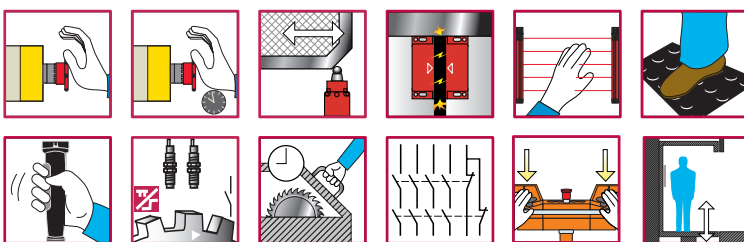


# Modular safety controllers

# Preventa XPSMCM

Catalog

August 2018



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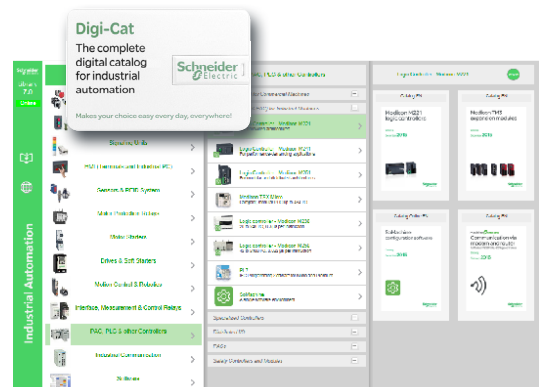
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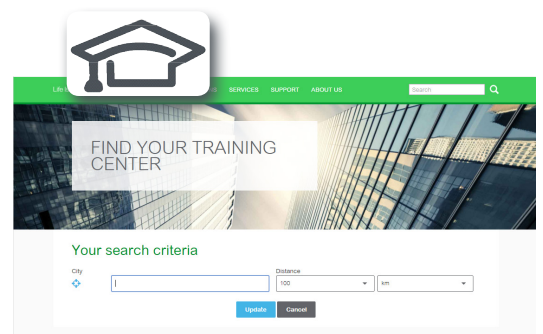
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Life Is On



# General content

## Modular safety controllers Preventa XPSMCM

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**Empowering industrial OEMs for the digital era**

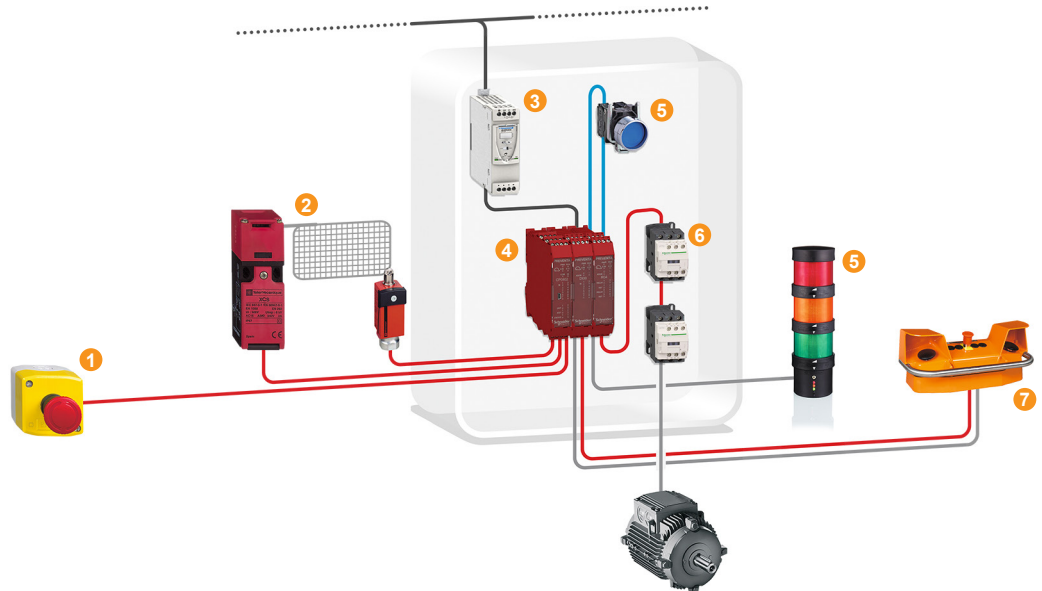
To be competitive in today’s digital era, machine builders must be innovative. Smart machines, those that are better connected, more flexible, more efficient, and safe, are enabling machine builders to innovate in ways never before possible.

- > EcoStruxure™ Machine, our open, interoperable, IoT-enabled system architecture helps you build smarter machines and equipment faster, making your business more efficient, profitable, and sustainable.
- > EcoStruxure Machine brings together key technologies for product connectivity and edge control on premises, and cloud technologies to provide analytics and digital services.
- > EcoStruxure Machine helps you bring more innovation and added value to your customers throughout the entire machine life cycle

**Safety Chain Solutions**

**Save time by using the ready to use, and easy to adapt certified Safety Chain Solutions**

The design of the machine, the re-use of the provided documentation with wiring diagram and documented calculations, for ease with the certification process.



**Solution Breakdown**

- 1 Harmony XALK Emergency stop
- 2 OsiSense safety limit switches
- 3 Phaseo power supply 24 V  $\overline{\text{---}}$
- 4 Preventa Modular safety controllers XPSMCM
- 5 Harmony signaling and control devices
- 6 TeSys D contactor
- 7 Harmony XY2SB two-hand control station



Perimeter Guarding



Position Monitoring



Speed Monitoring



Enabling movement



Guard Monitoring



Emergency Stop

Improve efficiency

Flexible and scalable performance

Schneider Electric offer is covering all the safety functionality and scalability you need for your machine to improve efficiency:

- > Single function offer designed for standalone machines
- > Multi functional offer designed for standalone machines
- > Multi functional offer designed for machine lines with safe distributed architectures

Performance

Multi-function distributed



Preventa XPSMCM  
Modular safety controller



Modicon TM5  
Embedded safety PLC

Multi-function



Embedded safety for Altivar drives  
and Lexium 32 motion controllers    Preventa XPSMC  
Safety controller

Single function



Traditional Preventa  
XPS safety module



Embedded Modicon TM3  
safety functional module

Standalone

Embedded Safety Network

Increase profitability

Everything you need is embedded



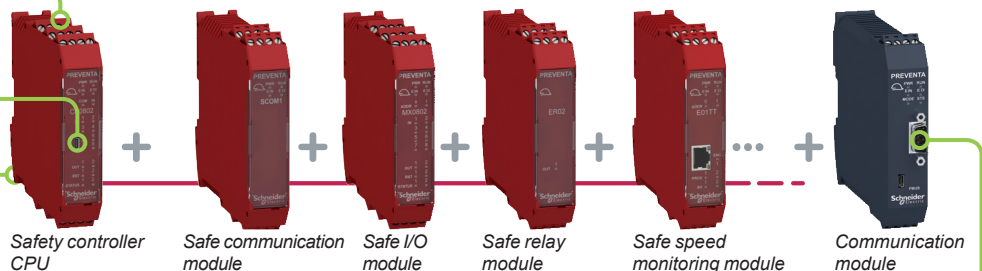
Up to Cat. 4, PL e, SIL3

- > Find the exact match to your specifications
- > Optimize your configuration
- > Save space in a cabinet with less components
- > Expand from small to large configuration by a wide range of expansion and communication modules
- > Build up to 6 island architectures via safe communication up to 50 m between each island

Screw or Spring clamp removable connector

Mini USB 2.0 configuration port

Communication via the expansion bus connector



+ Network and Machine bus: CANopen, Ethernet IP, Modbus Serial (RTU), EtherCAT, Modbus TCP, Profibus DP, Universal Serial Bus (USB)

