IEC 61508 - SIL 3,
- EN/IEC 60204-1,
- EN/IEC 60947-5-1,
- EN/IEC 61496-1,
- EN 574/ISO 13851,
- EN 954-1/ISO 13849-1

#### Product Certifications
UL, CSA, TÜV, CE

### Number of Circuits
- Safety: 4 N.O. (2 N.O. per function) + 6 solid-state
- Additional: 1 "muting" signalling output

### Display
LED display on front face

### Supply Voltage
24 Vdc

### Communication
- CANopen Bus: Via SUB-D 9-pin male connector, only on XPSMC16ZC and XPSMC32ZC
- Profibus Bus: Via SUB-D 9-pin female connector, only on XPSMC16ZP and XPSMC32ZP
- Modbus Network: Via RJ45 connector, on all controllers XPSMC_Z_c

### Product Type
XPSMC
ELECTRICAL RATINGS

Lifetime Curve and Switching Capability with N.O. Contacts

Determined by EN 60947-5-1 Table C2

<table>
<thead>
<tr>
<th>XPSAC, XPSAT, XPSSTSA, XPSATSW, XPSBA, XPSBC, XPSCM, XPSDA, XPSFB, XPSNS, XPSST, XPSVT, XPSVN, GNKL</th>
<th>XPSAT (instantaneous contacts), XPSECM, XPSECP, GBS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Switching current (A)</strong></td>
<td><strong>Number of operating cycles</strong></td>
</tr>
<tr>
<td>AC 15: 230 V</td>
<td>10^7</td>
</tr>
<tr>
<td>DC 13: 24 V</td>
<td>10^6</td>
</tr>
<tr>
<td>AC 1: 230 V</td>
<td>10^5</td>
</tr>
<tr>
<td>DC 1: 24 V</td>
<td>10^4</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>XPSAF, XPSAK, XPSAFL</th>
<th>XPSAV, XPSBF, XPSMP, XPSMC</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Switching current (A)</strong></td>
<td><strong>Number of operating cycles</strong></td>
</tr>
<tr>
<td>AC 15: 230 V</td>
<td>10^7</td>
</tr>
<tr>
<td>DC 13: 24 V</td>
<td>10^6</td>
</tr>
<tr>
<td>AC 1: 230 V</td>
<td>10^5</td>
</tr>
<tr>
<td>DC 1: 24 V</td>
<td>10^4</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>XPSAR</th>
<th>XPSDMB/DME</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Switching current (A)</strong></td>
<td><strong>Number of operating cycles</strong></td>
</tr>
<tr>
<td>DC 13: 24 V</td>
<td>10^7</td>
</tr>
<tr>
<td>AC 15: 230 V</td>
<td>10^6</td>
</tr>
<tr>
<td>AC 1: 230 V</td>
<td>10^5</td>
</tr>
</tbody>
</table>

The product life expressed above 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.
Preventa™ XPSMC Safety Controllers
Overview

Configurable safety controllers XPSMCZ are designed to provide a solution for safety applications requiring conformity to category 4 of standard EN 954-1, ISO 13849-1, and SIL 3 requirements of standard IEC 61508.

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

<table>
<thead>
<tr>
<th>Configurable controllers</th>
<th>Safety inputs</th>
<th>Safety outputs $^{(1)}$</th>
<th>Bus and networks connection</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>CANopen bus</td>
</tr>
<tr>
<td>XPSMC16Z</td>
<td>16</td>
<td>$6 + 2 \times 2$</td>
<td>–</td>
</tr>
<tr>
<td>XPSMC16ZC</td>
<td>16</td>
<td>$6 + 2 \times 2$</td>
<td>Yes, slave</td>
</tr>
<tr>
<td>XPSMC16ZP</td>
<td>16</td>
<td>$6 + 2 \times 2$</td>
<td>–</td>
</tr>
<tr>
<td>XPSMC32Z</td>
<td>32</td>
<td>$6 + 2 \times 2$</td>
<td>–</td>
</tr>
<tr>
<td>XPSMC32ZC</td>
<td>32</td>
<td>$6 + 2 \times 2$</td>
<td>Yes, slave</td>
</tr>
<tr>
<td>XPSMC32ZP</td>
<td>32</td>
<td>$6 + 2 \times 2$</td>
<td>–</td>
</tr>
</tbody>
</table>

Control Outputs

The safety inputs (16 or 32) into the safety controller are supplied with power from the safety controller terminals identified as control outputs $^{(2)}$, and these circuits are monitored for short-circuits between each input and ground 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 XPSMCZ are configurable and addressable using XPSMCWIN software running on a PC. Connection accessories required: see page 11.

Connections

For connection of safety inputs and outputs, safety controllers XPSMCZ can be fitted with a choice of:

- screw connectors type XPSMCTS, or
- spring clip connectors type XPSMCTC.

These connectors are to be ordered separately, see page 10.

$^{(1)}$ The safety outputs consist of six solid state outputs and two sets of relay outputs with two contacts each (for a total of four relay output contacts).

$^{(2)}$ Control outputs are available to power safety inputs, but they are not safety outputs.
Preventa™ XPSMC Safety Controllers
Overview

Safety Functions

Configuration of the safety functions is carried out using XPSMCWIN software.

30 certified 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:

- Certified in accordance with EN 954-1/ISO 13849-1 and IEC 61508,
- Configurable in controller XPSMC using XPSMCWIN software.

All 8 safety outputs are suitable for use in safety related parts of control systems conforming to category 4 of EN 954-1/ISO 13849-1, and SIL 3 requirements of standard IEC 61508. Each output can disconnect one of its safety circuits.

<table>
<thead>
<tr>
<th>Main safety functions</th>
<th>Wiring Diagrams and functional diagrams, see pages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emergency stop monitoring, with or without time delay, 1 or 2-channel wiring</td>
<td>12, 13</td>
</tr>
<tr>
<td>Two-hand control (type III-C conforming to EN 574/ISO 13851)</td>
<td>14</td>
</tr>
<tr>
<td>Guard monitoring with 1 or 2 limit switches or safety interlocks</td>
<td>15-19</td>
</tr>
<tr>
<td>Guard monitoring for injection presses and blowing machines</td>
<td>20, 21</td>
</tr>
<tr>
<td>Non-contact safety interlock switch monitoring</td>
<td>22, 23</td>
</tr>
<tr>
<td>Safety mat monitoring</td>
<td>24, 25</td>
</tr>
<tr>
<td>Light curtain (type 4 conforming to EN/IEC 61496, relay or solid-state output)</td>
<td>26-29</td>
</tr>
<tr>
<td>Zero speed detection</td>
<td>30</td>
</tr>
<tr>
<td>Dynamic monitoring of hydraulic valves on linear presses</td>
<td>31</td>
</tr>
<tr>
<td>Monitoring safety stop at top dead center on eccentric press</td>
<td>32-35</td>
</tr>
<tr>
<td>Safety time delays</td>
<td>36</td>
</tr>
<tr>
<td>“Muting” function of light curtains</td>
<td>37</td>
</tr>
<tr>
<td>Enabling switch monitoring, 2 or 3 contact</td>
<td>38, 39</td>
</tr>
<tr>
<td>Hydraulic press</td>
<td>40, 41</td>
</tr>
<tr>
<td>Eccentric press</td>
<td>42, 43</td>
</tr>
<tr>
<td>Foot switch monitoring</td>
<td>44</td>
</tr>
<tr>
<td>Chain shaft breakage monitoring</td>
<td>45</td>
</tr>
<tr>
<td>Position selector</td>
<td>46</td>
</tr>
</tbody>
</table>
## Preventa™ XPSMC Safety Controllers
### Overview

### Communication

#### CANopen fieldbus
- **Configurable controllers** XPSMC16Z, MC32ZC incorporate a SUB-D 9-pin male connector for direct connection on CANopen bus.
- CANopen bus is an 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 data rate varies between 10 Kbps and 1Mbps depending on the length of the bus (16404 to 65.6 ft (5000 m to 20 m)).

