Preventa™ Machine Safety Products

Catalog

2014

Chapter 2

Safety Automation System Solutions

Schneider Electric™

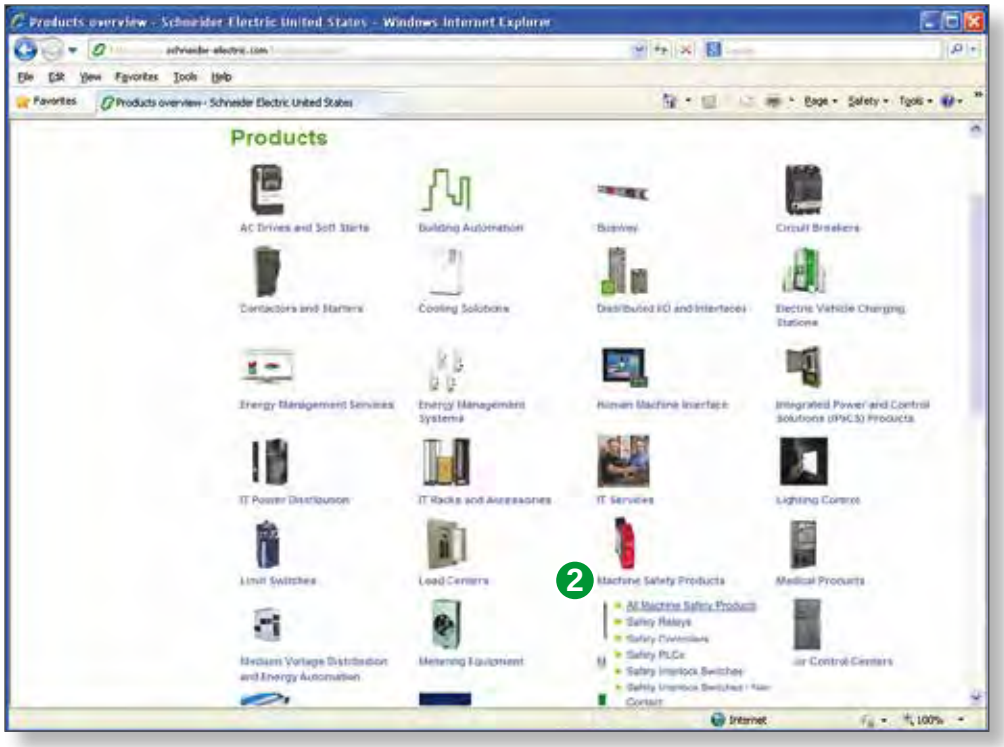
Preventa™ safety PLCs, XPSMF

Preventa safety controllers, XPSMP and XPSMC

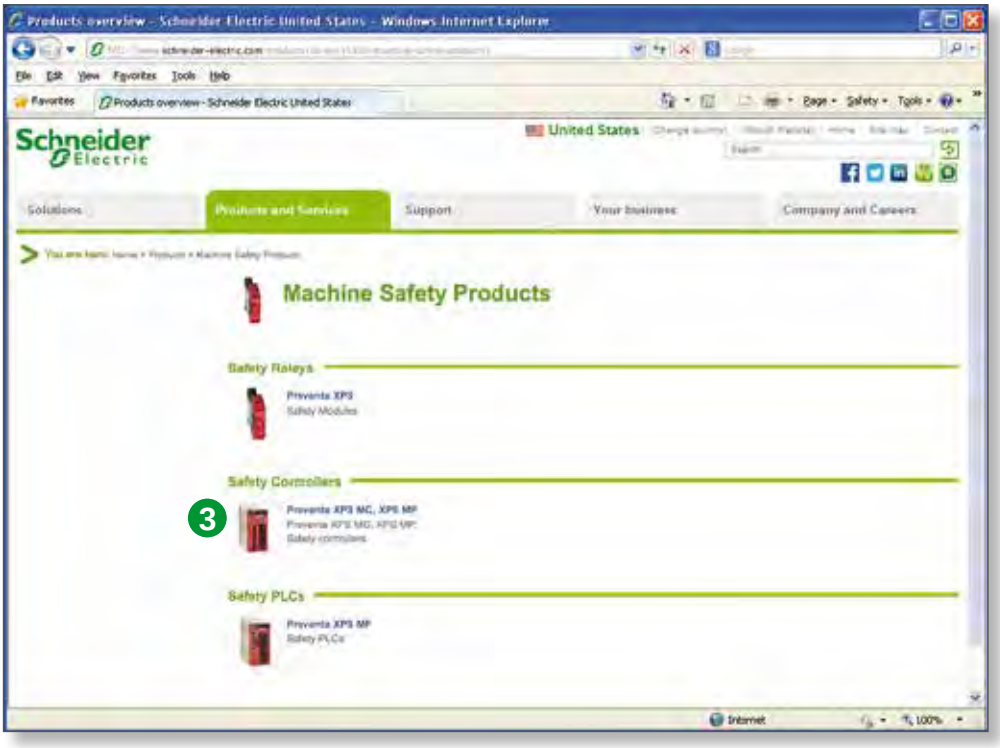
Go online to www.schneider-electric.com for information about Preventa™ products listed in this catalog, including:

1 Go to: www.schneider-electric.com and select "Products" on the "Products and Services" tab.

2 On the "Products" page, find the "Machine Safety Products" icon and select "All Machine Safety Products".

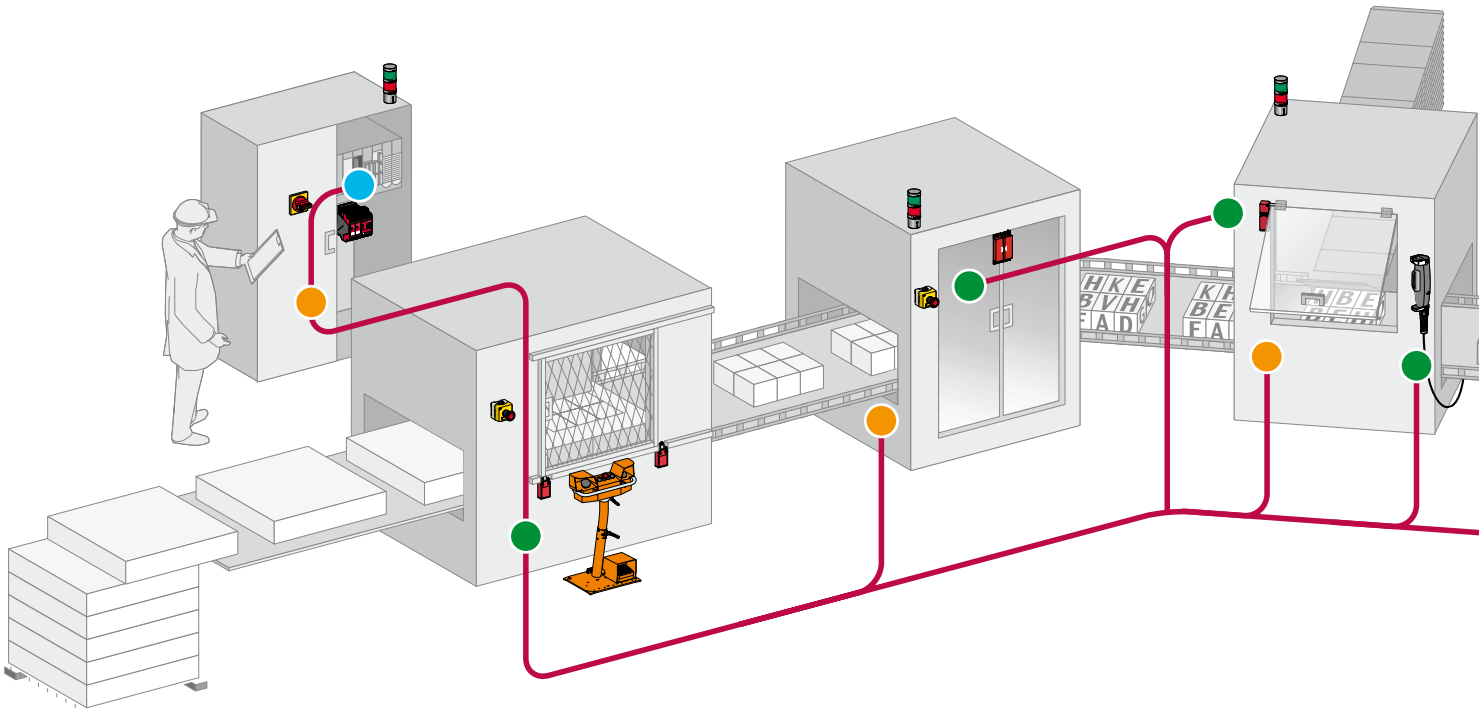


3 **On the “Machine Safety Products” page, select the product you are interested in, for example: “Safety Controllers - Preventa XPS MC, XPS MP - Safety Controllers”.**



4 **Explore the product page you have selected, including the “Product Information” tabs: “Documents & Downloads” and “Support”.**

Save time and money with our Preventa™ machine safety solutions offer



Safety-related signal transmission

Acquiring information…

- Safety interlock devices used as part of safeguarding systems to control access, under specific conditions of reduced risk.
- Light curtains to detect approach to dangerous and limited areas.
- Emergency stop buttons and cable pull switches for emergency shut down.

Monitoring and processing…

- Safety relay modules with specific safety functions – to monitor input signals from safety-related devices, and to interface with contactors and drives – by switching off output safety contacts.
- Safety Controller: configurable safety device capable of centralizing a range of safety monitoring functions.
- Safety PLCs: programmable electronic systems to carry out safety or non-safety related tasks for machinery and equipment.
- "As-interface safety at work": safety field bus network certified to work with safety-related devices to provide safety functions.

Safety interlocks

Light curtains

Emergency stop

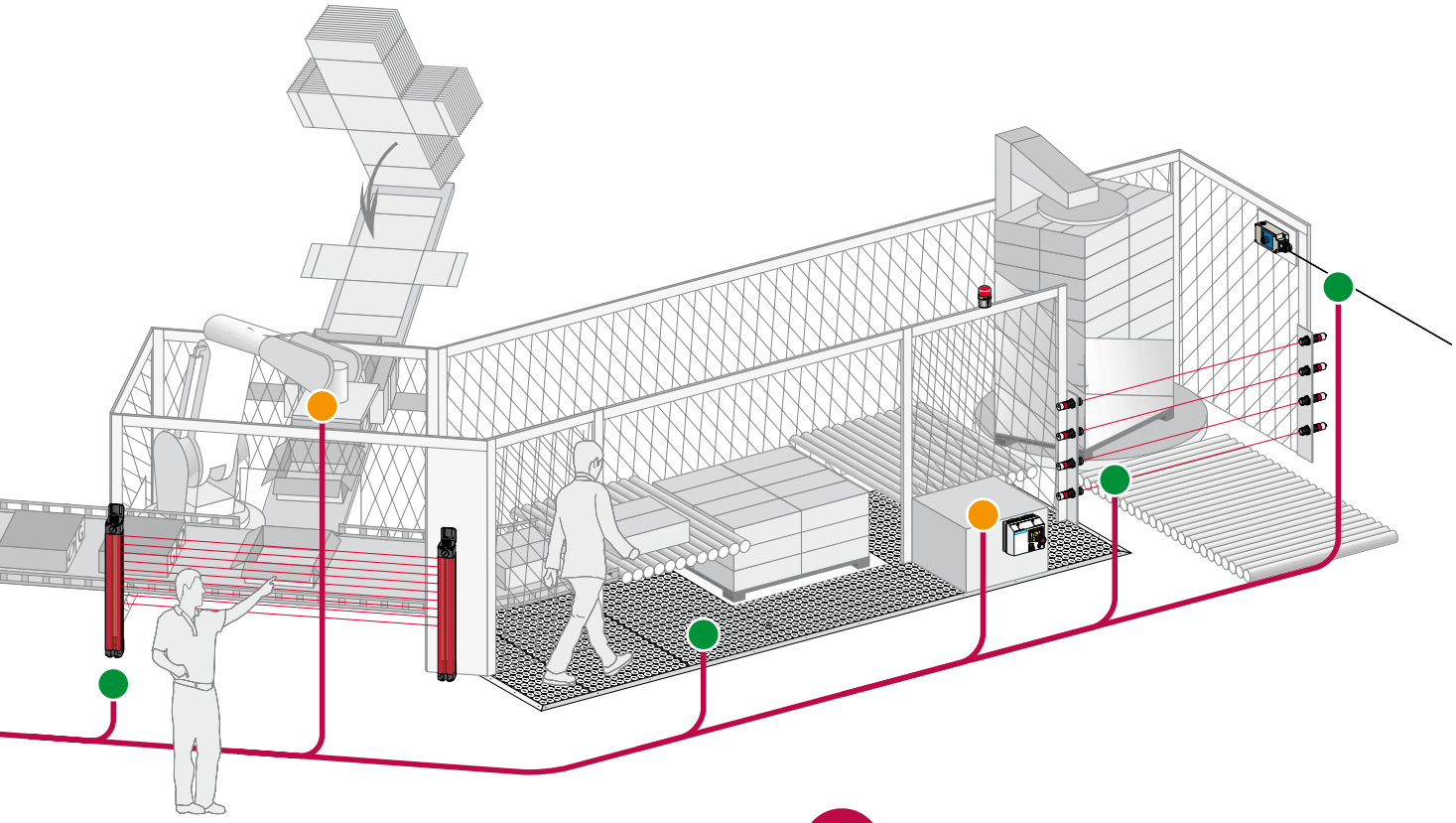
Cable pull switch

Safety relays

Safety Controller

Safety PLCs

As-interface safety at work



Stopping the machine…

- Contactors to cut-off the electrical power supply to motors – with mechanically linked or mirrored auxiliary contacts – integrated for feedback loop diagnosis of safety relay modules, safety controllers, or safety PLCs.
- Variable speed drives and servo drives with integrated safety functions…control stopping of dangerous movements.

Up to 50%
better space optimization
Compact components have smaller footprint

Save up to 30%
on installation time
Reduce installation time with quick and easy wiring


Variable speed drives


Servo drives


Contactors

Safety automation system solutions

Preventa™ safety PLCs
Compact and modular, XPSMF

Introduction

*Products referenced **XPSMF31222, XPSMF3022** and **XPSMF35●●** are marked **HIMatrix® F31, HIMatrix® F30** and **HIMatrix® F35** (manufactured by Hima, sold by Schneider Electric).*

Compact PLCs:
- Designed for use with numerous machine safety functions and for the protection of personnel.
- Designed for use in safety related parts of control systems up to category 4 conforming to EN 954-1, up to performance level "e" conforming to EN/ISO 13849-1, and up to SIL 3 conforming to EN/IEC 61508.

User memory	Application	250 kB			
	Data	250 kB			
Response time		Depending on size of application			
Maximum power consumption		8 A			9 A
Supply		External ⎓ 24 V supply (with separate protection conforming to EN/IEC 60950, SELV (Safety Extra Low Voltage) or PELV (Protection Extra Low Voltage) rated)			
Inputs	**Digital**	Number of channels	**24**, configurable, not electrically isolated	**20**, not electrically isolated	**24**, not electrically isolated
		Current at state 0	1.5 mA max. at ⎓ 24 V	1.5 mA max., 1.25 mA at 5 V	
		Current at state 1	3.5 mA at ⎓ 24 V 4.5 mA at ⎓ 30 V	≥ 2 mA at ⎓ 15 V	> 2 mA at ⎓ 15 V 3.5 mA at ⎓ 24 V 4.5 mA at ⎓ 30 V
	Analog	Number of channels	–	–	–
					8, single-pole
		Range: voltage/current	–	–	–
					0…10 V/0…20 mA *(1)*
	Counting	Number of channels	–	–	–
					2
		Current	–	–	–
					1.4 mA at ⎓ 5 V, 6.5 mA at ⎓ 24 V
Outputs	**Digital**	Number of channels	**24**, configurable, not electrically isolated	**8** *(2)*, not electrically isolated	**8**, not electrically isolated
		Output current	Chnls. 1 to 3, 5 to 7, 9 to 11, 13 to 15, 17 to 19, 21 to 23: 0.5 A at 140°F (60°C) Channels 4, 8, 12, 16, 20 and 24: 1 A at 140 °F (60 °C), 2 A at 122°F (50°C)	Channels 1 to 3 and 5 to 7: 0.5 A at 140 °F (60 °C) Channels 4 and 8: 1 A at 140°F (60 °C), 2 A at 122°F (50 °C)	
	Analog	Number of channels	–	–	–
					–
		Range: voltage/current	–	–	–
					–
	Relay	Number	–	–	–
					–
		Switching voltage	–	–	–
					–
	Line control		**2 x 4**	*(2)*	*(2)*
					–
Input/output connections		Removable screw terminals are provided with all Safety compact PLCs Reference **XPSMF40●●** is also provided with cage clamp terminal			
Communication on Ethernet network		**By integrated RJ45 switched Ethernet communication ports**			
■ **Safe communication** using SafeEthernet protocol		yes	yes	yes	yes
■ **Non safe communication** using Modbus™ TCP/IP protocol, server (slave)		yes (**XPSMF4002/4022/4042**)	yes (**XPSMF31222**)	yes (**XPSMF3022**)	yes (**XPSMF3502/ MF3522/MF3542**)
Communication on fieldbus					
Non safety using Modbus RTU protocol, slave (RS 485)		yes (**XPSMF4020/4022**)	–	yes (**XPSMF3022**)	yes (**XPSMF3522**)
Non safety using PROFIBUS DP protocol, (V0 slave)		yes (**XPSMF4040/4042**	–	–	yes (**XPSMF3542**)
Safety PLC type		**XPSMF400●/MF402●/ MF404●**	**XPSMF31222**	**XPSMF3022**	**XPSMF3502/ MF3522/MF3542**
See page		2/16	2/31	2/31	2/31
"In rack" card type		–	–	–	–
See page		–	–	–	–

(1) With 500 Ω jumper. (2) The digital outputs can be configured as line control outputs.

Modular PLC XPSMF60: metal rack **XPSMFGEH01** with slots for power supply module **XPSMFPS01**, central processing unit **XPSMFCPU22** and six "in rack" I/O cards.
- Designed for use with numerous machine safety functions and for the protection of personnel.
- Designed for use in safety related parts of control systems up to category 4 conforming to EN 954-1, up to performance level "e" conforming to EN/ISO 13849-1, and up to SIL 3 conforming to EN/IEC 61508.

500 kB						
500 kB						
Depending on size of application						
30 A max., 32 A external fuse						
External ⎓ 24 V supply (with separate protection conforming to EN/IEC 60950, SELV (Safety Extra Low Voltage) or PELV (Protection Extra Low Voltage) rated)						
–	–	–	**24**, electrically isolated	**32** *(2)*, electrically isolated	**24** *(2)*, electrically isolated	–
–	–	–	–	1 mA at 5 V	1 mA at 5 V	–
–	–	–	⩾ 2.2 mA at 79 V	2 mA at ⎓ 10 V, 5 mA at ⎓ 24 V	2 mA at ⎓ 10 V, 5 mA at ⎓ 24 V	–
8 single-pole or **4** 2-pole, configurable, electrically isolated	–	–	–	–	–	–
- 10…+ 10 V/0…20 mA *(1)*	–	–	–	–	–	–
–		**2**	–	–	–	–
–	–	0.8 A at ⎓ 3.3 V 0.1 A at ⎓ 5 V 0.1 A + output current at ⎓ 24 V	–	–	–	–
–	–	**4**	–	–	**16** *(3)*, electrically isolated	–
–	–	0.5 A per channel, 2 A max. per "in rack" card	–	–	2 A per channel at 86 °F (30 °C), 8 A max. at 86 °F (30 °C) per "in rack" card	–
–	**8**, electrically isolated	–	–	–	–	–
–	- 10…10 V / 0…20 mA	–	–	–	–	–
–	–	–	–	–	–	**8**
–	–	–	–	–	–	⏦ 6…250 V
–	–	–	–	–	*(3)*	–
Removable screw terminals are provided with "in rack" I/O cards and Power supply module						
By integrated RJ45 switched Ethernet communication ports						
yes						
yes						
yes						
yes						

XPSMFGEH01 (rack) + XPSMFPS01 (power supply) + XPSMFCPU22 (central processing unit) + "in rack" I/O cards (to be selected from below)

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XPSMFAI801	XPSMFAO801	XPSMFCIO2401	XPSMFDI2401	XPSMFDI3201	XPSMFDIO241601	XPSMFDO801
2/55	2/57	2/59	2/61	2/63	2/65	2/67

(1) With 250 Ω or 500 Ω jumper. (2) Digital inputs can be supplied by the line control outputs of the same I/O card. (3) The digital outputs (n° 1… n° 16) can be configured as line control outputs.

Safety automation system solutions
Preventa™ safety PLCs
Compact, XPSMF40

Introduction

Preventa™ compact safety PLCs **XPSMF40●●** enable the monitoring of simple to complex safety functions for all industrial applications relating to the protection of personnel and machine safety.

Designed for use with numerous machine safety functions, these compact safety PLCs are intended for use in safety related parts of control systems.
They can manage up to:
- category 4 conforming to EN 954-1,
- performance level “e” conforming to EN/ISO 13849-1,
- SIL 3 (safety integrity level) conforming to EN/IEC 61508.

The compact safety PLC range **XPSMF40●●** consists of 6 versions that are differentiated by their non safety related communication protocols.

Compact PLCs	Digital Inputs/Outputs	Line control outputs	Communication		
			On Ethernet network		On fieldbus
			Safety protocol	Non safety protocol	
XPSMF4000	24, configurable	8	SafeEthernet	–	–
XPSMF4002	24, configurable	8	SafeEthernet	Modbus™ TCP/IP Server	–
XPSMF4020	24, configurable	8	SafeEthernet	–	Modbus serial Slave (RTU)
XPSMF4022	24, configurable	8	SafeEthernet	Modbus TCP/IP Server	Modbus serial Slave (RTU)
XPSMF4040	24, configurable	8	SafeEthernet	–	PROFIBUS DP V0 slave
XPSMF4042	24, configurable	8	SafeEthernet	Modbus TCP/IP Server	PROFIBUS DP V0 slave

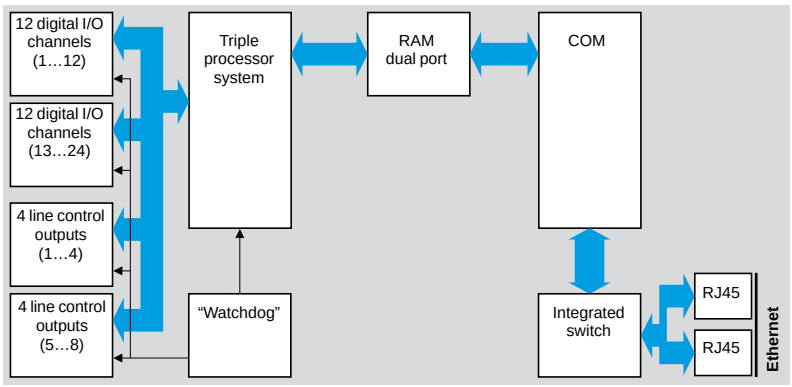
Safety PLCs

In order to meet safety requirements, the compact safety PLCs **XPSMF40●●** incorporate two essential functions (**Redundancy** and **Self-monitoring)** complying to category 4 conforming to EN 954-1 and performance level “e” conforming to EN/ISO 13849-1 in addition to the SafeEthernet safety communication protocol between the safety PLCs and the safety remote I/O modules (**Special Switch**).

■ **Redundancy**: the triple processor integrated in the compact safety PLCs analyzes and compares the data received from the safety inputs and outputs. The incoming and outgoing data (programmed values and received values) are received in parallel by the three processors and compared in real-time.
■ **Self-monitoring (“Watchdog”)**: the compact safety PLCs continuously monitor the data processing cycle and the execution of tasks, and intervenes if the cycle time does not conform to the predefined value.
■ **The integrated switch (Special Switch)** stores for a very short time and sends at very high speed the data provided by the inputs and outputs of the safety PLCs on the Ethernet network, while avoiding signal collisions and excessive amounts of data on the network.

Functional diagrams

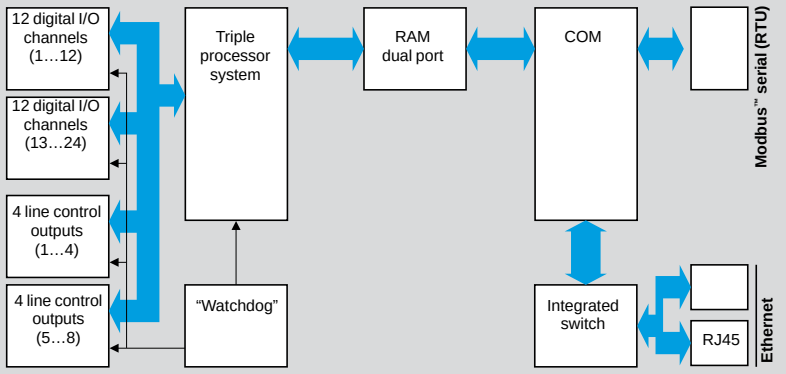
Compact safety PLCs XPS4000/MF4002



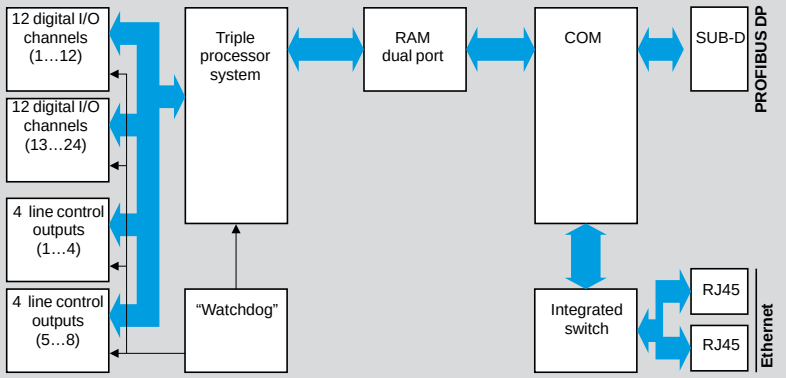
Safety automation system solutions
Preventa™ safety PLCs
Compact, XPSMF40

Functional diagrams *(continued)*

Compact safety PLCs XPSMF4020/MF4022



Compact safety PLCs XPSMF4040/MF4042



Line control for safety PLCs XPSMF40●●

Line control is a means of short-circuit and line break monitoring.
Using line control outputs enables SIL 3 (EN/IEC 61508) and category 4 (EN 954-1) safety to be achieved. The line control outputs send a high signal with a very short low signal, thus enabling a wiring anomaly (short-circuit, line break) to be seen at the inputs of the safety PLCs.

The line control outputs 1 to 8 are connected to the digital inputs of the same circuit.

Example: Emergency stop pushbutton with two normally closed (N.C.) contacts that are supplied by two different line control outputs connected via these two normally closed contacts and fed into the inputs of the safety PLCs

Programming automated safety functions

Software **XPSMFWIN** (reference SSV1XPSMFWIN) running on a PC enables the programming of all safety remote I/O modules and safety PLCs, as well as configuration of the communication settings.

Safety automation system solutions
Preventa™ safety PLCs
Compact, XPSMF40

Compact safety PLCs **XPSMF40●●** incorporate:
- ■ 24 configurable I/O channels
- □ digital inputs
- □ or digital outputs
- ■ and 8 (2 x 4) line control output channels.

Digital inputs

Compact safety PLCs **XPSMF40●●** incorporate up to 24 digital inputs for the connection of safety related input devices, such as emergency stop contacts, magnetic switches, and light curtains.

Compact PLCs	Digital inputs		
	N°	Safety detection	Safety dialog
XPSMF4000	24	Limit switches, Guard switches, with reset and with actuator, Light curtains type 2 and type 4, Safety mats and sensing edges	Mushroom head Emergency stops, Enclosures for control and signalling units, Two-hand control stations
XPSMF4002	24		
XPSMF4020	24		
XPSMF4022	24		
XPSMF4040	24		
XPSMF4042	24		

Digital outputs

Compact safety PLCs **XPSMF40●●** incorporate up to 24 digital outputs for the connection of safety related output devices, such as contactors, illuminated beacons, and sirens.

Compact PLCs	Digital outputs		
	N°	Safety actuators	Safety dialog
XPSMF4000	24	Contactors-motors, Contactors-reversing, Variable speed drives	Beacons and indicator banks, Rotating mirror beacons, Sirens
XPSMF4002	24		
XPSMF4020	24		
XPSMF4022	24		
XPSMF4040	24		
XPSMF4042	24		

Line control outputs

Compact PLCs	Line control outputs	
	N°	
XPSMF4000	8 (2 x 4)	Short-circuit and line break monitoring
XPSMF4002		
XPSMF4020		
XPSMF4022		
XPSMF4040		
XPSMF4042		

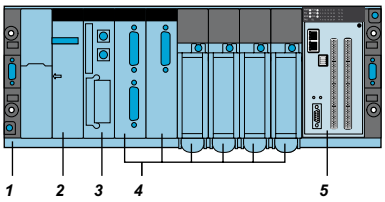
Remote inputs and outputs

In addition to the inputs/outputs integrated as standard, compact safety PLCs **XPSMF40●●** can be connected to safety remote input modules **XPSMF1** and/or safety remote output modules **XPSMF2** and/or safety remote mixed I/O modules **XPSMF3**.
The safety remote input, output and mixed I/O modules can be located within the vicinity of the machines to be monitored, thus reducing cabling.

Communication between these safety remote I/O modules and safety PLCs **XPSMF40●●** is performed on an Ethernet network using the SafeEthernet safety protocol, via the integrated RJ45 switched Ethernet communications ports.

Integrating safety PLCs XPSMF40 on a Premium™ automation platform

Designed for mechanical integration on a Premium automation platform, safety PLCs **XPSMF40●●** occupy 2 slots on the Premium rack **TSX RKY**.
There is interaction between the two programming environments (Unity and XPSMFWIN): the variables defined using software **XPSMFWIN** can be retrieved by Unity (platform programming software) by using a tool included in Safety Suite V2.

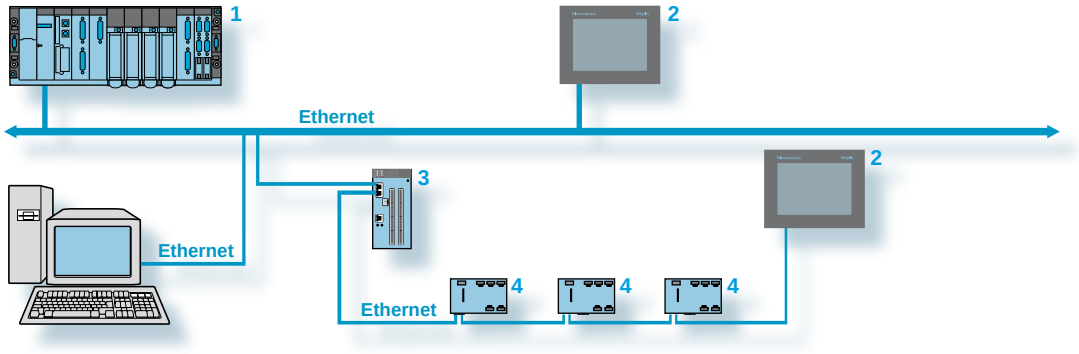


*Example of mechanical integration of a compact safety PLC **XPSMF40** on a Premium™ automation platform.*

1 *Premium rack*
2 *Power supply module*
3 *Premium processor module*
4 *Other Premium modules (communication, I/O)*
5 *Compact safety **PLC XPSMF40***

Safety communication on Ethernet network

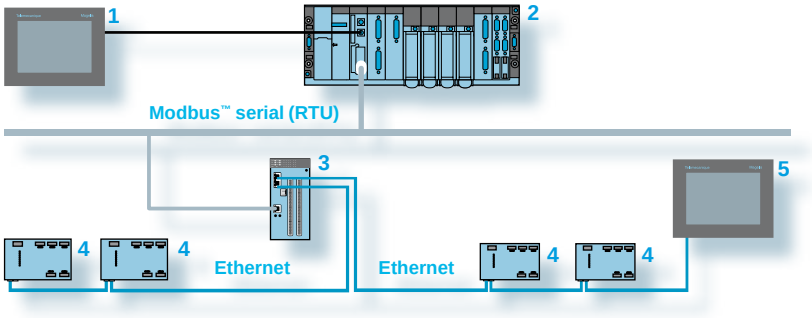
Communication between the PC, Magelis™ graphic terminals or automation platform (Premium™) and the compact safety PLCs **XPSMF40●●** is achieved by **Ethernet** network connection via the integrated RJ45 switched Ethernet communication ports of the compact PLCs.



1 Premium™ automation platform: Modbus™ TCP/IP client.
2 Graphic terminal **XBTGT**: Modbus TCP/IP client.
3 Safety PLCs **XPSMF40●●**: Modbus TCP/IP servers.
4 Safety remote I/O modules **XPSMF1/2/3**. They communicate with safety PLCs **XPSMF40●2** using the SafeEthernet protocol.

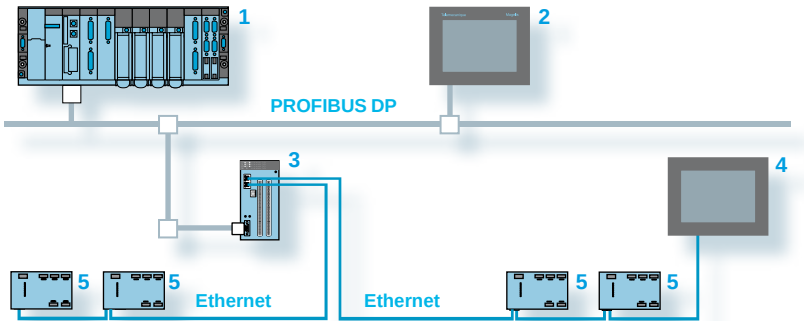
Communication on Modbus serial (RTU) and PROFIBUS DP fieldbus

■ On **Modbus serial (RTU)**, safety PLCs **XPSMF4020** and **XPSMF4022** are slaves of the Premium™ automation platform and Magelis graphic terminal.
They are connected to the Modbus serial network via their RJ45 connector.



1 Graphic terminal **XBTGT**: Modbus serial (RTU) master.
2 Premium™ automation platform: Modbus serial (RTU) master.
3 Safety PLCs **XPSMF402●**: Modbus serial (RTU) slave, Modbus TCP/IP server.
4 Safety remote I/O modules **XPSMF1/2/3**. They communicate with safety PLCs **XPSMF402●** using the SafeEthernet protocol.
5 Graphic terminal **XBTGT**: Modbus serial (RTU) client.

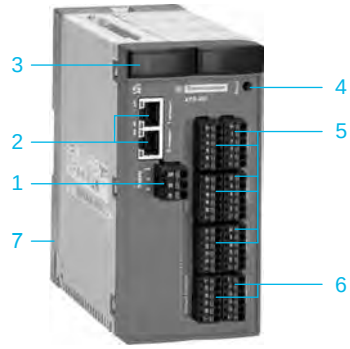
■ On **PROFIBUS DP**, safety PLCs **XPSMF4040** and **XPSMF4042** are slaves of the Premium™ automation platform and Magelis graphic terminal.
They are connected to the PROFIBUS DP network via their SUB-D 9-pin connector.



1 Premium™ automation platform: PROFIBUS DP master.
2 Graphic terminal **XBTGT**: PROFIBUS DP master.
3 Safety PLC **XPSMF404●**: PROFIBUS DP slave, Modbus TCP/IP server.
4 Graphic terminal **XBTGT**: Modbus TCP/IP client.
5 Safety remote I/O modules **XPSMF1/2/3**. They communicate with safety PLCs **XPSMF404●** using the SafeEthernet protocol.

Safety automation system solutions

Preventa™ safety PLCs
Compact, XPSMF40

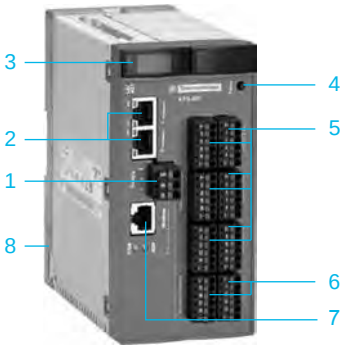


Description

Safety PLCs XPSMF4000/MF4002

On the front cover of the enclosure:

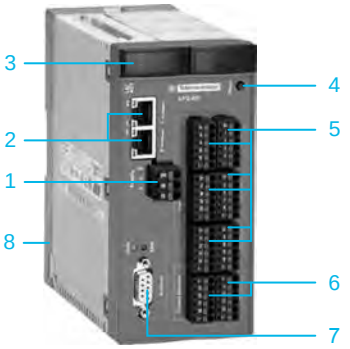
1 One terminal block *(1)* for ⎓ 24 V supply.
2 Two integrated RJ45 (type 10BASE-T/100BASE-TX) switched ports for programming, and for Safety and non-safety related communication on Ethernet (safety related using SafeEthernet protocol and Non-safety related using Modbus TCP/IP server protocol).
3 Process status LEDs.
4 One “Reset” button.
5 Six terminal blocks *(1)* for connection of configurable digital I/Os.
6 Two terminal blocks *(1)* for connection of line control outputs.
7 On the rear face: one removable plate with spring mounting for mounting on 35 mm DIN rail.



Safety PLCs XPSMF4020/MF4022

On the front cover of the enclosure:

1 One terminal block *(1)* for ⎓ 24 V supply.
2 Two integrated RJ45 (type 10BASE-T/100BASE-TX) switched ports for programming, and for Safety and non-safety related communication on Ethernet (safety related using SafeEthernet protocol and Non-safety related using Modbus server protocol).
3 Process status LEDs.
4 One “Reset” button.
5 Six terminal blocks *(1)* for connection of configurable digital I/Os.
6 Two terminal blocks *(1)* for connection of line control outputs.
7 One RJ45 connector for connection on Modbus serial (RTU), with 2 process status LEDs.
8 On the rear face: one removable plate with spring mounting for mounting on 35 mm DIN rail.



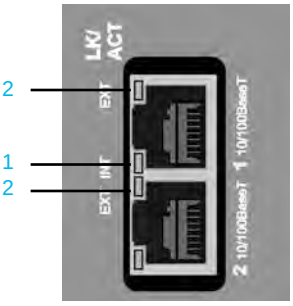
Safety PLCs XPSMF4040/MF4042

On the front cover of the enclosure:

1 One terminal block *(1)* for ⎓ 24 V supply.
2 Two integrated RJ45 (type 10BASE-T/100BASE-TX) switched ports for programming, and for Safety and non-safety related communication on Ethernet (safety related using SafeEthernet protocol and Non-safety related using Modbus TCP/IP server protocol).
3 Process status LEDs.
4 One “Reset” button.
5 Six terminal blocks *(1)* for connection of configurable digital I/Os.
6 Two terminal blocks *(1)* for connection of line control outputs.
7 One SUB-D (9-pin female) connector for connection on PROFIBUS DP, with 2 process status LEDs.
8 On the rear face: one removable plate with spring mounting for mounting on 35 mm DIN rail.

*(1) Removable Screw and Cage clamp terminals are provided with compact safety PLCs **XPSMF40**.*

Process status LEDs



1 *Internal Ethernet LED*
2 *External Ethernet LEDs*

Modbus serial (RTU) LEDs

PROFIBUS DP LEDs

LED details

Process status LEDs on safety PLCs XPSMF40●●

LED	Color	Status	Meaning
1…24	Green	On	Channels configured as inputs: input signal being received. Channels configured as outputs: output signal being sent.
T1…T8	Green	On	Line control outputs active.
PWR	Green	On	⎓ 24 V voltage present.
		Off	No voltage.
PG	Yellow	On	The CPU is being loaded with a new configuration.
		Flashing	The FLASH ROM is being loaded with a new operating system.
		Off	No loading of configuration or operating system.
ERR	Red	On	Software error or hardware anomaly detected by the CPU.
			The monitoring program (Watchdog) has triggered the STOP state of the process because the programmed cycle time has been exceeded.
			The CPU has stopped the execution of the user application, ended all hardware and software tests and all outputs have been reset.
			The process can only be started again from the PC.
		Off	No errors detected.
FAU	Orange	On	Error display for line control.
			The user application has caused an error.
			The system configuration is defective.
			The loading of a new operating system was defective and the operating system is corrupt.
		Flashing	An error has occurred while writing to FLASH ROM memory (during updating of the operating system).
			One or more I/O errors have occurred.
		Off	None of the above errors have occurred.
RUN	Green	On	Normal service mode, loaded program running, the PLC receives I/O messages, communication and hardware/software tests carried out.
		Flashing	The CPU is in STOP and is not executing any user application. All the outputs are reset to a safe, de-energized state.
		Off	The CPU is in “ERROR” state (see ERR).
FOR	Green	On	The CPU is in RUN mode and force is active.
		Flashing	The system is not processing (STOP), but force is prepared and is activated if the triple processor is started.
		Off	Force mode not activated.
OSL	Orange	Flashing	Emergency loading of the operating system is active.
BL	Orange	Flashing	COM in INIT_Fail state.

Ethernet LEDs on safety PLCs XPSMF40●●

LK/ACT external	Green	Off	No connection/link established.
		On	Connection established/link established.
		Flashing	External data exchange (speed 10…100 Mbps).
LK/ACT internal	Green	Off	No connection/link established.
		On	Connection established/link established.
		Flashing	Internal data exchange (speed 10…100 Mbps).

Modbus™ serial (RTU) LEDs on safety PLCs XPSMF4020/MF4022

COM	Yellow	Off	No bus network signals being received or transmitted.
		On	Bus network signals being received or transmitted.
RDY	Green	Off	Transmission power not available.
		On	Equipment on.

PROFIBUS DP LEDs on safety PLCs XPSMF4040/MF4042

RUN	Green	Off	Equipment not connected or not operational.
		On	Equipment operational.
ERR	Red	Off	Transmission power not available or the slave is exchanging data.
		On	Connection to other equipment is established but no data exchange is possible. Bus disconnected or bus Master not available.
		Flashing	A configuration error has occurred and no data exchange is possible.

Safety automation system solutions

Preventa™ safety PLCs
Compact, XPSMF40

Environment

Compact safety PLC type			XPSMF4000/4002, XPSMF4020/4022, XPSMF4040/4042
Products designed for max. use in safety related parts of control systems (conforming to EN 954-1, EN/ISO 13849-1 and EN/IEC 61508)			Category 4 (EN 954-1), Performance level “e” (EN/ISO 13849-1), Safety integrity level: SIL 3 (EN/IEC 61508)
Product certifications			IEC 61511 part 1-3: 2004, DIN VDE 0116: 1989, EN 50156-1: 2004, EN 12067-2: 2004, EN 298: 2003, EN 230: 2005, NFPA 85: 2001, EN/IEC 61131-2: 2003, EN 61000-6-2: 2001, EN 61000-6-4: 2001
Ambient air temperature conforming to EN/IEC 61131-2	Operating	**°F (°C)**	+32… + 140 (0…+ 60)
	Storage	**°F (°C)**	-40… + 185 (- 40…+ 85)
Relative humidity			95% (supply not connected)
Degree of protection	Enclosure		IP 20
Pollution			Degree of pollution II
Altitude			6560 ft. (2,000 m)
Protection class			Class II, conforming to EN/IEC 61131-2
Electromagnetic compatibility			Conforming to EN/IEC 61131-2
Vibration resistance conforming to EN/IEC 61131-2	Operating		1 g, frequency 9…150 Hz
Shock resistance conforming to EN/IEC 61131-2	Operating		15 g (duration 11 ms), unit test while operating, 2 cycles per axis
Resistance to electrostatic discharges conforming to EN/IEC 61000-4-2		**kV**	4 contact, 8 air discharge
Immunity to high frequency interference conforming to EN/IEC 61000-4-3		**V/m**	10 (80 MHz…2 GHz), amplitude modulation 80%

Electrical specifications

Supply	Voltage	**V**	⎓ 24 (external supply with separate protection conforming to EN/IEC 60950, SELV (Safety Extra Low Voltage) or PELV (Protection Extra Low Voltage) rated)
	Voltage limits		- 15…+ 20 %
Maximum power consumption		**A**	8
Idle current		**A**	0.5
Immunity to momentary supply interruptions		**ms**	10
Protection			Internal fuse, 10 A
Response time		**ms**	Depending on size of application
Clock			Supplied by backup capacitor for 1 week following loss of supply
User memory	Application	**kB**	250
	Data	**kB**	250
LED display			Yes
Digital inputs			
Number	Inputs not electrically isolated		24, configurable channels
Permissible current	At state 0	**mA**	1.5 max. at ⎓ 24 V
	At state 1	**mA**	3.5 at ⎓ 24 V, 4.5 at ⎓ 30 V
Input supply			3 x ⎓ 20 V/100 mA (on 24 V)
Input resistance		**kΩ**	< 7
Overvoltage protection		**V**	- 10, + 35
LED display			Yes, see page 2/13
Maximum distance of equipment			984 ft. (300 m)
Digital outputs			
Number	Outputs not electrically isolated		24, configurable channels
Output voltage		**V**	⎓ 24 ± 2
Output current	Channels 1 to 3, 5 to 7, 9 to 11, 13 to 15, 17 to 19, 21 to 23	**A**	0.5 at 140 °F (60 °C)
	Channels 4, 8, 12, 16, 20 and 24	**A**	1 at 140 °F (60 °C), 2 at 122 °F (50 °C)
Minimum load		**mA**	2 per channel
Leakage current at state 0		**mA**	1 max. at 2 V
Response to overload			Shutdown of outputs concerned with cyclic reconnection
Total output current		**A**	7 max., shutdown of all outputs if exceeded with cyclic reconnection
LED display			Yes
Maximum distance of equipment			984 ft. (300 m)
Line control outputs			
Number	Outputs not electrically isolated		8 (2 x 4)
Output voltage		**V**	20, depending on the supply voltage
Output current		**mA**	60
Minimum load		**mA**	None
Response to overload			4 x ⩾ 19.2 V/60 mA (on 24 V), short-circuit current
LED display			Yes

Introduction: page 2/8 | Specifications: page 2/14 | References: page 2/16 | Dimensions, mounting: page 2/19 | Connections: page 2/20

Communication

Ethernet network

Safety communication using SafeEthernet safety protocol

Compatibility			**XPSMF4000/MF4002, XPSMF4020/MF4022, XPSMF4040/MF4042**
Transmission	Communication ports		Integrated 2 RJ45 switched Ethernet communications ports
	Baud rate	**Mbps**	100 Half duplex, 10 Full duplex, Autonegotiation
Structure			10BASE-T/100BASE-TX
Medium			Dual twisted pair cable, category 5D or better (Ethernet)

Non safety communication using Modbus™ TCP/IP protocol

Compatibility			**XPSMF4002, XPSMF4022, XPSMF4042**
Connection ports	Number and type		Integrated 2 RJ45 switched Ethernet communications ports
	Baud rate	**Mbps**	100 Half duplex, 10 Full duplex, Autonegotiation
	Master/Slave		Server (slave)
Structure			10BASE-T/100BASE-TX
Medium			Dual twisted pair cable, category 5D or better (Ethernet)
Transparent Ready™ service	Class		A10
	Standard Ethernet TCP/IP communication services (supported by compact safety PLCs XPSMF40)		Modbus TCP/IP server.
			Modbus TCP/IP messaging (reading/writing of data words) Modbus identification requests
	TCP port		Standard 502
	Max. number of Modbus TCP/IP connections		1 to 20

Modbus serial (RTU)

Compatibility			**XPSMF4020, XPSMF4022**
Serial link ports	Number and type		1 x RJ45
	Master/Slave		Slave, V0
Addressing			122 slave addresses
Physical layer			RS 485
Medium			Shielded dual twisted pair cable

PROFIBUS DP

Compatibility			**XPSMF4040, XPSMF4042**
Serial link ports	Number and type		1 x SUB-D 9-pin female
	Master/Slave		Slave, V0
Physical layer			RS 485
Medium			Shielded dual twisted pair cable

Connections *(1)*

Type of connection			**Removable screw clamp terminal blocks** *(2)*	**Removable spring terminal blocks** *(2)*
Supply connection	Number of terminal blocks		1	1
	For 1 cable without cable end		Solid or flexible AWG 24-12 (0.2…2.5 mm^2)	–
	For 1 flexible cable with or without plastic cable end		AWG 24-14 (0.25…2.5 mm^2)	–
	For 2 cables of same diameter, without cable end		–	Solid or flexible AWG 24-12 (0.2…2.5 mm^2)
	For 2 cables of same diameter, flexible without cable end		–	AWG 24-12 (0.25…2.5 mm^2)
	For 2 cables of same diameter, flexible with plastic cable end		–	AWG 24-12 (0.25…2.5 mm^2)
Cable connection	Tightening torque		4.43 lb-in (0.5 Nm)	–
	Bared length		0.39” (10 mm)	0.35” (9 mm)
Connection to digital input channels, digital output channels, line control output channels	Number of terminal blocks		8	8
	For 1 cable without cable end		Solid or flexible AWG 24-16 (0.14…1.5 mm^2)	–
	For 1 flexible cable without cable end		AWG 24-16 (0.25…1.5 mm^2)	–
	For 1 flexible cable with plastic cable end		AWG 24-20 (0.25…0.5 mm^2)	–
	For 2 cables of same diameter, without cable end		–	Solid or flexible AWG 26-16 (0.14…1.5 mm^2)
	For 2 cables of same diameter, flexible without cable end		–	AWG 22 (0.25…0.34 mm^2)
	For 2 cables of same diameter, flexible with plastic cable end		–	AWG 20 (0.5 mm^2)
Cable connection	Tightening torque		1.95...2.21 lb-in (0.22...0.25 Nm)	–
	Bared length		0.35” (9mm)	0.35” (9mm)

(1) AWG: American Wire Gauge.
*(2) Removable Screw and Cage Clamp terminals provided with safety PLCs **XPSMF40●●**.*

Safety automation system solutions

Preventa™ safety PLCs
Compact, XPSMF40

XPSMF4000
XPSMF4002

XPSMF4020
XPSMF4022

XPSMF4040
XPSMF4042

Compact safety PLCs

⎓ 24 V supply

Digital Inputs or Outputs	Line control outputs	Communication on Ethernet network SafeEthernet protocol	Modbus TCP/IP protocol	Modbus™ serial (RTU)	PROFIBUS DP	Reference	Weight oz (kg)
0…24 configurable channels	2 x 4	Yes	–	–	–	**XPSMF4000**	35.273 (1.000)
			Yes, server	–	–	**XPSMF4002**	35.273 (1.000)
			–	Yes, slave	–	**XPSMF4020**	35.273 (1.000)
			Yes, server	Yes, slave	–	**XPSMF4022**	35.273 (1.000)
			–	–	Yes, slave	**XPSMF4040**	35.273 (1.000)
			Yes, server	–	Yes, slave	**XPSMF4042**	35.273 (1.000)

Configuration software

■ Reference **SSV1XPSMFWIN** contains the full version of the programming software XPSMFWIN software for the XPSMF Safety PLCs. The XPSMFWIN is part of our Safety Suite and is not available separately.

Description	Operating system	Details	Languages	Reference	Weight oz (kg)
Configuration software XPSMFWIN for programming compact safety PLCs CD-ROM + user manual	Windows® 2000, Windows® XP	Software available on Safety Suite V2 software pack	English, German, French	**SSV1XPSMFWIN**	18.342 (0.520)

ABL8RPS24050

ABL1REM24025

XBTGT2130, XBTGT2330

XBTGT4330

XBTGT5●30

XBTGT6330

XBTGT7340

Phaseo™ regulated switch mode power supplies

Mains input voltage	Output voltage	Nominal power	Nominal current	Auto-protect reset	Conformity to standard IEC EN 61000-3-2 and IEC EN 60950	Reference	Weight
V	⎓ V	W	A				oz (kg)
Universal range, single-phase (N-L1) **or 2-phase** (L1-L2) **connection**							
∿ **100…120 V/200...500** - 15%, + 10% 50/60 Hz	24...28.8	72	3	Auto/Manual	Yes	**ABL8RPS24030**	10.582 (0.300)
		120	5	Auto/Manual	Yes	**ABL8RPS24050**	24.692 (0.700)
		240	10	Auto/Manual	Yes	**ABL8RPS24100**	35.273 (1.000)
Dedicated range, single-phase connection							
∿ **100…240** *(1)* wide range, 47…63 Hz	12	60	5	Auto	No	**ABL1REM12050**	15.521 (0.440)
	24	60	2.5	Auto	No	**ABL1REM24025**	15.521 (0.440)
∿ **100...120/200...240** *(2)*	24	240	10	Auto	No	**ABL1REM24100**	31.041 (0.880)

Magelis™ multifunction graphic terminals with touch sensitive screen and on-board Ethernet *(1) (2)*

Supply voltage ⎓ 24 V

Description		Ports: serial and communication (type of link)	Application memory	Reference	Weight oz (kg)
5.7"	Monochrome black and white STN	1 x SUB-D 9-pin (RS 232C or RS 422/485 serial link to PLCs) 1 x RJ45 (RS 485 serial link) 1 x USB (peripheral connection and application transfer) 1 x RJ45 (Ethernet TCP/IP, 10BASE-T/100BASE-TX)	16 Mb	**XBTGT2130**	35.273 (1.000)
	Color TFT	1 x SUB-D 9-pin (RS 232C or RS 422/485 serial link to PLCs) 1 x RJ45 (RS 485 serial link) 1 x USB (peripheral connection and application transfer) 1 x RJ45 (Ethernet TCP/IP, 10BASE-T/100BASE-TX)	16 Mb	**XBTGT2330**	35.273 (1.000)
7.5"	Color TFT	1 x SUB-D 9-pin (RS 232C or RS 422/485 serial link to PLCs) 1 x RJ45 (RS 485 serial link) 1 x USB (peripheral connection and application transfer) 1 x RJ45 (Ethernet TCP/IP, 10BASE-T/100BASE-TX)	32 Mb	**XBTGT4330**	63.493 (1.800)
10.4"	Color STN	1 x SUB-D 9-pin (RS 232C or RS 422/485 serial link to PLCs) 1 x RJ45 (RS 485 serial link) 2 x USB (peripheral connection and application transfer) 1 x RJ45 (Ethernet TCP/IP, 10BASE-T/100BASE-TX)	32 Mb	**XBTGT5230**	105.822 (3.000)
	Color TFT	1 x SUB-D 9-pin (RS 232C or RS 422/485 serial link to PLCs) 1 x RJ45 (RS 485 serial link) 2 x USB (peripheral connection and application transfer) 1 x RJ45 (Ethernet TCP/IP, 10BASE-T/100BASE-TX)	32 Mb	**XBTGT5330**	105.822 (3.000)
12.1"	Color TFT	1 x SUB-D 9-pin (RS 232C or RS 422/485 serial link to PLCs) 1 x RJ45 (RS 485 serial link) 2 x USB (peripheral connection and application transfer) 1 x RJ45 (Ethernet TCP/IP, 10BASE-T/100BASE-TX)	32 Mb	**XBTGT6330**	105.822 (3.000)
15"	Color TFT	1 x SUB-D 9-pin (RS 232C or RS 422/485 serial link to PLCs) 1 x RJ45 (RS 485 serial link) 2 x USB (peripheral connection and application transfer) 1 x RJ45 (Ethernet TCP/IP, 10BASE-T/100BASE-TX)	32 Mb	**XBTGT7340**	197.534 (5.600)

(1) Service instructions, USB connectors locking device and mounting kit included.
(2) Other operator dialog terminals, industrial PCs: please refer to our "Human Machine Interface" catalog.

Safety automation system solutions
Preventa™ safety PLCs
Compact, XPSMF40

490NTW000●●

Connecting cables for network and bus

Connection to Ethernet network

Description	Pre-fitted connectors	Length ft. (m)	Reference	Weight oz (kg)
Shielded twisted pair cables, straight through	2 RJ45 connectors For connection to DTE (Data Terminal Equipment)	6.56 (2)	**490NTW00002***(1)*	–
		16.40 (5)	**490NTW00005***(1)*	–
		39.37 (12)	**490NTW00012***(1)*	–
		131.23 (40)	**490NTW00040***(1)*	–
		262.47 (80)	**490NTW00080***(1)*	–
Shielded twisted pair cables, crossed wires	2 RJ45 connectors For connection between hubs, switches and transceivers	16.40 (5)	**490NTC00005***(1)*	–
		49.21 (15)	**490NTC00015***(1)*	–
		131.23 (40)	**490NTC00040***(1)*	–
		262.47 (80)	**490NTC00080***(1)*	–

Connection to Modbus™ serial link

Description	Use		Length ft. (m)	Reference	Weight lb (kg)
	From	To			
Trunk cables, shielded dual twisted pair, RS 485	Compact safety PLCs XPSMF4020/MF4022 (RJ45)	Modbus splitter box LU9 GC3 (RJ45)	328 (100)	**TSXCSA100**	12.522 (5.680)
			656 (200)	**TSXCSA200**	24.030 (10.920)
			1640 (500)	**TSXCSA500**	66.139 (30.000)
	Graphic terminals XBTGT (SUB-D 9-pin)	Modbus splitter box LU9 GC3 (RJ45)	8.2 (2.5)	**XBTZ938***(2)*	0.474 (0.210)
Adaptor for cable XBTZ938	SUB-D 9-pin (XBTGT)	XBTZ938 (SUB-D 25-pin)	0.66 (0.2)	**XBTZG909**	–

Description	Specifications	Sold in lots of	Unit reference	Weight oz (kg)
End of line adaptors For RJ45 connector	R = 120 Ω, C = 1 nF	2	**VW3A8306RC**	7.055 (0.200)
	R = 150 Ω	2	**VW3A8306R**	0.353 (0.010)

PROFIBUS DP bus connection components

Description	Profile	Services	Reference	Weight oz (kg)
PROFIBUS DP module set for Premium™ PLCs	Master, 12 Mbps	Class 1 and Class 2 master V0 functions, see specifications. PROFIBUS FMS messaging not supported	**TSXPBY100**	30.688 (0.870)

TSXPBY100

Description	Use	Reference	Weight oz (kg)
Remote inputs/outputs on PROFIBUS DP bus	Advantys™ STB network interface module	**STBNDP2112**	4.938 (0.140)
	Momentum™ communication module	**170DTN11000**	–
Connectors for remote I/O communication module	Line terminators	**490NAD91103**	–
	Intermediate connection	**490NAD91104**	–
	Intermediate connection and terminal port	**490NAD91105**	–

Description	Length ft. (m)	Reference	Weight oz (kg)
PROFIBUS DP connecting cables	328 (100)	**TSXPBSCA100**	–
	1312 (400)	**TSXPBSCA400**	–

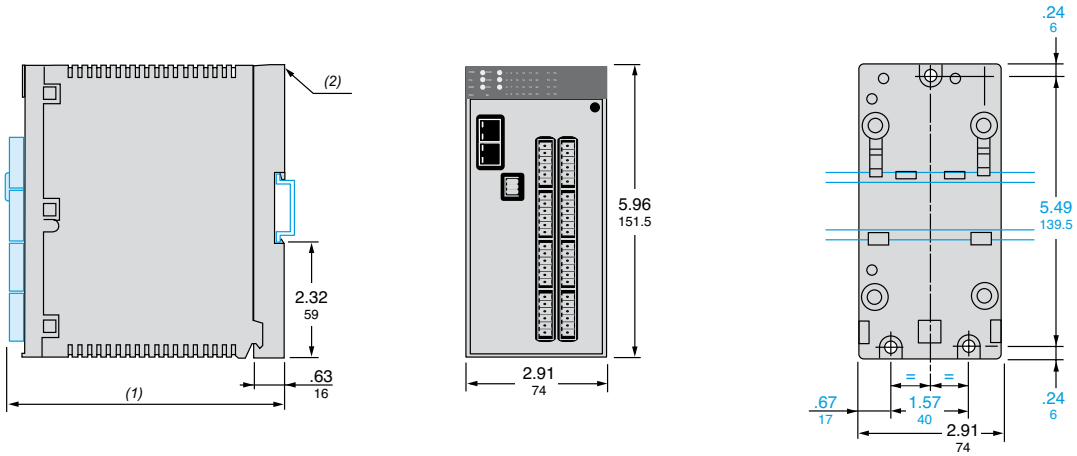
490NAD91103

Description		Reference	Weight oz (kg)
Replacement parts	Main bus junction box	**490NAE91100**	–
	PCMCIA card	**467NHP81100**	–

*(1) Cable conforming to standard EIA/TIA-568 category 5 and IEC 1180/EN 50 173 class D. For UL and CSA 22.1 approved cables, add the letter **U** to the end of the reference.*
*(2) Requires adaptor **XBTZG909**.*

Dimensions

XPSMF40●●

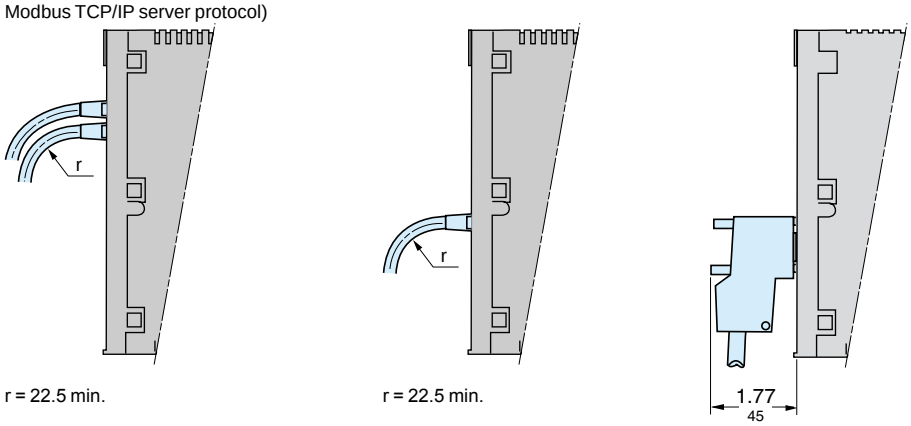


(1) 6.02 in (153 mm) with screw terminal block, 5.96 in (151.4 mm) with spring terminal block.
(2) Removable plate with spring mounting for mounting on 1.38 (35 mm) DIN rail.

Mounting

Mounting precautions relating to connectors

Access to Ethernet network	Access to Modbus™ serial link (RTU)	Access to Profibus DP bus
RJ45 socket (SafeEthernet protocol, Modbus TCP/IP server protocol)	RJ45 socket	Connector 490 NAD 911 03 in SUB-D 9-pin socket

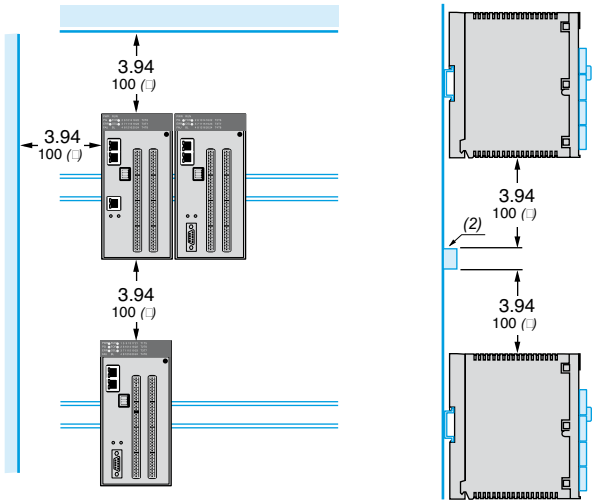


r = 22.5 min.

r = 22.5 min.

Dual Dimensions: INCHES Millimeters

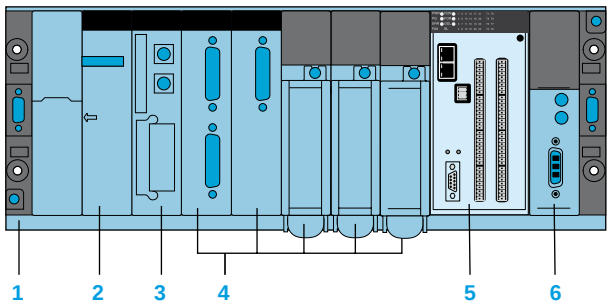
Mounting in panel or enclosure



(1) Minimum recommended value.
(2) Prefabricated electrical ducting for passage of cables.

Mounting on Premium™ rack

Mechanical mounting only, without connection to either the back plane bus or to the Premium™ platform supply

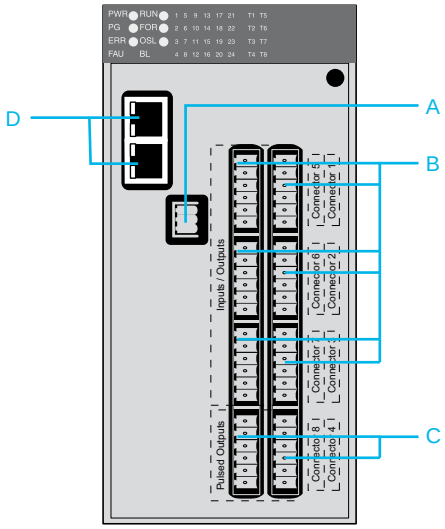


1 Premium™ rack
2 Premium™ supply
3 Premium™ CPU
4 Premium™ I/O module
5 Safety PLC **XPSMF40●●** (occupies 2 slots)
6 Premium™ As-interface master

Safety automation system solutions

Preventa™ safety PLCs
Compact, XPSMF40

Connections



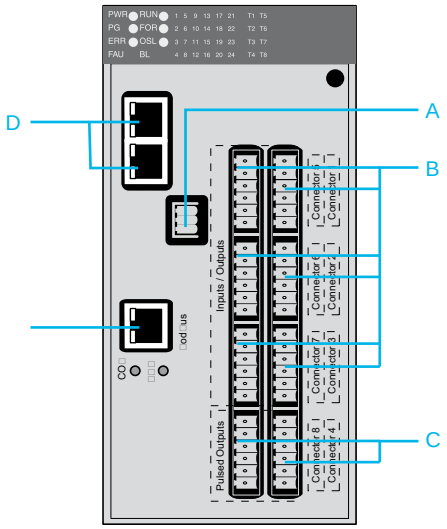
XPSMF4000/MF4002

XPSMF4000/MF4002, XPSMF4020/MF4022, XPSMF4040/MF4042

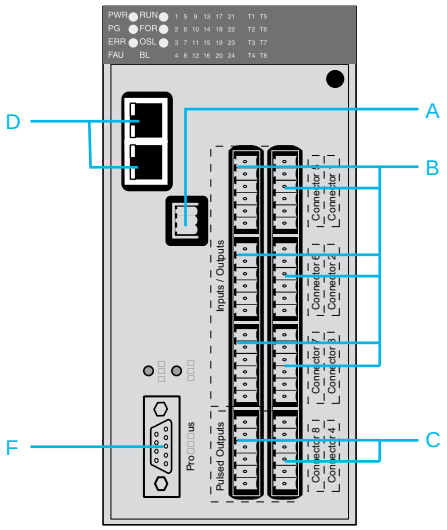
Item	Connection	Connector	Screw	Function
A	**Supply**	Supply	24 V	⎓ 24 V
			0 V	⎓ 24 V (reference pole)
			FE	Ground *(1)*
B	**Digital Inputs or Outputs**	Connector 1	S+	Supply to Inputs 1 to 4
			1	Input/Output 1
			2	Input/Output 2
			3	Input/Output 3
			4	Input/Output 4
			L-	Inputs/Outputs 1 to 4 common
		Connector 2	S+	Supply to Inputs 5 to 8
			5	Input/Output 5
			6	Input/Output 6
			7	Input/Output 7
			8	Input/Output 8
			L-	Inputs/Outputs 5 to 8 common
		Connector 3	S+	Supply to Inputs 9 to 12
			9	Input/Output 9
			10	Input/Output 10
			11	Input/Output 11
			12	Input/Output 12
			L-	Inputs/Outputs 9 to 12 common
		Connector 5	S+	Supply to Inputs 13 to 16
			13	Input/Output 13
			14	Input/Output 14
			15	Input/Output 15
			16	Input/Output 16
			L-	Inputs/Outputs 13 to 16 common
		Connector 6	S+	Supply to Inputs 17 to 20
			17	Input/Output 17
			18	Input/Output 18
			19	Input/Output 19
			20	Input/Output 20
			L-	Inputs/Outputs 17 to 20 common
		Connector 7	S+	Supply to Inputs 21 to 24
			21	Input/Output 21
			22	Input/Output 22
			23	Input/Output 23
			24	Input/Output 24
			L-	Inputs/Outputs 21 to 24 common
C	**Line control outputs**	Connector 4	L-	Outputs 1 to 4 common
			1	Line control Output 1 (T1)
			2	Line control Output 2 (T2)
			3	Line control Output 3 (T3)
			4	Line control Output 4 (T4)
			L-	Outputs 1 to 4 common
		Connector 8	L-	Outputs 5 to 8 common
			5	Line control Output 5 (T5)
			6	Line control Output 6 (T6)
			7	Line control Output 7 (T7)
			8	Line control Output 8 (T8)
			L-	Outputs 5 to 8 common

(1) Grounded when mounting on plate or rail.

Connections *(continuous)*



XPSMF4020/MF4022



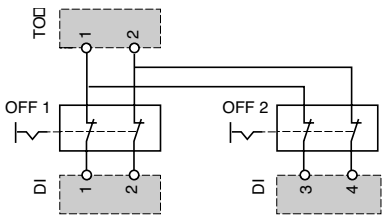
XPSMF4040/MF4042

XPSMF4000/MF4002, XPSMF4020/MF4022, XPSMF4040/MF4042

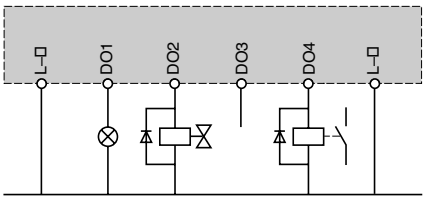
Item	Connection	Type	Function
D	**Programming**	Integrated 2 RJ45 switched Ethernet Communication ports	Either of the two switched Ethernet ports can be used to create a connection between the safety PLC and the programming terminal in a point to point or via an Ethernet network for programming, or setting an IP address.
	Safe Communication (all XPSMF Safety PLCs and Remote I/Os)		Either of the two switched Ethernet ports can be used to create a connection between the safety PLC and other safety related components (e.g other XPSMF safety PLCs or Safety Remote I/O modules) this can be established in a point to point way or via an Ethernet network.
	Non-Safe Communication available with references: XPSMF4002, XPSMF4022, XPSMF4042		Either of the two switched Ethernet ports can be used to create a connection between the safety PLC and other non- safety related components (e.g HMI Magelis™, standard PLCs, and Scada systems) this can be established in a point to point way or via an Ethernet network.
XPSMF4020/MF4022			
E	**Communication**	RJ45 (Modbus™)	**XPSMF4020/MF4022**: slaves on Modbus serial (RTU)
XPSMF4040/MF4042			
F	**Communication**	SUB-D 9-pin female (Profibus)	**XPSMF4040/MF4042**: slaves on PROFIBUS DP

Connections examples

Actuator connections to the outputs



Emergency stop connections (line control)



Safety automation system solutions

Preventa™ safety PLCs
Compact, XPSMF31/30/35

XPSMF31222

XPSMF3022

XPSMF35●●

*Products referenced **XPSMF31222, XPSMF3022** and **XPSMF35●●** are marked **HIMatrix® F31**, **HIMatrix® F30** and **HIMatrix® F35** (manufactured by Hima, sold by Schneider Electric).*

Introduction

Preventa™ compact safety PLCs **XPSMF31/30/35** enable the monitoring of simple to complex safety functions for all industrial applications relating to the protection of personnel and machine safety.

Designed for use with numerous machine safety functions, these compact safety PLCs are intended for use in safety related parts of control systems.
They can manage up to:

- category 4 conforming to EN 954-1,
- performance level “e” conforming to EN/ISO 13849-1,
- SIL 3 (safety integrity level) conforming to EN/IEC 61508.

The compact safety PLC range **XPSMF31/30/35** comprises 5 versions that are differentiated by their specifications, detailed below.

Compact PLCs	Inputs			Outputs Digital	Communication	
	Digital	Analog	Counter		On Ethernet network	On fieldbus
XPSMF31222	20	–	–	8 *(1)*	For all compact PLCs XPSMF31/30/35 using SafeEthernet safety protocol, and with non safety protocol Modbus™ TCP/IP server	–
XPSMF3022	20	–	–	8 *(1)*		Modbus serial Slave (RTU)
XPSMF3502	24	8	2	8		–
XPSMF3522	24	8	2	8		Modbus serial Slave (RTU)
XPSMF3542	24	8	2	8		PROFIBUS DP V0 slave

Safety PLCs

In order to meet safety requirements, the compact safety PLCs **XPSMF31/30/35** incorporate two essential functions (**Redundancy** and **Self-monitoring)** complying to category 4 conforming to EN 954-1 and performance level “e” conforming to EN/ISO 13849-1 in addition to the SafeEthernet safety communication protocol between the safety PLCs and the safety remote I/O modules (**Special Switch**).

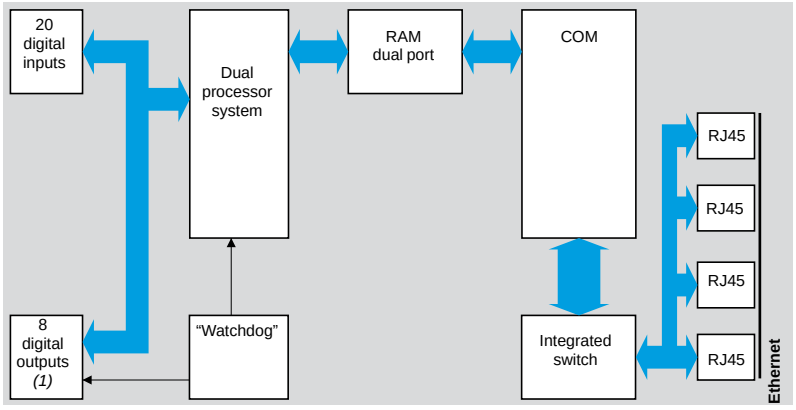
■ **Redundancy**: the dual processor integrated in the compact safety PLCs analyzes and compares the data received from the safety inputs and outputs.
The incoming and outgoing data (programmed values and received values) are received in parallel by the two processors and compared in real-time.

■ **Self-monitoring (“Watchdog”)**: the compact safety PLCs continuously monitor the data processing cycle and the execution of tasks, and intervenes if the cycle time does not conform to the predefined value.

■ **The integrated switch (Special Switch)** stores for a very short time and sends at very high speed the data provided by the inputs and outputs of the safety PLCs on the Ethernet network, while avoiding signal collisions and excessive amounts of data on the network.