# Modular safety controllers

## Preventa XPSMCM

### General overview

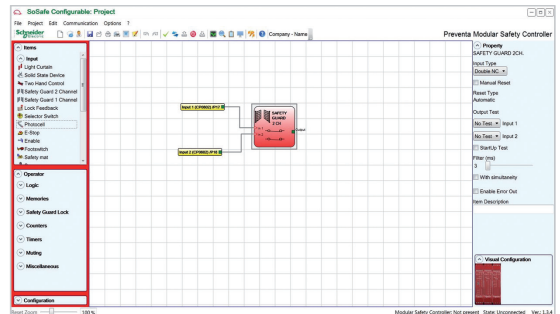
#### Reduce your time to market

#### Intuitive automation with SoSafe Configurable

Easy configuration using intuitive software SoSafe Configurable

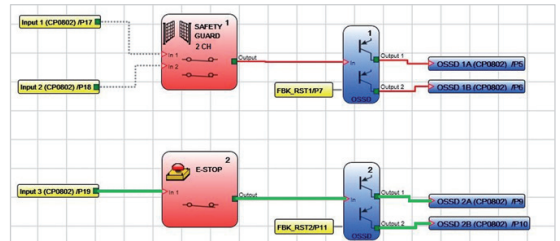
#### Configuration

- 1 Define hardware module configuration
- 2 Create project configuration by drag and drop of function blocks and assignment of inputs and outputs



#### Offline simulation and Online visualization & testing

- > Validate software configuration
- > View configuration behavior by offline simulation and online visualization in graphic or text views



#### Commissioning

- > Use project documentation to support the wiring and safety calculation to complete the commissioning

**Preventa Modular Safety Controller**

Project Report generated by SoSafe Configurable version 1.3.4

Project Name: Project  
User: User  
Company: Company  
Date: 21.10.2016 08:58:25  
Submodule CRC: 07808

Modular Safety Controller: Configuration  
Module CP0002 (Configured Firmware version: FW = 2.0)  
Module CP10 Side 0 (Minimum Required Firmware version: 0.1)  
Module SP4 Side 0 (Minimum Required Firmware version: 0.0)  
Updating from Memory used: Disabled: Yes

Modular Safety Controller: Safety Information  
PTFE (according to IEC 61508): 1.47E-001 (1/a)  
MTTF (according to IEC 61508-1): 175 years  
Sdavg (according to IEC 61508-1): 99.00 %

The PTFE value above takes into account the failure rate of all the components with exclusion of internal relays. For each Relay, output a new value must be added to the previous PTFE depending on the switching frequency and the load on the Relay output. However, the PTFE obtained for Relay output changes according to the customer configuration. See each Relay report for further details.

Attention!  
This definition of PTFE and of the other related parameters as set forth in IEC 61508-1 only refers to the conditions implemented in the Modular Safety Controller system by the BSC configuration software, assuming configuration has been performed correctly. The actual PTFE of the entire application and the relative parameters must consider data for all the devices connected to the Modular Safety Controller system within the scope of the application. This task and any other aspect of system configuration are the exclusive responsibility of the user/installer.

The final MTTF value, taking in account data for all the devices connected to the system, must always be estimated to 100 years if over.

Resources used  
I280T: 124 (1/24)  
Function Block: 2  
Total number blocks: 04 (0/64)  
OSSD-Relay: 2/8 (2/8)  
S120T9: 04 (0/2)

Electrical diagram  
Safety Guard 2 Channel  
Function Block 1  
Filter (a): 3  
Double JK  
Reset Type: Automatic  
Startup Test: False  
Connections:  
In1: CP0002 Input/Terminal17  
In2: CP0002 I280T9/Terminal10

E-stop  
Function Block 2  
Filter (a): 3  
Single  
Reset Type: Automatic  
Startup Test: False  
Connections:  
In1: CP0002 Input/Terminal17  
In2: CP0002 I280T9/Terminal10

CP0002: OSSD  
Reset Type: Automatic  
Response time: 15.000 ms  
Dependence on inputs:  
Function Block 1  
Connections:  
CP0002 OSSD1A/Terminal15  
CP0002 OSSD1B/Terminal16  
CP0002 Psk: Terminal17

CP0002: OSSD  
Reset Type: Automatic  
Response time: 15.000 ms  
Dependence on inputs:  
Function Block 2  
Connections:  
CP0002 OSSD2A/Terminal15  
CP0002 OSSD2B/Terminal16  
CP0002 Psk: Terminal17

Signature \_\_\_\_\_

#### Simplify integration & maintenance



#### Connected everywhere

- > Variety of communication bus for diagnostics for automation systems (I/O status, alarm and alert information)
- > Live diagnostics with PC via USB connection
- > Removable memory card transferring configuration data to new controller without using a PC

#### Customization and services

Our experts help you every step of the way, from perfecting machine design to on-site services of the finished machine. Global support, 24/7 hotline services, and replacement parts centers around the world enable you to deliver superior customer support and satisfaction.





Schneider Electric – the provider of the complete safety chain powered by **Preventa technology**, helps you simply to reach the right level of safety for your machine!



**Approved**

> Safety chain solutions to achieve the safety level required



Make your machine even safer. Easily.

# Modular safety controllers

## Preventa XPSMCM

### System components

#### General presentation

The Preventa Modular safety controllers type XPSMCM are designed to monitor multiple safety functions on and around a machine to minimise the risk of people accessing the dangerous moving parts of the machine.

This modular safety controller is designed for monitoring safety functions such as:

- > Emergency Stop
- > Guard Monitoring
- > Perimeter Guarding
- > Position Monitoring
- > Speed Monitoring
- > Enabling Movement

with input devices such as emergency stop pushbuttons, safety guard and limit switches, safety foot switches, safety light curtains and laser scanners, safety mats, safety encoders and proximity sensors, two-hand control stations and enabling switches.

#### XPSMCM system applications

XPSMCM system offers numerous advantages compared to traditional safety modules, such as:

- > The hardware architecture of expansion modules and layout can be designed according to the machine specification and thus reduces the number of components and the footprint and wiring
- > Simplify input and output wiring by software configuration combining multiple functions together
- > Allowing machine scalability from 8 inputs and 2 outputs and up to 128 inputs, 16 outputs and up to 32 diagnostic status outputs with the expansion modules connected directly to the controller or distributed among 6 islands
- > Connected everywhere with wide range of communication expansion modules
- > Provided with intuitive software for logical configuration, offline simulation and online visualization, testing, and commissioning
- > Simplification of machine maintenance through removable memory card, which can be used to transfer the configuration to a new controller without software

#### XPSMCM system components

XPSMCM system is composed of:

- > A safety controller CPU, which can be used as standalone or together with expansion modules
- > Safe expansion modules: digital input modules, solid state and relay output modules, or mixed input/output modules
- > Safe speed monitoring modules for proximity sensors and safety encoders: Sin/Cos, HTL, TTL
- > Safe communication expansion modules for safe island creation
- > Non-safe communication modules: interfaces to machine fieldbus (CANopen, Profibus DP, Modbus Serial (RTU), EtherCAT, Universal Serial Bus), and network (Modbus TCP, Ethernet IP)
- > A configuration software: SoSafe Configurable
- > A memory card, available for saving configuration data for ease of maintenance and controller setup
- > Backplane Expansion connectors, for connecting the modules to the safety controller CPU

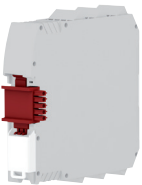
#### Configuration software

The modular safety controller XPSMCM is supported by a completely intuitive software: SoSafe Configurable.

The software follows a simple drag and drop function block approach to configuration and is completed with a library of configurable safety functions and logical functions as well as easy to use tools for:

- > online configuration monitoring
- > offline simulation
- > configuration validator
- > hardware device scanner
- > printable schematics and documentation

SoSafe Configurable supports a quick and easy setup of the machine.



Expansion bus connector



Removable memory card



SoSafe Configurable software



# Modular safety controllers

## Preventa XPSMCM

### Certification – Directive and standards

#### General presentation

##### XPSMCM system certification

XPSMCM system is certified by TÜV SÜD meeting the industrial safety standards of Category 4, PL e according to EN/ISO 13849-1 and SILCL 3 according to IEC/EN 61508 and IEC/EN 60261.

