Catalog | April 2023

Modicon MCM

Modular safety controllers

Life Is On | Schneider Electric

Modicon

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Industrial Edge control for IIoT

Modicon IIoT-native edge controllers manage complex interfaces across assets and devices or directly into the cloud, with embedded safety and cybersecurity. **Modicon** provides performance and scalability for a wide range of industrial applications up to high-performance multi-axis machines and high-available redundant processes.

Explore our offer

- **Modicon** HVAC Controllers
- **Modicon** PLC
- **Modicon** Motion Controllers
- **Modicon** PAC
- **Modicon** I/O
- **Modicon** Networking
- **Modicon** Power Supply
- **Modicon** Wiring

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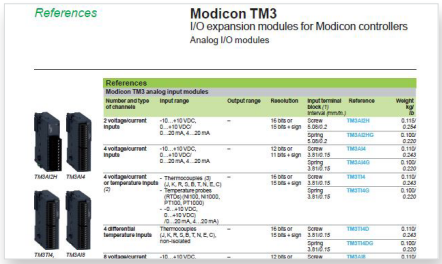
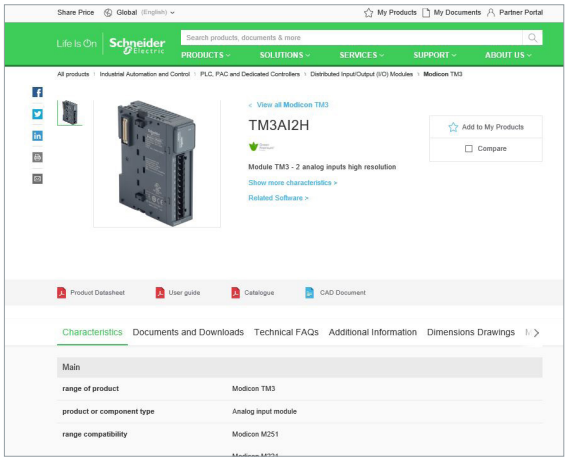
Quick access to product information

Get technical information about your product

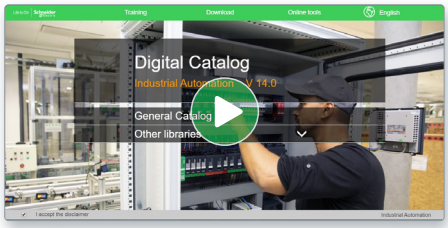


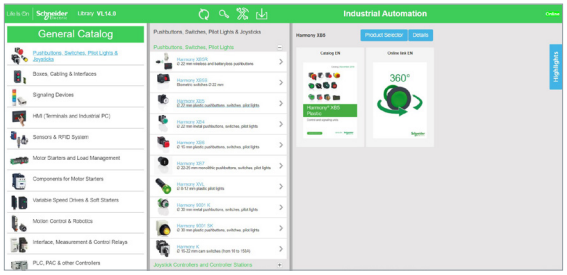


Each commercial reference presented in a catalog contains a hyperlink. Click on it to obtain the technical information of the product:

- Characteristics, Dimensions and drawings, Mounting and clearance, Connections and schemas, Performance curves
- Product image, Instruction sheet, User guide, Product certifications, End of life manual

Find your catalog





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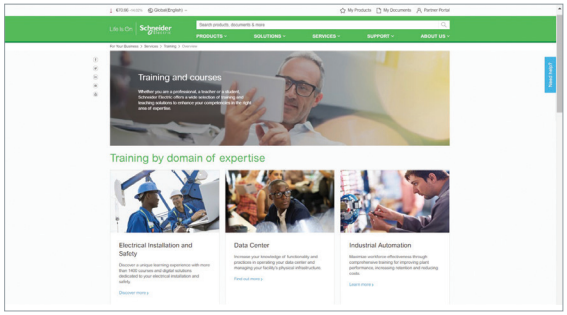

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Life Is On Schneider Electric

General content

Modicon MCM
Modular safety controllers

Modicon MCM
Modular safety controller
Empowering industrial OEMs for the digital era

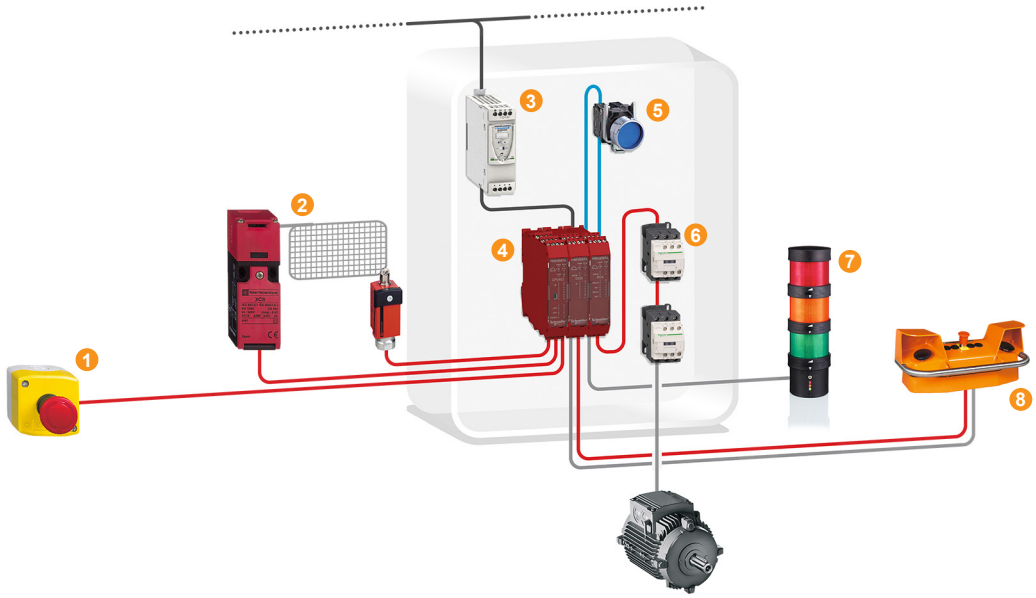
Empowering industrial OEMs for the digital era

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 Safety limit switches (from our partner Telemecanique sensor)
3 Modicon power supply 24 V DC
4 Modicon MCM Modular safety controller
5 Harmony XB4 Ø 22 mm modular metal pushbuttons, switches, and pilot lights
6 TeSys D contactor
7 Harmony XVB Ø 70 mm modular beacons and tower lights
8 Preventa XY2SB two-hand control station