Functional diagrams

Compact safety PLC XPSMF31222

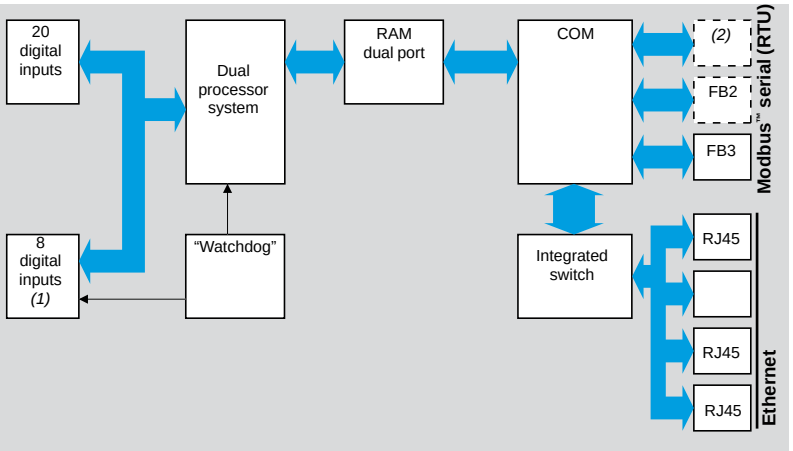


(1) Digital outputs can be configured for line control.

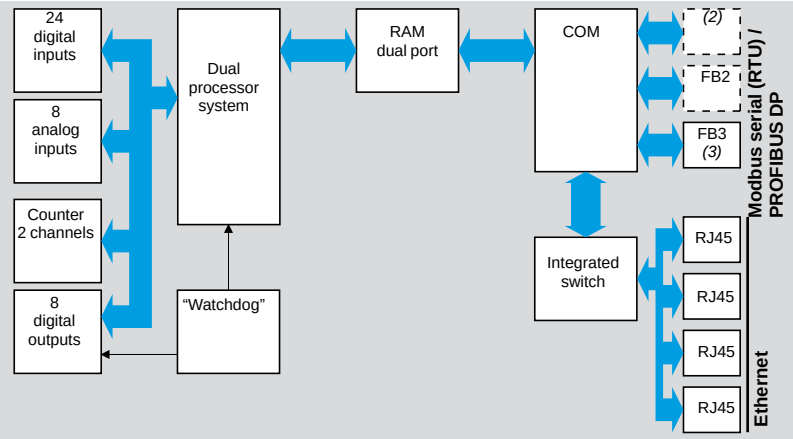
Safety automation system solutions
Preventa™ safety PLCs
Compact, XPSMF31/30/35

Functional diagrams *(continued)*

Compact safety PLC XPSMF3022



Compact safety PLCs XPSMF35●●



Line control for XPSMF31222 and XPSMF3022

Line control is a means of short-circuit and line break monitoring.
Using line control outputs enables SIL 3 (EN/IEC 61508) and category 4 (EN 954-1) safety to be achieved. The line control outputs send a high signal with a very short low signal, thus enabling a wiring anomaly (short-circuit, line break) to be seen at the inputs of the safety PLC inputs.

Digital outputs 1 to 8 are connected to the digital inputs of the same circuit.

Example: Emergency stop pushbutton with two normally closed (N.C.) contacts that are supplied by two different line control outputs connected via these two normally closed contacts and fed into the inputs of the safety PLCs.

Programming automated safety functions

Software **XPSMFWIN** (reference SSV1XPSMFWIN) running on a PC enables the programming of all safety remote I/O modules and safety PLCs, as well as configuration of the communication settings.

(1) Digital outputs can be configured for line control.
(2) FB1 and FB2 not used.
*(3) FB3 not available on safety PLC **XPSMF3502**.*
(4) Depending on model.

Safety automation system solutions
Preventa™ safety PLCs
Compact, XPSMF31/30/35

Digital inputs

Compact safety PLCs **XPSMF3●●●●** incorporate up to 24 digital inputs for the connection of safety related input devices.

Compact PLCs	Digital inputs		
	N°	Safety detection	Safety dialog
XPSMF31222	20	Limit switches, Guard switches, with reset and with actuator, Light curtains type 2 and type 4, Safety mats and sensing edges	Mushroom head Emergency stops, Enclosures for control and signalling units, Two-hand control stations
XPSMF3022	20		
XPSMF3502	24		
XPSMF3522	24		
XPSMF3542	24		

Analog inputs

Compact safety PLCs **XPSMF35●●** incorporate 8 analog measuring inputs that receive analog safety related signals from the machines to be monitored *(1)*.

Compact PLCs	Analog inputs with transmitter supply	
	N°	Functions
XPSMF3502	8	Closed circuit scanning of input channels, Single-pole measuring of 0 to 10 V voltages, Measuring 0 to 20 mA currents using jumper
XPSMF3522	8	
XPSMF3542	8	

Counter inputs

Compact safety PLCs **XPSMF35●●** incorporate 2 independent and configurable counting channels:

- as a counting function, independent to the direction of counting,
- as a counting function, dependent to the direction of counting,
- or as a counting function via an absolute encoder with Gray code.

Compact PLCs	Counting inputs		
	N°	⎓ 5 V	⎓ 24 V
XPSMF3502	2	Incremental encoders	Sensors, 2/3-wire PNP/NPN
XPSMF3522	2		
XPSMF3542	2		

Digital outputs

All compact safety PLCs **XPSMF●●●●** incorporate 8 digital outputs for connection to signalling equipment and machines to be controlled *(1)*.

Compact PLCs	Digital outputs		
	N°	Safety actuators	Safety dialog
XPSMF31222	8	Contactors-motors, Control relays, Variable speed drives.	Beacons and indicator banks, Rotating mirror beacons, Sirens
XPSMF3022	8		
XPSMF3502	8		
XPSMF3522	8		
XPSMF3542	8		

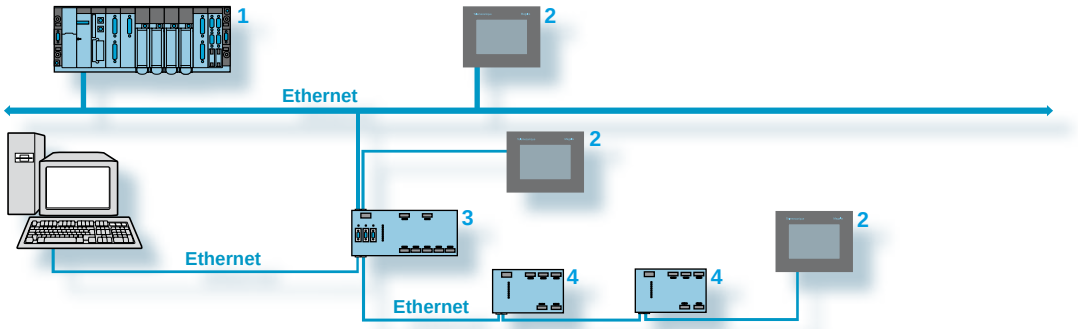
Remote inputs and outputs

In addition to the inputs/outputs integrated as standard, compact safety PLCs **XPSMF31/30/35** can be connected to safety remote input modules **XPSMF1** and/or safety remote output modules **XPSMF2** and/or safety remote mixed I/O modules **XPSMF3**.
The safety remote input, output and mixed I/O modules can be located within the vicinity of the machines to be monitored, thus reducing cabling.
Communication between these safety remote I/O modules and compact safety PLCs **XPSMF31/30/35** is performed on an Ethernet network using the SafeEthernet safety protocol, via the Integrated RJ45 switched Ethernet communications ports.

(1) Use shielded dual twisted pair cables, maximum length 984.2 ft (300 m), short-circuit unused analog inputs.

Safety communication on Ethernet network

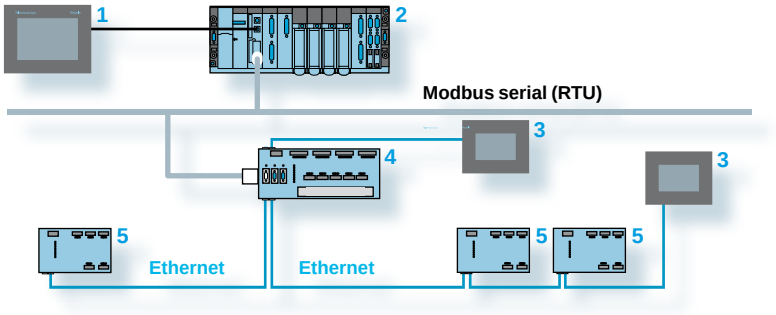
Communication between the PC, Magelis™ graphic terminal or automation platform (Premium™) and the compact safety PLCs is achieved by **Ethernet** network connection via the Integrated RJ45 switched Ethernet communications ports of compact PLCs **XPSMF31/30/35**.



1 Premium™ automation platform: Modbus™ TCP/IP client.
2 Graphic terminal **XBTGT**: Modbus TCP/IP client.
3 Safety PLC **XPSMF31/30/35**: Modbus TCP/IP server.
4 Safety remote I/O modules **XPSMF1/2/3**. They communicate with safety PLCs **XPSMF31/30/35** using the SafeEthernet protocol.

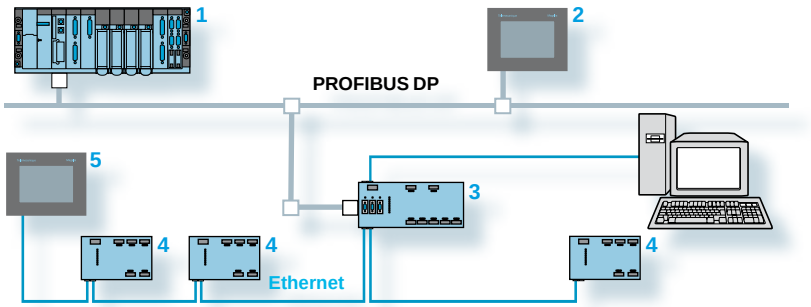
Communication on Modbus serial (RTU) and PROFIBUS DP fieldbus

■ On **Modbus serial (RTU)**, safety PLCs **XPSMF3022** and **XPSMF3522** are slaves of the Premium™ automation platform and Magelis graphic terminals.
They are connected to the Modbus serial network via their SUB-D 9-pin connector (FB3).



1 Graphic terminal **XBTGT**: Modbus serial (RTU) master.
2 Premium™ automation platform: Modbus serial (RTU) master.
3 Graphic terminal **XBTGT**: Modbus serial (RTU) client.
4 Safety PLC **XPSMF3022** or **XPSMF3522**: Modbus serial (RTU) slave, Modbus TCP/IP server.
5 Safety remote I/O modules **XPSMF1/2/3**. They communicate with safety PLCs **XPSMF3●●2** using the SafeEthernet protocol.

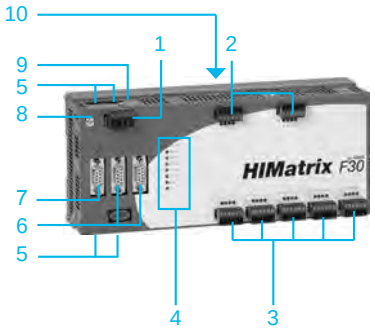
■ On **PROFIBUS DP**, safety PLC **XPSMF3542** is a slave of the Premium™ automation platform and Magelis™ graphic terminal.
It is connected to the PROFIBUS DP network via its SUB-D 9-pin connector (FB3).



1 Premium™ automation platform: PROFIBUS DP master.
2 Graphic terminal **XBTGT**: PROFIBUS DP master.
3 Safety PLC **XPSMF3542**: PROFIBUS DP slave, Modbus TCP/IP server.
4 Safety remote I/O modules **XPSMF1/2/3**. They communicate with safety PLC **XPSMF3542** using the SafeEthernet protocol.
5 Graphic terminal **XBTGT**: Modbus TCP/IP client.

Safety automation system solutions

Preventa™ safety PLCs
Compact, XPSMF31/30/35

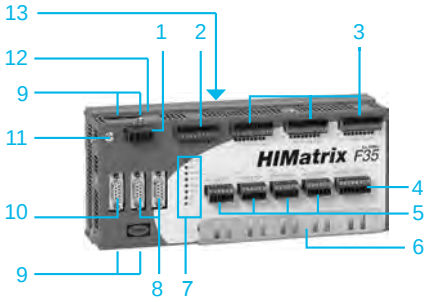


Description

Safety PLCs XPSMF31222 and XPSMF3022

On the front cover of the metal enclosure:

1 One terminal block *(1)* for ⎓ 24 V supply.
2 Two terminal blocks *(1)* for connection of digital outputs, with output status LED (four LEDs per terminal block).
3 Five terminal blocks *(1)* for connection of digital inputs, with input status LED (four LEDs per terminal block).
4 Eight process status LEDs.
5 Four integrated RJ45 (type 10BASE-T/100BASE-TX) switched ports for programming, and for Safety and non-safety related communication on Ethernet (safety related using SafeEthernet protocol and Non-safety related using Modbus™ TCP/IP server protocol).
6 On **XPSMF3022** only: two unused SUB-D connectors (FB1 and FB2).
7 On **XPSMF3022** only: one SUB-D 9-pin connector for connection on Modbus serial (RTU) (FB3).
8 One ground connection screw.
9 On the top: one “Reset” button.
10 On the rear face: one spring operated mounting device for mounting on 35 mm DIN rail.



Safety PLCs XPSMF35●●

On the front cover of the metal enclosure:

1 One terminal block *(1)* for ⎓ 24 V supply.
2 One terminal block *(1)* for connection of digital outputs, with four digital output status LEDs.
3 Three terminal blocks *(1)* for connection of digital inputs, with input status LED (eight LEDs per terminal block).
4 One terminal block *(1)* for connection of 2 counting input channels.
5 Four terminal blocks *(1)* for connection of analog inputs.
6 One plate for securing shielded analog input connection cables.
7 Eight process status LEDs.
8 Two unused SUB-D connectors (FB1 and FB2).
9 Four integrated RJ45 (type 10BASE-T/100BASE-TX) switched ports for programming, and for Safety and non-safety related communication on Ethernet (safety related using SafeEthernet protocol and Non-safety related using Modbus TCP/IP server protocol).
10 One type SUB-D 9-pin connector (FB3) for connection on PROFIBUS DP (**XPSMF3542**) or Modbus serial (RTU) (**XPSMF3522**).
11 One ground connection screw.
12 On the top: one “Reset” button.
13 On the rear face: one spring operated mounting device for mounting on 35 mm DIN rail.

*(1) Removable screw terminals are provided with compact safety PLCs **XPSMF31/30/35**.*

Status LED details

Compact safety PLCs XPSMF31222, XPSMF3022 and XPSMF35●●

LED	Color	Status	Meaning
FB1, FB2	–	–	Not used.
FB3	Orange	On	Communication on Modbus™ serial or PROFIBUS DP *(1)* active.
Inputs 1 to 20	Orange	On	Inputs active.
Outputs 1 to 8	Orange	On	Outputs active.
24 VDC	Green	On	⎓ 24 V voltage present.
		Off	No voltage.
RUN	Green	On	Normal service mode, loaded program running, the PLC receives I/O messages, communication and hardware/software tests carried out.
		Flashing	The CPU is in STOP and is not executing any user application. All the outputs are reset to a safe, de-energized state.
		Off	The CPU is in "ERROR" state (see ERROR).
ERROR	Red	On	Software error or hardware anomaly detected by the CPU.
			The monitoring program (Watchdog) has triggered the STOP state of the process because the programmed cycle time has been exceeded.
			The CPU has stopped the execution of the user application, ended all hardware and software tests and all outputs have been reset.
			The process can only be started again from the PC.
		Off	No errors detected.
PROG	Orange	On	The CPU is being loaded with a new configuration.
		Flashing	The FLASH ROM is being loaded with a new operating system.
		Off	No loading of configuration or operating system.
FORCE	Orange	On	The CPU is in RUN mode and force is active.
		Flashing	The system is not processing (STOP), but force is prepared and is activated if the dual processor is started.
		Off	Force mode not activated.
FAULT	Orange	On	Error display for line control.
			The user application has caused an error.
			The system configuration is defective.
			The loading of a new operating system was defective and the operating system is corrupt.
		Flashing	An error has occurred while writing to FLASH ROM memory (during updating of the operating system).
			One or more I/O errors have occurred.
		Off	None of the above errors have occurred.
OSL	Orange	Flashing	Emergency loading of the operating system is active.
BL	Orange	Flashing	COM in INIT_Fail state.
RJ45	Green	On	Full duplex mode operation.
		Flashing	Signal collision.
		Off	Half duplex mode operation, no collision.
	Yellow	On	Connection established.
		Flashing	Interface active.

(1) Depending on PLC model.

Safety automation system solutions
Preventa™ safety PLCs
Compact, XPSMF31/30/35

Environment

Compact safety PLC type			XPSMF31222	XPSMF3022	XPSMF3502, XPSMF3522, XPSMF3542
Products designed for max. use in safety related parts of control systems (conforming to EN 954-1, EN/ISO 13849-1 and EN/IEC 61508)			Category 4 (EN 954-1), Performance level "e" (EN/ISO 13849-1), Safety integrity level: SIL 3 (EN/IEC 61508)		
Product certifications			IEC 61511: 2004, DIN VDE 0116: 1989, EN 50156-1: 2004, EN 12067-2: 2004, EN 298: 2003, EN 230: 1990, NFPA 85: 2001, EN/IEC 61131-2: 2003, EN 61000-6-2: 2001, EN 61000-6-4: 2001		IEC 61511: 2004, DIN VDE 0116: 1989, EN 50156-1: 2004, EN 12067-2: 2004, EN 298: 2003, EN 230: 1990, NFPA 85: 2001, EN/IEC 61131-2: 2003, EN 61000-6-2: 2001, EN 61000-6-4: 2001, EN 54-2: 1997, NFPA 72: 2002
Ambient air temperature conforming to EN 61131-2	For operation	**°F(°C)**	+32… + 140 (0…+ 60)		
	For storage	**°F(°C)**	-40… + 185 (- 40…+ 85)		
Relative humidity			95% (supply not connected)		
Degree of protection	Enclosure		IP 20		
Pollution			Degree of pollution II		
Altitude			6560 ft (2000 m)		
Protection class			Class II, conforming to EN/IEC 61131-2		
Electromagnetic compatibility			Conforming to IEC 61131-2		
Vibration resistance conforming to EN 61131-2	Operating		1 g, frequency 9…150 Hz		
Shock resistance conforming to EN 61131-2	Operating		15 g (duration 11 ms), unit test while operating, 2 cycles per axis		
Resistance to electrostatic discharges conforming to EN/IEC 61000-4-2		**kV**	4 contact, 8 air discharge		
Immunity to high frequency interference conforming to EN/IEC 61000-4-3		**V/m**	10 (80 MHz…2 GHz), amplitude modulation 80%		

Electrical specifications

Supply	Voltage	**V**	⎓ 24 (external supply with separate protection conforming to EN/IEC 60950, SELV (Safety Extra Low Voltage) or PELV (Protection Extra Low Voltage) rated)		
	Voltage limits		- 15…+ 20%		
Maximum power consumption		**A**	8	8	9
Idle current		**A**	0.4	0.5	0.75
Immunity to momentary supply interruptions		**ms**	10		
Protection			Internal fuse		
Response time		**ms**	Depending on size of application		
Clock			Supplied by backup capacitor for 1 week following loss of supply		
User memory	Application	**kB**	250		
	Data	**kB**	250		
LED display			Yes		
Digital inputs					
Number	Inputs not electrically isolated		20		24
Permissible current	At state 0	**mA**	1.5 max., 1 mA at 5 V	1.5 max., 1.25 mA at 5 V	1.5 max., 1 mA at 5 V
	At state 1	**mA**	≥ 2 at ⎓ 15 V	> 2 at ⎓ 15 V	Approx. 3.5 at ⎓ 24 V Approx. 4.5 at ⎓ 30 V
Input supply			5 x 20 V/100 mA (on 24 V)		20 V/100 mA
Input protection			Protected against short-circuits, short-circuits to ground		
Overvoltage protection		**V**	500, conforming to IEC 61000-4-5		
Switching point		**V**	Typically 7.5		–
Current		**mA**	> 2 (⎓ 15 V)		–
LED display			Yes		
Maximum distance of equipment			328 ft (100 m)		
Digital outputs					
Number	Outputs not electrically isolated		8, configurable for line control		8
Output voltage		**V**	⎓ 24 ± 2		
Output current	Channels 1 to 3 and 5 to 7	**A**	0.5 at 140 °F (60 °C)		
	Channels 4 and 8	**A**	1 at 140 °F (60 °C), 2 at 122 °F (50 °C)		
Minimum load		**mA**	2 per channel		
Leakage current at state 0		**mA**	1 max. at 2 V		
Response to overload			Shutdown of outputs concerned with cyclic reconnection		
Total output current		**A**	7 max., shutdown of all outputs if exceeded with cyclic reconnection		
LED display			Yes		
Maximum distance of equipment			328 ft (100 m)		

Electrical specifications *(continued)*

Compact safety PLC type			XPSMF3502, XPSMF3522, XPSMF3542		
Analog inputs					
Number	Inputs not electrically isolated		8, single-pole		
External jumper		Ω	250 or 500 depending on application		
Input values	Nominal value	**V**	⎓ 0…10		
		mA	0…20, with 500 Ω jumper		
	Service value	**V**	⎓ 0.1…11.5		
		mA	0/4…23, with 500 Ω jumper		
Input impedance		**MΩ**	1		
Maximum distance of equipment		**m**	300		
Internal resistance of signal source		Ω	⩽ 500		
Overvoltage protection		**V**	+ 15, - 4		
Resolution (A/D converter)			12-bit		
Safety accuracy			± 2%		
LED display			Yes		
Counting inputs					
Number	Counter		2, not electrically isolated		
	Inputs		3 on each pole (A, B, Z)		
Input voltages	High threshold 5 V	**V**	4…6		
	High threshold 24 V	**V**	13…33		
	Low threshold 5 V	**V**	0…0.5		
	Low threshold 24 V	**V**	- 3…5		
Input currents		**mA**	1.4 at 5 V 6.5 at 24 V		
Input impedance		**kΩ**	3.7		
Maximum distance of equipment			1640 ft (500 m), with shielded dual twisted pair cable		
Up/down counting resolution			24-bit		
Input frequency		**kHz**	100, at 5 and 24 V		
Triggering			On falling edge		
Edge steepness		**V/µs**	1		
LED display			Yes		

Communication

Compatibility			XPSMF31222	XPSMF3022	XPSMF3502, XPSMF3522, XPSMF3542
Ethernet network: safety communication using SafeEthernet protocol					
Transmission	Communication ports		Integrated 4 RJ45 switched Ethernet communications ports		
	Baud rate	**Mbps**	100 Half duplex, 10 Full duplex, Autonegotiation		
Structure			10BASE-T/100BASE-TX		
Medium			Dual twisted pair cable, category 5D or better (Ethernet)		
Ethernet network: Non-safety related communication using Modbus™ TCP/IP protocol					
Connection Ports	Number and type		Integrated 4 RJ45 switched Ethernet communication ports		
	Baud rate	**Mbps**	100 Half Duplex, 10 Full Duplex, Autonegotiation		
	Master/Slave		Server (slave)		
Structure			10BASE-T/100BASE-TX		
Medium			Dual twisted pair cable, category 5D or better (Ethernet)		
Transparent Ready™ Services	Class		A10		
	Standard Ethernet TCP/IP communication services		Modbus TCP/IP Server		
			Modbus TCP/IP messaging (reading/writing of data words)		
			Modbus identification request		
	TCP port		Standard 502		
	Max. number of Modbus TCP/IP connections		1 to 20		
Modbus serial (RTU)					
Serial link ports	Number and type		–	1 x SUB-D 9-pin female (FB3)	
	Master/Slave		–	Slave	
Addressing			–	122 slave addresses	
Physical layer			–	RS 485	
Medium			–	Shielded dual twisted pair cable	
PROFIBUS DP					
Serial link ports	Number and type		–	–	1 x SUB-D 9-pin female
	Master/Slave		–	–	Slave, V0
Physical layer			–	–	RS 485
Medium			–	–	Shielded dual twisted pair cable

2

Connections *(1)*

Safety PLC type			XPSMF31222	XPSMF3022	XPSMF3502, XPSMF3522, XPSMF3542
Type of connection			Screw clamp terminal blocks *(2)*		
Supply connection	Number of terminal blocks		1		
	For 1 cable without cable end		Solid or flexible AWG 24-12 (0.2…2.5 mm^2)		
	For 1 flexible cable with or without plastic cable end		AWG 22-16 (0.25…2.5 mm^2)		
	For 2 cables of same diameter, without cable end		Solid or flexible AWG 24-12 (0.2…1.5 mm^2)		
	For 2 cables of same diameter, flexible without cable end		AWG 22-18 (0.25…1.0 mm^2)		
	For 2 cables of same diameter, flexible with plastic cable end		AWG 22-16 (0.5…1.5 mm^2)		
Digital input channel and output channel connection	Number of terminal blocks		5 (inputs) and 2 (outputs)	5 (inputs) and 2 (outputs)	3 (inputs) and 1 (output)
	For 1 cable without cable end		Solid or flexible AWG 28-16 (0.14…1.5 mm^2)		
	For 1 flexible cable without cable end		AWG 22-16 (0.25…1.5 mm^2)		
	For 1 flexible cable with plastic cable end		AWG 22-20 (0.25…0.5 mm^2)		
	For 2 cables of same diameter, without cable end		Solid: AWG 28-20 (0.14…0.5 mm^2) Flexible: AWG 28-18 (0.14…0.75 mm^2)		
	For 2 cables of same diameter, flexible without cable end		AWG 22 (0.25…0.34 mm^2)		
	For 2 cables of same diameter, flexible with plastic cable end		AWG 20 (0.5 mm^2)		
Analog input channel connection	Number of terminal blocks		–	–	4
	For 1 cable without cable end		–	–	Solid or flexible AWG 28-16 (0.14…1.5 mm^2)
	For 1 flexible cable without cable end		–	–	AWG 22-16 (0.25…1.5 mm^2)
	For 1 flexible cable with plastic cable end		–	–	AWG 22-20 (0.25…0.5 mm^2)
	For 2 cables of same diameter, without cable end		–	–	Solid: AWG 28-20 (0.14…0.5 mm^2) Flexible: AWG 28-18 (0.14…0.75 mm^2)
	For 2 cables of same diameter, flexible without cable end		–	–	AWG 22 (0.25…0.34 mm^2)
	For 2 cables of same diameter, flexible with plastic cable end		–	–	AWG 20 (0.5 mm^2)
Counting channel connection	Number of terminal blocks		–	–	1
	For 1 cable without cable end		–	–	Solid or flexible AWG 28-16 (0.14…1.5 mm^2)
	For 1 flexible cable without cable end		–	–	AWG 22-16 (0.25…1.5 mm^2)
	For 1 flexible cable with plastic cable end		–	–	AWG 22-20 (0.25…0.5 mm^2)
	For 2 cables of same diameter, without cable end		–	–	Solid: AWG 28-20 (0.14…0.5 mm^2) Flexible: AWG 28-18 (0.14…0.75 mm^2)
	For 2 cables of same diameter, flexible without cable end		–	–	AWG 22 (0.25…0.34 mm^2)
	For 2 cables of same diameter, flexible with plastic cable end		–	–	AWG 20 (0.5 mm^2)
Cable connection	Tightening torque		1.9…2.2 lb-in (0.22…0.25 Nm)		
	Bared length		0.35 in. (9 mm)		

(1) AWG: American Wire Gauge.
*(2) Removable screw terminals are provided with compact safety PLCs **XPSMF31/30/35**.*

Safety automation system solutions

Preventa™ safety PLCs
Compact, XPSMF31/30/35

XPSMF31222

XPSMF3022

XPSMF35●●

*Products referenced **XPSMF31222, XPSMF3022** and **XPSMF35●●** are marked **HIMatrix® F31**, **HIMatrix® F30** and **HIMatrix® F35** (manufactured by Hima, sold by Schneider Electric).*

Compact safety PLCs

⎓ **24 V supply**

Inputs			Outputs Digital	Communication on				Reference	Weight oz (kg)
				Ethernet network		Modbus™ serial (RTU)	PROFIBUS DP		
Digital	Analog	Counting		Safe Ethernet protocol	Modbus TCP/IP server protocol				
20	–	–	8	Yes	Yes	–	–	**XPSMF31222**	35.273 (1.000)
						Yes Slave	–	**XPSMF3022**	42.328 (1.200)
24	8	2	8	Yes	Yes	–	–	**XPSMF3502**	42.328 (1.200)
						Yes Slave	–	**XPSMF3522**	42.328 (1.200)
						–	Yes slave	**XPSMF3542**	42.328 (1.200)

Configuration software

■ Reference **SSV1XPSMFWIN contains the full version of the programming software XPSMFWIN software for the XPSMF Safety PLCs. The XPSMFWIN is part of our Safety Suite and is not available seperately.**

Description	Operating system	Details	Languages	Reference	Weight oz (kg)
Configuration software XPSMFWIN for programming compact safety PLCs CD-ROM + user manual	Windows® 2000, Windows® XP	Software available on Safety Suite V2 software pack	English, German, French	**SSV1XPSMFWIN**	18.342 (0.520)

2

ABL8RPS24050

Phaseo™ regulated switch mode power supplies

Mains input voltage	Output voltage	Nominal power	Nominal current	Auto-protect reset	Conformity to standard IEC EN 61000-3-2 and IEC EN 60950	Reference	Weight
V	⎓ V	W	A				oz (kg)
Universal range, single-phase (N-L1) **or 2-phase** (L1-L2) **connection**							
∿ **100…120 V/200...500** - 15%, + 10% 50/60 Hz	24...28.8	72	3	Auto/Manual	Yes	**ABL8RPS24030**	10.582 (0.300)
		120	5	Auto/Manual	Yes	**ABL8RPS24050**	24.692 (0.700)
		240	10	Auto/Manual	Yes	**ABL8RPS24100**	35.273 (1.000)
Dedicated range, single-phase connection							
∿ **100…240** *(1)* wide range, 47…63 Hz	12	60	5	Auto	No	**ABL1REM12050**	15.521 (0.440)
	24	60	2,5	Auto	No	**ABL1REM24025**	15.521 (0.440)
∿ **100...120/200...240** *(2)*	24	240	10	Auto	No	**ABL1REM24100**	31.041 (0.880)

ABL1REM24025

Magelis™ multifunction graphic terminals with touch sensitive screen and on-board Ethernet *(1) (2)*

Supply voltage ⎓ 24 V

Description		Ports: serial and communication (type of link)	Application memory	Reference	Weight oz (kg)
5.7"	Monochrome black and white STN	1 x SUB-D 9-pin (RS 232C or RS 422/485 serial link to PLCs) 1 x RJ45 (RS 485 serial link) 1 x USB (peripheral connection and application transfer) 1 x RJ45 (Ethernet TCP/IP, 10BASE-T/100BASE-TX)	16 Mb	**XBTGT2130**	35.273 (1.000)
	Color TFT	1 x SUB-D 9-pin (RS 232C or RS 422/485 serial link to PLCs) 1 x RJ45 (RS 485 serial link) 1 x USB (peripheral connection and application transfer) 1 x RJ45 (Ethernet TCP/IP, 10BASE-T/100BASE-TX)	16 Mb	**XBTGT2330**	35.273 (1.000)
7.5"	Color TFT	1 x SUB-D 9-pin (RS 232C or RS 422/485 serial link to PLCs) 1 x RJ45 (RS 485 serial link) 1 x USB (peripheral connection and application transfer) 1 x RJ45 (Ethernet TCP/IP, 10BASE-T/100BASE-TX)	32 Mb	**XBTGT4330**	63.493 (1.800)
10.4"	Color STN	1 x SUB-D 9-pin (RS 232C or RS 422/485 serial link to PLCs) 1 x RJ45 (RS 485 serial link) 2 x USB (peripheral connection and application transfer) 1 x RJ45 (Ethernet TCP/IP, 10BASE-T/100BASE-TX)	32 Mb	**XBTGT5230**	105.822 (3.000)
	Color TFT	1 x SUB-D 9-pin (RS 232C or RS 422/485 serial link to PLCs) 1 x RJ45 (RS 485 serial link) 2 x USB (peripheral connection and application transfer) 1 x RJ45 (Ethernet TCP/IP, 10BASE-T/100BASE-TX)	32 Mb	**XBTGT5330**	105.822 (3.000)
12.1"	Color TFT	1 x SUB-D 9-pin (RS 232C or RS 422/485 serial link to PLCs) 1 x RJ45 (RS 485 serial link) 2 x USB (peripheral connection and application transfer) 1 x RJ45 (Ethernet TCP/IP, 10BASE-T/100BASE-TX)	32 Mb	**XBTGT6330**	105.822 (3.000)
15"	Color TFT	1 x SUB-D 9-pin (RS 232C or RS 422/485 serial link to PLCs) 1 x RJ45 (RS 485 serial link) 2 x USB (peripheral connection and application transfer) 1 x RJ45 (Ethernet TCP/IP, 10BASE-T/100BASE-TX)	32 Mb	**XBTGT7340**	197.534 (5.600)

(1) Service instructions, USB connectors locking device and mounting kit included.

XBTGT2130, XBTGT2330

XBTGT4330

XBTGT5●30

XBTGT6330

XBTGT7340

Safety automation system solutions
Preventa™ safety PLCs
Compact, XPSMF31/30/35

490 NTW 000●●

Connecting cables for network and bus

Connection to Ethernet network

Description	Pre-fitted connectors	Length ft (m)	Reference	Weight oz (kg)
Shielded twisted pair cables, straight through	2 RJ45 connectors For connection to DTE (Data Terminal Equipment)	6.6 (2)	**490NTW00002***(1)*	–
		16.4 (5)	**490NTW00005***(1)*	–
		39.4 (12)	**490NTW00012***(1)*	–
		131.2 (40)	**490NTW00040***(1)*	–
		262.5 (80)	**490NTW00080***(1)*	–
Shielded twisted pair cables, crossed wires	2 RJ45 connectors For connection between hubs, switches and transceivers	16.4 (5)	**490NTC00005***(1)*	–
		49.2 (15)	**490NTC00015***(1)*	–
		131.2 (40)	**490NTC00040***(1)*	–
		262.5 (80)	**490NTC00080***(1)*	–

Connection to Modbus™ serial link

Description	Use		Length ft. (m)	Reference	Weight oz (kg)
	From	To			
Modbus serial link connecting cables	Compact PLCs XPSMF3022/3522 + adaptor XPSMFADAPT (RJ45)	Modbus splitter box LU9 GC3 (RJ45)	1.0 (0.3)	**VW3A8306R03**	0.882 (0.025)
			3.28 (1)	**VW3A8306R10**	2.116 (0.060)
			9.84 (3)	**VW3A8306R30**	74.640 (1.130)
		Premium™ module TSX SCY 21601 (SUB-D 25-pin)	1.0 (0.3)	**XPSMCSCY**	–
	Graphic terminals XBTGT (SUB-D 9-pin)	Modbus splitter box LU9 GC3 (RJ45)	8.2 (2.5)	**XBTZ938***(2)*	7.408 (0.210)
Adaptor for cable XBTZ938	SUB-D 9-pin (XBTGT)	XBTZ938 (SUB-D 25-pin)	0.66 (0.2)	**XBTZG909**	–
Adaptor SUB-D 9-pin/RJ45	Compact PLCs (SUB-D 9-pin)	Connecting cables for Modbus serial link (RJ45)	–	**XPSMFADAPT**	–

TSX PBY 100

Description	Specifications	Sold in lots of	Unit reference	Weight oz (kg)
End of line adaptors For RJ45 connector	R = 120 Ω, C = 1 nF	2	**VW3A8306RC**	7.055 (0.200)
	R = 150 Ω	2	**VW3A8306R**	0.353 (0.010)

PROFIBUS DP bus connection components

Description	Profile	Services	Reference	Weight oz (kg)
PROFIBUS DP module set for Premium™ PLCs	Master, 12 Mbps	Class 1 and Class 2 master V0 functions, see specifications. Profibus FMS messaging not supported	**TSXPBY100**	30.688 (0.870)

Description	Use	Reference	Weight oz (kg)
Remote inputs/outputs on PROFIBUS DP bus	Advantys™ STB network interface module	**STBNDP2112**	4.938 (0.140)
	Momentum™ communication module	**170DTN11000**	–
Connectors for remote I/O communication module	Line terminators	**490NAD91103**	–
	Intermediate connection	**490NAD91104**	–
	Intermediate connection and terminal port	**490NAD91105**	–

Description	Length (m)	Reference	Weight oz (kg)
PROFIBUS DP connecting cables	100	**TSXPBSCA100**	–
	400	**TSXPBSCA400**	–

490 NAD 911 03

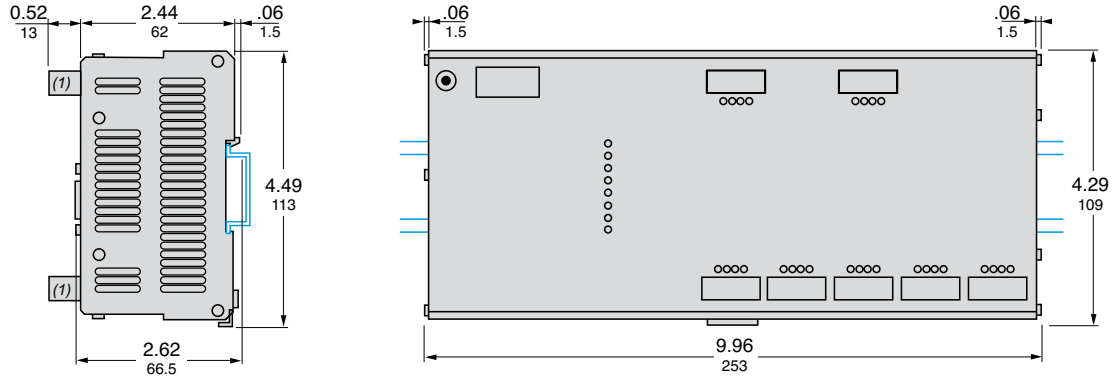
Description		Reference	Weight oz (kg)
Replacement parts	Main bus junction box	**490NAE91100**	–
	PCMCIA card	**467NHP81100**	–

*(1) Cable conforming to standard EIA/TIA-568 category 5 and IEC 1180/EN 50 173 class D. For UL and CSA 22.1 approved cables, add the letter **U** to the end of the reference.*
(2) Requires adaptor XBTZG909.

2

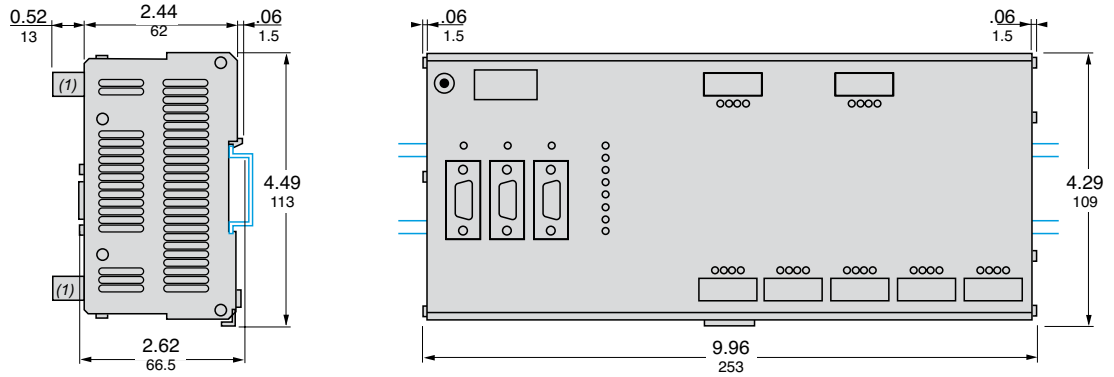
Dimensions

XPSMF31222



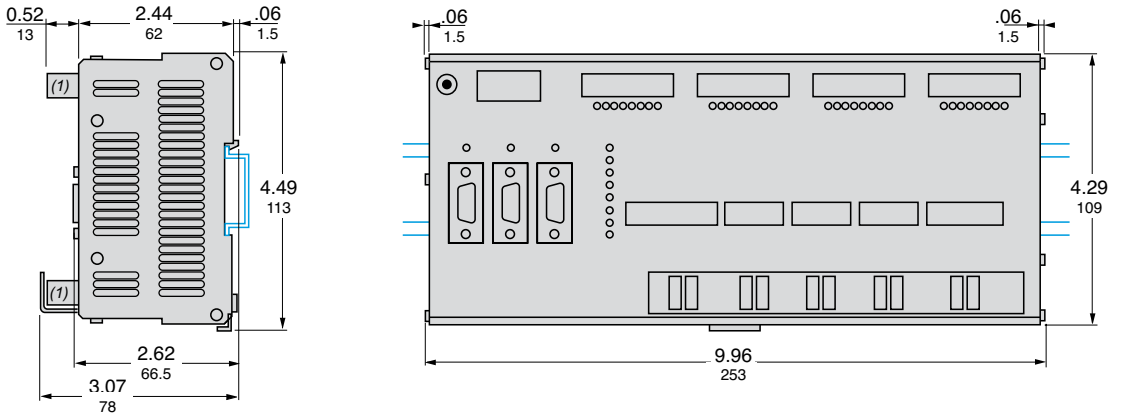
*(1) Removable screw terminals are provided with compact safety PLC **XPSMF31222**.*

XPSMF3022



*(1) Removable screw terminals are provided with compact safety PLC **XPSMF3022**.*

XPSMF35●●



Dual Dimensions: INCHES / Millimieters

*(1) Removable screw terminals are provided with compact safety PLC **XPSMF35●●**.*

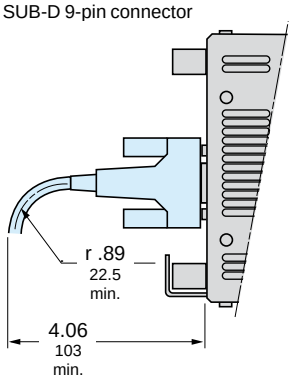
Safety automation system solutions
Preventa™ safety PLCs
Compact, XPSMF31/30/35

Mounting

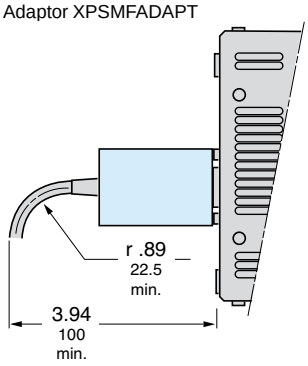
Mounting precautions relating to connectors

Access to Modbus™ serial link (RTU)

SUB-D 9-pin connector

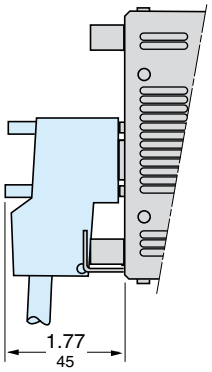


Adaptor XPSMFADAPT



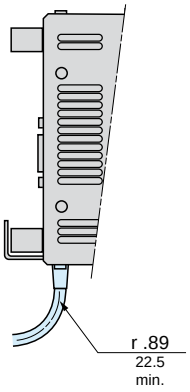
A ccess to PROFIBUS DP

Connector 490NAD91103



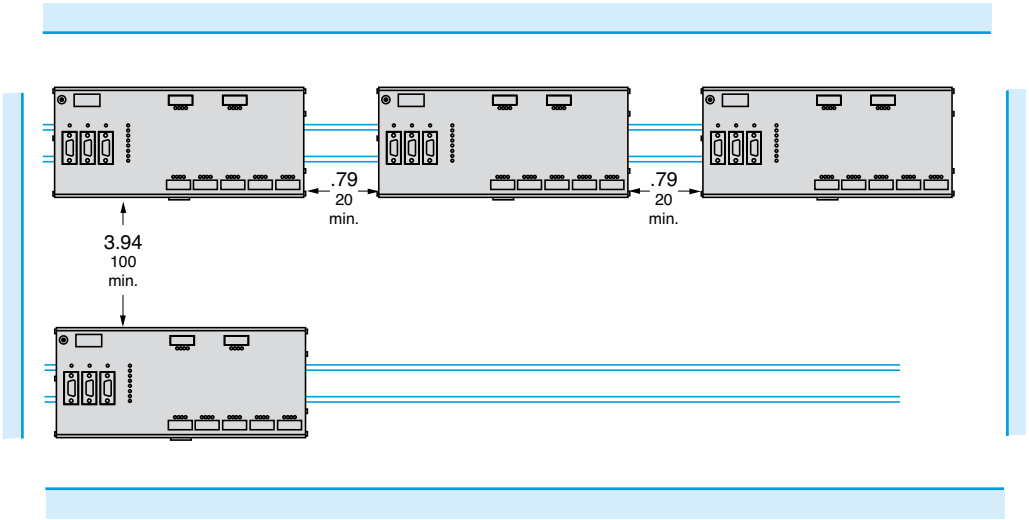
Access to Ethernet network

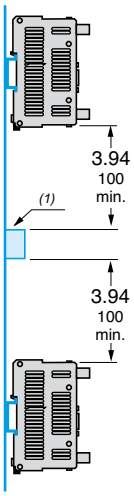
RJ45 socket (SafeEthernet protocol, Modbus TCP/IP server protocol)



Dual Dimensions: INCHES Millimieters

Mounting in panel or enclosure





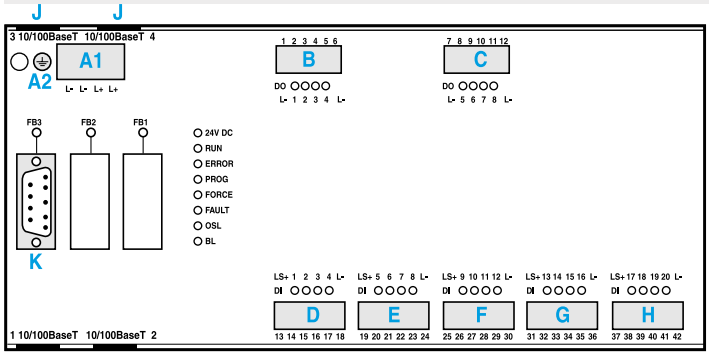
(1) Prefabricated electrical ducting for passage of cables.

Safety automation system solutions

Preventa™ safety PLCs
Compact, XPSMF31/30/35

Connections

XPSMF31222, XPSMF3022



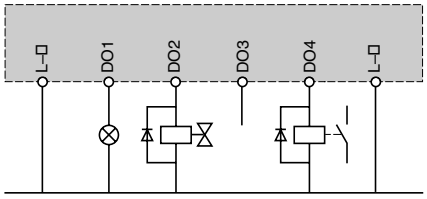
Item	Connection	Screw N°	Screw	Function
A1	**Supply**	–	L+	⎓ 24 V
			L+	⎓ 24 V
			L-	⎓ 24 V (reference pole)
			L-	⎓ 24 V (reference pole)
A2	**Ground**		⏚	Ground
B	**Outputs Digital**	1	L-	Outputs common
		2	1	Output 1
		3	2	Output 2
		4	3	Output 3
		5	4	Output 4 (for increased load)
		6	L-	Outputs common
C	**Outputs Digital**	7	L-	Outputs common
		8	5	Output 5
		9	6	Output 6
		10	7	Output 7
		11	8	Output 8 (for increased load)
		12	L-	Outputs common
D	**Inputs Digital**	13	LS+	Sensor supply for inputs 1 to 4
		14	1	Digital input 1
		15	2	Digital input 2
		16	3	Digital input 3
		17	4	Digital input 4
		18	L-	Inputs common
E	**Inputs Digital**	19	LS+	Sensor supply for inputs 5 to 8
		20	5	Digital input 5
		21	6	Digital input 6
		22	7	Digital input 7
		23	8	Digital input 8
		24	L-	Inputs common
F	**Inputs Digital**	25	LS+	Sensor supply for inputs 9 to 12
		26	9	Digital input 9
		27	10	Digital input 10
		28	11	Digital input 11
		29	12	Digital input 12
		30	L-	Inputs common

Item	Connection	Screw N°	Screw	Function
G	**Inputs Digital**	31	LS+	Sensor supply for inputs 13 to 16
		32	13	Digital input 13
		33	14	Digital input 14
		34	15	Digital input 15
		35	16	Digital input 16
		36	L-	Inputs common
H	**Inputs Digital**	37	LS+	Sensor supply for inputs 17 to 20
		38	17	Digital input 17
		39	18	Digital input 18
		40	19	Digital input 19
		41	20	Digital input 20
		42	L-	Inputs common

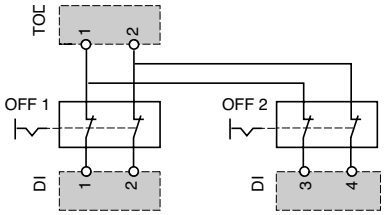
Item	Connection	Type	Function
K	**Communication**	SUB-D 9-pin (FB3)	**XPSMF3022**: slave on Modbus™ serial (RTU)
J	**Programming**	Integrated 4 RJ45 switched Ethernet Communication ports	Either of the four switched Ethernet ports can be used to create a connection between the safety PLC and the programming terminal in a point to point or via an Ethernet network for programming, or setting an IP address.
	Safe Communication (all XPSMF Safety PLCs and Remote I/Os)		Either of the four switched Ethernet ports can be used to create a connection between the safety PLC and other safety related components (e.g other XPSMF safety PLCs or Safety Remote I/O modules) this can be established in a point to point way or via an Ethernet network.
	Non-Safe Communication available with references: XPSMF3022, and XPSMF31222		Either of the four switched Ethernet ports can be used to create a connection between the safety PLC and other non- safety related components (e.g HMI Magelis™, standard PLCs, and Scada systems) this can be established in a point to point way or via an Ethernet network.

Connection examples

Actuator connections to the outputs

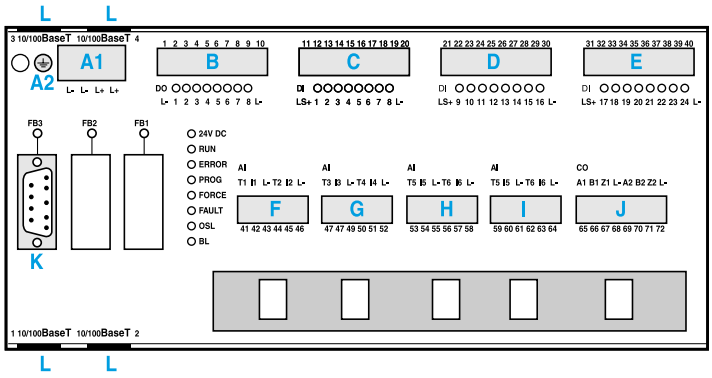


Emergency stop connections (line control)



Connections

XPSMF35●●



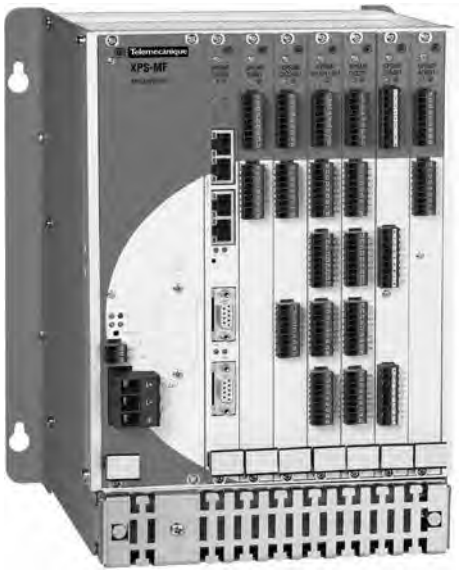
Item	Connection	Screw N°	Screw	Function
A1	**Supply**	–	L+	⎓ 24 V
			L+	⎓ 24 V
			L-	⎓ 24 V (reference pole)
			L-	⎓ 24 V (reference pole)
A2	**Ground**	–	⏚	Ground
B	**Outputs - Digital**	1	L-	Outputs common
		2	1	Digital output 1
		3	2	Digital output 2
		4	3	Digital output 3
		5	4	Digital output 4 (for increased load)
		6	5	Digital output 5
		7	6	Digital output 6
		8	7	Digital output 7
		9	8	Digital output 8 (for increased load)
		10	L-	Outputs common
C	**Inputs - Digital**	11	LS+	Sensor supply for inputs 1 to 8
		12	1	Digital input 1
		13	2	Digital input 2
		14	3	Digital input 3
		15	4	Digital input 4
		16	5	Digital input 5
		17	6	Digital input 6
		18	7	Digital input 7
		19	8	Digital input 8
		20	L-	Inputs common
D	**Inputs - Digital**	21	LS+	Sensor supply for inputs 9 to 16
		22	9	Digital input 9
		23	10	Digital input 10
		24	11	Digital input 11
		25	12	Digital input 12
		26	13	Digital input 13
		27	14	Digital input 14
		28	15	Digital input 15
		29	16	Digital input 16
		30	L-	Inputs common
E	**Inputs - Digital**	31	LS+	Sensor supply for inputs 17 to 24
		32	17	Digital input 17
		33	18	Digital input 18
		34	19	Digital input 19
		35	20	Digital input 20
		36	21	Digital input 21
		37	22	Digital input 22
		38	23	Digital input 23
		39	24	Digital input 24
		40	L-	Inputs common

Item (cont.)	Connection	Screw N°	Screw	Function
F	**Inputs - Analog**	41	T1	Transmitter supply 1
		42	I1	Analog input 1
		43	L-	Inputs common
		44	T2	Transmitter supply 2
		45	I2	Analog input 2
		46	L-	Inputs common
G	**Inputs - Analog**	47	T3	Transmitter supply 3
		48	I3	Analog input 3
		49	L-	Inputs common
		50	T4	Transmitter supply 4
		51	I4	Analog input 4
		52	L-	Inputs common
H	**Inputs - Analog**	53	T5	Transmitter supply 5
		54	I5	Analog input 5
		55	L-	Inputs common
		56	T6	Transmitter supply 6
		57	I6	Analog input 6
		58	L-	Inputs common
I	**Inputs - Analog**	59	T7	Transmitter supply 7
		60	I7	Analog input 7
		61	L-	Inputs common
		62	T8	Transmitter supply 8
		63	I8	Analog input 8
		64	L-	Inputs common
J	**Inputs - Counter**	65	A1	Input A1 or bit 0 (LSB)
		66	B1	Input B1 or bit 1
		67	Z1	Input Z1 or bit 2 (MSB)
		68	L-	Inputs common
		69	A2	Input A2 or bit 0 (LSB)
		70	B2	Input B2 or bit 1
		71	Z2	Input Z2 or bit 2 (MSB)
		72	L-	Inputs common

Item	Connection	Type	Function
K	**Communication**	SUB-D 9-pin (FB3)	**XPS3522**: slave on Modbus™ serial (RTU) **XPS3542**: slave V0 on PROFIBUS DP
L	**Programming**	Integrated 4 RJ45 switched Ethernet Communication ports	Either of the four switched Ethernet ports can be used to create a connection between the safety PLC and the programming terminal in a point to point or via an Ethernet network for programming, or setting an IP address.
	Safe Communication (all XPSMF Safety PLCs and Remote I/Os)		Either of the four switched Ethernet ports can be used to create a connection between the safety PLC and other safety related components (e.g other XPSMF safety PLCs or Safety Remote I/O modules) this can be established in a point to point way or via an Ethernet network.
	Non-Safe Communication available with references: XPSMF3502, XPSMF3522 and XPSMF3542		Either of the four switched Ethernet ports can be used to create a connection between the safety PLC and other non- safety related components (e.g HMI Magelis™, standard PLCs, and Scada systems) this can be established in a point to point way or via an Ethernet network.

Safety automation system solutions

Preventa™ safety PLCs
Modular, XPSMF60
Rack, power supply and CPU



Modular safety PLC XPSMF60, fitted with 6 different "in rack" I/O cards

Introduction

Safety PLC **XPSMF60** offers a modular solution for monitoring simple to complex safety functions for all industrial applications relating to the protection of personnel and machine safety.

Designed for use with numerous machine safety functions, this modular safety PLC is intended for use in safety related parts of control systems.
It can manage up to:

- category 4 conforming to EN 954-1,
- performance level "e" conforming to EN/ISO 13849-1,
- SIL 3 (safety integrity level) conforming to EN/IEC 61508.

Modularity

The safety PLC **XPSMF60** is a modular system consisting of a metal housing or rack, fitted with a power supply module, a CPU and "in rack" I/O cards.
■ Various types of "in rack" I/O cards are catalog listed and are selected according to the application.
■ Mounting the "in rack" cards is a simple operation using the guide rails (6 slots). Electrical connection is automatic and assured by the back plane bus of the rack.
■ The mounting order of the "in rack" I/O cards is open to the user, but the order, however, must correspond to the programming software.
■ The removal of the "in rack" cards, performed with the supply switched-off, is facilitated by a grip at the base of the cards.
■ Covering plates for unused "in rack" I/O card slots are available to protect the system in polluted environments.

Composition of the modular safety PLC XPSMF60

Minimum basic equipment	Optional "in rack" I/O cards	
	Type	Details
Metal rack XPSMFGEH01 with back plane bus assuring electrical connection of components installed + metal securing plate for shielded cables (EMC), two cooling fans **+ a power supply module (⎓ 24 V) XPSMFPS01**, **+ a central processing unit XPSMFCPU22** with 4 x RJ45 integrated switched Ethernet ports for Programming, and for Safety and non-safety related communication on Ethernet (safety related using SafeEthernet protocol and Non-safety related using Modbus™ TCP/IP server protocol) and in addition a SUB-D (FB2) connector for communication on Modbus serial (RTU)	XPSMFAI801	8 single-pole analog inputs or 4 2-pole analog inputs
	XPSMFAO801	8 analog outputs
	XPSMFCIO2401	2 counting inputs, 4 digital outputs
	XPSMFDI2401	24 digital inputs (⎓ 110 V / ∿ 127 V)
	XPSMFDI3201	32 digital inputs
	XPSMFDIO241601	24 digital inputs, 16 digital outputs
	XPSMFDO801	8 relay outputs (∿ 6…250 V)

Safety PLCs

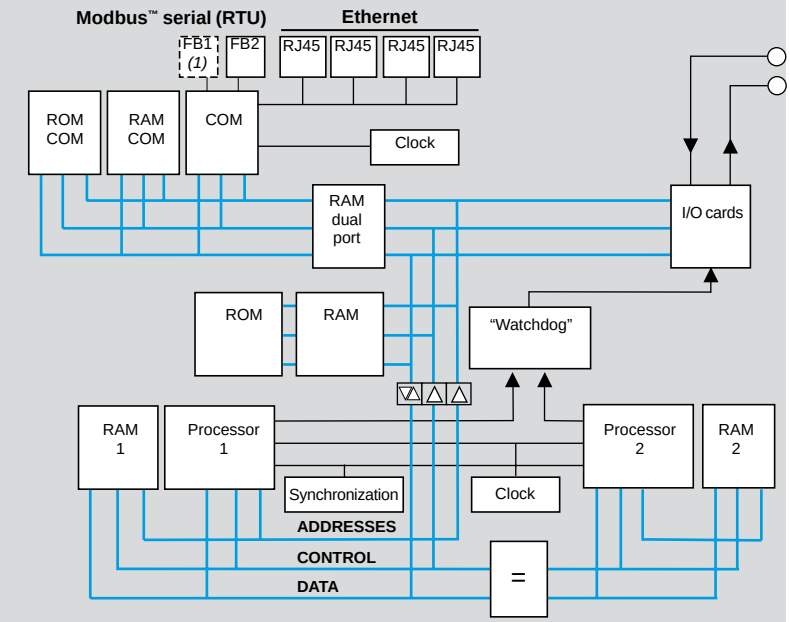
In order to meet safety requirements, the modular safety PLC **XPSMF60** incorporates two essential functions (**Redundancy** and **Self-monitoring)** complying to category 4 conforming to EN 954-1 and performance level "e" conforming to EN/ISO 13849-1 in addition to the SafeEthernet safety communication protocol between the safety PLCs and the safety remote I/O modules (**Special Switch**).
■ **Redundancy**: the 2 processors integrated in the modular safety PLC analyze and compare the data received from the safety inputs and outputs.
The incoming and outgoing data (programmed values and received values) are received in parallel by the two processors and compared in real-time.
■ **Self-monitoring ("Watchdog")**: the modular safety PLC continuously monitors the data processing cycle and the execution of tasks, and intervenes if the cycle time does not conform to the predefined value.
■ **The integrated switch (Special Switch)** stores for a very short time and sends at very high speed the data provided by the inputs and outputs of the safety PLC on the Ethernet network, while avoiding signal collisions and excessive amounts of data on the network.

Safety automation system solutions

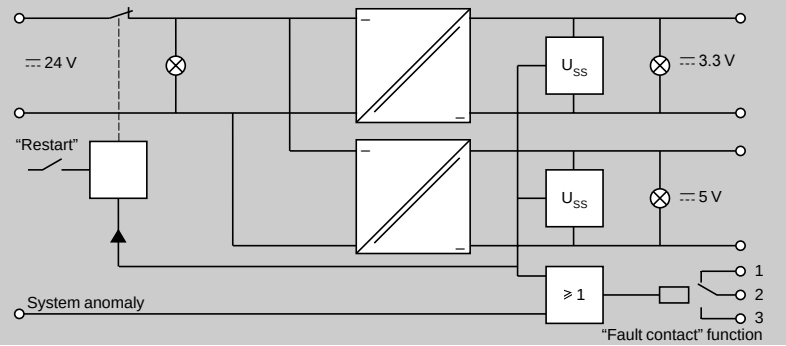
Preventa™ safety PLCs
Modular, XPSMF60
Rack, power supply and CPU

Functional diagrams

Central processing unit XPSMFCPU22



Power supply module XPSMFPS01



Line control for "in rack" I/O card XPSMFDIO241601 and "in rack" input card XPSMFDI3201

Line control is a means of short-circuit and line break monitoring.
Using line control outputs enables SIL 3 (EN/IEC 61508) and category 4 (EN 954-1) safety to be achieved. The line control outputs send a high signal with a very short low signal, thus enabling a wiring anomaly (short-circuit, line break) to be seen at the inputs of the safety PLCs.
The digital outputs 1 to 16 of card **XPSMFDIO241601** are connected to the digital inputs of the same card or to the digital inputs of card **XPSMFDI3201**.

(1) FB1 not used.

Safety automation system solutions

Preventa™ safety PLCs
Modular, XPSMF60
Rack, power supply and CPU

XPSMFDI2401

XPSMFDI3201

XPSMFAI801

Safety inputs and outputs (continued)

Programming automated safety functions

Software **XPSMFWIN** (reference SSV1XPSMFWIN) running on a PC enables the programming of all safety remote I/O modules and the modular safety PLCs, as well as configuration of the communication settings.

Safety inputs and outputs

The modularity of the PLC **XPSMF60** allows the user to select and install, in the six slots of the rack, various input, output and input/output cards to alter the number and type of safety inputs and/or outputs to be monitored.
6 identical cards can be installed in the same rack.
The cards listed (see below and next page) indicate the number of inputs and outputs available for connection to the machines to be monitored.

Digital input cards *(1)*

Cards	Digital inputs		
	N°	Type	
		Safety detection	Safety dialog
XPSMFDI2401	24	Limit switches, Guard switches, with reset and with actuator, Light curtains type 2 and type 4, Safety mats and sensing edges	Mushroom head emergency stops, Enclosures for control and signalling units, Two-hand control stations
XPSMFDI3201	32		

Analog input card *(1) (2)*

Card	Analog measuring inputs	
	N°	Functions
XPSMFAI801	8 single-pole or 4 2-pole	Closed circuit scanning of input channels, Single-pole measuring of 0 to 10 V voltages, 2-pole measuring of -10 to +10 V voltages, Single-pole measuring of 0 to 20 mA currents

(1) Removable screw terminal blocks are provided with the power supply and "in rack" I/O cards.
(2) Use shielded dual twisted pair cables, maximum length 984 ft (300m), short-circuit unused analog inputs.

Safety automation system solutions

Preventa™ safety PLCs
Modular, XPSMF60
Rack, power supply and CPU

XPSMFCIO2401

XPSMFDIO241601

XPSMFAO801

XPSMFDO801

Safety inputs and outputs *(continued)*

Mixed I/O cards *(1)*

Card	Counting inputs			Digital outputs	
	N°	⎓ 5 V	⎓ 24 V	N°	Type
XPSMFCIO2401	2	Incremental encoders	Sensors 2/3-wire PNP/NPN	4	**Safety actuators** Contactors-motors, Control relays, Variable speed drives. **Safety dialog** Beacons and indicator banks, Rotating mirror beacons, Sirens
		Independent and configurable counting inputs (one channel for counting and one channel for increasing or decreasing counting direction)			

Card	Digital inputs		Digital outputs	
	N°	Type	N°	Type
XPSMFDIO241601	24	**Safety detection** Limit switches, Guard switches, with reset and with actuator, Light curtains type 2 and type 4, Safety mats and sensing edges **Safety dialog** Mushroom head Emergency stops, Enclosures for control and signalling units, Two-hand control stations	16	**Safety actuators** Contactors-motors, Control relays, Variable speed drives. **Safety dialog** Beacons and indicator banks, Rotating mirror beacons, Sirens

Analog output card *(1) (2)*

Card	Analog outputs	
	N°	Functions
XPSMFAO801	8	Closed circuit scanning of output channels, Single-pole measuring of 0 to 10 V voltages, Measuring, using jumper, 0/4 to 20 mA currents (with 500 Ω external resistor)

Relay output card *(1) (2)*

Card	Relay outputs	
	N°	Type
XPSMFDO801	8	**Safety actuators** Contactors-motors, Control relays, Variable speed drives. **Safety dialog** Beacons and indicator banks, Rotating mirror beacons, Sirens

Remote inputs and outputs

In addition to the inputs/outputs available as standard on the optional “in rack” cards, the modular safety PLC **XPSMF60** can be connected to safety remote input modules **XPSMF1** and/or safety remote output modules **XPSMF2** and/or safety remote mixed I/O modules **XPSMF3**.
The safety remote input, output and mixed I/O modules can be located within the vicinity of the machines to be monitored, thus reducing cabling.
Communication between these safety modules and the safety PLC **XPSMF60** is performed on an Ethernet network using the SafeEthernet safety protocol, via the integrated RJ45 switched Ethernet communications ports.

(1) Removable screw terminal blocks are provided with the power supply and “in rack” I/O cards.
(2) Use shielded dual twisted pair cables, maximum length 984 ft (300 m), short-circuit unused analog inputs.

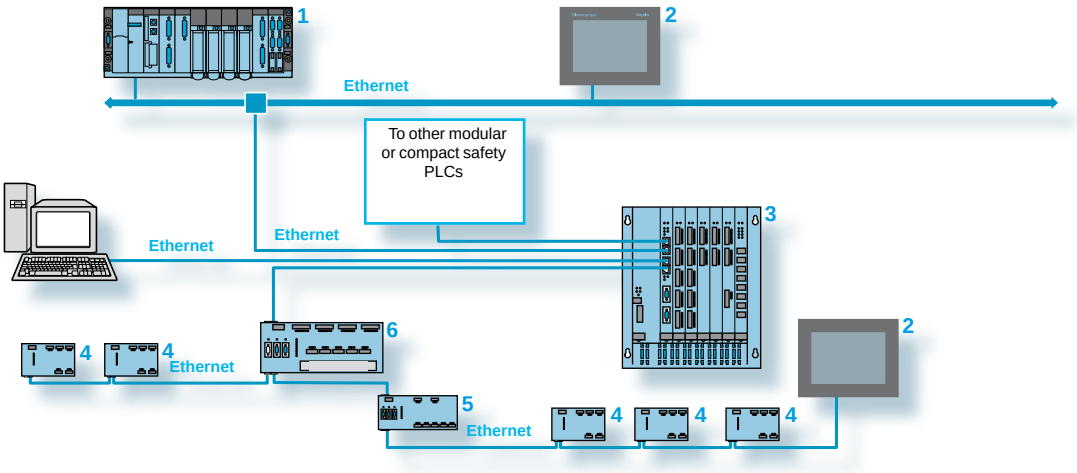
Safety automation system solutions
Preventa™ safety PLCs
Modular, XPSMF60
Rack, power supply and CPU

Communication

Safety communication on Ethernet network

Communication between the PC, Magelis™ graphic terminals or automation platform (Premium™) and the modular safety PLC is achieved by the **Ethernet** network connection via the integrated RJ45 switched Ethernet communications ports of the modular safety PLC.

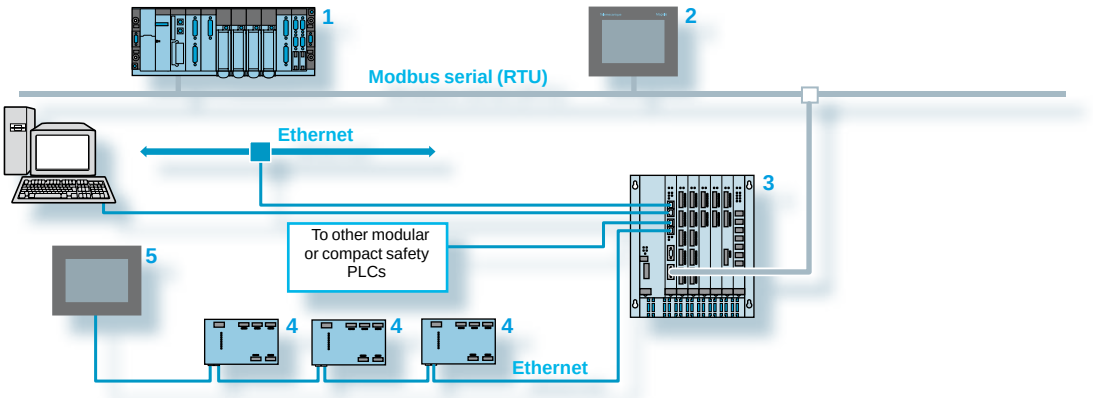
Modular PLC	Communication protocols	
	safety	non safety
XPSCPU22	SafeEthernet	Modbus™ TCP/IP server (slave)



1 Premium™ automation platform: Modbus™ TCP/IP client.
2 Graphic terminal **XBTGT**: Modbus TCP/IP client.
3 Modular safety PLC: Modbus TCP/IP server.
4 Safety remote I/O modules **XPSMF1/2/3**. They communicate with compact and modular safety PLCs using the SafeEthernet protocol.
5 Compact safety PLC **XPSMF31/30**: Modbus TCP/IP server.
6 Compact safety PLC **XPSMF35●●**: Modbus TCP/IP server.

Communication on Modbus serial (RTU) fieldbus

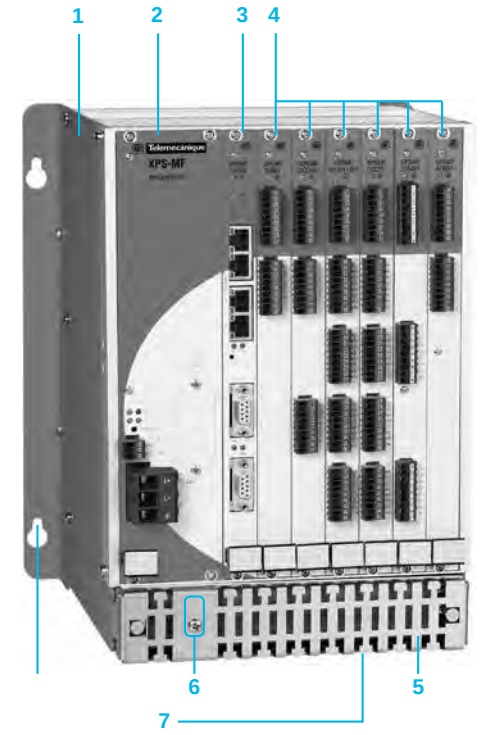
On Modbus serial (RTU), the modular safety PLC is a slave of the Premium™ automation platform and Magelis graphic terminal.
It is connected to the Modbus serial network via its SUB-D 9-pin connector (FB2).



1 Graphic terminal **XBTGT**: Modbus serial (RTU) master.
2 Premium™ automation platform: Modbus serial (RTU) master.
3 Modular safety PLC: Modbus serial (RTU) slave, Modbus TCP/IP server.
4 Safety remote I/O modules **XPSMF1/2/3**. They communicate with the modular safety PLC using the SafeEthernet protocol.
5 Graphic terminal **XBTGT**: Modbus serial (RTU) client.

Safety automation system solutions

Preventa™ safety PLCs
Modular, XPSMF60
Rack, power supply and CPU

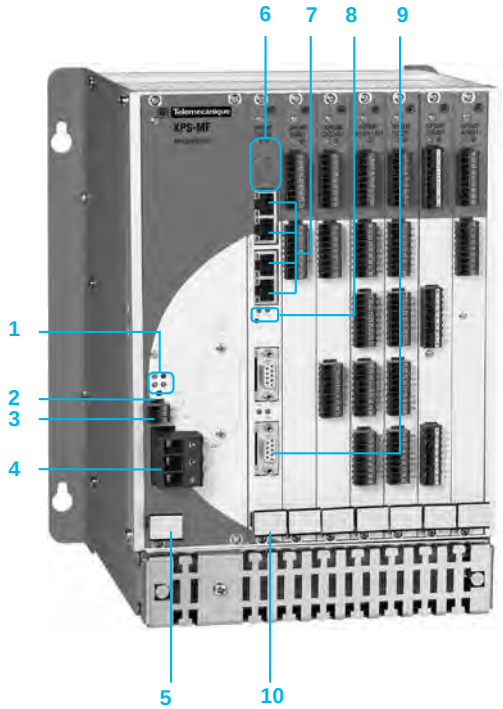


Description

Modular safety PLC

Modular assembly consisting of:

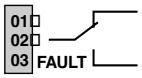
1 A metal rack **XPSMFGEH01**.
2 A ⎓ 24 V power supply module **XPSMFPS01**.
3 A central processing unit **XPSMFCPU22**.
4 Six optional “in rack” I/O cards (back plane bus assures the electrical connection of “in rack” cards installed, the power supply module and the CPU).
5 A metal plate for securing shielded analog input connection cables (EMC),
6 One ground connection screw.
7 Two cooling fans (beneath the metal rack).
8 Four Ø 0.55 in (14 mm) elongated holes for mounting the rack on a vertical support.



Power supply module XPSMFPS01 and Central processing unit XPSMFCPU22 consisting of:

1 Four voltage status LEDs (FAULT, 24 V, 3.3 V or 5 V).
2 A RESTART button (accessible using fine pointed tool).
3 A 3-pole terminal block (3 captive screws) for “Fault contact” function *(1)*.
4 A ⎓ 24 V supply terminal block, including ground connection *(2)*.
5 A grip to assist installation/removal of the power supply module.
6 Seven process status LEDs.
7 Four integrated RJ45 (type 10BASE-T/100BASE-TX) switched ports for Programming, and for Safety and non-safety related communication on Ethernet. (safety related using SafeEthernet protocol and Non-safety related using Modbus™ TCP server protocol).
8 Two process status LEDs.
9 A SUB-D 9-pin connector (FB2) for connection on Modbus serial (RTU) (FB1 not used), with process status LED.
10 A grip to assist installation/removal of the CPU.

*(1) “**Fault contact**” function: the power supply module incorporates a volt-free changeover contact. Operating errors occurring in the system are read and displayed by the LEDs. The errors are analyzed on the programming PC:*

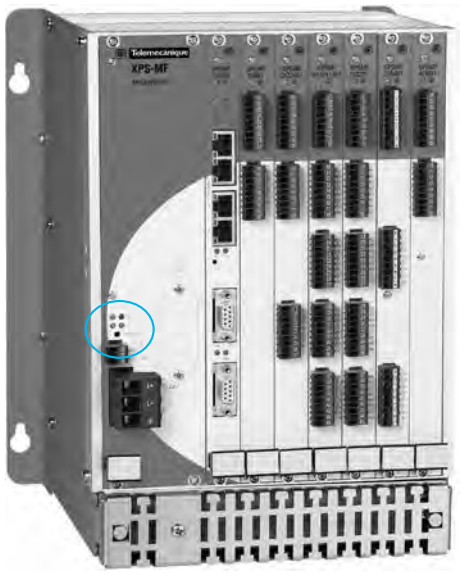


Contact positions	Status
1-2 closed (2-3 open)	Normal operation of the PLC.
1-2 open (2-3 closed)	Absence of supply to the PLC or the CPU is in ERROR STOP mode.