##### Directive and standards

**Preventa Modular safety controller type XPSMCM complies with the following directives and standards.**

Directives and standards	Subject
2006/42/EC	Machinery Directive
2004/108/EC	Electromagnetic Compatibility (EMC)
2006/95/EC	Low Voltage Directive (LVD)
IEC/EN 61131-2	Programmable Controllers– Part 2: Equipment requirements and tests
EN/ISO 13849-1	Safety of machinery: Safety-related parts of control systems – Part 1: General principles for design
EN/ISO 13849-2	Safety of machinery: Safety-related parts of control systems – Part 2: Validation
EN 61496-1 (Type 4)	Safety of machinery: Electro-Sensitive Protection Equipment, Part 1: General requirements and tests
IEC/EN 62061	Safety of machinery – Functional safety of safety-related electrical, electronic and programmable electronic control systems
EN 61508-1	Functional safety of electrical, electronic and programmable electronic safety-related systems – Part 1: General requirements
EN 61508-2	Functional safety of electrical, electronic and programmable electronic safety-related systems – Part 2: Requirements for electrical, electronic and programmable electronic safety – related systems
EN 61508-3	Functional safety of electrical, electronic and programmable electronic safety-related systems – Part 3: Software requirements
IEC 61784-3	Industrial communication networks – Profiles – Part 3: Functional safety field buses – General rules and profile definitions
CE for Europe, cULus mark for USA and Canada, RCM for Australia	

# Modular safety controllers

## Preventa XPSMCM

### System components

#### Flexibility and scalability

The Preventa modular safety controller type XPSMCM provides flexibility and scalability starting with the main unit: the safety controller **XPSMCMCP0802**.

- > It embeds eight safety digital inputs, two OSSD pairs and two status outputs. It is an appropriate solution for machines with a small number of safety functions requiring the configuration flexibility of a safety controller.
- > The safety controller **XPSMCMCP0802** can be used:
  - as standalone
  - and also with fourteen expansion modules: the system is expandable up to 128 inputs, 16 outputs and up to 32 diagnostic status outputs, ideal for machines requiring multiple safety function monitoring
- > Distributed architecture: it is possible to connect six islands up to 50 meters apart (164.04 ft.), using the safe expansion bus.

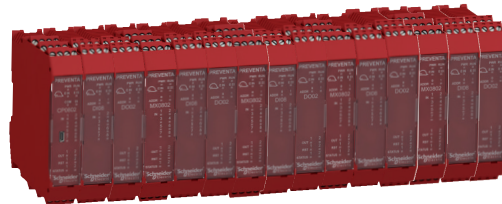
#### Expansion of XPSMCM system

- > Minimum size of hardware: a safety controller **XPSMCMCP0802** is used as standalone.



> 8 safety digital inputs + 2 OSSD pairs + 2 status outputs

- > Maximum size of hardware: one safety controller **XPSMCMCP0802** connected to fourteen expansion modules via the backplane expansion connectors.



> 128 inputs and 16 OSSD pairs + 32 status outputs

#### Key figures of XPSMCM system

Each of XPSMCM system components are compact designed: a single module dimensions are 22.5 x 99 x 114.5 mm ( 0.89 x 3.9 x 4.51 in.), size of a typical safety relay.

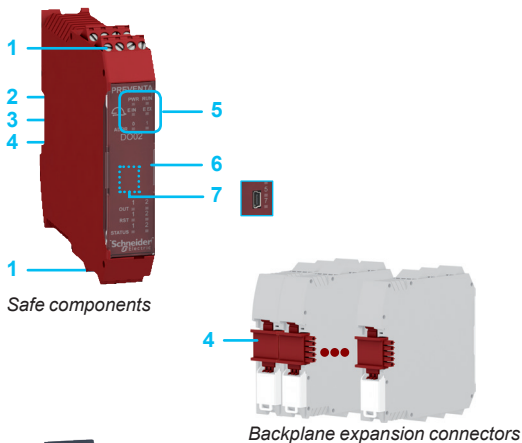
The safe components are red colored and equipped with:

- 1 Removable spring or screw-type terminal blocks (1) for connecting the safety channels and/or the power supply
- 2 Slot for a memory card (only on safety controller)
- 3 L-shaped symmetrical rail locking clip
- 4 Slot for backplane expansion connector
- 5 LEDs displaying the status (I/O, communication, power supply, reset, ...)
- 6 Protective cover
- 7 Mini USB 2.0 connector for configuration (only on safety controller)

The non-safe components are black colored and equipped with:

- 8 Removable spring or screw-type terminal blocks (1) for connecting the power supply
- 9 L-shaped symmetrical rail locking clip
- 10 LEDs displaying the status (I/O, communication, power supply, reset, ...)
- 11 Specific connector for connecting to the machine bus or network (depending on model)
- 12 Mini USB 2.0 connector for configuration

(1) Each XPSMCM component which part number is ending with a G is equipped with spring clamp connector.



Non safe components: non-safe communication modules

# Modular safety controllers

## Preventa XPSMCM

### System components

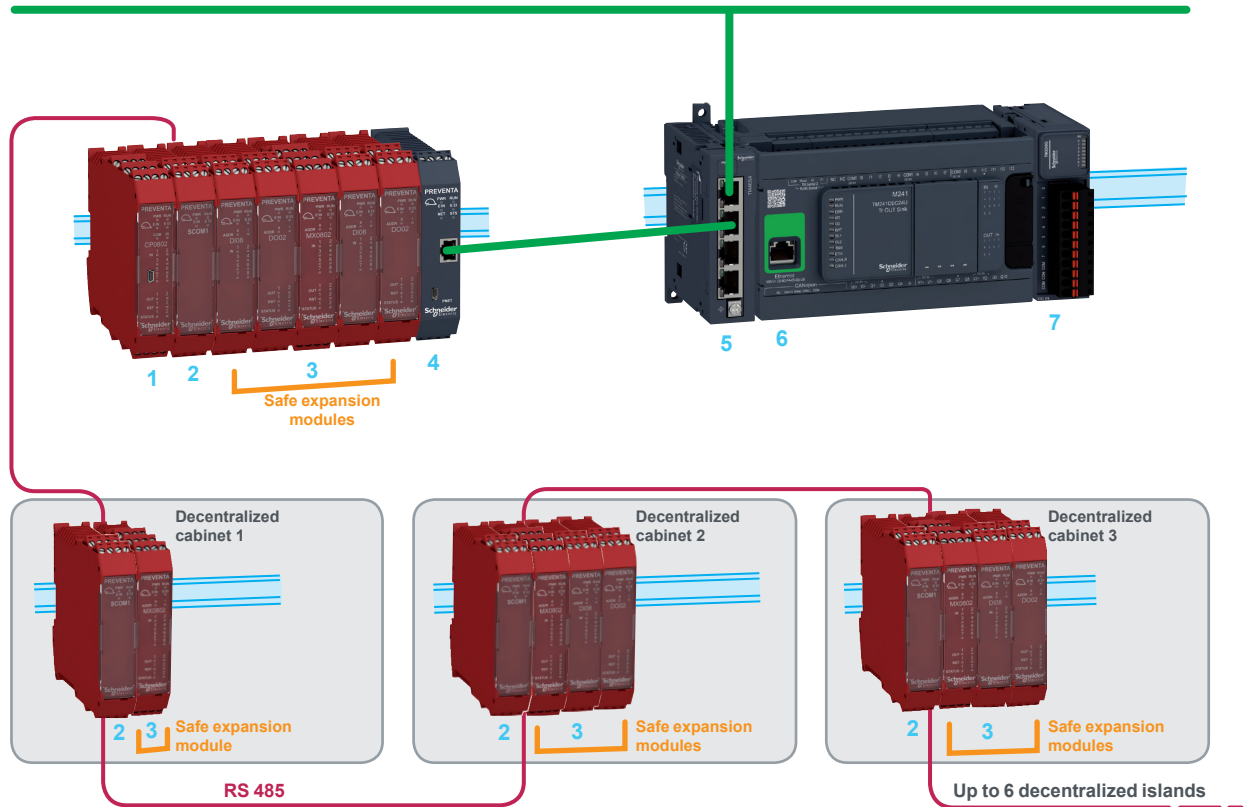
#### Flexibility and scalability

##### Safe communication with decentralized I/O's

The safety controller CPU has the possibility to create up to six decentralized safety related islands with a distance of 50 meters (164.04 ft.) between each island on a single Safety controller CPU.

- > The safety controller CPU, the expansion modules and the safe communication expansion modules communicate safely through the use of the expansion bus performed with the backplane expansion connector which are physically located on the back of each safe module.
- > The safe communication expansion modules are used in order to create safe decentralized islands (cabinets); they are connected in a line or tree configuration.
- > The islands can be expanded to 50 meters (164.04 ft.) between islands and use RS 485 cabling.
- > The order of the safe expansion modules connected with the backplane expansion connectors is not important, the configuration automatically recognizes the architecture based on the module addressing.