Modicon MCM
Modular safety controller
Improve efficiency
Increase profitability

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

Modicon MCM
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

Preventa XPSU
safety module

Embedded safety with Modicon TM3 functional module

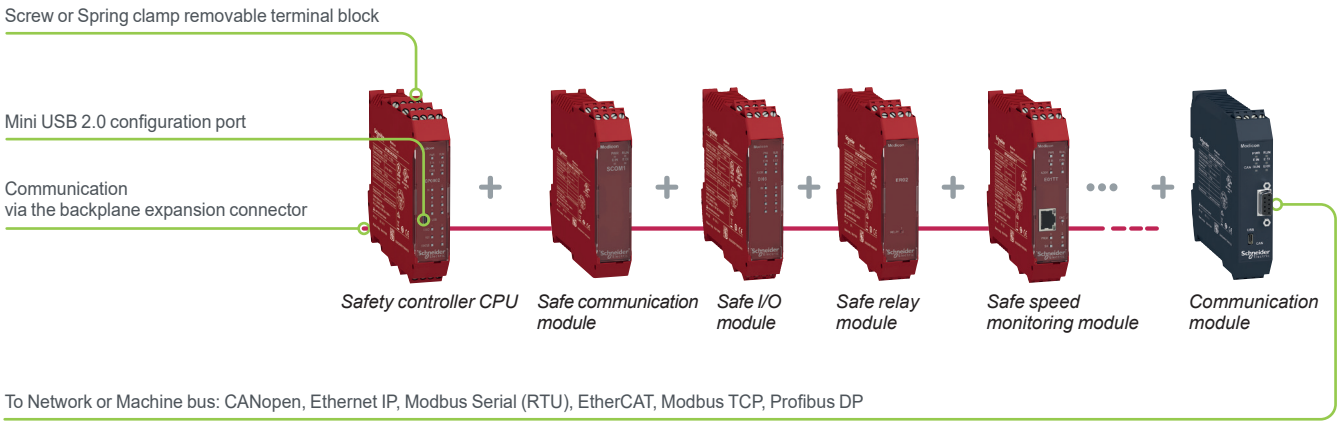
Standalone → **Embedded Safety Network**

Increase profitability

Up to Cat. 4, PI e, SIL3

Everything you need is embedded

- 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

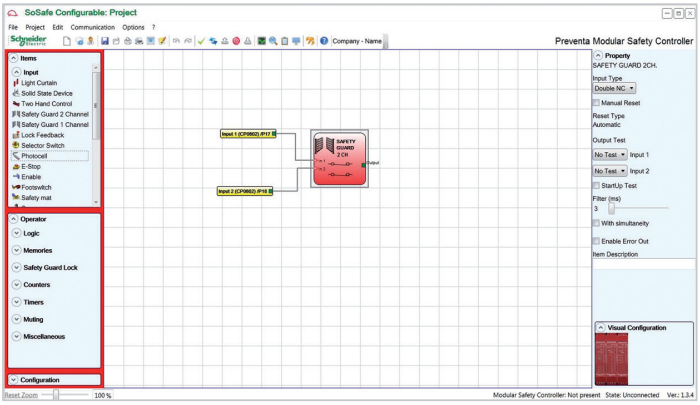


Modicon MCM
Modular safety controller
Reduce your time to market

Reduce your time to market

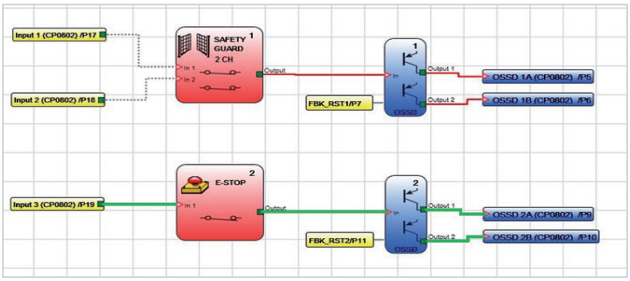
Intuitive automation with **SoSafe Configurable** software

> Configuration



- Define hardware module configuration
- Create project configuration: drag and drop 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


Modular Safety Controller

Schneider Electric

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

Modicon MCM
Modular safety controller
Simplify integration & maintenance
Safety chain solutions

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 transfering 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.

Safety chain solutions

Safety chain solutions to achieve the safety level required

- Schneider Electric provides a complete safety chain which helps you simply to reach the right level of safety for your machine!

> Make your machine even safer. Easily.

Modicon MCM
Modular safety controller
System applications
System components
Software


Emergency Stop


Guard Monitoring


Perimeter Guarding


Position Monitoring


Speed Monitoring


Enabling movement


Safety controller CPU


Safe I/O expansion module

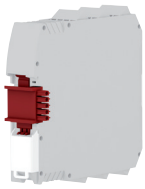

Safe relay output module


Safe speed monitoring module


Safe communication expansion module


Non-safe communication module

6 types of modules for 6 types of functionnality


Backplane expansion connector


Removable memory card


***SoSafe Configurable** software*

System applications

The Modular safety controllers Modicon MCM 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 such as:

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

Modicon MCM system provides 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 dual or 4 single channel outputs and up to 128 inputs,16 dual outputs or 32 single channel outputs and up to 32 or 48 diagnostic status outputs with the expansion modules connected directly to the safety controller CPU 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 safety controller CPU without software

System components

Modicon MCM system is composed of:

> A safety controller CPU which can be used as standalone or together with expansion modules
> Safe expansion I/O 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, safe analog inputs modules: 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), and network (EtherCAT, Modbus TCP, Ethernet IP)
> A configuration software: SoSafe Configurable
> A memory card, available for saving configuration data for ease of maintenance and safety controller CPU setup
> Backplane expansion connectors, for connecting the modules to the safety controller CPU

Software

The Modular safety controllers Modicon MCM are 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. Configuration data are transferred to the safety controller CPU (XPSMCMCP0802● or XPSMCMC10804●) via a USB link (see page 19).

Modicon MCM
Modular safety controller
Certification
Directive and standards

System certification

The Modular safety controllers Modicon MCM are 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

Modular safety controllers Modicon MCM comply 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 marking for Europe cULus marking for USA and Canada RCM marking for Australia	

Modicon MCM
Modular safety controller
Flexibility and scalability
key figures

Flexibility and scalability

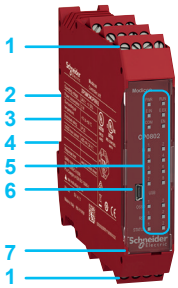
The modular safety controllers Modicon MCM provide flexibility and scalability starting with the safety controller CPU.

> It embeds 8 safety digital inputs, 2 OSSD pairs or 4 single channel OSSD, 2 or 4 status outputs. It is an appropriate solution for machines with a small number of safety functions requiring the configuration flexibility of a safety controller.