#### Profibus bus
- **Configurable controllers** XPSMC16ZP are slaves on the Profibus bus.
- Profibus bus is a fieldbus that meets industrial communication requirements. The topology of the Profibus bus is of the linear type with a centralized master/slave type access procedure.
- The physical link is a single shielded twisted pair.

#### Modbus network
- **Configurable controllers** XPSMC16Z, MC32ZC incorporate a Modbus® communication interface (RJ45 socket) for configuration and diagnostics.
- 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 bus. The latter execute the order without transmitting a reply.
Preventa™ XPSMC Safety Controllers
Overview

Description

Configurable safety controllers XPSMCoZp

Front cover of controllers
1. LED display and system diagnostics.
2. Two LEDs for CANopen or Profibus (1) connection status.
3. SUB-D 9-pin male connector for connection on CANopen bus (XPSMC16ZC/ MC32ZC) or SUB-D 9-pin female connector for connection on Profibus bus (XPSMC16ZP/ MC32ZP).
5. Power supply (24 Vdc) and relay safety output terminals.
6. Control output terminals for power supply to safety inputs and safety input terminals.
7. RJ45 connector for connection on Modbus network.
8. RESET button (resetting of controller).

Back of controllers

LED details

<table>
<thead>
<tr>
<th>LED</th>
<th>Color</th>
<th>Status</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>PWR</td>
<td>Green</td>
<td>On</td>
<td>Supply voltage present.</td>
</tr>
<tr>
<td>CNF</td>
<td>Yellow</td>
<td>On</td>
<td>In configuration mode.</td>
</tr>
<tr>
<td>E In</td>
<td>Red</td>
<td>Flashing</td>
<td>Not configured, initial power-up.</td>
</tr>
<tr>
<td>E Ex</td>
<td>Red</td>
<td>On</td>
<td>External error: all safety outputs deactivated.</td>
</tr>
<tr>
<td>COM</td>
<td>Green</td>
<td>On</td>
<td>Controller communicating via the TER (RJ45) connection.</td>
</tr>
<tr>
<td>R1, R2</td>
<td>Green</td>
<td>On</td>
<td>Relay outputs 13/14, 23/24, 33/34 and 43/44 activated.</td>
</tr>
<tr>
<td>RUN</td>
<td>Green</td>
<td>Off</td>
<td>Hardware OK for the Profibus bus or the CANopen bus.</td>
</tr>
<tr>
<td>ERR</td>
<td>Red</td>
<td>On</td>
<td>Communication impossible, configuration error, damaged cabling or absence. Bus deactivated.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Off</td>
<td>Communicating on CANopen or Profibus bus. Normal status.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Flashing (x 1)</td>
<td>Warning limit reach.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Flashing (x 2)</td>
<td>Control event error on CANopen bus.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Flashing (x 3)</td>
<td>Synchronization error on CANopen bus.</td>
</tr>
<tr>
<td>1 to 16</td>
<td>Green</td>
<td>On</td>
<td>Input circuit closed.</td>
</tr>
<tr>
<td>1 to 32</td>
<td></td>
<td>Flashing</td>
<td>Error detected on input relating to LED.</td>
</tr>
<tr>
<td>01 to 06</td>
<td>Green</td>
<td>On</td>
<td>Solid-state output activated.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Flashing</td>
<td>Short-circuit, fault on output.</td>
</tr>
<tr>
<td>RUN</td>
<td>Green</td>
<td>On</td>
<td>Run mode.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Flashing</td>
<td>Changing from run mode to stop mode.</td>
</tr>
</tbody>
</table>

(1) Depending on controller model.
Preventa™ XPSMC Safety Controllers
Technical Data

<table>
<thead>
<tr>
<th>Configurable safety controller type</th>
<th>XPSMC16Z and MC32Z, XPSMC16ZC and MC32ZC, XPSMC16ZP and MC32ZP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conformity to standards</td>
<td>EN/IEC 60204-1, EN 1760-1/ISO 13856-1, EN/IEC 60947-5-1, EN/IEC 61496-1, EN/IEC 61434-1, EN 954-1/ISO 13849-1, IEC 61508</td>
</tr>
<tr>
<td>Product certifications</td>
<td>UL, CSA, TÜV, CE</td>
</tr>
<tr>
<td>Products designed for max. use in safety related parts of control systems (conforming to EN 954-1/ISO 13849-1 and IEC 61508)</td>
<td>Category 4 max. (EN 954-1/ISO 13849-1), SIL 3 max. (IEC 61508)</td>
</tr>
<tr>
<td>Power supply</td>
<td>V 24 Vdc ± 20%</td>
</tr>
<tr>
<td>Power consumption</td>
<td>W 12</td>
</tr>
<tr>
<td>Fuse protection</td>
<td>A 16 gL max.</td>
</tr>
<tr>
<td>Start button monitoring</td>
<td>Configurable</td>
</tr>
<tr>
<td>Control circuit voltage (maximum)</td>
<td>28.8 V/13 mA</td>
</tr>
<tr>
<td>Calculation of wiring resistance RL</td>
<td>Ω 100 max, maximum cable length: 6500 ft. (2000 m)</td>
</tr>
<tr>
<td>Synchronization time between inputs</td>
<td>s Depending on configuration selected</td>
</tr>
<tr>
<td>Outputs</td>
<td>Relay</td>
</tr>
<tr>
<td></td>
<td>Safety circuit 2 N.O. per function (4 N.O. total) (13-14, 23-24, 33-34, 43-44)</td>
</tr>
<tr>
<td></td>
<td>Breaking capacity in AC-15 VA C300: inrush 1800, maintained 180</td>
</tr>
<tr>
<td></td>
<td>Breaking capacity in DC-13 24 V/1.5 A L/R = 50 ms</td>
</tr>
<tr>
<td></td>
<td>Thermal current (Ith) for each group of 2 outputs A 6 for 1 output and 2 for the other, or 4 for both outputs.</td>
</tr>
<tr>
<td></td>
<td>Current limit A 16 gL</td>
</tr>
<tr>
<td></td>
<td>Output fuse protection A 4 gL or 6 fast acting</td>
</tr>
<tr>
<td></td>
<td>Minimum current mA 10 (1)</td>
</tr>
<tr>
<td></td>
<td>Minimum voltage V 17 (1)</td>
</tr>
<tr>
<td></td>
<td>Breaking capacity 24 Vdc/2 A</td>
</tr>
<tr>
<td></td>
<td>Safety circuit 6 solid-state (O1, O2, O3, O4, O5, O6)</td>
</tr>
<tr>
<td></td>
<td>Current limit A 6 solid-state</td>
</tr>
<tr>
<td>Electric life</td>
<td>See page 3</td>
</tr>
<tr>
<td>Response time on input opening</td>
<td>ms Response time = 20 or 30, configurable using software XPSMCWIN</td>
</tr>
<tr>
<td></td>
<td>— if controllers XPSMCZP are set for 20 ms, response time for safety mats will be 30 ms</td>
</tr>
<tr>
<td></td>
<td>— if controllers XPSMCZP are set for 30 ms, response time for safety mats will be 45 ms</td>
</tr>
<tr>
<td>Rated insulation voltage (Ui)</td>
<td>V 300 (degree of pollution 2 conforming to IEC 60647-5-1, DIN VDE 0110 part 1)</td>
</tr>
<tr>
<td>Rated impulse withstand voltage (Uimp.)</td>
<td>kV 4 (overvoltage category III, conforming to IEC 60647-5-1, DIN VDE 0110 part 1)</td>
</tr>
<tr>
<td>LED display</td>
<td>30 (XPS MC16Z), 46 (XPS MC32Z)</td>
</tr>
<tr>
<td>Temperature</td>
<td>Operating +14°F to +130°F (-10°C to +55°C)</td>
</tr>
<tr>
<td></td>
<td>Storage -13°F to +185°F (-25°C to +85°C)</td>
</tr>
<tr>
<td>Degree of protection</td>
<td>IP 20 conforming to IEC 60529 (connector and enclosure)</td>
</tr>
</tbody>
</table>

