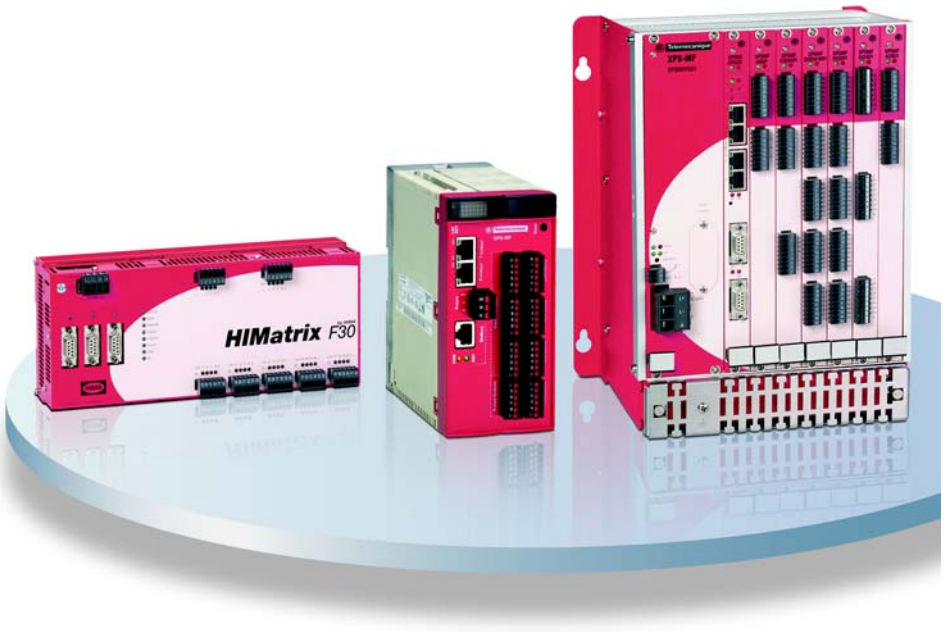
Machine Safety

Preventa™ Safety PLCs
Type XPS MF

Catalog
July

07



a brand of Schneider Electric

Telemecanique

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Type XPS MF

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*Products referenced **XPS MF31222, XPS MF3022** and **XPS MF35●●** are marked **HIMatrix F31**, **HIMatrix F30** and **HIMatrix F35** (manufactured by Hima, sold by Schneider Electric).*

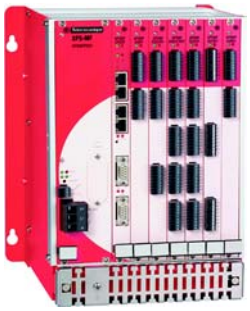
User memory		Application	250 Kb			
		Data	250 Kb			
Response time			Depending on application			
Maximum consumption			8 A			9 A
Supply			External ⎓ 24 Vdc supply (with separate protection conforming to IEC 61131-2)			
Inputs	**Digital**	Number of channels	**24**, configurable using XPSMFWIN software	**20**, not electrically isolated		**24**, not electrically isolated
		Current at state 0	1.5 mA max. at ⎓ 24 Vdc	1.5 mA max, 1.25 mA at 5 Vdc		
		Current at state 1	3.5 mA at ⎓ 24 Vdc 4.5 mA at ⎓ 30 Vdc	⩾ 2 mA at ⎓ 15 Vdc	> 2 mA at ⎓ 15 Vdc	3.5 mA at ⎓ 24 Vdc 4.5 mA at ⎓ 30 Vdc
	Analog	Number of channels	–	–	–	**8**, single-pole
		Range: voltage/current	–	–	–	0…10 V/0…20 mA
	Counting	Number of channels	–	–	–	**2**
		Current	–	–	–	1.4 mA at ⎓ 5 Vdc, 6.5 mA at ⎓ 24 Vdc
Outputs	**Digital**	Number of channels	**24**, configurable using XPSMFWIN software	**8** *(1)*, not electrically isolated		**8**, not electrically isolated
		Output current	Channels 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	–	–	–	–
	Pulse		**2 x 4** for line control	*(1)*	*(1)*	–
Input/output connections			Removable screw terminal blocks, coded with locating device (safety PLCs XPS MF31, 30, 35 & 40) and also, removable spring terminal blocks, coded with locating device (safety PLCs XPS MF40)			
Communication	On Ethernet network		Yes, by 2 RJ45 connectors, with integrated switch	Yes, by 4 RJ45 connectors, with integrated switch		
			Using SafeEthernet safety protocol between decentralized I/O modules type **XPS MF1/2/3** and compact or modular safety PLCs type **XPS MF**			
	Slave on Modbus® bus (RS 485)		**XPS MF4020/MF4022**	–	**XPS MF3022**	**XPS MF3522**
	Slave on Profibus bus		**XPS MF4040/MF4042**	–	–	**XPS MF3542**
Safety PLC type			**XPS MF400●/ MF402●/MF404●**	**XPS MF31222**	**XPS MF3022**	**XPS MF3502/ MF3522/MF3542**
See page			12	27	27	27
"In rack" module type			–	–	–	–
See page			–	–	–	–

(1) The digital outputs can be configured as pulsed outputs using XPSMFWIN software.

For Technical Support, Call 800-468-5342.

Modular PLC XPS MF60: metal rack XPS MFGEH01 with slots for power supply module XPS MFPS01, CPU XPS MFCPU22 and "in rack" I/O modules.
- Automated line control solution
- Safety functions monitoring: protection of personnel and safety of machines
- Inputs and outputs management: number and type of inputs/outputs depending on type of "in rack" I/O modules

Maximum use of modular safety PLCs, designed for use in safety related parts of control systems conforming to EN 954-1/ISO 13849-1 and IEC 61508:
- Up to category 4 (EN 954-1/ISO 13849-1), SIL 3 (IEC 61508)



500 Kb						
500 Kb						
Depending on application						
30 A max., 32 A external fuse						
External ⎓ 24 Vdc supply (with separate protection conforming to IEC 61131-2)						
–	–	–	**24**, electrically isolated	**32** *(2)*, electrically isolated	**24** *(2)*, electrically isolated	–
–	–	–	–	1 mA at 5 Vdc	1 mA at 5 Vdc	–
–	–	–	⩾ 2.2 mA at 79 V	2 mA at ⎓ 10 Vdc, 5 mA at ⎓ 24 Vdc	2 mA at ⎓ 10 Vdc, 5 mA at ⎓ 24 Vdc	–
8, single-pole or 4 2-pole *(1)*, electrically isolated	–	–	–	–	–	–
- 10…+ 10 V/ 0…20 mA	–	–	–	–	–	–
–		**2**	–	–	–	–
–	–	0.8 A at ⎓ 3.3 Vdc 0.1 A at ⎓ 5 Vdc 0.1 A + output current at ⎓ 24 Vdc	–	–	–	–
–	–	**4**	–	–	**16** *(3)*, electrically isolated	–
–	–	0.5 A per channel, 2 A max. per "in rack" module	–	–	2 A per channel at 86 °F (30 °C), 8 A max. per "in rack" module at 86 °F (30 °C)	–
–	**8**, electrically isolated	–	–	–	–	–
–	- 10…10 V / 0…20 mA	–	–	–	–	–
–	–	–	–	–	–	**8**
–	–	–	–	–	–	∿ 6…230 Vac / ⎓ 110 Vdc
–	–	–	–	–	*(3)*	–
Removable screw terminal blocks, coded with locating device						
Yes, by 4 RJ45 connectors on CPU **XPS MFCPU22** of modular PLC **XPS MF60**, with integrated switch						
Using SafeEthernet safety protocol between decentralized I/O modules type **XPS MF1/2/3** and compact or modular safety PLCs type **XPS MF**						
XPS MF60						
–	–	–	–	–	–	–

XPS MFGEH01 (rack) + XPS MFPS01 (power supply) + XPS MFCPU22 (CPU) + "in rack" I/O modules (to be selected from below)

44

XPS MFAI801	XPS MFAO801	XPS MFCIO2401	XPS MFDI2401	XPS MFDI3201	XPS MFDIO241601	XPS MFDO801
50	52	54	56	58	60	62

(1) Configurable by choice of connection.
(2) Digital inputs can be supplied by the pulsed outputs of the same I/O rack.
(3) Digital outputs (n° 1…n° 8) can be configured as pulsed outputs using XPSMFWIN software.

Safety automation solutions
Preventa™ safety PLCs
Compact, type XPS MF40

XPS MF4000
XPS MF4002

XPS MF4020
XPS MF4022

XPS MF4040
XPS MF4042

Presentation

Preventa compact safety PLCs type XPS MF40 offer an automated line control solution in conjunction with the monitoring of safety functions that are required for the protection of personnel and the safety of machines.
They are designed to meet SIL 3 requirements of standard IEC 61508 and category 4 requirements conforming to EN 954-1/ISO 13849-1.
The compact safety PLC range XPS MF40 is based around 6 compact PLCs that are differentiated by their characteristics.

Compact PLCs XPS	Configurable digital Inputs/Outputs	Pulsed outputs	Communication		
			On Ethernet network		On serial bus
			Safety protocol	Non safety protocol	
MF4000	**24**, *configured using XPSMFWIN software*	**8**	SafeEthernet	–	–
MF4002	**24**, *configured using XPSMFWIN software*	**8**	SafeEthernet	Modbus TCP/IP	–
MF4020	**24**, *configured using XPSMFWIN software*	**8**	SafeEthernet	–	Modbus bus Slave (TER)
MF4022	**24**, *configured using XPSMFWIN software*	**8**	SafeEthernet	Modbus TCP/IP	Modbus bus Slave (TER)
MF4040	**24**, *configured using XPSMFWIN software*	**8**	SafeEthernet	–	Profibus bus Slave (BUS)
MF4042	**24**, *configured using XPSMFWIN software*	**8**	SafeEthernet	Modbus TCP/IP	Profibus bus Slave (BUS)

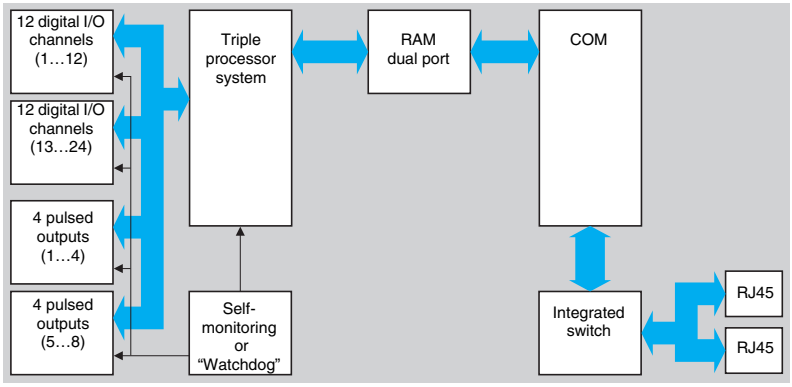
Safety PLCs

In order to comply with safety requirements, the compact PLCs XPS MF40 integrate two essential functions conforming to category 4 of EN 954-1/ISO 13849-1 in addition to the SafeEthernet safe communication protocol between the safety PLCs and the decentralized safety I/O modules (Special Switch).

■ **Redundancy**: the triple processors integrated in the compact safety PLCs analyzes and compares the information received from the safety inputs and outputs. The incoming and outgoing information (programmed values and received values) are received in parallel by the three processors and compared in real-time.
■ **"Watchdog" or self-monitoring**: the compact safety PLCs continuously monitor the information processing cycle and the execution of tasks, and intervene if the time of a cycle 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 information 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 diagram

Compact safety PLC XPS 4000/MF4002



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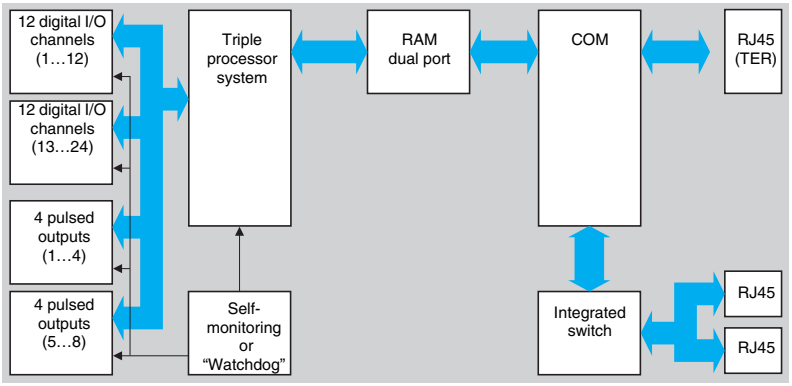
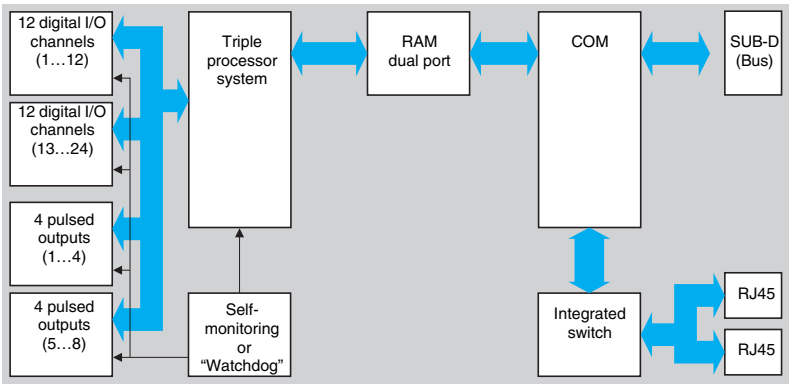
Safety automation solutions
Preventa™ safety PLCs
Compact, type XPS MF40

Functional diagram *(continued)*

Compact safety PLCs XPS MF4020/MF4022



Compact safety PLCs XPS MF4040/MF4042



Line control on safety PLCs XPS MF40●●

Line control is a means of short-circuit and line break monitoring, for example Emergency stop inputs to category 4 of standard EN 954-1, that is configurable in compact safety PLCs XPS MF40●●.
The pulsed outputs 1 to 8 are connected to the digital inputs of the same circuit. The pulses are automatic on the pulsed outputs: that drive the monitoring of the digital input lines.

Programming automated safety functions

XPSMFWIN software (reference SSV1XPSMFWIN) running on a PC enables:
- Programming of the safety functions of compact PLCs XPS MF,
- Configuration of the bus and industrial communication networks,
- Configuration and IP addressing of the automation line sensors/actuators,
- Programming of alarms via the power supply system.

See programming using XPSMFWIN software, pages 98 to 103.

By using a PC, Magelis® graphic terminal type XBT GT or a Premium™ automation platform and connecting to the RJ45 socket of compact safety PLCs XPS MF, an automation line can, at any time or point, be supervised and controlled.
- Using a PC: system programming, selection of communication network etc.
- Using a graphic terminal or Premium™ automation platform: diagnostics, cycle monitoring, etc.

Safety automation solutions
Preventa™ safety PLCs
Compact, type XPS MF40

Compact safety PLCs type XPS MF40 incorporate:
- ■ 24 I/O channels, configurable using XPSMFWIN software
- □ as digital type inputs, or
- □ as digital type outputs
- ■ and 8 (2 x 4) pulsed output channels.

Digital inputs

Compact safety PLCs type XPS MF40 incorporate up to 24 digital type inputs for connection to the hazardous zones of machines to be monitored *(1)*.

Compact PLCs XPS	Digital inputs			
	N°	Safety detection	Safety dialog	Safety control
MF4000	24	Limit switches, Guard switches, with reset and with actuator, Safety 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…	Vario™…, and mini-Vario™ switch disconnectors
MF4002	24			
MF4020	24			
MF4022	24			
MF4040	24			
MF4042	24			

Digital outputs

Compact safety PLCs type XPS MF40 incorporate up to 24 digital type outputs for connection to the hazardous zones of machines to be controlled *(1)*.

Compact PLCs XPS	Digital outputs		
	N°	Safety dialog	Safety control
MF4000	24	Beacons and indicator banks, Rotating mirror beacons, Sirens…	Enclosed thermal-magnetic motor circuit-breakers, Enclosed D.O.L. starters for motor control, Power contactors…
MF4002	24		
MF4020	24		
MF4022	24		
MF4040	24		
MF4042	24		

Pulsed outputs

Outputs for line control

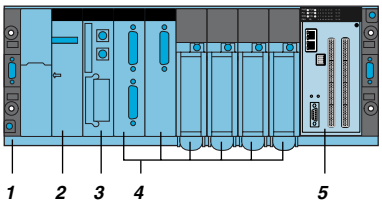
Compact PLCs XPS	Pulsed outputs N°	
MF4000	8 (2 x 4)	Line control for line break and short-circuit monitoring
MF4002		
MF4020		
MF4022		
MF4040		
MF4042		

Decentralized inputs and outputs

In addition to the inputs/outputs integrated as standard, compact safety PLCs XPS MF40 can accept supporting decentralized input modules type XPS MF1 and/or decentralized output modules type XPS MF2 and/or mixed decentralized I/O modules type XPS MF3.
These decentralized input, output and I/O modules are located in the vicinity of hazardous zones of machines to be monitored and increase the I/O capacity of the compact safety PLCs, see pages 66, 70, and 80.
Communication between the compact safety PLCs and decentralized input, output and I/O modules is performed on the Ethernet network using SafeEthernet safety communication protocol, via the RJ45 communication ports.

Integrating safety PLCs XPSMF40 on Premium™ automation platform

Designed for mechanical integration on a Premium™, automation platform, safety PLCs XPS MF40●● occupy 2 slots on the Premium rack TSX RKY.
If mounted in this way, there is interaction between the programming software: the variables defined using configuration XPSMFWIN software can be retrieved by Unity™ Premium™ platform programming software by using a tool included in Safety Suite V2, see page 98.



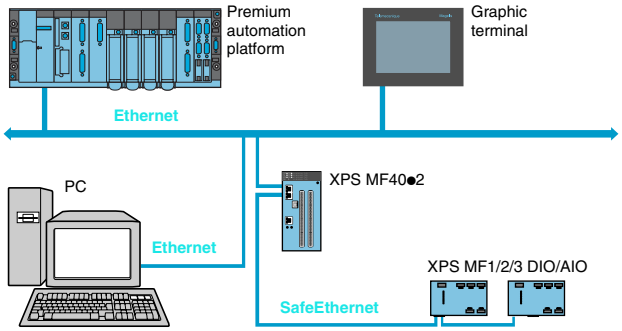
Example of mechanical integration of a safety PLC XPSMF40

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

(1) The connection of cables to screw terminal or spring terminal blocks that are both removable and guide marked avoids connection errors when, for example, carrying out maintenance. Terminal blocks included with compact safety PLCs XPS MF40.

Safety automation solutions
Preventa™ safety PLCs
Compact, type XPS MF40

Communication on Ethernet network



■ Communication between the PC, Magelis® graphic terminal or Premium™ automation platform and the compact safety PLCs XPS MF40●● is achieved by Ethernet connection, via the RJ45 communication ports of the compact PLC.
■ Connection on the Ethernet network enables integration of the compact safety PLCs XPS MF40●2 of a safety installation within a type A10 Transparent Ready® system.

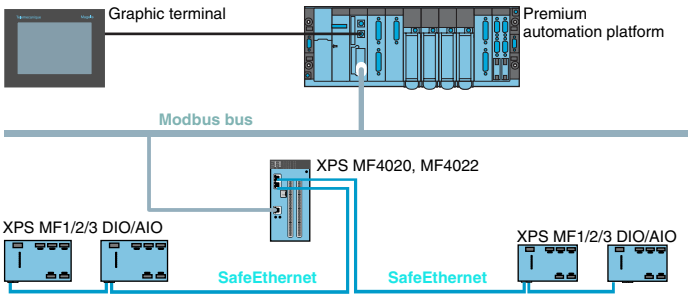
Compact PLCs XPS	Telemecanique® Transparent Ready®		
	Class	Communication protocols	
		Safety	Non safety
XPS MF4000	**A10**	SafeEthernet	–
XPS MF4002		SafeEthernet	Modbus TCP/IP
XPS MF4020		SafeEthernet	–
XPS MF4022		SafeEthernet	Modbus TCP/IP
XPS MF4040		SafeEthernet	–
XPS MF4042		SafeEthernet	Modbus TCP/IP

Industrial communication

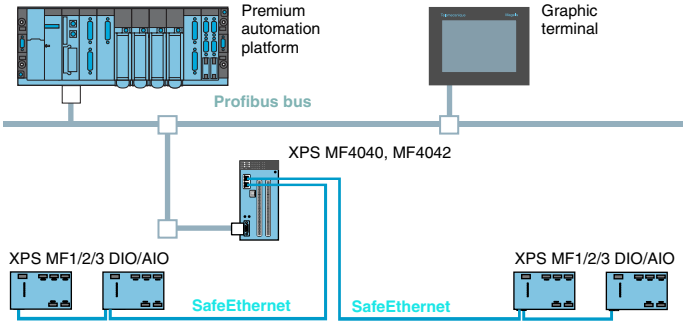
Safety PLCs XPS MF402● and XPS MF404● incorporate a port that enables their integration within an industrial architecture. See pages 94 and 95.

Examples

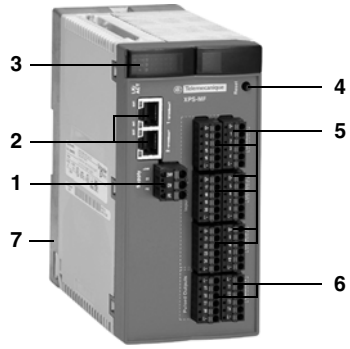
■ On Modbus bus, the compact safety PLCs XPS MF4020 and XPS MF4022 are slaves of a Premium™ automation platform, via their RJ45 connector.



■ On Profibus bus, the compact safety PLCs XPS MF4040 and XPS MF4042 are slaves of a Premium™ automation platform, via their SUB-D 9-pin connector.



Safety automation solutions
Preventa™ safety PLCs
Compact, type XPS MF40



Description

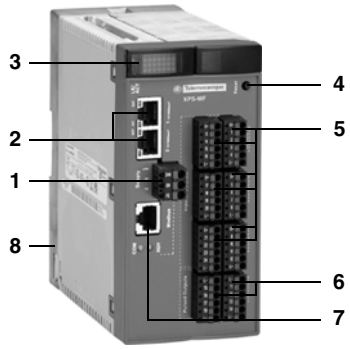
Safety PLCs XPS MF4000/MF4002

On the front face of the enclosure:

1 One terminal block *(1)* for ⎓ 24 Vdc supply.
2 Two RJ45 ports (type 10BASE-T/100BASE-TX) for connection on Ethernet network.
3 Process status LEDs.
4 One “Reset” button.
5 Six terminal blocks *(1)* for connection of configurable I/Os.
6 Two terminal blocks *(1)* for connection of pulsed outputs.

On the rear face:

7 One plate with spring for mounting on rail.



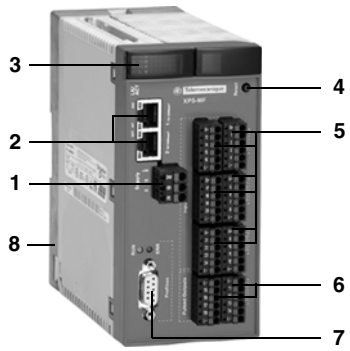
Safety PLCs XPS MF4020/MF4022

On the front face of the enclosure:

1 One terminal block *(1)* for ⎓ 24 Vdc supply.
2 Two RJ45 ports (type 10BASE-T/100BASE-TX) for connection on Ethernet network.
3 Process status LEDs.
4 One “Reset” button.
5 Six terminal blocks *(1)* for connection of configurable I/Os.
6 Two terminal blocks *(1)* for connection of pulsed outputs.
7 One TER connector (RJ45) for connection to Modbus bus, with 2 process status LEDs.

On the rear face:

8 One plate with spring for mounting on rail.



Safety PLCs XPS MF4040/MF4042

On the front face of the enclosure:

1 One terminal block *(1)* for ⎓ 24 Vdc supply.
2 Two RJ45 ports (type 10BASE-T/100BASE-TX) for connection on Ethernet network.
3 Process status LEDs.
4 One “Reset” button.
5 Six terminal blocks *(1)* for connection of configurable I/Os.
6 Two terminal blocks *(1)* for connection of pulsed outputs.
7 One BUS connector (RJ45) for connection to Profibus bus, with 2 process status LEDs.

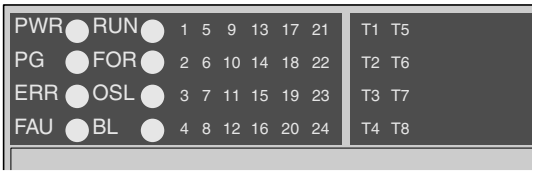
On the rear face:

8 One plate with spring for mounting on rail.

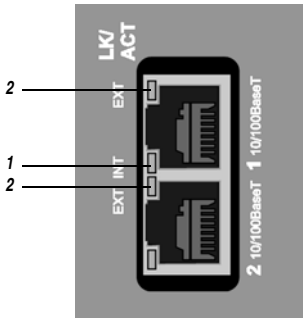
(1) Removable screw or spring terminal blocks, coded with locating device, included with compact safety PLCs XPS MF40.

Characteristics: pages 10 and 11 | References: page 12 | Dimensions, mounting: page 15 | Connections: page 16

Safety automation solutions
Preventa™ safety PLCs
Compact, type XPS MF40



Process status LEDs



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

Modbus LEDs

Profibus LEDs

LED details

Process status LEDs on safety PLCs XPS MF40●●

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	Pulsed outputs active.
PWR	Green	On	⎓ 24 Vdc 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 fault 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 XPS MF40●●

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® LEDs on safety PLCs XPS MF4020/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 LEDs on safety PLCs XPS MF4040/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 and no data exchange is possible. Bus disconnected or bus Master not available.
		Flashing	A configuration error has occurred and no data exchange is possible.

Characteristics: pages 10 and 11
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Machine Safety
Preventa™ safety PLCs
Compact, type XPS MF40

Environment

Compact safety PLC type			XPS MF4000/4002, XPS MF4020/4022, XPS MF4040/4042
Product designed for max. use in safety related parts of control systems (conforming to EN 954-1/ISO 13849-1 and IEC 61508)			Category 4 (EN 954-1/ISO 13849-1), SIL 3 (IEC 61508)
Product certifications			EN/IEC 61131-2, EN 501156 pending, DIN V 19250, DIN V VDE 0801
Ambient air temperature conforming to EN/IEC 61131-2	For operation		+32...+140 °F (0…+ 60°C)
	For storage		-40...+185 °F (-40…+ 85°C), -22...+185 °F (-30…+ 85°C) with battery
Relative humidity			95% (supply not connected)
Degree of protection	Enclosure		IP 20, IP 54: mounted in enclosure conforming to EN 60204
Pollution			Degree of pollution II
Altitude			6560 ft. (2000m)
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 gn, frequency 10…150 Hz
Shock resistance conforming to EN/IEC 61131-2	Operating		15 gn (duration 11 ms)
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)

Electrical characteristics

Supply	Voltage	**Vdc**	⎓ 24 (external supply with separate protection conforming to EN/IEC 61131-2)
	Voltage limits		- 15…+ 20%
Maximum 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 application
Clock			Supplied by backup capacitor for 1 week following loss of supply
User memory	Application		250 Kb
	Data		250 Kb
LED display			Yes, see page 9

Digital inputs

Number	Inputs not electrically isolated		24, configurable using XPSMFWIN software
Permissible current	At state 0	**mA**	1.5 max. at ⎓ 24 Vdc
	At state 1	**mA**	3.5 at ⎓ 24 Vdc 4.5 at ⎓ 30 Vdc
Input supply			3 x ⎓ 20 Vdc/100 mA (at 24 Vdc)
Input resistance		**kΩ**	< 7
Overvoltage protection		**Vdc**	- 10…+ 35
LED display			Yes, see page 9
Maximum distance of equipment			984 ft. (300m)

Digital outputs

Number	Outputs not electrically isolated		24, configurable using XPSMFWIN software
Output voltage		**Vdc**	⎓ 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 overloads			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, see page 9
Maximum distance of equipment			984 ft. (300m)

Pulsed outputs

Number	Outputs not electrically isolated		8, for line control
Output voltage		**Vdc**	20, depending on the supply voltage
Output current		**mA**	60
Minimum load		**mA**	None
Response to overload			4 x ⩾ 19.2 Vdc/60 mA (on 24 Vdc), short-circuit current
LED display			Yes, see page 9

Presentation: pages 4 to 9 | References: page 12 | Dimensions, mounting: page 15 | Connections: page 16

Communication

Ethernet network

■ Safety communication using SafeEthernet safety protocol

Compatibility			**XPS MF4000/MF4002, XPS MF4020/MF4022, XPS MF4040/MF4042**
Transmission	Communication ports		2 x RJ45 with integrated switch
	Speed	Mbps	100
Structure			10BASE-T/100BASE-TX
Medium			Dual twisted pair cable

■ Non safety communication using Modbus® TCP/IP protocol

Compatibility			**XPS MF4002, XPS MF4022, XPS MF4042**
Connection ports	Number and type		2 x RJ45
	Speed	Mbps	100
	Status		Premium™ automation platform slave
Structure			10BASE-T/100BASE-TX
Medium			Dual twisted pair cable
Transparent Ready® service	Class		A10
	Standard Ethernet TCP/IP communication services (supported by compact safety PLCs XPS MF40)		Modbus TCP/IP, Modbus serial
			Modbus TCP/IP messaging (reading/writing of data words) Modbus identification requests
	TCP port		Standard 502
	Max. number of TCP connections		1 to 20

Modbus® SL bus

Compatibility			**XPS MF4020, XPS MF4022**
Serial link ports	Number and type		1 x RJ45 (TER)
	Status		Slave
Addressing			122 slaves max.
Physical layer			RS 485
Medium			Shielded dual twisted pair cable

Profibus bus

Compatibility			**XPS MF4040.XPS MF4042**
Serial link ports	Number and type		1 x SUB-D 9-pin female (BUS)
	Status		Slave
Physical layer			RS 485
Medium			Shielded dual twisted pair cable, fibre optic

Connections *(1)*

Type of connection			**Removable screw clamp terminal blocks**	**Removable spring terminal blocks**
Supply connection	Number of terminal blocks		**1**	**1**
	For 1 cable without cable end		Solid or flexible 0.2…2.5 mm², AWG 24-12	–
	For 1 flexible cable with or without plastic cable end		0.25…2.5 mm², AWG 24-14	–
	For 2 cables of same diameter, without cable end		–	Solid or flexible 0.2…2.5 mm², AWG 24-12
	For 2 cables of same diameter, flexible without cable end		–	0.25…2.5 mm², AWG 24-12
	For 2 cables of same diameter, flexible with plastic cable end		–	0.25…2.5 mm², AWG 24-12
Cable connection	Tightening torque		4.43 lb-in (0.5 Nm)	–
	Bared length		0.39" (10mm)	0.35" (9mm)
Connection to digital input channels, digital output channels, pulsed output channels	Number of terminal blocks		**8**	**8**
	For 1 cable without cable end		Solid or flexible 0.14…1.5 mm², AWG 24-16	–
	For 1 flexible cable without cable end		0.25…1.5 mm², AWG 24-16	–
	For 1 flexible cable with plastic cable end		0.25…0.5 mm², AWG 24-20	–
	For 2 cables of same diameter, without cable end		–	Solid or flexible: 0.14…1.5 mm², AWG 26-16
	For 2 cables of same diameter, flexible without cable end		–	0.25…0.34 mm², AWG 22
	For 2 cables of same diameter, flexible with plastic cable end		–	0.5 mm², AWG 20
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.