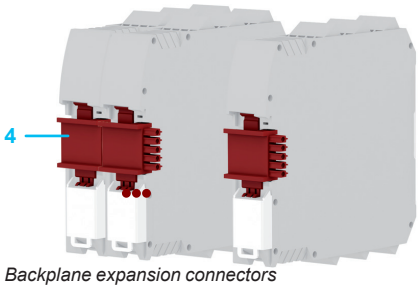
> The safety controller CPU can be used as standalone and also with fourteen expansion modules: the system is expandable up to 128 inputs, 16 dual outputs or 32 single channel outputs and up to 32 or 48 diagnostic status outputs, ideal for machines requiring multiple safety function monitoring

Minimum size of hardware: a safety controller CPU used as standalone: *8 safety digital inputs + 2 OSSD pairs or 4 single channel OSSD + 2 or 4 status outputs*

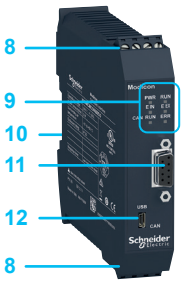
Maximum size of hardware: one safety controller CPU connected to fourteen expansion modules *(1)* via the backplane expansion connectors: *128 inputs + 16 OSSD pairs or 32 single channel OSSD + status outputs*



Safe components



Backplane expansion connectors



Non safe components: non-safe communication modules

Key figures of Modicon MCM system

> Each component is 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 ⊔ symmetrical rail locking clip
4 Slot for backplane expansion connector
5 LEDs displaying the status (I/O, communication, power supply, reset, ...)
6 Mini USB 2.0 connector for configuration (only on safety controller)
7 Protective cover

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

8 Removable spring or screw-type terminal blocks *(2)* for connecting the power supply
9 LEDs displaying the status (I/O, communication, power supply, reset, ...)
10 ⊔ symmetrical rail locking clip
11 Specific connector for connecting to the machine bus or network (depending on model)
12 Mini USB 2.0 connector for configuration

(1) Each expansion module is provided with a multi-language instruction sheet and a backplane expansion connector (XPSMCMCN0000SG), except for XPSMCMER0002●/0004●.
(2) Each Modicon MCM component which part number is ending with a G is equipped with spring clamp terminal block.

Modicon MCM
Modular safety controller
Safe communication with decentralized I/O's

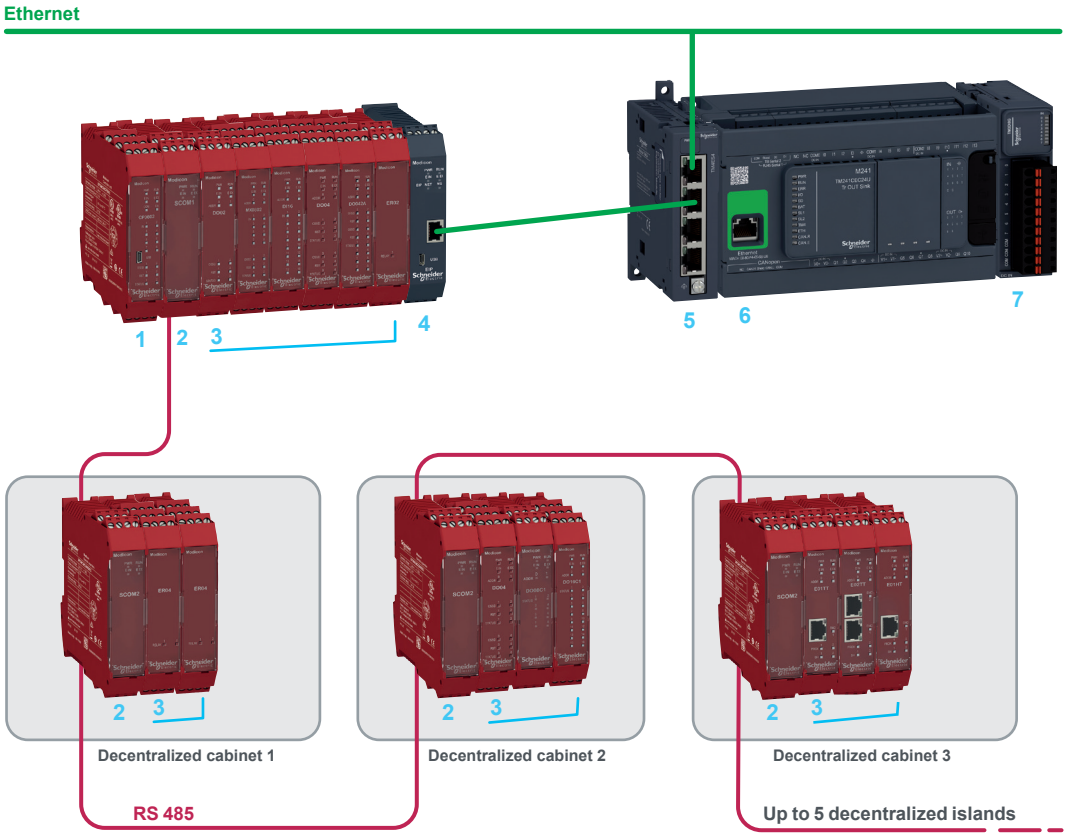
Safe communication with decentralized I/O's

The safety controller CPU has the possibility to monitor up to five 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 I/O modules are used in order to create safe decentralized islands (cabinets) ; they are connected in a line or tree configuration.

> 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.



Safety related communication

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

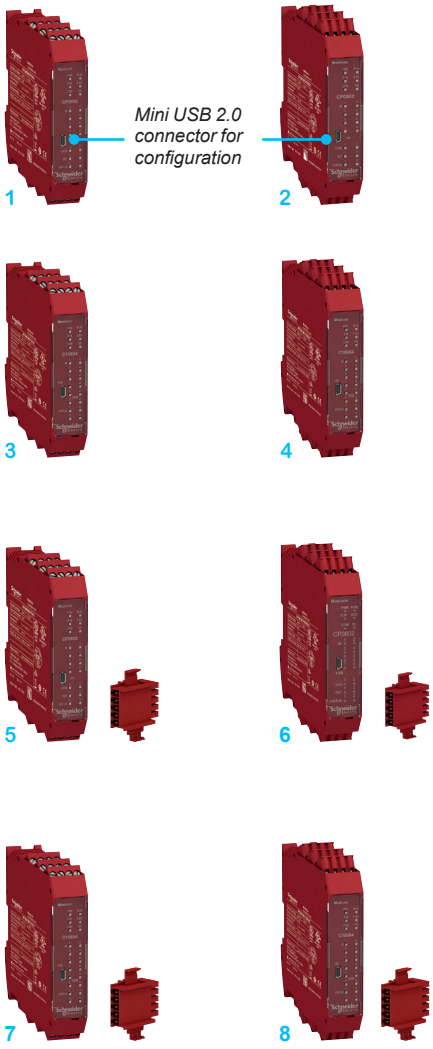
1 Safety controller CPU
2 Safe communication expansion modules (line configuration)
3 Safe expansion I/O modules: mixed I/O modules, Safe relay output modules, Safe speed monitoring modules for proximity sensors and safety encoders