(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).
Preventa™ XPSMC Safety Controllers
Technical Data

Communication

**Modbus network**

<table>
<thead>
<tr>
<th>Compatibility</th>
<th>XPSMC16Z, XPSMC32Z, XPSMC16ZC, XPSMC32ZC, XPSMC16ZP, XPSMC32ZP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Serial link ports</td>
<td>Number and type 1 x RJ45</td>
</tr>
<tr>
<td>Status</td>
<td>Slave</td>
</tr>
<tr>
<td>Data exchange</td>
<td>14 words</td>
</tr>
<tr>
<td>Addressing</td>
<td>1 to 247</td>
</tr>
<tr>
<td>Speed (Baud)</td>
<td>bps 1200, 2400, 4800, 9600 or 19200</td>
</tr>
<tr>
<td>Parity</td>
<td>Even, odd, none</td>
</tr>
<tr>
<td>Fixed parameters</td>
<td>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</td>
</tr>
<tr>
<td>Functions supported</td>
<td>01: 8-bit output data / 32-bit input data (0 = OFF, 1 = ON) 02: 32-bit input data / 8-bit output data (0 = OFF, 1 = ON) 03: information and errors</td>
</tr>
</tbody>
</table>

**CANopen bus**

<table>
<thead>
<tr>
<th>Compatibility</th>
<th>XPSMC16ZC, XPSMC32ZC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Serial link ports</td>
<td>Number and type 1 x SUB-D 9-pin male</td>
</tr>
<tr>
<td>Status</td>
<td>Slave</td>
</tr>
<tr>
<td>Data exchange</td>
<td>14 words By included dual port memory: only data addresses, diagnostics, but no baud rates</td>
</tr>
<tr>
<td>Parameters (adjustable using software XPSMCWIN)</td>
<td>Speed (Baud) Kbps 20, 50, 125, 250, 500, 800 Mbps 1 Address 1 to 127</td>
</tr>
</tbody>
</table>

**Profibus bus**

<table>
<thead>
<tr>
<th>Compatibility</th>
<th>XPSMC16ZP, XPSMC32ZP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Serial link ports</td>
<td>Number and type 1 x SUB-D 9-pin female</td>
</tr>
<tr>
<td>Status</td>
<td>Slave</td>
</tr>
<tr>
<td>Data exchange</td>
<td>14 words By included dual port memory: only data addresses</td>
</tr>
<tr>
<td>Parameters</td>
<td>Speed (Baud) Mbps 12 Address 1 to 125</td>
</tr>
</tbody>
</table>

Connections

<table>
<thead>
<tr>
<th>Type</th>
<th>Power supply and relay output terminals</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Separate plug-in screw connector XPSMCTS pp (1)</td>
</tr>
</tbody>
</table>

**Power supply and relay output terminals**

<table>
<thead>
<tr>
<th>Type</th>
<th>Without cable end</th>
<th>With cable end</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 conductor</td>
<td>Solid or stranded cable: 24-12 AWG (0.2-2.5 mm²)</td>
<td>Without bezel, stranded cable: 22-14 AWG (0.25-2.5 mm²)</td>
</tr>
<tr>
<td></td>
<td>With bezel, stranded cable: 22-14 AWG (0.25-2.5 mm²)</td>
<td></td>
</tr>
<tr>
<td>2 conductors</td>
<td>Solid or stranded cable: 24-16 AWG (0.2-1.5 mm²)</td>
<td>Without bezel, stranded cable: 22-16 AWG (0.25-1.5 mm²)</td>
</tr>
<tr>
<td></td>
<td>With bezel, stranded cable: 22-16 AWG (0.25-1.5 mm²)</td>
<td>Double, with bezel, stranded cable: 20-16 AWG (0.5-1.5 mm²)</td>
</tr>
<tr>
<td></td>
<td>Without cable end</td>
<td>Double, with bezel, stranded cable: 20-18 AWG (0.5-1.0 mm²)</td>
</tr>
<tr>
<td></td>
<td>Solid or stranded cable: 28-16 AWG (0.14-1.5 mm²)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Without bezel, stranded cable: 22-16 AWG (0.25-1.5 mm²)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>With bezel, stranded cable: 22-20 AWG (0.25-0.5 mm²)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Without cable end</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Solid cable: 28-20 AWG (0.14-0.5 mm²) Stranded cable: 28-20 AWG (0.14-0.5 mm²)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Without bezel, stranded cable: 22 AWG (0.25-0.34 mm²)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>With cable end</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Double, with bezel, stranded cable: 20 AWG (0.5 mm²)</td>
<td></td>
</tr>
</tbody>
</table>