Presentation: pages 4 to 9 | References: page 12 | Dimensions, mounting: page 15 | Connections: page 16

Machine Safety
Preventa™ safety PLCs
Compact, type XPS MF40

XPS MF4000
XPS MF4002

XPS MF4020
XPS MF4022

XPS MF4040
XPS MF4042

Compact safety PLCs

⎓ 24 Vdc supply

Digital Inputs or Outputs	Pulsed outputs	Communication on Ethernet network		Modbus SL bus	Profibus bus	Reference	Weight oz. (kg)
		SafeEthernet protocol	Modbus TCP/IP protocol				
0…24 configurable using XPSMFWIN software	**8**	Yes	–	–	–	**XPSMF4000**	35.27 (1.000)
			Yes, client	–	–	**XPSMF4002**	35.27 (1.000)
		–		Yes, slave	–	**XPSMF4020**	35.27 (1.000)
		Yes, client		Yes, slave	–	**XPSMF4022**	35.27 (1.000)
		–		–	Yes, slave	**XPSMF4040**	35.27 (1.000)
		Yes, client		–	Yes, slave	**XPSMF4042**	35.27 (1.000)

Configuration software

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

Description	Operating system	Details	Languages	Reference	Weight oz. (kg)
Configuration XPSMFWIN software 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**	18.35 (0.520)

Machine Safety
Preventa™ safety PLCs
Compact, type XPS MF40

ABL 7RE2403

ABL 1REM24042

Regulated switch mode power supplies, single-phase

Output voltage ⎓ 24 Vdc

Mains input voltage 47...63 Hz	Nominal power	Nominal current	Auto-protect reset	Conformity to standard EN 61000-3-2	Reference	Weight
V	W	A				oz. (kg)
∿ **100…240 Vac** single-phase wide range	72	3	Automatic	No	**ABL8REM24030**	18.34 (0.520)
	120	5	Automatic	No	**ABL8REM24050**	35.27 (1.000)
	240	10	Automatic or Manual	Yes	**ABL8RPS24100**	35.27 (1.000)
	100	4.2	Automatic	No	**ABL1REM24042**	22.58 (0.640)

XBT GT2130, XBT GT2330

XBT GT4330

XBT GT5●30

XBT GT6330

XBT GT7340

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

Supply voltage ⎓ 24 Vdc

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**	35.27 (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**	35.27 (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**	63.49 (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**	105.82 (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**	105.82 (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**	105.82 (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**	197.53 (5.600)

(1) Supplied with service instructions, USB connectors locking device and mounting kit.

Presentation: pages 4 to 9 | Characteristics: pages 10 and 11 | Dimensions, mounting: page 15 | Connections: page 16

Machine Safety
Preventa™ safety PLCs
Compact, type XPS MF40

490 NTW 000●●

Connecting cables for network and bus

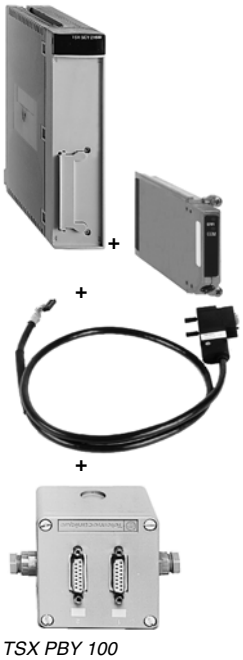
Connection to Ethernet network

Description	Pre-fitted connectors	Length ft. (m)	Reference	Weight oz. (kg)
Shielded twisted pair cables, straight through	2 RJ45 type 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 type 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® bus

Description	Use		Length ft. (m)	Reference	Weight oz. (kg)
	From	To			
Trunk cables, shielded dual twisted pair, RS 485	Compact safety PLCs XPS MF4020/MF4022 (RJ45)	Modbus splitter box LU9 GC3 (RJ45)	328 (100)	**TSXSCA100**	12.52 (5.680)
			656 (200)	**TSXSCA200**	24.07 (10.920)
			1640 (500)	**TSXSCA500**	66.14 (30.000)
	Graphic terminals XBT GT (SUB-D 9-pin)	Modbus splitter box LU9 GC3 (RJ45)	8.2 (2.5)	**XBTZ938** *(2)*	7.41 (0.210)
Adaptor for cable XBT Z938	SUB-D 9-pin (XBT GT)	XBT Z938 (SUB-D 25-pin)	0.66 (0.2)	**XBTZG909**	–

Description	Characteristics	Sold in lots of	Unit reference	Weight oz. (kg)
End of line adaptors For RJ45 type connector	R = 120 Ω, C = 1 nF	2	**VW3A8306RC**	7.05 (0.200)
	R = 150 Ω	2	**VW3A8306R**	0.35 (0.010)



TSX PBY 100

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 characteristics. Profibus FMS messaging not supported	**TSXPBY100**	30.69 (0.870)

Description	Use	Reference	Weight oz. (kg)
Remote inputs/outputs on Profibus DP bus	Advantys STB network interface module	**STBNDP2112**	4.94 (0.140)
	Momentum communication module	**170DTN11000**	–
Connectors for remote I/O communication module	Line terminator	**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**	–

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

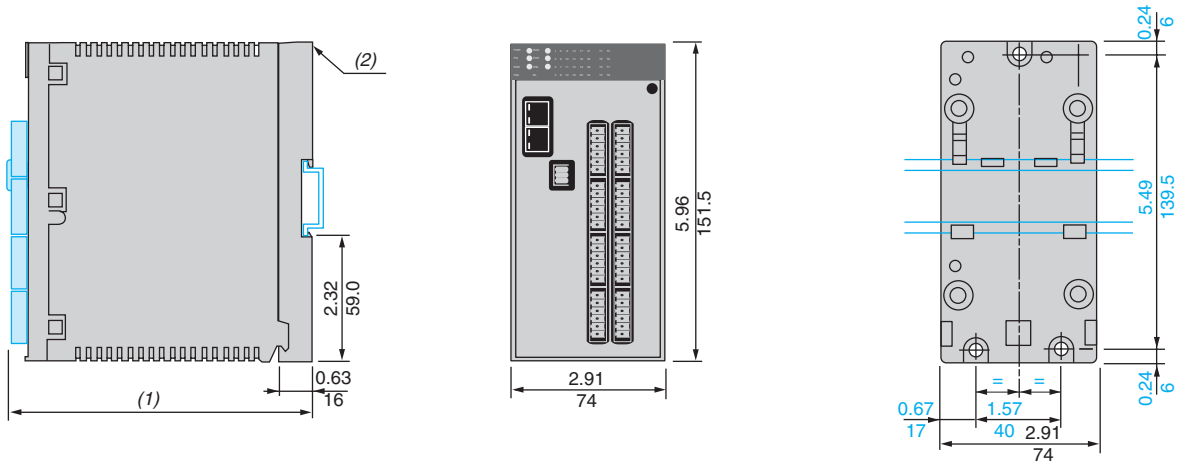
490 NAD 911 03

(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 XBT ZG909.

Presentation: pages 4 to 9 | Characteristics: pages 10 and 11 | Dimensions, mounting: page 15 | Connections: page 16

Dimensions

XPS MF40●●



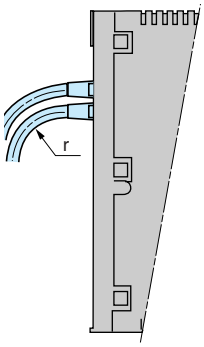
(1) 6.02" (153 mm) with screw terminal block, 5.96" (151.4mm) with spring terminal block.
(2) Metal adaptor for mounting on metal 35 mm ⊓ rail

Mounting

Mounting precautions relating to connectors

Access to Ethernet network

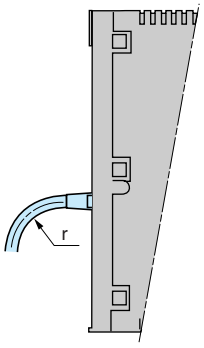
RJ45 sockets



r = 0.89" (22.5mm) min.

Access to Modbus bus

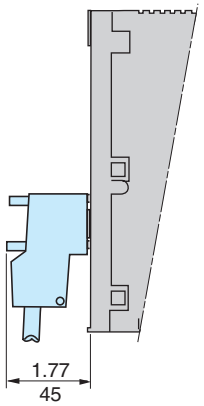
RJ45 socket



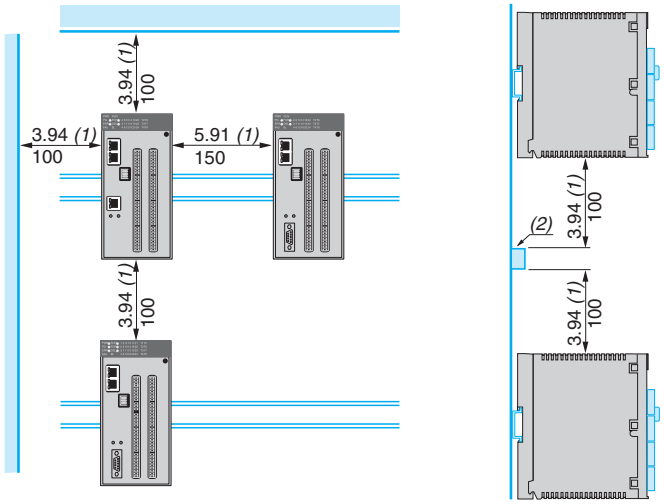
r = 0.89" (22.5mm) min.

Access to Profibus bus

Connector 490 NAD 911 03 in SUB-D 9-pin socket



Mounting in panel or enclosure

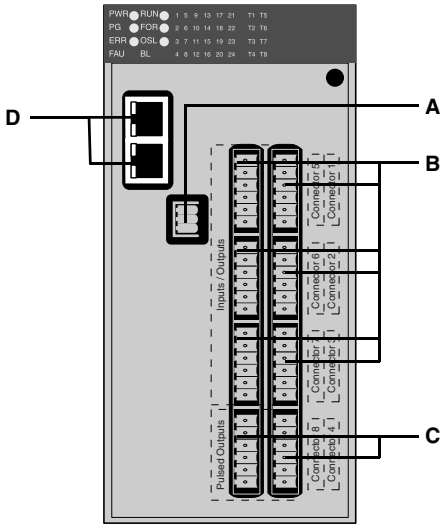


Dual Dimensions: Inches / mm

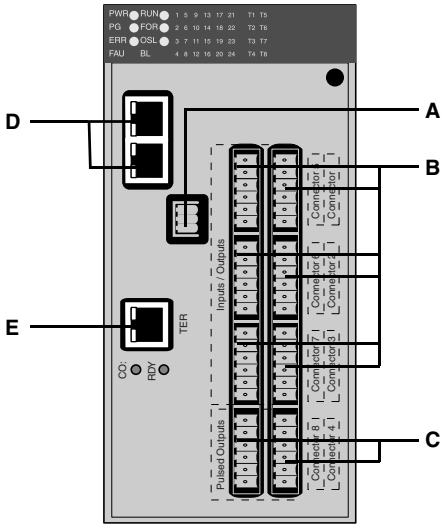
(1) Minimum recommended value.
(2) Prefabricated electrical ducting for passage of cables.

Machine Safety
Preventa™ safety PLCs
Compact, type XPS MF40

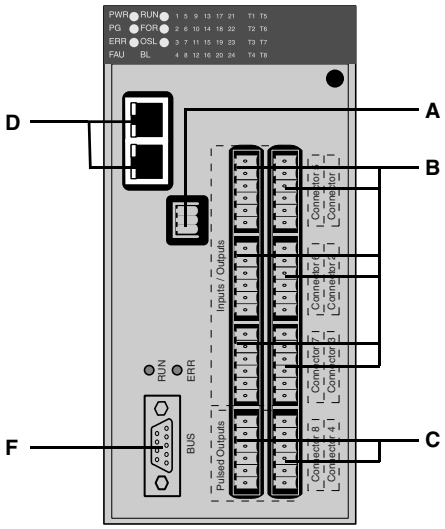
Connections



XPS MF4000/MF4002



XPS MF4020/MF4022



XPS MF4040/MF4042

XPS MF4000/MF4002, XPS MF4020/MF4022, XPSMF4040/MF4042

Item	Connection	Connector	Screw	Function
A	**Supply**	Supply	24 V	⎓ 24 Vdc
			0 V	⎓ 24 Vdc (reference pole)
			FE	Ground *(1)*
B	**Digital Inputs or Outputs**	Connector 1	S+	Supply to Inputs/Outputs 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/Outputs 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/Outputs 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/Outputs 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/Outputs 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/Outputs 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	**Pulsed outputs**	Connector 4	L-	Outputs 1 to 4 common
			1	Output 1
			2	Output 2
			3	Output 3
			4	Output 4
			L-	Outputs 1 to 4 common
		Connector 8	L-	Outputs 5 to 8 common
			5	Output 5
			6	Output 6
			7	Output 7
			8	Output 8
			L-	Outputs 5 to 8 common

Item	Connection	Type	Function
D	**Communication**	RJ45	Compact or modular safety PLCs XPS MF. Ethernet network. PC. Graphic terminal. Decentralized I/O modules.

XPS MF4020/MF4022

Item	Connection	Type	Function
E	**Communication**	RJ45 (TER)	**XPS MF4020/MF4022**: slaves on Modbus bus

XPS MF4040/MF4042

Item	Connection	Type	Function
F	**Communication**	SUB-D 9-pin female (BUS)	**XPS MF4040/MF4042**: slaves on Profibus bus

(1) Earthed when mounting on plate or rail.

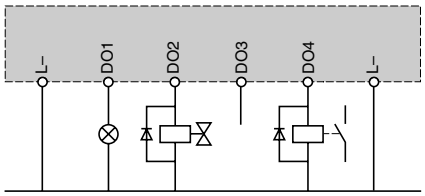
Presentation: pages 4 to 9
Characteristics: pages 10 and 11
References: page 12

Machine Safety
Preventa™ safety PLCs
Compact, type XPS MF40

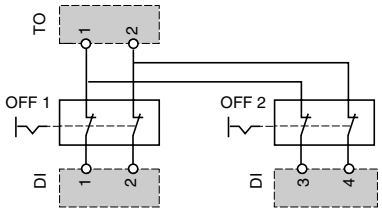
Connections

Connection examples

Actuator connections to the outputs



Emergency stop connections (line control)



Safety automation solutions
Preventa™ safety PLCs
Compact, type XPS MF31/30/35

XPS MF31222

XPS MF3022

XPS MF35●●

Products referenced XPS MF31222, XPS MF3022 and XPS MF35●● are marked HIMatrix F31, HIMatrix F30 and HIMatrix F35 (manufactured by Hima, sold by Schneider Electric).

Presentation

Preventa compact safety PLCs type XPS MF offer an automated line control solution in conjunction with the monitoring of safety functions that are required for the protection of personnel and the safety of machines.
They are designed to meet SIL 3 requirements of standard IEC 61508 and category 4 requirements conforming to EN 954-1/ISO 13849-1.
The compact safety PLC range XPS MF is based around 5 compact PLCs that are differentiated by their characteristics.

Compact PLCs XPS	Inputs			Outputs	Communication	
	Digital	Analog	Counter	Digital	On Ethernet network	On serial bus
MF31222	**20**	**–**	**–**	**8**	Using SafeEthernet safety protocol	–
MF3022	**20**	**–**	**–**	**8**	Using SafeEthernet safety protocol	Modbus Slave
MF3502	**24**	**8**	**2**	**8**	Using SafeEthernet safety protocol	–
MF3522	**24**	**8**	**2**	**8**	Using SafeEthernet safety protocol	Modbus Slave
MF3542	**24**	**8**	**2**	**8**	Using SafeEthernet safety protocol	Profibus Slave

Safety PLCs

In order to comply with safety requirements, the compact PLCs XPS MF integrate two essential functions conforming to category 4 of EN 954-1/ISO 13849-1 in addition to the SafeEthernet safety communication protocol between the safety PLCs and the decentralized safety I/O modules (Special Switch).

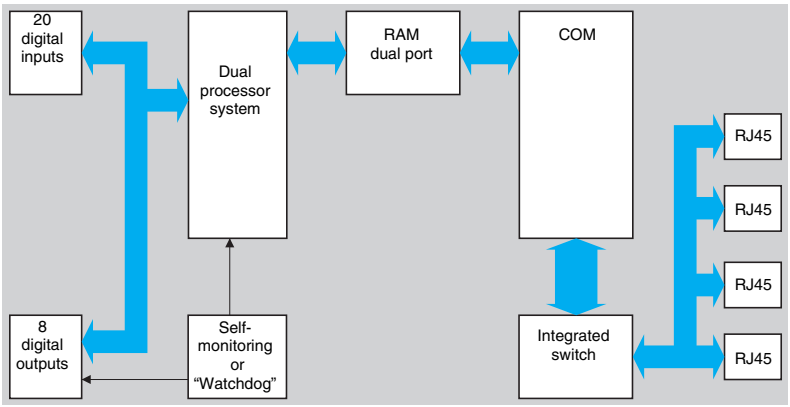
■ **Redundancy**: the dual processor integrated in the compact safety PLCs analyzes and compares the information received from the safety inputs and outputs.
The incoming and outgoing information (programmed values and received values) are received in parallel by the two processors and compared in real-time.

■ **"Watchdog" or self-monitoring**: the compact safety PLCs continuously monitor the information processing cycle and the execution of tasks, and intervene if the time of a cycle 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 information provided by the inputs and outputs of the safety PLCs on Ethernet network, while avoiding signal collisions and excessive amounts of data on the network.

Functional diagram

Compact safety PLC XPS MF31222

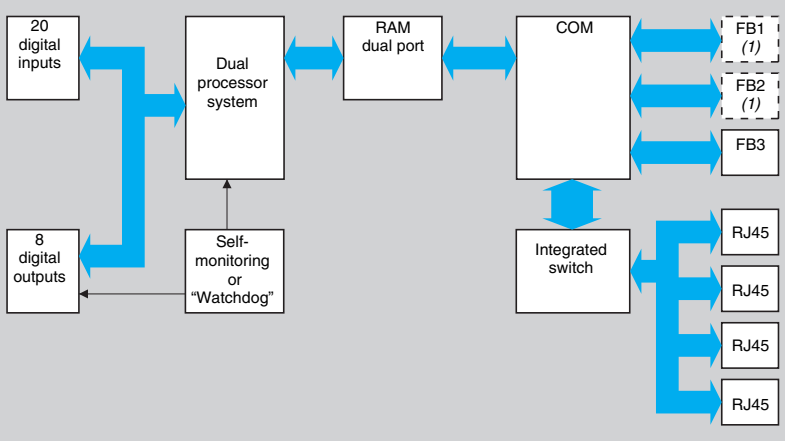


Characteristics: pages 24 to 26
References: page 27
Dimensions, mounting: page 30
Connections: page 31

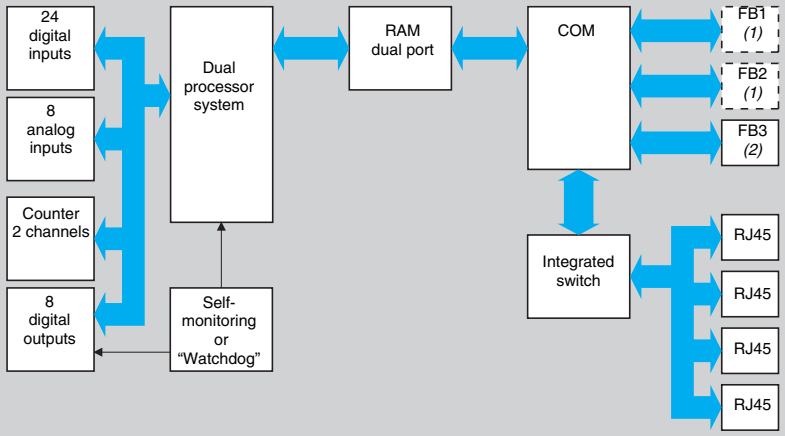
Safety automation solutions
Preventa™ safety PLCs
Compact, type XPS MF31/30/35

Functional diagram *(continued)*

Compact safety PLC XPS MF3022



Compact safety PLCs XPS MF35●●



Line control on XPS MF31222 and XPS MF3022

Line control is a means of short-circuit and line break monitoring, for example Emergency stop inputs to category 4 of standard EN 954-1/ISO 13849-1, that is configurable in compact safety PLCs XPS MF31222 and MF3022.
Digital outputs 1 to 8 are connected to the digital inputs of the same circuit. The pulses are automatic on the digital outputs: that drive the monitoring of the digital input lines.

Programming automated safety functions

XPSMFWIN software (reference SSV1XPSMFWIN) running on a PC enables:
- Programming of the safety functions of compact PLCs XPS MF,
- Configuration of the bus and industrial communication networks,
- Configuration and IP addressing of the automation line sensors/actuators,
- Programming of alarms via the power supply system.

See programming using XPSMFWIN software, pages 98 to 103.
By using a PC, Magelis graphic terminal type XBT GT or a Premium™ automation platform and connecting to the RJ45 socket of compact safety PLCs XPS MF, an automation line can, at any time or point, be supervised and controlled.
- Using a PC: system programming, selection of communication network etc.
- Using a graphic terminal or Premium™ automation platform: diagnostics, cycle monitoring, etc.

(1) FB1 and FB2 not used.
(2) FB3 not available on PLC XPS MF3502.

Safety automation solutions
Preventa™ safety PLCs
Compact, type XPS MF31/30/35

Digital inputs

All compact safety PLCs type XPS MF3●●●● incorporate digital type inputs for connection to the hazardous zones of machines to be monitored *(1)*.

Compact PLCs XPS	Digital inputs			
	N°	Safety detection	Safety dialog	Safety control
MF31222	20	Limit switches, Guard switches, with reset and with actuator, Safety 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…	Vario™…, and mini-Vario™ switch disconnectors
MF3022	20			
MF3502	24			
MF3522	24			
MF3542	24			

Analog inputs

Compact safety PLCs XPS MF35●● incorporate 8 analog measuring inputs for connection to the hazardous zones of machines to be monitored *(1)* *(2)*.

Compact PLCs XPS	Analog inputs with transmitter supply	
	N°	Functions
MF3502	8	Closed circuit scanning of input channels, Single-pole measuring of 0 to 10 V voltages, Measuring, with equipotential link, currents from 0 to 20 mA
MF3522	8	
MF3542	8	

Counter inputs

Compact safety PLCs type XPS MF35●● incorporate 2 independent and configurable counting channels: one channel for counting and one channel for increasing or decreasing counting direction *(1)*.

Compact PLCs XPS	Counting inputs		
	N°	⎓ 5 Vdc	⎓ 24 Vdc
MF3502	2	Incremental encoders	Sensors, 2/3-wire PNP/NPN
MF3522	2		
MF3542	2		

Digital outputs

All compact safety PLCs type XPS MF●●●● incorporate 8 digital type outputs for connection to signalling equipment and to the hazardous zones of machines to be controlled *(1)*.

Compact PLCs XPS	Digital outputs		
	N°	Safety dialog	Safety control
MF31222	8	Beacons and indicator banks, Rotating mirror beacons, Sirens…	Enclosed thermal-magnetic motor circuit-breakers, Enclosed D.O.L. starters for motor control, Power contactors…
MF3022	8		
MF3502	8		
MF3522	8		
MF3542	8		

(1) The connection of cables to captive screw terminal blocks that are both removable and guide marked avoids connection errors when, for example, carrying out maintenance. Terminal blocks included with compact safety PLCs XPS MF31/30/35.
(2) Use shielded dual twisted pair cables, maximum length 984 ft. (300 m), short-circuit unused analog inputs.

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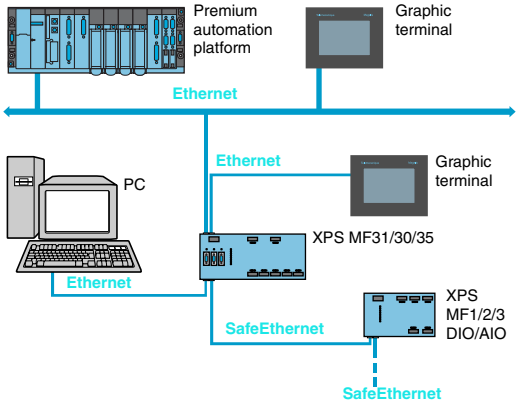
Safety automation solutions
Preventa™ safety PLCs
Compact, type XPS MF31/30/35



Decentralized inputs/outputs

In addition to the inputs/outputs integrated as standard, compact safety PLCs can accept supporting decentralized input modules type XPS MF1 and/or decentralized output modules type XPS MF2 and/or mixed decentralized I/O modules type XPS MF3.
These decentralized input, output and I/O modules are located in the vicinity of hazardous zones of machines to be monitored and increase the I/O capacity of the compact safety PLCs, see pages 66, 70, and 80.
Communication between the compact safety PLCs and decentralized input, output and I/O modules is performed on the Ethernet network using SafeEthernet safety communication protocol, via the RJ45 communication ports.

Safety communication on Ethernet network

■ Communication between the PC, Magelis graphic terminal or Premium™ automation platform and the compact safety PLCs is achieved by Ethernet connection, via the RJ45 communication ports of the compact PLC.
■ Connection on the Ethernet network enables integration of the compact safety PLCs XPS MF31/30/35 of a safety installation within a type A10 Transparent Ready® system.

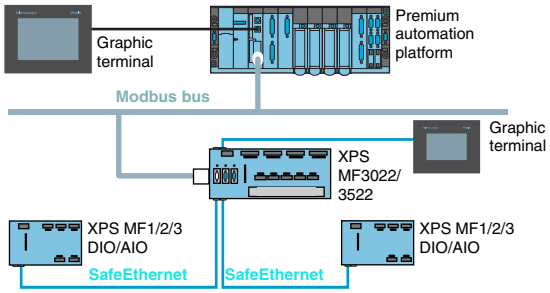
Compact PLCs XPS	Telemecanique® Transparent Ready®		
	Class	Communication protocols	
		safety	non safety
MF31222	A10	SafeEthernet	Modbus TCP/IP
MF3022			
MF3502			
MF3522			
MF3542			

Industrial communication

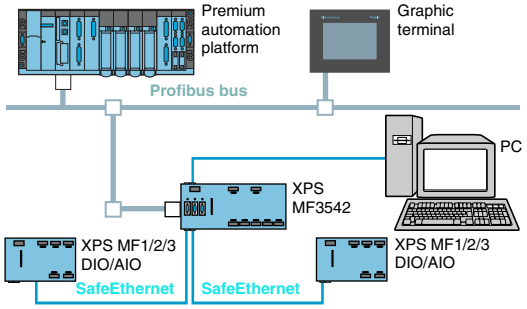
All compact safety PLCs XPS MF3022, XPS MF3522 and XPS MF3542 incorporate an FB3 (SUB-D 9-pin connector) which enables their integration in an industrial architecture. See pages 94 and 95.

Examples

■ On Modbus bus, the compact safety PLCs XPS MF3022 and XPS MF3522 are slaves of a Premium™ automation platform.



■ On Profibus bus, the compact safety PLC XPS MF3542 is a slave of a Premium™ automation platform.



Characteristics: pages 24 to 26
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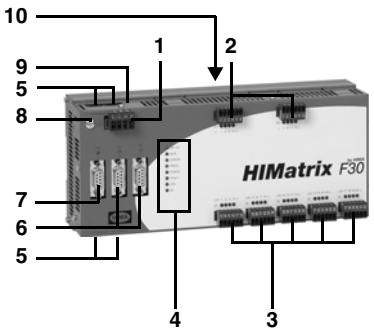
Safety automation solutions
Preventa™ safety PLCs
Compact, type XPS MF31/30/35



Description

Safety PLCs XPS MF31222 and XPS MF3022

On the front face of the metal enclosure:

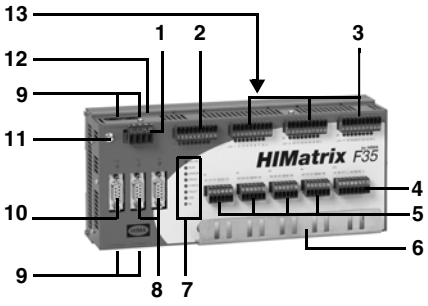
1 One terminal block *(1)* for ⎓ 24 Vdc supply.
2 Two terminal blocks *(1)* for connection of digital outputs, with output status LED (four LEDs per terminal block).
3 Five terminal blocks *(1)* for connection of digital inputs, with input status LED (four LEDs per terminal block).
4 Eight process status LEDs.
5 Four RJ45 ports (type 10BASE-T/100BASE-TX) for connection on Ethernet network.
6 Two unused FB1 and FB2 connectors *(2)*.
7 One FB3 (type SUB-D 9-pin female) connector for connection to Modbus bus (XPS MF3022 only).
8 One earth connection screw.

On the top:

9 One “Reset” button.

On the rear face:

10 One spring operated mounting device for mounting on rail.



Safety PLCs XPS MF35●●

On the front face of the metal enclosure:

1 One terminal block *(1)* for ⎓ 24 Vdc 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 FB1 and FB2 connectors.
9 Four RJ45 ports (type 10BASE-T/100BASE-TX) for connection on Ethernet network.
10 One FB3 (type SUB-D 9-pin female) connector for connection to Profibus bus (XPS MF3542) or Modbus bus (XPS MF3502).
11 One earth connection screw.

On the top:

12 One “Reset” button.

On the rear face:

13 One spring operated mounting device for mounting on rail.

(1) Removable screw terminal blocks, with locating devices, included with compact safety PLCs XPS MF31/30/35.
(2) Only applicable to compact safety PLC XPS MF3022.

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Safety automation solutions
Preventa™ safety PLCs
Compact, type XPS MF31/30/35

Status LED details

Compact safety PLCs XPS MF31222, XPS MF3022 and XPS MF35●●

LED	Color	Status	Meaning
FB1, FB2	–	–	Not used.
FB3	Orange	On	Communication on Modbus or Profibus bus *(1)* active.
Inputs 1 to 20	Orange	On	Inputs active.
Outputs 1 to 8	Orange	On	Outputs active.
24 VDC	Green	On	⎓ 24 Vdc 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 fault 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 compact safety PLC model.

