Modicon M340 automation platform

Catalogue

September 2013

Schneider Electric

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General contents

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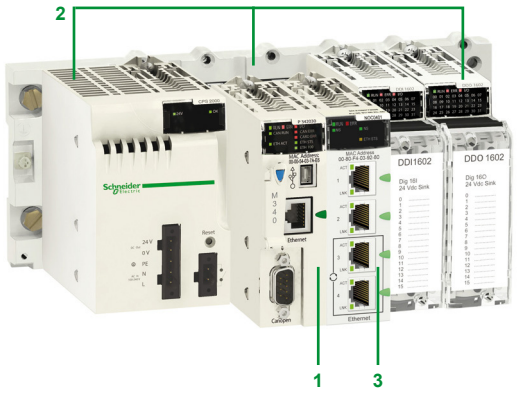
1 - Processor modules

Modicon M340 automation platform
Composition



Modicon M340 automation platform comprising:
- BMXP34 type processors,
- A single-rack or multi-rack Modicon X80 I/O platform,
- Additional dedicated modules.

Presentation

The Modicon M340 automation platform comprises:
1 BMXP34 dedicated processors
2 A Modicon X80 I/O platform, in a single-rack or multi-rack configuration
3 Additional modules for various applications (application-specific, Ethernet communication, etc.)

Modicon M340 processors

Seven processor models comprising 1 Standard model (**BMXP341000)** and 6 Performance models (**BMXP3420●●●** or **BMXP3420●●●CL**) with different memory capacities, processing speeds, number of I/O and number and type of communication ports.

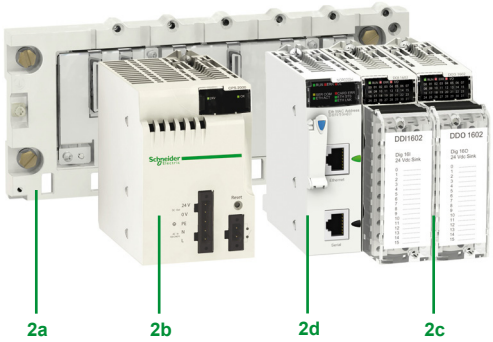
Depending on the model, they offer a maximum (non-cumulative) of:
- 512 to 1024 discrete I/O
- 128 to 256 analog I/O
- 20 to 36 application-specific channels *(1)* (process counter, motion control and serial link, or RTU)
- 0 to 3 Ethernet Modbus/TCP or Ethernet/IP networks (with or without integrated port and 2 network modules maximum)
- 4 “Full Extended master” AS-Interface V3 actuator/sensor buses, profile M4.0

Depending on the model, Modicon M340 processors include:
- A 10BASE-T/100BASE-TX Ethernet Modbus/TCP port
- A CANopen machine and installation bus port
- A Modbus or Character mode serial link port

Each processor has a USB TER port (for connecting a programming terminal or a Magelis GTO, GTW, STU/STO, etc. HMI terminal) *(2)*.

It is supplied with a memory card *(3)* that enables:
- Backing up the application (program, symbols and constants)
- Activating a standard Web server for the Transparent Ready class B10 integrated Ethernet port (depending on the model)

Depending on the model, this memory card can be replaced by another type of memory card (to be ordered separately) that supports:
- Backing up the application and activation of the standard Web server (same as other card)
- An 8 MB or 128 MB storage area, depending on the option card, for storing additional data organized in a file system (directories and sub-directories)



Modicon X80 I/O platform

Modicon X80 I/O platform and additional modules *(4)*

The “Modicon X80 I/O” platform, which can be used “In Rack” and/or in a remote I/O (RIO) drop depending on the type of automation platform (Modicon M340, Quantum, etc.), comprises the following elements:
- Racks with 4, 6, 8 or 12 slots (**2a**)
- Power supply modules, ⎓ or ∿ (**2b**)
- Discrete and analog I/O modules (**2c**)
- RTU *(Remote Terminal Unit)*, serial link, AS-Interface, etc. communication modules (**2d**)

Additional dedicated modules for the Modicon M340 automation platform that can be used on “Modicon X80 I/O” are also available:
- Application-specific
- Ethernet (Modbus/TCP, Ethernet/IP) communication module

External modules, such as Modbus Plus, Profibus DP/PA communication as well as modules offered as part of CAPP (Collaboration Automation Partner Program), are also available.

Treatment for severe environments

Using the “ruggedized” modules enables the Modicon M340 automation platform to be used in severe environments or at operating temperatures from - 25°C to + 70°C. See pages 6/2 to 6/9.

(1) Maximum number of application-specific channels per station. Only the application-specific channels actually configured in the Unity application count.
(2) For details of the Magelis offer please visit our website www.schneider-electric.com.
(3) With the exception of 2 models supplied without memory card (see page 1/9).
(4) The X80 I/O platform is described in detail on page 2/2.

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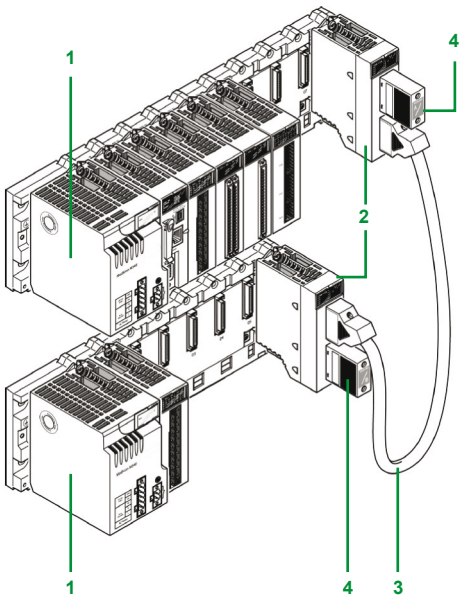
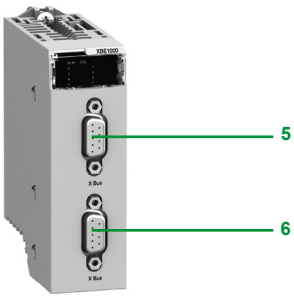
Modicon M340 automation platform

Software configuration and multi-rack configuration

Unity Pro





Rack expansion module BMXXBE1000

Line terminator TSXTLYEX

Presentation (continued)

Design and setup of Modicon M340 applications

Setting up of the Modicon M340 automation platform processors requires the use one of the following software packages:

- Unity Pro Small programming software
- Unity Pro Medium, Large or Extra Large programming software or identical to that used to set up Modicon Premium and Modicon Quantum automation platforms
- Optionally, depending on requirements, Unity EFB toolkit software for developing EF and EFB function block libraries in C language

The function block software libraries provide Modicon M340 processors with the processing capability required to meet the specialized requirements within the motion control with multiple independent axis functions domain (MFB *"Motion Function Blocks"* library). The axes are controlled by Altivar 312/71 variable speed drives or Lexium 32 servo drives connected on the CANopen machine bus.

***Note: Compatibility of BMXP3420102/20302 processors with the Unity Pro software version. BMXP3420102/20302** processors with integrated CANopen bus are compatible with Unity Pro **version ≥ 4.1**. Both these processors can be used to customize configuration of the device Boot Up procedure compatible with all CANopen third-party products.*

Composition of a multi-rack configuration

Multi-rack configurations are made up of standard **BMXXBP●●00** racks. They comprise:

- 2 racks maximum for a station with **BMXP341000** processor
- 4 racks maximum for a station with **BMXP3420●●● or BMXP3420●●●CL** processor

Each rack is equipped with:

1 A **BMXCPS●●●●●** power supply
2 A **BMXXBE1000** expansion rack module. This module, inserted in the right-hand end of the rack (**XBE** slot, see page 2/8) does not occupy rack slots **00**…**11** (4, 6, 8 or 12 slots are still available)

Bus X

The racks, distributed on the Bus X, are connected to each other by Bus X extension cordsets **3** with a total length of **30 m maximum**.
The racks are connected in a daisy chain using **BMXXBC●●0K** *(1)* Bus X extension cordsets connected to the two 9-way SUB-D connectors **5** and **6** on the front panels of the **BMXXBE1000** rack expansion modules **2**.

Line terminators 4
Both expansion modules at the ends of the daisy chain must have a line terminator **4** **TSXTLYEX** on the unused 9-way SUB-D connector.

***Note:** The processor module is always positioned in the rack at address 0. However, in a Bus X daisy chain, the order of the racks has no effect on operation; the order of the daisy chain could be, for example 0-1-2-3, 2-0-3-1, 3-1-2-0, etc.*

*(1) Extension cordsets **BMXXBC●●0K** in lengths of 0.8 m, 1.5 m, 3 m, 5 m or 12 m with elbowed connectors or **TSXCBY●08K** in lengths of 1 m, 3 m, 5 m, 12 m, 18 m or 28 m with straight connectors.*

Modicon M340 automation platform
Modicon M340 processors

Type of Modicon M340 processor			Standard processor	Performance processors with or without memory card
				
Racks	Number of racks		2 (with 4, 6, 8 or 12 slots)	4 (with 4, 6, 8 or 12 slots)
	Max. number of slots (excluding power supply module)		24	48
I/O	In-rack discrete I/O *(1)*		512 channels (modules with 8, 16, 32 or 64 channels)	1024 channels (modules with 8, 16, 32 or 64 channels)
	In-rack I/O *(1)*		128 channels (modules with 2, 4, 6 or 8 channels)	256 channels (modules with 2, 4, 6 or 8 channels)
	Distributed I/O (limited depending on the type of medium)		- On Ethernet Modbus/TCP via network module (63 devices with I/O Scanning function) - On Modbus link (32 devices)	
In-rack application-specific channels	No. of channels (counter, motion control, serial link)		20 max.	36 max.
	Counter *(1)*		BMXEHC0200 2-channel (60 kHz) or BMXEHC0800 8-channel (10 kHz) modules	
	Motion control *(1)*		BMXMSP0200 2-channel (200 kHz) PTO *(Pulse Train Output)* modules for servo drives	
			–	
	Serial link (process or RTU) *(1)*		BMXNOM0200 2-channel module or BMXNOR0200H module with 1 RTU serial channel	
	Process control, programmable loops		Process control EFB library	
Integrated communication ports	Ethernet Modbus/TCP network		–	
	CANopen master bus		–	
	Serial link (process or RTU)		1 in RTU/ASCII Modbus master/slave mode or in Character mode (isolated RS232/RS485, 0.3…38.4 Kbps)	
	USB port		1 programming port (PC terminal) or HMI connection port	
Communication modules *(1)*	Ethernet network	Max. no.	2	
		Type of module	BMXNOE0100/0110 or BMXNOC0401 network modules or BMXNOR0200H module with 1 Ethernet RTU channel	
	AS-Interface bus	Max. no.	2	4
		Type of module	BMXEIA0100 master module	
Internal memory capacity	Internal user RAM		2048 KB	4096 KB
	Program, constants and symbols		1792 KB	3584 KB
	Located/unlocated data		128 KB	256 KB
Memory card capacity (on processor)	Backup of program, constants and symbols		8 MB as standard	
	Hosting and display of user Web pages		*(2)*	
	File storage		–	8 or 128 MB (according to BMXRMS●●8MPF option card)
Application structure	Master task		1	
	Fast task		1	
	Event tasks		32	64
No. of K instructions executed per ms	100% Boolean		5.4 Kinstructions/ms	8.1 Kinstructions/ms
	65% Boolean + 35% fixed arithmetic		4.2 Kinstructions/ms	6.4 Kinstructions/ms
Rack power supply			24 V ⎓ isolated, 24…48 V ⎓ isolated or 100…240 V ∿ power supply module	
References			**BMXP341000**	**BMXP342000**
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*(1) The maximum values for the number of discrete I/O, analog I/O, counter/motion control/serial link channels and the number of networks are not cumulative (they are limited by the maximum number of slots in the configuration, 1 rack: **11**, 2 racks: **23**, 3 racks: **35** and 4 racks: **47**.*
*(2) User web pages with **BMXNOE0110** Ethernet FactoryCast module (12 MB available).*
*(3) **BMXP3420102/20102CL/20302/20302CL** processors can be used to customize configuration of the device Boot Up procedure compatible with all CANopen third-party products. Requires Unity Pro software, version ≥ V4.1.*

Performance processors with or without memory card *(continued)*				
				
4 (with 4, 6, 8 or 12 slots)				
48				
1024 channels (modules with 8, 16, 32 or 64 channels)				
256 channels (modules with 2, 4, 6 or 8 channels)				
- On CANopen bus (63 devices), - On Ethernet Modbus/TCP via network module (63 devices with I/O Scanning function), - On Modbus link (32 devices).				
36 max.				
BMXEHC0200 2-channel (60 kHz) or BMXEHC0800 8-channel (10 kHz) modules				
BMXMSP0200 2-channel (200 kHz) PTO *(Pulse Train Output)* modules for servo drives				
MFB (Motion Function Blocks) library (for drives or servo drives on CANopen bus)		–		MFB (Motion Function Blocks) library (for drives or servo drives on CANopen bus)
BMXNOM0200 2-channel module or BMXNOR0200H module with 1 RTU serial channel				
Process control EFB library				
–		1 x 10BASE-T/100BASE-TX (Modbus/TCP, BOOTP/DHCP, FDR client, e-mail notification, class B10 standard web server)		
1 (63 slaves, 50…1000 Kbps, class M20) *(3)*		–		1 (63 slaves, 50…1000 Kbps, class M20) *(3)*
1 in RTU/ASCII Modbus master/slave mode or in Character mode (isolated RS232/RS485, 0.3…38.4 Kbps)				–
1 programming port (PC terminal) or HMI connection port				
2				
BMXNOE0100/0110 or BMXNOC0401 network modules or BMXNOR0200H module with 1 Ethernet RTU channel				
4				
BMXEIA0100 master module				
4096 KB				
3584 KB				
256 KB				
8 MB as standard	Supplied without card	8 MB as standard		Supplied without card
(2)				
8 or 128 MB (according to BMXRMS●●8MPF option card)				
1				
1				
64				
8.1 Kinstructions/ms				
6.4 Kinstructions/ms				
24 V ⎓ isolated, 24…48 V ⎓ isolated or 100…240 V ∿ power supply module				
BMXP3420102	**BMXP3420102CL**	**BMXP342020**	**BMXP3420302**	**BMXP3420302CL**
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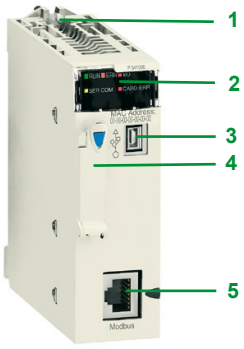
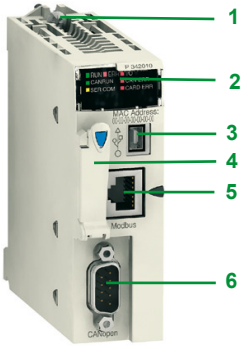
Modicon M340 automation platform
Processor modules



BMXP341000/2000



BMXP3420102/BMXP3420102CL

Presentation

Dedicated processor modules BMXP34, which form part of a Modicon M340 automation platform, are available in two types:
- Standard type processor modules
- Performance type processor modules

The main differences between these 2 types of processor are:
- Their number of I/O (512 or 1024)
- Their memory capacity (2,048 or 4,096 KB)
- The type of communication ports integrated in each model

Description of BMXP341000/2000/20102/20102CL processors

BMXP341000/2000/20102/20102CL Standard and Performance single-format processors have the following on the front panel:

1 Safety screw for locking the module in its slot (marked 0) in the rack.

2 A display block comprising 5 or 7 LEDs, depending on the model:
- Run LED (green): processor in operation (program execution)
- ERR LED (red): processor or system fault
- I/O LED (red): I/O module fault
- SER COM LED (yellow): activity on the Modbus serial link
- CARD ERR LED (red): memory card missing or faulty
- CAN RUN LED (green): integrated CANopen bus operational (**BMXP3420102** and **BMXP3420102CL** models only)
- CAN ERR LED (red): integrated CANopen bus fault (**BMXP3420102 and BMXP3420102CL** models only)

3 A mini B USB connector for a programming terminal (or Magelis GT/GTO/GK/GTW and STU/STO HMI terminal *(1)*).

4 A slot equipped with its Flash memory card *(2)* for backing up the application (an LED, located above this slot, indicates recognition of or access to the memory card).

5 An RJ45 connector for Modbus serial link or Character mode link (RS 232C/RS 485, 2-wire, isolated).

With, in addition, for **BMXP3420102** and **BMXP3420102CL** models:

6 A 9-way SUB-D connector for the integrated CANopen master bus.

(1) Magelis GT/GTO/GK/GTW and STU/STO graphic terminals with USB port and Vijeo Designer configuration software version ≥ 4.5. For more detailed information, please refer to our website www.schneider-electric.com.

(2) Except for model BMXP3420102CL, which is supplied without memory card.

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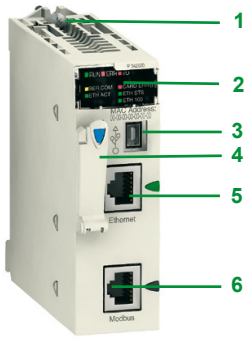
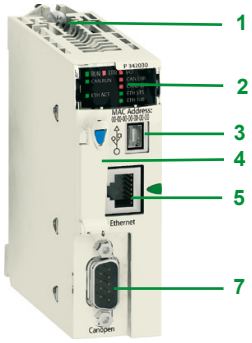
Ruggedized Modicon M340 modules: page 6/2

Modicon M340 automation platform
Processor modules



BMXP342020



BMXP3420302/BMXP3420302CL

Description of BMXP342020/20302/20302CL processors with integrated Ethernet Modbus/TCP port

BMXP342020/20302/20302CL Performance single-format processors have the following on the front panel:

1 Safety screw for locking the module in its slot (marked 0) in the rack.

2 A display block comprising 8 or 10 LEDs, depending on the model:
- Run LED (green): processor in operation (program execution)
- ERR LED (red): processor or system fault
- I/O LED (red): I/O module fault
- SER COM LED (yellow): activity on the Modbus serial link
- CARD ERR LED (red): memory card missing or faulty
- ETH ACT LED (green): activity on the Ethernet Modbus/TCP network
- ETH STS LED (green): Ethernet Modbus/TCP network status
- ETH 100 (red): Ethernet Modbus/TCP data rate (10 or 100 Mbps)
- CAN RUN LED (green): integrated CANopen bus operational (**BMXP3420302** and **BMXP3420302CL** models only)
- CAN ERR LED (red): integrated CANopen bus fault (**BMXP3420302** and **BMXP3420302CL** models only)

3 A mini B USB connector for a programming terminal (or Magelis GT/GTO/GK/GTW and STU/STO terminal *(1)*).

4 A slot equipped with its Flash memory card *(2)* for backing up the application (an LED, located above this slot, indicates recognition of or access to the memory card).

5 An RJ45 connector for connection to the 10BASE-T/100BASE-TX Ethernet Modbus/TCP network.

With, in addition, depending on the model:

6 **BMXP342020** processor: an RJ45 connector for the Modbus serial link or Character mode link (RS 232C/RS 485, 2-wire, isolated).

7 **BMXP3420302** and **BMXP3420302CL** processors: a 9-way SUB-D connector for the integrated CANopen master bus.

On the back panel: 2 rotary switches for selecting the IP address assignment method for the module.

USB terminal port

The USB port **3**, offering a useful data rate of 12 Mbps, is compatible with Unity Pro programming software, the OPC Factory Server *(OFS)*, and Magelis GT/GTO/GK/GTW and STU/STO HMI terminals *(1)*.

All **BMXP34** processors can be connected to a USB bus comprising several peripheral devices. However:
- Only one processor can be connected to the USB bus
- No device on the USB bus can be controlled by the PLC (modem, printer)

(1) Magelis GT/GTO/GK/GTW and STU/STO graphic terminals with USB port and Vijeo Designer configuration software version ≥ 4.5. For more detailed information, please refer to our website www.schneider-electric.com.

(2) Except for model BMXP3420302CL, which is supplied without memory card.

Modicon M340 automation platform
Processor modules

Memory cards

BMXRMS008MP memory card (included as standard)

Modicon M340 processors are supplied as standard *(1)* with an SD *(Secure Digital)* type Flash memory card, reference **BMXRMS008MP**. This card is intended for backing up the two memory areas on the processor module's internal RAM:
■ Program, symbols and comments area, which contains the executable binary code and the IEC source code of the application program for the program part
■ Constants area, which contains the constant data located by address.
The data is backed up automatically by duplication, when the PLC is turned off. Likewise, the restoration of the data is transparent for the user, on return of power.
Capacity of the "backup area" on the memory card:
□ 1792 KB for the **BMXP341000** Standard processor
□ 3584 KB for the **BMXP342●●●●** Performance processors

BMXP342020/20302/20302CL processors with an integrated Ethernet port have an additional 2 MB memory area specifically for **"**Standard Web services" (Transparent Ready B10) (see page 3/16).

The **BMXRMS008MP** memory card is formatted by Schneider Electric and included with each processor. It is referenced as a replacement part.

BMXRMS008MPF/128MPF optional memory cards

BMXP342●●●● Performance processors can take a **BMXRMS008MPF** or **BMXRMS128MPF** optional memory card, with greater memory capacity, in place of the standard memory card. These cards also provide a "file storage area" with a maximum capacity of 8 MB (for the **BMXRMS008MPF** card) or 128 MB (for the **BMXRMS128MPF** card).

This "file storage area" enables:
■ Any user-defined Word, Excel, PowerPoint or Acrobat Reader document to be received via FTP (for example, maintenance manuals, diagrams. etc.)
■ Additional data to be stored via EFB user function blocks (for example: production data, manufacturing recipes, etc.)

Unity Pro programming software helps the application designer manage the structure and memory space occupation of the Modicon M340 automation platform.

Protecting the application

If necessary, it is possible to prohibit access to the application (in terms of reading and modifying the program) by only loading the executable code in the PLC.

Additionally, a memory protection bit, set in configuration mode, is also available to prevent any program modification (via the programming terminal or downloading).

From Unity Pro V5.0 on, the user has function blocks for protecting know-how by means of a signature that can be loaded and stored in the M340 processor module's Flash memory card (code not executed if the signature is not present).

Program modification in online mode

As with Modicon Premium and Quantum platforms (with Unity Pro software), the online program modification function is available on the Modicon M340 automation platform with the option of adding or modifying the program code and data in different places in the application in a single modification session (thus ensuring modification is homogenous and consistent with the controlled process).
A dedicated memory area of the application internal RAM authorizes these program modification or addition sessions while complying with the recommendation to structure the application program in several, reasonably-sized sections.

(1) With the exception of 2 models (see page 1/9).

Modicon M340 automation platform
Processor modules

BMXP341000

BMXP342000

BMXP3420102/20102CL
BMXP3420302/20302CL

BMXP342020

BMXRMS008/128MPF

BMXXCAUSBH0●●

Modicon M340 processors

I/O capacity	Max. no. of network and bus modules	Integrated communication ports	Compatibility with Unity Pro software	Memory card	Reference	Weight kg
Standard BMXP3410, 2 racks						
512 discrete I/O **128 analog I/O** **20 application-specific channels** 2048 KB integrated (internal user memory)	2 Ethernet networks 2 AS-Interface buses	1 Modbus serial link	Version ≥ 3.0	Included	**BMXP341000**	0.200
Performance BMXP3420, 4 racks						
1024 discrete I/O **256 analog I/O** **36 application-specific channels** 4096 KB integrated (internal user memory)	2 Ethernet networks 4 AS-Interface buses	1 Modbus serial link	Version ≥ 3.0	Included	**BMXP342000**	0.200
		1 Modbus serial link 1 CANopen bus	Version ≥ 4.1	Included	**BMXP3420102** *(1)*	0.210
				Not included *(2)*	**BMXP3420102CL** *(1)*	0.210
		1 Modbus serial link 1 Ethernet network	Version ≥ 3.0		**BMXP342020**	0.205
		1 Ethernet network 1 CANopen bus	Version ≥ 4.1	Included	**BMXP3420302** *(1)*	0.215
				Not included *(2)*	**BMXP3420302CL** *(1)*	0.215

Memory cards

Description	Processor compatibility	Capacity	Reference	Weight kg
Flash Memory cards (optional) *(3)*	BMXP342000 BMXP3420102 BMXP342020 BMXP3420302 BMXP3420102CL BMXP3420302CL	8 MB + 8 MB file storage	**BMXRMS008MPF**	0.002
		8 MB + 128 MB file storage	**BMXRMS128MPF**	0.002

Separate parts

Description	Use		Length	Reference	Weight kg
	From	To			
Terminal port/USB cordsets	Mini B USB port on the Modicon M340 processor	Type A USB port on: - PC terminal, - Magelis XBT GT/GK/GTW, HMI GTW, HMI STU/STO HMI graphic terminal.	1.8 m	**BMXXCAUSBH018**	0.065
			4.5 m	**BMXXCAUSBH045**	0.110

Replacement part

Description	Use	Processor compatibility	Reference	Weight kg
8 MB standard Flash memory card	Included as standard with each processor. Used for: - Backing up the program, constants, symbols and data, - Activation of class B10 Web server.	BMXP341000 BMXP342000 BMXP342020 BMXP3420102/20302	**BMXRMS008MP**	0.002

(1) **BMXP3420102/20302** *processors, combined with Unity Pro software version ≥ 4.1, can be used to customize configuration of the device Boot Up procedure compatible with all CANopen third-party products.*

(2) These products are supplied without integrated memory card. The memory card must be ordered separately (see memory cards above).

(3) Memory cards for **BMXP342●●●●** *processors, to replace the standard memory card, used for:*
- *Backing up the program, constants, symbols and data*
- *Activation of class B10 Web server*
- *File storage*

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2

Modicon X80 I/O platform

Modicon X80 I/O platform (continued)

■ **Communication, integrated ports and modules**

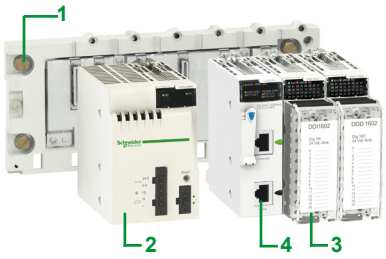
Modicon distributed I/O solutions

Modicon X80 I/O platform
Composition

Modicon X80 I/O platform with Modicon M340 processor

Modicon X80 Ethernet RIO drop with CRA bus terminal module

Ethernet Modbus/TCP DIO drop with PRA module



Presentation

The Modicon X80 I/O platform serves as the common base for automation platforms by simply adding a dedicated processor *(1)*.
It may also:
- form part of a Quantum Ethernet I/O architecture as an Ethernet RIO drop with a CRA bus terminal module
- form an Ethernet Modbus/TCP DIO drop with a PRA module

The Modicon X80 I/O platform is available in single-rack or multi-rack configuration.

This platform may also accept automation platform-dedicated modules (communication, application, etc.).

One Modicon X80 drop may support two racks separated by a cumulative distance of up to 30 metres.

This platform, common to several automation platforms, can reduce maintenance and training costs as it comprises:
- a single range of spare parts in stock
- training common to several PLCs

Based on the latest I/O technology, the Modicon X80 I/O platform offers:
- high-quality ruggedness and compactness
- compliance with international certifications (ATEX, IEC, etc.)
- a wide selection of modules: digital or analog I/O, expert modules, communication modules, etc.

This platform is programmed and configured using Unity Pro software.

Bit forcing simplifies simulation and structured data simplifies diagnostics.

Description

Modicon X80 I/O platform

The Modicon X80 I/O platform, which can be used in-rack and/or in remote I/O drops (RIO) and/or distributed I/O drops (DIO) depending on the type of PLC (M340, Quantum, etc.), offers:
1. racks with 4, 6, 8 or 12 slots
2. AC or DC power supply modules
3. digital and analog I/O modules
4. RTU (Remote Terminal Unit) communication modules, serial link, AS-Interface, etc.

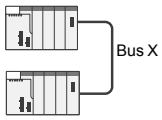
- Ethernet Modbus/TCP communication modules
- Character Mode and Modbus serial link modules (on X80 drops with Quantum Ethernet I/O)
- application-specific modules: counting, motion control
- modules offered within the framework of the CAPP program (Collaborative Automation Partner Program)
- supplementary modules dedicated to automation platforms (Ethernet modules for Modicon M340 processors, etc.)

Treatment for harsh environments

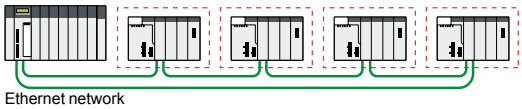
With “ruggedized” modules, the Modicon X80 I/O platform may be used in harsh environments or within a range of operating temperatures from - 25 °C to + 70 °C.
See pages 6/2 to 6/9.

(1) See the compatibility guide on page 2/4.

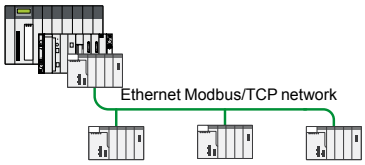
Modicon X80 I/O platform
Architecture, software configuration



Multi-rack configuration with M340 processor



Quantum Ethernet I/O with Modicon X80 Ethernet RIO drop



Ethernet Modbus/TCP DIO drop connected to an automation system platform

Architectures based on the Modicon X80 I/O platform

Single-rack or multi-rack configuration with M340 processor

This configuration comprises:
- a Modicon X80 I/O primary rack with a Modicon M340 processor
- a Modicon X80 I/O secondary rack

This configuration may comprise four racks with **BMXP342000** processors separated by a cumulative distance of up to a maximum of 30 metres.

Quantum Ethernet I/O with Modicon X80 Ethernet RIO drop

This architecture comprises:
- a Quantum Ethernet I/O platform comprising a processor and dedicated modules
- one or more Modicon X80 Ethernet RIO drops with a standard or high performance CRA drop adaptor

This configuration may include:
- 16 drops with **140CPU6●1●●** processors
- 31 drops with **140CPU6●2●●** processors

Ethernet Modbus/TCP DIO drop connected to an automation system platform

This architecture comprises:
- a Quantum/Premium/M340 automation platform
- one or more Ethernet Modbus/TCP DIO drops with a **BMXPRA0100** peripheral remote I/O adaptor, a power supply and I/O

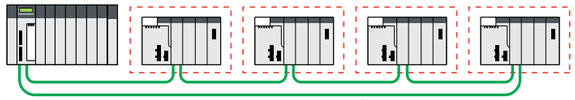
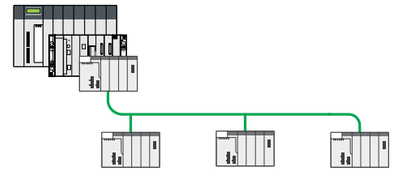
Unity Pro

Software configuration

Unity Pro programming software is required to set up the Modicon X80 I/O platform.

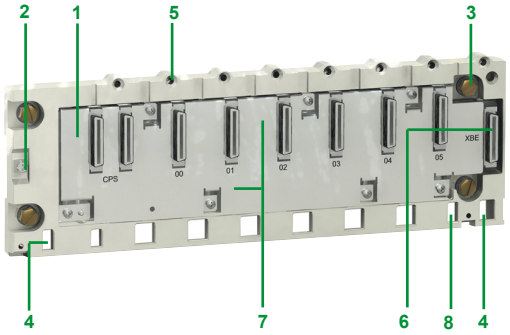
The Unity Pro function block software libraries make it possible to meet the needs of specialist applications in various fields of application such as:
- Water and Waste Water (WWW)
- Food & Beverage (F&B)
- Mining, Minerals, Metals (MMM)
- Oil & Gas (O&G)

Modicon X80 I/O platform
Product compatibility according to the network architecture

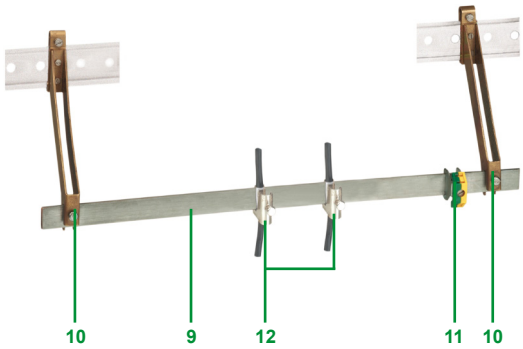
Product type	Reference	All Modicon M340 processors	Ethernet I/O Quantum drop with Modicon X80 RIO drop with CRA drop adaptor, type		Ethernet Modbus TCP DIO drop with PRA connected to a Quantum/Premium/M340 platform
		Single-rack or multi-rack	"standard" BMXCRA31200	"performance" BMXCRA31210	BMXPRA0100
					
Racks	BMXXBE1000/BMXXBE1000H				
	BMXXBE2005				
	BMXXBP0400/BMXXBP0400H				
	BMXXBP0600/BMXXBP0600H				
	BMXXBP0800/BMXXBP0800H				
	BMXXBP1200				
	BMXXEM010				
Power supply modules	BMXCPS2000				
	BMXCPS2010				
	BMXCPS3020/BMXCPS3020H				
	BMXCPS3500/BMXCPS3500H				
	BMXCPS3540T				
I/O	BMXAMI0410/BMXAMI0410H				
	BMXAMI0800				
	BMXAMI0810/BMXAMI0810H				
	BMXAMM0600/BMXAMM0600H				
	BMXAMO0210/BMXAMO0210H				
	BMXAMO0410/BMXAMO0410H				
	BMXAMO0802				
	BMXART0414/BMXART0414H				
	BMXART0814/BMXART0814H				
	BMXDAI0805				
	BMXDAI1602/BMXDAI1602H				
	BMXDAI1603/BMXDAI1603H				
	BMXDAI1604/BMXDAI1604H				
	BMXDAO1605/BMXDAO1605H				
	BMXDDI1602/BMXDDI1602H				
	BMXDDI1603/BMXDDI1603H				
	BMXDDI1604T				
	BMXDDI3202K				
	BMXDDI6402K				
	BMXDDM16022/BMXDDM16022H				
	BMXDDM16025/BMXDDM16025H				
	BMXDDM3202K				
	BMXDDO1602/BMXDDO1602H				
	BMXDDO1612/BMXDDO1612H				
	BMXDDO3202K				
	BMXDDO6402K				
	BMXDRA0804T				
	BMXDRA0805/BMXDRA0805H				
	BMXDRA1605/BMXDRA1605H				
Application-specific modules	BMXEAE0300/BMXEAE0300H				
	BMXEHC0200/BMXEHC0200H				
	BMXEHC0800/BMXEHC0800H				
	BMXERT1604T				
	BMXMSP0200				
Communication modules	BMXNOC0401				
	BMXNOE0100/BMXNOE0100H				
	BMXNOE0110/BMXNOE0110H				
	BMXNOM0200/BMXNOM0200H				
	BMXNOR0200H				
	BMXEIA0100				
	BMXNRP0200				
	BMXNRP0201				
	PMXNOW0300				

Compatible | **Not compatible**

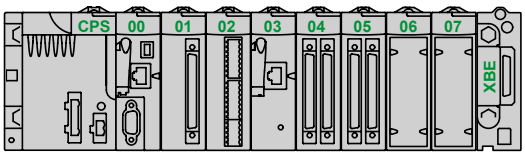
Modicon X80 I/O platform
Single-rack configuration



BMXXBP0600 rack with 6 slots



BMXXSP●●00 cable shielding connection kit



Example of installation with 8-slot rack

Presentation

BMXXBP●●00 racks are the basic element in Modicon X80 I/O platform single-rack and multi-rack configurations. They perform the following functions:

■ Mechanical function: they are used to install all the modules in a PLC station (power supply, processor, discrete, analog and application-specific I/O). These racks can be mounted on a panel, plate or DIN rail:

□ Inside enclosures

□ On machine frames, etc.

■ Electrical function: the racks incorporate a Bus X (proprietary bus). They are used to:

□ Distribute the power supplies required for each module in the same rack

□ Distribute data and service signals for the entire PLC station

□ Hot swap modules during operation

Description

BMXXBP●●00 racks are available in 4, 6, 8 or 12-slot versions and comprise:

1 A metal frame that performs the following functions:
- Holds the Bus X electronic card and protects it against EMI and ESD type interference
- Holds the modules
- Gives the rack mechanical rigidity

2 An earth terminal for earthing the rack

3 4 holes (big enough for M6 screws) for mounting the rack on a frame

4 2 fixing points for the shielding connection bar

5 Tapped holes to take the locking screw on each module

6 A connector for a rack expansion module, marked **XBE**

7 40-way female ½ DIN connectors forming the electrical connection between the rack and each module, marked **CPS**, **00**…**11** (the rack is delivered with each connector protected by a cover, which must be removed before inserting the module)

8 Slots for anchoring the module pins

To be ordered separately:

A **BMXXSP●●00** cable shielding connection kit, used to protect against electrostatic discharge when connecting the shielding on cordsets for connecting:

□ Analog, counter and motion control modules

□ A Magelis XBT operator interface to the processor (via **BMXXCAUSBH0●●** shielded USB cable)

The **BMXXSP●●00** shielding connection kit comprises:

9 A metal bar that takes the clamping rings and the earthing terminal

10 Two sub-bases to be mounted on the rack

11 An earthing terminal

12 Not included in the shielding connection kit, the **STBXSP30●0** clamping rings (sold in lots of 10, cross-section 1.5…6 mm² or 5…11 mm²)

Function

Addressing modules in a single-rack configuration *(1)*

Each rack must contain a power supply module and a processor module.

Installing the modules in the rack:

□ The power supply module always occupies the **CPS** slot

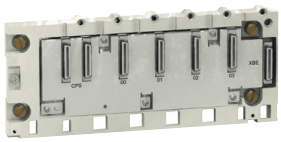
□ The processor module must always be installed in slot **00**

□ I/O modules and application-specific modules are installed from slot **01** to slot:
- **03** for a 4-slot rack
- **05** for a 6-slot rack
- **07** for an 8-slot rack
- **11** for a 12-slot rack

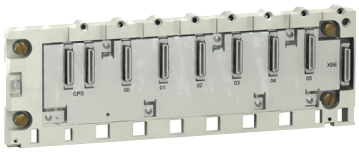
(1) For a multi-rack configuration with a BMXXBE1000 rack expansion module (XBE slot), see page 2/8.

I/O: pages 2/12 and 2/24
Communication: page 2/50
Software: page 4/2
Ruggedized Modicon M340 modules: page 6/2

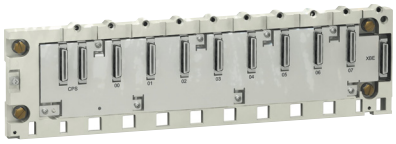
Modicon X80 I/O platform
Single-rack configuration



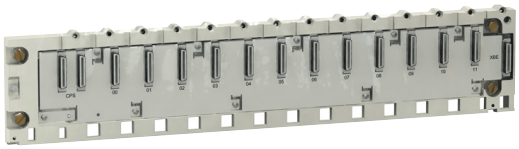
BMXXBP0400



BMXXBP0600



BMXXBP0800



BMXXBP1200

Racks

Description	Type of module to be inserted	No. of slots *(1)*	Power consumption *(2)*	Reference	Weight kg
Racks	BMXCPS power supply, BMXP34 processor, I/O modules, communication modules and application-specific modules (counter, motion control and serial)	4	1 W	**BMXXBP0400**	0.630
		6	1,5 W	**BMXXBP0600**	0.790
		8	2 W	**BMXXBP0800**	0.950
		12	0 W	**BMXXBP1200**	1.270

(1) Number of slots taking the processor module, I/O modules, communication modules and application-specific modules (excluding power supply module).

(2) Power consumption of anti-condensation resistor(s).

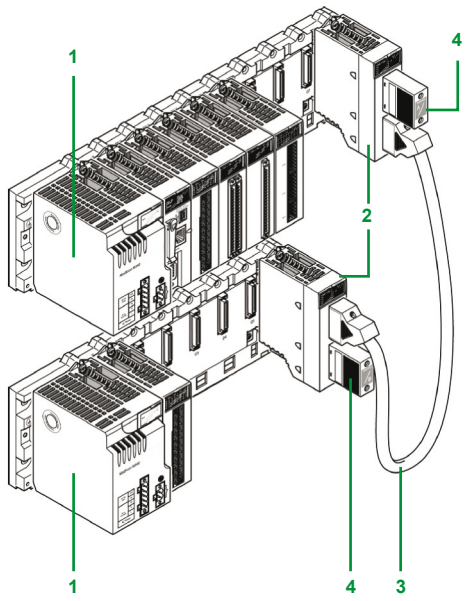
STBXSP●●00 + STBXP30●0

Accessories

Description	For use with	Reference	Weight kg
Shielding connection kits comprising: - 1 metal bar - 2 support sub-bases - 1 earthing terminal	BMXXBP0400 rack	**BMXXSP0400**	0.280
	BMXXBP0600 rack	**BMXXSP0600**	0.310
	BMXXBP0800 rack	**BMXXSP0800**	0.340
	BMXXBP1200 rack	**BMXXSP1200**	0.400
Spring clamping rings Sold in lots of 10	Cables, cross-section 1.5...6 mm²	**STBXSP3010**	0.050
	Cables, cross-section 5...11 mm²	**STBXSP3020**	0.070
Protective covers (replacement parts) Sold in lots of 5	Unoccupied slots on BMXXBP●●00 rack	**BMXXEM010**	0.005

I/O: pages 2/12 and 2/24
Communication: page 2/50
Software: page 4/2
Ruggedized Modicon M340 modules: page 6/2

Modicon X80 I/O platform
Multi-rack configuration



Composition of a multi-rack configuration

Multi-rack configurations are made up of standard **BMXXBP●●00** racks. They comprise:
- 2 racks maximum for a station with **BMXP341000 processor**
- 4 racks maximum for a station with **BMXP3420●●●** or **BMXP3420●●●CL processor**

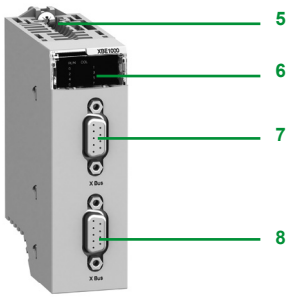
Each rack is equipped with:
1 A **BMXCPS●●●●●** power supply
2 A **BMXXBE1000** rack expansion module This module, inserted in the right-hand end of the rack (**XBE** slot, see page 2/6) does not occupy rack slots **00**…**11** (4, 6, 8 or 12 slots are still available)
3 The **BMXXBE1000** rack expansion modules are connected to each other by Bus X cordsets

Bus X

The racks, distributed on the Bus X, are connected to each other by Bus X extension cordsets **3** with a total length of **30 m maximum**.
The racks are connected in a daisy chain using **BMXXBC●●0K** *(1)* Bus X extension cordsets connected to the two 9-way SUB-D connectors **7** and **8** on the front panels of the **BMXXBE1000 rack expansion modules 2**.

Line terminators 4
Both expansion modules at the ends of the daisy chain must have a line terminator **4** **TSXTLYEX** on the unused 9-way SUB-D connector.

Note: *The processor module is always positioned in the rack at address 0. However, in a Bus X daisy chain, the order of the racks has no effect on operation. For example, the order of the daisy chain can be 0-1-2-3, 2-0-3-1 or 3-1-2-0, etc.*



Description

The front panel of the **BMXXBE1000** rack expansion module comprises:
5 Safety screw for locking the module in its slot (at the far right-hand end of the rack)
6 A display block with 5 LEDs:
- RUN LED (green): module in operation
- COL LED (red): several racks have the same address, or rack address 0 does not contain the **BMXP34●●●0** processor module
- LEDs 0, 1, 2 and 3 (green): rack address 0, 1, 2 or 3

7 A 9-way female SUB-D connector, marked Bus X, for the incoming Bus X cordset **3** connected to the upstream rack, or if it is the first rack, for the **A/** line terminator included in the **TSXTLYEX 4** pack
8 A 9-way female SUB-D connector, marked Bus X, for the outgoing Bus X cordset **3** to the downstream rack, or if it is the last rack, for the **/B** line terminator included in the **TSXTLYEX 4** pack

On the right-hand side panel
A flap for accessing the 3 rack addressing micro-switches: 0…3.

Installation rules for BMXXBP●●●0 racks
Rules for installing racks in enclosures (see our website www.schneider-electric.com).

(1) ***BMXXBC●●0K*** *extension cordsets, length 0.8 m, 1.5 m, 3 m, 5 m or 12 m, with angled connectors or* ***TSXCBY●08K*** *extension cordsets, length 1 m, 3 m, 5 m, 12 m, 18 m or 28 m, with straight connectors.*

Modicon X80 I/O platform
Multi-rack configuration

BMXXBE1000

Rack expansion

Description	Use	Reference	Weight kg
Modicon X80 I/O rack expansion module	Standard module for mounting in each rack (**XBE** slot) and used to interconnect: - Up to 2 racks with BMXP341000 processor module - Up to 4 racks with BMXP342●●●● processor module	**BMXXBE1000**	0.178
Modicon X80 I/O rack expansion kit	Complete kit for 2-rack configuration comprising: - 2 BMXXBE1000 rack expansion modules - 1 BMXXBC008K extension cordset, length 0.8 m - 1 TSXTLYEX line terminator (set of 2)	**BMXXBE2005**	0.700

BMXXBC●●●K

Cordsets and connection accessories

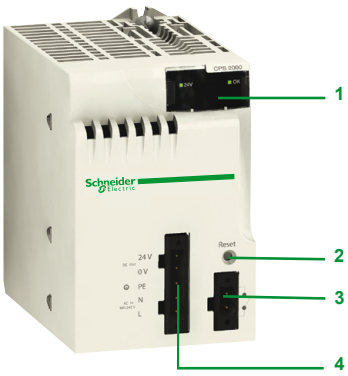
Description	Use	Composition	Type of connector	Length	Reference	Weight kg
Bus X extension cordsets total length 30 m max.	Between 2 BMXXBE1000 rack expansion modules	2 x 9-way SUB-D connectors	Angled	0.8 m	**BMXXBC008K**	0.165
				1.5 m	**BMXXBC015K**	0.250
				3 m	**BMXXBC030K**	0.420
				5 m	**BMXXBC050K**	0.650
				12 m	**BMXXBC120K**	1.440
			Straight	1 m	**TSXCBY010K**	0.160
				3 m	**TSXCBY030K**	0.260
				5 m	**TSXCBY050K**	0.360
				12 m	**TSXCBY120K**	1.260
				18 m	**TSXCBY180K**	1.860
				28 m	**TSXCBY280K**	2.860
Cable reel	Length of cable to be fitted with TSX CBY K9 connectors	Cable with ends with flying leads, 2 line testers	–	100 m	**TSXCBY1000**	12.320

TSXTLYEX

Description	Use	Composition	Sold in lots of	Reference	Weight kg
Line terminators	Required on the 2 BMXXBP●●●0 modules located at either end of the daisy chain	2 x 9-way SUB-D connectors marked A/ and /B	2	**TSXTLYEX**	0.050
Bus X straight connectors	For TSXCBY1000 cables	2 x 9-way SUB-D straight connectors	2	**TSXCBYK9**	0.080
Connector assembly kit	Fitting TSXCBYK9 connectors	2 crimping pliers, 1 pen *(1)*	–	**TSXCBYACC10**	–

(1) To fit the connectors on the cable, you also need a wire stripper, a pair of scissors and a digital ohmmeter.

Modicon X80 I/O platform
Power supply modules



Presentation

BMXCPS●●●● power supply modules provide the power supply for each **BMXXBP●●00** Modicon X80 I/O rack and the modules installed on it.

The Modicon X80 I/O power supply module offer comprises:
- Three power supply modules for DC line supplies:
  - 24 V ⎓ isolated power supply module, **BMXCPS2010**
  - 24...48 V ⎓ isolated power supply module, **BMXCPS3020**
  - 125 V ⎓ power supply module, **BMXCPS3540T** (extended operating temperature -25° to +70°C)
- Two power supply modules for AC line supplies:
  - 100...240 V ∿, 20 W power supply module, **BMXCPS2000**
  - 100...240 V ∿, 36 W power supply module, **BMXCPS3500**

Description

The power supply module is selected according to:
- The electrical line supply: 24 V ⎓, 48 V ⎓, 125 V ⎓ or 100...240 V ∿
- The required power (see the power consumption table on page 7/22) *(1)*

BMXCPS●●●● power supply modules have the following on the front panel:
1. A display block comprising:
   - OK LED (green), lit if rack voltages are present and correct
   - 24 V LED (green), lit when the sensor voltage is present

(BMXCPS2000/3500/3540T AC power supply modules only)
2. A pencil-point RESET pushbutton for a cold restart of the application
3. A 2-way connector that can take a removable terminal block (cage clamp or spring-type) for connecting the alarm relay
4. A 5-way connector that can take a removable terminal block (cage clamp or spring-type) for connecting the following:
   - ⎓ or ∿ line supply
   - Protective earth
   - Dedicated 24 V ⎓ power supply for the input sensors (for BMXCPS2000/3500/3540T AC power supply modules only)

Included with each power supply module:
- Set of two cage clamp removable terminal blocks (5-way and 2-way) **BMXXTSCPS10**

To be ordered separately (if necessary)**:**
- Set of two spring-type removable terminal blocks (5-way and 2-way) **BMXXTSCPS20**

Functions

Alarm relay

The alarm relay incorporated in each power supply module has a volt-free contact accessible on the front panel, on the 2-way connector.

The operating principle is as follows:
In normal operation, with the PLC in RUN, the alarm relay is energized and its contact is closed (state 1).
The relay de-energizes and its associated contact opens (state 0) whenever the application stops, even partially, due to any of the following:
- Occurrence of a blocking fault
- Incorrect rack output voltages
- Loss of supply voltage

(1) This power consumption calculation for the rack can also be performed by the Unity Pro programming software.

Functions (continued)

RESET pushbutton

The power supply module in each rack has a RESET button on the front panel which, when pressed, triggers an initialization sequence on the processor and the modules in the rack it supplies.
Pressing this pushbutton triggers a sequence of service signals, which is the same as that for:
- A power break, when the pushbutton is pressed
- A power-up, when the pushbutton is released

In terms of the application, these operations represent a cold start (forcing the I/O modules to state 0 and initializing the processor).

Sensor power supply

BMXCPS2000/3500 AC power supply modules and **BMXCPS3540T** DC power supply modules have an integrated 24 V ⎓ supply for powering the input sensors.
Connection to this 24 V ⎓ sensor power supply is via the 5-way connector on the front panel.
The available power depends on the power supply module (0.45 A or 0.9 A).

References

Each **BMXXBP●●00** rack must be equipped with a power supply module. These modules are inserted in the first two slots of each rack (marked CPS).
The power required to supply each rack depends on the type and number of modules installed in the rack. It is therefore necessary to draw up a power consumption table for each rack in order to determine which **BMXCPS●●●0** power supply module is the most suitable for each rack (see page 7/22).

BMXCPS2010/3020

BMXCPS2000/3500

Power supply modules *(1)*

Line supply	Available power *(2)*				Nominal current	Reference	Weight
	3.3 V ⎓ *(3)*	24 V ⎓ rack *(3)*	24 V ⎓ sensors *(4)*	Total	24 V ⎓ rack *(3)*		kg
24 V ⎓ isolated	8.3 W	16.8 W	–	16.8 W	0.7 A	**BMXCPS2010**	0.290
24...48 V ⎓ isolated	15 W	31.2 W	–	31.2 W	1.3 A	**BMXCPS3020**	0.340
100...150 V ⎓	15 W	31.2 W	21.6 W	36 W *(5)*	1.3 A	**BMXCPS3540T** *(5)*	0.340
100...240 V ∿	8.3 W	16.8 W	10.8 W	20 W	0.7 A	**BMXCPS2000**	0.300
	15 W	31.2 W	21.6 W	36 W	1.3 A	**BMXCPS3500**	0.360

Separate part

Description	Type	Composition	Reference	Weight kg
Set of 2 removable connectors	Spring-type	One 5-way terminal block and one 2-way terminal block	**BMXXTSCPS20**	0.015

Replacement part

Description	Type	Composition	Reference	Weight kg
Set of 2 removable connectors	Cage clamp	One 5-way terminal block and one 2-way terminal block	**BMXXTSCPS10**	0.020

*(1) Include a set of 2 cage clamp removable connectors. Spring-type connectors available separately under reference **BMXXTSCPS20**.*
(2) The sum of the power consumed on each voltage (3.3 V ⎓ and 24 V ⎓) must not exceed the total power of the module. See the power consumption table on page 7/22.
(3) 3.3 V ⎓ and 24 V ⎓ rack voltages for powering modules in the Modicon X80 I/O rack.
(4) 24 V ⎓ sensor voltage for powering the input sensors (voltage available via the 2-way removable connector on the front panel).
(5) Extended operating temperature -25° to +70°C (with power derating at extreme temperatures: 27 W between -25° and 0°C and between 60° and 70°C).

Modicon X80 I/O platform
Discrete I/O modules
Input modules

Applications		Input module 8 channels	16-channel input modules	
		Connection via cage clamp, screw clamp or spring-type removable block terminal		
				
Type		∼	⎓	
Voltage		200…240 V	24 V	48 V
Current per channel		10.4 mA (for U = 220 V to 50 Hz)	3.5 mA	2.5 mA
Modularity (Number of channels and commons)		8 isolated inputs and 1 common	16 isolated inputs and 1 common	
Connection		Via 20-way cage clamp, screw clamp or spring-type removable terminal block BMXFTB2000/2010/2020		
Isolated inputs	IEC/EN 61131-2 conformity	Type 2	Type 3	Type 1
	Logic	–	Positive *(sink)*	
	Type of input	Capacitive	Current sink	
	Sensor compatibility IEC/EN 60947-5-2	2-wire ∼	2-wire ⎓, 3-wire ⎓ PNP any type	
Sensor power supply (ripple included)		170…264 V	19…30 V	38…60 V
Protection of inputs		Use one 0.5 A fast-blow fuse per group of channels		
Maximum dissipated power		4.73 W	2.5 W	3.6 W
Operating temperature		0…60°C		
Compatibility with installation help system TeSys Quickfit		–		
Compatibility with pre-wired system Modicon Telefast ABE7	Passive connection sub-bases	–		
	Adaptor sub-bases with relays	–		
References		**BMXDAI0805**	**BMXDDI1602**	**BMXDDI1603**
Pages		2/22		

16-channel input modules			
Connection via cage clamp, screw clamp or spring-type removable block terminal			
			
∼ or ⎓	∼		⎓
24 V (∼ or ⎓)	48 V	100…120 V	125 V
3 mA (∼ or ⎓)	5 mA		2.4 mA
16 isolated inputs and 1 common			
Via BMXFTB2000/2010/2020 20-way cage clamp, screw clamp or spring-type removable block terminal			
Type 1 (∼)	Type 3		–
Negative *(source)* (⎓)	–		Positive *(sink)*
Resistive	Capacitive		Current sink
2-wire ⎓/∼, 3-wire ⎓ PNP or NPN any type	2-wire ∼		–
19...30 V ⎓ 20…26 V ∼	40…52 V	85…132 V	88…150 V
Use one 0.5 A fast-blow fuse per group of channels			
3 W	4 W	3.8 W	8.5 W (at 40°C)
0…60°C			-25…70°C
–			
–			
–			
BMXDAI1602	**BMXDAI1603**	**BMXDAI1604**	**BMXDDI1604T**
2/22			

Modicon X80 I/O platform
Discrete I/O modules
Input modules and mixed I/O modules

Applications		32 or 64-channel high-density input modules	
		Connection via 40-way connectors with preassembled cordsets	
			
Type		⎓	
Voltage		24 V	
Current per channel	Inputs	2.5 mA	1 mA
	Outputs	–	–
Modularity (Number of channels and commons)		32 isolated inputs and 2 commons	64 isolated inputs and 4 commons
Connection		Via one 40-way connector	Via two 40-way connectors
Isolated inputs	IEC/EN 61131-2 conformity	Type 3	Non-IEC
	Logic	Positive *(sink)*	
	Type of input	Current sink	
	Sensor compatibility IEC/EN 60947-5-2	2-wire ⎓, 3-wire ⎓ PNP any type	–
Sensor power supply (ripple included)		19…30 V	
Protection of inputs		Use one 0.5 A fast-blow fuse per group of channels	
Isolated outputs	Fallback	–	
	IEC/EN 61131-2 conformity	–	
	Protection	–	
	Logic	–	
Preactuator power supply (ripple included)		–	
Output fuse protection		–	
Maximum dissipated power		3.9 W	4.3 W
Operating temperature		0…60°C	
Compatibility with installation help system TeSys Quickfit		LU9 G02 splitter boxes (8 motor starters) and BMXFCC●●1/●●3 preassembled cordsets. See pages 2/19 and 2/23.	
Compatibility with pre-wired system Modicon Telefast ABE7	Passive connection sub-bases	Depending on model, 8 or 16-channel passive sub-bases, with or without LED, with common or 2 terminals per channel. See pages 5/2 and 5/8.	
	Adaptor sub-bases with relays	Depending on model, active sub-bases with solid state or electromagnetic relays (fixed or removable), 16 channels, with common or 2 terminals per channel (screw or spring-type connection). See pages 5/2 and 5/8.	
References		**BMXDDI3202K**	**BMXDDI6402K**
Pages		2/22	

16 or 32-channel mixed I/O module		
Connection via cage clamp, screw clamp or spring-type removable block terminal		Connection via 40-way connector with preassembled cordsets
		
⎓	⎓ and ∿ (outputs only)	⎓
Inputs: 24 V Solid-state outputs: 24 V	Inputs: 24 V ⎓ Relay outputs: 24 V ⎓ or 24…240 V ∿	Inputs: 24 V Solid-state outputs: 24 V
3.5 mA	3.5 mA	2.5 mA
0.5 A	2 A (⎓ or ∿)	0.1 A
8 isolated inputs and 1 common, 8 isolated outputs and 1 common		16 isolated inputs and 1 common, 16 isolated outputs and 1 common
Via BMXFTB2000/2010/2020 20-way cage clamp, screw clamp or spring-type removable terminal block		Via one 40-way connector
Type 3		
Positive *(sink)*	–	Positive *(sink)*
Current sink		
2-wire ⎓, 3-wire ⎓ PNP any type		
19…30 V		
Use one 0.5 A fast-blow fuse per group of channels		
Configurable output fallback, continuous monitoring of output control and resetting of outputs in case of internal fault		
Yes		
Protected	Not protected	Protected
Positive	–	Positive
19…30 V	19...30 V ⎓ 24...240 V ∿	19…30 V
Use a 2 A fast-blow fuse	Use a 12 A fast-blow fuse	Use a 2 A fast-blow fuse
3.7 W	3.1 W	4 W
0…60°C		
–		LU9 G02 splitter boxes (8 motor starters) and BMXFCC●●1/●●3 preassembled cordsets. See pages 2/19 and 2/23.
–		Depending on model, 8 or 16-channel passive sub-bases, with or without LED, with common or 2 terminals per channel. See pages 5/2 and 5/8.
–		Depending on model, active sub-bases with solid state or electromagnetic relays (fixed or removable) 16 channels, with common or 2 terminals per channel (screw or spring-type connection). See pages 5/2 and 5/8.
BMXDDM16022	**BMXDDM16025**	**BMXDDM3202K**
2/23		

Modicon X80 I/O platform
Discrete I/O modules
Output modules

Applications		32 or 64-channel high-density output modules	
		Connection via 40-way connectors with preassembled cordsets	
			
Type		⎓ transistor	
Voltage		24 V	
Current per channel		0.1 A	
Modularity (Number of channels and commons)		32 protected outputs and 2 commons	64 protected outputs and 4 commons
Connection		Via one 40-way connector	Via two 40-way connectors
Isolated outputs	Fallback	Configurable output fallback, continuous monitoring of output control and resetting of outputs in case of internal fault	
	IEC/EN 61131-2 conformity	Yes	
	Protection	Yes	
	Logic	Positive	
Preactuator power supply (ripple included)		19…30 V ⎓	
Output fuse protection		Use one 2 A fast-blow fuse per group of channels	
Maximum dissipated power		3.6 W	6.85 W
Operating temperature		0…60°C	
Compatibility with installation help system TeSys Quickfit		LU9 G02 splitter boxes (8 motor starters) and BMXFCC●●1/●●3 preassembled cordsets. See pages 2/19 and 2/23.	
Compatibility with pre-wired system Modicon Telefast ABE7	Passive connection sub-bases	Depending on model, passive sub-bases with 8 or 16 channels, with or without LED, with common or with 2 terminals per channel. See pages 5/2 and 5/8.	
	Adaptor sub-bases with relays	Depending on model, active sub-bases with solid state or electromagnetic relays (fixed or removable). 16 channels with 1 common or 2 terminals per channel, screw or spring-type connection. See pages 5/2 and 5/8	
References		**BMXDDO3202K**	**BMXDDO6402K**
Pages		2/22	

	16-channel output modules		8 or 16-channel output modules	
	Connection via cage clamp, screw clamp or spring-type removable block terminal			
				
	⎓ transistor	∿ triac	⎓ relay	⎓/∿ relay
	24 V	100…240 V	100…150 V	24 V ⎓, 24…240 V a
	0.5 A	0.6 A	0.3 A (Ith)	2 A (Ith)
	16 protected outputs and 1 common	16 non-protected outputs and 4 commons	8 non-protected outputs, without common	16 non-protected outputs and 2 commons
	Via BMXFTB2000/2010/2020 20-way cage clamp, screw clamp or spring-type removable block terminal			
	Configurable output fallback, continuous monitoring of output control and resetting of outputs in case of internal fault	Configurable output fallback		
	Yes	Yes		
	Yes	–		
	Positive *(source)*	Negative *(sink)*	–	
	19…30 V	100…240 V	100…150 V	19...30 V ⎓ 24...240 V ∿
	Use one 6.3 A fast-blow fuse per group of channels	Use one 3 A fast-blow fuse per group of channels	Use one 0.5 A, 250 V DC fast-blow fuse on each relay	Use one 3 A fast-blow fuse on each channel / Use one 12 A fast-blow fuse on each group of channels
	4 W / 2.26 W	–	3.17 W	2.7 W / 3 W
	0…60°C		-25…70°C	0…60°C
	–			
	–			
	–			
	BMXDDO1602	**BMXDDO1612**	**BMXDAO1605**	**BMXDRA0804T** / **BMXDRA0805** / **BMXDRA1605**
	2/22			

Modicon X80 I/O platform
Discrete I/O modules

Presentation

Discrete I/O modules in the Modicon X80 I/O offer are standard modules occupying a single slot on the rack. These modules are equipped with either of the following:
- A connector for a screw or spring-type 20-way removable terminal block
- One or two 40-way connectors

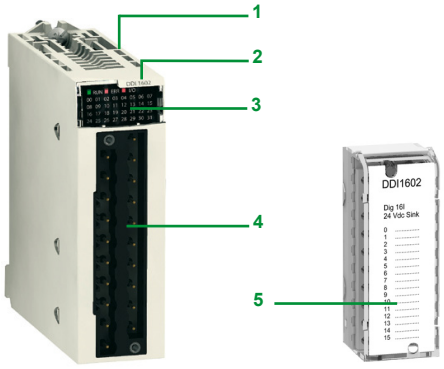
This wide range of "discrete" I/O can be used to meet whatever requirements arise in terms of:
- Functions, AC or DC I/O, positive or negative logic
- Modularity, 8, 16, 32 or 64 channels per module

The inputs receive signals from the sensors and perform the following functions:
- Acquisition
- Adaptation
- Electrical isolation
- Filtering
- Protection against interference signals

The outputs memorize commands issued by the processor to enable control of the preactuators via the decoupling and amplification circuits.

Description

BMXD●I/D●O/DRA discrete I/O modules are standard format (1 slot). They have a case, which ensures IP 20 protection of the electronics, and are locked into position by a captive screw.

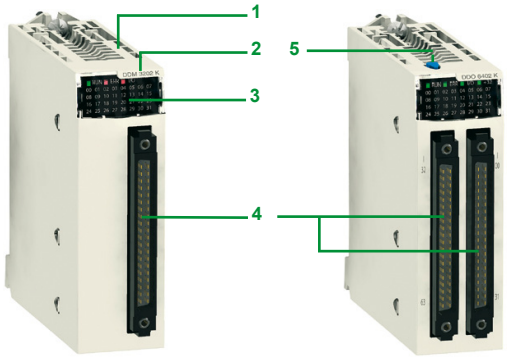


Module for connection via 20-way removable terminal block

I/O modules connected via 20-way removable terminal block

1 Rigid body providing support and protection for the electronic card
2 Module reference marking (a label is also visible on the right-hand side of the module)
3 Channel status display block
4 Connector taking the 20-way removable terminal block for connecting sensors or preactuators

To be ordered separately:
5 A **BMXFTB20●0** 20-way removable terminal block (identification label supplied with each I/O module) or a preassembled cordset with a 20-way removable terminal block at one end and flying leads at the other (see page 2/19).