Non-safety related communication

4 Non-safe communication modules: interfaces to Ethernet IP network for non-safety related communication
5 Modicon TM4 communication module (Ethernet switch module) *(1)*
6 Modicon M241 logic controller *(2)*
7 Modicon TM3 expansion I/O module *(3)*

(1) Consult catalog Ref. DIA3ED2140106EN
(2) Consult catalog Ref. DIA3ED2140106EN
(3) Consult catalog Ref. DIA3ED2140109EN

Modicon MCM
Modular safety controller
Safety controllers CPU



Safety controller CPU

Safety controller CPU

The safety controller CPU is designed to monitor a safety configuration created using the software SoSafe Configurable.
The safety controller CPU is usable as a standalone device or able to be connected to any of the expansion units of Modicon MCM system such as

> I/O expansion modules,
> relay output modules,
> communication expansion modules,
> speed monitoring modules,
> non-safe fieldbus communication modules.

The safety controller CPU 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
1	XPSMCMCP0802	> 8 safety digital inputs > 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
2	XPSMCMCP0802G	
3	XPSMCMC10804	> 8 safety digital inputs > 4 single channel OSSD with 400 mA output current > 4 test outputs for line control monitoring of input circuits > 4 inputs for Start/Restart interlock and external device monitoring (EDM) > 4 configurable status outputs
4	XPSMCMC10804G	

Safety controller reference *(1)*		Description
5	XPSMCMCP0802BC	> Safety controller XPSMCMCP0802 or XPSMCMCP0802G with backplane expansion connector XPSMCMCN0000SG
6	XPSMCMCP0802BCG	
7	XPSMCMC10804B	> Safety controller XPSMCMC10804 or XPSMCMC10804G with backplane expansion connector XPSMCMCN0000SG
8	XPSMCMC10804BG	

(1) Safety controllers can be equipped with a spring clamp terminal block. The reference ends with a G.

Modicon MCM
Modular safety controller
Safe I/O expansion modules

1

Safe analog I/O expansion modules

2

3

4

5

6

7

8

9

10

Safe digital I/O expansion modules

11

12

Safe mixed I/O expansion modules

XPSMCM●●●●●●G: equipped with a spring clamp terminal block.

Safe I/O expansion modules

The Safe expansion modules are designed for safety inputs and outputs.
The safety inputs/outputs are configurable individually or in pairs, with several possibilities:

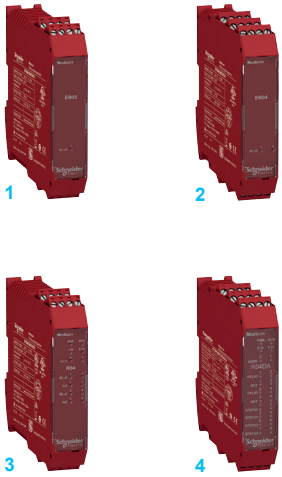
> Monitoring using line control via dedicated test outputs
> Configurable filters and delays for each single input
> Configurable output activation and de-activation delays
> Independent control of pairs of outputs
> Configurable diagnostic output signals
> Simple diagnostics via front led signalling,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

Safe analog I/O expansion module reference *(1)*		Description
1	XPSMCMAI0400 XPSMCMAI0400G	> 4 configurable analog inputs 0...20 mA / 0...10 V (selectable via **SoSafe configurable** software) *The XPSMCMAI0400● modules can only be configured with the XPSMCMC10804● safety controller CPU.*
Safe digital I/O expansion module reference *(1)*		**Description**
2	XPSMCMDI0800 XPSMCMDI0800G	> 8 digital inputs > 4 test outputs for line control monitoring of input circuits
3	XPSMCMDI1200MT XPSMCMDI1200MTG	> 12 digital inputs > 8 test outputs for line control monitoring: dedicated to monitor up to four 4-wire safety mats
4	XPSMCMDI1600 XPSMCMDI1600G	> 16 digital inputs > 4 test outputs for line control monitoring of input circuits
5	XPSMCMDO0002 XPSMCMDO0002G	> 2 OSSD pairs with 400mA output current > 2 inputs for Start/Restart interlock and external device monitoring (EDM) > 2 configurable status outputs
6	XPSMCMDO0004 XPSMCMDO0004G	> 4 inputs for Start/Restart interlock and external device monitoring (EDM) > 4 OSSD pairs with 400mA output current > 4 configurable status outputs
7	XPSMCMDO00042A XPSMCMDO00042AG	> 4 single channel solid state OSSD high current (2 A), which can be used as 4 single or 2 dual OSSD + 8 status outputs SIL 1/ PL c
8	XPSMCMDO0004S XPSMCMDO0004SG	> 4 single channel OSSD with 400mA output current > 4 status outputs SIL 1/PL c *The XPSMCMDO0004S● modules can only be configured with the XPSMCMC10804● safety controller CPU.*
9	XPSMCMDO0008C1 XPSMCMDO0008C1G	> 8 digital outputs SIL 1/PL c
10	XPSMCMDO0016C1 XPSMCMDO0016C1G	> 16 digital outputs SIL 1/PL c
Safe mixed I/O expansion modules reference *(1)*		**Description**
11	XPSMCMMX0802 XPSMCMMX0802G	> 8 digital inputs > 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)
12	XPSMCMMX0804 XPSMCMMX0804G	> 8 digital inputs > 4 single channel OSSD with 400 mA output current > 4 test outputs for line control monitoring of input circuits > 4 configurable status outputs > 4 inputs for Start/Restart interlock and external device monitoring (EDM) *The XPSMCMMX0804● modules can only be configured with the XPSMCMC10804● safety controller CPU.*

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

(1) Safety I/O expansion module can be equipped with a spring clamp terminal block. The reference ends with a G.

Modicon MCM
Modular safety controller
Safe relay output modules



Safe relay output modules

Safe relay output modules

Four types of safe relay output modules are available.