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Safety automation solutions
Preventa™ safety PLCs
Compact, type XPS MF31/30/35

Environment

Compact safety PLC type			XPS MF31222	XPS MF3022	XPS MF3502, XPS MF3522, XPS MF3542
Product designed for max. use in safety related parts of control systems (conforming to EN 954-1/ISO 13849-1 and IEC 61508)			Category 4 (EN 954-1/ISO 13849-1), SIL 3 (IEC 61508)		
Product certifications			IEC 61131, EN 50156 pending, DIN V 19250, DIN V VDE 0801		
Ambient air temperature conforming to EN 61131-2	For operation		+32...+140 °F (0…+ 60 °C)		
	For storage		-40...+185 °F (-40…+ 85 °C) -22...+185 °F (- 30…+ 85 °C) with battery		
Relative humidity			95% (supply not connected)		
Degree of protection	Enclosure		IP 20, IP 54: mounted in enclosure conforming to EN 60204		
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 gn, frequency 10…150 Hz		
Shock resistance conforming to EN 61131-2	Operating		15 gn (duration 11 ms)		
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)		

Electrical characteristics

Supply	Voltage	**Vdc**	⎓ 24 (external supply with separate protection conforming to IEC 61131-2)		
	Voltage limits		- 15…+ 20%		
Maximum 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 application		
Clock			Supplied by backup capacitor for 1 week following loss of supply		
User memory	Application		250 Kb		
	Data		250 Kb		
LED display			Yes, see page 23		

Digital inputs

Number	Inputs not electrically isolated		20		24
Permissible current	At state 0	**mA**	1.5 max., 1 mA at 5 Vdc	1.5 max., 1.25 mA at 5 Vdc	1.5 max., 1 mA at 5 Vdc
	At state 1	**mA**	⩾ 2 at ⎓ 15 Vdc	> 2 at ⎓ 15 Vdc	Approx. 3.5 at ⎓ 24 Vdc Approx. 4.5 at ⎓ 30 Vdc
Input supply			5 x 20 V/100 mA (at 24 Vdc)		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 Vdc)		–
LED display			Yes, see page 23		
Maximum distance of equipment			328 ft. (100 m)		

Digital outputs

Number	Outputs not electrically isolated		8
Output voltage		**Vdc**	⎓ 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
Output overloads			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, see page 23
Maximum distance of equipment			328 ft. (100 m)

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Electrical characteristics (continued)

Compact safety PLC type			XPS MF3502, XPS MF3522, XPS MF3542
Analog inputs			
Number	Inputs not electrically isolated		8, single-pole
Input values	Nominal value	**Vdc**	⎓ 0…10
		mA	0…20
	Service value	**Vdc**	⎓ 0.1…11.5
		mA	0.4…23
Input impedance		**MΩ**	1
Maximum distance of equipment			984 ft. (300 m)
Internal resistance of signal source		**Ω**	⩽ 500
Overvoltage protection		**V**	+ 15, - 4
Resolution (A/D converter)			12-bit
Safety accuracy			± 2%
LED display			Yes, see page 23
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, see page 23

Communication

Ethernet network: safety communication using SafeEthernet protocol

Compatibility			XPS MF31222	XPS MF3022	XPS MF3502, XPS MF3522, XPS MF3542
Transmission	Communication ports		4 x RJ45 With integrated switch		
	Speed	Mbps	100		
Structure			10BASE-T/100BASE-TX		
Medium			Dual twisted pair cable		

Modbus® bus

Compatibility			XPS MF31222	XPS MF3022	XPS MF3522
Serial link ports	Number and type		–	1 x SUB-D 9-pin female (FB3)	
	Status		–	Slave	
Addressing			–	122 slaves max.	
Physical layer			–	RS 485	
Medium			–	Shielded dual twisted pair cable	

Profibus bus

Compatibility			XPS MF31222	XPS MF3022	XPS MF3542
Serial link ports	Number and type		–	–	1 x SUB-D 9-pin female
	Status		–	–	Master/Slave
Physical layer			–	–	RS 485
Medium			–	–	Shielded dual twisted pair cable, fiber optic

Safety automation solutions
Preventa™ safety PLCs
Compact, type XPS MF31/30/35

Connections *(1)*

Compact safety PLC type			XPS MF31222	XPS MF3022	XPS MF3502, XPS MF3522, XPS MF3542
Type of connection			Screw clamp terminal blocks, removable and coded for correct location		
Supply connection	Number of terminal blocks		1		
	For 1 cable without cable end		Solid or flexible 0.2…2.5 mm^2, AWG 24-12		
	For 1 flexible cable with or without plastic cable end		0.25…2.5 mm^2, AWG 22-16		
	For 2 cables of same diameter, without cable end		Solid or flexible 0.2…1.5 mm^2, AWG 24-12		
	For 2 cables of same diameter, flexible without cable end		0.25…1.0 mm^2, AWG 22-18		
	For 2 cables of same diameter, flexible with plastic cable end		0.5…1.5 mm^2, AWG 22-16		
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 0.14…1.5 mm^2, AWG 28-16		
	For 1 flexible cable without cable end		0.25…1.5 mm^2, AWG 22-16		
	For 1 flexible cable with plastic cable end		0.25…0.5 mm^2, AWG 22-20		
	For 2 cables of same diameter, without cable end		Solid: 0.14…0.5 mm^2, AWG 28-20 Flexible: 0.14…0.75 mm^2, AWG 28-18		
	For 2 cables of same diameter, flexible without cable end		0.25…0.34 mm^2, AWG 22		
	For 2 cables of same diameter, flexible with plastic cable end		0.5 mm^2, AWG 20		
Analog input channel connection	Number of terminal blocks		–	–	4
	For 1 cable without cable end		–	–	Solid or flexible 0.14…1.5 mm^2, AWG 28-16
	For 1 flexible cable without cable end		–	–	0.25…1.5 mm^2, AWG 22-16
	For 1 flexible cable with plastic cable end		–	–	0.25…0.5 mm^2, AWG 22-20
	For 2 cables of same diameter, without cable end		–	–	Solid: 0.14…0.5 mm^2, AWG 28-20 Flexible: 0.14…0.75 mm^2, AWG 28-18
	For 2 cables of same diameter, flexible without cable end		–	–	0.25…0.34 mm^2, AWG 22
	For 2 cables of same diameter, flexible with plastic cable end		–	–	0.5 mm^2, AWG 20
Counting channel connection	Number of terminal blocks		–	–	1
	For 1 cable without cable end		–	–	Solid or flexible 0.14…1.5 mm^2, AWG 28-16
	For 1 flexible cable without cable end		–	–	0.25…1.5 mm^2, AWG 22-16
	For 1 flexible cable with plastic cable end		–	–	0.25…0.5 mm^2, AWG 22-20
	For 2 cables of same diameter, without cable end		–	–	Solid: 0.14…0.5 mm^2, AWG 28-20 Flexible: 0.14…0.75 mm^2, AWG 28-18
	For 2 cables of same diameter, flexible without cable end		–	–	0.25…0.34 mm^2, AWG 22
	For 2 cables of same diameter, flexible with plastic cable end		–	–	0.5 mm^2, AWG 20
Cable connection	Tightening torque	Nm	0.22…0.25		
	Bared length		0.35 in. (9 mm)		

(1) AWG: American Wire Gauge.

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Safety automation solutions
Preventa™ safety PLCs
Compact, type XPS MF31/30/35

XPS MF31222

XPS MF3022

XPS MF35●●

*Products referenced **XPS MF31222, XPS MF3022** and **XPS MF35●●** are marked **HIMatrix F31**, **HIMatrix F30** and **HIMatrix F35** (manufactured by Hima, sold by Schneider Electric).*

Compact safety PLCs

⎓ 24 Vdc supply

Inputs			Outputs	Communication on			Reference	Weight
Digital	Analog	Counting	Digital	Ethernet network	Modbus SL bus	Profibus bus		oz. (kg)
20	–	–	8	Yes, using SafeEthernet protocol	–	–	**XPSMF31222**	35.27 (1.000)
					Yes Slave	–	**XPSMF3022**	42.33 (1.200)
24	8	2	8	Yes, using SafeEthernet protocol	–	–	**XPSMF3502**	42.33 (1.200)
					Yes Slave	–	**XPSMF3522**	42.33 (1.200)
					–	Yes Slave	**XPSMF3542**	42.33 (1.200)

Configuration software

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

Description	Operating system	Details	Languages	Reference	Weight oz. (kg)
Configuration XPSMFWIN software 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**	18.34 (0.520)

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Safety automation solutions
Preventa™ safety PLCs
Compact, type XPS MF31/30/35

ABL 7RE2403

ABL 1REM24042

Regulated switch mode power supplies, single-phase

Output voltage ⎓ 24 Vdc

Mains input voltage 47...63 Hz	Nominal power	Nominal current	Auto-protect reset	Conformity to standard EN 61000-3-2	Reference	Weight
V	W	A				oz. (kg)
∿ 100…240 Vac single-phase wide range	72	3	Automatic	No	**ABL8REM24030**	18.34 (0.520)
	120	5	Automatic	No	**ABL8REM24050**	35.27 (1.000)
	240	10	Automatic or Manual	Yes	**ABL8RPS24100**	35.27 (1.000)
	100	4.2	Automatic	No	**ABL1REM24042**	22.58 (0.640)

XBT GT2130, XBT GT2330

XBT GT4330

XBT GT5●30

XBT GT6330

XBT GT7340

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

Supply voltage ⎓ 24 Vdc

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**	35.27 (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**	35.27 (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**	63.49 (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**	105.82 (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**	105.82 (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**	105.82 (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**	197.53 (5.600)

(1) Supplied with service instructions, USB connectors locking device and mounting kit.

Presentation: pages 18 to 23
Characteristics: pages 24 to 26
References: page 27

490 NTW 000●●

Connecting cables for network and bus

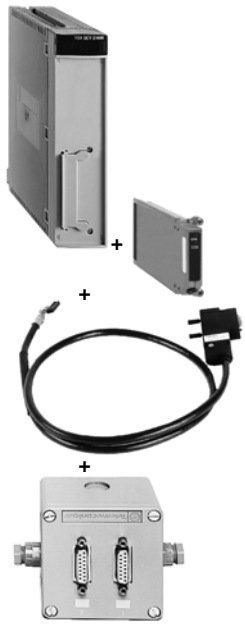
Connection to Ethernet network

Description	Pre-fitted connectors	Length ft. (m)	Reference	Weight oz. (kg)
Shielded twisted pair cables, straight through	2 RJ45 type 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 type 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® bus

Description	Use		Length ft. (m)	Reference	Weight oz. (kg)
	From	To			
Modbus bus connecting cables	Compact PLCs XPS MF3022/3522 + adaptor XPS MFADAPT (RJ45)	Modbus splitter box LU9 GC3 (RJ45)	0.98 (0.3)	**VW3A8306R03**	0.88 (0.025)
			3.28 (1)	**VW3A8306R10**	2.12 (0.060)
			9.84 (3)	**VW3A8306R30**	39.86 (1.130)
		Premium™ module TSX SCY 21601 (SUB-D 25-pin)	0.98 (0.3)	**XPSMCSCY**	–
	Graphic terminals XBT GT (SUB-D 9-pin)	Modbus splitter box LU9 GC3 (RJ45)	8.20 (2.5)	**XBTZ938** *(2)*	7.41 (0.210)
Adaptor for cable XBT Z938	SUB-D 9-pin (XBT GT)	XBT Z938 (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 bus (RJ45)	–	**XPSMFADAPT**	–

Description	Characteristics	Sold in lots of	Unit reference	Weight oz. (kg)
End of line adaptors For RJ45 type connector	R = 120 Ω, C = 1 nF	2	**VW3A8306RC**	7.05 (0.200)
	R = 150 Ω	2	**VW3A8306R**	0.35 (0.010)



TSX PBY 100

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 characteristics. Profibus FMS messaging not supported	**TSXPBY100**	30.69 (0.870)

Description	Use	Reference	Weight oz. (kg)
Remote inputs/outputs on Profibus DP bus	Advantys STB network interface module	**STBNDP2112**	4.94 (0.140)
	Momentum communication module	**170DTN11000**	–
Connectors for remote I/O communication module	Line terminator	**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**	–

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 XBT ZG909.

490 NAD 911 03

Presentation: pages 18 to 23
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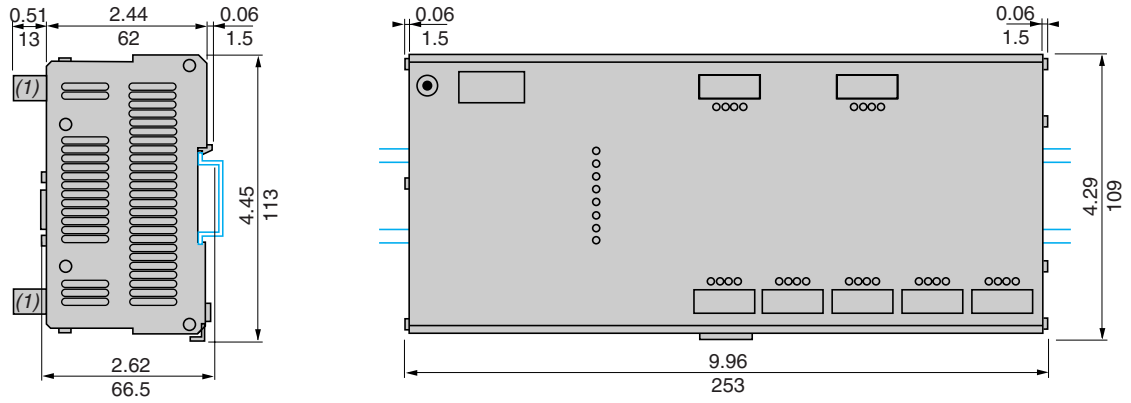
Safety automation solutions
Preventa™ safety PLCs
Compact, type XPS MF31/30/35

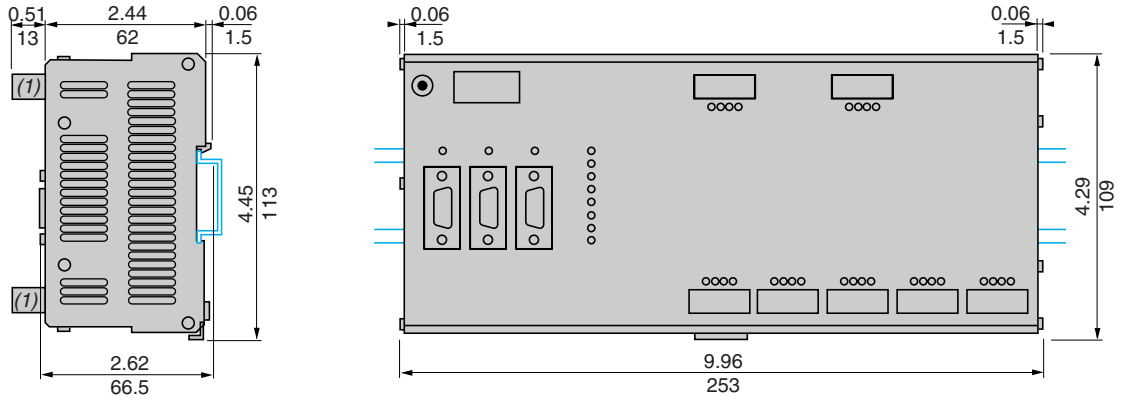
Dimensions

XPS MF31222



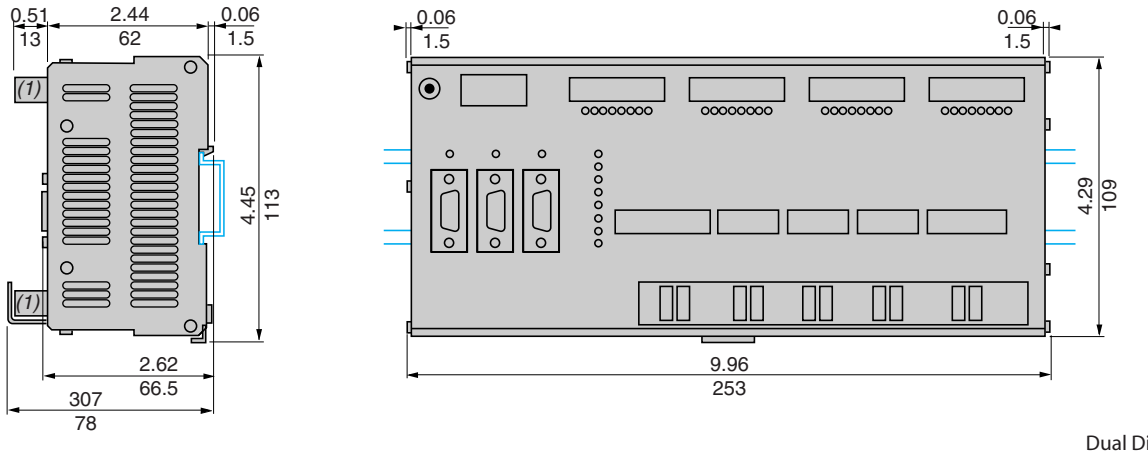
(1) Removable terminal blocks.

XPS MF3022



(1) Removable terminal blocks.

XPS MF35●●



Dual Dimensions: Inches / mm

(1) Removable terminal blocks.

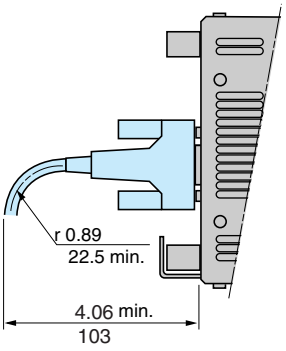
Safety automation solutions
Preventa™ safety PLCs
Compact, type XPS MF31/30/35

Mounting

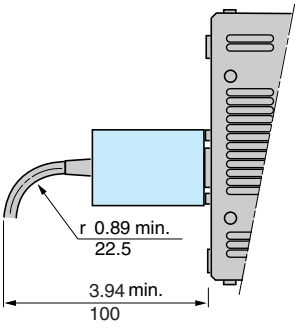
Mounting precautions relating to connectors

Access to Modbus bus

SUB-D 9-pin connector

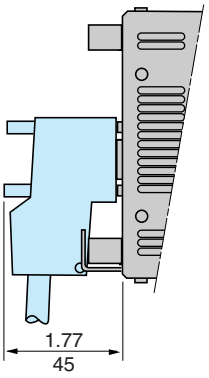


Connector XPS MFADAPT



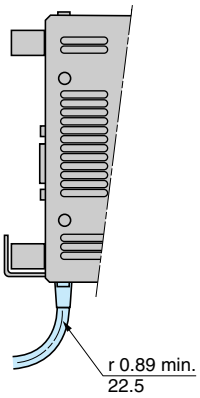
Access to Profibus bus

Connector 490 NAD 911 03

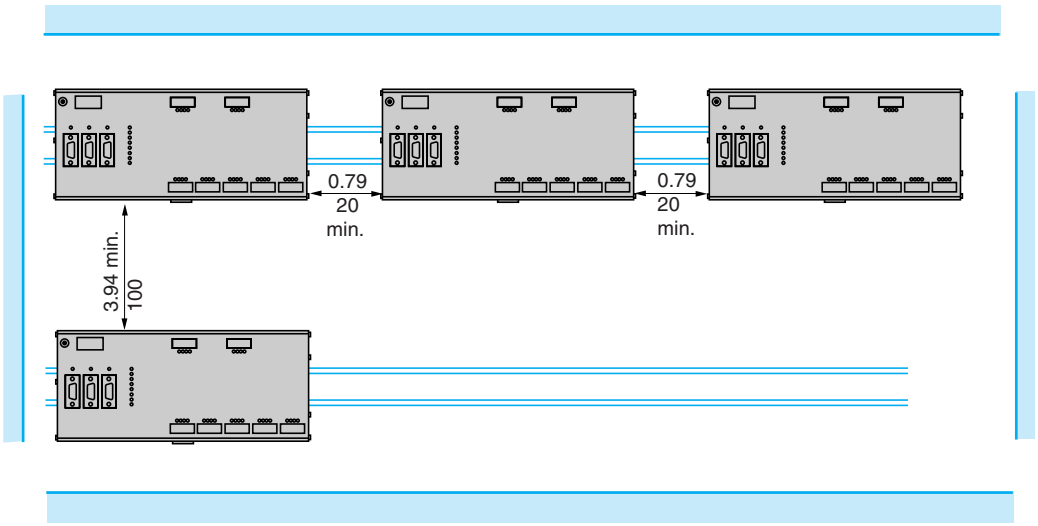


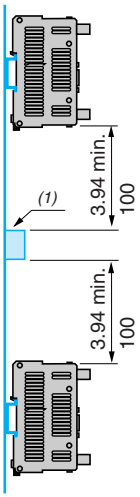
Access to Ethernet network

RJ45 socket



Mounting in panel or enclosure





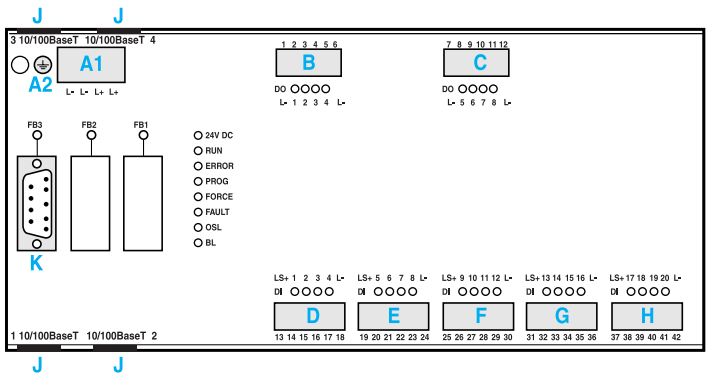
Dual Dimensions: Inches / mm

(1) Prefabricated electrical ducting for passage of cables.

Safety automation solutions
Preventa™ safety PLCs
Compact, type XPS MF31/30/35

Connections

XPS MF31222, XPS MF3022

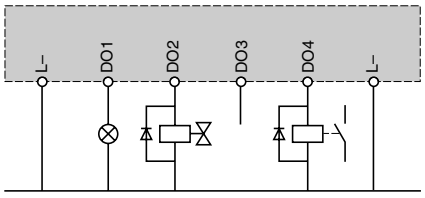


Item	Connection	Screw N°	Screw	Function
A1	**Supply**	–	L+	⎓ 24 Vdc
			L+	⎓ 24 Vdc
			L-	⎓ 24 Vdc (reference pole)
			L-	⎓ 24 Vdc (reference pole)
A2	**Ground**		⏚	Ground
B	**Outputs Digital**	1	L-	Outputs common
		2	1	Output 1
		3	2	Output 2
		4	3	Output 3
		5	4	Output 4 (for increased load)
		6	L-	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

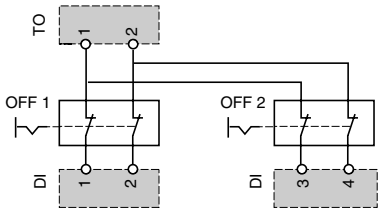
Item	Connection	Type	Function
K	**Communication**	FB3 (SUB-D 9-pin female)	**XPS MF3022**: slave on Modbus bus
J	**Communication**	RJ45	Compact or modular safety PLCs XPS MF. Ethernet network. PC. Graphic terminal. Decentralized I/O modules.

Connection examples

Actuator connections to the outputs



Emergency stop connections (line control)



Presentation: pages 18 to 23
Characteristics: pages 24 to 26
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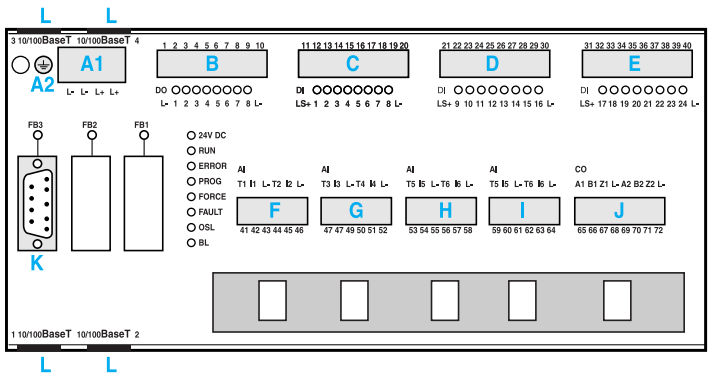
Safety automation solutions
Preventa™ safety PLCs
Compact, type XPS MF31/30/35

Connections
XPS MF35●●



Item	Connection	Screw N°	Screw	Function
A1	**Supply**	–	L+	⎓ 24 Vdc
			L+	⎓ 24 Vdc
			L-	⎓ 24 Vdc (reference pole)
			L-	⎓ 24 Vdc (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**	FB3 (SUB-D 9-pin female)	**XPS 3522**: slave on Modbus bus **XPS 3542**: slave on Profibus bus
L	**Communication**	RJ45	Compact or modular safety PLCs XPS MF. Ethernet network. PC. Graphic terminal. Decentralized I/O modules.

Presentation: pages 18 to 23
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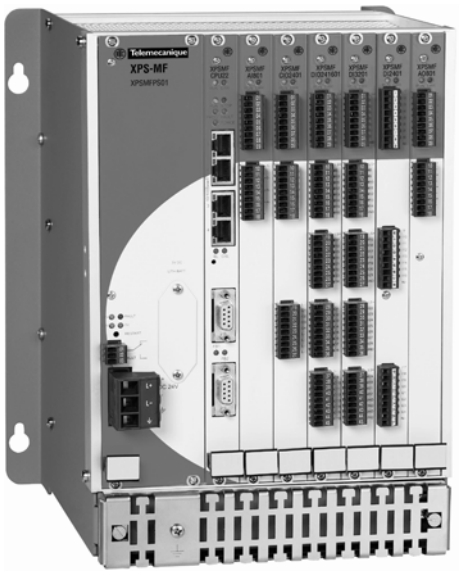
Safety automation solutions
Preventa™ safety PLCs
Modular, type XPS MF60
Rack, power supply and CPU



Modular safety PLC XPS MF60, fitted with 6 different "in rack" I/O modules

Presentation

Preventa safety PLC type XPS MF60 offers a modular automated line control solution in conjunction with the monitoring of safety functions that are required for the protection of personnel and the safety of machines.

The modular safety PLC XPS MF60 is designed to meet SIL 3 requirements of standard IEC 64508 and category 4 requirements conforming to EN 954-1/ ISO 13849-1.

Modularity

The safety PLC XPS MF60 is a modular system comprising a metal housing or rack, fitted with a power supply module, a CPU and "in rack" I/O modules.
- Six slots are available.
- Various types of "in rack" I/O modules are catalog listed and are selected according to the application.
- Mounting the modules in the rack is performed by simple fitting using the guide rails. Electrical connection is automatic and assured by the back plane bus of the rack.
- The mounting order of the "in rack" I/O modules is open to the user, but the order must, however, correspond to the programming software.
- The removal of the modules, performed with the supply switched-off, is facilitated by a grip in the base of the modules.
- Covering plates for unused "in rack" I/O module slots are available and protect the system in polluted environments.

Composition of the modular safety PLC XPS MF60

Basics	"In rack" I/O modules		
	XPS	Characteristics	See page
Metal rack XPS MFGEH01 with back plane bus assuring electrical connection of components installed + metal securing plate for shielded cables (EMC), 2 cooling fans + **power supply module (⎓ 24 Vdc) XPS MFPS01** with lithium backup battery, + **CPU XPS MFCPU22** with safety communication ports (RJ45: Ethernet) and industrial (FB2: Modbus)	**MFAI801**	8 single-pole analog inputs or 4 2-pole analog inputs	50
	MFAO801	8 analog outputs	52
	MFCIO2401	2 counting inputs, 4 digital outputs	54
	MFDI2401	24 digital inputs (⎓ 110 Vdc / ∿ 117 Vac)	56
	MFDI3201	32 digital inputs	58
	MFDIO241601	24 digital inputs, 16 digital outputs	60
	MFAO801	8 relay outputs (∿ 6…230 Vac / ⎓ 110 Vdc)	62

Safety PLCs

In order to comply with safety requirements, the modular safety PLC XPS MF60 integrates two essential functions conforming to category 4 of EN 954-1/ISO 13849-1 in addition to the SafeEthernet safety communication protocol between the safety PLCs and the decentralized safety I/O modules (Special Switch).

- **Redundancy**: the 2 processors integrated in the CPU of the modular safety PLC XPS MF60 analyze and compare the information received from the safety inputs and outputs. The incoming and outgoing information (programmed values and received values) are received in parallel by the two processors and compared in real-time.
- **"Watchdog" or self-monitoring**: the modular PLC continuously monitors the information processing cycle and the execution of tasks, and intervenes if the time of a cycle does not conform to the predefined value.
- **The integrated switch (Special Switch)** manages the supply voltage variations from the Communication (Ethernet) and Serial (Modbus) ports. It stores for a very short time and sends at very high speed the information provided by inputs and outputs of the PLC on the Ethernet network, while avoiding signal collisions.

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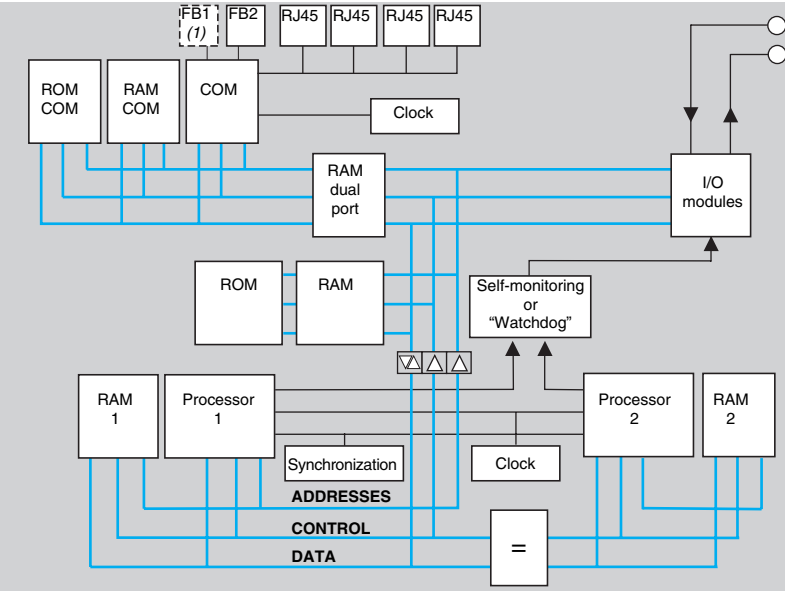
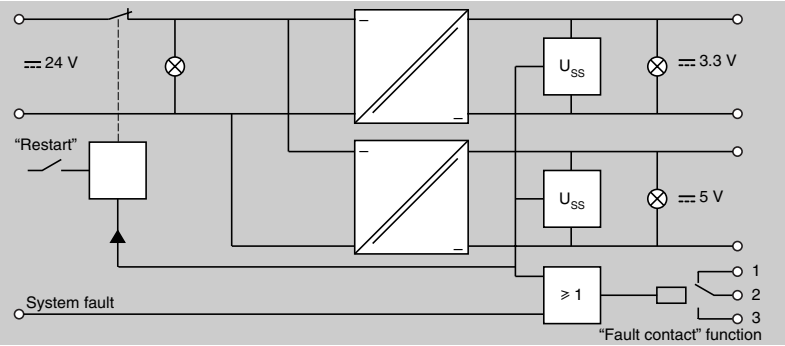
Safety automation solutions
Preventa™ safety PLCs
Modular, type XPS MF60
Rack, power supply and CPU

Functional diagram

CPU XPS MFCPU22



Power supply module XPS MFPS01



Line control on "in rack" I/O module XPS MFDIO241601 and XPS MFDI3201

Line control is a means of short-circuit and line break monitoring, for example Emergency stop inputs to category 4 of standard EN 954-1/ISO 13849-1, that is configurable in modular safety PLCs XPS MF60.
The digital outputs 1 to 16 of the "in rack" module XPS MFDIO241601 are connected the digital inputs of the same module or to the inputs of module XPS MFDI3201. The pulses are automatic on the digital outputs: that drive the monitoring of the digital input lines.

(1) FB1 not used.

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Safety automation solutions
Preventa™ safety PLCs
Modular, type XPS MF60
Rack, power supply and CPU

XPS MFDI2401

XPS MFDI3201

XPS MFAI801

Presentation (continued)

Programming safety automation system functions

XPSMFWIN software (reference SSV1XPSMFWIN) running on a PC enables:
- Programming of the safety functions of the “in rack” I/O modules of the modular PLC XPS MF60,
- Configuration of the bus and industrial communication networks,
- Configuration and IP addressing of the automation line sensors/actuators,
- Programming of alarms via the power supply system.

See programming using XPSMFWIN software, pages 98 to 103.

By using a PC, Magelis graphic terminal type XBT GT or a Premium™ automation platform and connecting to one of four RJ45 sockets of the CPU of the modular PLC XPS MF60, an automation line can, at any time or point, be supervised and controlled.
- ☐ using a PC: system programming, selection of communication network etc.
- ☐ using a graphic terminal or Premium™ automation platform: diagnostics, cycle monitoring, etc.

Safety inputs and outputs

The modularity of the PLC XPS MF60 allows the user to select and install, in the six slots of the rack, various input, output and input/output modules to alter the number and type of safety inputs and/or outputs to be monitored. 6 identical modules can be installed in the same rack.

The modules listed (see below and page 37) indicate the number of inputs and outputs available for connection to the hazardous zones of machines to be monitored.