#### Ethernet



#### Safety related communication

— RS 485 serial interface shielded cable (up to 50 m /164.04 ft.) between two decentralized islands)

- 1 Safety controller CPU
- 2 Safe communication expansion modules (line configuration)
- 3 Safe expansion modules: mixed I/O modules, Safe relay output modules, Safe speed monitoring modules for proximity sensors and safety encoders

#### Non-safety related communication

- 4 Non-safe communication modules: interfaces to machine fieldbus (CANopen, Profibus DP, Modbus Serial (RTU), ...) and network (Ethernet IP, ModbusTCP), for non-safety related communication
- 5 Modicon TM4 communication module (Ethernet switch module) (1)
- 6 Modicon M241 logic controller (1)
- 7 Modicon TM3 expansion I/O module (1)

(1) Schneider Electric offers: Please consult on our website [www.schneider-electric.com](http://www.schneider-electric.com)

# Modular safety controllers

## Preventa XPSMCM

### Safety controller, expansion modules



mini USB 2.0 connector for configuration

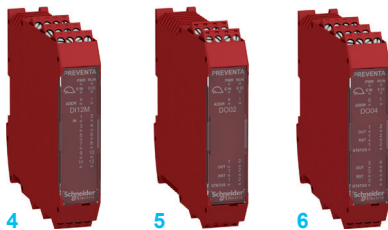
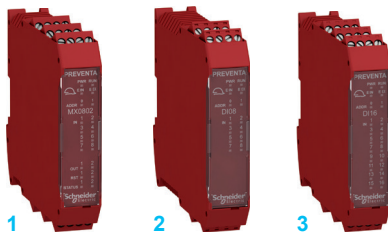
XPSMCMCP0802



XPSMCMCP0802G



XPSMCMCP0802BCG



Safe expansion modules



XPSMCM●●●●●G: equipped with a spring clamp connector

### XPSMCM system components

#### Safety controller

The safety controller XPSMCMCP0802 is designed to monitor a safety configuration.

Its configuration is created using the software SoSafe Configurable.

The safety controller CPU is also usable as a standalone device or able to be connected to any of the expansion units of XPSMCM system such as I/O expansion modules, relay output modules, communication expansion modules, speed monitoring modules and non-safe fieldbus communication modules.

#### The safety controller features:

- > A configuration memory card (optional)
- > A LOG file containing the last 5 configuration modifications in chronological order, with date of modification
- > 24 terminals in 22.5 mm (0,89 in.)
- > Connection with other expansion modules via the backplane expansion connectors (sold separately)
- > mini USB 2.0 connector for configuration

Safety controller reference (1)	Description
XPSMCMCP0802	> 8 safety digital inputs
XPSMCMCP0802G	> 2 OSSD pairs with 400 mA output current
	> 4 test outputs for line control monitoring of input circuits
	> 2 inputs for Start/Restart interlock and external device monitoring (EDM)
	> 2 configurable status outputs
Safety controller reference (1)	Description
XPSMCMCP0802BC	> Safety controller XPSMCMCP0802 or XPSMCMCP0802G with expansion connector XPSMCMCN0000SG
XPSMCMCP0802BCG	

#### Safe expansion modules

Six types of expansion modules are available, designed for safety inputs or outputs.

The safety inputs/outputs are configurable individually or in pairs, with several possibilities:

- > Monitoring using line control monitoring via dedicated test outputs
- > Configurable filters and delays for each single input
- > Configurable output activation and de-activation delays
- > Independent control of pairs of outputs
- > Configurable diagnostic output signals
- > Simple diagnostics via front led signalling, configuration software, communication expansion modules

Safe expansion module reference (1)	Description
1 XPSMCMMX0802	> 8 digital inputs
XPSMCMMX0802G	> 2 OSSD pairs with 400mA output current
	> 4 test outputs for line control monitoring of input circuits
	> 2 configurable status outputs
	> 2 inputs for Start/Restart interlock and external device monitoring (EDM)
2 XPSMCMDI0800	> 8 digital inputs
XPSMCMDI0800G	> 4 test outputs for line control monitoring of input circuits
3 XPSMCMDI1600	> 16 digital inputs
XPSMCMDI1600G	> 4 test outputs for line control monitoring of input circuits
4 XPSMCMDI1200MT	> 12 digital inputs
XPSMCMDI1200MTG	> 8 test outputs for line control monitoring: can monitor up to four 4-wire safety mats
5 XPSMCMDO0002	> 2 OSSD pairs with 400mA output current
XPSMCMDO0002G	> 2 inputs for Start/Restart interlock and external device monitoring (EDM)
	> 2 configurable status outputs
6 XPSMCMDO0004	> 4 OSSD pairs with 400mA output current
XPSMCMDO0004G	> 4 inputs for Start/Restart interlock and external device monitoring (EDM)
	> 4 configurable status outputs

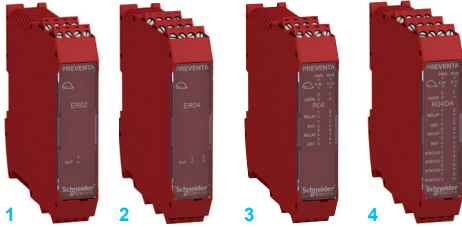
> The Safe expansion modules are connected to the safety controller CPU via the backplane expansion connectors.

(1) Safety controller and each Expansion module can be equipped with a spring clamp connector. The reference ends with a G.

# Modular safety controllers

## Preventa XPSMCM

Safe relay output modules, Safe speed monitoring modules



Safe relay output modules

### XPSMCM system components

#### Safe relay output modules

Four types of safe relay output modules are available.

Safe relay output module reference (1)	Description
1 XPSMCMER0002 XPSMCMER0002G	<ul style="list-style-type: none"> <li>&gt; 2 forcibly guided contact safety relay output (2 NO + 1 NC) modules for 1 output without expansion bus connection</li> <li>&gt; 1 input for Start/Restart interlock and external device monitoring (EDM)</li> </ul>
2 XPSMCMER0004 XPSMCMER0004G	<ul style="list-style-type: none"> <li>&gt; 4 forcibly guided contact safety relay output (2 NO + 1 NC) modules for 2 independent outputs without expansion bus connection</li> <li>&gt; 2 inputs for Start/Restart interlock and external device monitoring (EDM)</li> </ul>
3 XPSMCMRO0004 XPSMCMRO0004G	<ul style="list-style-type: none"> <li>&gt; The safe relay output modules XPSMCMER000● do not require the backplane expansion connectors as they are directly wired to the selected OSSDs.</li> <li>&gt; 4 forcibly guided contact safety relay output modules with expansion bus connection</li> <li>&gt; Expansion module with 4 independent safety relay outputs and the corresponding 4 inputs for the external feedback contacts (EDM)</li> <li>&gt; The relay can be configured according to Category 1, 2 and 4 architectures</li> </ul>
4 XPSMCMRO0004DA XPSMCMRO0004DAG	<ul style="list-style-type: none"> <li>&gt; 4 forcibly guided contact safety relay output modules with expansion bus connection</li> <li>&gt; Expansion module with 4 independent safety relay outputs and the corresponding 4 inputs for the external feedback contacts (EDM)</li> <li>&gt; The relay can be configured according to Category 1, 2 and 4 architectures</li> <li>&gt; 8 configurable status outputs</li> </ul>

> The safe relay output modules XPSMCMRO000● are connected to the safety controller CPU via the backplane expansion connector.

#### Safe speed monitoring modules

The safe speed monitoring modules are designed to monitor zero speed control, max speed (limited speed), speed range and direction.