**Other terminals**

<table>
<thead>
<tr>
<th>Type</th>
<th>Power supply and relay output terminals</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Separate plug-in screw connector XPSMCTS pp (1)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Type</th>
<th>Without cable end</th>
<th>With cable end</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 conductor</td>
<td>Solid or stranded cable: 28-16 AWG (0.14-1.5 mm²)</td>
<td>Without bezel, stranded cable: 22-16 AWG (0.25-1.5 mm²)</td>
</tr>
<tr>
<td></td>
<td>With bezel, stranded cable: 22-20 AWG (0.25-0.5 mm²)</td>
<td></td>
</tr>
<tr>
<td>2 conductors</td>
<td>Solid cable: 28-20 AWG (0.14-0.5 mm²) Stranded cable: 28-20 AWG (0.14-0.5 mm²)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Without bezel, stranded cable: 22 AWG (0.25-0.34 mm²)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>With cable end</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Double, with bezel, stranded cable: 20 AWG (0.5 mm²)</td>
<td></td>
</tr>
</tbody>
</table>

**Enclosure mounting**

(conforming to DIN EN 50022)

<table>
<thead>
<tr>
<th>Power supply and relay output terminals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metal adaptor for mounting on “L” 35 mm metal rail</td>
</tr>
</tbody>
</table>

(1) To be ordered separately.
Preventa™ XPSMC Safety Controllers
Ordering Information

Configurable safety controllers (connectors not included)

<table>
<thead>
<tr>
<th>Number of inputs</th>
<th>Number of outputs (1)</th>
<th>Communication (Network and bus)</th>
<th>Catalog Number</th>
<th>Weight oz (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>16</td>
<td>Relay: 4 (2 x 2)</td>
<td>Solid-state: 6</td>
<td>XPSMC16Z</td>
<td>28.92 (0.820)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>XPSMC16ZC</td>
<td>28.92 (0.820)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>XPSMC16ZP</td>
<td>28.92 (0.820)</td>
</tr>
<tr>
<td>32</td>
<td>Relay: 4 (2 x 2)</td>
<td>Solid-state: 6</td>
<td>XPSMC32Z</td>
<td>29.63 (0.840)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>XPSMC32ZC</td>
<td>29.63 (0.840)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>XPSMC32ZP</td>
<td>29.63 (0.840)</td>
</tr>
</tbody>
</table>

Plug-in connectors for configurable safety controllers (2)

<table>
<thead>
<tr>
<th>Description</th>
<th>For use with</th>
<th>Catalog Number</th>
<th>Weight oz (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Screw connectors</td>
<td>XPSMC16Z, MC16ZC, MC16ZP</td>
<td>XPSMCTS16</td>
<td>2.82 (0.080)</td>
</tr>
<tr>
<td></td>
<td>XPSMC32Z, MC32ZC, MC32ZP</td>
<td>XPSMCTS32</td>
<td>3.88 (0.110)</td>
</tr>
<tr>
<td>Spring clip connectors</td>
<td>XPSMC16Z, MC16ZC, MC16ZP</td>
<td>XPSMCTC16</td>
<td>2.82 (0.080)</td>
</tr>
<tr>
<td></td>
<td>XPSMC32Z, MC32ZC, MC32ZP</td>
<td>XPSMCTC32</td>
<td>3.88 (0.110)</td>
</tr>
</tbody>
</table>

Configuration software

<table>
<thead>
<tr>
<th>Description</th>
<th>Characteristics</th>
<th>Catalog Number</th>
<th>Weight oz (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Configuration software for controllers XPSMC16Z/32Z</td>
<td>CD-ROM + user manual Operating system: Windows NT®, 2000 or XP</td>
<td>XPSMCWIN</td>
<td>18.32 (0.520)</td>
</tr>
</tbody>
</table>

(1) The safety outputs consist of six solid state outputs and two sets of relay outputs with two contacts each (for a total of four relay output contacts).
(2) To be ordered separately from the controllers.
Connecting cables (1)

<table>
<thead>
<tr>
<th>Function</th>
<th>Description</th>
<th>Length (ft (m))</th>
<th>Catalog number</th>
<th>Weight oz (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diagnostics using Magelis® operator dialog terminal type XBTG (using adapter XPSMCCPC)</td>
<td>-</td>
<td>8.20 (2.5)</td>
<td>XBTZ968</td>
<td>6.35 (0.180)</td>
</tr>
<tr>
<td>Configuration</td>
<td>1 Adapter: RJ45 socket/PC connection cables</td>
<td>-</td>
<td>XPSMCCPC</td>
<td>0.39 (0.011)</td>
</tr>
<tr>
<td></td>
<td>2 Cable to PC serial port</td>
<td>8.20 (2.5)</td>
<td>TSXPCX1031</td>
<td>6.00 (0.170)</td>
</tr>
<tr>
<td></td>
<td>2 Cable to PC USB port</td>
<td>8.20 (2.5)</td>
<td>TSXPCX3030</td>
<td>6.00 (0.170)</td>
</tr>
<tr>
<td>Modbus network access</td>
<td>Premium automation platform TSX SCY 21601</td>
<td>-</td>
<td>XPSMCSCY</td>
<td>-</td>
</tr>
<tr>
<td>CANopen bus access</td>
<td>1 CANopen connection cables (fitted with 1 SUB-D 9-pin female connector at each end)</td>
<td>0.98 (0.3)</td>
<td>TSXCANCADD03</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>2 CANopen tap-off box</td>
<td>3.28 (1.0)</td>
<td>TSXCANCADD1</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>3 Standard CANopen cables</td>
<td>9.84 (3.0)</td>
<td>TSXCANCADD3</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>16.40 (5.0)</td>
<td>TSXCANCADD5</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Profibus bus access</td>
<td>-</td>
<td>-</td>
<td>TSCCANTDM4</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>164.04 (50.0)</td>
<td>TSXCANCB50</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td></td>
<td>328.08 (100.0)</td>
<td>TSXCANCB100</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td></td>
<td>984.25 (300.0)</td>
<td>TSXCANCB300</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Accessories</td>
<td>Regulated power supply, single-phase</td>
<td>Output voltage: 24 Vdc</td>
<td>ABL7RP2410</td>
<td>77.00 (2.200)</td>
</tr>
<tr>
<td></td>
<td>Nominal current: 10 A</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Nominal power: 240 W</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(1) To be ordered separately

Dimensions

(1) 6.02" (153 mm) with screw connector XPSMCTSz. 5.96" (151.4 mm) with spring clip connector XPSMCTCsz.
(2) Metal adaptor for mounting on metal "L:" 35 mm rail.

Overview: .......... 4-7
Technical Data: .......... 8, 9
Wiring Diagrams and Functions: .......... 12 - 46

Preventa™ XPSMC Safety Controllers
Ordering Information and Dimensions
Preventa™ XPSMC Safety Controllers
Wiring Diagrams

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

A jumper between the two terminals of an emergency stop will not be detected. Short-circuits between I1, I2, I3 will be detected.

Functional diagram

Run Emergency stop Run Emergency stop Run
Input Emergency stop 1
Input Emergency stop 2
Input Emergency stop 3
Relay outputs K1/K2 Stop category 0
Relay outputs K3/K4 Stop category 1
tv = 0...300 s
tv = 0...300 s

Key
0 1

Overview .................. 4-7
Technical Data .............. 8, 9
Ordering Information ...... 10, 11
Dimensions .................. 11

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Courtesy of Steven Engineering, Inc. ● 230 Ryan Way, South San Francisco, CA 94080-6370 ● General Inquiries: (800) 670-4183 ● www.stevenengineering.com
Emergency stop monitoring, with or without time delay, 2-channel wiring, with start button Category 4 conforming to standard EN 954-1.