Digital input modules *(1)*

Modules XPS	Digital inputs			
	N°	Type		
		Safety detection	Safety dialog	Safety control
MFDI2401	24	Limit switches, Guard switches, with reset and with actuator, Safety 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…	Vario™…, and mini-Vario™ switch disconnectors
MFDI3201	32			

Analog input module *(1) (2)*

Module XPS	Analog measuring inputs	
	N°	Functions
MFAI801	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) The connection of cables to captive screw terminal blocks that are both removable and guide marked avoids connection errors when, for example, carrying out maintenance. Terminal blocks included with CPU, power supply module and “in rack” I/O modules.
(2) Use shielded dual twisted pair cables, maximum length 984 ft. (300 m), short-circuit unused analog inputs.

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Safety automation solutions
Preventa™ safety PLCs
Modular, type XPS MF60
Rack, power supply and CPU

XPS MFCIO2401

XPS MFDIO241601

XPS MFAO801

XPS MFDO801

Safety inputs and outputs (continued)

Mixed I/O modules *(1)*

Module XPS	Counting inputs			Digital outputs	
	N°	⎓ 5 Vdc	⎓ 24 V dc	N°	Type
MFCIO2401	2	Incremental encoders	Sensors, 2/3-wire PNP/NPN	4	**Safety dialog** Beacons and indicator banks, Rotating mirror beacons, Sirens… **Safety control** Enclosed thermal-magnetic motor circuit-breakers, Enclosed D.O.L. starters for motor control, Power contactors…
		Independent and configurable counting inputs (one channel for counting and one channel for increasing or decreasing counting direction)			

Module XPS	Digital inputs		Digital outputs	
	N°	Type	N°	Type
MFDIO241601	24	**Safety detection** Guard switches, with reset and with actuator, Safety 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… **Safety control** Vario™, and mini-Vario™ switch disconnectors	16	**Safety dialog** Beacons and indicator banks, Rotating mirror beacons, Sirens… **Safety control** Enclosed thermal-magnetic motor circuit-breakers, Enclosed D.O.L. starters for motor control, Power contactors…

Analog output module *(1) (2)*

Module XPS	Analog outputs	
	N°	Functions
MFAO801	8	Closed circuit scanning of output channels, Single-pole measuring of 0 to 10 V voltages,

Relay output module *(1) (2)*

Module XPS	Relay outputs	
	N°	Type
MFDO801	8	**Safety dialog:** Beacons and indicator banks, rotating mirror beacons, sirens… **Safety control:** Enclosed thermal-magnetic motor circuit-breakers, Enclosed D.O.L. starters for motor control, Power contactors…

Decentralized inputs/outputs

In addition to the inputs/outputs available on the removable “in rack” I/O modules, the modular safety PLC XPS MF60 can accept supporting decentralized input modules type XPS MF1 and/or decentralized output modules type XPS MF2 and/or mixed decentralized I/O modules type XPS MF3.
These decentralized input, output and I/O modules are located in the vicinity of hazardous zones of machines to be monitored and increase the I/O capacity of the modular PLC, see pages 66, 70, and 80.

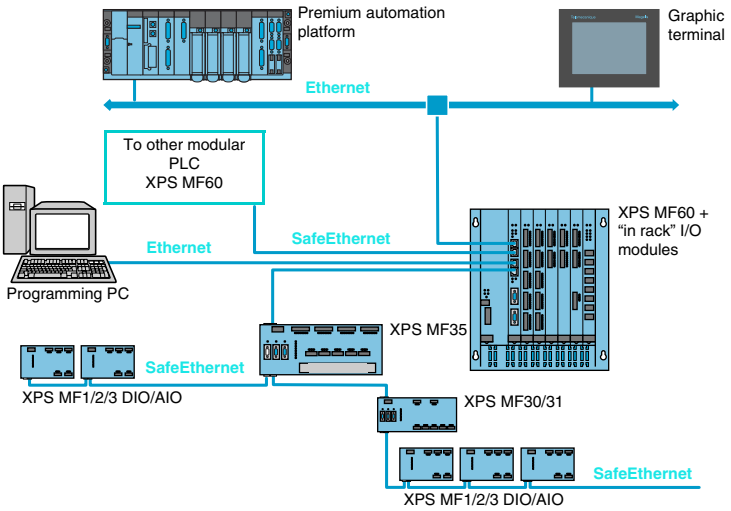
(1) The connection of cables to captive screw terminal blocks that are both removable and guide marked avoids connection errors when, for example, carrying out maintenance. Terminal blocks included with CPU, power supply module and “in rack” I/O modules.
(2) Use shielded dual twisted pair cables, maximum length 984 ft. (300 m), short-circuit unused analog inputs.

Safety automation solutions
Preventa™ safety PLCs
Modular, type XPS MF60
Rack, power supply and CPU

Communication
Safety communication on Ethernet network

■ Communication between the PC, Magelis® graphic terminal or Premium™ automation platform and the modular safety PLC is achieved by Ethernet network connection, via the four RJ45 communication ports of the CPU of the modular PLC.
■ Connection on the Ethernet network enables integration of the modular safety PLC XPS MF60 of a safety installation within a type A10 Transparent Ready® system.

Modular PLC	Telemecanique® Transparent Ready®		
	Class	Communication protocols	
		safety	non safety
XPS MF60	**A10**	SafeEthernet	Modbus TCP/IP

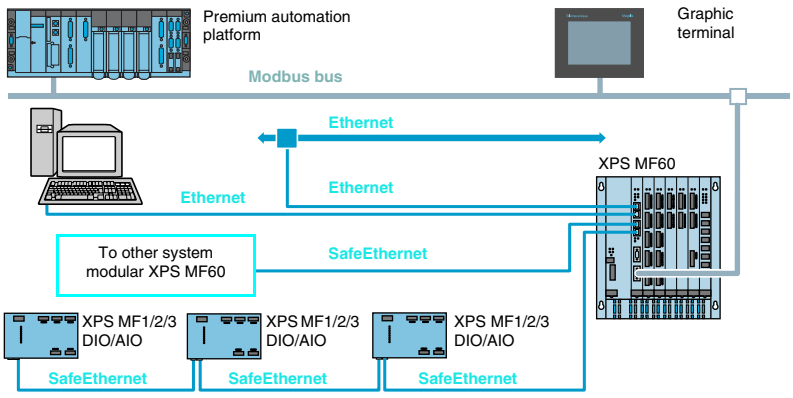


Communication between the modular safety PLC XPS MF60, compact safety PLCs type XPS MF30/31/35 and modules type XPS MF1/2/3 (Decentralized input, output and I/O modules) is performed on the Ethernet network using SafeEthernet communication protocol, via the RJ45 communication ports.

Industrial communication on Modbus® bus

The CPU of the modular safety PLC XPS MF60 incorporates an FB2 (SUB-D 9-pin connector) which enables integration within an industrial architecture. See pages 94 and 95.

Examples: on Modbus, the modular safety PLC XPS MF60 is a slave of a Premium™ automation platform.



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Modular, type XPS MF60
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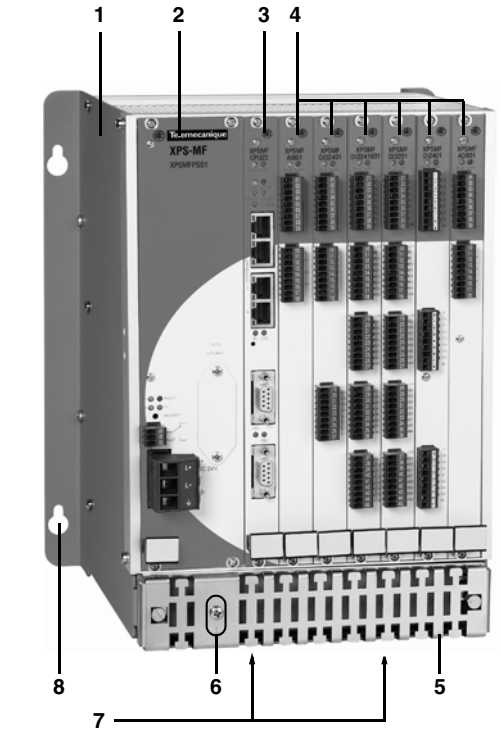
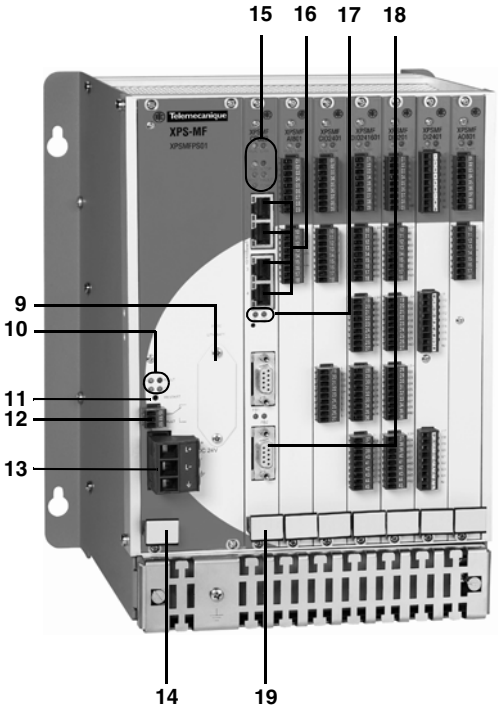




Description

Modular safety PLC XPS MF60

Modular assembly comprising:

1 A metal rack **XPS MFGEH01**.
2 A ⎓ 24 Vdc power supply module **XPS MFPS01**.
3 A CPU **XPS MFCPU22**.
4 Six “in rack” I/O modules (back plane bus assures the electrical connection of “in rack” modules installed, the power supply module and the CPU).
5 A metal plate for securing shielded analog input connection cables (EMC),
6 An ground connection screw.
7 Two cooling fans (beneath the metal rack).
8 Four Ø 0.55" (14 mm) elongated holes for mounting the rack on a vertical support.

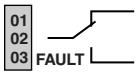
Power supply module XPS MFPS01 comprising:

9 A backup lithium battery compartment.
10 Four voltage status LEDs (FAULT, 24 V, 3.3 V or 5 V).
11 A RESTART button (accessible using fine pointed tool).
12 A 3-pole terminal block (3 captive screws) for “Fault contact” function *(1)*.
13 A ⎓ 24 Vdc supply terminal block, including ground connection *(2)*.
14 A grip to assist installation/removal of the power supply module.

CPU XPS MFCPU22 comprising:

15 Seven process status LEDs.
16 Four RJ45 ports (type 10BASE-T/100BASE-TX) for connection on Ethernet network.
17 Two process status LEDs.
18 An FB2 connector for connection to Modbus bus (FB1 not used), with process status LED.
19 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) The connection of cables to captive screw terminal blocks that are both removable and guide marked avoids connection errors when, for example, carrying out maintenance. Terminal blocks included with CPU, power supply module and “in rack” I/O modules.

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Safety automation solutions

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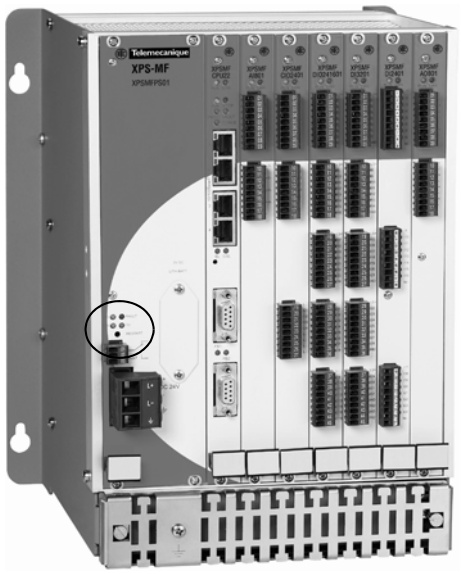

LED details

Power supply module XPS MFPS01

LED	Color	Status	Meaning
24 VDC	Green	On	⎓ 24 Vdc voltage present.
		Off	No voltage.
3.3 VDC	Green	On	⎓ 3.3 Vdc voltage present.
		Off	No voltage.
5 VDC	Green	On	⎓ 5 Vdc 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.

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Safety automation solutions

Preventa™ safety PLCs
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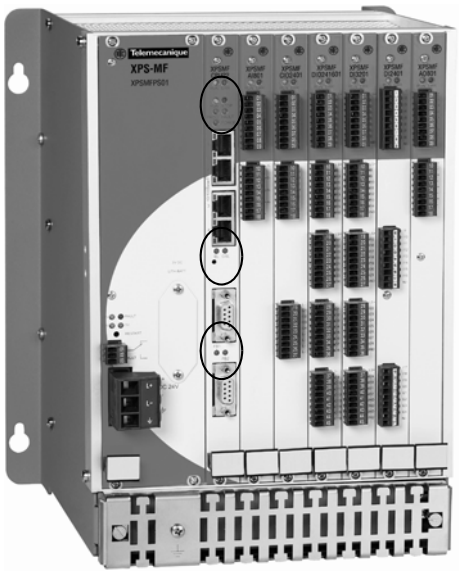

LED details (continued)

CPU XPS MFCPU22

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 fault 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 bus 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.

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Safety automation solutions
Preventa™ safety PLCs
Modular, type XPS MF60
Rack, power supply and CPU

Environment

Modular safety PLC type			**XPS MF60:** rack **XPS MFGEH01** + power supply module **XPS MFPS01** and CPU **XPS MFCPU22**
Product designed for max. use in safety related parts of control systems (conforming to EN 954-1/ISO 13849-1 and IEC 61508)			Category 4 (EN 954-1/ISO 13849-1), SIL 3 (IEC 61508)
Product certifications			IEC 61131-2, EN 50156 pending, DIN V 19250, NFPA
Ambient air temperature conforming to EN 61131-2	For operation		Rack, power supply and CPU: +32...+140 °F (0…+ 60 °C)
	For storage		■ Rack **XPS MFGEH01**: -40...+185 °F (-40…+ 85 °C), ■ Power supply module **XPS MFPS01**: □ -40...+185 °F (-40…+ 85 °C), without backup battery □ -22...+185 °F (-30…+ 85 °C), with backup battery ■ CPU **XPS MFCPU22**: -40...+185 °F (-40…+ 85 °C)
Relative humidity			95% (supply not connected)
Degree of protection	Enclosure		IP 20 with covering plate on unused “in rack” I/O module slots IP 54 mounted in enclosure
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 gn, frequency 10…150 Hz
Shock resistance conforming to EN 61131-2	Operating		15 gn (duration 11 ms)
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 characteristics

Supply	Voltage	**Vdc**	⎓ 24
	Voltage limits		- 15… + 20% (power supply module) - 20… + 25%
Output voltage of power supply module		**Vdc**	⎓ 3.3 / 10 A
		Vdc	⎓ 5 / 2 A
Maximum consumption		**A**	30 max., 32 A external fuse
Immunity to momentary supply interruptions		**ms**	10
Protection			Internal fuse
Response time		**ms**	Depending on application
Backup battery	On power supply module XPS MFPS01		Data backup: 24 hours, 3 V, lithium Service life: 1000 hours
Clock			Yes
Operational data of CPU			⎓ 3.3 Vdc / 1.5 A
			⎓ 5 Vdc / 1 A
User memory	Application	**Kb**	500
	Data	**Kb**	500
LED display			Yes, see pages 40 and 41

Communication

Ethernet network: safety communication using SafeEthernet protocol

Compatibility			**CPU XPS MFCPU22**
Transmission	Communication ports		4 x RJ45 With integrated switch
	Speed	Mbps	100
Structure			10BASE-T/100BASE-TX
Medium			Dual twisted pair cable
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 and outputs

Modbus® bus

Compatibility			**CPU XPS MFCPU22**
Serial link ports	Number and type		1 x SUB-D 9-pin female (FB2)
	Status		Slave
Addressing			122 slaves max.
Physical layer			RS 485

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Safety automation solutions
Preventa™ safety PLCs
Modular, type XPS MF60
Rack, power supply and CPU

Connections (1)

Power supply module		XPS MFPS01
Type of connection		Screw clamp terminal blocks, removable and coded for correct location
Supply connection	Number of terminal blocks	1
	For 1 cable without cable end	Solid or flexible 0.75…16 mm², AWG 20
	For 1 flexible cable with or without plastic cable end	0.5…16 mm², AWG 20
	For 2 cables of same diameter, without cable end	Solid or flexible 0.75…6 mm², AWG 20
	For 2 cables of same diameter, flexible without cable end	0.5…4 mm², AWG 20
	For 2 cables of same diameter, flexible with plastic cable end	0.5…6 mm², AWG 20
"In rack" I/O module		**XPS MFAI801, XPS MFAO801, XPS MFCIO2401, XPS MFDI2401, XPS MFDI3201, XPS MFDIO241601, XPS MFDO801**
Type of connection		Screw clamp terminal blocks, removable and coded for correct location
Digital input channel and output channel connection	Number of terminal blocks	Depending on "in rack" module type
	For 1 cable without cable end	Solid or flexible: 0.14…1.5 mm², AWG 28-16
	For 1 flexible cable without cable end	0.25…1.5 mm², AWG 22-16
	For 1 flexible cable with plastic cable end	0.25…0.5 mm², AWG 22-20
	For 2 cables of same diameter, without cable end	Solid: 0.14…0.5 mm², AWG 28-20 Flexible: 0.14…0.75 mm², AWG 28-18
	For 2 cables of same diameter, flexible without cable end	0.25…0.34 mm², AWG 22
	For 2 cables of same diameter, flexible with plastic cable end	0.5 mm², AWG 20
Analog input channel and output channel connection	Number of terminal blocks	Depending on "in rack" module type
	For 1 cable without cable end	Solid or flexible: 0.14…1.5 mm², AWG 28-16
	For 1 flexible cable without cable end	0.25…1.5 mm², AWG 22-16
	For 1 flexible cable with plastic cable end	0.25…0.5 mm², AWG 22-20
	For 2 cables of same diameter, without cable end	Solid: 0.14…0.5 mm², AWG 28-20 Flexible: 0.14…0.75 mm², AWG 28-18
	For 2 cables of same diameter, flexible without cable end	0.25…0.34 mm², AWG 22
	For 2 cables of same diameter, flexible with plastic cable end	0.5 mm², AWG 20
Counting channel connection	Number of terminal blocks	Depending on "in rack" module type
	For 1 cable without cable end	Solid or flexible: 0.14…1.5 mm², AWG 28-16
	For 1 flexible cable without cable end	0.25…1.5 mm², AWG 22-16
	For 1 flexible cable with plastic cable end	0.25…0.5 mm², AWG 22-20
	For 2 cables of same diameter, without cable end	Solid: 0.14…0.5 mm², AWG 28-20 Flexible: 0.14…0.75 mm², AWG 28-18
	For 2 cables of same diameter, flexible without cable end	0.25…0.34 mm², AWG 22
	For 2 cables of same diameter, flexible with plastic cable end	0.5 mm², AWG 20
Cable connection	Tightening torque	1.95...2.21 lb-in (0.22…0.25 Nm)
	Bared length	0.35" (9mm)

(1) AWG: American Wire Gauge.

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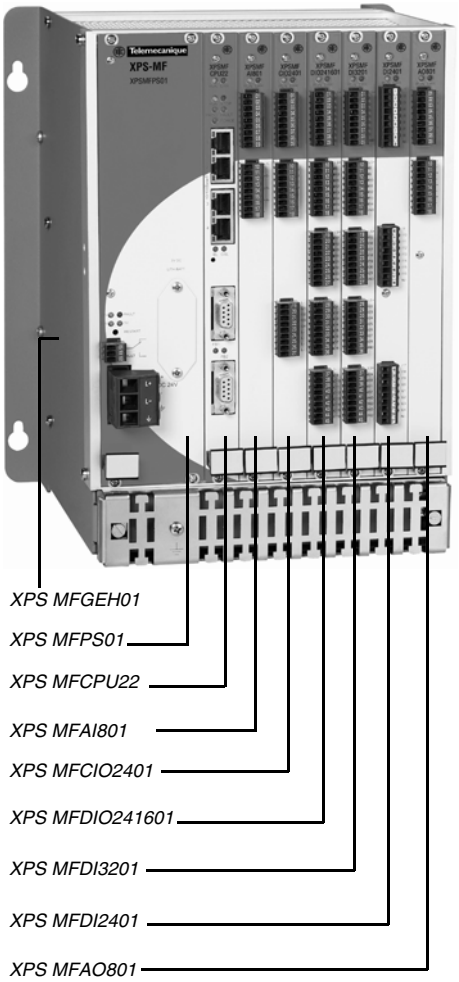
Safety automation solutions

Preventa™ safety PLCs
Modular, type XPS MF60
Rack, power supply and CPU



Modular PLC XPS MF60 (⎓ 24 Vdc supply)

Description	Reference	Weight oz. (kg)
Metal rack fitted with: □ a back plane bus, assuring electrical connection of components installed: power supply module, CPU and "in rack" modules □ two cooling fans □ a metal securing plate for shielded cables (EMC) □ a lithium backup battery	**XPSMFGEH01**	–
⎓ 24 Vdc power supply module	**XPSMFPS01**	28.92 (0.820)
CPU fitted with: □ 4 Ethernet access ports (RJ45) for safety communication □ 1 FB2 Modbus bus access port (SUB-D 9-pin) for industrial communication	**XPSMFCPU22**	9.88 (0.280)

Description	Functions		Reference	Weight oz. (kg)
	Inputs	Outputs		
"In rack" I/O modules	Analog: 8 single-pole or 4 2-pole	–	**XPSMFAI801** See page 50	8.47 (0.240)
	–	8 analog	**XPSMFAO801** See page 52	9.88 (0.280)
	2 counting	4 digital	**XPSMFCIO2401** See page 54	9.17 (0.260)
	24 digital inputs (⎓ 110 Vdc / ∿ 127 Vac)	–	**XPSMFDI2401** See page 56	9.17 (0.260
	32 digital	–	**XPSMFDI3201** See page 58	9.17 (0.260
	24 digital	16 digital	**XPSMFDIO241601** See page 60	9.17 (0.260
	–	8 relay ∿ 0…230 Vdc/⎓ 110 Vdc	**XPSMFDO801** See page 62	21.16 (0.600)

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Safety automation solutions
Preventa™ safety PLCs
Modular, type XPS MF60
Rack, power supply and CPU

Configuration software

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

Description	Operating system	Details	Languages	Reference	Weight oz. (kg)
Configuration XPSMFWIN software 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**	18.34 (0.520)

Accessories for modular PLCs

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

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Safety automation solutions
Preventa™ safety PLCs
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ABL 7RE2403

ABL 1REM24042

Regulated switch mode power supplies, single-phase

Output voltage ⎓ 24 Vdc

Mains input voltage 47...63 Hz	Nominal power	Nominal current	Auto-protect reset	Conformity to standard EN 61000-3-2	Reference	Weight
Vac	**W**	**A**				**oz. (kg)**
∿ **100…240 Vac** single-phase wide range	72	3	Automatic	No	**ABL8REM24030**	18.34 (0.520)
	120	5	Automatic	No	**ABL8REM24050**	35.27 (1.000)
	240	10	Automatic or manual	Yes	**ABL8RPS24100**	35.27 (1.000)
	100	4.2	Automatic	No	**ABL1REM24042**	22.58 (0.640)

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

Supply voltage ⎓ 24 Vdc

XBT GT2130, XBT GT2330

XBT GT4330/

XBT GT5●30

XBT GT6330

XBT GT7340

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**	35.27 (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**	35.27 (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**	63.49 (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**	105.82 (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**	105.82 (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**	105.82 (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**	197.53 (5.600)

(1) Supplied with service instructions, USB connectors locking device and mounting kit.

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Safety automation solutions
Preventa™ safety PLCs
Modular, type XPS MF60
Rack, power supply and CPU

490 NTW 000●●

Connecting cables for network and bus

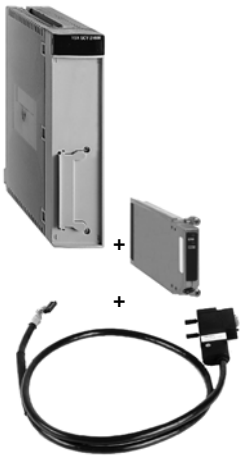
Connection to Ethernet network

Description	Pre-fitted connectors	Length ft. (m)	Reference	Weight oz. (kg)
Shielded twisted pair cables, straight through	2 RJ45 type 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 type 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® bus

Description	Use		Length ft. (m)	Reference	Weight oz. (kg)
	From	To			
Modbus bus connecting cables	Compact PLCs XPS MF3022/3522 + adaptor XPS MFADAPT (RJ45)	Modbus splitter box LU9 GC3 (RJ45)	0.98 (0.3)	**VW3A8306R03**	0.88 (0.025)
			3.28 (1)	**VW3A8306R10**	2.12 (0.060)
			9.84 (3)	**VW3A8306R30**	39.86 (1.130)
		Premium™ module TSX SCY 21601 (SUB-D 25-pin)	0.98 (0.3)	**XPSMCSCY**	–
	Graphic terminals XBT GT (SUB-D 9-pin)	Modbus splitter box LU9 GC3 (RJ45)	8.20 (2.5)	**XBTZ938** *(2)*	7.41 (0.210)
Adaptor for cable XBT Z938	SUB-D 9-pin (XBT GT)	XBT Z938 (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 bus (RJ45)	–	**XPSMFADAPT**	–

Description	Characteristics	Sold in lots of	Unit reference	Weight oz. (kg)
End of line adaptors For RJ45 type connector	R = 120 Ω, C = 1 nF	2	**VW3A8306RC**	7.05 (0.200)
	R = 150 Ω	2	**VW3A8306R**	0.35 (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 characteristics. Profibus FMS messaging not supported	**TSXPBY100**	30.69 (0.870)

Description	Use	Reference	Weight oz. (kg)
Remote inputs/outputs on Profibus DP bus	Advantys STB network interface module	**STBNDP2112**	4.94 (0.140)
	Momentum communication module	**170DTN11000**	–
Connectors for remote I/O communication module	Line terminator	**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**	–

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 XBT ZG909.

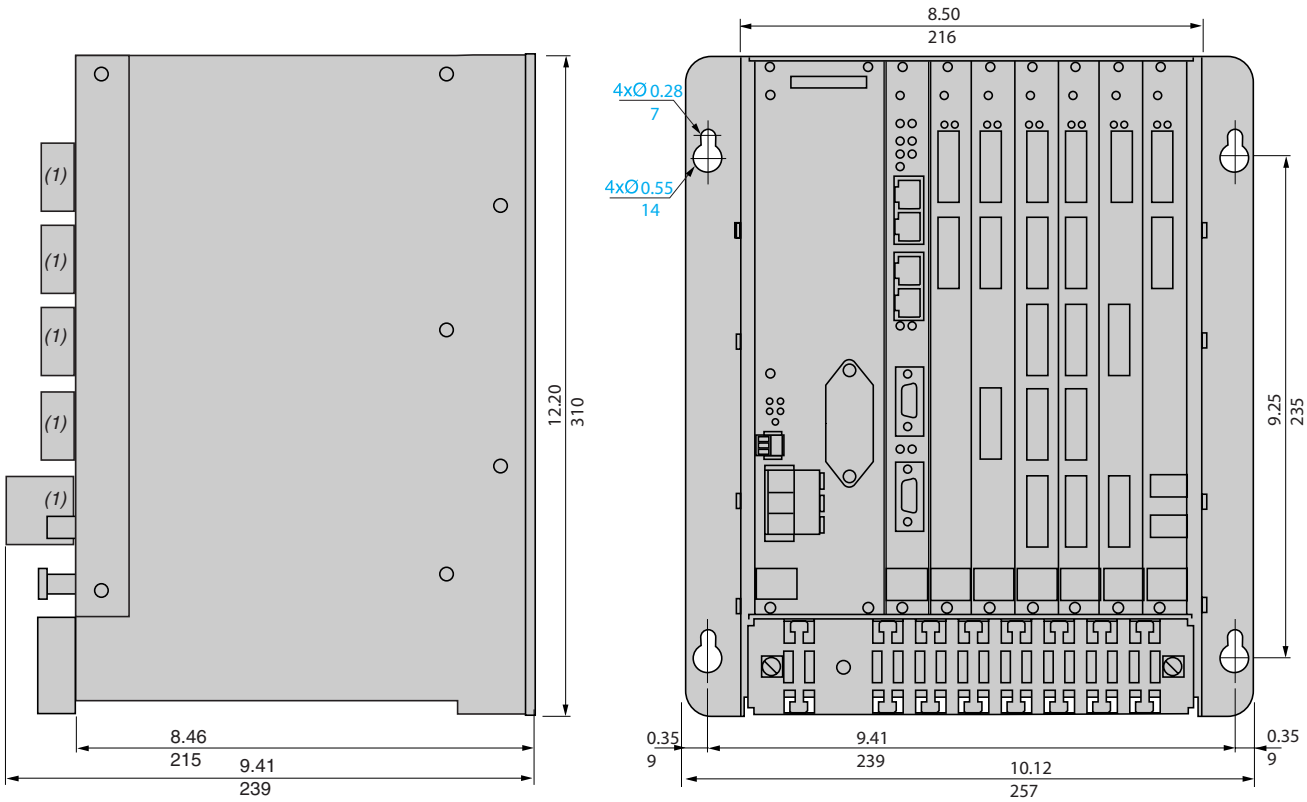
TSX PBY 100

490 NAD 911 03

Presentation: pages 34 to 41 | Characteristics: pages 42 and 43 | Dimensions, mounting: page 48 | Connections: page 49

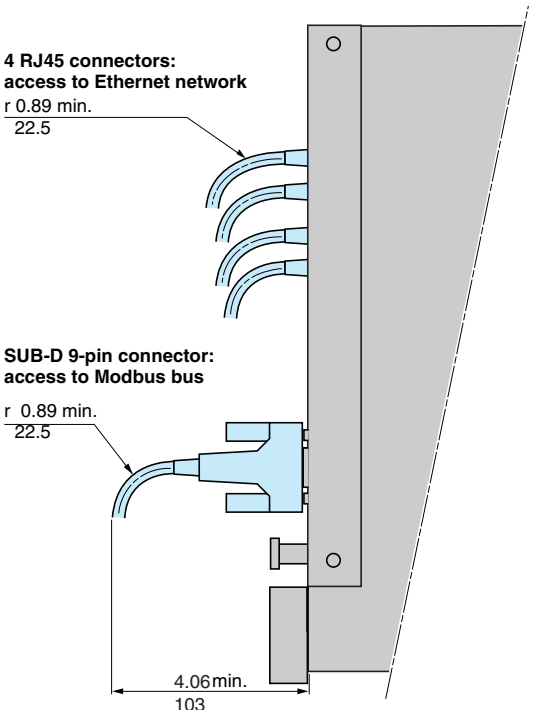
Safety automation solutions
Preventa™ safety PLCs
Modular, type XPS MF60
Rack, power supply and CPU

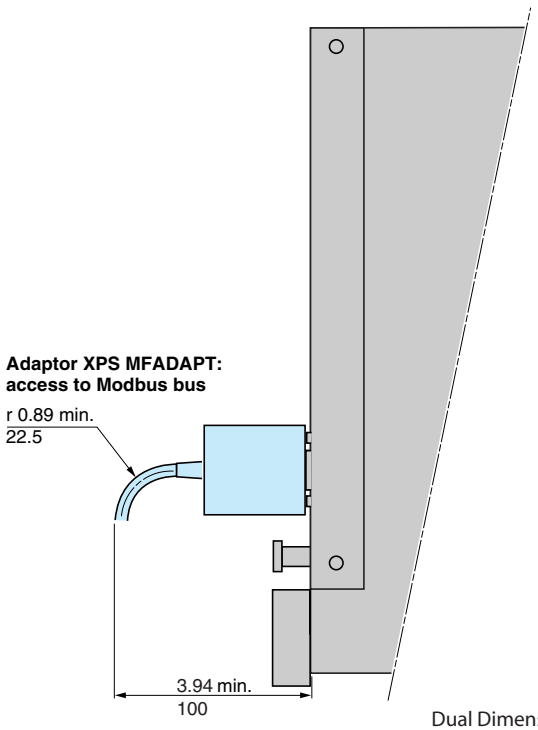
Dimensions
XPS MF60



(1) Removable terminal blocks.