32 and 64-channel modules for connection via one or two 40-way connector(s)

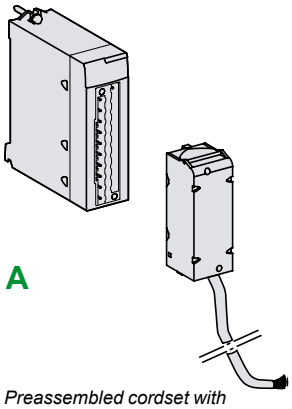
I/O modules connected via 40-way connector(s)

1 Rigid body providing support and protection for the electronic card
2 Module reference marking (a label is also visible on the right-hand side of the module)
3 Channel status display block
4 One or two 40-way connectors (32 or 64 channels) *(1)* for connecting sensors or preactuators
5 With the 64-channel module, a pushbutton which, with successive presses, displays the state of channels 0...31 or 32...63 on the display block **3** (see page 2/20)

To be ordered separately, depending on the type of module:
One or two preassembled cordset(s) with a 40-way connector (see page 2/19)

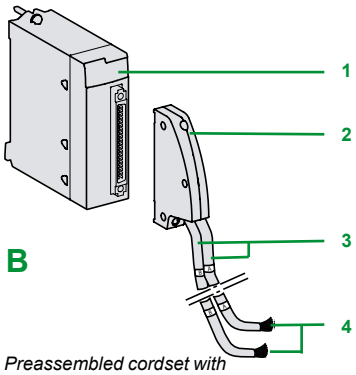
(1) Fujitsu FCN 40-way connector

Modicon X80 I/O platform
Discrete I/O modules



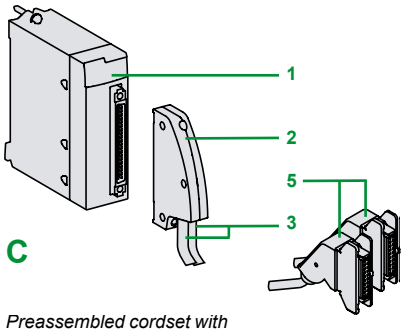
A

Preassembled cordset with 20-way removable terminal block at one end and flying leads at the other



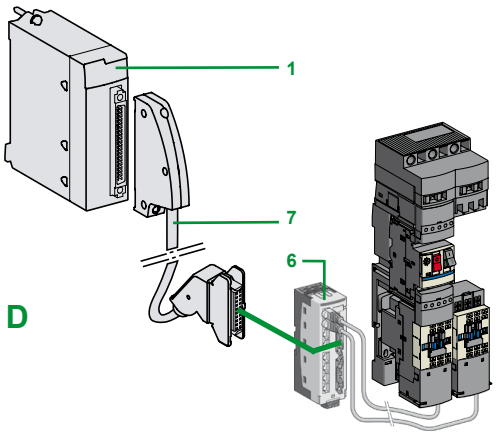
B

Preassembled cordset with 40-way connector and two ends with flying leads



C

Preassembled cordset with 40-way connectors and HE10 connectors for Modicon Telefast ABE7 system



D

Example of connection to the TeSys Quickfit installation help system

Connecting modules with removable terminal blocks

There are three types of 20-way removable terminal block:
- Screw clamp terminal block
- Cage clamp terminal block
- Spring-type terminal block

Each removable terminal block can take:
- Bare wires
- Wires equipped with **DZ5CE** cable ends

A : One version of the removable terminal block is equipped with 3, 5 or 10 m cordsets with colour-coded flying leads (**BMXFTW●●1**). Use limited to voltages of ≤ 48 V.

Cage clamp terminal blocks

The capacity of each terminal is:
- Minimum: One 0.34 mm²wire (AWG 22)
- Maximum: One 1 mm² wire (AWG 18)

BMXFTB2000 cage clamp connectors are equipped with captive screws (maximum tightening torque 0.5 N.m).

Screw clamp terminal blocks

The capacity of each terminal is:
- Minimum: One or two 0.34 mm² wires (AWG 22)
- Maximum: Two 1.5 mm² wires (AWG 15)

BMXFTB2010 screw clamp connectors are equipped with captive screws (maximum tightening torque 0.5 N.m).

Spring terminals

The capacity of each terminal in the **BMXFTB2020** spring-type terminal blocks is:
- Minimum: One 0.34 mm² wire (AWG 22)
- Maximum: One 1 mm² wire (AWG 18)

Connecting modules with 40-way connectors

Preassembled cordsets with 40-way connector at one end and flying leads at the other

B : Preassembled cordsets can be used for easy direct wire-to-wire connection between the I/O of modules with 40-way connectors**1** and the sensors, preactuators or intermediate terminal blocks.
These preassembled cordsets comprise:
- At one end, a 40-way connector **2** with either of the following:
  - One sheath containing 20 wires with a cross-section of 0.34 mm² (AWG 22) (**BMXFCW●●1**)
  - Two sheaths **3**, each containing 20 wires with a cross-section of 0.34 mm² (AWG 22) (**BMXFCW●●3**)
- At the other end, colour-coded flying leads **4** conforming to standard DIN47100.

Preassembled cordsets with 40-way connector and HE 10 connector(s)

C : Two types of cordset can be used for connecting the I/O of modules **1** with 40-way connectors to Modicon Telefast ABE7 rapid wiring connection and adaptation interfaces, (see page 5/8).
These preassembled cordsets comprise:
- At one end, a 40-way connector **2** with either of the following:
  - One sheath containing 20 wires (**BMXFCC●●1**)
  - Two sheaths **3** each containing 20 wires (**BMXFCC●●3**)
- At the other end, one or two HE 10 connectors **5**.

Connection to TeSys Quickfit system

D : **1** **BMXDDI3202K/6402K** input modules, **BMXDDO3202K/6402K** output modules and **BMXDDM3202K** mixed I/O modules with 40-way connectors are designed, amongst other things, for use in conjunction with the TeSys Quickfit mounting system via the **LU9G02 splitter module** **6** (for 8 motor starters).
The splitter modules are easily connected using **7** **BMXFCC●●1**/**●●3** preassembled cordsets.

Modicon X80 I/O platform
Discrete I/O modules

Run		Err		I/O		+32	
0	1	2	3	4	5	6	7
8	9	10	11	12	13	14	15
16	17	18	19	20	21	22	23
24	25	26	27	28	29	30	31

Display block for module BMXDDO6402K

Functions *(1)*

The discrete I/O modules provide the following functions:

■ **Hot swapping**: Due to their special integrated devices, I/O modules (including application-specific modules) can be removed or added while the power is on.

■ **I/O assignment**: The channels of discrete I/O modules are grouped into blocks of 4, 8 or 16 consecutive channels depending on the type of module. Each group of channels can be assigned to a specific application task, namely master or fast.

■ **Protection of DC inputs**: The 24 V ⎓ and 48 V ⎓ inputs are constant-current type. This characteristic ensures and limits the current consumed at the inputs.

■ **Protection of DC outputs**: All active transistor outputs are protected against overload, short-circuits, reverse polarity and inductive over-voltage.

■ **Reactivation of DC outputs**: If a fault has caused an output to trip, the output can be reactivated using this parameter if no other terminal fault is present. Reactivation is controlled by means of a group of 8 channels. It can be programmed or automatic.

■ **RUN/STOP** command: An input can be configured to control the RUN/STOP changeover for the PLC.

■ **Output fallback**: This parameter defines the fallback mode used by the DC transistor outputs when the PLC stops. It can assume the “fallback” value at state 0 or state 1 for the corresponding group of 8 channels or the “maintain” value representing the state of the outputs before the PLC stops.

■ **I/O module diagnostics**: Each discrete I/O module is equipped with a display block on the front panel centralizing all the information necessary for module control, diagnostics and maintenance.

Diagnostics via Unity Pro:
Using the integrated diagnostics in Unity Pro, this local diagnostics on the module front panel is complemented by system diagnostics based on predefined screens at global hardware configuration level, module level and channel level (see page 4/4).

Remote diagnostics using a web browser on a “Thin Client” PC:
In addition, the diagnostics described above can be performed remotely using a simple web browser thanks to the standard web server integrated in the Modicon X80 I/O platform (processor with integrated Ethernet port or Ethernet module), using the “ready-to-use” Rack Viewer function (see page 3/16).

■ **Compatibility with 2-wire and 3-wire sensors**: The discrete input modules can be used in conjunction with OsiSense XS inductive proximity sensors (for compatibility, see page 7/16) and with OsiSense XU photo-electric sensors (for compatibility, see page 7/14).

(1) For further information, please consult our website at www.schneider-electric.com.

Complementary characteristics

The following characteristics complement those introduced in the selection guide on pages 2/12 to 2/17.

DC input modules BMXDDI16●●/1604T/3202K/6402K and BMXDAI1602

- Input impedance at nominal voltage: 6.4 to 19.2 kΩ, depending on model
- Reverse polarity: Protection for modules BMXDDI1602/1603/3202K
- Paralleling of inputs *(1)*: Yes, for modules BMXDDI1602/1603
- Dielectric strength between group of channels: 500 V ⎓ for modules BMXDDI3202K/6402K
- Temperature derating for module BMXDDI1604T: No derating up to 40°C, a maximum of 25% of inputs at state 1 at 70°C

AC input modules BMXDAI16●●/0805

- Input frequency: 47 to 63 Hz
- Current peak on activation at nominal voltage: 5 to 240 mA depending on model
- Input impedance at nominal voltage and F = 55 Hz: 6 to 21 kΩ, depending on model

Triac output modules BMXDAO1605

- Current via common: 2.4 A
- Current for all 4 commons together: 4.8 A

DC transistor output modules BMXDDO16●●/3202K/6402K

- Dielectric strength between groups of channels: 500 V ⎓ for modules BMXDDO3202K/6402K

Relay output modules BMXDRA080●●/1605

- Protection against AC inductive overvoltage: Use an RC circuit or ZNO surge limiter appropriate to the voltage in parallel on each output.
- Protection against DC inductive overvoltage: Use a discharge diode on each output.

Mixed I/O relay module BMXDDM16025

- Input impedance at nominal voltage: 6.8 kΩ
- Dielectric strength between groups of inputs: 500 V ⎓

DC mixed I/O modules BMXDDM16022/3202K

- Input impedance at nominal voltage: 6.8 to 9.6 kΩ, depending on model
- Reverse polarity on the inputs: Protection
- Paralleling of outputs: Yes, for a maximum of 2 outputs for module BMXDDM16022 and a maximum of 3 outputs for module BMXDDM3202K

(1) This characteristic allows several inputs to be wired in parallel on the same module or on different modules for input redundancy.

Modicon X80 I/O platform
Discrete I/O modules
Input modules and output modules

BMXDDI160●●
BMXDAI●●●●

BMXDDI3202K

BMXDDI6402K

References

Discrete input modules *(1)*

Type of current	Input voltage	Connection via *(2)*	IEC/EN 61131-2 conformity	No. of channels (common)	Reference	Weight kg
⎓	24 V (positive logic)	Screw or spring-type 20-way removable terminal block	Type 3	16 isolated inputs (1 x 16)	**BMXDDI1602**	0.115
		One 40-way connector	Type 3	32 isolated inputs (2 x 16)	**BMXDDI3202K**	0.110
		Two 40-way connectors	Non-IEC	64 isolated inputs (4 x 16)	**BMXDDI6402K**	0.145
	24 V (negative logic)	Screw or spring-type 20-way removable terminal block	Non-IEC	16 isolated inputs (1 x 16)	**BMXDAI1602**	0.115
	48 V (positive logic)	Screw or spring-type 20-way removable terminal block	Type 1	16 isolated inputs (1 x 16)	**BMXDDI1603**	0.115
	125 V (positive logic)	Screw or spring-type 20-way removable terminal block		16 isolated inputs (1 x 16)	**BMXDDI1604T**	0.144
∼	24 V	Screw or spring-type 20-way removable terminal block	Type 1	16 isolated inputs (1 x 16)	**BMXDAI1602**	0.115
	48 V	Screw or spring-type 20-way removable terminal block	Type 3	16 isolated inputs (1 x 16)	**BMXDAI1603**	0.115
	100…120 V	Screw or spring-type 20-way removable terminal block	Type 3	16 isolated inputs (1 x 16)	**BMXDAI1604**	0.115
	200…240 V	Screw or spring-type 20-way removable terminal block	Type 2	8 isolated inputs (1 x 8)	**BMXDAI0805**	0.152

BMXDDO16●2

BMXDRA0805/ 1605

BMXDDO3202K

BMXDDO6402K

Discrete output modules *(1)*

Type of current	Output voltage	Connection via *(2)*	IEC/EN 61131-2 conformity	No. of channels (common)	Reference	Weight kg
⎓ **transistor**	24 V/0.5 A (positive logic)	20-way removable terminal block, screw or spring-type	Yes	16 protected outputs (1 x 16)	**BMXDDO1602**	0.120
	24 V/0.5 A (negative logic)	20-way removable terminal block, screw or spring-type	–	16 protected outputs (1 x 16)	**BMXDDO1612**	0.120
	24 V/0.1 A (positive logic)	One 40-way connector	Yes	32 protected outputs (2 x 16)	**BMXDDO3202K**	0.110
		Two 40-way connectors	Yes	64 protected outputs (4 x 16)	**BMXDDO6402K**	0.150
∼ **triac**	100…240	20-way removable terminal block, screw or spring-type	–	16 outputs (4 x 4)	**BMXDAO1605**	0.140
⎓ **relay**	100…150 V ⎓/ 0.3 A	20-way removable terminal block, screw or spring-type	Yes	8 non-protected outputs	**BMXDRA0804T**	0.178
⎓ **or** ∼ **relay**	24 V ⎓/2 A 24…240 V ∼/ 2 A	20-way removable terminal block, screw or spring-type	Yes	8 non-protected outputs (without common)	**BMXDRA0805**	0.145
		20-way removable terminal block, screw or spring-type	Yes	16 non-protected outputs (2 x 8)	**BMXDRA1605**	0.150

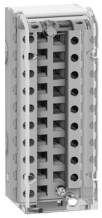
(1) Typical consumption: See the power consumption table on page 7/22.
(2) 64-channel modules have 2 connectors and therefore require 2 connection cables.


BMXDDM1602● BMXDDM3202K

References (continued)

Discrete mixed I/O modules (1)

Number of I/O	Connection	No. of input channels (common)	No. of output channels (common)	IEC/EN 61131-2 conformity	Reference	Weight kg
16	Screw or spring-type 20-way removable terminal block	8 (positive logic) (1 x 8)	8, transistor 24 V ⎓ / 0.5 A (1 x 8)	Inputs, type 3	**BMXDDM16022**	0.115
			8, relay 24 V ⎓ or 24…240 V ∿ (1 x 8)	Inputs, type 3	**BMXDDM16025**	0.135
32	One 40-way connector	16 (positive logic) (1 x 16)	16, transistor 24 V ⎓ / 0.1 A (1 x 16)	Inputs, type 3	**BMXDDM3202K**	0.110


BMXFTB2000

Removable terminal blocks

Description	For use with	Type	Reference	Weight kg
20-way removable terminal blocks	For module with 20-way removable terminal block	Cage clamp	**BMXFTB2000**	0.093
		Screw clamp	**BMXFTB2010**	0.075
		Spring	**BMXFTB2020**	0.060

Preassembled cordsets for 16-channel I/O modules with removable terminal block

Description	Composition	Cross-section	Length	Reference	Weight kg
Preassembled cordsets with one end with flying leads for 16-channel I/O modules Operating voltage ≤ 48 V	One 20-way spring-type removable terminal block (BMXFTB2020) and one end with colour-coded flying leads	0.324 mm²	3 m	**BMXFTW301**	0.850
			5 m	**BMXFTW501**	1.400
			10 m	**BMXFTW1001**	2.780


BMXFTW●01

Preassembled cordsets for 16, 32 and 64-channel I/O modules with 40-way connectors

Description	No. of sheaths	Composition	Cross-section	Length	Reference	Weight kg
Preassembled cordsets with one end with flying leads	1 x 20 wires (16 channels)	One 40-way connector and one end with colour-coded flying leads	0.324 mm²	3 m	**BMXFCW301**	0.820
				5 m	**BMXFCW501**	1.370
				10 m	**BMXFCW1001**	2.770
	2 x 20 wires (32 channels) *(2)*	One 40-way connector and two ends with colour-coded flying leads	0.324 mm²	3 m	**BMXFCW303**	0.900
				5 m	**BMXFCW503**	1.490
				10 m	**BMXFCW1003**	2.960


BMXFCW●01


BMXFCW●03

Preassembled cordsets for Modicon Telefast ABE7 sub-bases	1 x 20 wires (16 channels)	One 40-way connector and one HE 10 connector	0.324 mm²	0.5 m	**BMXFCC051**	0.140
				1 m	**BMXFCC101**	0.195
				2 m	**BMXFCC201**	0.560
				3 m	**BMXFCC301**	0.840
				5 m	**BMXFCC501**	1.390
				10 m	**BMXFCC1001**	2.780
	2 x 20 wires (32 channels) *(2)*	One 40-way connector and two HE 10 connectors	0.324 mm²	0.5 m	**BMXFCC053**	0.210
				1 m	**BMXFCC103**	0.350
				2 m	**BMXFCC203**	0.630
				3 m	**BMXFCC303**	0.940
				5 m	**BMXFCC503**	1.530
				10 m	**BMXFCC1003**	3.000


BMXFCC●01

(1) Typical consumption: See the power consumption table on page 7/22.
(2) 64-channel modules have 2 connectors and therefore require 2 connection cables.

Modicon X80 I/O platform
Analog I/O modules
Input modules

Applications		Analog inputs	
			
Type of input		Isolated low-level inputs, voltage, thermocouples, temperature probes, resistors	
Type		Multirange	
Range	Voltage	± 40 mV, ± 80 mV, ± 160 mV, ± 320 mV, ± 640 mV, ± 1.28 V	
	Current	–	
	Thermocouple Temperature probe Resistor	Thermocouples, type B, E, J, K, L, N, R, S, T, U 2, 3 or 4-wire temperature probes, type Pt100, JPt100, Pt1000, JPt1000, Ni100, Ni1000 (in accordance with DIN43760) and Cu 10 2, 3 or 4-wire resistors, 400 Ω or 4000 Ω	
Modularity		4 inputs	8 inputs
Acquisition period		400 ms for the 4 inputs	400 ms for the 8 inputs
Conversion time		–	
Resolution		15 bits + sign	
Isolation	Between channels	750 V⎓	
	Between channels and bus	1400 V⎓	
	Between channels and earth	750 V⎓	
Connection	Directly to the module	Via 40-way connector	Via two 40-way connectors
	Via preassembled cordsets	Cordsets with one end with colour-coded flying leads BMXFCW●01S (3 or 5 m long)	
Compatibility with pre-wired system Modicon Telefast ABE7	Connection sub-base	4-channel sub-base for direct connection of 4 thermocouples plus connection and provision of cold junction compensation. See page 5/8	
	Type of connection sub-base	ABE7CPA412	
	Type of preassembled cordsets	BMXFCA●●2 (1.5, 3 or 5 m long)	
References		**BMXART0414**	**BMXART0814**
Pages		2/32	

Analog inputs			
			
Isolated high-level inputs		Non-isolated high-level inputs	Isolated high-level inputs
Voltage/current			
± 10 V, 0…10 V, 0...5 V, 1..5 V, ± 5 V			
0...20 mA, 4…20 mA, ± 20 mA			
–			
4 inputs		8 inputs	
Fast: 1 + (1 x no. of declared channels) ms Default: 5 ms for the 4 channels		Fast: 1 + (1 x no. of declared channels) ms Default: 9 ms for the 8 channels	
–			
16 bits		15 bits + sign	
300 V⎓		–	300 V⎓
1400 V⎓			
1400 V⎓			
Via 20-way removable terminal block (screw or spring-type) BMXFTB20●0		Via 28-way removable terminal block (cage clamp-type) BMXFTB2800 or (spring-type) BMXFTB2820	
Cordsets with one end with colour-coded flying leads BMXFTW●01S (3 or 5 m long)		Cordsets with one end with colour-coded flying leads BMXFTW●08S (3 or 5 m long)	
4-channel sub-base for direct connection of 4 inputs, delivers and distributes 4 protected isolated power supplies. See page 5/8		8-channel sub-base for direct connection of 8 current/voltage inputs. See page 5/8	
ABE7CPA410		ABE7CPA02/03/31/31E	ABE7CPA02/31/31E
BMXFCA●●0 (1.5, 3 or 5 m long)		BMXFTA●●0 (1.5 or 3 m long)	
BMXAMI0410		**BMXAMI0800**	**BMXAMI0810**
2/32			

Modicon X80 I/O platform
Analog I/O modules
Output modules and mixed I/O modules

Applications		Analog Outputs		
				
Type of I/O		Isolated high-level outputs	Isolated high-level outputs	High-level outputs non-isolated
Type		Voltage/current		Current
Range	Voltage	± 10 V		–
	Current	0...20 mA, 4…20 mA		
Modularity		2 outputs	4 outputs	8 outputs
Acquisition period (inputs)		–		
Conversion time (outputs)		≤ 1 ms		≤ 4 ms
Resolution	Inputs	–		
	Outputs	15 bits + sign		
Isolation		Between channels: 750 V ⎓		
		Between channels and bus: 1400 V ⎓		
		Between channels and earth: 1400 V ⎓		
Connection	Directly to the module	Via 20-way removable terminal block (screw or spring-type) BMXFTB20●0		
	Via preassembled cordsets	Cordsets with one end with colour-coded flying leads BMXFTW●01S (3 or 5 m long)		
Compatibility with pre-wired system Modicon Telefast ABE7	Connection sub-base	4-channel sub-base for direct connection of 2/4 current/voltage outputs. See page 5/8		8-channel sub-base for direct connection of 8 current/voltage inputs. See page 5/8
	Type of connection sub-base	ABE7CPA21		ABE7CPA02
	Type of preassembled cordsets	BMXFCA●●0 (1.5, 3 or 5 m long)		BMXFTA●●2 (1.5 or 3 m long)
References		**BMXAMO0210**	**BMXAMO0410**	**BMXAMO0802**
Pages		2/32		

Mixed analog I/O

Non-isolated high-level inputs and outputs
Voltage/current
Inputs: ± 10 V, 0…10 V, 0...5 V, 1..5 V Outputs: ± 10 V
Inputs: 0...20 mA, 4…20 mA Outputs: 0...20 mA, 4…20 mA
4 inputs and 2 outputs
Fast: 1 + (1 x no. of declared channels) ms Default: 5 ms for the 4 channels
≤ 1 ms
14…12-bit in U range 12-bit in I range
12-bit in U range 11-bit in I range
Between groups of input or output channels: 750 V ⎓
Between channels and bus: 1400 V ⎓
Between channels and earth: 1400 V ⎓
Via 20-way removable terminal block (screw or spring-type) BMXFTB20●0
BMXFTW●01S cordsets with one end with colour-coded flying leads (3 or 5 m long)
–
–
–
BMXAMM0600
2/32

2

More technical information on www.schneider-electric.com

Modicon X80 I/O platform
Analog I/O modules

Presentation

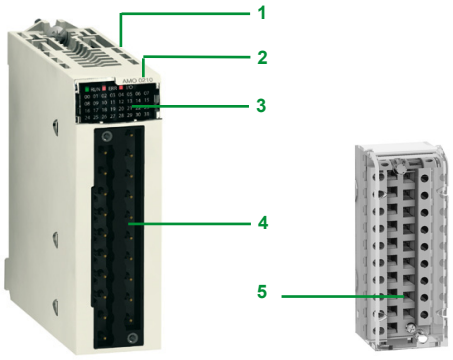
The Modicon X80 I/O analog I/O module offer comprises:
- 5 analog input modules:
  - 2 modules with 4 and 8 isolated channels, low-level voltage, thermocouples, Pt, JPt, Ni or Cu temperature probes and resistors, 15 bits + sign **BMXART0414/0814**
  - 1 module with 4 high-speed isolated analog channels, high-level voltage or current, 16 bits **BMXAMI0410**
  - 2 modules with 8 high-speed non-isolated analog channels, high-level voltage or current, 15 bits + sign **BMXAMI0800/0810**
- 3 analog output modules:
  - 1 module with 2 isolated analog channels, high-level voltage or current, 15 bits + sign **BMXAMO0210**
  - 1 module with 4 isolated analog channels, high-level voltage or current, 15 bits + sign **BMXAMO0410**
  - 1 module with 8 non-isolated analog channels, high-level current, 15 bits + sign **BMXAMO0802**
- 1 mixed analog I/O module with 4 input channels and 2 output channels (non-isolated), voltage or current, 12 to 14 bits according to type of channel and range **BMXAMM0600**

Analog I/O modules are equipped with a connector for a 20 or 28-way removable terminal block, except for **BMXART0414/0814** analog input modules for thermocouples/temperature probes, which are equipped with one or two 40-way connector(s).

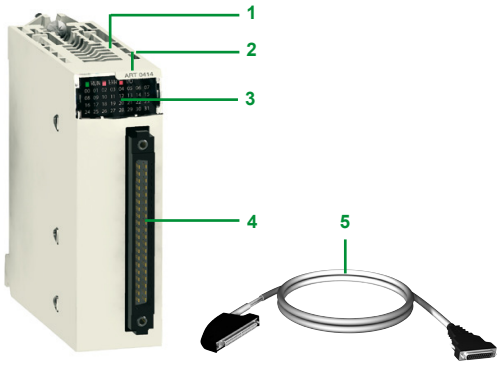
All analog modules occupy a single slot in **BMXXBP●●●** racks. These modules can be installed in any slot in the rack, except the first two (PS and 00) which are reserved for the power supply module and the processor module respectively.

The power supply for the analog functions is supplied by the backplane bus (3.3 V and 24 V). Analog I/O modules are hot-swappable (see page 2/20).

Modicon X80 I/O platform
Analog I/O modules



Module for connection via 20 or 28-way removable terminal block



Module for connection for 40-way connector

Description

BMXAM●/ART analog I/O modules are standard format (1 slot). They have a case, which ensures IP 20 protection of the electronics, and are locked into position by a captive screw.

I/O modules connected via 20 or 28-way removable terminal block

BMXAM● analog I/O modules feature the following:

1 A rigid body providing support and protection for the electronic card
2 A module reference marking (a label is also visible on the right-hand side of the module)
3 A module and channel status display block
4 A connector taking the 20 or 28-way removable screw or spring-type terminal block for directly connecting the sensors or preactuators to the module.

To be ordered separately:

5 A **BMXFTB20●0** or **BMXFTB28●0** 20 or 28-way removable terminal block (referencing label supplied with each I/O module) or pre-wired cables with:
- A 20-way terminal block at one end and flying leads at the other (**BMXFTW●01S)**
- A 28-way terminal block at one end and flying leads at the other (**BMXFTW●08S)**
- A 20 or 28-way terminal block and a 25-way SUB-D connector (**BMXFCA●●0** or **BMXFTA●●0**), for connection to Modicon Telefast ABE7 sub-bases (see page 2/33).

I/O modules connected via 40-way connector

BMXART analog input modules have the following on the front panel:

1 A rigid body providing support and protection for the electronic card
2 A module reference marking (a label is also visible on the right-hand side of the module)
3 A module and channel status display block
4 One (or two) 40-way connector(s) for connecting the sensors

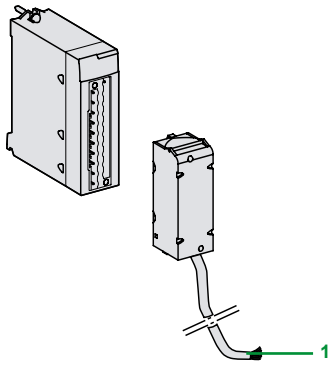
To be ordered separately:

5 Pre-wired cables with:
- A 40-way connector at one end and flying leads at the other **BMXFCW●01S**
- A 40-way connector and a 25-way SUB-D connector (**BMXFCA●●2**) for direct connection to the Modicon Telefast ABE7 sub-bases (see page 2/33)

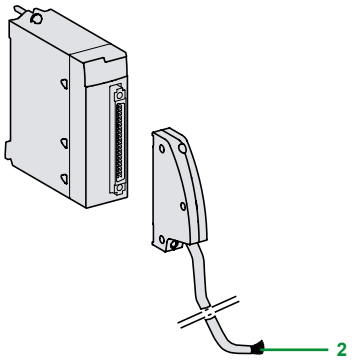
Must be ordered separately:

■ A shielding connection kit to protect against electrostatic discharge, consisting of a metal bar and two sub-bases for mounting on the rack supporting the analog modules

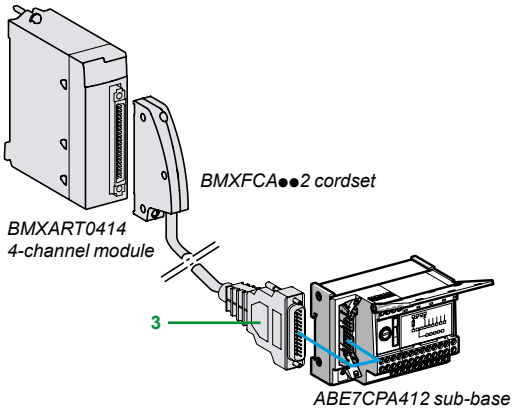
■ A set of **STBXSP3020** clamping rings for the shielding braids of analog signal cables



BMXFTW●01S cordset
(with 20-way removable terminal block at one end and flying leads at the other)



BMXFCW●01S cordset
(with 40-way connector at one end and flying leads at the other)



Connecting modules with removable terminal blocks

BMXAMI0410, BMXAMO and BMXAMM modules with 20-way terminal block

The 20-way removable terminal blocks (**BMXFTB20●0**) are the same as those used for discrete I/O modules (screw clamp, cage clamp or spring-type) (see page 2/19).
One version of the removable terminal block is equipped with a 3 or 5 m cordset with colour-coded flying leads (**BMXFTW●01S**). These preassembled cordsets with reinforced shielding have colour-coded flying leads at the other end **1**.

BMXAMI0800/0810 modules with 28-way terminal block

The 28-way removable terminal blocks are cage clamp-type (**BMXFTB2800**) or spring-type (**BMXFTB2820**).
One version of the removable terminal block is equipped with a 3 or 5 m cordset with colour-coded flying leads (**BMXFTW●08S**). These preassembled cordsets with reinforced shielding have colour-coded flying leads at the other end **1**.

Connecting modules with 40-way connectors

BMXART0●14 modules with 40-way connectors

Two types of cordset are available:

- Preassembled **cordsets with reinforced shielding (BMXFCW●01S)** which have colour-coded flying leads at the other end **2**. Available in 3 or 5 m lengths, they enable easy direct wire-to-wire connection of the analog sensors via terminal blocks.
- Preassembled cordsets with reinforced shielding (**BMXFCA●02**) which have a 25-way SUB-D connector at the other end **3**. Available in 1.5, 3 or 5 m lengths, they enable direct connection to the Modicon Telefast **ABE7CPA412** sub-base (see below).

Use with Modicon Telefast ABE7 sub-bases

Using the Modicon Telefast ABE7 pre-wired system makes it easier to install the modules since the inputs (or outputs) can be accessed via screw terminals. 7 special sub-bases are available:

Modicon Telefast ABE7CPA410 sub-base

The Modicon Telefast ABE7CPA410 sub-base is mainly used in conjunction with the **BMXAMI0410** voltage/current analog 4-input module. This sub-base allows you to:

- Directly connect 4 sensors
- Remotely locate the input terminals in voltage mode
- Power the 4 to 20 mA conditioning units one channel at a time with a 24 V voltage, protected and limited to 25 mA, while maintaining isolation between channels
- Protect the current impedance matching resistors integrated in the sub-base against overvoltages

Connection is via the **BMXFCA●●0** cordset (1.5, 3 or 5 m long).

Modicon Telefast ABE7CPA412 sub-base

The Modicon Telefast ABE7CPA412 sub-base is specially designed as a wiring interface for the **BMXART0414** and **BMXART0814** thermocouple modules. This sub-base allows you to:

- Connect 4 thermocouple probes
- Provide external cold junction compensation with a temperature probe integrated in the sub-base
- Ensure continuity of the shielding

The **BMXART0814** module requires two Modicon Telefast **ABE7CPA412** sub-bases. The connection with each sub-base is made via a **BMXFCA●●2** cordset (1.5, 3 or 5 m long).

Modicon Telefast ABE7CPA21 sub-base

The Modicon Telefast ABE7CPA21 sub-base is compatible with the **BMXAMO0210** output module. This sub-base allows you to:

- Directly connect 2 current/voltage outputs
- Ensure continuity of the shielding

Connection is via the **BMXFCA●●0 3** cordset (1.5, 3 or 5 m long).

Use with Modicon Telefast ABE7 sub-bases (continued)

Modicon Telefast ABE7CPA02 sub-base

The Modicon Telefast **ABE7CPA02** sub-base can be used in combination with:
- The **BMXAMI0800/0810** analog current input modules with 8 inputs
- The **BMXAMO0802** analog current output modules with 8 outputs

This sub-base allows you to:
- Connect the 8 analog inputs or outputs point-to-point
- Ensure continuity of the shielding

The **BMXAMI0800/0810** modules are connected by means of the 1.5 or 3 m long **BMXFTA●●0** cables.
The **BMXAMO0802** module is connected by means of the 1.5, 3 or 5 m long **BMXFTA●●2** cables.

Modicon Telefast ABE7CPA03 sub-base

The Modicon Telefast **ABE7CPA03** sub-base can be used in combination with the **BMXAMI0800** voltage/current analog 8-input module.
This sub-base allows you to:
- Directly connect 8 analog inputs
- Power the current inputs one channel at a time with a voltage of 24 V that is protected and limited to 25 mA
- Ensure continuity of the shielding

The **BMXAMI0800** module is connected by means of the 1.5 or 3 m long **BMXFTA●●0** cables.

Modicon Telefast ABE7CPA31/31E sub-bases

The Modicon Telefast **ABE7CPA31/31E** sub-bases can be used in combination with the **BMXAMI0800/0810** voltage/current analog 8-input modules.
This sub-base allows you to:
- Directly connect 8 analog inputs
- Power the current inputs one channel at a time with 24 V converters
- Ensure continuity of the shielding

The **BMXAMI0800/0810** modules are connected by means of the 1.5 or 3 m long **BMXFTA●●0** cables.

Complementary characteristics

BMXART0414/0814 analog input modules

The **BMXART0414/0814** modules are multirange input modules with 4 or 8 low-level isolated inputs (15 bits + sign) respectively.
Depending on the choice made during configuration, the modules offer, for each of the inputs, the following ranges:
- Temperature probe: Pt100, JPt100, Pt1000, JPt1000, Cu10, Ni100 or Ni1000 (in accordance with DIN43760), with open-circuit detection
- Thermocouple: B, E, J, K, L, N, R, S, T or U with broken wire detection
- Resistor: 0…400 or 0…4000 Ω, 2, 3 or 4-wire
- Voltage: ± 40 mV, ± 80 mV, ± 160 mV, ± 320 mV, ± 640 mV, ± 1.28 V

BMXAMI0410 analog input modules

The **BMXAMI0410** module is a high-level analog input module with 4 isolated inputs (16 bits).
Used with sensors or transmitters, it performs monitoring, measurement and process control functions for continuous processes.
The module offers the following ranges for each of the inputs depending on the choice made during configuration:
- Voltage ± 10 V, ± 5 V, 0…10 V, 0…5 V and 1…5 V
- Current 0…20 mA, 4…20 mA and ± 20 mA, depending on the choice made during configuration

BMXAMI0800/0810 analog input modules

The BMXAMI0800/0810 analog input modules are modules with 8 high-level isolated/non-isolated analog inputs (15 bits + sign).
The modules offer the following ranges for each of the inputs depending on the choice made during configuration:
- Voltage: ± 10 V, 0…10 V, 0…5 V, 1…5 V, ± 5 V
- Current: 0…20 mA and 4…20 mA

2

Complementary characteristics (continued)

BMXAMO0210 analog output module

The **BMXAMO0210** module is a module with 2 high-level isolated outputs (15 bits + sign).
The **BMXAMO0210** module offers the following ranges for each of the inputs depending on the choice made during configuration:
- Voltage: ± 10 V
- Current: 0…20 mA and 4…20 mA

BMXAMO0410/0802 analog output modules

The **BMXAMO0410/0802** analog output modules are modules with 4 or 8 high-level isolated/non-isolated analog outputs (16 bits/15 bits + sign).
The **BMXAMO0410** module offers the following ranges for each of the outputs depending on the choice made during configuration:
- Voltage: ± 10 V
- Current: 0…20 mA and 4…20 mA

The **BMXAMO0802** module offers the current ranges 0…20 mA and 4…20 mA.

BMXAMM0600 analog mixed I/O module

The **BMXAMM0600** mixed module is a non-isolated I/O module with 4 inputs (14/12) bits and 2 outputs (12 bits). The module offers the following ranges for each of the inputs or outputs depending on the choice made during configuration:
- Voltage: ± 10 V, 0…10 V, 0…5 V and 1…5 V
- Current: 0…20 mA and 4…20 mA

References

BMXAM●0●●0

BMXART0414

Analog input modules *(1)*

Type of input	Input signal range	Resolution	Connection	No. of channels	Reference	Weight kg
Isolated high-level inputs	± 10 V, 0…10 V, 0…5 V, 1…5 V, ± 5 V, 0…20 mA, 4…20 mA, ± 20 mA	16 bits	Removable terminal block, 20-way cage clamp, screw clamp or spring-type	4 channels	**BMXAMI0410**	0.143
High-level inputs non-isolated	± 10 V, 0…10 V, 0…5 V, 1…5 V, ± 5 V, 0…20 mA	15 bits + sign	Removable terminal block, 28-way, cage clamp or spring-type	8 channels	**BMXAMI0800**	0.175
Isolated high-level inputs	± 10 V, 0…10 V, 0…5 V, 1…5 V, ± 5 V, 0…20 mA,	15 bits + sign	Removable terminal block, 28 way, cage clamp or spring-type	8 channels	**BMXAMI0810**	0.175
Isolated low-level inputs	Temperature probe, thermocouple, ± 40 mV, ± 80 mV, ± 160 mV, ± 320 mV, ± 640 mV, ± 1.28 V	15 bits + sign	40-way connector	4 channels	**BMXART0414**	0.135
				8 channels	**BMXART0814**	0.165

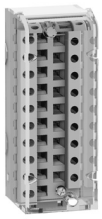
Analog output modules *(1)*

Type of outputs	Output signal range	Resolution	Connection	No. of channels	Reference	Weight kg
Isolated high-level outputs	± 10 V, 0…20 mA, 4…20 mA	16 bits	Removable terminal block, 20-way, cage clamp, screw clamp or spring-type	2 channels	**BMXAMO0210**	0.144
High-level outputs isolated	± 10 V, 0…20 mA, 4…20 mA, ± 20 mA	15 bits + sign	Removable terminal block, 20-way, cage clamp, screw clamp or spring-type	4 channels	**BMXAMO0410**	0.175
High-level outputs non-isolated	0…20 mA, 4…20 mA	15 bits + sign	Removable terminal block, 20-way, cage clamp, screw clamp or spring-type	8 channels	**BMXAMO0802**	0.175

Analog mixed I/O module *(1)*

Type of I/O	Signal range	Resolution	Connection	No. of channels	Reference	Weight kg
Mixed I/O, non-isolated	± 10 V, 0…10 V, 0…5 V, 1…5 V, 0…20 mA, 4…20 mA	14 bits or 12 bits depending on the range	Removable terminal block, 20-way, cage clamp, screw clamp or spring-type	Inputs: 4 channels Outputs: 2 channels	**BMXAMM0600**	0.155

(1) Typical consumption: See the power consumption table on page 7/22.



BMXFTB20●0

BMXFTW●01S

ABE7CPA41●/21

BMXFCA●●0

BMXFCA●●2

References (continued)

Connection accessories for analog modules (1)

Description	For use with modules	Type, composition	Length	Reference	Weight kg
20-way removable terminal blocks	BMXAMI0410 BMXAMO0210 BMXAMO0410 BMXAMO0802 BMXAMM0600	Cage clamp	–	**BMXFTB2000**	0.093
		Screw clamp	–	**BMXFTB2010**	0.075
		Spring	–	**BMXFTB2020**	0.060
28-way removable terminal block	BMXAMI0800 BMXAMI0810	Cage clamp	–	**BMXFTB2800**	0.111
		Spring	–	**BMXFTB2820**	0.080
Preassembled cordsets	BMXAMI0410 BMXAMO0210 BMXAMO0410 BMXAMO0802 BMXAMM0600	One 20-way terminal block (BMXFTB2020) and one end with colour-coded flying leads	3 m	**BMXFTW301S**	0.470
			5 m	**BMXFTW501S**	0.700
	BMXAMI0800 BMXAMI0810	1 removable terminal block, 28-way, MX FTB 2820, and one end with colour-coded flying leads	3 m	**BMXFTW308S**	0.435
			5 m	**BMXFTW508S**	0.750
	BMXART0414 BMXART0814	One 40-way connector and one end with colour-coded flying leads	3 m	**BMXFCW301S**	0.480
			5 m	**BMXFCW501S**	0.710

Modicon Telefast ABE7 pre-wired system

Description	For use with modules	Type, composition	Length or connection technology	Reference	Weight kg
Modicon Telefast ABE7 sub-bases	BMXAMI0410	Distribution of isolated power supplies Delivers 4 protected isolated power supplies for 4…20 mA inputs. Direct connection of 4 inputs	Screws	**ABE7CPA410**	0.180
	BMXART0414 BMXART0814 (2)	Connection and provision of cold-junction compensation for thermocouples Direct connection of 4 inputs	Screws	**ABE7CPA412**	0.180
	BMXAMO0210 BMXAMO0410	Direct connection of 2/4 outputs	Screws	**ABE7CPA21**	0.210
	BMXAMI0800 BMXAMI0810 BMXAMO0802	Point-to-point connection of 8 I/O	Screws	**ABE7CPA02**	0.317
	BMXAMI0800	Direct connection of 8 inputs Delivers 8x 24 V ⎓ power supplies limited to 25 mA to the 8 current inputs	Screws	**ABE7CPA03**	0.307
	BMXAMI0800 BMXAMI0810	Direct connection of 8 inputs Delivers 8x 24 V ⎓ power supplies isolated and limited to 25 mA to the 8 current inputs	Screws	**ABE7CPA31**	0.498
			Spring	**ABE7CPA31E**	0.508
Preassembled cordsets for Modicon Telefast ABE7 sub-bases	BMXAMI0410 BMXAMO0210 BMXAMO0410	One 20-way removable terminal block and one 25-way SUB-D connector for ABE7CPA410/ CPA21 sub-base	1.5 m	**BMXFCA150**	0.320
			3 m	**BMXFCA300**	0.500
			5 m	**BMXFCA500**	0.730
	BMXART0414 BMXART0814 (2)	One 40-way connector and one 25-way SUB-D connector for ABE7CPA412 sub-base	1.5 m	**BMXFCA152**	0.330
			3 m	**BMXFCA302**	0.510
			5 m	**BMXFCA502**	0.740
	BMXAMI0800 BMXAMI0810	One 28-way removable terminal block and one 25-way SUB-D connector for sub-bases ABE7CPA02/03/31/31E	1.5 m	**BMXFTA150**	0.374
			3 m	**BMXFTA300**	0.500
	BMXAMO0802	One 20-way removable terminal block and one 25-way SUB-D connector for ABE7CPA02 sub-bases	1.5 m	**BMXFTA152**	0.374
			3 m	**BMXFTA302**	0.500

(1) The shielding on the cordsets carrying the analog signals must always be connected to the **BMXXSP●●00** *shielding connection kit mounted under the rack holding the analog modules (see page 2/7).*
(2) The **BMXART0814** *8-channel module requires two* **ABE7CPA412** *sub-bases and two* **BMXFCA●●2** *cordsets.*

Processors: page 1/4
Communication: page 2/50
Software: page 4/2
Ruggedized Modicon M340 modules: page 6/2

Modicon X80 I/O platform
BMXEHC0200/0800 counter modules

Presentation

BMXEHC0200 and **BMXEHC0800** counter modules for the Modicon X80 I/O platform are used to count the pulses generated by a sensor or to process the signals from an incremental encoder.

The two modules differ in their number of counter channels, maximum input frequencies, functions and auxiliary input and output interfaces:

Counter Module	No. of channels	Maximum frequency	Integrated functions	No. of physical inputs	No. of physical outputs
BMXEHC0200	2	60 KHz	Upcounting Downcounting Period meter Frequency meter Frequency generator Axis control	6	2
BMXEHC0800	8	10 KHz	Upcounting Downcounting Measurement	2	–

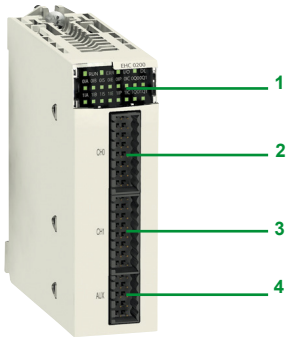
The sensors used on each channel can be:
- 2-wire 24 V proximity sensors
- 3-wire 24 V proximity sensors
- 10/30 V output signal incremental encoders with push-pull outputs

BMXEHC0200/0800 counter modules can be used to meet the demands of applications such as:
- Alarm generation on empty unwinder status using the ratio
- Sorting small parts using the period meter
- Single electronic cam using the dynamic setting thresholds
- Speed control using the period meter

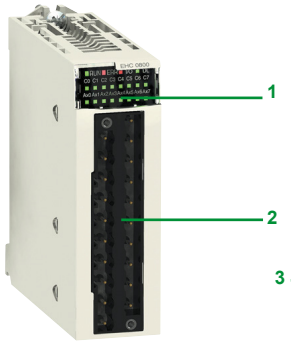
These standard format modules can be installed in any available slot of a Modicon X80 I/O PLC. They are hot-swappable.

In a Modicon X80 I/O PLC configuration, the number of **BMXEHC0200/0800** counter modules should be added to the number of application-specific modules (communication).

The function parameters are set by configuration using the Unity Pro software.



BMXEHC0200



BMXEHC0800

BMXFTB20●0

Description

BMXEHC0200/0800 counter modules are standard format. They occupy a single slot in **BMXXBP●●●** racks. They come in a plastic case, which ensures IP 20 protection of the electronics, and are locked into position by a captive screw.

BMXEHC0200 module, 2 channels, 60 KHz

The front panel of the **BMXEHC0200** counter module features:
1. Module and channel status display block
2. 16-way connector for connecting the sensors of counter 0
3. 16-way connector for connecting the sensors of counter 1
4. 10-way connector for connecting:
   - Auxiliary outputs
   - Sensor power supplies

To be ordered separately:
- A **BMXXTSHSC20** kit containing two 16-pin connectors and one 10-pin connector
- A **BMXXSP●●00** shielding connection kit if the rack is not already equipped with one (see page 2/7).

BMXEHC0800 module, 8 channels, 10 KHz

The front panel of the **BMXEHC0800** counter module features:
1. Module and channel status display block
2. Connector taking the 3 **BMXFTB20●0** 20-way removable terminal block (same as that of I/O modules)

To be ordered separately:
- A 20-way removable terminal block 3 (cage clamp, screw clamp or spring-type) **BMXFTB20●0**
- A **BMXXSP●●00** shielding connection kit if the rack is not already equipped with one (see page 2/7).

Operating modes for module BMXEHC0200

8 configurable modes	Frequency meter	This mode measures a frequency, speed, data rate or an event stream. As standard, this mode measures the frequency received on the IN A input. This frequency is always expressed in Hz (number of pulses/second), with a precision of 1 Hz. The maximum frequency on the IN A input is 60 kHz. The maximum cyclic ratio at 60 kHz is 60%.
	Event counting	This mode is used to determine the number of events received. In this mode, the counter calculates the number of pulses applied to the IN_A input at time intervals defined by the user. The module counts the pulses applied to the IN_A input each time the pulse for this input lasts longer than 5 µs (without anti-bounce filter).
	Period measurement	This mode is used to: ■ Determine the duration of an event ■ Determine the time between 2 events ■ Time and measure the execution time of a process It measures the time elapsed during an event or between 2 events (IN_A input) according to a selectable time base of 1 µs, 100 µs or 1 ms. The IN_SYNC input can be used to enable or stop a measurement. The module can carry out a maximum of 1 measurement every 5 ms. The shortest measurable pulse is 100 µs, even if the unit defined by the user is 1 µs. The maximum measurable duration is 4,294,967,295 units (unit to be defined).
	Ratio counting	Ratio counting mode only uses the IN_A and IN_B inputs. There are 2 possible modes: ■ Ratio 1: Used to divide 2 frequencies. This is intended for applications such as flowmeters, mixers, etc. ■ Ratio 2: Used to subtract 2 frequencies. This is intended for the same applications, but for those requiring more precise regulation (more similar frequencies). Ratio 1 mode gives the results in thousandths for better accuracy (a display of 2000 corresponds to a value of 2) and ratio 2 mode gives the results in Hz. The maximum frequency that the module can measure on the IN_A and IN_B inputs is 60 kHz.
	Downcounting	This mode is used to list a group of operations. In this mode, activating the synchronization function starts the counter which, starting from a user-defined preset value, decreases with each pulse applied to the IN_A input, until it reaches 0. This downcounting is made possible when the enable function has been activated. The counting register is thus updated at 1 ms intervals. One basic use of this mode is to signal, using an output, the end of a group of operations (when the counter reaches 0). The shortest pulse applied to the IN_SYNC input is 100 µs. The maximum frequency applied to the IN_SYNC input is 1 pulse every 5 ms. The maximum user-defined preset value is 4,294,967,295. The maximum count value is 4,294,967,295 units.
	Loop (modulo) counting	This mode is used in packaging and labelling applications where actions are repeated on sets of moving objects: ■ In upcounting, the counter increases until it reaches the user-defined “modulo - 1” value. On the next pulse, the counter is reset to 0 and upcounting restarts. ■ In downcounting, the counter decreases until it reaches 0. On the next pulse, the counter is reset to the user-defined “modulo - 1” value. Downcounting can then restart. The maximum frequency applied to the IN_A and IN_B inputs is 60 kHz. The maximum frequency of the modulo event is 1 event every 5 ms. The maximum modulo value is 4,294,967,296 (possible by declaring 0 in the modulo adjust value).
	32-bit counter counting	This mode is mainly used in axis following. The maximum frequency applied simultaneously to the IN_A and IN_B inputs is 60 kHz. The maximum frequency of the referencing event is 1 event every 5 ms. The counter value is between - 2,147,483,648 and + 2,147,483,647.
	Width modulation	In this operating mode, the module uses an internal clock generator to supply a periodic signal on the module's O0 output. Only the O0 output is affected by this mode, as the O1 output is independent of it. The maximum output frequency is 4 kHz. As O0 is a source output, a load resistor is necessary for the O0 output signal to change to 0 at the correct frequency. The cyclic ratio adjustment range varies according to the frequency of the O0 output.

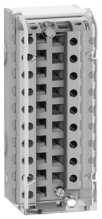
Operating modes for module BMXEHC0800

5 configurable 16-bit modes	Frequency meter	This mode measures a frequency, speed, rate or data stream control. As standard, this mode measures the frequency received on the IN A input. This frequency is always expressed in Hz (number of pulses per second), with a precision of 1 Hz. The maximum frequency on the IN A input is 10 kHz. The maximum cyclic ratio at 10 kHz is 60%.
	Event counting	This mode is used to determine the number of events received. In this mode, the counter calculates the number of pulses applied to the IN_A input at time intervals defined by the user. As an option, it is possible to use the IN_AUX input during a period of time, provided that the enable bit has been configured. The module counts the pulses applied to the IN_A input each time the pulse for this input lasts longer than 50 µs (without anti-bounce filter). Pulses with less than 100 ms synchronization are lost.
	Downcounting	This mode is used to list a group of operations. In this mode, when counting is enabled (software validation via the valid_sync command), a rising or falling edge on the IN_AUX input causes a value, defined by the user, to be loaded in the counter. The latter decreases with each pulse applied to the IN_A input until it reaches the value 0. Downcounting is made possible when the force_enable command is high (software positioning). The smallest pulse applied to the IN_AUX input varies according to the selected filter level. The maximum frequency applied to the IN_AUX input is 1 pulse every 25 ms.
	Loop (modulo) counting	This mode is used in packaging and labelling applications where actions are repeated on sets of moving objects. The counter increases with each pulse applied to the IN_A input until it reaches the user-defined “modulo - 1” value. On the next pulse in the upcounting direction, the counter is reset to 0 and upcounting restarts. The maximum frequency applied to the IN_A input is 10 kHz. The smallest pulse applied to the IN_AUX input varies according to the selected filter level. The maximum frequency of the modulo event is 1 event every 25 ms. The maximum modulo value is 65,536 units.
	Up/down counter	This mode is used for an accumulation, upcounting or downcounting operation on a single input. Each pulse applied to the IN_A input produces: ■ Upcounting of pulses if the IN_AUX input is high ■ Downcounting of pulses if the IN_AUX input is low The counter values vary between the limits - 65,536 and + 65,535. The maximum frequency applied to the IN_A input is 10 kHz. Pulses applied to the IN_A input after a change of direction are only upcounted or downcounted after a period corresponding to the delay for taking account of the state of the IN_AUX input due to the programmable filter level on this input.
One 32-bit mode	32-bit counter counting	32-bit counter counting mode is available for channels 0, 2, 4 and 6 (channels 1, 3, 5 and 7 are now inactive). It behaves in the same way as the up/down counting mode using up to 3 physical inputs. It enables simultaneous upcounting and downcounting. The counter values vary between the limits - 2,147,483,648 and + 2,147,483,647 (31 bits + sign). The maximum frequency applied to the IN_A and IN_B inputs is 10 kHz. The smallest pulse applied to the IN_AUX input is defined according to the filtering applied to this input. The maximum frequency of loading the preset value is 1 every 25 ms.

Modicon X80 I/O platform
BMXEHC0200/0800 counter modules

BMXEHC0200

BMXEHC0800



BMXFTB20●0

References

BMXEHC0200/0800 counter modules *(1)*

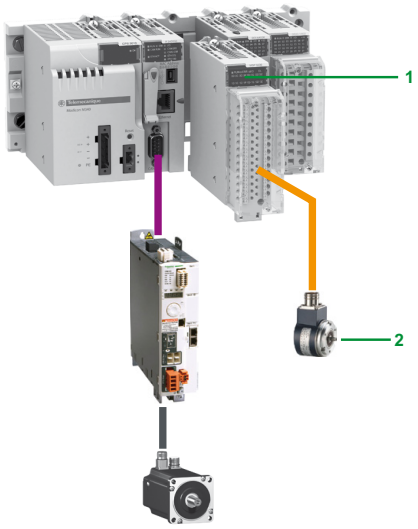
Description	No. of channels	Characteristics	Reference	Weight kg
Counter modules for 24 V ⎓ 2 and 3-wire sensors and 10/30 V ⎓ incremental encoders with push-pull outputs	2	60 kHz counting	**BMXEHC0200**	0.112
	8	10 kHz counting	**BMXEHC0800**	0.113

Connection accessories *(2)*

Description	Composition	Unit reference	Weight kg
Pack of connectors for BMXEHC0200 module	Two 16-way connectors and one 10-way connector	**BMXXTSHSC20**	0.021
20-way removable terminal blocks for BMXEHC0800 module	Cage clamp	**BMXFTB2000**	0.093
	Screw clamp	**BMXFTB2010**	0.075
	Spring	**BMXFTB2020**	0.060
Shielding connection kit for BMXEHC0200/0800 modules	Comprising a metal bar and two support bases for mounting on rack	See page 2/7	–

(1) Typical consumption: See the power consumption table on page 7/22.
(2) The shielding on the cordsets carrying the counter signals must always be connected to the **BMXXSP●●00** *shielding connection kit mounted under the rack which holds the* **BMXEHC0200** *module (see page 2/7).*

Modicon X80 I/O platform
BMXEAE0300 SSI encoder interface module



Modicon X80 I/O platform with Modicon M340 processor

Presentation

The **BMXEAE0300** SSI encoder interface module **1** for the Modicon automation platform *(1)* is a 3-channel standard synchronous serial interface module designed for use with SSI absolute encoders **2**.

The **BMXEAE0300** module enables SSI encoder values to be processed on PAC platforms for applications requiring accurate and reliable position/angular control, such as:
- Hydro power, e.g. dam inlet gate position control
- Wind power, e.g. wind turbine blade pitch control
- Complex motion loop control, e.g. ship elevator, blast furnace, flame cutting, etc.

The **BMXEAE0300** module provides a migration path from Premium (with **TSXCTY2C** measurement and counter module) to the M340 SSI solution to compete in the above market segments.

Like any other application-specific module, the **BMXEAE0300** module is installed in the rack slots (01 to 11). The number of modules is limited by the maxiumum number of application-specific channels, permitted according to the CPU type (consult our website www.schneider-electric.com).

Dam inlet gate control

Inlet gate control enables the water level in a dam to be monitored and controlled:
- The SSI encoder provides the PLC with accurate feedback of the gate position for precise monitoring of gate opening, adjustment and positioning.
- The SSI interface converts the signals from the SSI encoders and transmits them to the CPU.

Wind turbine blade pitch control

Pitch control is required for adjusting the angle of the wind turbine blades in relation to the wind direction and strength, in order to achieve optimum energy conversion efficiency.
- The SSI absolute encoder is frequently used to feedback the position of the blade due to its reliability and robustness.
- Typically, the position of each of the 3 blades are read by the SSI encoders and then transmitted to the CPU via the SSI interface for motion loop control. Sometimes, 3 additional SSI inputs act as backup. Therefore, this new offer is adequately sized for the channel density.

Description

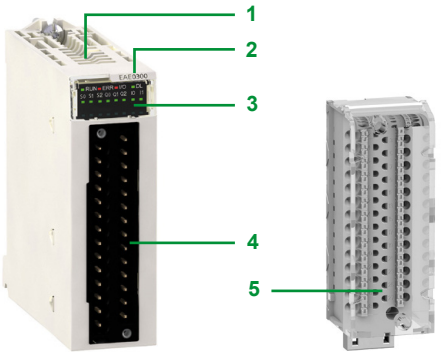
The **BMXEAE0300** SSI encoder interface module is standard format (1 slot). Its housing provides IP 20 protection of the electronics and it is locked in each slot (**01** to **11**) by a captive screw.

The front panel of the **BMXEAE0300** module features:
1 A rigid housing providing support and protection for the electronic card
2 The module reference marking (a label is also visible on the right-hand side of the module)
3 A display block indicating:
□ Module status, 4 LEDs:
- RUN (green): module's operational status
- ERR (red): internal fault detected in the module or a fault detected between the module and the rest of the configuration
- I/O (red): external fault detected
- DL (green): firmware download status

□ Status of the 3 SSI channels, 8 LEDs:
- Sx (green): channel x input (x = 0, 1 or 2)
- Qx (green): reflex output for channel x (x = 0, 1 or 2)
- I0/1 (green): capture inputs for the 3 SSI channels

4 A connector for a 28-way terminal block, for connecting to a removable cage clamp or spring terminal block on sensors and preactuators

To be ordered separately:
5 A 28-way removable cage clamp terminal block **BMXFTB2800** or spring terminal block **BMXFTB2820**, supplied with a channel identification label
□ A shielding connection kit to protect against electrostatic discharge, consisting of a metal bar and two sub-bases for mounting on the rack: **BMXXSP●●00** (reference dependent on the number of slots in the rack) (see page 2/7)
□ A set of clamping rings **STBXSP30●0** for the connection cable shielding braids (reference dependent on the cable diameter) (see page 2/7)



BMXEAE0300

BMXFTB28●0

(1) Only for the Modicon automation platforms compatible with Modicon X80 I/O platform

Module specifications and functions

Sepecifications

The SSI module **BMXEAE0300** is a 3-channel, synchronous serial interface, absolute encoder interface for Modicon PLCs.
It supports:

- 3 channels of SSI inputs (DATA pair, CLK pair, 24 VDC field power supply to encoder)
- 1 reflex output for each SSI channel (Q)
- 2 capture inputs for the 3 SSI channels (CAP_IN0, CAP_IN1)
- 8 to 31 bits data width
- 4 ranks of baud rates (100 kHz, 200 kHz, 500 kHz, 1 MHz)
- capture and compare functions

Basic and optional functions

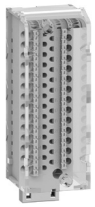
The following table presents the main functionalities of the **BMXEAE0300** module:

Function	Basic/ optional	Description
Absolute SSI encoder value acquisition	Basic	The position values of the SSI channel are automatically read by the module within 1 ms, unless the channel is disabled.
Modulo	Optional for motion	The modulo function limits the dynamics of the position value within the power of 2. An event (if enabled) detects the modulo passing. The reflex output can also be asserted at the passing of modulo (if configured).
Reduction	Optional for motion	This function reduces the intrinsic resolution of the encoder by a value defined by the “reduction” parameter. This reduction is carried out by a shift in the bit field provided by the encoder.
Offset	Optional for motion	The correction function of the encoder offset systematically corrects the offset produced by the encoder at mechanical position “0”. The user enters the absolute encoder offset parameter.
Capture	Optional for events	The two capture input registers (per channel) enable the PLC program to carry out a dynamic measurement function between two points. The capture action can be triggered by two capture inputs. The event will be triggered at each occurrence of capture.
Compare	Optional for events	Two independent comparators (per channel), with thresholds that can be modified by adjustment (explicit exchange), are able to generate an event or reflex output when the threshold is crossed.

Main features

- Supported by Unity Pro V6.0 (or higher).
- Supports absolute encoder 24 V model with standard SSI interface, including Telemecanique Sensors OsiSense SSI encoders. For further information, consult the website www.tesensors.com.
- Standards and approvals: CE, UL, CSA, C-Tick, GOST, etc.

BMXEAE0300



BMXFTB28●0

References

SSI encoder interface module *(1)*

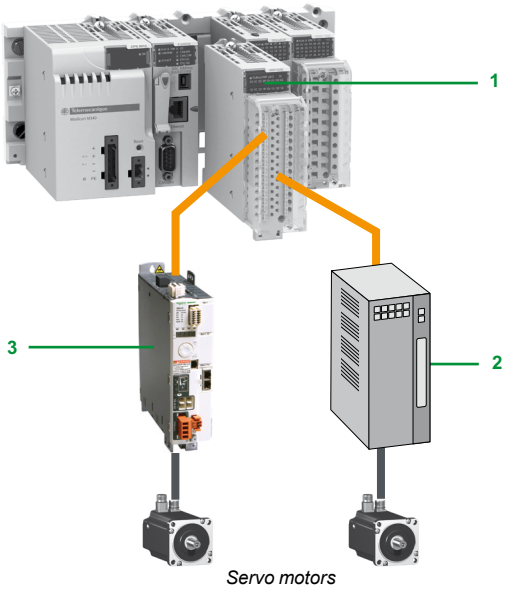
Description	Number of channels	Description per channel	Reference	Weight kg
SSI encoder interface module	3 SSI channels	1 reflex output for each SSI channel 2 capture inputs for the 3 SSI channels 8 to 31 bits data width 4 ranks of baud rates:100 kHz, 200 kHz, 500 kHz, 1 MHz Capture and compare functions	**BMXEAE0300**	0.138

Cabling accessories

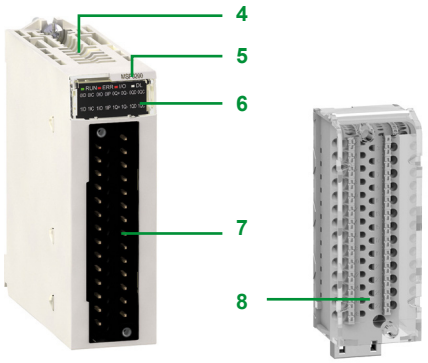
Description	Description, use	Reference	Weight kg
28-way removable terminal block	Cage clamp	**BMXFTB2800**	0.111
	Spring	**BMXFTB2820**	0.080
Shielding connection kit for module BMXEAE0300 *(2)*	Comprising a metal bar and two support bases for mounting on rack	See page 2/7	–

(1) Typical consumption: See the power consumption table on page 7/22.
*(2) The shielding on the cables carrying the supply to the module, each SSI channel, the capture inputs and the reflex outputs (if any of them is wired) must always be connected to the **BMXXSP●●00** shielding connection kit mounted under the rack holding the **BMXEAE0300** module (see page 2/7).*

Modicon X80 I/O platform
BMXMSP0200 motion control module



Servo motors



BMXMSP0200

BMXFTB28●0

Presentation

The **1** **BMXMSP0200** motion control *pulse train output* (PTO) module for the Modicon X80 I/O platform is used for controlling third-party variable speed drives **2** which have an integrated position loop and inputs that are compatible with open collector outputs.

The **BMXMSP0200** control module is also directly compatible with the Lexium 32C and 32M **3** servo drive ranges, which have an integrated pulse control interface.

The **BMXMSP0200** motion control PTO module has two independent PTO channels. Like any other application-specific module, it is installed in the rack slots (labelled **01** to **11**). The number of modules is limited by the maximum number of application-specific channels permitted according to the CPU type:

- Standard **BMXP341000**: Maximum of 20 application-specific channels *(1)*
- Performance **BMXP3420●0**: Maximum of 36 application-specific channels *(1)*

Description

The **BMXMSP0200** motion control module is standard format (1 slot). Its housing provides IP 20 protection of the electronics and it is locked in each slot (**01** to **11**) by a captive screw.