A jumper between the two terminals of an emergency stop will not be detected. Short-circuits between I1, I2, I3 will be detected.

(1) Technical characteristics for maximum rating of fuses, see page 8.
(2) Only applicable to XPSMC32Z.

Functional diagram

Run    Run    Run
Input Emergency stop 1 Input Emergency stop 1 Input Emergency stop 2
Input Emergency stop 2 Input Emergency stop 2 Input Start
Output O1 Stop category 0 Output O2 Stop category 1

Key

tv = delay time

tv = 0...300 s

Overview .......................... 4-7
Technical Data ..................... 8, 9
Ordering Information .......... 10, 11
Dimensions ........................ 11
Preventa™ XPSMC Safety Controllers
Wiring Diagrams

Two-hand control (type III-C conforming to EN 574-1) Category 4 conforming to standard EN 954-1.

<table>
<thead>
<tr>
<th>230 V</th>
<th>24 V</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Control outputs

A1 C8 C7 C6 C5 C4 C3 C2 C1 I1 I2 I3 I4 I5 I6 I7 I8 I9 I10 I11 I12 I13 I14 I15 I16 I17 I18 I19 I20 I21 I22 I23 I24 I25 I26 I27 I28 I29 I30 I31 I32

(1) Technical characteristics for maximum rating of fuses, see page 8.
(2) Only applicable to XPSMC32Z.

Functional diagram

Start-up

Mushroom head 1
- Input 1 closing
- Input 1 opening

Mushroom head 2
- Input 2 closing
- Input 2 opening

Output
- No start-up

Key
- tv = delay time

Overview .................. 4-7
Technical Data ............. 8, 9
Ordering Information ...... 10, 11
Dimensions ................ 11
Guard monitoring with 1 limit switch or safety interlock Category 1 conforming to standard EN 954-1.

(1) Technical characteristics for maximum rating of fuses, see page 8. (2) Only applicable to XPSMC32Z.

Functional diagrams

Start test = NO

Automatic start
Input Limit switch 1
Output

Rising edge monitored start
Input Limit switch 1
Input Start
Output

Falling edge monitored start
Input Limit switch 1
Input Start
Output

Start test = YES

Automatic start
Input Limit switch 1
Output

Rising edge monitored start
Input Limit switch 1
Input Start
Output

Falling edge monitored start
Input Limit switch 1
Input Start
Output

Key
0
1
Guard monitoring with 2 limit switches or safety interlocks Category 4 conforming to standard EN 954-1.

ESC = external start conditions
EDM = external devices monitoring

(1) Technical characteristics for maximum rating of fuses, see page 8.
(2) Only applicable to XPSMC32Zp.

Overview ............... 4-7
Technical Data ............ 8, 9
Ordering Information ...... 10, 11
Dimensions ................ 11
Guard monitoring with 2 limit switches or safety interlocks (continued)

Functional diagrams

<table>
<thead>
<tr>
<th>Start test = NO</th>
<th>Start test = YES</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Automatic start</strong></td>
<td><strong>Automatic start</strong></td>
</tr>
<tr>
<td><strong>Start-up</strong></td>
<td><strong>Output</strong></td>
</tr>
<tr>
<td>Input Limit switch 1</td>
<td>Guard closed</td>
</tr>
<tr>
<td>Input Limit switch 2</td>
<td>Guard open</td>
</tr>
<tr>
<td>Input EDM</td>
<td>Guard closed</td>
</tr>
<tr>
<td>Output</td>
<td>t &lt; t EDM</td>
</tr>
<tr>
<td></td>
<td>t = t EDM</td>
</tr>
<tr>
<td></td>
<td>t &gt; t EDM</td>
</tr>
</tbody>
</table>

**Rising edge monitored start**

<table>
<thead>
<tr>
<th>Start-up</th>
<th>Guard closed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input Limit switch 1</td>
<td>Guard open</td>
</tr>
<tr>
<td>Input Limit switch 2</td>
<td>Guard closed</td>
</tr>
<tr>
<td>Input Start</td>
<td>t &lt; t sync.</td>
</tr>
<tr>
<td>Input EDM</td>
<td>t &lt; t EDM</td>
</tr>
<tr>
<td>Output</td>
<td>t &lt; t EDM</td>
</tr>
<tr>
<td></td>
<td>t = t EDM</td>
</tr>
<tr>
<td></td>
<td>t &gt; t EDM</td>
</tr>
</tbody>
</table>

**Falling edge monitored start**

<table>
<thead>
<tr>
<th>Start-up</th>
<th>Guard closed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input Limit switch 1</td>
<td>Guard open</td>
</tr>
<tr>
<td>Input Limit switch 2</td>
<td>Guard closed</td>
</tr>
<tr>
<td>Input Start</td>
<td>t &lt; t sync.</td>
</tr>
<tr>
<td>Input EDM</td>
<td>t &lt; t EDM</td>
</tr>
<tr>
<td>Output</td>
<td>t &lt; t EDM</td>
</tr>
<tr>
<td></td>
<td>t = t EDM</td>
</tr>
<tr>
<td></td>
<td>t &gt; t EDM</td>
</tr>
</tbody>
</table>

**Key**

0

1

EDM = external devices monitoring

t EDM = maximum monitoring time of external devices

t sync. = synchronization time
Guard monitoring with 2 limit switches or safety interlocks, with guard locking Category 4 conforming to standard EN 954-1.

ESC = external start conditions
EDM = external devices monitoring

(1) Technical characteristics for maximum rating of fuses, see page 8.
(2) Only applicable to XPSMC32Z.

Overview.................4-7
Technical Data.............8, 9
Ordering Information......10, 11
Dimensions..................11

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Guard monitoring with 2 limit switches or safety interlocks, with guard locking (continued)

### Functional diagrams

#### Start test = NO

**Automatic start**

<table>
<thead>
<tr>
<th>Input Limit switch 1</th>
<th>Guard closed</th>
<th>Guard open</th>
<th>Guard closed</th>
<th>Start-up</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input Limit switch 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Input Locking</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Output</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Start-up**

- Start test = NO
- Start test = YES

**Automatic start**

<table>
<thead>
<tr>
<th>Input Limit switch 1</th>
<th>Guard closed</th>
<th>Guard open</th>
<th>Guard closed</th>
<th>Start-up</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input Limit switch 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Input Locking</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Output</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**No start-up**

- Start test = NO
- Start test = YES

#### Rising edge monitored start

**Start-up**

<table>
<thead>
<tr>
<th>Input Limit switch 1</th>
<th>Guard closed</th>
<th>Guard open</th>
<th>Guard closed</th>
<th>Start-up</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input Limit switch 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Input Locking</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Input Start</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Output</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Start-up**

- Start test = NO
- Start test = YES

#### Falling edge monitored start

**Start-up**

<table>
<thead>
<tr>
<th>Input Limit switch 1</th>
<th>Guard closed</th>
<th>Guard open</th>
<th>Guard closed</th>
<th>Start-up</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input Limit switch 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Input Locking</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Input Start</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Output</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Start-up**

- Start test = NO
- Start test = YES

---

Key

| 0 | 1 |

$t_{sync.}$ = synchronization time
Guard monitoring for injection presses and blowing machines Category 4 conforming to standard EN 954-1.