Mounting precautions relating to connectors
Access to Modbus bus and Ethernet network



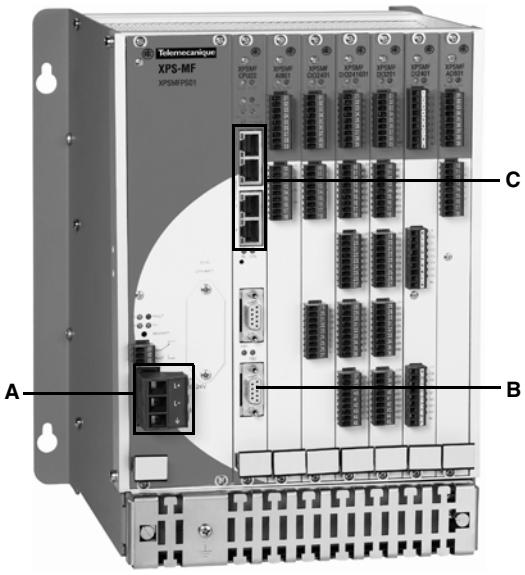


Dual Dimensions: Inches / mm

Safety automation solutions
Preventa™ safety PLCs
Modular, type XPS MF60
Rack, power supply and CPU

Connections

Power supply module and CPU

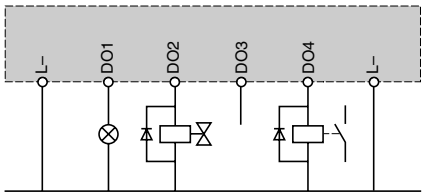


Item	Connection	Screw	Function
A	**Supply**	L+	⎓ 24 Vdc
		L-	⎓ 24 Vdc(reference pole)
		⏚	Ground

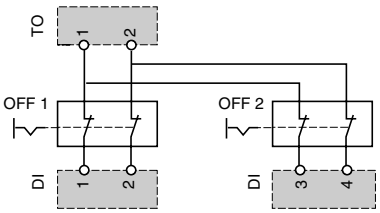
Item	Connection	Type	Function
B	**Communication**	FB2 (SUB-D 9-pin female)	**XPS MFCPU22**: slave on Modbus bus
C	**Communication**	RJ45	Modular or compact safety PLCs XPS MF. Ethernet network. PC. Graphic terminal. Decentralized I/O modules type XPS MF1/2/3.

Connection examples

Actuator connections to the outputs



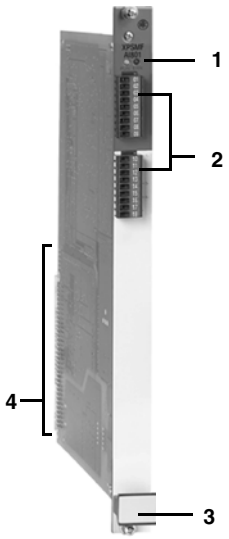
Emergency stop connections (line control)



Presentation: pages 34 to 41
Characteristics: pages 42 and 43
References: pages 44 and 45

Safety automation solutions

Preventa™ safety PLCs
Modular, type XPS MF60
"In rack" analog input module



Presentation

The analog input module **XPS MFAI801** is designed to meet SIL 3 requirements of standard IEC 61508 and category 4 requirements conforming to EN 954-1/ ISO 13849-1.

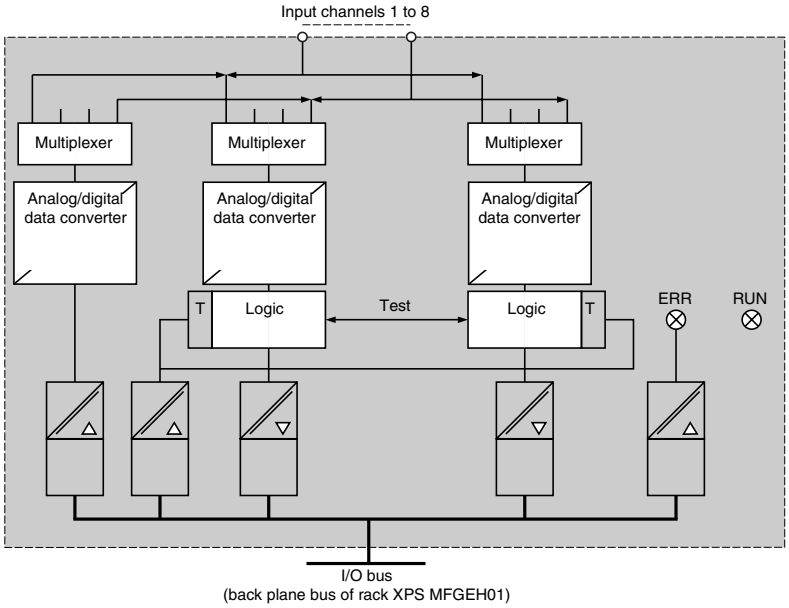
■ It incorporates 8 analog inputs:
□ electrically isolated from the back plane bus of rack XPS MFGEH01,
□ configured by choice of connection (see page 51) for managing eight single-pole or four 2-pole functions.
■ This module can be installed in rack XPS MFGEH01 as many times as required in the six slots 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 0...2000	Measuring currents from 0 to 20 mA
4 inputs	2-pole	± 10 V	–	± 1000	Closed circuit scanning of input channels

(1) The unused input channels must be short-circuited on the reference pole (L-).

Functional diagram



Description

On the front face of the module:
1 Two process status LEDs (RUN, ERR).
2 Two removable screw terminal blocks (9 terminals per block) for connection of inputs *(1)*.
3 Grip to assist installation/removal.

On the rear:
4 Terminals for automatic electrical connection to the back plane bus of rack XPS MFGEH01.

LED details

LED	Color	Status	Description
RUN	Green	On	Voltage present.
		Off	No voltage.
ERR	Red	On	Module defect or external error, diagnostics response.
		Off	No error regarding the module or the network.

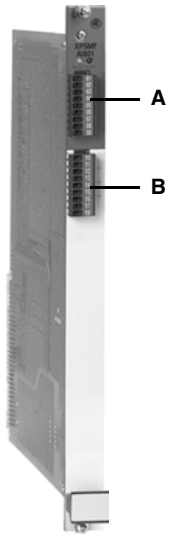
(1) The connection of cables to captive screw terminal blocks that are both removable and guide marked avoids connection errors when, for example, carrying out maintenance. Terminal blocks included with module.

Safety automation solutions

Preventa™ safety PLCs
Modular, type XPS MF60
"In rack" analog input module

Characteristics

Module type			XPS MFAI801
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	**Vdc**	⎓ 24, supplied by rack XPS MFGEH01 incorporating power supply module XPS MFPS01
	Voltage limits		- 15…+ 20%
Signal	Usable range	**V**	± 10.25
		mA	0...+ 20.5
	Nominal value	**V**	± 10
		mA	0...+ 20
Maximum input signal		**V**	± 10.7
Equipotential link for current measurement		Ω	250 or 500
Overvoltage protection		**Vdc**	⎓ - 15…+ 15 (30 V range)
Input resistance	d.c.	**MΩ**	1
Operational data			⎓ 24 Vdc/380 mA ⎓ 3.3 Vdc/150 mA
Ambient air temperature conforming to EN 61131-2	Operating		+32...+140 °F (0…+ 60 °C)
	Storage		-40...+185 °F (-40…+ 85 °C)
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 43



XPS MFAI801

References

Description	Number of channels	Voltage Current	Reference	Weight oz. (kg)
Analog input module	8, single-pole	± 10 V 0...20 mA	**XPSMFAI801**	8.47 (0.240)
	4, 2-pole	± 10 V		

Connections

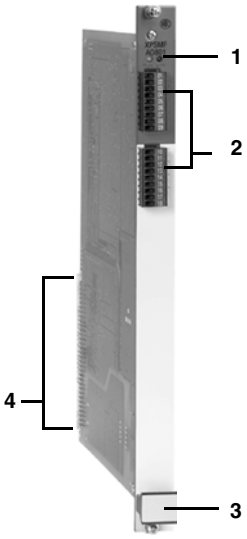
Item	Connection	Screw N°	Screw	Function
A	**Analog inputs**	01	L1+	Analog input 1
		02	L-	Input 1 (reference pole)
		03	L2+	Analog input 2
		04	L-	Input 2 (reference pole)
		05	L3+	Analog input 3
		06	L-	Input 3 (reference pole)
		07	L4+	Analog input 4
		08	L-	Input 4 (reference pole)
		09	⏚	Ground/Shielding
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-				

Safety automation solutions

Preventa™ safety PLCs
Modular, type XPS MF60
"In rack" analog output module



Presentation

The analog output module **XPS MFAO801** is designed to meet SIL 3 requirements of standard IEC 61508 and category 4 requirements conforming to EN 954-1/ISO 13849-1.

■ 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	–

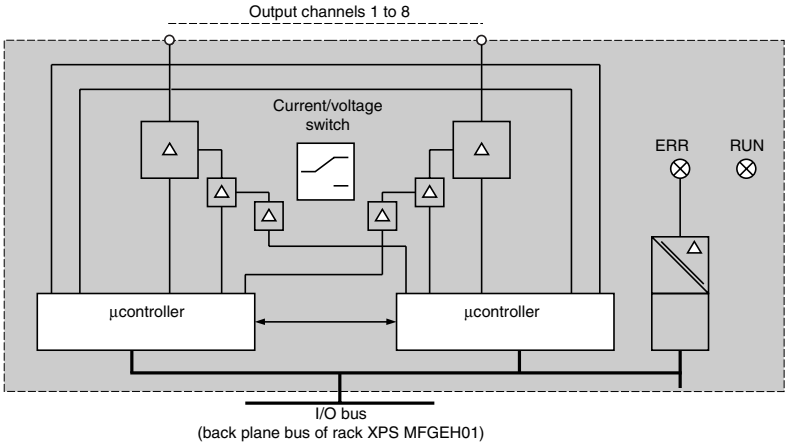
□ Selection of measuring scale using XPSMFWIN software: the "Properties" sub-menu displays the scale options in the "Type" window (…FS1000 or …FS2000).

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 module can be installed in rack XPS MFGEH01 as many times as required in the six slots available.

Functional diagram



Description

On the front face of the module:

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.

On the rear:

4 Terminals for automatic electrical connection to the back plane bus of rack XPS MFGEH01.

LED details

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

(1) The connection of cables to captive screw terminal blocks that are both removable and guide marked avoids connection errors when, for example, carrying out maintenance. Terminal blocks included with module.

Safety automation solutions

Preventa™ safety PLCs
Modular, type XPS MF60
"In rack" analog output module

Characteristics

Module type			XPS MFAO801
Number of outputs			8 analog outputs
Supply	Voltage	**Vdc**	⎓ 24 (supplied by rack XPS MFGEH01 incorporating power supply module XPS MFPS01)
	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		+32...+140 °F (0…+ 60 °C)
	Storage		-40,,,+185 °F (-40…+ 85 °C)
Resolution	Effective		7-bit
	Maximum		12-bit
Symmetrical tolerance			± 1% max.
Safety accuracy			± 1% max.
Processing time			Approximately 45 µs
Connections			See page 43

References

Description	No. of channels	Configuration		Reference	Weight oz. (kg)
		Current	Voltage		
Analog output module	8	0...20 mA	- 10…+ 10 V	**XPSMFAO801**	9.88 (0.280)

XPS MFAO801

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 solutions

Preventa™ safety PLCs
Modular, type XPS MF60
"In rack" mixed module: counting inputs/digital outputs

Presentation

The mixed counting input and digital output module **XPS MFCIO2401** is designed to meet SIL 3 requirements of standard IEC 61508 and category 4 requirements conforming to EN 954-1/ISO 13849-1.

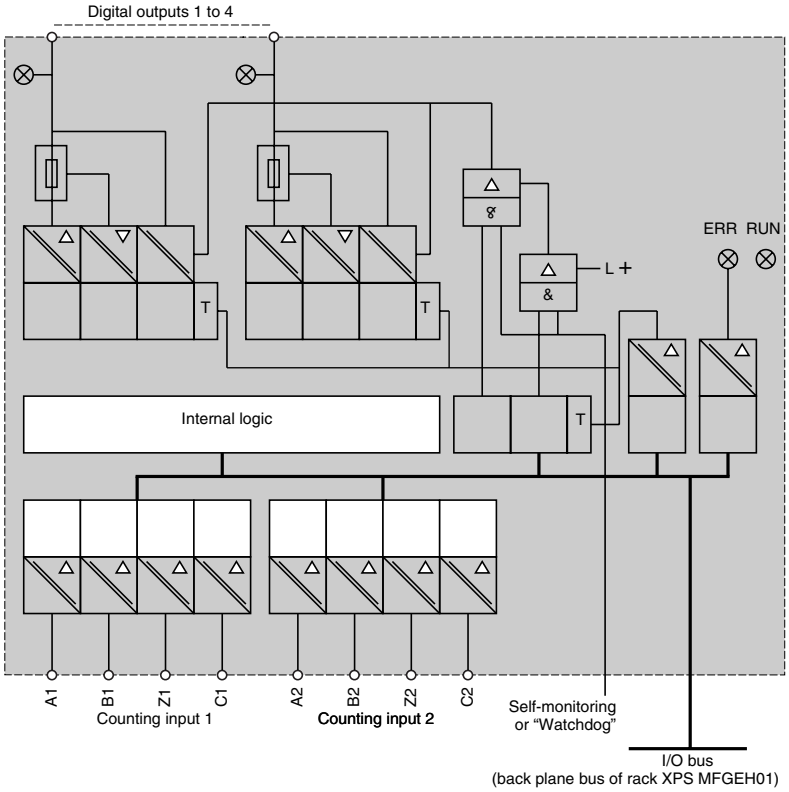
■ It incorporates:

□ 2 24-bit independent and configurable counting channels *(1)* (one channel for counting and one channel for increasing or decreasing counting direction). They are configured using XPSMFWIN software.

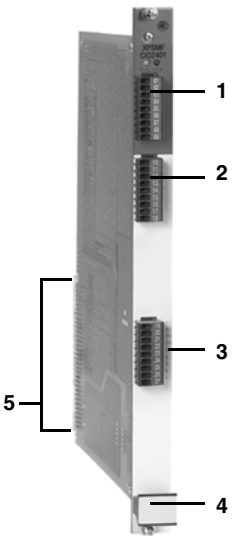
□ 4 digital outputs.

■ The module can be installed in rack XPS MFGEH01 as many times as required in the six slots available.

Functional diagram



Description



On the front face of the module:

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.

On the rear:

5 Terminals for automatic electrical connection to the back plane bus of rack XPS MFGEH01.

LED details

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

(1) The connection of cables to captive screw terminal blocks that are both removable and guide marked avoids connection errors when, for example, carrying out maintenance. Terminal blocks included with module.

Safety automation solutions

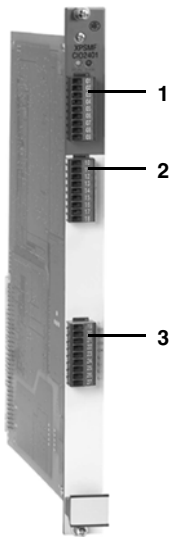
Preventa™ safety PLCs
Modular, type XPS MF60
"In rack" mixed module: counting inputs/digital outputs

Characteristics

Mixed module type			XPS MFCIO2401
Supply	Voltage	**Vdc**	⎓ 24 (supplied by rack XPS MFGEH01 incorporating power supply module XPS MFPS01)
	Voltage limits		- 15…+ 20%
Ambient air temperature conforming to EN 61131-2	Operating		+32...+140 °F (0…+ 60 °C)
	Storage		-40...+185 °F (-40…+ 85 °C)
Counting inputs			
Number	Counter		2
	Inputs		4 on each pole (A, B, Z, C)
Input voltage		**Vdc**	⎓ 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 Vdc / 0.8 A ⎓ 5 Vdc / 0.1 A ⎓ 24 Vdc / 0.1 A + output current
Maximum distance of equipment			1640 ft. (500m), with shielded dual twisted pair cable
Input connections			See page 43
Digital outputs			
Number			4
Output voltage		**Vdc**	⎓ 18.4…26.8
Output current		**A**	0.5 per channel, 2 max. per module 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 consumption			⎓ 24 Vdc / 0.1 A + output current
Output connections			See page 43

References

Description	Characteristics	Reference	Weight oz. (kg)
Mixed I/O module	□ 2 x 24-bit counting inputs, configurable: 5 V…24 V □ 4 digital outputs	**XPSMFCIO2401**	9.17 (0.260)



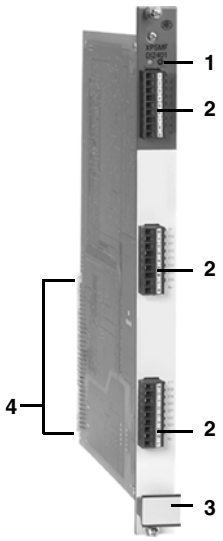
XPS MFCIO2401

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 solutions

Preventa™ safety PLCs
Modular, type XPS MF60
"In rack" digital input module



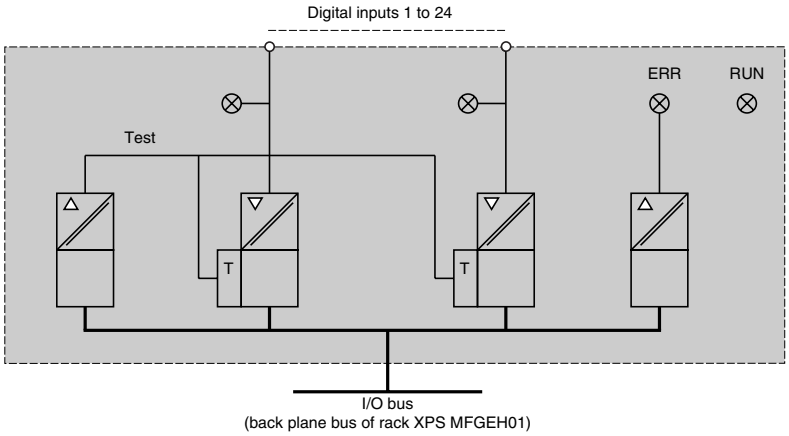
Presentation

The digital input module **XPS MFDI2401** is designed to meet SIL 3 requirements of standard IEC 61508 and category 4 requirements conforming to EN 954-1/ ISO 13849-1.

■ It incorporates 24 ⎓ 110 Vdc / ∿ 127 Vac digital inputs that are configurable using programming XPSMFWIN software.

■ The module can be installed in rack XPS MFGEH01 as many times as required in the six slots available.

Functional diagram



Description

On the front face of the module:

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.

On the rear:

4 Terminals for automatic electrical connection to the back plane bus of rack XPS MFGEH01.

LED details

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

(1) The connection of cables to captive screw terminal blocks that are both removable and guide marked avoids connection errors when, for example, carrying out maintenance. Terminal blocks included with module.

Safety automation solutions

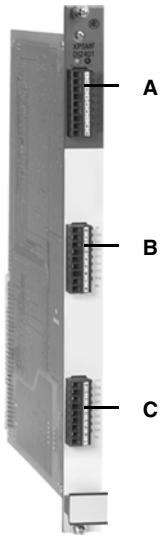
Preventa™ safety PLCs
Modular, type XPS MF60
"In rack" digital input module

Characteristics

Input module type			XPS MFDI2401
Supply	Voltage	**Vdc**	⎓ 24 (supplied by rack XPS MFGEH01 incorporating power supply module XPS MFPS01)
	Voltage limits		- 15…+ 20%
Ambient air temperature conforming to EN 61131-2	Operating		+32...+140 °F (0…+ 60 °C)
	Storage		-40...+185 °F (-40…+ 85 °C)
Number of inputs			24, electrically isolated
Nominal voltage			⎓ 110 Vdc/∿ 127 Vac (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 Vdc / 0.05 A ⎓ 24 Vdc / 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" (12 mm) max. cable with connection to ground of rack XPS MFGEH01

References

Description	Characteristics	Reference	Weight oz. (kg)
Input module	24 digital inputs ⎓ 110 Vdc / ∿ 127 Vac	**XPSMFDI2401**	9.17 (0.260)



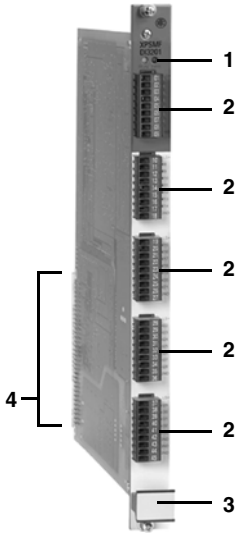
XPS MFDI2401

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 solutions

Preventa™ safety PLCs
Modular, type XPS MF60
"In rack" digital input module



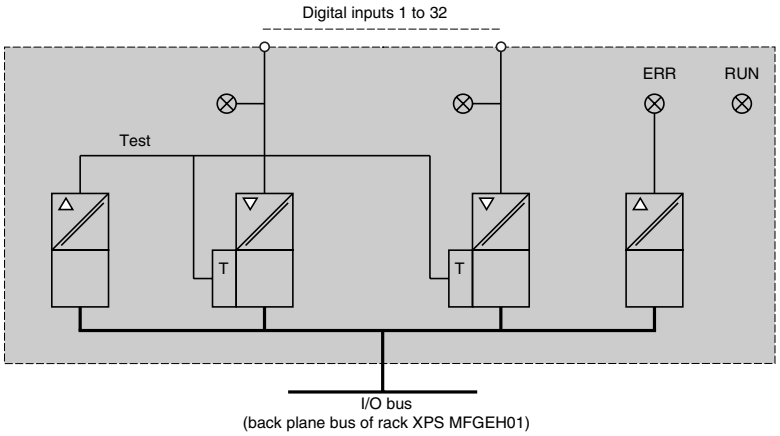
Presentation

The digital input module **XPS MFDI3201** is designed to meet SIL 3 requirements of standard IEC 61508 and category 4 requirements conforming to EN 954-1/ ISO 13849-1.

■ It incorporates 32 digital inputs that are configurable using programming XPSMFWIN software.

■ The module can be installed in rack XPS MFGEH01 as many times as required in the six slots available.

Functional diagram



Line control

Line control is a means of short-circuit and line break monitoring, for example Emergency stop inputs to category 4 of standard EN 954-1/ISO 13849-1, that are configurable in the module XPS MFDI3201. See page 35.

Description

On the front face of the module:

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.

On the rear:

4 Terminals for automatic electrical connection to the back plane bus of rack XPS MFGEH01.

LED details

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

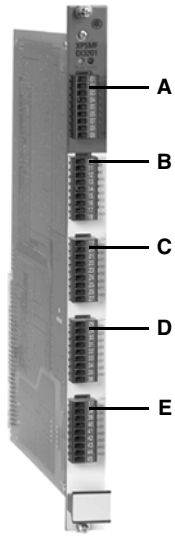
(1) The connection of cables to captive screw terminal blocks that are both removable and guide marked avoids connection errors when, for example, carrying out maintenance. Terminal blocks included with module.

Safety automation solutions

Preventa™ safety PLCs
Modular, type XPS MF60
"In rack" digital input module

Characteristics

Input module type			XPS MFDI3201
Supply	Voltage	**Vdc**	⎓ 24, supplied by rack XPS MFGEH01 incorporating power supply module XPS MFPS01
	Voltage limits		- 15…+ 20%
Ambient air temperature conforming to EN 61131-2	Operating		+32...+140 °F (0…+ 60 °C)
	Storage		-40...+185 °F (-40…+ 85 °C)
Number of digital inputs			32, electrically isolated
Nominal voltage		**Vdc**	⎓ 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 Vdc / 0.05 A, ⎓ 24 Vdc / 0.2 A
LED display			Yes
Connections			Shielded dual twisted pair cable recommended to provide protection against electromagnetic interference, or Ø 0.47" (12 mm) max. cable with connection to ground of rack XPS MFGEH01



XPS MFDI3201

References

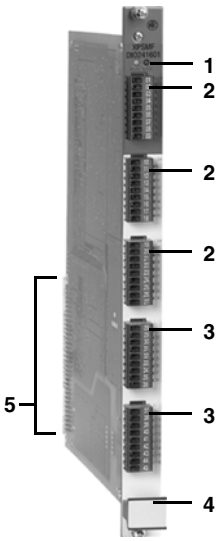
Description	Characteristics	Reference	Weight oz. (kg)
Input module	32 digital inputs	**XPSMFDI3201**	9.17 (0.260)

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**	28	LS+	Supply for inputs 29 to 32
		29	I29	Input 29
		30	I30	Input 30
		31	I31	Input 31
		32	I32	Input 32
		33	EGND	Reference pole
		34	EGND	Reference pole
		35	EGND	Reference pole
		36	EGND	Reference pole

Safety automation solutions

Preventa™ safety PLCs
Modular, type XPS MF60
"In rack" digital I/O module



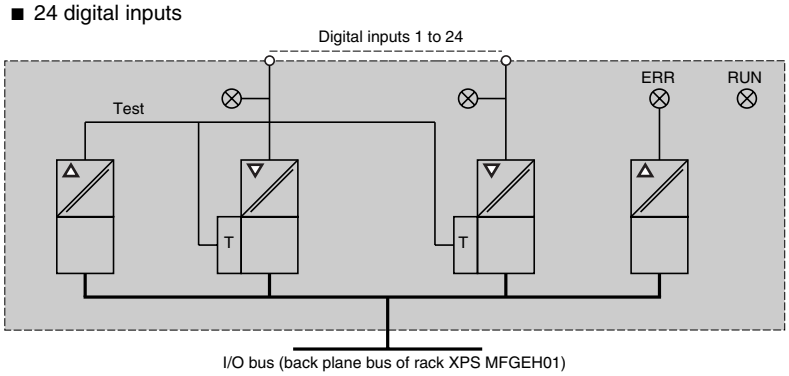
Presentation

The digital I/O module **XPS MFDIO241601** is designed to meet SIL 3 requirements of standard IEC 61508 and category 4 requirements conforming to EN 954-1/ ISO 13849-1.

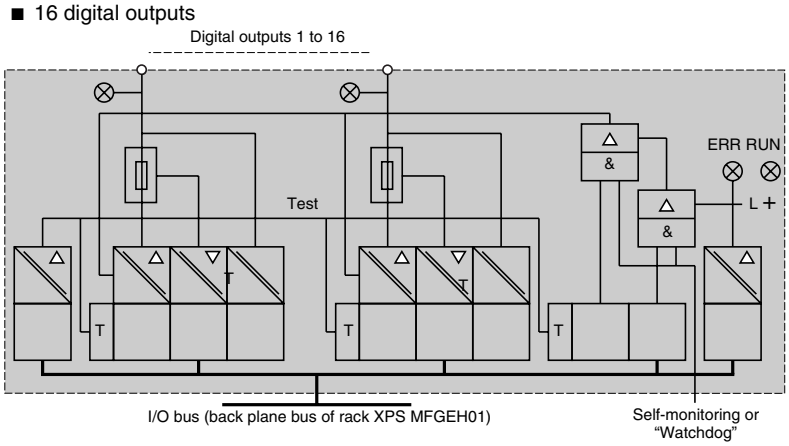
- It incorporates 24 digital inputs and 16 digital outputs.
- The module can be installed in rack XPS MFGEH01 as many times as required in the six slots available.

Functional diagram

- 24 digital inputs



- 16 digital outputs



Line control

Line control is a means of short-circuit and line break monitoring, for example Emergency stop inputs to category 4 of standard EN 954-1/ISO 13849-1, that is configurable in the module XPS MFDIO241601. See page 35.

Description

On the front face of the module:

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.

On the rear:

5 Terminals for automatic electrical connection to the back plane bus of rack XPS MFGEH01.

LED details

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

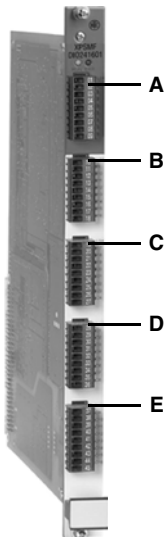
(1) The connection of cables to captive screw terminal blocks that are both removable and guide marked avoids connection errors when, for example, carrying out maintenance. Terminal blocks included with module.

Safety automation solutions

Preventa™ safety PLCs
Modular, type XPS MF60
"In rack" digital I/O module

Characteristics

Module type			XPS MFDIO241601
Supply	Voltage	**Vdc**	⎓ 24, supplied by rack XPS MFGEH01 incorporating power supply module XPS MFPS01
	Voltage limits		- 15…+ 20%
Ambient air temperature conforming to EN 61131-2	Operating		+32...140 °F (0…+ 60 °C)
	Storage		-40...+185 °F (-40…+ 85 °C)
Digital input and output connections			Shielded dual twisted pair cable recommended to provide protection against electromagnetic interference, or Ø 0.47" (12 mm) max. cable with connection to ground of rack XPS MFGEH01
Digital inputs			
Number			24, electrically isolated
Nominal input voltage		**Vdc**	⎓ 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		**Vdc**	⎓ 3.3 V / 0.3 A, ⎓ 24 V / 0.5 A
Digital outputs			
Number			16, electrically isolated
Output voltage		**Vdc**	⎓ 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 module Continuous short-circuit proof
Minimum current		**mA**	2 per channel
Permissible current	At state 0	**mA**	1 max. at 2 V



XPS MFDIO241601

References

Description	Characteristics	Reference	Weight oz. (kg)
I/O module	□ 24 digital inputs □ 16 digital outputs	**XPSMFDIO241601**	9.17 (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

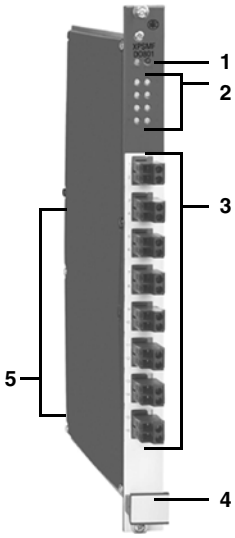
Digital outputs

	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 solutions

Preventa™ safety PLCs
Modular, type XPS MF60
"In rack" relay output module



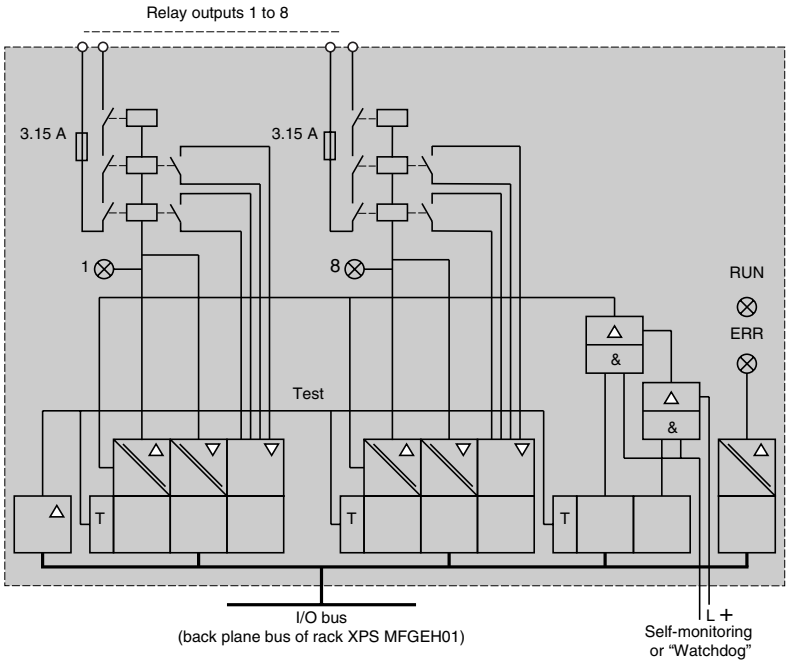
Presentation

The relay output module **XPS MFDO801** is designed to meet SIL 3 requirements of standard IEC 61508 and category 4 requirements conforming to EN 954-1/ ISO 13849-1.