The front panel of the **BMXMSP0200** motion control module features:

4 A rigid body providing support and protection for the electronic card

5 A module reference marking (a label is also visible on the right-hand side of the module)

6 A display block indicating:

- Module status, 4 LEDs (RUN, ERR, I/O and DL)
- Status of the auxiliary inputs, 4 per channel
- Status of the PTO outputs, 2 per channel
- Status of the auxiliary outputs, 2 per channel

7 A connector for a 28-way terminal block, for connecting to a removable spring terminal block on sensors and preactuators

To be ordered separately:

8 A 28-way removable cage clamp terminal block **BMXFTB2800** or spring terminal block **BMXFTB2820**, supplied with a channel identification label

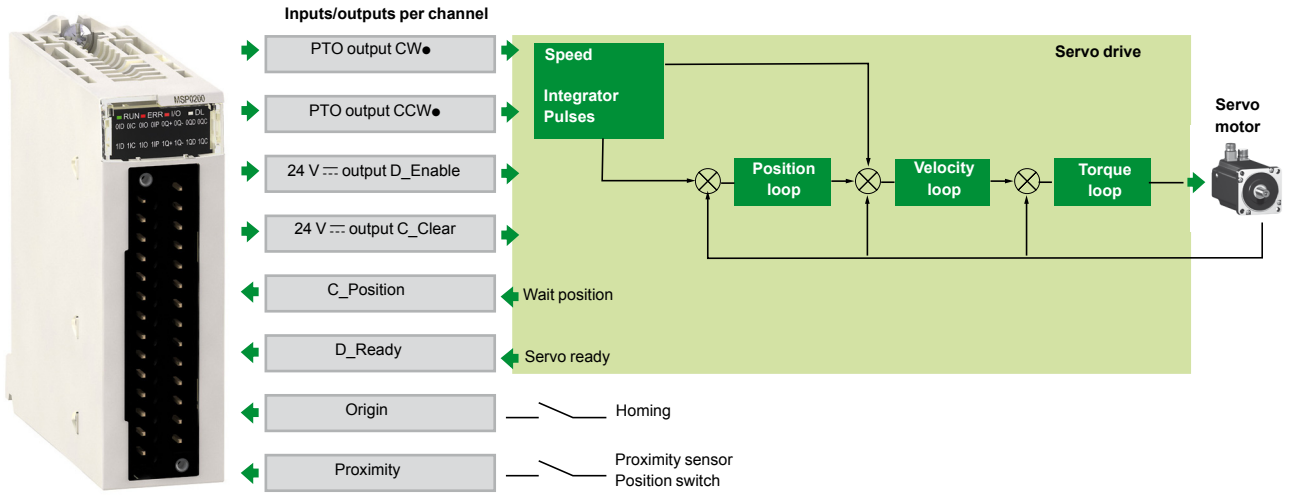
- A shielding connection kit to protect against electrostatic discharge, consisting of a metal bar and two sub-bases for mounting on the rack: **BMXXSP●●00** (reference dependent on the number of slots in the rack) (see page 2/7)
- A set of clamping rings **STBXSP30●0** for the connection cable shielding braids (reference dependent on the cable diameter) (see page 2/7)

(1) Application-specific channels: **BMXEHC0200** *(2-channel) and* **BMXEHC0800** *(8-channel) counter modules,* **BMXMSP0200** *(2-channel) motion control module and* **BMXNOM0200** *(2-channel) and* **BMXNOR0200H** *(1-channel) serial communication modules.*

Modicon X80 I/O platform
BMXMSP0200 motion control module

Operation

Block diagram of a BMXMSP0200 module channel



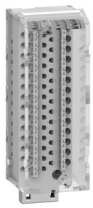
BMXMSP0200

References

Motion control modules *(1)*

Description	Number of channels	Description per channel	Reference	Weight kg
PTO module *(PTO = Pulse Train Output)*	2	2 x 200 kHz max. PTO outputs 2 x 24 V ⎓/50 mA auxiliary outputs 4 x 24 V ⎓ auxiliary inputs	**BMXMSP0200**	0.145

BMXMSP0200



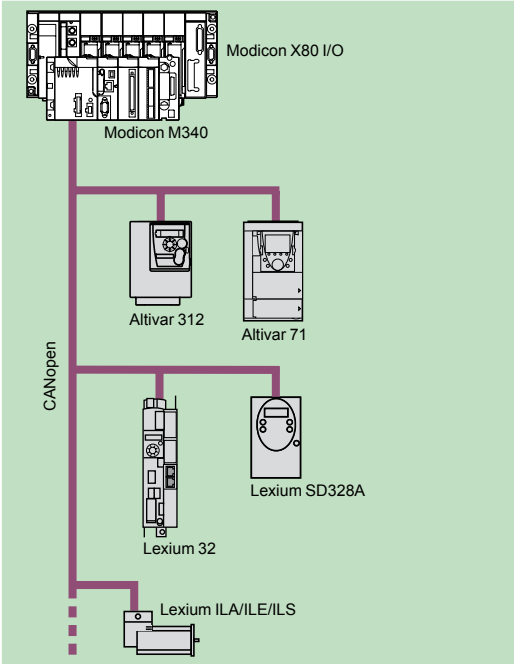
BMXFTB28●0

Cabling accessories

Description	Description, use	Length	Reference	Weight kg
28-way removable terminal block	Cage clamp	–	**BMXFTB2800**	0.111
	Spring	–	**BMXFTB2820**	0.080
Connection cable for daisy chain or pulse control *(2)*	From BMXMSP0200 (screw terminal block) module to Lexium 32C or 32M (RJ45 connector) *(cable with flying leads at one end and an RJ45 connector at the other)*	3 m	**VW3M8223R30**	–
Shielding connection kit for module BMXMSP0200	Comprising a metal bar and two support bases for mounting on rack	–	See page 2/7	–

(1) Typical consumption: See the power consumption table on page 7/22.
(2) The shielding on the cordsets carrying the motion control signals must always be connected to the **BMXXSP●●00** *shielding connection kit mounted under the rack holding the* **BMXMSP0200** *module (see page 2/7).*

Modicon X80 I/O platform
MFB motion control



MFB: Motion control distributed over CANopen

Presentation

MFB *(Motion Function Blocks)* is a library of function blocks integrated in Unity Pro used to set up motion control in the architectures of drives and servo drives on CANopen buses:

- Altivar 312: For asynchronous motors from 0.18 to 15 kW
- Altivar 71: For synchronous or asynchronous motors from 0.37 to 500 kW
- Lexium 32: For servo motors from 0.15 to 7 kW
- Lexium ILA/ILE/ILS: Integrated motor drives from 0.10 to 0.35 kW
- Lexium SD328A: For 3-phase stepper motors from 0.35 to 0.75 kW.

In compliance with PLCopen specifications, the MFB library allows both easy and flexible motion programming with Unity Pro, as well as axis diagnosis.
In maintenance operations, drives can be replaced quickly and safely thanks to drive parameter download blocks.-
Setting up drives on the CANopen network is facilitated through *Motion Tree Manager* organization in the Unity Pro browser, making it easy for users to access the application drives.

Applications

The features of the *Motion Function Blocks* library are particularly suitable for machines with independent axes. In the case of these modular/special machines, MFB function blocks are the perfect solution for controlling single axes. The following are typical applications for this type of architecture:

- Automatic storage/removal
- Material handling
- Palletizers/depalletizers
- Conveyors
- Packaging, simple label application
- Grouping/ungrouping
- Adjustment axes in flexible machines, etc.

Functions

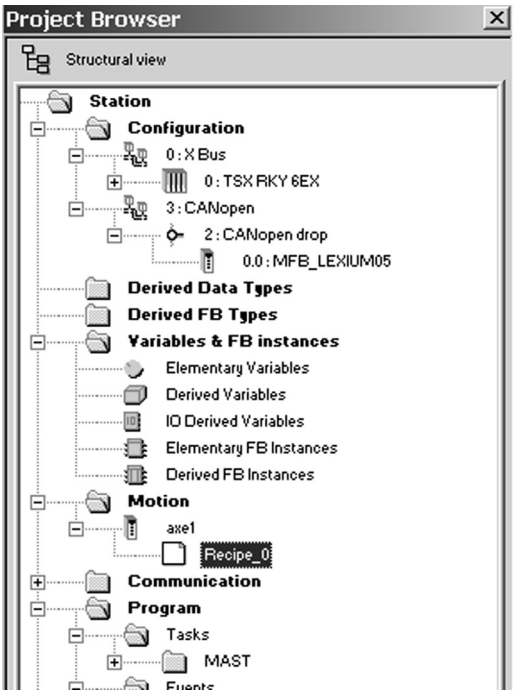
The table below lists the function blocks of the MFB library and the drives compatible with them. The prefix indicates the block family:

- MC: Function block defined by the Motion Function Blocks PLC Open standard
- TE: Function block specific to Schneider Electric products
- Lxm: Function block specific to Lexium servo drives

Type	Function	Function block	Altivar 312	Altivar 71	Lexium 32	Lexium ILA/ ILE/ILS	Lexium SD328A
Management and motion	Read an internal parameter	MC_ReadParameter	■	■	■	■	■
	Write an internal parameter	MC_WriteParameter	■	■	■	■	■
	Read the current position	MC_ReadActualPosition	■	■	■	■	■
	Read the instantaneous speed	MC_ReadActualVelocity	■	■	■	■	■
	Acknowledge error messages	MC_Reset	■	■	■	■	■
	Stop all active movement	MC_Stop	■	■	■	■	■
	Axis coming to standstill	MC_Power	■	■	■	■	■
	Movement to absolute position	MC_MoveAbsolute	■	■	■	■	■
	Relative movement	MC_MoveRelative	■	■	■	■	■
	Additional movement	MC_MoveAdditive	■	■	■	■	■
	Homing	MC_Home	■	■	■	■	■
	Movement at given speed	MC_MoveVelocity	■	■	■	■	■
	Read diagnostic data	MC_ReadAxisError	■	■	■	■	■
	Read servo drive status	MC_ReadStatus	■	■	■	■	■
	Torque control	MC_TorqueControl	■	■	■	■	■
	Read actual torque value	MC_ReadActualTorque	■	■	■	■	■
	Manual control	MC_Jog	■	■	■	■	■
Save and restore parameters (FDR)	Read all parameters and store in PLC memory	TE_UploadDriveParam	■	■	■	■	■
	Write all parameters from PLC memory	TE_DownloadDriveParam	■	■	■	■	■
Advanced Lexium functions	Read a motion task	Lxm_UploadMTask	■	■	■	■	■
	Write a motion task	Lxm_DownloadMTask	■	■	■	■	■
	Start a motion task	Lxm_StartMTask	■	■	*(1)*	■	■
	Set the reduction ratio, signed	Lxm_GearPosS	■	■	*(1)*	■	■
System	Communication with the servo drive	TE_CAN_Handler	■	■	■	■	■

■ Compatible

(1) The Lxm_StartMTask and Lxm_GearPosS function blocks are only compatible with the M type Lexium 32 (LXM32M) servo drives.



Motion Tree Manager integrated in the Unity Pro browser

Motion Tree Manager

Motion Tree Manager is associated with Unity Pro's MFB library and integrated in its browser. It provides specific assistance for:

- Axis object management
- Axis variable definition
- Drive parameter management

Motion Tree Manager automatically creates links between the CANopen bus configuration and the MFB function block data using a limited amount of configuration data.

General axis parameters

In this tab, the designer is prompted to define:

- The name of the axis that will identify it in the browser for the entire application
- The address of the drive on the CANopen bus

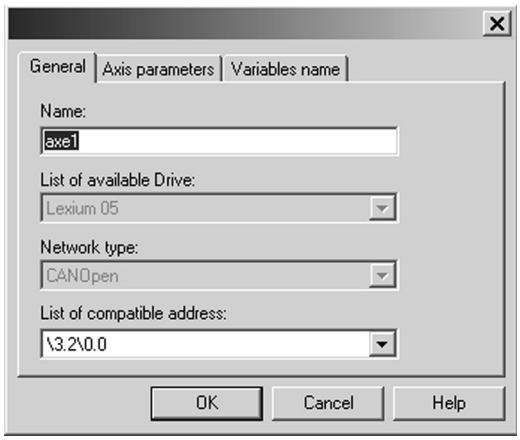
Axis parameters

The drop-down lists in this tab are used to determine the exact type of drive: Family, version.

Variable names

This last tab is used to identify data structures:

- **Axis_Reference**: Used by all the instances of function blocks for the axis in question
- **CAN_Handler**: Used to manage communication with the drive via the CANopen network

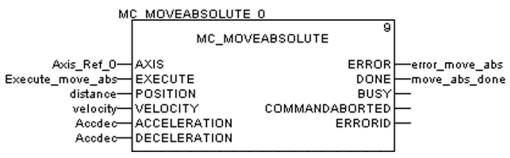


General parameters: Axis name and address

Recipe definition

The "recipes" attached to the axis are the data structures containing all the adjustment parameters of a given drive. This data is used when:

- Changing the drive with restoration of the context during *"Faulty Device Replacement"* (FDR) maintenance
- Changing the manufacturing program of the machine and calling up an appropriate set of parameters: servo control gains, limitations, etc. adapted to the weight and size of the moving parts
- Saving parameters in the initial values of the PLC application



MFB: Programming a movement in absolute mode

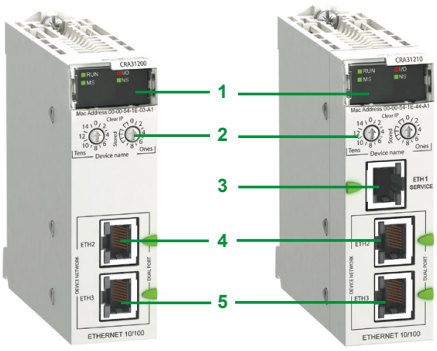
Programming, diagnostics and maintenance

Communication between the PLC and drive is automatically set up by the system as soon as a TE_CAN_Handler instance is declared in the Unity Pro task with which the axis is associated. Movements are then programmed by sequencing function blocks from the library in the user's chosen Unity Pro editor (LD, ST, FBD).

The two function blocks, MC_ReadStatus, and in some cases MC_ReadAxisError, are useful for determining the overall status of the axis, as well as the code of active warnings or errors.

The function blocks TE_UploadDriveParam and TE_DownloadDriveParam allow the application to save all the parameters of a drive (recipe) and to then quickly reload them into another drive if the first one fails.

Modicon X80 I/O platform
Modicon X80 CRA Ethernet drop adaptors



BMXCRA31200 *BMXCRA31210*

Modicon X80 CRA Ethernet drop adaptors *(1)(2)*

Presentation

A Quantum Ethernet I/O architecture with Modicon X80 RIO drops requires the use of a dedicated CRA drop adaptor in each Modicon X80 drop:
- "Standard" drop adaptor BMXCRA31200 (capacity, see below)
- "Performance" drop adaptor BMXCRA31210 (capacity, see below)

These drop adaptors are connected by Ethernet cordsets fitted with RJ45 connectors. The dual Ethernet network connection port on each drop adaptor allows *Daisy Chain Loop* connections using the RSTP protocol (*Rapid Spanning Tree Protocol*).

Each module uses one slot in the Modicon X80 rack.
The BMXCRA31210 adaptor is also available in a conformal coating version for harsh environments.

Capacity of Quantum Ethernet I/O architectures with Modicon X80 Ethernet RIO

- 1 Quantum CPU drop that can have one primary rack and one secondary rack *(3)*, equipped with a 140 CPU 6●●●● advanced CPU
- With 140 CPU 651●● standard CPUs and the 140 CPU 67160 HSBY CPU:
  - Up to 16 Modicon X80 RIO drops, limited to a maximum of 31 RIO drops (Quantum + Modicon X80)
- With the 140 CPU 65260 standard CPU and 140 CPU 6726 HSBY CPUs●:
  - Up to 31 Modicon X80 RIO drops, limited to a maximum of 31 RIO drops (Ethernet Quantum and Modicon X80)
- Each Modicon X80 RIO drop can comprise one primary rack and one secondary rack *(3)*
- Distance:
  - 100 m between stations (copper medium)
  - 2 km between Modicon X80 drops, with BMXNRP0200 multimode optical fibre repeaters
  - 16 km between Modicon X80 drops, with BMXNRP0201 multimode optical fibre repeaters

Capacity of Modicon X80 CRA drop adaptors

Type of module	BMXCRA31200 "standard"	BMXCRA31210 "performance"
Primary racks per drop	Up to 2	Up to 2
SERVICE port	–	1
Discrete I/O modules	Up to 128	Up to 1024
Analog I/O modules	Up to 16	Up to 256
Expert modules supported:		
■ serial link	–	BMXNOM0200
■ time and date stamping at 1 ms	–	BMXERT1604T
■ counting	–	BMXEHC0200/0800
CCOTF function	–	Yes
Time and date stamping	–	10 ms

Description

1 Display block indicating the module status
2 Rotary switches for addressing Ethernet RIO drops (00…159)
3 On BMXCRA31210 module: dedicated RJ45 SERVICE port for remote service tools such as a PC, an HMI terminal or Ethernet DIO devices (identical to the SERVICE port on Quantum CRP/CRA modules, see page 2/8)
4 RJ45 DEVICE NETWORK port for connection to the Ethernet network
5 RJ45 DEVICE NETWORK port for connection to the Ethernet network

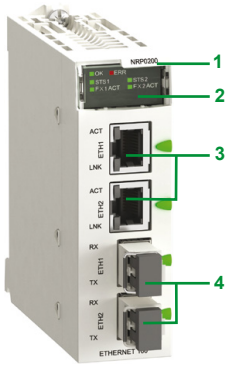
(1) For additional characteristics, see our website www.schneider-electric.com.
(2) Requires Unity Pro Extra Large software ≥ V7.0.
(3) Requires two BMXXBE1000 rack expansion modules (one in the primary rack and one in the secondary rack) and a BMXXBC●●●K extension cable (0.8, 2 or 28 m) for connecting these two modules. See our Quantum catalogue on our website www.schneider-electric.com.

Modicon X80 Ethernet RIO drop optical repeaters *(1)(2)*

Presentation

BMXNRP0200/0201 optical fibre repeaters are an alternative to the use of ConneXium managed dual ring switches (DRS), for optical fibre communications over long distances, in Ethernet I/O systems.
When inserted in Modicon X80 RIO drops, BMXNRP0200/0201 optical fibre repeaters make it possible to:
- Extend the total distance of the Ethernet I/O network, when Ethernet RIO drops are located in areas of the factory more than 100 m away
- Enhance immunity to noise
- Resolve earthing problems, between sites which have different earthing methods

NRP repeaters can be installed on the primary ring or on secondary rings. These modules cannot however be used to connect secondary rings to the primary ring.
The BMXNRP0200 repeater for multimode optical fibre allows remote location up to 2 km.
The BMXNRP0201 repeater or single mode optical fibre allows remote location up to 16 km.
Depending on the configuration, the NRP repeater must be linked to the CRA adaptor of the drop where it is installed, via one or two Ethernet Interlink cables.



BMXNRP020●

Description

1 Module reference
2 Display block indicating the module status
3 RJ45 Ethernet ports. Two LEDs LNK and ACT indicate the state of each port
4 Optical fibre ports with SFP transceiver for LC type connector

References *(1)*

Modicon X80 Ethernet RIO drop optical repeaters *(2)*

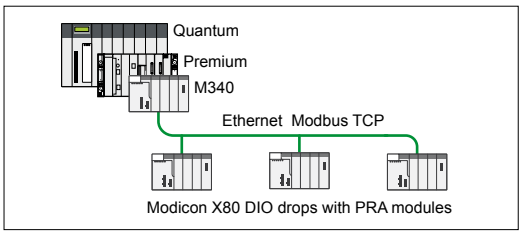
Description	Optical fibre	Reference	Weight kg
Modicon X80 Ethernet RIO drop optical repeaters	multimode	**BMXNRP0200**	–
	single mode	**BMXNRP0201**	–

Ethernet drop adaptors *(2)*

Description	SERVICE port	Reference	Weight kg
Modicon X80 Ethernet RIO drop adaptor Provide 1 module per Modicon X80 Ethernet RIO drop	–	**BMXCRA31200**	–
	1	**BMXCRA31210** *(3)*	–

(1) For additional characteristics, see our website www.schneider-electric.com.
(2) Requires Unity Pro Extra Large software ≥ V7.0, see our website www.schneider-electric.com.
(3) Conformal coating version for harsh environments. In this case, add the letter "C" to the end of the reference.

Modicon X80 I/O platform
Peripheral Remote I/O Adaptor



Modicon X80 DIO drops in a Quantum/Premium/M340 I/O architecture using Ethernet Modbus TCP

Presentation

The Peripheral Remote I/O Adaptor (PRA) is specifically dedicated for Modicon X80 DIO drops in a Quantum/Premium/M340 I/O architecture using Ethernet Modbus TCP.
The BMXPRA0100 module manages a remote X80 I/O rack on Ethernet Modbus TCP which includes:
- discrete I/O modules
- analog I/O modules

It communicates by I/O scanning with the master PAC (Quantum/ Premium/M340). In case of a redundant Ethernet link, the use of a BMXNOE0100 Ethernet module is necessary.

Principal characteristics

Primary racks per drop

Up to 4

Discrete I/O modules

Up to 1024

Analog I/O modules

Up to 256

Intern memory

Up to 448 kBits

Memory card capacity

Up to 96 kBits

Average consumption

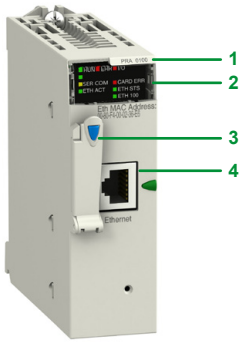
95 mA

Dissipated power

2.3 W

Savable real time clock

Yes



Description

1 Module reference
2 Display block indicating the module status
3 Protected memory card port
4 RJ45 Ethernet port

Modicon X80 I/O platform
Peripheral Remote I/O Adaptor

PF122533A

BMXPRA0100

Reference *(1)*

Description	Reference	Weight
Peripheral Remote I/O Adaptor Provide 1 module per Ethernet Modbus TCP DIO drop	**BMXPRA0100**	–

(1) Requires Unity Pro software ≥ V4.1.

Modicon X80 I/O platform
Time stamping system

BMXERT1604T module

Presentation

The time stamping system is a complete solution providing a sequence of events that are time-stamped at source, enabling the user to analyze the source of any abnormal behaviour in an automated system.

The SOE (system of events) is displayed in the alarm log or in the list of events for a client such as a SCADA.

Each event in the SOE is a change of value (transition) of a discrete I/O detected by a time stamping module.

Advantages

Using the time stamping system has the following advantages:
- ■ No PLC programming
- ■ Direct communication between the time stamping modules and the client. If the time stamping modules are in a Quantum Ethernet I/O drop, the bandwidth of the PLC communication is not used
- ■ Consistency of the I/O values between the process (time stamping modules) and the client
- ■ Consistency is maintained irrespective of the operating mode
- ■ Consistency is based on the following characteristics:
  - □ A buffer is available to store events in each time stamping module. Storage of events is stopped when the buffer is full
  - □ Rising and falling edges are stored for each discrete I/O
  - □ Advanced diagnostics functions:
    - Indication of an unknown SOE on the client
    - Information on the time management associated with each time stamping event
- ■ No loss of events under normal operating conditions
- ■ Management of Hot Standby configurations on the PLC and/or SCADA redundancy

Composition of a time stamping architecture

BMXCRA312●0 module

This time stamping module can be at the source of any discrete I/O signal located in the drop with a resolution of 10 ms.
To ensure no event is lost, all events are stored and kept in a buffer located in the product until OFS takes them.
The synchronization of the CRA module does not use the NTP protocol.

BMXERT1604T module

This module has 16 discrete inputs which carry out the time stamping at source outputs with a resolution of 1 ms.
To ensure no event is lost, all events are stored and kept in a buffer located in the product until OFS takes them.
This module can be placed either in an RIO drop, or in a local rack equipped with a BMXCRA31210 module.
The CRA module is synchronized via the DCF 77 or IRIG-B standards.

OFS V3.40

OFS V3.40 is used to access events stored in the various buffers in the architecture and to place them in the SCADA via the standard OPC DA protocol. For further information, consult our website www.schneider-electric.com.

Vijeo Citect V7.30

Vijeo Citect V7.30 receives events transmitted by OFS and displays them in the SOE or in the list of alarms.

Software
OPC data server software
OPC Factory Server
Time stamping system

Performance

Function	Event source module	Value
Duration of time stamping between two identical source modules in the same rack	**BMXERT1604T**	1.6 < duration of time stamping < 3.3 ms
	BMXCRA312●0	10 ms
Duration of time stamping between two different inputs in the same source module	**BMXERT1604T**	1 ms
	BMXCRA312●0	1 scan
Maximum number of events scanned	**BMXERT1604T**	400 events *(1)*
	BMXCRA312●0	2048 events *(1)*
Maximum number of I/O and memory available	**BMXERT1604T**	16 discrete inputs on module
		512 events in internal buffer
	BMXCRA312●0	256 discrete I/O configured
		4000 events in internal buffer
Maximum number of source modules in an Ethernet remote I/O drop	**BMXCRA312●0**	1 per drop
	BMXERT●●●●	9 per drop
Maximum number of event sources controlled	**BMXERT●●●●**	500 sources per second *(1)*

References

Description	Input type	Reference	Weight kg
Multifunction time stamping input module	16 discrete inputs	**BMXERT1604T**	–

(1) The maximum value depends on the performance of the overall system. It is not an absolute value and must be consistent.

Modicon X80 I/O platform
Communication, integrated ports and modules

Applications		RTU communication	
Type of device		RTU module	
			
Network protocols		**Modbus/TCP, IEC 60870-5-104, DNP3 (subset level 3)**	**Serial link, External modem link, IEC 60870-5-101, DNP3 (subset level 3)**
Structure	Physical interface	10BASE-T/100BASE-TX (Modbus/TCP), PPPoE (Point-to-Point Protocol over Ethernet) for ADSL external modem link	Non-isolated RS 232/485 (Serial link), Non-isolated RS 232 (Radio, PSTN, GSM, GPRS/3G external modem link)
	Type of connector	One RJ45 connector	One RJ45 connector
	Access method	CSMA-CD (Modbus/TCP), Master/slave (IEC 104/DNP3)	Master/slave (IEC101/DNP3)
	Data rate	10/100 Mbps (Modbus/TCP)	0.3…38.4 Kbps (Serial link)
Medium		Double twisted pair copper cable, category CAT 5E, optical fibre via ConneXium cabling system	Double shielded twisted pair copper cable, Crossover serial cable (Serial link), Direct serial cable (External modem link)
Configuration	Maximum number of devices	128 (Modbus/TCP), 64 slaves/servers (IEC 104/DNP3)	32 max.
	Max. length	100 m (copper cable), 4000 m (multi-mode optical fibre), 32,500 m (single-mode optical fibre)	1000 m (Serial link with insulating case)
	Number of modules of the same type per station	2 Ethernet or RTU modules per station with any BMXP34 processor	Depending on application-specific channels (20/36 application-specific channels with BMXP341000/P342●●●●)
Standard services		Modbus/TCP messaging	Reading/writing digital and analog I/O, counters
Transparent Ready conformity class		C30	–
Embedded Web server services	Standard services	Rack Viewer PLC diagnostics, Data Editor access to PLC data and variables	–
	Configurable services	–	–
		Hosting and display of user Web pages	–
Transparent Ready communication services	I/O Scanning service	–	
	Global Data service	–	
	NTP time synchronization	Yes	
	FDR service	Yes (client)	–
	SMTP e-mail notification service	Yes	–
	SOAP/XML Web service	Server	–
	SNMP network management service	Yes (agent)	–
	RSTP redundancy service	–	
	QoS (Quality of Service) service	–	
RTU communication services IEC 60870-5-104, DNP3 IP or IEC 60870-5-101, DNP3 serial	Master or Slave configuration	Yes, IEC101/104 and DNP3	
	Time and date stamped data exchange	Interrogation via polling and exchanges on change of status (RBE), unsolicited messaging	
	RTU time synchronization	Yes, IEC101/104 and DNP3	
	Management and buffering of time and date stamped events	Yes, IEC101/104 and DNP3	
	Automatic transfer of time and date stamped events to the Master/SCADA	Yes, IEC101/104 and DNP3 Buffer holding 10,000 events (per connected client, 4 clients max.)	
Data Logging service		Yes, on SD 128 MB memory card, in CSV files, access via FTP or sent by e-mail	
Compatibility with processor		Standard and Performance (see page 1/4)	–
Processor or module references depending on other type of integrated port	No other integrated port		
	Serial link	**BMXNOR0200H**	
	Ethernet Modbus/TCP		**BMXNOR0200H**
	CANopen		
Page		2/55	

Applications		AS-Interface communication	Serial link communication
Type of device		AS-Interface actuator/sensor bus module	2-channel serial link module
			
Network protocols		**AS-Interface**	**Modbus and Character mode**
Structure	Physical interface	AS-Interface V3 standard	Non-isolated RS 232, 8-wire Isolated RS 485, 2-wire
	Type of connector	3-way SUB-D	2 RJ45 and 1 RJ45
	Access method	Master/slave	–
	Data rate	167 Kbps	0.3...115.2 Kbps in RS 232 0.3...57.6 Kbps in RS 485
Medium		Two-wire AS-Interface cable	Shielded twisted pair copper cable
Configuration	Maximum number of devices	62 slaves	2 per drop, 16 per Ethernet remote I/O *(RIO)* network max.
	Max. length	100 m, 500 m max. with 2 repeaters	15 m with non-isolated RS 232, 1000 m with non-isolated RS 485
	Number of links of the same type per station	BMXP341000 processor: 2 AS-Interface modules	20/36 application-specific channels with BMXP341000/P342●●●● (1 application-specific channel = 1 counter, motion control module or serial link channel)
		BMXP3420●0 processor: 4 AS-Interface modules	36 application specific channels max. per BMXCRA31210 Ethernet drop adaptor: 2 BMXNOM0200 modules
		BMXCRA31210 Ethernet drop adaptor: 2 AS-Interface module	
Standard services		Transparent exchanges with the sensors/actuators	Read/write bits and words, diagnostics in Modbus mode Send and receive character string in Character mode
Conformity class		M4 profile	–
SMTP service notification by e-mail		–	–
Compatibility with processor		Standard and Performance (see page 1/4)	Standard and Performance (see page 1/4)
Type of processor or module depending on other integrated port	None	**BMXEIA0100**	
	Serial link		**BMXNOM0200**
	Ethernet Modbus/TCP		
	CANopen		
Page		2/57	2/59

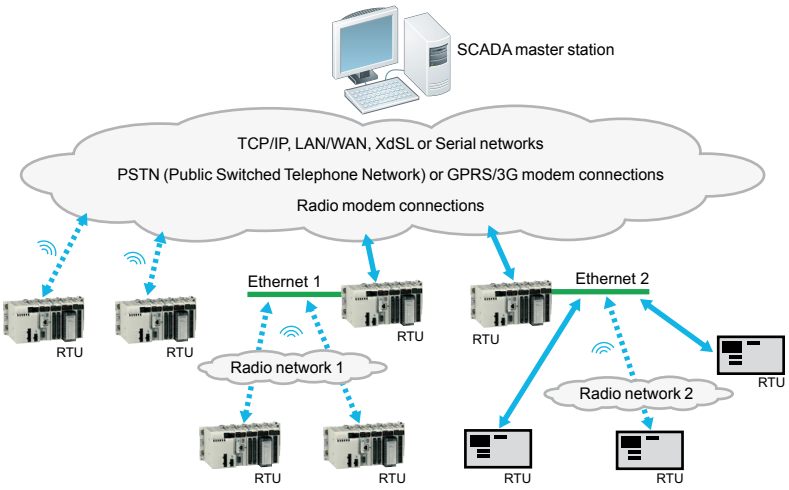
Modicon X80 I/O platform
RTU communication systems

Presentation

RTU systems are designed to meet the needs of the water industry, the oil and gas sector and other infrastructures, where remote monitoring and telecontrol are essential to the good management of sites and substations spread over a wide geographical area.

RTU protocols and Telemetry systems provide robust, reliable means of communication which are suitable for the process values, maintenance and remote monitoring needs of infrastructures disseminated over a vast geographical area which may be difficult to access.

An RTU system consists of the following elements:
- A Telemetry Supervisor (SCADA) in a central control room
- A network infrastructure and a variety of suitable communication methods (LAN, WAN, modems, etc)
- A large number of RTU substations geographically distributed throughout the field



Example of an RTU system architecture

Main functions

The main RTU system functions are as follows:
- Remote communications:
  - Between remote RTU sites (coordination, synchronization)
  - With the SCADA host system, controlling the central operator station (monitoring, alarm reports) and centralized databases (archiving of alarms or events)
  - With the on-call staff (alarm indication)
  - With the technical station (diagnostics, maintenance)

- Data acquisition, processing and memorization:
  - Process data sampling using standard or dedicated sensors, validation
  - Exchange of data with other devices within the station, including controllers and operator consoles
  - Use of digital or analog I/O, serial links, fieldbuses and LANs
  - Event detection, time and date stamping, prioritization and logging as required by the application

- Other functions:
  - IEC 1131-3 programmable control: forcing, access control, load sharing, servo control
  - Data logging
  - Alarm and report notification by e-mail/SMS
  - Web HMI: displaying the process, alarm handling, trend analysis, telecontrol

Processors: page 1/4 | I/O: pages 2/12 and 2/24 | Software: page 4/2 | Ruggedized Modicon M340 modules: page 6/2

Presentation (continued)

Currently, people working in the industrial Telemetry sectors use standard protocols for communication between control centres (SCADA) and RTU stations.

The most commonly used protocols are as follows:
- IEC 60870-5: IEC (International Electrotechnical Commission), in particular IEC 60870-5-101/104 (commonly known as IEC 101 or 104)
- DNP3: Distributed Network Protocol version 3

DNP3 is the predominant protocol in North America, Australia and South Africa whereas, in certain European countries, the IEC protocol is required by the legislation. IEC is also commonly used in the Middle East.

The geographical distribution of these protocols is as follows:
- DNP3: North America, Australia, New Zealand, UK, Asia, South America, etc
- IEC 60870-5: Europe, Middle East, Asia, South America, etc

These protocols offer similar functions.
They are both particularly suited to “transient communications” (modem, radio) and data exchanges with limited bandwidth for the following reasons:
- They transfer data in a very robust and reliable manner between the SCADA system and the RTU devices
- They are essentially “event-triggered” protocols (exchanges on changes of state, exchanges of time and date stamped events).

They offer the following transmission modes:
- Interrogation via polling
- Data exchanges on changes of state *(RBE: Report By Exception)*
- Unsolicited messaging (a slave station can start an exchange of data with the master station).

Both protocols offer native data management and time and date stamped events:
- Time synchronization between the master station and auxiliary stations via protocol functions
- Time and date stamping of data and events
- Automatic transfer of time and date stamped events between the RTU stations and SCADA (control room).

2

Presentation (continued)

The **BMXNOR0200H** communication module integrates the RTU *(Remote Terminal Unit)* functions and protocols in the Modicon X80 I/O platform, for industrial Telemetry applications and other widely distributed infrastructures.

The **BMXNOR0200H** module can be used to connect an RTU X80 I/O PLC directly to a Telemetry supervisor or to other RTU stations, via the standard DPN3 protocols (subset level 3) or IEC 60870-5-101/104 with different connection methods: Ethernet TCP/IP, LAN, WAN, serial link or modem connections (radio, PSTN, GSM, GPRS/3G, ADSL).

The **BMXNOR0200H** module is designed to operate in a harsh environment (conformal coating), in an extended temperature range (-25 to +70°C).

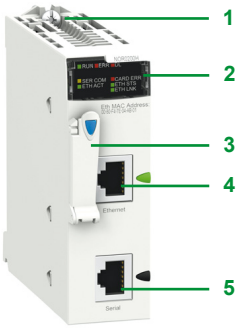
Functions

The **BMXNOR0200H** module offers the following functions:
- Upstream RTU communication to the SCADA (server or slave mode)
- Downstream RTU communication to field devices (master mode)
- RTU protocols: Time synchronization, exchanges of time and date stamped data via polling (on change of state and unsolicited), management of time and date stamped events
- Application Data Logging with time and date stamping in the module Flash memory card
- Event notifications via e-mail or SMS
- Embedded Web server for setting the RTU protocol parameters, diagnostics and monitoring

- Communications on Ethernet port:
  - 10BASE-T/100BASE-TX physical interface
  - Modbus/TCP protocol (client and server)
  - Integrated RTU protocols for Ethernet communications: DNP3 IP (client or server) and IEC 60870-5-104 (over IP) (client or server)
  - Connection of ADSL external modem on the Ethernet port, via the PPPoE *(Point-to-Point Protocol over Ethernet)* protocol
  - Advanced Ethernet functions: NTP client, FTP client or server, HTTP server, SOAP/XML server, SNMP agent, SMTP agent

- Communications on serial port:
  - Isolated RS232/RS485 point-to-point serial links
  - Integrated RTU protocols for serial and modem communications: IEC 60870-5-101 (master or slave) and DNP3 serial (master or slave)
  - Connection of external modems (radio, PSTN, GSM, GPRS/3G) via the PPP *(Point-to-Point Protocol)* protocol

Description



The **BMXNOR0200H** module can be installed in either a standard or “ruggedized” configuration, equipped with a standard **BMXP34●●●●●** or “ruggedized” **BMXP34●●●●●H** processor.

The front panel of the **BMXNOR0200H** module features:
1. A safety screw for locking the module in a slot in the rack.
2. A display block with 8 LEDs, 4 of which relate to the serial and Ethernet communication ports.
3. A slot for a Flash memory card (SD card), with protective cover.
4. An RJ45 connector for the connection to the Ethernet network.
5. An RJ45 connector for connection of the serial link or an external modem.

On the rear panel, 2 rotary switches for selecting the IP address assignment method for the module.

Processors: page 1/4 | I/O: pages 2/12 and 2/24 | Software: page 4/2 | Ruggedized Modicon M340 modules: page 6/2

Modicon X80 I/O platform
RTU communication module

BMXNOR0200H

References

Description	Communication port	Protocol	Reference	Weight kg
RTU communication module *(1)*	Ethernet 10BASE-100BASE-TX	■ Modbus/TCP (client or server), Transparent Ready class C30 ■ DNP3 IP (client or server) ■ IEC 60870-5-104 (over IP) (client or server)	**BMXNOR0200H** *(2)*	0.205
	Serial, External modems	■ Isolated RS232/RS485 point-to-point serial links ■ DNP3 serial (master or slave) ■ IEC 60870-5-101 (master or slave)		

Spare parts

Description	Usage	Supplied with module	Reference	Weight kg
128 MB Flash memory card supplied as standard with the module	Web pages, Storage of data logging files (CSV)	**BMXNOR0200H**	**BMXRWS128MWF**	0.002

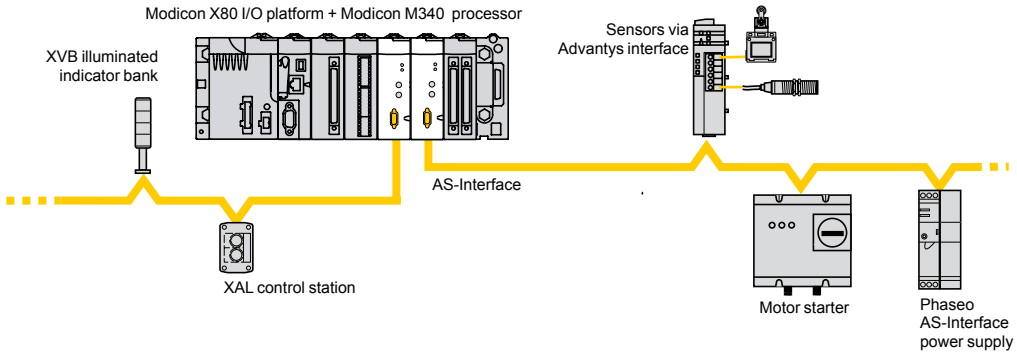
(1) See ruggedized module characteristics, pages 6/2 and 6/8.
(2) The Web Designer software is supplied on CD-ROM with the module. This software can be used to configure and download the embedded website and to configure advanced services: data logging, sending alarm notifications via SMS or e-mail, see page 3/18.

Modicon X80 I/O platform

BMXEIA0100 master module
for AS-Interface cabling system

Presentation

The **BMXEIA0100** master module for AS-Interface cabling system provides the AS-Interface system master function for the Modicon X80 I/O platform.



The AS-Interface cabling system consists of a master station (Modicon X80 I/O platform) and slave stations. The master supporting the AS-Interface profile interrogates the devices connected on the AS-Interface line one by one and stores the information (actuator/sensor status, device operating status) in the PLC memory. Communication on the AS-Interface line is managed totally transparently in relation to the application PLC program.

The **BMXEIA0100** master module supports the latest management profile for AS-Interface devices *(AS-Interface V3)* that are able to manage all level V1, V2 and V3 AS-Interface slaves:

- Discrete slave devices (up to 62 devices of 4I/4Q organized in 2 banks (A/B) of 31 addresses each)
- Analog devices (up to 31 devices (4 channels) in bank A)
- Safety interfaces (up to 31 devices in bank A)

An AS-Interface power supply is essential for powering the various devices on the line. Ideally it should be placed near stations that consume a great deal of energy. Please refer to the “Phaseo power supplies and transformers - AS-Interface range” catalogue.

A Modicon M340 Performance configuration with **BMXP3420●0/20●02** processor can take 4 **BMXEIA0100** modules. A Standard configuration with **BMXP341000** processor can take 2 **BMXEIA0100** modules.

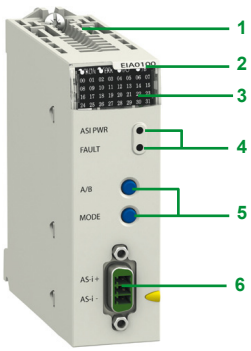
Description

The **BMXEIA0100** AS-Interface master module is standard format (1 slot). Its housing provides IP 20 protection of the electronics and it is locked into each rack slot **01** ….**11**) by a captive screw.

The front panel of the **BMXEIA0100** AS-Interface master module features:

1 A rigid body providing support and protection for the electronic card.
2 A module reference marking.
3 A display block with 5 LEDs indicating the module operating modes:
- □ RUN (green): Module running
- □ ERR (red): Module faulty
- □ A/B (green): Displays the group of 31 slaves
- □ I/O (red): I/O fault on AS-Interface line
- □ 32 LEDs for diagnostics of the AS-Interface line and each slave connected on the line depending on the A/B pushbutton selection *(1)*.

4 2 LEDs marked ASI POWER and FAULT: AS-Interface external power supply present and AS-Interface line fault: see diagnostics on page 2/57.
5 Two pushbuttons marked A/B and MODE: see diagnostics on page 2/57.
6 A 3-way male SUB-D connector for the AS-Interface cable (female screw connector supplied).

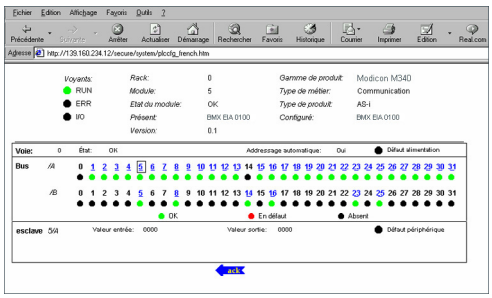


BMXEIA0100

(1) Depending on whether A or B is selected, this displays either the first 31 slaves (standard addressing) or the last 31 slaves (extended addressing).

Modicon X80 I/O platform

BMXEIA0100 master module
for AS-Interface cabling system



Diagnostics

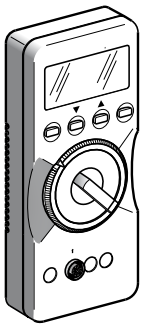
BMXEIA0100 module

The two LEDs **4** on the module front panel are used in conjunction with the two pushbuttons **5** for module diagnostics:

LEDs		Pushbuttons	
4 ASI PWR: AS-Interface power supply present	**4** FAULT: AS-Interface line fault	**5** A/B: Selects the group of slaves on the display block **3**	**5** MODE: Module Offline/Online

The display block on the front panel of the **BMXEIA0100** master module can be used to perform simplified local diagnostics by displaying the slave devices present on the AS-Interface line.
Detailed diagnostics of each of the slave devices is also possible using:

- The **ASITERV2** adjustment terminal
- A web browser using the Rack Viewer function in the standard Web server on the Modicon X80 I/O platform (see page 3/16)



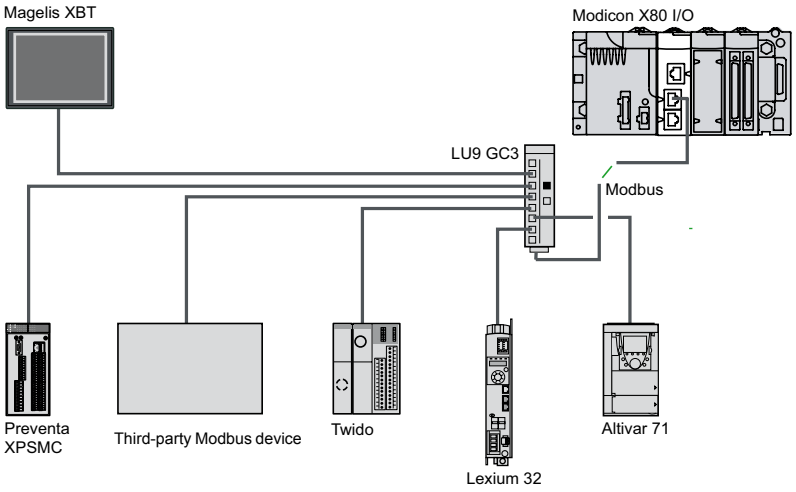
ASITERV2

References

Description	Usage	Reference	Weight kg
AS-Interface master module supplied with 3-way male SUB-D connector	M4 AS-Interface profile for level V1, V2 and V3 slaves	**BMXEIA0100**	0.340
Adjustment terminal	For addressing and diagnostics of AS-Interface level V1, V2 and V3 interfaces Powered by LR6 batteries	**ASITERV2**	1.000

Modicon X80 I/O platform
Modbus and Character mode serial links

Presentation

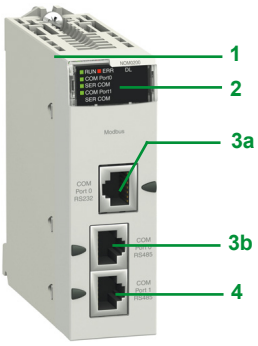


The Modbus serial link is used for master/slave architectures (it is necessary, however, to check that the Modbus services used by the application have been implemented on all relevant devices).

The bus consists of a master station and slave stations. Only the master station can initiate the exchange (direct communication between slave stations is not possible).
Two exchange mechanisms are available:
■ Question/response, where requests from the master are addressed to a given slave. The master then waits for the response from the slave which has been interrogated.
■ Broadcasting, where the master broadcasts a message to all slave stations on the bus. The latter execute the order without transmitting a reply.
■ It is necessary to use **BMXCRA31210** drop adaptors as head of drops. On one drop it is possible to plug a maximum of two **BMXNOM0200** modules.
The following services are not available in the slave stations:
□ Modbus slave,
□ Modem services.
Although most types of serial links can support modems, The **BMXNOM0200** 2-channel serial link module is particularly recommended for this type of use.
Its performance and numerous parameter-setting options make it ideal for any type of configuration, especially when using radio modems.

Description

BMXNOM0200 serial link module



BMXNOM0200

The front panel of the **BMXNOM0200** serial link module features:
1 A safety screw for locking the module in a slot in the rack.
2 A display block with 4 LEDs:
□ RUN (green) and ERR (red): Module status
□ For each of the two channels: SER COM (green): Activity on the serial link (lit)/fault on a device present on the serial link (flashing).
3 Two RJ45 connectors (exclusive use) for connection of channel 0 (with black indicator):
□ **3a** A connector for RS 232C connection, marked COM Port 0 RS232
□ **3b** A connector for RS 485 connection, marked COM Port 0 RS485
4 An RJ45 connector for RS 485 connection of channel 1, marked COM Port 1 RS485, with black indicator.

To be ordered separately:
RS 485 cordsets (see page 3/64) or RS 232 cordsets for DCE terminal (see page 2/59).

Complementary characteristics

The following characteristics complement those indicated in the selection guide on page 2/51.

BMXNOM0200 module serial links

- Physical interface:
  - RS 232 port 0: RS 232 8-wire, non-isolated
  - RS 485 port 0 and port 1: RS 485 2-wire, isolated
- Frame:
  - Modbus: RTU/ASCII, full duplex in RS 232, half duplex in RS 485
  - Character mode: full duplex in RS 232, half duplex in RS 485
- Data rate:
  - RS 232 port 0: 0.3...115 Kbps (Modbus/Character mode)
  - RS 485 port 0 and port 1: 0.3...57.6 Kbps (Modbus/Character mode)
- Line polarization:
  - Modbus RS 485: automatic
  - RS 485 character mode: configurable with Unity Pro software
- Maximum length of a tap link in RS 485 2-wire:
  - 15 m in a non-isolated link
  - 40 m in an isolated link
- Expert mode (from version V1.2 of the module and version V5 of Unity Pro): used to configure the time out links individually from the application and thus adapt to the specific characteristics of certain modems.

BMXNOM0200

References *(1)*

Modbus serial link

Designation	Protocol	Physical layer	Reference	Weight kg
Modbus serial link 2 channels *(2)*	Modbus master/slave RTU/ASCII, Character mode, GSM/GPRS modem	1 non-isolated RS 232 channel (Port 0) 2 isolated RS 485 channels (Port 0 and Port 1)	**BMXNOM0200**	0.230

Cordsets for RS 232 serial link *(3)*

Designation	Description		Length	Reference	Weight kg
Cordset for Data Terminal Equipment (DTE) (printer)	Equipped with an RJ45 connector and a 9-way female SUB-D connector		3 m	**TCSMCN3M4F3C2**	0.150
Cordset for Data Communication Equipment (DCE) (modem, etc.)	Equipped with an RJ45 connector and a 9-way male SUB-D connector	4-wire (RX, TX, RTS, CTS)	3 m	**TCSMCN3M4M3S2**	0.150
		8-wire (excluding RI signal)	3 m	**TCSXCN3M4F3S4**	0.165

(1) Requires Unity Pro software ≥ V1.4.
(2) For the ruggedized version, **BMXNOM0200H**, *see characteristics on pages 6/2 and 6/8.*
(3) RS 485 serial link connection (see pages 3/64 and 3/65).

Modicon X80 I/O platform
Wi-Fi network
PMXNOW0300 Wi-Fi access point

PMXNOW0300 Wi-Fi access point

Presentation

The PMXNOW0300 Wi-Fi access point consists of a WLAN wireless connection combined with a 3-port 10/100 Ethernet switch.
This module is designed to be integrated in the Modicon X80 I/O platform Modicon processor *(1)*. It retrieves the 24 V voltage from the backplane rack and occupies one slot in it. An Ethernet cable, supplied with the module, must be used to connect the Wi-Fi module to the processor or the communication module (BMXNO●●●●●).
This module offers the following functions:

- access point
- Ethernet bridge
- Wi-Fi repeater

The PMXNOW0300 is compatible with the majority of Ethernet-based protocols, including Modbus TCP, EtherNet/IP, etc.
It also allows Wi-Fi access to the associated Modicon processor from Vijeo Citect and Unity Pro software as well as exchange of data between automation platforms.

The PMXNOW0300 module can be removed and replaced while the rack is powered up. It is compatible with Vijeo Design'Air and Vijeo Design'Air Plus, allowing the HMI to be remotely located on a tablet or smartphone *(2)*.

Main characteristics

Type of device
Wi-Fi access point, client and repeater

Wi-Fi standards
IEEE 802.11 a/b/g/h

Operating frequencies
2.4 GHz and 5 GHz

IP rating
IP 30

Mounting
On the rack

Number of radios
1

Nominal data rate
≤108 Mbps (Super AG mode, 54 Mbps in standard mode)

Antenna connections
1 x RP-SMA

Ethernet connections
3 x 10/100 BASE TX, MDI-MDIX

Wi-Fi connections
1 x WLAN interface

Range
Up to 300 m in free field with the antenna supplied as with standard and up to 5 km with external antenna (frequency range and data rate dependent on antenna type)

Dimensions
97 x 32 x 104 mm

Storage temperature
- 40°C to + 80°C

Humidity
Max. 95% (non-condensing)

Supply voltage
+ 24 V ⎓ from the Modicon X80 I/O platform rack

Consumption
3.5 W typical

(1) Only for processors compatible with the Modicon X80 I/O platform (see page 1/9).
(2) For more information, please consult our website www.schneider-electric.com.

Modicon X80 I/O platform
Wi-Fi network
PMXNOW0300 Wi-Fi access point

References

Wi-Fi access points

Description	Number of radios	Data rate	IP rating	Reference	Weight
		Mbps			kg
Wi-Fi 802.11a/b/g/h access point with antenna and 50 cm long Ethernet cable equipped with two RJ45 connectors, plus CD-ROM	1	⩽108 (Super AG mode, 54 Mbps in standard mode)	IP 30	**PMXNOW0300** *(1)*	0.205

Technology approved by Schneider Electric

(1) To order this product, consult our partner ACKSYS (Collaborative Automation Partner Program): www.acksys.com.

Modicon distributed I/O solutions

Type of splitter box and module		Monobloc IP 67 I/O splitter boxes
		Modicon ETB
		
Available buses and networks		Ethernet Modbus TCP/IP EtherNet/IP
Max. number per connection point		
Discrete I/O	Modularity	Splitter box with 16 configurable I/O, 16 I, 12 I + 4 O, or 8 I +8 O
	Input voltage	24 V ⎓
	Output voltage	24 V ⎓
Analog I/O		–
Application-specific I/O		–
		–
I/O connection		M12 connectors
Type of housing		Plastic
Type of module		**ETB1E●●●**
Pages		Please consult the catalogue pages on our website www.schneider-electric.com

Monobloc IP 20 distributed I/O	Optimum IP 20 distributed I/O	Modular IP 20 distributed I/O
Modicon Momentum	**Modicon OTB**	**Modicon STB**
		
Ethernet Modbus TCP/IP Modbus Plus Fipio INTERBUS Profibus DP DeviceNet	Ethernet Modbus TCP/IP CANopen Modbus (RS 485)	Ethernet Modbus TCP/IP EtherNet/IP CANopen Modbus Plus Fipio INTERBUS Profibus DP DeviceNet
1 I/O base with 1 CPU or 1 communication module	1 interface module + 7 Twido expansion modules	1 NIM (Network Interface Module) + 32 I/O modules
I/O base with 16 I, 32 I, 8 O, 16 O, 32 O, 10 I/8 O, 16 I/8 O, 16 I/12 O and 16 I/16 O	12 I/8 O (interface module) 8 I, 16 I, 32 I, 8 O, 16 O, 32 O, 4 I/4 O and 16 I/8 O (expansion modules)	Module with 2 I, 4 I, 6 I, 16 I, 2 O, 4 O, 6 O or 16 O
24 V ⎓, 120 V ∿ and 230 V ∿	24 V ⎓	24 V ⎓, 115 V ∿ and 230 V ∿
24 V ⎓ V, 120 V ∿ and 230 V ∿ and relay	24 V ⎓ and relay	24 V ⎓, 115/230 V ∿ and relay
8 I, 16 I or 4 O voltage/current I/O bases I/O base with 4 thermocouple or probe inputs	2 I, 4 I, 8 I, 1 O, 2 O, 2 I/1 O and 4 I/2 O (expansion modules) voltage/current, thermocouple or temperature probe	Modules with 2, 4 or 8 inputs and 1 or 2 outputs (voltage/current) I/O base with 2 thermocouple or probe inputs
10 kHz/200 kHz 2-channel counter I/O base	Integrated in interface module: - Two 5 kHz/20 kHz channels - 2 PWM function channels	Counter module with one 40 kHz channel HART multiplexer module - 4 HART channels per HART multiplexer module - Up to 8 HART multiplexer modules per island
6 I/3 O 120 V ∿ I/O base with 1 Modbus port	–	Parallel interface modules for TeSys Quickfit and TeSys U motor starters, integrated connection for third-party CANopen products
Screw or spring-type removable terminal blocks	Removable screw terminal block (interface module) Removable screw terminal block, non-removable spring-type terminal block and HE 10 connector (expansion modules)	Removable screw or spring-type connectors, Telefast connectors
Plastic		
170A●	**OTB1●0DM9LP**	**STB●●●**
Please consult the catalogue pages on our website www.schneider-electric.com		

Contents

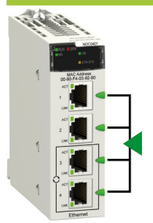
3 - Communication

CANopen machine and installation bus

Modbus and Character mode serial links

Modicon M340 automation platform
Communication, integrated ports and modules

Applications		**Ethernet communication**		
Type of device		**Processors with integrated Modbus/TCP port**	**Ethernet modules**	
				
Network protocols		**◀ Ethernet Modbus/TCP**		
Structure	Physical interface	10BASE-T/100BASE-TX		
	Type of connector	RJ45		
	Access method	CSMA-CD		
	Data rate	10/100 Mbps		
Medium		Double twisted pair copper cable, category CAT 5E Optical fibre via ConneXium cabling system		
Configuration	Maximum number of devices	–		
	Max. length	100 m (copper cable), 4000 m (multi-mode optical fibre), 32,500 m (single-mode optical fibre)		
	Number of modules of the same type per station	1	2 Ethernet or RTU modules per station with any BMXP34 processor	
Standard services		Modbus/TCP messaging		
Transparent Ready conformity class		B10	B30	C30
Embedded Web server services	Standard services	Rack Viewer PLC diagnostics, Data Editor access to PLC data and variables		
	Configurable services	–		Alarm Viewer and Graphic Data Editor
				Hosting and display of user Web pages (14 MB)
Transparent Ready communication services	I/O Scanning service	–	Yes	
	Global Data service	–	Yes	
	NTP time synchronization	–	Yes (module version ≥ 2.0)	
	FDR service	Yes (client)	Yes (client/server)	
	SMTP e-mail notification service	Yes, via EF function block Unity Pro ≥ 4.0	–	
	SOAP/XML Web service	–	–	Server
	SNMP network management service	Yes	Yes	
	RSTP redundancy service	–	–	–
	QoS (Quality of Service) service	–	–	–
RTU communication services IEC 60870-5-104, DNP3 IP or IEC 60870-5-101, DNP3 serial	Master or Slave configuration	–		
	Time and date stamped data exchange	–		
	RTU time synchronization	–		
	Management and buffering of time and date stamped events	–		
	Automatic transfer of time and date stamped events to the Master/SCADA	–		
Data Logging service		–	–	–
Compatibility with processor		–	Standard and Performance (see page 1/4)	
Processor or module references depending on other type of integrated port	No other integrated port		**BMXNOE0100**	**BMXNOE0110**
	Serial link	**BMXP342020**		
	Ethernet Modbus/TCP			
	CANopen	**BMXP3420302/ BMXP3420302CL**		
Page		3/20	3/21	

Ethernet communication	**RTU communication**	
Ethernet modules	**RTU module**	
		
◀ EtherNet/IP and Modbus/TCP	**◀ Modbus/TCP, IEC 60870-5-104, DNP3 (subset level 3)**	**◀ Serial link, External modem link, IEC 60870-5-101, DNP3 (subset level 3)**
10BASE-T/100BASE-TX	10BASE-T/100BASE-TX (Modbus/TCP), PPPoE (Point-to-Point Protocol over Ethernet) for ADSL external modem link	Non-isolated RS 232/485 (Serial link), Non-isolated RS 232 (Radio, PSTN, GSM, GPRS/3G external modem link)
Four RJ45 connectors (2 connectors for a ring topology)	One RJ45 connector	One RJ45 connector
CSMA-CD	CSMA-CD (Modbus/TCP), Master/slave (IEC 104/DNP3)	Master/slave (IEC 101/DNP3)
10/100 Mbps	10/100 Mbps (Modbus/TCP)	0.3…38.4 Kbps (Serial link)
Double twisted pair copper cable, category CAT 5E, optical fibre via ConneXium cabling system		Double shielded twisted pair copper cable, Crossover serial cable (Serial link), Direct serial cable (External modem link)
128 (EtherNet/IP or Modbus/TCP)	128 (Modbus/TCP), 64 slaves/servers (IEC 104/DNP3)	32 max.
100 m (copper cable), 4000 m (multi-mode optical fibre), 32,500 m (single-mode optical fibre)		1000 m (Serial link with insulating case)
2 Ethernet or RTU modules per station with any BMXP34 processor		Depending on application-specific channels (20/36 application-specific channels with BMXP341000/P342●●●●)
EtherNet/IP and Modbus/TCP messaging	Modbus/TCP messaging	Reading/writing digital and analog I/O, counters
B30	C30	–
Rack Viewer PLC diagnostics, Data Editor access to PLC data and variables		–
–	–	–
–	Hosting and display of user Web pages	–
Yes	–	
–	–	
–	Yes	
Yes (client/server)	Yes (client)	–
–	Yes	–
–	Server	–
Yes	Yes (agent)	–
Yes	–	
Yes	–	
–	Yes, IEC101/104 and DNP3	
–	Interrogation via polling and exchanges on change of status (RBE), unsolicited messaging	
–	Yes, IEC101/104 and DNP3	
–	Yes, IEC101/104 and DNP3	
–	Yes, IEC101/104 and DNP3 Buffer holding 10,000 events (per connected client, 4 clients max.)	
–	Yes, on SD 128 MB memory card, in CSV files, access via FTP or sent by e-mail	
Standard and Performance (see page 1/4)		
BMXNOC0401		
	BMXNOR0200H	
		BMXNOR0200H
3/23	2/55	

Modicon M340 automation platform
Communication, integrated ports and modules

Applications	CANopen communication		AS-Interface communication
Type of device	Processors with integrated CANopen port		AS-Interface actuator/sensor bus module
			
Network protocols	**CANopen**		**AS-Interface**
Structure Physical interface	ISO 11898 (9-way SUB-D connector)		AS-Interface V3 standard
Type of connector	9-way SUB-D		3-way SUB-D
Access method	CSMA/CA (multiple access)		Master/slave
Data rate	20 Kbps...1 Mbps depending on distance		167 Kbps
Medium	Double shielded twisted pair copper cable		Two-wire AS-Interface cable
Configuration Maximum number of devices	63 depending on the devices connected		62 slaves
Max. length	20 m (1 Mbps)…2500 m (20 Kbps)		100 m, 500 m max. with 2 repeaters
Number of links of the same type per station	1		BMXP341000 processor: 2 AS-Interface modules
			BMXP3420●0 processor: 4 AS-Interface modules
			BMXCRA31210 Ethernet drop adaptor: 2 AS-Interface modules
Standard services	PDO implicit exchange (application data) SDO explicit exchange (service data)		Transparent exchanges with the sensors/actuators
Conformity class	Class M20		M4 profile
SMTP service notification by e-mail	–	Yes, via EF function block Unity Pro ≥ 4.0	–
Compatibility with processor	–		Standard and Performance (see page 1/4)
Type of processor or module depending on other integrated port None			**BMXEIA0100**
Serial link	**BMXP3420102/ BMXP3420102CL**		
Ethernet Modbus/TCP		**BMXP3420302/ BMXP3420302CL**	
CANopen			
Page	3/58		2/57

Serial link communication		
Processors with integrated serial link		2-channel serial link module
		
Modbus and Character mode		
Non-isolated RS 232, 4-wire Non-isolated RS 485, 2-wire		Non-isolated RS 232, 8-wire Isolated RS 485, 2-wire
RJ45		2 RJ45 and 1 RJ45
Master/slave with Modbus link, Full duplex (RS 232)/Half duplex (RS 485) in Character mode		
0.3...38.4 Kbps		0.3...115.2 Kbps in RS 232 0.3...57.6 Kbps in RS 485
Double shielded twisted pair copper cable		Shielded twisted pair copper cable
32 per segment, 247 max.		2 per drop, 16 per Ethernet remote I/O *(RIO)* network max.
15 m (non-isolated), 1000 m with insulating case		15 m with non-isolated RS 232, 1000 m with non-isolated RS 485
1		20/36 application-specific channels with BMXP341000/P342●●●● (1 application-specific channel = 1 counter, motion control module or serial link channel)
		36 application specific channels max. per BMXCRA31210 Ethernet drop adaptor: 2 BMXNOM0200 modules
Read/write bits and words, diagnostics in Modbus mode Send and receive character string in Character mode		
–		
–		
–		Standard and Performance (see page 1/4)
BMXP341000/2000		
		BMXNOM0200
BMXP342020		
BMXP3420102/BMXP3420102CL		
3/63		2/59