- > Up to four logically selectable limited speed thresholds (freely configurable via SoSafe Configurable software) for each logical input (axis)
- > The safe speed monitoring modules (excluding XPSMCMEN0200) are equipped with RJ 45 connectors (one or two depending on the model) for encoders and terminal blocks for proximity switches
- > Max input frequency: 500 kHz for encoder monitoring and 5 kHz for proximity sensors
- > The modules can be configured with incremental encoders and PNP/NPN proximity switches as described below:



Safe speed monitoring modules

Safe speed monitoring module reference (1)	Description	Connector type
1 XPSMCMEN0100TT XPSMCMEN0100TTG	> 1 input for TTL encoder + 1 or 2 proximity switches	1x RJ 45 (ENC1) and terminal blocks for proximity sensor wiring
2 XPSMCMEN0200TT XPSMCMEN0200TTG	> 1 or 2 inputs for TTL encoders + 1 or 2 proximity switches	2x RJ 45 (ENC1/ENC2) and terminal blocks for proximity sensor wiring
3 XPSMCMEN0100HT XPSMCMEN0100HTG	> 1 input for HTL encoder + 1 or 2 proximity switches	1x RJ 45 (ENC1) and terminal blocks for proximity sensor wiring
4 XPSMCMEN0200HT XPSMCMEN0200HTG	> 1 or 2 inputs for HTL encoders + 1 or 2 proximity switches	2x RJ 45 (ENC1/ENC2) and terminal blocks for proximity sensor wiring
5 XPSMCMEN0100SC XPSMCMEN0100SCG	> 1 input for Sin/Cos encoder + 1 or 2 proximity switches	1x RJ 45 (ENC1) and terminal blocks for proximity sensor wiring
6 XPSMCMEN0200SC XPSMCMEN0200SCG	> 1 or 2 inputs for Sin/Cos encoders + 1 or 2 proximity switches	2x RJ 45 (ENC1/ENC2) and terminal blocks for proximity sensor wiring
7 XPSMCMEN0200 XPSMCMEN0200G	> 2 inputs for proximity switches	Terminal blocks for proximity sensor wiring

> The safe speed monitoring modules are connected to the safety controller CPU via the backplane expansion connector.

(1) Each Safe relay output module or Safe speed monitoring module can be equipped with a spring clamp connector. The reference ends with a G.



XPSMCM●●●●●G: equipped with a spring clamp connector



# Modular safety controllers

## Preventa XPSMCM

Safe communication expansion modules,  
Non-safe communication modules



Safe communication expansion modules

### XPSMCM system components

#### Safe communication expansion modules

The safe communication expansion modules enable the connection of XPSMCMCP0802 modular safety controller with the expansion modules placed at distances,  $\leq 50$  m ( $\leq 164$  ft.).

Using RS 485 shielded cable two XPSMCMCO0000S modules placed at the desired distance can be linked together thus joining the expansion modules to the Modular Safety Controller.

- > Each XPSMCMCO0000S2 safe communication expansion module has two independent connection channels; typically used in between two XPSMCMCO0000S1 modules.
- > The XPSMCMCO0000S1 safe communication expansion module has only one channel connection for transmitting/receiving data and must be connected as the first or last module.
- > Up to six islands can be created using the safe communication modules with a total length of 250 meters (820.2 ft.) and a maximum of 50 meters (164 ft.) between two safe communication modules. The system response time does not change with the use of the safety communication modules.

Safe communication expansion module reference (2)	Description
1 XPSMCMCO0000S1 XPSMCMCO0000S1G	> 1 connection interface: single channel transmitter/receiver (1)
2 XPSMCMCO0000S2 XPSMCMCO0000S2G	> 2 connections interface: dual channel transmitter/receiver

#### Non-safe fieldbus communication modules

The non-safe communication modules are designed for diagnostics connection and data communication purposes to machine field bus or network systems.



Non-safe communication modules

non-safe communication module reference (2)	Machine bus/network interface	Connector type
1 XPSMCMCO0000CO XPSMCMCO0000COG	> CANopen	SUB-D 9 contacts (female)
2 XPSMCMCO0000EI XPSMCMCO0000EIG	> Ethernet IP	1x RJ 45 (in/out)
3 XPSMCMCO0000MB XPSMCMCO0000MBG	> Modbus Serial (RTU)	1x RJ 45
4 XPSMCMCO0000EC XPSMCMCO0000ECG	> EtherCAT	2x RJ 45 (in/out)
5 XPSMCMCO0000EM XPSMCMCO0000EMG	> Modbus TCP	1x RJ 45 (in/out)
6 XPSMCMCO0000PB XPSMCMCO0000PBG	> Profibus DP	SUB-D 9 contacts (male)
7 XPSMCMCO0000UB XPSMCMCO0000UBG	> Universal Serial Bus	Mini USB

- > The non-safe communication modules are connected to the safety controller via the Expansion bus connector. Each of them have a mini USB 2.0 connector for configuration
- > Only one non-safe communication module type can be connected on a safety controller.

(1) End of the network or Start of the network if connected to a single RS 485 cable

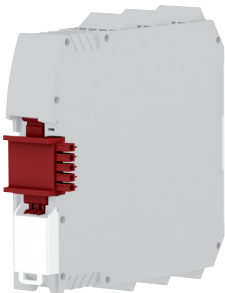
(2) Each Safe communication expansion module and non-safe communication module can be equipped with a spring clamp connector. The reference ends with a G.



XPSMCM●●●●●G: equipped with a spring clamp connector



Memory card



Backplane Expansion connector



SoSafe Configurable software

### XPSMCM system components

#### Accessories

##### ■ Memory card

**XPSMCMME0000** is a removable memory card that can be used to save XPSMCM configuration data for subsequent transfer to a new device without using a PC.

- > The configuration in the XPSMCMME0000 overwrites any other configuration present on the safety controller CPU XPSMCMCP0802, replacing this with that contained in the card.
- > This configuration replacement function can be disabled on the safety controller CPU via SoSafe Configurable software.
- > Overwrite operations are recorded in chronological order in the safety controller CPU XPSMCMCP0802 LOG file.

##### ■ Backplane Expansion connector

**XPSMCMCN0000SG** is a backplane expansion connector:

- > It provides a safe communication between safe expansion components and the safety controller CPU.
- > Only the XPSMCMCP0802 safety controller CPU requires the purchase of the expansion bus connector. Each expansion module is provided with one expansion bus connector.
- > Use references XPSMCMCP0802BC and XPSMCMCP0802BCG when I/O expansion is required. The references includes both the safety controller and expansion bus connector.

##### ■ Configuration cable

**TCSXCNAMUM3P** is a configuration cable to be used for software configuration between a PC, the safety controller CPU, and to the fieldbus communication modules.

- > Length 3 m (9.84 ft.)
- > It is equipped with USB connectors: USB A and USB mini B

##### ■ Safe communication cable

- > RS 485 serial interface shielded cable are used between the safe communications expansion modules to create up to 6 decentralized safety related islands
- > Available lengths: 10 to 50 m (32.81 to 164.04 ft.)

##### ■ Encoder splitter cable

- > The encoder splitter cable enables the connection of an embedded encoder within the MC-4 Servo Drives (PacDrive M motion system) as well for Lexium 32, Lexium 52 and Lexium 62 servo drives to the speed monitoring module of the modular safety controller
- > Available lengths: 1 to 5 m (3.3 to 16.4 ft.)

#### Software

The SoSafe Configurable software, installed on a PC, is used to create complex logical conditions using logical operators and safety functions, such as muting, timer, counters, memories, etc. via a simple and intuitive graphic configuration interface. Configuration data are transferred to the safety controller CPU XPSMCMCP0802 via a USB link.

# Modular safety controllers

## Preventa XPSMCM

### System components



XPSMCMCP0802



XPSMCMCP0802BC



XPSMCMMX0802



XPSMCMMDI0800



XPSMCMMDI1600



XPSMCMMDI1200MT



XPSMCMDO0002



XPSMCMDO0004



XPSMCMER0002



XPSMCMER0004



XPSMCMRO0004



XPSMCMRO0004DA

#### Safety controller

##### CPU

Description	Inputs (number & type)	Outputs (number & type)	Connector type	Reference	Weight kg/lb
Safety controller CPUs	8 digital inputs + 2 for Start/Restart interlock	2 OSSD pairs + 4 test outputs + 2 status outputs	Screw	XPSMCMCP0802	0.250 0.55
			Spring clamp	XPSMCMCP0802G	0.250 0.55

##### CPU combined with Backplane Expansion connector

Description	Reference	Weight kg/lb
CPU combined with backplane expansion connector	XPSMCMCP0802BC	0.260 0.57
CPU (spring terminal) combined with backplane expansion connector	XPSMCMCP0802BCG	0.260 0.57