ESC = external start conditions
EDM = external devices monitoring

(1) Technical characteristics for maximum rating of fuses, see page 8.
(2) Only applicable to XPSMC32Z.
Guard monitoring for injection presses and blowing machines (continued)

### Functional diagrams

#### Start test = NO

<table>
<thead>
<tr>
<th>Automatic start</th>
<th>Start-up</th>
<th>Guard closed</th>
<th>Guard open</th>
<th>Guard closed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input Limit switch 1</td>
<td>Guard closed</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Input Limit switch 2</td>
<td></td>
<td>t &lt; t sync.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Input Valve monitoring</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Output</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Start test = YES

<table>
<thead>
<tr>
<th>Automatic start</th>
<th>Start-up</th>
<th>Guard closed</th>
<th>Guard open</th>
<th>Guard closed</th>
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<tbody>
<tr>
<td>Input Limit switch 1</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Output</td>
<td></td>
<td></td>
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<td></td>
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</tbody>
</table>

#### Rising edge monitored start

<table>
<thead>
<tr>
<th>Rising edge monitored start</th>
<th>Start-up</th>
<th>Guard closed</th>
<th>Guard open</th>
<th>Guard closed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input Limit switch 1</td>
<td>Guard closed</td>
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<td>Input Limit switch 2</td>
<td></td>
<td>t &lt; t sync.</td>
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<tr>
<td>Input Valve monitoring</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Input Start</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Output</td>
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</tbody>
</table>

#### Rising edge monitored start

<table>
<thead>
<tr>
<th>Rising edge monitored start</th>
<th>Start-up</th>
<th>Guard closed</th>
<th>Guard open</th>
<th>Guard closed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input Limit switch 1</td>
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<td></td>
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</tr>
<tr>
<td>Input Start</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Output</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Falling edge monitored start

<table>
<thead>
<tr>
<th>Falling edge monitored start</th>
<th>Start-up</th>
<th>Guard closed</th>
<th>Guard open</th>
<th>Guard closed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input Limit switch 1</td>
<td>Guard closed</td>
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<td></td>
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<tr>
<td>Input Limit switch 2</td>
<td></td>
<td>t &lt; t sync.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Input Valve monitoring</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Input Start</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Output</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Falling edge monitored start

<table>
<thead>
<tr>
<th>Falling edge monitored start</th>
<th>Start-up</th>
<th>Guard closed</th>
<th>Guard open</th>
<th>Guard closed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input Limit switch 1</td>
<td>Guard closed</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Input Limit switch 2</td>
<td></td>
<td>t &lt; t sync.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Input Valve monitoring</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Input Start</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Output</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Key

- **0**: Guard open
- **1**: Guard closed

\[ t \text{ sync.} = \text{synchronization time} \]

Overview . . . . . . . . . . . . . . . . . . . . 4-7
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Wiring Diagrams

Non-contact safety interlock switch monitoring

ESC = external start conditions
EDM = external devices monitoring

(1) Technical characteristics for maximum rating of fuses, see page 8.
(2) Only applicable to XPSMC32Z.

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Wiring Diagrams

Non-contact safety interlock switch monitoring (continued)

Functional diagrams

<table>
<thead>
<tr>
<th>Start test = NO</th>
<th>Start test = YES</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Automatic start</strong></td>
<td><strong>Automatic start</strong></td>
</tr>
<tr>
<td><img src="image" alt="Wiring Diagram" /></td>
<td><img src="image" alt="Wiring Diagram" /></td>
</tr>
</tbody>
</table>

- **Input**: N.C., N.O., EDM
- **Output**: start-up, rising edge monitored start, falling edge monitored start

**Rising edge monitored start**

- **Start-up**
  - Magnet present
  - Magnet not present
  - Magnet present

**Falling edge monitored start**

- **Start-up**
  - Guard closed
  - Guard open
  - Guard closed

Key:

- EDM = external devices monitoring
- t EDM = maximum monitoring time of external devices
- t sync. = synchronization time

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Safety mat monitoring

- Category 3 conforming to standard EN 954-1.
- Control outputs connected to a safety mat cannot be used for other items.

ESC = external start conditions
EDM = external devices monitoring

(1) Technical characteristics for maximum rating of fuses, see page 8.
(2) Only applicable to XPSMC32Z.
Safety mat monitoring (continued)

Functional diagrams

Start-up test

Automatic start

- Input 1: Safety mat
- Input 2: Safety mat
- Input: EDM
- Output

Rising edge monitored start

- Input 1: Safety mat
- Input 2: Safety mat
- Input: Start
- Input: EDM
- Output

Falling edge monitored start

- Input 1: Safety mat
- Input 2: Safety mat
- Input: Start
- Input: EDM
- Output

Key
- 0
- 1
- EDM = external devices monitoring
- t EDM = maximum monitoring time of external devices

Overview .......................... 4-7
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Preventa™ XPSMC Safety Controllers
Wiring Diagrams

Light curtain monitoring, relay output type Category 4 conforming to standard EN 954-1.

Esc = external start conditions
ESPE = electro-sensitive protection equipment (i.e.: light curtains)
OSSD1/OSSD2 = output signal switching device

(1) Technical characteristics for maximum rating of fuses, see page 8.
(2) Only applicable to XPSMC32Z.

ESC = external start conditions
ESPE = electro-sensitive protection equipment (i.e.: light curtains)
OSSD1/OSSD2 = output signal switching device

(1) Technical characteristics for maximum rating of fuses, see page 8.
(2) Only applicable to XPSMC32Z.
Preventa™ XPSMC Safety Controllers
Wiring Diagrams

Light curtain monitoring, relay output type (continued)

Functional diagrams

Start test = NO
Start test = YES

Automatic start

Rising edge
Light curtain beams made
Light curtain beam(s) broken
Light curtain beams made

Input OSSD 1
Input OSSD 2
Input EDM
Output

- t < t EDM
- t = t EDM
- t > t EDM

Automatic start

Rising edge
Light curtain beams made
Light curtain beam(s) broken
Light curtain beams made

Input OSSD 1
Input OSSD 2
Input EDM
Output

- t < t sync.
- t < t EDM
- t > t EDM

Rising edge monitored start

Input OSSD 1
Input OSSD 2
Input Start
Input EDM
Output

- t < t EDM

Rising edge monitored start

Input OSSD 1
Input OSSD 2
Input Start
Input EDM
Output

- t < t EDM

Falling edge monitored start

Input OSSD 1
Input OSSD 2
Input Start
Input EDM
Output

- t < t EDM

Falling edge monitored start

Input OSSD 1
Input OSSD 2
Input Start
Input EDM
Output

- t < t EDM

No start-up

Key

0 1

EDM = external devices monitoring
\( t \) EDM = maximum monitoring time of external devices
\( t \) sync. = synchronization time
Preventa™ XPSMC Safety Controllers
Wiring Diagrams

Light curtain monitoring, solid-state output type Category 4 conforming to standard EN 954-1.