(2) Removable screw terminal blocks are provided with the power supply and “in rack” I/O cards.

Safety automation system solutions

Preventa™ safety PLCs
Modular, XPSMF60
Rack, power supply and CPU



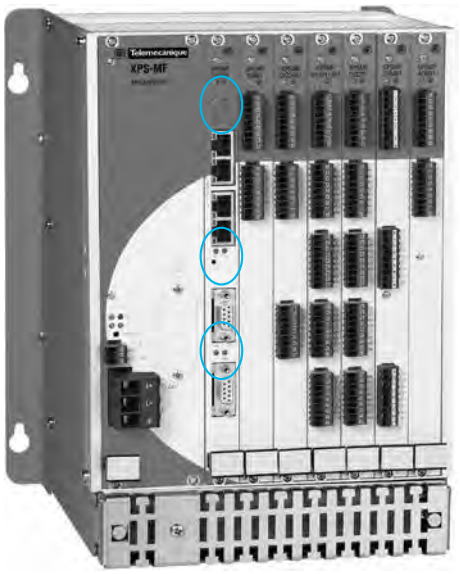
LED details

Power supply module XPSMFPS01

LED	Color	Status	Meaning
24 VDC	Green	On	⎓ 24 V voltage present.
		Off	No voltage.
3.3 VDC	Green	On	⎓ 3.3 V voltage present.
		Off	No voltage.
5 VDC	Green	On	⎓ 5 V voltage present.
		Off	No voltage.
FAULT	Orange	On	Operating error.
			The user application has caused an error.
			The system configuration is defective.
			Replace module.
		Off	None of the above errors have occurred.

Safety automation system solutions

Preventa™ safety PLCs
Modular, XPSMF60
Rack, power supply and CPU



LED details *(continued)*

Central processing unit XPSMFCPU22

LED	Color	Status	Meaning
RUN	Green	On	Program in operation: CPU in STOP or RUN mode.
		Flashing	A new programming system will be downloaded.
		Off	The CPU is in “ERROR” state (see ERROR).
ERR	Red	On	Software error or hardware anomaly detected by the CPU. The monitoring program (Watchdog) has triggered the STOP state of the process because the programmed cycle time has been exceeded. The CPU has stopped the execution of the user application, ended all hardware and software tests and all outputs have been reset. The process can only be started again from the PC.
		Flashing	In the event of all the LEDs being on, restarting has detected a system error, a new operating system (OS) must be loaded.
		Off	No error detected.
FB1	–	–	Not used.
FB2	Orange	On	Communication on Modbus™ serial link active.
RUN	Green	On	Normal service mode, loaded program running, the PLC receives I/O messages, communication and hardware/ software tests carried out.
		Off	The CPU is in “ERROR” state (see ERROR).
STOP	Red	On	The CPU is in STOP mode and no program can be executed.
			The outputs are in the waiting state for the correct supply.
			The CPU has stopped the execution of the user application, ended all hardware and software tests and all outputs have been reset.
			The process can only be started again from the terminal.
		Off	CPU operating. A new programming system will be downloaded.
PROG	Orange	On	The CPU is being loaded with a new configuration.
		Flashing	CPU changing from INIT state to STOP state. The FLASH ROM is being loaded with a new operating system.
		Off	No loading of configuration or operating system.
FAULT	Orange	On	Program error.
			The loading of a new operating system was defective and the operating system is corrupt.
		Flashing	An error has occurred while writing to FLASH ROM memory (during updating of the operating system).
			One or more I/O errors have occurred.
		Off	None of the above errors have occurred.
FORCE	Orange	On	CPU in RUN mode and force is active.
		Flashing	Program in STOP mode, but force is prepared and activated if the program restarts.
		Off	Force not activated.
OSL	Orange	Flashing	Operating system and backup loading active.
BL	Orange	Flashing	COM in INIT_Fail state.
RJ45	Green	On	Full duplex mode operation.
		Flashing	Signal collision.
		Off	Half duplex mode operation, no collision.
	Yellow	On	Connection established.
		Flashing	Interface active.

Safety automation system solutions

Preventa™ safety PLCs
Modular, XPSMF60
Rack, power supply and CPU

Environment

Modular safety PLC			Rack XPSMFGEH01 + power supply module XPSMFPS01 and central processing unit XPSMFCPU22
Products designed for max. use in safety related parts of control systems (conforming to EN 954-1, EN/ISO 13849-1 and EN/IEC 61508)			Category 4 (EN 954-1), Performance level “e” (EN/ISO 13849-1), Safety integrity level: SIL 3 (EN/IEC 61508)
Product certifications			EN/IEC 61508, part 1-7: 2000, IEC 61511 part 1-3: 2004, DIN VDE 0116: 1989, EN 50156-1: 2004, EN 12067-2: 2004, EN 298: 2003, EN 230: 1990, NFPA 85: 2001, EN/IEC 61131-2: 2003, EN 61000-6-2: 2001, EN 61000-6-4: 2001 EN 54-2: 1997, NFPA 72: 2002
Ambient air temperature conforming to EN 61131-2	Operating	**°F (°C)**	Rack, power supply module and CPU: +32… + 140 (0…+ 60)
	Storage	**°F (°C)**	■ Rack **XPSMFGEH01**: -40… + 185 (- 40…+ 85), ■ Power supply module **XPSMFPS01**: □ -40… + 185 (- 40…+ 85), without backup battery □ -22… + 185 (- 30…+ 85), with backup battery ■ Central processing unit **XPSMFCPU22**: -40… + 185 (- 40…+ 85)
Relative humidity			95% (supply not connected)
Degree of protection	Enclosure		IP 20 with covering plate on unused “in rack” I/O card slots
Pollution			Degree of pollution II
Altitude			6560 ft (2000 m)
Protection class			Class II, conforming to EN/IEC 61131-2
Electromagnetic compatibility			Conforming to EN/IEC 61131-2
Vibration resistance conforming to EN 61131-2	Operating		1 g, frequency 10…150 Hz, unit test while operating, 10 cycles per axis
Shock resistance conforming to EN 61131-2	Operating		15 g (duration 11 ms), unit test while operating, 2 cycles per axis
Resistance to electrostatic discharges conforming to EN/IEC 61000-4-2		**kV**	4 contact, 8 air discharge
Immunity to high frequency interference conforming to EN/IEC 61000-4-3		**V/m**	10 (26 MHz…1 GHz)
Rack material			Metal alloy

Electrical specifications

Supply	Voltage	**V**	⎓ 24 (External supply with separate protection conforming to EN/IEC 60950, SELV (Safety Extra Low Voltage) or PELV (Protection Extra Low Voltage) rated)
	Voltage limits		- 15… + 20% (power supply module) - 20… + 25%
Output voltage of power supply module		**V**	⎓ 3.3 / 10 A
		V	⎓ 5 / 2 A
Maximum power consumption		**A**	30 max., 32 A external fuse
Immunity to momentary supply interruptions		**ms**	10
Protection			Internal fuse
Response time		**ms**	Depending on size of application
Backup capacitor			Approximately 1 week for diagnostics and time information Program is not effected
Clock			Yes
Operational data of CPU			⎓ 3.3 V/1.5 A
			⎓ 5 V/1 A
User memory	Application	**kB**	500
	Data	**kB**	500
LED display			Yes

Communication

Ethernet network: safety communication using SafeEthernet protocol

Compatibility			Central processing unit XPSMFCPU22
Transmission	Communication ports		Integrated 4 RJ45 switched Ethernet communications ports
	Baud rate	**Mbps**	100 Half duplex, 10 Full duplex, Autonegotiation
Structure			10BASE-T/100BASE-TX
Medium			Dual twisted pair cable, category 5D or better (Ethernet)
Functions	Control of:		Transmitted data: duplication, loss, bit changing. Addressing of transmitted and received messages. Data sequence: repetition, loss of data, change. Data reception time: delay, repetition, echo
	Diagnostics on:		CPU, user program, communication, operating voltage and temperature, inputs & outputs

Communication *(continuous)*

Compatibility			**Central processing unit XPSMFCPU22**
Ethernet network: Non-safety related communication using Modbus™ TCP/IP protocol			
Connection Ports	Number and type		Integrated 4 RJ45 switched Ethernet communication ports
	Baud rate	**Mbps**	100 Half duplex, 10 Full duplex, Autonegotiation
	Master/Slave		Server (slave)
Structure			10BASE-T/100BASE-TX
Medium			Dual twisted pair cable, category 5D or better (Ethernet)
Transparent Ready™ Services	Class		A10
	Standard Ethernet TCP/IP communication services		Modbus TCP/IP Server
			Modbus TCP/IP messaging (reading/writing of data words)
			Modbus identification requests
	TCP port		standard 502
	Max. number of Modbus TCP/IP connections		1 to 20
Modbus serial (RTU)			
Serial link ports	Number and type		1 x SUB-D 9-pin female (FB2)
	Master/Slave		Slave
Addressing			122 slave addresses
Physical layer			RS 485

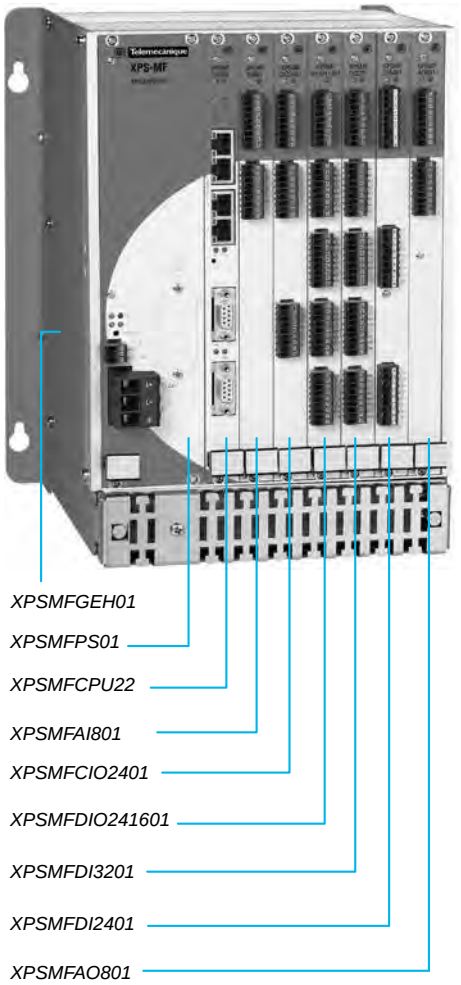
Connections *(1)*

Power supply module			**XPSMFPS01**
Type of connection			Removable screw terminal blocks *(2)*
Supply connection	Number of terminal blocks		1
	For 1 cable without cable end		Solid or flexible AWG 20 (0.75…16 mm^2)
	For 1 flexible cable with or without plastic cable end		AWG 20 (0.5…16 mm^2)
	For 2 cables of same diameter, without cable end		Solid or flexible AWG 20 (0.75…6 mm^2)
	For 2 cables of same diameter, flexible without cable end		AWG 20 (0.5…4 mm^2)
	For 2 cables of same diameter, flexible with plastic cable end		AWG 20 (0.5…6 mm^2)
"In rack" I/O card			**XPSMFAI801, XPSMFAO801, XPSMFCIO2401, XPSMFDI2401, XPSMFDI3201, XPSMFDIO241601, XPSMFDO801**
Type of connection			Removable screw terminal blocks *(2)*
Digital input channel and output channel connection	Number of terminal blocks		Depending on "in rack" I/O card type
	For 1 cable without cable end		Solid or flexible: AWG 28-16 (0.14…1.5 mm^2)
	For 1 flexible cable without cable end		AWG 22-16 (0.25…1.5 mm^2)
	For 1 flexible cable with plastic cable end		AWG 22-20 (0.25…0.5 mm^2)
	For 2 cables of same diameter, without cable end		Solid: AWG 28-20 (0.14…0.5 mm^2) Flexible: AWG 28-18 (0.14…0.75 mm^2)
	For 2 cables of same diameter, flexible without cable end		AWG 22 (0.25…0.34 mm^2)
	For 2 cables of same diameter, flexible with plastic cable end		AWG 20 (0.5 mm^2)
Analog input channel and output channel connection	Number of terminal blocks		Depending on "in rack" I/O card type
	For 1 cable without cable end		Solid or flexible: AWG 28-16 (0.14…1.5 mm^2)
	For 1 flexible cable without cable end		AWG 22-16 (0.25…1.5 mm^2)
	For 1 flexible cable with plastic cable end		AWG 22-20 (0.25…0.5 mm^2)
	For 2 cables of same diameter, without cable end		Solid: AWG 28-20 (0.14…0.5 mm^2) Flexible: AWG 28-18 (0.14…0.75 mm^2)
	For 2 cables of same diameter, flexible without cable end		AWG 22 (0.25…0.34 mm^2)
	For 2 cables of same diameter, flexible with plastic cable end		AWG 20 (0.5 mm^2)
Counting channel connection	Number of terminal blocks		Depending on "in rack" I/O card type
	For 1 cable without cable end		Solid or flexible: AWG 28-16 (0.14…1.5 mm^2)
	For 1 flexible cable without cable end		AWG 22-16 (0.25…1.5 mm^2)
	For 1 flexible cable with plastic cable end		AWG 22-20 (0.25…0.5 mm^2)
	For 2 cables of same diameter, without cable end		Solid: AWG 28-20 (0.14…0.5 mm^2) Flexible: AWG 28-18 (0.14…0.75 mm^2)
	For 2 cables of same diameter, flexible without cable end		AWG 22 (0.25…0.34 mm^2)
	For 2 cables of same diameter, flexible with plastic cable end		AWG 20 (0.5 mm^2)
Cable connection	Tightening torque		1.9…2.2 lb-in (0.22…0.25 Nm)
	Bared length		0.35 in (9mm)

(1) AWG: American Wire Gauge.
(2) Removable screw terminal blocks are provided with the power supply and "in rack" I/O cards.

Safety automation system solutions

Preventa™ safety PLCs
Modular, XPSMF60
Rack, power supply and CPU



Modular PLC (⎓ 24 V supply)

Minimum basic equipment

Description	Reference	Weight oz (kg)
Metal rack *(1)* **fitted with:** □ a back plane bus, assuring electrical connection of components installed: power supply module, CPU and "in rack" cards □ two cooling fans □ a metal securing plate for shielded cables (EMC)	**XPSMFGEH01**	–
⎓ **24 V power supply module** *(1)*	**XPSMFPS01**	28.925 (0.820)
CPU *(1)* **fitted with:** □ 4 x integrated RJ45 (type 10BASE-T/100BASE-TX) switched ports for Programming, and for Safety and non-safety related communication on Ethernet. (safety related using SafeEthernet protocol and Non-safety related using Modbus™ TCP/IP server protocol □ 1 x SUB-D 9-pin port (FB2) for access to Modbus serial (RTU)	**XPSMFCPU22**	9.877 (0.280)

Optional "in rack" I/O cards

Description	Functions		Reference	Weight oz (kg)
	Inputs	Outputs		
"In rack" I/O card *(1)*	Analog: 8 single-pole or 4 2-pole, configurable	–	**XPSMFAI801**	8.466 (0.240)
	–	8 analog	**XPSMFAO801**	9.877 (0.280)
	2 counting	4 digital	**XPSMFCIO2401**	9.171 (0.260)
	24 digital (⎓ 110 V / ∿ 127 V)	–	**XPSMFDI2401**	9.171 (0.260)
	32 digital	–	**XPSMFDI3201**	9.171 (0.260)
	24 digital	16 digital *(2)*	**XPSMFDIO241601**	9.171 (0.260)
	–	8 relay ≂ 6…250 V	**XPSMFDO801**	21.164 (0.600)

(1) Removable screw terminal blocks are provided with the power supply and "in rack" I/O cards.
(2) Configurable for line control.

Configuration software

■ Reference **SSV1XPSMFWIN** contains the full version of the programming software XPSMFWIN software for the XPSMF Safety PLCs. The XPSMFWIN is part of our Safety Suite and is not available seperately.

Description	Operating system	Details	Languages	Reference	Weight oz (kg)
Configuration software XPSMFWIN for programming modular safety PLCs CD-ROM + user manual	Windows® 2000, Windows® XP	Software available on Safety Suite V2 software pack	English, German, French	**SSV1XPSMFWIN**	18.342 (0.520)

Accessories for modular PLC

Description	For use with	Reference	Weight oz (kg)
Covering plate	Unused “in rack” I/O card slots	**XPSMFBLK**	–

Safety automation system solutions

Preventa™ safety PLCs
Modular, XPSMF60
Rack, power supply and CPU

ABL8RPS24050

Phaseo™ regulated switch mode power supplies

Mains input voltage	Output voltage	Nominal power	Nominal current	Auto-protect reset	Conformity to standard IEC EN 61000-3-2 and IEC EN 60950	Reference	Weight
V	⎓ V	W	A				oz (kg)
Universal range, single-phase (N-L1) **or 2-phase** (L1-L2) **connection**							
∿ **100…120 V/200...500** - 15%, + 10% 50/60 Hz	24...28.8	72	3	Auto/Manual	Yes	**ABL8RPS24030**	10.582 (0.300)
		120	5	Auto/Manual	Yes	**ABL8RPS24050**	24.692 (0.700)
		240	10	Auto/Manual	Yes	**ABL8RPS24100**	35.273 (1.000)
Dedicated range, single-phase connection							
∿ **100…240** *(1)* wide range, 47…63 Hz	12	60	5	Auto	No	**ABL1REM12050**	15.521 (0.440)
	24	60	2.5	Auto	No	**ABL1REM24025**	15.521 (0.440)
∿ **100...120/200...240** *(2)*	24	240	10	Auto	No	**ABL1REM24100**	31.041 (0.880)

ABL1REM24025

Magelis™ multifunction graphic terminals with touch sensitive screen and on-board Ethernet *(1)*

Supply voltage ⎓ 24 V

Description		Ports: serial and communication (type of link)	Application memory	Reference	Weight oz (kg)
5.7"	Monochrome black and white STN	1 x SUB-D 9-pin (RS 232C or RS 422/485 serial link to PLCs) 1 x RJ45 (RS 485 serial link) 1 x USB (peripheral connection and application transfer) 1 x RJ45 (Ethernet TCP/IP, 10BASE-T/100BASE-TX)	16 Mb	**XBTGT2130**	35.273 (1.000)
	Color TFT	1 x SUB-D 9-pin (RS 232C or RS 422/485 serial link to PLCs) 1 x RJ45 (RS 485 serial link) 1 x USB (peripheral connection and application transfer) 1 x RJ45 (Ethernet TCP/IP, 10BASE-T/100BASE-TX)	16 Mb	**XBTGT2330**	35.273 (1.000)
7.5"	Color TFT	1 x SUB-D 9-pin (RS 232C or RS 422/485 serial link to PLCs) 1 x RJ45 (RS 485 serial link) 1 x USB (peripheral connection and application transfer) 1 x RJ45 (Ethernet TCP/IP, 10BASE-T/100BASE-TX)	32 Mb	**XBTGT4330**	63.493 (1.800)
10.4"	Color STN	1 x SUB-D 9-pin (RS 232C or RS 422/485 serial link to PLCs) 1 x RJ45 (RS 485 serial link) 2 x USB (peripheral connection and application transfer) 1 x RJ45 (Ethernet TCP/IP, 10BASE-T/100BASE-TX)	32 Mb	**XBTGT5230**	105.822 (3.000)
	Color TFT	1 x SUB-D 9-pin (RS 232C or RS 422/485 serial link to PLCs) 1 x RJ45 (RS 485 serial link) 2 x USB (peripheral connection and application transfer) 1 x RJ45 (Ethernet TCP/IP, 10BASE-T/100BASE-TX)	32 Mb	**XBTGT5330**	105.822 (3.000)
12.1"	Color TFT	1 x SUB-D 9-pin (RS 232C or RS 422/485 serial link to PLCs) 1 x RJ45 (RS 485 serial link) 2 x USB (peripheral connection and application transfer) 1 x RJ45 (Ethernet TCP/IP, 10BASE-T/100BASE-TX)	32 Mb	**XBTGT6330**	105.822 (3.000)
15"	Color TFT	1 x SUB-D 9-pin (RS 232C or RS 422/485 serial link to PLCs) 1 x RJ45 (RS 485 serial link) 2 x USB (peripheral connection and application transfer) 1 x RJ45 (Ethernet TCP/IP, 10BASE-T/100BASE-TX)	32 Mb	**XBTGT7340**	197.534 (5.600)

XBTGT2130, XBTGT2330

XBTGT4330

XBTGT5●30

XBTGT6330

XBTGT7340

(1) Service instructions, USB connectors locking device and mounting kit included.

Safety automation system solutions

Preventa™ safety PLCs
Modular, XPSMF60
Rack, power supply and CPU

490NTW000●●

Connecting cables for network and bus

Connection to Ethernet network

Description	Pre-fitted connectors	Length ft (m)	Reference	Weight oz (kg)
Shielded twisted pair cables, straight through	2 RJ45 connectors For connection to DTE (Data Terminal Equipment)	6.6 (2)	**490NTW00002***(1)*	–
		16.4 (5)	**490NTW00005***(1)*	–
		39.4 (12)	**490NTW00012***(1)*	–
		131.2 (40)	**490NTW00040***(1)*	–
		262.5 (80)	**490NTW00080***(1)*	–
Shielded twisted pair cables, crossed wires	2 RJ45 connectors For connection between hubs, switches and transceivers	16.4 (5)	**490NTC00005***(1)*	–
		49.2 (15)	**490NTC00015***(1)*	–
		131.2 (40)	**490NTC00040***(1)*	–
		262.5 (80)	**490NTC00080***(1)*	–

Connection to Modbus™ serial link

Description	Use		Length ft. (m)	Reference	Weight lb (kg)
	From	To			
Trunk cables, shielded dual twisted pair, RS 485	Compact safety PLCs XPSMF4020/MF4022 (RJ45)	Modbus splitter box LU9 GC3 (RJ45)	328 (100)	**TSXCSA100**	12.522 (5.680)
			656 (200)	**TSXCSA200**	24.074 (10.920)
			1640 (500)	**TSXCSA500**	66.139 (30.000)
	Graphic terminals XBTGT (SUB-D 9-pin)	Modbus splitter box LU9 GC3 (RJ45)	8.2 (2.5)	**XBTZ938***(2)*	0.441 (0.210)
Adaptor for cable XBTZ938	SUB-D 9-pin (XBTGT)	XBTZ938 (SUB-D 25-pin)	0.66 (0.2)	**XBTZG909**	–
Adaptor SUB-D 9-pin/RJ45	Compact PLCs (SUB-D 9-pin)	Connecting cables for Modbus serial link (RJ45)	–	**XPSMFADAPT**	–

Description	Specifications	Sold in lots of	Unit reference	Weight oz (kg)
End of line adaptors For RJ45 connector	R = 120 Ω, C = 1 nF	2	**VW3A8306RC**	7.055 (0.200)
	R = 150 Ω	2	**VW3A8306R**	0.353 (0.010)

PROFIBUS DP bus connection components

Description	Profile	Services	Reference	Weight oz (kg)
PROFIBUS DP module set for Premium™ PLCs	Master, 12 Mbps	Class 1 and Class 2 master V0 functions, see specifications. PROFIBUS FMS messaging not supported	**TSXPBY100**	30.688 (0.870)

Description	Use	Reference	Weight oz (kg)
Remote inputs/outputs on PROFIBUS DP bus	Advantys™ STB network interface module	**STBNDP2112**	4.938 (0.140)
	Momentum™ communication module	**170DTN11000**	–
Connectors for remote I/O communication module	Line terminators	**490NAD91103**	–
	Intermediate connection	**490NAD91104**	–
	Intermediate connection and terminal port	**490NAD91105**	–

TSXPBY100

Description	Length ft (m)	Reference	Weight oz (kg)
PROFIBUS DP connecting cables	328 (100)	**TSXPBSCA100**	–
	1312 (400)	**TSXPBSCA400**	–

Description	Reference	Weight oz (kg)
Replacement parts	Main bus junction box	**490NAE91100**	–
	PCMCIA card	**467NHP81100**	–

490NAD91103

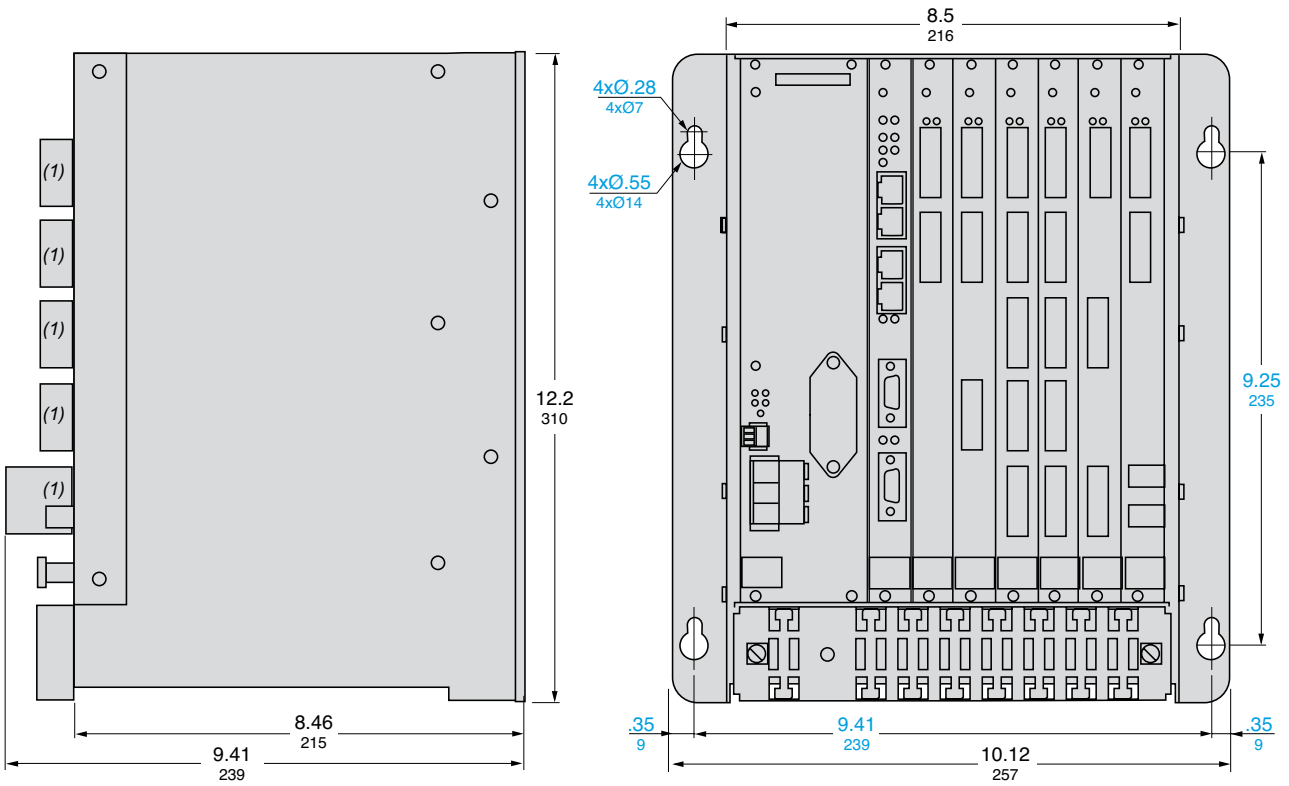
*(1) Cable conforming to standard EIA/TIA-568 category 5 and IEC 1180/EN 50 173 class D. For UL and CSA 22.1 approved cables, add the letter **U** to the end of the reference.*
(2) Requires adaptor XBTZG909.

Safety automation system solutions

Preventa™ safety PLCs
Modular, XPSMF60
Rack, power supply and CPU

Dimensions

XPSMF60



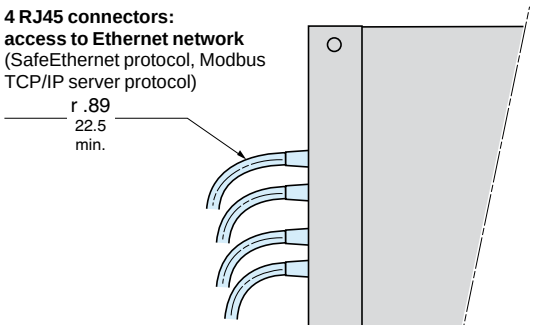
Dual Dimensions: INCHES Millimieters

(1) Removable screw terminal blocks are provided with the power supply and "in rack" I/O cards.

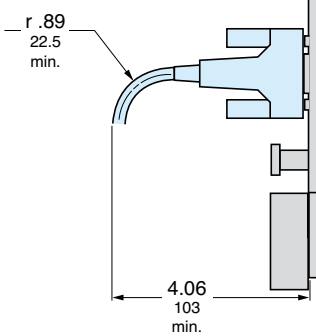
Mounting precautions relating to connectors

Access to Modbus™ serial link (RTU) and Ethernet network

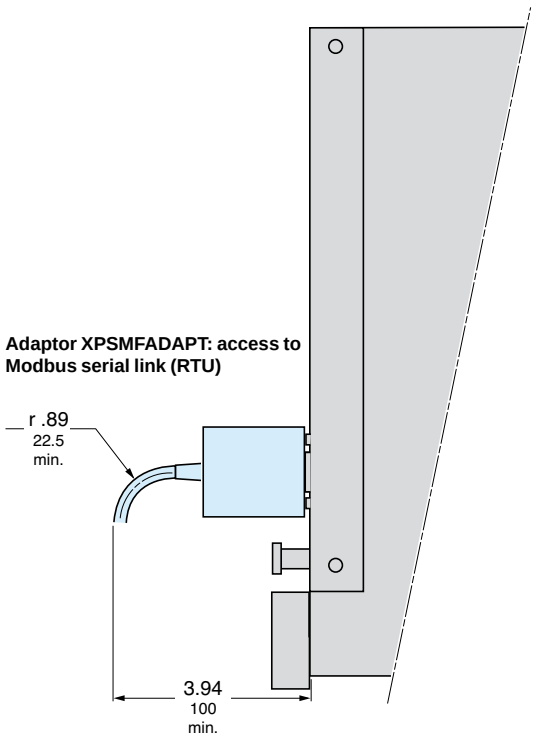
4 RJ45 connectors: access to Ethernet network (SafeEthernet protocol, Modbus TCP/IP server protocol)



SUB-D 9-pin connector: access to Modbus serial link (RTU)



Adaptor XPSMFADAPT: access to Modbus serial link (RTU)

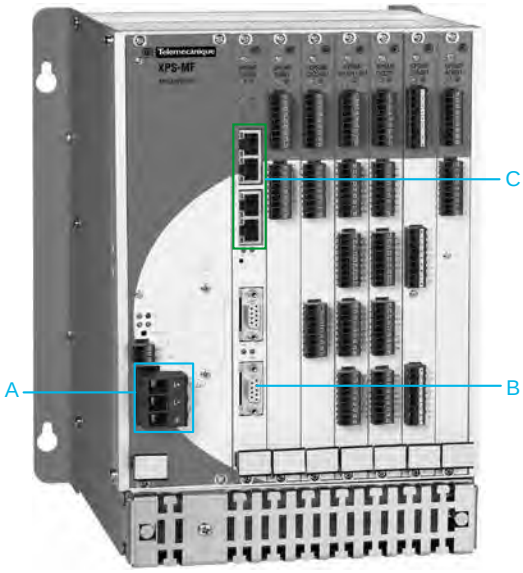


Safety automation system solutions

Preventa™ safety PLCs
Modular, XPSMF60
Rack, power supply and CPU

Connections

Power supply module and CPU

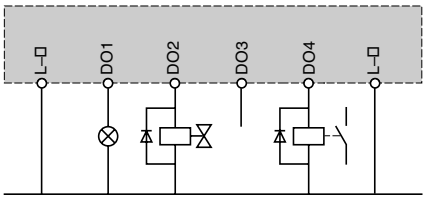


Item	Connection	Screw	Function
A	**Supply**	L+	⎓ 24 V
		L-	⎓ 24 V (reference pole)
		⏚	Ground

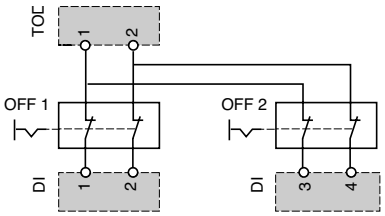
Item	Connection	Type	Function
B	**Communication**	SUB-D 9-pin female (FB2)	**XPSMFCPU22**: slave on Modbus™ serial (RTU)
C	**Programming**	Integrated 4 RJ45 switched Ethernet Communication ports	Either of the four switched Ethernet ports can be used to create a connection between the safety PLC and the programming terminal in a point to point or via an Ethernet network for programming, and setting an IP address.
	Safe Communication (all XPSMF Safety PLCs and Remote I/Os)		Either of the four switched Ethernet ports can be used to create a connection between the safety PLC and other safety related components (e.g other XPSMF safety PLCs or Safety Remote I/O modules) this can be established in a point to point way or via an Ethernet network.
	Non-Safe Communication available with: XPSMF60 (reference XPSMFCPU22		Either of the four switched Ethernet ports can be used to create a connection between the safety PLC and other non- safety related components (e.g HMI Magelis™, standard PLCs, and Scada systems) this can be established in a point to point way or via an Ethernet network.

Connection examples

Actuator connections to the outputs



Emergency stop connections (line control)



Safety automation system solutions

Preventa™ safety PLCs
Modular, XPSMF60
"In rack" analog input card

Introduction

The "in rack" analog input card **XPSMFAI801** is designed to manage up to:
- category 4 conforming to EN 954-1,
- performance level "e" conforming to EN/ISO 13849-1,
- SIL 3 (safety integrity level) conforming to EN/IEC 61508.

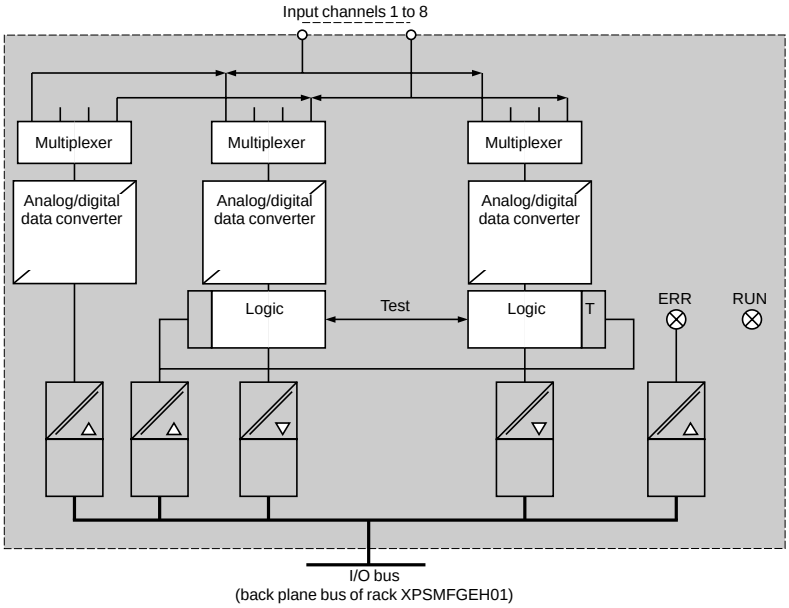
■ It incorporates 8 analog inputs:
□ electrically isolated from the back plane bus of rack **XPSMFGEH01**,
□ configured by choice of connection for managing eight single-pole or four 2-pole functions.

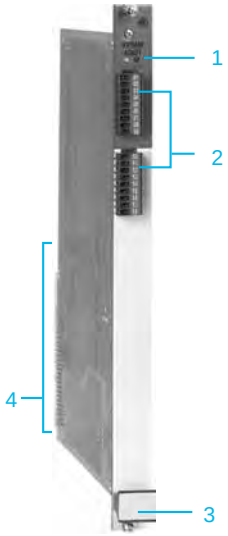
■ The card can be installed in rack **XPSMFGEH01** as many times as required in the six slots available.

Input values *(1)*

Number	Type	Voltage	Current	Value range	Example
8 inputs	Single-pole	± 10 V	–	± 1000	Single-pole measuring of 0 to 10 V voltages
		–	0...20 mA	0...1000 *(2)* 0...2000 *(3)*	Measuring 0 to 20 mA currents using jumper
4 inputs	2-pole	± 10 V	–	± 1000	Closed circuit scanning of input channels

Functional diagram





Description

On the front cover of the card:
1 Two process status LEDs (RUN, ERR).
2 Two removable screw terminal blocks (9 terminals per block) for connection of inputs *(4)*.
3 Grip to assist installation/removal.
4 On the rear: terminals for automatic electrical connection to the back plane bus of rack **XPSMFGEH01**.

LED details

LED	Color	Status	Meaning
RUN	Green	On	Voltage present.
		Off	No voltage.
ERR	Red	On	Card defect or external error, diagnostics response.
		Off	No error regarding the card or on the channels.

(1) The unused input channels must be short-circuited on the reference pole (L-).
(2) With 250 Ω external jumper.
(3) With 500 Ω external jumper.
*(4) Removable screw terminals are provided with the "in rack" card **XPSMFAI801**.*

Safety automation system solutions

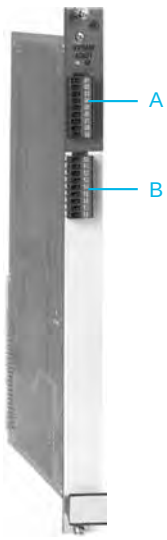
Preventa™ safety PLCs
Modular, XPSMF60
"In rack" analog input card

Specifications

Card type			XPSMFAI801
Number of analog inputs			8 single-pole inputs (± 10 V / 0…20 mA) or 4 2-pole inputs (± 10 V), electrically isolated, configurable by choice of connection
Supply	Voltage	**V**	⎓ 24, supplied by rack XPSMFGEH01 incorporating power supply module XPSMFPS01
	Voltage limits		- 15…+ 20%
Signal	Usable range	**V**	± 10.25
		mA	0...+ 20.5 (with jumper)
	Nominal value	**V**	± 10
		mA	0...+ 20 (with jumper)
Maximum input signal		**V**	± 10.7
Jumper for current measurement		Ω	250 or 500
Overvoltage protection		**V**	⎓ - 15…+ 15 (30 V range)
Input resistance	d.c.	**MΩ**	1
Operational data			⎓ 24 V/380 mA ⎓ 3.3 V/150 mA
Ambient air temperature conforming to EN 61131-2	Operating	**°F (°C)**	+32… + 140 (0…+ 60)
	Storage	**°F (°C)**	- 40… + 185 (- 40…+ 85)
Resolution	Effective		9-bit
	Maximum		12-bit
Output voltage			± 1% max.
Safety accuracy			± 1% max.
Transient deviation			± 1% max.
Value acquisition renewal			Once per CPU cycle
Processing time			Approximately 45 µs
Connections			See page 2/47

References

Description	Number of channels	Voltage Current	Reference	Weight oz (kg)
Analog input card	8 single-pole	± 10 V 0...20 mA *(1)*	**XPSMFAI801**	8.466 (0.240)
	4 2-pole	± 10 V		



XPSMFAI801

Connections

Item	Connection	Screw N°	Screw	Function
A	**Analog inputs**	01	L1+	Analog input 1
		02	L-	Input 1 (reference pole)
		03	L2+	Analog input 2
		04	L-	Input 2 (reference pole)
		05	L3+	Analog input 3
		06	L-	Input 3 (reference pole)
		07	L4+	Analog input 4
		08	L-	Input 4 (reference pole)
		09	⏚	Ground/Shielding
B	**Analog inputs**	10	L5+/L1-	Analog input 5
		11	L-	Input 5 (reference pole)
		12	L6+/L2-	Analog input 6
		13	L-	Input 6 (reference pole)
		14	L7+/L3-	Analog input 7
		15	L-	Input 7 (reference pole)
		16	L8+/L4-	Analog input 8
		17	L-	Input 8 (reference pole)
		18	⏚	Ground/Shielding

Configuration of analog inputs

Connection	...	with	...	Connection	...	with	...
8 single-pole inputs	L1+		L-	**4 2-pole inputs**	L1+		L5+/L1-
	L2+		L-		L2+		L6+/L2-
	L3+		L-		L3+		L7+/L3-
	L4+		L-		L4+		L8+/L4-
	L5+/L1-		L-				
	L6+/L2-		L-				
	L7+/L3-		L-				
	L8+/L4-		L-				

(1) With a 250 Ω or 500 Ω external jumper.

Safety automation system solutions

Preventa™ safety PLCs
Modular, XPSMF60
"In rack" analog output card

Introduction

The analog output card **XPSMFAO801** is designed to manage up to:
- category 4 conforming to EN 954-1,
- performance level "e" conforming to EN/ISO 13849-1,
- SIL 3 (safety integrity level) conforming to EN/IEC 61508.

■ It incorporates 8 configurable analog outputs (0…20 mA, 0…+ 10 V or - 10…+ 10 V):

□ For selection of the type of voltage/current measurement: a switch enables selection of 6 functions for each output channel.

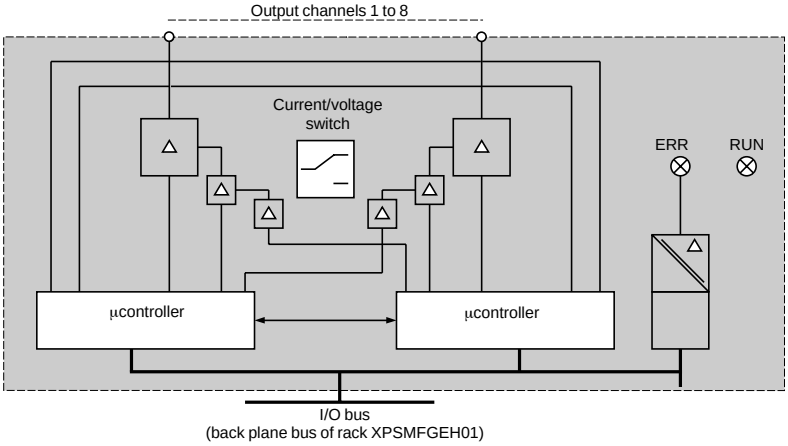
Switch position	Outputs	
	Voltage ± 10 V	Current 0…+ 20 mA
1	–	On
2	–	On
3	–	On
4	On	–
5	On	–
6	On	–

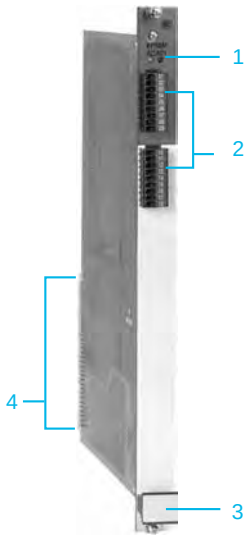
□ Selection of measuring scale using software **XPSMFWIN**: the "Properties" sub-menu displays the scale options in the "Type" window (…FS1000 or …FS2000).

Configurable output values				
Type	Voltage	Current	Value range	
			Half scale (version FS1000)	Full scale (version FS2000)
8 analog outputs	–	0…20 mA	0...+ 1000	0...+ 2000
	0…+ 10 V	–	0...+ 1000	0...+ 2000
	- 10...+ 10 V	–	- 1000...+ 1000	- 2000...+ 2000

■ The card can be installed in rack **XPSMFGEH01** as many times as required in the six slots available.

Functional diagram





Description

On the front cover of the card:

1 Two process status LEDs (RUN, ERR).
2 Two removable screw terminal blocks (9 terminals per block) for connection of outputs *(1)*.
3 Grip to assist installation/removal.
4 On the rear: terminals for automatic electrical connection to the back plane bus of rack **XPSMFGEH01**.

LED details

LED	Color	Status	Meaning
RUN	Green	On	Voltage present.
		Off	No voltage.
ERR	Red	On	Card defect or external error, diagnostics response.
		Off	No error regarding the card or on the channels.

*(1) Removable screw terminals are provided with the "in rack" card **XPSMFAO801**.*

Safety automation system solutions

Preventa™ safety PLCs
Modular, XPSMF60
“In rack” analog output card

Specifications

Card type			XPSMFAO801
Number of outputs			8 analog outputs
Supply	Voltage	**V**	⎓ 24 (supplied by rack XPSMFGEH01 incorporating power supply module XPSMFPS01)
	Voltage limits		- 15…+ 20%
Nominal output values		**V**	± 10 (- 10…+ 10)
		mA	0...+ 20
Maximum output value		**V**	± 10.25
		mA	0...+ 21
Overvoltage protection		**V**	24
Output resistance	Current	Ω	≤ 600
	Voltage	**kΩ**	> 1
Operational data			3.3 V/130 mA 5 V/280 mA 24 V/630 mA
Ambient air temperature conforming to EN 61131-2	Operating	**°F (°C)**	+32… + 140 (0…+ 60)
	Storage	**°F (°C)**	-40… + 185 (- 40…+ 85)
Resolution	Effective		7-bit
	Maximum		12-bit
Symmetrical tolerance			± 1% max.
Safety accuracy			± 1% max.
Processing time			Approximately 45 µs
Connections			See page 2/47

References

Description	Number of channels	Configuration		Reference	Weight oz (kg)
		Current	Voltage		
Analog output card	8	0...20 mA	- 10…+ 10 V	**XPSMFAO801**	9.877 (0.280)

XPSMFAO801

Connections

Item	Connection	Screw N°	Screw	Function
A	**Analog outputs**	01	O1+	Analog output 1
		02	O1-	Output 1 (reference pole)
		03	O2+	Analog output 2
		04	O2-	Output 2 (reference pole)
		05	O3+	Analog output 3
		06	O3-	Output 3 (reference pole)
		07	O4+	Analog output 4
		08	O4-	Output 4 (reference pole)
		09	⏚	Ground/Shielding
B	**Analog outputs**	10	O5+	Analog output 5
		11	O5-	Output 5 (reference pole)
		12	O6+	Analog output 6
		13	O6-	Output 6 (reference pole)
		14	O7+	Analog output 7
		15	O7-	Output 7 (reference pole)
		16	O8+	Analog output 8
		17	O8-	Output 8 (reference pole)
		18	⏚	Ground/Shielding

Safety automation system solutions

Preventa™ safety PLCs
Modular, XPSMF60
“In rack” mixed card: counting inputs/digital outputs

Introduction

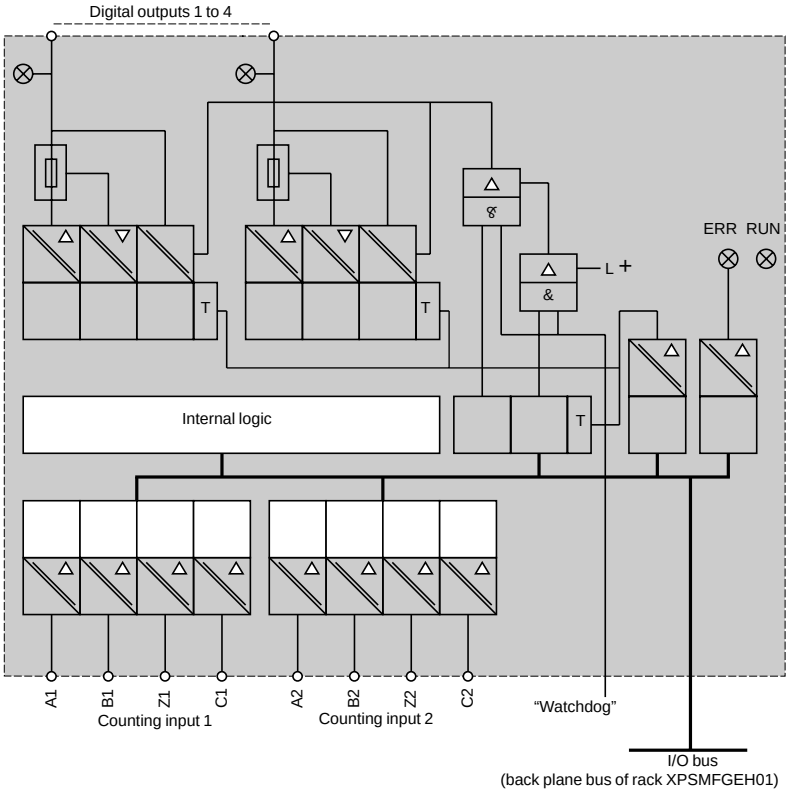
The mixed counting input and digital output card **XPSMFCIO2401** is designed to manage up to:

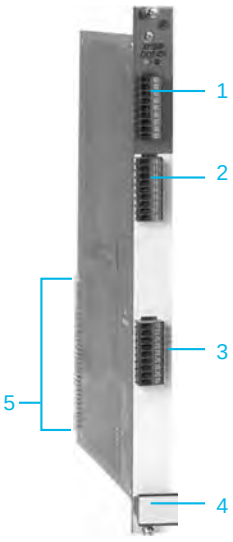
- category 4 conforming to EN 954-1,
- performance level “e” conforming to EN/ISO 13849-1,
- SIL 3 (safety integrity level) conforming to EN/IEC 61508.

■ It incorporates:
□ 2 24-bit independent and configurable counting channels (one channel for counting and one channel for increasing or decreasing counting direction). They are configured using software **XPSMFWIN**.
□ 4 digital outputs.

■ The card can be installed in rack **XPSMFGEH01** as many times as required in the six slots available.

Functional diagram





Description

On the front cover of the card:

1 Two process status LEDs (RUN, ERR).
2 Two removable screw terminal blocks (9 terminals per block) for connection of inputs *(1)*.
3 One removable screw terminal block (9 terminals) for connection of outputs *(1)* with four output status LEDs.
4 Grip to assist installation/removal.
5 On the rear: terminals for automatic electrical connection to the back plane bus of rack **XPSMFGEH01**.

LED details

LED	Color	Status	Meaning
RUN	Green	On	Voltage present.
		Off	No voltage.
ERR	Red	On	Card defect or external error, diagnostics response.
		Off	No error regarding the card or on the channels.

*(1) Removable screw terminals are provided with the “in rack” card **XPSMFCIO2401**.*

Safety automation system solutions

Preventa™ safety PLCs
Modular, XPSMF60
"In rack" mixed card: counting inputs/digital outputs

Specifications

Mixed card type			XPSMFCIO2401
Supply	Voltage	**V**	⎓ 24 (supplied by rack XPSMFGEH01 incorporating power supply module XPSMFPS01)
	Voltage limits		- 15…+ 20%
Ambient air temperature conforming to EN 61131-2	Operating	**°F (°C)**	+32… + 140 (0…+ 60)
	Storage	**°F (°C)**	- 40… + 185 (- 40…+ 85)
Counting inputs			
Number	Counter		2
	Inputs		4 on each pole (A, B, Z, C)
Input voltage		**V**	⎓ 5 or 24
Input current		**mA**	≤ 3
Input resistance		**kΩ**	3.7
Counting frequency		**MHz**	0…1
Resolution			24-bit
Time base accuracy			0.2%
Operational data			⎓ 3.3 V/0.8 A ⎓ 5 V/0.1 A ⎓ 24 V / 0.1 A + output current
Maximum distance of equipment			1640 ft (500 m), with shielded dual twisted pair cable
Input connections			See page 2/47
Digital outputs			
Number			4
Output voltage		**V**	⎓ 18.4…26.8
Output current		**A**	0.5 per channel, 2 max. per card. Continuous short-circuit proof
Internal volt drop		**V**	3 max. at 0.5 A
Minimum current		**mA**	2 per channel
Permissible current	At state 0	**mA**	1 mA max. at 2 V
Current power consumption		**V**	⎓ 24 / 0.1 A + output current
Output connections			See page 2/47

References

Description	Specifications	Reference	Weight oz (kg)
Mixed I/O card	■ 2 x 24-bit counting inputs, configurable: 5 V…24 V ■ 4 digital outputs	**XPSMFCIO2401**	9.171 (0.260)

XPSMFCIO2401

Connections

Item	Connection	Screw N°	Screw	Function
1	**Counting input**	01	C-	Common reference pole
		02	A1	Input A1 or bit 1
		03	B1	Input B1 or bit 2
		04	Z1	Input Z1 or bit 3
		05	C1	Input C1 or bit 4
		06	C-	Common reference pole
		07	C-	Common reference pole
		08	C-	Common reference pole
		09	C-	Common reference pole
2	**Counting input**	10	C-	Common reference pole
		11	A2	Input A2 or bit 1
		12	B2	Input B2 or bit 2
		13	Z2	Input Z2 or bit 3
		14	C2	Input C2 or bit 4
		15	C-	Common reference pole
		16	C-	Common reference pole
		17	C-	Common reference pole
		18	C-	Common reference pole
3	**Digital outputs**	19	L-	Common reference pole
		20	1	Digital output 1
		21	2	Digital output 2
		22	3	Digital output 3
		23	4	Digital output 4
		24	L-	Common reference pole
		25	L-	Common reference pole
		26	L-	Common reference pole
		27	L-	Common reference pole

Safety automation system solutions

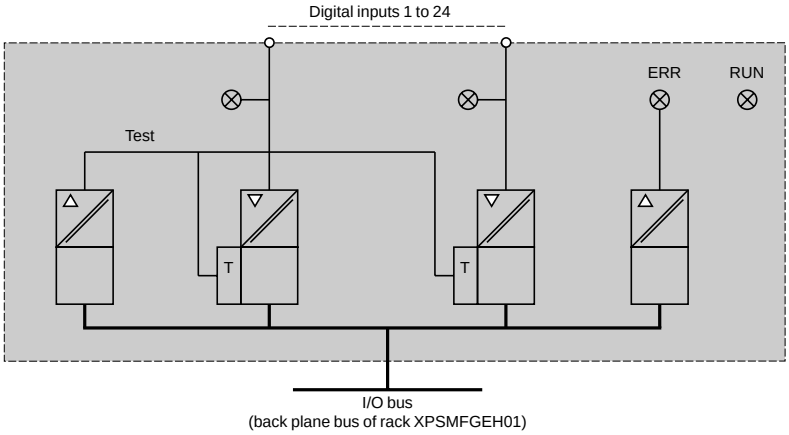
Preventa™ safety PLCs
Modular, XPSMF60
"In rack" digital input card

Introduction

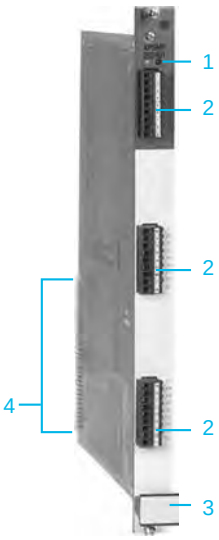
The digital input card **XPSMFDI2401** is designed to manage up to:

■ It incorporates 24 ⎓ 110 / ∿ 127 V digital inputs that are configurable using software **XPSMFWIN**.
■ The card can be installed in rack **XPSMFGEH01** as many times as required in the six slots available.

Functional diagram



Description



On the front cover of the card:

1 Two process status LEDs (RUN, ERR).
2 Three removable terminal blocks (9 terminals per block) for connection of inputs *(1)*, each with eight input status LEDs.
3 Grip to assist installation/removal.
4 On the rear: terminals for automatic electrical connection to the back plane bus of rack **XPSMFGEH01**.

LED details

LED	Color	Status	Meaning
RUN	Green	On	Voltage present.
		Off	No voltage.
ERR	Red	On	Card defect or external error, diagnostics response.
		Off	No error regarding the card or on the channels.

*(1) Removable screw terminals are provided with the "in rack" card **XPSMFDI2401**.*

Safety automation system solutions

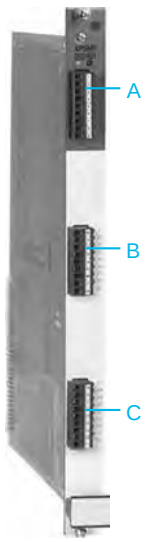
Preventa™ safety PLCs
Modular, XPSMF60
“In rack” digital input card

Specifications

Input card type			XPSMFDI2401
Supply	Voltage	**V**	⎓ 24 (supplied by rack XPSMFGEH01 incorporating power supply module XPSMFPS01)
	Voltage limits		- 15…+ 20%
Ambient air temperature conforming to EN 61131-2	Operating	**°F (°C)**	+32… + 140 (0…+ 60)
	Storage	**°F (°C)**	-40… + 185 (- 40…+ 85)
Number of inputs			24, electrically isolated
Nominal voltage		**V**	⎓ 110/∿ 127 (single-phase)
Input voltage	At state 0	**V**	⩽ 20
	At state 1	**V**	⩾ 79
Input current	At state 1	**mA**	⩾ 2.2 at 79 V
Operational data			⎓ 3.3 V/0.05 A ⎓ 24 V / 0.1 A (79 V at state 1)
LED display			Yes
Connections			Shielded dual twisted pair cable recommended to provide protection against electromagnetic interference, or Ø 0.47 in (12 mm) max. cable with connection to ground of rack XPSMFGEH01

References

Description	Specifications	Reference	Weight oz (kg)
Input card	24 digital inputs ⎓ 110 V / ∿ 127 V	**XPSMFDI2401**	9.171 (0.260)



XPS MFDI2401

Connections

Item	Connection	Screw N°	Screw	Function
A	**Digital inputs**	01	I1	Input 1
		02	I2	Input 2
		03	I3	Input 3
		04	I4	Input 4
		05	I5	Input 5
		06	I6	Input 6
		07	I7	Input 7
		08	I8	Input 8
		09	N/-	Common reference pole
B	**Digital inputs**	10	I9	Input 9
		11	I10	Input 10
		12	I11	Input 11
		13	I12	Input 12
		14	I13	Input 13
		15	I14	Input 14
		16	I15	Input 15
		17	I16	Input 16
		18	N/-	Common reference pole
C	**Digital inputs**	19	I17	Input 17
		20	I18	Input 18
		21	I19	Input 19
		22	I20	Input 20
		23	I21	Input 21
		24	I22	Input 22
		25	I23	Input 23
		26	I24	Input 24
		27	N/-	Common reference pole

Safety automation system solutions

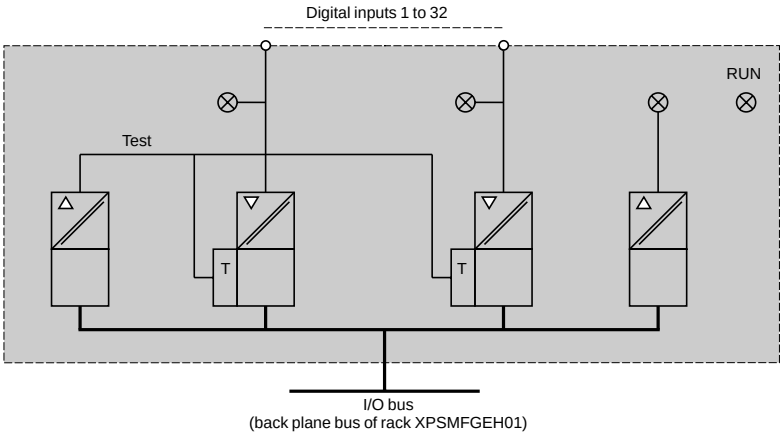
Preventa™ safety PLCs
Modular, XPSMF60
“In rack” digital input card

Introduction

The digital input card **XPSMFDI3201** is designed to manage up to:
- category 4 conforming to EN 954-1,
- performance level “e” conforming to EN/ISO 13849-1,
- SIL 3 (safety integrity level) conforming to EN/IEC 61508.

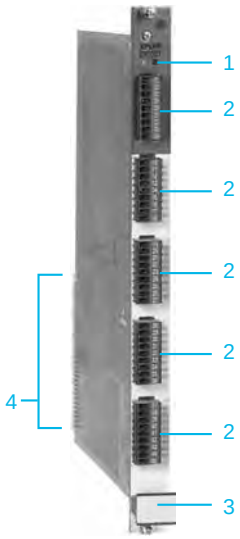
■ It incorporates 32 digital inputs that are configurable using programming software **XPSMFWIN**.
□ The card can be installed in rack **XPSMFGEH01** as many times as required in the six slots available.

Functional diagram



Line control for card XPSMFDI3201

Line control is a means of short-circuit and line break monitoring.
Using line control outputs enables SIL 3 (EN/IEC 61508) and category 4 (EN 954-1) safety to be achieved. The line control outputs send a high signal with a very short low signal, thus enabling a wiring anomaly (short-circuit, line break) to be seen at the inputs of the safety PLCs.



Description

On the front cover of the card:
1 Two process status LEDs (RUN, ERR).
2 Five removable terminal blocks (9 terminals per block) for connection of inputs *(1)*, with a status LED for each input terminal.
3 Grip to assist installation/removal.
4 On the rear: terminals for automatic electrical connection to the back plane bus of rack **XPSMFGEH01**.

LED details

LED	Color	Status	Meaning
RUN	Green	On	Voltage present.
		Off	No voltage.
ERR	Red	On	Card defect or external error, diagnostics response.
		Off	No error regarding the card or on the channels.

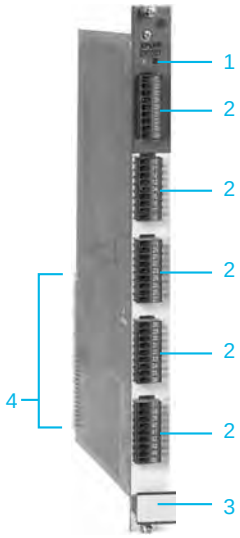
*(1) Removable screw terminals are provided with the “in rack” card **XPSMFDI3201**.*

Safety automation system solutions

Preventa™ safety PLCs
Modular, XPSMF60
"In rack" digital input card

Specifications

Input card type			XPSMFDI3201
Supply	Voltage	**V**	⎓ 24, supplied by rack XPSMFGEH01 incorporating power supply module XPSMFPS01
	Voltage limits		- 15…+ 20%
Ambient air temperature conforming to EN 61131-2	Operating	**°F (°C)**	+32… + 140 (0…+ 60)
	Storage	**°F (°C)**	-40… + 185 (- 40…+ 85)
Number of digital inputs			32, electrically isolated
Nominal voltage		**V**	⎓ 24
Input voltage	At state 0	**V**	5 max.
	At state 1	**V**	10…30
Input current	At state 0	**mA**	1.0 at 5 V
	At state 1	**mA**	2 at 10 V, 5 at 24 V
Operational data			⎓ 3.3 V / 0.05 A, ⎓ 24 V / 0.2 A
LED display			Yes
Connections			Shielded dual twisted pair cable recommended to provide protection against electromagnetic interference, or Ø 0.47 in (12mm) max. cable with connection to ground of rack XPSMFGEH01



References

Description	Specifications	Reference	Weight oz (kg)
Input card	32 digital inputs	**XPSMFDI3201**	9.171 (0.260)

Connections

Item	Connection	Screw N°	Screw	Function
A	**Digital inputs**	01	LS+	Supply for inputs 1 to 7
		02	I1	Input 1
		03	I2	Input 2
		04	I3	Input 3
		05	I4	Input 4
		06	I5	Input 5
		07	I6	Input 6
		08	I7	Input 7
		09	EGND	Reference pole
B	**Digital inputs**	10	LS+	Supply for inputs 8 to 14
		11	I8	Input 8
		12	I9	Input 9
		13	I10	Input 10
		14	I11	Input 11
		15	I12	Input 12
		16	I13	Input 13
		17	I14	Input 14
		18	EGND	Reference pole
C	**Digital inputs**	19	LS+	Supply for inputs 15 to 21
		20	I15	Input 15
		21	I16	Input 16
		22	I17	Input 17
		23	I18	Input 18
		24	I19	Input 19
		25	I20	Input 20
		26	I21	Input 21
		27	EGND	Reference pole
D	**Digital inputs**	28	LS+	Supply for inputs 22 to 28
		29	I22	Input 22
		30	I23	Input 23
		31	I24	Input 24
		32	I25	Input 25
		33	I26	Input 26
		34	I27	Input 27
		35	I28	Input 28
		36	EGND	Reference pole
E	**Digital inputs**	37	LS+	Supply for inputs 29 to 32
		38	I29	Input 29
		39	I30	Input 30
		40	I31	Input 31
		41	I32	Input 32
		42	EGND	Reference pole
		43	EGND	Reference pole
		44	EGND	Reference pole
		45	EGND	Reference pole

Safety automation system solutions

Preventa™ safety PLCs
Modular, XPSMF60
"In rack" digital I/O card

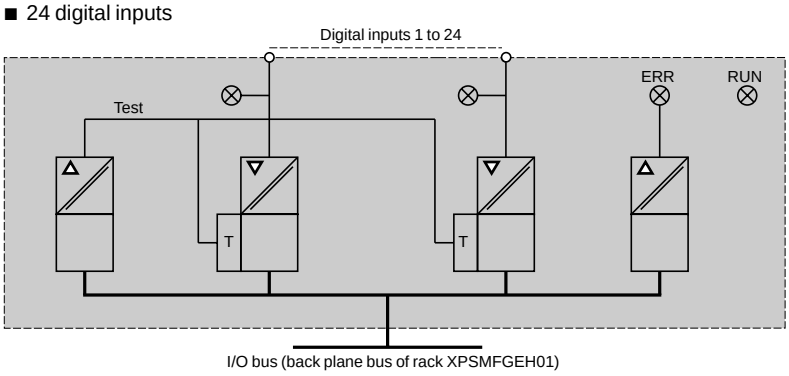
Introduction

The digital I/O card **XPSMFDIO241601** is designed to manage up to:
- category 4 conforming to EN 954-1,
- performance level "e" conforming to EN/ISO 13849-1,
- SIL 3 (safety integrity level) conforming to EN/IEC 61508.

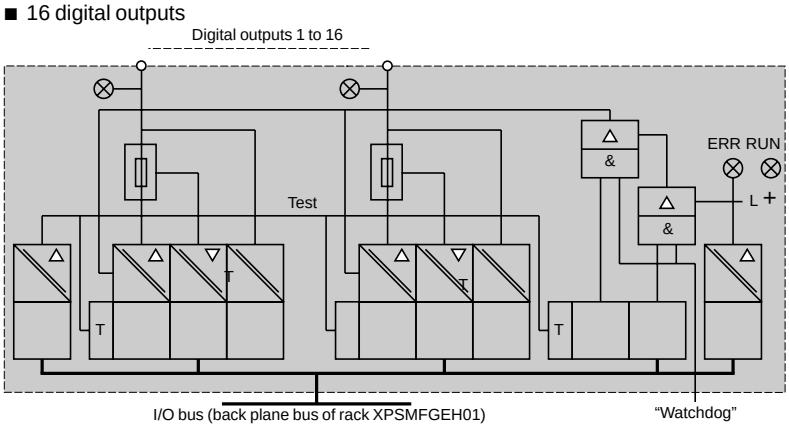
■ It incorporates 24 digital inputs and 16 digital outputs.
■ The card can be installed in rack **XPSMFGEH01** as many times as required in the six slots available.

Functional diagrams

■ 24 digital inputs

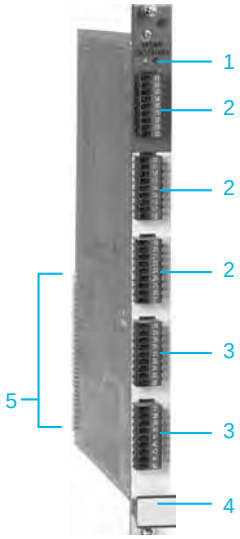


■ 16 digital outputs



Line control for card XPSMFDIO241601

Line control is a means of short-circuit and line break monitoring.
Using line control outputs enables SIL 3 (EN/IEC 61508) and category 4 (EN 954-1) safety to be achieved. The line control outputs send a high signal with a very short low signal, thus enabling a wiring anomaly (short-circuit, line break) to be seen at the inputs of the safety PLCs.



Description

On the front cover of the card:
1 Two process status LEDs (RUN, ERR).
2 Three removable terminal blocks (9 terminals per block) for connection of inputs *(1)*, each with eight input status LEDs.
3 Two removable screw terminal blocks (9 terminals per block) for connection of outputs *(1)*, each with eight output status LEDs.
4 Grip to assist installation/removal.
5 On the rear: terminals for automatic electrical connection to the back plane bus of rack **XPSMFGEH01**.

LED details

LED	Color	Status	Meaning
RUN	Green	On	Voltage present.
		Off	No voltage.
ERR	Red	On	Card defect or external error, diagnostics response.
		Off	No error regarding the card or on the channels.

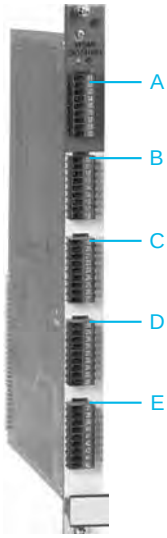
*(1) Removable screw terminals are provided with the "in rack" card **XPSMFDIO241601**.*

Safety automation system solutions

Preventa™ safety PLCs
Modular, XPSMF60
“In rack” digital I/O card

Specifications

I/O card type			XPSMFDIO241601
Supply	Voltage	**V**	⎓ 24, supplied by rack XPSMFGEH01 incorporating power supply module XPSMFPS01
	Voltage limits		- 15…+ 20%
Ambient air temperature conforming to EN 61131-2	Operating	**°F (°C)**	+32… + 140 (0…+ 60)
	Storage	**°F (°C)**	-40… + 185 (- 40…+ 85)
Digital input and output connections			Shielded dual twisted pair cable recommended to provide protection against electromagnetic interference, or Ø 0.47 in (12mm) max. cable with connection to ground of rack XPSMFGEH01
Digital inputs			
Number			24, electrically isolated
Nominal input voltage		**V**	⎓ 24
Input voltage	At state 0	**V**	5 max.
	At state 1	**V**	10…30
Input current	At state 0	**mA**	1.0 at 5 V
	At state 1	**mA**	2 at 10 V, 5 at 24 V
Operational data			⎓ 3.3 V / 0.3 A, ⎓ 24 V / 0.5 A
Digital outputs			
Number			16, electrically isolated
Output voltage		**V**	⎓ 18.4…26.8
Internal volt drop			2 V max. at 2 A
Output current	At 86 °F (30 °C)	**A**	2 per output channel, 8 max. per card. Continuous short-circuit proof
Minimum current		**mA**	2 per channel
Permissible current	At state 0	**mA**	1 max. at 2 V



XPSMFDIO241601

References

Description	Specifications	Reference	Weight oz (kg)
I/O card	■ 24 digital inputs ■ 16 digital outputs, configurable for line control	**XPSMFDIO241601**	9.171 (0.260)

Connections

Digital inputs

Item	Connection	Screw N°	Screw	Function
A	**Digital inputs**	01	LS+	Supply for inputs 1 to 8
		02	I1	Input 1
		03	I2	Input 2
		04	I3	Input 3
		05	I4	Input 4
		06	I5	Input 5
		07	I6	Input 6
		08	I7	Input 7
		09	I8	Input 8
B	**Digital inputs**	10	LS+	Supply for inputs 9 to 16
		11	I9	Input 9
		12	I10	Input 10
		13	I11	Input 11
		14	I12	Input 12
		15	I13	Input 13
		16	I14	Input 14
		17	I15	Input 15
		18	I16	Input 16
C	**Digital inputs**	19	LS+	Supply for inputs 17 to 24
		20	I17	Input 17
		21	I18	Input 18
		22	I19	Input 19
		23	I20	Input 20
		24	I21	Input 21
		25	I22	Input 22
		26	I23	Input 23
		27	I24	Input 24

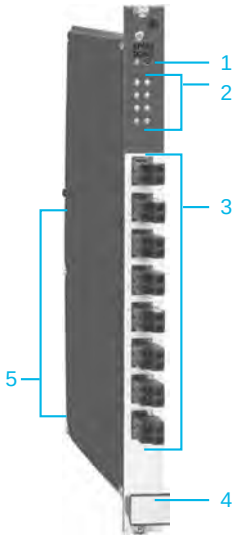
Digital outputs

Item	Connection	Screw N°	Screw	Function
D	**Digital outputs**	28	L-	Reference pole for outputs 1 to 8
		29	O1	Output 1
		30	O2	Output 2
		31	O3	Output 3
		32	O4	Output 4
		33	O5	Output 5
		34	O6	Output 6
		35	O7	Output 7
		36	O8	Output 8

Item	Connection	Screw N°	Screw	Function
E	**Digital outputs**	37	L-	Reference pole for outputs 9 to 16
		38	O9	Output 9
		39	O10	Output 10
		40	O11	Output 11
		41	O12	Output 12
		42	O13	Output 13
		43	O14	Output 14
		44	O15	Output 15
		45	O16	Output 16

Safety automation system solutions

Preventa™ safety PLCs
Modular, XPSMF60
“In rack” relay output card



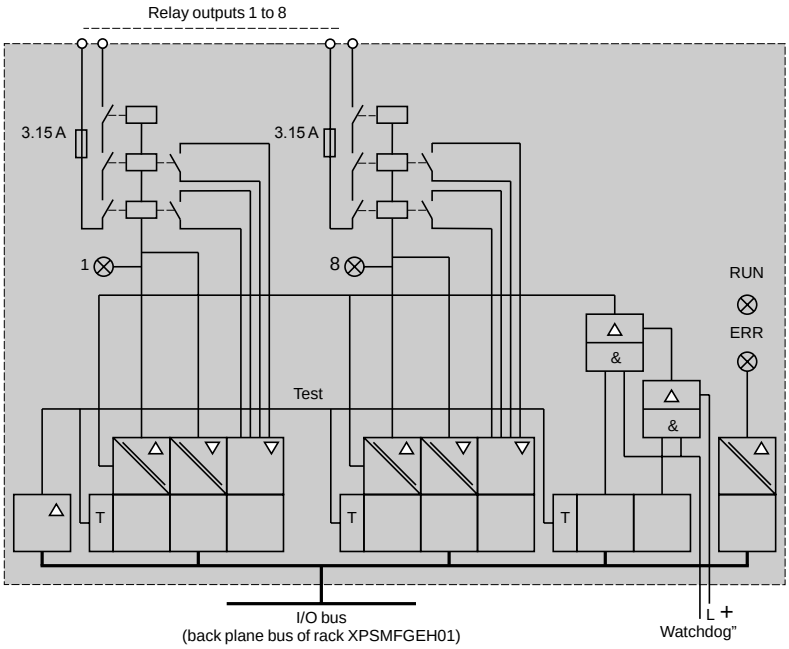
Introduction

The relay output card **XPSMFDO801** is designed to manage up to :

- category 4 conforming to EN 954-1,
- performance level “e” conforming to EN/ISO 13849-1,
- SIL 3 (safety integrity level) conforming to EN/IEC 61508.

■ It incorporates 8 relay safety outputs (3.15 A fuse) that are configurable using software **XPSMFWIN**.
■ The card can be installed in rack **XPSMFGEH01** as many times as required in the six slots available.

Functional diagram



Description

On the front cover of the card:

1 Two process status LEDs (RUN, ERR).
2 Eight output status LEDs.
3 Eight removable screw terminal blocks (2 terminals per block) for connection of outputs *(1)*.
4 Grip to assist installation/removal.
5 On the rear: terminals for automatic electrical connection to the back plane bus of rack **XPSMFGEH0**.