	Safe relay output module reference *(1)*	Description
1	XPSMCMER0002 XPSMCMER0002G	> 2 forcibly guided contact safety relay output (2 NO + 1 NC) modules for 1 output without expansion bus connection > 1 input for Start/Restart interlock and external device monitoring (EDM)
2	XPSMCMER0004 XPSMCMER0004G	> 4 forcibly guided contact safety relay output (2 NO + 1 NC) modules for 2 independent outputs without expansion bus connection > 2 inputs for Start/Restart interlock and external device monitoring (EDM)

> The safe relay output modules **XPSMCMER000●** do not require the backplane expansion connectors as they are directly wired to the selected OSSD.

3	XPSMCMRO0004 XPSMCMRO0004G	> 4 forcibly guided contact safety relay output modules with expansion bus connection > Expansion module with 4 independent safety relay outputs and the corresponding 4 inputs for the external feedback contacts (EDM) > The relay can be configured according to Category 1, 2 and 4 architectures
4	XPSMCMRO0004DA XPSMCMRO0004DAG	> 4 forcibly guided contact safety relay output modules with expansion bus connection > Expansion module with 4 independent safety relay outputs and the corresponding 4 inputs for the external feedback contacts (EDM) > The relay can be configured according to Category 1, 2 and 4 architectures > 8 configurable status outputs

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

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

XPSMCM●●●●●●G: equipped with a spring clamp terminal block.

Modicon MCM
Modular safety controller
Safe speed monitoring modules


1


2


3


4


5


6


7

Safe speed monitoring modules

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 intput (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 module reference *(1)*	Description	Connector type
1	XPSMCMEN0100HT XPSMCMEN0100HTG	> 1 input for HTL encoder + 1 or 2 proximity switches	1x RJ 45 (ENC1) and terminal blocks for proximity sensor wiring
2	XPSMCMEN0100SC XPSMCMEN0100SCG	> 1 input for Sin/Cos encoder + 1 or 2 proximity switches	1x RJ 45 (ENC1) and terminal blocks for proximity sensor wiring
3	XPSMCMEN0100TT XPSMCMEN0100TTG	> 1 input for TTL encoder + 1 or 2 proximity switches	1x RJ 45 (ENC1) and terminal blocks for proximity sensor wiring
4	XPSMCMEN0200 XPSMCMEN0200G	> 2 inputs for proximity switches	Terminal blocks for proximity sensor wiring
5	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
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	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

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

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

XPSMCM●●●●●●G: equipped with a spring clamp terminal block.

Modicon MCM
Modular safety controller
Safe communication expansion modules
Non-safe communication modules

1 2

Safe communication expansion modules

Safe communication expansion modules

The safe communication expansion modules enable the connection of safety controller CPU (XPSMCMCP0802● or XPSMCMC10804●) with the expansion modules placed remotely (≤ 50 m *(≤ 164 ft)*).
Using RS 485 shielded cable, the two modules (XPSMCMCO0000S1 and XPSMCMCO0000S2) placed at the desired distance can be linked together thus joining the expansion modules to the safety controller CPU.

> **XPSMCMCO0000S2** safe communication expansion module has two independent connection channels; typically used in between two **XPSMCMCO0000S1** modules.
> **XPSMCMCO0000S1** safe communication expansion module has one channel connection for transmitting/receiving data and must be connected as the first or last module.
> Up to five 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 *(1)*		Description
1	XPSMCMCO0000S1 XPSMCMCO0000S1G	> 1 connection interface: single channel transmitter/receiver *(2)*
2	XPSMCMCO0000S2 XPSMCMCO0000S2G	> 2 connections interface: dual channel transmitter/receiver

1 2 3 4 5 6

Non-safe communication modules

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.

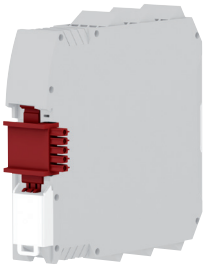
Non-safe communication module reference *(1)*		Machine bus/network interface	Connector type
1	XPSMCMCO0000CO XPSMCMCO0000COG	> CANopen	SUB-D 9 contacts (female)
2	XPSMCMCO0000EC XPSMCMCO0000ECG	> EtherCAT	2x RJ 45 (in/out)
3	XPSMCMCO0000EI XPSMCMCO0000EIG	> Ethernet IP	1x RJ 45 (in/out)
4	XPSMCMCO0000EM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

> The non-safe communication modules are connected to the safety controller via the backplane expansion 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) Safe communication expansion module and non-safe communication module can be equipped with a spring clamp terminal block. The reference ends with a G.
(2) End of the network or Start of the network if connected to a single RS 485 cable

XPSMCM●●●●●●G: equipped with a spring clamp terminal block.

Memory card



Backplane Expansion connector

Accessories

■ Memory card

XPSMCMME0000 removable memory card is used to save 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● or XPSMCMC10804●), replacing the old configuration contained in the card by the newest one.
> This configuration replacement function can be disabled on the safety controller via **SoSafe Configurable** software.
> Overwrite operations are recorded in chronological order in the safety controller CPU LOG file.

■ Backplane expansion connector

XPSMCMCN0000SG backplane expansion connector provides a safe communication between safe expansion components and the safety controller CPU.

> Safety controller CPU (XPSMCMCP0802● or XPSMCMC10804●) requires the purchase of the backplane expansion connector.
> Expansion modules are provided with one backplane expansion connector.
> Use references XPSMCMCP0802BC, XPSMCMCP0802BCG, XPSMCMC10804B and XPSMCMC10804BG when I/O expansion is required. The references includes both the safety controller and backplane expansion connector.

■ Configuration cable

TCSXCNAMUM3P cable is used for software configuration between a PC, the safety controller, 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)*

Modicon MCM
Modular safety controller
Safety controllers CPU
Safe I/O expansion modules


XPSMCMCP0802BC


XPSMCMC10804


XPSMCMMX0802


XPSMCMMX0804


XPSMCMAI0400


XPSMCMDI0800


XPSMCMDI1600


XPSMCMDI1200MT


XPSMCMDO0002


XPSMCMDO0004


XPSMCMDO00042A


XPSMCMDO0004S


XPSMCMDO0008C1


XPSMCMDO0016C1

Safety controllers CPU

Description	Inputs	Outputs	Terminal block type	Reference	Weight kg/lb
Safety controllers CPU	8 safety-related 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	
	8 safety digital inputs + 4 for Start/Restart interlock	4 single channel OSSD with 400 mA output current + 4 configurable status outputs	Screw	XPSMCMC10804	
			Spring clamp	XPSMCMC10804G	