ESC = external start conditions
ESPE = electro-sensitive protection equipment (i.e.: light curtains)
OSSD1/OSSD2 = output signal switching device

(1) Technical characteristics for maximum rating of fuses, see page 8.
(2) Only applicable to XPSMC32Z.

Overview ................. 4-7
Technical Data ............. 8, 9
Ordering Information ...... 10, 11
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Telme canque
Light curtain monitoring, solid-state output type (continued)

Functional diagrams

Start test = NO

Automatic start

Input I1 OSSD 1
Input I2 OSSD 2
Input EDM
Output

Rising edge monitored start

Input I1 OSSD 1
Input I2 OSSD 2
Input Start
Input EDM
Output

Falling edge monitored start

Input I1 OSSD 1
Input I2 OSSD 2
Input Start
Input EDM
Output

Automatically start

Input I1 OSSD 1
Input I2 OSSD 2
Input EDM
Output

Rising edge monitored start

Input I1 OSSD 1
Input I2 OSSD 2
Input Start
Input EDM
Output

Falling edge monitored start

Input I1 OSSD 1
Input I2 OSSD 2
Input Start
Input EDM
Output

No start-up

EDM = external devices monitoring

$\text{t EDM} = \text{maximum monitoring time of external devices}$

$\text{t sync.} = \text{synchronization time}$

Key

| 0 | 1 |

Overview .................................. 4-7
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Preventa™ XPSMC Safety Controllers
Wiring Diagrams

Zero speed detection  Category 4 conforming to standard EN 954-1.

The zero speed signal (validation of the output) will be activated only if:
1: one input is in a high state,
2: the other input is in a low state,
3: the frequency of the two inputs is less than the stated value.

(1) Technical characteristics for maximum rating of fuses, see page 8.
(2) Only applicable to XPSMC32Zp.
(3) Only one "Zero speed detection" function can be connected to an XPSMC controller, and only to the inputs i1 and i2.

Functional diagram

Sensor control

Input 1 (i1)  Sensor B1
Input 2 (i2)  Sensor B2
Output

Zero speed f1, f2 < f max.
Rotation f1, f2 > f max.
Zero speed f1, f2 < f max.
Dynamic monitoring of hydraulic valves on linear presses
Category 4 conforming to standard EN 954-1.

ESC = external start conditions

(1) Technical characteristics for maximum rating of fuses, see page 8.

(2) Only applicable to XPSMC32Z.

Functional diagrams

Valve control

<table>
<thead>
<tr>
<th>Input</th>
<th>Closing of press</th>
<th>Stop at TDC</th>
<th>Stop at BDC</th>
<th>Opening of press</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valve B1 (closing)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Valve B2 (opening)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Input - Valve B3 (closing/opening)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Valve sensor signals

<table>
<thead>
<tr>
<th>Press open (TDC)</th>
<th>Closing of press</th>
<th>Press closed (BDC)</th>
<th>Opening of press</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valve B1 (closing)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Valve B2 (opening)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Valve B3 (closing/opening)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: The valve sensor signals must function as described above.

Key: 0 1

BDC = Bottom Dead Center
TDC = Top Dead Center
1 sync. = synchronization time

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Preventa™ XPSMC Safety Controllers
Wiring Diagrams

Monitoring safety stop at top dead center on eccentric press Category 4 conforming to standard EN 954-1.

This function comprises several monitoring modes including:
- Safety stop at top dead center (1),
- monitoring braking travel,
- as an option, dynamic monitoring of doubled-bodied solenoid valves (2).

S1 and S2: Mushroom buttons for two hand control.
S8: Operating modes:
0 - stop,
1 - adjust,
2 - jog,
3 - automatic continuous run.

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

(1) Technical characteristics for maximum rating of fuses, see page 8.
(2) Only applicable to XPSMC32Z.
## Functional diagram in adjust mode

<table>
<thead>
<tr>
<th>Input</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>OTS</td>
<td>Limit switch associated with top dead center (TDC)</td>
</tr>
<tr>
<td>UN</td>
<td>Limit switch associated with bottom dead center (BDC)</td>
</tr>
<tr>
<td>PSV 1</td>
<td>Safety valve</td>
</tr>
<tr>
<td>PSV 2</td>
<td>Safety valve</td>
</tr>
<tr>
<td>Channel 1</td>
<td></td>
</tr>
<tr>
<td>Channel 2</td>
<td></td>
</tr>
<tr>
<td>Input selector</td>
<td></td>
</tr>
<tr>
<td>Adjust selector</td>
<td></td>
</tr>
<tr>
<td>Jog selector</td>
<td></td>
</tr>
<tr>
<td>Continuous run foot switch (embedded tools)</td>
<td></td>
</tr>
<tr>
<td>Output - Valve 1</td>
<td></td>
</tr>
<tr>
<td>Output - Valve 2</td>
<td></td>
</tr>
<tr>
<td>Output - Emergency stop</td>
<td></td>
</tr>
</tbody>
</table>

### Key
- 0: First position
- 1: Second position

### Technical Notes
- OTS = Limit switch associated with top dead center (TDC)
- UN = Limit switch associated with bottom dead center (BDC)
- PSV = Safety valve
- t sync = Synchronization time
Monitoring safety stop at top dead center on eccentric press (continued)

Functional diagram in jog mode

<table>
<thead>
<tr>
<th>Emergency stop</th>
<th>Selector Jog</th>
<th>Start main movement</th>
<th>Start</th>
<th>Closing of press</th>
<th>Automatic raised maintain</th>
<th>Braking</th>
<th>Stop at TDC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mushroom head 1</td>
<td>Input - N.O.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Input - N.C.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mushroom head 2</td>
<td>Input - N.O.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Input - N.C.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Input - Emergency stop Channel 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Input - Emergency stop Channel 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Input - OTS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Input - UN</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Input - PSV 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Input - PSV 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Input Continuous deactivated</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Input Reset</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Input Stop selector</td>
<td>Start</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Input Adjust selector</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Input Jog selector</td>
<td>Jog</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Input Continuous run foot switch (embedded tools)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Output - Valve 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Output - Valve 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Output - Emergency stop</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Key:
- 0
- 1

BDC = Bottom Dead Center
TDC = Top Dead Center

OTS = Limit switch associated with top dead center (TDC)
UN = Limit switch associated with bottom dead center (BDC)
PSV = safety valve
\( t \text{ sync} \) = synchronization time

\( t < 500 \text{ ms} \)

\( t < t \text{ sync} \)
Monitoring safety stop at top dead center on eccentric press (continued)

Functional diagram in automatic continuous run mode

- Emergency stop
- Reset
- Continuous run
- Stop at TDC
- Continuous run
- Continuous deactivated
- Braking
- Stop at TDC

- Input - Emergency stop Channel 1
- Input - Emergency stop Channel 2
- Input - OTS
- Input - UN
- Input - PSV 1
- Input - PSV 2
- Input - Continuous deactivated
- Input - Reset
- Input - Stop selector
- Input - Adjust selector
- Input - Jog selector
- Input - Continuous run foot switch (embedded tools)
- Output - Valve 1
- Output - Valve 2
- Output - Emergency stop

Key:
- 0
- 1

BDC = Bottom Dead Center
TDC = Top Dead Center

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

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Wiring Diagrams

Safety time delays Category 4 conforming to standard EN 954-1.