LED details

LED	Color	Status	Meaning
RUN	Green	On	Voltage present.
		Off	No voltage.
ERR	Red	On	Card defect or external error, diagnostics response.
		Off	No error regarding the card or on the channels.

*(1) Removable screw terminals are provided with the “in rack” card **XPSMFDO801**.*

Safety automation system solutions

Preventa™ safety PLCs
Modular, XPSMF60
“In rack” relay output card

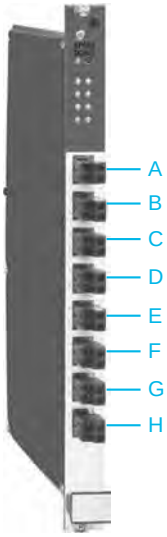
Specifications

Output card type			XPSMFDO801
Supply	Voltage	**V**	⎓ 24, supplied by rack XPSMFGEH01 incorporating power supply module XPSMFPS01
	Voltage limits		- 15…+ 20%
Ambient air temperature conforming to EN 61131-2	Operating	**°F (°C)**	+ 32… + 122 (0…+ 50) *(1)*
	Storage	**°F (°C)**	- 40… + 185 (- 40…+ 85)
Number and type of outputs			8 relay outputs, relay hard contact, with N.O. contact
Relay	Type		2 safety relays with positively guided contacts
	Degree of protection		IP 40
	Contact material		Silver alloy, gold flashed
	Switching time	**ms**	30 approx.
	Reset time	**ms**	20 approx.
	Bounce time	**ms**	30 approx.
	Mechanical life		≥ 10 million operating cycles
	Electrical life		≥ 250 000 operating cycles on full load (resistive) and ≤ 0.1 operating cycles/s
Switching voltage		**V**	⏦ 6 V…250 V
Switching current		**A**	3.15 A with internal fuse Breaking capacity 100 A
Switching capacity	a.c.	**VA**	700 max., cos ϕ = 1
	d.c. (non inductive)		≤ ⎓ 30 V: 95 W max. (3.15 A) ≤ ⎓ 70 V: 40 W max. (0.5 A) ≤ ⎓ 110 V: 33 W max. (315 A) With suitable external fuse
Operational data			⎓ 3.3 V / 0.2 A, ⎓ 24 V ± 10% *(1)* / 0.7 A
LED display			Yes
Connections			Shielded dual twisted pair cable recommended to provide protection against electromagnetic interference, or Ø 0.47 in (12 mm) max. cable with connection to ground of rack XPSMFGEH01

(1) Limited system data.

References

Description	Specifications	Reference	Weight oz (kg)
Output card	8 relay outputs ⏦ 6 V…250 V	**XPSMFDO801**	21.164 (0.600)



XPSMFDO801

Connections

Item	Connection	Screw N°	Screw	Function
A	**Relay output**	01	1	Contact 1, terminal A
		02		Contact 1, terminal B
B	**Relay output**	03	2	Contact 2, terminal A
		04		Contact 2, terminal B
C	**Relay output**	05	3	Contact 3, terminal A
		06		Contact 3, terminal B
D	**Relay output**	07	4	Contact 4, terminal A
		08		Contact 4, terminal B
E	**Relay output**	09	5	Contact 5, terminal A
		10		Contact 5, terminal B
F	**Relay output**	11	6	Contact 6, terminal A
		12		Contact 6, terminal B
G	**Relay output**	13	7	Contact 7, terminal A
		14		Contact 7, terminal B
H	**Relay output**	15	8	Contact 8, terminal A
		16		Contact 8, terminal B

Safety automation system solutions

Preventa™ safety PLCs
Compact and modular, XPSMF
Communication on network and bus

Introduction

To communicate, Preventa™ compact and modular safety PLCs **XPSMF** are fitted with:
- Integrated 2 or 4 RJ45 Ethernet switched ports for transfer Safety and Non-safety related data (Safety Related using SafeEthernet protocol, Non-Safety Related using Modbus™ TCP/IP protocol),
- and/or serial communication ports for transferring non safety related data.

Safety communication on a single network
The Ethernet network supports the SafeEthernet protocol: physically, a single network is possible for communication between:
- safety products (SafeEthernet protocol),
- non safety related products (Modbus TCP/IP and other protocols),
- safety related and non safety related products (Modbus TCP/IP protocol).

Communication on more than one network: a minimum of two separate cabling systems are established.
- An Ethernet network with Modbus TCP/IP protocol is used for communication between non safety related products and the safety PLCs.
- An Ethernet network with SafeEthernet protocol is used for communication between the safety PLCs **XPSMF** and safety remote I/O modules **XPSMF1/2/3**.
- A Modbus serial network with Modbus serial (RTU) protocol is used for communication between the safety PLCs **XPSMF** and non safety related products.
- A PROFIBUS DP network with PROFIBUS protocol is used for communication between the safety PLCs **XPSMF** and non safety related products.

Safety PLCs	Communication on Ethernet network			Communication on fieldbus	
Compact	Port (number x type)	SafeEthernet protocol: safe communication	Modbus TCP/IP protocol: non safe communication	Modbus serial (RTU) protocol	PROFIBUS DP protocol
XPSMF31222	4 x RJ45	yes	yes	no	no
XPSMF3022	4 x RJ45	yes	yes	yes (slave) / 1 x SUB-D (9-pin)	no
XPSMF3502	4 x RJ45	yes	yes	no	no
XPSMF3522	4 x RJ45	yes	yes	yes (slave) / 1 x SUB-D (9-pin)	no
XPSMF3542	4 x RJ45	yes	yes	no	yes (slave) / 1 x SUB-D (9-pin)
XPSMF4000	2 x RJ45	yes	no	no	no
XPSMF4002	2 x RJ45	yes	yes	no	no
XPSMF4020	2 x RJ45	yes	no	yes (slave) / 1 x RJ45	no
XPSMF4022	2 x RJ45	yes	yes	yes (slave) / 1 x RJ45	no
XPSMF4040	2 x RJ45	yes	no	no	yes (slave) / 1 x SUB-D (9-pin)
XPSMF4042	2 x RJ45	yes	yes	no	yes (slave) / 1 x SUB-D (9-pin)
Modular					
XPSMFCPU22 (central processing unit)	4 x RJ45	yes	yes	yes (slave) / 1 x SUB-D (9-pin)	no

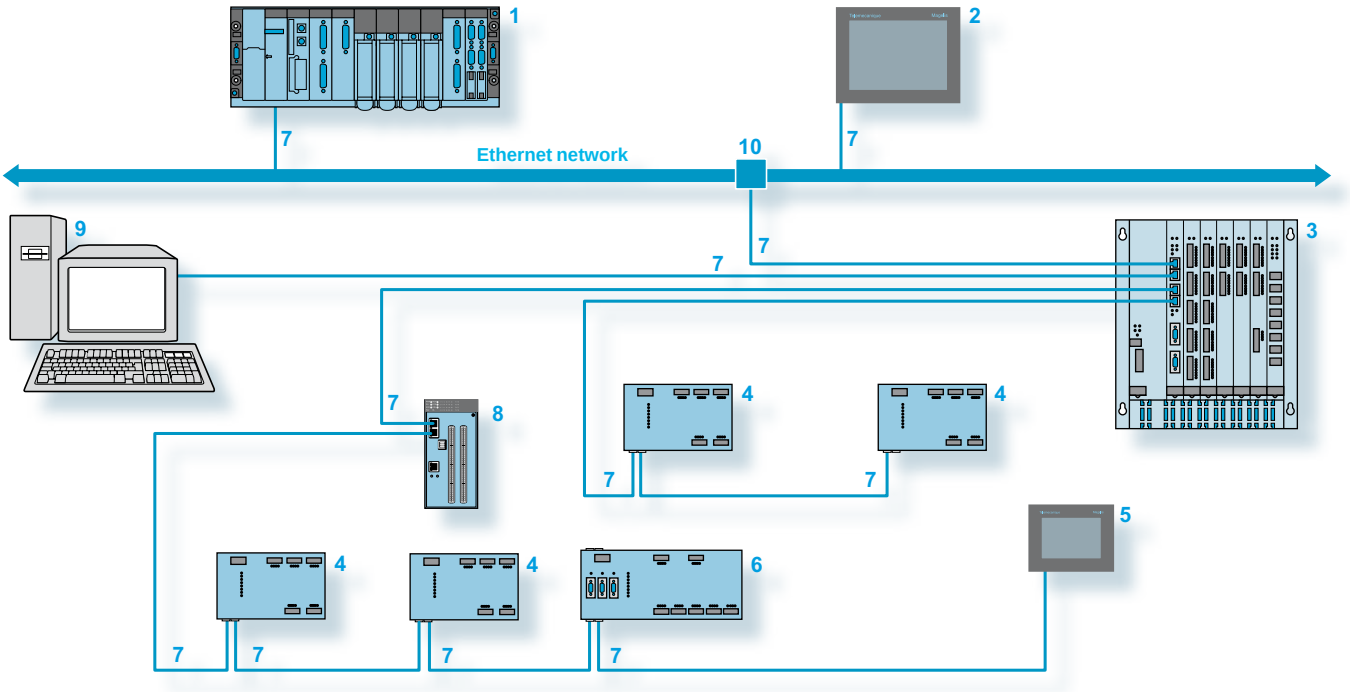
Safety automation system solutions

Preventa™ safety PLCs

Compact and modular, XPSMF

Communication on network and bus

Connection on Ethernet network



1 Premium™ processor **TSX P57 ●634M/●623M** or module **TSX ETY 4103** on Premium™ automation platform: Modbus™ TCP/IP client (master).
2 Graphic supervision terminal **XBTGT5230**: Modbus TCP/IP client (master).
3 Modular safety PLC **XPSMF60**: Modbus TCP/IP server (slave).
4 Safety remote I/O modules **XPSMF1/2/3**.
5 Graphic supervision terminal **XBTGT2130**: Modbus TCP/IP client (master).
6 Compact safety PLCs **XPSMF31/30/35**: Modbus TCP/IP server (slave).
7 Shielded twisted pair cables **490 NTW 000 ●●**, lengths 6.6 to 262 ft (2 to 80 m).
8 Compact safety PLCs **XPSMF40**: Modbus TCP/IP server (slave).
9 Programming PC.
10 Ethernet connector.

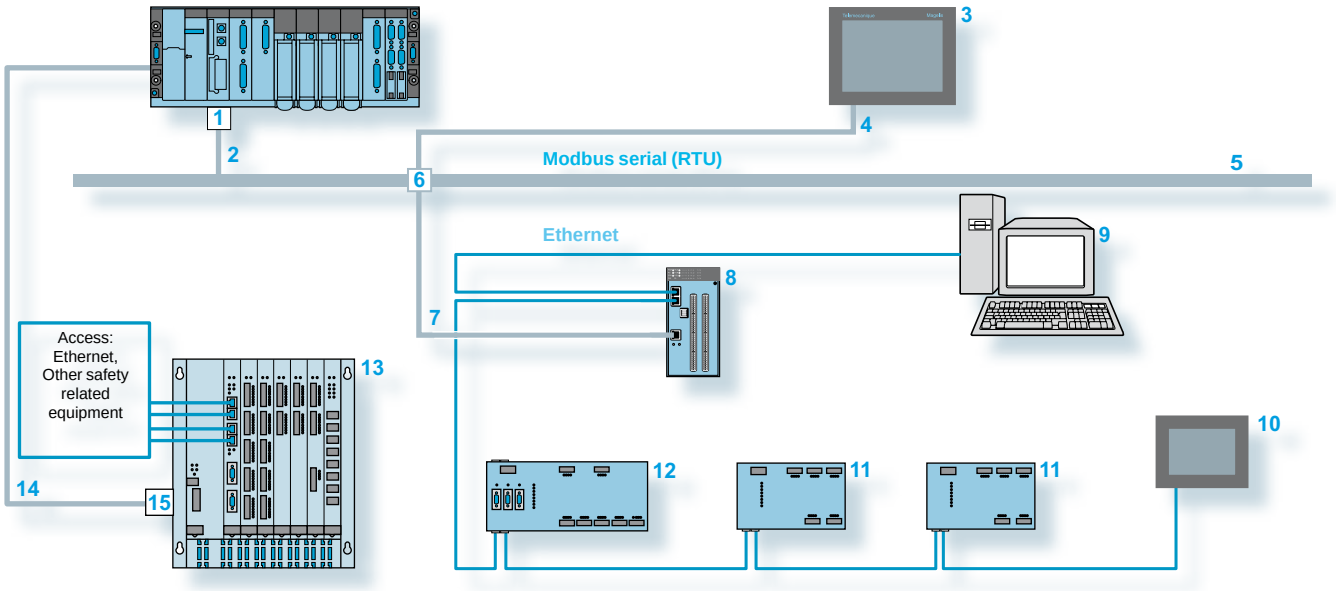
Specifications

Protocol		**SafeEthernet**	
Compatibility with compact and modular safety PLCs		**XPSMF4000, XPSMF4002, XPSMF4020, XPSMF4022, XPSMF4040, XPSMF4042**	**XPSMF31222, XPSMF3022, XPSMF3502, XPSMF3522, XPSMF3542, XPSMFCPU22 (central processing unit of modular PLC XPSMF60)**
Transmission	Speed (Baud rate)	100 Mbps Half duplex, 10 Mbps Full duplex, Autonegotiation	
	Communication ports	Integrated 2 RJ45 switched Ethernet communications ports	Integrated 4 RJ45 switched Ethernet communications ports
	Medium	Dual twisted pair cable, category 5D or better	
Structure		10BASE-T/100BASE-TX	
Transparent Ready™ service	Class	A10	
	Standard Ethernet TCP/IP communication services (supported by compact and modular safety PLCs)	Modbus™ TCP/IP	
		Modbus TCP/IP messaging (reading/writing of data words) Modbus identification requests	
	TCP port	Standard 502	
	Max. number of TCP/IP connections	1 to 20	

Safety automation system solutions

Preventa™ safety PLCs
Compact and modular, XPSMF
Communication on network and bus

Connection on Modbus™ serial (RTU)

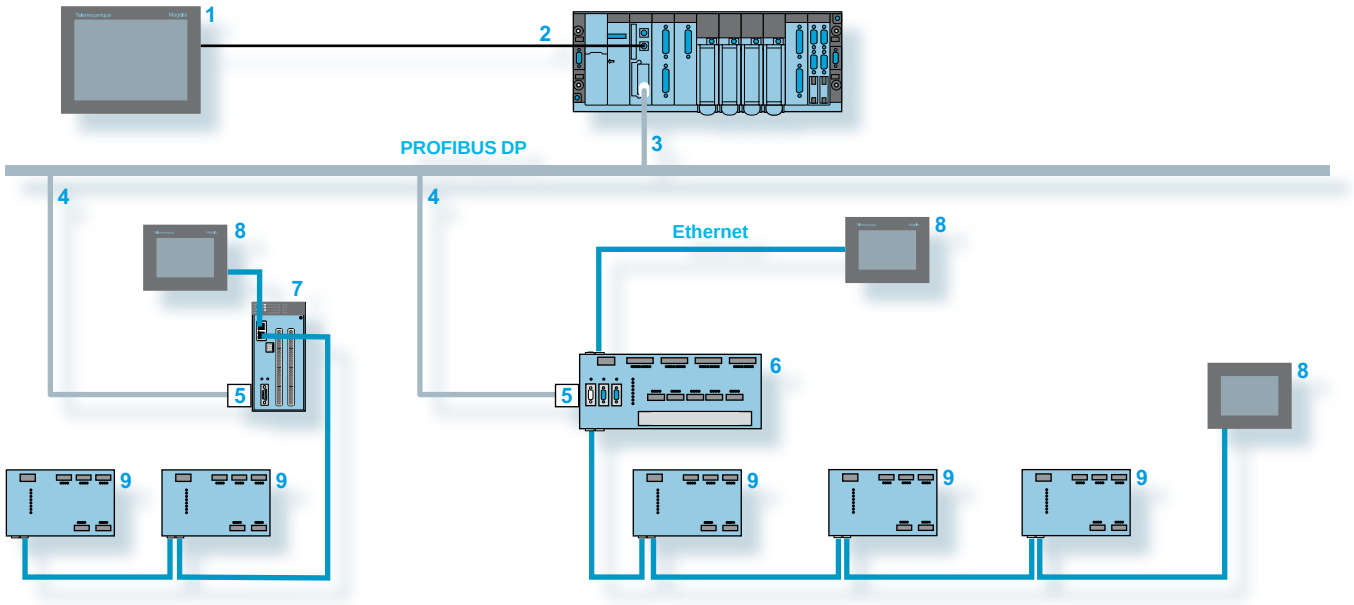


1 Premium™ module **TSXSCY21601**: access to Modbus serial, on a Premium™ automation platform: Modbus serial (RTU) master.
2 Cable **TSXSCYCM6030**.
3 Graphic supervision terminal **XBTGT5230**: Modbus serial (RTU) master.
4 Cable **XBTZ938** + adaptor **XBTZG909**.
5 Cables **VW3A83●6R●●** for Modbus serial, lengths 1.0 to 9.8 ft (0.3 to 3 m).
6 Modbus serial splitter box **LU9 GC3** for equipment connection.
7 Cables **TSXCSA ●00** for Modbus serial, lengths 328 to 1640 ft (100 to 500 m).
8 Compact safety PLCs **XPSMF4020/MF4022**: Modbus serial (RTU) slaves, Modbus TCP/IP server.
9 Programming PC.
10 Graphic supervision terminal **XBTGT2130**: Modbus serial (RTU) client.
11 Safety remote I/O modules **XPSMF1/2/3**.
12 Compact safety PLCs **XPSMF3022/3522:** Modbus serial (RTU) slaves, Modbus TCP/IP server.
13 Modular safety PLC **XPSMF60**, Modbus serial (RTU) slaves, Modbus TCP/IP server.
14 Direct connection cables **XPSMCSCY** for safety PLCs to Premium™ module **TSXSCY21601**, length 1 ft (0.3 m).
15 Connector **XPSMFADAPT** (RJ45/SUB-D 9-pin male) for connector FB2 or FB3, depending on PLC.

Specifications

Bus type			**Modbus serial (RTU)**		
Compatibility with compact and modular safety PLCs			**XPSMF3022, XPSMF3522**	**XPSMF4020, XPSMF4022**	**XPSMFCPU22 (CPU of modular PLC XPSMF60)**
Serial link port		Number and type	1 x SUB-D 9-pin female (FB3)	1 x RJ45 (Modbus)	1 x SUB-D 9-pin female (FB2)
		Master/Slave	Slave		
Addressing			122 slave addresses. Addressing range: 1…247		
Medium			Shielded twisted pair cable		
Physical layer			RS 485		
Services			13 Modbus functions (reading/writing of bits and words, event counters, connection events, diagnostics, identification)		
	Functions	**Code**	Modbus slave		
		01	Reading n bits of output		
		02	Reading n bits of inputs		
		03	Reading n words of output		
		04	Reading n words of inputs		
		23	Reading/writing variables		
		15	Writing bit variables		
		16	Writing word variables		
		05	Writing 1 bit of output		
		06	Writing 1 word of output		
		08	Diagnostics		
		43	Reading equipment identification		
Transmission	**Binary transfer rate (bps)**		115 200, 76 800, 62 500, 57 600, 38 400, 19 200, 9600, 4800, 2400, 1200, 600, 300. Default value: 57 600		
Elements	**Parity**		None. Odd. Even. Default value: even		
	Stop bit		Standard. 1 stop bit. 2 stop bits. Default value: standard		

Connection on PROFIBUS DP



1 Graphic terminal connected to TER/AUX port of Premium automation platform: PROFIBUS DP master.
2 Connecting cable (RS 485) + adaptor .
3 PROFIBUS module on Premium™ processor: PROFIBUS DP master.
4 Connecting cable ●, lengths 328 and 1312 ft (100 and 400 m).
5 Connector (SUB-D 9-pin male) on the FB3 connector of safety PLC or on the “PROFIBUS” connector of safety PLC .
6 Compact safety PLC : PROFIBUS DP slaves, Modbus™ TCP/IP server.
7 Compact safety PLCs : PROFIBUS DP slaves, Modbus TCP/IP server.
8 Graphic supervision terminal : Modbus TCP/IP client.
9 Safety remote I/O modules .

Specifications

Bus type		**PROFIBUS DP**	
Compatibility with compact safety PLCs		**XPSMF3542**	**XPSMF4040, XPSMF4042**
Serial port	Number and type	1 x SUB-D 9-pin female (FB3)	1 x SUB-D 9-pin female (PROFIBUS)
	Master/Slave	Slave, V0	
Physical layer		RS 485	
Topology		Linear, with line terminators at each end	
Medium		Shielded twisted pair cable	
Number of slaves		32 slaves on each segment, 126 slaves maximum with repeaters	
Data exchange speed		9.6 kbps…12 Mbps, depending on the length of the segment (3937...328 ft / 1200...100 m)	

Safety automation system solutions

Programming software XPSMFWIN for Preventa™ compact and modular safety PLCs XPSMF

Introduction

Conforming to standard IEC 61131-3, programming software **XPSMFWIN** is designed for programming all safety PLCs **XPSMF** and safety remote I/O modules. This safety software is part of the Safety Suite V2 software pack.

To create a program the user can use predefined function blocks, such as the elementary logic functions and certified function blocks, by dragging the blocks into the software programming area.
The “drag and drop” operation of the Windows® programming environment enables quick and simple creation of configurations.

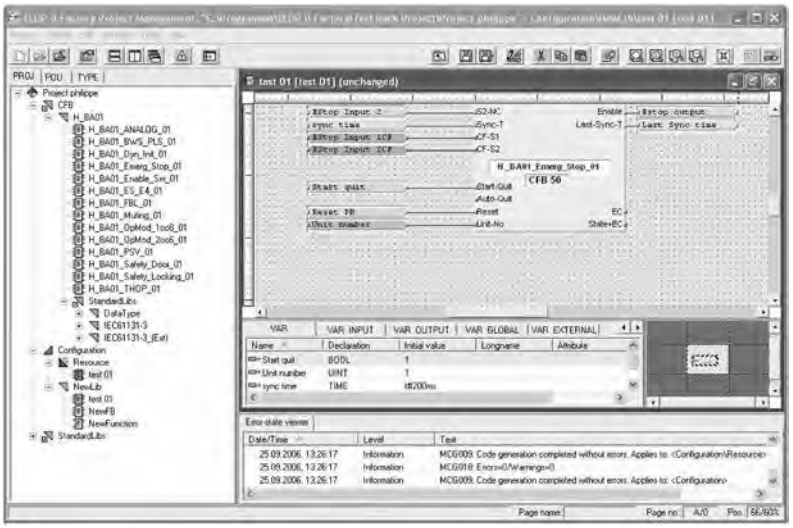
Using the **XPSMFWIN** software, it is possible to program complete systems consisting of several safety PLCs and safety remote I/O modules.
The conditions detailed in the software manual must be adhered to and a complete report accompanying the certificate should be established.

Reference

■ Reference **SSV1XPSMFWIN** contains the full version of the programming software XPSMFWIN software for the XPSMF Safety PLCs. The XPSMFWIN is part of our Safety Suite and is not available separately.

Description	Operating system	Composition	Language	Reference	Weight oz (kg)
Configuration software XPSMFWIN for programming compact XPSMF40●●, XPSMF3● and modular XPSMF60 safety PLCs	Windows® 2000, Windows® XP	CD-ROM + user manual	English, German, French	**SSV1XPSMFWIN** *Available with Safety Suite V2 software pack for safety systems*	18.342 (0.520)

Installation



Software XPSMFWIN: project management

Software **XPSMFWIN** uses an electronic key (dongle) for protection against unauthorized use.

A USB dongle is available. It must be connected to the PC before the software is installed.
Drivers must also be installed on the computer to recognize the dongle. These drivers are included with software **XPSMFWIN** and are automatically installed during installation.
To install software **XPSMFWIN**:
- □ Connect the dongle.
- □ Insert the **SSV1XPSMFWIN** software CD-ROM into the computer.
- □ Launch installation.
- □ Select the preferred language from the configuration menu.
- □ Follow the guided installation procedure for the software.
- □ Restart the computer.
- □ Launch the software by clicking on the Safety Suite icon on the desktop.

The computer hardware requirements are as follows:
- ■ Processor (Intel® Pentium II 400 MHz minimum, Intel® Pentium III 800 MHz recommended).
- ■ RAM (128 Mb minimum, 256 Mb recommended).
- ■ Graphics card (2 Mb XGA, 1024 x 768, 256 colors minimum, 8 Mb XGA, 1280 x 1024 True color recommended).
- ■ Hard disk (1 Gigabyte minimum).
- ■ Operating system:
  - □ Windows® 2000 Professional with Service Pack 1 or higher.
  - □ Windows® XP with Service pack 1.

Safety automation system solutions

Programming software XPSMFWIN for Preventa™ compact and modular safety PLCs XPSMF

Safety related communication

Safety related communication for the safety systems is performed using SafeEthernet protocol.
SafeEthernet is a TCP/IP based protocol that uses highly intelligent switches to provide extremely reliable deterministic communication.
Connection is made automatically between the master and slaves when assigning the slaves to the corresponding masters. Transmission speeds of up to 100 Mbps in Half duplex mode and 10 Mbps in Full duplex mode can be achieved and using Autonegotiation ensures the correct baud rates for the connection.
Each safety PLC can manage up to 64 safety connections. These 64 connections can consist of safety remote I/Os and other safety PLCs.
Communication between two safety PLCs is established via a Peer-Peer link. This Peer-Peer communication enables data between two or more safety PLCs to be communicated safely.
The connectivity of all the equipment enables centralised or decentralised networks to be established. It also enables safety PLCs and safety remote I/O modules to be connected anywhere on the network with only the assigning of an IP address, to each module, in the software.

Interface

XPSMFWIN features two distinct windows, one for internal configuration and one for hardware management.

- Project management

This window enables creation, archiving and recalling of all the user programs. It contains all the logic functions and predefined certified function blocks.

- Hardware management

This window enables all hardware specific data, inputs and outputs and signal transfer between safety controllers to be defined, as well as the various safety PLCs being used or safety remote I/O modules.

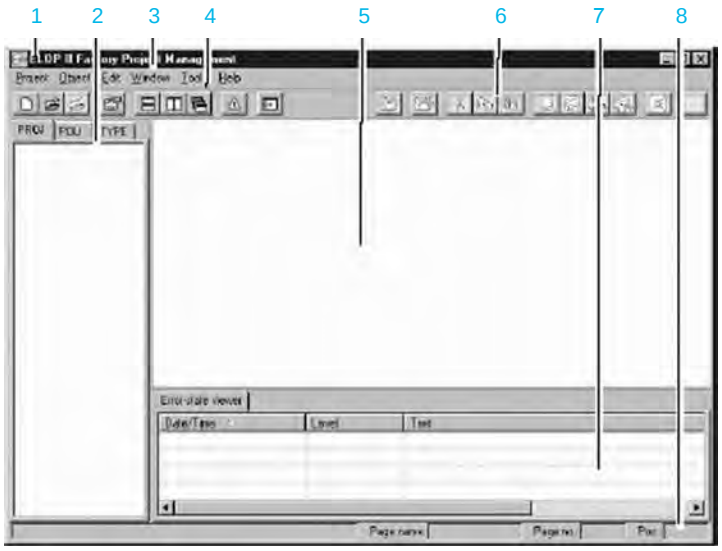
Items included in the XPSMFWIN interface

- Menu and title bar
- Toolbar and status bar
- Windows® layout, structure window and work space
- Error display window

XPSMFWIN is a program offering numerous functions and features intuitive, Windows® style, operation, making it a very user-friendly programming environment.

Project Management window layout

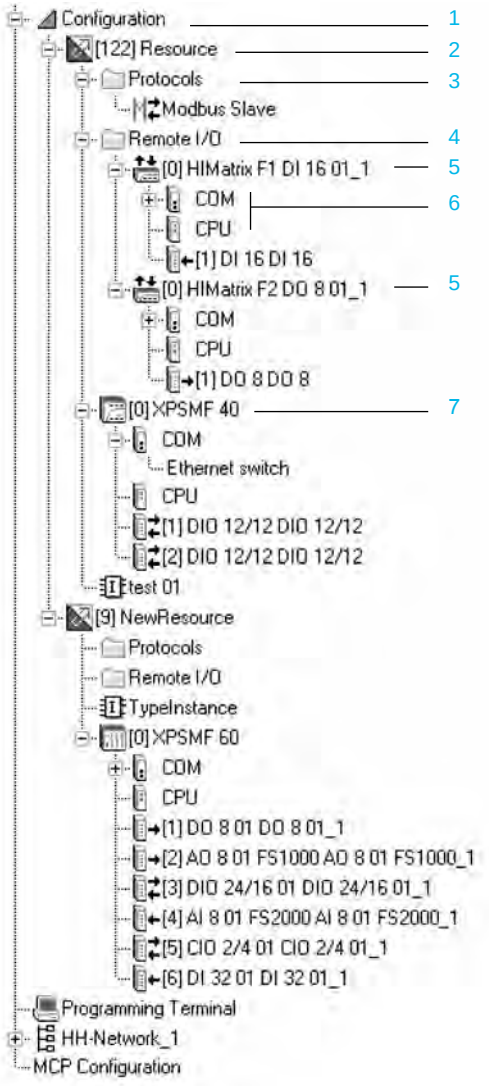
On launching software **XPSMFWIN**, the standard screen shown below opens.
This screen generally includes the following items:



1. Title bar.
2. Structure window.
3. Menu bar.
4. Project management toolbar.
5. Work space.
6. FBD (Function Block Diagram) editor toolbar.
7. Error display window.
8. Status bar with coordinate information of the function plan editor.

Safety automation system solutions

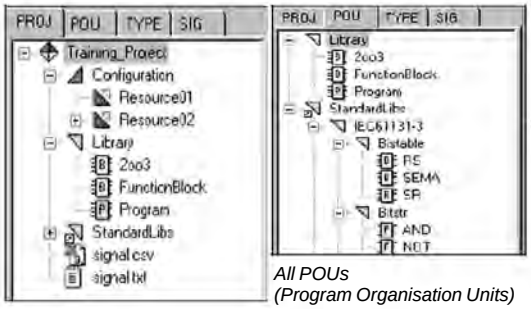
Programming software XPSMFWIN for Preventa™ compact and modular safety PLCs XPSMF



Structure window

1 Configuration.
2 Resource folder.
3 Communication protocols.
4 Remote I/O folder.
5 Remote I/O type.
6 Components and modules.
7 Resource type.

The structure window displays the hierarchical structure of the project. Selecting one of three views provides the user with different levels of detail.



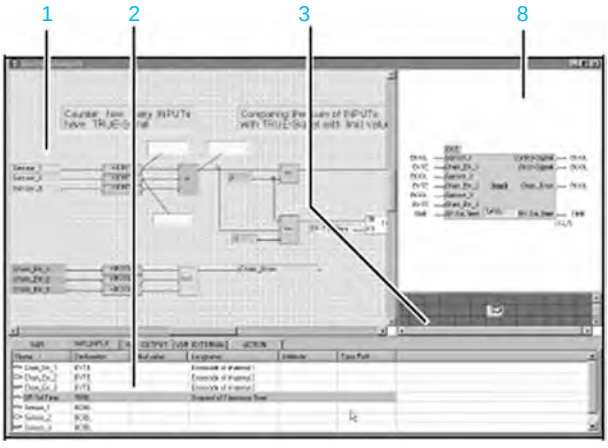
Complete project

All POUs (Program Organisation Units)

All data types

FBD (Function Block Diagram) editor

Using this editor, the user can create function blocks in FBD (Function Block Diagram) language or SFC (Sequential Function Chart) language.
The FBD editor consists of the following panes:



1 Drawing field.
2 Variable declaration editor.
3 Overview window.
4 Interface declaration editor.

Safety automation system solutions

Programming software XPSMFWIN for Preventa™ compact and modular safety PLCs XPSMF

Programming

Software **XPSMFWIN** enables programming of the entire range of Preventa™ safety PLCs **XPSMF**.
The powerful and easy to use methodology of this software enables users to quickly and simply familiarize themselves with the product. The Windows® based look and user-friendliness provides users with trouble free operation of the software.

On launching the software, the program's start-up assistant opens simultaneously. This assistant enables the user to easily open a new or existing file, delete a file or archive a file. Once a new or existing file is opened, the user quickly accesses the working environment.

Configuration

The user can begin creating a configuration as soon as a personal library is set-up, that will contain the user configuration(s).
Once the personal library is opened, the user can use the standard library function blocks (And, Or, Not, and Flip-Flop) to create exactly what is required.

The user drags the function blocks into the configuration environment and places them where required. Once the function blocks are placed, the user can define specific signals or variables for the inputs and outputs.

The Hardware menu enables assigning of all the signals to the relevant inputs and outputs.

From within the Hardware menu the relevant safety PLCs are selected using the pull-down menu of each resource.
To add additional safety PLCs a new resource is easily created and assigned with the type of safety PLC.

Up to 64 remote inputs/outputs can be assigned to each safety PLC.
Once all the safety PLCs and remote I/Os have been selected, the signals can be simply connected to the relevant safety modules.
The "drag and drop" function enables defining of the inputs and outputs.

Therefore, configuration is very quick and simple.
Once all the inputs and outputs have been defined the user can compile the entire program, which is performed in the configuration menu.
Compilation must be performed twice and the results of both compilations printed and compared. If both results match, the program can be downloaded via the Ethernet RJ45 communication port on any of the safety PLCs.

Program execution

The program will automatically be stored in all the safety PLCs.
The safety PLCs can then execute the configuration and full diagnostics can be viewed on screen.
The software incorporates various diagnostic options that can be used to quickly identify the presence of errors. Some of these diagnostic options are "On-line test": which displays the logic condition of all the I/Os. Others allow the user to view the status of the transmission line, the cycle time and errors that have occurred on the communication line.

The programming tool enables the user to create and design to suit their needs. Other certified function blocks are available, which enable the overall configuration time to be further reduced. Included in these additional blocks are "Muting" and "Emergency stop" functions, together with 12 other certified functions.

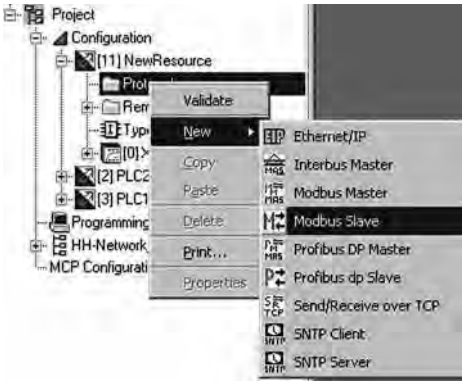
Modbus™ TCP/IP, Modbus serial (RTU) and PROFIBUS DP protocols are included in software **XPSMFWIN**. They can be used for non safety related data transfer.

2

Non safety related communication protocols

Modbus™ TCP/IP server (slave)

The **XPSMF** range of safety PLCs (**XPSMFCPU22**, **XPSMF40●2**, **XPSMF35●2**, **XPSMF3022** and **XPSMF31222**) allow the communication of non safety related data on an Ethernet network via a Modbus TCP/IP link.

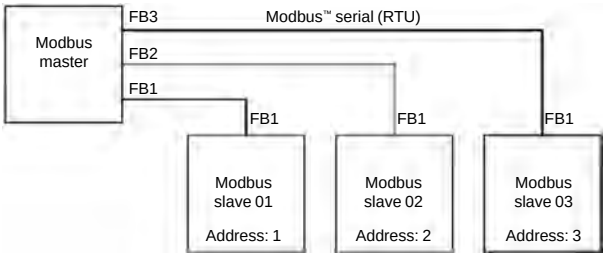


On the Ethernet network, several masters (clients) can read data provided by several slaves (servers).

Creation of Modbus TCP/IP servers is quick and simple: Select Protocols / New / Modbus Slave.

Modbus serial (RTU)

The **XPSMF** range of safety PLCs (**XPSMFCPU22**, **XPSMF402●**, **XPSMF352●** and **XPSMF3022**) allow the communication of non safety related data on a Modbus serial (RTU) link.
On the Modbus serial network, a master can read the data provided by several slaves on a network segment.

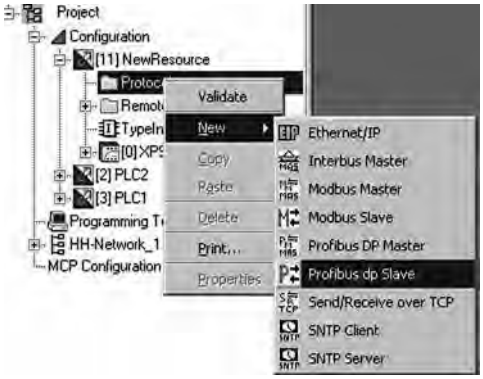


Creation of Modbus (RTU) servers is quick and simple: Select Protocols / New / Modbus Slave.
Select the serial option in the properties window to activate, then select the signals to send and receive from your standard automation system equipment.

Non safety related communication protocols

PROFIBUS DP

To create a PROFIBUS DP slave on a resource (PLC), a project must be created.
Safety PLCs **XPSMF404●** and **XPSMF3542** are PROFIBUS DP V0 slaves.
Within hardware management, assignment of PROFIBUS DP slaves is simple:
Select Protocols / New / PROFIBUS DP slave from the protocol tag of a resource.



The PROFIBUS DP Slave menu contains the following fields:
□ Connect signals tab: for connecting the inputs and outputs to and from the safety PLC, and predefined signals for diagnostics.
□ Import and Export tool: used for importing and exporting the signal list to/from a .CSV format file (format that can be imported into a standard automation PLC).
□ Properties tab: enabling setting of the station address, interface, baud rate and data refresh rate.

Safety automation system solutions

Preventa™ safety PLCs
Compact and modular, XPSMF
Safety remote input, output and input/output modules XPSMF1/2/3

Introduction

Remote input, output and input/output modules:
- Location: within the vicinity of machines to be monitored.
- Extension of the I/O capacity of compact and modular safety PLCs.
- Designed for use in safety related parts of control systems up to category 4 conforming to EN 954-1, up to performance level “e” conforming to EN/ISO 13849-1, and up to SIL 3 conforming to EN/IEC 61508.

*Products referenced **XPSMF1DI1601** and **XPSMF2●●●●●●** are marked **HIMatrix® F1DI** and **HIMatrix® F2DI** (manufactured by Hima, sold by Schneider Electric).*

User memory		Application	–		
		Data	–		
Response time			Depending on size of application		
Maximum power consumption			0.8 A	0.5 A	9 A
Supply			External ⎓ 24 V supply (with separate protection conforming to EN/IEC 60950, SELV (Safety Extra Low Voltage) or PELV (Protection Extra Low Voltage) rated)		
Inputs	**Digital**	Number of channels	16, not electrically isolated	–	–
		Current at state 0	1.5 mA max., 1 mA at 5 V	–	–
		Current at state 1	≥ 2 mA at ⎓ 15 V	–	–
	Analog	Number of channels	–	–	–
		Range: voltage/current	–	–	–
	Counting	Number of channels	–	–	–
		Current	–	–	–
Outputs	**Digital**	Number of channels	–	4, not electrically isolated	16, not electrically isolated
		Output current	–	5 A max.	1 A max. at 140 °F (60 °C), 2 A max. at 104 °F (40 °C)
	Analog	Number of channels	–	–	–
		Range: voltage/current	–	–	–
	Relay	Number	–	–	–
		Switching voltage	–	–	–
	Line control	Number	4, not electrically isolated	–	–
		Current/Voltage	60 mA/20 V	–	–
Input/output connections			Removable screw terminal blocks *(1)*		
Safety communication on Ethernet network using SafeEthernet protocol			Yes, access to network via integrated 2 RJ45 switched Ethernet communications ports		
Safety remote I/O module type			**XPSMF1DI1601**	**XPSMF2DO401**	**XPSMF2DO1601**
See page			2/82	2/89	

*(1) Removable screw terminal blocks are provided with safety remote I/O modules **XPSMF1/2/3**.*

Safety automation system solutions

Preventa™ safety PLCs
Compact and modular, XPSMF
Safety remote input, output and input/output modules XPSMF1/2/3

*Products referenced **XPSMF2●●●●●●●** and **XPSMF3●●●●●●●** are marked **HIMatrix® F2DO** and **HIMatrix® F3...** (manufactured by Hima, sold by Schneider Electric).*

–					
–					
Depending on size of application					
0.6 A	0.6 A	8 A	14 A	8 A	0.8 A
External ⎓ 24 V supply (with separate protection conforming to EN/IEC 60950, SELV (Safety Extra Low Voltage) or PELV (Protection Extra Low Voltage) rated)					
–	–	8, not electrically isolated	16, not electrically isolated	20, not electrically isolated	–
–	–	1.5 mA max. 1.25 mA at ⎓ 5 V	1.5 mA max. 1 mA at ⎓ 5 V	1.5 mA max. 1.25 mA at ⎓ 5 V	–
–	–	> 2 mA at ⎓ 15 V	> 2 mA at ⎓ 15 V	⩾ 2 mA at ⎓ 15 V	–
–	–	–	–	–	8 single-pole
–	–	–	–	–	⎓ 0…10 V/0…20 mA *(1)*
–	–	–	–	–	–
–	–	–	–	–	–
–	–	8 DO+ (reference pole L-) 2 DO- (reference pole S+)	8 2-pole or 16 single-pole, not electrically isolated	8, not electrically isolated *(2)*	–
–	–	DO+: channels 1 to 3 and 5 to 7: 0.5 A at 140 °F (60 °C) channels 4 and 8: 1 A at 140 °F (60 °C), 2 A at 104 °F (40 °C) DO-: channels 1 and 2: 1 A at 140 °F (60 °C)	2 A max. at 104 °F (40 °C), 1 A max. at 140 °F (60 °C), 10 mA min.	Channels 1 to 3 and 5 to 7: 0.5 A at 140 °F (60 °C) Channels 4 and 8: 1 A at 140 °F (60 °C), 2 A at 122 °F (50 °C)	–
–	–	–	–	–	4 non safety related outputs
–	–	–	–	–	Usable range: 0…20 mA Nominal range: 4…20 mA
8	16	–	–	–	–
⩾ 5 V, ⩽ ⎓ 250 V/ ∼ 250 V	⩾ 5 V, ⩽ ⎓ 30 V/ ∼ 60 V	–	–	–	–
–	–	2, not electrically isolated		–	–
–	–	60 mA/20 V	60 mA/20 V	–	–
Removable screw terminal blocks *(3)*					
Yes, access to network via integrated 2 RJ45 switched Ethernet communications ports					
XPSMF2DO801	**XPSMF2DO1602**	**XPSMF3DIO8801**	**XPSMF3DIO16801**	**XPSMF3DIO20802**	**XPSMF3AIO8401**
2/89		2/101			

*(1) With 500 Ω jumper (2) Configurable for Line control. (3) Removable screw terminal blocks are provided with safety remote I/O modules **XPSMF1/2/3**.*

Safety automation system solutions

Preventa™ safety PLCs
Compact and modular
Safety remote input modules XPSMF1

XPSMF1DI1601

*This product, referenced **XPSMF1DI1601**, is marked **HIMatrix**® **F1DI** (manufactured by Hima, sold by Schneider Electric).*

Introduction

XPSMF1DI1601 is a compact safety remote input module which is designed to extend the input capacity of safety PLCs **XPSMF**, either compact or modular, to which it is associated.
The communication with either the compact or modular safety PLCs is managed via one of its' integrated 2 RJ45 switched Ethernet communications ports.
The safety remote input module **XPSMF1DI1601** does not have a user program: it receives its instructions from its parent safety PLC.

Safety remote input module XPSMF1DI1601

Remote digital inputs		
N°	**Safety detection**	**Safety dialog**
16	Limit switches, Guard switches, with reset and with actuator, Light curtains type 2 and type 4, Safety mats and sensing edges	Mushroom head Emergency stops, Enclosures for control and signalling units, Two-hand control stations

Remote line control outputs	
N°	
4	Short-circuit and line break monitoring

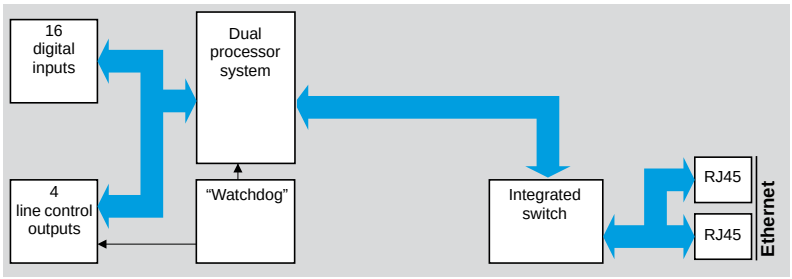
Line control

Line control is a means of short-circuit and line break monitoring.
Using line control outputs enables SIL 3 (EN/IEC 61508) and category 4 (EN 954-1) safety to be achieved. The line control outputs send a high signal with a very short low signal, thus enabling a wiring anomaly (short-circuit, line break) to be seen at the inputs of the safety modules.
Example: The line control outputs 1 to 4 are connected to the digital inputs 1 to 16.

Safety PLCs

In order to meet safety requirements, the safety remote input module **XPSMF1DI1601** incorporates two essential functions (**Redundancy** and **Self-monitoring)** complying to category 4 conforming to EN 954-1 and performance level "e" conforming to EN/ISO 13849-1 in addition to the SafeEthernet safety communication protocol between this safety remote input module and the safety PLCs (**Special Switch**).
■ **Redundancy**: the dual processor integrated in the safety remote input module **XPSMF1DI1601** analyzes and compares the data received from the safety inputs and outputs. The incoming and outgoing data (programmed values and received values) are received in parallel by the two processors and compared in real-time.
■ **Self-monitoring ("Watchdog")**: the safety remote input module **XPSMF1DI1601** continuously monitors the data processing cycle and the execution of tasks, and intervenes if the cycle time does not conform to the predefined value.
■ **The integrated switch (Special Switch)** stores for a very short time and sends at very high speed the data provided by the inputs of the safety module on the Ethernet network, while avoiding signal collisions and excessive amounts of data on the network.

Functional diagram



Safety communication on Ethernet network

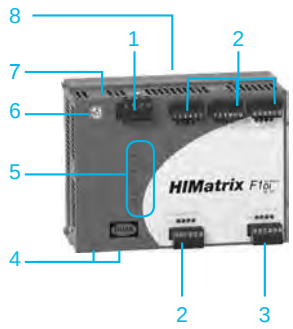
The safety input module **XPSMF1DI1601** incorporates two RJ45 (type 10BASE-T/100BASE-TX) integrated switched ports, that enable communication on the Ethernet network using SafeEthernet communication protocol and therefore, data exchange with compact or modular safety PLCs **XPSMF**.

Safety automation system solutions

Preventa™ safety PLCs

Compact and modular

Safety remote input modules XPSMF1



Description

Safety remote input module XPSMF1DI1601

On the front cover of the metal enclosure:

1 One terminal block *(1)* for c 24 V supply.
2 Four terminal blocks *(1)* for connection of digital inputs, with input status LED (four LEDs per terminal block).
3 One terminal block *(1)* for connection of digital line control outputs, with four digital output status LEDs.
4 Two RJ45 (type 10BASE-T/100BASE-TX) integrated switched ports, for connection on Ethernet network and for configuring IP address.
5 Eight process status LEDs.
6 One ground connection screw.
7 On the top: one “Reset” button.
8 On the rear face: one spring operated mounting device for mounting on 35 mm DIN rail.

Status LED details

Safety remote input module XPSMF1DI1601

LED	Color	Status	Meaning
Inputs 1…16	Orange	On	Inputs active.
Outputs 1…4	Orange	On	Outputs active.
24 VDC	Green	On	⎓ 24 V voltage present.
		Off	No voltage.
RUN	Green	On	Normal service mode, loaded program running, the PLC receives I/O messages, communication and hardware/ software tests carried out.
		Flashing	The CPU is in STOP and is not executing any user application. All the outputs are reset to a safe, de-energized state.
		Off	The CPU is in “ERROR” state (see ERROR).
ERROR	Red	On	Software error or hardware anomaly detected by the CPU.
			The monitoring program (Watchdog) has triggered the STOP state of the process because the programmed cycle time has been exceeded.
			The CPU has stopped the execution of the user application, ended all hardware and software tests and all outputs have been reset.
			The process can only be started again from the PC.
		Off	No errors detected.
PROG	Orange	On	The CPU is being loaded with a new configuration.
		Flashing	The FLASH ROM is being loaded with a new operating system.
		Off	No loading of configuration or operating system.
FORCE	Orange	On	The CPU is in RUN mode and force is active.
		Flashing	The system is not processing (STOP), but force is prepared and is activated if the dual processor is started.
		Off	Force mode not activated.
FAULT	Orange	On	Error display for line control.
			The user application has caused an error.
			The system configuration is defective.
			The loading of a new operating system was defective and the operating system is corrupt.
		Flashing	An error has occurred while writing to FLASH ROM memory (during updating of the operating system).
			One or more I/O errors have occurred.
		Off	None of the above errors have occurred.
OSL	Orange	Flashing	Emergency loading of the operating system is active.
BL	Orange	Flashing	COM in INIT_Fail state.
RJ45	Green	On	Full duplex mode operation.
		Flashing	Signal collision.
		Off	Half duplex mode operation, no collision.
	Yellow	On	Connection established.
		Flashing	Interface active.

*(1) Removable screw terminals are provided with safety input module **XPSMF1DI1601**.*

Safety automation system solutions

Preventa™ safety PLCs
Compact and modular
Safety remote input modules XPSMF1

Specifications

Safety remote input module type			XPSMF1DI1601
Supply voltage		**V**	⎓ 24 (external supply with separate protection conforming to EN/IEC 60950, SELV (Safety Extra Low Voltage) or PELV (Protection Extra Low Voltage) rated)
Voltage limits		**V**	- 15…+ 20%
Ambient air temperature	For operation	**°F (°C)**	+ 32… + 140 (0…+ 60)
	For storage	**°F (°C)**	- 40…+ 185 (- 40…+ 85)
Degree of protection			IP 20
Response time		**ms**	Depending on size of application
Current power consumption		**A**	0.8 max.
Backup battery			None
Digital inputs			
Number			16, not electrically isolated
Permissible current	At state 1	**mA**	≥ 2 at ⎓ 15 V
	At state 0	**mA**	1.5 max., 1 mA at 5 V
Switching point		**V**	Typically 7.5
Switching time		**µs**	250
Input supply			4 x 19.2 V/40 mA (on 24 V), protected against short-circuits
Line control outputs			
Number			4, not electrically isolated
Output voltage		**V**	20 (approximately, depending on the supply voltage)
Output current		**mA**	60
Minimum load			None
Response to overload			4 x ≥ 19.2 V, short-circuit current 60 mA at 24 V
Connections			See page 2/30 for wire sizes of the various connector types.

Communication

Ethernet network: safety communication using SafeEthernet protocol			
Transmission	Communication ports		Integrated 2 RJ45 switched Ethernet communications ports
	Baud rate	Mbps	100 Half duplex, 10 Full duplex, Autonegotiation
Structure			10BASE-T/100BASE-TX
Medium			Dual twisted pair cable, category 5D or better (Ethernet)

References

XPSMF1DI1601

*This product, referenced **XPSMF1DI1601**, is marked **HIMatrix® F1DI** (manufactured by Hima, sold by Schneider Electric).*

Safety remote input module (⎓ 24 V supply)

For use with	Digital inputs	Line control outputs	Ports	Reference	Weight oz (kg)
Safety PLCs, modular XPSMF60 or compact XPSMF40 and XPSMF31/30/35	16	4	Integrated 2 RJ45 switched Ethernet communications ports	**XPSMF1DI1601**	24.692 (0.700)

Connecting cables

Description	For	Reference	Weight oz (kg)
Ethernet network connecting cables	Connection between safety remote input modules and modular or compact safety PLCs XPSMF RJ45 connector fitted at each end	See 2/29	–

Safety automation system solutions

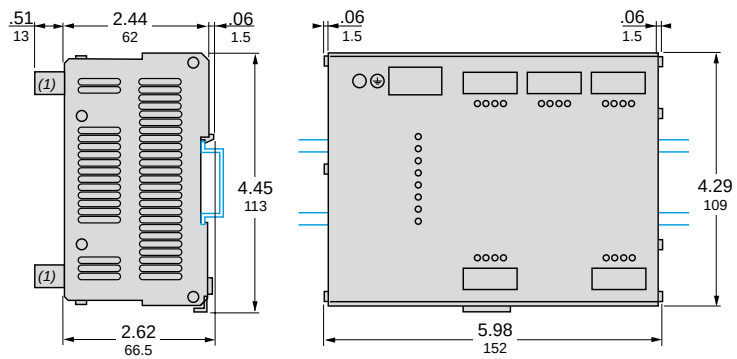
Preventa™ safety PLCs

Compact and modular

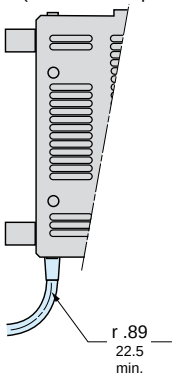
Safety remote input modules XPSMF1

Dimensions

XPSMF1DI1601



RJ45 connector for access to Ethernet network (SafeEthernet protocol)

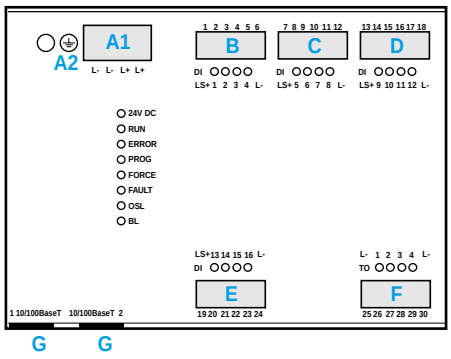


Dual Dimensions: INCHES / Millimeters

*(1) Removable screw terminals are provided with safety input module **XPSMF1DI1601**.*

Connections

XPSMF1DI1601



Item	Connection	Screw N°	Screw	Function
A1	**Supply**	–	L+	⎓ 24 V
			L+	⎓ 24 V
			L-	⎓ 24 V (reference pole)
			L-	⎓ 24 V (reference pole)
A2	**Ground**	–	⏚	Ground
B	**Digital inputs**	1	LS+	Sensor supply for inputs 1 to 4
		2	1	Digital input 1
		3	2	Digital input 2
		4	3	Digital input 3
		5	4	Digital input 4
		6	L-	Reference pole
C	**Digital inputs**	7	LS+	Sensor supply for inputs 5 to 8
		8	5	Digital input 5
		9	6	Digital input 6
		10	7	Digital input 7
		11	8	Digital input 8
		12	L-	Reference pole
D	**Digital inputs**	13	LS+	Sensor supply for inputs 9 to 12
		14	9	Digital input 9
		15	10	Digital input 10
		16	11	Digital input 11
		17	12	Digital input 12
		18	L-	Reference pole
E	**Digital inputs**	19	LS+	Sensor supply for inputs 13 to 16
		20	13	Digital input 13
		21	14	Digital input 14
		22	15	Digital input 15
		23	16	Digital input 16
		24	L-	Reference pole
F	**Line control outputs**	25	L+	Outputs common
		26	1	Output 1
		27	2	Output 2
		28	3	Output 3
		29	4	Output 4
		30	L-	Outputs common

Item	Connection	Type	Function
G	**Programming**	Integrated 2 RJ45 switched Ethernet Communication ports	Either of the two switched Ethernet ports can be used to create a connection between the safety remote I/O and the programming terminal in a point to point or via an Ethernet network for setting the IP address
	Safe Communication (all XPSMF Safety PLCs and Remote I/Os)	Integrated 2 RJ45 switched Ethernet Communication ports	Either of the two switched Ethernet ports can be used to create a connection between the safety PLC and other safety related components (e.g other XPSMF safety PLCs or Safety Remote I/O modules) this can be established in a point to point way or via an Ethernet network.

Safety automation system solutions

Preventa™ safety PLCs
Compact and modular
Safety remote output modules XPSMF2

XPSMF2DO401

XPSMF2DO1601

XPSMF2DO801

XPSMF2DO801

*Products referenced **XPSMF2●●●●●●** are marked **HIMatrix® F2 DO...** (manufactured by Hima, sold by Schneider Electric).*

Introduction

XPSMF2DO●●●● are compact safety remote output modules which are designed to extend the output capacity of safety PLCs **XPSMF**, either compact or modular, to which they are associated.
The communication with either the compact or modular safety PLCs is managed via one of its' integrated 2 RJ45 switched Ethernet communications ports.
Safety modules **XPSMF2DO●●●●** do not have a user program: they receive their instructions from its parent safety PLC.

Safety remote output modules XPSMF2DO●●●●

Safety output modules	Remote outputs		
	N°	Type	
XPSMF2DO401	**4**	Digital power outputs	**Safety actuators:** Contactors-motors, Control relays, Variable speed drives **Safety dialog:** Beacons and indicator banks, rotating mirror beacons, sirens
XPSMF2DO1601	**16**	Digital outputs	
XPSMF2DO801	**8**	Relay outputs	
XPSMF2DO1602	**16**	Relay outputs	

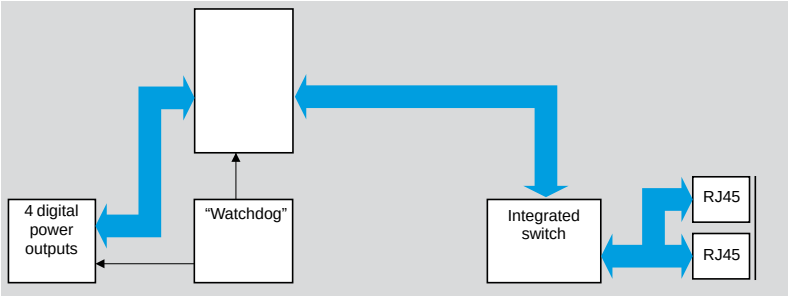
Safety PLCs

In order to meet safety requirements, the safety remote output modules **XPSMF2DO●●●●** incorporate two essential functions (**Redundancy** and **Self-monitoring)** complying to category 4 conforming to EN 954-1 and performance level "e" conforming to EN/ISO 13849-1 in addition to the SafeEthernet safety communication protocol between these safety remote output modules and the safety PLCs (**Special Switch**).

■ **Redundancy**: the dual processor integrated in the safety remote output modules **XPSMF2** analyzes and compares the data received from the safety inputs and outputs. The incoming and outgoing data (programmed values and received values) are received in parallel by the two processors and compared in real-time.
■ **Self-monitoring ("Watchdog")**: the safety remote output modules **XPSMF2** continuously monitor the data processing cycle and the execution of tasks, and intervenes if the cycle time does not conform to the predefined value.
■ **The integrated switch (Special Switch)** stores for a very short time and sends at very high speed the data provided by the outputs of the safety modules on the Ethernet network, while avoiding signal collisions and excessive amounts of data on the network.

Functional diagrams

Remote output module XPSMF2DO401

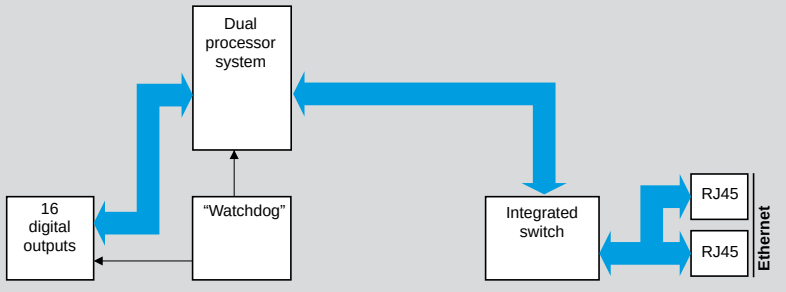


Safety automation system solutions

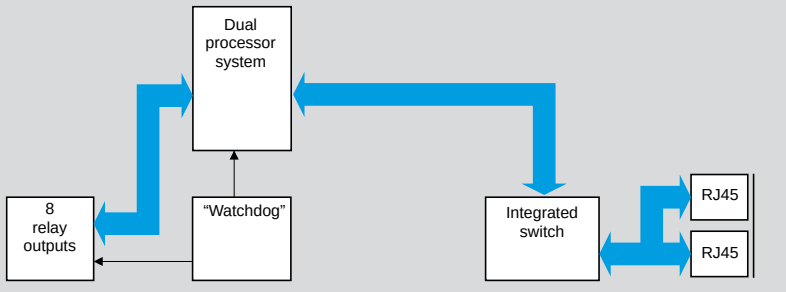
Preventa™ safety PLCs
Compact and modular
Safety remote output modules XPSMF2

Functional diagrams (continued)

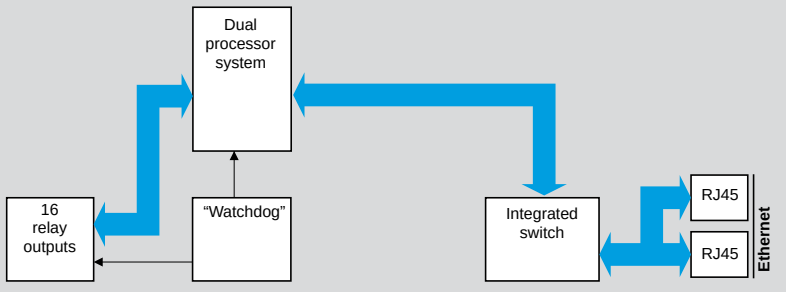
Remote output module XPSMF2DO801



Remote output module XPSMF2DO801



Remote output module XPSMF2DO1602



Safety communication on Ethernet network

The safety remote output modules **XPSMF2DO●●●●** incorporate two RJ45 (type 10BASE-T/100BASE-TX) integrated switched ports, that enable communication on the Ethernet network using SafeEthernet communication protocol and therefore, data exchange with compact or modular safety PLCs **XPSMF**.

Safety automation system solutions

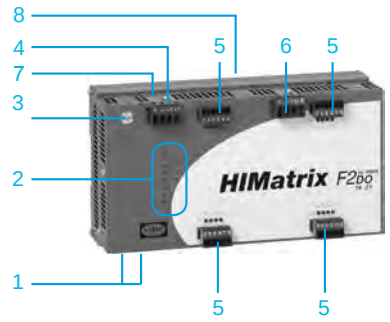
Preventa™ safety PLCs
Compact and modular
Safety remote output modules XPSMF2

Description

Remote output module XPSMF2DO401

On the front cover of the metal enclosure:

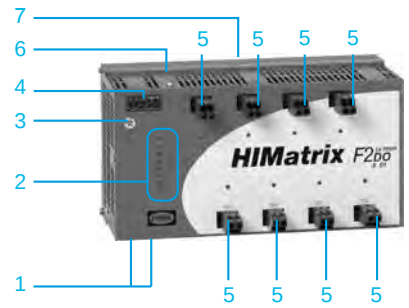
1 Two RJ45 (type 10BASE-T/100BASE-TX) integrated switched ports, for connection on Ethernet network and for configuring IP address.
2 Eight process status LEDs.
3 One ground connection screw.
4 Four terminal blocks *(1)* for connection of digital outputs, with output status LED (one LED per terminal block).
5 On the top: one “Reset” button.
6 On the rear face: one spring operated mounting device for mounting on 35 mm DIN rail.



Remote output module XPSMF2DO1601

On the front cover of the metal enclosure:

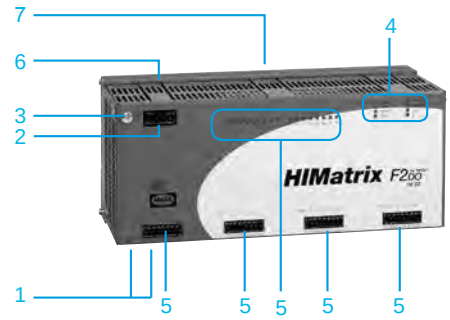
1 Two RJ45 (type 10BASE-T/100BASE-TX) integrated switched ports, for connection on Ethernet network and for configuring IP address.
2 Eight process status LEDs.
3 One ground connection screw.
4 One terminal block *(1)* for ⎓ 24 V supply.
5 Four terminal blocks *(1)* for connection of digital outputs, with output status LED (four LEDs per terminal block).
6 One terminal block for connection of output channels.
7 On the top: one “Reset” button.
8 On the rear face: one spring operated mounting device for mounting on 35 mm DIN rail.



Remote output module XPSMF2DO801

On the front cover of the metal enclosure:

1 Two RJ45 (type 10BASE-T/100BASE-TX) integrated switched ports, for connection on Ethernet network and for configuring IP address.
2 Eight process status LEDs.
3 One ground connection screw.
4 One terminal block *(1)* for ⎓ 24 V supply.
5 Eight terminal blocks *(1)* for connection of relay outputs, with output status LED (one LED per terminal block).
6 On the top: one “Reset” button.
7 On the rear face: one spring operated mounting device for mounting on 35 mm DIN rail.



Remote output module XPSMF2DO1602

On the front cover of the metal enclosure:

1 Two RJ45 (type 10BASE-T/100BASE-TX) integrated switched ports, for connection on Ethernet network and for configuring IP address.
2 One terminal block *(1)* for ⎓ 24 V supply.
3 One ground connection screw.
4 Eight process status LEDs.
5 Four terminal blocks *(1)* for connection of relay outputs, with relay output status LEDs.
6 On the top: one “Reset” button.
7 On the rear face: one spring operated mounting device for mounting on 35 mm DIN rail.

*(1) Removable screw terminals are provided with the safety output modules **XPSMF2**.*

Status LED details

Safety remote output modules XPSMF2DO●●●●

LED	Color	Status	Meaning
Outputs 1…16	Orange	On	Outputs active.
24 VDC	Green	On	⎓ 24 V voltage present.
		Off	No voltage.
RUN	Green	On	Normal service mode, loaded program running, the PLC receives I/O messages, communication and hardware/ software tests carried out.
		Flashing	The CPU is in STOP and is not executing any user application. All the outputs are reset to a safe, de-energized state.
		Off	The CPU is in “ERROR” state (see ERROR).
ERROR	Red	On	Software error or hardware anomaly detected by the CPU.
			The monitoring program (Watchdog) has triggered the STOP state of the process because the programmed cycle time has been exceeded.
			The CPU has stopped the execution of the user application, ended all hardware and software tests and all outputs have been reset.
			The process can only be started again from the PC.
		Off	No errors detected.
PROG	Orange	On	The CPU is being loaded with a new configuration.
		Flashing	The FLASH ROM is being loaded with a new operating system.
		Off	No loading of configuration or operating system.
FORCE	Orange	On	The CPU is in RUN mode and force is active.
		Flashing	The system is not processing (STOP), but force is prepared and is activated if the dual processor is started.
		Off	Force mode not activated.
FAULT	Orange	On	Error display for line control.
			The user application has caused an error.
			The system configuration is defective.
			The loading of a new operating system was defective and the operating system is corrupt.
		Flashing	An error has occurred while writing to FLASH ROM memory (during updating of the operating system).
			One or more I/O errors have occurred.
		Off	None of the above errors have occurred.
OSL	Orange	Flashing	Emergency loading of the operating system is active.
BL	Orange	Flashing	COM in INIT_Fail state.
RJ45	Green	On	Full duplex mode operation.
		Flashing	Signal collision.
		Off	Half duplex mode operation, no collision.
	Yellow	On	Connection established.
		Flashing	Interface active.

Safety automation system solutions

Preventa™ safety PLCs
Compact and modular
Safety remote output modules XPSMF2

Specifications

Safety remote output module type			XPSMF2DO401	XPSMF2DO1601	XPSMF2DO801	XPSMF2DO1602
Supply voltage		**V**	⎓ 24 (external supply with separate protection conforming to EN/IEC 60950, SELV (Safety Extra Low Voltage) or PELV (Protection Extra Low Voltage) rated)			
Voltage limits		**V**	- 15…+ 20%			
Ambient air temperature	For operation	**°F (°C)**	+32… + 140 (0…+ 60)			
	For storage	**°F (°C)**	- 40…+ 185 (- 40…+ 85)			
Degree of protection			IP 20			
Response time		**ms**	Depending on size of application			
Maximum current power consumption		**A**	0.5	9 per group Residual: 0.2 per group	0.6	
External fuse			10 A, slow blow			
Backup battery			None			
Connections			See page 2/30 for wire sizes of the various connector types.			
Digital outputs						
Number of outputs			4, not electrically isolated	16, not electrically isolated	–	
Permissible output channel current		**A**	20 max.	16 max.	–	
Output current		**A**	5 max.	1 max. at 140 °F (60 °C) 2 max. at 104 °F (40 °C)	–	
Maximum lamp load		**W**	60	10 for 1 A outputs 25 for 2 A outputs	–	
Maximum inductive load		**mH**	500	500	–	
Maximum leakage current	At state 0	**mA**	1 at 1 V	1 at 2 V	–	
Response to overload			Shutdown of outputs concerned with cyclic reconnection		–	
Relay outputs						
Relay type per channel			–	–	2, with positively guided contacts 1 magnetic, high resolution	
Outputs	Number		–	–	8	16
	Type				N.O.	
Switching voltage		**V**	–	–	⩾ 5, ⩽ ⎓ 250 V/ ∼ 250 V	⩾ 5, ⩽ ⎓ 30 V/ ∼ 60 V
Switching current		**mA**			3 A, with internal fuse Breaking capacity 100 A	3.15 A, with internal fuse Breaking capacity 100 A
Switching capacity (non inductive)	∼	**VA**	–	–	240 max., cos φ > 0.5	48 max., cos φ > 0.5
	Up to ⎓ 30 V	**W**			90 max. (3.15 A internal fuse)	
	Up to ⎓ 70 V	**W**			35 max. (0.5 A internal fuse)	–
	Up to ⎓ 127 V	**W**			30 max. (315 A internal fuse)	–
Contact material			–	–	Silver alloy	
Mechanical life			–	–	⩾ 1 million operating cycles	
Electrical life			–	–	⩾ 250 000 operating cycles on full load (resistive) and ⩽ 0.1 operating cycles/s	
Communication						
Ethernet network: safety communication using SafeEthernet protocol						
Transmission	Communication ports		Integrated 2 RJ45 switched Ethernet communications ports			
	Baud rate	**Mbps**	100 Half duplex, 10 Full duplex, Autonegotiation			
Structure			10BASE-T/100BASE-TX			
Medium			Dual twisted pair cable, category 5D or better (Ethernet)			

Introduction: page 2/84 | Specifications: page 2/88 | References: page 2/89 | Dimensions, mounting: page 2/90 | Connections: page 2/92

Safety automation system solutions

Preventa™ safety PLCs
Compact and modular
Safety remote output modules XPSMF2

References

XPSMF2DO401

XPSMF2DO1601

XPSMF2DO801

XPSMF2DO1602

*Products referenced **XPSMF2●●●●●●** are marked **HIMatrix® F2 DO...** (manufactured by Hima, sold by Schneider Electric).*

Safety remote output modules (⎓ 24 V supply)

For use with	Outputs		Ports	Reference	Weight oz (kg)
	Digital	Relay			
Safety PLCs, modular XPSMF60 or compact XPSMF40 and XPSMF31/30/35	4	–	Integrated 2 RJ45 switched Ethernet communications ports	**XPSMF2DO401**	28.219 (0.800)
	16	–	Integrated 2 RJ45 switched Ethernet communications ports	**XPSMF2DO1601**	29.983 (0.850)
	–	8	Integrated 2 RJ45 switched Ethernet communications ports	**XPSMF2DO801**	45.856 (1.300)
	–	16	Integrated 2 RJ45 switched Ethernet communications ports	**XPSMF2DO1602**	70.548 (2.000)

Connecting cables

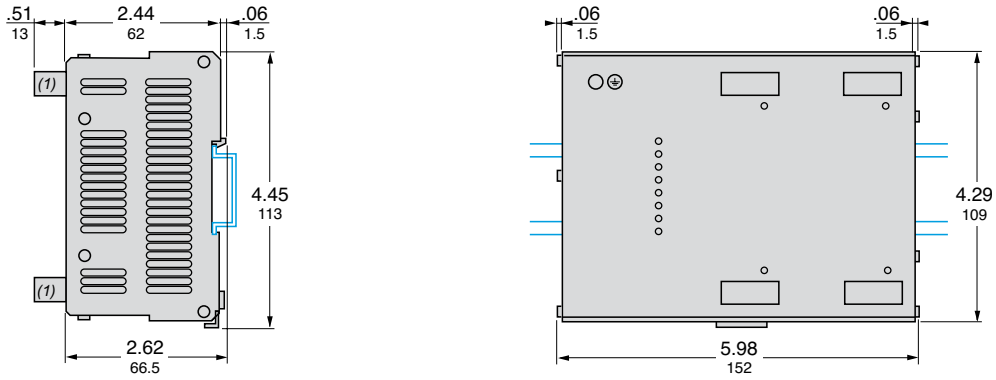
Description	For	Reference	Weight oz (kg)
Ethernet network connecting cables	Connection between safety remote output modules and modular or compact safety PLCs XPSMF RJ45 connector fitted at each end	See page 2/33	–

Safety automation system solutions

Preventa™ safety PLCs
Compact and modular
Safety remote output modules XPSMF2

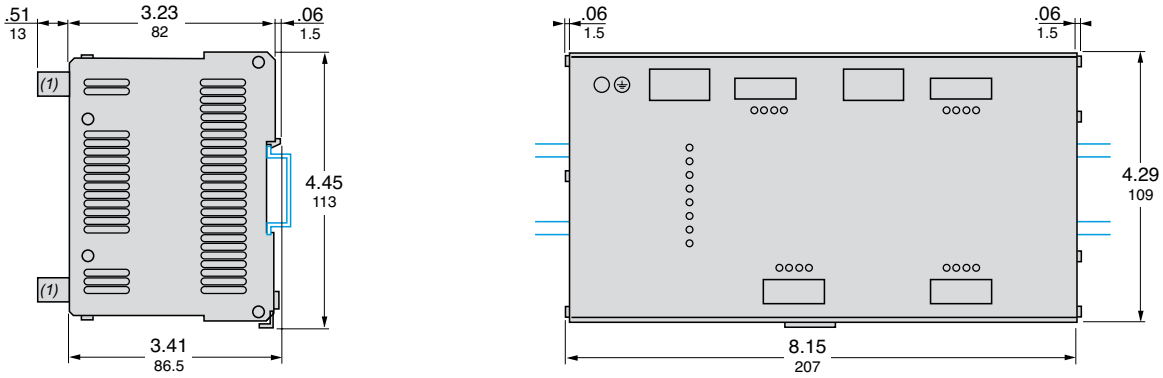
Dimensions

XPSMF2DO401



*(1) Removable screw terminals are provided with the safety output modules **XPSMF2DO401**.*

XPSMF2DO1601

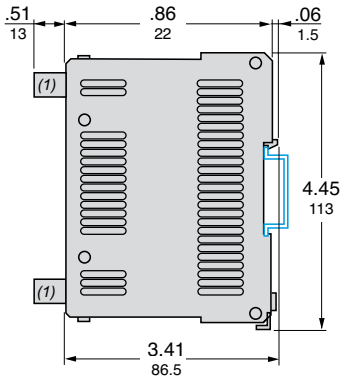


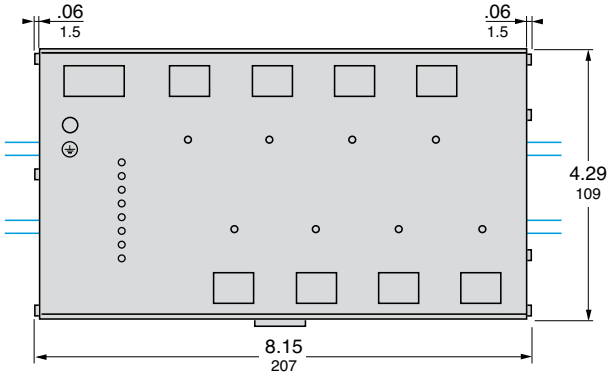
*(1) Removable screw terminals are provided with the safety output modules **XPSMF2DO1601**.*

Dual Dimensions: INCHES Millimieters

Dimensions

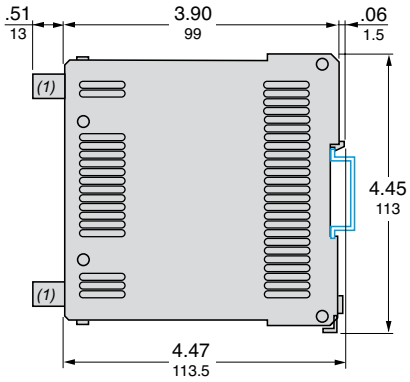
XPSMF2DO801

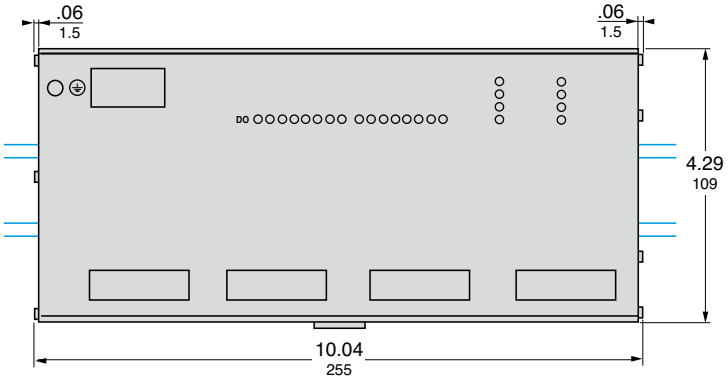




*(1) Removable screw terminals are provided with the safety output modules **XPSMF2DO801**.*

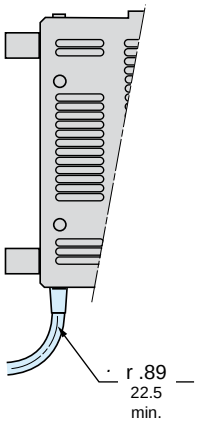
XPSMF2DO1602





*(1) Removable screw terminals are provided with the safety output modules **XPSMF2DO1602**.*

RJ45 connector for access to Ethernet network (SafeEthernet protocol)



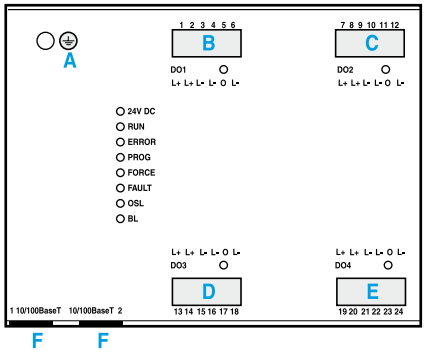
Dual Dimensions: INCHES / Millimieters

Safety automation system solutions

Preventa™ safety PLCs
Compact and modular
Safety remote output modules XPSMF2

Connections

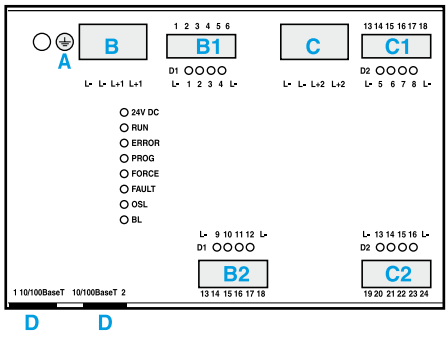
XPSMF2DO401



Item	Connection	Screw N°	Screw	Function
A	**Ground**	–	⏚	Ground
B	**Digital output 1**	1	L+	Supply for output 1
		2	L+	Supply for output 1
		3	L-	Reference pole
		4	L-	Reference pole
		5	O	Digital output 1
		6	L-	Reference pole
C	**Digital output 2**	7	L+	Supply for output 2
		8	L+	Supply for output 2
		9	L-	Reference pole
		10	L-	Reference pole
		11	O	Digital output 2
		12	L-	Reference pole
D	**Digital output 3**	13	L+	Supply for output 3
		14	L+	Supply for output 3
		15	L-	Reference pole
		16	L-	Reference pole
		17	O	Digital output 3
		18	L-	Reference pole
E	**Digital output 4**	19	L+	Supply for output 4
		20	L+	Supply for output 4
		21	L-	Reference pole
		22	L-	Reference pole
		23	O	Digital output 4
		24	L-	Reference pole

Item	Connection	Type	Function
F	**Programming**	Integrated 2 RJ45 switched Ethernet Communication ports	Either of the two switched Ethernet ports can be used to create a connection between the safety remote I/O and the programming terminal in a point to point or via an Ethernet network for setting the IP address
	Safe Communication (all XPSMF Safety PLCs and Remote I/Os)		Either of the two switched Ethernet ports can be used to create a connection between the safety PLC and other safety related components (e.g other XPSMF safety PLCs or Safety Remote I/O modules) this can be established in a point to point way or via an Ethernet network.