■ It incorporates 8 relay safety outputs (3.15 A fuse) that are configurable using programming XPSMFWIN software.

■ The module can be installed in rack XPS MFGEH01 as many times as required in the six slots available.

Functional diagram



Description

On the front face of the module:

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.

On the rear:

5 Terminals for automatic electrical connection to the back plane bus of rack XPS MFGEH01.

LED details

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

(1) The connection of cables to captive screw terminal blocks that are both removable and guide marked avoids connection errors when, for example, carrying out maintenance. Terminal blocks included with module.

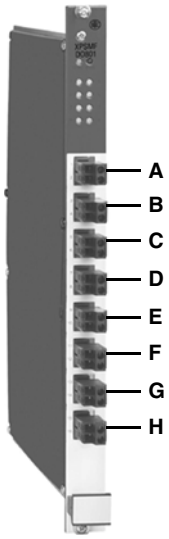
Safety automation solutions

Preventa™ safety PLCs
Modular, type XPS MF60
"In rack" relay output module

Characteristics

Output module type			XPS MFDO801
Supply	Voltage	**Vdc**	⎓ 24, supplied by rack XPS MFGEH01 incorporating power supply module XPS MFPS01
	Voltage limits		- 15…+ 20%
Ambient air temperature conforming to EN 61131-2	Operating		+32...+122 °F (0…+ 50 °C)
	Storage		- 40…+ 185 °F (-40...+85 °C)
Number and type of outputs			8 relay outputs, volt-free, 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.
Switching voltage			∿ 6 Vac…230 Vac / ⎓ 110 Vdc
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 Vdc: 95 W max. (3.15 A) ⩽ ⎓ 70 Vdc: 40 W max. (0.5 A) ⩽ ⎓ 110 Vdc: 33 W max. (0.315 A) With suitable external fuse
Operational data			⎓ 3.3 Vdc / 0.2 A, ⎓ 24 Vdc ± 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" (12 mm) max. cable with connection to ground of rack XPS MFGEH01

(1) Limited system data.



XPS MFDO801

References

Description	Characteristics	Reference	Weight oz. (kg)
Output module	8 relay outputs ∿ 6 Vac…230 Vac / ⎓ 110 Vdc	**XPSMFDO801**	21.16 (0.600)

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 solutions

Preventa™ safety PLCs
Compact and modular, type XPS MF
Decentralized input, output and input/output modules type XPS MF1/2/3

Presentation

Decentralized input, output and input/output modules:
- Location: within the vicinity of hazardous zones of machines to be monitored.
- Extension of the I/O capacity of compact and modular safety PLCs, both for number and type.

Maximum use of decentralized input, output and input/output modules, designed for use in safety related parts of control systems conforming to EN 954-1/ISO 13849-1 and IEC 61508:
- Up to category 4 (EN 954-1/ISO 13849-1),
- SIL 3 (IEC 61508)

*Products referenced **XPS MF1DI1601** and **XPS MF2●●●●●●** are marked **HIMatrix F1DI** and **HIMatrix F2DI** (manufactured by Hima, sold by Schneider Electric).*

User memory		Application	–		
		Data	–		
Response time			Depending on application		
Maximum consumption			0.8 A	0.5 A	9 A
Supply			External ⎓ 24 Vdc supply (with separate protection conforming to IEC 61131-2)		
Inputs	**Digital**	Number of channels	16, not electrically isolated	–	–
		Current at state 0	1.5 mA max., 1 mA at 5 Vdc	–	–
		Current at state 1	⩾ 2 mA at ⎓ 15 Vdc	–	–
	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 °CF (60 °C), 2 A max. at 104 °F (40 °C)
	Analog	Number of channels	–	–	–
		Range: voltage/current	–	–	–
	Relay	Number	–	–	–
		Switching voltage	–	–	–
	Pulse	Number	4, not electrically isolated	–	–
		Current/Voltage	60 mA/20 V	–	–
Input/output connections			Removable screw terminal blocks, coded with locating device		
Communication		On Ethernet network	Yes, by 2 RJ45 connectors, with integrated switch		
			Using SafeEthernet safety protocol between compact **XPS MF40**, **XPS MF31/30/35** or modular **XPS MF60** safety PLCs and other decentralized I/O modules type **XPS MF1/2/3**		
Decentralized I/O module type			**XPS MF1DI1601**	**XPS MF2DO401**	**XPS MF2DO1601**
See page			68	75	

Products referenced XPS MF2●●●●●●● and XPS MF3●●●●●●● are marked HIMatrix F2DO and HIMatrix F3... (manufactured by Hima, sold by Schneider Electric).

–					
–					
Depending on application					
0.6 A	0.6 A	8 A	14 A	8 A	0.8 A
External ⎓ 24 Vdc supply (with separate protection conforming to IEC 61131-2)					
–	–	8, not electrically isolated	16, not electrically isolated	20, not electrically isolated	–
–	–	1.5 mA max. 1.25 mA at ⎓ 5 Vdc	1.5 mA max. 1 mA at ⎓ 5 Vdc	1.5 mA max. 1.25 mA at ⎓ 5 Vdc	–
–	–	> 2 mA at ⎓ 15 Vdc	> 2 mA at ⎓ 15 Vdc	⩾ 2 mA at ⎓ 15 Vdc	–
–	–	–	–	–	8, single-pole
–	–	–	–	–	⎓ 0…10 Vdc/ 0…20 mA
–	–	–	–	–	–
–	–	–	–	–	–
–	–	8 DO+ (reference pole L-) 2 DO- (preference pole S+)	8 2-pole or 16 single-pole, not electrically isolated	8, not electrically isolated	–
–	–	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 outputs
–	–	–	–	–	Usable range: 0…20 mA Nominal range: 4…20 mA
8	16	–	–	–	–
⩾ 5 V, ⩽ ⎓ 250 Vdc/∿ 250 Vac	⩾ 5 V, ⩽ ⎓ 30 Vdc/∿ 60 Vac	–	–	–	–
–	–	2, not electrically isolated		–	–
–	–	60 mA/20 V	60 mA/20 V	–	–
Removable screw terminal blocks, coded with locating device					
Yes, by 2 RJ45 connectors, with integrated switch					
Using SafeEthernet safety protocol between compact **XPS MF40**, **XPS MF31/30/35** or modular **XPS MF60** safety PLCs and other decentralized I/O modules type **XPS MF1/2/3**					
XPS MF2DO801	**XPS MF2DO1602**	**XPS MF3DIO8801**	**XPS MF3DIO16801**	**XPS MF3DIO20802**	**XPS MF3AIO8401**
75		87			

Safety automation solutions
Preventa™ safety PLCs
Compact or modular
Decentralized input module type XPS MF1

XPS MF1DI1601

*This product referenced **XPS MF1DI1601** is marked **HIMatrix F1DI** (manufactured by Hima, sold by Schneider Electric).*

Presentation

Supplied on ⎓ 24 Vdc, module XPS MF1DI160 is a compact decentralized input block that is designed to extend the input capacity of safety PLCs XPS MF to which it is connected.
It is connected to the compact or modular safety PLCs via its 2 RJ45 communication ports. It does not have a user program.

Decentralized input module XPS MF1DI1601

Decentralized digital inputs			
N°	**Safety detection**	**Safety dialog**	**Safety control**
16	Limit switches, Guard switches, with reset and with actuator, Safety 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…	Vario™…, and mini-Vario™ Switch disconnectors

Decentralized pulsed outputs	
N°	
4	Line control for line break and short-circuit monitoring

Line control

Line control is a means of short-circuit and line break monitoring, for example Emergency stop inputs to category 4 of standard EN 954-1/ISO 13849-1, that is configurable in the decentralized input module XPS MF1DI1601. The pulsed outputs 1 to 4 are connected to the digital inputs 1 to 16. The pulses are automatic on the outputs: that drive the monitoring of the digital input lines.

Safety PLCs

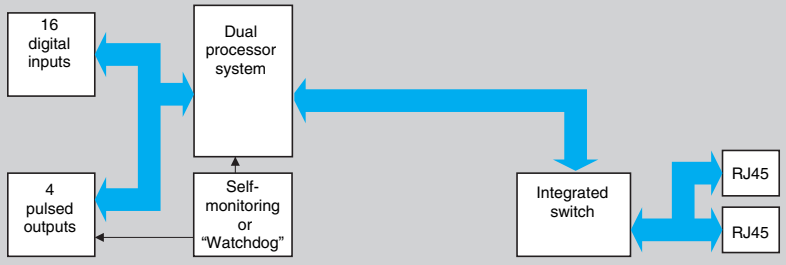
In order to comply with safety requirements, the decentralized input module XPS MF1DI1601 integrates two essential functions conforming to category 4 of EN 954-1/ISO 13849-1 in addition to the SafeEthernet safety communication protocol between this decentralized input module and the safety PLCs (Special Switch).

■ **Redundancy**: the dual processor integrated in the decentralized input module XPS MF1DI1601 analyzes and compares the information received from the safety inputs and outputs.
The incoming and outgoing information (programmed values and received values) are received in parallel by the two processors and compared in real-time.

■ **"Watchdog" or self-monitoring**: the decentralized input module XPS MF1DI1601 continuously monitors the information processing cycle and the execution of tasks, and intervenes if the time of a cycle 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 information provided by inputs of the module on the Ethernet network, while avoiding signal collisions and excessive amounts of data on the network.

Functional diagram



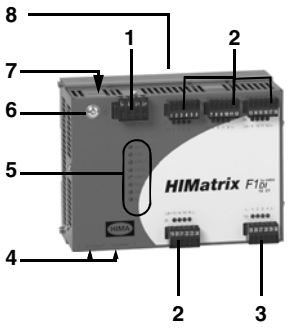
Safety communication on Ethernet network

The decentralized input module XPS MF1 incorporates two RJ45 (type 10BASE-T/100BASE-TX) connectors that enable communication on the Ethernet network using SafeEthernet communication protocol and therefore, data exchange with compact or modular safety PLCs type XPS MF.

Characteristics: page 68
References: page 68
Dimensions: page 69
Connections: page 69

Safety automation solutions

Preventa™ safety PLCs
Compact or modular
Decentralized input module type XPS MF1



Description

Decentralized input module XPS MF1DI1601

On the front face of the metal enclosure:

1 One terminal block *(1)* for ⎓ 24 Vdc 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 pulsed digital outputs, with four digital output status LEDs.
4 Two RJ45 ports (type 10/100 BaseT) for connection on Ethernet network.
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 rail.

Status LED details

Decentralized input module XPS MF1DI1601

LED	Color	Status	Meaning
Inputs 1…16	Orange	On	Inputs active.
Outputs 1…4	Orange	On	Outputs active.
24 VDC	Green	On	⎓ 24 Vdc 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 fault 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 terminal block, with locating device, included with input module XPS MF1.

Characteristics: page 68 | References: page 68 | Dimensions: page 69 | Connections: page 69

Safety automation solutions
Preventa™ safety PLCs
Compact or modular
Decentralized input module type XPS MF1

Characteristics

Decentralized I/O module type			XPS MF1DI1601
Supply voltage		**Vdc**	⎓ 24 (external supply with separate protection conforming to IEC 61131-2)
Voltage limits		**V**	- 15…+ 20%
Ambient air temperature	For operation		+32...+140 °F (0…+ 60 °C)
	For storage		-40...+185 °F (-40…+ 85 °C)
Degree of protection			IP 20
Response time		**ms**	Depending on application
Current 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 (at 24 V), protected against short-circuits
Pulsed 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 26

Communication

Ethernet network: safety communication using SafeEthernet protocol

Transmission	Communication ports		2 x RJ45 with integrated switch
	Speed	**Mbps**	100
Structure			10BASE-T/100BASE-TX
Medium			Dual twisted pair cable

References

XPS MF1DI1601

*Product referenced **XPS MF1DI1601** is marked **HIMatrix F1DI** (manufactured by Hima, sold by Schneider Electric).*

Decentralized input module (⎓ 24 Vdc supply)

For use with	Digital inputs	Pulsed outputs	Ports	Reference	Weight oz. (kg)
Safety PLCs, modular XPS MF60 or compact XPS MF40 and XPS MF31/30/35	16	4	2 x RJ45: access to Ethernet network	**XPSMF1DI1601**	24.69 (0.700)

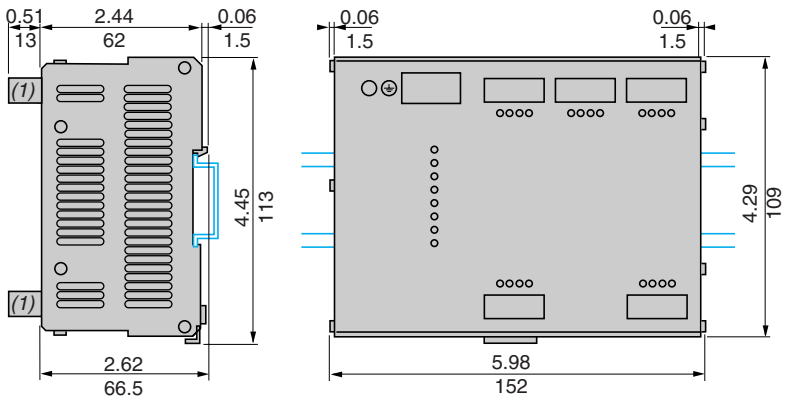
Connecting cables

Description	For	Reference	Weight oz. (kg)
Ethernet network connecting cables	Connection between decentralized input module XPS MF1 and compact safety PLCs XPS MF30/31/35 RJ45 connector fitted at each end	See page 29	–

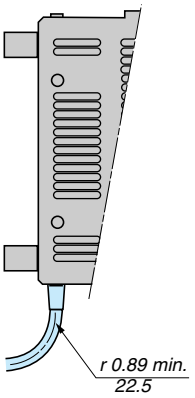
Presentation: page 66 | Description: page 67 | Dimensions: page 69 | Connections: page 69

Safety automation solutions
Preventa™ safety PLCs
Compact or modular
Decentralized input module type XPS MF1

Dimensions
XPS MF1DI1601



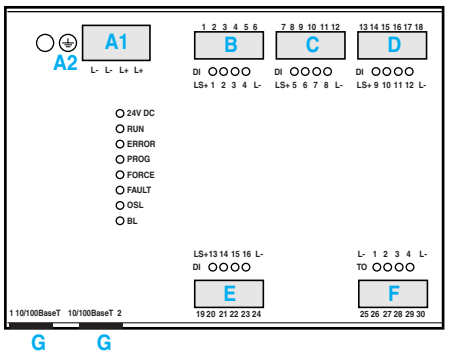
RJ45 connector for access to Ethernet network



Dual Dimensions: Inches / mm

(1) Removable terminal blocks.

Connections
XPS MF1DI1601



Item	Connection	Screw N°	Screw	Function
A1	**Supply**	–	L+	⎓ 24 Vdc
			L+	⎓ 24 Vdc
			L-	⎓ 24 Vdc (reference pole)
			L-	⎓ 24 Vdc (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	**Pulsed 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	**Communication**	RJ45	Compact or modular safety PLCs XPS MF. Ethernet network. PC. Graphic terminal. Decentralized I/O modules.

Safety automation solutions
Preventa™ safety PLCs
Compact and modular
Decentralized output modules type XPS MF2

XPS MF2DO401

XPS MF2DO1601

XPS MF2DO801

XPS MF2DO801

*Products referenced **XPS MF2●●●●●●** are marked **HIMatrix F2 DO...** (manufactured by Hima, sold by Schneider Electric).*

Presentation

Supplied on ⎓ 24 Vdc, modules type XPS MF2 are compact decentralized output blocks that are designed to extend the output capacity of safety PLCs XPS MF to which they are connected.
They are connected to the modular or compact safety PLCs via their 2 RJ45 communication ports. They do not have a user program.

Decentralized output modules type XPS MF2

Output modules XPS	Decentralized outputs		
	N°	Type	
MF2DO401	**4**	Digital power outputs	**Safety dialog:** Beacons and indicator banks, rotating mirror beacons, sirens… **Safety control:** Enclosed thermal-magnetic motor circuit-breakers, Enclosed D.O.L. starters for motor control, Power contactors…
MF2DO1601	**16**	Digital outputs	
MF2DO801	**8**	Relay outputs	
MF2DO1602	**16**	Relay outputs	

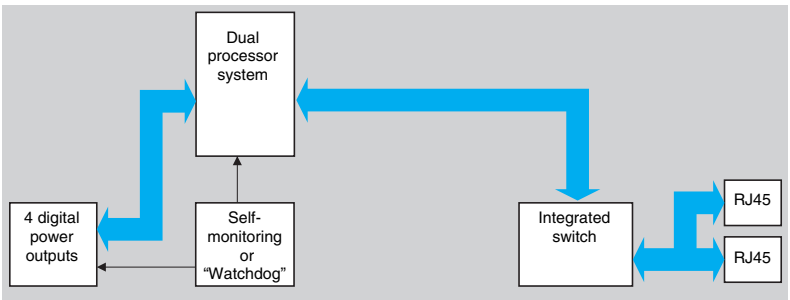
Safety PLCs

In order to comply with safety requirements, the decentralized output modules XPS MF2DO●●●● integrate two essential functions conforming to category 4 of EN 954-1/ISO 13849-1 in addition to the SafeEthernet safety communication protocol between these decentralized output modules and the safety PLCs (Special Switch).

■ **Redundancy**: the dual processor integrated in the decentralized output modules XPS MF2 analyzes and compares the information received from the safety inputs and outputs.
The incoming and outgoing information (programmed values and received values) are received in parallel by the two processors and compared in real-time.
■ **"Watchdog" or self-monitoring**: the decentralized output modules XPS MF2 continuously monitor the information processing cycle and the execution of tasks, and intervene if the time of a cycle 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 information provided by the outputs of the modules on the Ethernet network, while avoiding signal collisions and excessive amounts of data on the network.

Functional diagram

Decentralized output module XPS MF2DO401

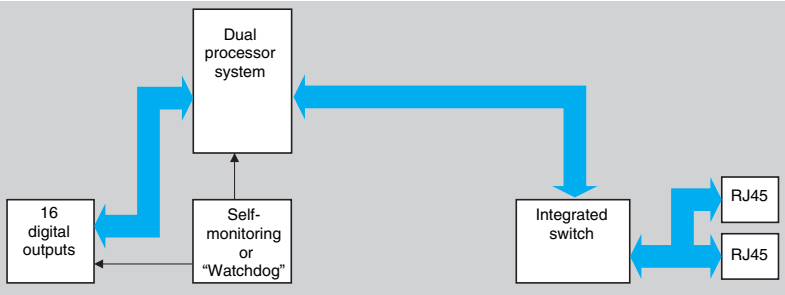


Characteristics: page 74
References: page 75
Dimensions, mounting: pages 76 and 77
Connections: pages 78 and 79

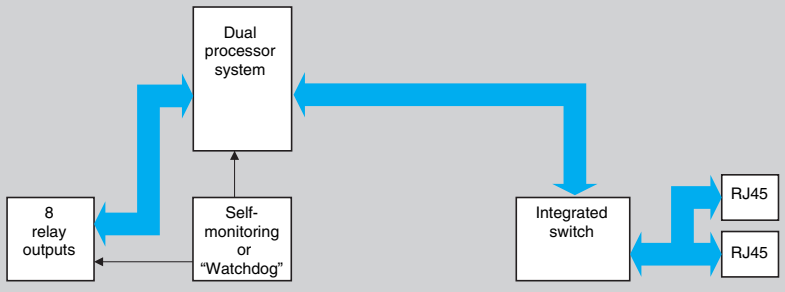
Safety automation solutions
Preventa™ safety PLCs
Compact and modular
Decentralized output modules type XPS MF2

Functional diagram (continued)

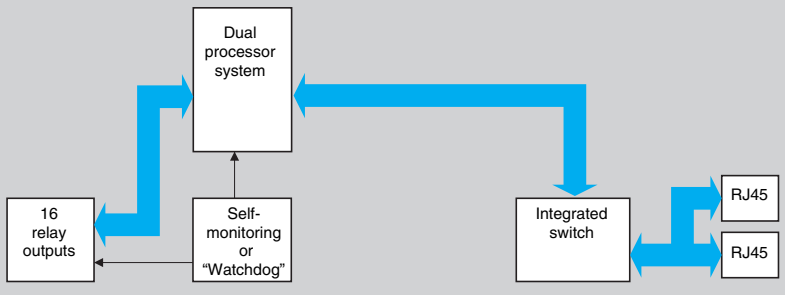
Decentralized output module XPS MF2DO1601



Decentralized output module XPS MF2DO801



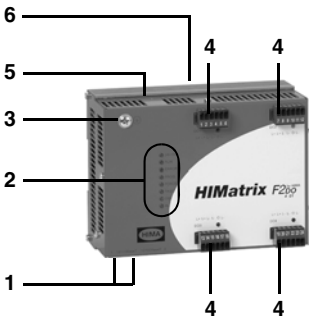
Decentralized output module XPS MF2DO1602

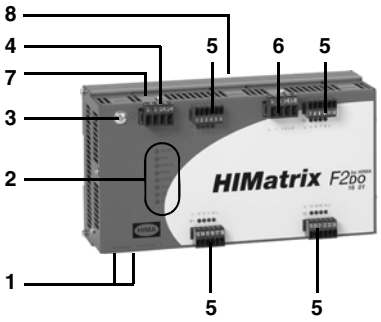


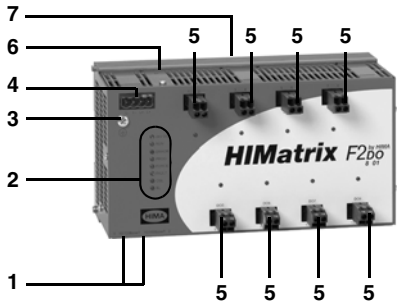
Safety communication on Ethernet network

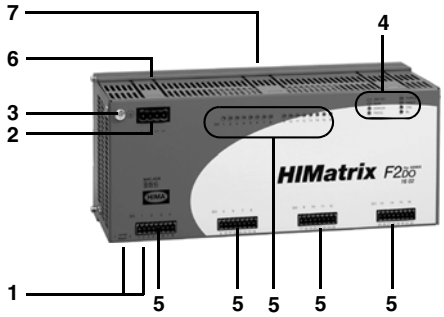
The decentralized output modules XPS MF2DO●●●● incorporate two RJ45 (type 10BASE-T/100BASE-TX) connectors that enable communication on the Ethernet network using SafeEthernet communication protocol and therefore, data exchange with compact or modular safety PLCs type XPS MF.

Safety automation solutions
Preventa™ safety PLCs
Compact and modular
Decentralized output modules type XPS MF2









Description

Decentralized output module XPS MF2DO401

On the front face of the metal enclosure:
1 Two RJ45 ports (type 10BASE-T/100BASE-TX) for connection on Ethernet network.
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).

On the top:
5 One “Reset” button.

On the rear face:
6 One spring operated mounting device for mounting on rail.

Decentralized output module XPS MF2DO1601

On the front face of the metal enclosure:
1 Two RJ45 ports (type 10BASE-T/100BASE-TX) for connection on Ethernet network.
2 Eight process status LEDs.
3 One ground connection screw.
4 One terminal block *(1)* for ⎓ 24 Vdc 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.

On the top:
7 One “Reset” button.

On the rear face:
8 One spring operated mounting device for mounting on rail.

Decentralized output module XPS MF2DO801

On the front face of the metal enclosure:
1 Two RJ45 ports (type 10BASE-T/100BASE-TX) for connection on Ethernet network.
2 Eight process status LEDs.
3 One ground connection screw.
4 One terminal block *(1)* for ⎓ 24 Vdc supply.
5 Eight terminal blocks *(1)* for connection of relay outputs, with output status LED (one LED per terminal block).

On the top:
6 One “Reset” button.

On the rear face:
7 One spring operated mounting device for mounting on rail.

Decentralized output module XPS MF2DO1602

On the front face of the metal enclosure:
1 Two RJ45 ports (type 10BASE-T/100BASE-TX) for connection on Ethernet network.
2 One terminal block *(1)* for ⎓ 24 Vdc 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.

On the top:
6 One “Reset” button.

On the rear face:
7 One spring operated mounting device for mounting on rail.

(1) The connection of cables to captive screw terminal blocks that are both removable and guide marked avoids connection errors when, for example, carrying out maintenance. Terminal blocks included with decentralized output modules type XPS MF2.

Characteristics: page 74 | References: page 75 | Dimensions, mounting: pages 76 and 77 | Connections: pages 78 and 79

Safety automation solutions
Preventa™ safety PLCs
Compact and modular
Decentralized output modules type XPS MF2

Status LED details

Decentralized output modules XPS MF2DO●●●●

LED	Color	Status	Meaning
Outputs 1…16	Orange	On	Outputs active.
24 VDC	Green	On	⎓ 24 Vdc 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 fault 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.

Characteristics: page 74 | References: page 75 | Dimensions, mounting: pages 76 and 77 | Connections: pages 78 and 79

Safety automation solutions
Preventa™ safety PLCs
Compact and modular
Decentralized output modules type XPS MF2

Characteristics

Decentralized output module type			XPS MF2DO401	XPS MF2DO1601	XPS MF2DO801	XPS MF2DO1602
Supply voltage		**Vdc**	⎓ 24 (external supply with separate protection conforming to IEC 61131-2)			
Voltage limits		**V**	- 15…+ 20%			
Ambient air temperature	For operation		+32...+140 °F (0…+ 60 °C)			
	For storage		-40...+185 °F (-40…+ 85 °C)			
Degree of protection			IP 20			
Response time		**ms**	Depending on application			
Maximum current 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 26			
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 volt-free contacts (diversity factor)	
Switching voltage		**V**	–	–	⩾ 5, ⩽ ⎓ 250 Vdc/ ∿ 250 Vac	⩾ 5, ⩽ ⎓ 30 Vdc/ ∿ 60 Vac
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)	∿ Vac	**VA**	–	–	240 max., cos φ > 0.5	48 max., cos φ > 0.5
	Up to ⎓ 30 Vdc	**W**			90 max. (3.15 A internal fuse)	
	Up to ⎓ 70 Vdc	**W**			35 max. (0.5 A internal fuse)	–
	Up to ⎓ 127 Vdc	**W**			30 max. (0.315 A internal fuse)	–
Contact material			–	–	Silver alloy	
Communication						
Ethernet network: safety communication using SafeEthernet protocol						
Transmission	Communication ports		2 x RJ45 with integrated switch			
	Speed	Mbps	100			
Structure			10BASE-T/100BASE-TX			
Medium			Dual twisted pair cable			

Presentation, description: pages 70 to 73
Dimensions, mounting: pages 76 and 77
Connections: pages 78 and 79

Safety automation solutions
Preventa™ safety PLCs
Compact and modular
Decentralized output modules type XPS MF2

References

XPS MF2DO401

XPS MF2DO1601

XPS MF2DO801

XPS MF2DO1602

*Products referenced **XPS MF2●●●●●●** are marked **HIMatrix F2 DO...** (manufactured by Hima, sold by Schneider Electric).*

Decentralized output modules (⎓ 24 Vdc supply)

For use with	Outputs		Ports	Reference	Weight oz. (kg)
	Digital	Relay			
Safety PLCs, modular XPS MF60 or compact XPS MF40 and XPS MF31/30/35	4	–	2 x RJ45: access to Ethernet network	**XPSMF2DO401**	28.22 (0.800)
	16	–	2 x RJ45: access to Ethernet network	**XPSMF2DO1601**	29.98 (0.850)
	–	8	2 x RJ45: access to Ethernet network	**XPSMF2DO801**	45.86 (1.300)
	–	16	2 x RJ45: access to Ethernet network	**XPSMF2DO1602**	70.55 (2.000)

Connecting cables

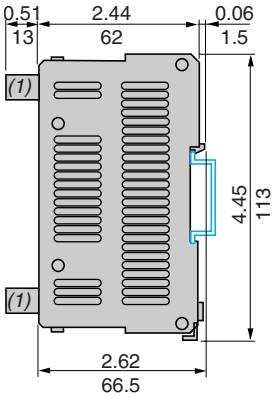
Description	For	Reference	Weight oz. (kg)
Ethernet network connecting cables	Connection between decentralized output modules type XPS MF2 and compact or modular safety PLCs XPS MF RJ45 connector fitted at each end	See page 29	–

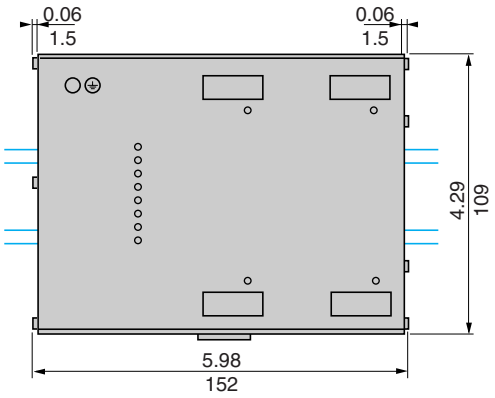
Presentation, description: pages 70 to 73
Dimensions, mounting: pages 76 and 77
Connections: pages 78 and 79

Safety automation solutions
Preventa™ safety PLCs
Compact and modular
Decentralized output modules type XPS MF2

Dimensions

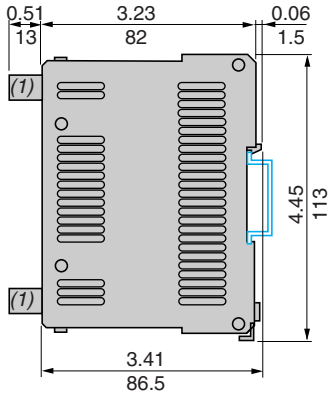
XPS MF2DO401

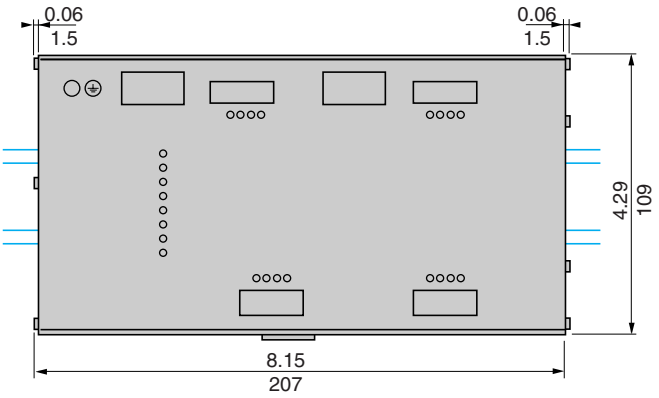




(1) Removable terminal blocks.