Description	Composition	Terminal block type	Reference	Weight kg/lb
Safety controllers CPU combined with backplane expansion connector	XPSMCMCP0802 + XPSMCMCN0000SG	Screw	XPSMCMCP0802BC	0.260 *0.57*
	XPSMCMC10804 + XPSMCMCN0000SG		XPSMCMC10804B	
	XPSMCMCP0802G + XPSMCMCN0000SG	Spring clamp	XPSMCMCP0802BCG	
	XPSMCMC10804G + XPSMCMCN0000SG		XPSMCMC10804BG	

Safe I/O expansion modules

Description	Inputs	Outputs	Terminal block type	Reference	Weight kg/lb
Safe analog I/O expansion modules					
Safe analog I/O expansion modules	4 configurable analog inputs 0...20 mA / 0...10 V (selectable via **SoSafe configurable** software)	–	Screw	XPSMCMAI0400 *(1)*	0.164 *0,36*
			Spring clamp	XPSMCMAI0400G *(1)*	
Safe digital I/O expansion modules					
Safe digital I/O expansion modules	8 digital inputs	4 test outputs	Screw	XPSMCMDI0800	0.230 *0.51*
			Spring clamp	XPSMCMDI0800G	
	12 digital inputs	8 test ouputs for 4 wires safety Mats	Screw	XPSMCMDI1200MT	0.250 *0.55*
			Spring clamp	XPSMCMDI1200MTG	
	16 digital inputs	4 test outputs	Screw	XPSMCMDI1600	0.250 *0.55*
			Spring clamp	XPSMCMDI1600G	
	2 for Start/Restart interlock	2 OSSD pairs + 2 configurable status outputs	Screw	XPSMCMDO0002	0.230 *0.51*
			Spring clamp	XPSMCMDO0002G	
	4 for Start/Restart interlock	4 OSSD pairs + 4 configurable status outputs	Screw	XPSMCMDO0004	0.250 *0.55*
			Spring clamp	XPSMCMDO0004G	
	–	4 single channel solid state OSSD high current (2 A), which can be used as 4 single or 2 dual OSSD + 8 status outputs SIL 1/ PL c	Screw	XPSMCMDO00042A	0.150 *0.33*
			Spring clamp	XPSMCMDO00042AG	
		4 single channel OSSD with 400mA output current 4 status outputs SIL 1/PL c	Screw	XPSMCMDO0004S *(1)*	0.138 *0,30*
			Spring clamp	XPSMCMDO0004SG *(1)*	
		8 digital outputs SIL 1/PL c	Screw	XPSMCMDO0008C1	0.130 *0,28*
			Spring clamp	XPSMCMDO0008C1G	
		16 digital outputs SIL 1/ PL c	Screw	XPSMCMDO0016C1	0.145 *0,31*
			Spring clamp	XPSMCMDO0016C1G	
Safe mixed I/O expansion modules					
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	
	8 digital inputs + 4 for Start/Restart interlock	4 single channel OSSD with 400 mA output current + 4 test outputs for line control monitoring of input circuits + 4 configurable status outputs	Screw	XPSMCMMX0804 *(1)*	0.150 *0.33*
			Spring clamp	XPSMCMMX0804G *(1)*	

(1) XPSMCMAI0400●, XPSMCMDO0004S● and XPSMCMMX0804● modules can only be configured with XPSMCMC10804● safety controller CPU.

Modicon MCM
Modular safety controller
Safe relay output modules
Safe speed monitoring modules
Safe communication expansion modules


XPSMCMER0002


XPSMCMER0004


XPSMCMRO0004


XPSMCMRO0004DA


XPSMCMEN0100HT


XPSMCMEN0100SC


XPSMCMEN0100TT


XPSMCMEN0200


XPSMCMEN0200HT


XPSMCMEN0200SC


XPSMCMEN0200TT


XPSMCMCO0000S1


XPSMCMCO0000S2

Safe relay output modules

Description	Inputs	Outputs	Terminal block type	Reference	Weight kg/lb
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	
	2 for Start/Restart interlock	4 relays for 2 independant outputs (4 NO + 2 NC)	Screw	XPSMCMER0004	0.300 *0.66*
			Spring clamp	XPSMCMER0004G	
Safe relay output modules (wiring with the backplane expansion connector)	4 for Start/Restart interlock	4 relays	Screw	XPSMCMRO0004	0.300 *0.66*
			Spring clamp	XPSMCMRO0004G	
	4 for Start/Restart interlock	4 relays with 8 status outputs	Screw	XPSMCMRO0004DA	0.330 *0.73*
			Spring clamp	XPSMCMRO0004DAG	

Safe speed monitoring modules

Description	■ Inputs (number & type) ■ Connector type	Terminal block type	Reference	Weight kg/lb
Safe speed monitoring modules	■ 1 HTL encoder and 2 proximity sensor inputs *(1)* ■ 1x RJ 45 (ENC1)	Screw	XPSMCMEN0100HT	0.280 *0.62*
		Spring clamp	XPSMCMEN0100HTG	
	■ 1 Sin/Cos encoder and 2 proximity sensor inputs *(1)* ■ 1x RJ 45 (ENC1)	Screw	XPSMCMEN0100SC	0.280 *0.62*
		Spring clamp	XPSMCMEN0100SCG	
	■ 1 TTL encoder and 2 proximity sensor inputs *(1)* ■ 1x RJ 45 (ENC1)	Screw	XPSMCMEN0100TT	0.280 *0.62*
		Spring clamp	XPSMCMEN0100TTG	
	■ 2 inputs for proximity switches *(1)* ■ None	Screw	XPSMCMEN0200	0.230 *0.51*
		Spring clamp	XPSMCMEN0200G	
	■ Up to 2 HTL encoders and 2 proximity sensor inputs *(1)* ■ 2x RJ 45 (ENC1/ENC2)	Screw	XPSMCMEN0200HT	0.300 *0.66*
		Spring clamp	XPSMCMEN0200HTG	
	■ Up to 2 Sin/Cos encoders and 2 proximity sensor inputs *(1)* ■ 2x RJ 45 (ENC1/ENC2)	Screw	XPSMCMEN0200SC	0.300 *0.66*
		Spring clamp	XPSMCMEN0200SCG	
	■ Up to 2 TTL encoders and 2 proximity sensor inputs *(1)* ■ 2x RJ 45 (ENC1/ENC2)	Screw	XPSMCMEN0200TT	0.300 *0.66*
		Spring clamp	XPSMCMEN0200TTG	

Safe communication expansion modules

Description	Characteristics	Terminal block 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	
	2 connections interface: dual channel transmitter/ receiver network connection	Screw	XPSMCMCO0000S2	0.300 *0.66*
		Spring clamp	XPSMCMCO0000S2G	

(1) Proximity sensor connection via terminal blocks.