XPSMF2DO1601

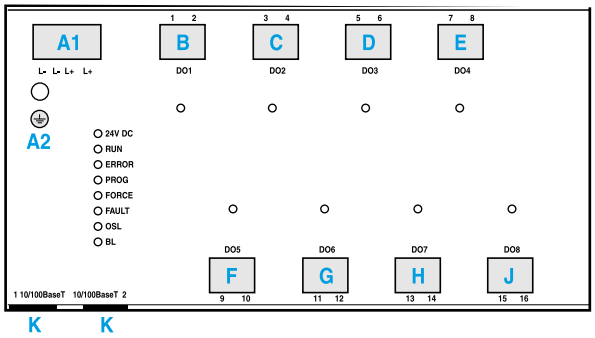


Item	Connection	Screw N°	Screw	Function
A	**Ground**	–	⏚	Ground
B	**Supply**	–	L-	Reference pole
		–	L-	Reference pole
		–	L+	Supply for outputs 1, 2, 3, 4, 9, 10, 11, 12
		–	L+	Supply for outputs 1, 2, 3, 4, 9, 10, 11, 12
B1	**Digital outputs**	1	L-	Reference pole
		2	1	Digital output 1
		3	2	Digital output 2
		4	3	Digital output 3
		5	4	Digital output 4
		6	L-	Reference pole
B2	**Digital outputs**	13	L-	Reference pole
		14	9	Digital output 9
		15	10	Digital output 10
		16	11	Digital output 11
		17	12	Digital output 12
		18	L-	Reference pole
C	**Supply**	–	L-	Reference pole
		–	L-	Reference pole
		–	L+	Supply for outputs 5, 6, 7, 8, 13, 14, 15, 16
		–	L+	Supply for outputs 5, 6, 7, 8, 13, 14, 15, 16
C1	**Digital outputs**	7	L-	Reference pole
		8	5	Digital output 5
		9	6	Digital output 6
		10	7	Digital output 7
		11	8	Digital output 8
		12	L-	Reference pole
C2	**Digital outputs**	19	L-	Reference pole
		20	13	Digital output 13
		21	14	Digital output 14
		22	15	Digital output 15
		23	16	Digital output 16
		24	L-	Reference pole

Item	Connection	Type	Function
D	**Programming**	Integrated 2 RJ45 switched Ethernet Communication ports	Either of the two switched Ethernet ports can be used to create a connection between the safety remote I/O and the programming terminal in a point to point or via an Ethernet network for setting the IP address
	Safe Communication (all XPSMF Safety PLCs and Remote I/Os)		Either of the two switched Ethernet ports can be used to create a connection between the safety PLC and other safety related components (e.g other XPSMF safety PLCs or Safety Remote I/O modules) this can be established in a point to point way or via an Ethernet network.

Connections

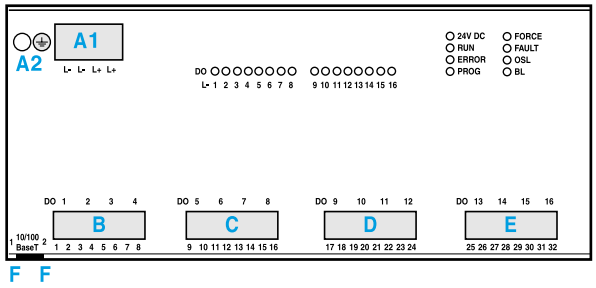
XPSMF2DO801



Item	Connection	Screw N°	Screw	Function
A1	**Supply**	–	L+	Supply for relay outputs
		–	L+	Supply for relay outputs
		–	L-	Reference pole
		–	L-	Reference pole
A2	**Ground**	–	⏚	Ground
B	**Relay output 1**	1	–	Contact 1, terminal A
		2	–	Contact 1, terminal B
C	**Relay output 2**	3	–	Contact 2, terminal A
		4	–	Contact 2, terminal B
D	**Relay output 3**	5	–	Contact 3, terminal A
		6	–	Contact 3, terminal B
E	**Relay output 4**	7	–	Contact 4, terminal A
		8	–	Contact 4, terminal B
F	**Relay output 5**	9	–	Contact 5, terminal A
		10	–	Contact 5, terminal B
G	**Relay output 6**	11	–	Contact 6, terminal A
		12	–	Contact 6, terminal B
H	**Relay output 7**	13	–	Contact 7, terminal A
		14	–	Contact 7, terminal B
J	**Relay output 8**	15	–	Contact 8, terminal A
		16	–	Contact 8, terminal B

Item	Connection	Type	Function
K	**Programming**	Integrated 2 RJ45 switched Ethernet Communication ports	Either of the two switched Ethernet ports can be used to create a connection between the safety remote I/O and the programming terminal in a point to point or via an Ethernet network for setting the IP address
	Safe Communication (all XPSMF Safety PLCs and Remote I/Os)		Either of the two switched Ethernet ports can be used to create a connection between the safety PLC and other safety related components (e.g other XPSMF safety PLCs or Safety Remote I/O modules) this can be established in a point to point way or via an Ethernet network.

XPSMF2DO1602



Item	Connection	Screw N°	Screw	Function
A1	**Supply**	–	L+	Supply for relay outputs
		–	L+	Supply for relay outputs
		–	L-	Reference pole
		–	L-	Reference pole
A2	**Ground**	–	⏚	Ground
B	**Relay outputs 1 to 4**	1	–	Contact 1, terminal A
		2	–	Contact 1, terminal B
		3	–	Contact 2, terminal A
		4	–	Contact 2, terminal B
		5	–	Contact 3, terminal A
		6	–	Contact 3, terminal B
		7	–	Contact 4, terminal A
		8	–	Contact 4, terminal B
C	**Relay outputs 5 to 8**	9	–	Contact 5, terminal A
		10	–	Contact 5, terminal B
		11	–	Contact 6, terminal A
		12	–	Contact 6, terminal B
		13	–	Contact 7, terminal A
		14	–	Contact 7, terminal B
		15	–	Contact 8, terminal A
		16	–	Contact 8, terminal B
D	**Relay outputs 9 to 12**	17	–	Contact 9, terminal A
		18	–	Contact 9, terminal B
		19	–	Contact 10, terminal A
		20	–	Contact 10, terminal B
		21	–	Contact 11, terminal A
		22	–	Contact 11, terminal B
		23	–	Contact 12, terminal A
		24	–	Contact 12, terminal B
E	**Relay outputs 13 to 16**	25	–	Contact 13, terminal A
		26	–	Contact 13, terminal B
		27	–	Contact 14, terminal A
		28	–	Contact 14, terminal B
		29	–	Contact 15, terminal A
		30	–	Contact 15, terminal B
		31	–	Contact 16, terminal A
		32	–	Contact 16, terminal B

Item	Connection	Type	Function
F	**Programming**	Integrated 2 RJ45 switched Ethernet Communication ports	Either of the two switched Ethernet ports can be used to create a connection between the safety remote I/O and the programming terminal in a point to point or via an Ethernet network for setting the IP address
	Safe Communication (all XPSMF Safety PLCs and Remote I/Os)		Either of the two switched Ethernet ports can be used to create a connection between the safety PLC and other safety related components (e.g other XPSMF safety PLCs or Safety Remote I/O modules) this can be established in a point to point way or via an Ethernet network.

Safety automation system solutions

Preventa™ safety PLCs
Compact and modular
Safety remote mixed I/O modules XPSMF3

XPSMF3DIO8801

XPSMF3DIO16801

XPSMF3DIO20802

XPSMF3AIO8401

*Products referenced **XPSMF3●●●●●●** are marked **HIMatrix® F3...** (manufactured by Hima, sold by Schneider Electric).*

Introduction

XPSMF3DIO/AIO are compact safety remote input/output modules which are designed to extend the I/O capacity of safety PLCs **XPSMF**, either compact or modular, to which they are associated.
The communication with either the compact or modular safety PLCs is managed via one of its' integrated 2 RJ45 switched Ethernet communications ports.
Safety modules **XPSMF3DIO/AIO** do not have a user program: they receive their instructions from its' parent safety PLC.

Safety remote mixed I/O modules XPSMF3DIO/AIO

Mixed I/O safety modules	Remote inputs		Remote outputs	
	N°	Type	N°	Type
XPSMF3DIO8801	**8**	Digital	**8 DO+ / 2 DO-**	Digital
			2	Line control
XPSMF3DIO16801	**16**	Digital	**8 2-pole or 16 single-pole**	Digital
			2	Line control
XPSMF3DIO20802	**20**	Digital	**8**	Digital
XPSMF3AIO8401	**8**	Analog	**4**	Analog (non safety outputs)

Examples of remote inputs of safety modules XPSMF3●IO●●●●●

■ **Digital inputs**

Safety actuators	Safety detection	Safety dialog
Contactors-motors, Control relays, Variable speed drives	Limit switches, Guard switches, with reset and with actuator, Light curtains type 2 and type 4, Safety mats and sensing edges	Mushroom head Emergency stops, Enclosures for control and signalling units, Two-hand control stations

■ **Analog inputs**

Closed circuit scanning of input channels,
Single-pole measuring of 0 to 10 V voltages,
Measuring, using jumper, 0/4 to 20 mA currents (with 500 Ω external resistor).

Examples of remote outputs of safety modules XPSMF3●IO●●●●●

■ **Digital outputs**

Safety actuators	Safety dialog
Contactors-motors, Control relays, Variable speed drives	Beacons and indicator banks, Rotating mirror beacons, Sirens

■ **Line control outputs**

Short-circuit and line break monitoring

■ **Analog outputs**

Closed circuit scanning of output channels,
Single-pole measuring of 0 to 10 V voltages,
Measuring, using jumper, 0/4 to 20 mA currents (with 500 Ω external resistor).

Safety automation system solutions

Preventa™ safety PLCs
Compact and modular
Safety remote mixed I/O modules XPSMF3

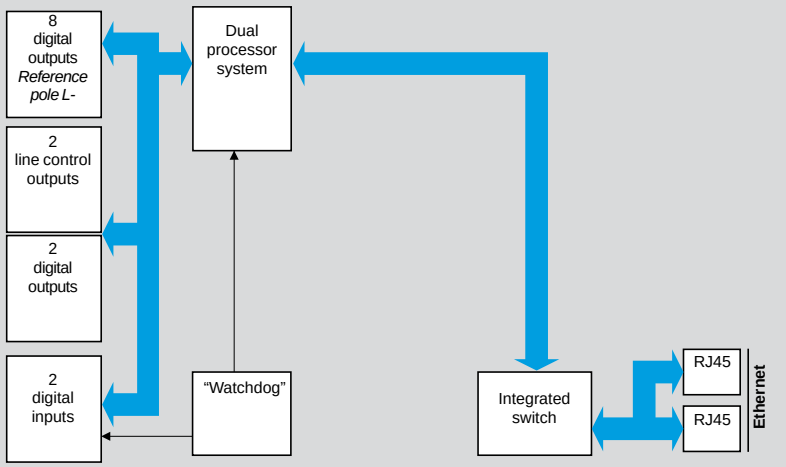
Safety PLCs

In order to meet safety requirements, the safety remote mixed I/O modules **XPSMF3●IO●●●●●** incorporate two essential functions (**Redundancy** and **Self-monitoring)** complying to category 4 conforming to EN 954-1 and performance level “e” conforming to EN/ISO 13849-1 in addition to the SafeEthernet safety communication protocol between these safety remote mixed I/O modules and the safety PLCs (**Special Switch**).

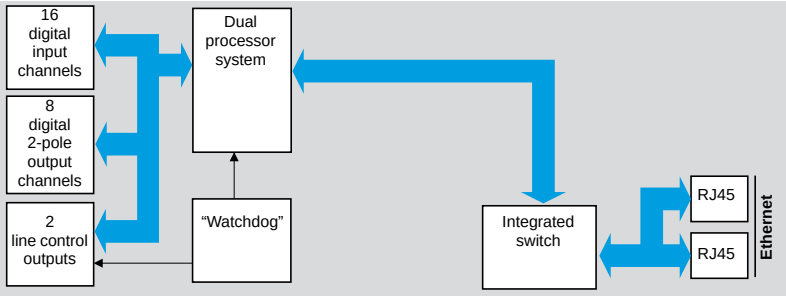
■ **Redundancy**: the dual processor integrated in safety modules **XPSMF3●IO●●●●●** analyzes and compares the data received from the safety inputs and outputs. The incoming and outgoing data (programmed values and received values) are received in parallel by the two processors and compared in real-time.
■ **Self-monitoring (“Watchdog”)**: the safety remote mixed I/O modules **XPSMF3●IO●●●●●** continuously monitor the data processing cycle and the execution of tasks, and intervenes if the cycle time does not conform to the predefined value.
■ **The integrated switch (Special Switch)** stores for a very short time and sends at very high speed the data provided by the inputs and outputs of the safety modules on the Ethernet network, while avoiding signal collisions and excessive amounts of data on the network.

Functional diagrams

Remote mixed I/O module XPSMF3DIO8801



Remote mixed I/O module XPSMF3DIO16801

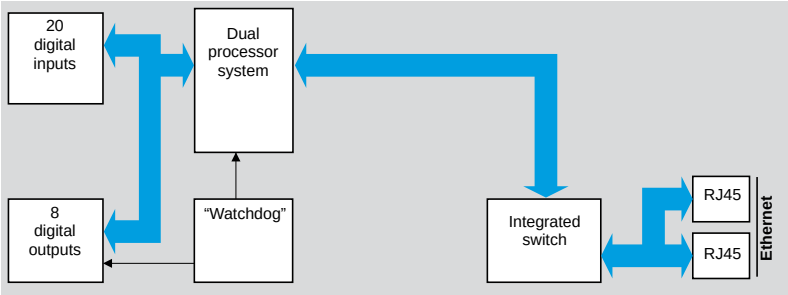


Safety automation system solutions
Preventa™ safety PLCs
Compact and modular
Safety remote mixed I/O modules XPSMF3

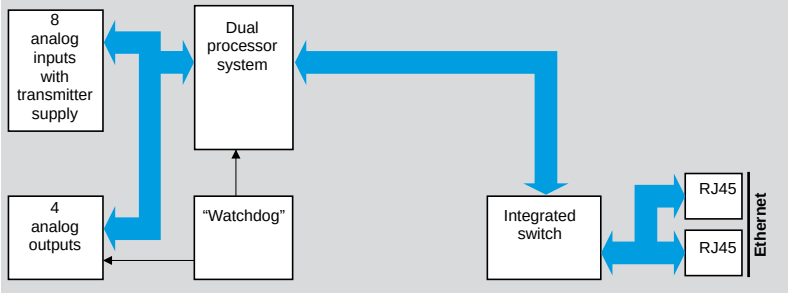
2

Functional diagrams *(continued)*

Remote mixed I/O module XPSMF3DIO20802



Remote mixed I/O module XPSMF3AIO8401



Line control

Line control is a means of short-circuit and line break monitoring.
Using line control outputs enables SIL 3 (EN/IEC 61508) and category 4 (EN 954-1) safety to be achieved. The line control outputs send a high signal with a very short low signal, thus enabling a wiring anomaly (short-circuit, line break) to be seen at the inputs of the safety modules.

Examples

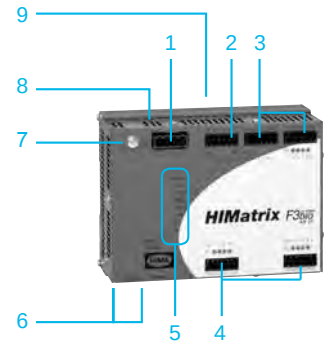
- For **XPSMF3DIO8801** and **XPSMF3DIO16801**, the line control outputs 1 and 2 are connected to the digital inputs of the same circuit.
- For **XPSMF3DIO20802**, the digital outputs 1 to 8 are connected to the digital inputs of the same circuit.

Safety communication on Ethernet network

The safety remote mixed I/O modules **XPSMF3●IO●●●●** incorporate two RJ45 (type 10BASE-T/100BASE-TX) integrated switched ports, that enable communication on the Ethernet network using SafeEthernet communication protocol and therefore, data exchange with compact or modular safety PLCs **XPSMF**.

Safety automation system solutions

Preventa™ safety PLCs
Compact and modular
Safety remote mixed I/O modules XPSMF3

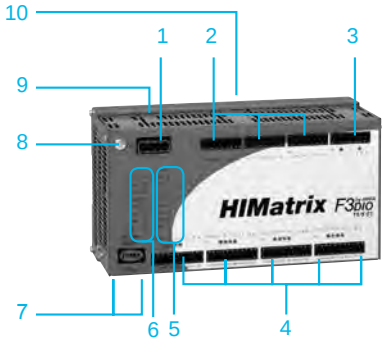


Description

Remote mixed I/O module XPSMF3DIO8801

On the front cover of the metal enclosure:

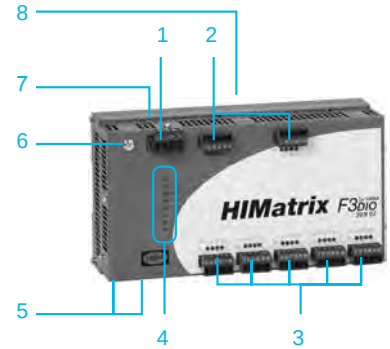
1 One terminal block *(1)* for ⎓ 24 V supply.
2 One terminal block *(1)* for connection of line control outputs, with four line control output status LEDs.
3 Two terminal blocks *(1)* for connection of digital outputs, with output status LED (four LEDs per terminal block).
4 Two terminal blocks *(1)* for connection of digital inputs, with input status LED (four LEDs per terminal block).
5 Eight process status LEDs.
6 Two RJ45 (type 10BASE-T/100BASE-TX) integrated switched ports, for connection on Ethernet network and for configuring IP address.
7 One ground connection screw.
8 One “Reset” button (on the top).
9 On the rear face: One spring operated mounting device for mounting on 35 mm DIN rail.



Remote mixed I/O module XPSMF3DIO16801

On the front cover of the metal enclosure:

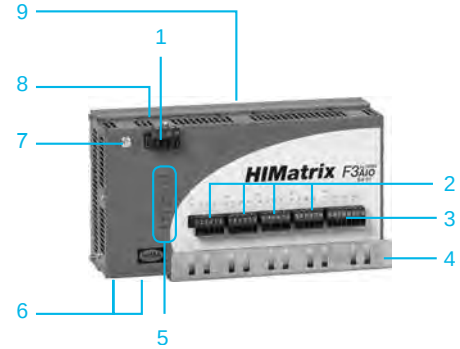
1 One terminal block *(1)* for ⎓ 24 V supply.
2 Three terminal blocks for connection of digital output channels.
3 One terminal block *(1)* for connection of line control outputs.
4 Four terminal blocks *(1)* for connection of digital inputs, with input status LED (four LEDs per terminal block).
5 Sixteen digital output status LEDs.
6 Eight process status LEDs.
7 Two RJ45 (type 10BASE-T/100BASE-TX) integrated switched ports, for connection on Ethernet network and for configuring IP address.
8 One ground connection screw.
9 One “Reset” button (on the top).
10 On the rear face: One spring operated mounting device for mounting on 35 mm DIN rail.



Remote mixed I/O module XPSMF3DIO20802

On the front cover of the metal enclosure:

1 One terminal block *(1)* for ⎓ 24 V supply.
2 Two terminal blocks *(1)* for connection of digital outputs, with output status LED (four LEDs per terminal block)
3 Five terminal blocks *(1)* for connection of digital inputs, with input status LED (four LEDs per terminal block).
4 Eight process status LEDs.
5 Two RJ45 (type 10BASE-T/100BASE-TX) integrated switched ports, for connection on Ethernet network and for configuring IP address.
6 One ground connection screw.
7 One “Reset” button (on the top).
8 On the rear face: One spring operated mounting device for mounting on 35 mm DIN rail.



Remote mixed I/O module XPSMF3AIO8401

On the front cover of the metal enclosure:

1 One terminal block *(1)* for ⎓ 24 V supply.
2 Four terminal blocks *(1)* for connection of analog inputs.
3 One terminal block *(1)* for connection of analog outputs.
4 One metal plate for securing shielded analog input/output connection cables (EMC).
5 Eight process status LEDs.
6 Two RJ45 (type 10BASE-T/100BASE-TX) integrated switched ports, for connection on Ethernet network and for configuring IP address.
7 One ground connection screw.
8 One “Reset” button (on the top).
9 On the rear face: one spring operated mounting device for mounting on 35 mm DIN rail.

*(1) Removable screw terminals are provided with the safety remote mixed I/O modules **XPSMF3DIO/AIO**.*

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Status LED details

Safety remote mixed I/O modules XPSMF3●IO●●●●●

LED	Color	Status	Meaning
24 VDC	Green	On	⎓ 24 V voltage present.
		Off	No voltage.
RUN	Green	On	Normal service mode, loaded program running, the PLC receives I/O messages, communication and hardware/ software tests carried out.
		Flashing	The CPU is in STOP and is not executing any user application. All the outputs are reset to a safe, de-energized state.
		Off	The CPU is in “ERROR” state (see ERROR).
ERROR	Red	On	Software error or hardware anomaly detected by the CPU.
			The monitoring program (Watchdog) has triggered the STOP state of the process because the programmed cycle time has been exceeded.
			The CPU has stopped the execution of the user application, ended all hardware and software tests and all outputs have been reset.
			The process can only be started again from the PC.
		Off	No errors detected.
PROG	Orange	On	The CPU is being loaded with a new configuration.
		Flashing	The FLASH ROM is being loaded with a new operating system.
		Off	No loading of configuration or operating system.
FORCE	Orange	On	The CPU is in RUN mode and force is active.
		Flashing	The system is not processing (STOP), but force is prepared and is activated if the dual processor is started.
		Off	Force mode not activated.
FAULT	Orange	On	Error display for line control.
			The user application has caused an error.
			The system configuration is defective.
			The loading of a new operating system was defective and the operating system is corrupt.
		Flashing	An error has occurred while writing to FLASH ROM memory (during updating of the operating system).
			One or more I/O errors have occurred.
		Off	None of the above errors have occurred.
OSL	Orange	Flashing	Emergency loading of the operating system is active.
BL	Orange	Flashing	COM in INIT_Fail state.
RJ45	Green	On	Full duplex mode operation.
		Flashing	Signal collision.
		Off	Half duplex mode operation, no collision.
	Yellow	On	Connection established.
		Flashing	Interface active.

Safety automation system solutions

Preventa™ safety PLCs
Compact and modular
Safety remote mixed I/O modules XPSMF3

Specifications

Safety remote mixed I/O module type			XPSMF3DIO8801	XPSMF3DIO16801	XPSMF3DIO20802	XPSMF3AIO8401
Supply voltage		**V**	⎓ 24 (external supply with separate protection conforming toEN/IEC 60950, SELV (Safety Extra Low Voltage) or PELV (Protection Extra Low Voltage) rated)			
Voltage limits		**V**	- 15…+ 20%			
Ambient air temperature	For operation	**°F (°C)**	+ 32… + 140 (0…+ 60)			
	For storage	**°F (°C)**	- 40…+ 185 (- 40…+ 85)	- 40…+ 185 (- 40… + 85) without battery	- 40…+ 185 (- 40…+ 85)	
Degree of protection			IP 20			
Response time		**ms**	Depending on size of application			
Maximum current power consumption		**A**	8	14 (max. load) Residual: 0.6	8 (max. load) Residual: 0.4	0.8
External fuse			10 A, slow blow	16 A, slow blow	–	–
Backup battery			None	–	None	None
Connections			See page 2/30 for wire sizes of the various connector types.			

Digital inputs

Safety remote mixed I/O module type			XPSMF3DIO8801	XPSMF3DIO16801	XPSMF3DIO20802
Number	Inputs not electrically isolated		8	16	20
Voltage	At state 1	**V**	⎓ 15…30		
		mA	> 2 at ⎓ 15 V		⩾ 2 at ⎓ 15 V
	At state 0	**V**	⎓ 5 max.		
		mA	1.5 max. 1.25 at ⎓ 5 V	1.5 max. 1 at ⎓ 5 V	1.5 max. 1.25 at ⎓ 5 V
Switching voltage		**V**	7.5	7.5	7.5
Switching time		**µs**	–	250	–
Supply		**V**	2 x 20 V/100 mA at 24 V, protected against short-circuits	4 x 20 V/40 mA at 24 V, protected against short-circuits, buffered for 20 ms. 20 V/2 A total at 22 V, protected against short-circuits, not buffered Max. current 2 A at 140 °F (60 °C)	5 x 20 V/100 mA at 24 V, protected against short-circuits
LED display			Yes		

Digital outputs

Safety remote mixed I/O module type			XPSMF3DIO8801	XPSMF3DIO16801	XPSMF3DIO20802
Number	Outputs not electrically isolated		8 DO+ (reference pole L-)	8 x 2-pole or 16 x single-pole	8
			2 DO- (reference pole S+)		
Output voltage		**V**	⎓ 24 ± 2	⎓ 24 ± 3	⎓ 24 ± 2
Output current	Channels 1 to 3 and 5 to 7	**A**	DO+: 0.5 at 140 °F (60 °C)	2 max. at 104 °F (40 °C) 1 max. at 140 °F (60 °C) 10 mA min.	0.5 at 140 °F (60 °C)
	Channels 4 and 8	**A**	DO+: 1 at 140 °F (60 °C), 2 at 104 °F (40 °C)		1 at 140 °F (60 °C), 2 at 50 °C
	Channels 1 and 2	**A**	DO-: 1 at 140 °F (60 °C)	–	–
Lamp load	Channels 1 to 3 and 5 to 7	**W**	DO+: 10	25 max.	–
	Channels 4 and 8		DO+: 25		
	Channels 1 and 2		DO-: 25		
Inductive load	Channels 1 to 3 and 5 to 7		DO+: 500	500 mH max.	–
	Channels 4 and 8		DO+: 500		
	Channels 1 and 2		DO-: 500		
Line break		**kΩ**	–	> 5	–
Short-circuit threshold		**Ω**	–	< 10	–
Minimum load		**mA**	2 per channel		
Leakage current at state 0		**mA**	1 max. at 2 V		
Response to overload			Shutdown of outputs concerned with cyclic reconnection		
Total output current		**A**	7 max.	9 max. (14 A for 2 ms)	7 max.
			Shutdown of all outputs if exceeded with cyclic reconnection		
LED display			Yes		

2

Specifications *(continued)*

Line control outputs

Module type			XPSMF3DIO8801	XPSMF3DIO16801
Number	Outputs not electrically isolated		2	2
Output voltage		**V**	20, depending on the supply voltage	
Output current		**mA**	60	
Minimum load			None	
Response to overload			4 x ≥ 19.2 V/60 mA (on 24 V), short-circuit current	
LED display			Yes	

Analog inputs

Safety remote mixed I/O module type			XPSMF3AIO8401
Number	Inputs not electrically isolated		8, single-pole
External jumper		Ω	250 or 500 depending on application
Input values	Nominal value	**V**	⎓ 0…10
		mA	0…20, with 500 Ω jumper
	Service value	**V**	⎓ 0.1…11.5
		mA	0/4…23, with 500 Ω jumper
Input impedance		**MΩ**	2
Maximum distance of equipment			984 ft (300 m)
Internal resistance of signal source		Ω	≤ 500
Overvoltage protection		**V**	+ 15, - 4
Resolution			12-bit
Safety accuracy			± 2%
LED display			No

Analog outputs

Safety remote mixed I/O module type			XPSMF3AIO8401
Number	Outputs not electrically isolated		4 non safety outputs with breaking of safety common
Signal	Nominal range	**mA**	4…20
	Usable range	**mA**	0…20
Load impedance		Ω	600 max.
Maximum distance of equipment			984 ft (300 m)
Resolution			12-bit
Relative error			± 1%
LED display			No

Communication

Ethernet network: safety communication using SafeEthernet protocol

Safety remote mixed I/O module type			XPSMF3DIO8801	XPSMF3DIO16801	XPSMF3DIO20802	XPSMF3AIO8401
Transmission	Communication ports		Integrated 2 RJ45 switched Ethernet communications ports			
	Baud rate	**Mbps**	100 Half duplex, 10 Full duplex, Autonegotiation			
Structure			10BASE-T/100BASE-TX			
Medium			Dual twisted pair cable, category 5D or better (Ethernet)			

Safety automation system solutions

Preventa™ safety PLCs
Compact and modular
Safety remote mixed I/O modules XPSMF3

XPSMF3DIO8801

XPSMF3DIO16801

XPSMF3DIO20802

XPSMF3AIO8401

*Products referenced **XPSMF3●●●●●●** are marked **HIMatrix® F3...** (manufactured by Hima, sold by Schneider Electric).*

References

Safety remote mixed I/O modules (⎓ 24 V supply)

For use with	Inputs		Outputs			Ports	Reference	Weight oz (kg)
	Digital	Analog	Digital	Line control	Analog			
Safety PLCs, modular XPSMF60 or compact XPSMF40 and XPSMF31/30/35	8	–	8 DO+ 2 DO-	2	–	Integrated 2 RJ45 switched Ethernet communications ports	**XPSMF3DIO8801**	35.274 (1.000)
	16	–	8 x 2 or 16 x 1	2	–	Integrated 2 RJ45 switched Ethernet communications ports	**XPSMF3DIO16801**	45.856 (1.300)
	20	–	8 *(1)*	–	–	Integrated 2 RJ45 switched Ethernet communications ports	**XPSMF3DIO20802**	35.273 (1.000)
	–	8	–	–	4	Integrated 2 RJ45 switched Ethernet communications ports	**XPSMF3AIO8401**	33.510 (0.950)

Connecting cables

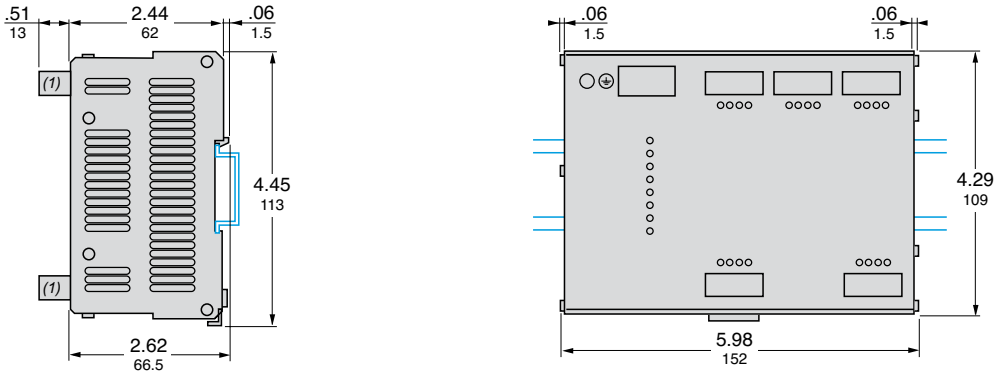
Description	For	Reference	Weight oz (kg)
Ethernet network connecting cables	Connection between safety remote mixed I/O modules and modular or compact safety PLCs XPSMF. RJ45 connector fitted at each end	See page 2/33	–

(1) Configurable for line control.

Safety automation system solutions

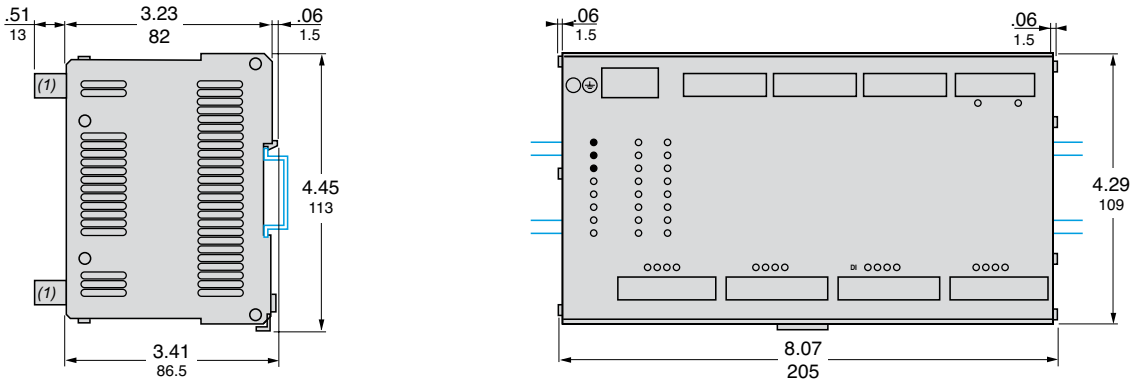
Preventa™ safety PLCs
Compact and modular
Safety remote mixed I/O modules XPSMF3

XPSMF3DIO8801



*(1) Removable screw terminals are provided with the safety remote mixed I/O modules **XPSMF3DIO8801**.*

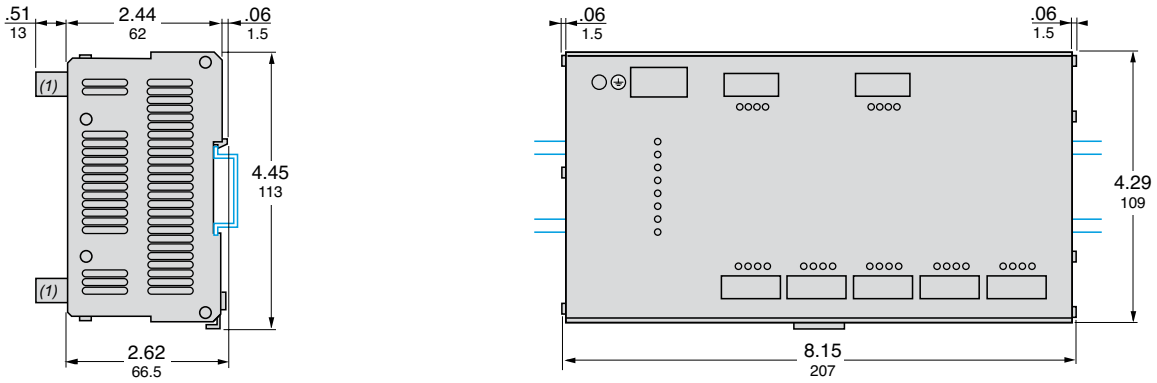
XPSMF3DIO16801



*(1) Removable screw terminals are provided with the safety remote mixed I/O modules **XPSMF3DIO16801**.*

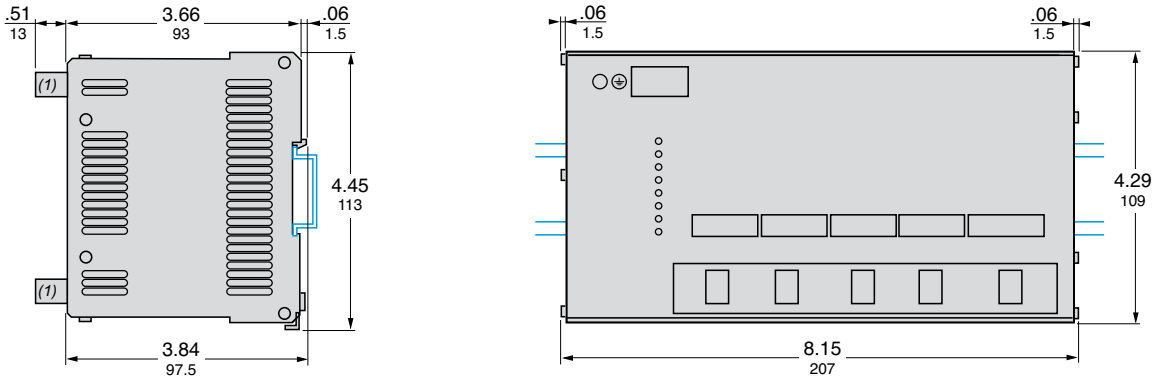
Dual Dimensions: INCHES Millimieters

XPSMF3DIO20802



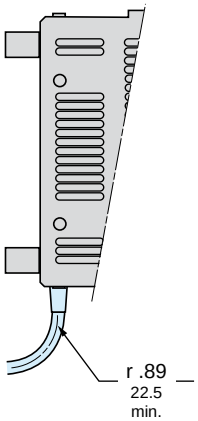
*(1) Removable screw terminals are provided with the safety remote mixed I/O modules **XPSMF3DIO20802**.*

XPSMF3AIO8401



*(1) Removable screw terminals are provided with the safety remote mixed I/O modules **XPSMF3AIO8401**.*

RJ45 connector for access to Ethernet network (SafeEthernet protocol)

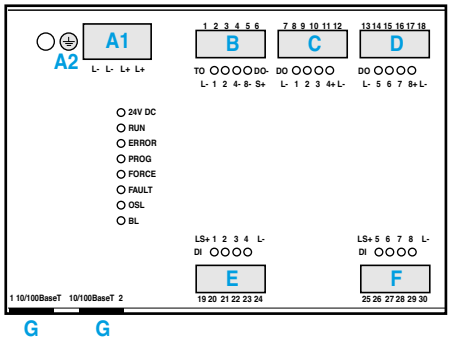


Dual Dimensions: INCHES Millimieters

Safety automation system solutions

Preventa™ safety PLCs
Compact and modular
Safety remote mixed I/O modules XPSMF3

XPSMF3DIO8801

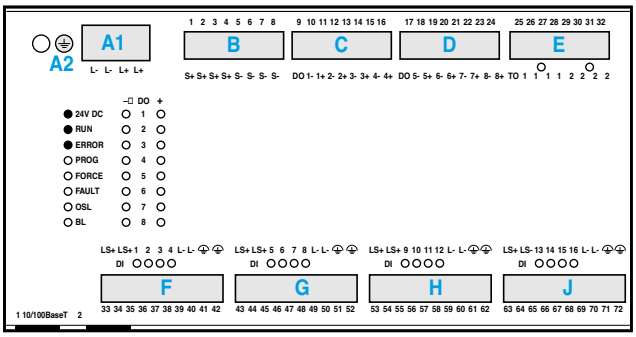


Item	Connection	Screw N°	Screw	Function
A1	**Supply**	–	L-	⎓ 24 V (reference pole)
		–	L-	⎓ 24 V (reference pole)
		–	L+	⎓ 24 V
		–	L+	⎓ 24 V
A2	**Ground**	–	⏚	Ground
B	**Outputs - Line control/ Digital**	1	L-	Reference pole
		2	1	Line control output 1
		3	2	Line control output 2
		4	4-	Digital output 4- (for increased load)
		5	8-	Digital output 8- (for increased load)
		6	S+	Reference pole
C	**Outputs - Digital**	7	L-	Reference pole
		8	1	Digital output 1
		9	2	Digital output 2
		10	3	Digital output 3
		11	4+	Digital output 4+ (for increased load)
		12	L-	Reference pole
D	**Outputs - Digital**	13	L-	Reference pole
		14	5	Digital output 5
		15	6	Digital output 6
		16	7	Digital output 7
		17	8+	Digital output 8+ (for increased load)
		18	L-	Reference pole
E	**Inputs - Digital**	19	LS+	Sensor supply for inputs 1 to 4
		20	1	Digital input 1
		21	2	Digital input 2
		22	3	Digital input 3
		23	4	Digital input 4
		24	L-	Reference pole
F	**Inputs - Digital**	25	LS+	Sensor supply for inputs 5 to 8
		26	5	Digital input 5
		27	6	Digital input 6
		28	7	Digital input 7
		29	8	Digital input 8
		30	L-	Reference pole

Item	Connection		Function
G	**Programming**	Integrated 2 RJ45 switched Ethernet Communication ports	Either of the two switched Ethernet ports can be used to create a connection between the safety remote I/O and the programming terminal in a point to point or via an Ethernet network for setting the IP address
	Safe Communication (all XPSMF Safety PLCs and Remote I/Os)	Integrated 2 RJ45 switched Ethernet Communication ports	Either of the two switched Ethernet ports can be used to create a connection between the safety PLC and other safety related components (e.g other XPSMF safety PLCs or Safety Remote I/O modules) this can be established in a point to point way or via an Ethernet network.

Connections

XPSMF3DIO16801



Item	Connection	Screw N°	Screw	Function
A1	**Supply**	–	L+	⎓ 24 V
			L+	⎓ 24 V
			L-	⎓ 24 V (reference pole)
			L-	⎓ 24 V (reference pole)
A2	**Ground**	–	⏚	Ground
B	**Supply of single-pole digital outputs**	1	S+	–
		2	S+	–
		3	S+	–
		4	S+	–
		5	S-	–
		6	S-	–
		7	S-	–
		8	S-	–
C	**Outputs - Digital**	9	1-	Output 1
		10	1+	Output 1
		11	2-	Output 2
		12	2+	Output 2
		13	3-	Output 3
		14	3+	Output 3
		15	4-	Output 4
		16	4+	Output 4
D	**Outputs - Digital**	17	5-	Output 5
		18	5+	Output 5
		19	6-	Output 6
		20	6+	Output 6
		21	7-	Output 7
		22	7+	Output 7
		23	8-	Output 8
		24	8-	Output 8
E	**Outputs - Line control**	25	1	Output 1
		26	1	Output 1
		27	1	Output 1
		28	1	Output 1
		29	2	Output 2
		30	2	Output 2
		31	2	Output 2
		32	2	Output 2

Item (cont.)	Connection	Screw N°	Screw	Function
F	**Inputs - Digital**	33	LS+	Sensor supply for inputs 1 to 4 (not protected)
		34	LS+	Sensor supply for inputs 1 to 4 (protected)
		35	1	Input 1
		36	2	Input 2
		37	3	Input 3
		38	4	Input 4
		39	L-	⎓ 24 V (reference pole)
		40	L-	⎓ 24 V (reference pole)
		41	PA	Electrically clean ground
		42	PA	Electrically clean ground
G	**Inputs - Digital**	43	LS+	Sensor supply for inputs 5 to 8 (not protected)
		44	LS+	Sensor supply for inputs 5 to 8 (protected)
		45	5	Input 5
		46	6	Input 6
		47	7	Input 7
		48	8	Input 8
		49	L-	⎓ 24 V (reference pole)
		50	L-	⎓ 24 V (reference pole)
		51	PA	Electrically clean ground
		52	PA	Electrically clean ground
H	**Inputs - Digital**	53	LS+	Sensor supply for inputs 9 to 12 (not protected)
		54	LS+	Sensor supply for inputs 9 to 12 (protected)
		55	9	Input 9
		56	10	Input 10
		57	11	Input 11
		58	12	Input 12
		59	L-	⎓ 24 V (reference pole)
		60	L-	⎓ 24 V (reference pole)
		61	PA	Electrically clean ground
		62	PA	Electrically clean ground
J	**Inputs - Digital**	63	LS+	Sensor supply for inputs 13 to 16 (not protected)
		64	LS+	Sensor supply for inputs 13 to 16 (protected)
		65	5	Input 13
		66	6	Input 14
		67	7	Input 15
		68	8	Input 16
		69	L-	⎓ 24 V (reference pole)
		70	L-	⎓ 24 V (reference pole)
		71	PA	Electrically clean ground
		72	PA	Electrically clean ground

Item	Connection		Function
K	**Programming**	Integrated 2 RJ45 switched Ethernet Communication ports	Either of the two switched Ethernet ports can be used to create a connection between the safety remote I/O and the programming terminal in a point to point or via an Ethernet network for setting the IP address
	Safe Communication (all XPSMF Safety PLCs and Remote I/Os)		Either of the two switched Ethernet ports can be used to create a connection between the safety PLC and other safety related components (e.g other XPSMF safety PLCs or Safety Remote I/O modules) this can be established in a point to point way or via an Ethernet network.

Safety automation system solutions

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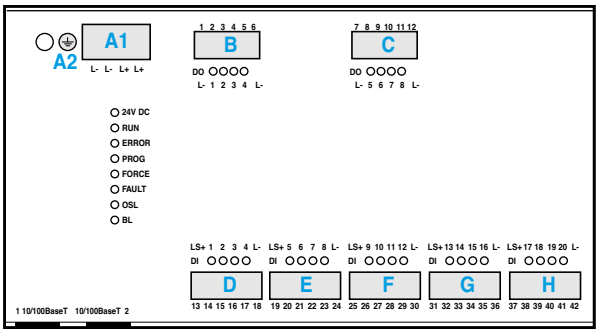
Compact and modular
Safety remote mixed I/O modules XPSMF3

Connections

XPSMFDIO20802

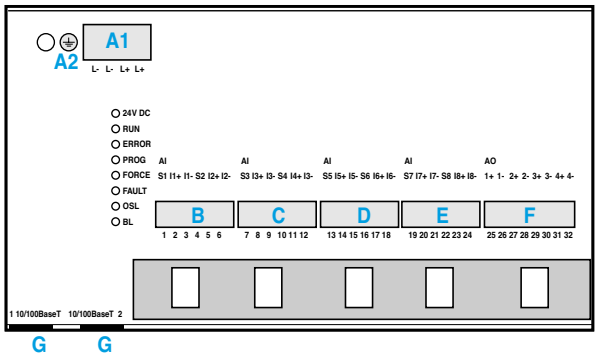


Item	Connection	Screw N°	Screw	Function
A1	**Supply**	–	L+	⎓ 24 V
			L+	⎓ 24 V
			L-	⎓ 24 V (reference pole)
			L-	⎓ 24 V (reference pole)
A2	**Ground**		⏚	Ground
B	**Outputs - Digital**	1	L-	Outputs common
		2	1	Output 1
		3	2	Output 2
		4	3	Output 3
		5	4	Output 4 (for increased load)
		6	L-	Outputs common
C	**Outputs - Digital**	7	L-	Outputs common
		8	5	Output 5
		9	6	Output 6
		10	7	Output 7
		11	8	Output 8 (for increased load)
		12	L-	Outputs common
D	**Inputs - Digital**	13	LS+	Sensor supply for inputs 1 to 4
		14	1	Digital input 1
		15	2	Digital input 2
		16	3	Digital input 3
		17	4	Digital input 4
		18	L-	Inputs common
E	**Inputs - Digital**	19	LS+	Sensor supply for inputs 5 to 8
		20	5	Digital input 5
		21	6	Digital input 6
		22	7	Digital input 7
		23	8	Digital input 8
		24	L-	Inputs common
F	**Inputs - Digital**	25	LS+	Sensor supply for inputs 9 to 12
		26	9	Digital input 9
		27	10	Digital input 10
		28	11	Digital input 11
		29	12	Digital input 12
		30	L-	Inputs common
G	**Inputs - Digital**	31	LS+	Sensor supply for inputs 13 to 16
		32	13	Digital input 13
		33	14	Digital input 14
		34	15	Digital input 15
		35	16	Digital input 16
		36	L-	Inputs common
H	**Inputs - Digital**	37	LS+	Sensor supply for inputs 17 to 20
		38	17	Digital input 17
		39	18	Digital input 18
		40	19	Digital input 19
		41	20	Digital input 20
		42	L-	Inputs common

Item	Connection		Function
J	**Programming**	Integrated 2 RJ45 switched Ethernet Communication ports	Either of the two switched Ethernet ports can be used to create a connection between the safety remote I/O and the programming terminal in a point to point or via an Ethernet network for setting the IP address
	Safe Communication (all XPSMF Safety PLCs and Remote I/Os)		Either of the two switched Ethernet ports can be used to create a connection between the safety PLC and other safety related components (e.g other XPSMF safety PLCs or Safety Remote I/O modules) this can be established in a point to point way or via an Ethernet network.

Connections

XPSMF3AIO8401

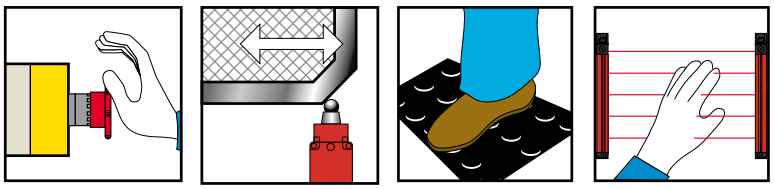


Item	Connection	Screw N°	Screw	Function
A1	**Supply**	–	L+	⎓ 24 V
			L+	⎓ 24 V
			L-	⎓ 24 V (reference pole)
			L-	⎓ 24 V (reference pole)
A2	**Ground**		⏚	Ground
B	**Inputs - Analog**	1	S1	Transmitter supply 1
		2	I1+	Input 1
		3	I1-	Reference pole
		4	S2	Transmitter supply 2
		5	I2+	Input 2
		6	I2-	Reference pole
C	**Inputs - Analog**	7	S3	Transmitter supply 3
		8	I3+	Input 3
		9	I3-	Reference pole
		10	S4	Transmitter supply 4
		11	I4+	Input 4
		12	I4-	Reference pole
D	**Inputs - Analog**	13	S5	Transmitter supply 5
		14	I5+	Input 5
		15	I5-	Reference pole
		16	S6	Transmitter supply 6
		17	I6+	Input 4
		18	I6-	Reference pole
E	**Inputs - Analog**	19	S7	Transmitter supply 7
		20	I7+	Input 7
		21	I7-	Reference pole
		22	S8	Transmitter supply 8
		23	I8+	Input 8
		24	I8-	Reference pole
F	**Outputs - Analog**	25	O1+	Output 1
		26	O1-	Output 1 reference pole
		27	O2+	Output 2
		28	O2-	Output 2 reference pole
		29	O3+	Output 3
		30	O3-	Output 3 reference pole
		31	O4+	Output 4
		32	O4-	Output 4 reference pole

Item	Connection		Function
G	**Programming**	Integrated 2 RJ45 switched Ethernet Communication ports	Either of the two switched Ethernet ports can be used to create a connection between the safety remote I/O and the programming terminal in a point to point or via an Ethernet network for setting the IP address
	Safe Communication (all XPSMF Safety PLCs and Remote I/Os)		Either of the two switched Ethernet ports can be used to create a connection between the safety PLC and other safety related components (e.g other XPSMF safety PLCs or Safety Remote I/O modules) this can be established in a point to point way or via an Ethernet network.

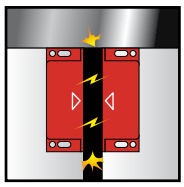
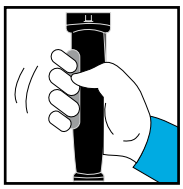
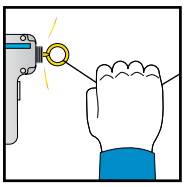
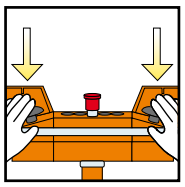
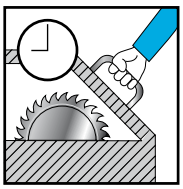
Safety automation system solutions
Preventa™ safety controllers

Applications



Modules	**Controllers for monitoring 2 independent safety functions simultaneously. User selection of 2 functions from a choice of 15. Programmable from front cover of controller.**

Functions		◻ Emergency stop monitoring ◻ Switch monitoring ◻ Enabling switch monitoring ◻ Sensing mat or edges monitoring ◻ Light curtain monitoring, relay output type
Conformity to standards		EN 954-1 - category 4/ISO 13849-1, EN/IEC 60204-1, DIN V VDE 801 + A1, EN/IEC 60947-1 + A11, EN/IEC 60947-5-1
Product certifications		UL, CSA, BIA
Number of circuits		
	Safety	6 N.O. (3 N.O. per function)
	Additional	3 solid-state outputs for signalling to PLC
Display		12 LEDs
Supply voltage		⎓ 24 V
Communication	CANopen bus	–
	Profibus bus	–
	Modbus™ network	–
Module type		**XPSMP**
Page		2/112

Configurable controllers using software, for several independent safety functions: selection of safety functions using configuration software running on Windows® (16 or 32 inputs and 8 independent safety outputs)

- Emergency stop monitoring
- Limit switch monitoring
- Two-hand control monitoring
- Light curtain monitoring, with or without “muting” function
- Enabling switch monitoring, coded magnetic switch monitoring
- Safety mat monitoring
- Hydraulic press solenoid valve monitoring
- Eccentric press safety stop at top dead center monitoring. Zero speed detection
- Hydraulic press monitoring
- Eccentric press monitoring
- Foot switch monitoring
- Chain shaft breakage monitoring
- Position selector

EN 954-1 - category 4/ISO 13849-1,
IEC 61508 - SIL 3,
EN/IEC 60204-1,
EN 1760-1/ISO 13856-1,
EN/IEC 60947-5-1,
EN/IEC 61496-1,
EN 574/ISO 13851,
EN 954-1/ISO 13849-1

UL, CSA, TÜV

4 N.O. (2 N.O. per function) + 6 solid-state

1 “muting” signalling output

LED display on front cover

⎓ 24 V

Via SUB-D 9-pin male connector, only on XPSMC16ZC and XPSMC32ZC

Via SUB-D 9-pin female connector, only on XPSMC16ZP and XPSMC32ZP

Via RJ45 connector, on all controllers XPSMC●●Z●

XPSMC

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Safety automation system solutions

Preventa™ safety controllers type XPSMP

With pre-defined functions

Introduction

Operating principle

Preventa™ safety controller modules XPSMP are designed to conform with category 4 of the standard EN 954-1/ISO 13849-1.
They enable two independent safety functions (selected from a choice of 15 pre-defined configurations) to be performed using the same product. Configuration selection is easily made using 3 buttons on the front cover of the module.

These 15 pre-programmed safety functions provide a solution for the majority of safety applications up to level 4 conforming to the standard EN 954-1/ISO 13849-1, for example: monitoring Emergency stops, limit switches, safety mats and sensing edges, enabling switches, coded magnetic switches, type 4 relay output light curtains conforming to EN/IEC 61496-1 (for example, light curtains type XUS L. Safety controllers XPSMP incorporate 6 safety outputs (3 per function) and 3 solid-state signalling outputs for signalling to the process PLC.

To aid diagnostics, the modules have LEDs on the front cover which provide information on the monitoring circuit status. They also indicate and assist selection of the 2 required configurations.

	Configuration	Synchronization time	Type of start *(1)*		Start test	Notes
			Automatic or unmonitored	Monitored		
Functions disabled	**0**	–	–	–	–	Factory setting
Emergency stop monitoring, 1-channel wiring (category 2)	**1**	–	X	–	–	–
	2	–	–	X	–	–
Emergency stop monitoring, 2-channel wiring, or guard monitoring (category 4)	**3**	Unlimited	X	–	X	–
	4	Unlimited	–	X	X	–
	5	1.5 s	X	–	X	–
	6	1.5 s	–	X	X	–
	7	Unlimited	X	–	–	–
	8	Unlimited	–	X	–	–
Guard monitoring for injection press or blowing machine (category 4)	**9**	1.5 s	–	X	X	Uses both safety outputs *(2)*
Enabling grip switch monitoring (3 position switch) (category 4)	**10**	–	X	–	X	The start button acts as start-up preparation
Sensing mat and edges monitoring (category 3)	**11**	–	X	–	–	Mats with circuit making contacts
	12	–	–	X	–	
Relay output light curtain monitoring (category 4)	**13**	0.5 s	–	X	X	–
Non-contact safety interlock switch monitoring (category 4)	**14**	1.5 s	X	–	–	Magnetic switches with 2 contacts, 1 N.O. and 1 N.C.
	15	1.5 s	–	X	–	

(1) Automatic start: there is no start contact or it is jumpered.
Unmonitored start: the output is activated on closing of the start contact.
Monitored start: the start input is monitored so that there is no start-up in the event of the start contact being jumpered or the start circuit being closed for more than 10 seconds.
Start-up is triggered following activation of the start button (push-release function) on opening of the contact.
(2) Tool zone guard with 3rd switch.
Additional rear guard (optional) with automatic start. The opening of the guard cuts all outputs.

Safety automation system solutions

Preventa™ safety controllers type XPSMP

With pre-defined functions

Specifications

Module type			XPSMP11123	XPSMP11123P
Conformity to standards			EN/IEC 60204-1, DIN V VDE 801 + A1, EN/IEC 60947-1 + A11, EN/IEC 60947-5-1	
Product certifications			UL, CSA, BIA	
Product designed for max. use in safety related parts of control systems (conforming to EN 954-1/ISO 13849-1)			Category 4 max.	
Supply		**V**	⎓ 24	
Voltage limits			- 20…+ 20%	
Power consumption		**W**	⩽ 5	
Module inputs fuse protection			Internal, electronic	
Start button monitoring			Yes/No (depending on configuration selected)	
Control unit voltage Between input terminals C1-I1, C2-I2, C3-I3, C4-I4, C5-I5 or C6-I6		**V**	24 (at nominal supply voltage)	
Calculation of wiring resistance RL between input terminals		Ω	100 max. Maximum cable length: 6561 ft (2000 m)	
Synchronization time between inputs		**s**	0.5, 1.5 or unlimited, depending on configuration selected	
Outputs	Voltage reference		Relay hard contacts	
	Number and type of safety circuits		3 N.O. per function (6 N.O. total) (13-14, 23-24, 33-34, 43-44, 53-54, 63-64)	
	Number and type of additional circuits		3 solid-state	
	Breaking capacity in AC-15	**VA**	C300: inrush 1800, maintained 180	
	Breaking capacity in DC-13		24 V/1.5 A L/R = 50 ms	
	Breaking capacity of solid-state outputs		24 V/20 mA	
	Max. thermal current (Ithe) for each group of 3 outputs		3.3 A for all 3 outputs, or 6 A for 1 output and 2 A for the other 2 outputs, or 2 A for 1 output and 4 A for the other 2 outputs	
	Max. total thermal current	**A**	20	
	Output fuse protection		4 gG or 6 fast acting, conforming to EN/IEC 60947-5-1, DIN VDE 0660 part 200	
	Minimum current	**mA**	10	
	Minimum voltage	**V**	17	
Electrical life			See page 3/12	
Response time on input opening		**ms**	< 30	
Rated insulation voltage (Ui)		**V**	300 (degree of pollution 2 conforming to EN/IEC 60947-5-1, DIN VDE 0110 parts 1 & 2)	
Rated impulse withstand voltage (Uimp.)		**kV**	4 (overvoltage category III, conforming to EN/IEC 60947-5-1, DIN VDE 0110 parts 1 & 2)	
LED display			12	
Operating temperature		**°F (°C)**	+ 14…+ 131 (- 10…+ 55)	
Storage temperature		**°F (°C)**	- 13…+ 267.8 (- 25…+ 85)	
Degree of protection conforming to IEC 60529	Terminals		IP 20	
	Enclosure		IP 40	
Connections	Type		Captive screw clamp terminals	Captive screw clamp terminals, removable terminal block
	1-wire connection, without cable end		Solid or flexible cable: 26-14 AWG (0.14… 2.5 mm²)	Solid or flexible cable: 24-14 AWG (0.2… 2.5 mm²)
	1-wire connection, with cable end		Without bezel, flexible cable: 24-14 AWG (0.25…2.5 mm²)	
			With bezel, flexible cable: 24-16 AWG (0.25…1.5 mm²)	With bezel, flexible cable: 24-14 AWG (0.25…2.5 mm²)
	2-wire connection, without cable end		Solid or flexible cable: 26-20 AWG (0.14…0.75 mm²)	Solid cable: 24-18 AWG (0.2…1 mm²) Flexible cable: 24-18 AWG (0.2…1.5 mm²)
	2-wire connection, with cable end		Without bezel, flexible cable: 24-18 AWG (0.25…1 mm²)	
			Double, with bezel, flexible cable: 22-14 AWG (0.5…1.5 mm²)	

Safety automation system solutions

Preventa™ safety controllers type XPSMP

With pre-defined functions

XPSMP11123

XPSMP11123P

References

Description	Type of terminal block connection	Number of safety circuits	Additional outputs	Supply	Reference	Weight oz (kg)
Modules for 2 independent safety functions	Integrated in module	3 N.O. per function (6 N.O. total)	3 solid-state	⎓ 24 V	**XPSMP11123**	11.287 (0.320)
	Removable from module	3 N.O. per function (6 N.O. total)	3 solid-state	⎓ 24 V	**XPSMP11123P**	11.287 (0.320)

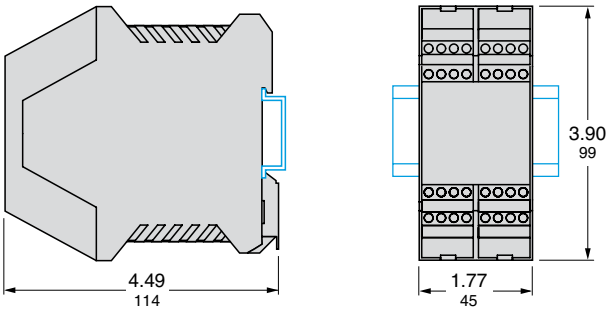
Safety automation system solutions

Preventa™ safety controllers type XPSMP

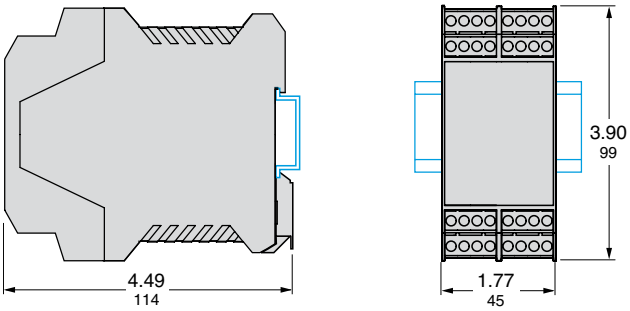
AM1 DP200 rail mounting

Dimensions

XPSMP●●●●

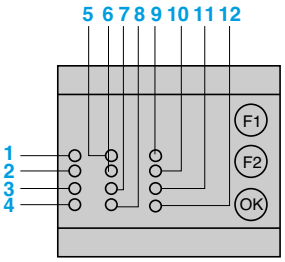


XPSMP●●●●P



Dual Dimensions: INCHES Millimieters

LED details



1-2-3	Function 1 configuration code.
4	K1/K2 status (function 1, N.O. safety outputs closed).
5-6-7	Function 2 configuration code.
8	K3/K4 status (function 2, N.O. safety outputs closed).
9	Supply voltage A1-A2.
10	Fault.
11	Function 1 configuration.
12	Function 2 configuration.
F1, F2, OK:	Configuration buttons.

Safety automation system solutions

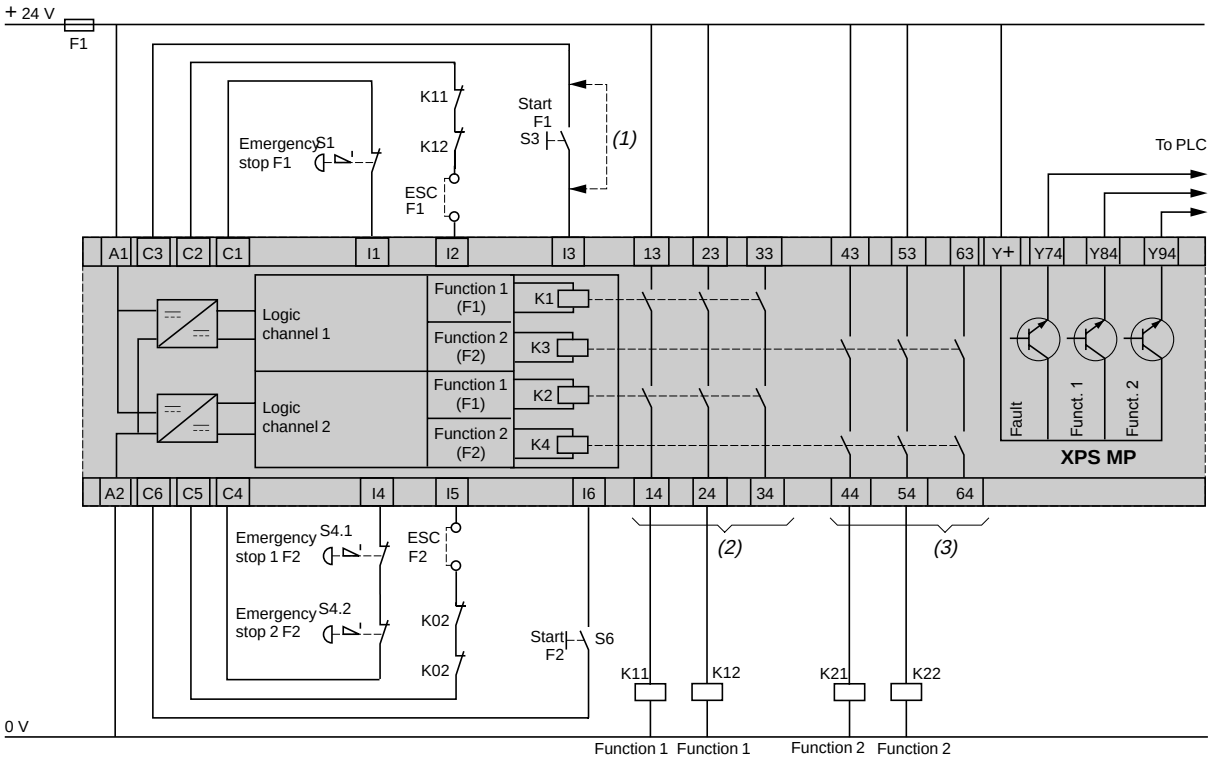
Preventa™ safety controllers type XPSMP

With pre-defined functions

XPSMP

Emergency stop monitoring, 1-channel wiring

Configuration 1 (1-channel Emergency stop, automatic or unmonitored start) = function 1.
Configuration 2 (1-channel Emergency stop, monitored start) = function 2.

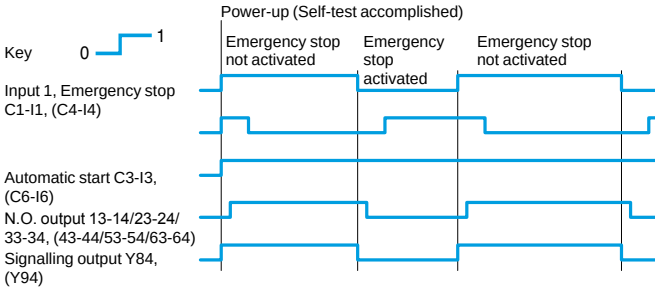


(1) Automatic start.
(2) Function 1 safety outputs.
(3) Function 2 safety outputs.
ESC = External start conditions.

Functional diagrams

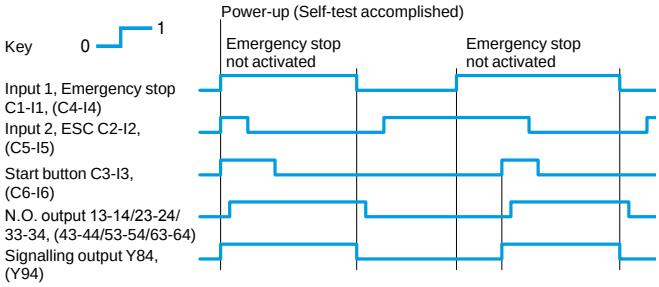
Configuration 1

Automatic start



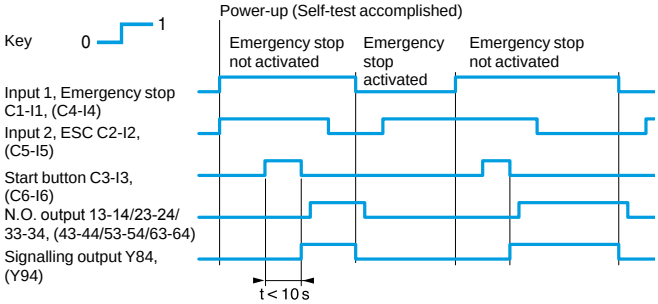
Configuration 1

Unmonitored start



Configuration 2

Monitored start

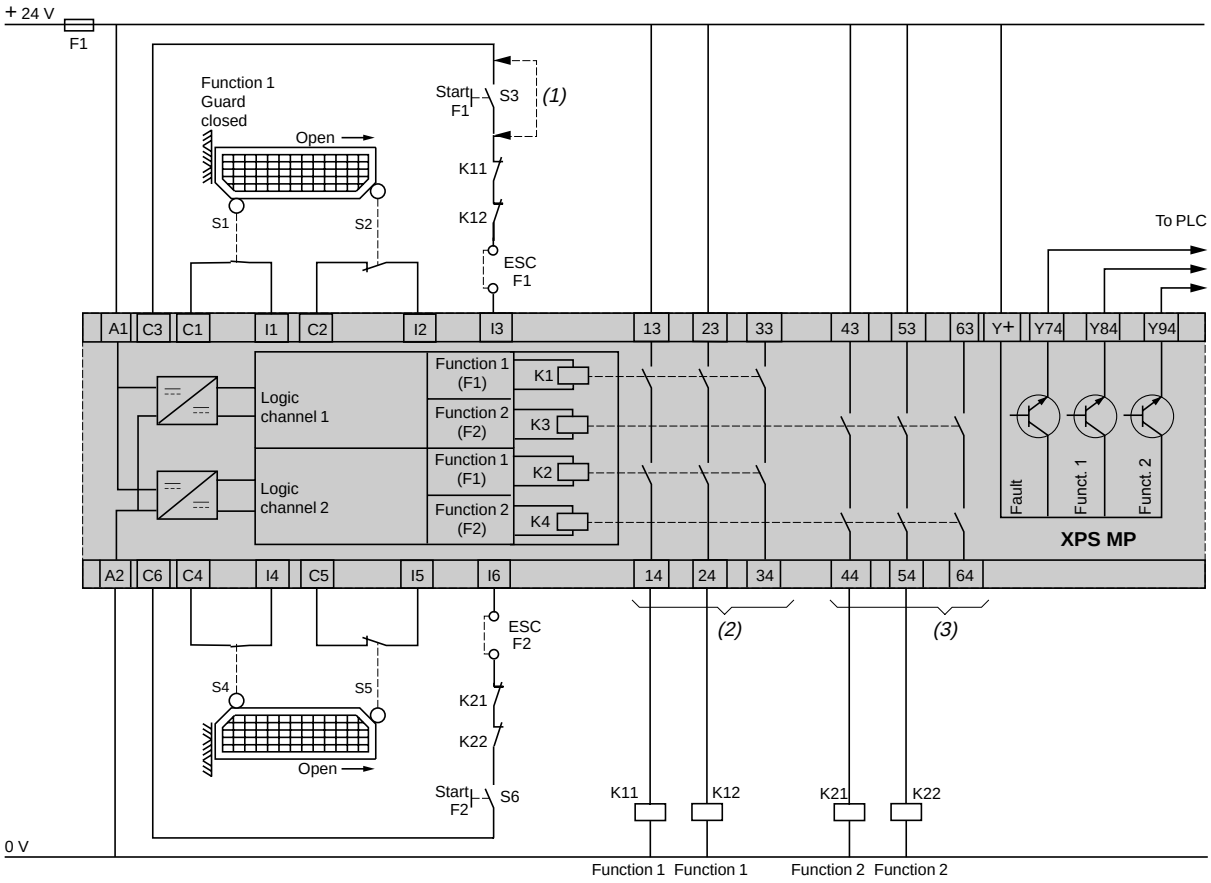


2

XPSMP

Guard monitoring with start test

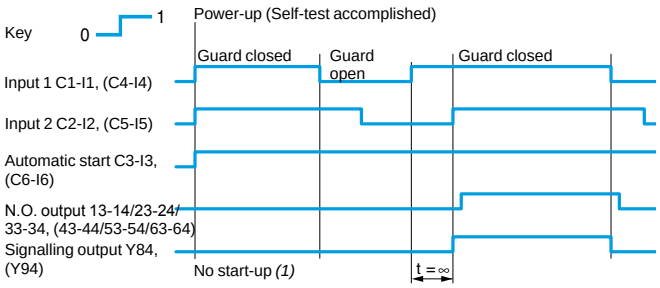
Configuration 3 (locking of guard with start test, automatic or unmonitored start) = function 1.
Configuration 4 (locking of guard with start test, monitored start) = function 2.