#### Safe expansion modules

##### Safe expansion I/O modules

Description	Inputs (number & type)	Outputs (number & type)	Connector type	Reference	Weight kg/lb
Safe mixed I/O expansion modules	8 digital inputs + 2 for Start/Restart interlock	2 OSSD pairs + 4 test outputs + 2 status outputs	Screw	XPSMCMMX0802	0.250 0.55
			Spring clamp	XPSMCMMX0802G	0.250 0.55
Safe input expansion modules	8 digital inputs	4 test outputs	Screw	XPSMCMMDI0800	0.230 0.51
			Spring clamp	XPSMCMMDI0800G	0.230 0.51
	16 digital inputs	4 test outputs	Screw	XPSMCMMDI1600	0.250 0.55
			Spring clamp	XPSMCMMDI1600G	0.250 0.55
	12 digital inputs	8 test outputs for 4 wires safety Mats	Screw	XPSMCMMDI1200MT	0.250 0.55
			Spring clamp	XPSMCMMDI1200MTG	0.250 0.55
Safe output expansion modules	2 for Start/Restart interlock + 2 status outputs	2 OSSD pairs + 2 status outputs	Screw	XPSMCMDO0002	0.230 0.51
			Spring clamp	XPSMCMDO0002G	0.230 0.51
	4 for Start/Restart interlock + 4 status outputs	4 OSSD pairs + 4 status outputs	Screw	XPSMCMDO0004	0.250 0.55
			Spring clamp	XPSMCMDO0004G	0.250 0.55

##### Safe relay output modules

Safe relay output modules (without expansion bus connection)	1 for Start/Restart interlock	2 relays for 1 output (2 NO + 1 NC)	Screw	XPSMCMER0002	0.250 0.55
			Spring clamp	XPSMCMER0002G	0.250 0.55
Safe relay output modules (wiring with the expansion bus connector)	4 for Start/Restart interlock	4 relays with 8 status outputs	Screw	XPSMCMRO0004	0.300 0.66
			Spring clamp	XPSMCMRO0004G	0.300 0.66
Safe relay output modules (wiring with the expansion bus connector)	4 for Start/Restart interlock	4 relays with 8 status outputs	Screw	XPSMCMRO0004DA	0.330 0.73
			Spring clamp	XPSMCMRO0004DAG	0.330 0.73



XPSMCMEN0100TT



XPSMCMEN0200TT



XPSMCMEN0100HT



XPSMCMEN0200HT



XPSMCMEN0100SC



XPSMCMEN0200SC



XPSMCMEN0200



XPSMCMCO0000S1



XPSMCMCO0000S2

## Safe expansion modules (continued)

## Safe speed monitoring modules

Description	Inputs (number & type) - Connector type	Connector type	Reference	Weight kg/lb
Safe speed monitoring modules	1 TTL encoder and 2 proximity sensor inputs - 1x RJ 45 (ENC1) Proximity sensor connection via terminal blocks	Screw	XPSMCMEN0100TT	0.280 0.62
		Spring clamp	XPSMCMEN0100TTG	0.280 0.62
	Up to 2 TTL encoders and 2 proximity sensor inputs - 2x RJ 45 (ENC1/ENC2) Proximity sensor connection via terminal blocks	Screw	XPSMCMEN0200TT	0.300 0.66
		Spring clamp	XPSMCMEN0200TTG	0.300 0.66
	1 HTL encoder and 2 proximity sensor inputs - 1x RJ 45 (ENC1) Proximity sensor connection via terminal blocks	Screw	XPSMCMEN0100HT	0.280 0.62
		Spring clamp	XPSMCMEN0100HTG	0.280 0.62
	Up to 2 HTL encoders and 2 proximity sensor inputs - 2x RJ 45 (ENC1/ENC2) Proximity sensor connection via terminal blocks	Screw	XPSMCMEN0200HT	0.300 0.66
		Spring clamp	XPSMCMEN0200HTG	0.300 0.66
	1 Sin/Cos encoder and 2 proximity sensor inputs - 1x RJ 45 (ENC1) - Proximity sensor connection via terminal blocks	Screw	XPSMCMEN0100SC	0.280 0.62
		Spring clamp	XPSMCMEN0100SCG	0.280 0.62
	Up to 2 Sin/Cos encoders and 2 proximity sensor inputs - 2x RJ 45 (ENC1/ENC2) Proximity sensor connection via terminal blocks	Screw	XPSMCMEN0200SC	0.300 0.66
		Spring clamp	XPSMCMEN0200SCG	0.300 0.66
	2 inputs for proximity switches Proximity sensor connection via terminal blocks	Screw	XPSMCMEN0200	0.230 0.51
		Spring clamp	XPSMCMEN0200G	0.230 0.51

## Safe communication expansion modules

Description	Characteristics	Connector type	Reference	Weight kg/lb
Safe RS 485 bus expansion module for remote extension	1 connection interface: single channel transmitter/receiver network connection	Screw	XPSMCMCO0000S1	0.300 0.66
		Spring clamp	XPSMCMCO0000S1G	0.300 0.66
	2 connections interface: dual channel transmitter/receiver network connection	Screw	XPSMCMCO0000S2	0.300 0.66
		Spring clamp	XPSMCMCO0000S2G	0.300 0.66

# Modular safety controllers

## Preventa XPSMCM

### System components



XPSMCMCO0000CO



XPSMCMCO0000EI



XPSMCMCO0000MB



XPSMCMCO0000EM



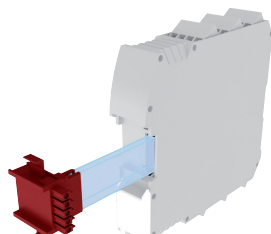
XPSMCMCO0000EC



XPSMCMCO0000PB



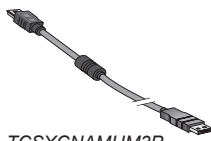
XPSMCMCO0000UB



XPSMCMCN0000SG



XPSMCMME0000



TCSXCNAMUM3P



TSXSZCMCN0000



TSXESPPM0000



TSXESPP3000

### Non-safe communication modules

Description	Field bus / network type - Connector type	Connector type	Reference	Weight kg/lb
Non-safe communication modules	CANopen - SUB-D 9 contacts (female)	Screw	XPSMCMCO0000CO	0.300 0.66
		Spring clamp	XPSMCMCO0000COG	0.300 0.66
	Ethernet IP - 1x RJ 45 (in/out)	Screw	XPSMCMCO0000EI	0.300 0.66
		Spring clamp	XPSMCMCO0000EIG	0.300 0.66
	Modbus Serial (RTU) - 1x RJ 45	Screw	XPSMCMCO0000MB	0.300 0.66
		Spring clamp	XPSMCMCO0000MBG	0.300 0.66
	EtherCAT - 2x RJ 45 (in/out)	Screw	XPSMCMCO0000EC	0.300 0.66
		Spring clamp	XPSMCMCO0000ECG	0.300 0.66
	Modbus TCP - 1x RJ 45 (in/out)	Screw	XPSMCMCO0000EM	0.300 0.66
		Spring clamp	XPSMCMCO0000EMG	0.300 0.66
	Profibus DP - SUB-D 9 contacts (male)	Screw	XPSMCMCO0000PB	0.300 0.66
		Spring clamp	XPSMCMCO0000PBG	0.300 0.66
Universal Serial Bus - 1x Mini USB	Screw	XPSMCMCO0000UB	0.300 0.66	
	Spring clamp	XPSMCMCO0000UBG	0.300 0.66	

### Accessories

Description	Application	Reference	Weight kg/lb
Backplane expansion connector (1)	To connect the various expansion modules to the safety controller CPU	XPSMCMCN0000SG	0.001 0.002
Memory card	For saving configuration data for subsequent transfer to a new device without using a PC	XPSMCMME0000	0.004 0.009

Description	Use	Length	Reference	Weight kg/lb
Configuration cable	For software configuration, between a PC, the safety controller CPU, and to the fieldbus communication modules Equipped with 2x USB connectors: USB A and USB mini B	3 m / 9.84 ft	TCSXCNAMUM3P	0.065 0.143
		RS 485 shielded cables	Between two safe communication expansion modules	10 m / 32.81 ft
Encoder splitter cables	Between SIN/COS safe speed monitoring module and MC-4 servo drives and the associated servo motors	25 m / 82.02 ft	TSXSZCMCN025	2.300 5.07
		50 m / 164.04 ft	TSXSZCMCN050	4.600 10.14
		1 m / 3.3 ft	TSXESPPM001	0.110 0.24
Encoder splitter cables	Between SIN/COS safe speed monitoring modules and Lexium 32, 52 and 62 servo drives and the associated servo motors	3 m / 9.84 ft	TSXESPPM003	0.310 0.68
		5 m / 16.40 ft	TSXESPPM005	0.510 1.12
		1 m / 3.3 ft	TSXESPP3001	0.150 0.33
		3 m / 9.84 ft	TSXESPP3003	0.450 0.99
		5 m / 16.40 ft	TSXESPP3005	0.750 1.65

(1) This reference needs to be ordered for the XPSMCMCP0802 reference only when it is connected to expansion modules.