Modicon M340 automation platform

Communication, integrated ports and modules

Applications		Modbus Plus communication	
Type of device		**M340 Modbus Plus proxy module (external)**	
			
Network protocols		**Ethernet Modbus/TCP**	**Modbus Plus**
Structure	Physical interface	10/100BASE-T	Modbus Plus standard
	Type of connector	Two RJ45 connectors	Two 9-way female SUB-D connectors
	Access method	CSMA-CD	Token ring
	Data rate	10/100 Mbps	1 Mbps
Medium		Double shielded twisted pair copper cable, category CAT 5E (direct or crossover)	Twisted pair copper cable
Configuration	Maximum number of devices	128	32 per segment 64 for all segments
	Max. length	100 m	450 m per segment 1800 m with 3 repeaters
	Number of links of the same type per station	1 max.	
Standard services		Modbus/TCP messaging	Modbus Plus messaging
Conformity class		–	–
Embedded Web server service	Standard service	Configuration, diagnostics	
	Configurable services	–	
Communication services		Modbus Plus server (scanned by the PLC)	Reading/writing variables
		FDR service	Global database
		SNMP agent network management service	Peer Cop service
24 V ⎓ external power supply		19.2…31.2 V	
Module types		**TCSEGDB23F24FA**	
Page		3/53	

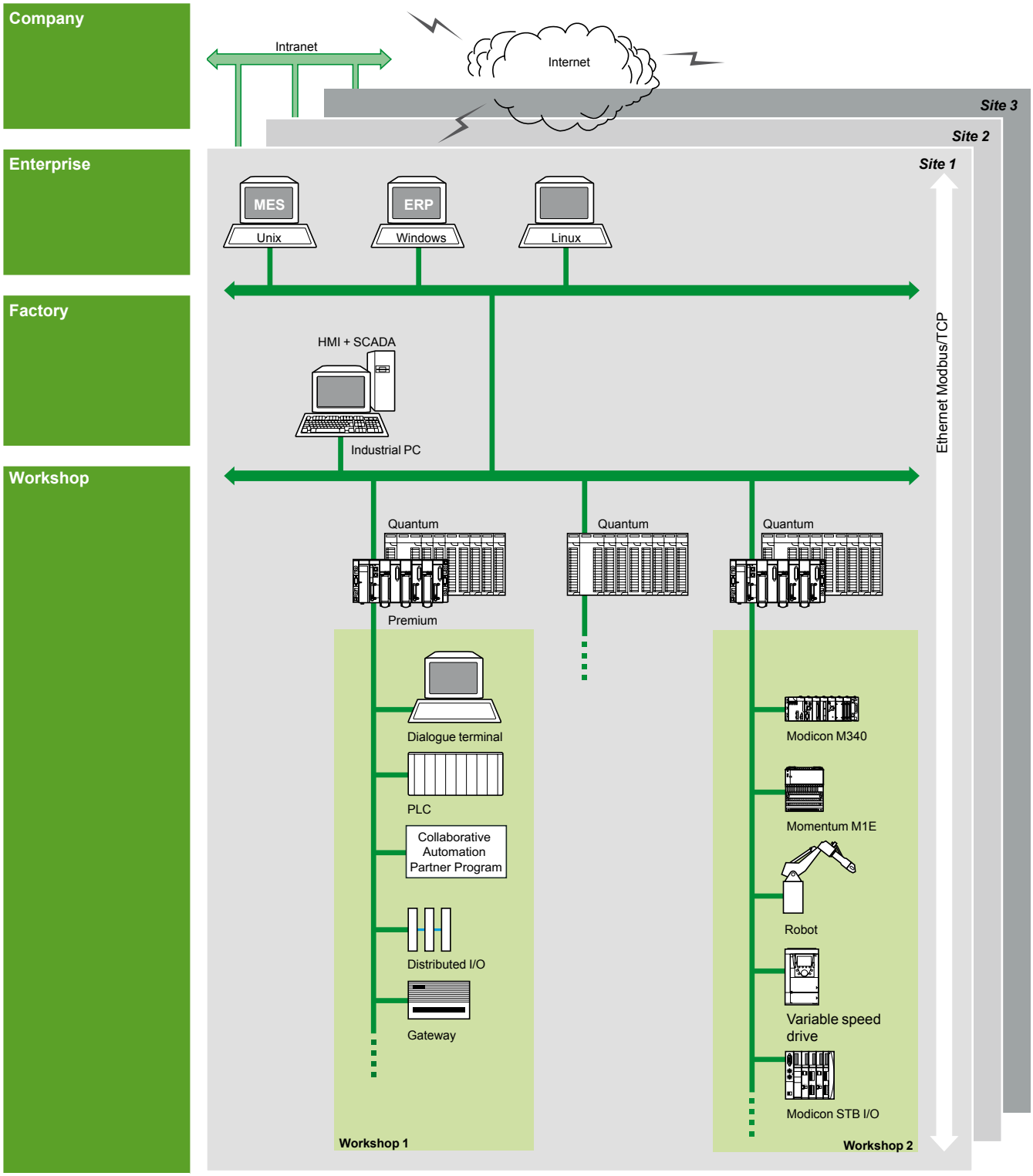
Profibus DP and Profibus PA communication	
Profibus Remote Master (PRM) module (external)	
	
Ethernet Modbus/TCP	**Profibus DP V1** **Profibus PA (via gateway)**
10BASE-T/100BASE-TX	Isolated RS 485
Two RJ45 connectors (supporting daisy chain topology)	One 9-way female SUB-D connector
CSMA-CD	Master/slave
10/100 Mbps	9.6 Kbps...12 Mbps
Double shielded twisted pair copper cable, category CAT 5E (direct or crossover)	Shielded twisted pair copper cable
Several PRMs can be connected to the Ethernet port on the M340, Premium or Quantum PLC, as long as the I/O scanner capacity is not exceeded	125 slaves
100 m (copper)	1200 (9.6 Kbps), 4800 m with 3 repeaters, 100 m (12 Mbps), 400 m with 3 repeaters
–	
Modbus/TCP messaging	Cyclic and acyclic data exchange with slaves
Transparent Ready Class A20	Class 1 and Class 2
–	
–	
Modbus server (scanned by the PLC)	Master/slave communication
FDR service	Global Control service
SNMP agent network management service	Acyclic communication (read/write) in Class 1 and Class 2
	Support for extended diagnostics
	Auto-scanning service of slaves on the bus
18…30 V	
TCSEGPA23F14F	
3/55	

Modicon M340 automation platform

PlantStruxure Ethernet Architectures

Logical communication architecture

Logical communication architecture



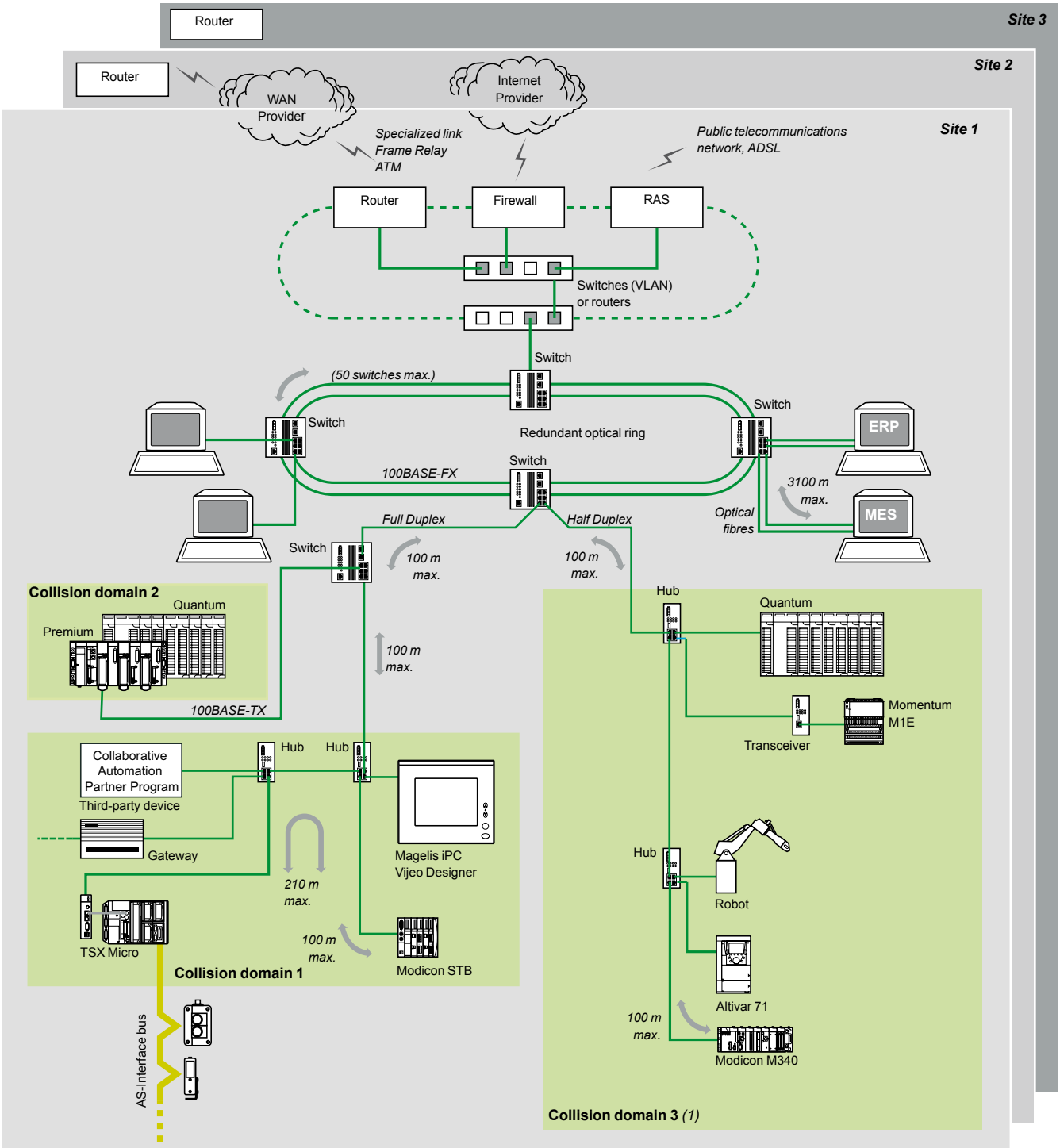
MES: Manufacturing Execution System (production management system)
ERP: Enterprise Resource Planning (integrated management software packages)
IHM/SCADA: Human/Machine Interface and Supervision Control And Data Acquisition
Gateway: Gateway to sensor/actuator bus, to installed base network, fieldbus, etc.

Modicon M340 automation platform

PlantStruxure Ethernet Architectures

Physical communication architecture

Physical communication architecture



(1) As a general rule, defining several collision domains can increase the size of the architecture and improve performance (see pages 7/6 to 7/11).

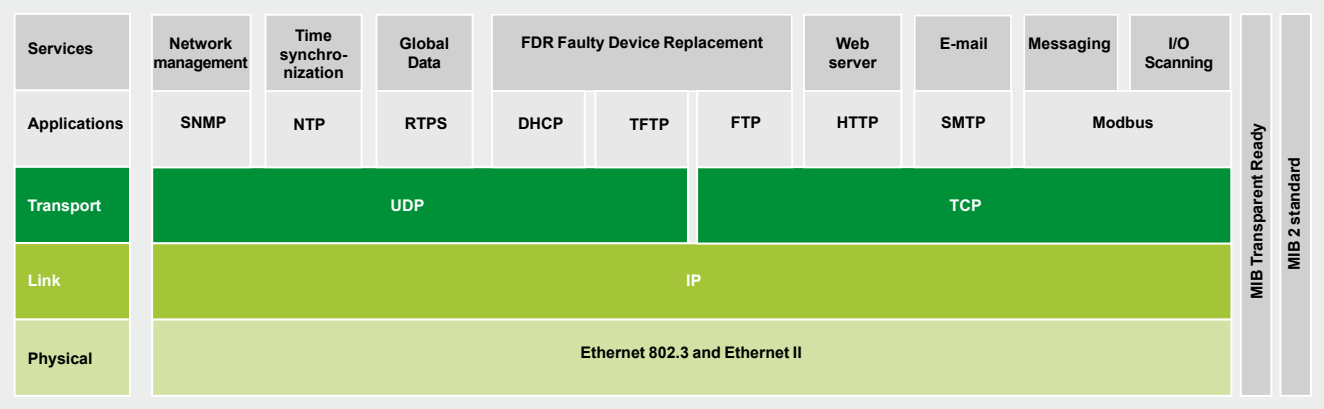
Modicon M340 automation platform

Ethernet Modbus/TCP network

Ethernet Modbus/TCP communication services

Presentation

BMXP342020/20302/20302CL processors via their integrated Ethernet port, **BMXNOE0100/0110** network modules and the **BMXNOR0200H** RTU module provide transparent communication on the Ethernet Modbus/TCP network using Transparent Ready communication services.



Ethernet communication services for the BMXNOE0100/0110 module

The following Transparent Ready communication services are designed for use in automation applications. They supplement the universal Ethernet services (HTTP, BOOTP/DHCP, FTP, etc):

- Modbus/TCP messaging for class 10 or 30 devices
- I/O Scanning service for class 30 devices
- FDR (Faulty Device Replacement) for class 10 or 30 devices
- SNMP *(Simple Network Management Protocol)* network management for class 10 or 30 devices
- Global Data, for class 30 devices
- Bandwidth management for class 10 or 30 devices
- NTP (*Network Time Protocol*) synchronization for class 30 devices
- E-mail alarm notification via SMTP server, via Unity Pro function block

Note: *See selection guide on pages 3/2 and 3/3 for the communication services supported by* ***BMXP342020/20302/20302CL*** *processors,* ***BMXNOE0100/0110*** *network modules and the* ***BMXNOR0200H*** *RTU module on the Modicon M340 platform.*

The following pages (3/11 to 3/15) present the various options available through all of these services in order to facilitate the optimum choice of solutions when defining a system integrating Transparent Ready devices.

Processors: page 1/4 | I/O: pages 2/12 and 2/24 | Software: page 4/2 | Ruggedized Modicon M340 modules: page 6/2

Modicon M340 automation platform

Ethernet Modbus/TCP network

Ethernet Modbus/TCP communication services

Functions

Ethernet universal services

The universal Ethernet services used are as follows:

■ **HTTP *(HyperText Transfer Protocol)***:
□ This protocol is used for transmitting Web pages between a server and a browser.
□ Web servers embedded in Transparent Ready automation products provide easy access to products located anywhere in the world from a standard web browser such as Internet Explorer.

■ **BOOTP/DHCP** (**RFC1531**):
□ These protocols are used to provide devices with IP parameters automatically. This avoids having to manage each device address individually by transferring this management to a dedicated IP address server.
□ The DHCP protocol *(Dynamic Host Configuration Protocol)* is used to assign configuration parameters to devices automatically. DHCP is an extension of BOOTP.
□ Schneider Electric devices can be “BOOTP clients” (used to retrieve the IP address automatically from a server) or “BOOTP servers” (allowing the device to distribute IP addresses to the network stations).
□ Schneider Electric uses standard BOOTP/DHCP protocols for its FDR *(Faulty Device Replacement) service*.

■ **FTP *(File Transfer Protocol)*** **(RFCs 959, 2228, and 2640)**:
□ This protocol provides the basic elements for file sharing. Many systems use it to exchange files between devices.

■ **TFTP *(File Transfer Protocol)*** **(RFCs 959, 2228, and 2640)**:
□ This network transfer protocol can be used to connect to a device and download code to it.
□ For example, it can be used to transfer a boot code to a workstation without a disk drive or to connect and download updates of network device firmware.
□ Transparent Ready devices implement FTP and TFTP for transferring certain information to or from devices, in particular for downloads of firmware or user-defined Web pages.

■ **SNMP *(Simple Network Management Protocol)*** **(RFCs 1155, 1156 and 1157)**:
□ The SNMP standard manages the various network components via a single system.
□ The network management system can exchange data with SNMP agent devices. This function allows the manager to display the status of the network and devices, modify their configuration and feed back alarms in the event of a fault.
□ Transparent Ready devices are SNMP-compatible and can be integrated naturally in a network managed via SNMP.

■ **COM/DCOM *(Distributed Component Object Model)*** **(RFCs 1155, 1156 and 1157)**:
□ COM/DCOM or OLE *(Object Linking and Embedding)* protocol is the name of the technology consisting of Windows objects which enables transparent communication between Windows applications.
□ These technologies are used in the OFS *(OLE for Process Control Factory Server)* data server software.

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Modbus standard communication protocol

Modbus protocol, the industry communication standard since 1979, has been combined with Ethernet Modbus/TCP, the medium for the Internet revolution, to form Modbus/TCP, a completely open Ethernet protocol.
The development of a connection to Modbus/TCP does not require any proprietary component, nor purchase of a license.
This protocol can easily be combined with any product supporting a standard TCP communication stack. The specifications can be obtained free of charge from the following website: **www.modbus-ida.org**.

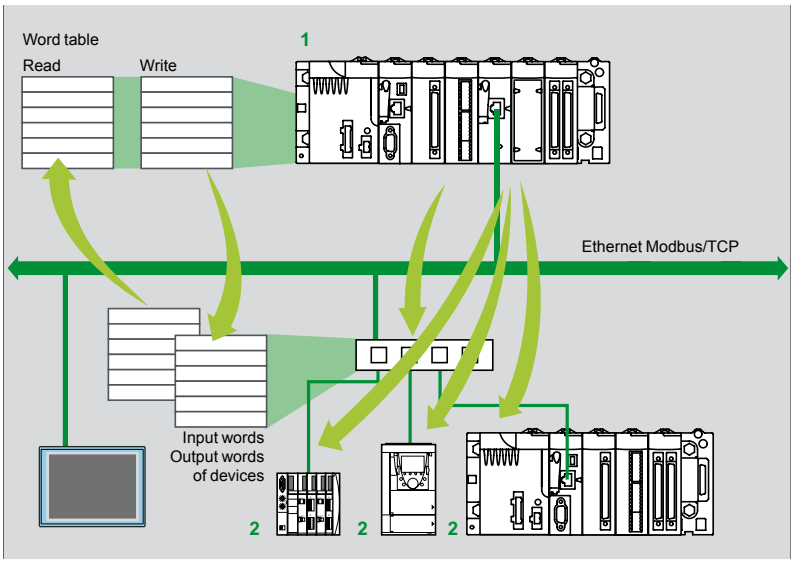
Modicon M340 automation platform

Ethernet Modbus/TCP network

Ethernet Modbus/TCP communication services

Functions (continued)

I/O Scanning service



1 Modicon M340 device with I/O Scanning service

2 Device with Modbus TCP messaging in server mode

The I/O Scanning Service is used to manage the exchange of remote I/O states on the Ethernet network after a simple configuration operation, with no need for special programming.
I/O scanning is performed transparently by means of read/write requests according to the Modbus client/server protocol on the TCP profile.
This principle of scanning via a standard protocol enables a device with the I/O Scanning service to communicate with any device supporting Modbus TCP messaging in server mode.
This service can be used to define:

- A word zone reserved for reading inputs
- A word zone reserved for writing outputs
- Refresh periods independent of the PLC scan

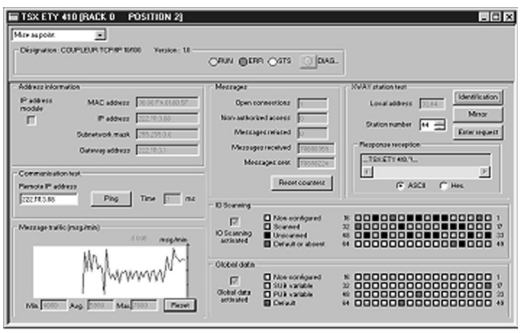
During operation, the module:

- Manages TCP connections with each remote device
- Scans devices and copies the I/O to the configured word zone
- Feeds back status words used to check that the service is working correctly from the PLC application
- Applies pre-configured fallback values if a communication problem occurs

A range of hardware and software products is available enabling the I/O Scanning protocol to be implemented on any type of device that can be connected to the Ethernet network (please consult the Modbus-IDA website: www.modbus-ida.org.

Characteristics

- Each Modicon M340 station can exchange a maximum of 100 words for writing and 125 words for reading.
- Maximum size in the Modicon M340 PLC that manages the service (64 stations max.) with **BMXNOE0100/0110** and **BMXNOC0401** network modules: 2 Kwords (input) and 2 Kwords (output).



I/O Scanning service diagnostics

I/O Scanning service diagnostics can be performed in one of five ways:

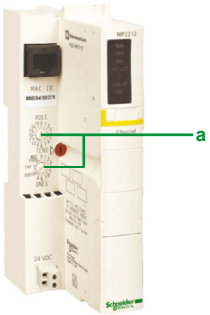
- Via the application program from a specific PLC data zone
- From the setup software debug screen
- From the PLC system diagnostic function displayed by means of an internet browser on a PC station
- Using standard SNMP manager software

Processors: page 1/4 | I/O: pages 2/12 and 2/24 | Software: page 4/2 | Ruggedized Modicon M340 modules: page 6/2

Modicon M340 automation platform

Ethernet Modbus/TCP network

Ethernet Modbus/TCP communication services



NIM network module for Modicon STB I/O

Functions (continued)

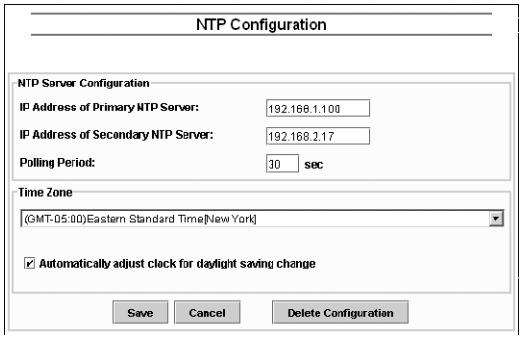
FDR *(Faulty Device Replacement)* service

The Faulty Device Replacement service uses standard address management technologies (BOOTP, DHCP) and the TFTP *(Trivial File Transfer Protocol)* file management service, with the aim of simplifying maintenance of Ethernet devices. The FDR service is used to replace a faulty device with a new device with the guarantee that it will be detected, reconfigured and automatically rebooted by the system.

The main steps in replacement are:

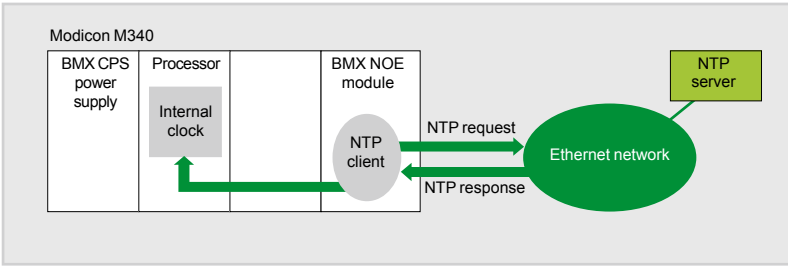
1. A device using the FDR service malfunctions.
2. Another similar device is taken from the maintenance store, preconfigured with the Device name for the faulty device, then reinstalled on the network. Depending on the device, addressing can be performed using rotary selector switches (as for Modicon STB distributed I/O a, or Modicon OTB for example) or can be given using the keypad integrated in the device (as for Altivar variable speed drives for example).
3. The FDR server detects the new device, allocates it an IP address and transfers the configuration parameters to it.
4. The substituted device checks that all these parameters are indeed compatible with its own characteristics and switches to operational mode.

The FDR server can be the **BMXNOE0100/0110** Ethernet module or the **BMXNOC0401** module.



NTP time synchronization service

Presentation



The time synchronization service is based on NTP *(Network Time Protocol)* which is used to synchronize the time of a client or a server on Ethernet from a server or another reference time source (radio, satellite, etc).

Operation

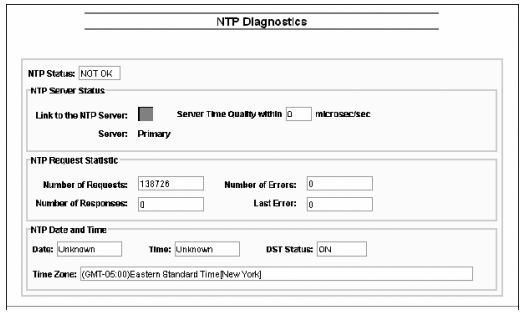
BMXNOE0100/0110, **BMXNOC0401** and **BMXNOR0200H** Ethernet Modbus/TCP modules have an NTP client component.

These modules connect to an NTP server using a client request (*Unicast*) in order to update their local time. The module clock is updated periodically (1 to 120 s) with typical precision of 5 ms. If the NTP server cannot be reached, the Ethernet TCP/IP module switches to a standby NTP server.

The PLC processor clock is therefore itself updated with a precision of 5 ms. A function block is used to read this clock, thus enabling Unity Pro application events or variables to be time and date stamped.

The Ethernet module is configured by means of a Web page. The time zone can be configured. A time synchronization service (NTP) diagnostic Web page is also available.

Information on the time synchronization service (NTP) is also available in the Transparent Ready private MIB, which can be accessed via the SNMP network management service.



Processors: page 1/4 | I/O: pages 2/12 and 2/24 | Software: page 4/2 | Ruggedized Modicon M340 modules: page 6/2

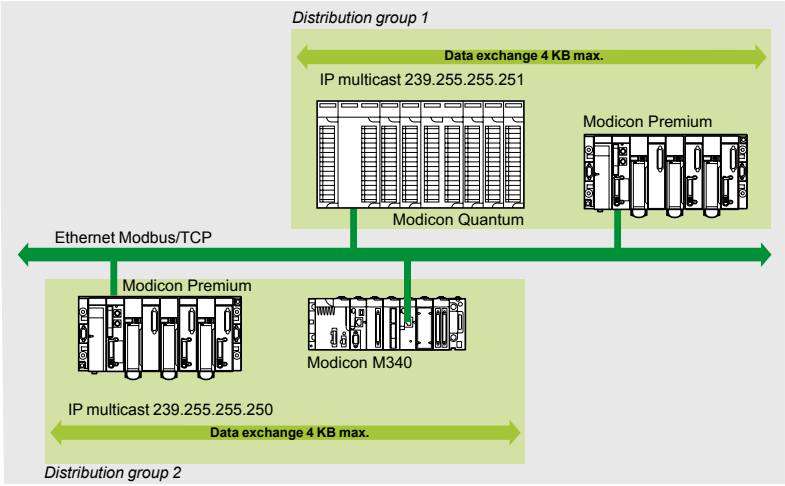
Modicon M340 automation platform

Ethernet Modbus/TCP network

Ethernet Modbus/TCP communication services

Functions (continued)

Global Data service



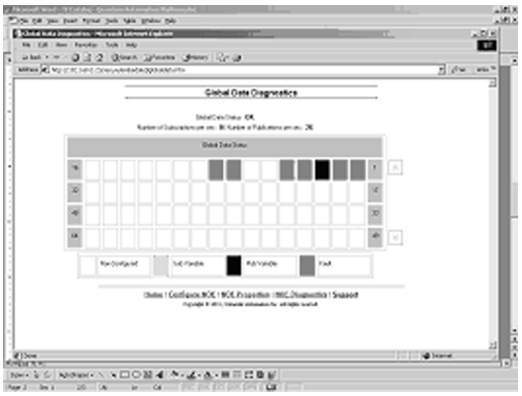
The Global Data service performs data exchanges in real time between stations belonging to the same distribution group. It is used to synchronize remote applications, or to share a common database between a number of distributed applications. Exchanges are based on a standard producer/consumer protocol, guaranteeing optimum performance with a minimum load on the network. This RTPS (*Real Time Publisher Subscriber*) protocol is promoted by Modbus-IDA (*Interface for Distributed Automation*), and is already a standard adopted by several manufacturers.

Characteristics

A maximum of 64 stations can participate in Global Data within a single distribution group. Each station can:

- Publish one 1024-byte variable. The publication period can be configured from 1 to n processor master task *(Mast)* periods.
- Subscribe to between 1 and 64 variables. The validity of each variable is controlled by status bits *(Health Status bits)* linked to a refresh timeout configurable between 50 ms and 1s. Access to an element of the variable is not possible. The total size of subscribed variables amounts to 4 K contiguous bytes.

To further optimize the performance of the Ethernet network, Global Data can be configured with the “multicast filtering” option which, together with switches in the ConneXium range (see pages 3/26 to 3/37), broadcasts data only to Ethernet ports where there is a Global Data service subscriber station. If these switches are not used, Global Data is sent in “multicast” mode to all switch ports.



Global Data service diagnostics

The diagnostic screens use a colour code to show the Global Data status:

- Configured/not configured/faulty.
- Published/subscribed.

Global Data service diagnostics can be performed in one of five ways:

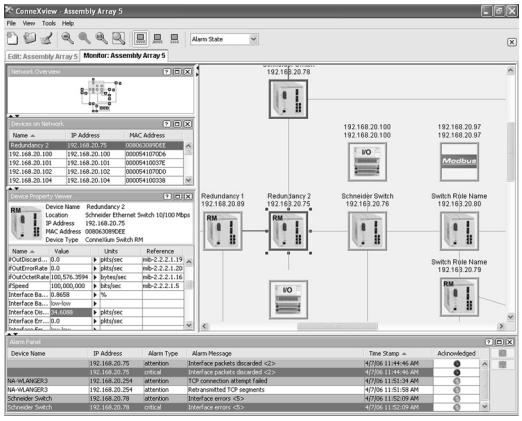
- Via the application program from a specific PLC data zone.
- From the setup software debug screen.
- From the PLC system diagnostic function displayed by means of an internet browser on a PC station.
- Using standard SNMP manager software.

Processors: page 1/4 | I/O: pages 2/12 and 2/24 | Software: page 4/2 | Ruggedized Modicon M340 modules: page 6/2

Modicon M340 automation platform

Ethernet Modbus/TCP network

Ethernet Modbus/TCP communication services



Automatic recognition of IP devices via the ConneXview diagnostic software for Ethernet industrial networks

Functions (continued)

SNMP network management service

From a network management station, SNMP *(Simple Network Management Protocol)* monitors and checks all components of the Ethernet architecture and thus ensures quick diagnostics in the event of a problem.
It is used to:
- Interrogate network components such as computer stations, routers, switches, bridges or terminal devices in order to view their status.
- Obtain statistics about the network to which the devices are connected.

This network management software complies with the conventional client/server model. However, to avoid confusion with other communication protocols that use this terminology, we talk instead about:
- Network manager for the client application that operates on the computer station.
- SNMP agent for the network device server application.

Transparent Ready devices can be managed by any SNMP network manager, including HP Openview and IBM Netview.

Standard SNMP *(Simple Network Management Protocol)* is used to access configuration and management objects contained in the device MIBs (Management Information Bases). These MIBs must comply with certain standards to be accessed by any commercially-available manager, but depending on the complexity of products, manufacturers can add certain objects to private databases.

The Transparent Ready private MIB presents management objects specific to the Schneider Electric offer. These objects simplify the installation, setup and maintenance of Transparent Ready devices in an open environment using standard network management tools.

Transparent Ready devices support 2 levels of SNMP network management:
- The Standard MIB II interface: This interface accesses a first level of network management. It enables the manager to identify the devices making up the architecture and retrieve general information about the configuration and operation of Ethernet Modbus/TCP interfaces.
- The Transparent Ready MIB interface: This interface improves the management of Transparent Ready devices. This MIB has a set of data enabling the network management system to supervise all the Transparent Ready services.

The Transparent Ready MIB can be downloaded from the FTP server of any Transparent Ready Ethernet module in a PLC.

Modicon M340 automation platform

Ethernet Modbus/TCP network

Standard Web services

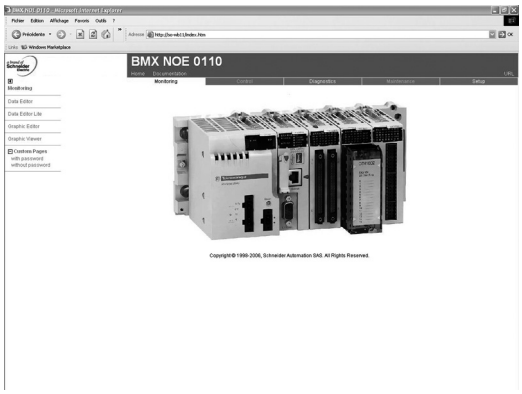
Presentation of Web services

The standard Web server functions are integrated in a wide variety of Schneider Electric Ethernet products: Modicon automation platform processors and Ethernet modules, distributed I/O modules, variable speed drives and gateways. These functions are mainly integrated in **BMXP342020**/**20302**/**20302CL** processors, in **BMXNOE0100**/**0110** and **BMXNOC0401** Ethernet network modules, in the **BMXNOR0200H** RTU module, and the **TCSEGDB23F24FA** Modbus Plus proxy module on the Modicon M340 platform.

From a simple Internet browser, the standard Web server authorizes the following "ready-to-use" functions:
- Remote diagnostics and maintenance of products
- Display and adjustment of products (read/write variables, status)

With the **BMXNOE0110** FactoryCast module equipped as standard with the **BMXRWSFC032M** card, the Web server also offers the following functions:
- Management of PLC system and application alarms with partial or total acknowledgement (ready-to-use Alarm Viewer function pages)
- Hosting and display of Web pages created by the user

The embedded Web server is a real-time data server. All the data can be presented in the form of standard Web pages in HTML format and can therefore be accessed using any Web browser that supports the embedded Java code. The standard functions provided by the Web server are supplied "ready-to-use" and thus do not require any programming of either the PLC or the client PC device supporting a Web browser.



Modicon M340 hardware configuration

Standard Web server on the Modicon M340 platform

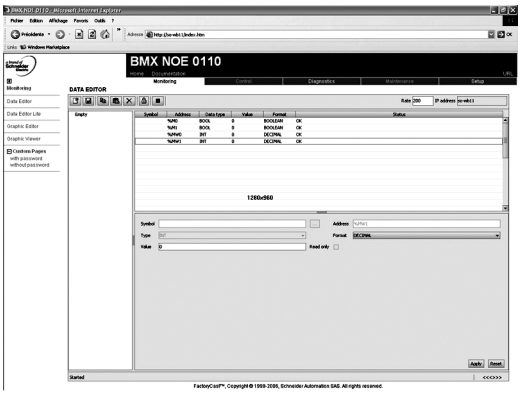
Rack Viewer PLC diagnostics function

The Rack Viewer function can be used for PLC system and I/O diagnostics. It displays the following in real time:
- Status of LEDs on the PLC front panel
- The PLC type and version
- Hardware configuration of the PLC including status of the system bits and words
- Detailed diagnostics of:
  - Each of the I/O module channels or application-specific channels in the configuration
  - Devices connected to the CANopen bus

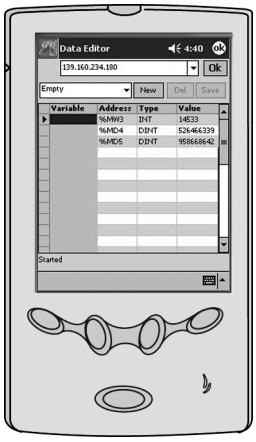
Data Editor read/write function for PLC data and variables

The Data Editor function can be used to create tables of animated variables for real-time read/write access to PLC data in the form of lists.

Various animation tables containing specific application variables to be monitored or modified can be created by the user and saved in the standard Web server module.



Data Editor variables table

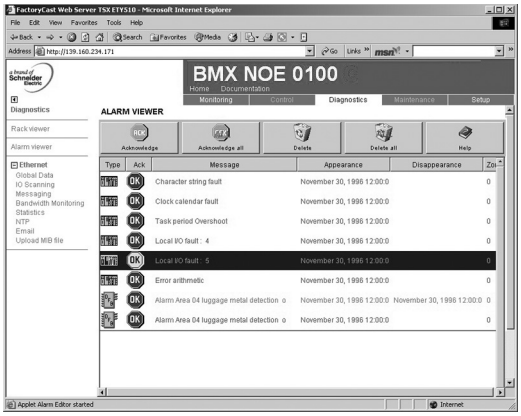


In addition to the functions provided by the standard Web server, the **BMXNOE0110** Ethernet module's FactoryCast Web server offers the following**:**
- Display of variables: Variables can be entered and displayed either in their symbolic form (S_Pump 234) or as their address (%MW99).
- Write access to variables: This can be enabled or disabled for each of the variables using the FactoryCast module configuration software.
- Read/write function: This can be used on tools such as a pocket PC or PDA terminal.

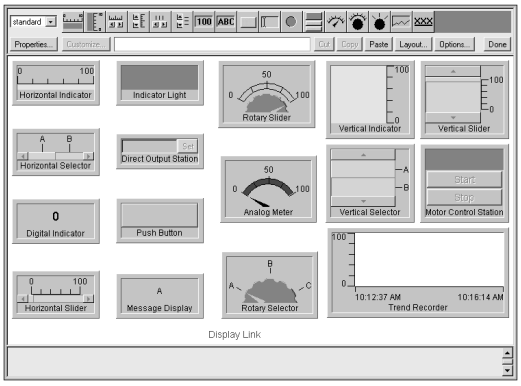
Modicon M340 automation platform

Ethernet Modbus/TCP network

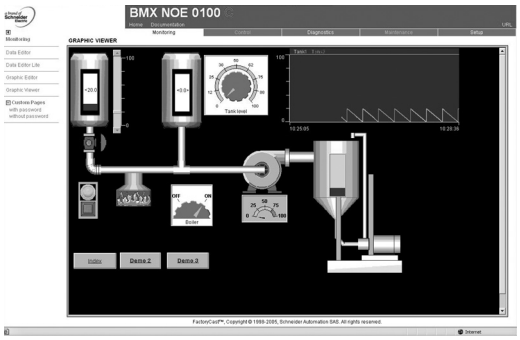
FactoryCast Web services



Alarm display from the diagnostic buffer



Library of predefined graphic objects



Real-time supervision graphic interface

BMXNOE0100 module FactoryCast Web server

In addition to the standard services, the embedded Web server in the **BMXNOE0110** FactoryCast module offers the functions described below.

Alarm Viewer function

The alarm viewer is a ready to use, password-protected function. It is used to process alarms (display, acknowledgement and deletion) managed at PLC level by the system or using diagnostic function blocks known as DFBs (system-specific diagnostic function blocks and application-specific diagnostic function blocks created by the user).
These alarms are stored in the diagnostic buffer managed by the Modicon M340 platform (dedicated memory space for storing all the diagnostic events).

The diagnostic viewer is a Web page comprising a list of messages, which displays the following information for each alarm:
- Dates and times of the occurrence/removal of a fault
- Alarm message
- Alarm status
- Type of associated diagnostic function block (DFB)

Graphic Data Editor function

This function is used to create the graphic views animated by the PLC variables that can be accessed via their address or via their symbol (access to located data). The ready-to-use graphic editor is available in online mode when connected to the **BMXNOE0110** module.

These views are created from a library of predefined graphic objects by simple copy/paste operations. The objects are configured to suit the user's requirements (colour, PLC variables, name, etc).
List of graphic objects available:
- Analog and digital indicators
- Horizontal and vertical bar charts
- Boxes for displaying messages and entering values
- Pushbutton boxes
- Trend recorders
- Vats, valves, motors, etc

Customized graphic objects can be added to this list and can be reused in user Web pages that have been created using standard software for editing HTML pages. The views thus created are saved in the **BMXNOE0110** module and can be displayed using any Web browser.

User Web page hosting and display function

The **BMXNOE0110** FactoryCast module has a 16 Mbyte non-volatile memory which is accessed in the same way as a hard drive. This allows hosting of Web pages and any user-defined Word or Acrobat Reader document (for example, maintenance manuals, wiring diagrams, etc).

Web pages can be created using any standard tool for creation and editing in HTML format. They can be enhanced by inserting animated graphic objects linked to PLC variables. These animated objects are created using the Graphic Data Editor. They are then downloaded to the **BMXNOE0110** module via the FactoryCast Web server configuration software.

These user Web pages can be used, for example, to:
- Display and modify all PLC variables in real time
- Create hyperlinks to other external Web servers (documentation, suppliers, etc)

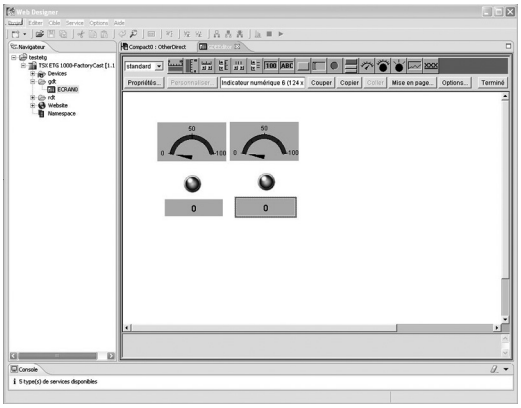
This function is particularly suitable for creating graphic interfaces used for the following purposes:
- Real-time display and supervision
- Production monitoring
- Diagnostics and help with maintenance
- Operator guides

Modicon M340 automation platform

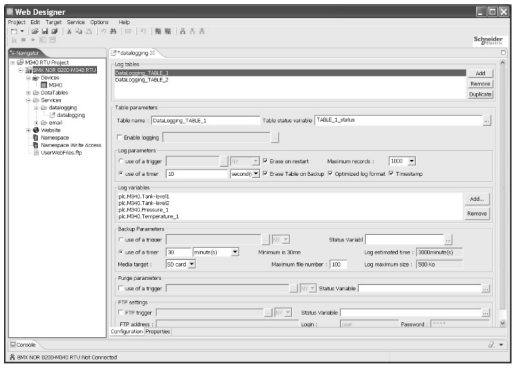
Ethernet Modbus/TCP network

Web Designer configuration software

Web Designer



Graphic Data Editor



Configuring the Data Logging *function for BMXNOR0200H module*

Web Designer configuration software

The Web Designer software is supplied on CD-ROM with the **BMXNOE0110** Ethernet network module and the **BMXNOR0200H** RTU module.

The software is used for the configuration and administration of the Web server embedded in the modules. It makes it easier to create customized Web human/machine interfaces (HMIs). It is also used for easy configuration of embedded advanced processing functions for numerous Web server modules and RTU modules:

- FactoryCast Web server modules for Modicon M340, Quantum and Premium PLCs
- FactoryCast HMI Web server modules for Modicon Premium and Quantum PLCs
- ETG 1000/3000 FactoryCast Gateways for remote access
- RTU module for Modicon M340

Web Designer software is compatible with the Windows 2000 SP2, Windows XP Professional and Windows Vista Professional 32-bit operating systems.
For optimum use, it requires Java Virtual Machine 1.4.2 minimum.

Web Designer software offers the following functions:

- **Setting the Web Designer function parameters**:
  - Definition of access security, passwords
  - Importing of PLC symbol databases
  - Definition of access to write-enabled variables
- **Management of the Web site**:
  - Management of default site Web pages
  - Management of user site Web pages
  - Graphic Data Editor for animating Web pages *(BMXNOE0110 module only)*. This integrated editor can be used for easy customization of graphic objects: bar charts, gauges, LEDs, curves, cursors, operator input fields, alphanumeric display fields, buttons, etc.
  - Downloading of Web pages between the PC and the module
  - Debugging of Web pages in online mode or in simulation mode (including animations and Java beans)
- **Simulation mode**:
  - The application and the Web site (including the Java animations) can be set up in online mode or in simulation mode.
  - Simulation mode is used to test the operation of the Web application without a module (with no physical connection to a PLC) thereby simplifying debugging.
- **Creation of user Web pages**:
  - User Web pages are created graphically using an external HTML editor (FrontPage or similar, not supplied).
  - User Web pages created with the graphic editor are actual animated supervisory control screens and can be used to monitor the process. Based on Web technologies (HTML and Java), they provide real-time access to PLC variables using the FactoryCast library of graphic objects (Java beans) *(BMXNOC0401 module only) (1)*.
- **Data Logging** *(for BMXNOR0200H module only)*:
  - This service is used to archive the application data: events, alarms, process data, device states, process values, etc.
  - The data are logged in CSV files in ASCII format, which are stored locally on the SD memory card in the BMXNOR0200H module.
- **Sending alarm notifications or reports via Email or SMS** *(BMXNOR0200H module only)*:
  - The BMXNOR0200H module can send e-mails or SMS messages automatically in real time in order to send alarm notifications, maintenance calls, production reports or factory status updates, etc to specified users.
  - E-mails or SMS messages are sent when a predefined application or process is triggered.

(1) Web Designer includes a plug-in for FrontPage 2000. This plug-in makes it easier to set up animations for real-time access to the PLC variables in HTML pages created by the user. They are created in the HTML editor by simply inserting customized graphic objects.

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Modicon M340 automation platform

Ethernet Modbus/TCP network

SOAP/XML Web services

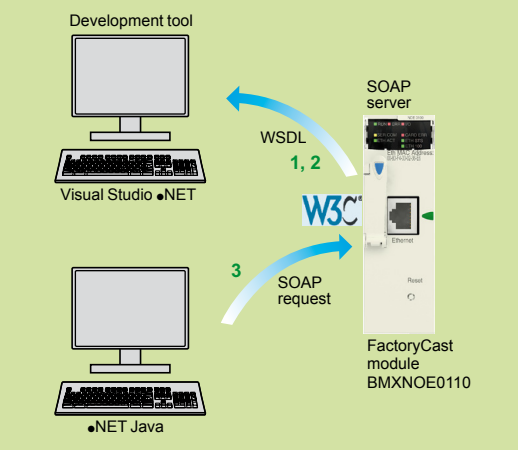
SOAP/XML Web services

BMXNOE0110, **BMXNOC0401** Ethernet network modules and **BMXNOR0200H** RTU modules incorporate a standard SOAP/XML data server that provides direct interoperability between control system devices and computer management applications (MES, ERP, SAP, .Net application, etc).

SOAP/XML Web services embedded in the PLC

These Web services conform to the **W3C** *(World Wide Web Consortium)* Web service standards. They offer standard open communication resources thanks to which the control peripherals can interact directly with computer management applications using a non-proprietary SOAP protocol.

SOAP/XML Web services are based on the following standards:
- **SOAP** *(Simple Object Access Protocol)*, the exchange protocol executed via the HTTP *(HyperText Transfer Protocol)* channel
- **WSDL** *(Web Services Description Language)*, in XML format
- **XML** *(eXtensible Markup Language)*, the universal standard for data exchange



ModbusXMLDa Web services: SOAP server interface

The implementation of **ModbusXMLDa** *(Modbus XML Data access)* services in control system device Web servers means IT engineers can easily create their own application to access the desired information directly in the PLC, in real time.

Applications such as Microsoft.NET, SQL Server, Microsoft Office (Excel), IBM (WebSphere), SUN (Java, Eclipse), Lotus, Oracle, SAP, MES, ERP, etc can interact directly with the PLC module Web server.

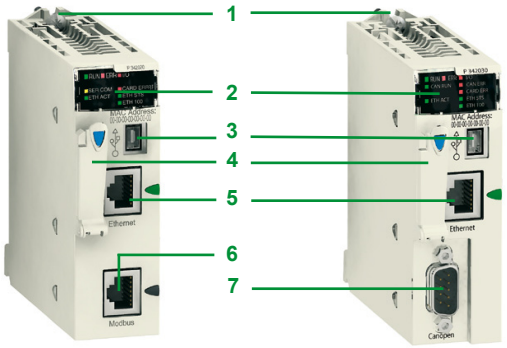
Exchanges are initiated by the SOAP client application (the server responds to these requests). Data exchanges are made in XML standard format in response to a request using the SOAP protocol.

- **Step 1: Creation of the client application with learning of the Web services**. The development environment (for example, Visual Studio .NET) looks in the FactoryCast server for the list of available services and their WSDL standard interfaces provided by the module.
- **Step 2: Development of the client application**. The developer integrates the Web service functions using the code retrieved at step 1 of the learning process.
- **Step 3: Execution of the client application**. The client application communicates in real time with the FactoryCast Web server module using the SOAP protocol.

3

Modicon M340 automation platform

Processors with integrated Ethernet Modbus/TCP port



Presentation

BMXP342020, **BMXP3420302** and **BMXP3420302CL** standard format Modicon M340 processors with integrated Ethernet port occupy a single slot marked “00” in the rack on the Modicon M340 platform.

Description

The front panel of **BMXP342020/20302/20302CL** Modicon M340 processors features:

1 A safety screw for locking the module in a slot in the rack.

2 A display block with 8 LEDs, including 3 relating to the Ethernet port:

- ETH ACT LED (green): Activity on the Ethernet network
- ETH STS LED (green): Ethernet network status

Depending on processor version:

- Version 1**:** ETH 100 LED (green): data rate on the Ethernet network (10 or 100 Mbps)
- Version 2 and later**:** ETH LNK LED (green): Ethernet link status

3 A mini B USB connector for a programming terminal (or Magelis XBTGT/GK/GTW HMI terminal).

4 A slot equipped with its Flash memory card for saving the application and activating the standard Web server (Transparent Ready class B10) *(1)*.

5 An RJ45 connector for the connection to the Ethernet network.

Depending on model:

6 **BMXP342020** processor: An RJ45 connector for the Modbus serial link or Character mode link (RS 232C/RS 485, 2-wire, non-isolated)

7 **BMXP3420302/20302CL** processor: A 9-way SUB-D connector for the master CANopen machine and installation bus.

On the rear panel: 2 rotary switches for selecting the IP address using one of 3 assignment methods:

- Address set by the position of the two switches
- Address set by the application parameters
- Address set by the Ethernet network BOOTP server

BMXP342020

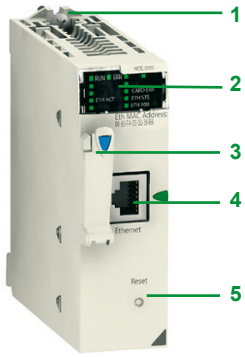
BMXP3420302
BMXP3420302CL

References

Description	I/O capacity Memory capacity	Other integrated communication ports	Reference	Weight kg
Processors with integrated Ethernet Modbus/TCP link Transparent Ready class B10	1024 discrete I/O 256 analog I/O 36 app-specific channels 4096 KB integrated	Modbus serial link or Character mode	**BMXP342020**	0.205
		CANopen bus	**BMXP3420302**	0.215
Processors with integrated Ethernet Modbus/TCP link without memory card Transparent Ready class B10	1024 discrete I/O 256 analog I/O 36 app-specific channels 4096 KB integrated	CANopen bus	**BMXP3420302CL** *(1)*	0.215

(1) Memory card must be ordered separately for the BMXP3420302CL processor (see page 1/9).

Modicon M340 automation platform
Ethernet Modbus/TCP network modules



BMXNOE0100/0110

Presentation

BMXNOE0100 and **BMXNOE0110** standard format modules occupy a single slot in the rack on the Modicon M340 platform equipped with a Standard or Performance processor.

Description

The front panel of **BMXNOE0100** and **BMXNOE0110** modules features:

1 A safety screw for locking the module in a slot in the rack.

2 A display block with 6 LEDs, including 3 relating to the Ethernet port:

- ETH ACT LED (green): Activity on the Ethernet network
- ETH STS LED (green): Ethernet network status

Depending on processor version:

- Version 1**:** ETH 100 LED (green): data rate on the Ethernet network (10 or 100 Mbps)
- Version 2 and later**:** ETH LNK LED (green): Ethernet link status

3 A slot equipped with its Flash memory card for saving the application and activating the Web server (Transparent Ready class B30 or C30 depending on the model).

4 An RJ45 connector for connection to the Ethernet network.

5 A pencil-point RESET pushbutton for a cold restart of the module.

On the rear panel: 2 rotary switches for assigning the IP address in one of three ways:

- Address set by the position of the two switches
- Address set by the application parameters
- Address set by the Ethernet network BOOTP server

References

Description	Data rate	Transparent Ready Class	Reference	Weight kg
Ethernet Modbus/ TCP network modules	10/100 Mbps	B30	**BMXNOE0100**	0.200
		C30	**BMXNOE0110** *(1)*	0.200

Spare parts

Description	Size	Supplied as standard with	Reference	Weight kg
Flash memory cards	8 MB	**BMXNOE0100**	**BMXRWSB000M**	0.002
	32 MB	**BMXNOE0110**	**BMXRWSFC032M**	0.002

(1) The Web Designer software is supplied on CD-ROM with the **BMXNOE0110** *module. This software is used for the configuration and administration of the Web server embedded in the module, see page 3/18.*

Modicon M340 automation platform

Modbus/TCP and EtherNet/IP network module

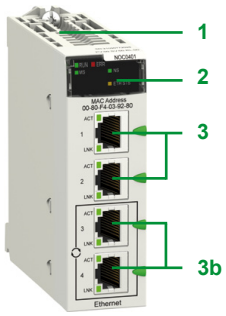
Presentation

The **BMXNOC0401** network module acts as an interface between the M340 PLC and other Ethernet network devices via the Modbus/TCP and EtherNet/IP communication protocols.

The standard format **BMXNOC0401** network module occupies a single slot in the rack of the Modicon M340 platform.
This must be equipped with a Standard **BMXP341000** or Performance **BMXP342●●●●** processor.

Functions

The **BMXNOC0401** module offers the following functions:
- Modbus/TCP and EtherNet/IP protocols operating simultaneously.
- Ring topologies on 2 Ethernet ports using RSTP *(Rapid Spanning Tree Protocol)*.
- Priority of Ethernet packets using QoS *(Quality of Service) service*.
- Automatic module configuration recovery using FDR *(Faulty Device Replacement) service*.
- Support for SCADA functions via the OPC *protocol*.
- Embedded Web server for application monitoring and module diagnostics.
- Sharing data between PLCs.
- Network management using SNMP *(Simple Network Management Protocol)*.



Description

The front panel of the **BMXNOC0401** module features:
1 A safety screw for locking the module in a slot in the rack.
2 A display block with 5 LEDs:
- RUN LED (green): Operating status
- ERR LED (red): Error detected
- MS LED (green/red): Module status
- NS LED (green/red): Network connection status
- ETH STS LED (amber): Ethernet link status

3 Four RJ45 connectors for connection to the Ethernet network. The two bottom connectors **3b** support ring topologies (RSTP protocol).

Each RJ45 connector has two associated LEDs:
- LNK LED (yellow): Ethernet link established
- ACT LED (green): Transmission/reception activity

On the rear panel, 2 rotary switches for selecting the IP address module using one of 4 assignment methods:
- IP address defined by the Ethernet network BootP server
- IP address configured by the application parameters
- Default IP address
- IP address defined by the position of the 2 rotary switches

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Modicon M340 automation platform

Modbus/TCP and EtherNet/IP network module

BMXNOC0401

References

Description	Data rate	Transparent Ready Class	Reference	Weight kg
EtherNet/IP, Modbus/TCP network module	10/100 Mbps	B30	**BMXNOC0401** *(1)*	0.345

(1) The "Unity Pro configuration tool" software is supplied on CD-ROM with the module. This software is used to update the Unity Pro hardware catalogue (addition of the new module DTMs).

Modicon M340 automation platform
Web servers and gateways

Applications		**Standalone Web Gateway/Server module for remote access**	
Type		**FactoryCast Gateway ETG10●0**	
			
Target products	Type	All equipment supporting Modbus	All equipment supporting Uni-Telway
Network/Remote access services	Remote access	Intranet or via external Modem and integrated RAS function	Intranet or Modem, External Modem and integrated RAS function
		Remote programming, downloading via FTP, access to Web server via web browser	
	Gateway function	Ethernet to Modbus serial Modem to Modbus serial and Ethernet	Ethernet to Uni-Telway serial Modem to Uni-Telway and Ethernet
	Serial protocols	Modbus master	Uni-Telway slave
	Ethernet protocols	Modbus/TCP	Modbus/TCP Uni-TE (Premium, Micro)
	TCP/IP protocols	BootP/DHCP, DNS, SNMP agent, SMTP client, NTP client *(1)*, FTP	BootP/DHCP, DNS, SNMP agent, SMTP client, NTP client *(1)*, FTP
	Security	Protection by IP address filtering and passwords	
Web server	Characteristics	HTTP and FTP server, 8 MB memory available for user, hosting of user Web pages and documents (Doc, Pdf, Excel)	
Predefined services	Configuration	Via Web Designer software or predefined Web pages	
	Diagnostics	Serial device diagnostics via predefined Web pages	
	Monitoring	Monitoring via animation tables Display of PLC Unity program in a Web page	Monitoring of devices and application via animation tables (read/write variables) Display of PLC Unity program in a Web page
	Alarm management	–	
Customizable services	Graphic views	Graphic monitoring via animated views (integrated graphic editor)	
	Unity Pro operator screen	–	
	User Web pages	Graphic monitoring via animated Web pages created by the user	
Advanced and HMI services	Calculation scripts	–	
	E-mail service	Alarm notification by e-mail	
	Data logging	–	
	Database connection	–	
	Report service	–	
	Recipe service	–	
Application development software		Web Designer (supplied with each module)	
		Web Designer	
References		**TSXETG1000**	**TSXETG1010**
Catalogue or website		www.schneider-electric.com	

(1) Except with TSXP57103M/153M Modicon Premium processors which do not have the NTP service.

Standalone Web Gateway/Server modules for remote access				
FactoryCast HMI Gateway ETG30●●				
				
All Modicon PLCs and third-party equipment supporting Modbus				
Intranet or Modem, External Modem and integrated RAS function		Intranet or Modem RTC modem and integrated RAS function		Intranet or Modem GSM modem and integrated RAS function
Remote programming, downloading via FTP, access to Web server via web browser				
Ethernet to Uni-Telway serial, Modem to Modbus serial and Ethernet				
Modbus master				
Modbus/TCP				
DHCP, DNS, SNMP agent, SMTP client, NTP client *(1)*, FTP				
Protection by IP address filtering and passwords				
HTTP and FTP server, 32 MB memory available for user Web pages, memory expansion using Compact Flash cards 1 GB max., hosting of user Web pages and documents (Doc, Pdf, Excel)				
Via Web Designer software or predefined Web pages				
Network diagnostics, serial and Ethernet device diagnostics via predefined Web pages				
Monitoring of devices and application via animation tables (read/write variables) Display of PLC Unity program in a Web page				
–				
Graphic monitoring via animated views (integrated graphic editor)				
–				
Graphic monitoring via animated Web pages created by the user				
Arithmetic and logical scripts				
Alarm notification by e-mail/SMS				
Data recorded in the module with date and time stamping (CSV files)				
Direct recording in an SQL, Oracle or MySQL server				
Dynamic HTML report management				
Management of “Recipe” data (storage and review locally or on remote database)				
Web Designer (supplied with each module)				
Web Designer				
TSXETG3000		**TSXETG3010 (PSTN modem)**		**TSXETG3021 (GSM900/1800 MHz band) TSXETG3022 function (GSM850/1900 MHz band)**
www.schneider-electric.com				

Ethernet network
Cabling system
ConneXium hub and unmanaged switches

Device type			**Hub**
			
Interfaces	Copper cable ports	Number and type	4 x 10BASE-T ports
		Shielded connectors	RJ45
		Medium	Shielded twisted pair, category CAT 5E
		Total length of pair	100 m
	Fibre optic ports	Number and type	–
		Connectors	–
		Medium	–
	Length of optical fibre	50/125 µm	–
		62.2/125 µm	–
	Optical fibre attenuation analysis	50/125 µm fibre	–
		62.2/125 µm fibre	–
	Ethernet services		–
Topology	Number of hubs or switches	Cascaded	4 max.
		In a ring	–
Redundancy			P1 and P2 redundant power supplies
Power supply	Voltage		24 V ⎓ (18…32) safety extra low voltage (SELV)
	Consumption		80 mA (130 max. at 24 V ⎓)
	Removable terminal block		5 terminals
Operating temperature			0…+ 60°C
Relative humidity			10…95% non-condensing
Degree of protection			IP 30
Dimensions	W x H x D		40 x 125 x 80 mm
Mounting			On symmetrical DIN rail, 35 mm wide
Weight			0.530 kg
Conforming to standards			cUL 60950, UL 508 and CSA 22.2 No. 142, UL 1604 and CSA 22.2 No. 213 class 1 division 2, CE, GL, C-Tick
			FM 3810, FM 3611 class 1 division 2
LED indicators			Power supply, activity, link
Alarm relay			Power supply fault, Ethernet network fault or communication port fault (volt-free contact 1 A max. at 24 V ⎓)
Reference			**499NEH10410**
Pages			3/46

Unmanaged switches, copper twisted pair			
			
Interfaces	Copper cable ports	Number and type	5 x 10BASE-T/100BASE-TX ports
		Shielded connectors	M12 (type D)
		Medium	Shielded twisted pair, category CAT 5E
		Total length of pair	100 m
	Fibre optic ports	Number and type	–
		Connectors	–
		Medium	–
	Length of optical fibre	50/125 µm	–
		62.2/125 µm	–
	Optical fibre attenuation analysis	50/125 µm fibre	–
		62.2/125 µm fibre	–
	Ethernet services		Storage and re-routing of received data, auto MDI/MDX, automatic negotiation of 10/100 Mbps and duplex mode (on all ports)
Topology	Number of hubs or switches	Cascaded	Unlimited
		In a ring	–
Redundancy			–
Power supply	Voltage		24 V ⎓ (18…32) safety extra low voltage (SELV)
	Consumption		100 mA max.
	Removable terminal block		5 terminals, M12 (type A, male)
Operating temperature			0…+ 60°C
Relative humidity			–
Degree of protection			IP 67
Dimensions	W x H x D		60 x 126 x 31 mm
Mounting			On a flat surface
Weight			0.210 kg
Conforming to standards			cUL 508 and CSA 22.2 No. 142
LED indicators			Power supply, link status, data rate
Alarm relay			–
Reference			**TCSESU051F0**
Pages			3/47

Ethernet network
Cabling system
ConneXium unmanaged switches

Device type			Unmanaged switches, copper twisted pair	Unmanaged switches (IP 67), copper twisted pair
				
Interfaces	Copper cable ports	Number and type	8 x 10BASE-T/100BASE-TX ports	
		Shielded connectors	RJ45	
		Medium	Shielded twisted pair, category CAT 5E	
		Total length of pair	100 m	
	Fibre optic ports	Number and type	–	
		Connectors	–	
		Medium	–	
	Length of optical fibre	50/125 µm	–	
		62.2/125 µm	–	
	Optical fibre attenuation analysis	50/125 µm fibre	–	
		62.2/125 µm fibre	–	
	Ethernet services		–	Storage and re-routing of received data, auto MDI/MDX, automatic negotiation of 10/100 Mbps and duplex mode (on all ports), automatic change of polarity
Topology	Number of switches	Cascaded	Unlimited	
		Redundant in a ring	–	
Redundancy			P1 and P2 redundant power supplies	–
Power supply	Voltage		24 V ⎓ (18…32) safety extra low voltage (SELV)	24 V ⎓ (9.6…32) SELV
	Consumption		125 mA (290 mA max.)	4.1 W max.
	Removable terminal block		5 terminals	3 terminals
Operating temperature			0…+ 60°C	
Relative humidity			10…95% non-condensing	95% max. non-condensing
Degree of protection			IP 20	IP 30
Dimensions	W x H x D		47 x 135 x 111 mm	35 x 138 x 121 mm
Mounting			On symmetrical DIN rail, 35 mm wide	
Weight			0.230 kg	0.246 kg
Conforming to standards			cUL 60950, UL 508 and CSA 22.2 No. 142, UL 1604 and CSA 22.2 No. 213 class 1 division 2, CE, GL, C-Tick	UL 508 and CSA 22.2 No.142 IEC/EN 61131-2, IEC 60825-1 class 1, CISPR 11A
LED indicators			P1 and P2 power supplies, Ethernet link/port status	Power supply, copper port activity, 10 or 100 Mbps data rate
Alarm relay			Power supply fault, Ethernet network fault or communication port fault (volt-free contact 1 A max. at 24 V ⎓)	–
Reference			**499NES18100**	**TCSESU083FN0**
Pages			3/47	

(1) Length dependent on the attenuation analysis and attenuation of the optical fibre (typical value: 2000 m).