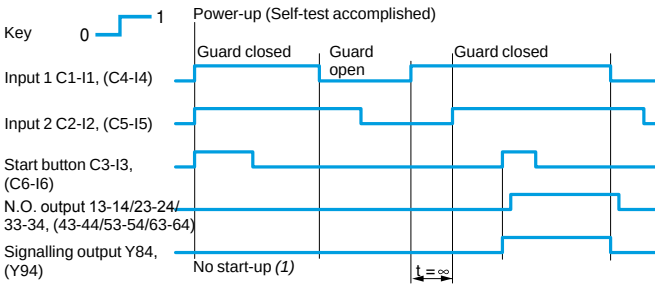
(1) Automatic start.
(2) Function 1 safety outputs.
(3) Function 2 safety outputs.
ESC = External start conditions.

Functional diagrams

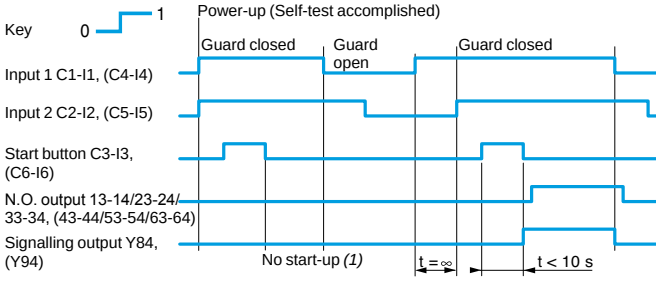
Configuration 3
Automatic start



Configuration 3
Unmonitored start



Configuration 4
Monitored start



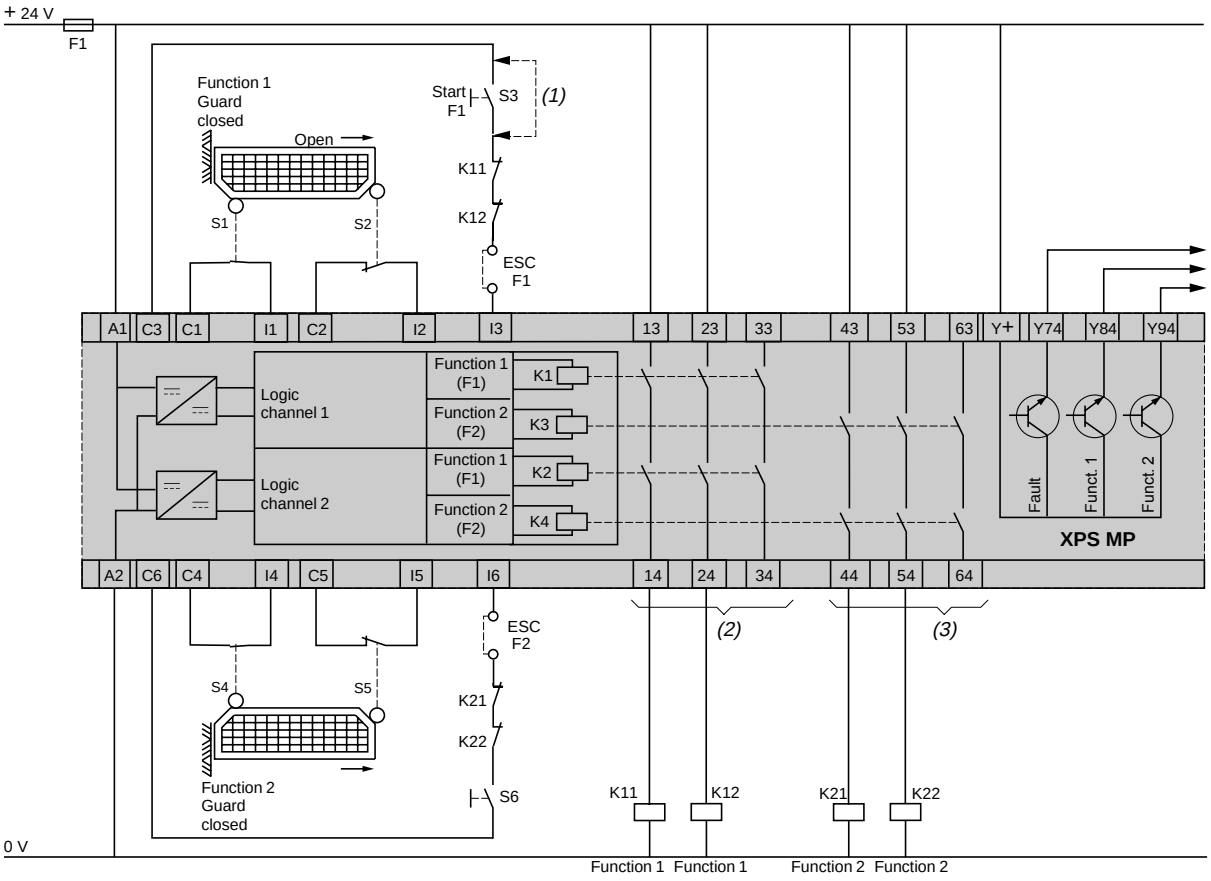
(1) Prevention of start-up necessary: to check the sensors connected, open and reclose the guard.

2

XPSMP

Guard monitoring with start test and synchronization time = 1.5 ms

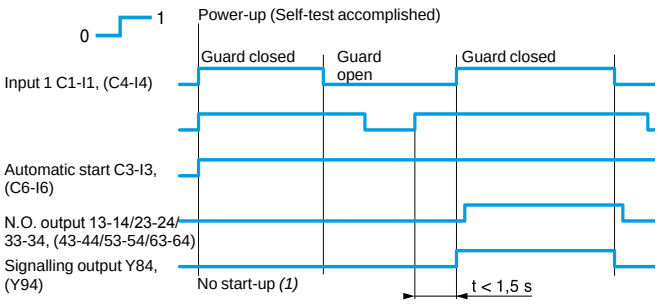
Configuration 5 (locking of guard with start test, automatic or unmonitored start) = function 1.
Configuration 6 (locking of guard with start test, monitored start) = function 2.



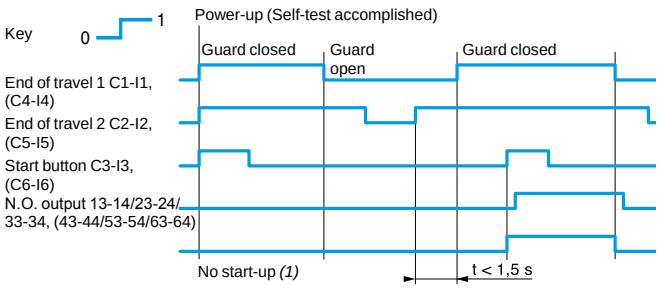
(1) Automatic start.
(2) Function 1 safety outputs.
(3) Function 2 safety outputs.
ESC = External start conditions.

Functional diagrams

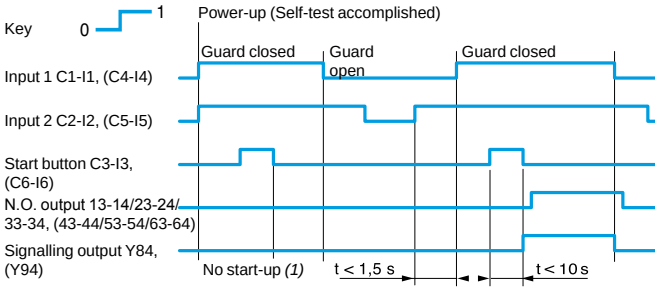
Configuration 5
Automatic start



Configuration 5
Unmonitored start



Configuration 6
Monitored start

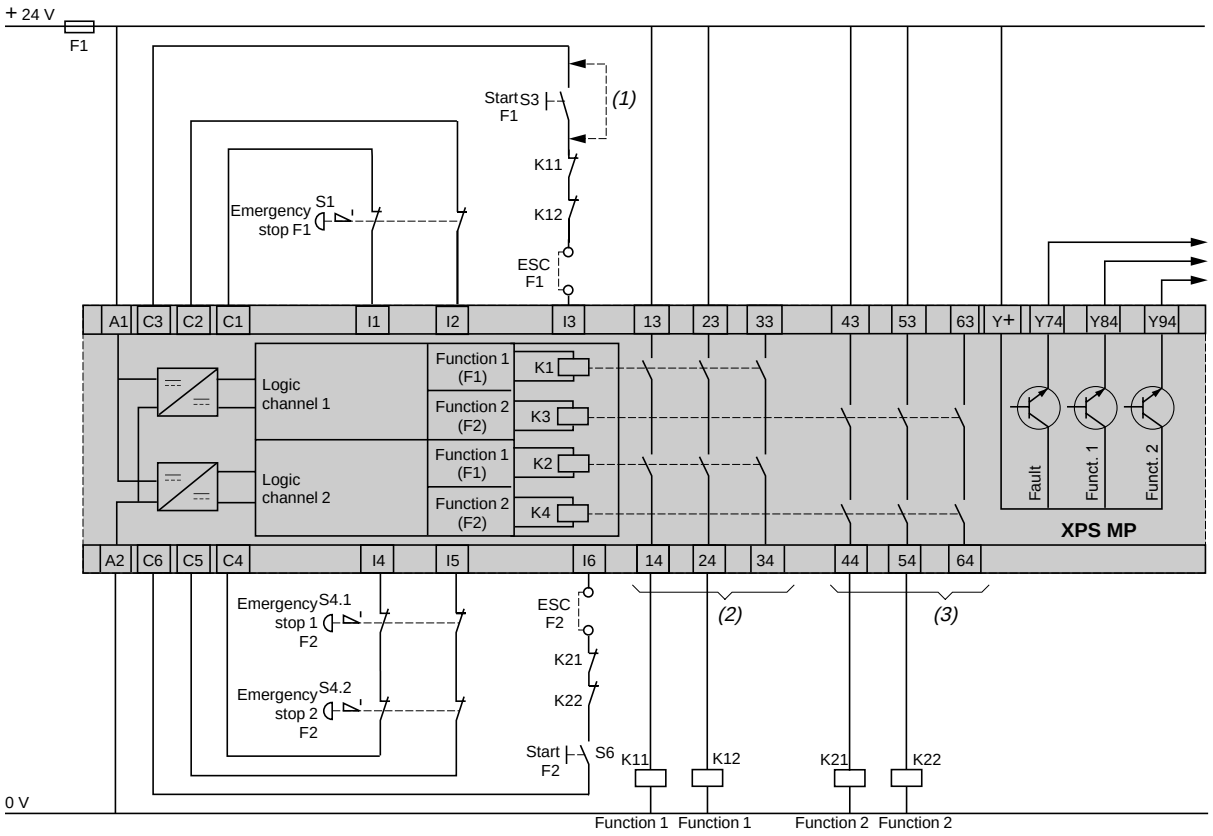


(1) Prevention of start-up necessary: to check the sensors connected, open and reclose the guard.

XPSMP

Emergency stop monitoring, 2-channel wiring

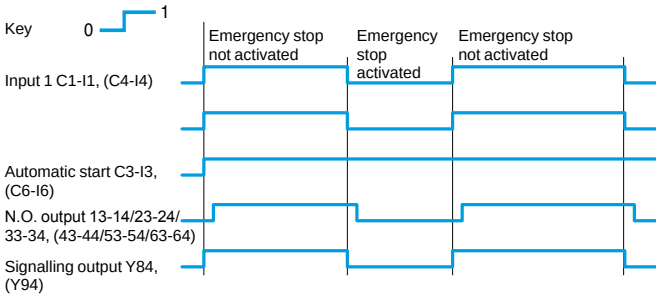
Configuration 7 (2-channel Emergency stop, automatic or unmonitored start) = function 1.
Configuration 8 (2-channel Emergency stop, monitored start) = function 2.



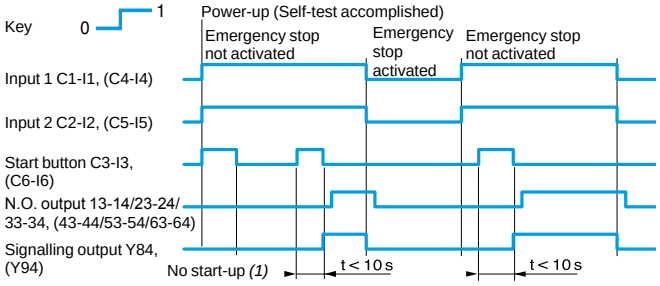
(1) Automatic start.
(2) Function 1 safety outputs.
(3) Function 2 safety outputs.
ESC = External start conditions.

Functional diagrams

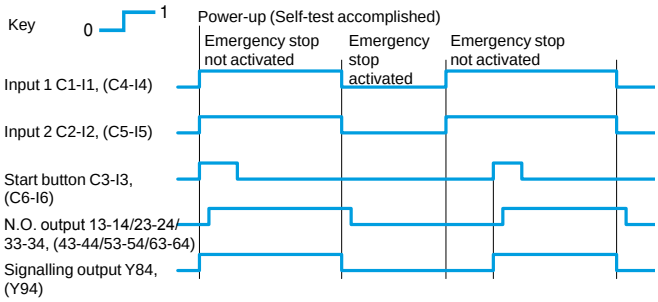
Configuration 7
Automatic start



Configuration 8
Monitored start



Configuration 7
Unmonitored start



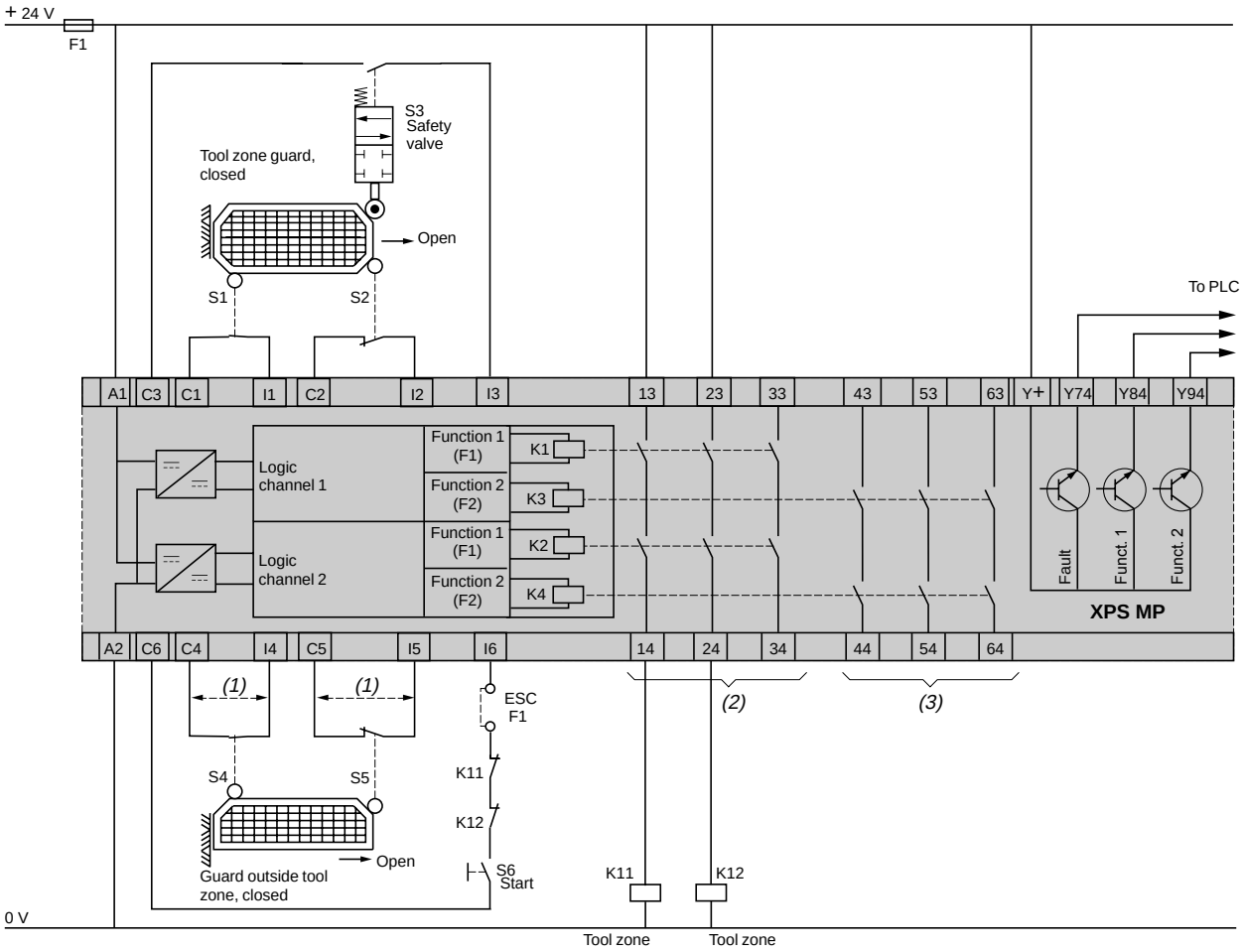
(1) Start button control: the start button must not be activated on power-up.

2

XPSMP

Guard monitoring for injection press or blowing machine

Configuration 9 (this configuration uses both functions of the controller. Only function 1 is configured).



(1) If sensors S4 and S5 are not used, terminals C4-I4 and C5-I5 must be linked.

(2) Safety outputs for tool zone.

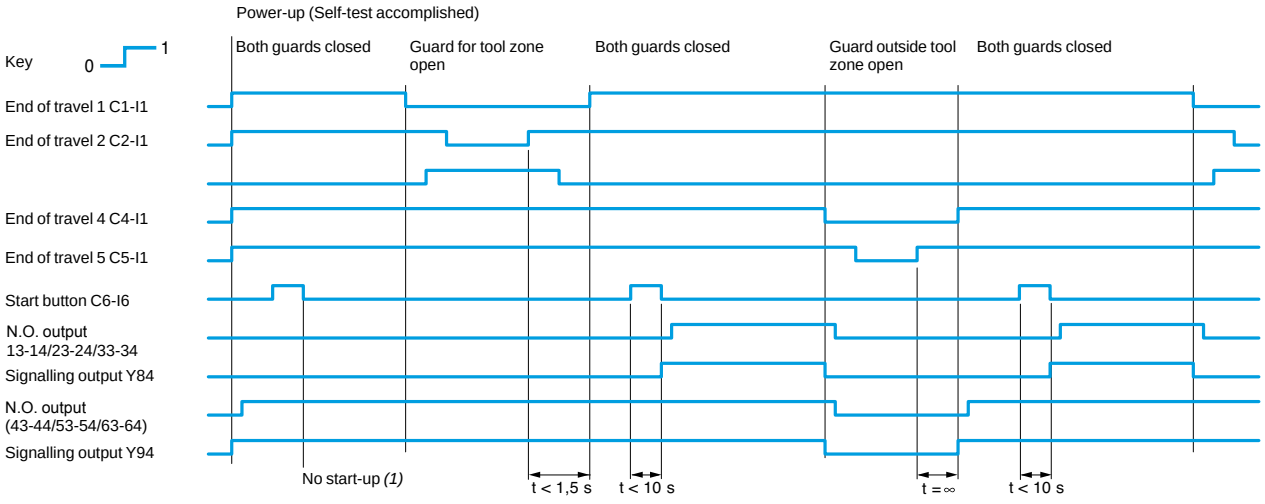
(3) Safety outputs for rear access safety doors.

In configuration mode 9, the N.C. contacts of the relays or contactors controlled via outputs 43-44, 53-54, 63-64 cannot be monitored by the feedback loop (ESC).

ESC = External start conditions.

Functional diagram

Configuration 9



(1) Prevention of start-up necessary: to check the sensors connected, open and reclose the guard.

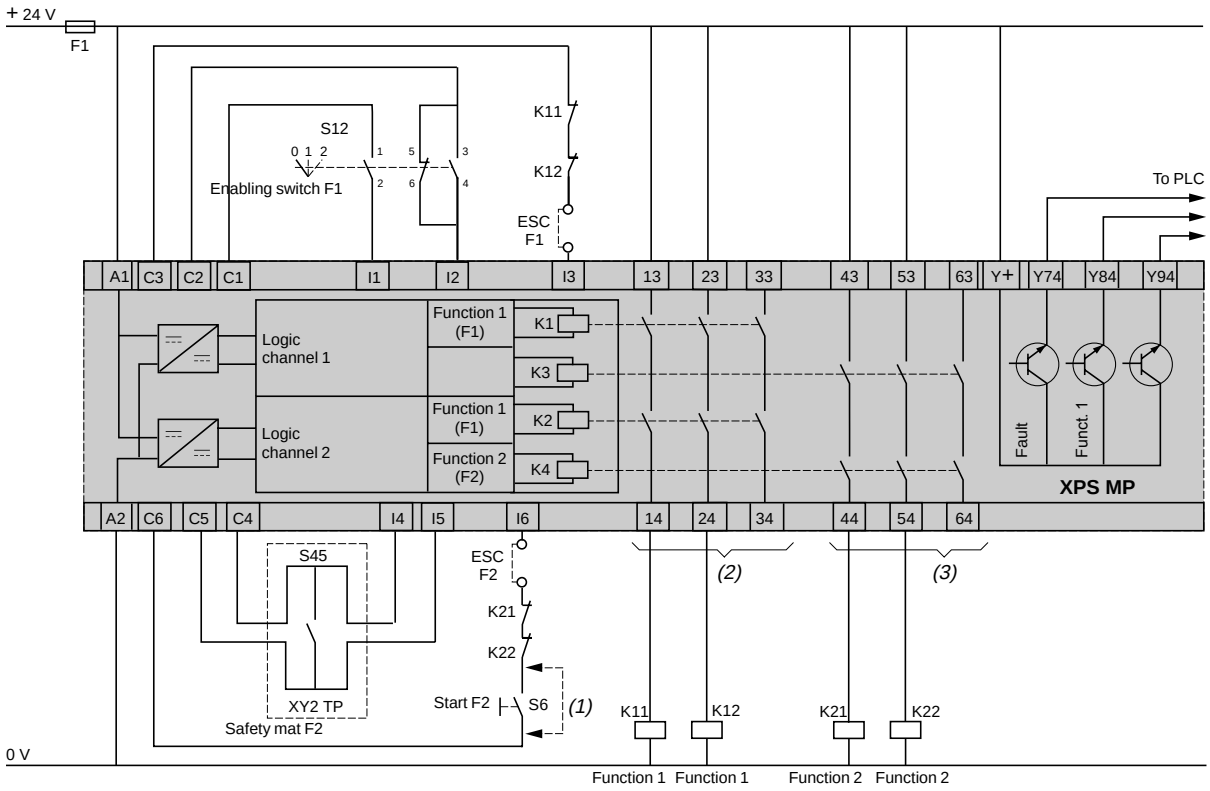
Introduction: page 2/110 | Specifications: page 2/111 | References: page 2/112 | Dimensions: page 2/113 | Wiring diagrams page 2/114

2

XPSMP

Enabling switch monitoring, safety mat monitoring

Configuration 10 (enabling switch monitoring, with or without start-up preparation) = function 1.
Configuration 11 (safety mat monitoring, automatic or unmonitored start) = function 2.

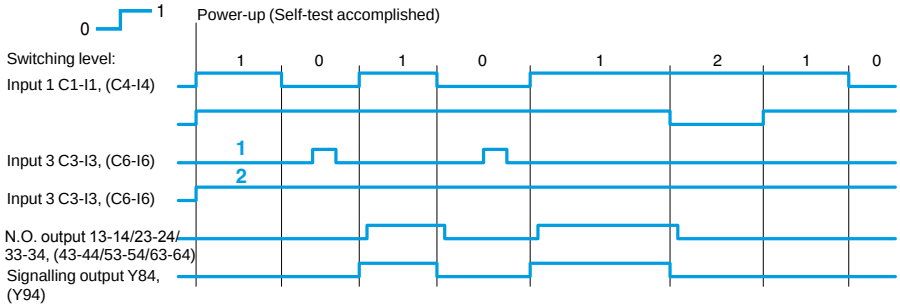


(1) Automatic start.
(2) Function 1 safety outputs.
(3) Function 2 safety outputs.
ESC = External start conditions.

Functional diagrams

Configuration 10

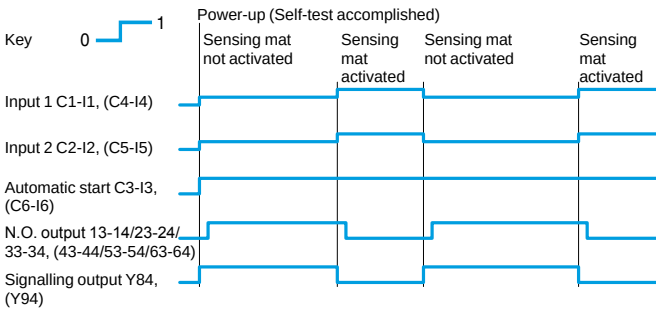
Enabling switch



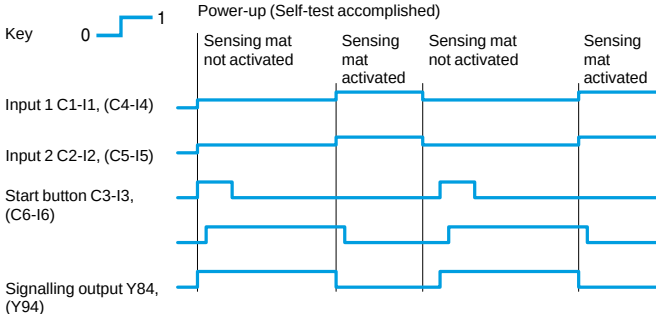
1 With start-up preparation.
2 Without start-up preparation.

Configuration 11

Safety mat with automatic start



Safety mat with unmonitored start

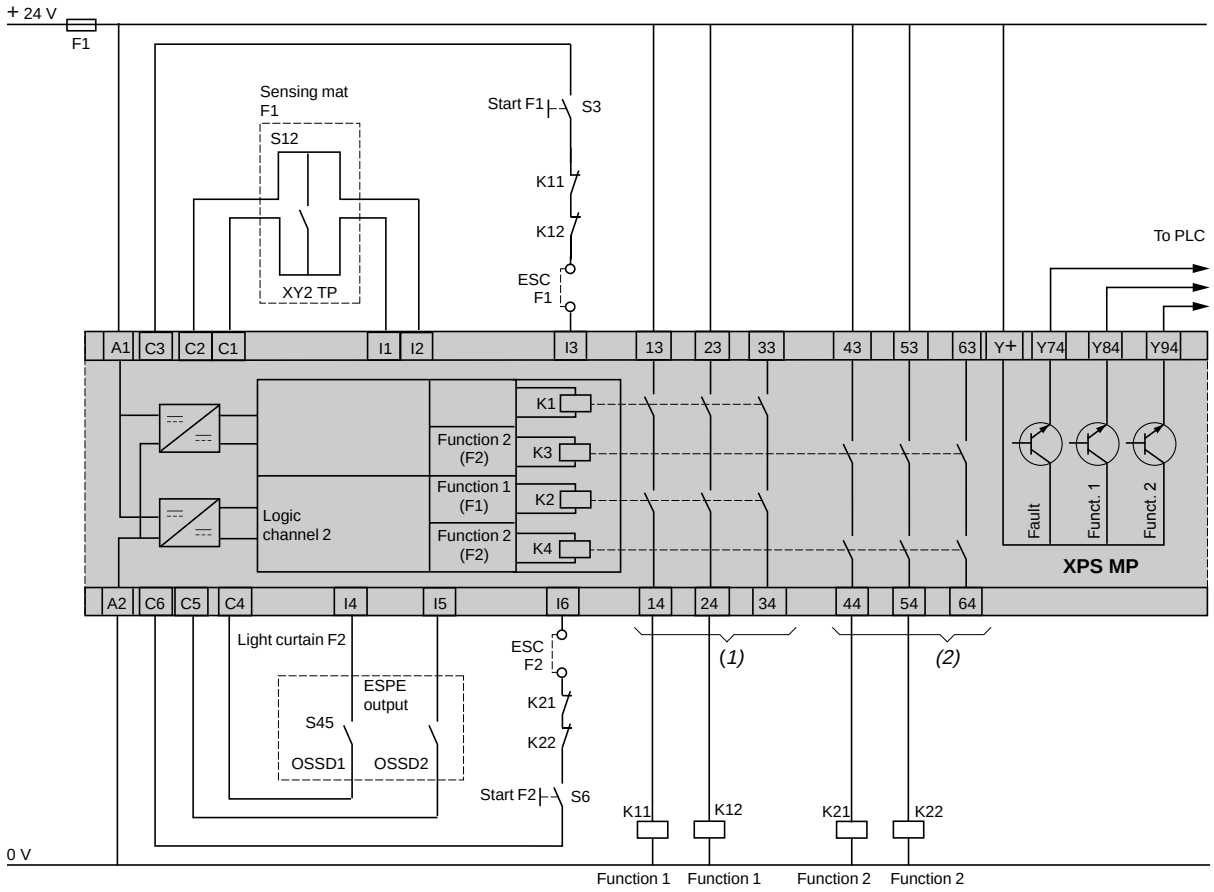


2

XPSMP

Safety mat monitoring, light curtain monitoring

Configuration 12 (sensing mat monitoring, monitored start) = function 1.
Configuration 13 (light curtain monitoring, monitored start; synchronization time = 0.5 s) = function 2.

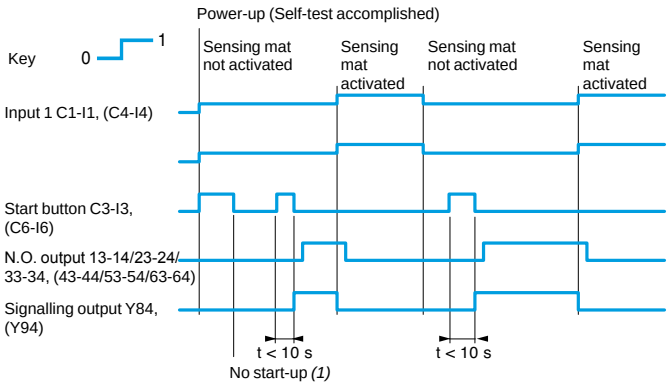


(1) Function 1 safety outputs.
(2) Function 2 safety outputs.
ESC = External start conditions.

Functional diagrams

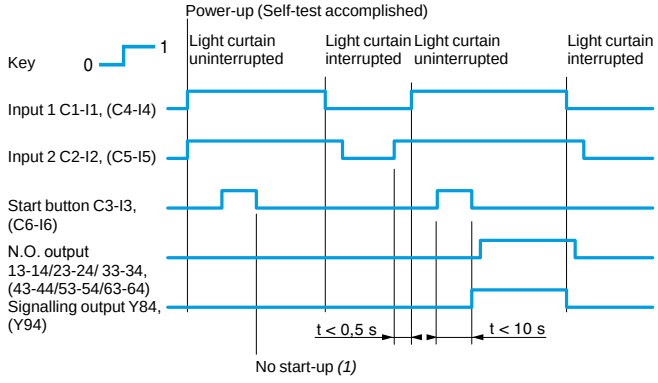
Configuration 12

Sensing mat with monitored start



Configuration 13

Light curtain with monitored start

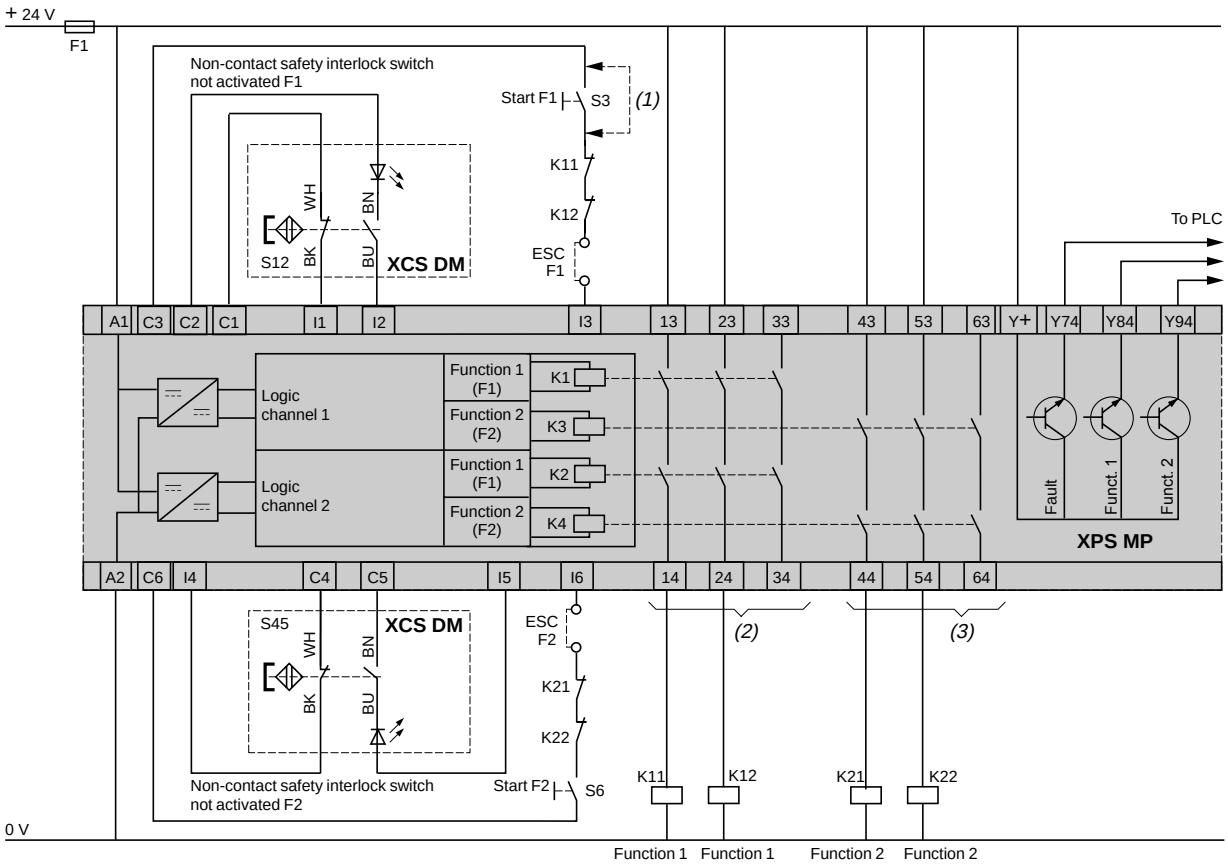


(1) Start button control: the start button must not be activated on power-up.

XPSMP

Non-contact safety interlock switch monitoring

Configuration 14 (automatic or unmonitored start, synchronization time = 1.5 s) = function 1.
Configuration 15 (monitored start, synchronization time = 1.5 s) = function 2.

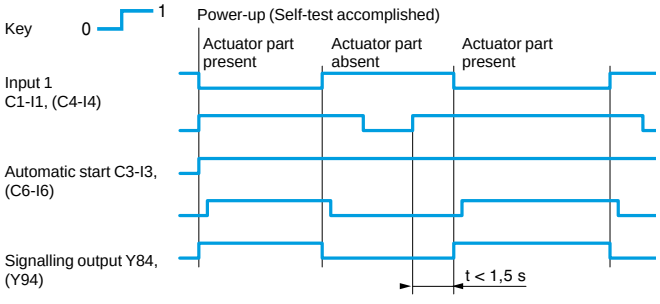


(1) Automatic start.
(2) Function 1 safety outputs.
(3) Function 2 safety outputs.
ESC = External start conditions.

Functional diagrams

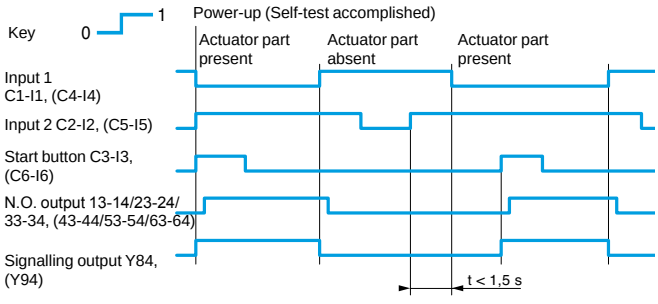
Configuration 14

Automatic start



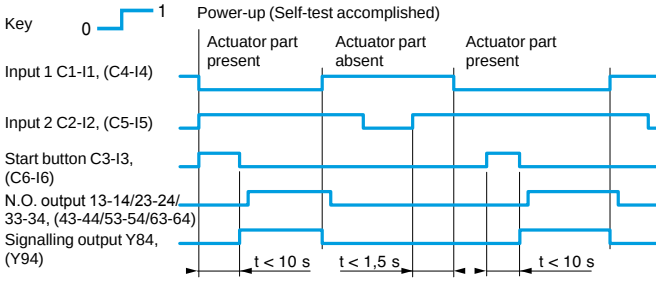
Configuration 14

Unmonitored start



Configuration 15

Monitored start



Safety automation system solutions

Preventa™ configurable safety controllers type XPSMC

XPSMC16ZC

XPSMC32ZC

Introduction

Configurable safety controllers XPSMC●●Z● are designed to provide a solution for safety applications requiring conformity to category 4 of standard EN 954-1/EN/ ISO 13849-1 and SIL 3 requirements of standard IEC 61508.
The range of configurable safety controllers consists of 6 products, each with different technical specifications.

Configurable controllers	Safety inputs	Safety outputs *(1)*	Communication via		
			CANopen bus	Profibus bus	Modbus™ serial link
XPSMC16Z	16	6 + 2 x 2	–	–	Yes, slave
XPSMC16ZC	16	6 + 2 x 2	Yes, slave	–	Yes, slave
XPSMC16ZP	16	6 + 2 x 2	–	Yes, slave	Yes, slave
XPSMC32Z	32	6 + 2 x 2	–	–	Yes, slave
XPSMC32ZC	32	6 + 2 x 2	Yes, slave	–	Yes, slave
XPSMC32ZP	32	6 + 2 x 2	–	Yes, slave	Yes, slave

Line control

The safety inputs are supplied by the various control outputs *(2)*, in such a manner so as to monitor for short-circuits between the inputs, short-circuits between each input and ground or the presence of residual voltages.
The controller, assisted by the control outputs, continuously tests all the connected inputs. As soon as an error is detected on an input, all the outputs associated with this input are disconnected. Safety outputs associated with other inputs remain active.

Configuration

Safety controllers XPSMC●●Z● are configurable and addressable using software XPSMCWIN running on a PC. Connection accessories required: see page 2/129.

Connections

For connection of safety inputs and outputs, safety controllers XPSMC●●Z● can be fitted with a choice of:
- screw connectors type XPSMCTS●●, or
- spring clip connectors type XPSMCTC●●.

These connectors are to be ordered separately, see page 2/128.

(1) 8 independent safety outputs = 6 solid-state safety outputs + 2 x 2 relay outputs (4 relay outputs with guided contacts).
(2) 8 control outputs are available but they are not safety outputs.

Safety functions

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

30 certified safety functions are available with this software and they are easily assignable to the safety outputs. The safety functions have multiple combination possibilities and various starting conditions.

The safety functions are:
- certified in accordance with EN 954-1/EN/ISO 13849-1 and IEC 61508,
- configurable in controller XPSMC using XPSMCWIN software.

All 8 safety outputs are suitable for use in safety related parts of control systems conforming to category 4 of EN 954-1/EN/ISO 13849-1 and each output can disconnect one of its safety circuits.

Main safety functions

- Emergency stop monitoring, with or without time delay, 1 or 2-channel wiring
- Two-hand control (type III-C conforming to EN 574/ISO 13851)
- Guard monitoring with 1 or 2 limit switches
- Guard monitoring for injection presses and blowing machines
- Magnetic switch monitoring
- Sensing mat monitoring
- Light curtain (type 4 conforming to EN/IEC 61496, relay or solid-state output) monitoring
- Zero speed detection
- Dynamic monitoring of hydraulic valves on linear presses
- Monitoring safety stop at top dead center on eccentric press
- Safety time delays
- “Muting” function of light curtains
- Enabling switch monitoring, 2 or 3 contact
- Hydraulic press
- Eccentric press
- Foot switch monitoring
- Chain shaft breakage monitoring
- Position selector

Wiring diagrams and functional diagrams

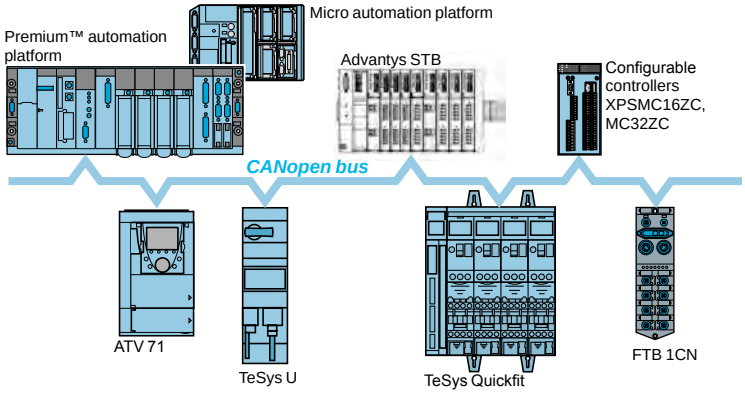
See from page 2/130

Safety automation system solutions

Preventa™ configurable safety controllers type XPSMC

Communication

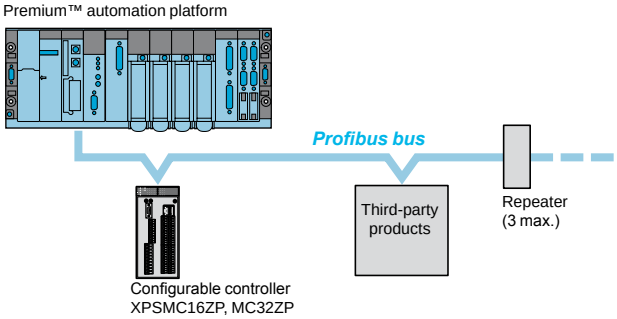
CANopen fieldbus



Configurable safety controllers XPSMC●●ZC incorporate a SUB-D 9-pin male connector for direct connection on CANopen bus.

CANopen bus is an open bus that ensures deterministic and reliable access to the real-time data of automation equipment. The bus uses a shielded dual twisted pair on which a maximum of 127 devices can be connected by chaining. The data rate varies between 10 Kbps and 1Mbps depending on the length of the bus (16,404 to 66 ft / 5,000 to 20 m).

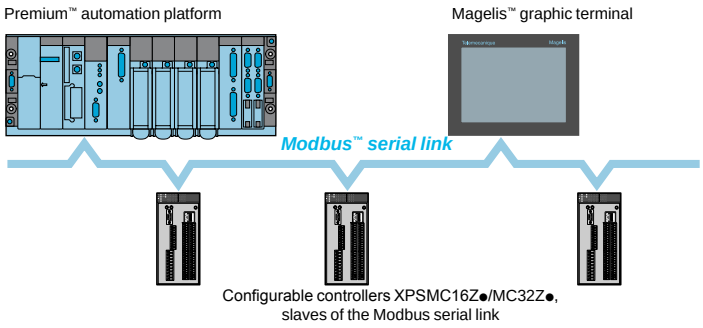
Profibus bus



Configurable safety controllers XPSMC●●ZP incorporate a SUB-D 9-pin female connector for connection on Profibus bus.
Configurable safety controllers XPSMC●●ZP are slaves on the Profibus bus.

Profibus bus is a fieldbus that meets industrial communication requirements. The topology of the Profibus bus is of the linear type with a centralized master/slave type access procedure. The physical link is a single shielded twisted pair.

Modbus™ serial link

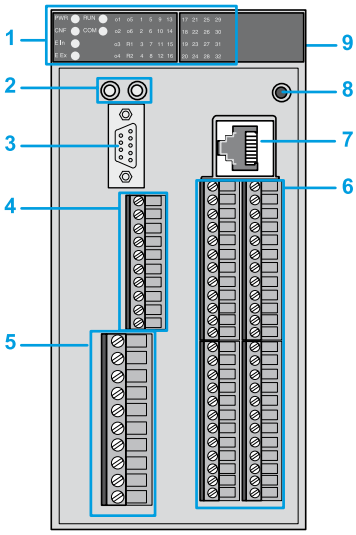


Configurable safety controllers XPSMC●●Z● MC incorporate a Modbus communication interface (RJ45 connector) for configuration and diagnostics.
This interface enables connection of the controllers to:
- a PC (configuration),
- a PLC (diagnostics), or
- an operator dialog terminal (diagnostics).

The Modbus serial link consists of a master station (Premium™ automation platform) and slave stations (configurable controllers XPSMC16/32Z●).
Two exchange mechanisms are possible:
■ **Question/response:** the questions from the master are addressed to a given slave. The response is expected by return from the interrogated slave.
■ **Distribution:** the master distributes a message to all the stations of the Modbus serial link. The latter execute the order without transmitting a reply.

Safety automation system solutions

Preventa™ configurable safety controllers type XPSMC



Configurable safety controller XPSMC●●Z●, with screw connectors

Description

Configurable safety controllers XPSMC●●Z●

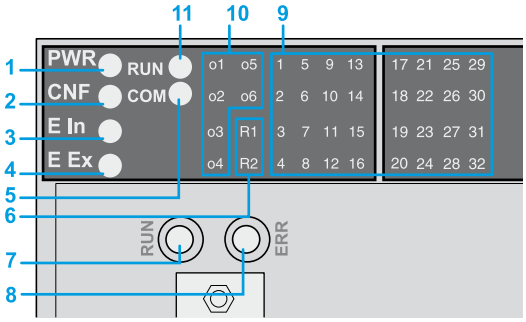
Front cover of controllers:

1 LED display and system diagnostics.
2 Two LEDs for CANopen or Profibus (1) connection status.
3 SUB-D 9-pin male connector for connection on CANopen bus (**XPSMC16ZC/ MC32ZC**) or SUB-D 9-pin female connector for connection on Profibus bus (**XPSMC16ZP/MC32ZP**).
4 Solid-state safety output and "muting" indicator light terminals.
5 Power supply (⎓ 24 V) and relay safety output terminals.
6 Control output terminals for power supply to safety inputs and safety input terminals.
7 RJ45 connector for connection on Modbus™ serial link.
8 RESET button (resetting of controller).

Rear face of controllers:

9 Mounting plate for mounting on rail.

(1) Depending on controller model.



Illuminated display

LED details

LED	Color	Status	Meaning
1 PWR	Green	On	Supply voltage present.
2 CNF	Yellow	On	In configuration mode.
		Flashing	Not configured, initial power-up.
3 E In	Red	On	Internal error: all safety outputs deactivated.
4 E Ex	Red	On	External error: all safety outputs associated with the defective circuit are deactivated.
5 COM	Green	On	Controller communicating via the TER (RJ45) connection.
6 R1, R2	Green	On	Relay outputs 13/14, 23/24, 33/34 and 43/44 activated.
		Flashing	Fault on these outputs.
7 RUN	Green	Off	Hardware OK for the Profibus bus or the CANopen bus.
		On	Communicating on Profibus bus or on CANopen bus. Normal status.
8 ERR	Red	On	Communication impossible, configuration error, damaged cabling or absence. Bus deactivated
		Off	Communicating on CANopen or Profibus bus. Normal status.
		Flashing (x 1)	Warning limit reach.
		Flashing (x 2)	Control event error on CANopen bus.
		Flashing (x 3)	Synchronization error on CANopen bus.
9 1…16 1…32	Green	On	Input circuit closed.
		Flashing	Error detected on input relating to LED.
10 o1…o6	Green	On	Solid-state output activated.
		Flashing	Short-circuit, anomaly on output.
11 RUN	Green	On	Run mode.
		Flashing	Changing from run mode to stop mode.

Safety automation system solutions

Preventa™ configurable safety controllers type XPSMC

Specifications

Configurable safety controller type				XPSMC16Z and MC32Z, XPSMC16ZC and MC32ZC, XPSMC16ZP and MC32ZP
Conformity to standards				EN/IEC 60204-1, EN 1760-1/ISO 13856-1, EN/IEC 60947-5-1, EN/IEC 61496-1, EN 574/ISO 13851, EN 954-1/EN/ISO 13849-1, IEC 61508
Product certifications				UL, CSA, TÜV
Products designed for max. use in safety related parts of control systems (conforming to EN 954-1/EN/ISO 13849-1 and IEC 61508)				Category 4 max. (EN 954-1/EN/ISO 13849-1), SIL 3 max. (IEC 61508)
Supply voltage			**V**	⎓ 24 ± 20%
Maximum power consumption			**W**	12
Fuse protection			**A**	16 gL max.
Start button monitoring				Configurable
Control circuit voltage				28.8 V/13 mA (between input terminals C1-I1 to C8-I16, resp. I32)
Calculation of wiring resistance RL			Ω	100 max, maximum cable length: 2000 m (Between input terminals)
Synchronization time between inputs			**s**	Depending on configuration selected
Outputs	**Relay**	Voltage reference		Relay hard contacts
		Safety circuit		2 N.O. per function (4 N.O. total) (13-14, 23-24, 33-34, 43-44)
		Breaking capacity in AC-15	**VA**	C300: inrush 1800, maintained 180
		Breaking capacity in DC-13		24 V/1.5 A L/R = 50 ms
		Thermal current (Ithe) for each group of 2 outputs	**A**	6 for 1 output and 2 for the other, **or** 4 for both outputs.
		Current limit	**A**	Ith ⩽ 16 (with several relay output circuits simultaneously loaded)
		Output fuse protection	**A**	4 gL or 6 quick blow
		Minimum current	**mA**	10 *(1)*
		Minimum voltage	**V**	17 *(1)*
	Solid-state	Breaking capacity		24 V/2 A
		Safety circuit		6 solid-state (O1, O2, O3, O4, O5, O6)
		Current limit	**A**	Ith ⩽ 6.5 (with several solid-state output circuits simultaneously loaded)
Electrical life				See page 3/12
Response time on input opening			**ms**	Response time = 20 or 30, configurable using software XPSMCWIN □ if 20 for controllers XPSMC●●Z●: 30 for a safety mat □ if 30 for controllers XPSMC●●Z●: 45 for a safety mat
Rated insulation voltage (Ui)			**V**	300 (degree of pollution 2 conforming to IEC 60647-5-1, DIN VDE 0110 part 1)
Rated impulse withstand voltage (Uimp.)			**kV**	4 (overvoltage category III, conforming to IEC 60647-5-1, DIN VDE 0110 part 1)
LED display				30 (XPSMC16Z), 46 (XPSMC32Z) 32 (XPSMC16ZC/MC16ZP, 48 (XPSMC32ZC/MC32ZP)
Temperature	Operating		**°F (°C)**	+ 14…+ 131 (- 10…+ 55)
	Storage		**°F (°C)**	- 13…+ 267.8 (- 25…+ 85)
Degree of protection				IP 20 conforming to EN/IEC 60529 (connector and enclosure)

(1) The controller is also capable of switching low power loads (17 V/10 mA minimum) provided that the contact has not been used for switching high power loads (possible contamination or wear of the gold layer on the contact tips).

Communication

Modbus™ serial link

Compatibility			**XPSMC16Z, XPSMC32Z, XPSMC16ZC, XPSMC32ZC, XPSMC16ZP, XPSMC32ZP**
Serial link ports	Number and type		1 x RJ45
	Status		Slave
Data exchange			14 words
Addressing			1 …247
Baud rate		**bps**	1200, 2400, 4800, 9600 or 19200
Parity			Even, odd, none
Fixed parameters			RTU (Remote Terminal Unit) mode 1 start bit / 8 data bits 1 stop bit stop with “even” or “odd” parity 2 stop bits without parity
Functions supported			01: 8-bit output data / 32-bit input data (0 = OFF, 1 = ON) 02: 32-bit input data / 8-bit output data (0 = OFF, 1 = ON) 03: information and errors

CANopen bus

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

Profibus bus

Compatibility			**XPSMC16ZP, XPSMC32ZP**
Serial link ports	Number and type		1 x SUB-D 9-pin female
	Status		Slave
Data exchange			14 words By included dual port memory: only data addresses
Parameters	Baud rate	**Mbps**	12
	Address		1…125

Connections

Type				**Separate plug-in screw connector XPSMCTS●● *(1)***	**Separate plug-in spring clip connector XPSMCTS●● *(1)***
Power supply and relay output terminals					
	1 conductor	Without cable end		Solid or flexible cable: 24-12 AWG (0.2…2.5 mm²)	
		With cable end		Without bezel, flexible cable: 22-12 AWG (0.25…2.5 mm²)	
				With bezel, flexible cable: 22-12 AWG (0.25…2.5 mm²)	
	2 conductors	Without cable end		Solid or flexible cable: 24-16 AWG (0.2…1.5 mm²)	–
		With cable end		Without bezel, flexible cable: 22-16 AWG (0.25…1.5 mm²)	–
				Double, with bezel, flexible cable: 20-16 AWG (0.5…1.5 mm²)	Double, with bezel, flexible cable: 20-18 AWG (0.5…1.0 mm²)
	Tightening torque of screw terminals			4.2...5.3 lb-in (0.5...0.6 Nm)	–
	Wire stripping length			0.39 in (10 mm)	
Other terminals					
	1 conductor	Without cable end		Solid or flexible cable: 28-16 AWG (0.14…1.5 mm²)	
		With cable end		Without bezel, flexible cable: 23-16 AWG (0.25…1.5 mm²)	
				With bezel, flexible cable: 23-20 AWG (0.25…0.5 mm²)	
	2 conductors	Without cable end		Solid cable: 28-20 AWG (0.14…0.5 mm²) Flexible cable: 28-19 AWG (0.14…0.75 mm²)	–
		With cable end		Without bezel, flexible cable: 23-22 AWG (0.25…0.34 mm²)	–
				Double, with bezel, flexible cable: 20 AWG (0.5 mm²)	–
Enclosure mounting (conforming to DIN EN 50022)				Metal adaptor for mounting on DIN 35 mm metal rail	

(1) To be ordered separately.

Safety automation system solutions

Preventa™ configurable safety controllers type XPSMC

XPSMC16Z

XPSMC32Z

XPSMC16ZC

XPSMC32ZC

XPSMC16ZP

XPSMC32ZP

References

Configurable safety controllers (connector not included)

Number of inputs	Number of outputs		Communication (Link and bus)	Reference	Weight oz (kg)
	Relay	Solid-state			
16	**4 (2 x 2)**	**6**	Modbus™	**XPSMC16Z**	28.925 (0.820)
			Modbus, CANopen	**XPSMC16ZC**	28.925 (0.820)
			Modbus, Profibus	**XPSMC16ZP**	28.925 (0.820)
32	**4 (2 x 2)**	**6**	Modbus	**XPSMC32Z**	29.630 (0.840)
			Modbus, CANopen	**XPSMC32ZC**	29.630 (0.840)
			Modbus, Profibus	**XPSMC32ZP**	29.630 (0.840)

Plug-in connectors for configurable safety controllers *(1)*

Description	For use with	Reference	Weight oz (kg)
Screw connectors	XPSMC16Z, MC16ZC, MC16ZP	**XPSMCTS16**	2.822 (0.080)
	XPSMC32Z, MC32ZC, MC32ZP	**XPSMCTS32**	3.880 (0.110)
Spring clip connectors	XPSMC16Z, MC16ZC, MC16ZP	**XPSMCTC16**	2.822 (0.080)
	XPSMC32Z, MC32ZC, MC32ZP	**XPSMCTC32**	3.880 (0.110)

Configuration software

Description	Operating system	Details *(2)*	Languages	Reference	Weight oz (kg)
Configuration software for controllers XPSMC●●Z● CD-ROM + user manual	Windows® 2000, Windows® XP, Windows® Vista, Windows® 7	Software available on Safety Suite V2 software pack	EN, FR, DE, IT, ES, PT	**XPSMCWIN**	18.342 (0.520)

(1) To be ordered separately to the controllers.
(2) EDS and GSD files are available on the XPSMCWIN configuration software CD-ROM.


XPSMCCPC


TSX PCX 1031


490 NT● 000 ●●


TSX CUSB485

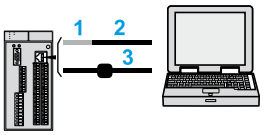

TSX CAN TDM4


ABL8RPS24100

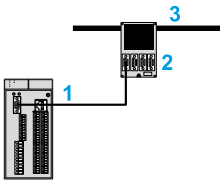
References

Connecting cables *(1)*

Function			Length ft (m)	Reference	Weight oz (kg)
Diagnostics using Magelis™ operator dialog terminal type XBT GT			9.8 (3)	**VW3A8306R30**	39.860 (1.130)
Configuration software	1	Adaptor: RJ45 socket/PC connection cables	–	**XPSMCCPC**	0.388 (0.011)
	2	Cable to PC serial port (type SUB-D9)	8.2 (2.5)	**TSXPCX1031**	5.997 (0.170)
	3	Straight shielded twisted pair cables, EIA/TIA 568 standard (RJ45 connector at each end)	6.6 (2)	**490NTW00002**	–
			16.4 (5)	**490NTW00005**	–
			39.4 (12)	**490NTW00012**	–
		Straight shielded twisted pair cables, UL and CSA 22.1 approved (RJ45 connector at each end)	6.6 (2)	**490NTW00002U**	–
			16.4 (5)	**490NTW00005U**	–
			39.4 (12)	**490NTW00012U**	–
	with	RJ45/PC USB port converter *(2)*	1.3 (0.4)	**TSXCUSB485**	–



Function	Medium		Length ft (m)	Reference	Weight oz (kg)
Modbus serial link access	Premium™ automation platform TSXSCY21601		–	**XPSMCSCY**	–
CANopen bus access	1	CANopen connection cables (fitted with: 1 SUB-D 9-pin female connector at each end)	1 (0.3)	**TSXCANCADD03**	–
			3.3 (1)	**TSXCANCADD1**	–
			9.8 (3)	**TSXCANCADD3**	–
			16.4 (5)	**TSXCANCADD5**	–
	2	CANopen tap-off box	–	**TSCCANTDM4**	–
	3	Standard CANopen cables	164 (50)	**TSXCANCA50**	–
			328 (100)	**TSXCANCA100**	–
			984 (300)	**TSXCANCA300**	–
Profibus bus access			328 (100)	**TSXPBSCA100**	–
			1312 (400)	**TSXPBSCA400**	–



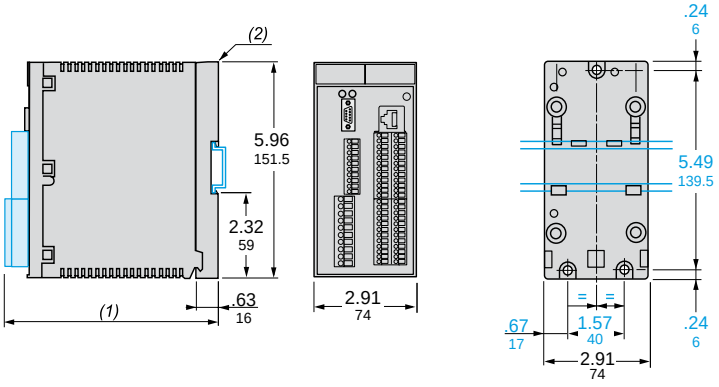
Accessories *(1)*

Regulated switch mode power supply, single-phase	Output voltage: ⎓ 24…28.8 V Nominal current: 10 A Nominal power: 240 W	**ABL8RPS24100**	35.274 (1.000)

(1) To be ordered separately.
*(2) The converter **TSX CUSB485** is installed using **Driver Pack V2.3**. This "driver" is available on the Safety Suite V2 software pack or downloadable from our site: www.schneider-electric.com*

Dimensions, mounting

XPSMC●●Z●



Dual Dimensions: INCHES / Millimeters

(1) 6.02 in (153 mm) with screw connector XPSMCTS●●. 5.96 in (151.4 mm) with spring clip connector XPSMCTC●●.
(2) Metal adaptor for mounting on metal DIN 35 mm rail.

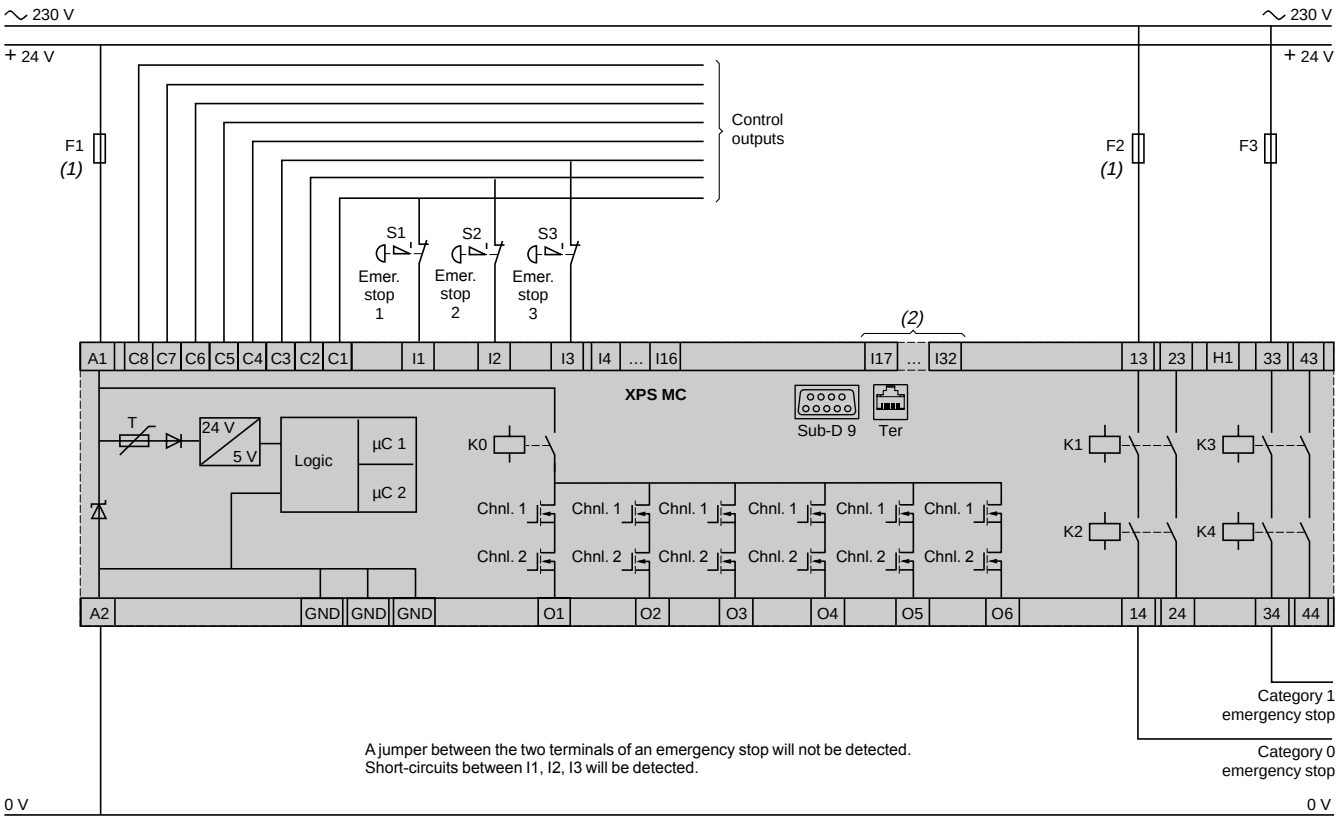
Safety automation system solutions

Preventa™ configurable safety controllers
type XPSMC

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

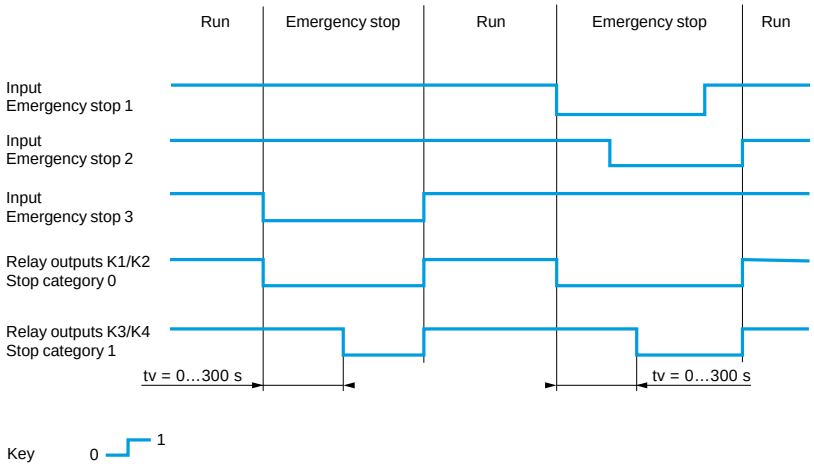
Category 4 achieved with necessary precautions taken to eliminate input circuit anomalies.

Wiring diagram



(1) Technical specifications for maximum rating of fuses, see page 2/126.
(2) Only applicable to XPSMC32Z●.

Functional diagram



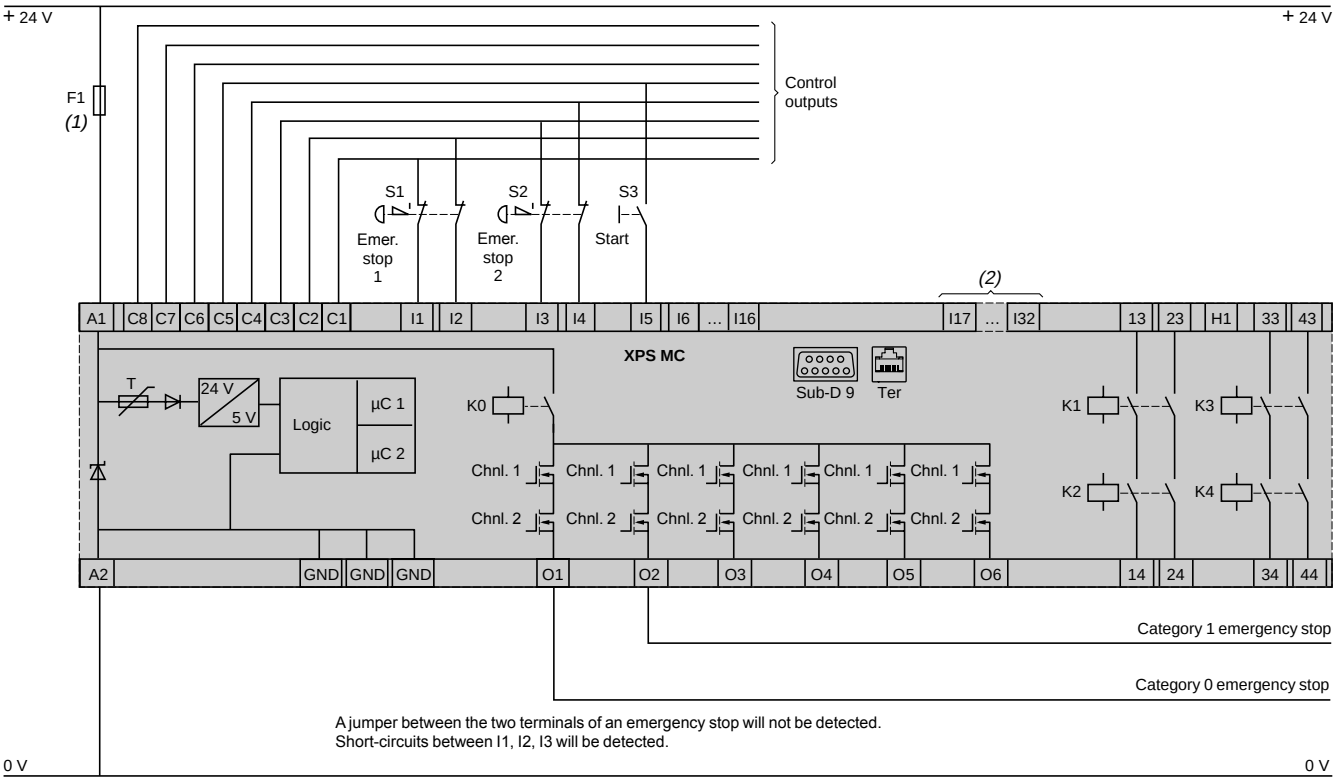
tv = delay time

2

Emergency stop monitoring, with or without time delay, 2-channel wiring, with start button

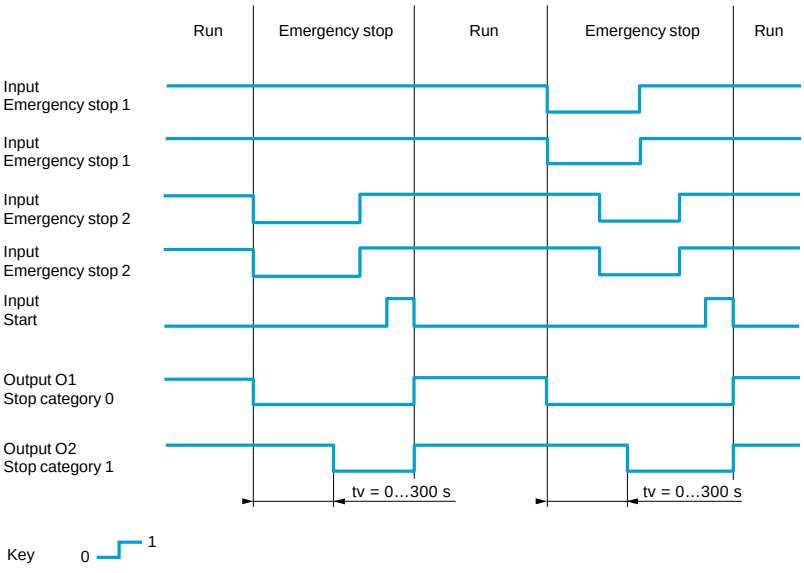
Category 4 conforming to standard EN 954-1.

Wiring diagram



(1) Technical specifications for maximum rating of fuses, see page 2/126.
(2) Only applicable to XPSMC32Z●.

Functional diagram



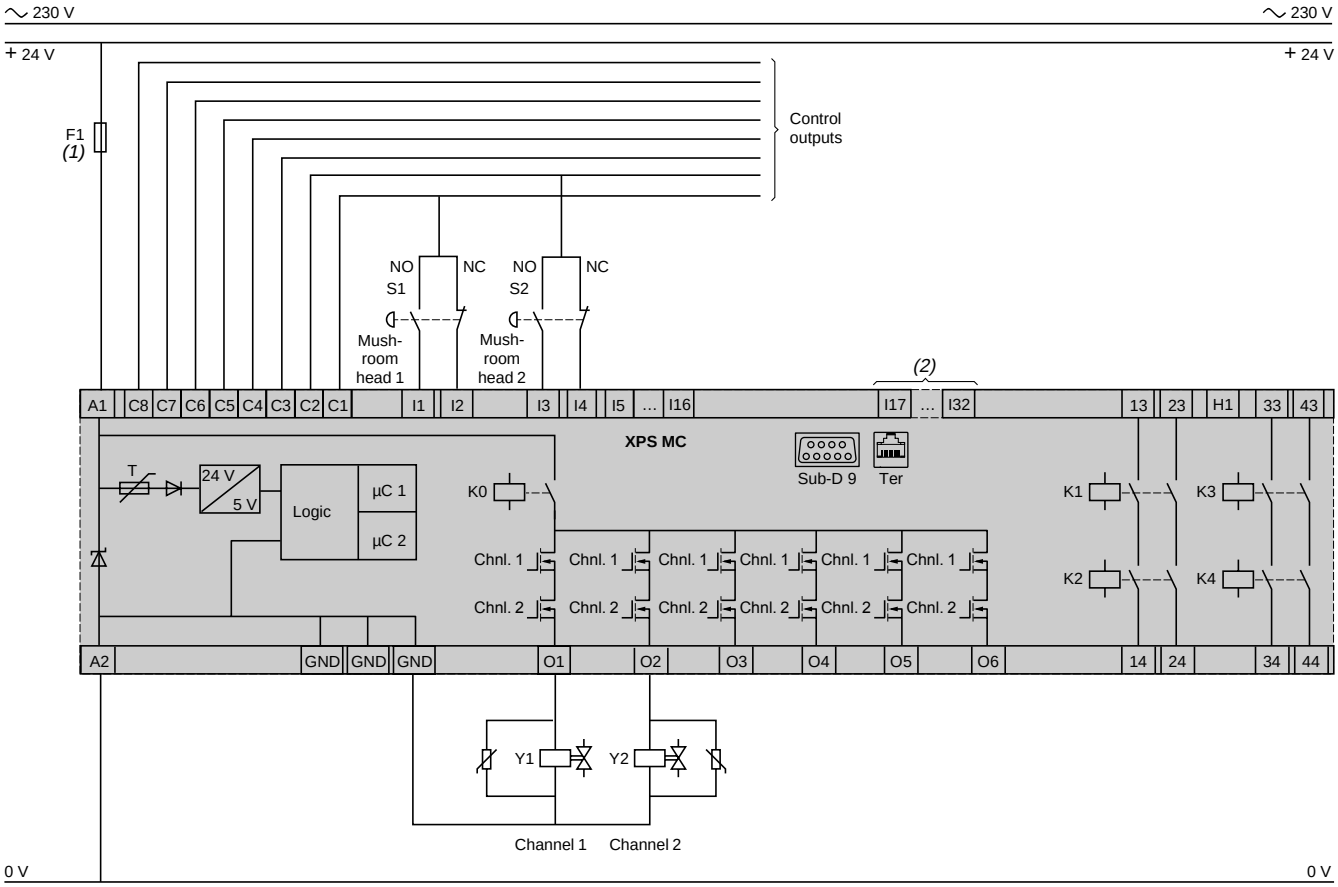
tv = delay time

2

Two-hand control (type III-C conforming to EN 574-1)

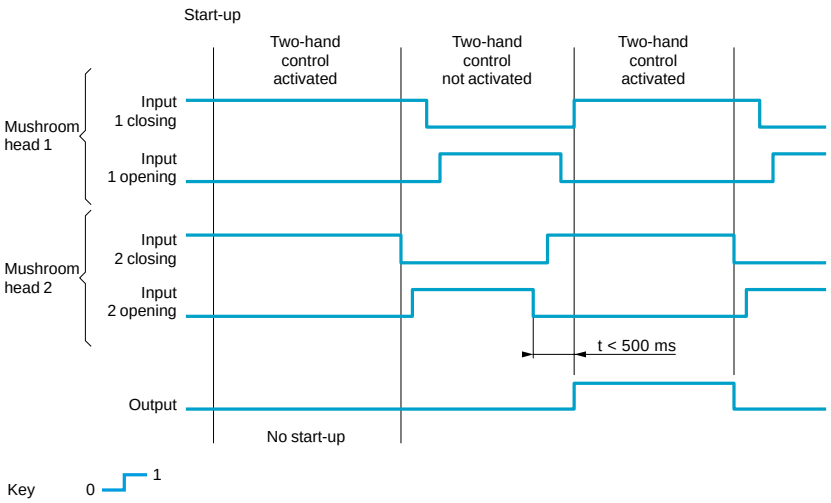
Category 4 conforming to standard EN 954-1.