XPS MF2DO1601





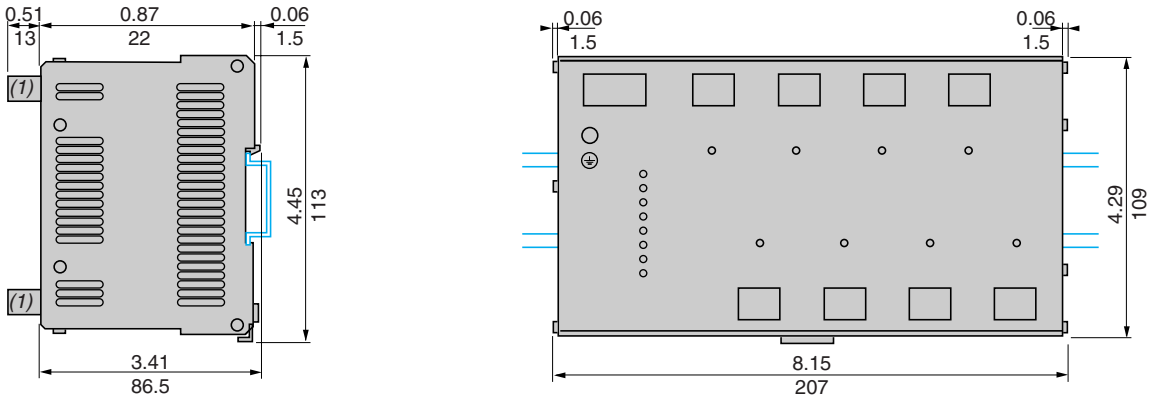
Dual Dimensions: Inches / mm

(1) Removable terminal blocks.

Safety automation solutions
Preventa™ safety PLCs
Compact and modular
Decentralized output modules type XPS MF2

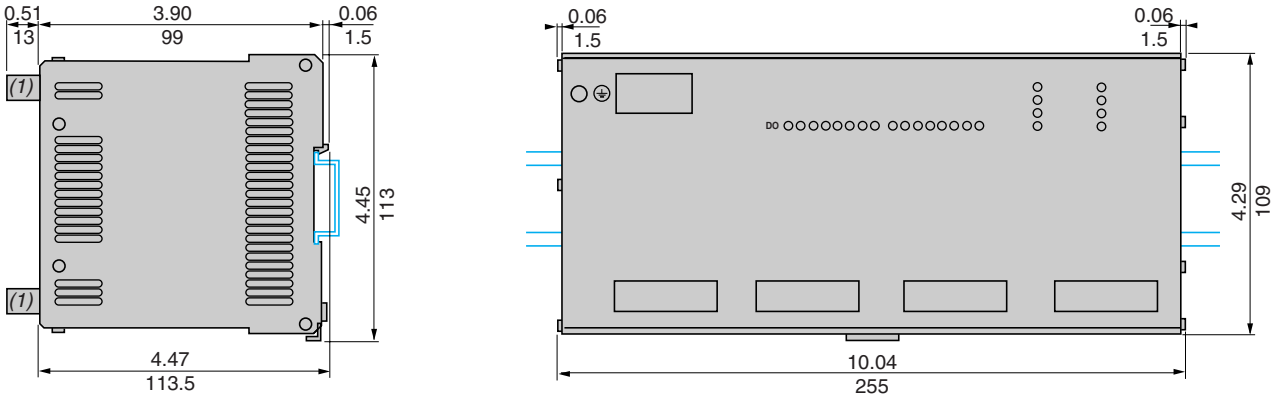
Dimensions

XPS MF2DO801



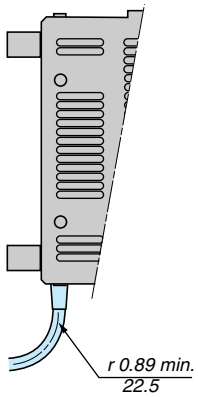
(1) Removable terminal blocks.

XPS MF2DO1602



(1) Removable terminal blocks.

RJ45 connector for access to Ethernet network

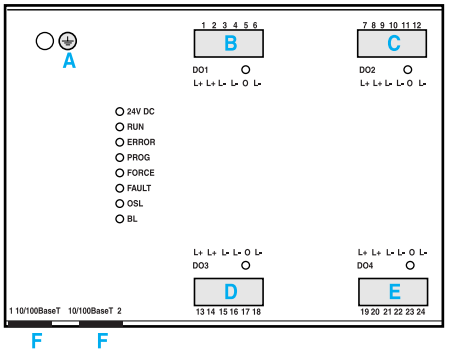


Dual Dimensions: Inches / mm

Safety automation solutions
Preventa™ safety PLCs
Compact and modular
Decentralized output modules type XPS MF2

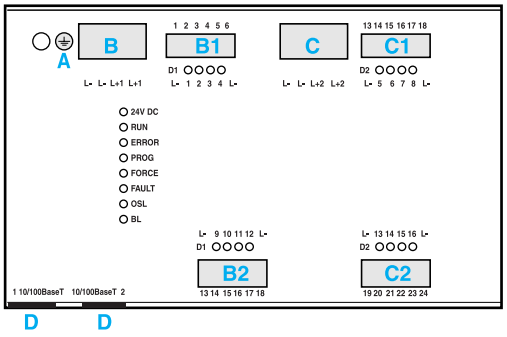
Connections

XPS MF2DO401



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	**Communication**	RJ45		Compact or modular safety PLCs XPS MF. Ethernet network. PC. Graphic terminal. Decentralized I/O modules.

XPS MF2DO1601



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	**Communication**	RJ45		Compact or modular safety PLCs XPS MF. Ethernet network. PC. Graphic terminal. Decentralized I/O modules.

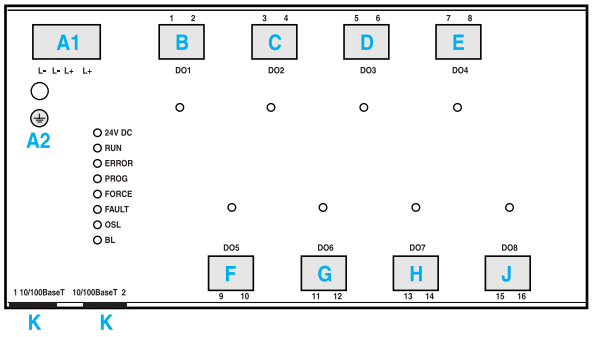
Presentation, description: pages 70 to 73
Characteristics: page 74
References: page 75
Dimensions, mounting: pages 76 and 77

Safety automation solutions

Preventa™ safety PLCs
Compact and modular
Decentralized output modules type XPS MF2

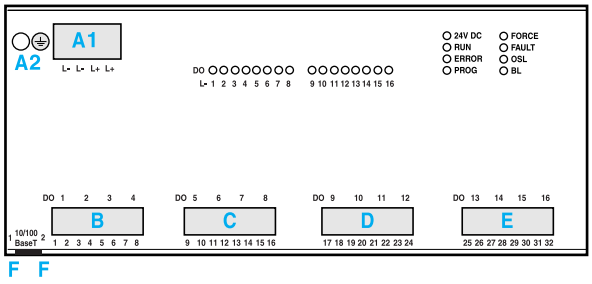
Connections

XPS MF2DO801



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	**Communication**	RJ45		Compact or modular safety PLCs XPS MF. Ethernet network. PC. Graphic terminal. Decentralized I/O modules.

XPS MF2DO1602



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	**Communication**	RJ45		Compact or modular safety PLCs XPS MF. Ethernet network. PC. Graphic terminal. Decentralized I/O modules.

Presentation, description: pages 70 to 73
Characteristics: page 74
References: page 75
Dimensions, mounting: pages 76 and 77

Safety automation solutions
Preventa™ safety PLCs
Compact and modular
Decentralized input/output modules type XPS MF3

XPS MF3DIO8801

XPS MF3DIO16801

XPS MF3DIO20802

XPS MF3AIO8401

*Products referenced **XPS MF3●●●●●●** are marked **HIMatrix F3...** (manufactured by Hima, sold by Schneider Electric).*

Presentation

Supplied on ⎓ 24 Vdc, modules type XPS MF3 are compact decentralized I/O blocks that are designed to extend the I/O capacity of safety PLCs XPS MF to which they are connected.
They are connected to the modular or compact safety PLCs via their 2 RJ45 communication ports. They do not have a user program.

Decentralized mixed I/O modules type XPS MF3

Mixed I/O modules XPS	Decentralized inputs		Decentralized outputs	
	N°	Type	N°	Type
MF3DIO8801	**8**	Digital	**8 DO+ / 2 DO-**	Digital
			2	Pulse
MF3DIO16801	**16**	Digital	**8 2-pole or 16 single-pole**	Digital
			2	Pulse
MF3DIO20802	**20**	Digital	**8**	Digital
MF3AIO8401	**8**	Analog	**4**	Analog (non safety outputs)

Examples of decentralized inputs of modules XPS MF3●IO●●●●●

■ Digital inputs

Safety detection	Safety dialog	Safety control
Limit switches, Guard switches, with reset and with actuator, Safety 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…	Vario™…, and mini-Vario™ Switch disconnectors

■ Analog inputs

Closed circuit scanning of input channels,
Single-pole measuring of 0 to 10 V voltages,
Measuring 0.4 to 20 mA currents

Examples of decentralized outputs of modules XPS MF3●IO●●●●●

■ Digital outputs

Safety dialog	Safety control
Beacons and indicator banks, Rotating mirror beacons, Sirens…	Enclosed thermal-magnetic motor circuit-breakers, Enclosed D.O.L. starters for motor control, Power contactors…

■ Pulsed outputs

Line control for line break and short-circuit monitoring

■ Analog outputs

Closed circuit scanning of output channels,
Single-pole measuring of 0 to 10 V voltages,
Measuring 0.4 to 20 mA currents

Characteristics: pages 85 and 86
References: page 87
Dimensions, mounting: pages 88 and 89
Connections: pages 90 to 93

Safety automation solutions
Preventa™ safety PLCs
Compact and modular
Decentralized input/output modules type XPS MF3

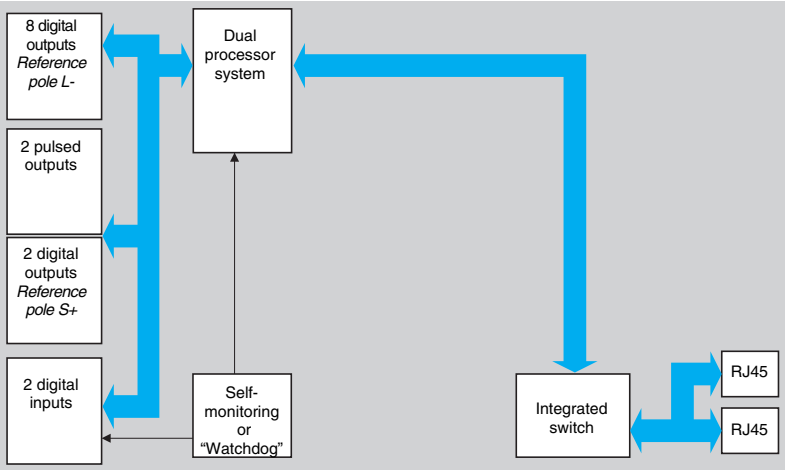
Safety PLCs

In order to comply with safety requirements, the decentralized I/O modules XPS MF3●IO●●●●● integrate two essential functions conforming to category 4 of EN 954-1/ISO 13849-1 in addition to the SafeEthernet safety communication protocol between these decentralized mixed I/O modules and the safety PLCs (Special Switch).

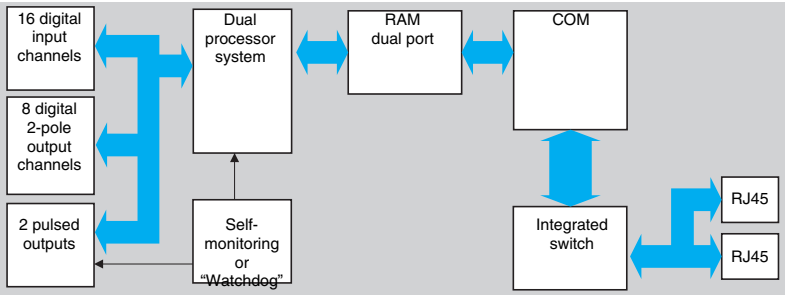
■ **Redundancy**: the dual processor integrated in modules XPS MF3●IO●●●●● analyzes and compares the information received from the safety inputs and outputs. The incoming and outgoing information (programmed values and received values) are received in parallel by the two processors and compared in real-time.
■ **"Watchdog" or self-monitoring**: the modules XPS MF3●IO●●●●● continuously monitor the information processing cycle and the execution of tasks, and intervene if the time of a cycle 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 information provided by the inputs and outputs of the modules on the Ethernet network, while avoiding signal collisions and excessive amounts of data on the network.

Functional diagrams

Decentralized mixed I/O module XPS MF3DIO8801



Decentralized mixed I/O module XPS MF3DIO16801

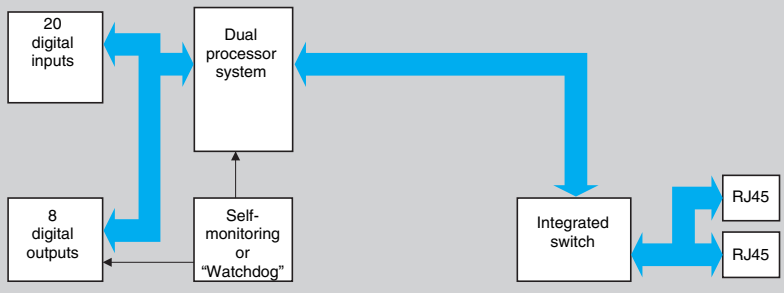


Characteristics: pages 85 and 86
References: page 87
Dimensions, mounting: pages 88 and 89
Connections: pages 90 to 93

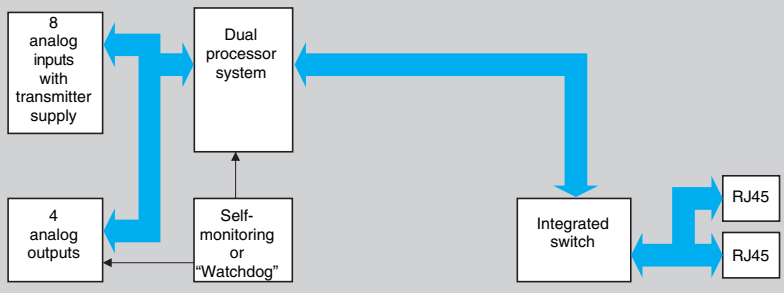
Safety automation solutions
Preventa™ safety PLCs
Compact and modular
Decentralized input/output modules type XPS MF3

Functional diagrams (continued)

Decentralized mixed I/O module XXPS MF3DIO20802



Decentralized mixed I/O module XPS MF3AIO8401



Line control

Line control is a means of short-circuit and line break monitoring, for example Emergency stop inputs to category 4 of standard EN 954-1, that is configurable in mixed decentralized I/O modules:

□ For XPS MF3DIO8801 and XPS MF3DIO16801, the pulsed outputs 1 and 2 are connected to the digital inputs of the same circuit. The pulses are automatic on the outputs: that drive the monitoring of the digital input lines.

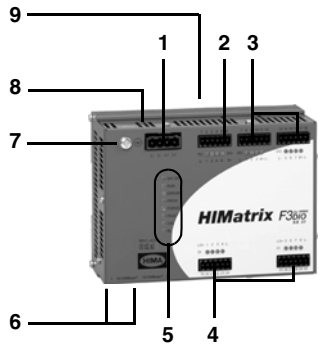
□ For XPS MF3DIO20802, the digital outputs1 to 8 are connected to the digital inputs of the same circuit. The pulses are automatic on the outputs: that drive the monitoring of the digital input lines.

Safety communication on Ethernet network

The decentralized mixed I/O modules XPS MF3●IO●●●● incorporate two RJ45 (type 10BASE-T/100BASE-TX) connectors that enable communication on the Ethernet network using SafeEthernet communication protocol and therefore, data exchange with compact or modular safety PLCs type XPS MF.

Safety automation solutions

Preventa™ safety PLCs
Compact and modular
Decentralized input/output modules type XPS MF3



Description

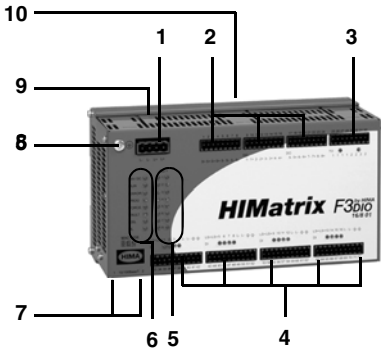
Decentralized mixed I/O module XPS MF3DIO8801

On the front face of the metal enclosure:

1 One terminal block *(1)* for ⎓ 24 Vdc supply.
2 One terminal block *(1)* for connection of pulsed outputs, with four pulse 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 ports (type 10BASE-T/100BASE-TX) for connection on Ethernet network.
7 One ground connection screw.
8 One “Reset” button (on the top).

On the rear face:

9 One spring operated mounting device for mounting on rail.



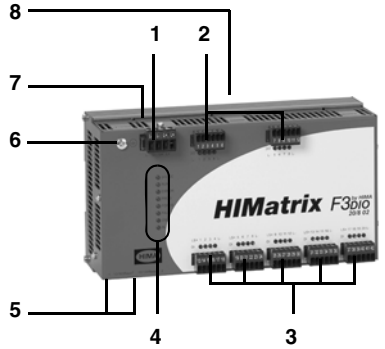
Decentralized mixed I/O module XPS MF3DIO16801

On the front face of the metal enclosure:

1 One terminal block *(1)* for ⎓ 24 Vdc supply.
2 Three terminal blocks for connection of digital output channels.
3 One terminal block *(1)* for connection of pulsed 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 ports (type 10BASE-T/100BASE-TX) for connection on Ethernet network.
8 One ground connection screw.
9 One “Reset” button (on the top).

On the rear face:

10 One spring operated mounting device for mounting on rail.



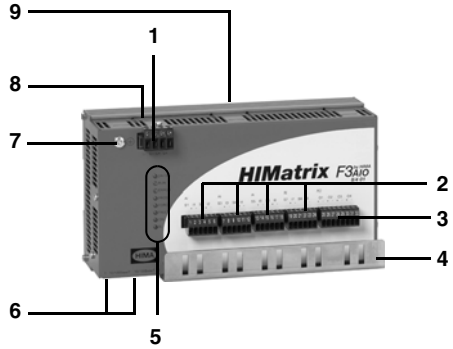
Decentralized mixed I/O module XXPS MF3DIO20802

On the front face of the metal enclosure:

1 One terminal block *(1)* for ⎓ 24 Vdc 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 ports (type 10BASE-T/100BASE-TX) for connection on Ethernet network.
6 One ground connection screw.
7 One “Reset” button (on the top).

On the rear face:

8 One spring operated mounting device for mounting on rail.



Decentralized mixed I/O module XPS MF3AIO8401

On the front face of the metal enclosure:

1 One terminal block *(1)* for ⎓ 24 Vdc 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 ports (type 10BASE-T/100BASE-TX) for connection on Ethernet network.
7 One ground connection screw.
8 One “Reset” button (on the top).

On the rear face:

9 One spring operated mounting device for mounting on rail.

(1) The connection of cables to captive screw terminal blocks that are both removable and guide marked avoids connection errors when, for example, carrying out maintenance. Terminal blocks included with mixed I/O modules type XPS MF3.

Characteristics: pages 85 and 86 | References: page 87 | Dimensions, mounting: pages 88 and 89 | Connections: pages 90 to 93

Safety automation solutions
Preventa™ safety PLCs
Compact and modular
Decentralized input/output modules type XPS MF3

Status LED details

Decentralized mixed I/O modules XPS MF3●IO●●●●●

LED	Color	Status	Meaning
24 VDC	Green	On	⎓ 24 Vdc 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 fault 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.

Characteristics: pages 85 and 86 | References: page 87 | Dimensions, mounting: pages 88 and 89 | Connections: pages 90 to 93

Safety automation solutions
Preventa™ safety PLCs
Compact and modular
Decentralized input/output modules type XPS MF3

Characteristics

Decentralized mixed I/O module type			XPS MF3DIO8801	XPS MF3DIO16801	XPS MF3DIO20802	XPS MF3AIO8401
Supply voltage		**Vdc**	⎓ 24 (external supply with separate protection conforming to IEC 61131-2)			
Voltage limits		**Vdc**	- 15…+ 20%			
Ambient air temperature	For operation		+32...140 °F (0…+ 60 °C)			
	For storage		-40...+185 °F (-40…+ 85 °C)	-40...+185 °F (-40…+ 85 °C) without battery	-40...+185 °F (-40…+ 85 °C)	
Degree of protection			IP 20			
Response time		**ms**	Depending on application			
Maximum current 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 26			

Digital inputs

Decentralized mixed I/O module type			XPS MF3DIO8801	XPS MF3DIO16801	XPS MF3DIO20802
Number	Inputs not electrically isolated		8	16	20
Voltage	At state 1	**Vdc**	⎓ 15…30		
		mA	> 2 at ⎓ 15 Vdc		⩾ 2 at ⎓ 15 Vdc
	At state 0	**Vdc**	⎓ 5 max.		
		mA	1.5 max. 1.25 at ⎓ 5 Vdc	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

Decentralized mixed I/O module type			XPS MF3DIO8801	XPS MF3DIO16801	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		**Vdc**	⎓ 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 122 °F (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		

Presentation, description: pages 80 to 84 | References: page 87 | Dimensions, mounting: pages 88 and 89 | Connections: pages 90 to 93

Characteristics (continued)

Pulsed outputs

Decentralized mixed I/O module type			XPS MF3DIO8801	XPS MF3DIO16801
Number	Outputs not electrically isolated		2	2
Output voltage		**Vdc**	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

Decentralized mixed I/O module type			XPS MF3AIO8401
Number	Inputs not electrically isolated		8, single-pole
External shunt		Ω	250 or 500 depending on application
Input values	Nominal value	**Vdc**	⎓ 0…10
		mA	0…20, with 500 Ω shunt
	Service value	**Vdc**	⎓ 0.1…11.5
		mA	0.4…23
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

Decentralized mixed I/O module type			XPS MF3AIO8401
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

Decentralized mixed I/O module type			XPS MF3DIO8801	XPS MF3DIO16801	XPS MF3DIO20802	XPS MF3AIO8401
Transmission	Communication ports		2 x RJ45 with integrated switch			
	Speed	Mbps	100			
Structure			10BASE-T/100BASE-TX			
Medium			Dual twisted pair cable			

Safety automation solutions
Preventa™ safety PLCs
Compact and modular
Decentralized input/output modules type XPS MF3

XPS MF3DIO8801

XPS MF3DIO16801

XPS MF3DIO20802

XPS MF3AIO8401

*Products referenced **XPS MF3●●●●●●** are marked **HIMatrix F3...** (manufactured by Hima, sold by Schneider Electric).*

References

Decentralized mixed I/O modules (⎓ 24 Vdc supply)

For use with	Inputs		Outputs			Ports	Reference	Weight oz. (kg)
	Digital	Analog	Digital	Pulsed	Analog			
Safety PLCs, modular XPS MF60 or compact XPS MF40 and XPS MF31/30/35	8	–	8 DO+ 2 DO-	2	–	2 x RJ45: access to Ethernet network	**XPSMF3DIO8801**	35.27 (1.000)
	16	–	8 x 2 or 16 x 1	2	–	2 x RJ45: access to Ethernet network	**XPSMF3DIO16801**	45.86 (1.300)
	20	–	8	–	–	2 x RJ45: access to Ethernet network	**XPSMF3DIO20802**	35.27 (1.000)
	–	8	–	–	4	2 x RJ45: access to Ethernet network	**XPSMF3AIO8401**	33.51 (0.950)

Connecting cables

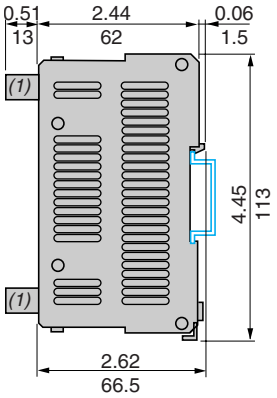
Description	For	Reference	Weight oz. (kg)
Ethernet network connecting cables	Connection between decentralized mixed I/O modules XPS MF3●IO and compact or modular safety PLCs XPS MF RJ45 connector fitted at each end	See page 29	–

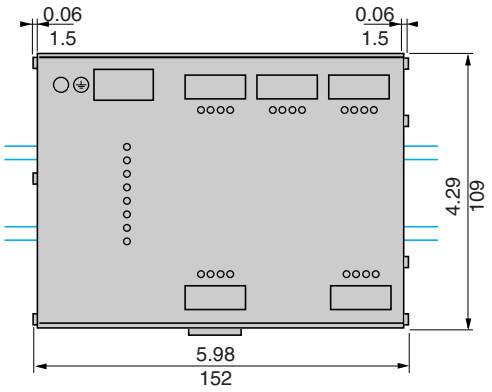
Presentation, description: pages 80 to 84
Characteristics: pages 85 and 86
Dimensions, mounting: pages 88 and 89
Connections: pages 90 to 93

Safety automation solutions
Preventa™ safety PLCs
Compact and modular
Decentralized input/output modules type XPS MF3

Dimensions

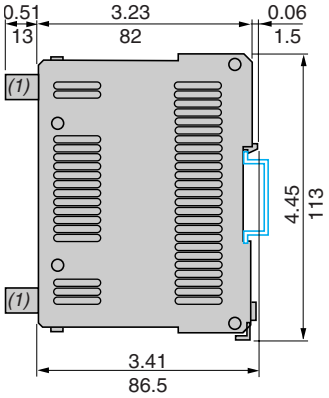
XPS MF3DIO8801

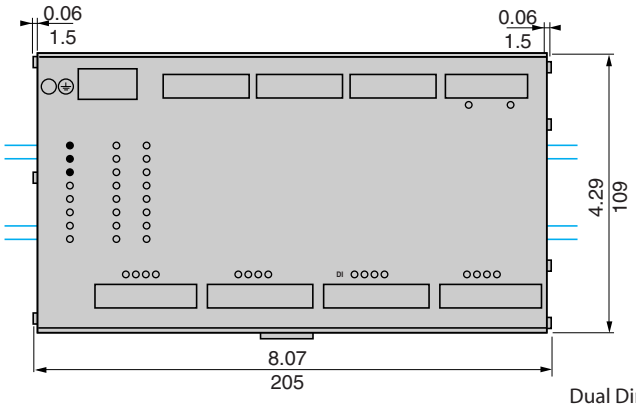




(1) Removable terminal blocks.

XPS MF3DIO16801





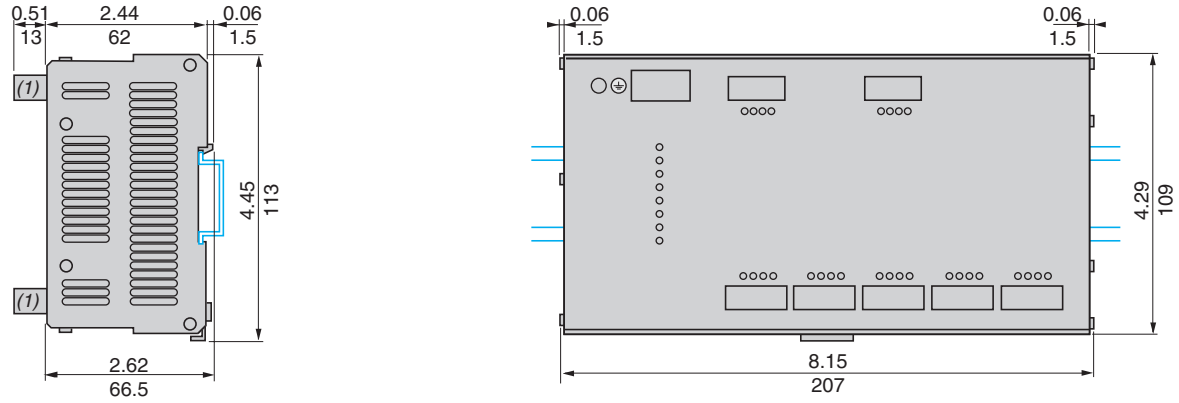
Dual Dimensions: Inches / mm

(1) Removable terminal blocks.

Safety automation solutions
Preventa™ safety PLCs
Compact and modular
Decentralized input/output modules type XPS MF3

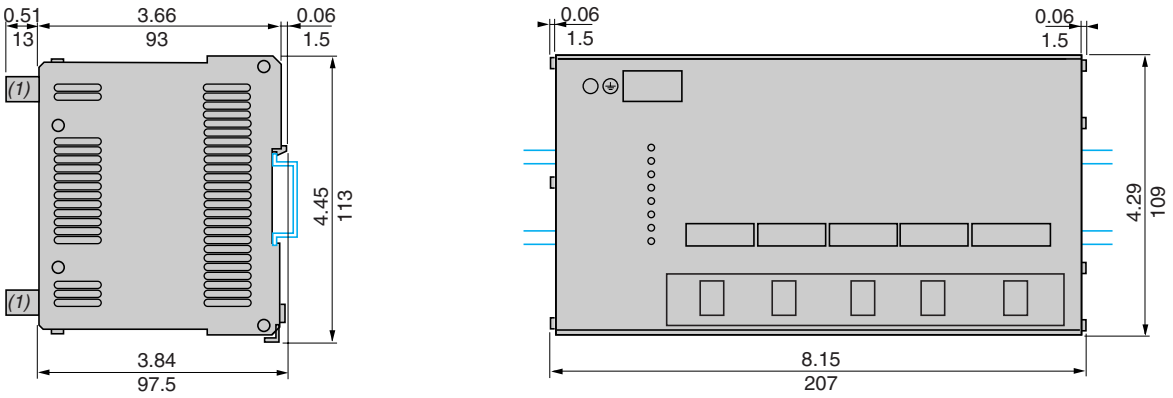
Dimensions

XPS MF3DIO20802



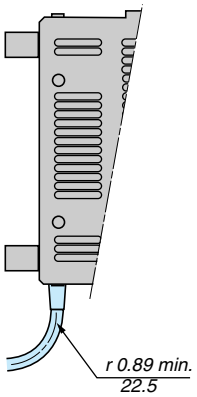
(1) Removable terminal blocks.

XPS MF3AIO8401



(1) Removable terminal blocks.

RJ45 connector for access to Ethernet network

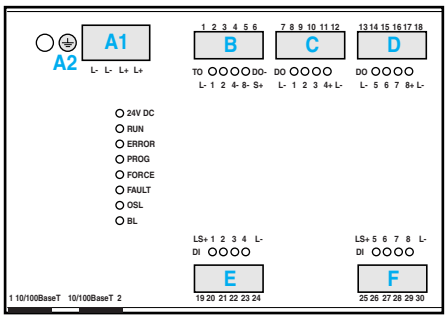


Dual Dimensions: Inches / mm

Safety automation solutions
Preventa™ safety PLCs
Compact and modular
Decentralized input/output modules type XPS MF3

Connections

XPS MF3DIO8801



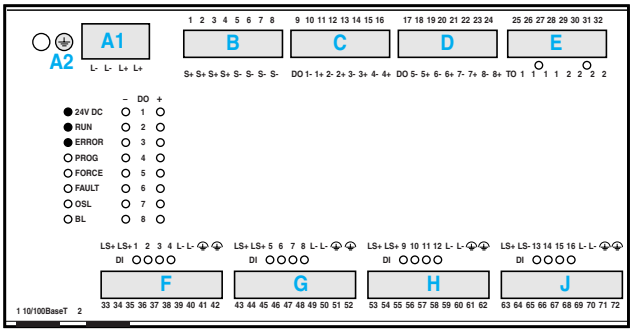
Item	Connection	Screw N°	Screw	Function
A1	**Supply**	–	L-	⎓ 24 Vdc (reference pole)
		–	L-	⎓ 24 Vdc (reference pole)
		–	L+	⎓ 24 Vdc
		–	L+	⎓ 24 Vdc
A2	**Ground**	–	⏚	Ground
B	**Outputs - Pulsed/Digital**	1	L-	Reference pole
		2	1	Pulsed output 1
		3	2	Pulsed output 2
		4	4-	Digital output 4- (for increased 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	Type		Function
G	**Communication**	RJ45		Compact or modular safety PLCs XPS MF. Ethernet network. PC. Graphic terminal. Decentralized I/O modules.