Unmanaged switches, 4 and 5 ports, copper twisted pair and fibre optic					
					
Interfaces	Copper cable ports	Number and type	3 x 10BASE-T/100BASE-TX ports	4 x 10BASE-T/100BASE-TX ports	5 x 10BASE-T/100BASE-TX ports
		Shielded connectors	RJ45		
		Medium	Shielded twisted pair, category CAT 5E		
		Total length of pair	100 m		
	Fibre optic ports	Number and type	–	1 x 100BASE-FX port	–
		Connectors	–	Duplex SC	–
		Medium	–	Multimode optical fibre	–
	Length of optical fibre	50/125 µm	–	5000 m *(1)*	–
		62.2/125 µm	–	4000 m *(1)*	–
	Optical fibre attenuation analysis	50/125 µm fibre	–	8 dB	–
		62.2/125 µm fibre	–	11 dB	–
	Ethernet services		Storage and re-routing of received data, auto MDI/MDX, automatic negotiation of 10/100 Mbps and duplex mode (on all ports)		
Topology	Number of switches	Cascaded	Unlimited		
		Redundant in a ring	–		
Redundancy			–		
Power supply	Voltage		24 V ⎓ (9.6…32 V) safety extra low voltage (SELV)		
	Consumption		2.2 W max.	3.9 W max.	2.2 W max.
	Removable terminal block		3-terminal removable screw terminal block		
Operating temperature			0…+ 60°C		
Relative humidity			95% max. non-condensing		
Degree of protection			IP 30		
Dimensions	W x H x D		25 x 114 x 79 mm		
Mounting			On symmetrical DIN rail, 35 mm wide		
Weight			0.113 kg	0.120 kg	0.113 kg
Conforming to standards			UL 508 and CSA 22.2 No. 142 IEC/EN 61131-2, IEC 60825-1 class 1, CISPR 11A		
LED indicators			Power supply, copper port activity, 10 or 100 Mbps data rate		
			–	Fibre port activity and status	–
Alarm relay			–		
Reference			**TCSESU033FN0**	**TCSESU043F1N0**	**TCSESU053FN0**
Pages			3/48		

Ethernet network
Cabling system
Managed and unmanaged ConneXium switches

Device type			Unmanaged switches, 5 ports, copper twisted pair and fibre optic			
						
Interfaces	Copper cable ports	Number and type	4 x 10BASE-T/ 100BASE-TX ports	3 x 10BASE-T/ 100BASE-TX ports	4 x 10BASE-T/ 100BASE-TX ports	3 x 10BASE-T/ 100BASE-TX ports
		Shielded connectors	RJ45			
		Medium	Shielded twisted pair, category CAT 5E			
		Total length of pair	100 m			
	Fibre optic ports	Number and type	1 x 100BASE-FX port	2 x 100BASE-FX ports	1 x 100BASE-FX port	2 x 100BASE-FX ports
		Connectors	SC			
		Medium	Multimode optical fibre		Single mode optical fibre	
	Length of optical fibre	50/125 µm	5000 m *(1)*		–	
		62.2/125 µm	4000 m *(1)*		–	
		9/125 µm fibre	–		32,500 m *(2)*	
	Optical fibre attenuation analysis	50/125 µm fibre	8 dB		–	
		62.2/125 µm fibre	11 dB		–	
		9/125 µm fibre	–		16 dB	
	Ethernet services		–			
Topology	Number of switches	Cascaded	Unlimited			
		Redundant in a ring	–			
Redundancy			P1 and P2 redundant power supplies			
Power supply	Voltage		24 V ⎓ (18…32 V) safety extra low voltage (SELV)			
	Consumption		200 mA max.	240 mA max.	200 mA max.	240 mA max.
	Removable terminal block		5 terminals			
Operating temperature			- 40...+ 70°C			
Relative humidity			10…95% non-condensing			
Degree of protection			IP 20			
Dimensions		W x H x D	47 x 135 x 111 mm			
Mounting			On symmetrical DIN rail, 35 mm wide			
Weight			0.330 kg	0.335 kg	0.330 kg	0.335 kg
Conforming to standards			cUL 60950, cUL 508 and CSA 22.2 No. 142, UL 1604 and CSA 22.2 No. 213 class 1 division 2, CE, GL, C-Tick			
LED indicators			P1 and P2 power supplies, Ethernet link status, transmission activity			
Alarm relay			Activity, power supply fault, Ethernet network fault or communication port fault (volt-free contact 1 A max. at 24 V ⎓)			
Reference			**499NMS25101**	**499NMS25102**	**499NSS25101**	**499NSS25102**
Pages			3/48			

(1) Length dependent on the attenuation analysis and attenuation of the optical fibre (typical value: 2000 m).
(2) Length dependent on the attenuation analysis and attenuation of the optical fibre (typical value: 15,000 m).

Managed switches, 4 ports, copper twisted pair and fibre optic						
						
3 x 10/100BASE-TX ports	2 x 10/100BASE-TX ports	3 x 10/100BASE-TX ports	2 x 10/100BASE-TX ports			
RJ45						
Shielded twisted pair, category CAT 5E						
100 m						
1 x 100BASE-FX port	2 x 100BASE-FX ports	1 x 100BASE-FX port	2 x 100BASE-FX ports			
Duplex SC						
Multimode optical fibre		Single mode optical fibre				
5000 m *(1)*		–				
4000 m *(1)*		–				
–		32,500 m *(2)*				
8 dB		–				
11 dB		–				
–		16 dB				
FDR, SMTP V3, SNTP client, multicast filtering for optimization of the Global Data protocol, configuration via Web access,VLAN, IGMP Snooping, RSTP *(Rapid Scanning Tree Protocol)*, priority port, data stream control, secure port						
Unlimited						
50 max.						
Redundant power supplies, redundant single ring, ring coupling						
9.6...60 V ⎓ /18…30 V ∼ safety extra low voltage (SELV)						
6.5 W	7.3 W	6.5 W	7.3 W			
6 terminals						
0…+ 60°C						
10…90% non-condensing						
IP 20						
47 x 131 x 111 mm						
On symmetrical DIN rail, 35 mm wide						
0.400 kg						
IEC 61131-2, UL 508, UL 1604 class 1 division 2, CSA 22.2 No. 142 (cUL), CSA 22.2 No. 213 class 1 division 2 (cUL), CE, GL, C-Tick						
Power supply status, alarm relay status, active redundancy, redundancy management, copper port status and copper port activity						
Power supply fault, Ethernet network fault, communication port fault, redundancy fault (volt-free contact 1 A max. at 24 V ⎓)						
TCSESM043F1CU0	**TCSESM043F2CU0**	**TCSESM043F1CS0**	**TCSESM043F2CS0**			
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(1) Length dependent on the attenuation analysis and attenuation of the optical fibre (typical value: 2000 m).
(2) Length dependent on the attenuation analysis and attenuation of the optical fibre (typical value: 15,000 m).

Ethernet network
Cabling system
ConneXium managed switches

Device type			Managed switches, 4 and 8 ports, copper twisted pair	
				
Interfaces	Copper cable ports	Number and type	4 x 10/100BASE-TX ports	8 x 10/100BASE-TX ports
		Shielded connectors	RJ45	
		Medium	Shielded twisted pair, category CAT 5E	
		Total length of pair	100 m	
	Fibre optic ports	Number and type	–	
		Connectors	–	
		Medium	–	
	Length of optical fibre	50/125 µm	–	
		62.2/125 µm	–	
		9/125 µm fibre	–	
	Attenuation analysis	50/125 µm fibre	–	
		62.2/125 µm fibre	–	
		9/125 µm fibre	–	
	Ethernet services		FDR, SMTP V3, SNTP client, multicast filtering for optimization of the Global Data protocol, configuration via Web access,VLAN, IGMP Snooping, RSTP *(Rapid Scanning Tree Protocol)*, priority port, data stream control, secure port	
Topology	Number of switches	Cascaded	Unlimited	
		Redundant in a ring	50 max.	
Redundancy			P1 and P2 redundant power supplies, redundant single ring, ring coupling	
Power supply	Voltage		9.6...60 V ⎓ /18…30 V ∿ safety extra low voltage (SELV)	
	Consumption		5.3 W	
	Removable terminal block		6 terminals	
Operating temperature			0...+ 60°C	
Relative humidity			10…90% non-condensing	
Degree of protection			IP 20	
Dimensions	W x H x D		47 x 131 x 111 mm	74 x 131 x 111 mm
Mounting			On symmetrical DIN rail, 35 mm wide	
Weight			0.400 kg	0.410 kg
Conforming to standards			IEC/EN 61131-2, UL 508, UL 1604 class 1 division 2, CSA 22.2 No. 214 (cUL), CSA 22.2 No. 213 class 1 division 2 (cUL), CE, GL, C-Tick	
LED indicators			Power supply status, alarm relay status, active redundancy, redundancy management, copper port status and copper port activity	Power supply status, alarm relay status, active redundancy, redundancy management, fibre port status and fibre port activity
Alarm relay			Power supply fault, Ethernet network fault or communication port fault (volt-free contact 1 A max. at 24 V ⎓)	
Reference			**TCSESM043F23F0**	**TCSESM083F23F0**
Pages			3/49	

Managed switches, 8 ports, copper twisted pair and fibre optic					
						
Interfaces	Copper cable ports	Number and type	7 x 10/100BASE-TX ports	6 x 10/100BASE-TX ports	7 x 10/100BASE-TX ports	6 x 10/100BASE-T ports
		Shielded connectors	RJ45			
		Medium	Shielded twisted pair, category CAT 5E			
		Total length of pair	100 m			
	Fibre optic ports	Number and type	1 x 100BASE-FX port	2 x 100BASE-FX ports	1 x 100BASE-FX port	2 x 100BASE-FX ports
		Connectors	Duplex SC			
		Medium	Multimode optical fibre		Single mode optical fibre	
	Length of optical fibre	50/125 µm	5000 m *(1)*		–	
		62.2/125 µm	4000 m *(1)*		–	
		9/125 µm fibre	–		32,500 m *(2)*	
	Attenuation analysis	50/125 µm fibre	8 dB		–	
		62.2/125 µm fibre	11 dB		–	
		9/125 µm fibre	–		16 dB	
	Ethernet services		FDR, SMTP V3, SNTP client, multicast filtering for optimization of the Global Data protocol, configuration via Web access,VLAN, IGMP Snooping, RSTP *(Rapid Scanning Tree Protocol)*, priority port, data stream control, secure port			
Topology	Number of switches	Cascaded	Unlimited			
		Redundant in a ring	50 max.			
Redundancy			Redundant power supplies, redundant single ring, ring coupling			
Power supply	Voltage		9.6...60 V ⎓ /18…30 V ∿ safety extra low voltage (SELV)			
	Consumption		6.5 W	7.3 W	6.5 W	7.3 W
	Removable terminal block		6 terminals			
Operating temperature			0…+ 60°C			
Relative humidity			10…90% non-condensing			
Degree of protection			IP 20			
Dimensions	W x H x D		75 x 131 x 111 mm			
Mounting			On symmetrical DIN rail, 35 mm wide			
Weight			0.410 kg			
Conforming to standards			IEC/EN 61131-2, UL 508, UL 1604 class 1 division 2, CSA 22.2 No. 214 (cUL), CSA 22.2 No. 213 class 1 division 2 (cUL), CE, GL, C-Tick			
LED indicators			Power supply status, alarm relay status, active redundancy, redundancy management, fibre port status and fibre port activity			
Alarm relay			Power supply fault, Ethernet network fault or communication port fault (volt-free contact 1 A max. at 24 V ⎓)			
Reference			**TCSESM083F1CU0**	**TCSESM083F2CU0**	**TCSESM083F1CS0**	**TCSESM083F2CS0**
Pages			3/50			

(1) Length dependent on the attenuation analysis and attenuation of the optical fibre (typical value: 2000 m).
(2) Length dependent on the attenuation analysis and attenuation of the optical fibre (typical value: 15,000 m).

Ethernet network
Cabling system
Basic ConneXium managed switches

Device type			**Basic managed switch, 8 ports, copper twisted pair**	**Basic managed switches, 8 and 9 ports, copper twisted pair and fibre optic**
				 
Interfaces	Copper cable ports	Number and type	8 x 10/100BASE-TX ports	6 x 10/100BASE-TX ports / 6 x 10/100BASE-TX ports
		Shielded connectors	RJ45	RJ45
		Medium	Shielded twisted pair, category CAT 5E	Shielded twisted pair, category CAT 5E
		Total length of pair	100 m	100 m
	Fibre optic ports	Number and type	–	2 x 100BASE-FX ports / 3 x 100BASE-FX ports
		Connectors	–	Duplex SC
		Medium	–	Multimode optical fibre
	Length of optical fibre	50/125 µm	–	5000 m *(1)*
		62.2/125 µm	–	4000 m *(1)*
		9/125 µm fibre	–	–
	Attenuation analysis	50/125 µm fibre	–	8 dB+
		62.2/125 µm fibre	–	11 dB
		9/125 µm fibre	–	–
	Ethernet services		FDR, SNTP client, multicast filtering for optimization of the Global Data protocol, configuration via Web access, IGMP Snooping, RSTP *(Rapid Scanning Tree Protocol)*, priority port	FDR, SNTP client, multicast filtering for optimization of the Global Data protocol, configuration via Web access, IGMP Snooping, RSTP *(Rapid Scanning Tree Protocol)*, priority port
Topology	Number of switches	Cascaded	Unlimited	Unlimited
		Redundant in a ring	50 max.	50 max.
Redundancy			P1 and P2 redundant power supplies, redundant single ring, ring coupling	P1 and P2 redundant power supplies, redundant single ring, ring coupling
Power supply	Voltage		9.6...32 V ⎓ safety extra low voltage (SELV)	9.6...32 V ⎓ safety extra low voltage (SELV)
	Consumption		6 W	8 W / 9 W
	Removable terminal block		6 terminals	6 terminals
Operating temperature			0...+ 60°C	0…+ 60°C
Relative humidity			95% max. non-condensing	95% max. non-condensing
Degree of protection			IP 20	IP 20
Dimensions	W x H x D		47 x 131 x 111 mm	74 x 131 x 111 mm
Mounting			On symmetrical DIN rail, 35 mm wide	On symmetrical DIN rail, 35 mm wide
Weight			0.400 kg	0.400 kg
Conforming to standards			IEC/EN 61131-2, UL 508, UL 1604 class 1 division 2, CSA 22.2 No. 214 (cUL), CSA 22.2 No. 213 class 1 division 2 (cUL), CE, GL, C-Tick	IEC/EN 61131-2, UL 508, UL 1604 class 1 division 2, CSA 22.2 No. 214 (cUL), CSA 22.2 No. 213 class 1 division 2 (cUL), CE, GL, C-Tick
LED indicators			Power supply status, alarm relay status, active redundancy, redundancy management, copper port status and copper port activity	Power supply status, alarm relay status, active redundancy, redundancy management, fibre port status and fibre port activity
Alarm relay			Power supply fault, Ethernet network fault or communication port fault (volt-free contact 1 A max. at 24 V ⎓)	Power supply fault, Ethernet network fault or communication port fault (volt-free contact 1 A max. at 24 V ⎓)
Reference			**TCSESB083F23F0**	**TCSESB083F2CU0** / **TCSESB093F2CU0**
Pages			3/50	3/50

(1) Length dependent on the attenuation analysis and attenuation of the optical fibre (typical value: 2000 m).
(2) Length dependent on the attenuation analysis and attenuation of the optical fibre (typical value: 15,000 m).

Ethernet network
Cabling system
ConneXium managed switches

Device type			Managed switches, 8 extended ports, copper twisted pair and fibre optic		
					
Interfaces	Copper cable ports	Number and type	8 x 10/100BASE-TX ports	6 x 10/100BASE-TX ports	6 x 10/100BASE-T ports
		Shielded connectors	RJ45		
		Medium	Shielded twisted pair, category CAT 5E		
		Total length of pair	100 m		
	Fibre optic ports	Number and type	–	2 x 100BASE-FX ports	
		Connectors	–	Duplex SC	
		Medium	–	Multimode optical fibre	Single mode optical fibre
	Length of optical fibre	50/125 µm	–	5000 m *(1)*	–
		62.2/125 µm	–	4000 m *(1)*	–
		9/125 µm fibre	–	–	32,500 m *(2)*
	Attenuation analysis	50/125 µm fibre	–	8 dB	–
		62.2/125 µm fibre	–	11 dB	–
		9/125 µm fibre	–	–	16 dB
	Ethernet services		FDR, SMTP V3, SNTP client, multicast filtering for optimization of the Global Data protocol, configuration via Web access,VLAN, IGMP Snooping, RSTP *(Rapid Scanning Tree Protocol)*, priority port, data stream control, secure port		
Topology	Number of switches	Cascaded	Unlimited		
		Redundant in a ring	50 max.		
Redundancy			Redundant power supplies, redundant single ring, ring coupling, rings supporting MRP, Fast HIPER Ring and RSTP		
Power supply	Voltage		18...60 V ⎓		
	Consumption		10 W	12 W	
	Removable terminal block		2 terminal blocks, 2 terminals		
Operating temperature			0...+ 60°C		
Relative humidity			10…90% non-condensing		
Degree of protection			IP 30		
Dimensions	W x H x D		120 x 137 x 115 mm		
Mounting			On symmetrical DIN rail, 35 mm wide		
Weight			1 kg		
Conforming to standards			IEC/EN 61131-2, IEC 61850-3, UL 508, UL 1604 class 1 division 2, CSA 22.2 No. 214 (cUL), CSA 22.2 No. 213 class 1 division 2 (cUL), CE, GL, C-Tick, LR, BV		
LED indicators			Power supply status, alarm relay status, active redundancy, redundancy management, copper port status and copper port activity		
Alarm relay			Power supply fault, Ethernet network fault or communication port fault (volt-free contact 1 A max. at 24 V ⎓, 2-way)		
Reference			**TCSESM083F23F1**	**TCSESM063F2CU1**	**TCSESM063F2CS1**
Pages			3/50		

(1) Length dependent on the attenuation analysis and attenuation of the optical fibre (typical value: 2000 m).
(2) Length dependent on the attenuation analysis and attenuation of the optical fibre (typical value: 15,000 m).

Device type			Managed switches, 16 and 24 ports, copper twisted pair and fibre optic			
						
Interfaces	Copper cable ports	Number and type	16 x 10/100BASE-TX ports	14 x 10/100BASE-TX ports	14 x 10/100BASE-TX ports	22 x 10/100BASE-TX ports
		Shielded connectors	RJ45			
		Medium	Shielded twisted pair, category CAT 5E			
		Total length of pair	100 m			
	Fibre optic ports	Number and type	–	2 x 100BASE-FX ports		
		Connectors	–	Duplex SC		
		Medium	–	Multimode optical fibre	Single mode optical fibre	Multimode optical fibre
	Length of optical fibre	50/125 µm	–	5000 m *(1)*	–	5000 m *(1)*
		62.2/125 µm	–	4000 m *(1)*	–	4000 m *(1)*
		9/125 µm fibre	–	–	32,500 m *(2)*	–
	Attenuation analysis	50/125 µm fibre	–	8 dB	–	8 dB
		62.2/125 µm fibre	–	11 dB	–	11 dB
		9/125 µm fibre	–	–	16 dB	–
	Ethernet services		FDR, SMTP V3, SNTP client, multicast filtering for optimization of the Global Data protocol, configuration via Web access,VLAN, IGMP Snooping, RSTP *(Rapid Scanning Tree Protocol)*, priority port, data stream control, secure port			
Topology	Number of switches	Cascaded	Unlimited			
		Redundant in a ring	50 max.			
Redundancy			Redundant power supplies, redundant single ring, ring coupling			
Power supply	Voltage		9.6...60 V ⎓ /18…30 V ∿ safety extra low voltage (SELV)			
	Consumption		9.4 W	11.8 W	11.8 W	15.5 W
	Removable terminal block		6 terminals			
Operating temperature			0…+ 60°C			
Relative humidity			10…90% non-condensing		95% max. non-condensing	10…90% non-condensing
Degree of protection			IP 20			
Dimensions	W x H x D		111 x 131 x 111 mm			
Mounting			On symmetrical DIN rail, 35 mm wide			
Weight			0.600 kg			0.650 kg
Conforming to standards			cUL 60950, UL 508 and CSA 22.2 No. 142, UL 1604 and CSA 22.2 No. 213 class 1 division 2		IEC/EN 61131-2, UL 508, UL 1604 class 1 division 2, CSA 22.2 No. 214 (cUL), CSA 22.2 No. 213 class 1 division 2 (cUL), CE, GL, C-Tick	cUL 60950, UL 508 and CSA 22.2 No. 142, UL 1604 and CSA 22.2 No. 213 class 1 division 2
LED indicators			Power supply status, alarm relay status, active redundancy, redundancy management, copper port status and copper port activity	Power supply status, alarm relay status, active redundancy, redundancy management, fibre port status and fibre port activity		
Alarm relay			Power supply fault, Ethernet network fault or communication port fault (volt-free contact 1 A max. at 24 V ⎓)			
Reference			**TCSESM163F23F0**	**TCSESM163F2CU0**	**TCSESM163F2CS0**	**TCSESM243F2CU0**
Pages			3/51			

(1) Length dependent on the attenuation analysis and attenuation of the optical fibre (typical value: 2000 m).

Ethernet network
Cabling system
ConneXium managed switches

Device type			Managed switch, 8 ports and 2 Gigabit ports, copper twisted pair and fibre optic		
					
Interfaces	Copper cable ports	Number and type	8 x 10/100BASE-TX ports		
		Shielded connectors	RJ45		
		Medium	Shielded twisted pair, category CAT 5E		
		Total length of pair	100 m		
	Fibre optic Gigabit ports (with SFP fibre optic module to be mounted on SFP connector)	Number and type	2 x 1000BASE-SX ports *(1)*	2 x 1000BASE-LH ports *(2)*	2 x 1000BASE-LX ports *(3)*
		Connectors	LC		
		Medium	Multimode optical fibre	Single mode optical fibre	Single mode and multimode optical fibre
	Length of optical fibre	50/125 µm	550 m	–	550 m
		62.2/125 µm	275 m	–	550 m
		9/125 µm fibre	–	8 - 72,000 m	20,000 m
	Attenuation analysis	50/125 µm fibre	7.5 dB	–	11 dB
		62.2/125 µm fibre	7.5 dB	–	11 dB
		9/125 µm fibre	–	6 - 22 dB	11 dB
	Ethernet services		FDR, SMTP V3, SNTP client, multicast filtering for optimization of the Global Data protocol, configuration via Web access, VLAN, IGMP Snooping, RSTP *(Rapid Scanning Tree Protocol)*, priority port, data stream control, secure port		
Topology	Number of switches	Cascaded	Unlimited		
		Redundant in a ring	50 max.		
Redundancy			Redundant power supplies, redundant single ring, ring coupling		
Power supply	Voltage		9.6...60 V ⎓ /18…30 V ∿ safety extra low voltage (SELV)		
	Consumption		8.9 W + 1 W per SFP fibre optic module		
	Removable terminal block		6 terminals		
Operating temperature			0...+ 60°C		
Relative humidity			10…90% non-condensing		
Degree of protection			IP 20		
Dimensions	W x H x D		111 x 131 x 111 mm		
Mounting			On symmetrical DIN rail, 35 mm wide		
Weight			0.410 kg		
Conforming to standards			cUL 60950, UL 508 and CSA 22.2 No. 142, UL 1604 and CSA 22.2 No. 213 class 1 division 2, CE, GL		
LED indicators			Power supply status, alarm relay status, active redundancy, redundancy management, fibre port status and fibre port activity		
Alarm relay			Power supply fault, Ethernet network fault or communication port fault (volt-free contact 1 A max. at 24 V ⎓)		
Reference			**TCSESM103F2LG0**		
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*(1) With **TCSEAAF1LFU00** fibre optic module to be ordered separately (see page 3/45).*
*(2) With **TCSEAAF1LFH00** fibre optic module to be ordered separately (see page 3/45).*
*(3) With **TCSEAAF1LFS00** fibre optic module to be ordered separately (see page 3/45).*

Managed switch, 8 ports and 2 Gigabit ports, copper twisted pair			
			
8 x 10/100BASE-TX ports and 2 x 10/100/1000BASE-TX ports (Gigabit)			
RJ45			
Shielded twisted pair, category CAT 5E			
100 m			
–			
LC			
–			
–			
–			
–			
–			
–			
FDR, SMTP V3, SNTP client, multicast filtering for optimization of the Global Data protocol, configuration via Web access,VLAN, IGMP Snooping, RSTP *(Rapid Scanning Tree Protocol)*, priority port, data stream control, secure port			
Unlimited			
50 max.			
Redundant power supplies, redundant single ring, ring coupling			
9.6...60 V ⎓ /18…30 V ∿ safety extra low voltage (SELV)			
8.3 W			
6 terminals			
0...+ 60°C			
10…90% non-condensing			
IP 20			
111 x 131 x 111 mm			
On symmetrical DIN rail, 35 mm wide			
0.410 kg			
cUL 60950, UL 508 and CSA 22.2 No. 142, UL 1604 and CSA 22.2 No. 213 class 1 division 2, CE, GL			
Power supply status, alarm relay status, active redundancy, redundancy management, fibre port status and fibre port activity			
Power supply fault, Ethernet network fault or communication port fault (volt-free contact 1 A max. at 24 V ⎓)			
TCSESM103F23G0			
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Ethernet networks
ConneXium industrial Firewalls

Device type			TX/TX firewall	TX/TX Tofino firewall	TX/MM firewall	MM/TX firewall
						
Interfaces	Copper cable ports	Number and type	2 x 10/100 BASE-TX ports for internal and external networks		1 x 10/100BASE-TX port for internal network	1 x 10/100BASE-TX port for external network
		Shielded connectors	RJ45 type		RJ45 type	
		Medium	Shielded twisted pair, category CAT 5E		Shielded twisted pair, category CAT 5E	
		Total length of pair	100 m/328.08 ft		100 m/328.08 ft	
	Fibre optic ports	Number and type	–		1 x 100BASE-FX port for external network	1 x 100BASE-FX port for internal network
		Connectors	–		Duplex SC type	
		Medium	–		Multimode optical fiber	
	Length of optical fibre	50/125 µm	–		5000 m *(2)*	
		62.2/125 µm	–		4000 m *(3)*	
	Attenuation analysis	50/125 µm fibre	–		8 dB	
		62.2/125 µm fibre	–		11 dB	
	Configuration tools		Configuration via Web access or command line interface	Menu based off-line configuration software that is included with the firewall	Configuration via Web access or command line interface	
Security capabilities			Packet filtering, network address translation, VPN, denial of service, routing, redundancy	Built-in security modules that include Firewall, Modbus/TCP Enforcer and Event Logger	Packet filtering, network address translation, VPN, denial of service, routing, redundancy	
Power supply	Voltage		12 to 48 V ⎓ (minimum 9 V to maximum 60 V) or 24 V ∿ (minimum 18 V to maximum 30 V)		12 to 48 V ⎓ (minimum 9 V to maximum 60 V) or 24 V ∿ (minimum 18 V to maximum 30 V)	
	Consumption		6.9 W max.		8.1 W max.	
	Hold up time		Minimum 20 ms at 20.4 V ⎓		Minimum 20 ms at 20.4 V ⎓	
Ambiant air temperature	For operating		0 to 60 °C/32 to 140 °F		0 to 60 °C/32 to 140 °C	
	For storage		- 40 to 70 °C/- 40 to 158 °F		- 40 to 70 °C/- 40 to 158 °F	
Relative humidity			10 to 95% non-condensing		10 to 95% non-condensing	
Maximum operating altitude			2000 m/6560 ft		2000 m/6560 ft	
Pollution degree			2		2	
Degree of protection			IP 20		IP 20	
MTBF (mean time between failures)			450 861 hr. at 25 °C/77 °F	240 024 hr. at 25 °C/77 °F	426672 hr. at 25 °C/77 °F	
Dimensions		W x H x D	60 x 145 x 125 mm/2.36 x 5.71 x 4.92 in	60 x 145 x 123 mm/2.36 x 5.71 x 4.84 in	60 x 145 x 125 mm/2.36 x 5.71 x 4.92 in	
Mounting			35 mm/1.38 in DIN rail		35 mm/1.38 in DIN rail	
Weight			0.600 kg/21.160 oz	0.615 kg/21.700 oz	0.630 kg/22.220 oz	
Standards and certifications			IEC 60068-2-6, IEC 60068-2-27, EN 61000-4-2, EN 61000-4-3, EN 61000-4-4, EN 61000-4-5, EN 61000-4-6, EN 61000-4-9, EN 55022 class A/FCC 47 CFR Part 15 class A cUL 508:1988, CE *(1)*		EN60825-1, IEC 60068-2-6, IEC 60068-2-27, EN 61000-4-2, EN 61000-4-3, EN 61000-4-4, EN 61000-4-5, EN 61000-4-6, EN 61000-4-9, EN 55022 class A/FCC 47 CFR Part 15 class A cUL 508:1988, CE	
LED indicators			Power Supply 1, Power Supply 2, Fault, Device Status, External Port Status, Internal Port Status, Serial Port Status		Power Supply 1, Power Supply 2, Fault, Device Status, External Port Status, Internal Port Status, Serial Port Status	
References			**TCSEFEC23F3F20**	**TCSEFEA23F3F20**	**TCSEFEC23FCF20**	**TCSEFEC2CF3F20**
Pages			3/51		3/51	

(1) The ConneXium Tofino Industrial Ethernet Firewall TCSEFEA23F3F20 is also compliant with the Germanischer Lloyd VI-7-3 Part 1 Ed. 2003 certification.
(2) Length dependent on the attenuation analysis and attenuation of the optical fibre (typical value : 2000 m).
(3) Length dependent on the attenuation analysis and attenuation of the optical fibre (typical value : 15,000 m).

3

More technical information on www.schneider-electric.com

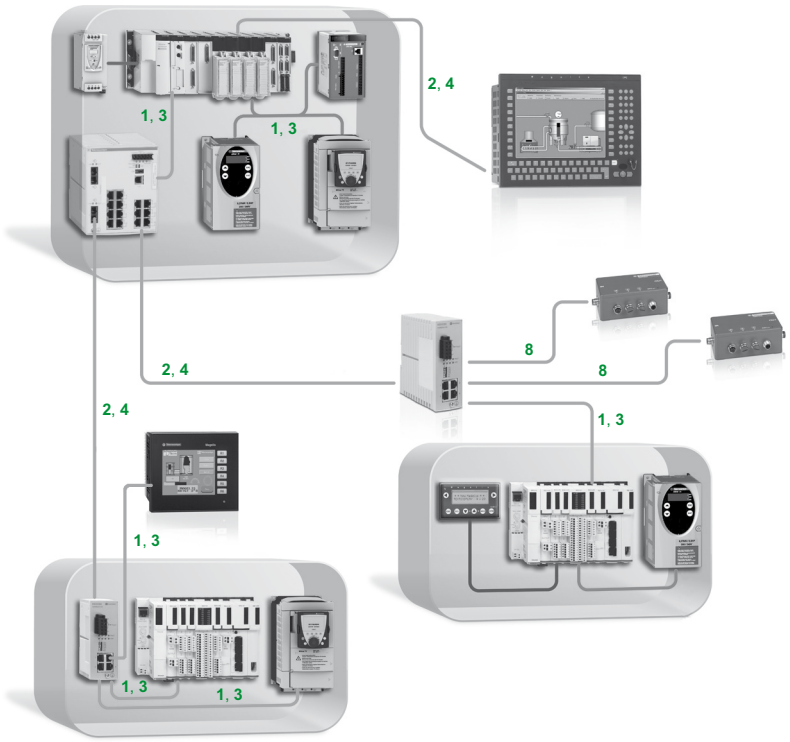
Ethernet network
Infrastructure

Presentation

Schneider Electric offers copper and fibre optic cables for connecting IP 20 and IP 67 Ethernet devices.

Examples

Mixed IP 20 and IP 67 wiring (copper)



Key:
1, **3** : Straight-through copper cables
2, **4** : Crossover copper cables
8 : Cables with IP 67 connector (see page 3/45)

Selection guide:
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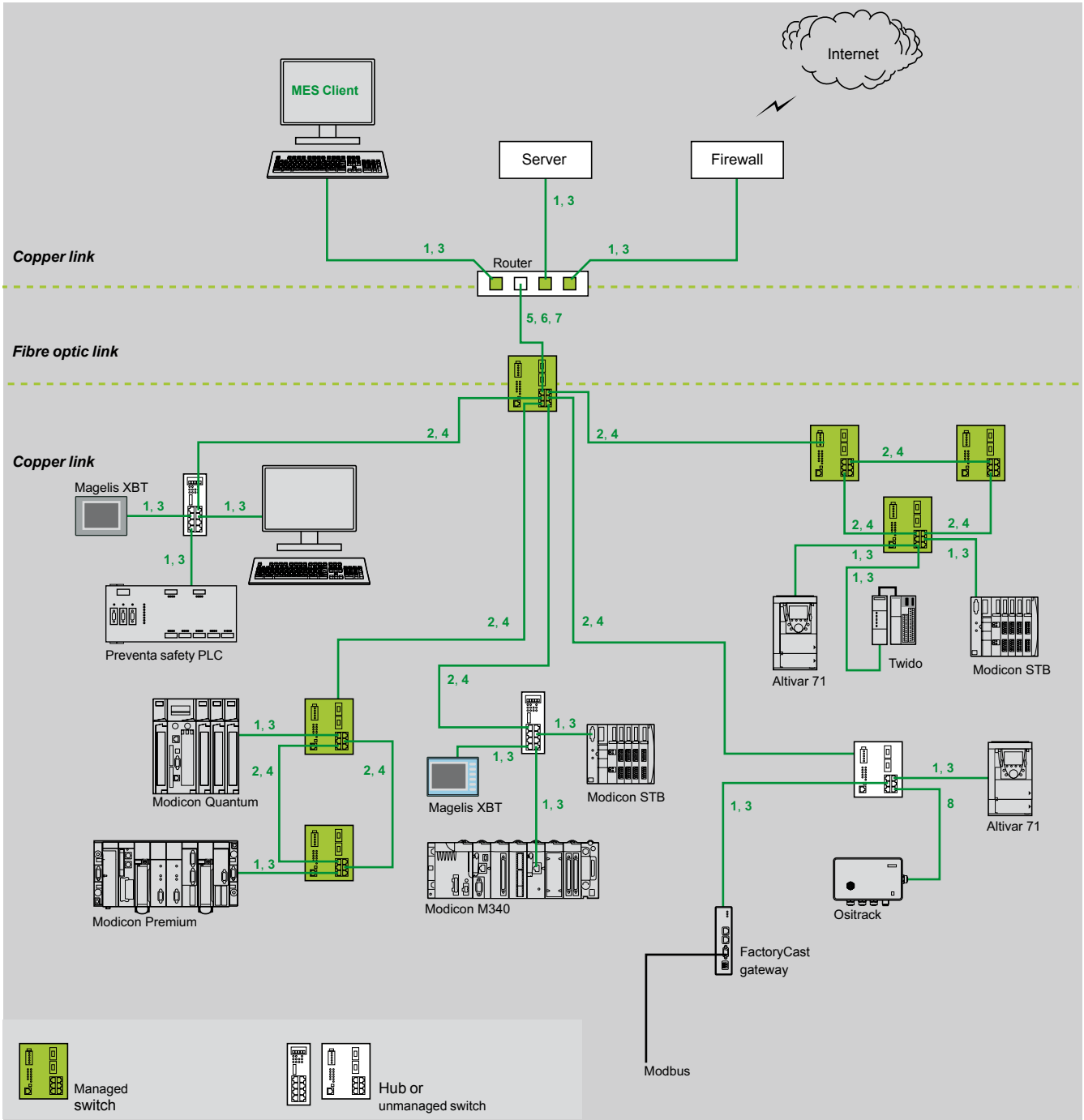
Ethernet network
Infrastructure

Examples (continued)
Mixed copper and fibre optic wiring



Key:
1, 3: Straight-through copper cables
2, 4 : Crossover copper cables
5, 6, 7 : Fibre optic cables
8 : Cables with IP 67 connector (see pages 3/44 and 3/45)

Selection guide:
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3

Shielded copper connection cables

ConneXium shielded connection cables are available in two versions to meet the various current standards and approvals:

■ **EIA/TIA 568 shielded twisted pair cables for** CE market

These cables conform to:

□ EIA/TIA-568 standard, category CAT 5E

□ IEC 11801/EN 50173-1 standard, class D

Their fire resistance conforms to:

□ NF C32-070 standard, class C2

□ IEC 322/1 standards

□ Low Smoke Zero Halogen (LSZH)

■ **EIA/TIA 568 shielded twisted pair cables for UL market**

These cables are:

□ CEC type FT-1

□ NEC type CM

A new range of ConneXium fully shielded preassembled cables has been specially designed for use in harsh industrial environments. These cables combine a category 5E shielded cable and RJ45 connectors reinforced with a metal profile.

TCSEC●3M3M●●S4

EIA/TIA 568 shielded twisted pair cables for CE market

Description	With connectors at both ends	No.	Type	Length	Reference	Weight kg
Straight-through copper cables CE compatible	2 x RJ45 connectors For connection to terminal equipment (DTE)	1	Standard	2 m	**490NTW00002**	–
				5 m	**490NTW00005**	–
				12 m	**490NTW00012**	–
				40 m	**490NTW00040**	–
				80 m	**490NTW00080**	–
			Ruggedized	1 m	**TCSECE3M3M1S4**	–
				2 m	**TCSECE3M3M2S4**	–
				3 m	**TCSECE3M3M3S4**	–
				5 m	**TCSECE3M3M5S4**	–
				10 m	**TCSECE3M3M10S4**	–
Crossover copper cables CE compatible	2 x RJ45 connectors For connection between hubs, switches and transceivers	2	Standard	5 m	**490NTC00005**	–
				15 m	**490NTC00015**	–
				40 m	**490NTC00040**	–
				80 m	**490NTC00080**	–

Shielded twisted pair cables for UL market

Description	With connectors at both ends	No.	Type	Length	Reference	Weight kg
Straight-through copper cables UL compatible	2 x RJ45 connectors For connection to terminal equipment (DTE)	3	Standard	2 m	**490NTW00002U**	–
				5 m	**490NTW00005U**	–
				12 m	**490NTW00012U**	–
				40 m	**490NTW00040U**	–
				80 m	**490NTW00080U**	–
			Ruggedized	1 m	**TCSECU3M3M1S4**	–
				2 m	**TCSECU3M3M2S4**	–
				3 m	**TCSECU3M3M3S4**	–
				5 m	**TCSECU3M3M5S4**	–
				10 m	**TCSECU3M3M10S4**	–
Crossover copper cables UL compatible	2 x RJ45 connectors For connection between hubs, switches and transceivers	4	Standard	5 m	**490NTC00005U**	–
				40 m	**490NTC00040U**	–
				80 m	**490NTC00080U**	–

Do it Yourself copper cable and connectors

The ConneXium Do it Yourself offer consists of 2 references for connectors (M12 and RJ45) and 1 cable reference (300 m coil), enabling Ethernet 10/100 Mbps networks to be cabled in the field.
The maximum length of cables created in this way is 80 m.
They are quick to assemble using a knife and simple wire cutters (no special tools are required).

Description	Characteristics	Length	Reference	Weight kg
Ethernet copper cable 2 shielded twisted pairs 24 AWG	Conforms to the standards and approvals listed above	300 m	**TCSECN300R2**	–
RJ45 connector	Conforms to EIA/TIA-568-D	–	**TCSEK3MDS**	–
M12 connector	Conforms to IEC 60176-2-101	–	**TCSEK1MDRS**	–

490NOC00005

490NOT00005

490NOR00005

Glass fibre optic cables

Glass fibre optic cables are intended for connection:
- To terminal devices (DTE)
- Between hubs, transceivers and switches

Description	With connectors at both ends	No.	Length	Reference	Weight kg
Glass fibre optic cables	1 SC connector 1 MT-RJ connector	5	5 m	**490NOC00005**	–
	1 ST (BFOC) connector 1 MT-RJ connector	6	5 m	**490NOT00005**	–
	2 MT-RJ connectors	7	3 m	**490NOR00003**	–
			5 m	**490NOR00005**	–

Separate parts for TCS ESM and TCS ESB switches

Description	Optical fibre	Type	Reference	Weight kg
Fibre optic modules for Gigabit ports with LC connector *(1)*	Multimode 50/125 µm or 62.5/125 µm	1000BASE -SX	**TCSEAAF1LFU00**	0.040
	Single mode 9/125 µm	1000BASE -LH	**TCSEAAF1LFH00**	0.040
	Multimode 50/125 µm or 62.5/125 µm Single mode 62.5/125 µm	1000BASE -LX	**TCSEAAF1LFS00**	0.040

Description	Use	Port	Reference	Weight kg
Configuration backup key for TCS ESM switches	Connected on the front of the switch, used to: - Save and retrieve the switch configuration - Update the internal software	USB	**TCSEAM0100**	–
Configuration backup key for TCS ESB switches		RJ45 (V24)	**TCSEAM0200**	–

Connection components for IP 67 switch

Description	With connectors at both ends	No.	Length	Reference	Weight kg
Straight-through copper cables	1 x IP 67 4-way M12 connector and 1 x RJ45 connector	8	1 m	**TCSECL1M3M1S2**	–
			3 m	**TCSECL1M3M3S2**	–
			10 m	**TCSECL1M3M10S2**	–
			25 m	**TCSECL1M3M25S2**	–
			40 m	**TCSECL1M3M40S2**	–
	2 x IP 67 4-way M12 connectors	–	1 m	**TCSECL1M1M1S2**	–
			3 m	**TCSECL1M1M3S2**	–
			10 m	**TCSECL1M1M10S2**	–
			25 m	**TCSECL1M1M25S2**	–
			40 m	**TCSECL1M1M40S2**	–
Power supply cables	2 female M12 straight connectors	–	2 m	**XZCP1164L2**	–
			5 m	**XZCP1164L5**	–
	2 female M12 elbowed connectors	–	2.5 m	**XZCP1264L2**	–
			5 m	**XZCP1264L5**	–
	2 female M12 straight connectors	–	–	**XZCC12FDM50B**	–
	2 female M12 elbowed connectors	–	–	**XZCC12FCM50B**	–
M12/RJ45 adaptor	IP 67 4-way female M12 connector and female RJ45 connector	–	–	**TCSEAAF11F13F00**	–

Reinforced connectors and ConneXium Ethernet cables

Description	Characteristics	Length	Reference	Weight kg
Ethernet cable 4 pairs	Conforms to the CE standards	300 m	**TCSECE300R2**	–
	Conforms to the UL standards	300 m	**TCSECU300R2**	–
RJ45 reinforced connectors	Set of 2 connectors	–	**TCSEK3MR2**	–
	Set of 10 connectors	–	**TCSEK3MR10**	–

(1) Dimensions: W x H x D = 20 x 18 x 50 mm

Selection guide:
page 3/26

Ethernet network
Wiring system
ConneXium hub and transceiver

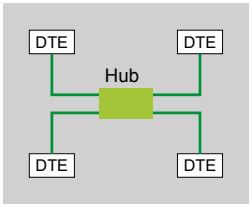
499NEH10410

ConneXium hub

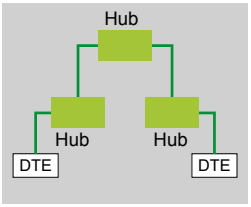
Presentation

Hubs *(concentrators)* are used for transmitting signals between several media (ports). Hubs are plug and play devices that do not need to be configured by the user.

The use of hubs makes it possible to create the following topologies:
- Star topology
- Tree topology



Star topology



Tree topology

Reference

Description	Interfaces	Reference	Weight kg
ConneXium hub	4 x 10BASE-T ports (copper cable), RJ45 shielded connectors	**499NEH10410**	0.530

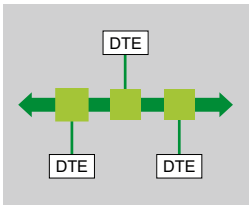
ConneXium transceiver

Presentation

ConneXium transceivers are used to:
- Create fibre optic linear bus topologies, for devices with a twisted pair cable Ethernet connection
- Interface devices with a twisted pair cable Ethernet connection with a fibre optic cable

Transceivers are plug and play devices that do not need to be configured by the user.

ConneXium transceivers provide fibre optic connections for transmission in areas subject to interference (high levels of electromagnetic interference) and for long distance communications.



Linear topology on optical fibre

Selection guide:
page 3/26

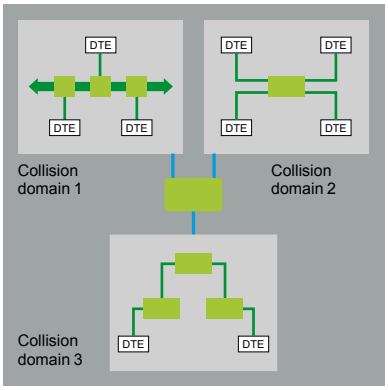
Ethernet network
Wiring system
ConneXium unmanaged switches

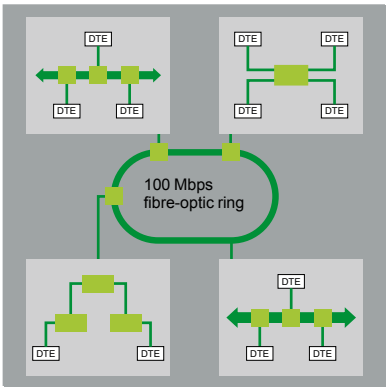
ConneXium unmanaged switches, twisted pair

Presentation

Switches are used to increase the limits of architectures based on hubs or transceivers, by separating collision domains.
Higher layer communication is provided between the ports, and collisions at link layer are not propagated (filtering).
They therefore improve performance by better allocation of the bandwidth due to the reduction of collisions and network load.
Certain ConneXium switch models also enable redundant architectures to be created on twisted pair copper ring or optical fibre.

Unmanaged switches are plug and play devices that do not need to be configured by the user. Certain models can also be managed remotely via SNMP or HTTP protocols for monitoring and diagnostic purposes.





TCSESU051F0

499NES18100

Reference

Description	Interfaces	Reference	Weight kg
ConneXium unmanaged switches	5 x 10BASE-T/100BASE-TX ports (copper cable), shielded M12 type D connectors, IP67	**TCSESU051F0**	0.210
	8 x 10BASE-T/100BASE-TX ports (copper cable), RJ45 shielded connectors, IP20	**499NES18100**	0.230
	8 x 10BASE-T/100BASE-TX ports (copper cable), RJ45 shielded connectors, IP30	**TCSESU083FN0**	0.246

Description	With connectors at both ends	Length	Reference	Weight kg
IP67 power supply cables *(for ConneXium switch **TCSESU051F0**)*	Female M12 straight connector	0.230 kg	**XZCP1164L2**	–
		5 m	**XZCP1164L5**	–
	Female M12 elbowed connector	2 m	**XZCP1264L2**	–
		5 m	**XZCP1264L5**	–
IP67 power supply connectors *(for ConneXium switch **TCSESU051F0**)*	Female M12 straight connector	–	**XZCC12FDM50B**	–
	Female M12 elbowed connector	–	**XZCC12FCM50B**	–

Selection guide:
page 3/26

TCSESU053FN0

ConneXium unmanaged switches, 3, 4 and 5 ports, twisted pair and fibre optic

References

Description	Interfaces	Reference	Weight kg
ConneXium unmanaged switches	3 x 10BASE-T/100BASE-TX ports (copper cable), RJ45 shielded connectors	**TCSESU033FN0**	0.113
	■ 4 x 10BASE-T/100BASE-TX ports (copper cable), RJ45 shielded connectors ■ 1 x 100BASE-FX port (multimode optical fibre), duplex SC connector	**TCSESU043F1N0**	0.120
	5 x 10BASE-T/100BASE-TX ports (copper cable), RJ45 shielded connectors	**TCSESU053FN0**	0.113

499NMS25101

499NSS25102

ConneXium unmanaged switches, 5 ports, twisted pair and fibre optic

Reference

Description	Interfaces	Reference	Weight kg
ConneXium unmanaged switches	■ 4 x 10BASE-T/100BASE-TX ports (copper cable), RJ45 shielded connectors ■ 1 x 100BASE-FX port (multimode optical fibre), duplex SC connector	**499NMS25101**	0.330
	■ 3 x 10BASE-T/100BASE-TX ports (copper cable), RJ45 shielded connectors ■ 2 x 100BASE-FX ports (multimode optical fibre), duplex SC connector	**499NMS25102**	0.335
	■ 4 x 10BASE-T/100BASE-TX ports (copper cable), RJ45 shielded connectors ■ 1 x 100BASE-FX port (single mode optical fibre), duplex SC connector	**499NSS25101**	0.330
	■ 3 x 10BASE-T/100BASE-TX ports (copper cable), RJ45 shielded connectors ■ 2 x 100BASE-FX ports (single mode optical fibre), duplex SC connector	**499NSS25102**	0.335

Selection guide:
page 3/26

TCSESM043F1CU0

TCSESM043F2CS0

ConneXium managed switches, 4 ports, twisted pair and fibre optic

References

Description	Interfaces	Reference	Weight kg
ConneXium managed switches	■ 3 x 10BASE-T/100BASE-TX ports (copper cable), RJ45 shielded connectors ■ 1 x 100BASE-FX port (multimode optical fibre), duplex SC connector	**TCSESM043F1CU0**	0.400
	■ 2 x 10BASE-T/100BASE-TX ports (copper cable), RJ45 shielded connectors ■ 2 x 100BASE-FX ports (multimode optical fibre), duplex SC connector	**TCSESM043F2CU0**	0.400
	■ 3 x 10BASE-T/100BASE-TX ports (copper cable), RJ45 shielded connectors ■ 1 x 100BASE-FX port (single mode optical fibre), duplex SC connector	**TCSESM043F1CS0**	0.400
	■ 2 x 10BASE-T/100BASE-TX ports (copper cable), RJ45 shielded connectors ■ 2 x 100BASE-FX ports (single mode optical fibre), duplex SC connector	**TCSESM043F2CS0**	0.400

TCSESM083F23F0

ConneXium managed switches, 4 and 8 ports, twisted pair

References

Description	Interfaces	Reference	Weight kg
ConneXium managed switches	4 x 10/100BASE-TX ports (copper cable), RJ45 shielded connectors	**TCSESM043F23F0**	0.400
	8 x 10/100BASE-TX ports (copper cable), RJ45 shielded connectors	**TCSESM083F23F0**	0.410

Selection guide:
page 3/26

TCSESM083F1CU0

TCSESM083F2CS0

TCSESB083F23F0

TCSESM063F2CS1

ConneXium managed switches, 8 ports, twisted pair and fibre optic

References

Description	Interfaces	Reference	Weight kg
ConneXium managed switches	■ 7 x 10/100BASE-TX ports (copper cable), RJ45 shielded connectors ■ 1 x 100BASE-FX port (multimode optical fibre), duplex SC connector	**TCSESM083F1CU0**	0.410
	■ 6 x 10/100BASE-TX ports (copper cable), RJ45 shielded connectors ■ 2 x 100BASE-FX ports (multimode optical fibre), duplex SC connector	**TCSESM083F2CU0**	0.410
	■ 7 x 10/100BASE-TX ports (copper cable), RJ45 shielded connectors ■ 1 x 100BASE-FX port (single mode optical fibre), duplex SC connector	**TCSESM083F1CS0**	0.410
	■ 6 x 10/100BASE-TX ports (copper cable), RJ45 shielded connectors ■ 2 x 100BASE-FX ports (single mode optical fibre), duplex SC connector	**TCSESM083F2CS0**	0.410

Basic ConneXium managed switches, 8 and 9 ports, twisted pair and fibre optic

References

Description	Interfaces	Reference	Weight kg
Basic ConneXium managed switches	8 x 10/100BASE-TX ports (copper cable), RJ45 shielded connectors	**TCSESB083F23F0**	0.400
	■ 6 x 10/100BASE-TX ports (copper cable), RJ45 shielded connectors ■ 2 x 100BASE-FX ports (multimode optical fibre), duplex SC connector	**TCSESB083F2CU0**	0.400
	■ 6 x 10/100BASE-TX ports (copper cable), RJ45 shielded connectors ■ 3 x 100BASE-FX ports (multimode optical fibre), duplex SC connector	**TCSESB093F2CU0**	0.400

ConneXium managed switches, 8 extended ports, twisted pair and fibre optic

References

Description	Interfaces	Reference	Weight kg
ConneXium managed switches	8 x 10/100BASE-TX ports (copper cable), RJ45 shielded connectors, IP30	**TCSESM083F23F1** *(1)*	1.000
	■ 6 x 10/100BASE-TX ports (copper cable), RJ45 shielded connectors, IP30 ■ 2 x 100BASE-FX ports (multimode optical fibre), duplex SC connector	**TCSESM063F2CU1** *(1)*	1.000
	■ 6 x 10/100BASE-TX ports (copper cable), RJ45 shielded connectors, IP30 ■ 2 x 100BASE-FX ports (single mode optical fibre), duplex SC connector	**TCSESM063F2CS1** *(1)*	1.000

(1) Available in Conformal Coating version. For this version, add the letter **C** *at the end of the reference. For example, the* **TCSESM083F23F1** *switch becomes* **TCSESM083F23F1C** *in the Conformal Coating version. For further information on treatments for harsh environments, see page 6/2 or consult our website www.schneider-electric.com.*

Ethernet network
Wiring system
ConneXium managed switches, ConneXium Industrial Ethernet Firewalls

TCSESM163F23F0

TCSESM243F2CU0

TCSESM103F2LG0

TCSESM103F23G0

TCSEFEC23FCF20

TCSEFEA23F3F20

ConneXium managed switches, 16 and 24 ports, twisted pair and fibre optic

References

Description	Interfaces	Reference	Weight kg
ConneXium managed switches	16 x 10/100BASE-TX ports (copper cable), RJ45 shielded connectors	**TCSESM163F23F0**	0.600
	■ 14 x 10/100BASE-TX ports (copper cable), RJ45 shielded connectors ■ 2 x 100BASE-FX ports (multimode optical fibre), duplex SC connector	**TCSESM163F2CU0**	0.600
	■ 14 x 10/100BASE-TX ports (copper cable), RJ45 shielded connectors ■ 2 x 100BASE-FX ports (single mode optical fibre), duplex SC connector	**TCSESM163F2CS0**	0.600
	■ 22 x 10/100BASE-TX ports (copper cable), RJ45 shielded connectors ■ 2 x 100BASE-FX ports (multimode optical fibre), duplex SC connector	**TCSESM243F2CU0**	0.650

ConneXium managed switches, 8 ports and 2 Gigabit ports, twisted pair and fibre optic

References

Description	Interfaces	Reference	Weight kg
ConneXium managed switches	■ 8 x 10/100BASE-TX ports (copper cable), RJ45 shielded connectors ■ 2 x 1000BASE-SX ports (multimode optical fibre) *(1)*, or ■ 2 x 1000BASE-LH ports (single mode optical fibre) *(2)*, or ■ 2 x 1000BASE-LX ports (single mode and multimode optical fibre) *(3)*	**TCSESM103F2LG0**	0.410
	■ 8 x 10/100BASE-TX ports (copper cable), RJ45 shielded connectors ■ 2 x 10/100/1000BASE-TX (Gigabit) ports (copper cable), RJ45 shielded connectors	**TCSESM103F23G0**	0.410

ConneXium Industrial Ethernet Firewalls

References

Description	Interfaces	Reference	Weight kg
ConneXium Industrial Ethernet Firewall TX/TX	2 x 10/100BASE-TX ports (copper cable) for internal and external network connections	**TCSEFEC23F3F20**	0.600
ConneXium Tofino Industrial Ethernet Firewall TX/TX	2 x 10/100BASE-TX ports (copper cable) for internal and external network connections	**TCSEFEA23F3F20**	0.615
ConneXium Industrial Ethernet Firewall TX/MM	1 x 10/100BASE-TX port (copper cable) for internal network and 1 x 100BASE-FX port (multimode optical fiber) *(1)* for external network connections	**TCSEFEC23FCF20**	0.630
ConneXium Industrial Ethernet Firewall MM/TX	1 x 100BASE-FX port for internal network (multimode optical fiber) *(1)* and 1 x 10/100BASE-TX port (copper cable) *(2)* for external network connections	**TCSEFEC2CF3F20**	0.630

(1) With **TCSEAAF1LFU00** *fibre optic module to be ordered separately (see page 3/45)*
(2) With **TCSEAAF1LFH00** *fibre optic module to be ordered separately (see page 3/45)*
(3) With **TCSEAAF1LFS00** *fibre optic module to be ordered separately (see page 3/45)*

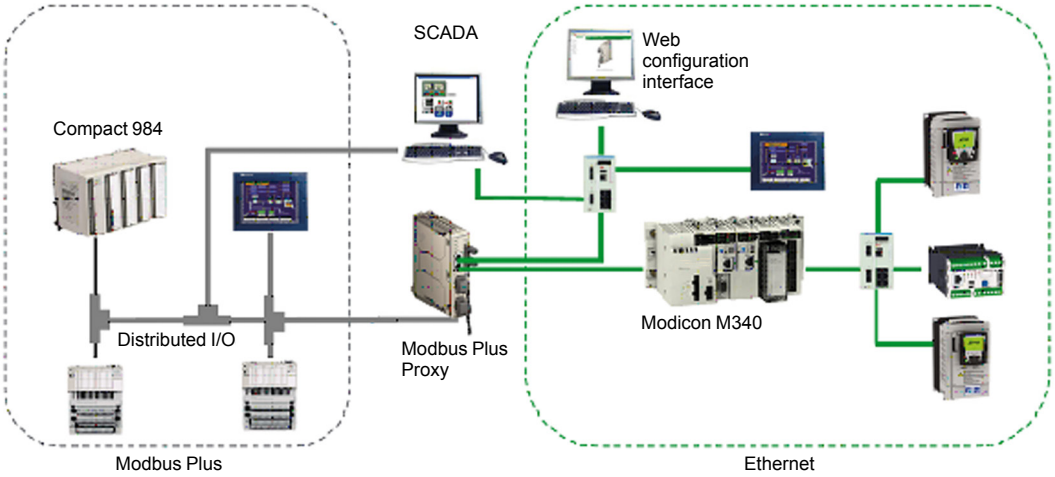
Selection guide:
page 3/26

Modicon M340 automation platform
Modbus Plus Proxy module

Presentation

The **TCSEGDB23F24FA** Modbus Plus Proxy module (also called **M340EGD**) is a network gateway which allows the Modicon M340 PLC to communicate with existing Modbus Plus devices.
It is not necessary to modify the applications for these devices to communicate with the Modicon M340 PLC, since the module automatically addresses the platforms and the various communication functions between the M340 and other PLC platforms (especially 984LL).

The M340 Modbus Plus Proxy offers Modbus Plus PLC users the chance to integrate the M340 PLC easily into their Modbus Plus network and thus access to advanced communications via Ethernet, or to migrate gradually from other PLC models to Modicon M340 and Unity.



Key benefits

Reduced startup time

- Online configuration of the proxy via a simple Web browser
- Setup Web pages similar to the screens of the Modbus Plus Peer Cop utility, accessible under Concept/Unity for the Global Data transaction
- Simpler data exchange with Global Data transactions performed on all network nodes
- Point-to-point communication without programming with Peer Cop

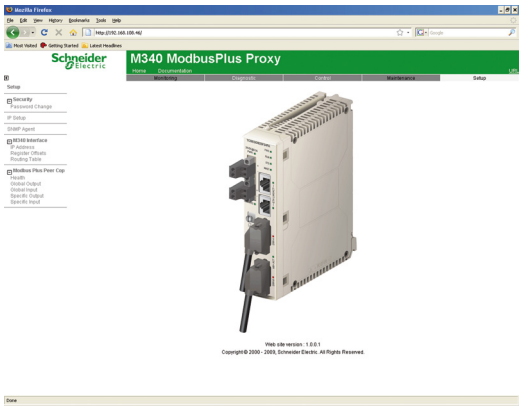
Increased network reliability and maintainability

- Standard diagnostics provide data on all network nodes for easy troubleshooting
- Dual Modbus Plus ports provide Modbus Plus network redundancy

Reduced total cost of ownership

- Protects your investment in Modbus Plus while migrating to Ethernet
- Dual Ethernet ports allow connection of both the M340 PLC and the configuration PC to the proxy, without any additional switches

Modicon M340 automation platform
Modbus Plus Proxy module



Embedded Web server

Web server functions

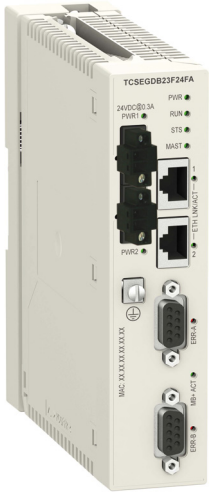
The **M340EGD** includes an embedded Web server which can be used to perform diagnostics and configure the module connection. All the data is presented in the form of standard Web pages in HTML format. To access a Web page, you need Internet Explorer 6.0 (or later version) and Java 1.5 (or later version).

Embedded Web server functions

1 - Setup: The Setup pages allow you to define the parameters for several different module services, including security, IP, SNMP, Global Data, Peer Cop and Ethernet ports.
2 - Diagnostics: These network diagnostic pages contain Ethernet, TCP and SNMP statistics, as well as a log of the diagnostics performed.

Complementary characteristics

The following characteristics complement those introduced in the communication selection guide on page 3/6:
- External power supply voltage: 19.2...31.2 V ⎓
- Consumption: 300 mA max.
- Dissipated power: 6.2 W
- Conformity with standards: UL 508, CSA 22.2 No. 142 (cUL), EMI EN 55011, EN 61131-2, C-Tick



TCSEGDB23F24FA

References

System and network requirements

Unity Pro XL 3.x programming software (or later version)
Internet Explorer 6.0 (or later version)
Java 1.5 (or later version)
Microsoft Windows XP or Vista

Modicon M340 processor:
- BMXP342020 (Modbus and Ethernet version)
- BMXP3420302 (CANopen and Ethernet version)
- BMXP3420302CL (CANopen and Ethernet version) *(1)*

Ethernet Modicon M340 communication modules:
- BMXNOE0100
- BMXNOE0110
- BMXNOC0401

Modicon M340 Modbus Plus Proxy module

Description	Type	Reference	Weight kg
Modbus Plus Proxy module for Modicon M340 PLC supplied with 2 front-mounted power supply connectors (2 positions)	Standard	**TCSEGDB23F24FA**	–
	Conformal coating	**TCSEGDB23F24FK**	–

(1) Memory card must be ordered separately for the BMXP3420302CL processor (see page 1/9).

Modicon M340 automation platform

Profibus DP V1 and Profibus PA buses

Profibus Remote Master module

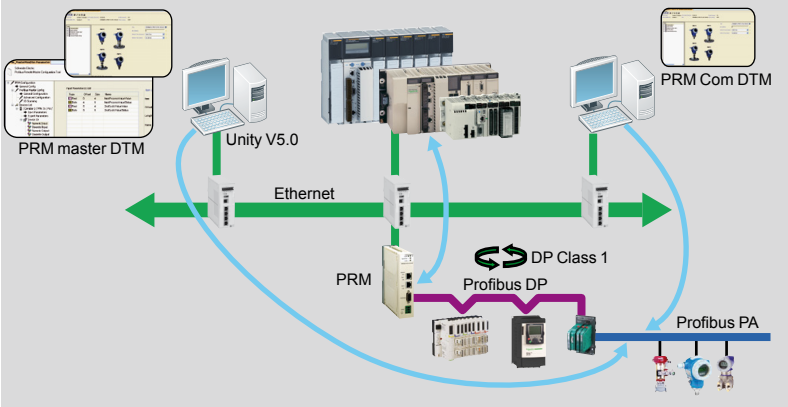
Profibus DP fieldbus

Profibus DP is one of the most widely used fieldbuses in industry.
Based on a master/slave protocol, only master stations, sometimes called active stations, have the right to access the bus, with slave, or passive, stations being limited to responding to interrogations.

Version V0 of Profibus only allows cyclic exchanges with I/O, whereas version V1 offers an acyclic message handling channel which can be used for device adjustment or diagnostics during operation.

The physical link is a single shielded twisted pair, but numerous interfaces are available for creating all sorts of topologies - tree, star or ring - including those using optical fibre or a non-physical link.

Gateways can be used to communicate transparently with Profibus PA, one of the most commonly used standards in process applications for connecting instrumentation.
Profibus PA can be used to supply devices across the network and also to install sensors in potentially explosive zones (ATEX).



Profibus Remote Master (PRM) module

Presentation

The Profibus Remote Master (PRM) module is connected to the Ethernet Modbus TCP/IP network via its integrated 2-port switch, as close as possible to the process and the instrumentation.

The PRM module can be used to connect Modicon Quantum, Modicon Premium and Modicon M340 PLCs to Profibus DP V1 via the I/O scanner function.
Irrespective of the type of PLC, only one product reference is required and setup is identical, thus reducing training and maintenance costs.
Two versions are available, standard and tropicalized, so as to adapt to any type of environment.

The PRM module is open to Asset Management tools.
A dedicated communication DTM is supplied with the product, thus allowing any compatible FDT standard tool to remotely adjust devices on Profibus using Ethernet (see page 4/5).

Configuration

From a single Unity tool, the user can create the Profibus configuration, the PLC application and configure or calibrate devices.
The latter are integrated in the Unity catalogue via their DTMs if they exist, or their *gsd* files.

The I/O scanner configuration is created implicitly in Unity Pro using the Profibus configuration. The parameters assigned by default guarantee optimized performance, as well as the consistency of I/O data in the PLC application, irrespective of the PLC platform.
Similarly, the I/O variables defined and presymbolized in the DTMs can be used directly in the application. Finally, the screens integrated in Unity Pro, together with the diagnostic functions integrated in the device DTMs simplify application maintenance.