Wiring diagram



(1) Technical specifications for maximum rating of fuses, see page 2/126.
(2) Only applicable to XPSMC32Z●.

Functional diagram

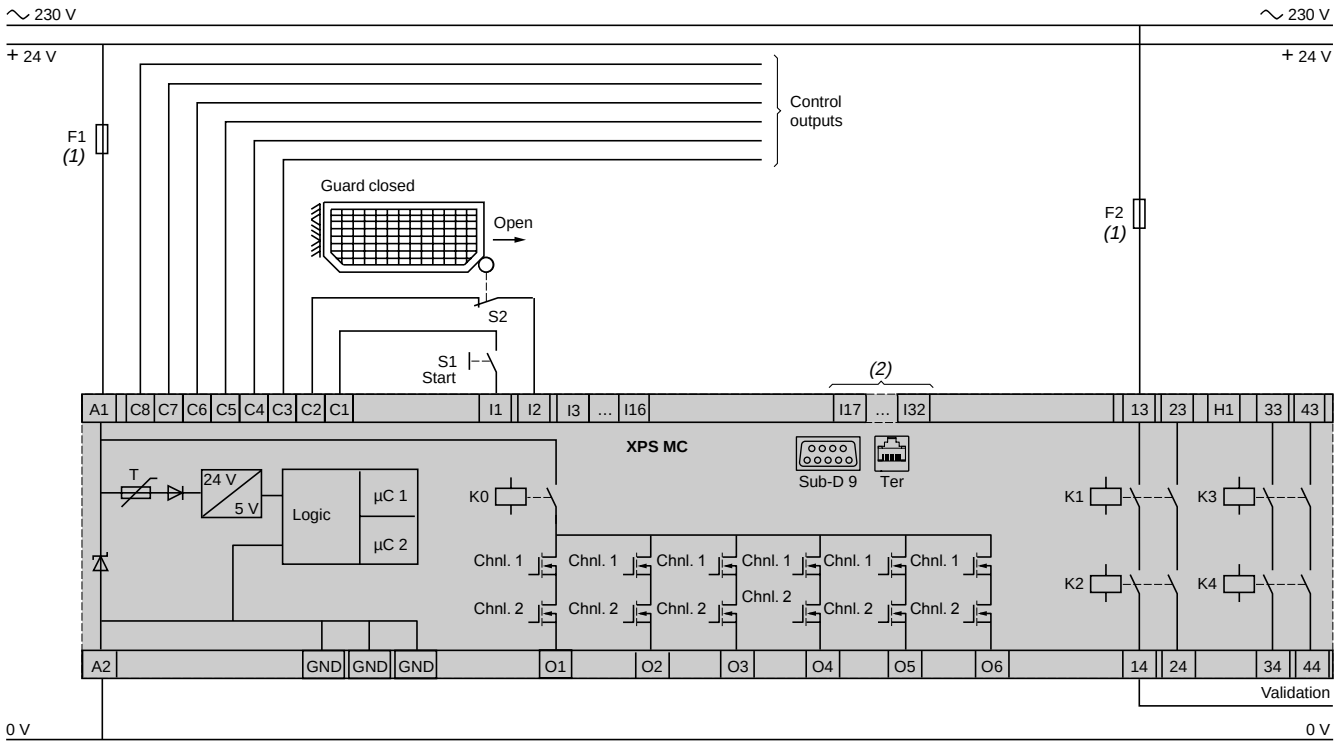


tv = delay time

Guard monitoring with 1 safety limit switch

Category 1 conforming to standard EN 954-1.

Wiring diagram

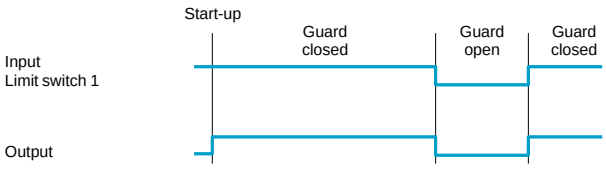


(1) Technical specifications for maximum rating of fuses, see page 2/126.
(2) Only applicable to XPSMC32Z●.

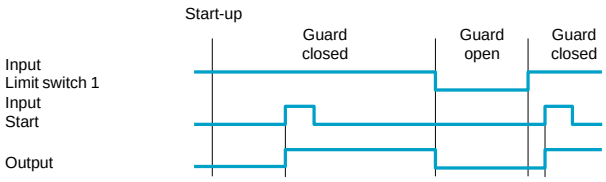
Functional diagrams

Start test = NO

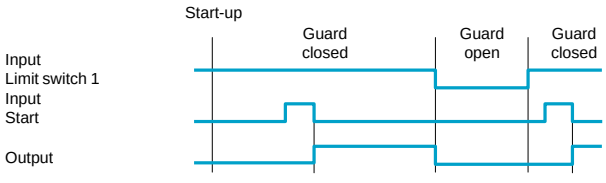
Automatic start



Rising edge monitored start

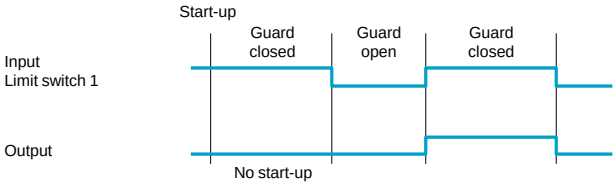


Falling edge monitored start

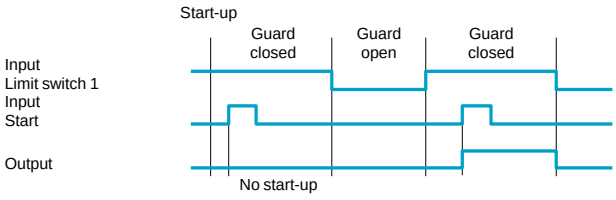


Start test = YES

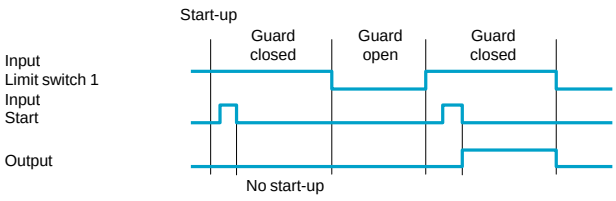
Automatic start



Rising edge monitored start



Falling edge monitored start



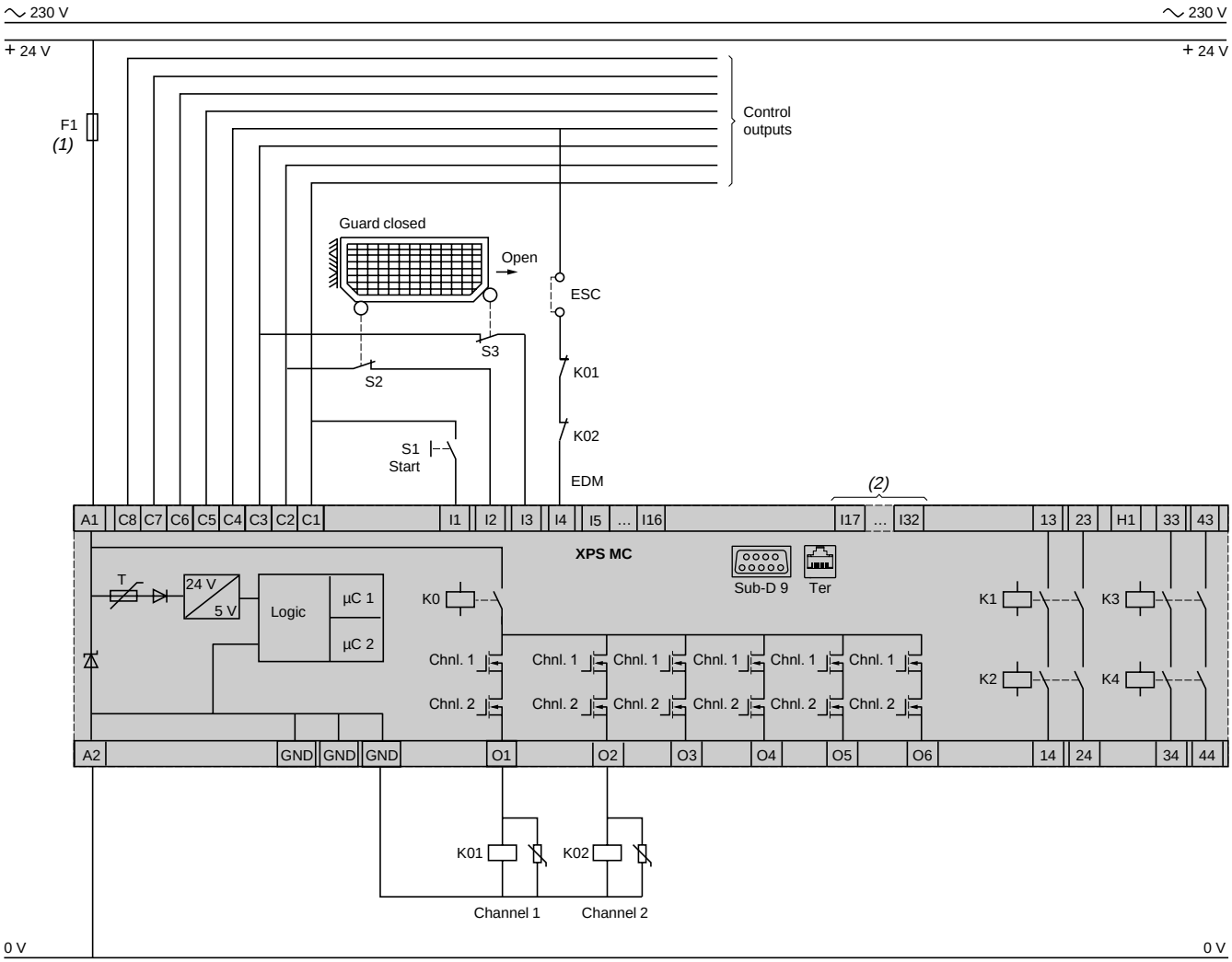
Key 0 1

2

Guard monitoring with 2 safety limit switches

Category 4 conforming to standard EN 954-1.

Wiring diagram



ESC = external start conditions
EDM = external devices monitoring

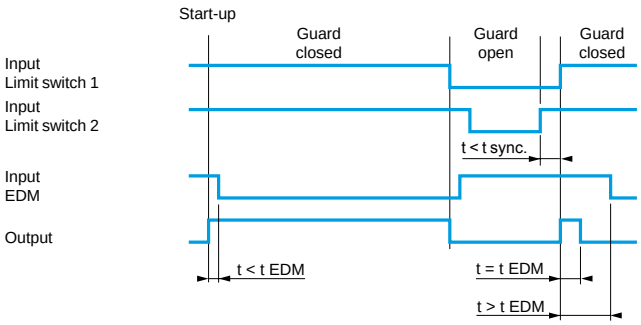
(1) Technical specifications for maximum rating of fuses, see page 2/126.
(2) Only applicable to XPSMC32Z●.

Guard monitoring with 2 safety limit switches (continued)

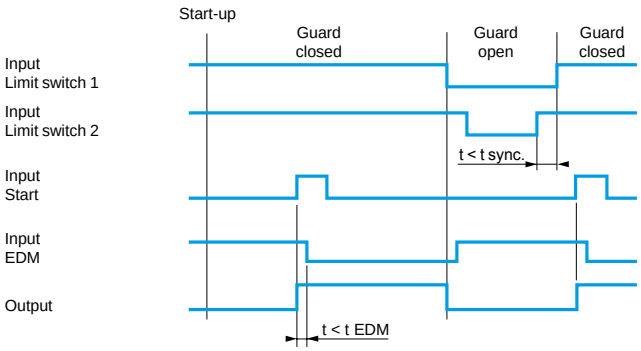
Functional diagrams

Start test = NO

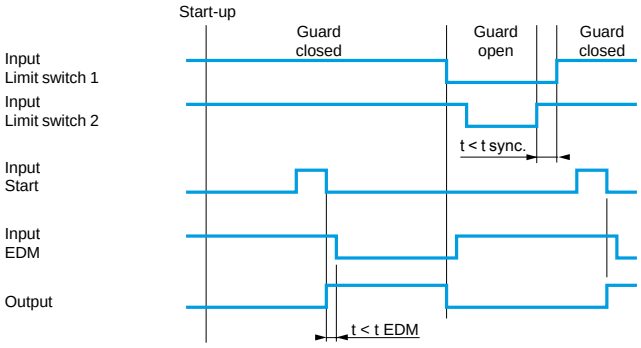
Automatic start



Rising edge monitored start

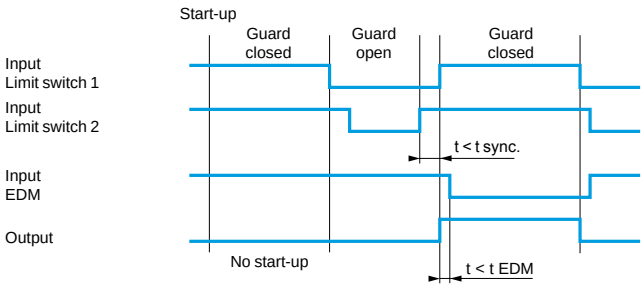


Falling edge monitored start

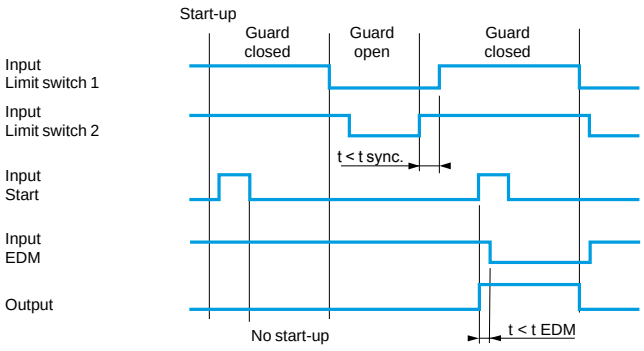


Start test = YES

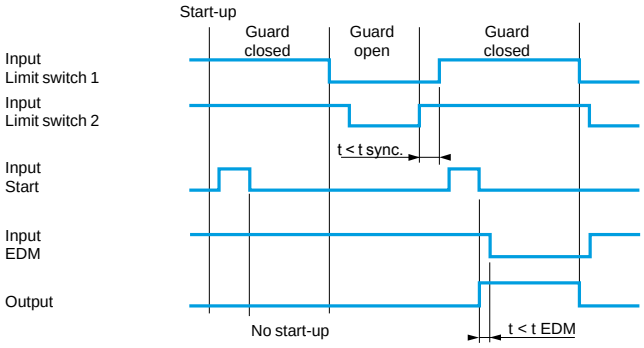
Automatic start



Rising edge monitored start



Falling edge monitored start



Key 0 — 1

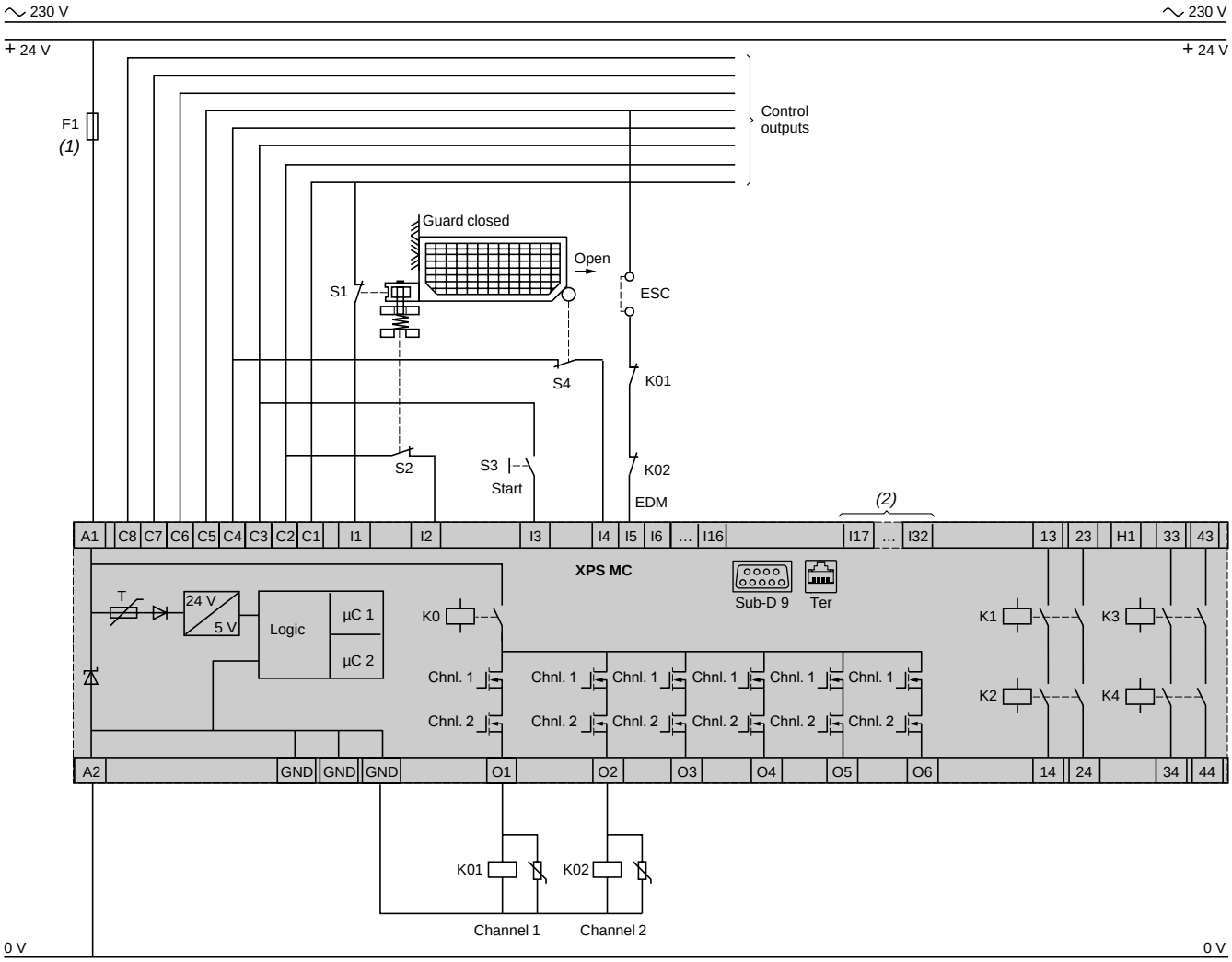
EDM = external devices monitoring
t EDM = maximum monitoring time of external devices
t sync. = synchronization time

2

Guard monitoring with 2 safety limit switches, with guard locking

Category 4 conforming to standard EN 954-1.

Wiring diagram



ESC = external start conditions
EDM = external devices monitoring

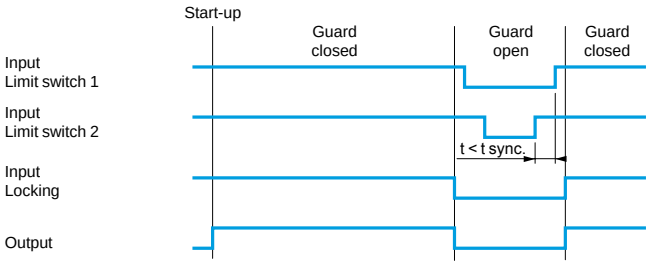
(1) Technical specifications for maximum rating of fuses, see page 2/126.
(2) Only applicable to XPSMC32Z●.

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

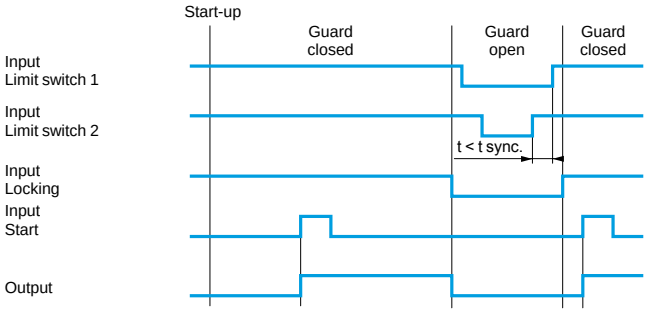
Functional diagrams

Start test = NO

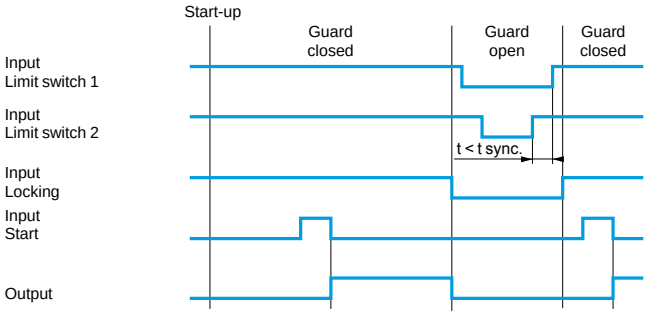
Automatic start



Rising edge monitored start

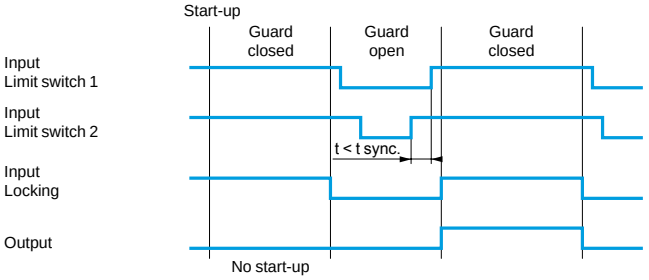


Falling edge monitored start

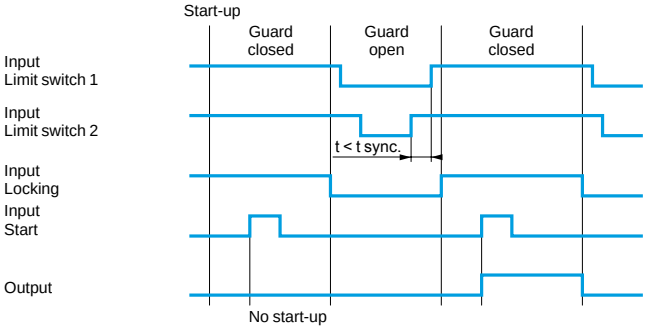


Start test = YES

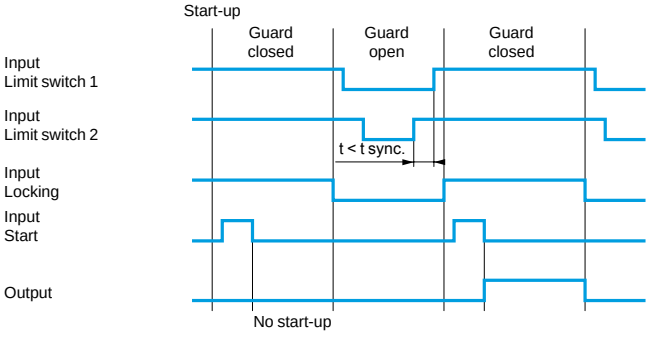
Automatic start



Rising edge monitored start



Falling edge monitored start



Key 0 ⎍ 1

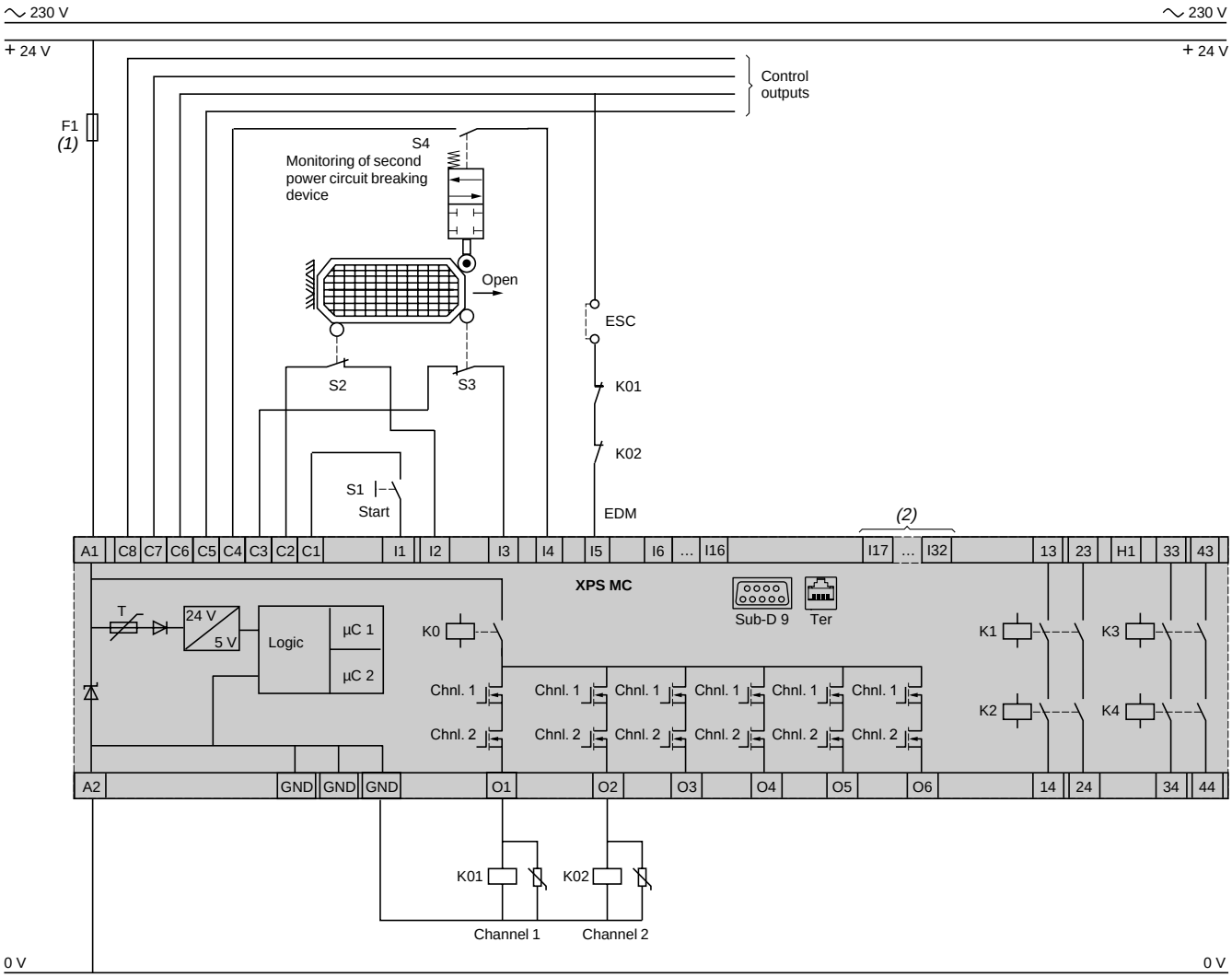
t sync. = synchronization time

2

Guard monitoring for injection presses and blowing machines

Category 4 conforming to standard EN 954-1.

Wiring diagram



ESC = external start conditions
EDM = external devices monitoring

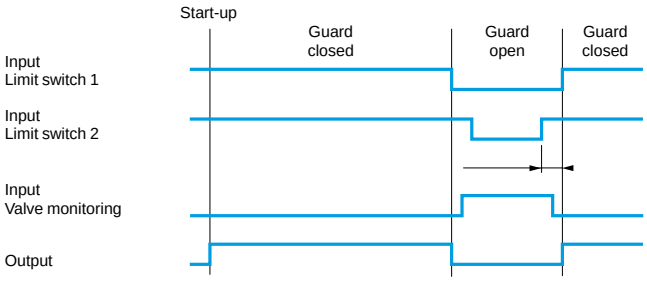
(1) Technical specifications for maximum rating of fuses, see page 2/126.
(2) Only applicable to XPSMC32Z●.

Guard monitoring for injection presses and blowing machines (continued)

Functional diagrams

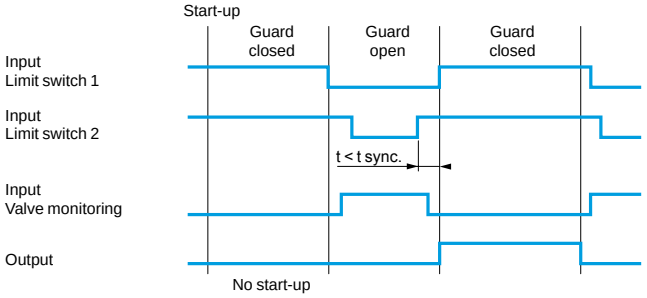
Start test = NO

Automatic start

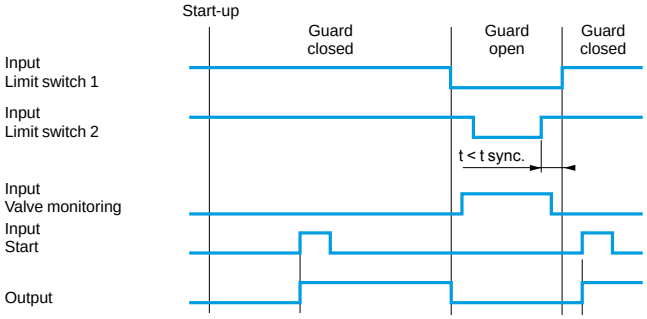


Start test = YES

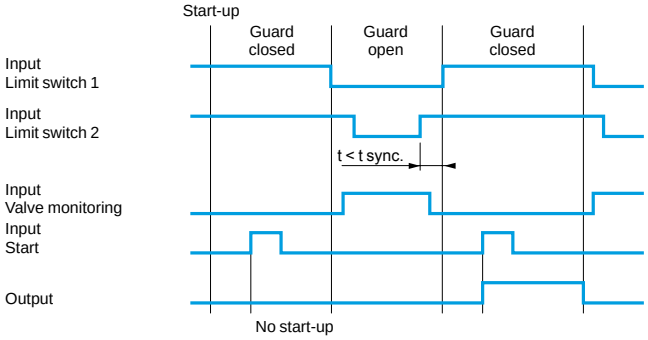
Automatic start



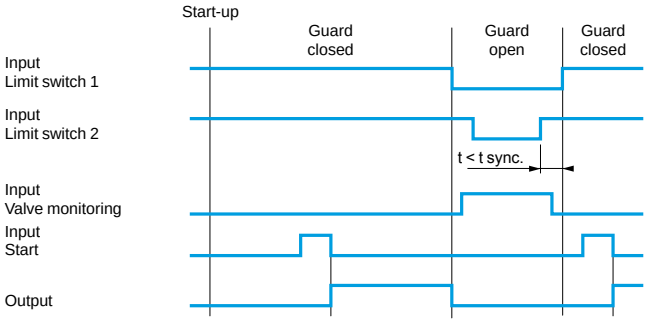
Rising edge monitored start



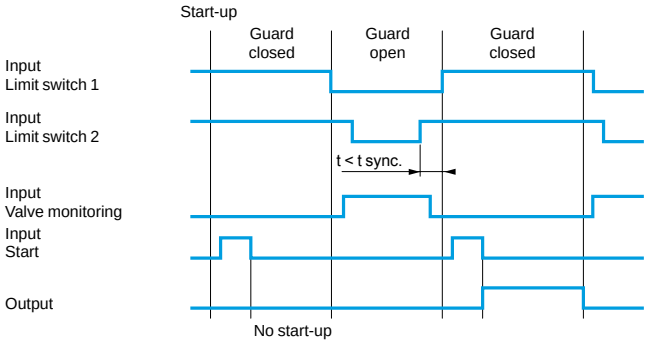
Rising edge monitored start



Falling edge monitored start



Falling edge monitored start



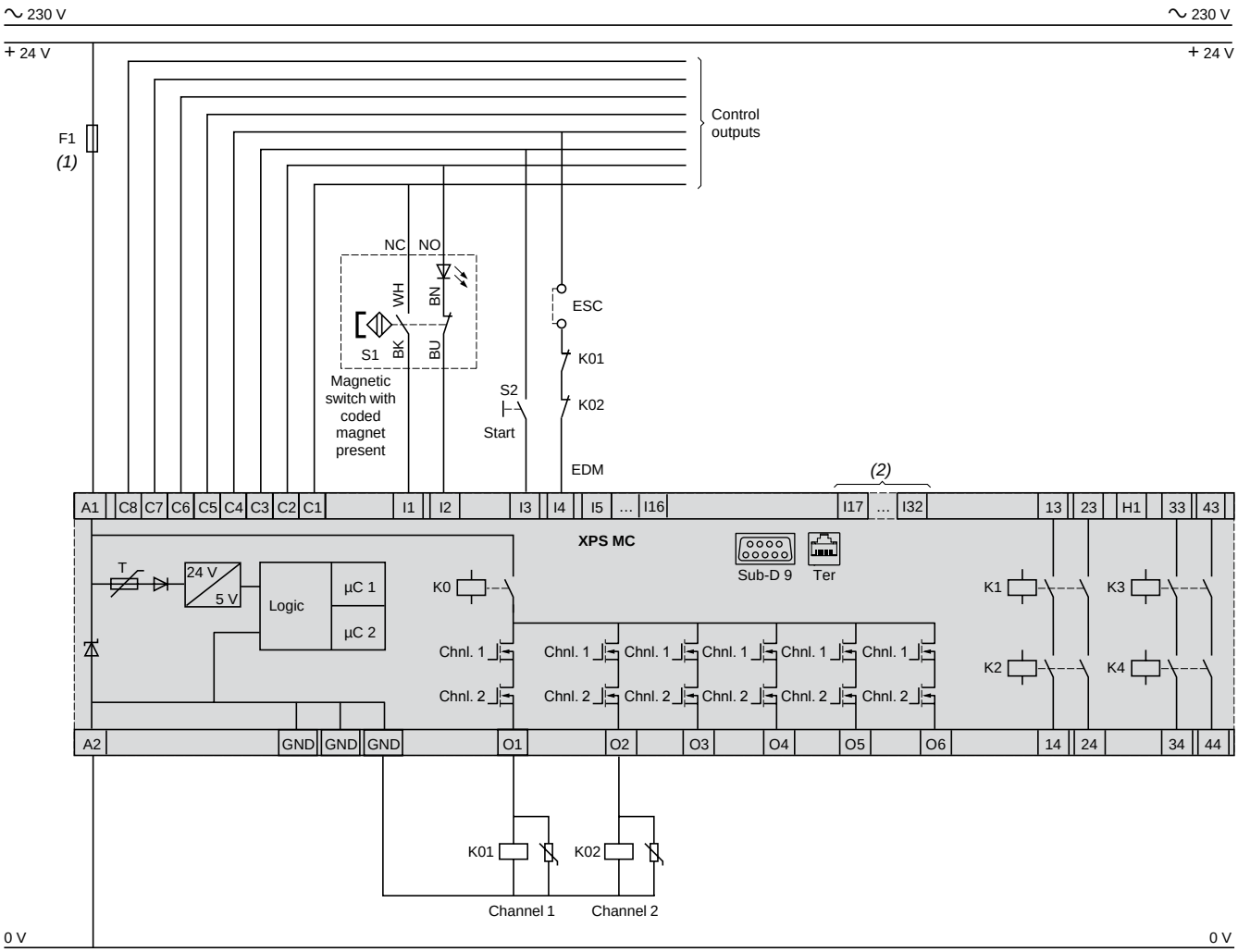
Key 0 — 1

t sync. = synchronization time

2

Non-contact safety interlock (magnetic switch) monitoring

Wiring diagram



ESC = external start conditions
EDM = external devices monitoring

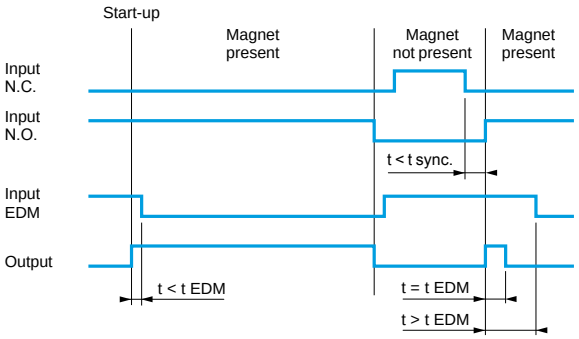
(1) Technical specifications for maximum rating of fuses, see page 2/126.
(2) Only applicable to XPSMC32Z●.

Non-contact safety interlock (magnetic switch) monitoring (continued)

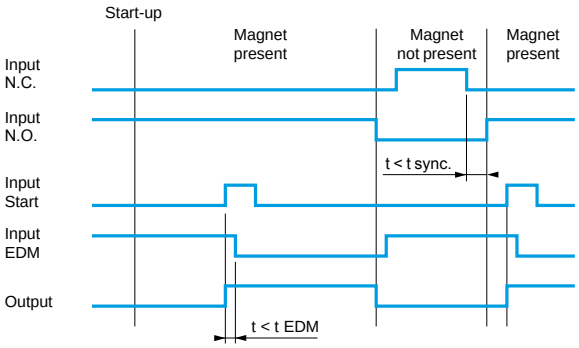
Functional diagrams

Start test = NO

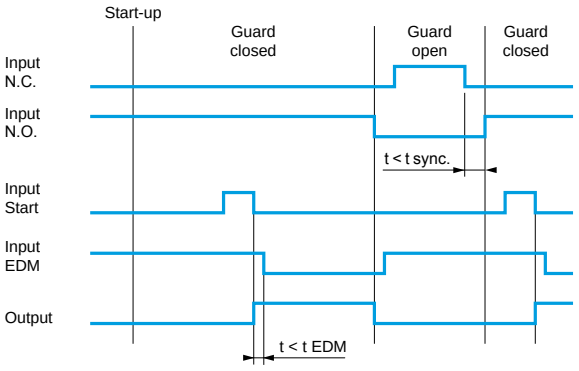
Automatic start



Rising edge monitored start

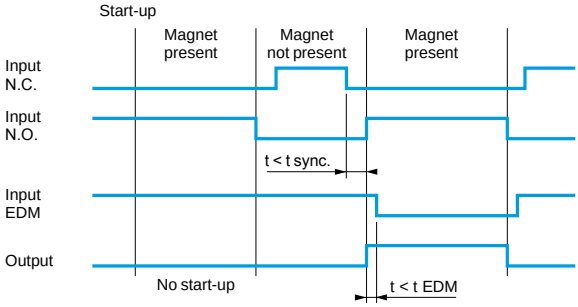


Falling edge monitored start

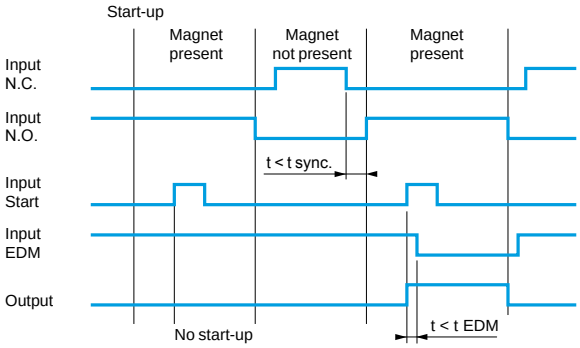


Start test = YES

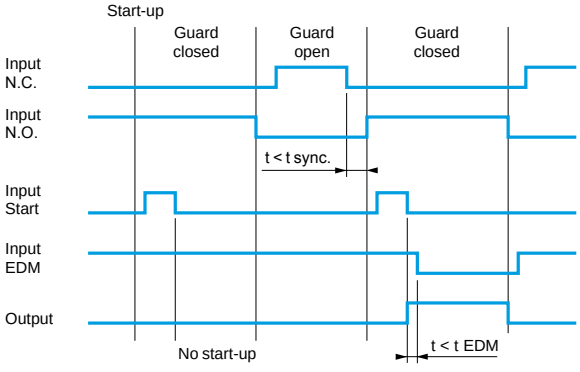
Automatic start



Rising edge monitored start



Falling edge monitored start



Key 0 ⌐ 1

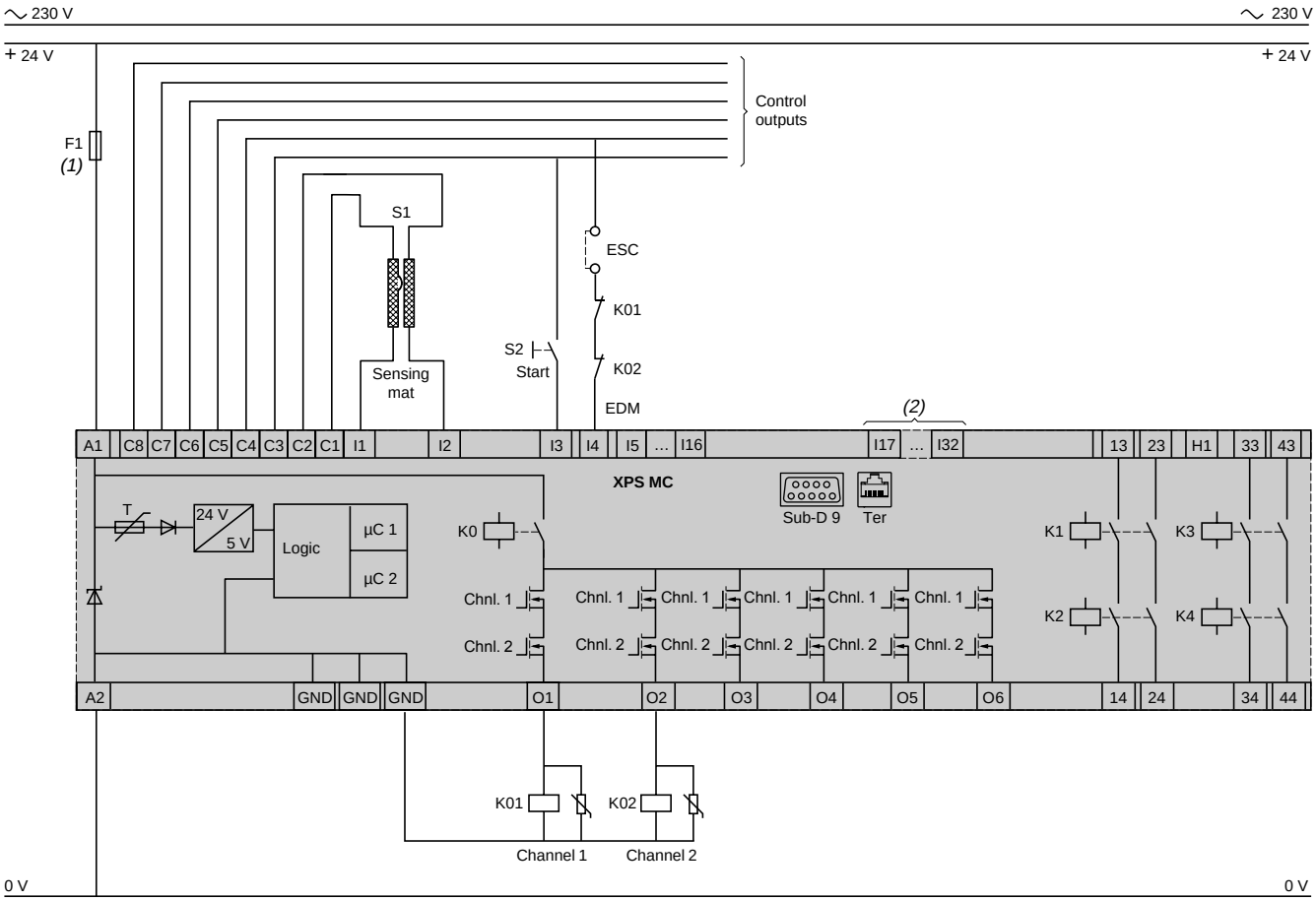
EDM = external devices monitoring
t EDM = maximum monitoring time of external devices
t sync. = synchronization time

2

Sensing mat monitoring

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

Wiring diagram



ESC = external start conditions
EDM = external devices monitoring

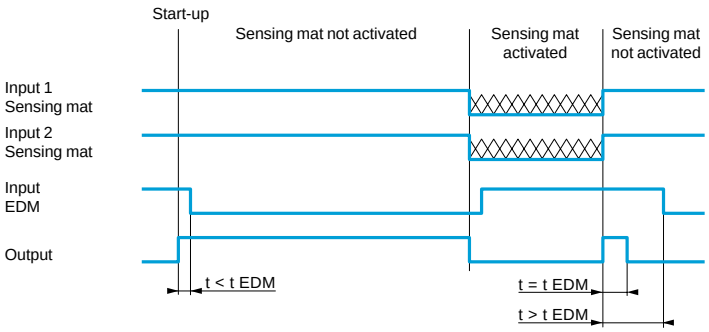
(1) Technical specifications for maximum rating of fuses, see page 2/126.
(2) Only applicable to XPSMC32Z●.

Sensing mat monitoring (continued)

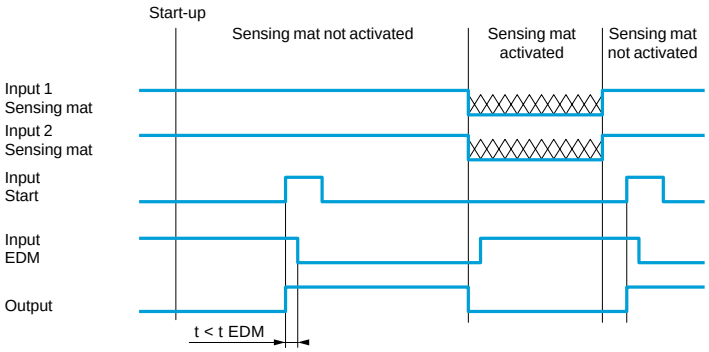
Functional diagrams

Start-up test

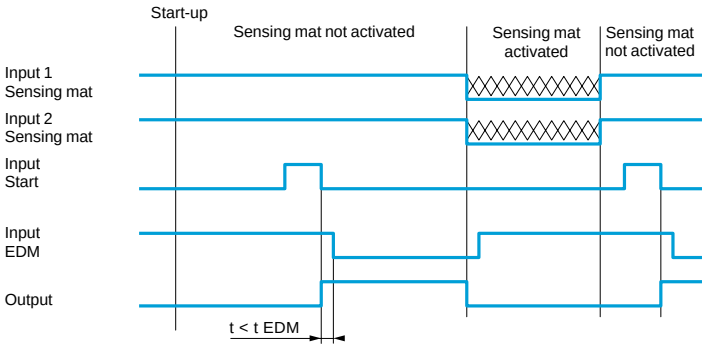
Automatic start



Rising edge monitored start



Falling edge monitored start



Key 0 ⌐ 1

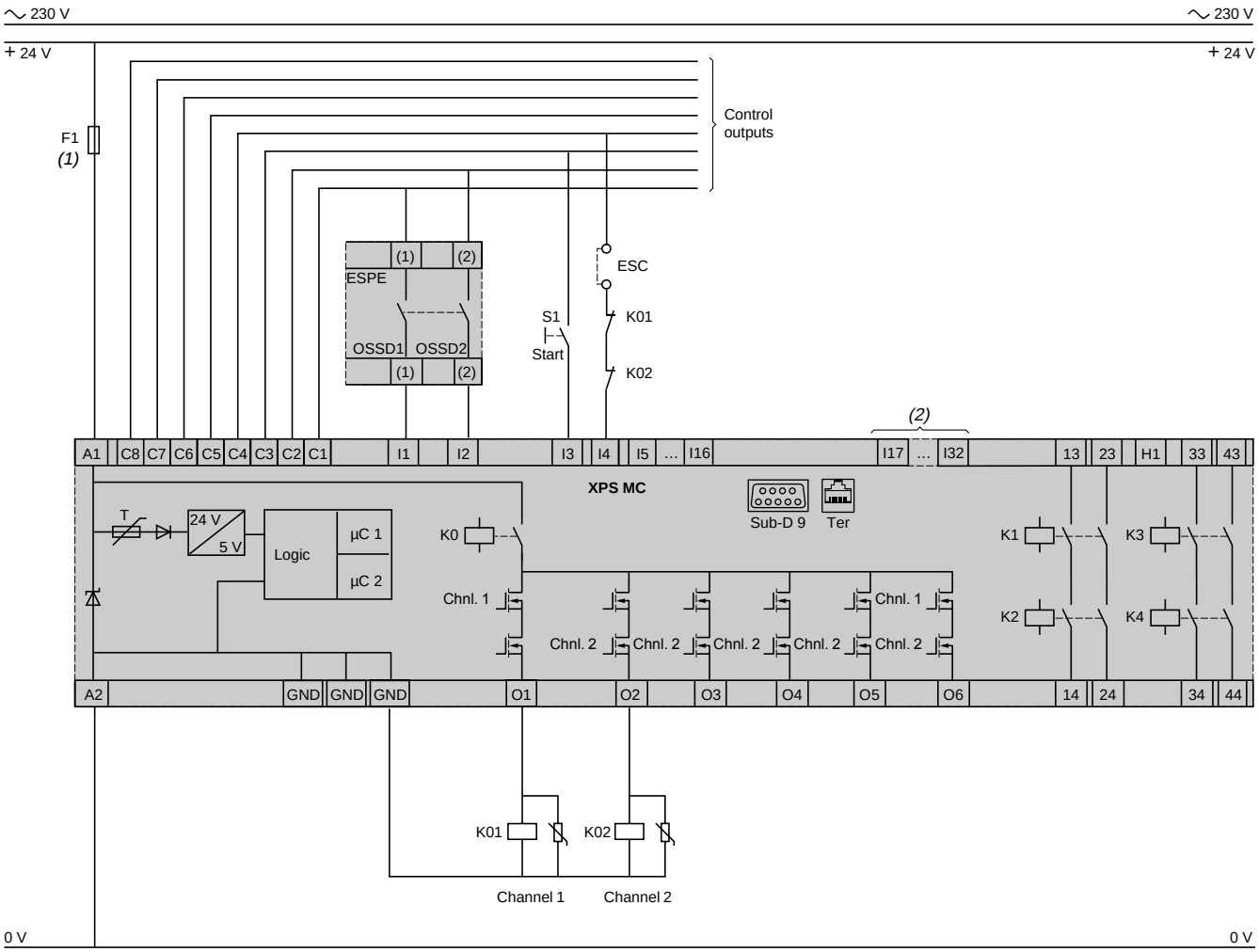
EDM = external devices monitoring
t EDM = maximum monitoring time of external devices

2

Light curtain monitoring, relay output type

Category 4 conforming to standard EN 954-1.

Wiring diagram



ESC = external start conditions
ESPE = electro-sensitive protection equipment
OSSD1/OSSD2 = output signal switching device

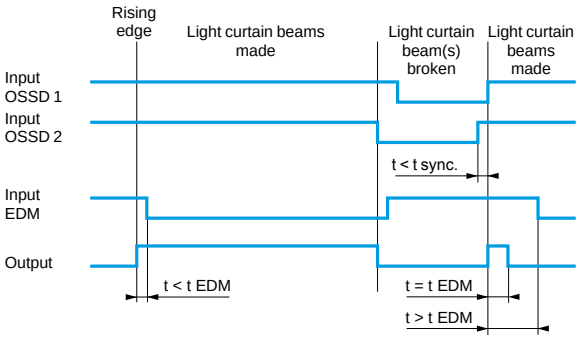
(1) Technical specifications for maximum rating of fuses, see page 2/126.
(2) Only applicable to XPSMC32Z●.

Light curtain monitoring, relay output type (continued)

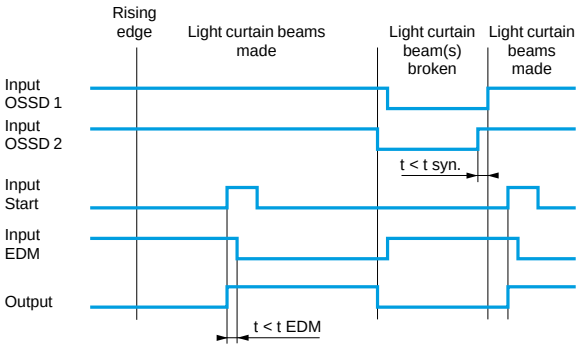
Functional diagrams

Start test = NO

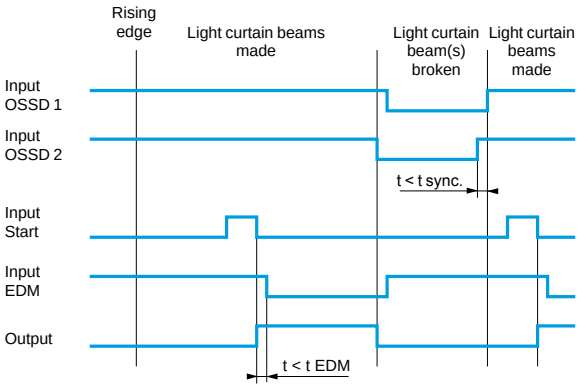
Automatic start



Rising edge monitored start

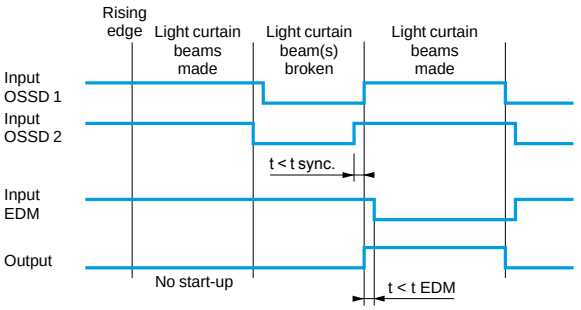


Falling edge monitored start

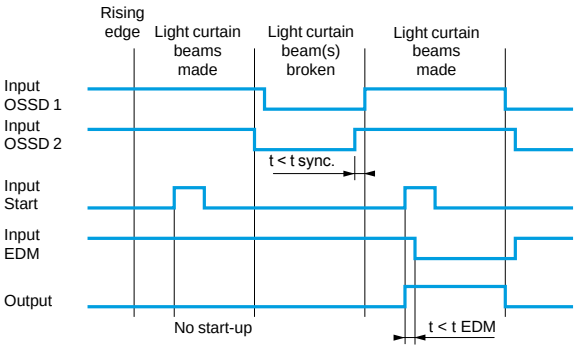


Start test = YES

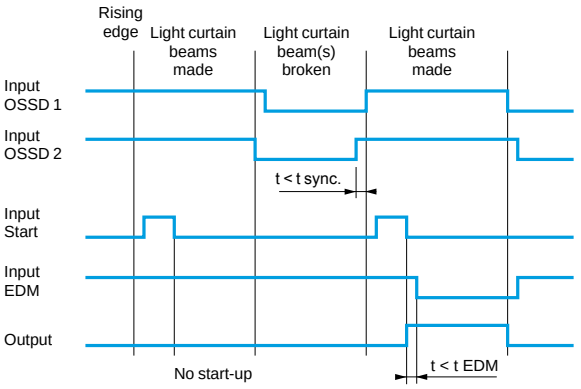
Automatic start



Rising edge monitored start



Falling edge monitored start



Key 0 ⌐ 1

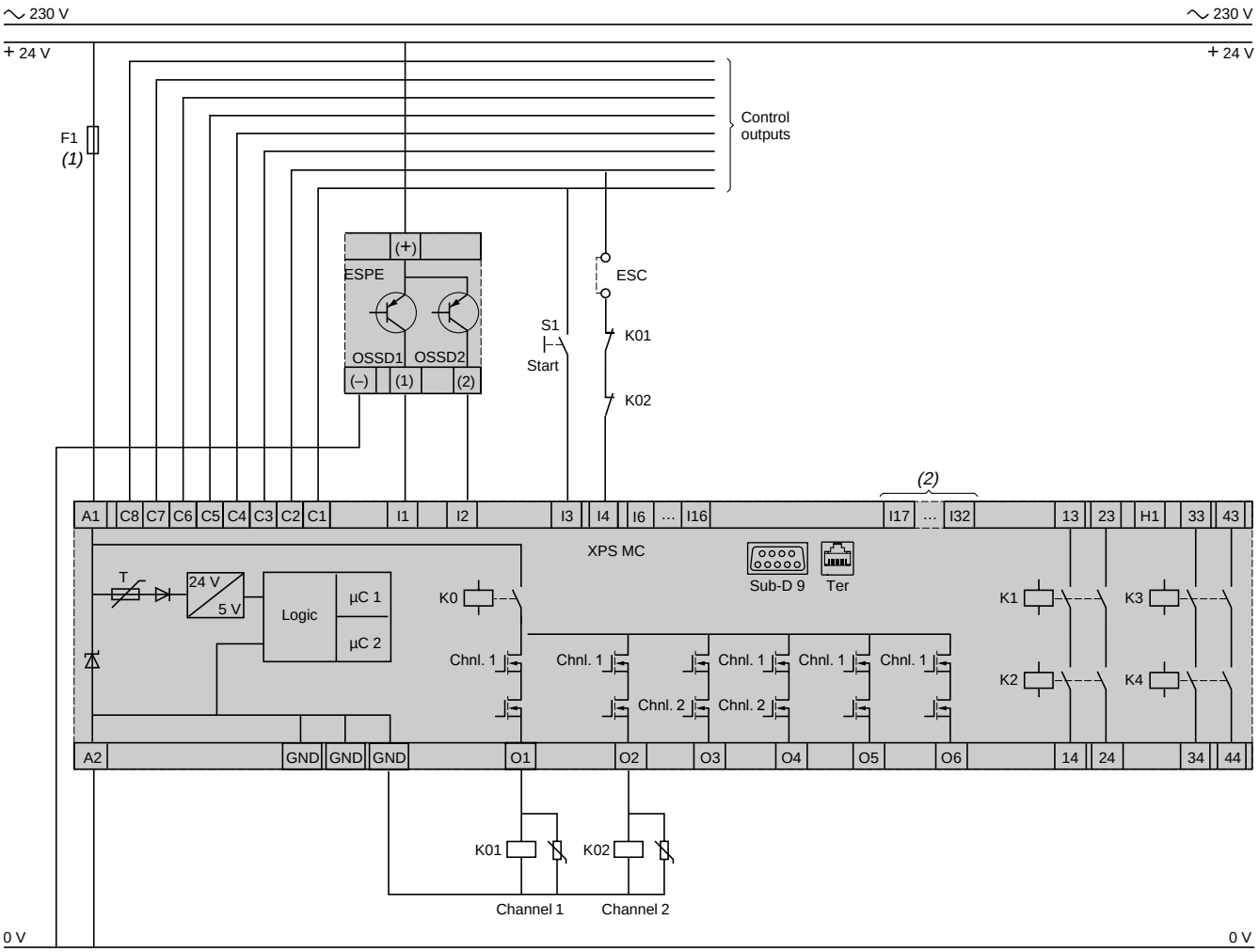
EDM = external devices monitoring
t EDM = maximum monitoring time of external devices
t sync. = synchronization time

2

Light curtain monitoring, solid-state output type

Category 4 conforming to standard EN 954-1.

Wiring diagram



ESC = external start conditions
ESPE = electro-sensitive protection equipment
OSSD1/OSSD2 = output signal switching device

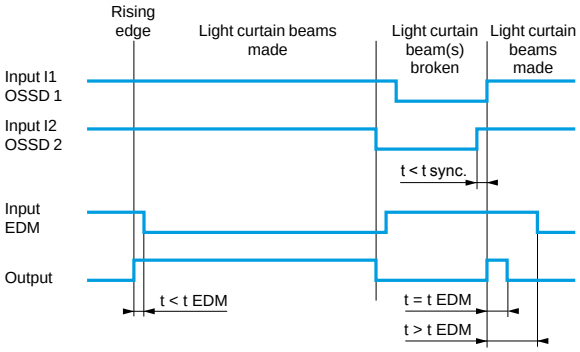
(1) Technical specifications for maximum rating of fuses, see page 2/126.
(2) Only applicable to XPSMC32Z●.

Light curtain monitoring, solid-state output type (continued)

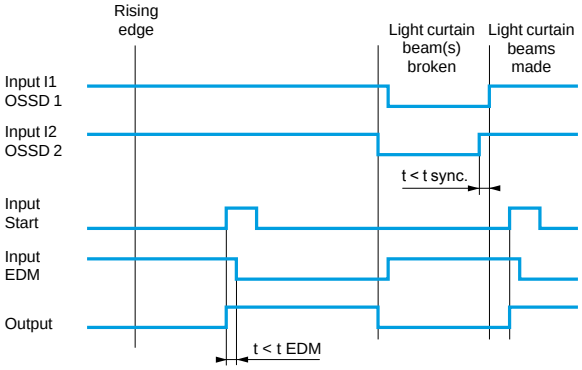
Functional diagrams

Start test = NO

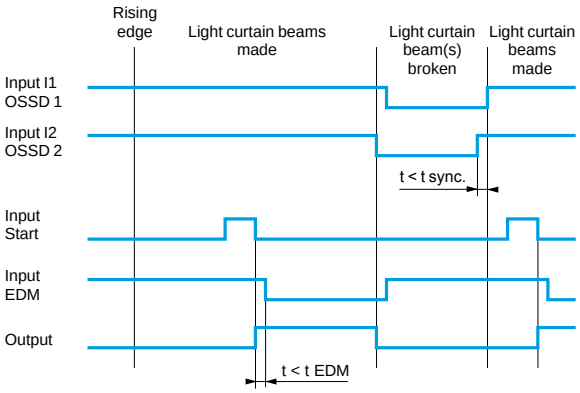
Automatic start



Rising edge monitored start

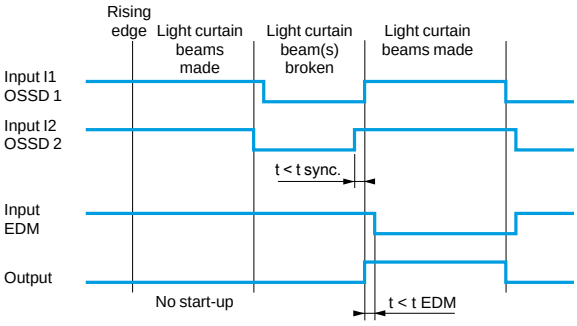


Falling edge monitored start

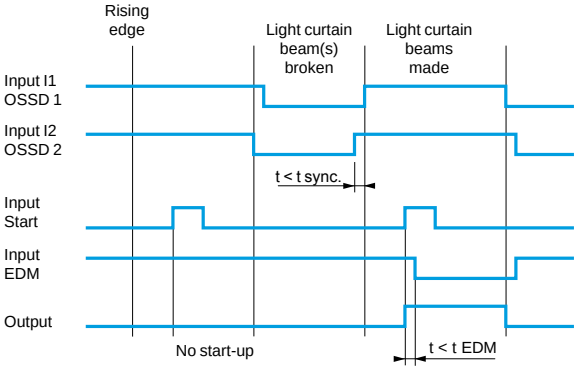


Start test = YES

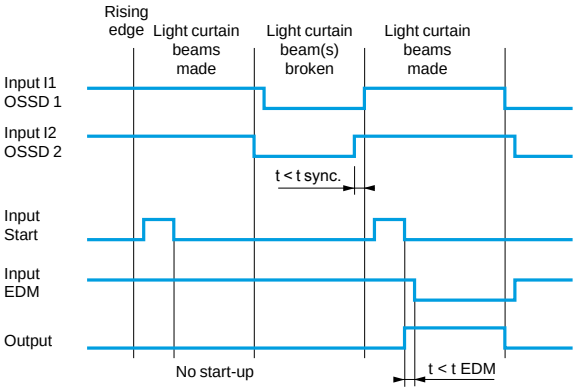
Automatic start



Rising edge monitored start



Falling edge monitored start



Key 0 ⌐ 1

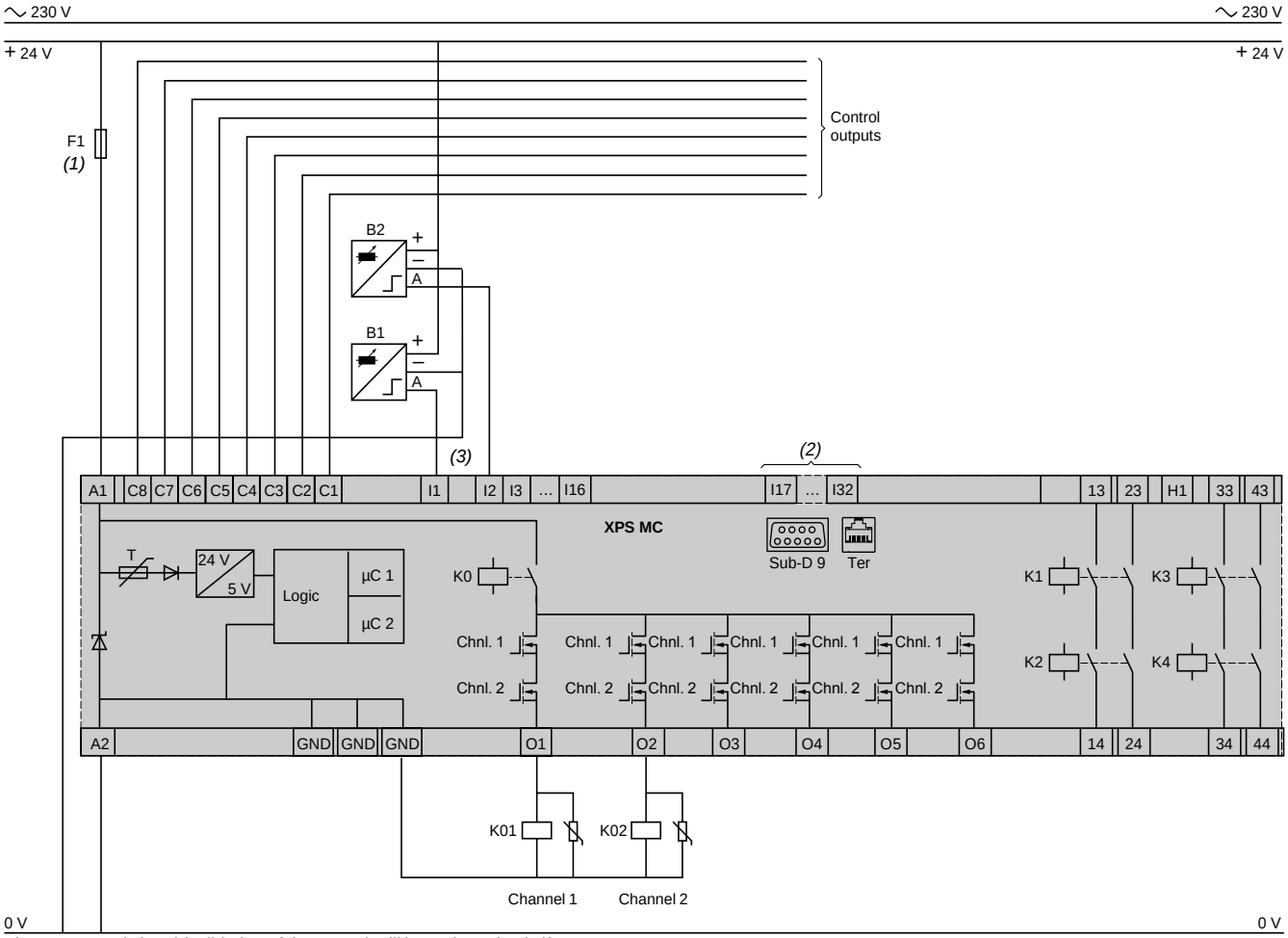
EDM = external devices monitoring
t EDM = maximum monitoring time of external devices
t sync. = synchronization time

2

Zero speed detection

Category 4 conforming to standard EN 954-1.

Wiring diagram

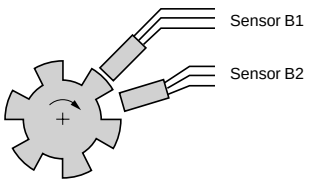


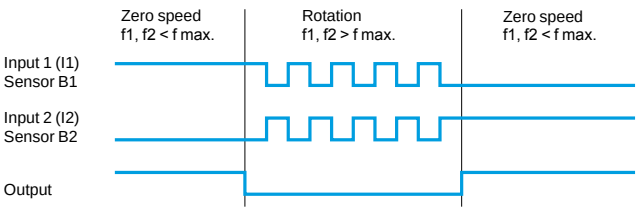
The zero speed signal (validation of the output) will be activated only if:
1: one input is in a high state,
2: the other input is in a low state,
3: the frequency of the two inputs is less than the stated value.

(1) Technical specifications for maximum rating of fuses, see page 2/126.
(2) Only applicable to XPSMC32Z●.
(3) Only one "Zero speed detection" function can be connected to an XPSMC controller, and only to the inputs i1 and i2.

Functional diagram

Sensor control

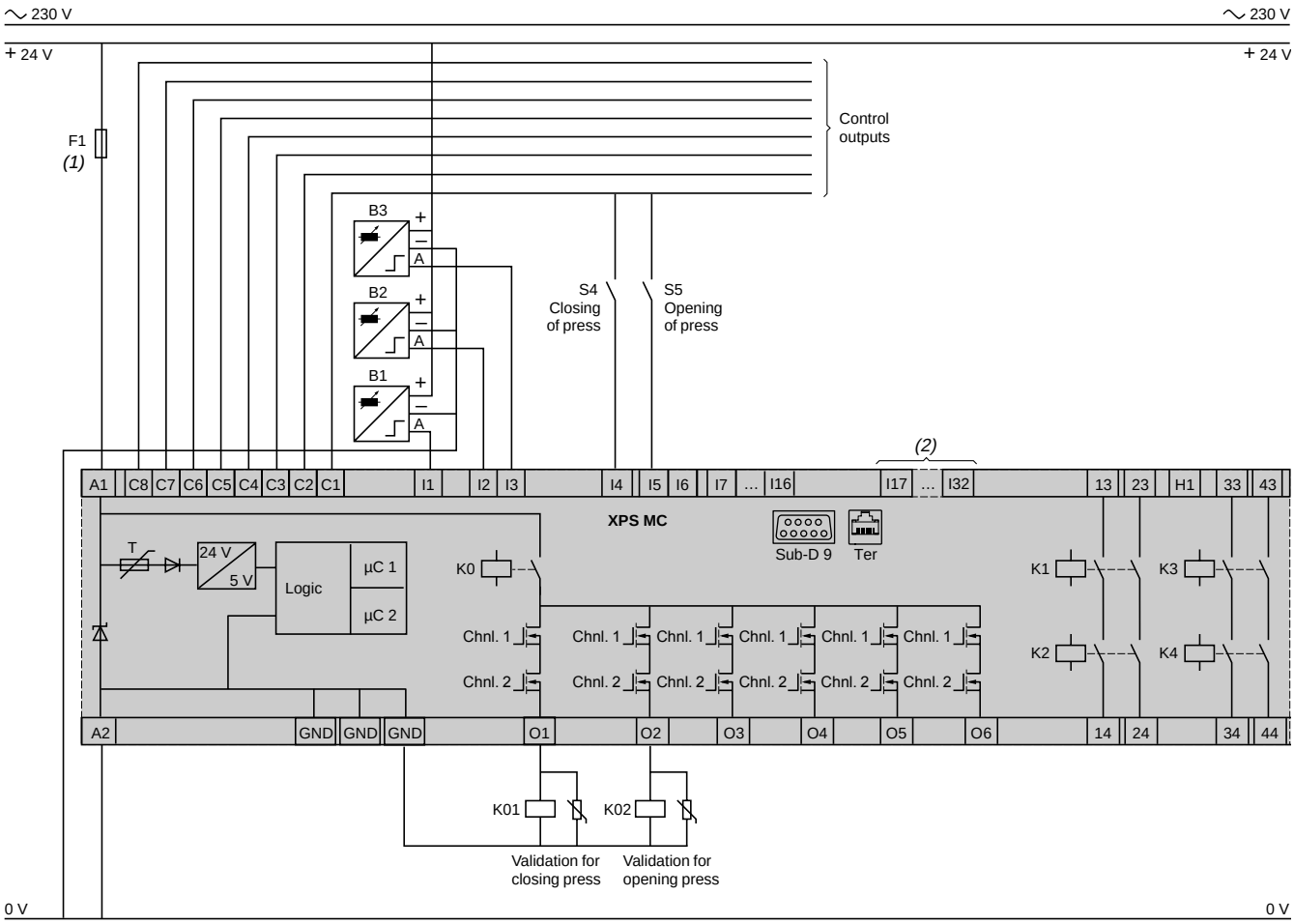




Dynamic monitoring of hydraulic valves on linear presses

Category 4 conforming to standard EN 954-1.

Wiring diagram

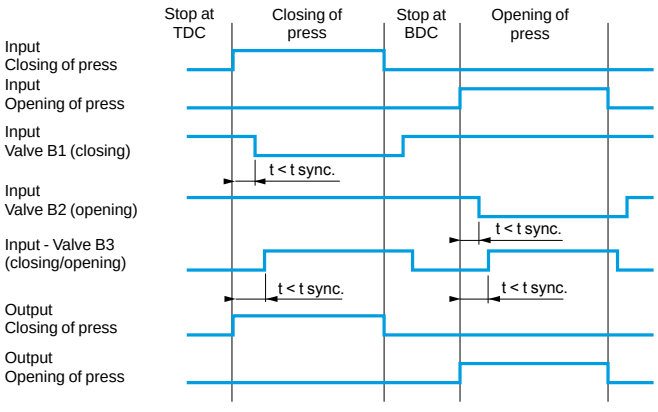


ESC = external start conditions

(1) Technical specifications for maximum rating of fuses, see page 2/126.
(2) Only applicable to XPSMC32Z●.