Control signal
Output signal for EV function
Output signal for AV function
Output signal for EW function
Output signal for AW function

On-delay
Start-up
Input Control signal
Output
Time delay

Off-delay
Start-up
Input Control signal
Output
Time delay

Pulse on energization
Start-up
Input Control signal
Output
Pulse time

Pulse on de-energization
Start-up
Input Control signal
Output
Pulse time

Key
0
1

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**Wiring Diagrams**

"Muting" function for light curtains Category 4 conforming to standard EN 954-1.

ESC = external start conditions
EDM = external devices monitoring
ESPE = electro-sensitive protection equipment (i.e.: light curtains)
OSSD1/OSSD2 = output signal switching device

---

**Technical characteristics for maximum rating of fuses**, see page 8.

(2) Only applicable to XPSMC32Z.

(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.

---

**Functional diagram**

- Start necessary
- ESPE protected
- "Muting" activated
- Protected zone shunted
- ESPE protected
- "Muting" error
- Outputs Stop
- Free passage activated
- Protected zone shunted
- Start necessary
- ESPE protected

---

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IM = "Muting" time
IF = free passage activation time
t sync. = synchronization time

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Wiring Diagrams

Enabling switch monitoring, 2 contact type Category 1 conforming to standard EN 954-1.

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(1) Technical characteristics for maximum rating of fuses, see page 8.
(2) Only applicable to XPSMC32Z.

Functional diagram

Start-up

Input

Closing enabling switch 13-14

Opening enabling switch 21-22

Output

Key

\[ t < t_Z \]

\[ t > t_Z \]

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Wiring Diagrams

Enabling switch monitoring, 3 contact type Category 4 conforming to standard EN 954-1.

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Wiring Diagrams

Hydraulic press Category 4 conforming to standard EN 954-1.

(1) Technical characteristics for maximum rating of fuses, see page 8.
(2) Only applicable to XPSMC32Z

Functional diagram

Hydraulic press, adjust mode

Emergency stop
Adjust mode
Jog mode
Automatic mode
Hydraulic pump (1)
Opening command
Closing command (1)
Safety device
OT
NWK (1)
UT
Closing valve (1)
Opening valve (1)
Closing + Opening valve
Output - opening
Output - closing
Overtravel OK

(1) Not used.

Key 0
Hydraulic press

Functional diagrams (continued)

Hydraulic press, mode = jog, with overtravel monitoring and opening and closing control coming from the automation platform

- Emergency stop
- Adjust mode
- Jog mode
- Automatic mode
- Hydraulic pump
- Opening command
- Closing command
- Safety device
- OT
- NWK
- UT
- Closing valve
- Opening valve
- Opening + closing valve
- Output - opening
- Output - closing
- Overtravel OK

Hydraulic press, mode = automatic, with overtravel monitoring and opening and closing control coming from the automation platform

- Emergency stop
- Adjust mode
- Jog mode
- Automatic mode
- Hydraulic pump
- Opening command
- Closing command
- Safety device
- OT
- NWK
- UT
- Closing valve
- Opening valve
- Opening + closing valve
- Output - opening
- Output - closing
- Overtravel OK

Key

(1) Not used.
Eccentric press Category 4 conforming to standard EN 954-1.

Overview ........................................... 4-7
Technical Data ................................. 8, 9
Ordering Information .............. 10, 11
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S1 and S2: mushroom buttons for two hand control
S8: Operating modes:
  0 - stop,
  1 - adjust,
  2 - jog,
  3 - automatic continuous run.

OTS = Limit switch associated with top dead center (TDC) (S4)
UN = Limit switch associated with bottom dead center (BDC) (S5)
PSV = safety valve
B1 = sensor at tooth wheel in cam switch mechanism.

(1) Technical characteristics for maximum rating of fuses, see page 8.
(2) Only applicable to XPSMC32Zp.

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Wiring Diagrams

Eccentric press (continued)

Functional diagrams

Eccentric press: Jog
Emergency stop
Adjust mode
Jog mode
Continuous mode
Automatic continuous mode
Safety device + start
Safety device for automatic continuous mode (1)
Shaft monitoring sensor
OTS
UN
PSV1
PSV2
Continuous function deactivated (1)
Reset
Output

Eccentric press: Continuous
Emergency stop
Adjust mode
Jog mode
Continuous mode
Automatic continuous mode
Safety device + start
Safety device for automatic continuous mode (1)
Shaft monitoring sensor
OTS
UN
PSV1
PSV2
Continuous function deactivated (1)
Reset
Output

Eccentric press: automatic continuous
Emergency stop
Adjust mode
Jog mode
Continuous mode
Automatic continuous mode
Safety device + start
Safety device for automatic continuous mode
Shaft monitoring sensor
OTS
UN
PSV1
PSV2
Continuous function deactivated (1)
Reset
Output

Key
0
1
t sync. = synchronization time
1 tot. = dead time
Not used.
Preventa™ XPSMC Safety Controllers
Wiring Diagrams

Foot switch monitoring

(1) Technical characteristics for maximum rating of fuses, see page 8.
(2) Only applicable to XPSMC32Z

Without start interlock

With start interlock

Key

0 1

t sync. = synchronization time

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Chain shaft breakage monitoring

F1

B3

Cam switch drive spindle sensor

(1) Technical characteristics for maximum rating of fuses, see page 8.
(2) Only applicable to XPSMC32Zp.

Functional diagrams

<table>
<thead>
<tr>
<th>Sensor input</th>
<th>Zero speed</th>
<th>Shaft movement</th>
<th>Zero speed or error</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>( t &lt; t_p )</td>
<td></td>
</tr>
</tbody>
</table>

Output

Key

0 1

\( t_p \) = pulse time

Overview: 4-7
Technical Data: 8, 9
Ordering Information: 10, 11
Dimensions: 11
Position selector

Technical characteristics for maximum rating of fuses, see page 8.

(2) Only applicable to XPSMC32Z.

Functional diagrams

Position of position selector

Status required of component n° 1 in the selected position

Status required of component n° 2 in the selected position

Output

Key

Overview .......................... 4-7
Technical Data ........................ 8, 9
Ordering Information .......... 10, 11
Dimensions ........................... 11

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