Modicon M340 automation platform
Profibus DP V1 and Profibus PA buses
Profibus Remote Master module

Profibus Remote Master (PRM) module (continued)

Connectable devices

The following Schneider Electric devices can be connected to this bus:
- TeSys U and TeSys T starter-controllers
- Momentum and Modicon STB distributed I/O
- Altivar 312/61/71 variable speed drives for asynchronous motors
- Lexium 05/15 servo drives for brushless motors
- Altistart ATS 48 soft start-soft stop units
- Any third-party device compatible with Profibus DP and PA standard profiles

Limitations

Once saved, the Unity project incorporates all the Profibus parameters as well as those of the slaves connected to the bus. Modicon Quantum, Modicon Premium and Modicon M340 PLCs are capable of embedding all this data so that an empty Unity terminal without any applications is able, after a simple transfer from the PLC, to locate the whole application, including the slave parameters. This function is called ETS *(Empty Terminal Service)*.

In certain cases, it may be that the memory size required to save the device parameters exceeds the PLC memory capacity (signalled by a “memory full” message during the build). This is particularly likely on devices which have DTM (the most common instrumentation on PA). Typically, each device of this type takes up around 20 KB of the PLC memory.

It is therefore essential to create a memory map according to the type of configuration used and possibly adapt it accordingly, either by increasing the amount of memory dedicated to the application (by reducing the zone allocated to data), or by increasing the overall memory via cartridges available in the catalogue.

If the ETS function is not required, Unity Pro can also be configured in such a way as to reduce the size of the embedded data by disabling comments and animation tables, or by disabling the upload function so that the application does not include data relating to DTMs. In this case, the upload from an empty terminal function is no longer available.

References

The Profibus Remote Master module is supplied with a CD-ROM, which includes:
- PRM master DTMs and generic Profibus DTMs (for configuration in Unity Pro V5.0 or later)
- The PRM communication DTM for third-party (non-Schneider Electric) FDT

TCSEGPA23F14F

490NAD91103

Profibus Remote Master modules

Description	Type	Reference	Weight kg
Profibus Remote Master modules	Standard	**TCSEGPA23F14F**	0.620
	Ruggedized *(1)*	**TCSEGPA23F14FK**	0.620

Profibus DP bus connection components

Description	Type	Reference	Weight kg
Distributed I/O on Profibus DP bus	Modicon STB network interface module	**STBNDP2212**	0.140
	Momentum communication module	**170DNT11000**	0.070
Connectors for remote I/O communication module	Line terminators	**490NAD91103**	–
	In-line connector	**490NAD91104**	–
	In-line connector and terminal port	**490NAD91105**	–

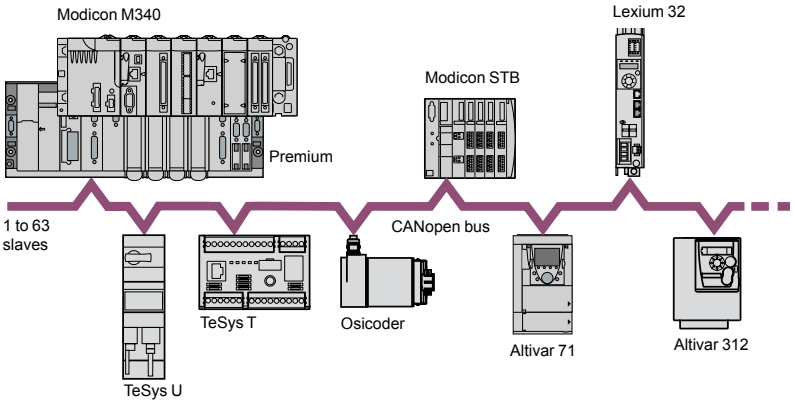
Description	Length	Reference	Weight kg
Profibus DP connection cables	100 m	**TSXPBSCA100**	–
	400 m	**TSXPBSCA400**	–

(1) Conformal coating and extended operating temperatures between -25 and +70°C. See ruggedized module characteristics on page 6/2.

Modicon M340 automation platform

CANopen machine and installation bus

Presentation



Schneider Electric has selected CANopen for its machines and installations because of its wealth of functions and its resulting benefits in the automation world. This decision was based on the general acceptance of CANopen, and the fact that CANopen products are increasingly used in control system architectures.
CANopen is an open network supported by more than 400 companies worldwide, and promoted by CAN in Automation (CiA).
CANopen conforms to standards EN 50325-4 and ISO 15745-2.
Schneider Electric is heavily involved in working groups, which are important for machine and installation architectures, systems and products.

CANopen brings transparency to Ethernet

CAN in Automation and Modbus-IDA have worked together to create a standard that ensures total transparency between CANopen and Modbus/TCP. The result of this collaboration has been the CiA DSP309-2 specification, which defines the communication standards between a Modbus/TCP network and a CANopen bus. The specification defines the mapping services which enable CANopen devices to communicate with a Modbus/TCP network through a gateway. The data in a CANopen device can be accessed in both read and write mode.

This specification is the first standard available for developing open standard communication between Modbus/TCP and CANopen. It is driving Schneider Electric network solutions toward better integration, diagnostics and configuration of distributed applications. It allows machines and installations to be connected to an Ethernet network continuously, while combining the advantages of each network in its specific area.

The CANopen bus is a multi-master bus which ensures reliable, deterministic access to real-time data in control system devices. The CSMA/CA protocol is based on broadcast exchanges, sent cyclically or on an event, to ensure optimum use of the bandwidth. A message handling channel can also be used to define slave parameters.

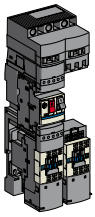
The bus uses a double shielded twisted pair on which, with the Modicon M340 platform, a maximum of 63 devices are connected by daisy-chaining or by tap junctions. The variable data rate between 20 Kbps and 1 Mbps depends on the length of the bus (between 20 m and 2500 m).
Each end of the bus must be fitted with a line terminator.

The Modicon M340 automation platform, via its **BMXP3420102/20302/20102CL/ 20302CL** processor with integrated CANopen link, performs the role of master on the bus.

Processors: page 1/4 | I/O: pages 2/12 and 2/24 | Software: page 4/2 | Ruggedized Modicon M340 modules: page 6/2

Modicon M340 automation platform

CANopen machine and installation bus



TeSys Quickfit

Altivar ATV 312

Lexium 32

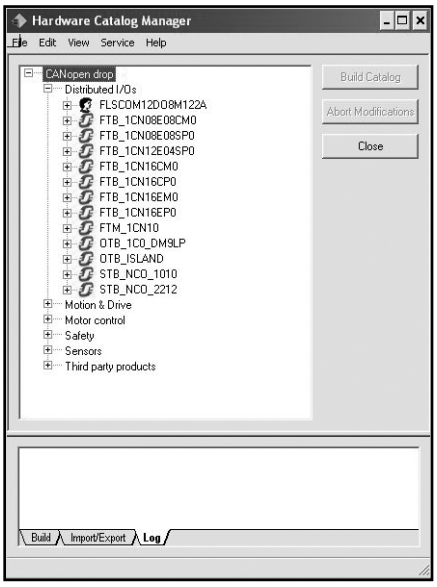
Modicon OTB

Connectable Schneider Electric devices

The following Schneider Electric devices can be connected to the CANopen bus, depending on the model *(1)*:

- Osicoder absolute encoders
- TeSys U starter-controllers with **LULC08** communication module
- TeSys T motor management system, with LTM controller
- TeSys D motor-starters using the TeSys Quickfit installation help system with **APP1CCO0/O2** communication module
- Modicon OTB IP 20 distributed I/O, with Twido I/O expansion modules and OTB interface module
- Modicon STB IP 20 modular distributed I/O, with STB NIM interface module
- Preventa configurable safety controllers
- 0.18…15 kW Altivar 312/71/61 variable speed drives for asynchronous motors:
- Lexium 32 servo drives for BMH and BSH servo motors
- IcLA intelligent compact motor-drives

3



Hardware Catalog Manager for integration of third-party devices

Integration of third-party devices

■ **Unity Pro version ≥ 4.0** offers the *Hardware Catalog Manager* tool which can be used to integrate third-party devices at an identical level to that of Schneider Electric devices. These third-party devices and their EDS file must conform to the CiA (*CAN In Automation*) standard.

The *Hardware Catalog Manager* tool is used to:

□ Integrate third-party devices in Unity Pro

□ Optimize the size of the **BMXP3420102/20302/20102CL/20302CL** processor memory area reserved for PDO (*Process Data Object*) process variables

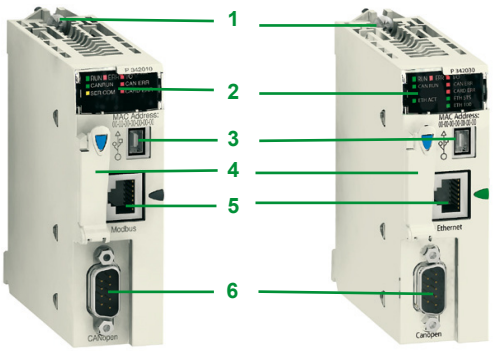
□ Customize the parameters specific to each third-party device

■ **Unity Pro version ≥ 4.1**, combined with **BMXP3420102/20302/20102CL/20302CL** processors with integrated CANopen link, can be used to customize configuration of the device *Boot Up* procedure, and thus be compatible with all commercially-available CANopen third-party products.

(1) See our website schneider-electric.com for compatible device versions and their setup software.

Modicon M340 automation platform

CANopen machine and installation bus



BMXP3420102CL
BMXP3420102CL

BMXP3420302
BMXP3420302CL

Description

BMXP3420102/20102CL and **BMXP3420302/20302CL** Performance processors on the Modicon M340 platform have an integrated CANopen communication port. They feature the following on the front panel:

1 A safety screw for locking the module in its slot in the rack, marked “00”.
2 A display block comprising at least:
- CAN RUN LED (green): Integrated machine/installation bus operational
- CAN ERR LED (red): Integrated machine/installation bus fault

3 A mini B USB connector for a programming terminal
4 A slot equipped with Flash memory card for backing up the application *(1)*
5 An RJ45 connector for serial link (with **BMXP3420102/20102CL** model) or Ethernet Modbus/TCP port (with **BMXP3420302/20302CL** model)
6 A 9-way SUB-D connector for the CANopen master machine and installation bus

Complementary characteristics

The following characteristics complement those introduced in the communication selection guide on page 3/4:

- Data rate: 20 Kbps to 1 Mbps
- Maximum length of CANopen bus *(2)*:
  - 20 m at 1 Mbps, 40 m at 800 Kbps, 100 m at 500 Kbps, 250 m at 250 Kbps
  - 500 m at 125 Kbps, 1000 m at 50 Kbps, 2500 m at 20 Kbps
- Maximum length of tap-offs on one tap junction *(3)*:
  - 0.6 m at 1 Mbps, 6 m at 800 Kbps, 10 m at 500 Kbps, 10 m at 250 Kbps
  - 10 m at 125 Kbps, 120 m at 50 Kbps, 300 m at 20 Kbps
- Limitation per segment:
  - Max. number of products: 64 at 1 Mbps, 32 at 800 Kbps, 16 at 500 Kbps
  - Maximum length of segment *(4)*: 160 m at 1 Mbps, 185 m at 800 Kbps, 205 m at 500 Kbps

Modicon M340 Performance processors with integrated CANopen bus link

Modicon M340 processor modules are supplied with the Flash card **BMXRMS008MP** *(1)*.
This card performs the following actions transparently:

- Backing up the application (program, symbols and constants) supported in the processor internal RAM that is not backed up
- Activation of the Transparent Ready class B10 standard web server (with **BMXP3420302/20302CL** processor)
- This card can be replaced by another card featuring a file storage option (see page 1/9).

BMXP3420102
BMXP3420102CL

BMXP3420302
BMXP3420302CL

Capacitance	Max. no. of network/ bus modules	Integrated communication ports	Compatibility with Unity software *(5)*	Reference	Weight kg
Performance BMXP3420, 4 racks					
1024 discrete I/O **256 analog I/O** **36 application-specific channels** 4096 KB integrated	2 Ethernet Modbus/ TCP networks 4 AS-Interface buses	CANopen bus Modbus serial link	Version ≥ 4.1	**BMXP3420102**	0.210
				BMXP3420102CL *(1)*	
		CANopen bus Ethernet network Modbus/TCP	Version ≥ 4.1	**BMXP3420302**	0.215
				BMXP3420302CL *(1)*	

(1) Memory card must be ordered separately for the **BMXP3420102CL/302CL** *processors (see page 1/9).*
(2) Deduct 15 m per repeater from the length of the bus.
(3) For other restrictions, please refer to the CANopen hardware setup manual available on our website www.schneider-electric.com.
(4) With the use of **TSXCANC●50/100/300** *CANopen cables and* **TSXCANC●DD03/1/3/5** *preformed cordsets.*
(5) See “Integration of third-party devices” paragraph on page 3/57.

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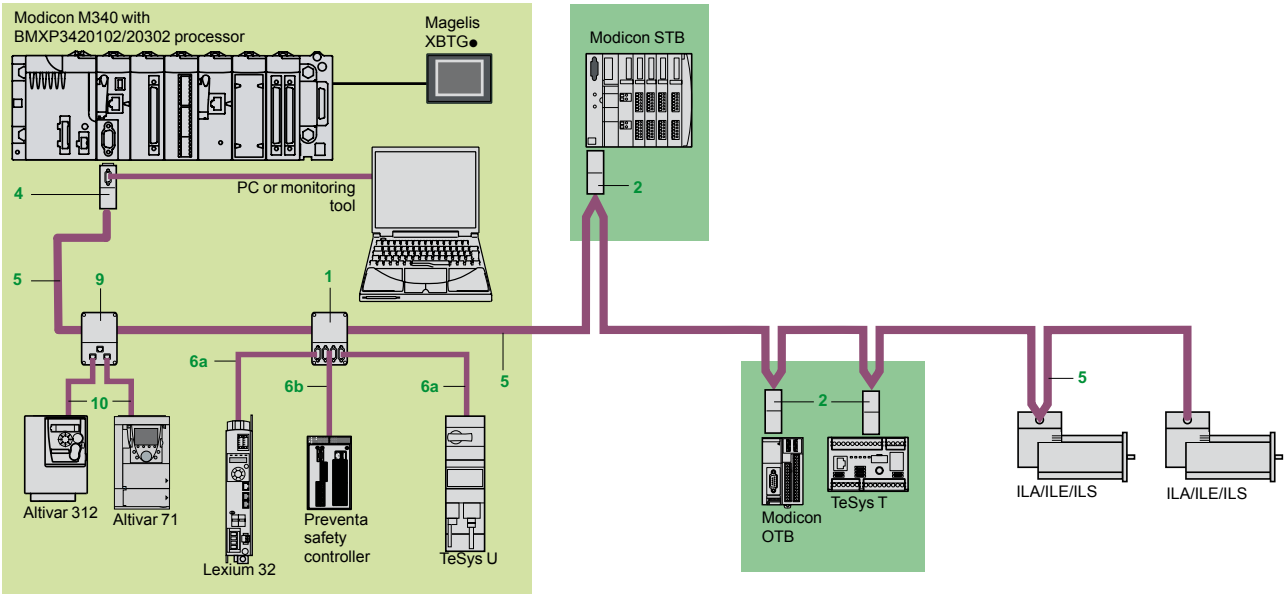
Modicon M340 automation platform

CANopen machine and installation bus

CANopen bus cabling system



Note: *For key and references* **1**, **2**, *…,* **17**, *see pages 3/60 and 3/61.*

Different types of cable are available, making it possible to create any type of application, including for harsh environments (for a definition of standard and harsh environments, see page 3/60).
Several connectors are available to meet any requirement: straight or 90° angled connectors, or angled connectors with the option of connecting a PC or diagnostic pocket PC.

Power can be supplied to devices by means of cables, cordsets and tap junctions: one AWG24 pair for the CAN signals, one AWG22 pair for the power supply and the ground.

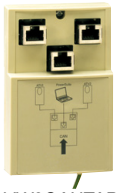
In addition to the IP 20 cabling offer, there is also an IP 67 cabling offer.

Modicon M340 automation platform

CANopen machine and installation bus

Cabling system

TSXCANTDM4



VW3CANTAP2

TSXCANKCDF90T

TSXCANKCDF180T

TSXCANKCDF90TP

Standard tap junctions and connectors

Designation	Description	No. (1)	Reference	Weight kg
IP 20 CANopen tap junction	4 SUB-D ports. Screw terminal block for connecting the trunk cables Line termination	1	**TSXCANTDM4**	0.196
IP 20 connectors CANopen female 9-way SUB-D. Switch for line termination	90° angled	2	**TSXCANKCDF90T**	0.046
	Straight *(2)*	–	**TSXCANKCDF180T**	0.049
	Right angle with 9-way SUB-D for connecting a PC or diagnostic tool	4	**TSXCANKCDF90TP**	0.051
IP 67 M12 connectors	Male	–	**FTXCN12M5**	0.050
	Female	–	**FTXCN12F5**	0.050
IP 20 CANopen tap junctions for Altivar and Lexium 32	2 RJ45 ports	9	**VW3CANTAP2**	–

IP 20 standard cables and preformed cordsets

Designation	Description	No. (1)	Length	Unit reference	Weight kg
CANopen cables (AWG 24)	Standard, CE marking: low smoke emission. Zero halogen. Flame-retardant (IEC 60332-1)	5	50 m	**TSXCANCA50**	4.930
			100 m	**TSXCANCA100**	8.800
			300 m	**TSXCANCA300**	24.560
	Standard, UL certification, CE marking: flame-retardant (IEC 60332-2)	5	50 m	**TSXCANCB50**	3.580
			100 m	**TSXCANCB100**	7.840
			300 m	**TSXCANCB300**	21.870
	For harsh environments *(3)* or mobile installations, CE marking: low smoke emission. Zero halogen. Flame-retardant (IEC 60332-1). Oil-resistant	5	50 m	**TSXCANCD50**	3.510
			100 m	**TSXCANCD100**	7.770
			300 m	**TSXCANCD300**	21.700
CANopen preformed cordsets One 9-way female SUB-D connector at each end (AWG 24)	Standard, CE marking: low smoke emission. Zero halogen. Flame-retardant (IEC 60332-1)	6a	0.3 m	**TSXCANCADD03**	0.091
			1 m	**TSXCANCADD1**	0.143
			3 m	**TSXCANCADD3**	0.295
			5 m	**TSXCANCADD5**	0.440
	Standard, UL certification, CE marking: flame-retardant (IEC 60332-2)	6a	0.3 m	**TSXCANCBDD03**	0.086
			1 m	**TSXCANCBDD1**	0.131
			3 m	**TSXCANCBDD3**	0.268
			5 m	**TSXCANCBDD5**	0.400
CANopen preformed cordsets	One 9-way SUB-D connector, One RJ45 connector (AWG 24)	6b	0.5 m	**TCSCCN4F3M05T**	–
			1 m	**TCSCCN4F3M1T**	–
				VW3M3805R010 *(4)*	–
			3 m	**TCSCCN4F3M3T**	–
	Two 9-way SUB-D connectors, one male and one female	–	0.5 m	**TLACDCBA005**	–
			1.5 m	**TLACDCBA015**	–
			3 m	**TLACDCBA030**	–
			5 m	**TLACDCBA050**	–

IP 67 standard preformed cordsets

Designation	Description	No. (1)	Length	Unit reference	Weight kg
CANopen preformed cordsets	Preformed cordsets of two 5-way M12 A-coded angled connectors (one male connector and one female connector)	12	0.3 m	**FTXCN3203**	0.40
			0.6 m	**FTXCN3206**	0.70
			1 m	**FTXCN3210**	0.100
			2 m	**FTXCN3220**	0.160
			3 m	**FTXCN3230**	0.220
			5 m	**FTXCN3250**	0.430

(1) For key to numbers, see page 3/59.
(2) For connection to Controller Inside programmable card, the **VW3CANKCDF180T** *connector can also be used.*
(3) ***Standard environment****:*
-- Without any particular environmental constraints
-- Operating temperature between + 5°C and + 60°C
-- Fixed installation
Harsh environment:
-- Resistance to hydrocarbons, industrial oils, detergents, solder splashes
-- Relative humidity up to 100%
-- Saline atmosphere
-- Significant temperature variations
-- Operating temperature between - 10°C and + 70°C
-- Mobile installation
(4) Cordset with line termination.

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Modicon M340 automation platform

CANopen machine and installation bus

Cabling system

VW3CANA71

IP 20 connection accessories

Designation	Description	No. (1)	Length	Reference	Weight kg
CANopen connector for Altivar 71 drive *(2)*	9-way female SUB-D. Switch for line termination. Cables exit at 180°	–	–	**VW3CANKCDF180T**	–
Adaptor for Altivar 71 drive	SUB-D to RJ45 CANopen adaptor	–	–	**VW3CANA71**	–
Preformed CANopen cordsets for Altivar drives	One RJ45 connector at each end	10	0.3 m	**VW3CANCARR03**	–
			1 m	**VW3CANCARR1**	–
Y-connector	CANopen/Modbus	–	–	**TCSCTN011M11F**	–

FTXDP21●●

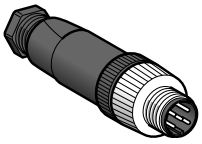
IP 67 connection accessories

For Modicon FTB monobloc splitter boxes

Designation	Composition	No. (1)	Length m	Reference	Weight kg
IP 67 line terminator	Equipped with one M12 connector (for end of bus)	13	–	**FTXCNTL12**	0.010
24 V ⎓ power supply connection cables	Equipped with two 5-way 7/8 connectors	16	0.6	**FTXDP2206**	0.150
			1	**FTXDP2210**	0.190
			2	**FTXDP2220**	0.310
			5	**FTXDP2250**	0.750
	Equipped with one 5-way 7/8 connector at one end and flying leads at the other end	17	1.5	**FTXDP2115**	0.240
			3	**FTXDP2130**	0.430
			5	**FTXDP2150**	0.700
T-connector for power supply	Equipped with two 5-way 7/8 connectors	–	–	**FTXCNCT1**	0.100

Separate parts

Designation	Composition		Sold in lots of	Reference	Weight kg
Connectors	7/8 type, 5-way	Male	–	**FTXC78M5**	0.050
		Female	–	**FTXC78F5**	0.050
	Straight, M12 type, 5 screw terminals	Male	–	**XZCC12MDM50B**	0.020
		Female	–	**XZCC12FDM50B**	0.020
	Angled, M12 type, 5 screw terminals	Male	–	**XZCC12MCM50B**	0.020
		Female	–	**XZCC12FCM50B**	0.020
Sealing plugs	For M8 connector (sold in packs of 10)		–	**FTXCM08B**	0.100
	For M12 connector (sold in packs of 10)		–	**FTXCM12B**	0.100
	For 7/8 connector		–	**FTXC78B**	0.020
Y-connectors	Connection of two M8 connectors to M12 connector on splitter box		–	**FTXCY1208**	0.020
	Connection of two M12 connectors to M12 connector on splitter box		–	**FTXCY1212**	0.030
Diagnostics adaptor	Equipped with two M12 connectors		–	**FTXDG12**	0.020
Marker labels	For plastic splitter boxes		10	**FTXBLA10**	0.010
	For metal splitter boxes		10	**FTXMLA10**	0.010



XZCC12●DM50B

XZCC12●CM50B

FTXCY1208

(1) For key to numbers, see page 3/59.

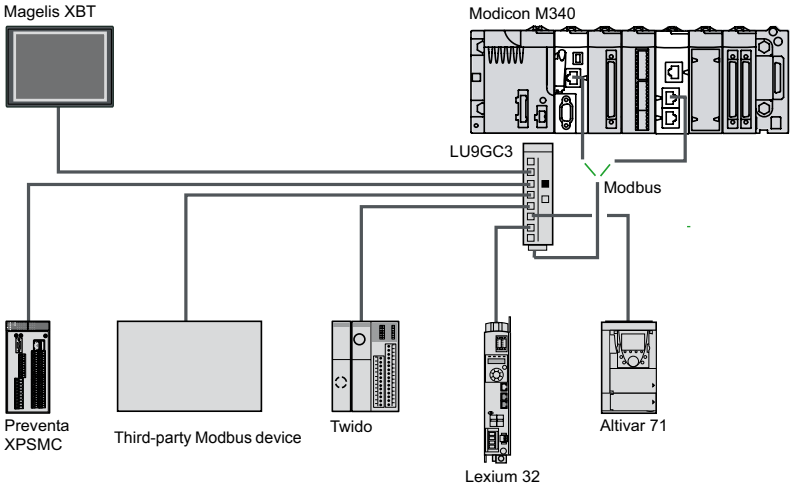
(2) For **ATV71H●●●M3**, **ATV71HD11M3X**, **HD15M3X**, **ATV71H075N4** ... **HD18N4** *drives, this connector can be replaced by the* **TSXCANKCDF180T** connector.

Processors: page 1/4 | I/O: pages 2/12 and 2/24 | Software: page 4/2 | Ruggedized Modicon M340 modules: page 6/2

Modicon M340 automation platform

Modbus and Character mode serial link

Presentation



The Modbus serial link is used for master/slave architectures (it is necessary, however, to check that the Modbus services used by the application have been implemented on all relevant devices).

The bus consists of a master station and slave stations. Only the master station can initiate the exchange (direct communication between slave stations is not possible). Two exchange mechanisms are available:
- Question/response, where requests from the master are addressed to a given slave. The master then waits for the response from the slave which has been interrogated.
- Broadcasting, where the master broadcasts a message to all slave stations on the bus. The latter execute the order without transmitting a reply.

The Modicon M340 platform offers serial link connection options for Modbus or Character mode:
- Via the serial link integrated in the following processors:
  - Standard processor **BMXP341000**
  - Performance processors **BMXP342000/20102/2020/20102CL**

The number of serial link modules is limited by the maximum number of application-specific channels permitted per station, depending on the type of processor:
- Standard processor **BMXP341000**: maximum of 20 application-specific channels *(1)*.
- Performance processors **BMXP342●●●●**: maximum of 36 application-specific channels *(1)*.

Description

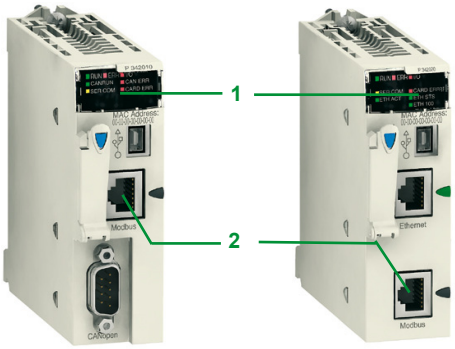
Processors with integrated serial link

BMXP341000/2000/20102/2020/20102CL processors integrate a serial link which can be used with either the Modbus RTU/ASCII master/slave protocol or with the Character mode protocol.

These processors have the following elements on the front panel, relating to the serial port:

1 A display block including at least the following LEDs:
- SER COM LED (yellow): Activity on the serial link (lit) or fault on a device present on the serial link (flashing).

2 An RJ45 connector for Modbus serial link or Character mode link (non-isolated RS 232C/RS 485) with its black indicator *(2)*.



BMXP3420102/20102CL *BMXP341000/2000/2020*

Note: *For more information about the processors, see page 1/7*

(1) Application-specific channels: **BMXEHC0200** *counter modules (2 channels),* **BMXEHC0800** *(8 channels),* **BMXMSP0200** *motion control modules (2 channels) and* **BMXNOR0200H** *RTU communication module (1 channel).*

(2) For isolated serial links, the **TWDXCAISO** *isolation box must be used.*

Modicon M340 automation platform

Modbus and Character mode serial link

BMXP341000/2000

BMXP342020

Complementary characteristics

The following characteristics complement those indicated in the selection guide on page 3/5.

Serial link integrated in the processors

- ■ Physical interface:
  - □ In Modbus: RS 232 4-wire or RS 485 2-wire, non-isolated *(1)*
  - □ In Character mode: RS 232 4-wire or RS 485 2-wire
- ■ Frame:
  - □ In Modbus: RTU/ASCII half duplex
  - □ In Character mode: full duplex in RS 232, half duplex in RS 485
- ■ Maximum length of a tap link in RS 485 2-wire:
  - □ 15 m in a non-isolated serial link
  - □ 40 m in an isolated serial link *(1)*

References

I/O capacity	Memory capacity	Integrated communication ports	Reference	Weight kg
BMX P3410 Standard processor with integrated serial link, 2 racks				
512 discrete I/O 128 analog I/O 20 application-specific channels	2048 KB integrated	Modbus serial link	**BMXP341000**	0.200
BMX P3420 Performance processors with integrated serial link, 4 racks				
1024 discrete I/O 256 analog I/O 36 application-specific channels	4096 KB integrated	Modbus serial link	**BMXP342000**	0.200
		Modbus serial link CANopen bus	**BMXP342010**	0.210
		Modbus serial link CANopen bus version V2.1 *(2)*	**BMXP3420102**	0.210
			BMXP3420102CL *(3)*	0.210
		Modbus serial link Ethernet Modbus/TCP network	**BMXP342020**	0.205

(1) For isolated serial links, the **TWDXCAISO** *isolation box must be used.*

(2) Version which can be used to customize configuration of the device Boot Up procedure compatible with all third-party CANopen products. Requires Unity Pro version V4.1.

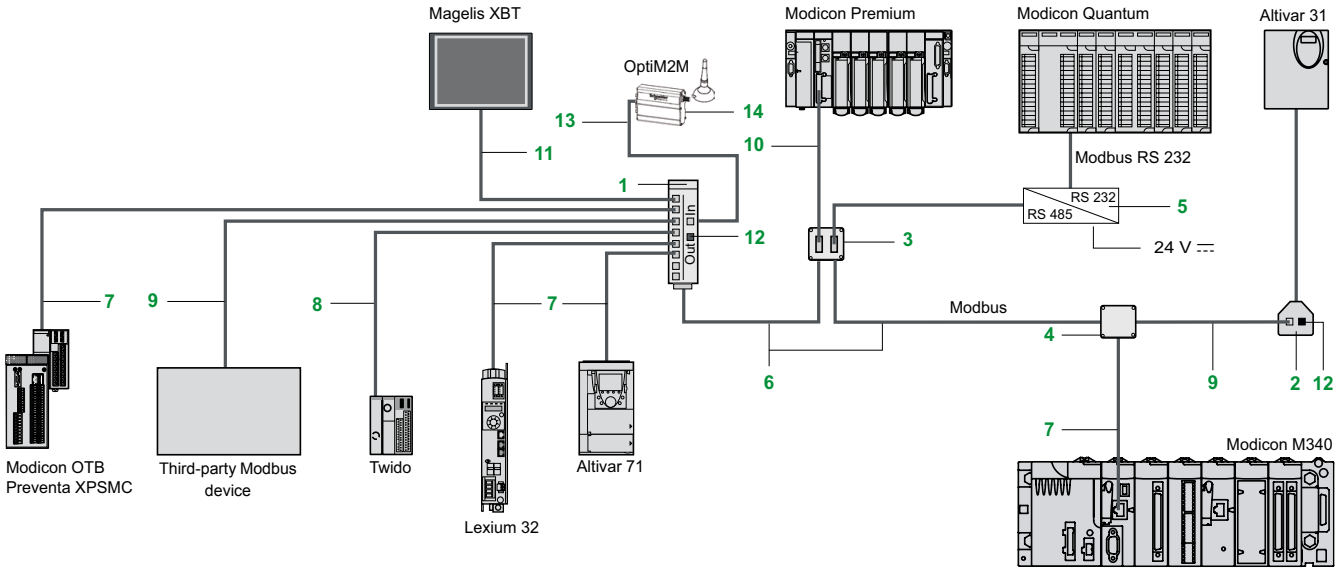
(3) Memory card must be ordered separately for the BMXP3420102CL processor (see page 1/9).

Modicon M340 automation platform

Modbus and Character mode serial link

Cabling system

Cabling system



Extension and adaptation elements for RS 485 serial link

LU9GC3

VW3A8306TF●●

TWDXCAISO

TWDXCAT3RJ

VW3A8114

XGSZ24

Designation	Description	No.	Length	Unit reference	Weight kg
Modbus splitter box	- 1 screw terminal block for trunk cable: D(A), D(B), ⏚ and 0V - 8 x RJ45 connectors for tap-off - 2 x RJ45 connectors for series connection of LU9 GC3 splitter boxes Mounting on 35 mm ⊥ rail	1	–	**LU9GC3**	0.500
T-junction boxes dedicated to Altivar and Lexium	- 2 x RJ45 connectors - 1 integrated cable with RJ45 connector	2	0.3 m	**VW3A8306TF03**	0.190
			1 m	**VW3A8306TF10**	0.210
Passive T-junction box	- Tap-off and extension of the bus - Line termination	4	–	**TSXSCA50**	0.520
2-channel passive subscriber socket 2 x 15-way female SUB-D connectors and 2 screw terminal blocks	- 2-channel tap-off point and extension of trunk cable - Address coding - Line termination	3	–	**TSXSCA62**	0.570
Tap junction 3 x RJ45 connectors	- Line termination (R =120 Ω, C = 1 nF) - Line pre-polarization *(1)* (2 R = 620 Ω) Mounting on 35 mm ⊥ rail	–	–	**TWDXCAT3RJ**	0.080
Modbus/Bluetooth® adaptor	- 1 Bluetooth® adaptor (range 10 m, class 2) with 1 x RJ45 connector - 1 x0.1 m long cordset for PowerSuite with 2 x RJ45 connectors - 1 x0.1 m long cordset for TwidoSuite, with 1 x RJ45 connector and 1 mini-DIN connector - 1 RJ45/9-way male SUB-D adaptor for Altivar drives	–	–	**VW3A8114**	0.155
RS 232C/RS 485 line converter without modem signals	24 V ⎓/20 mA power supply, 19.2 Kbps Mounting on 35 mm ⊥ rail	5	–	**XGSZ24**	0.100
Line terminator	For RJ45 connector R = 120 Ω, C = 1 nF	12	Sold in lots of 2	**VW3A8306RC**	0.200

(1) Line polarization required for connection to the master Twido programmable controller.
(2) 24 V ⎓ power supply, or power supply via the serial port integrated in Modicon M340 processors.

Modicon M340 automation platform

Modbus and Character mode serial link

Cabling system

Cables and cordsets for RS 485 serial link

Designation	Description	No.	Length	Unit reference	Weight kg
RS 485 double shielded twisted pair trunk cables	Modbus serial link, supplied without connector	6	100 m	**TSXCSA100**	5.680
			200 m	**TSXCSA200**	10.920
			500 m	**TSXCSA500**	30.000
Modbus RS 485 cordsets	2 x RJ45 connectors	7	0.3 m	**VW3A8306R03**	0.030
			1 m	**VW3A8306R10**	0.050
			3 m	**VW3A8306R30**	0.150
	1 x RJ45 connector and 1 x 15-way SUB-D connector	–	3 m	**VW3A8306**	0.150
	1 x mini-DIN connector for Twido controller and 1 x RJ45 connector	8	0.3 m	**TWDXCARJ003**	0.040
			1 m	**TWDXCARJ010**	0.090
			3 m	**TWDXCARJ030**	0.160
	1 x RJ45 connector and 1 end with flying leads	9	3 m	**VW3A8306D30**	0.150
	1 miniature connector and 1 x 15-way SUB-D connector	10	3 m	**TSXSCPCM4530**	0.180
Cordsets for Magelis XBT display units and terminals	1 x RJ45 connector and 1 x 25-way SUB-D connector for: - XBTN200/N400/NU400 - XBTR410/411 - XBTGT2...GT7 (COM1 port) *(1)*	11	2.5 m	**XBTZ938**	0.210
	2 x RJ45 connectors for: - XBTGT1 (COM1 port) - XBTGT2...GT7 (COM2 port)	11	3 m	**VW3A8306R30**	0.150

Cordsets for RS 232 serial link

Designation	Description	Length	Reference	Weight kg
Cordset for Data Terminal Equipment (DTE) (printer)	Serial link for DTE (2) 1 x RJ45 connector and 1 x 9-way female SUB-D connector	3 m	**TCSMCN3M4F3C2**	0.150
Cordset for Data Communication Equipment (DCE) (modem, converter)	Serial link for DCE 1 x RJ45 connector and 1 x 9-way male SUB-D connector	3 m	**TCSMCN3M4M3S2**	0.150

OptiM2M

Designation	Description	No.	Length	Reference	Weight kg
Modbus RS485 Cordset *(2)*	1 x RJ45 connector and 1 x 9-way SUB-D connector	13	3 m	**SERM2MUNI2**	–
OptiM2M Pack *(3)*	The modem with embedded SIM card 35 mm (1.38 in) DIN rail mounting clip 2 mounting brackets Instructions 2-wire cable (red/black) with in-line fuse GSM magnetic antenna (SMA-M) Modbus RS485 cordset	14	3 m	**SERM2MMOD485**	–

(1) For use with **XBTZG909** *adaptor.*
(2) Only compatible with a OptiM2M modem.
(3) OPTIM2M, the ready to use solution.
OptiM2M comprises:
- The OPTIM2M pack which connects the machine to the Schneider Cloud via the GPRS network.
- A web application embedded in the Schneider Cloud which allows:
Management of a group of machines or equipment anywhere in the world.
Monitoring and analysis of machine and installation data.
- A subscription, which allows:
Use of the OptiM2M portal and services (Hosting, Roaming, Data consumption, Dashboards).

Contents

4 - Software

UAG (Unity Application Generator) software

OPC data server software

Software
Unity Pro software

Unity Pro programming software for Modicon M340 M, Premium P, Quantum Q, Safety S and Modicon distributed I/O D platforms			
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	Structured Text (ST)	M - D	M - P - D
	Function Block Diagram (FBD)	M - D	M - P - D
	Sequential Function Chart (SFC)/Grafcet	M - D	M - P - D
Ladder Logic Language LL984		M	M
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	Multitask programming (Master, fast, auxiliary and event-triggered)		
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	Data structure instances and tables	M - D	M - P - D
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	Programmable control loops (with process control FB library)	M - D	M - P - D
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Other services	Creation of hyperlinks	M - D	M - P - D
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	Unity Pro servers - Openness		
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	Importing of applications (Modsoft, Concept, ProWORX) written in LL984 language		
UDE support OFS exchanges	Dynamic exchange with 3rd party tools, OFS		
	Static exchange via XML/XVM export files	M - D	M - P - D
Compatible Modicon platforms	Modicon M340 CPUs M	All models	All models
	Premium CPUs P	–	TSXP57104M/1634M/154M TSXP57204M/2634M/254M TSXH5724M
	Quantum CPUs Q	–	–
	Safety CPUs S	–	–
Compatible Modicon distributed I/O D		STB, OTB, TM7, ETB, Momentum	STB, OTB, TM7, ETB, Momentum
Software name		**Unity Pro Small**	**Unity Pro Medium**
Unity Pro software type		**UNYSPUSF●CD70**	**UNYSPUMF●CD70**
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More technical information on www.schneider-electric.com

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Unity Pro programming software for Modicon M340 M, Premium P, Quantum Q, Safety S and Modicon distributed I/O D platforms			
M - P - Q - D		M - P - Q - D	M - P - Q - D
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M - Q		M - Q	M - Q
M - P - Q - D		M - P - Q - D	M - P - Q - D
		P (TSXP575●) - Q (140CPU651/671) - D	P (TSXP575●) - Q (140CPU651/671)- D
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M - P - Q - D		M - P - Q - D	M - P - Q - D
P (TSXP572●/3●/4●) - D		P (TSXP572●/3●/4●/5●) - D	P (TSXP572●/3●/4●/5●)- D
M - P - Q - D		M - P - Q - D	M - P - Q - D
			S - D
M - P - Q - D		M - P - D	M - P - D
P (TSXH5724M/44M) - D		P (TSXH5724M/44M) - Q (140CPU67160) - D	P (TSXH5724M/44M) - Q (140CPU67160) - S - D
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M - P - Q - D		M - P - Q - D	M - P - Q - D
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Q		Q	
Q		Q	
		M - P - Q - D	M - P - Q - S - D
M - P - Q - D		M - P - Q - D	M - P - Q - S - D
All models		All models	All models
TSXP57104M/1634M/154M TSXP57204M/2634M/254M TSXP57304M/3634M/354M	TSXP574634M/454M TSXH5724M/44M	TSXP57104M/1634M/154M TSXP57204M/2634M/254M TSXP57304M/3634M/354M	TSXP574634M/454M TSXP575634M/554M TSXP576634M TSXH5724M/44M	TSXP57104M/1634M/154M TSXP57204M/2634M/254M TSXP57304M/3634M/354M	TSXP574634M/454M TSXP575634M/554M TSXP576634M TSXH5724M/44M
140CPU31110 140CPU43412U 140CPU53414U		140CPU31110 140CPU43412U 140CPU53414U	140CPU65150/60 140CPU65260 140CPU67160 140CPU67260/61	140CPU31110 140CPU43412U 140CPU53414U	140CPU65150/60 140CPU65260 140CPU67160 140CPU67260/61
–		–		140CPU65160S 140CPU67160S	
STB, OTB, TM7, ETB, Momentum		STB, OTB, TM7, ETB, Momentum		STB, OTB, TM7, ETB, Momentum	
Unity Pro Large		**Unity Pro Extra Large**		**Unity Pro XL Safety**	
UNYSPULF●CD70		**UNYSPUEF●CD70**		**UNYSPUXF●CD70**	
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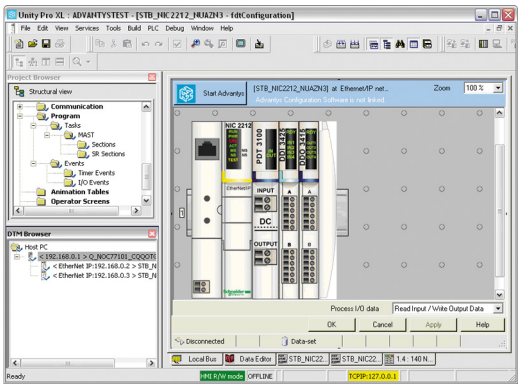
Software
Unity Pro software
Small/Medium/Large/Extra Large

Unity Pro

Presentation

Unity Pro is the common programming, debugging and operating software for the Modicon M340, Premium and Quantum PLC ranges.

Unity Pro is multitasking software offering the following features:
- All in one software
- Five IEC 61131-3 programming languages
- LL 984 programming language
- Integrated, customizable DFB library
- PLC simulator on PC for program validation prior to installation
- Built-in tests and diagnostics
- Wide range of online services



DTM editor (Modicon STB island)

FDT/DTM function

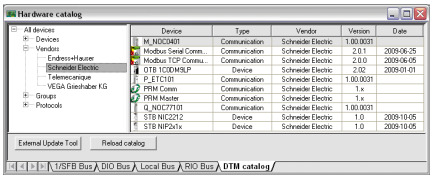
Unity Pro facilitates integration of fieldbus architectures into engineering control systems using FDT/DTM technology:
- FDT *(Field Device Tool)* is the container which supports the device DTMs.
- DTM *(Device Type Manager)* is the configuration tool for devices with integrated graphic interfaces. It contains all the properties specific to each device.

In addition to the FDT/DTM standard, Unity Pro uses specific information from the Master DTM created for the Profibus Remote Master (PRM) module and the Modbus/TCP and EtherNet/IP network module BMX NOC 0401.

Use of the Master DTM allows Unity Pro to perform the following actions:
- Manage the PLC I/O scan
- Create the application variables based on the description of the process objects available from the connected DTM devices
- Manage synchronization with the PLC configuration
- Create a generic DTM from the description files (GSD or EDS)

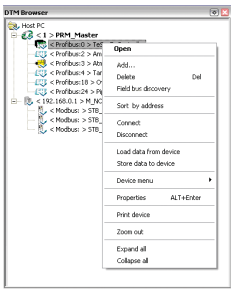
The DTM configuration is stored in the PLC memory so that the application can be downloaded in its entirety. It is also saved in the PLC project file (STU) and the archive file (STA).

A third-party DTM can be installed in the DTM hardware catalogue.
The DTM hardware catalogue can be used to sort or filter the DTMs according to various criteria such as Device, Vendor, Groups or Protocols.



DTM hardware catalogue

The DTM Browser in Unity Pro:
- Displays the fieldbus topologies in a tree structure
- Allows the user to configure the DTM devices:
  - Add and delete DTMs
  - Connect and disconnect DTMs to/from their physical devices
  - Display and print the properties of a DTM
  - Transfer DTM configuration data to and from the physical device
  - Functions specific to the DTM, via the Device menu



DTM browser and DTM context menu

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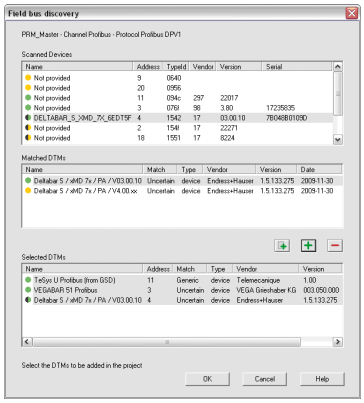
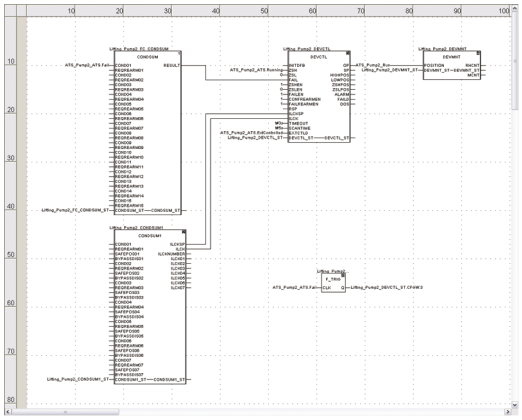


Fieldbus lookup screen

FDT/DTM function (continued)

The fieldbus lookup function scans the physical devices in a fieldbus network and adds the selected devices to the DTM Browser.



FBD language editor

Programming languages

The five IEC 61131-3 compliant languages

The five graphical or textual languages available in Unity Pro are used for programming Modicon M340, Premium and Quantum automation platforms.

The three graphical languages are:
- Ladder (LD) language
- Function Block Diagram (FBD)
- Sequential Function Chart (SFC) or Grafcet

The two textual languages are:
- Structured Text (ST)
- Instruction List (IL)

For these five languages, you can use the standard set of instructions compliant with IEC standard 61131-3 to create applications which can be transferred from one platform to another. Unity Pro software also provides extensions to this standard set of instructions. As they are specific to Modicon M340, Premium and Quantum PLCs, these extensions support the development of more complex applications in order to maximize the potential of the specific features of each of these platforms.

LL984 language

LL984 (Ladder Logic 984) language enables migration from legacy Modicon ranges.

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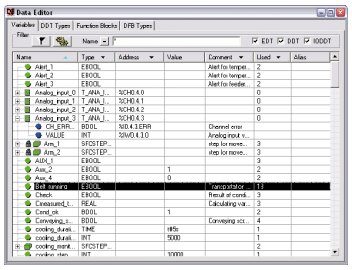
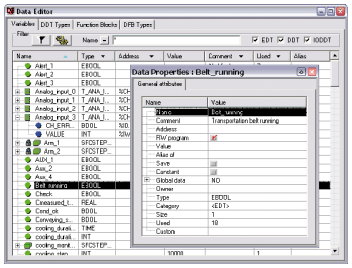


Data editor



Data properties

Data editor

The data editor, which can be accessed from the structural view of the project, provides a single tool for performing the following editing tasks:
- Declaration of data including variables and function blocks (declaration of their type, instances and attributes)
- Use and archiving of function block data types in different libraries
- Hierarchical view of data structures
- Searching, sorting and filtering of data
- Creation of a hyperlink to access a description from any variable comment

The data is displayed in four tabs:
- “Variables” tab for the creation and management of the following data instances: Bits, words, double words, inputs/outputs, tables and structures
- “DDT Types” tab for the creation of derived data types (tables and structures)
- “Function Blocks” tab for the declaration of EFBs and DFBs
- “DFB Types” tab for the creation of DFB user function block data types

Each data element has several attributes, of which:
- The variable name and type are mandatory
- The comment, physical address in the memory and initial values are optional

The data editor columns can be configured (number of columns, order). All the attributes associated with a variable can be displayed in a properties window.

This editor can be accessed at any time during programming by selecting variables for data modification or creation.

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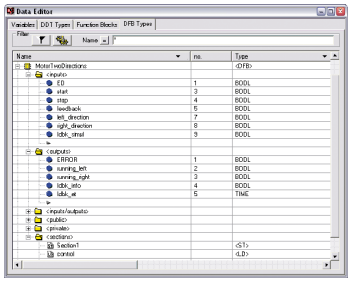
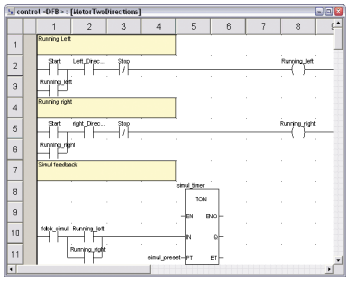
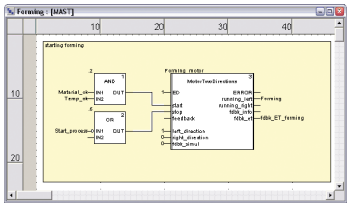


Design



Creating the code



Use within the program

DFB user function blocks

With Unity Pro software, users can create their own function blocks for specific application requirements on Modicon M340, Premium and Quantum platforms.

Once created and saved in the library, these user function blocks can be reused as easily as EFBs (Elementary Function Blocks).

The user function blocks can be used to structure an application. They are used when a program sequence is repeated several times in the application or for freezing a standard programming routine. They can be read-only or read/write. They can be exported to all other Unity Pro applications.

Using a DFB in one or more applications:
- Simplifies program design and entry
- Improves program readability and understanding
- Facilitates program debugging (all variables handled by the DFB are identified in the data editor)
- Enables the use of private variables specific to the DFBs, which are independent of the application

A DFB is set up in several stages:
- The DFB is designed by assigning a name, a set of parameters (inputs, outputs, public and private internal variables) and a comment to it via the data editor.
- The code is created in one or more sections of the program, with the following languages selected according to requirements: Structured Text, Instruction List, Ladder or Function Block Diagram (ST, IL, LD or FBD).
- The DFB may be stored in a library with an associated version number.
- A DFB instance is created in the data editor or when the function is called in the program editor.
- This instance is used in the program in the same way as an EFB (the instance can be created from within the program).

4

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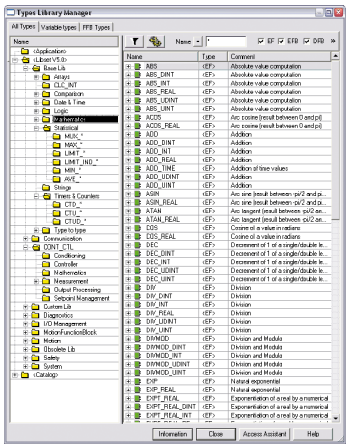


Standard function block libraries

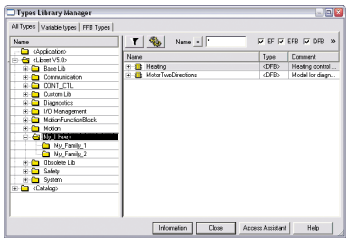
Function block libraries

The function and function block libraries manager contains all the elements provided with Unity Pro software. Functions and function blocks are organized into libraries, which themselves consist of families. Depending on the type of PLC selected and the processor model, users will have a subset of these libraries available to write their applications. However, the “Base Lib” library contains a set of functions and function blocks, for the majority of which compatibility is independent of the platforms. In particular, it contains the blocks compliant with IEC 61131-3.
The “Base Lib” library is structured into families:

- Timers and counters
- Process control on integers
- Table management
- Comparison
- Date and time management
- Logic processing
- Mathematical processing
- Statistical processing
- Character string processing
- Type-to-type data conversion

The “Base Lib” library, which covers standard automation functions, is supplemented by other, more application-specific libraries and platform-specific functions:

- **Communication library**, providing an easy means of integrating communication programs from PLCs with those used by HMIs from the PLC application program. Like other function blocks, these EFBs can be used in all languages to exchange data among PLCs or to deliver data to be displayed on an HMI.
- **Process control library**. The CONT_CTL library can be used to set up process-specific control loops. It offers controller, derivative and integral control functions plus additional algorithms, such as EFBs for calculating mean values, selecting a maximum value, detecting edges or assigning a hysteresis to process values, etc.
- **Diagnostics library**, which can be used to monitor actuators and contains EFBs for active diagnostics, reactive diagnostics, interlocking diagnostics, permanent process condition diagnostics, dynamic diagnostics, monitoring of signal groups, etc.
- **I/O management library**, providing services to handle information exchanged with hardware modules (formatting data, scaling, etc.).
- **Motion Function Blocks library**, containing a set of predefined functions and structures to manage motion controlled by drives and servo drives connected on CANopen.
- **Motion library** for motion control and fast counting.
- **System library**, which provides EFBs for the execution of system functions, including: evaluation of scan time, availability of several different system clocks, SFC section monitoring, display of system state, management of files on the memory cartridge of the Modicon M340 processor, etc.
- Finally, a library named “obsolete”, containing all function blocks used by legacy programming software needed to perform application conversions.



User libraries

Management of user standards

Users may create libraries and families in order to store their own DFBs and DDTs. This enhancement allows users to take advantage of programming standards adapted to their needs, along with version management. This means that it is possible to:

- Check the version of the elements used in an application program against those stored in the library
- Perform an upgrade, if necessary

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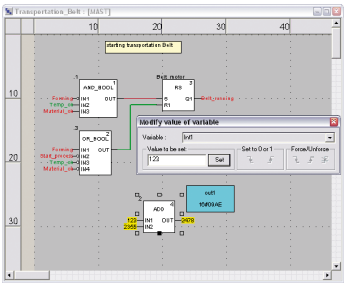
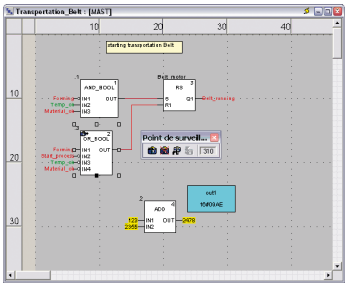
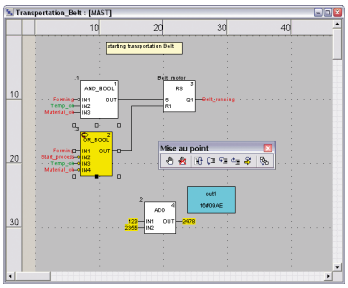


Dynamic animation/adjustment



Watchpoint



Breakpoint/step-by-step

Debugging tools

Unity Pro software offers a complete set of tools for debugging Modicon M340, Premium or Quantum applications. A tool palette provides direct access to the main functions:

- Dynamic program animation
- Setting of watchpoints or breakpoints (not authorized in event-triggered tasks)
- Step-by-step program execution. A function in this mode enables section-by-section execution. Instruction-by-instruction execution can be launched from the previous breakpoint. Three execution commands are therefore possible when the element to be processed is a subroutine (SR) or DFB user block instance:
  - Step Into: this command is used to move to the first element of the SR or DFB
  - Step Over: this command is used to execute the entire SR or DFB
  - Step Out: this command is used to move to the next instruction after the SR or DFB element
- Independent execution of the master (MAST), fast (FAST), auxiliary (AUX) and event-triggered (EVTi) tasks

Animation of program elements

Dynamic animation is managed section-by-section. A button on the toolbar is used to activate or deactivate animation for each section.
When the PLC is in RUN, this mode can be used to view, simultaneously:

- The animation of a program section, regardless of the language used
- The variables window containing the application objects created automatically from the section viewed

Animation table

Tables containing the variables of the application to be monitored or modified can be created by data entry or initialized automatically from the selected program section. The tables can be stored in the application and retrieved from there at a later date.

Debugging DFB user function blocks

The parameters and public variables of these blocks are displayed and animated in real time using animation tables, with the possibility of modifying and forcing the required objects.
In exactly the same way as with other program elements, the watchpoint, breakpoint, step-by-step execution and program code diagnostics functions can be used to analyze the behavior of DFBs. Setting a breakpoint in a DFB user function block instance stops the execution of the task containing this block.

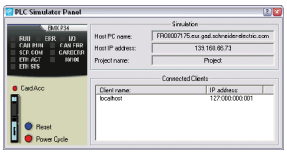
Debugging in Sequential Function Chart (SFC) language

The various debugging tools are also available in SFC language. However, unlike other sections (IL, ST, LD or FBD) an SFC section executed step-by-step does not stop execution of the task but instead freezes the SFC chart. Several breakpoints can be declared simultaneously within a single SFC section.

4

Selection guide:
page 4/2

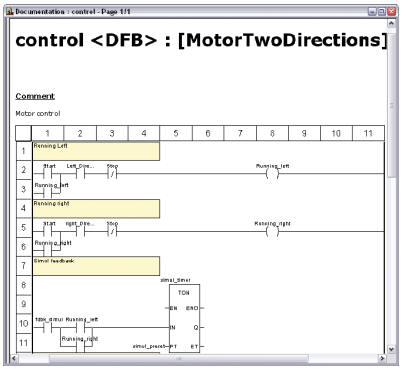
Software
Unity Pro software
Small/Medium/Large/Extra Large



Simulator control panel

PLC simulator

Unity Pro's integrated simulator can be used to test the application program for Modicon M340, Premium or Quantum PLCs from the PC terminal without having to connect to the PLC processor. The functions provided by the debugging tools are available for debugging the master, fast and auxiliary tasks.
As the simulator does not manage the PLC I/O, animation tables can be used to simulate the state of inputs by forcing them to 0 or 1.
The simulator can be connected to third-party applications via an OPC server with OFS *(OPC Factory Server)* software.



Accessing the documentation editor

Documentation editor

The documentation editor is based on the Documentation Browser, which shows the file structure in tree form.
It allows all or part of the application file to be printed on any graphics printer accessible under Windows and using True Type technology, in A4 or US letter print format.
The documentation editor supports the creation of user-specific files using the following headings:

- Title page
- Contents
- General information
- Footer
- Configuration
- EF, EFB and DFB type function blocks
- User variables
- Communication
- Project structure
- Program
- Animation tables and cross-references
- Runtime screens

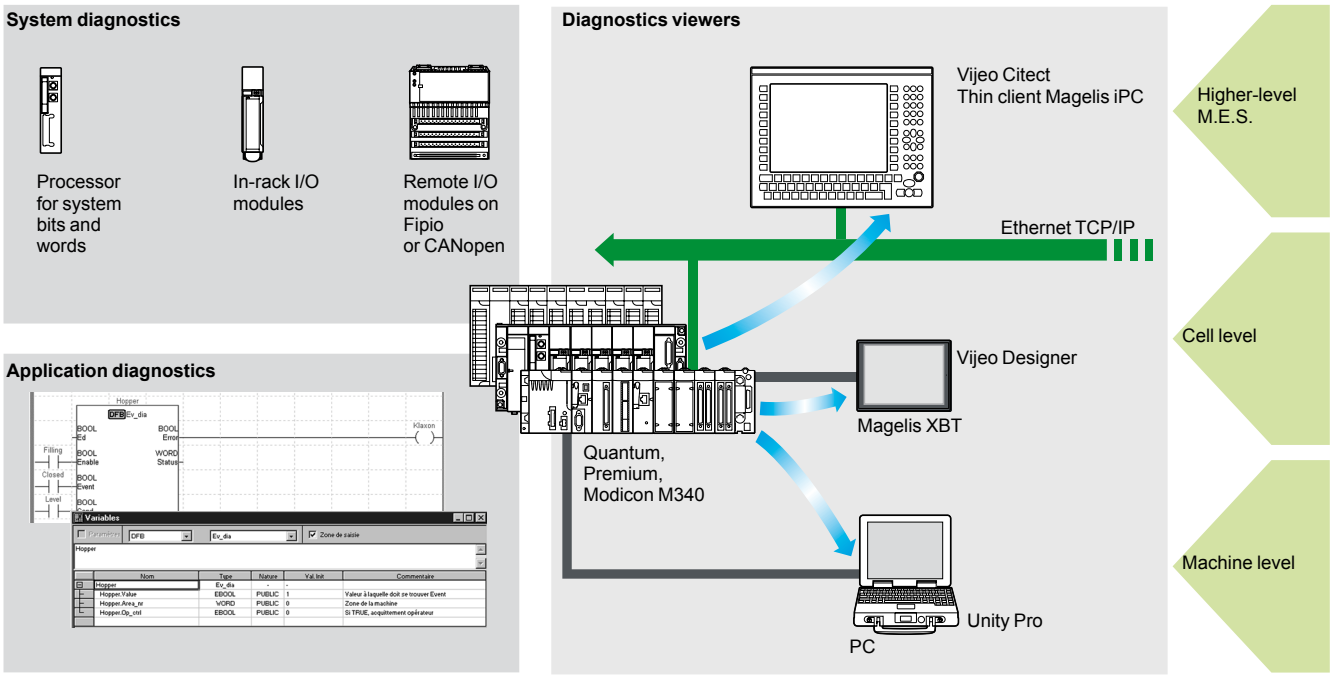
4

Selection guide:
page 4/2

Software
Unity Pro software
Small/Medium/Large/Extra Large
Integrated diagnostics

Diagnostics integrated in Modicon M340, Premium and Quantum automation platforms

Presentation

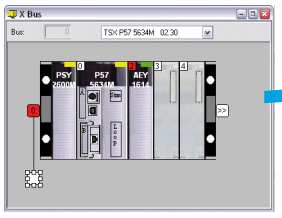


The diagnostics offer for Modicon M340, Premium and Quantum platforms is based on the following three components:
- System diagnostics
- DFB and EFB diagnostic function blocks (for system and application diagnostics)
- Error message display system, called viewers, supplied as a standard component of Magelis XBT terminals, Vijeo Citect supervisory software and Unity Pro setup software

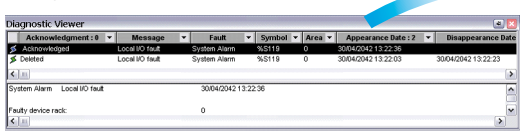
System diagnostics

The system diagnostics for the Modicon M340, Premium and Quantum platforms support the monitoring of system bits/words, I/O modules and activity times (minimum/maximum) of SFC steps. By simply choosing the relevant option during application configuration, any event will generate time-stamped messages logged in the diagnostic buffer of the PLC.
These events are displayed automatically in a diagnostics viewer *(1)* without requiring any additional programming.

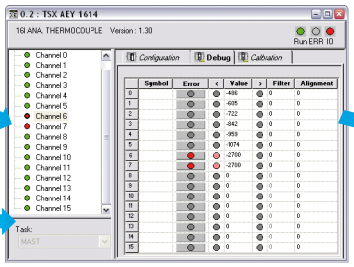
With Unity Pro integrated diagnostics, this function can be used to perform first level diagnostics of the elements in the configuration, up to and including each I/O module channel.



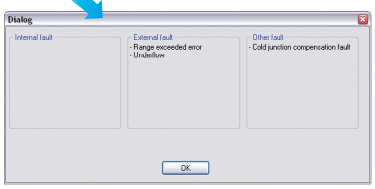
Configuration level



Viewer window (example with Unity Pro software)



Module level



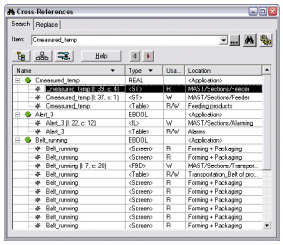
Channel level

(1) Diagnostics viewers are tools for displaying and acknowledging diagnostic error messages. They are supplied as a standard component of Unity Pro and Vijeo Designer software, with Magelis terminals and with the PLC Web server that can be accessed via a thin client Magelis iPC.

Modifying the program with the PLC in RUN mode

With Unity Pro, changes can be made to the program when the PLC connected to the programming terminal is in RUN mode. These modifications are performed with the following operations:
- The application contained in the PLC is transferred to the PC terminal running Unity Pro, if necessary.
- Program changes are prepared. These program modifications can be of any type and in any language (IL, ST, LD, FBD and SFC), for example, addition or deletion of SFC steps or actions. The code of a DFB user function block can also be modified (however, modification of its interface is not permitted).
- These program changes are updated in the PLC (in RUN mode).

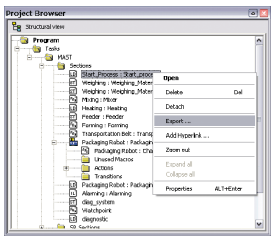
This function makes it possible to add or modify program code and data in different parts of the application in one single modification session (thus resulting in a uniform, consistent modification with respect to the controlled process). This increased flexibility comes at a cost in terms of the amount of program memory required.



Cross-references table

Cross-references function

Unity Pro's cross-references function, which is available in standalone mode (offline) and when connected to the PLC in Run (online), allows users to view all the elements of a PLC application when searching for any type of variable. This view indicates where the declared variable is used, as well as how it is used (for writing, reading, etc.).
This function also provides access to the Search/Replace function for variable names.
The variable search can be initialized from any editor (language, data, runtime screen, animation table, etc.).