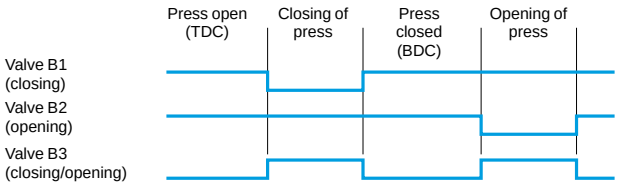
Functional diagrams

Valve control



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

Valve sensor signals



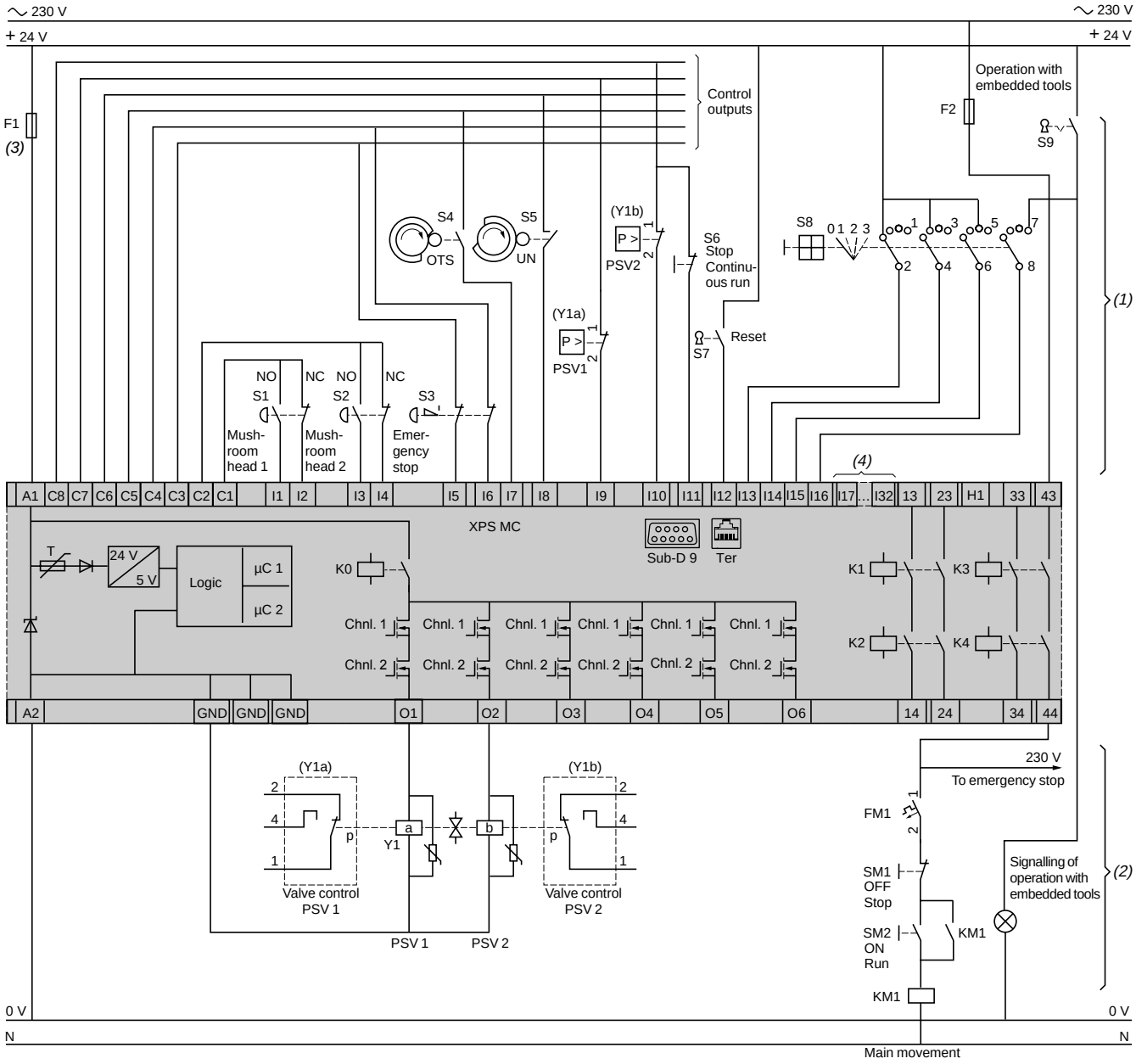
***Note:** The valve sensor signals must function as described above.*

2

Monitoring safety stop at top dead center on eccentric press

- Category 4 conforming to standard EN 954-1.
- This function consists of several monitoring modes including:
  - safety stop at top dead center *(1)*,
  - monitoring braking travel,
  - as an option, dynamic monitoring of doubled-bodied solenoid valves *(2)*.

Wiring diagram

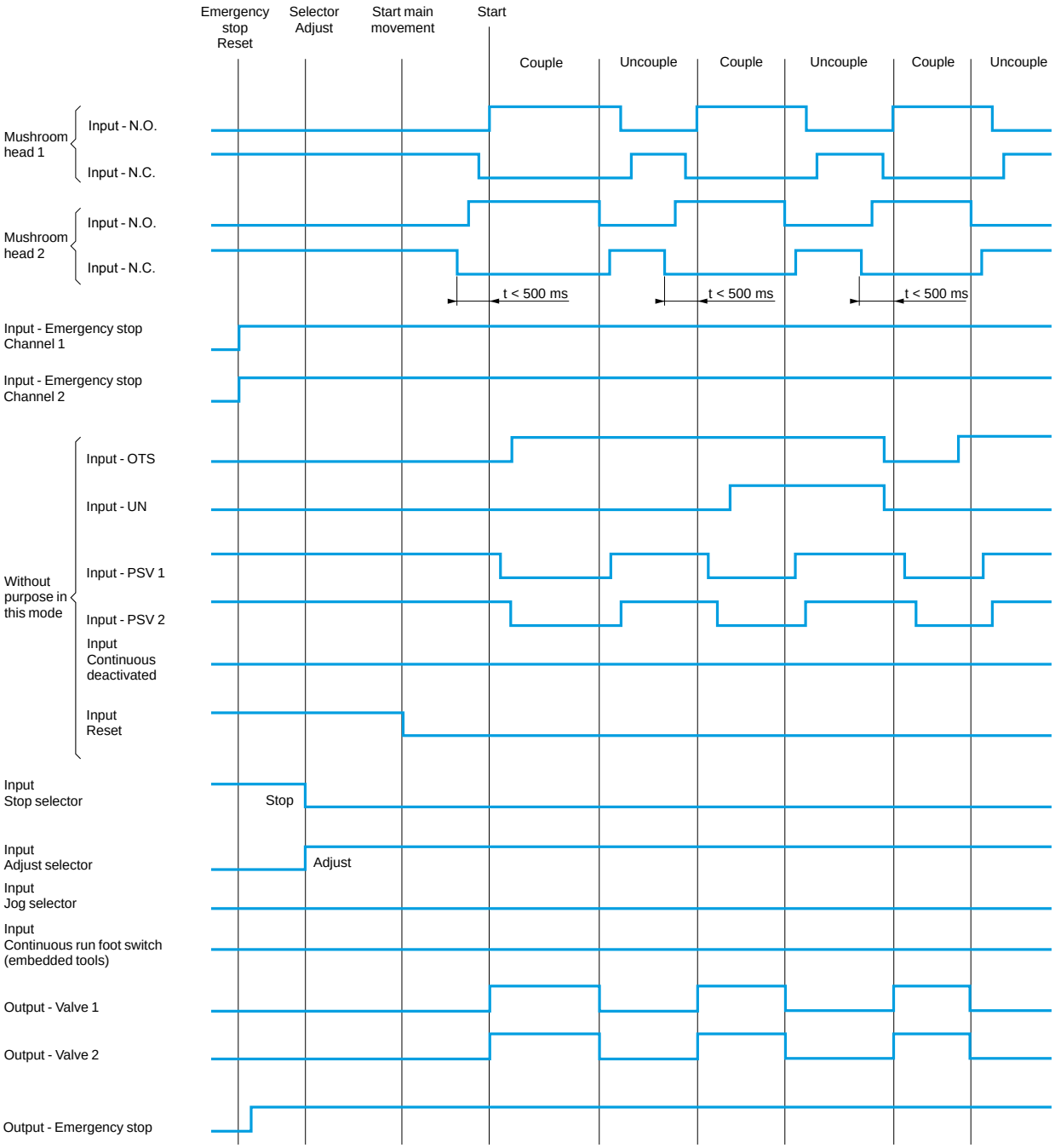


S8: Operating modes:
0 - stop,
1 - adjust,
2 - jog,
3 - automatic continuous run.
OTS = Limit switch associated with top dead center (TDC)
UN = Limit switch associated with bottom dead center (BDC)
PSV = safety valve

(3) Technical specifications for maximum rating of fuses, see page 2/126.
(4) Only applicable to XPSMC32Z●.

Monitoring safety stop at top dead center on eccentric press (continued)

Functional diagram in adjust mode



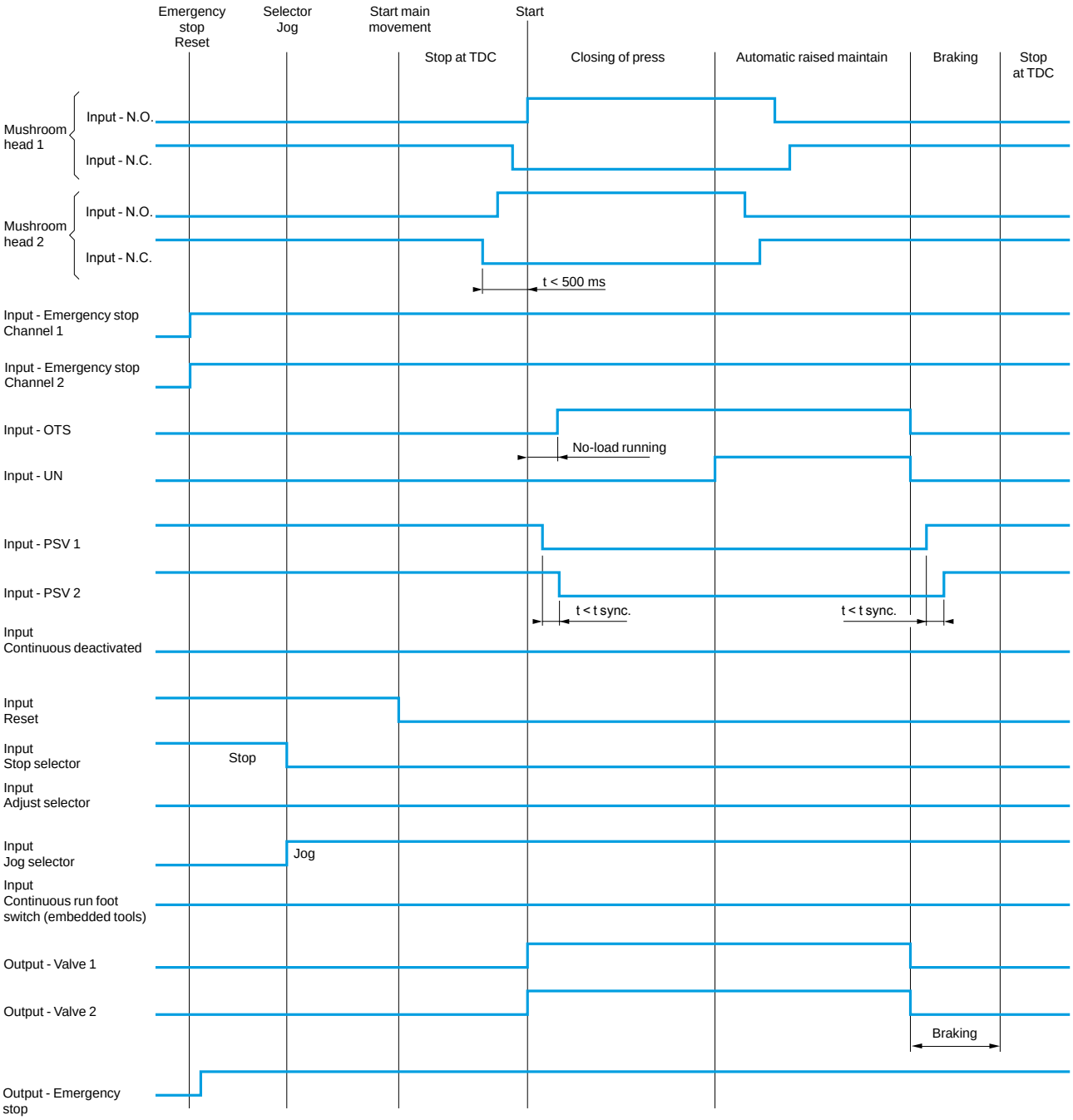
Key 0 — 1

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

2

Monitoring safety stop at top dead center on eccentric press (continued)

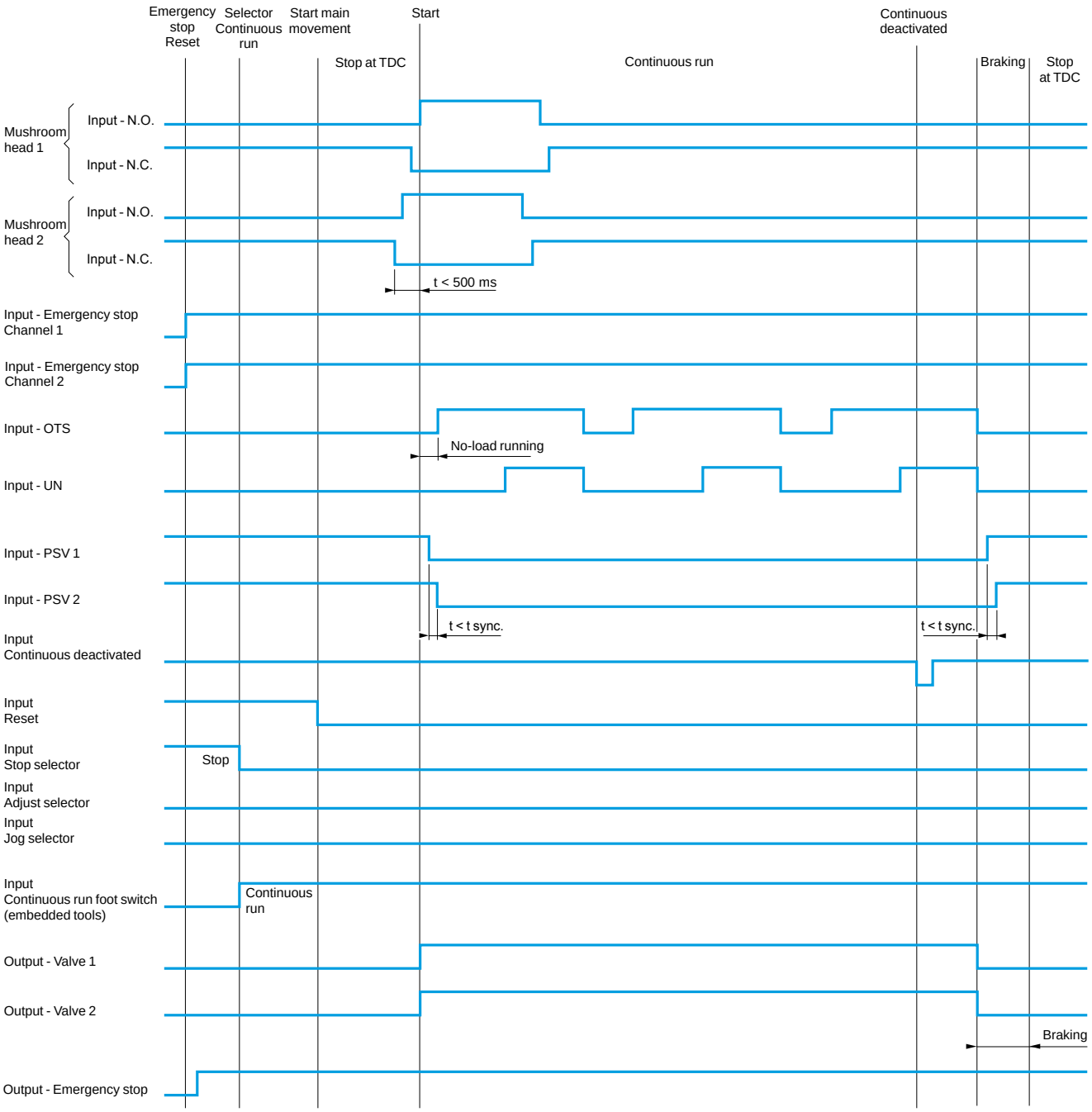
Functional diagram in jog mode



BDC = Bottom Dead Center
TDC = Top Dead Center
OTS = Limit switch associated with top dead center (TDC)
UN = Limit switch associated with bottom dead center (BDC)
PSV = safety valve
t sync = synchronization time

Monitoring safety stop at top dead center on eccentric press (continued)

Functional diagram in automatic continuous run mode



Key 0 1

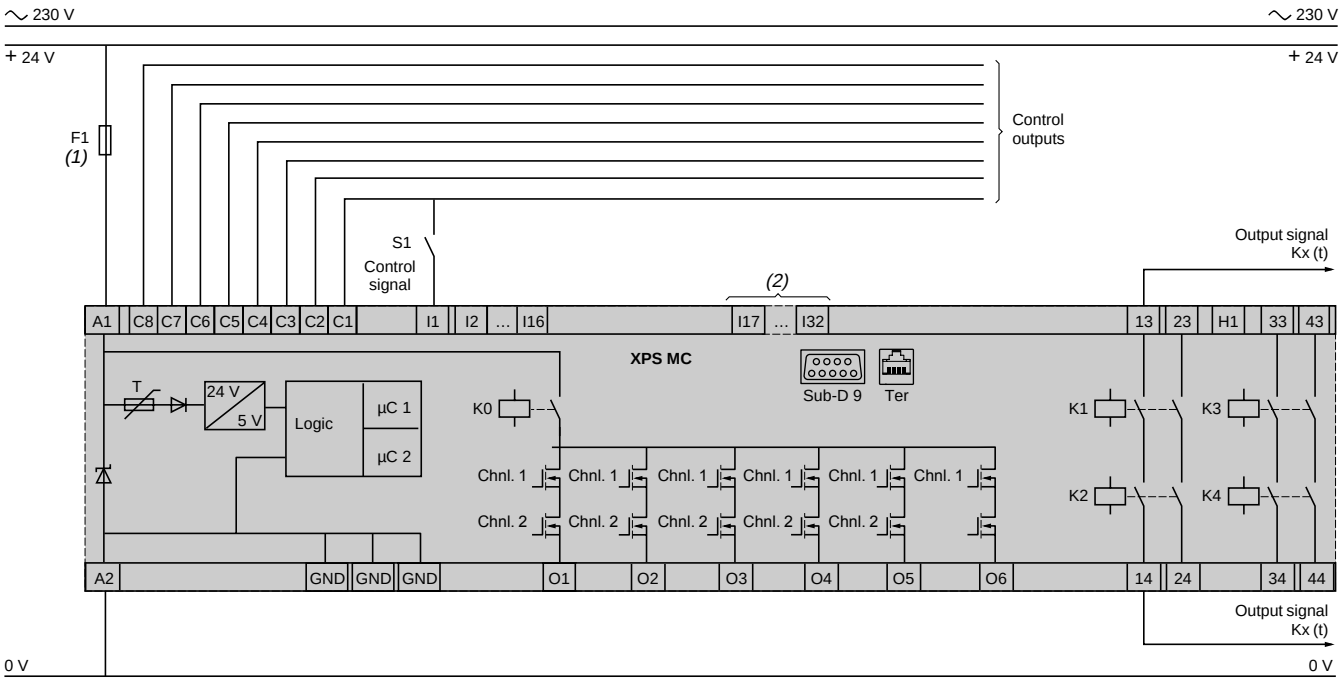
BDC = Bottom Dead Center
TDC = Top Dead Center
OTS = Limit switch associated with top dead center (TDC)
UN = Limit switch associated with bottom dead center (BDC)
PSV = safety valve
t sync = synchronization time

2

Safety time delays

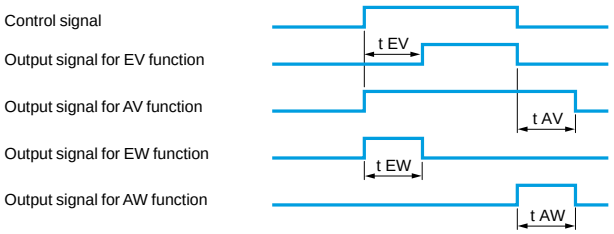
Category 4 conforming to standard EN 954-1.

Wiring diagram



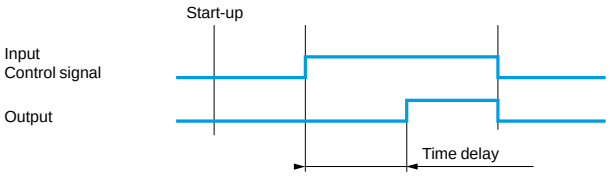
(1) Technical specifications for maximum rating of fuses, see page 2/126.
(2) Only applicable to XPSMC32Z●.

Functional diagrams

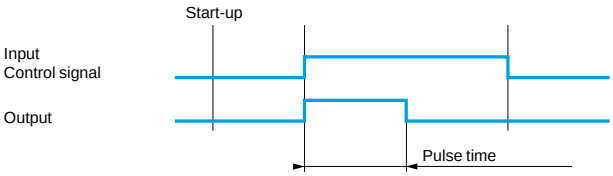


Functions:
EV = On-delay
AV = Off-delay
EW = Pulse on energization
AW = Pulse on de-energization

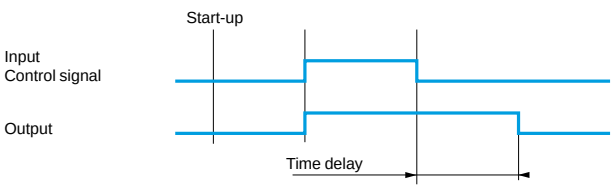
On-delay



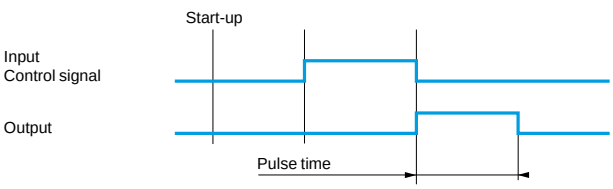
Pulse on energization



Off-delay



Pulse on de-energization

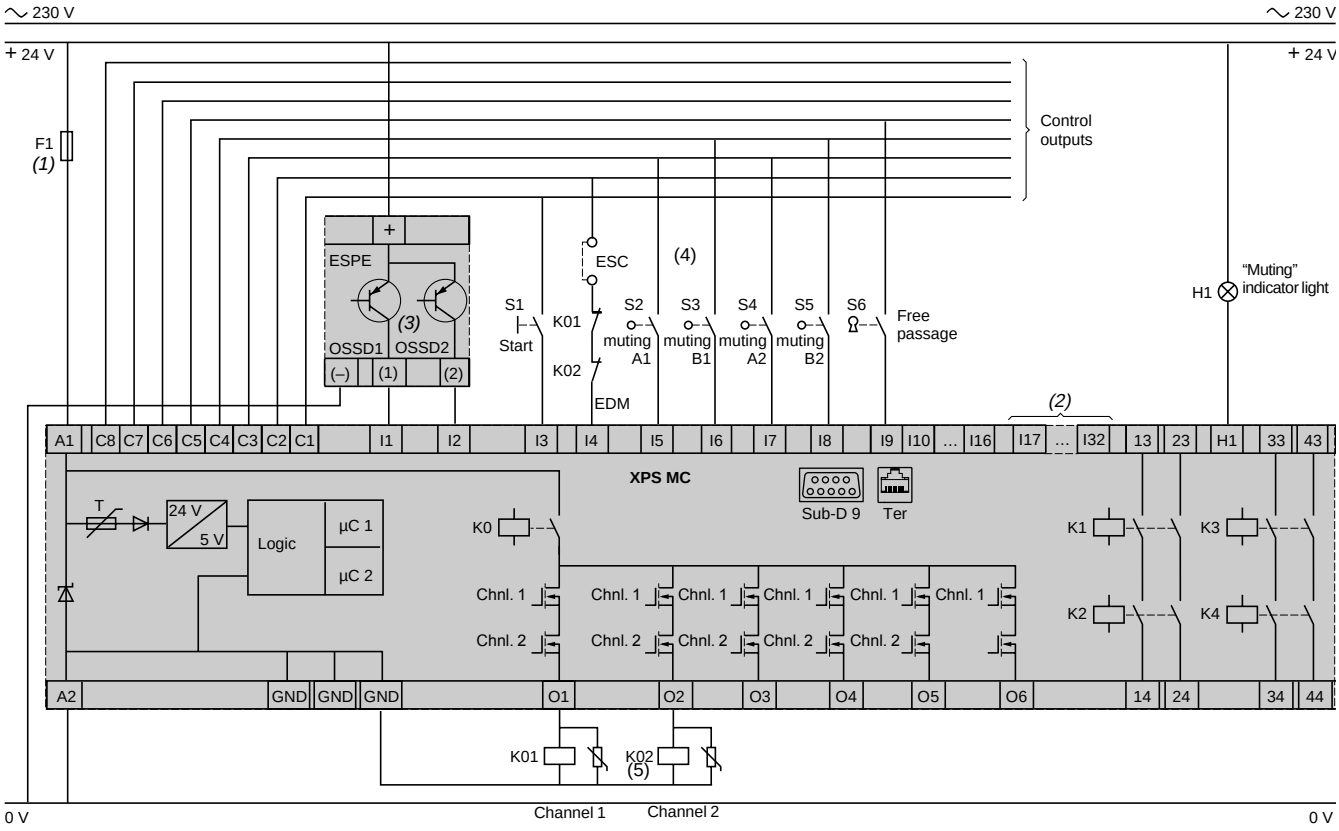


Key 0 1

"Muting" function for light curtains

Category 4 conforming to standard EN 954-1.

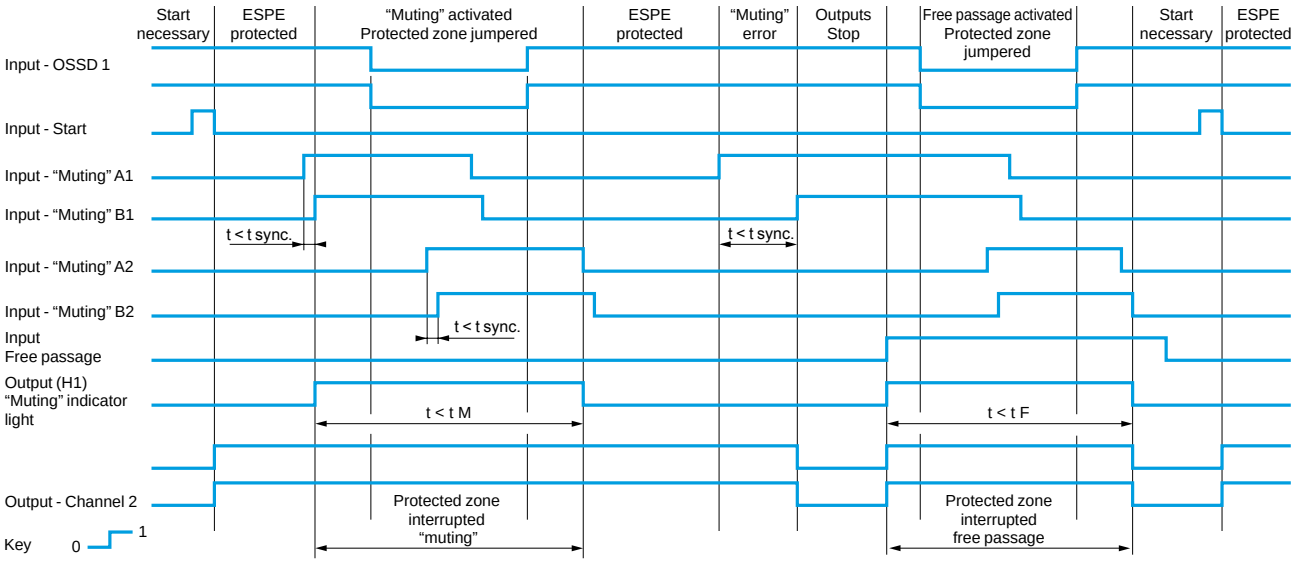
Wiring diagram



ESC = external start conditions
EDM = external devices monitoring
ESPE = electro-sensitive protection equipment
OSSD1/OSSD2 = output signal switching device

(1) Technical specifications for maximum rating of fuses, see page 2/126.
(2) Only applicable to XPSMC32Z●.
(3) A light curtain with relay outputs can also be used with the "Muting" function.
(4) Only one "Muting" function can be connected to an XPSMC controller.
(5) Example using 2 safety outputs to control 2 contactors linked to one safety function.

Functional diagram



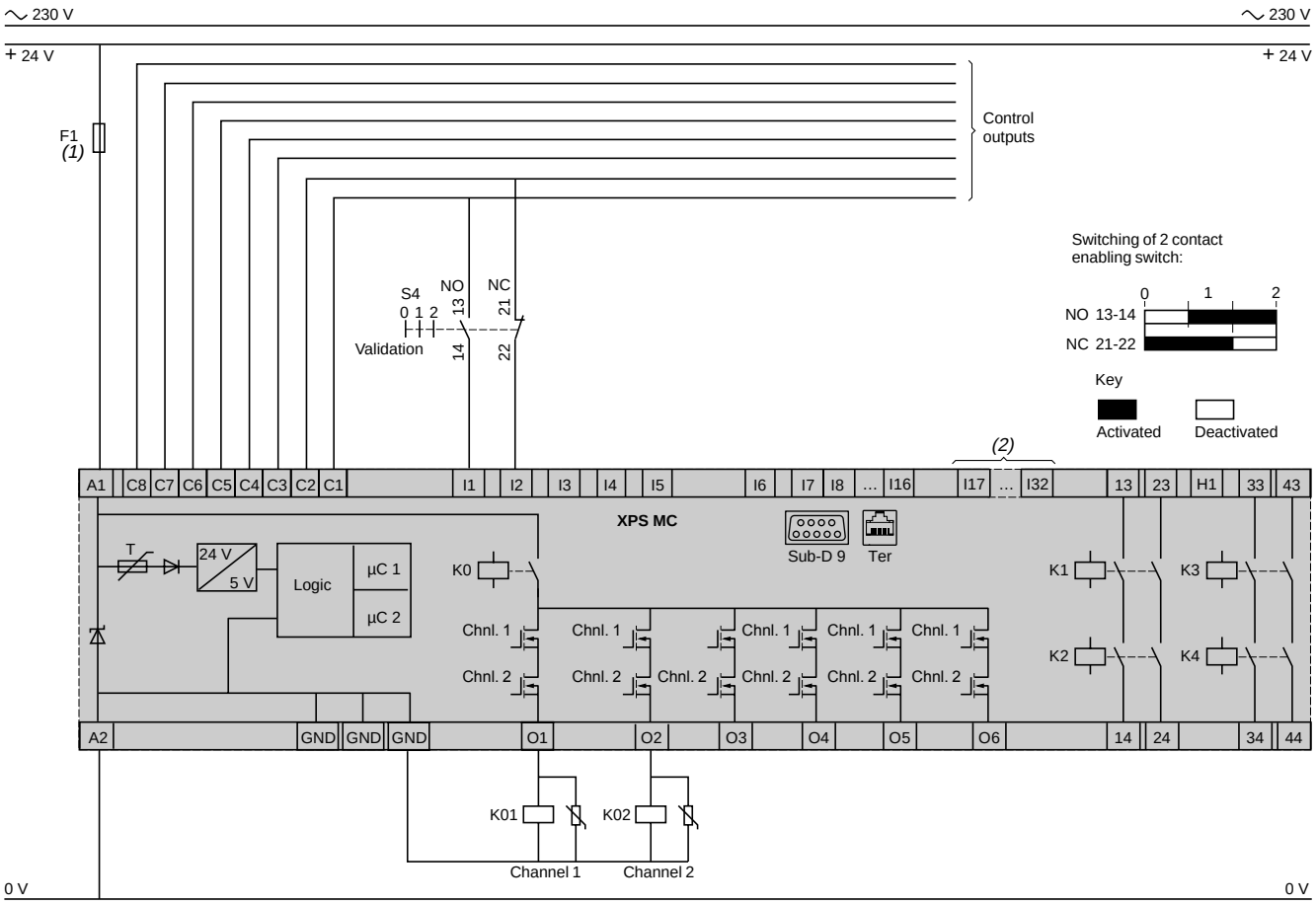
tM = "Muting" time
tF = free passage activation time
t sync. = synchronization time

2

Enabling switch monitoring, 2 contact type

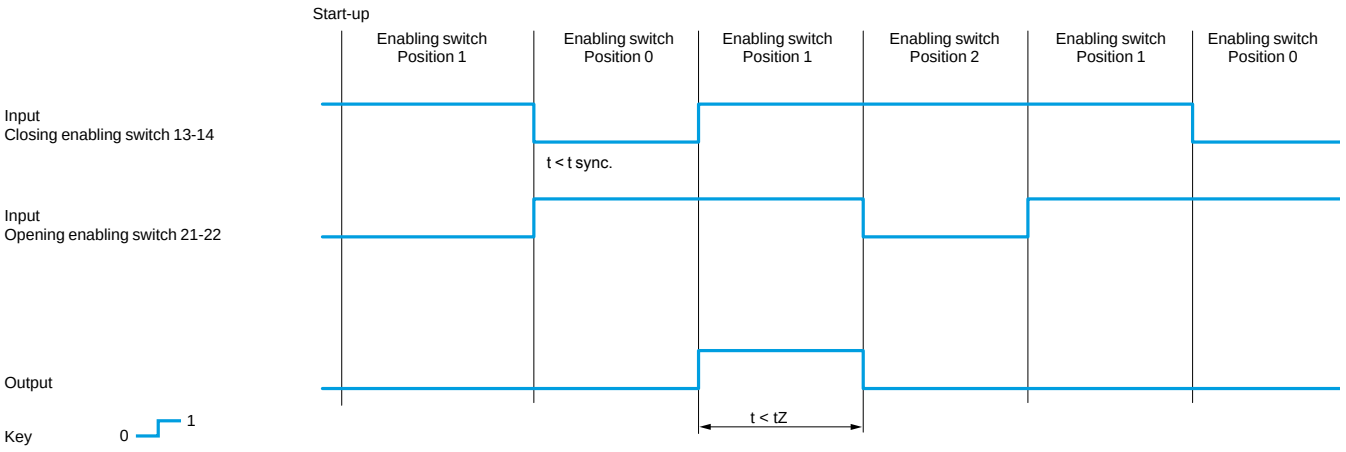
Category 1 conforming to standard EN 954-1.

Wiring diagram



(1) Technical specifications for maximum rating of fuses, see page 2/126.
(2) Only applicable to XPSMC32Z●.

Functional diagram

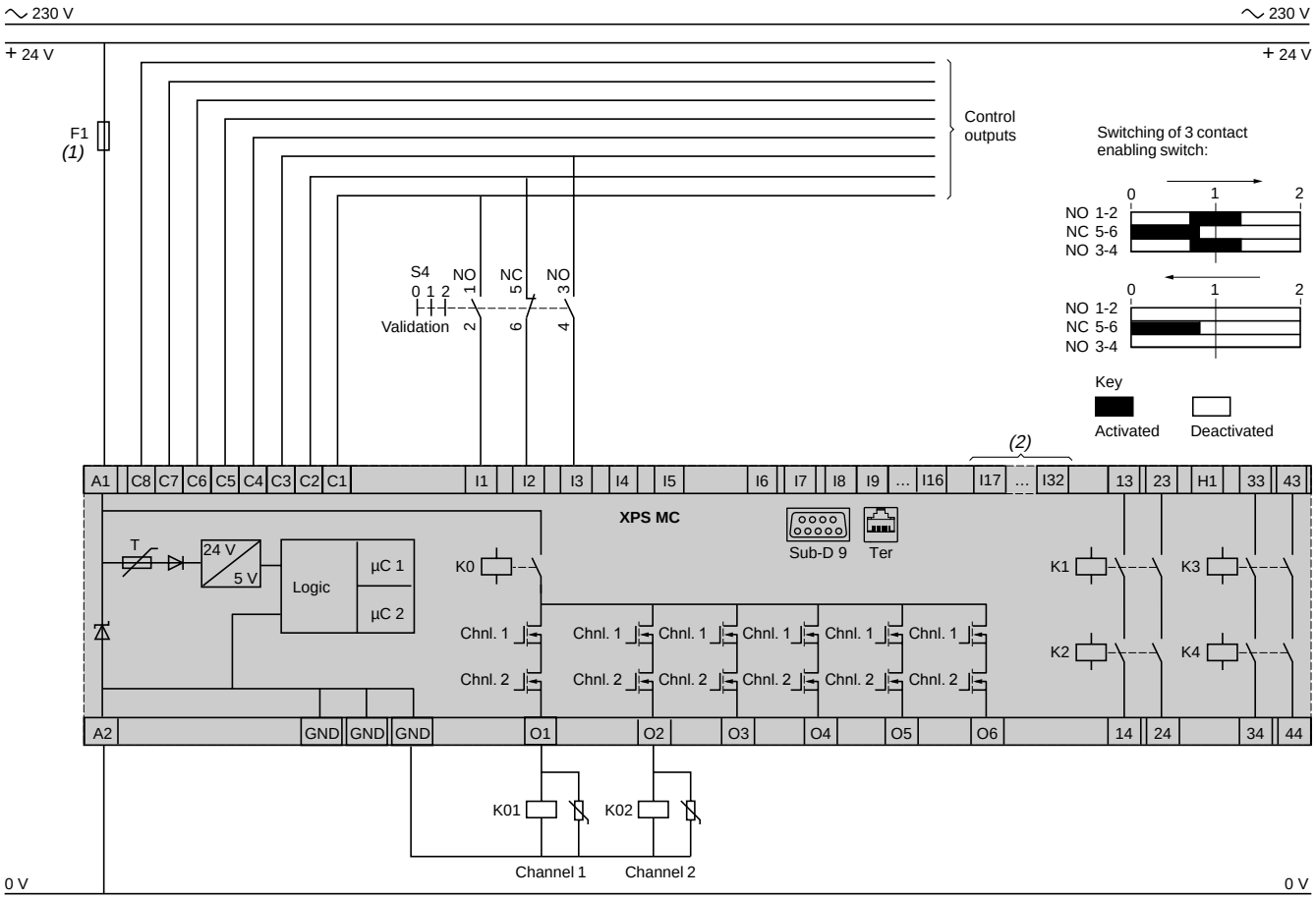


t Z = enabling time

Enabling switch monitoring, 3 contact type

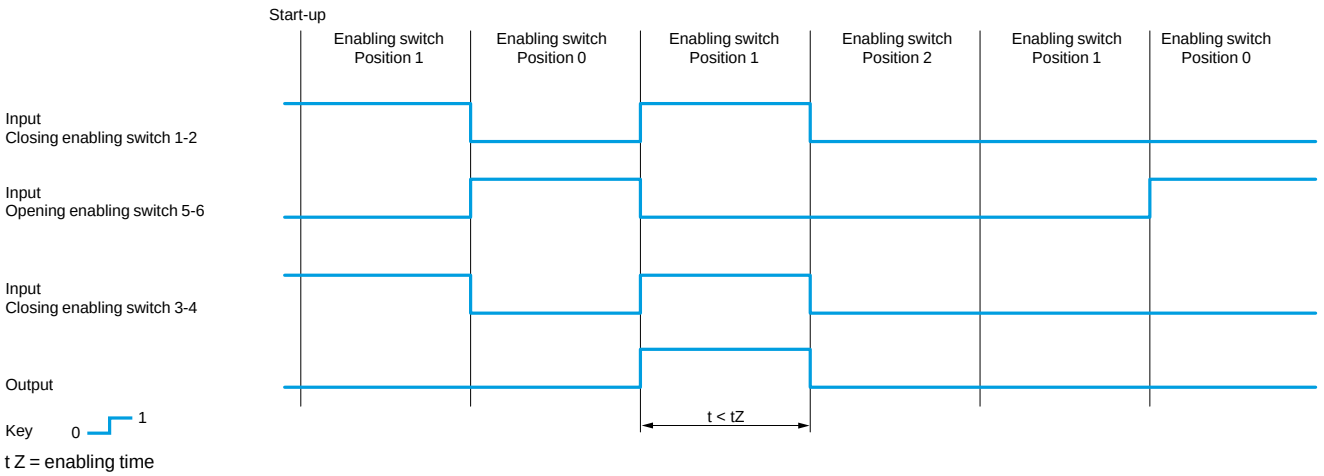
Category 4 conforming to standard EN 954-1.

Wiring diagram



(1) Technical specifications for maximum rating of fuses, see page 2/126.
(2) Only applicable to XPSMC32Z●.

Functional diagram



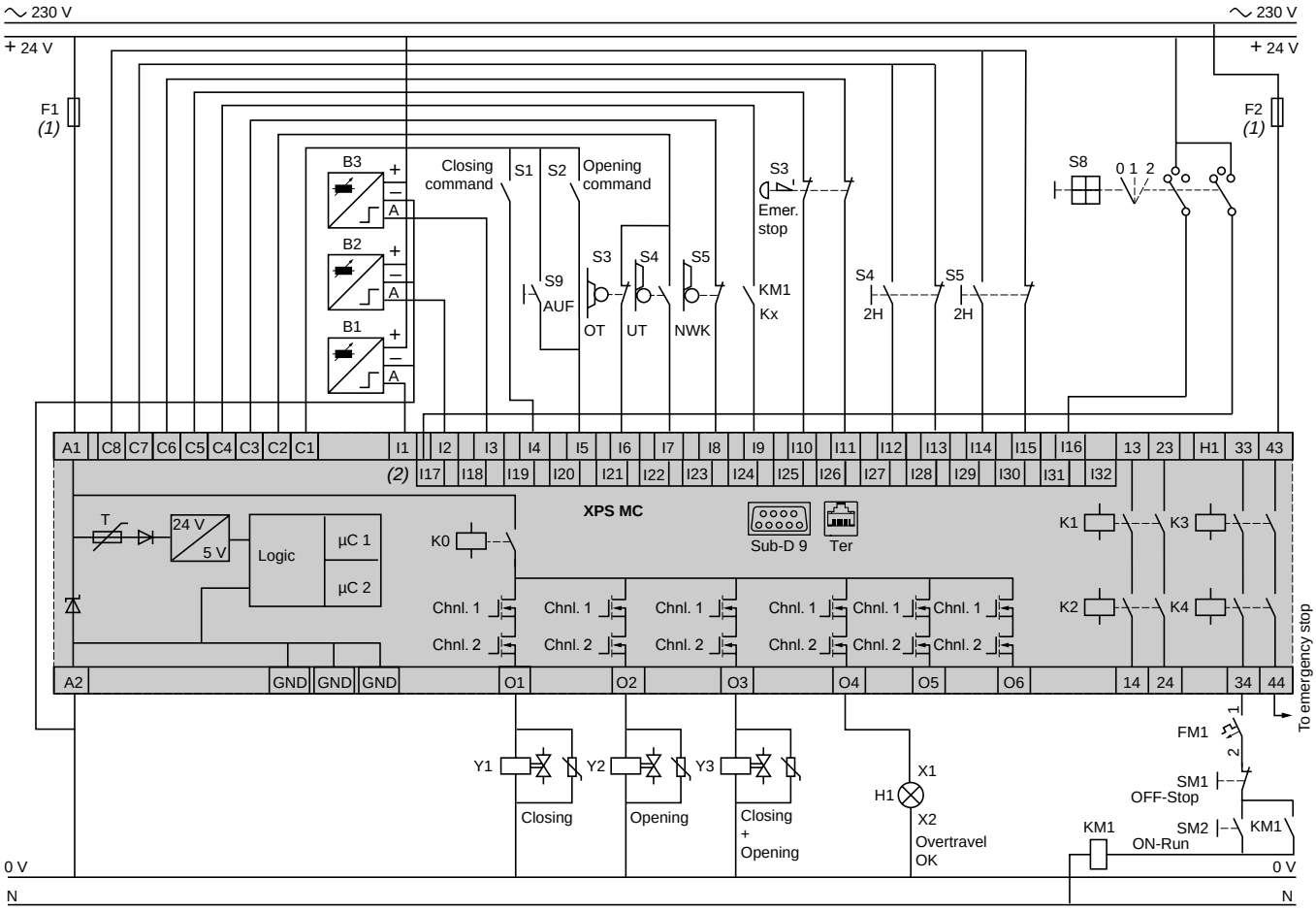
t Z = enabling time

2

Hydraulic press

Category 4 conforming to standard EN 954-1.

Wiring diagram



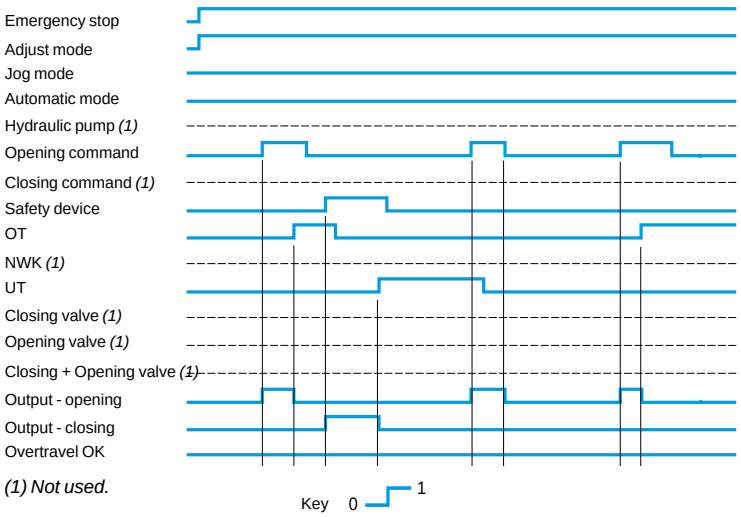
S8: Operating modes:
0 - stop,
1 - adjust,
2 - jog.

AUF = open, to be used in inching.
OT = Limit switch associated with top dead center (TDC).
UT = Limit switch associated with bottom dead center (BDC).
NWK = overtravel monitoring.

(1) Technical specifications for maximum rating of fuses, see page 2/126.
(2) Only applicable to XPSMC32Z● (I17…I32).

Functional diagram

Hydraulic press, adjust mode

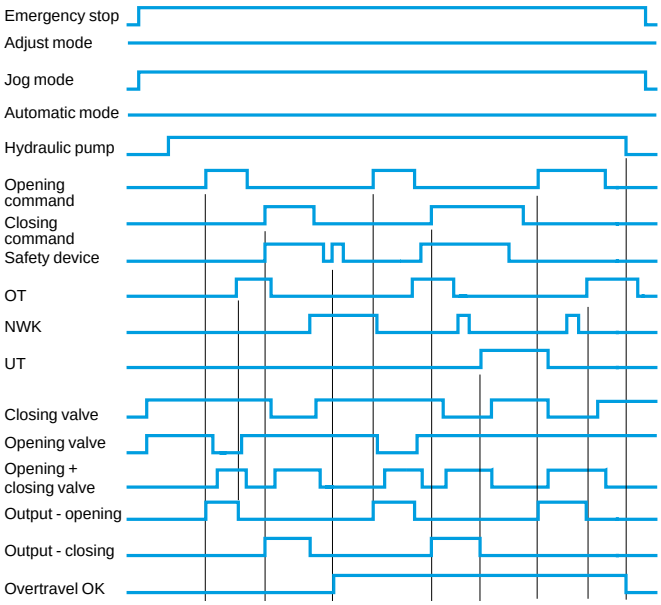


(1) Not used.

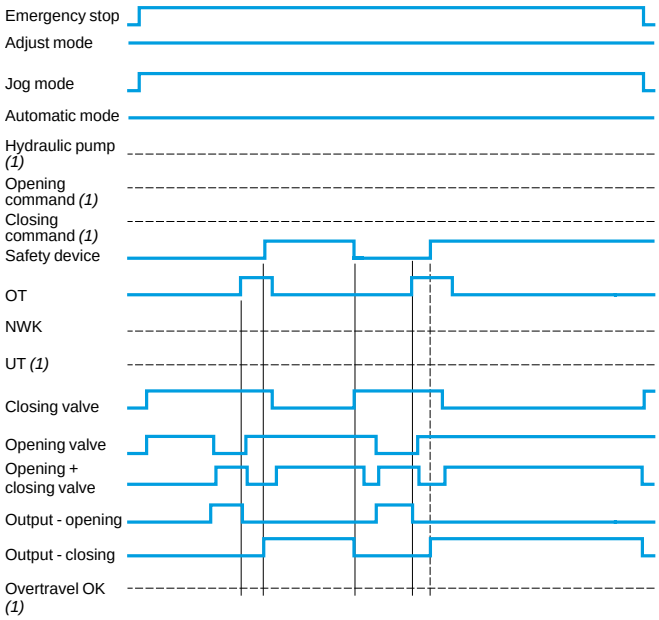
Hydraulic press

Functional diagrams *(continued)*

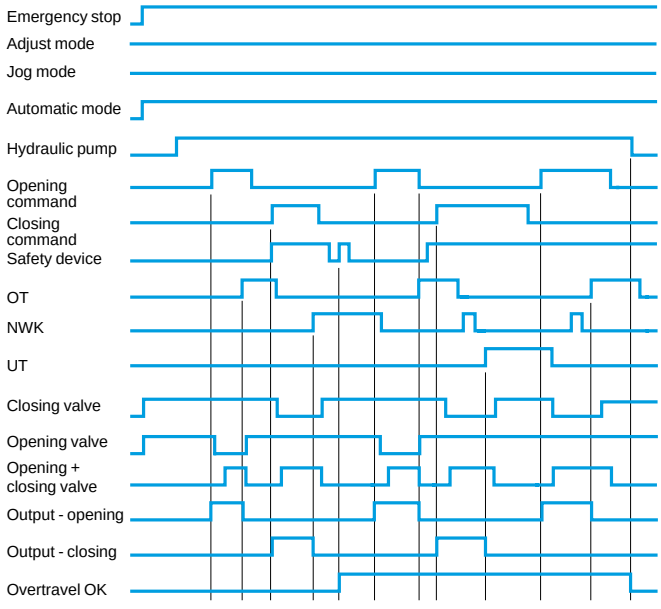
Hydraulic press, mode = jog, with overtravel monitoring and opening and closing control coming from the automation platform



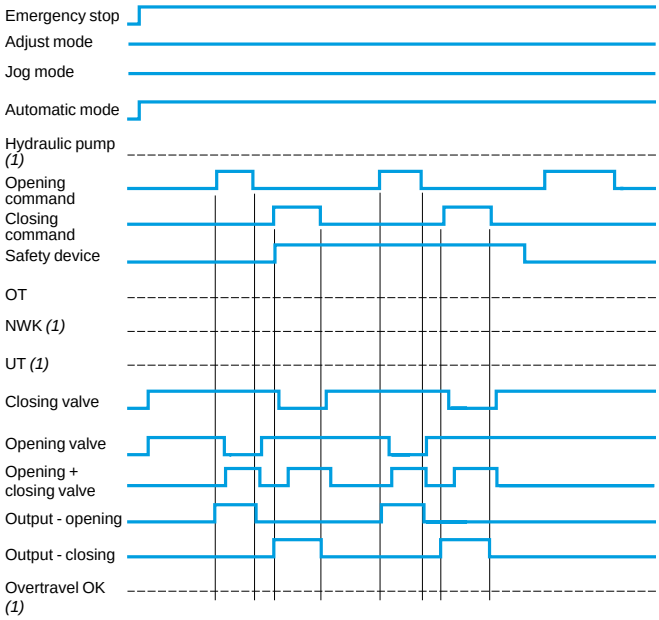
Hydraulic press, mode = jog



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



Hydraulic press, mode = automatic



Key 0 ⌐ 1

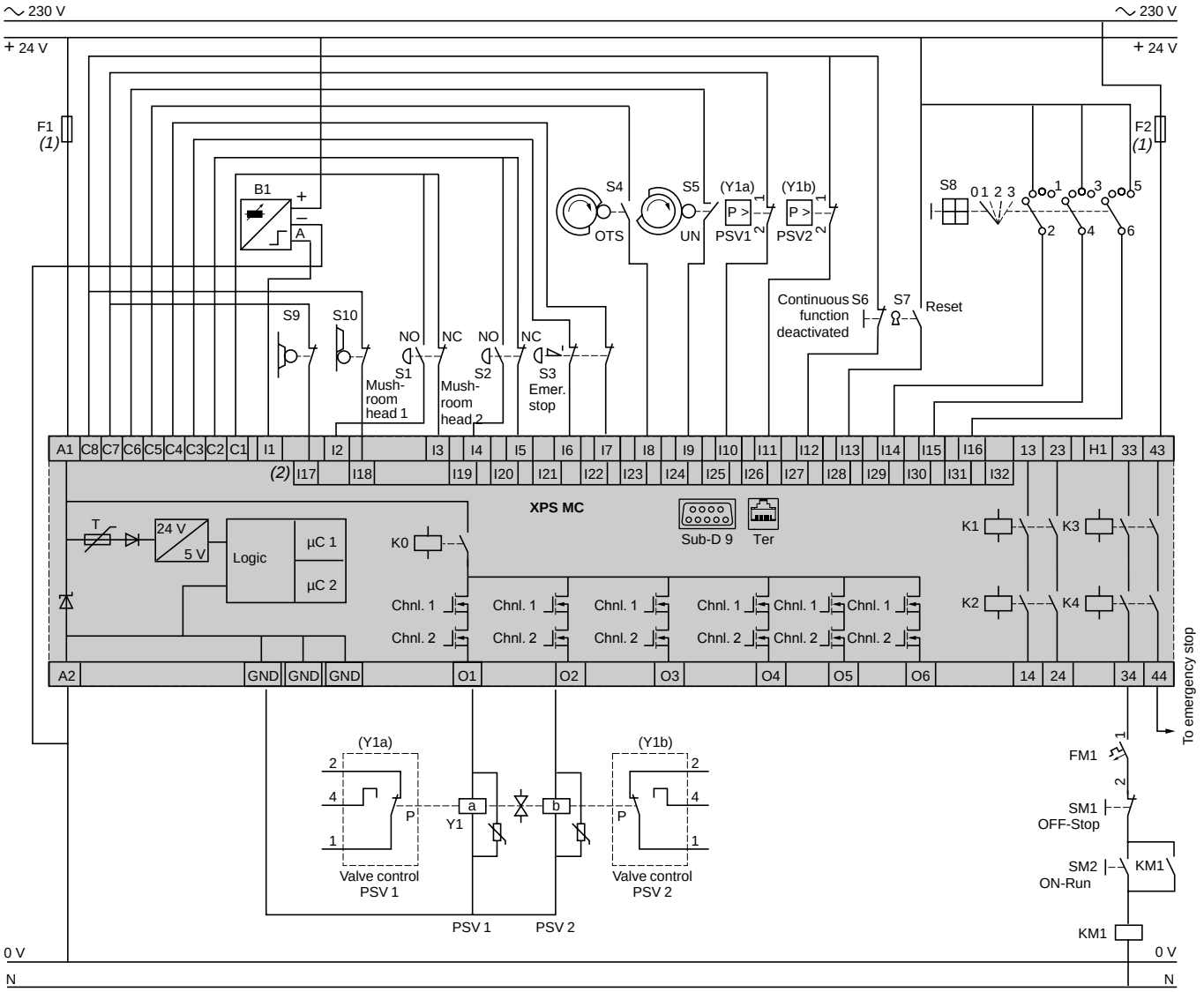
(1) Not used.

2

Eccentric press

Category 4 conforming to standard EN 954-1.

Wiring diagram



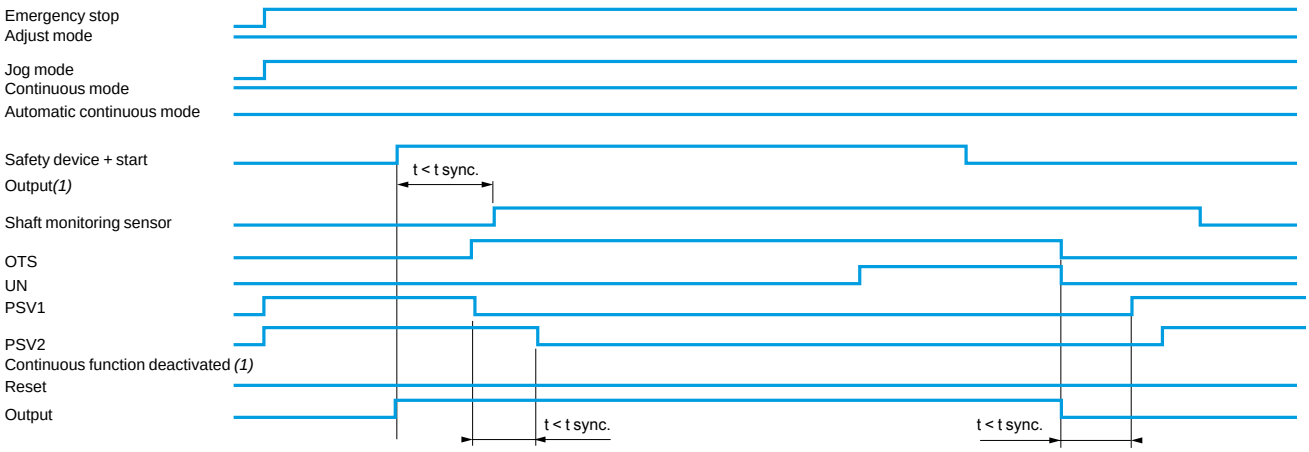
S8: Operating modes:
0 - stop,
1 - adjust,
2 - jog,
3 - automatic continuous run.
OTS = Limit switch associated with top dead center (TDC)
UN = Limit switch associated with bottom dead center (BDC)
PSV = safety valve
B1 = sensor at tooth wheel in cam switch mechanism.

(1) Technical specifications for maximum rating of fuses, see page 2/126.
(2) Only applicable to XPSMC32Z● (I17…I32).

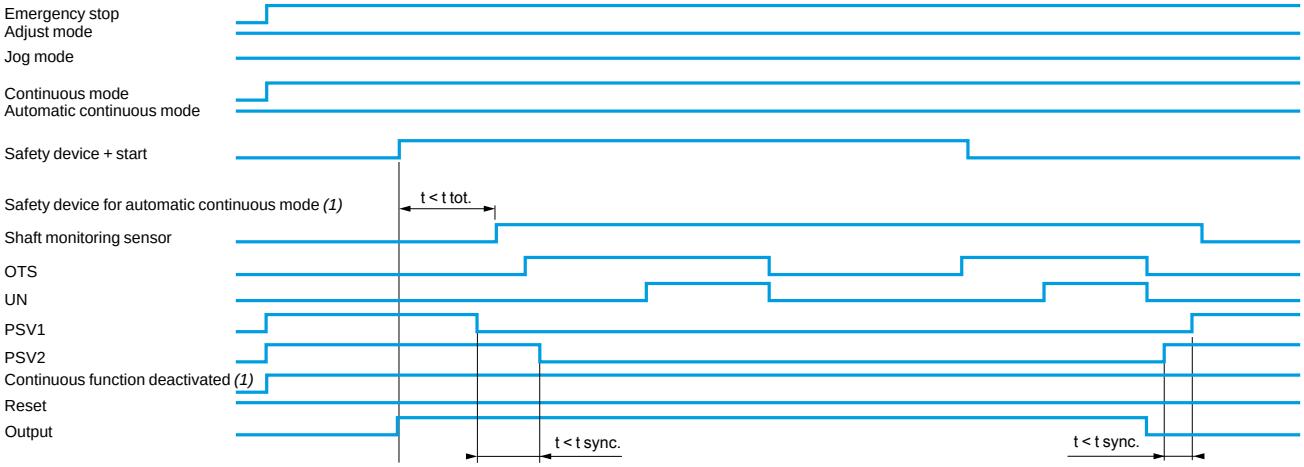
Eccentric press (continued)

Functional diagrams

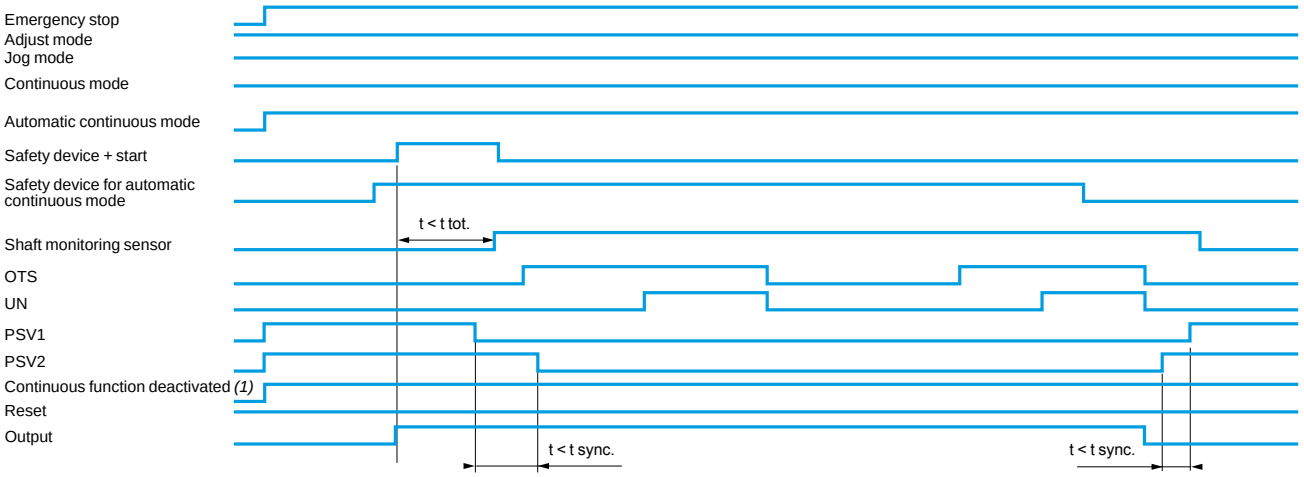
Eccentric press: Jog



Eccentric press: Continuous



Eccentric press: automatic continuous



Key 0 — 1

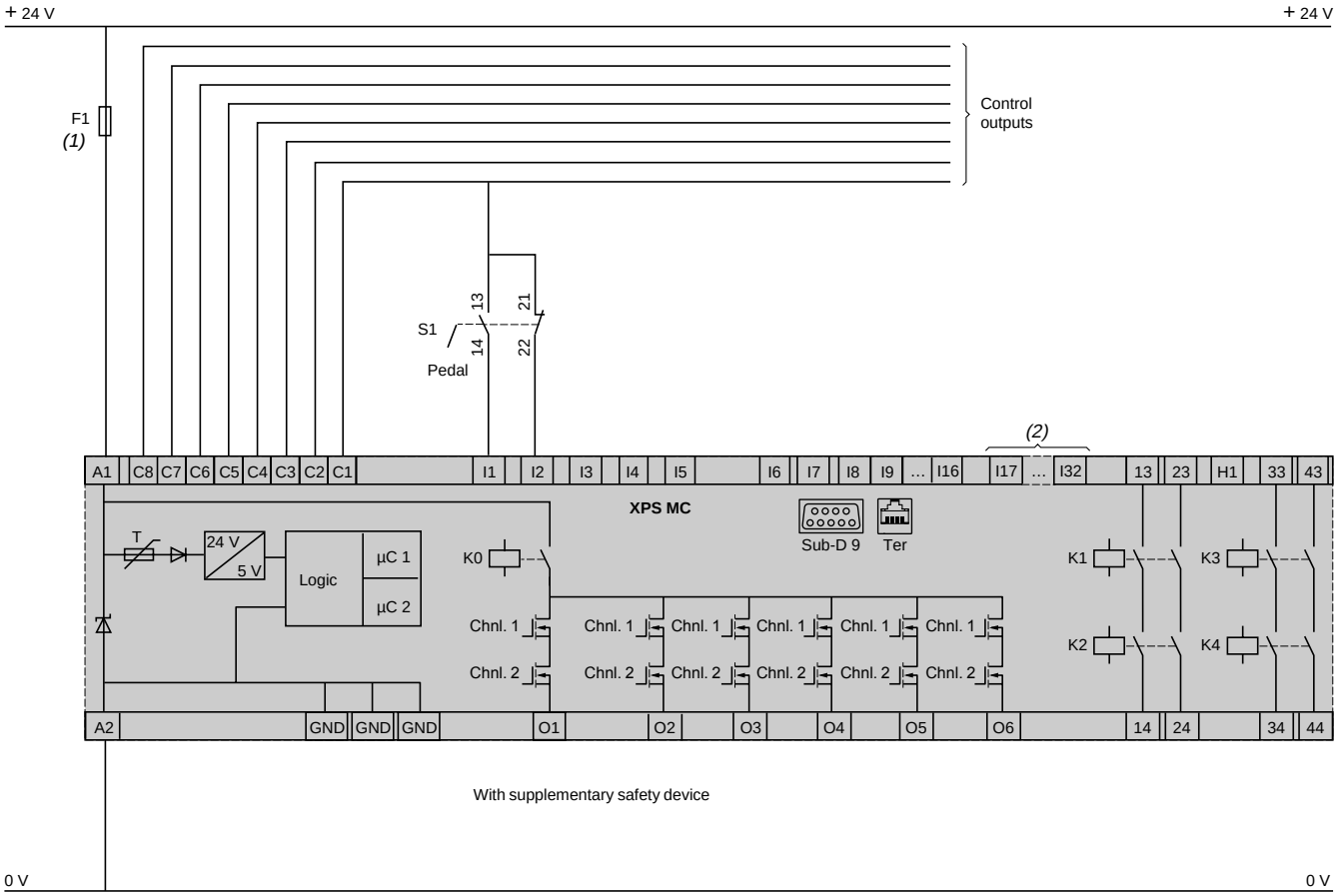
t sync. = synchronization time
t tot. = dead time

(1) Not used.

2

Foot switch monitoring

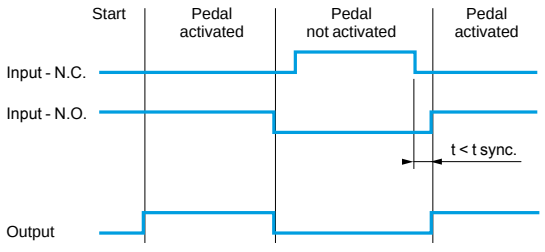
Wiring diagram



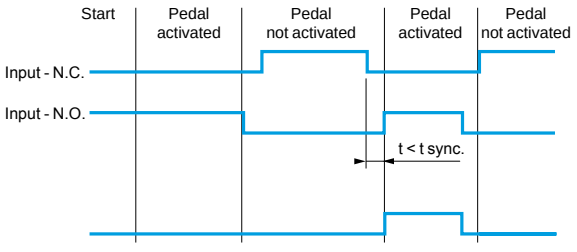
(1) Technical specifications for maximum rating of fuses, see page 2/126.
(2) Only applicable to XPSMC32Z●.

Functional diagrams

Without start interlock



With start interlock

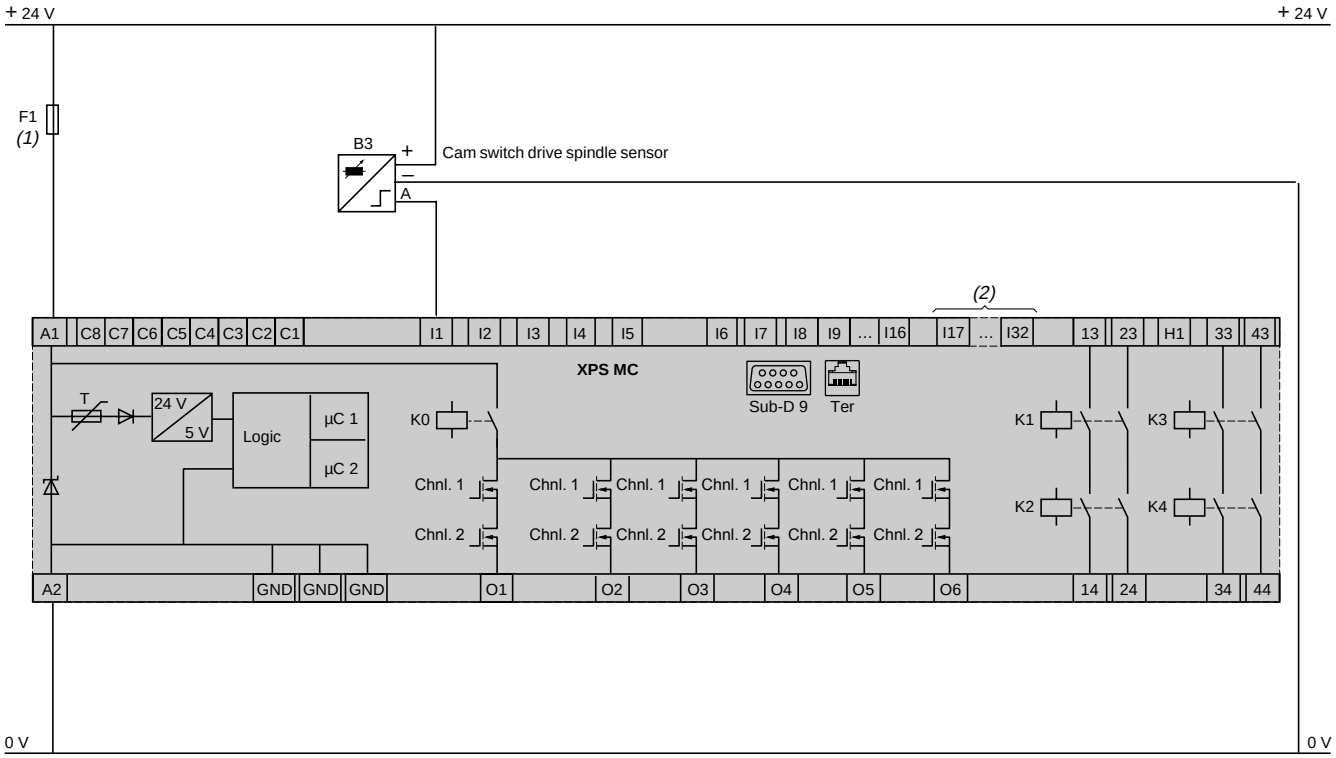


Key 0 1

t sync. = synchronization time

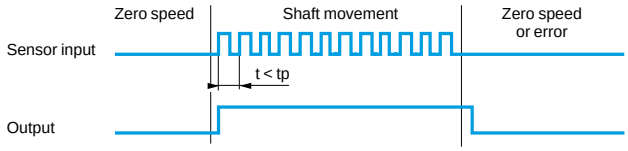
Chain shaft breakage monitoring

Wiring diagram



(1) Technical specifications for maximum rating of fuses, see page 2/126.
(2) Only applicable to XPSMC32Z●.

Functional diagrams



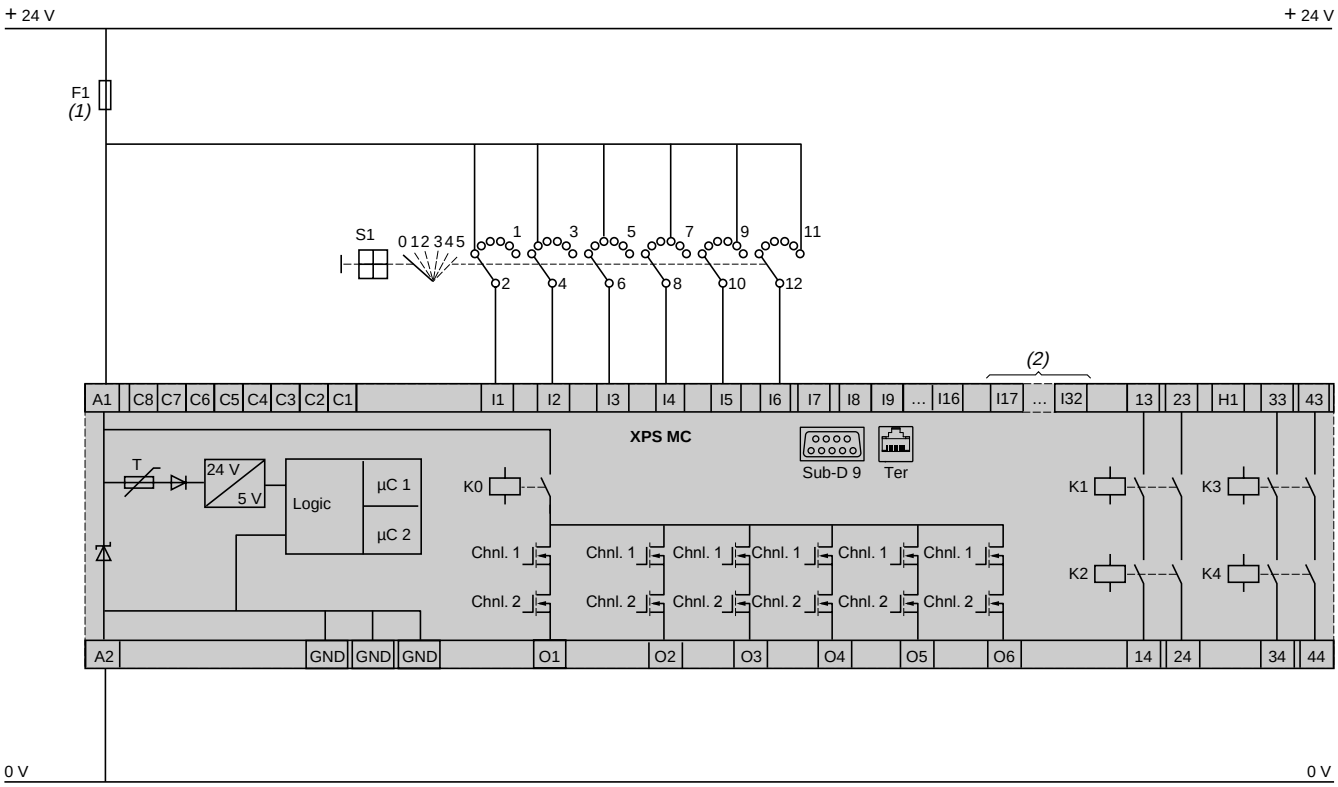
Key 0 1

tp = pulse time

2

Position selector

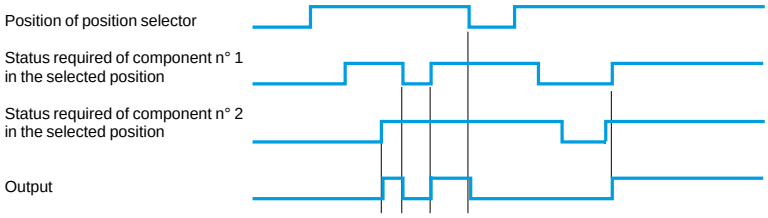
Wiring diagram

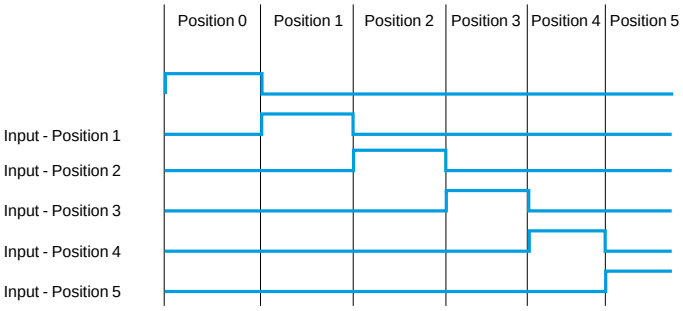


(1) Technical specifications for maximum rating of fuses, see page 2/126.
(2) Only applicable to XPSMC32Z●.

Position selector (continued)

Functional diagrams





Key 0 1

Product reference index

Schneider Electric USA, Inc.
8001 Knightdale Blvd.
Knightdale, NC 27545

USA Customer Care Center
Tel: 888-778-2733

Schneider Electric Canada
5985 McLaughlin Rd.
Missassauga, Ontario, Canada L5R 1B8

Canada Customer Care Center
Tel: 800-565-6699

www.schneider-electric.com

Design: Schneider Electric
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