Modicon MCM
Modular safety controller
Non-safe communication modules
Accessories


XPSMCMCO0000CO

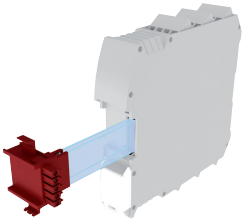

XPSMCMCO0000EC


XPSMCMCO0000EI

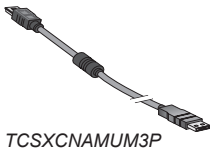

XPSMCMCO0000EM


XPSMCMCO0000MB


XPSMCMCO0000PB


XPSMCMCN0000SG


XPSMCMME0000


TCSXCNAMUM3P


TSXSCMCN0●●


TSXESPPM0●●


TSXESPP300●

Non-safe communication modules

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

Accessories

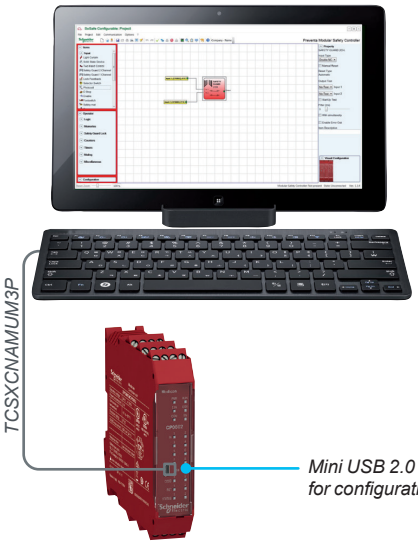
Description	Application	Reference	Weight kg/lb
Backplane expansion connector *(1)*	To connect the various expansion modules to the safety controller	XPSMCMCN0000SG	0.001 *0.002*
Memory card	For saving configuration data for subsequent transfer to a new device without using a PC	XPSMCMME0000	0.004 *0.009*

Description	Use	Length	Reference	Weight kg/lb
Configuration cable	For software configuration, between a PC, the safety controller, 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*	TSXSCMCN010	0.920 *2.03*
		25 m / *82.02 ft*	TSXSCMCN025	2.300 *5.07*
		50 m / *164.04 ft*	TSXSCMCN050	4.600 *10.14*
Encoder splitter cables	Between SIN/COS safe speed monitoring module and MC-4 servo drives and the associated servo motors	1 m / *3.3 ft*	TSXESPPM001	0.110 *0.24*
		5 m / *16.40 ft*	TSXESPPM005	0.510 *1.12*
	Between SIN/COS safe speed monitoring modules and Lexium 32, 52 and 62 servo drives and the associated servo motors	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*

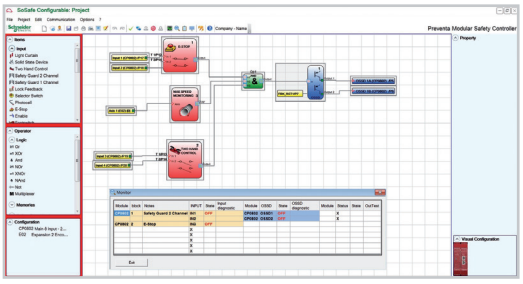
(1) This reference needs to be ordered for the XPSMCMCP0802 reference only when it is connected to expansion modules.

Modicon MCM
Modular safety controller
SoSafe Configurable software

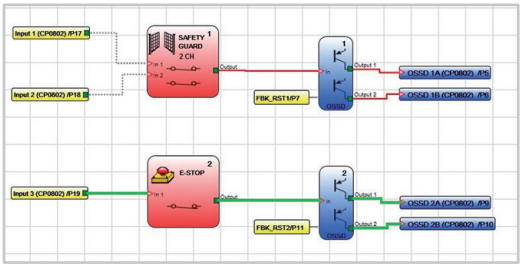
SoSafe Configurable software



Safety controller CPU



Text visualization



Graphic visualization

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

SoSafe Configurable software

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 CPU (XPSMCMCP0802● or XPSMCMC10804●) via a USB link.

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

Password
The 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 safety controller CPU) 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.

> 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 dual – 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

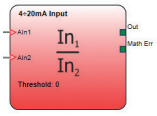
SoSafe Configurable is downloadable from our website. It runs on PC with:

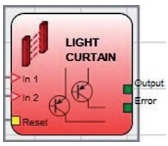
> RAM: 256 MB
> Hard disk: free space > 300 MB
> USB connector: 1.1 or 2.0
> Microsoft Windows® 10, Microsoft Windows® 7 32 and 64-bit , Microsoft Windows® 8.1 32 and 64-bit
> Microsoft Framework 3.5 (or higher).
> Available language: English

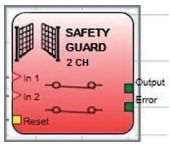
Safety level parameters

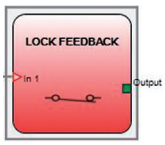
Parameter	Value	Standard
PFH_d	≥ 10^{-8} PFH_d < 10^{-7}	IEC 61508
SIL	3	
SILCL	3	IEC 62061
Type	4	EN 61496-1
PL	e	ISO 13849-1
DCavg	High	
$MTTF_d$ (years)	100 years	
Category	4	
Operation life time	20 years	

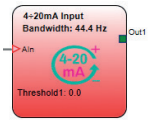
Modicon MCM
Modular safety controller
SoSafe Configurable software
Function blocks