Data export shortcut menu

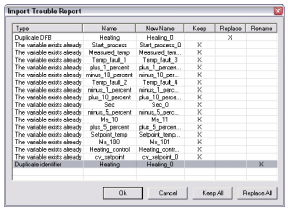
Import/export function

The import/export function available in Unity Pro supports the following operations from the structural and functional project views:
- Via the import function, reuse all or part of a previously created project in the current project
- Via the export function, copying of all or part of the current project to a file for subsequent reuse

The files generated during export are generally in XML format *(1)*. However, in addition to XML, variables can be exported and imported in the following formats:
- .xvm format compatible with OFS data server software
- Source format, in an .scy file compatible with PL7 development software
- Text format with separator (TAB) in a .txt file for compatibility with any other system

During an import, a wizard can be used to reassign data to new instances of:
- DFB function blocks
- DDT data structures
- Simple data

In addition, when a functional module is imported, the data associated with animation tables and runtime screens is also reassigned.



Data import wizard

The XML import function also supports the transfer of a Modicon M340, Premium or Quantum PLC configuration prepared in the SIS Pro costing and configuration tool for use in the creation of a project in Unity Pro.
This import function spares the user from having to redefine the PLC configuration when the PLC has already been configured with the SIS Pro tool.

(1) XML language is an open, text-based language that provides structural and semantic information.

Selection guide:
page 4/2

Application converters

Unity Pro's integrated conversion tools can be used to convert PLC applications created with Concept and PL7 programming software to Unity Pro applications.

Concept/Unity Pro converter (Quantum PLC)

This conversion is performed with a Concept application V2.5 or later (it can also be performed in V2.11 or later, but only after an update to V2.5). In order to perform the conversion, the application must be exported to an ASCII file in Concept.
The export file is converted to a Unity Pro source file automatically. This file is then analyzed by Unity Pro. At the end of the procedure, a conversion report is generated and an output window displays any conversion errors and provides direct access to the part of the program to be modified.
The Concept application converter converts the application to Unity Pro, but does not guarantee that it will operate correctly in real-time. It is therefore essential to test or debug all converted applications.

PL7/Unity Pro converter (Premium PLC and Atrium slot PLC)

This conversion is performed with a PL7 application V4 or later (Premium PLC or Atrium slot PLC). In order to perform the conversion, the source file (complete application or user function block) must be exported in PL7.
The conversion procedure is similar to that of the Concept conversion described above.

Note: *Applications created with Concept, Modsoft and ProWORX can be converted to LL984. Please consult our Customer Care Centre.*

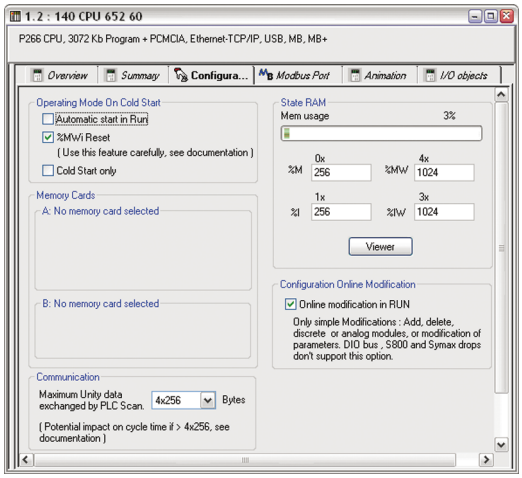
Operating system update utilities

The OS-Loader software is designed for updating operating systems on Premium and Quantum platforms. It is supplied with Unity Pro software.
It is used to upgrade Unity processors and modules as well as to upgrade PL7 or Concept processors and modules to make them compatible with Unity Pro.

OS-Loader software supports:
- Premium processors
- Quantum processors
- Ethernet communication modules
- EtherNet/IP communication modules

The operating system updates are performed as follows:
- Uni-Telway RS 485 terminal link for Premium processors
- Modbus or Modbus Plus terminal link for Quantum processors
- Ethernet TCP/IP network for integrated Ethernet port on Premium processors and Premium and Quantum Ethernet modules

Note: *For Modicon M340, this service is provided by Unity Loader (see page 4/26).*



Configuration screen

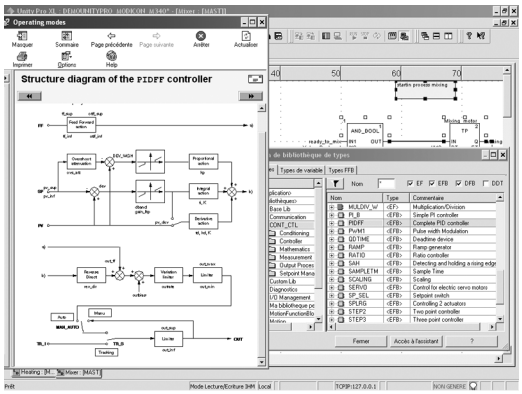
Online modification of the Quantum configuration

This function, also called *Change Configuration On The Fly (CCOTF)*, is used to modify the Quantum configuration online (application in RUN mode):
- Addition or removal of discrete or analog I/O modules
- Modification of configuration parameters of discrete or analog I/O modules (already present or newly installed)

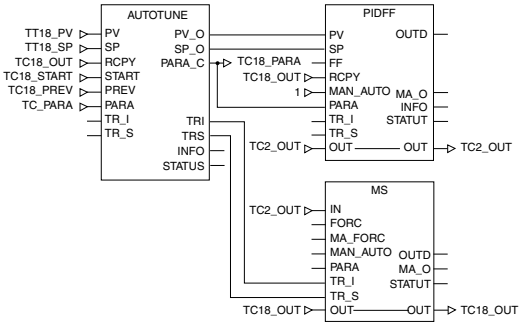
The CCOTF function is supported by standalone processors for all three types of I/O architecture (local, RIO, DIO) using version 5 of Unity Pro, and for Hot Standby processors using version 4.1 of Unity Pro.

The CCOTF function must first be validated in the Unity Pro configuration screen. A confirmation screen appears when the configuration has been modified online.

Software
Unity Pro software
Small/Medium/Large/Extra Large Programmable process control



CONT_CTL, programmable process control integrated in Unity Pro



Example: PID controller with MS manual control

Process control in machines

Unity Pro contains **CONT_CTL,** a library of 36 function blocks used to create control loops for machine control.

All requirements for closed loop control functions in machines are adequately met by Modicon M340, Premium and Quantum platforms thanks to the wealth of functions in the library and the flexibility with which function blocks can be linked together through programming. This solution therefore eliminates the need for external controllers and simplifies the overall control architecture of the machine, as well as its design, roll-out and operation.

The EFs or EFBs can be used in all Unity Pro languages (LD, ST, IL and FBD). FBD is particularly suitable for accessing control processing operations in Unity Pro through its wizard for entering and viewing parameters and function block variables.

CONT_CTL library functions

The library consists of five function families:
- Input data conditioning
- Controllers
- Mathematical functions
- Process value processing
- Output value processing

Input data conditioning	
DTIME	Pure time delay
INTEGRATOR	Integrator with limiting
LAG_FILTER	First order time lag
LDLG	Lead/lag function with smoothing
LEAD	Lead function with smoothing
MFLOW	Mass flow calculation based on the measurement of differential pressure or flow speed with pressure and temperature compensation
QDTIME	Dead time term
SCALING	Scaling
TOTALIZER	Integrator (typically of flow) until a limit (typically a volume) is reached, with automatic reset
VEL_LIM	Velocity limiter, with manipulated variable limiting

Controllers	
PI_B	Basic PI controller: PI algorithm with a mixed structure (series/parallel)
PIDFF	Complete PID controller: PID algorithm with a parallel or mixed structure (series/parallel)
AUTOTUNE	Automatic tuner setting for the PIDFF (complete PID) controller or the PI_B (simple PI) controller □ Identification using Ziegler Nichols type method □ Modeling based on first order process □ Building of control parameters with criterion for prioritizing either the reaction time to disturbance (dynamic) or the stability of the process
IMC	Model-based controller. The model is a first order model with delay. This corrector is useful: □ When there are serious delays compared with the main time constant of the process; this scenario cannot be satisfactorily resolved by standard PID process control □ For regulating a non-linear process IMC can handle any stable and aperiodic process of any order.
SAMPLETM	Control of controller startup and sampling
STEP2	Simple two-position controller
STEP3	Three-position controller for temperature regulation

Mathematical functions	
COMP_DB	Comparison of two values, with dead zone and hysteresis
K_SQRT	Square root, with weighting and threshold, useful for linearization of flow measurements
MULDIV_W	Weighted multiplication/division of 3 numerical values
SUM_W	Weighted summing of 3 numerical values

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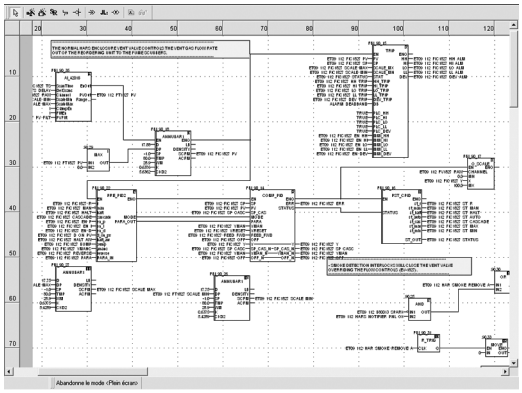
page 4/2



Programming in Unity Pro in offline mode

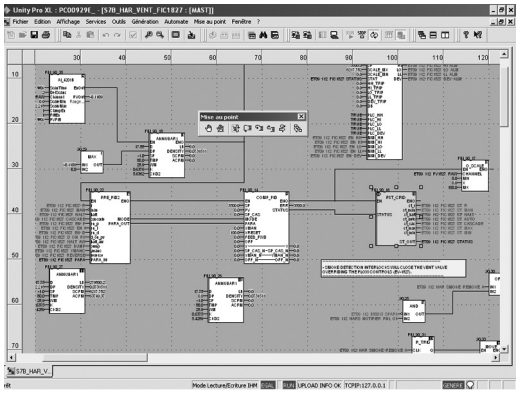
Process control in machines (continued)

CONT_CTL library functions (continued)

Process value processing	
AVGMV	Moving average with fixed number of samples (50 max.)
AVGMV_K	Moving average with constant correction factor, 10,000 samples max.
DEAD_ZONE	Dead zone
LOOKUP_TABLE1	Linearization of characteristic curves using first-order interpolation
SAH	Detection of a rising edge
HYST_XXX	Detection of high threshold with hysteresis *(1)*
INDLIM_XXX	Detection of high and low thresholds with hysteresis *(1)*
Output value processing	
MS	Manual control of an output
MS_DB	Manual control of an output with dead zone
PWM1	Control via pulse width modulation
SERVO	Control for servo motors
SPLRG	Control of two *Split Range* actuators
Setpoint management	
RAMP	Ramp generator, with separate ascending and descending ramps
RATIO	Ratio controller
SP_SEL	Selection of setpoint value: local (operator) or *remote* (processing)

Setting up process control function blocks

Based on the sequencing of function blocks, the FBD language integrated in Unity Pro is a programming language particularly suitable for building control loops. Designers can use FBD to easily associate blocks from the CONT_CTL library with their own DFBs written in Unity Pro's ST, IL or LD language, or in C language.



Programming in online mode

Debugging, operation

All Unity Pro's standard debugging services (see page 4/9) are available. In particular, the Modicon M340 processor simulator can be used to check correct execution of processing offline.

Compatibility

The CONT_CTL control function block library is available in all versions of Unity Pro. It is compatible with all processors in the Modicon M340, Premium and Quantum ranges.

Optional specialized libraries

The CONT_CTL control function block library can be supplemented with optional specialized libraries, to meet specific needs such as predictive control, fuzzy logic controller, HVAC and mass flow calculation (see page 4/28).

Resources

The technical documentation provides many examples of how to set up programmable process control function blocks in FBD, LD, IL and ST languages.

The techniques for adjusting process control loops are described in the document "Process control, Unity V3.0" available online at www.schneider-electric.com.

(1) XXX according to the type of variable: DINT, INT, UINT, UDINT, REAL.

Software
Unity Pro software
Small/Medium/Large/Extra Large

Communication drivers

The most commonly used communication drivers for Modicon M340, Premium and Quantum platforms are installed at the same time as the Unity Pro software.

Unity Pro also includes the following drivers, which can be installed as required *(1)*:

Protocol - Hardware	Windows XP Professional	Windows Vista Business 32-bit edition Windows 7 32-bit and 64-bit editions
Ethway - Ethernet	■	
Fip - FPC10 ISA card	■	
Fip - FPC20 PCMCIA card	■	
Fip adaptor - CUSBFIP	■	■
ISAway - PCX57 ISA card	■	
Modbus Serial - COM port	■	■
PCIway - Atrium TPCI57 PCI card	■	■
Uni-Telway - COM port	■	■
Uni-Telway - SCP114 PCMCIA card	■	
USB for high end PLC	■	■
XIP - XWay on TCP/IP	■	■

■ Driver available ☐ Driver not available

Upgrade kits for Concept, PL7 Pro and ProWORX software

The Concept, PL7 Pro and ProWORX upgrade kits allow users who already have one of these programs from the installed base and who have a current subscription to obtain Unity Pro version V4.1 software at a reduced price.

These upgrades are only available for licences of the same type (e.g. from Concept XL group licence to Unity Pro Extra Large group licence).

Composition and Windows OS compatibility

Unity Pro multilingual software packages are compatible with Windows XP (32-bit), Windows Vista (32-bit) and Windows 7 (32-bit and 64-bit) operating systems.
They include:
- Documentation in electronic format in six languages (English, French, German, Italian, Spanish and Chinese)
- Converters for converting applications created with Concept and PL7 Pro programming software
- PLC simulator

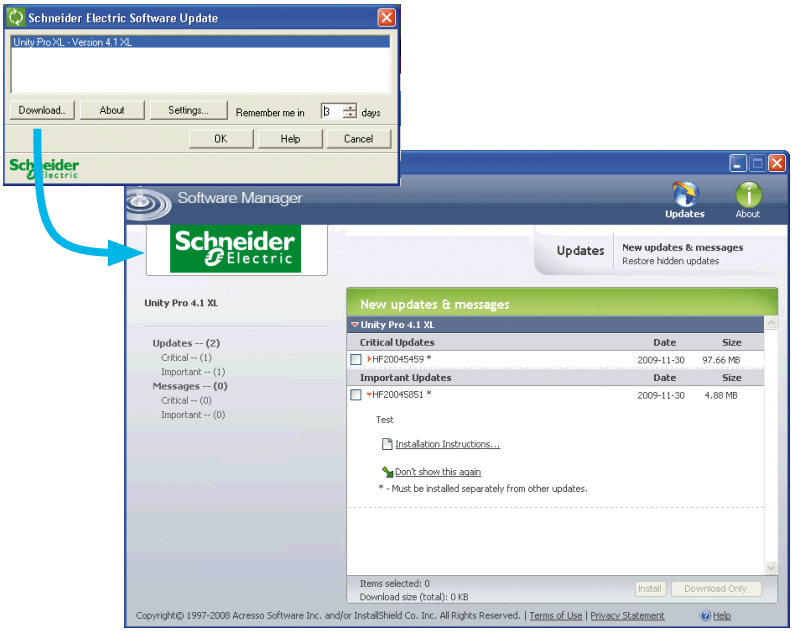
Cables for connecting the processor to the programming PC must be ordered separately.

(1) Also available separately under reference **TLX CD DRV 20M.**

Selection guide:
page 4/2

Unity Pro update

Customers are notified automatically when a new Unity Pro update becomes available.
They can then access the software updates manager directly, download the update and install it locally on their workstation.



***Note**: The latest firmware versions are available for download from our website www.schneider-electric.com.*

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Selection guide:
page 4/2

Software
Unity Pro software
Small/Medium/Large/Extra Large

Unity Pro

References

Unity Pro Small, Medium, Large and Extra Large software packages

These software packages are for programming and setting up Unity automation platforms. The software is available in five versions:
- **Unity Pro Small** (see page 4/18)
- **Unity Pro Medium** (see page 4/19)
- **Unity Pro Large** (see page 4/19)
- **Unity Pro Extra Large** (see page 4/20)

Upgrade kits for Concept, PL7 Pro and ProWORX software

These upgrade kits allow users who already have these software programs from the installed base and who have a **current subscription** to obtain Unity Pro version V7.0 software at a reduced price. These upgrades are only available for licences of the same type (e.g. from Concept XL group licence to Unity Pro Extra Large group licence). See page 4/20.

Composition and Windows OS compatibility

Unity Pro multilingual software packages are compatible with Windows XP (32-bit), Windows Vista Business Edition (32-bit) and Windows 7 (32-bit and 64-bit) operating systems.

The packages comprise:
- A Unity Pro V7.0 DVD in six languages (English, French, German, Italian, Spanish and Chinese)
- A Unity Loader V2.3 CD
- An Advantys V7.0 configuration software CD
- A DVD containing the documentation in electronic format in six languages (English, French, German, Italian, Spanish and Chinese)
- A one-year services subscription

Unity Pro Small version 7.0 software

For Modicon M340: All models
For distributed I/O: **Modicon ETB**, **TM7**, **OTB**, **STB**, **Momentum**

Unity Pro Small version 7.0 software packages *(1)*

Description	Licence type	Reference	Weight kg
Unity Pro Small software packages	Single (1 station)	**UNYSPUSFUCD70**	–
	Group (3 stations)	**UNYSPUSFGCD70**	–
	Team (10 stations)	**UNYSPUSFTCD70**	–
Software upgrades from: - Concept S - PL7 Micro - ProWORX NxT/32 Lite	Single (1 station)	**UNYSPUSZUCD70**	–
	Group (3 stations)	**UNYSPUSZGCD70**	–
	Team (10 stations)	**UNYSPUSZTCD70**	–

Licence type extensions for Unity Pro Small version 7.0

From	To	Reference	Weight kg
Single (1 station)	Group (3 stations)	**UNYSPUSZUGCD70**	–
Group (3 stations)	Team (10 stations)	**UNYSPUSZGTCD70**	–

(1) For compatibility of Unity software/automation platforms and distributed I/O, refer to the selection guide on page 4/2.

Software
Unity Pro software
Small/Medium/Large/Extra Large

Unity Pro Medium version 7.0 software

For Modicon M340: All models
For Modicon Premium: **TSX571●...2●**
For distributed I/O: **Modicon ETB**, **TM7**, **OTB**, **STB**, **Momentum**

Unity Pro Medium version 7.0 software packages *(1)*

Description	Licence type	Reference	Weight kg
Unity Pro Medium software packages	Single (1 station)	**UNYSPUMFUCD70**	–
	Group (3 stations)	**UNYSPUMFGCD70**	–
	Team (10 stations)	**UNYSPUMFTCD70**	–
Software upgrades from: - Concept S, M - PL7 Micro, Junior - ProWORX NxT/32 Lite	Single (1 station)	**UNYSPUMZUCD70**	–
	Group (3 stations)	**UNYSPUMZGCD70**	–
	Team (10 stations)	**UNYSPUMZTCD70**	–

Licence type extensions for Unity Pro Medium version 7.0

From	To	Reference	Weight kg
Single (1 station)	Group (3 stations)	**UNYSPUMZUGCD70**	–
Group (3 stations)	Team (10 stations)	**UNYSPUMZGTCD70**	–

Upgrade to Unity Pro Medium from Unity Pro Small

Type of upgrade The number of stations is unchanged	Reference	Weight kg
Small to Medium Single (1 station)	**UNYSPUMZSUCD70**	–
Small to Medium Group (3 stations)	**UNYSPUMZSGCD70**	–
Small to Medium Team (10 stations)	**UNYSPUMZSTCD70**	–

Unity Pro Large version 7.0 software

For Modicon M340: All models
For Modicon Premium: **TSX571●…4●**
For Modicon Quantum: **140CPU31110/43412U/53414U**
For distributed I/O: **Modicon ETB**, **TM7**, **OTB**, **STB**, **Momentum**

Unity Pro Large version 7.0 software packages *(1)*

Description	Licence type	Reference	Weight kg
Unity Pro Large software packages	Single (1 station)	**UNYSPULFUCD70**	–
	Group (3 stations)	**UNYSPULFGCD70**	–
	Team (10 stations)	**UNYSPULFTCD70**	–
	Site (⩽ 100 users)	**UNYSPULFFCD70**	–
Software upgrades from: - Concept S, M - PL7 Micro, Junior, Pro - ProWORX NxT/32 Lite	Single (1 station)	**UNYSPULZUCD70**	–
	Group (3 stations)	**UNYSPULZGCD70**	–
	Team (10 stations)	**UNYSPULZTCD70**	–
	Site (⩽ 100 users)	**UNYSPULZFCD70**	–

Licence type extensions for Unity Pro Large version 7.0

From	To	Reference	Weight kg
Single (1 station)	Group (3 stations)	**UNYSPULZUGCD70**	–
Group (3 stations)	Team (10 stations)	**UNYSPULZGTCD70**	–

Upgrade to Unity Pro Large from Unity Pro Medium

Type of upgrade The number of stations is unchanged	Reference	Weight kg
Medium to Large Single (1 station)	**UNYSPULZMUCD70**	–
Medium to Large Group (3 stations)	**UNYSPULZMGCD70**	–
Medium to Large Team (10 stations)	**UNYSPULZMTCD70**	–

(1) For compatibility of Unity software/automation platforms and distributed I/O, refer to the selection guide on page 4/2.

Selection guide:
page 4/2

Unity Pro Extra Large version 7.0 software

For Modicon M340: All models
For Modicon Premium: **TSX571●...6●**
For Modicon Quantum: **140CPU31110/43412U/53414U/65150/65160/65260/67160/67260/67261**
For distributed I/O: **Modicon ETB**, **TM7**, **OTB**, **STB**, **Momentum**

Unity Pro Extra Large version 7.0 software packages *(1)*

Description	Licence type	Reference	Weight kg
Unity Pro Extra Large software packages	Single (1 station)	**UNYSPUEFUCD70**	–
	Group (3 stations)	**UNYSPUEFGCD70**	–
	Team (10 stations)	**UNYSPUEFTCD70**	–
	Site (≤ 100 users)	**UNYSPUEFFCD70**	–
Software upgrades from: - Concept S, M, XL - PL7 Micro, Junior, Pro - ProWORX NxT Lite, Full - ProWORX 32 Lite, Full	Single (1 station)	**UNYSPUEZUCD70**	–
	Group (3 stations)	**UNYSPUEZGCD70**	–
	Team (10 stations)	**UNYSPUEZTCD70**	–
	Site (≤ 100 users)	**UNYSPUEZFCD70**	–

Licence type extensions for Unity Pro Extra Large

From	To	Reference	Weight kg
Single (1 station)	Group (3 stations)	**UNYSPUEZUGCD70**	–
Group (3 stations)	Team (10 stations)	**UNYSPUEZGTCD70**	–

Upgrade to Unity Pro Extra Large from Unity Pro Large

Type of upgrade The number of stations is unchanged	Reference	Weight kg
Large to Extra Large Single (1 station)	**UNYSPUEZLUCD70**	–
Large to Extra Large Group (3 stations)	**UNYSPUEZLGCD70**	–
Large to Extra Large Team (10 stations)	**UNYSPUEZLTCD70**	–

Documentation for Unity Pro version 7.0

Description	Licence type	Reference	Weight kg
Hardware and software manuals (on DVD) - Platform setup for: Modicon M340, Premium, Quantum, Momentum - Electromagnetic compatibility of networks and fieldbuses - Software setup for: Unity Pro, Function block library	Multilingual: English, French, German, Italian, Spanish, Chinese	**UNYUSE909CDM**	–

(1) For compatibility of Unity software/automation platforms and distributed I/O, refer to the selection guide on page 4/2.

4

Selection guide:
page 4/2

BMXXCAUSBH0●●

TSXPCX1031

TSXCUSB485

Accessories for connecting to the PC programming terminal

Description	Use		Length	Reference	Weight kg
	From processor port	To PC port			
PC terminal connection cables (PC to PLC)	USB mini B port BMXP341000/20●0/20●02	USB port	1.8 m	**BMXXCAUSBH018**	0.065
			4.5 m	**BMXXCAUSBH045**	0.110
	Mini-DIN port Premium TSX571●/2●/3●/4●	RS 232D (9-way SUB-D connector)	2.5 m	**TSXPCX1031**	0.170
		USB port (USB/RS 485 converter)	0.4 m	**TSXCUSB485** *(1)*	0.144
		USB port (mini-DIN/ RJ45 cordset)	2.5 m	**TSXCRJMD25** *(1)*	0.150
	Modbus port 15-way SUB-D Quantum 140CPU31110 140CPU43412A 140CPU53414B	RS 232D (9-way SUB-D connector)	3.7 m	**990NAA26320**	0.300
			15 m	**990NAA26350**	0.180
	USB port Premium TSX575●/6● Quantum 140CPU6●1	USB port	3.3 m	**UNYXCAUSB033**	–
	Modbus port, RJ45 connector Quantum 140CPU6●1	RJ 45 connector	1 m	**110XCA28201**	–
			3 m	**110XCA28202**	–
			6 m	**110XCA28203**	–
PC terminal connection cables (PC SUB-D to Modicon STB I/O)	HE13 connector Modicon STB I/O network interface module (NIM)	RS 232D *(2)* (9-way SUB-D connector)	2 m	**STBXCA4002**	0.210
USB/SUB-D adaptor (PC USB to Modicon STB I/O)	HE13 connector Modicon STB I/O network interface module (NIM) with STBXCA4002 cable *(3)*	USB port *(3)*	–	**SR2CBL06**	0.185

TCSWAAC13FB

Description	Use	Reference	Weight kg
Universal Bluetooth® interface (UBI)	Provides Bluetooth® connectivity for products such as the Modicon M340/Premium platforms and Altivar/Lexium servo drives, via their serial port (RS 485). Used for setting-up and maintenance of products. Designed for permanent installation and can be safely fitted on the inside or outside of electrical enclosures. ■ Protocols supported: Modbus and Uni-Telway ■ Powered via the product's RS 485 serial port ■ Max. range in direct line of sight: 20 m The kit comprises: ■ A Universal Bluetooth® interface (UBI) ■ An RJ45/mini-DIN cable (length 1 m) ■ An RJ45/RJ45 cable (length 1 m) ■ A fixing clamp for installation inside the electrical enclosure ■ A CD with configuration software and user manual	**TCSWAAC13FB**	0.320

(1) The **TSXCUSB485** *converter requires use of the* **TSXCRJMD25** *mini-DIN/RJ45 cordset.*
(2) For connection on a USB port, the **SR2CBL06** *cable must also be used (3).*
(3) Adaptor equipped with a USB connector (PC side) and a 9-way SUB-D connector (STBXCA4002 cable side); requires the **STBXCA4002** *cable (9-way SUB-D/HE 13) for connection to the HE13 connector on the Modicon STB NIM.*

Selection guide:
page 4/2

Software
Unity Pro software
Unity EFB Toolkit software

Unity EFB Toolkit

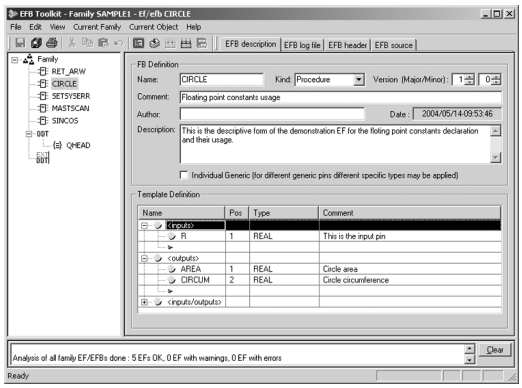
Presentation

Unity EFB Toolkit is the software for developing EFs and EFBs in “C” programming language. As an option with Unity Pro, it can be used to extend all the standard Unity Pro function blocks in order to increase functionality. This software comes with *Microsoft Visual Studio*, which can be used to debug the function blocks developed in the Unity Pro PLC simulator. Unity EFB Toolkit also includes a service for creating and managing families of function blocks and integrating them in Unity Pro.

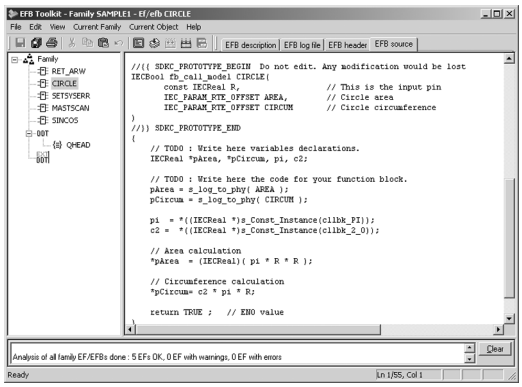
Setup

Unity EFB Toolkit manages the whole process of developing Unity Pro function blocks:

- User-friendly graphical user interface with automatic file organization
- Powerful tools for testing and debugging
- Management of compatibilities and software versions of created functions
- Generation of files for subsequent installation of functions on other Unity Pro stations



EFB Toolkit: Managing function block families



EFB Toolkit: Editor

Managing function block families

The software can be used to create function block families. The function blocks developed, also known as EFs/EFBs, are stored in families. This makes it possible to create an organized library of functions written in “C” language. Once created, these function block families are installed on the Unity Pro stations for the purpose of extending the standard Unity Pro libraries. Integration in Unity Pro can be executed from Unity EFB Toolkit or via the tool for updating Unity Pro libraries, which allows these families to be distributed without the use of any other software.

Developing function blocks

The EFB Toolkit software allows the user to create a function block as follows:

- Declaration of the function block interface in the same way as for the DFBs in Unity Pro
- Definition of all data types needed (elementary, structures, tables)
- Support of public and private variables
- Generation of all files and the block “C” coding frame (the user only adds functionality to this frame)
- Granting of access to numerous internal PLC services, such as the real-time clock, PLC variables and data, system words and math functions, including high-precision numerical processing in “double” format
- Structure of the function block family (compilation/link for all Unity Pro automation platforms)
- Provision of a debugging environment: the function blocks created can easily be debugged in *Microsoft Visual Studio* by downloading a Unity Pro application containing the function developed in the Unity Pro PLC simulator. All the debugging functions in *Microsoft Visual Studio*, especially breakpoints, step-by-step operations, display of the code/data and manipulation of the data, can be accessed without restriction.
- Support for managing Unity Pro versions, important during the function block maintenance phase

***Note**: A specific GNU compiler is used to generate the code for a Modicon M340 platform. It is supplied with the Unity EFB Toolkit.*

Compatibility

Unity EFB Toolkit is compatible with Unity Pro Small, Medium, Large and Extra Large. EFs and EFBs can be developed for Modicon Premium, Modicon M340 and Modicon Quantum platforms.

Software
Unity Pro software
Unity EFB Toolkit software

References

Unity Pro companion software, Unity EFB Toolkit, can be used to create Unity Pro function blocks in “C” programming language. The developed function blocks can then be integrated in standard Unity Pro function block libraries.
Unity EFB Toolkit and its documentation are supplied in electronic format on CD-ROM in English.

Description	Type	Language	Reference	Weight kg
Unity EFB Toolkit software	Single licence (1 station)	English (software and electronic documentation)	**UNYSPUZFUCD70**	–

Software
Unity Pro software
Unity Dif application comparison software

Unity Dif

Presentation

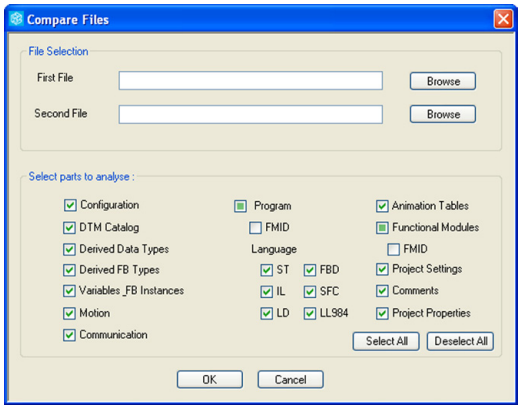
Unity Dif is an optional program for Unity Pro. It can handle all Unity Pro automation platforms. It compares two Unity Pro applications and returns an exhaustive list of all the differences. Unity Dif improves productivity during the main life stages of a control system, mainly during development and debugging of applications and commissioning, operation and maintenance of the installation.

Software setup

Unity Dif can be launched in several ways:
- From Unity Pro
- From the Windows Start menu
- From a command line interface without a graphical user interface

Unity Dif identifies all the differences between two Unity Pro applications at different levels:
- Hardware configuration
- Network configuration (Modbus/TCP, CANopen and RIO (Quantum only))
- All the variables and instances of function blocks
- Structure and content of the application, regardless of which language is used (including LL 984)
- DFB and DDT code
- Project options
- DTM catalogue

The result of the comparison can be displayed in the user interface, printed or saved in .txt file format.



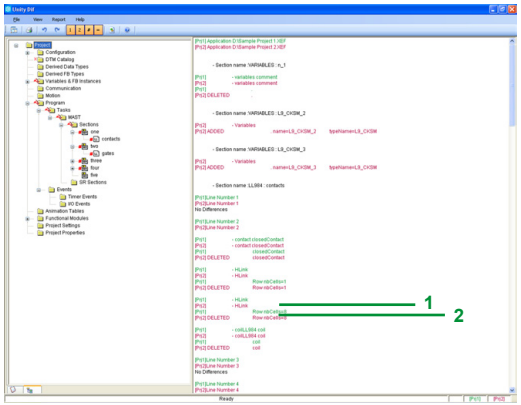
Selection of elements to compare

Comparison

The end of the comparison operation is signaled by the appearance of the application browser with its two tabs:

1 Identification tab for accessing the characteristics of the two applications being compared. The differences are summarized.

2 Browser tab for accessing the application tree structure.



Displaying results

Displaying results

The tree structure can be accessed after comparison, via the Browser tab. It shows any differences using four symbols, where the information associated with application 1 appears in blue and that associated with application **2** appears in red:

This branch, appearing at this level in the tree structure, contains at least one difference

This block contains at least one difference

This section is only present in application **1**

This section is only present in application **2**

In the example opposite, a difference is detected on the rung:
1 The line displayed in green belongs to application 1 [Prj1]
2 The line displayed in red belongs to application 2 [Prj2]

The source code extracts of both applications can be used to locate the differences precisely.

Software
Unity Pro software
Unity Dif application comparison software

References

This Unity Dif software extension is used to compare two Unity applications generated by Unity Pro software version V2.1 or later.

Description	Target extension PLC target	Type	Reference	Weight kg
Unity Dif comparison software extension for Unity Pro applications CD-ROM containing software and electronic documentation (English-French)	All Unity Pro Modicon M340, Premium, Quantum versions	Single licence (1 station) Download or CD	**UNYSDUZFUCD70**	–
		Site licence (100 stations) CD only	**UNYSDUZFFCD70**	–

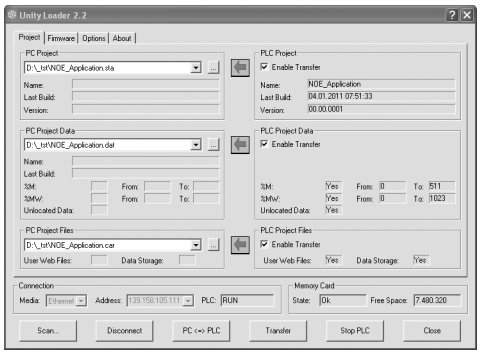
Software
Unity Pro software
Unity Loader software

Unity Loader

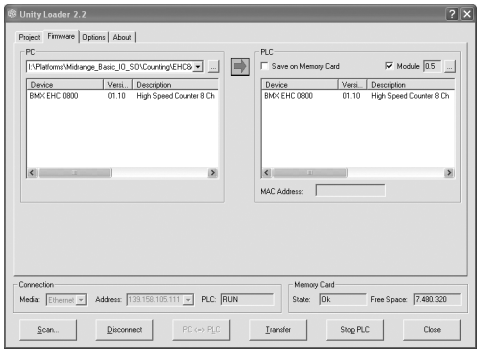
Presentation

Unity Loader is companion software to Unity Pro and is used to perform maintenance operations on automation applications. Its easy setup and the small size of its executable make it an essential tool for updating Unity Pro projects without needing to use Unity Pro. It can also be used for updating the embedded software on Modicon M340 modules. It performs the following main functions:

- Transferring automation project components, such as the program and data, from the PC to the PLC or the PLC to the PC
- Transferring files and user Web pages stored in the memory card of Modicon M340 PLCs
- Transferring the firmware from the PC to Modicon M340 modules only



Unity Loader: Project tab



Unity Loader: Firmware tab

Software graphic interface

The interface is easy to use and has four tabs for access to different operations:

- The "**Project**" tab manages the transfer of projects (program and data) between the PC and the PLC CPU. The software transfers the program (application file format: .stu; archive file format: .sta) and data (located and unlocated) of a Unity Pro project in both directions. The program and data files created by Unity Loader are compatible with Unity Pro. When it is connected to the PLC, Unity Loader displays the information associated with the data read in the PLC. This information is displayed on the PC for the selected files. The user decides which project elements will be transferred by a single command after validation of the required transfers.
  - ◻ *Modicon M340 PLCs and BMXRMS●●8MFP memory card only*: the files and user Web pages can be transferred from the memory card to the PC and vice versa.
  - ◻ *BMXNOE0110 with flash memory card only*: Web pages stored in the flash memory can be transferred from the module to the PC and vice versa.
- The "**Firmware**" tab can be used to update the firmware in the Modicon M340 modules. The screen displays the detailed content of the firmware versions existing in the module and on the PC. Firmware updating works in the same way as project transfers.
- The "**Options**" tabs is used to configure the working environment, especially the location of files on the PC and the selection of one of the six languages supported (English, French, German, Italian, Spanish and Chinese) for the user interface and online help.
- The "**About…**" tab displays information about the software.

Note: *Regardless of which tab is selected, the connection status with the PLC is always displayed, together with commands for connection/disconnection and changing the PLC operating mode.*

Modicon M340 PLC and BMXRMS●●8MFP memory card only

The Unity Loader software can download the project files and the firmware (PLC or module) onto a flash memory card (**BMXRMS●●8MFP** only) plugged into the PLC CPU.
This firmware download can then be used to update a remote Modicon M340 PLC.

Automation of Unity Loader commands

Projects can be downloaded/uploaded between a PLC and a supervisory station equipped with Unity Loader software by means of a command file included in the supervisory application.

Communication between the PC and the PLC

Unity Loader supports the following PC-to-PLC communication:
■ Quantum Unity Pro PLCs: Modbus communication, transfer of project components only
■ Premium Unity Pro PLCs: Unitelway communication, transfer of project components only
■ Modicon M340 PLCs and modules: communication via Ethernet and USB ports, transfer of project components and firmware. See the table below.

Reference	Type of module	Ethernet port	USB port
BMXP342000	CPU with Modbus		
BMXP342010/20103	CPU with CANopen		
BMXP342020	CPU with integrated Ethernet port		
BMXP342030/20302			
BMXNOE0100/0110	Ethernet Modbus/TCP		
BMXAMI/ART/AMO/AMM	Analog I/O		
BMXEHC0200/0800	Counter		
BMXMSP0200	Motion control		

Supported Supported if CPU has integrated Ethernet port

For Ethernet networks, Unity Loader contains a network scanner which can be used to scan a range of network addresses. Once a recognized Modicon M340 PLC has been selected, data transfer operations can be performed.

References

Unity Loader is supplied with Unity Pro Small, Medium, Large and Extra Large. It can also be downloaded free of charge from our website www.schneider-electric.com, download section.

Compatibility:

Unity Loader is independent of Unity Pro and compatible with all Modicon M340 PLCs, Unity Pro Quantum PLCs via Modbus and Unity Pro Premium PLCs via Unitelway. The program files and PLC data files are compatible between Unity Pro and Unity Loader.

Description	Type	Reference	Weight kg
Unity Loader software	Single licence (1 station)	Software can be downloaded free of charge from our website www.schneider-electric.com	–

Software
Unity Pro software
Specific libraries

Unity specific Libraries

Presentation

The CONT_CTL process control function block library supplied with Unity Pro software can be supplemented with optional specialized libraries so as to meet specific needs such as:
- Predictive control
- Fuzzy logic controller
- HVAC
- Mass flow calculation

Fuzzy Control Library

This library is used in particular in the water treatment field, for example for controlling chlorine levels in fresh water pools or controlling water levels in high-level reservoirs.

Flow Calculation Library

This library is used in the vertical Oil & Gas field, for measuring the gas flow in compliance with the *American Gas Association (AGA)* standard. This version of the library includes the AGA3, AGA7 and AGA8 function blocks.

TeSys Library

This library provides function blocks for TeSys T and TeSys U starter-controllers for M340 and Premium platforms.
It includes function blocks and a help function for Unity Pro.

PCR Library for Unity Pro and Concept

This library is used for predictive control of process applications.
Originally developed for reactors, predictive control can be used in other industrial sectors.
Schneider Electric's *Companion Unity & Libraries* team works in partnership with the French company *Sherpa Engineering*, who specialize in predictive control consultancy services.

Heating Ventilation & Air Conditioning Library

This library is used in the HVAC field and deals with repetitive temperature control and humidity problems using ventilation equipment.

System Library for Unity Pro

This library offers functional blocks that are derived from Devices and Process Library but only has Unity Pro components (DFBs).
The Devices and Process Library supports several Schneider Electric devices including TeSys T and TeSys U starters-controllers, Modicon STB distributed inputs/outputs, powermeters, Altivar variable speed drives, Icla and Lexium integrated drives, SEPAM digital protection relais, various fieldbus communications and other standard objects for motors.
There are approximately 100 objects in the library.

Software
Unity Pro software
Specific libraries

Unity specific Libraries

Specific libraries depending on the software used

Specific libraries depending on the software used (see below) can be ordered separately.

Control libraries

Description	Target software	Type	Reference	Weight kg
PCR Library	Unity Pro and Concept	Single licence (1 station)	**UNYLPCZAUWB**	–
Fuzzy Control Library	Unity Pro	Single licence (1 station)	**UNYLFZZAUWB12**	–
TeSys Library			**UNYLTSZAUWB10**	–
Heating Ventilation & Air Conditioning Library			**UNYLHVZAUWB10**	–
Flow Calculation Library			**UNYLAGZAUWB20**	–
System Library			**UNYLSYSFU**	–

System libraries for Unity Pro

Description	Target software	Type	Reference	Weight kg
Enhanced Process Library *(1)*	UAG	Single licence (1 station)	**UAGSBTCFUCD10**	–
Devices and Process Library *(1)*			**UAGSBTDFUWB13**	–

(1) Compatible with Unity Pro V5.0 max. For Unity Pro ≥ V6.0, please consult our Customer Care Centre.

Software
Unity software
Unity Application Generator

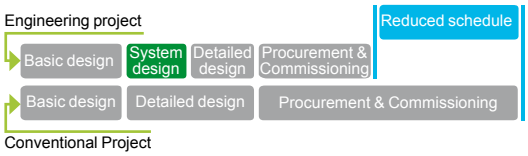
Advanced design tool for automation solutions *(1)*

Deliver your automation projects faster and re-use your know how!
Unity Application Generator (UAG) is an advanced design and generation software tool that integrates multiple PLCs and HMI/SCADA systems to provide an automation solution similar to a distributed control system. Using an approach based upon reusable objects (application libraries) and automatic application generation, UAG ensures consistent design and implementation of user-defined standards and specifications. Featuring change tracking and automatic documentation functions, UAG supports standards such as ISA-88 and GAMP.

Business advantage

UAG provides significant business advantages in terms of cost reduction, quality and performance improvement.

- **Cost**
  - Savings in system implementation cost
  - Improved time-to-market for the end user by allowing the project
  - Quicker return on investment
- **Quality**
  - Improved software quality,
  - Improved maintainability
  - Reduced risk and improved project schedules
- **Performance**
  - Standardized design and systematic improvement
  - Capture and re-use of your best practices
  - Integrated automation system design in your plant engineering workflow



Business advantage

Working efficiently

UAG provides the key features for an advanced automation solution to increase efficiency and share and re-use your know-how.

Working efficiently

Structured project design - bridge from the process engineer to the control/ automation designer (from the PID to the automation system).
It is possible to capture and re-use the customer's best practices within **application specific libraries** which reduces the dependency on experts, allows standardization and increases software robustness.
Single database entry avoids duplicate effort and resulting errors.
Automatic application generation, including the **automatic configuration of networks** in multi device systems increases efficiency, improves software quality and shortens setup times while simultaneously **reducing project risk**. Integrated **change tracking** and **automatic documentation generation** reduces engineering effort and enables system validation.

Advanced automation platform

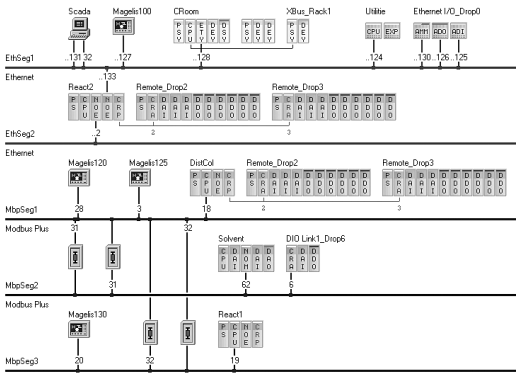
UAG integrates best in class products from Schneider Electric and leading partners into an advanced automation platform based on standards, including: ISA-88, GAMP and IEC 61131-3.
Single data point entry and management integrates the process control, monitoring and supervision and ensures data consistency and integrated communication between all devices.

Standards

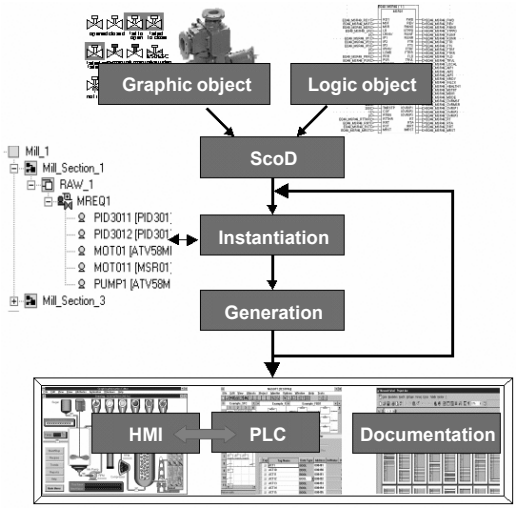
Applications *(1)*

- **Methodology**: UAG allows you to capture and re-use your know-how. Through automatic generation, the project information is propagated to all applications consistently, easily and quickly.
- **Creating user libraries**: libraries are based on re-usable control devices – **S**mart **C**ontrol **D**evices (SCoDs).
- **High level objects (template types) consisting of multiple SCoDs**: template types allow you to pre-define complex objects, e.g. a PID or a sequence, which consist of multiple SCoDs. A common graphic symbol can also be defined. This makes instantiation more efficient as the number of individual steps can be reduced by using the type definition.
- **Structuring your project**: a structured project design provides a bridge from the process engineer to the control automation designer (from the PID to the automation system) based on the ISA-88 standard. The PID drawing is mapped to the physical model in UAG.

(1) For more technical information, please consult our website www.schneider-electric.com.



Multi-station automation configuration



Generating the application

UAG

Applications (continued) *(1)*

■ **Multi-station automation configuration**: the entire process control, monitoring and supervision topology of the distributed automation system is managed within UAG.

■ **Generating the application**: the automation solution is generated based on the structured design and your standards contained within the pre-qualified UAG library, ensuring consistent information for the PLCs and the HMI/SCADA. The use of resources (addresses, name space, etc.) is optimized to avoid conflicts and errors. UAG can generate complete projects, as well as **incremental changes** when modifications occur.

■ **Validation**: UAG simplifies validation when required by regulation or to comply with GAMP (Good Automation Manufacturing Practice). UAG uses ISA 88 standard terminology for batch control and supports the GAMP methodology for creating an automation system.

■ **Process Application Library for Vijeo Citect**: the Process Application Library for Vijeo Citect is shipped together with the UAG CD and can be installed from there. A separate order is not necessary; simply complete the registration details during installation.

■ **Device and Process Library**: the Device and Process Library is shipped together with the UAG CD and can be installed from there. A separate order is not necessary; simply complete the registration details during installation.

Segment/Application-specific libraries

A number of more specialized libraries have been developed to provide a more complete starting point for certain projects, such as:
■ Water & Wastewater
■ Mining, Minerals, Metals
■ etc.

Supported platforms and environment

■ **Supported platforms**
□ PLC software: Unity Pro ≥ V4.1
□ PLC hardware: M340, Premium and Quantum
□ M340 I/O, Premium I/O, Quantum I/O and Modicon I/O
□ Modbus TCP and Modbus Plus
□ Fieldbus support
□ Advantys STB configuration and debugging software ≥ V4.7
■ **HMI/SCADA**
□ Vijeo Citect ≥ V6.1
□ Wonderware Archestra V3.0
□ OPC data server software (OFS)
□ Other HMI/SCADA via the UAG “Plug-In” interface
■ **Export of information for other devices/applications**
□ XML export file
□ CSV export file
■ **Environment**: Compatible with Microsoft Windows® 7 Professional *(2)*, Windows® Vista Business and Windows® XP Professional operating systems

References *(1)*

Description	License type	Reference	Weight kg
UAG software suites *(3)* Comprising: ■ UAG (Unity Application Generator) software in English, French, German, ■ Documentation (electronic format)	Single (1 station)	**UAGSEWLFUCD33**	–
	Site (> 10 stations)	**UAGSEWLFFCD33**	–

(1) For more technical information, please consult our website www.schneider-electric.com.
(2) Please contact our Customer Care Centre.
(3) The PLC/SCADA programming tools and/or communication driver must be ordered separately.

Software
OPC data server software
OPC Factory Server

Presentation

Based on the OLE for Process Control (OPC) standard, Schneider Electric's OPC Factory Server (OFS) software allows “client” software applications, such as supervisors/SCADA and customized interfaces, to access the data of Schneider Electric automation system and electrical distribution devices connected to networks or fieldbuses in real time.
It also allows communication with third-party devices supporting Modbus and Modbus/TCP protocols.

OFS enables simpler, more open and transparent communication between your software applications and your devices. These are just some of the advantages that ensure a complete interoperability solution that is central to your process.

In version V3.4, the OFS data server integrates the following specifications:
- **OPC-DA** (OPC Data Access).
- **.NET API interface**.
- **OPC XML-DA V1.0** (OPC XML Data Access).
- **OPC-UA** (OPC Unified Architecture).

The OFS V3.4 offer is available in two levels:
- **OFS Small:** Data server for 1000 items *(1)* supporting the OPC-DA and OPC-UA protocols (OPC XML-DA protocol not supported).
- **OFS Large:** Data server with an unlimited number of items *(1)* supporting the OPC-DA, OPC XML-DA and OPC-UA protocols.

Devices and protocols supported

OFS software is a multi-device data server: it allows simultaneous use of several communication protocols, and it provides client applications with a set of services for accessing control system items that may be local or remote, via physical address or via symbol.

Devices supported:
- Modicon Quantum, Premium, M340, Micro, Compact and Momentum PLCs
- Schneider Electric TSX Series 7 and April Series 1000 PLCs
- Modbus serial devices connected via Schneider Electric gateways: TSXETG10●●, EGX●●● ranges, etc.
- Uni-Telway serial devices connected via Schneider Electric gateways (TSX ETG 1010)

Networks and protocols supported:
- Modbus: Modbus serial, Modbus Plus, Modbus/TCP
- X-Way/Uni-TE: Uni-Telway, Fipway, ISAway, PCIway

Openness

The development of specialized interfaces is simpler with OFS V3.4 software, which is aimed at two types of user in particular:

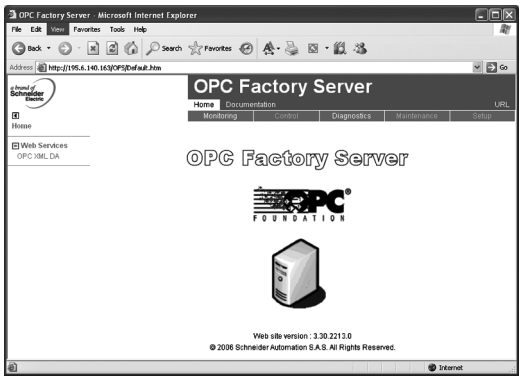
- **End users** who want either to interface their supervision or human/machine interface applications with Schneider Electric equipment, or to develop applications on a PC (supervisory control screens, Excel spreadsheets etc.) requiring access to control system data.

- **Suppliers of control system or industrial data processing software** (supervision, human/machine interfaces, etc.) seeking to develop, within their standard products, an OPC Client interface capable of accessing data in Schneider Electric equipment via the OFS server.

(1) “item”: variable, structure, table etc. in the Unity Pro application.

Architectures: page 4/33 | Setup: page 4/35 | Functions: page 4/36 | References: page 4/37 | Time stamping system: page 4/38

Software
OPC data server software
OPC Factory Server



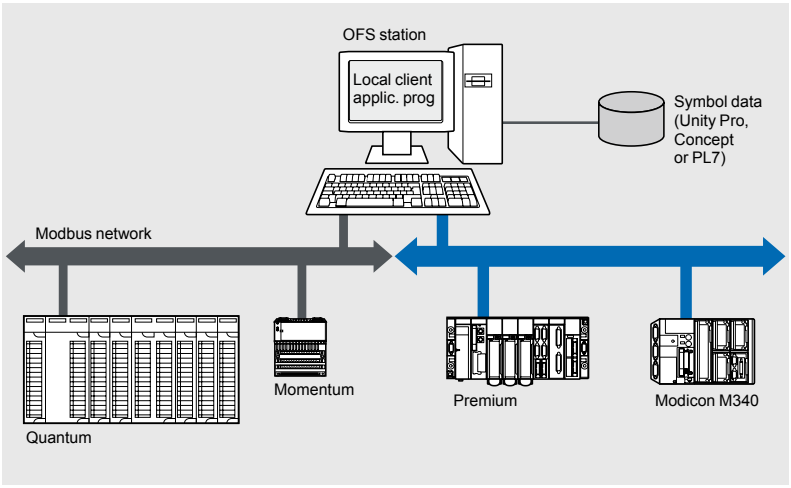
OPC Factory Server: Home page

Supported architectures

The OFS server allows four access modes:
- A purely local mode
- Remote access from an OPC-DA client
- Remote access from an OPC.NET client
- Remote access from an OPC XML-DA client
- Remote access from an OPC-UA client

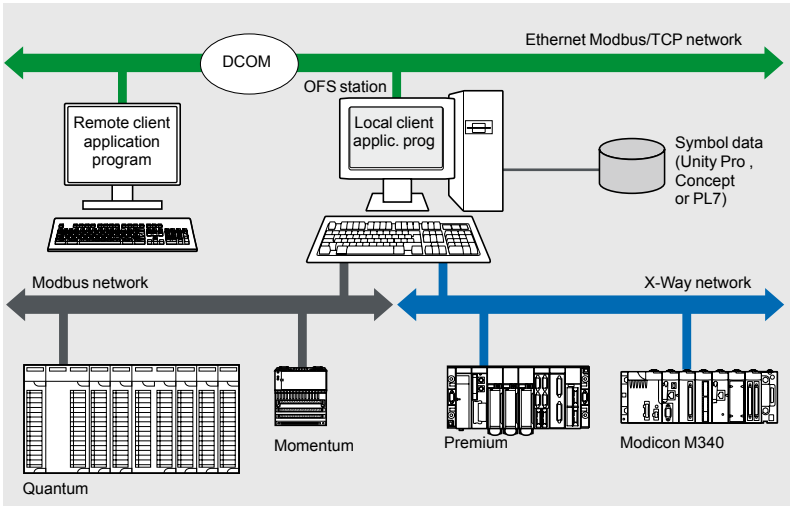
Local access

The client application and the OFS server are on the same PC.



Remote access from an OPC-DA client

The client application and the OFS data server are on remote stations. Communication between the client station and the OFS server is conducted through the DCOM layer (Microsoft) via the OPC-DA protocol.



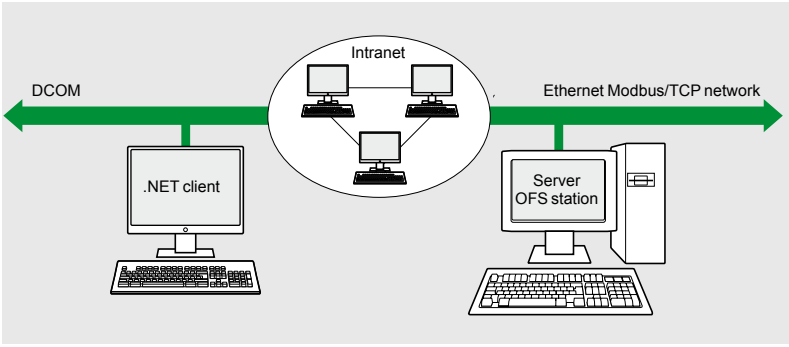
4

Software
OPC data server software
OPC Factory Server

Architectures supported (continued)

Remote access from an OPC .NET client

The .NET client application program and the OFS data server are on remote stations. Communication between the client station and the OFS server is conducted through the DCOM layer (Microsoft) via the OPC-DA protocol.

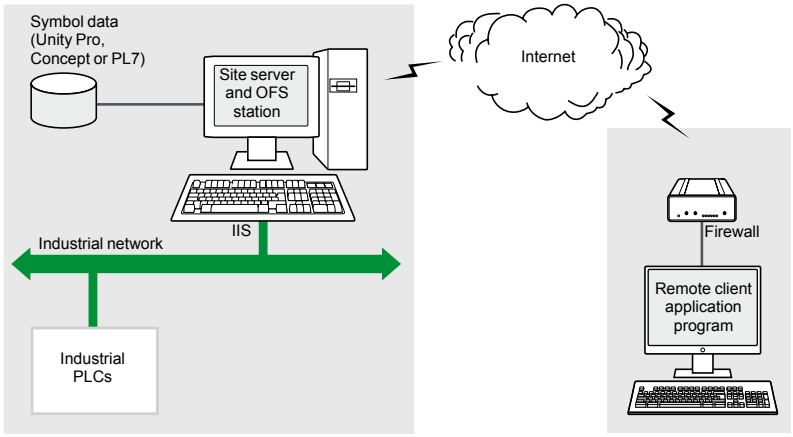


The .NET Microsoft compatibility of the OFS server has been developed to allow an OPC .NET client to access OFS server items on an Intranet network via the OPC .NET API interface.

This interface ensures interoperability between existing OPC applications and applications developed in the standard .NET environment.

Remote access from an OPC XML-DA client via HTTP

The client application program and the OFS server are on remote stations, using the SOAP protocol to communicate via the Internet in conformity with the OPC XML-DA V1.01 specification of the OPC Foundation.
The OFS data server is based on an HTTP server installed on the same station.



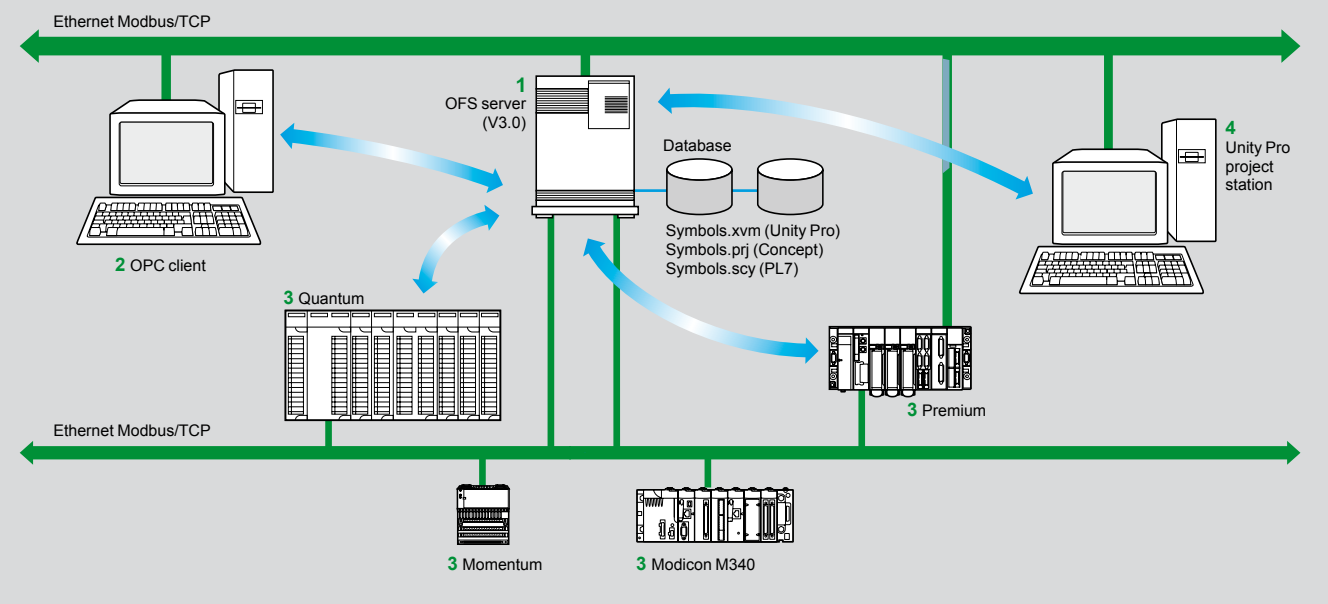
The OPC XML-DA V1.0 specifications are designed to overcome the limitations of COM/DCOM, thus providing:
- An OPC interface for Windows and non-Windows client applications
- Beyond the Intranet perimeter, remote access via the Internet through firewalls

The OPC XML-DA specification is based on Web Services standards such as SOAP, XML and WSDL *(1)*. A SOAP client can access data on the OFS server via Intranet or Internet using the SOAP protocol in conformity with the OPC XML-DA V1.01 specification of the OPC Foundation.

(1) SOAP: Simple Object Access Protocol
XML: Extensible Markup Language
WSDL: Web Services Description Language

Software
OPC data server software
OPC Factory Server

Setup



The OFS server **1** is at the centre of the data exchanges. It ensures that variables exchanged between the OPC client **2** and the PLC **3**, are consistent, in one of three ways using a symbol (or variables) database:

■ The variables database is either the Unity Pro project **4**, or the Concept project. In both these cases, Unity Pro or Concept needs to be installed on the OFS server station.

■ Or the variables database is an export file (SCY for PL7, XVM for Unity Pro). PL7 and Unity Pro are not required in either of these cases.

■ Or the variables database is the PLC itself. In this case neither Unity Pro nor an export file is needed. This does not apply to Momentum and TSX Micro PLCs.
If an inconsistency is detected (following online modification of the PLC program for example), OFS resynchronizes itself automatically as a background task, without breaking communication between the PLC and the OPC client.
For this function the following minimum versions are required:
- □ OFS V3.35
- □ Unity Pro V6.0
- □ Modicon Premium V2.9, M340 V2.3 and Quantum V3.0 PLCs

Software
OPC data server software
OPC Factory Server

Function

Development of client applications

OFS software has 4 types of interface:

■ **OLE Automation interface (OPC-DA)**
Particularly suitable for end users, this enables the development of OPC client applications in Visual Basic, in Visual Basic for Excel, and in C++.

■ **OLE Custom interface (OPC-DA)**
Used primarily by suppliers of automated control system or industrial IT products, this interface enables the development of applications in C++ in order to access the OFS software OPC server. It is aimed at software development experts in particular, so that they can integrate the client application into their standard products. It is the interface with the highest performance, in terms of access time to data stored in the OPC server. It requires extensive knowledge of C++ programming to set up.

■ **OPC .NET API wrapper interface**
The .NET Microsoft compatibility of the OFS data server gives an OPC .NET client standard access to OFS server items via an Intranet network, thus ensuring greater interoperability with standard .NET environments.

Note: *In this case, communication between the OPC .NET client and the OFS server is conducted through the DCOM layer (or COM layer in a local configuration) via the OPC-DA protocol.*

■ **OPC XML-DA interface** *(1)*
The OPC XML-DA V1.0 specifications are designed to overcome the limitations of the OPC-DA specification and COM/DCOM by providing:
□ An interface for Windows and non-Windows client applications
□ Remote access via the Internet through firewalls (beyond the Intranet perimeter)

The OPC XML-DA specification is based on Web Services standards such as SOAP, XML, WSDL. A SOAP client can access data on the OFS server via Intranet or Internet using the SOAP protocol in conformity with the OPC XML-DA V1.01 specification of the OPC Foundation.

■ **The OPC-UA interface**
This interface is aimed at users with software that includes an OPC-UA client interface. This interface is based on the same communication standards as the OPC XML-DA interface and offers the same advantages as it, which are:
□ An interface with Windows and non-Windows applications
□ Remote access, via the Internet, through a firewall

(1) Available only with the Large version of OPC Factory Server.

Software
OPC data server software
OPC Factory Server

References

OFS V3.4 software for PC compatible stations (minimum configuration: Pentium 566 MHz processor, 128 Mb of RAM) running Windows 7 (32-bit or 64-bit).

The OFS V3.4 offer comprises:
- OPC server software
- OPC server simulator (for debugging the application when no PLCs are present)
- OFS server configuration software
- An example of OPC client for setting up applications
- The setup documentation on DVD-ROM
- A reference document on “time stamping system” solutions
- A tool to help with sizing and configuring “time stamping system” solutions

Supplied on DVD-ROM, the software operates independently on a PC. It interfaces with the variable export files generated by PL7, ProWORX, Concept, and Unity Pro software.
It also provides a direct dynamic link to the Unity Pro and Concept applications.