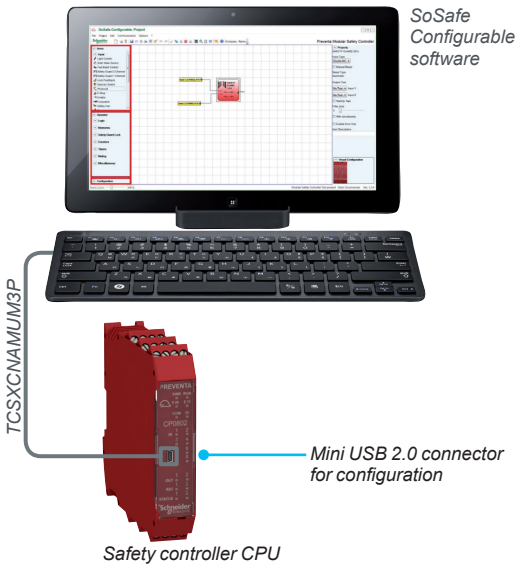
# Modular safety controllers

## Preventa XPSMCM

Configuration software: SoSafe Configurable



SoSafe configurable software



### Configuration software: SoSafe Configurable

SoSafe Configurable is used to create complex logical conditions using logical operators and safety functions, such as muting, timer, counters, memories, etc. via a simple and intuitive graphic configuration interface.

Configuration data are transferred to the safety controller XPSMCMCP0802 via a USB link.

- > XPSMCMCP0802 safety controller has a mini USB 2.0 connection to connect to a PC where the **SoSafe Configurable** software is installed.
- > An application held on XPSMCMCP0802 safety controller can be saved on the memory card (optional) for fast transfer of the configuration data to other modules.

#### Password

The SoSafe Configurable software is protected with 2 levels of alphanumerical password (max 8 characters.)

- > The level 1 password is an operation and maintenance password. It allows only to view the LOG file, the composition of the system and use the real time MONITOR .
- > The level 2 password enables all features of the software to be accessible. Allowing to load, modify, save, and download (from the PC to XPSMCMCP0802 safety controller) a project configuration.

#### LOG file (Level 1 password).

A log file with the creation date and CRC checksum (4-digit hexadecimal identification) of a project are stored in the safety controller CPU.

- > A logbook can record up to 5 consecutive events, after which these are overwritten, starting from the least recent event.
- > The log file can be visualized using the icon in the standard tool bar.

#### Main features

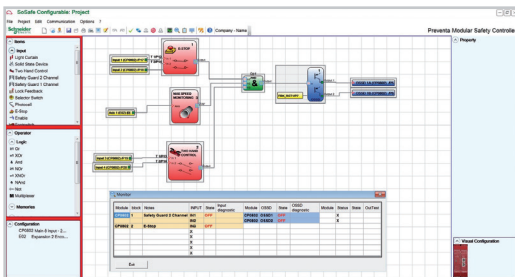
**SoSafe Configurable software main features are:**

- > "Drag & Drop" configuration of all safety functions and logic
- > Functional validation of design
- > 2-level password management for the prevention of unauthorised access and therefore of incidental modifications or tampering with system configuration
- > Configuration of parameters of function blocks, for example:
  - single – or double – channel NO or NC inputs
  - test outputs for monitoring of electro-mechanical input devices and photocells and related electrical connections
  - automatic, manual and monitored manual restart
  - synchronisation control of two channels
  - contact anti-rebound filters and timers
  - start-up test.
- > Single or bi-directional 2 or 4 sensor muting function blocks
- > Online monitoring of I/O status
- > Offline simulation of configuration
- > Project documentation and schematics

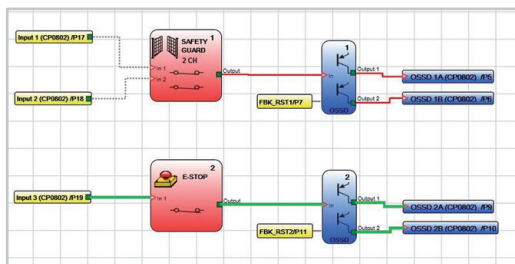
#### System requirements

SoSafe Configurable is downloadable from our website [www.schneider-electric.com](http://www.schneider-electric.com) It runs on PC with:

- > RAM: 256 MB
- > Hard disk: free space > 300 MB
- > USB connector: 1.1 or 2.0
- > Microsoft Windows® 10, Microsoft Windows® 7 32 and 64-bit , Microsoft Windows® 8.1 32 and 64-bit
- > Microsoft Framework 3.5 (or higher).
- > Available language: English



Text visualization

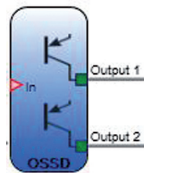
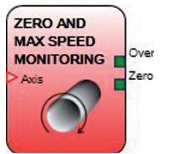
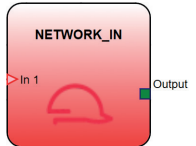
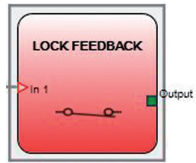
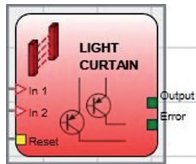
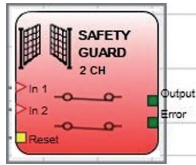
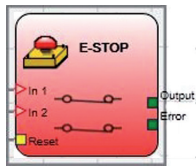


Graphic visualization

The I/O MONITOR allows the real-time monitoring of all the I/O of a Preventa XPSMCM system and the diagnostic information about a working system.

#### Safety level parameters

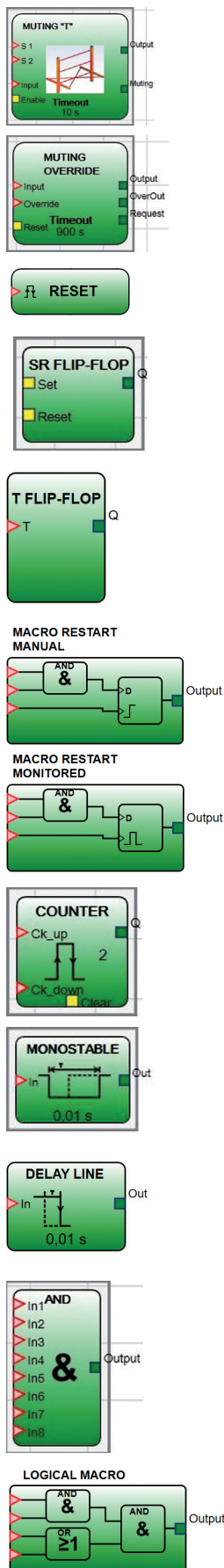
Parameter	Value	Standard
PFH <sub>d</sub>	≥ 10 <sup>-8</sup> PFH <sub>d</sub> < 10 <sup>-7</sup>	IEC 61508
SIL	3	
SILCL	3	IEC 62061
Type	4	EN 61496-1
PL	e	ISO 13849-1
DC <sub>avg</sub>	High	
MTTF <sub>d</sub> (years)	100 years	
Category	4	
Operation life time	20 years	