Safety automation solutions

Preventa™ safety PLCs
Compact and modular
Decentralized input/output modules type XPS MF3

Connections

XPS MF3DIO16801



Item	Connection	Screw N°	Screw	Function
A1	**Supply**	–	L+	⎓ 24 Vdc
			L+	⎓ 24 Vdc
			L-	⎓ 24 Vdc (reference pole)
			L-	⎓ 24 Vdc (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 - Pulsed**	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

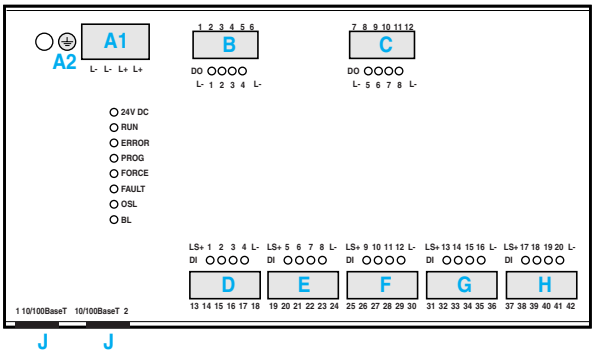
Item (cont.)	Connection	Screw N°	Screw	Function
F	**Inputs - Digital**	33	LS+	Sensor supply for inputs 1 to 4 (not protected)
		34	LS+	Sensor supply for inputs 1 to 4 (protected)
		35	1	Input 1
		36	2	Input 2
		37	3	Input 3
		38	4	Input 4
		39	L-	⎓ 24 Vdc (reference pole)
		40	L-	⎓ 24 Vdc (reference 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 Vdc (reference pole)
		50	L-	⎓ 24 Vdc (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 Vdc (reference pole)
		60	L-	⎓ 24 Vdc (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 Vdc (reference pole)
		70	L-	⎓ 24 Vdc (reference pole)
		71	PA	Electrically clean ground
		72	PA	Electrically clean ground

Item	Connection	Type	Function
K	**Communication**	RJ45	Compact or modular safety PLCs XPS MF. Ethernet network. PC. Graphic terminal. Decentralized I/O modules.

Presentation, description: pages 80 to 84
Characteristics: pages 85 and 86
References: page 87
Dimensions, mounting: pages 88 and 89

Safety automation solutions
Preventa™ safety PLCs
Compact and modular
Decentralized input/output modules type XPS MF3

Connections
XPSMFDIO20802



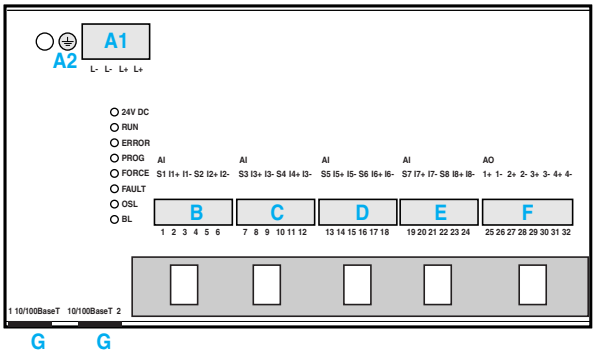
Item	Connection	Screw N°	Screw	Function
A1	**Supply**	–	L+	⎓ 24 Vdc
			L+	⎓ 24 Vdc
			L-	⎓ 24 Vdc (reference pole)
			L-	⎓ 24 Vdc (reference pole)
A2	**Ground**		⏚	Ground
B	**Outputs - Digital**	1	L-	Outputs common
		2	1	Output 1
		3	2	Output 2
		4	3	Output 3
		5	4	Output 4 (for increased load)
		6	L-	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	Type	Function
J	**Communication**	RJ45	Compact or modular safety PLCs XPS MF. Ethernet network. PC. Graphic terminal. Decentralized I/O modules.

Presentation, description: pages 80 to 84
Characteristics: pages 85 and 86
References: page 87
Dimensions, mounting: pages 88 and 89

Safety automation solutions
Preventa™ safety PLCs
Compact and modular
Decentralized input/output modules type XPS MF3

Connections
XPS MF3AIO8401



Item	Connection	Screw N°	Screw	Function
A1	**Supply**	–	L+	⎓ 24 Vdc
			L+	⎓ 24 Vdc
			L-	⎓ 24 Vdc (reference pole)
			L-	⎓ 24 Vdc (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	Type	Function
G	**Communication**	RJ45	Compact or modular safety PLCs XPS MF. Ethernet network. PC. Graphic terminal. Decentralized I/O modules.

Presentation, description: pages 80 to 84
Characteristics: pages 85 and 86
References: page 87
Dimensions, mounting: pages 88 and 89

Safety automation solutions
Preventa™ safety PLCs
Compact and modular, type XPS MF
Communication on network and bus

Presentation

To communicate, Preventa compact and modular safety PLCs XPS MF are fitted with safety communication ports and/or industrial communication serial ports.

Safety communication

With the SafeEthernet safety communication protocol, two structures are possible:

■ **Single network**

The Ethernet network supports the SafeEthernet protocol: physically, a single network is required for communication between:

- safety products (SafeEthernet protocol),
- standard products (Ethernet protocol),
- safety products and standard products (Modbus TCP/IP protocol).

■ **Double network**: two separate cabling systems are established.

□ An Ethernet network with Modbus TCP/IP protocol is used for communication between standard products.

□ An Ethernet network with SafeEthernet protocol is used for communication between safety products.

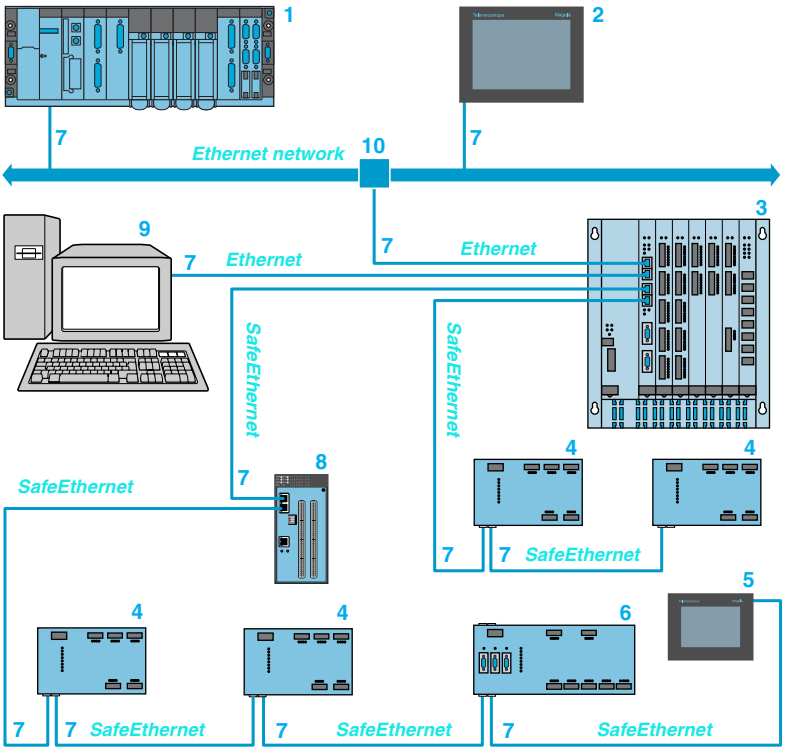
Compact PLCs	Ports (number and type)	Communication on Ethernet network	
		safety using SafeEthernet protocol	non safety using Modbus TCP/IP protocol
XPS MF31222	4 x RJ45	■	■
XPS MF3022	4 x RJ45	■	■
XPS MF3502	4 x RJ45	■	■
XPS MF3522	4 x RJ45	■	■
XPS MF3542	4 x RJ45	■	■
XPS MF4000	2 x RJ45	■	–
XPS MF4002	2 x RJ45	■	■
XPS MF4020	2 x RJ45	■	–
XPS MF4022	2 x RJ45	■	■
XPS MF4040	2 x RJ45	■	–
XPS MF4042	2 x RJ45	■	■
Modular PLC	**Ports (number and type)**	**Communication on Ethernet network**	
		safety using SafeEthernet protocol	**non safety using Modbus TCP/IP protocol**
XPS MFCPU22 (CPU of modular PLC XPS MF60)	4 x RJ45	■	■

Industrial communication

Compact PLCs	Serial port (number and type)	Industrial communication	
		On Modbus bus	On Profibus bus
XPS MF31222	–	–	–
XPS MF3022	FB3 (1x SUB-D 9-pin female)	■ (slave)	–
XPS MF3502	–	–	–
XPS MF3522	FB3 (1 x SUB-D 9-pin female)	■ (slave)	–
XPS MF3542	FB3 (1 x SUB-D 9-pin female)	–	■ (slave)
XPS MF4000	–	–	–
XPS MF4002	–	–	–
XPS MF4020	TER (1 x RJ45)	■ (slave)	–
XPS MF4022	TER (1 x RJ45)	■ (slave)	–
XPS MF4040	BUS (1 x SUB-D 9-pin female)	–	■ (slave)
XPS MF4042	BUS (1 x SUB-D 9-pin female)	–	■ (slave)
Modular PLC	**Serial port (number and type)**	**Industrial communication**	
		On Modbus bus	**On Profibus bus**
XPS MFCPU22 (CPU of modular PLC XPS MF60)	FB2 (1 x SUB-D 9-pin female)	■ (slave)	–

Safety automation solutions
Preventa™ safety PLCs
Compact and modular, type XPS MF
Communication on Ethernet network

Connection on Ethernet network



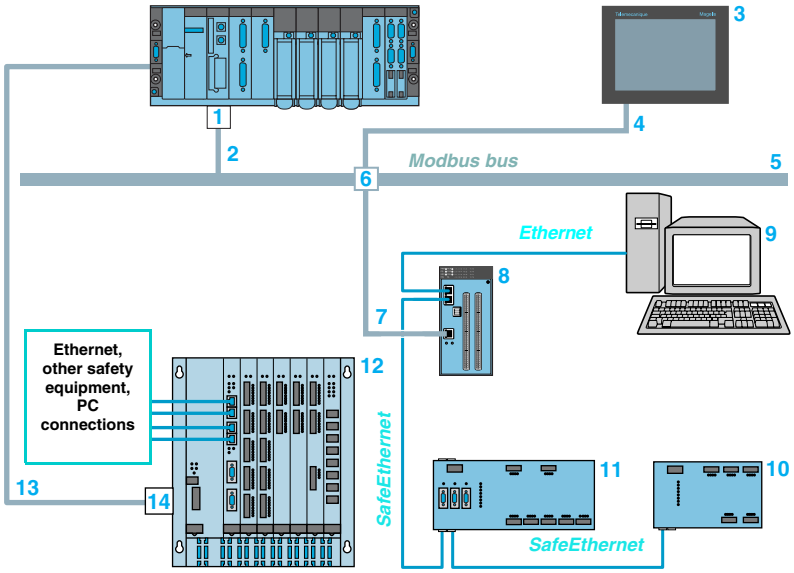
1 Premium™ processor **TSX P57 ●634M/●623M** *(1)* or module **TSX ETY 4103** *(1)* on Premium™ automation platform *(1)*, master on Ethernet network.
2 Graphic supervision terminal **XBT GT5230**.
3 Modular safety PLC **XPS MF60**.
4 Decentralized I/O modules type **XPS MF1/2/3**.
5 Graphic supervision terminal **XBT GT2130**.
6 Compact safety PLCs type **XPS MF31/30/35.**
7 Straight through, shielded twisted pair cables **490 NTW 000 ●●**, lengths 6.56...262 ft. (2…80 m).
8 Compact safety PLCs type **XPS MF40.**
9 Programming PC.
10 Hubs **499 NEH 10410**.

Characteristics

Protocol		**SafeEthernet**	
Compatibility with compact and modular safety PLCs		**XPS MF4000, XPS MF4002, XPS MF4020, XPS MF4022, XPS MF4040, XPS MF4042**	**XPS MF31222, XPS MF3022, XPS MF3502, XPS MF3522, XPS MF3542, XPS MFCPU22 (CPU of modular PLC XPS MF60)**
Transmission	Speed	10…100 Mbps	
	Communication ports	2 x RJ45 with integrated switch	4 x RJ45 with integrated switch
	Medium	Dual twisted pair cable	
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 serial	
		Modbus TCP/IP messaging (reading/writing of data words) Modbus identification requests	
	TCP port	Standard 502	
	Max. number of TCP connections	1 to 20	

Safety automation solutions
Preventa™ safety PLCs
Compact and modular, type XPS MF
Communication on Modbus® bus

Connection on Modbus® bus



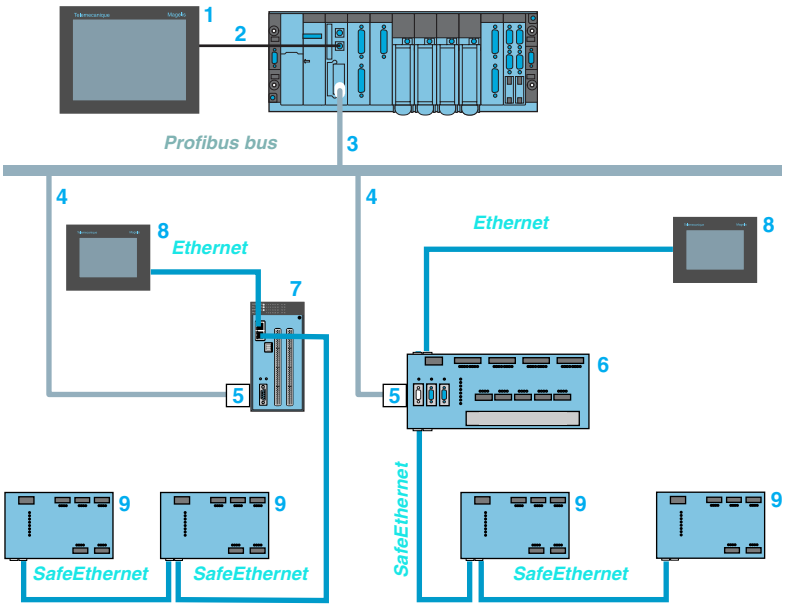
1 Premium™ module **TSX SCY 21601**: access to Modbus bus on a Premium™ automation platform, Modbus bus master.
2 Cable **TSX SCY CM6030**.
3 Graphic supervision terminal **XBT GT5230**.
4 Cable **XBT Z938** + adaptor **XBT ZG909**.
5 Cables **VW3 A83 ●6R●●** for Modbus bus, lengths 0.98...9.84 ft. (0.3…3 m).
6 Modbus splitter box **LU9 GC3** for equipment connection.
7 Cables **TSX SCA ●00** for Modbus bus, lengths 328...1640 ft. (100…500 m).
8 Compact safety PLCs **XPS MF4020/MF4022**, Modbus bus slaves.
9 Programming PC.
10 Decentralized I/O modules type **XPS MF1/2/3**.
11 Compact safety PLCs **XPS MF3022/3522**.
12 Modular safety PLC **XPS MF60**, Modbus bus slave.
13 Direct connection cables **XPS MCSCY** for safety PLCs to Premium™ module **TSX SCY 21601**, length 0.98 ft. (0.3 m).
14 Connector **XPS MFADAPT** (RJ45/SUB-D 9-pin male) for connector FB2 or FB3 depending on PLC.

Characteristics

Bus type			**Modbus serial**		
Compatibility with compact and modular safety PLCs			**XPS MF3022, XPS MF3522**	**XPS MF4020, XPS MF4022**	**XPS MFCPU22 (CPU of modular PLC XPSMF60)**
Serial link port		Number and type	1 x SUB-D 9-pin female (FB3)	1 x RJ45 (TER)	1 x SUB-D 9-pin female (FB2)
		Status	Slave		
Addressing			122 slaves max. 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		

Safety automation solutions
Preventa™ safety PLCs
Compact and modular, type XPS MF
Communication on Profibus DP bus

Connection on Profibus bus



1 Graphic terminal connected to TER/AUX port of ™ automation platform.
2 Connecting cable **XBT Z968** (RS 485) + adaptor **XBT ZG909**.
3 Profibus module **TSX PBY 100** on Premium™ processor master of the Profibus bus.
4 Connecting cable **TSX PBS CA ●00**, lengths 328...1312 ft. (100...400 m).
5 Connector **490 NAD 911 03** (SUB-D 9-pin male) on the FB3 connector of safety PLC **XPS MF3542** or on the BUS connector of safety PLC **XPS MF4040/MF4042**.
6 Compact safety PLC **XPS MF3542**, Profibus bus slave.
7 Compact safety PLCs **XPS MF4040/MF4042**
8 Graphic terminal.
9 Decentralized I/O modules **XPS MF1/2/3**.

Characteristics

Bus type		**Profibus DP**	
Compatibility with compact safety PLCs		**XPS MF3542**	**XPSMF4040, XPS MF4042**
Serial port	Number and type	1 x SUB-D 9-pin female (FB3)	1 x SUB-D 9-pin female (BUS)
	Status	Slave	
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 m…100 m)	

Safety automation solutions

Programming XPSMFWIN software for Preventa™ compact and modular safety PLCs type XPS MF

Presentation

Programming XPSMFWIN software conforms to standard IEC 61131-3 and is designed for compact safety PLCs XPS MF40, XPS MF31/30/35 and modular safety PLCs XPS MF60.
This safety software is part of the Safety Suite V2 software pack.

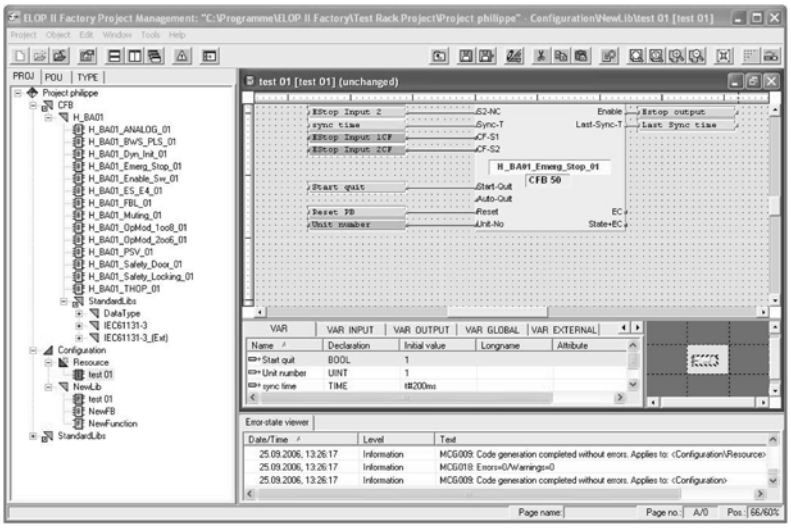
To create a program the user can either use predefined function blocks or elementary logic functions, by dragging the blocks into the software programming area.
The “drag and drop” operation of the XPSMFWIN software enables quick and simple creation of configurations.
This ergonomic environment allows the user to create complete configurations for safe operation of the safety PLC.
On completion, the users program is loaded into the safety PLC using the programming unit running XPSMFWIN.
The conditions detailed in the software manual must be adhered to and a complete report accompanying the certificate must be established.

Reference

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

Description	Operating system	Composition	Language	Reference	Weight oz. (kg)
Configuration XPSMFWIN software for programming compact XPS MF40●●, XPS MF3● 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*	18.34 (0.520)

Installation



XPSMFWIN software: project management

XPSMFWIN software uses an electronic key (dongle) for protection against unauthorized use.
This dongle is available in two versions, USB or serial.
It must be connected before the software is installed.
A driver must also be installed on the computer to recognize the dongle. Several appropriate drivers are included with XPSMFWIN software.

To install XPSMFWIN software:
■ Install the appropriate driver from the XPSMFWIN CD-ROM in order to recognize the dongle.
■ Check that the dongle is connected.
■ Select the preferred language from the configuration menu.
■ Follow the guided installation procedure for XPSMFWIN software.
■ Restart the computer.
■ Launch XPSMFWIN software by clicking on its desktop icon.

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 (110 Mb minimum).
■ Operating system (Microsoft® Windows® 2000 Professional with Service Pack 1 or better).

Safety automation solutions

Programming XPSMFWIN software for Preventa™ compact and modular safety PLCs type XPS MF

Communication

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.
Transmission speeds of up to 100 Mbps can be achieved in half duplex mode and 10 Mbps in full duplex mode.

Connection is made automatically between the master and slaves when assigning the slaves to the corresponding masters.
When communicating between two masters, a Peer-to-Peer connection must be established between the two partners. This allows the two masters to send and receive signals to and from each other.
The connectivity of all the equipment enables centralized or decentralized networks to be established. It also enables masters and slaves to be connected anywhere on the network without having to assign each module to a physical location within the software. The only requirement is that each master or slave has an IP address.

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 function blocks.

■ **Hardware management**
This window enables all hardware specific data, inputs and outputs and signal transfer between master safety controllers to be defined, as well as the various safety PLCs being used or remote I/Os.

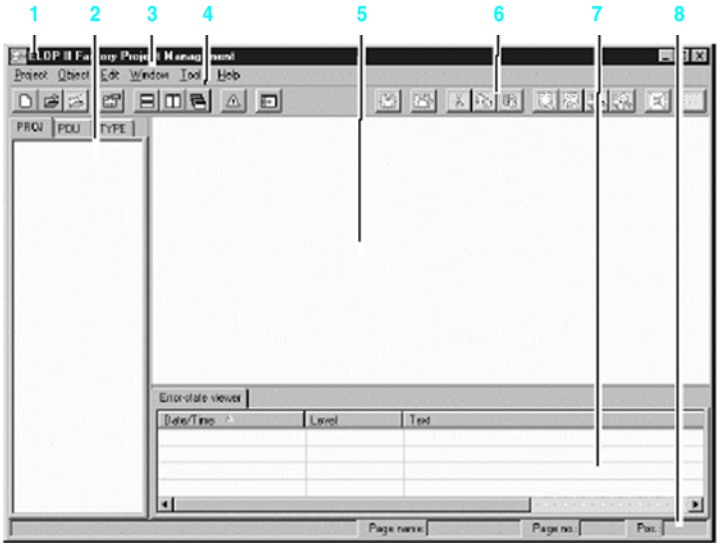
Items included in the XPSMFWIN interface

■ 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

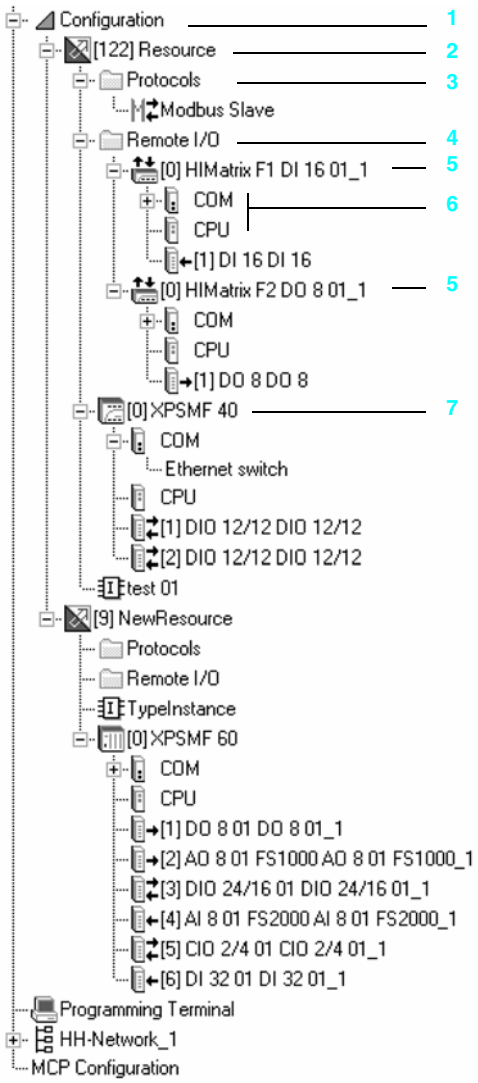
On launching XPSMFWIN software, the standard screen shown below opens. This screen generally includes the following items:



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 solutions

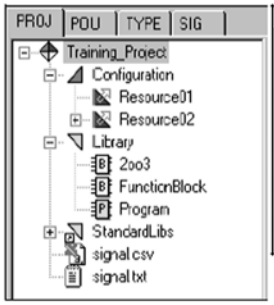
Programming XPSMFWIN software for Preventa™ compact and modular safety PLCs type XPS MF



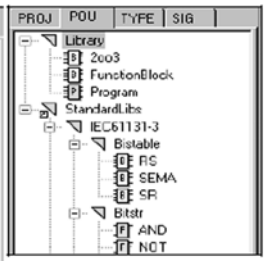
Structure window

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.

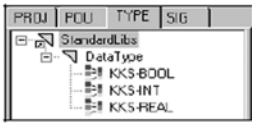
The structure window displays the hierarchical structure of the project. Selecting one of three views provides the user with different levels of detail.



Complete project



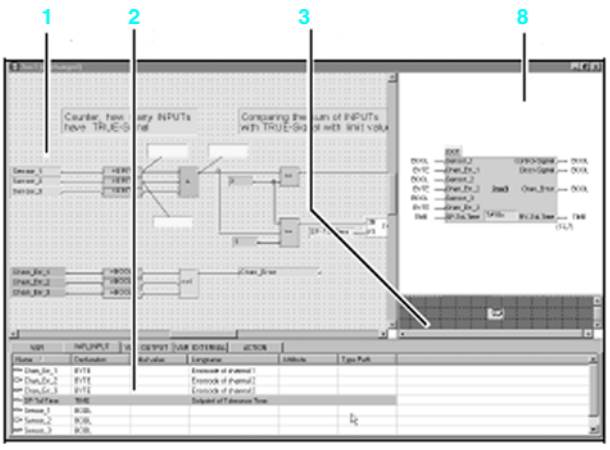
All POUs (Program Organization Units)



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 comprises the following panes:



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

Safety automation solutions

Programming XPSMFWIN software for Preventa™ compact and modular safety PLCs type XPS MF

Programming

XPSMFWIN software enables programming of the entire range of Preventa safety PLCs type XPS MF.
The powerful and easy to use methodology of this software enables users to quickly and simply familiarize themselves with the product. The Microsoft® 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, Flip-Flop, etc.) 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.

Each safety PLC master can have remote I/O modules assigned to them. The maximum number of remote I/Os that can be connected to each master is fixed at 64.
Once all the safety PLCs and remote I/Os have been selected, the signals can be simply connected to the relevant 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 must be downloaded via the SafeEthernet communication port on any of the safety PLCs.

Program execution

The program will automatically be stored in all the master 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.

The following additional protocols (see page 102) are included in XPSMFWIN software and these can be used for non safety related data transfer.

Safety automation solutions

Programming XPSMFWIN software for Preventa™ compact and modular safety PLCs type XPS MF

Communication protocols

Profibus (non safety)

PROFIBUS-DP Master
Connect Signals
Validate
New
Copy
Paste
Delete
Print
Properties

To create the Profibus-DP master in a resource a project must be created first. The safety PLCs (XPS MF3542, XPSMF4040 and/or XPS MF4042) must be defined as one of the resources.
In the Hardware management window, select: Protocols - New - Profibus Master.
The Profibus-DP Master menu contains the following fields:
Select Connect Signals for connecting the two signal indication states for program evaluation and detection of bus errors and status of the master.
The parameter settings of the master and slaves can be tested before code generation. Select Validate to display any errors or warnings in the error display window.
Nevertheless, validation is executed automatically before each code generation. If any error is identified, the code generation sequence is automatically aborted.

If the user selects New - Profibus Slave in the Profibus-DP Master menu, a Profibus-DP slave is added to the Profibus-DP master. Selecting Properties in the Profibus-DP Master menu makes many options available. The option enables the user to change time parameters and to view general information.

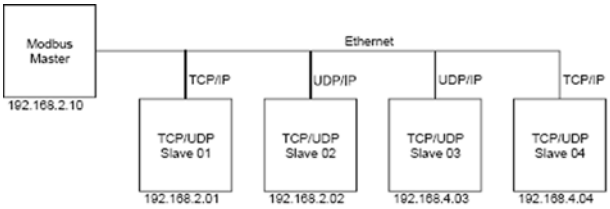
On completion, the program can be compiled and downloaded to the safety PLC via a SafeEthernet connection.

Safety automation solutions

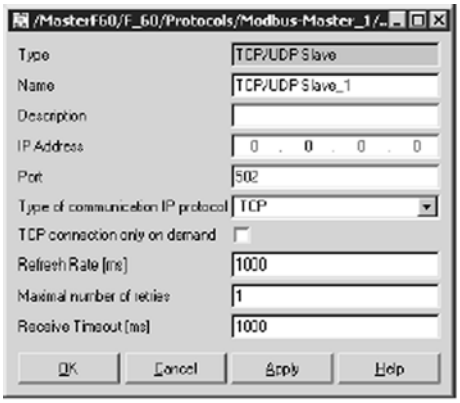
Programming XPSMFWIN software for Preventa™ compact and modular safety PLCs type XPS MF

Communication protocols (continued)

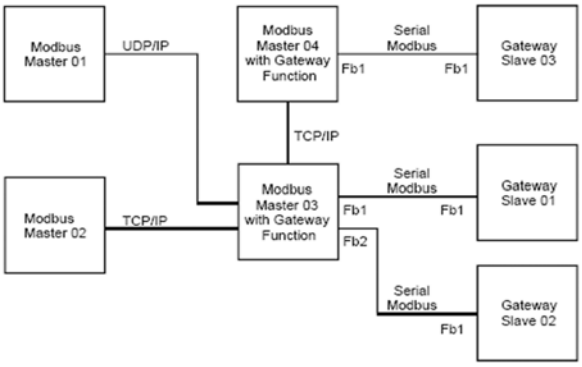
Ethernet TCP/UDP Modbus (non safety)



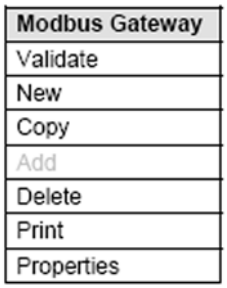
TCP/UDP slaves are created using the Modbus Masters directory “Ethernet Slaves”.
The Modbus master communicates with its slaves via TCP/IP or TCP/UDP protocols. In both cases, up to 32 slaves can be connected to a Modbus master.



To modify the TCP/UDP properties click on the relevant option in the contextual menu of the TCP/UDP slave and select the properties tag.

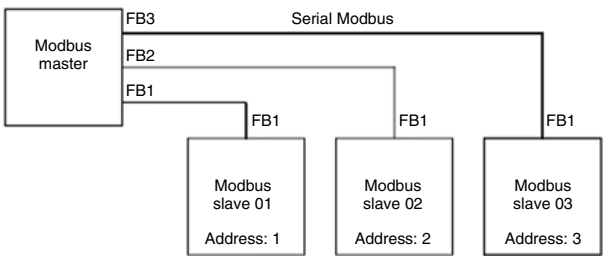


The Modbus master can serve as a TCP and UDP gateway simultaneously.



When using the gateway of the Modbus master, the menu shown appears. The user can then define the gateway functions.

Serial Modbus



The Modbus serial interface is available on compact safety PLCs XPS MF4020, XPS MF4022, XPS MF3022, XPS MF3522 and modular safety PLC XPS MF60.
It is configured using the Modbus master gateway and by selecting the serial properties in the Gateway contextual menu.
The Modbus master communicates with its serial slave via a Modbus serial interface.
The Modbus master is configured by initially selecting the Modbus Master option in the protocol sub-menu of the safety PLCs mentioned above.

Product reference index

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