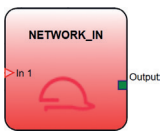


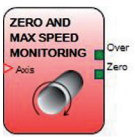


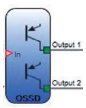


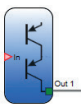












Function blocks

Input objects	
E-STOP	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.
SAFETY GUARD	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.
ENABLE (enable key)	Verifies a manual key device Input status. If the key is not turned the output is 0. Otherwise the output is 1.
LIGHT CURTAIN (optoelectronic safety light curtain / laser scanner)	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.
FOOTSWITCH (safety pedal)	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.
PHOTOCELL (safety photocell)	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.
SELECTOR SWITCH	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.
TWO HAND CONTROL	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.
SAFETY MAT (safety mat or safety edge)	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.
ENABLE SWITCH	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.
TESTABLE SAFETY DEVICE	The function can be used with every generic input either one or two channels and either NO or NC contacts.
SENSOR	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.
LOCK FEEDBACK	Verifies the feedback from the Guardlock solenoid generating a 1 when the guardlock is locked and 0 when open.
SWITCH	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.
SOLID STATE DEVICE	Verifies INx input status. If the the inputs are High the output is 1 else 0.
FIELDBUS INPUT	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.
LL0	0 input value.
LL1	1 input value.
NETWORK_IN	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.
Analog Monitoring	
ANALOG INPUT	Configures the single or redundant analog input 4... 20 mA or 0... 0V. It is available with XPSMCMC10804● safety controller CPU and XPSMCMAI0400● Safe I/O expansion module.
ANALOG DIVISION	Allows the arithmetic division of the values of two inputs. The inputs can be single or redundant. ANALOG DIVISION allows also the configuration of one THRESHOLD COMPARATOR (or one WINDOW COMPARATOR) and an ALERT COMPARATOR.
Speed Monitoring	
ZERO SPEED MONITORING	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.
ZERO AND MAX SPEED MONITORING	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.
MAXIMUM SPEED MONITORING	Verifies the speed of a device generating an output 0 when the speed is over a defined threshold.
SPEED RANGE MONITORING	Verifies the speed of a device generating an output 1 when the speed is inside a defined range.
Output objects	
SINGLE-DOUBLE OSSD (safety outputs)	OSSD semiconductor PNP safety static output single or dual channel (single channel, 400mA) The outputs can operate independently or in pairs. Each OSSD single or dual channel can work in both AUTO/Manual restart mode and can perform the EDM of external relays or contactors using the dedicated RESTART_FBK input.
STATUS (signal output)	The Status outputs are non-safety diagnostic outputs which can be used to provide the status of part of the logic within the configuration.
RELAY	Used with the XPSMCMRO0004● modules and is configurable to Category 1, 2 and 4.
FIELDBUS PROBE OUTPUT	Used to provide the status of part of the logic within the configuration to a PLC or HMI device.

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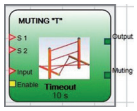
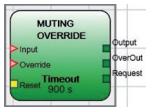
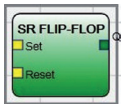
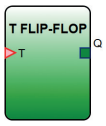
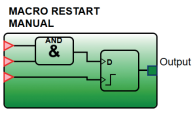
SoSafe Configurable software
Function blocks

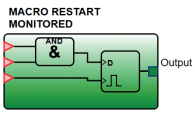


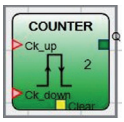


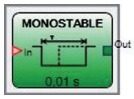


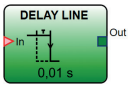


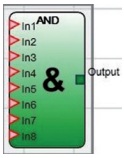


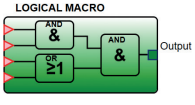












Function blocks

Muting operators	
MUTING "L" with 2 Muting sensors, only for one-way openings	Monitors the 2 muting sensors along with the light curtain for L Muting setup.
MUTING "T" with 2 Muting sensors for two-way openings	Monitors the 2 muting sensors along with the light curtain for T Muting setup.
MUTING "SEQUENTIAL" with 4 Muting sensors for two-way openings	Monitors the 4 muting sensors along with the light curtain for sequential Muting setup.
MUTING "CONCURRENT" with 4 Muting sensors for two-way openings	Monitors the 4 muting sensors along with the light curtain for concurrent Muting setup.
MUTING OVERRIDE	Forces the output high allowing to remove the material obstructing the gate. Two different operations are available: Manual action with hold to run, and Automatic with pulse command.
Analog operators	
ANALOG COMPARATOR	Works as a comparator of an analog signal connected only with XPSMCMC10804● controller.
MATH	Calculates the sum or the difference of analog signals coming from ANALOG INPUT blocks. This works only with XPSMCMC10804● controller.
EQUALITY CHECK	Verifies if two analog inputs are equal within a selectable tolerance. This works only with XPSMCMC10804● controller.
General/Miscellaneous	
SERIAL OUTPUT	Transfers the state of up to a maximum of 8 inputs into a serial line data output.
NETWORK	Allows to distribute in a local network Stop and Reset commands between safety controller CPU.
INTERPAGE IN AND INTERPAGE OUT	Memory bit which are reused from inputs to multiple outputs.
RESET	Initiates a system reset when there is an OFF-ON-OFF transition on the corresponding input which lasts less than 5 s.
Memory operators	
D FLIP FLOP	Saves the previously set status on output Q on the clock rising edge.
SR FLIP FLOP	Provides an output Q at 1 with Set, 0 with Reset.
T FLIP FLOP	Changes state whenever the input triggered. If the T input is low, the flip-flop holds the previous value.
T FLIP-FLOP	Switches the Q output at each rising edge of the T input (toggle).
USER RESTART MANUAL	Used to create a common reset for multiple input functions on rising edge of the reset input.
MACRO RESTART MANUAL	Used to combine a logic gate of your choice with the USER RESTART MANUAL function block according to the pre-defined truth table.
USER RESTART MONITORED	Used to create a common reset for multiple input functions on rising edge and falling edge of the reset input.
MACRO RESTART MONITORED	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	
COUNTER	Generates a pulse as soon as the set count is reached.
Timer operators	
PULSE GENERATOR	Generates a clock signal output with the desired period if the input In is 1.
MONOSTABLE	Generates a level 1 output activated by the rising edge of the input and remains in this condition for the set time.
MONOSTABLE_B	Generates a 1 (TRUE) output activated by the rising/falling edge of the input and remains in this condition for the set time.
PASSING MAKE CONTACT	The output follows the signal on the input. However, if this is 1 for longer than the set time, the output changes to 0.
DELAY	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.
DELAY LINE	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.
TIMER	Generates a signal (TRUE or FALSE) for a user-definable period.
Logical operators	
AND	Returns 1 as output if all the inputs are 1
NAND	Returns 0 as output if all the inputs are 1.
NOT	Inverts the logical status of the input.
OR	Returns 1 as output if at least one of the inputs is 1.
NOR	Returns 0 as output if at least one of the inputs is 1.
XOR	Returns 0 as output if all the inputs are in the same logical status.
XNOR	Returns 1 as output if all the inputs are in the same logical status.
MULTIPLEXER	Forwards the signal of the inputs to the output according to the Sel selection.
LOGICAL MACRO	Enables the grouping of two or three logic gates. The result of the third logic gate provided at the output.
IntFbk	
INTFBK IN & INTFBK OUT	Configures up to 8 internal feedback loops. Possible to connect the output of a function block by using the IntFbk_Out operator to the input of a function block by using the IntFbk_In operator. This works only with XPSMCMC10804● controller.

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Product reference index