### Function blocks

#### Input objects

<b>E-STOP</b>	Verifies an emergency stop device inputs status. If the emergency stop button has been pressed (contacts open) the output is 0. If not the output is 1.
<b>SAFETY GUARD</b>	Verifies a mobile guard or safety gate device input status. If the mobile guard or safety gate is open, the output is 0. Otherwise the output is 1.
<b>ENABLE (enable key)</b>	Verifies a manual key device Input status. If the key is not turned the output is 0. Otherwise the output is 1.
<b>LIGHT CURTAIN (optoelectronic safety light curtain / laser scanner)</b>	Verifies an optoelectronic safety light curtain (or laser scanner) inputs state. If the area protected by the light curtain is occupied, (light curtain outputs 0) the output is 0. Otherwise, with the area clear and outputs to 1 the output of this function block is 1.
<b>FOOTSWITCH (safety pedal)</b>	Verifies the status of the inputs of a safety pedal device. If the pedal is not pressed the output is 0. Otherwise the output is 1.
<b>PHOTOCELL (safety photocell)</b>	Verifies the status of the inputs of an optoelectronic safety photocell. If the beam of the photocell is occupied (photocell output 0) the output is 0. Otherwise with the beam clear and an output of 1 the output is 1.
<b>SELECTOR SWITCH</b>	Verifies the status of the inputs from a mode selector (up to 4 inputs). If only one input is 1 the corresponding output is also 1. In all other cases, and thus when all inputs are 0 or more than one input is 1 all the outputs are 0.
<b>TWO HAND CONTROL</b>	Verifies the status of the inputs of a two hand control switch. If both the buttons are pressed within 500 msec the output is 1. Otherwise the output is 0.
<b>SAFETY MAT (safety mat or safety edge)</b>	Verifies the status of the inputs of a safety mat or safety edge. If a person stands on the mat the output is 0. Otherwise, with the mat clear, the output is 1. Test outputs must be used. Cannot be used with 2-wire mats and termination resistance mats.
<b>ENABLE SWITCH</b>	Verifies the input Inx status of an Enabling Switch. In the event that the switch is not pressed (position 1) or completely pressed (position 3), the OUTPUT will be 0. If it is pressed in the middle (position 2), the output will be 1.
<b>TESTABLE SAFETY DEVICE</b>	The function can be used with every generic input either one or two channels and either NO or NC contacts.
<b>SENSOR</b>	Verifies the status of the input of a sensor (non-safety sensor). If the beam of the sensor is occupied (sensor output 0) the output is 0. Otherwise, with the beam clear and an output of 1 then the output is 1.
<b>LOCK FEEDBACK</b>	Verifies the feedback from the Guardlock solenoid generating a 1 when the guardlock is locked and 0 when open.
<b>SWITCH</b>	Verifies the input status of a pushbutton or switch (non-safety switch). If the pushbutton is pressed the output is 1. Otherwise, the output is 0.
<b>SOLID STATE DEVICE</b>	Verifies INx input status. If the the inputs are High the output is 1 else 0.
<b>FIELDBUS INPUT</b>	Verifies the fieldbus input value signals (up to 8 bits) from the machine control unit via the field-bus module. The signal is connected directly into the configuration.
<b>LL0</b>	0 input value.
<b>LL1</b>	1 input value.
<b>NETWORK_IN</b>	Used to connect the network inputs to the NETWORK function block. When the inputs are set to TRUE, the associated output is set to TRUE.
<b>Speed Monitoring</b>	
<b>Zero Speed Monitoring</b>	Verifies the speed of a device generating an output 1 when the speed is 0. If the speed is different from 0 generates an output 0 .
<b>Zero and Max Speed Monitoring</b>	Verifies the speed of a device generating an output Zero = 1 when the speed is 0. If the speed is different from 0 generates an output Zero = 0. Moreover, this block verifies the speed of a device generating an output Over = 0 when the speed is over a defined threshold.
<b>Maximum Speed Monitoring</b>	Verifies the speed of a device generating an output 0 when the speed is over a defined threshold.
<b>Speed Range Monitoring</b>	Verifies the speed of a device generating an output 1 when the speed is inside a defined range.
<b>Output objects</b>	
<b>OSSD (safety outputs)</b>	The OSSD semiconductor PNP safety static output pair. The 2 output cannot operate independently. Each OSSD pair can work in both AUTO/Manual restart mode and can perform the EDM of external relays or contactors using the dedicated RESTART_FBK input.
<b>STATUS (signal output)</b>	The Status outputs are non-safety diagnostic outputs which can be used to provide the status of part of the logic within the configuration.
<b>Relay</b>	Used with the XPSMCMR0004 modules and is configurable to Category 1, 2 and 4.
<b>FIELDBUS PROBE OUTPUT</b>	Used to provide the status of part of the logic within the configuration to a PLC or HMI device.



### Function blocks

Muting operators	
<b>MUTING "L" with 2 Muting sensors, only for one-way openings</b>	Monitors the 2 muting sensors along with the light curtain for L Muting setup.
<b>MUTING "T" with 2 Muting sensors for two-way openings</b>	Monitors the 2 muting sensors along with the light curtain for T Muting setup.
<b>MUTING "Sequential" with 4 Muting sensors for two-way openings</b>	Monitors the 4 muting sensors along with the light curtain for sequential Muting setup.
<b>MUTING "Concurrent" with 4 Muting sensors for two-way openings</b>	Monitors the 4 muting sensors along with the light curtain for concurrent Muting setup.
<b>MUTING OVERRIDE</b>	OVERRIDE command forces the output high allowing to remove the material obstructing the gate. Two different operations are available: Manual action with hold to run Automatic with pulse command

General/Miscellaneous	
<b>Serial Output</b>	Transfers the state of up to a maximum of 8 inputs into a serial line data output.
<b>Network</b>	Allows to distribute in a local network Stop and Reset commands between XPSMCMCP0802 controllers.
<b>Interpage IN and Interpage OUT</b>	Memory bit which are reused from inputs to multiple outputs.
<b>RESET</b>	initiates a system reset when there is an OFF-ON-OFF transition on the corresponding input which lasts less than 5 s.

Memory operators	
<b>D FLIP FLOP</b>	Saves the previously set status on output Q on the clock rising edge.
<b>SR FLIP FLOP</b>	Provides an output Q at 1 with Set, 0 with Reset.
<b>T FLIP FLOP</b>	Changes state whenever the input triggered. If the T input is low, the flip-flop holds the previous value.
<b>T FLIP-FLOP</b>	Switches the Q output at each rising edge of the T input (toggle).
<b>USER RESTART MANUAL</b>	Used to create a common reset for multiple input functions on rising edge of the reset input.
<b>MACRO RESTART MANUAL</b>	Used to combine a logic gate of your choice with the USER RESTART MANUAL function block according to the pre-defined truth table.
<b>USER RESTART MONITORED</b>	Used to create a common reset for multiple input functions on rising edge and falling edge of the reset input.
<b>MACRO RESTART MONITORED</b>	Used to combine a logic gate of your choice with the USER RESTART MONITORED function block according to the pre-defined truth table.

Counter operator	
<b>COUNTER</b>	The counter generates a pulse as soon as the set count is reached.

Timer operators	
<b>PULSE GENERATOR</b>	Generates a clock signal output with the desired period if the input In is 1.
<b>MONOSTABLE</b>	Generates a level 1 output activated by the rising edge of the input and remains in this condition for the set time.
<b>MONOSTABLE_B</b>	Generates a 1 (TRUE) output activated by the rising/falling edge of the input and remains in this condition for the set time.
<b>PASSING MAKE CONTACT</b>	The output follows the signal on the input. However, if this is 1 for longer than the set time, the output changes to 0.
<b>DELAY</b>	Applies a delay to a signal by setting the output to 1 after the set time, against a change in the level of the input signal.
<b>DELAY LINE</b>	Applies a delay to a signal by setting the output to 0 (FALSE) after the set time, the delay is set at a falling edge of the input signal.
<b>TIMER</b>	Generates a signal (TRUE or FALSE) for a user-definable period.

Logical operators	
<b>AND</b>	Returns 1 as output if all the inputs are 1
<b>NAND</b>	Returns 0 as output if all the inputs are 1.
<b>NOT</b>	Inverts the logical status of the input.
<b>OR</b>	Returns 1 as output if at least one of the inputs is 1.
<b>NOR</b>	Returns 0 as output if at least one of the inputs is 1.
<b>XOR</b>	Returns 0 as output if all the inputs are in the same logical status.
<b>XNOR</b>	Returns 1 as output if all the inputs are in the same logical status.
<b>MULTIPLEXER</b>	Forwards the signal of the inputs to the output according to the Sel selection.
<b>LOGICAL MACRO</b>	Enables the grouping of two or three logic gates. The result of the third logic gate provided at the output.





More information on  
<http://www.schneider-electric.com/machinesafety>

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