OFS V3.4 software is available in two versions:
- **Small Version TLXCDS●OFS34**
  - Maximum of 1000 items *(1)*
  - Protocols supported: OPC-DA and OPC-UA
  - Single station and 10-station site licences
- **Large Version TLXCDL●OFS34**
  - Unlimited number of items *(1)*
  - Protocols supported: OPC-DA, OPC XML-DA and OPC-UA
  - Single station, 10-station and 200-station site licences

OPC Factory Server V3.4 Small

Description	Licence type	Reference	Weight kg
OPC Factory Server V3.4 Small software ■ Maximum of 1000 items *(1)* ■ Protocols supported: OPC-DA and OPC-UA	Single station	**TLXCDSUOFS34**	–
	10 stations	**TLXCDSTOFS34**	–

OPC Factory Server V3.4 Large

Description	Licence type	Reference	Weight kg
OPC Factory Server V3.4 Large software ■ Unlimited number of items*(1)* ■ Protocols supported: OPC-DA, OPC XML-DA and OPC-UA	Single station	**TLXCDLUOFS34**	–
	10 stations	**TLXCDLTOFS34**	–
	200 stations	**TLXCDLFOFS34**	–

(1) “item”: variable, structure, table etc. in the Unity Pro application.

Software
OPC data server software
Time stamping system

Presentation

The time stamping system is a complete solution providing a SCADA with a sequence of events that are time-stamped at source, enabling the user to analyze the source of any abnormal behaviour in an automated system.

The SOE (sequence of events) is displayed in the alarm log or in the list of events for a client such as a SCADA.

Each event in the SOE is a change of value (transition) of a discrete I/O detected by a time stamping module.

Advantages

Using the time stamping system has the following advantages:
- No PLC programming
- Direct communication between the time stamping modules and the client. If the time stamping modules are in a Quantum Ethernet I/O drop, the bandwidth of the PLC communication is not used
- Consistency of the I/O values between the process (time stamping modules) and the client
- Consistency is maintained irrespective of the operating mode
- No loss of events under normal operating conditions
- Management of Hot Standby configurations on the PLC and/or SCADA redundancy

Composition of a time stamping architecture

BMXCRA31210 module

This time stamping module can be at the source of any discrete I/O signal located in the drop with a resolution of 10 ms.
To ensure no event is lost, all events are stored and kept in a buffer located in the product until OFS takes them.
Synchronization of the CRA module uses the NTP protocol.

BMXERT1604T module

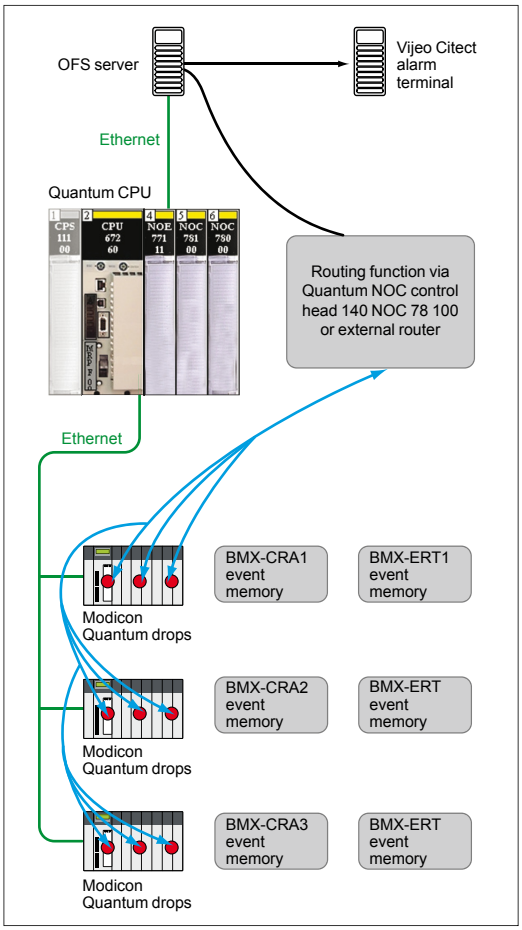
This module has 16 discrete inputs which carry out the time stamping at source outputs with a resolution of 1 ms.
To ensure no event is lost, all events are stored and kept in a buffer located in the product until OFS takes them.
This module can be placed either in an RIO drop, or in a local rack equipped with a BMXCRA31210 module.
The CRA module is synchronized via the DCF 77 or IRIG-B standards.

OFS V3.40

OFS V3.40 is used to access events stored in the various buffers in the architecture and to notify the SCADA of them via the standard OPC DA protocol.

Vijeo Citect V7.30

Vijeo Citect V7.30 receives events transmitted by OFS and displays them in the SOE or in the list of alarms.



Example of a Time stamping architecture

Software
OPC data server software
Time stamping system

Performance

Performance	Event source module	Value
Between two identical source modules in the same rack	**BMXERT1604T**	1.6 < resolution < 3.3 ms
	BMXCRA31210	10 ms
Between two different inputs in the same source module	**BMXERT1604T**	1 ms
	BMXCRA31210	1 scan
Maximum number of events scanned	**BMXERT1604T**	400 events *(1)*
	BMXCRA31210	2048 events *(1)*
Maximum number of I/O and memory available	**BMXERT1604T**	16 discrete inputs on module
		512 events in internal buffer
	BMXCRA31210	256 discrete I/O configured
		4000 events in internal buffer
Maximum number of source modules in an Ethernet remote drop	**BMXCRA31210**	1 per drop
	BMXERT●●●●	9 per drop
Maximum number of event sources controlled	**BMXERT●●●●**	500 sources per second *(1)*

(1) This maximum value is not an absolute value. It depends on the overall system dynamics (total number of scanned items and number of events generated by the system).

4

Contents

5 - Connection interfaces

Modicon Telefast ABE7 pre-wired system

5

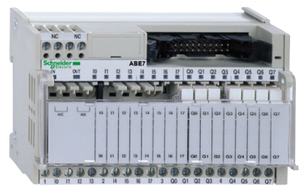
Connection interfaces

Modicon Telefast ABE7 pre-wired system

Discrete input and/or output sub-bases

Applications	Discrete inputs or outputs				
	Optimum “Economy”	Optimum “Miniature”	Universal		
					
Compatibility	TSX Micro, Modicon Premium, Modicon M340	TSX Micro, Modicon Premium, Modicon Quantum, Modicon M340			
Sub-base type	Passive connection sub-bases				
Equipped with relays	–				
Control voltage	24 V ⎓				
Output voltage	24 V ⎓				
Output current per channel	0.5 A				
Modularity	16		8 -12 -16		
No. of terminals per channel	1	1 to 3	1	2	
Type of connection terminals	Signal	Signal, common (configurable as 24 V ⎓ or 0 V)	Signal	Signal, common (configurable as 24 V ⎓ or 0 V)	
Connectors	20-way HE10 connector				
Terminal block Removable	No		No		
Terminal block Terminal type	Screw				
Additional or optional* function	Low-cost version fitted with cable	Miniature sub-bases	Compact size *	Input type 2 * *(1)*	Isolator *
Type of device	**ABE7H●●E●00**	**ABE7H16C●●**	**ABE7H●●R1● ABE7H●●R50**	**ABE7H●●R2●**	**ABE7H●●S21**
Page	5/12		5/13		

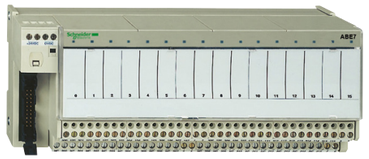
(1) For Modicon TSX Micro and Modicon Premium PLCs

Discrete inputs or outputs		Outputs for solid state and/or electromechanical relays
Optimum “Miniature”		Optimum and Universal
		
TSX Micro, Modicon Premium, Modicon Quantum, Modicon M340		
Passive connection sub-bases		Plug-in electromechanical or solid state relays
–		Yes
24 V ⎓		
24 V ⎓		24V ⎓ (solid state) 5... 24 V ⎓, 230 V ∿ (electromechanical)
0.5 A		5 A (th)
16		16 8 passive inputs 8 relay outputs
1	2	1
Signal, 2 common connections between the inputs and the outputs	Signal, common, 2 common connections between the inputs and the outputs	1 N/O contact and common, 4 output channels 2 input connection points
20-way HE10 connectors		
No		
Screw		
Miniature sub-base Synergy with Tego Power and Micro PLC		Miniature sub-base - Common per group of 4 channels Synergy with Tego Power and Micro PLC
ABE7H16CM11	**ABE7H16CM21**	**ABE7R16M111**
5/12		5/15

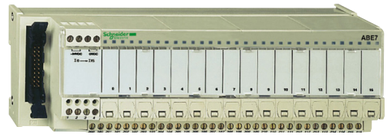
Connection interfaces

Modicon Telefast ABE7 pre-wired system

Discrete input and output sub-bases

Applications	Discrete outputs					
	Optimum		Universal	Optimum		Universal
						
Compatibility	TSX Micro, Modicon Premium, Modicon Quantum, Modicon M340					
Relay sub-base	Electromechanical, fixed			Electromechanical or solid state		
Equipped with relays	Yes			Yes	No	No
Control voltage	24 V ⎓					
Output voltage	5 V... 30 V ⎓ 230 V ∿		5 V... 150 V ⎓ 230 V ∿	24 V ⎓ (solid state) 5 V... 24 V ⎓, 230 V ∿ (E.M.)		5 V... 150 V ⎓ 230 V ∿
Output current per channel	2 A (th)	3 A (th)	5 A (th)	2 A (solid state) 6 A (electromechanical)		0.5 to 10 A (dependent on relay)
Modularity	8	8 - 16		16		8 or 16
No. of terminals per channel	2	1	2	1		2 to 3
Type of connection terminals	1 N/O contact and common Volt-free	1 N/O contact	1 N/O contact and common	1 N/O contact		Signal, Polarities
Connectors	20-way HE 10 connector					
Terminal block Removable	Yes	Yes	Yes	No		No
Terminal type	Screw or spring			Screw		
Additional or optional* function	Miniature sub-base Latching relay	Volt-free or common per group of 8 channels		Miniature sub-bases Common per group of 4 channels		Isolator and fuse
Type of device	**ABE7R08S216●**	**ABE7R●●S1●●**	**ABE7R●●S2●●**	**ABE7R16T111**	**ABE7P16T111**	**ABE7P16T2●●●** **ABE7P08T3●●●**
Page	5/14			5/15	5/16	

(1) For TSX Micro and Modicon Premium PLCs

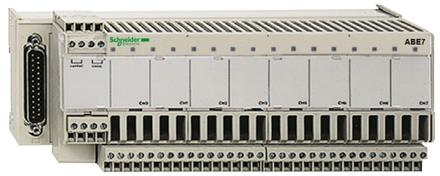
Discrete outputs		Discrete inputs or outputs					
Universal		Universal					
							
TSX Micro, Modicon Premium, Modicon Quantum, Modicon M340							
Electromechanical, plug-in		Solid state, fixed	–	–		Solid state, fixed	Solid state, plug-in
Yes		Yes	–	–		Yes	No
24 V ⎓						From 24 V ⎓ to 230 V ∿	From 5 V TTL to 230 V ∿
5 V... 150 V ⎓ 230 V ∿		24 V ⎓					
5 A (th)	8 A (th)	0.5 to 2 A	125 mA	0.5 A	125 mA	12 mA	
16							
2 to 3	2 to 6	2		3	2		
1 C/O contact or 1 N/O contact and common	1 C/O contact or 2 C/O contacts and common	Signal and 0 V		24 V ⎓ and 0 V signal	Signal can be isolated, Protected common	Signal	Signal and common
20-way HE 10 connector							
No		Yes	No	No		Yes	No
Screw		Screw or spring		Screw		Screw or spring	
Volt-free or common per group of: 8 channels	4 channels	Fault signal	Isolator and fuse (indicator)	3-wire proximity sensor	Isolator and fuse (indicator)	–	
ABE7R16T2●●	**ABE7R16T3●●**	**ABE7S●●S2B●**	**ABE7H16F43**	**ABE7H16R3●**	**ABE7H16S43**	**ABE7S16E2●●E**	**ABE7P16F31●**
5/15		5/14	5/13			5/14	5/15

Connection interfaces

Modicon Telefast ABE7 pre-wired system

Analog and application-specific sub-bases

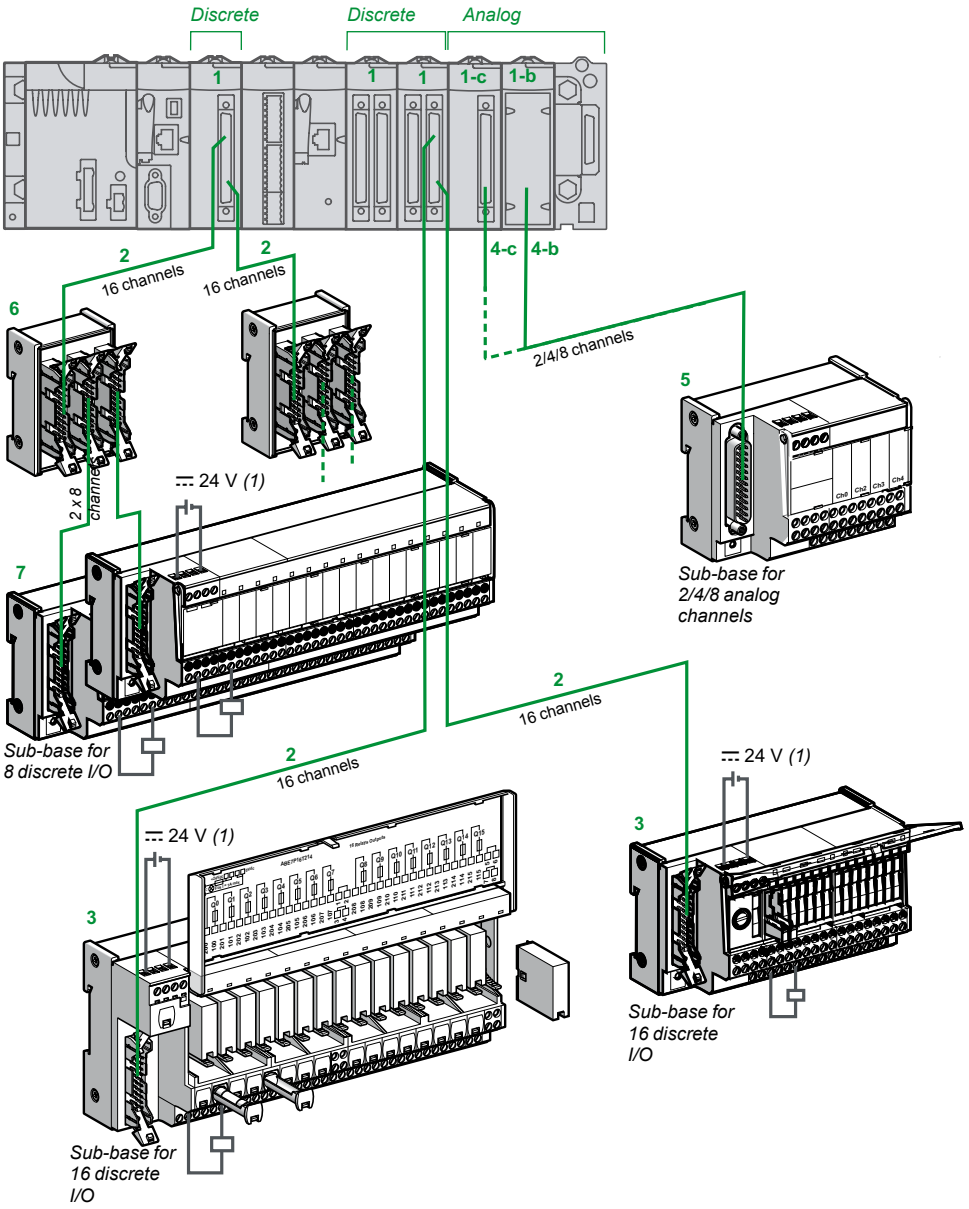
Applications	Analog signals and special functions				
					
Compatibility	TSX Micro: □ TSX3722 □ TSXCTZ●A	Modicon Premium: □ TSXCTY●A □ TSXCAY●1	Modicon Premium: □ TSXASY800 □ TSXAEY1600 TSXA●Y800 Modicon M340: □ BMXAMI0800 □ BMXAMI0810 □ BMXAMO0802 Modicon Quantum: □ 140AVI03000 □ 140ACI03000 □ 140ACI04000 □ 140ACO13000	Modicon Premium: □ TSXASY410 □ TSXAEY420 Modicon M340: □ BMXAMO0410 Modicon Quantum □ 140AVO02000 □ 140ACO02000	Modicon M340: □ BMXART0414 □ BMXART0814 Modicon Premium: □ TSXAEY1614
Type of signal	Counter inputs and analog I/O	Counter inputs Axis control Position control	Analog inputs Current/Voltage Pt 100	Analog outputs Current Voltage	Analog inputs
Functions	Passive connection, point-to-point with shield continuity				Connection of cold junction compensation or provision, distribution of isolated power supplies
Modularity	1 counter channel or 8 analog inputs + 2 analog outputs		8 channels	4 channels	4 channels
Control voltage	24 V ⎓				–
Output voltage	24 V ⎓				–
Output current per channel	25 mA				–
No. of terminals per channel	2		2 or 4	2 or 4	2 or 4
Connector type	15-way SUB-D + 9-way SUB-D		25-way SUB-D		25-way SUB-D
Terminal block Removable	No		No		No
Terminal type	Screw		Screw		Screw
Type of device	**ABE7CPA01**		**ABE7CPA02**	**ABE7CPA21**	**ABE7CPA412** **ABE7CPA410**
Page	5/18				

Analog signals and special functions				
				
Modicon Premium: □ TSXAEY800 □ TSXAEY1600 Modicon Quantum: □ 140AVI03000 □ 140ACI03000 □ 140ACI04000	Modicon Premium: □ TSXAEY810 Modicon M340: □ BMXAMI0800 □ BMXAMI0810 □ BMXAMO0802 Modicon Quantum: □ 140AVI03000 □ 140ACI03000 □ 140ACI04000	Modicon Premium: □ TSXCAY●1, □ TSXCTY●A	Modicon Premium: □ TSXAEY1614	Modicon Premium: □ TSXPAY2●2
Analog inputs Current Voltage Pt 100	Isolated analog inputs	Counter inputs	Inputs for thermocouples	I/O
Distribution of sensor power supplies by limiter (25 mA)	Distribution of isolated sensor power supplies by converter	Acquisition of value from an absolute encoder	Connection of 16 thermocouples with cold junction compensation	Safety module (BG)
8 channels	8 channels	1 channel	16 channels	12 Emergency stops
24 V ⎓				
24 V ⎓				
25 mA				–
2 or 4		–	2 or 4	1
25-way SUB-D	25-way SUB-D	15-way SUB-D	25-way SUB-D	50-way SUB-D
No	No	No	No	No
Screw	Screw or spring	Screw	Screw	Screw
ABE7CPA03	**ABE7CPA31●**	**ABE7CPA11**	**ABE7CPA12**	**ABE7CPA13**
5/18				

Connection interfaces

Modicon Telefast ABE7 pre-wired system

Interface with Modicon X80 I/O modules



(1) Connection of the 24 V ⎓ power supply is only possible using Modicon Telefast ABE7 sub-bases. The 0 V ⎓ connections must be equipotential.

Connection interfaces
Modicon Telefast ABE7 pre-wired system
Interface with Modicon X80 I/O modules

Presentation

I/O modules on the Modicon X80 platform

1 Discrete input modules (BMXDDI●●02K), discrete output modules (BMXDDO●●02K) and discrete mixed I/O modules (BMXDDM3202K) equipped with one or two 40-way FCN connectors. The modularity of each module (●●) is 32 or 64 channels.

□ **1-b** Analog input or output modules:
- Analog inputs: **BMXAMI0410** (4 channels), **BMXAMI0800** (4 channels) and **BMXAMI0810** (8 channels)
- Analog outputs: **BMXAMO0210** (2 channels), **BMXAMO0410** (4 channels) and **BMXAMO0802** (8 channels)

□ **1-c** Analog input modules **BMXART0414** (4 channels) and **BMXART0814** (8 channels)

2 2 types of cordset are available depending on the type of discrete module connected to the sub-base (for combinations, see page 5/10). These cordsets are available in 0.5, 1, 2, 3, 5 or 10 m lengths:
- **BMXFCC●●●1** cordsets with one 20-wire sheath (AWG 22) equipped with one 40-way FCN connector and one HE 10 moulded connector on the Telefast sub-base end
- **BMXFCC●●●3** cordsets with two 20-wire sheaths (AWG 22) equipped with one common 40-way FCN connector on the module end and two HE 10 moulded connectors on the Telefast sub-base end

3 16-channel Modicon Telefast ABE7 Optimum or Universal passive connection sub-bases or adaptor sub-bases.

4 4 types of cordset are available depending on the type of analog module connected to the sub-base (for combinations, see page 5/11).

□ **4-b** : Connection to analog module with removable terminal block 20-way or 28-way:
- **BMXFCA●●0** cordsets with a 20-way removable terminal block on the module end and a 25-way SUB-D connector on the Telefast sub-base end Cordsets available in 1.5, 3 or 5 m lengths.
- **BMXFTA●●2** cordsets with a 20-way removable terminal block on the module end and a 25-way SUB-D connector on the Telefast sub-base end Cordsets available in 1.5 or 3 m lengths.
- **BMXFTA●●0** cordsets with a 28-way removable terminal block on the module end and a 25-way SUB-D connector on the Telefast sub-base end Cordsets available in 1.5 or 3 m lengths.

□ **4-c** : Connection to analog module with 40-way FCN connector:
- **BMXFCA●●2** cordsets with a 40-way FCN connector on the module end and a 25-way SUB-D connector on the Telefast sub-base end Cordsets available in 1.5, 3 or 5 m lengths.

5 Modicon Telefast ABE7CPA analog and application-specific connection sub-bases (for combinations, see pages 5/11):
- **ABE7CPA410** allows connection on a screw terminal block of 4 current/voltage inputs, with provision and distribution of 4 isolated protected power supplies for the current loop inputs
- **ABE7CPA412** allows connection on a screw terminal block of 4 thermocouple inputs, with supply of cold-junction compensation for these inputs
- **ABE7CPA21** allows connection on a screw terminal block of 4 current/voltage outputs
- **ABE7CPA02** allows connection on a screw terminal block of 8 current/voltage I/O
- **ABE7CPA03** allows connection on a screw terminal block of 8 inputs, with provision and distribution of the power supply (with limitation of each current loop) for the current/voltage outputs of the **BMXAMO0210** analog module
- **ABE7CPA31, ABE7CPA31E** allows connection on a screw terminal block (ABE7CPA31) or a spring-type terminal block (ABE7CPA31E) of 8 inputs, with provision and distribution of the power supply (limited to 25 mA per input)

6 **ABE7ACC02** sub-base for splitting 16 into 2 x 8 channels, allowing connection of 8-channel sub-bases.

7 8-channel Modicon Telefast ABE7 Optimum or Universal passive connection sub-bases or adaptor sub-bases.

Connection interfaces
Modicon Telefast ABE7 pre-wired system
Modicon X80 I/O modules with ABE7 sub-bases

Combinations of discrete inputs/outputs on the Modicon X80 platform with ABE7 sub-bases.

(items 1…7), see Presentation on page 5/8

		Discrete I/O modules on the Modicon X80 platform				
		Reference for 24 V ⎓ discrete I/O modules (item 1)				
		Inputs		Outputs		Inputs/outputs
		2 x 16 I	4 x 16 I	2 x 16 Q	4 x 16 Q	1 x 16 I, 1 x 16 Q
		BMXDDI3202K	BMXDDI6402K	BMXDDO3202K	BMXDDO6402K	BMXDDM3202K
Required cordsets						
Preassembled cordsets (at both ends)	**BMXFCC●●1, BMXFCC●●3 (item 2)** *(1)*	Yes	Yes	Yes	Yes	No
	BMXFCC●●3 (item 2) *(1)*	No	No	No	No	Yes
	Quantities to be ordered	1	2	1	2	1
Passive connection sub-bases						
Optimum 16 channels (item 3)	**ABE7H34E●00 "economy"** *(2)*					
	ABE7H16C●● "miniature"					
Universal 8 channels (item 7)	**ABE7H08R●●**	*(3)*	*(3)*	*(3)*	*(3)*	*(3)*
	ABE7H08S21	*(3)*	*(3)*	*(3)*	*(3)*	*(3)*
Universal 16 channels (item 3)	**ABE7H16R1●●**					
	ABE7H16R50●					
	ABE7H16R2●●					
	ABE7H16S21●					
	ABE7H16R3●					
	ABE7H16R23					
	ABE7H16S43					
	ABE7H16F43					
Input adaptor sub-bases with solid state relays						
Universal 16 channels (item 3)	**ABE7S16E2●●●** Fixed solid state relays, removable terminal blocks					
	ABE7P16F31● Plug-in solid state relays					
Output adaptor sub-bases with fixed relays, removable terminal blocks						
Optimum & Universal 8 channels (item 7)	**ABE7S08S2B●●** Solid state relays			*(3)*	*(3)*	*(3)*
	ABE7R08S111●, ABE7R08S21●● Electromechanical relays			*(3)*	*(3)*	*(3)*
Optimum & Universal 16 channels (item 3)	**ABE7S16S●B●●** Solid state relays					
	ABE7R16S111●, ABE7R16S210●, ABE7R16S212 Electromechanical relays					
Output adaptor sub-bases with plug-in relays						
Universal 8 channels (item 7)	**ABE7P08T330●** Solid state relays			*(3)*	*(3)*	*(3)*
Optimum & Universal 16 channels (item 3)	**ABE7R16T●●●, ABE7R16M111** Electromechanical relays					
	ABE7P16T●●● Solid state and/or electromechanical relays					
Sub-bases for analog I/O						
4 channels (item 5)	**ABE7CPA410**					
	ABE7CPA412					
2 channels (item 5)	**ABE7CPA21**					
8 channels (item 5)	**ABE7CPA02**					
	ABE7CPA03					
	ABE7CPA31, ABE7CPA31E					

Compatible
Not compatible

(1) References for cordsets: to be completed, see page 2/23.
(2) ABE7H34E●00 "economy" sub-bases: the cordset is supplied.
(3) Via the splitter sub-base 6 **ABE7ACC02** *used to separate 16 channels into 2 x 8 channels*

Connection interfaces
Modicon Telefast ABE7 pre-wired system
ABE7 interfaces with Modicon X80 I/O modules

Combinations of analog inputs/outputs on the Modicon X80 platform with ABE7 sub-bases

(items 1…7), see Presentation on page 5/8

		Analog I/O modules on the Modicon X80 platform							
		Reference for analog I/O modules (item 1-b and 1-c)							
		Inputs					Outputs		
		4 I	4 I	2 x 4 I	8 I	8 I	2 Q	4 Q	8 Q
		BMXAMI 0410	**BMXART 0414**	**BMXART 0814**	**BMXAMI 0800**	**BMXAMI 0810**	**BMXAMO 0210**	**BMXAMO 0410**	**BMXAMO 0802**
Required cordsets									
Preassembled cordsets (at both ends)	**BMXFCA●●0 (item 4-b)** *(1)*	Yes	No	No	No	No	Yes	Yes	No
	BMXFCA●●2 (item 4-c) *(1)*	No	Yes	Yes	No	No	No	No	Yes
	BMXFTA●●0 (item 4-c) *(1)*	No	No	No	Yes	Yes	No	Yes	No
	BMXFTA●●2 (item 4-c) *(1)*	No	No	No	No	No	No	No	Yes
	Quantities to be ordered	1	1	2	1	1	1	1	1
Passive connection sub-bases									
Optimum 16 channels (item 3)	**ABE7H16C●● "miniature"**								
Universal 8 channels (item 7)	**ABE7H08R●●**								
	ABE7H08S21								
Universal 16 channels (item 3)	**ABE7H16R1●●**								
	ABE7H16R50●								
	ABE7H16R2●●								
	ABE7H16S21●								
	ABE7H16R3●								
	ABE7H16R23								
	ABE7H16S43								
	ABE7H16F43								
Input adaptor sub-bases with solid state relays									
Universal 16 channels (item 3)	**ABE7S16E2●●●** Fixed solid state relays, removable terminal blocks								
	ABE7P16F31● Plug-in solid state relays								
Output adaptor sub-bases with fixed relays, removable terminal blocks									
Optimum & Universal 8 channels (item 7)	**ABE7S08S2B●●** Solid state relays								
	ABE7R08S111●, ABE7R08S21●● Electromechanical relays								
Optimum & Universal 16 channels (item 3)	**ABE7S16S●B●●** Solid state relays								
	ABE7R16S111●, ABE7R16S210●, ABE7R16S212 Electromechanical relays								
Output adaptor sub-bases with plug-in relays									
Universal 8 channels (item 7)	**ABE7P08T330●** Solid state relays								
Optimum & Universal 16 channels (item 3)	**ABE7R16T●●●, ABE7R16M111** Electromechanical relays								
	ABE7P16T●●● Solid state and/or electromechanical relays								
Sub-bases for analog I/O									
4 channels (item 5)	**ABE7CPA410**	■							
	ABE7CPA412		■	■					
2 channels (item 5)	**ABE7CPA21**						■	■	
8 channels (item 5)	**ABE7CPA02**				■	■			■
	ABE7CPA03				■				
	ABE7CPA31, ABE7CPA31E				■	■			

■ Compatible

Not compatible

(1) References for cordsets: to be completed, see page 2/33.

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Connection interfaces
Modicon Telefast ABE7 pre-wired system
Passive connection sub-bases

ABE7H20E●●●

Passive connection sub-bases for discrete signals

Optimum "Economy" sub-bases

Function	No. of channels	No. of terminals per channel	No. of terminals on row number	For PLCs	Length of PLC connection cable	Type of connection	Reference	Weight kg
Input or output	16	1	2	Modicon TSX Micro Modicon Premium	1 m	Screw	**ABE7H20E100**	0.330
					2 m	Screw	**ABE7H20E200**	0.410
					3 m	Screw	**ABE7H20E300**	0.480
				Siemens S7	1.5 m	Screw	**ABE7H32E150**	0.360
					3 m	Screw	**ABE7H32E300**	0.460

Optimum "Miniature" sub-bases

Function	No. of channels	No. of terminals per channel	No. of terminals on row number	LED per channel	Polarity distribution	Type of connection	Reference	Weight kg
Input or output	16	1	1	No	No	Screw	**ABE7H16C10**	0.160
				Yes	No	Screw	**ABE7H16C11**	0.160
		2	2	Yes	0 or 24 V	Screw	**ABE7H16C21**	0.205
		3	3	Yes	0 or 24 V	Screw	**ABE7H16C31**	0.260
Input and output *(1)*	16	1	1	Yes	No	Screw	**ABE7H16CM11**	0.160
		2	2	Yes	0 or 24 V	Screw	**ABE7H16CM21**	0.200

ABE7H16C21

ABE7H16CM21

(1) 8 I + 8 Q: these products have 2 common connections which enable inputs and outputs to be connected to the same sub-base at the same time.

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Connection interfaces
Modicon Telefast ABE7 pre-wired system
Passive connection sub-bases

ABE7H●●R1●

Passive connection sub-bases for discrete signals (continued)

Universal sub-bases

Function	No. of channels	No. of terminals per channel	No. of terminals on row number	LED per channel	Polarity distribution	Isolator (I) Fuse (F) per channel	Type of connection	Reference	Weight kg
Input or output	8	1	1	No	No	–	Screw	**ABE7H08R10**	0.187
				Yes	No	–	Screw	**ABE7H08R11**	0.187
		2	2	Yes	0 or 24 V	–	Screw	**ABE7H08R21**	0.218
						I	Screw	**ABE7H08S21**	0.245
	12	1	1	No	No	–	Screw	**ABE7H12R10**	0.274
				Yes	No	–	Screw	**ABE7H12R11**	0.274
			2	No	No	–	Screw	**ABE7H12R50**	0.196
		2	2	No	0 or 24 V	–	Screw	**ABE7H12R20**	0.300
				Yes	0 or 24 V	–	Screw	**ABE7H12R21**	0.300
						I	Screw	**ABE7H12S21**	0.375
	16	1	1	No	No	–	Screw	**ABE7H16R10**	0.274
				Yes	No	–	Screw	**ABE7H16R11**	0.274
			2	No	No	–	Screw	**ABE7H16R50**	0.196
		2	2	No	0 or 24 V	–	Screw	**ABE7H16R20**	0.300
				Yes	0 or 24 V	–	Screw	**ABE7H16R21**	0.300
						I	Screw	**ABE7H16S21**	0.375
		3	3	No	0 or 24 V	–	Screw	**ABE7H16R30**	0.346
				Yes	0 or 24 V	–	Screw	**ABE7H16R31**	0.346
Input type 2 *(1)*	16	2	2	Yes	0 or 24 V	–	Screw	**ABE7H16R23**	0.320
Input	16	2	1	Yes	24 V	I, F *(2)*	Screw	**ABE7H16S43**	0.640
Output	16	2	1	Yes	0 V	I, F *(2)*	Screw	**ABE7H16F43**	0.640

(1) For TSX Micro, Modicon Premium.
(2) With LED to indicate blown fuse.

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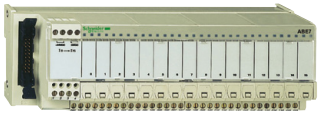
Connection interfaces

Modicon Telefast ABE7 pre-wired system

Adaptor sub-bases with fixed relays and removable terminal blocks



ABE7H16E2●●

Adaptor sub-bases with fixed solid state relays, removable terminal blocks

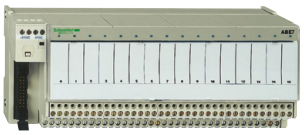
Universal input sub-bases with solid state relays

Number of channels	No. of terminals per channel	Isolation of PLC/ Operative part	Voltage	Type of connection	Reference	Weight kg
16	2	Yes	⎓ 24 V	Screw	**ABE7S16E2B1**	0.370
				Spring	**ABE7S16E2B1E**	0.370
			⎓ 48 V	Screw	**ABE7S16E2E1**	0.370
			∿ 48 V	Screw	**ABE7S16E2E0**	0.386
			∿ 110 V	Screw	**ABE7S16E2F0**	0.397
			∿ 230 V	Screw	**ABE7S16E2M0**	0.407
				Spring	**ABE7S16E2M0E**	0.407

Universal output sub-bases with solid state relays

Number of channels	Isolation of PLC/ Operative part	Output voltage	Output current	Fault detection signal *(1)*	Type of connection	Reference	Weight kg
16	No	24 V ⎓	0.5 A	Yes *(2)*	Screw	**ABE7S16S2B0**	0.405
					Spring	**ABE7S16S2B0E**	0.405
				No	Screw	**ABE7S16S1B2**	0.400
					Spring	**ABE7S16S1B2E**	0.400

Optimum and Universal output sub-bases with electromechanical relays



ABE7R08S216

Number of channels	Number of contacts	Output current	Polarity distribution/ operative part	Type of connection	Reference	Weight kg
8	1 N/O	2 A	Contact common per group of 4 channels	Screw	**ABE7R08S111**	0.252
	Latching	2 A	Volt-free	Screw	**ABE7R08S216**	0.448
	1 N/O	5 A	Volt-free	Screw	**ABE7R08S210**	0.448
16	1 N/O	2 A	Contact common per group of 8 channels	Screw	**ABE7R16S111**	0.405
				Spring	**ABE7R16S111E**	0.405
	1 N/O	5 A	Volt-free	Screw	**ABE7R16S210**	0.405
				Spring	**ABE7R16S210E**	0.405
			Common per group of 8 channels on both poles	Screw	**ABE7R16S212**	0.400

(1) A fault on a sub-base output Qn will set PLC output Qn to safety mode, which will be detected by the PLC.
(2) Can only be used with modules with protected outputs.

Connection interfaces

Modicon Telefast ABE7 pre-wired system

Input/output adaptor sub-bases for or with plug-in relays

ABE7R16M111

ABE7R16T210

Adaptor sub-bases with plug-in relays

Universal input sub-bases for solid state relays, supplied without relays

Number of channels	No. of terminals per channel	For relay type	Isolation of PLC/ Operative part	Input connection	Type of connection	Reference	Weight kg
16	2	ABS7E ABR7 ABS7S33E	Yes	Volt-free	Screw	**ABE7P16F310**	0.850
				Polarity distribution	Screw	**ABE7P16F312**	0.850

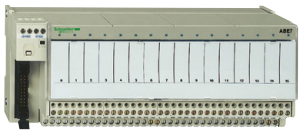
Optimum and Universal output sub-bases, supplied with electromechanical relays *(1)*

Number of channels	Relay width	Relay type supplied	Number and type of contacts	Polarity distribution/operative part	Reference	Weight kg
16	5 mm	ABR7S11	1 N/O	Contact common per group of 4 channels	**ABE7R16T111**	0.600
				Contact common per group of 4 output channels + 2 common input terminals	**ABE7R16M111** *(2)*	0.600
	10 mm	ABR7S21	1 N/O	Volt-free	**ABE7R16T210**	0.735
				Common on both poles *(3)*	**ABE7R16T212**	0.730
		ABR7S23	1 C/O	Volt-free	**ABE7R16T230**	0.775
				Contact common *(3)*	**ABE7R16T231**	0.730
	12 mm	ABR7S33	1 C/O	Volt-free	**ABE7R16T330**	1.300
				Common on both poles *(4)*	**ABE7R16T332**	1.200
		ABR7S37	2 C/O	Volt-free	**ABE7R16T370**	1.300

(1) The sub-bases are supplied as standard with electromechanical relays, all or part of which can be replaced by solid state relays of the same width (it is possible to combine these different technologies on a single sub-base).
(2) Two connection methods are available, enabling inputs and outputs to be connected to the same sub-base at the same time.
(3) Per group of 8 channels.
(4) Per group of 4 channels.

5

Connection interfaces
Modicon Telefast ABE7 pre-wired system
Output adaptor sub-bases for plug-in relays



ABE7P16T2●●

Output adaptor sub-bases for plug-in relays

Optimum and Universal output sub-bases for solid state relays and/or electromechanical relays *(1)*

No. of channels	Relay width	For relay type	Isolator per channel	Fuse per channel	Polarity distribution/ operative part	Type of connection	Reference	Weight
	mm							kg
16	5 mm	ABR7S11 ABS7SC1B	No	No	Contact common per group of 4 channels	Screw	**ABE7P16T111**	0.550
	10 mm	ABR7S2● ABS7SA2● ABS7SC2● ABE7ACC20	No	No	Volt-free	Screw	**ABE7P16T210** *(2)*	0.615
							ABE7P16T230 *(2)*	0.655
				Yes	Volt-free	Screw	**ABE7P16T214**	0.675
				No	Common on both poles *(3)*	Screw	**ABE7P16T212**	0.615
				Yes	Common on both poles *(3)*	Screw	**ABE7P16T215**	0.670
8	12 mm	ABR7S33 ABS7A3● ABS7SC3●● ABE7ACC21	No	No	Volt-free	Screw	**ABE7P08T330**	0.450
16	12 mm	ABR7S33 ABS7A3● ABS7SC3●● ABE7ACC21	No	No	Volt-free	Screw	**ABE7P16T330**	0.900
					Common on both poles *(4)*	Screw	**ABE7P16T332**	0.900
		ABR7S33 ABS7A3M ABS7SC3E ABE7ACC21	No	Yes	Volt-free	Screw	**ABE7P16T334**	0.900
			Yes	Yes	Common on both poles *(4)*	Screw	**ABE7P16T318**	1.000

(1) Not equipped with relays.
(2) With relay ABR7S21 for sub-base ABE7P16T210, with relay ABR7S23 for sub-base ABE7P16T230●.
(3) Per group of 8 channels.
(4) Per group of 4 channels.

Connection interfaces

Modicon Telefast ABE7 pre-wired system

Plug-in relays

571152

ABS7SC1B

Plug-in solid state relays

Relay width	Functions	Input circuit		Output circuit		Unit reference	Weight
		Current	Nominal voltage	Current	Nominal voltage	Order in lots of 4	kg
5 mm	Output	⎓	24 V	2 A	24 V ⎓	**ABS7SC1B**	0.010
10 mm	Output	⎓	24 V	0.5 A	5…48 V ⎓	**ABS7SC2E**	0.016
					24…240 V ∿	**ABS7SA2M**	0.016
12 mm	Input	⎓	5 V TTL	–	24 V ⎓	**ABS7EC3AL**	0.014
			24 V Type 2	–	24 V ⎓	**ABS7EC3B2**	0.014
			48 V Type 2	–	24 V ⎓	**ABS7EC3E2**	0.014
		50 Hz ∿	48 V	–	24 V ⎓	**ABS7EA3E5**	0.014
		60 Hz ∿	110…130 V	–	24 V ⎓	**ABS7EA3F5**	0.014
		50 Hz ∿	230…240 V	–	24 V ⎓	**ABS7EA3M5**	0.014
	Output	⎓	24 V	2 A Self-protected	24 V ⎓	**ABS7SC3BA**	0.016
				1.5 A	5…48 V ⎓	**ABS7SC3E**	0.016
				1.5 A	24…240 V ∿	**ABS7SA3MA**	0.016

816476

ABR7S2●

816474

ABR7S3●

Plug-in electromechanical relays

Relay width	Control voltage	Output current *(1)*	Number of contacts	Order in lots of	Unit reference	Weight kg
5 mm	24 V ⎓	5 A (Ith)	1 N/O	4	**ABR7S11**	0.005
10 mm	24 V ⎓	5 A (Ith)	1 N/O	4	**ABR7S21**	0.008
			1 C/O	4	**ABR7S23**	0.008
12 mm	2 V ⎓	10 A (Ith)	1 C/O	4	**ABR7S33**	0.017
		8 A (Ith)	2 C/O	4	**ABR7S37**	0.017
	48 V ⎓	8 A (Ith)	1 C/O	4	**ABR7S33E**	0.017

Accessory

Description	Reference	Weight kg
Extractor for 5 mm miniature relay	**ABE7ACC12**	0.010

Connection interfaces

Modicon Telefast ABE7 pre-wired system

Connection sub-bases for analog channels and application-specific channels

ABE7CPA01

ABE7CPA11

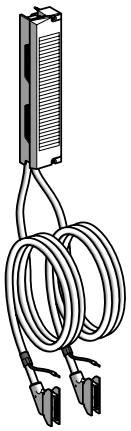
ABE7CPA21
ABE7CPA410
ABE7CPA412

Connection sub-bases for counter and analog channels

Functions	For PLCs	Compatible modules	Type of connection on Telefast end	Type of connection	Reference	Weight kg
Analog and counter	TSX Micro	Analog and integrated counter TSX3722 TSXCTZ●A	15-way SUB-D	Screw	**ABE7CPA01**	0.300
Counter, axis control, position control	Modicon Premium	TSXCTY●A TSXCAY●1	15-way SUB-D	Screw	**ABE7CPA01**	0.300
Connection of absolute encoder with parallel output	Modicon Premium	TSXCTY●A TSXCAY●1	15-way SUB-D	Screw	**ABE7CPA11**	0.330
Distribution of 4 thermocouples	Modicon M340	BMXART0414 BMXART0814	25-way SUB-D	Screw	**ABE7CPA412**	0.180
Distribution of 16 thermocouples	Modicon Premium	TSXAEY1614	25-way SUB-D	Screw	**ABE7CPA12**	0.300
Passive distribution of 8 analog EIS channels on screw terminals, with shield continuity	Modicon Premium	TSXASY800 TSXAEY1600 TSXA●Y800	25-way SUB-D	Screw	**ABE7CPA02**	0.290
	Modicon M340	BMXAMI0800 BMXAMI0810 BMXAMO0802				
	Modicon Quantum	140AVI03000 140ACI03000 140ACI04000 140ACO13000				
Provision and distribution of protected isolated power supplies for 4 analog input channels	Modicon M340	BMXAMI0410	25-way SUB-D	Screw	**ABE7CPA410**	0.180
Distribution of 4 analog output channels	Modicon Premium	TSXASY410 TSXAEY420	25-way SUB-D	Screw	**ABE7CPA21**	0.210
	Modicon M340	BMXAMO0410				
	Modicon Quantum	140AVO02000 140ACO02000				
Distribution and supply of 8 analog input channels with limitation of each current loop	Modicon Premium	TSXAEY800 TSXAEY1600	25-way SUB-D	Screw	**ABE7CPA03**	0.330
	Modicon Quantum	140AVI03000 140ACI03000 140ACI04000				
Distribution and supply of 8 analog input channels isolated from one another with 25 mA/ channel limitation	Modicon Premium	TSXAEY810	25-way SUB-D	Screw	**ABE7CPA31**	0.410
	Modicon M340	BMXAMI0800 BMXAMI0810 BMXAMO0802		Spring	**ABE7CPA31E**	0.410
	Modicon Quantum	140AVI03000 140ACI03000 140ACI04000				
Safety	Modicon Premium	TSXPAY2●2	25-way SUB-D	Screw	**ABE7CPA13**	0.290

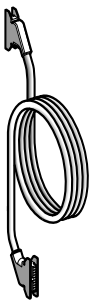
Connection interfaces
Modicon Telefast ABE7 pre-wired system
Cabled connectors for Modicon Quantum I/O modules

816500



ABFM32H●●1

570464



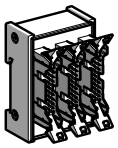
TSXCDP●03

Cabled connectors for Modicon Quantum I/O modules

Type of signal	I/O modules	Type of connector	Gauge	Cross-section	Length	No. of channels	Reference	Weight
			AWG	mm²	m			kg
Inputs and relay outputs	See our Quantum catalogue	2 x 20-way HE10	22	0.324	1.5	2 x 16	**ABFM32H150**	0.650
					3	2 x 16	**ABFM32H300**	1.150
0.5 A outputs	See our Quantum catalogue	2 x 20-way HE10 + external power supply	22	0.324	1.5	2 x 16	**ABFM32H151**	0.650
					3	2 x 16	**ABFM32H301**	1.150
Inputs or outputs (96 channels)	140DDI36400 140DDO36400	2 x 20-way HE10	22	0.324	0.5	6 x 16	**TSXCDP053**	0.085
					1	6 x 16	**TSXCDP103**	0.150
					2	6 x 16	**TSXCDP203**	0.280
					3	6 x 16	**TSXCDP303**	0.410
					5	6 x 16	**TSXCDP503**	0.670
Analog inputs	140AVI03000 140ACI03000	1 x 25-way SUB-D	24	0.22	2	8	**ABFM08S201**	0.600
	140ACI04000	2 x 25-way SUB-D	24	0.22	2	16	**ABFM16S201**	0.620
Analog outputs	140AVO02000	1 x 25-way SUB-D	24	0.22	2	4	**ABFM04S200**	0.450
	140ACO02000	1 x 25-way SUB-D	24	0.22	2	4	**ABFM04S201**	0.450
	140ACO13000	1 x 25-way SUB-D	24	0.22	2	8	**ABFM04S202**	0.450

5

Connection interfaces
Modicon Telefast ABE7 pre-wired system
Accessories for connection sub-bases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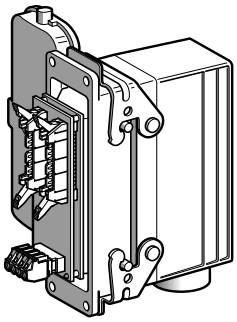
ABE7ACC02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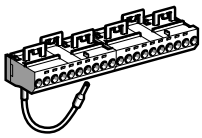
ABE7ACC80 + ABE7ACC81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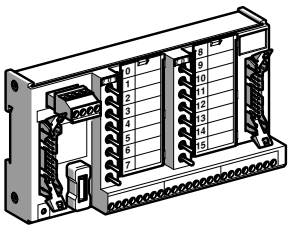
ABE7BV20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ABE7TES160

Accessories

Description	No. of channels	Characteristics	Order in multiples of	Unit reference	Weight kg
Kit for fixing on solid plate	–	–	10	**ABE7ACC01**	0.008
Splitter sub-base	–	16 as 2 x 8 channels	1	**ABE7ACC02**	0.075
Redundant output sub-base	–	16 as 2 x 16 channels	1	**ABE7ACC10**	0.075
Redundant input sub-base	–	16 as 2 x 16 channels	1	**ABE7ACC11**	0.075
Plug-in continuity blocks	–	Width 10 mm	4	**ABE7ACC20**	0.007
		Width 12 mm	4	**ABE7ACC21**	0.010
Enclosure feedthrough with CNOMO M23 connector (1 x 20-way HE 10 connector, PLC end)	16	19-way	1	**ABE7ACC82**	0.150
Impedance adaptor for compatibility Type 2	–	Used with ABE7ACC82 and ABE7ACC83	1	**ABE7ACC85**	0.012
IP 65 cable gland	–	For 3 cables	5	**ABE7ACC84**	0.300
Additional snap-on terminal blocks (shunted terminals)	8	10 screw terminals	5	**ABE7BV10**	0.030
	16	20 screw terminals	5	**ABE7BV20**	0.060
I/O simulator sub-base	16	For display, forcing, inhibition, continuity	1	**ABE7TES160**	0.350
Self-adhesive marker tag holder	–	For 6 characters	50	**AR1SB3**	0.001
Quick-blow fuses 5 x 20, 250 V, UL	–	0.125 A	10	**ABE7FU012**	0.010
		0.5 A	10	**ABE7FU050**	0.010
		1 A	10	**ABE7FU100**	0.010
		2 A	10	**ABE7FU200**	0.010
		4 A	10	**ABE7FU400**	0.010
		6.3 A	10	**ABE7FU630**	0.010

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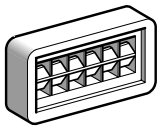
Connection interfaces
Modicon Telefast ABE7 pre-wired system
Accessories for connection sub-bases

816479



AR1SB3

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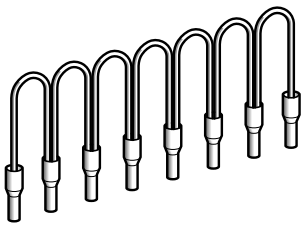

ABEC08R●●●

Commoning link accessories

Description	For common	Colour	Distance between cable ends	Reference	Weight kg
Commoning links Modularity 8 x 1 mm²	Coil	White	12 cm	**ABFC08R12W**	0.020
			2 cm	**ABFC08R02W**	0.010
	~	Red	12 cm	**ABFC08R12R**	0.020
			2 cm	**ABFC08R02R**	0.010
	⎓	Blue	12 cm	**ABFC08R12B**	0.020
			2 cm	**ABFC08R02B**	0.010

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Contents

6 - Ruggedized Modicon M340 modules

Modicon M340 automation platform

Treatment for severe environments

Ruggedized modules

Presentation

Protective treatment of Modicon M340 PLCs

Modicon M340 PLCs comply with "**TC**" treatment requirements (**T**reatment for all **C**limates). They are designed as standard to operate in temperatures of 0 to + 60°C.

For installations in industrial production workshops or environments corresponding to "**TH**" (**T**reatment for **H**ot and humid environments), PLCs must be housed in enclosures providing at least IP 54 protection as specified by standard IEC/EN 60529, or an equivalent level of protection according to NEMA 250.

Modicon M340 PLCs themselves offer **IP 20 degree of protection** *(1)*. They can therefore be installed without an enclosure in reserved access areas that do not exceed **pollution level 2** (control room with no dust-producing machinery or activity). **Pollution level 2** does not take account of harsher environments, such as those where the air is polluted with dust, fumes, corrosive or radioactive particles, vapours or salts, moulds, insects, etc.

Treatment for more severe environments

If the Modicon M340 automation platform has to be used in more severe environments or is required to start and operate in an extended temperature range, from **- 25°C to + 70°C**, the "***ruggedized***" offer features industrially hardened processor and power supply modules, Bus X I/O modules and racks which have protective coating on all their circuit boards.

***Note**: Capable of **starting** within an extended temperature range (from **- 25°C to + 70°C**), a single-rack configuration is also able to **operate at extremely low temperatures (to - 40°C)** if placed in an appropriate enclosure. Please consult our Customer Care Centre.*

This treatment increases the isolation capability of the circuit boards and their resistance to:
- Condensation
- Dusty atmospheres (conducting foreign particles)
- Chemical corrosion, in particular during use in sulphurous atmospheres (oil refinery, purification plant, etc.) or atmospheres containing halogens (chlorine, etc.)

This protection, combined with appropriate installation and maintenance, enables Modicon M340 products to be used in the following environments:
- **Harsh chemical environments:**
  - **IEC/EN 60721-3-3 class 3C3:**
    - 14 days; 25°C/relative humidity 75%
    - Concentrations (mm^3/m^3): H_2S: 2100/SO_2: 1850/Cl_2: 100
  - **ISA S71.04 classes G1 to G3:**
    - 14 days; 25°C/relative humidity 75%
    - Concentrations (mm^3/m^3): H_2S: 50/SO_2: 300/Cl_2: 10/NO_2: 1250
  - **IEC/EN 60068-2-52 salt mist, Kb test severity level 2:**
    - 3 x 24-hour cycles
    - 5% NaCl
    - 40°C/relative humidity 93%
- **Extreme climatic environments:**
  - Temperatures from - 25 to + 70°C
  - Relative humidity levels up to 93% (95% depending on the device), from + 25 to + 70°C during operation
  - Formation of ice
  - Altitudes from 0 to 5000 m

Three modules are specifically designed for extended temperature ranges from **- 25** to **+ 70°C** (the product references include the suffix "T") :
- 125 V ⎓ power supply module **BMXCPS3540T** (see page 2/11)
- 125 V ⎓ discrete input module, 16 channels, **BMXDDI1604T** (see page 2/22)
- 125 V ⎓ discrete relay output module, 8 channels, **BMXDRA0804T** (see page 2/22)

*(1) Each slot in a **BMXXSP●●●0** rack is equipped as standard with a protective cover that should only be removed when inserting a module. If any covers are subsequently misplaced, replacements can be ordered under reference **BMXXEM010** (sold in lots of 5).*

BMXP341000H

BMXP342020H

BMXP3420302H

BMXRMS008MPF/128MPF

Presentation (continued)

References and characteristics

To order ruggedized modules and racks, see the reference pages 6/3 to 6/9 (the references of the ruggedized products available include the suffix "**H**").
All standard separate parts (cordsets, cables, memory cards, sub-bases, etc.) which are compatible with the ruggedized modules offer are listed in the reference pages (see pages 6/3 to 6/9).

The majority of operating and electrical characteristics of ruggedized modules are identical to those of their equivalent standard versions. However, some characteristics are subject to either derating or limitation. Please consult our website www.schneider-electric.com.

BMXP34 Modicon M340 ruggedized processors *(1)*

Modicon M340 processor modules are supplied with the **BMXRMS008MP** Flash memory card. This card performs the following actions transparently:
■ Backup of the application (program, symbols and constants) supported in the processor's internal RAM which is not backed up
■ Activation of the Transparent Ready class B10 standard Web server with **BMXP341000H** Standard processors and **BMXP342020H**/**20302H** Performance processors.
This card can be replaced by either of the **BMXRMS008MPF or BMXRMS128MPF** cards which feature a file storage option.

Max. capacity	Memory capacity	Max. no. of network modules	Integrated communication ports	Reference	Weight kg
2 racks 512 discrete I/O 128 analog I/O 20 application-specific channels	2048 KB integrated	2 Ethernet networks	Modbus serial link	**BMXP341000H**	0.200
4 racks 1024 discrete I/O 256 analog I/O 36 application-specific channels	4096 KB integrated	2 Ethernet networks	Modbus serial link Ethernet network	**BMXP342020H**	0.205
			Ethernet network CANopen bus	**BMXP3420302H**	0.215

Standard memory cards

Description	Processor compatibility	Capacity	Reference	Weight kg
Flash memory cards *(2)*	BMXP342020H BMXP3420302H	8 MB/8 MB files	**BMXRMS008MPF**	0.002
		8 MB/128 MB files	**BMXRMS128MPF**	0.002

(1) General characteristics are the same as those of the standard equivalent versions (see page 1/4).
(2) Cards to replace the memory card supplied as standard with each processor, used for:
- Backing up the program, constants, symbols and data
- File storage
- Activation of class B10 Web server

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Modicon M340 automation platform

Dedicated parts for severe environments

Ruggedized processor modules and ruggedized power supply modules

BMXXCAUSBH0●●

Standard separate parts

Description	Use		Length	Reference	Weight kg
	From	To			
Terminal port/USB cordsets	Mini B USB port on the Modicon M340 processor	Type A USB port on: - PC terminal - Magelis XBTGT/ GK/GTW, GTWHMI, STU/STOHMI graphic terminal	1.8 m	**BMXXCAUSBH018**	0.065
			4.5 m	**BMXXCAUSBH045**	0.110

Standard replacement part

Description	Use	Processor compatibility	Reference	Weight kg
8 MB Flash memory card	Supplied as standard with each processor. Used for: - Backing up the program, constants, symbols and data - Activation of class B10 Web server	BMXP342020H BMXP3420302H	**BMXRMS008MP**	0.002

Ruggedized power supply modules

Each **BMXXBP●●00H** rack must be equipped with a power supply module. These modules are inserted in the first two slots of each rack (marked CPS).
The available power values given below in ***bold italic*** correspond to operation at - 25°C and + 70°C (see temperature derating curves on our website www.schneider-electric.com).
The power required to supply each rack depends on the type and number of modules installed in the rack. It is therefore necessary to draw up a power consumption table for each rack in order to determine which is the most appropriate **BMXCPS●●●0H** power supply module for your requirements (see page 7/22).

BMXCPS3020H

BMXCPS3500H

Power supply modules (1)

Line supply	Available power (2)				Reference	Weight kg
	3.3 V ⎓ (3)	24 V ⎓ rack (3)	24 V ⎓ sensors (4)	Total		
24...48 V ⎓ isolated	15 W ***11.3 W***	31.2 W ***23.4 W***	–	31.2 W ***23.4 W***	**BMXCPS3020H**	0.340
100...240 V ∿	15 W ***11.3 W***	31.2 W ***23.4 W***	21.6 W ***16.2 W***	36 W ***27 W***	**BMXCPS3500H**	0.360

Standard separate part

Description	Type	Composition	Reference	Weight kg
Set of 2 removable connectors	Spring-type	One 5-way terminal block and one 2-way terminal block	**BMXXTSCPS20**	0.015

Standard replacement part

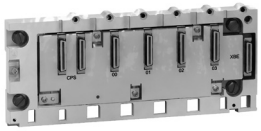
Description	Type	Composition	Reference	Weight kg
Set of 2 removable connectors	Cage clamp	One 5-way terminal block and one 2-way terminal block	**BMXXTSCPS10**	0.020

*(1) Includes a set of 2 cage clamp removable connectors **BMXXTSCPS10.***
(2) The total power consumed on each voltage (3.3 V ⎓ and 24 V ⎓) must not exceed the total power of the module. See the power consumption table on page 7/22.
(3) 3.3 V ⎓ and 24 V ⎓ rack voltages for powering Modicon M340 PLC modules.
(4) 24 V ⎓ sensor voltage for powering the input sensors (voltage available via the 2-way removable connector on the front panel).

Modicon M340 automation platform

Dedicated parts for severe environments

Ruggedized racks and rack expansion module



BMXXBP0400H

BMXXBE1000H

BMXXSP0●00 + BMXXSP30●0

Angled connector on extension cordsets

TSXTLYEX

Ruggedized racks

Description	Type of module to be inserted	No. of slots *(1)*	Power consumption *(2)*	Reference	Weight kg
Ruggedized racks	BMXCPS power supply, BMXP34 processor, I/O modules and application-specific (counter and communication) modules	4	1 W	**BMXXBP0400H**	0.630
		6	1.5 W	**BMXXBP0600H**	0.790
		8	2 W	**BMXXBP0800H**	0.950
		12	0.74 W	**BMXXBP1200H**	1.270

Description	Use	Reference	Weight kg
Ruggedized rack expansion module *(3)*	Standard module to be installed in each rack (**XBE** slot) Used to daisy chain up to 4 racks	**BMXXBE1000H**	0.178

Standard accessories for racks

Description	For use with	Sold in lots of	Reference	Weight kg
Shielding connection kits comprising: - A metal bar - 2 support bases	BMXXBP0400H rack	–	**BMXXSP0400**	0.280
	BMXXBP0600H rack	–	**BMXXSP0600**	0.310
	BMXXBP0800H rack	–	**BMXXSP0800**	0.340
	BMXXBP1200H rack	–	**BMXXSP1200**	0.400
Spring clamping rings	Cables, cross-section 1.5...6 mm²	10	**STBXSP3010**	0.050
	Cables, cross-section 5...11 mm²	10	**STBXSP3020**	0.070
Protective covers (replacement parts)	Unoccupied slots on BMXXBP●●00H rack	5	**BMXXEM010**	0.005

Standard cordsets and connection accessories

Description	Use	Composition	Type of connector	Length	Weight kg
Bus X extension cordsets total length 30 m max. *(3)*	Between two BMXXBE1000H rack expansion modules.	2 x 9-way SUB-D connectors	Angled	0.8 m	0.165
				1.5 m	0.250
				3 m	0.420
				5 m	0.650
				12 m	1.440
			Straight	1 m	0.160
				3 m	0.260
				5 m	0.360
				12 m	1.260
				18 m	1.860
				28 m	2.860
Cable reel *(3)*	Length of cable to be fitted with TSXCBYK9 connectors.	Ends with flying leads, 2 line testers		100 m	12.320

Description	Use	Composition	Sold in lots of	Reference	Weight kg
Line terminator	Required on both BMXXBP●●●0H modules at each end of the daisy chain	2 x 9-way SUB-D connectors marked A/ and /B	2	**TSXTLYEX**	0.050
Bus X straight connectors	For ends of TSXCBY1000 cables	2 x 9-way SUB-D straight connectors	2	**TSXCBYK9**	0.080
Connector assembly kit	Fitting TSXCBYK9 connectors	2 crimping pliers, 1 pen *(4)*	–	**TSXCBYACC10**	–

(1) Number of slots taking the processor module, I/O modules and application-specific modules (excluding power supply module).

(2) Power consumption of anti-condensation resistor(s)

*(3) Module and cordsets do not operate properly at temperatures **lower than - 25°C**.*

(4) To fit the connectors on the cable, you also need a wire stripper, a pair of scissors and a digital ohmmeter.

Modicon M340 automation platform

Dedicated parts for severe environments

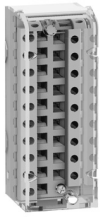
Ruggedized discrete I/O modules

BMXD●I160●H

BMXDDO16●2H

BMXDRA0805H/ 1605H

BMXDDM1602●H



BMXFTB2000

References

Ruggedized discrete input modules

Type of current	Input voltage	Connection via *(1)*	IEC/EN 61131-2 conformity	No. of channels (common)	Reference	Weight kg
⎓	24 V (positive logic)	Screw or spring-type 20-way removable terminal block	Type 3	16 isolated inputs (1 x 16)	**BMXDDI1602H**	0.115
	24 V (negative logic)	Screw or spring-type 20-way removable terminal block	Non-IEC	16 isolated inputs (1 x 16)	**BMXDAI1602H**	0.115
	48 V (positive logic)	Screw or spring-type 20-way removable terminal block	Type 1	16 isolated inputs (1 x 16)	**BMXDDI1603H**	0.115
∼	24 V	Screw or spring-type 20-way removable terminal block	Type 1	16 isolated inputs (1 x 16)	**BMXDAI1602H**	0.115
	48 V	Screw or spring-type 20-way removable terminal block	Type 3	16 isolated inputs (1 x 16)	**BMXDAI1603H**	0.115
	100…120 V	Screw or spring-type 20-way removable terminal block	Type 3	16 isolated inputs (1 x 16)	**BMXDAI1604H**	0.115

Ruggedized discrete output modules

Type of current	Output voltage	Connection via *(1)*	IEC/EN 61131-2 conformity	No. of channels (common)	Reference	Weight kg
⎓ **transistor**	24 V/0.5 A (positive logic)	Screw or spring-type 20-way removable terminal block	Yes	16 protected outputs (1 x 16)	**BMXDDO1602H**	0.120
	24 V/0.5 A (negative logic)	Screw or spring-type 20-way removable terminal block	–	16 protected outputs (1 x 16)	**BMXDDO1612H**	0.120
∼ **triac**	100…240	Screw or spring-type 20-way removable terminal block	–	16 outputs (4 x 4)	**BMXDAO1605H**	0.140
⎓ **or** ∼ **relay**	12…24 V ⎓/2 A 24…240 V ∼/2 A	Screw or spring-type 20-way removable terminal block	Yes	8 non-protected outputs (without common)	**BMXDRA0805H**	0.145
	24 V ⎓/2 A, 240 V ∼/2 A	Screw or spring-type 20-way removable terminal block	Yes	16 non-protected outputs (2 x 8)	**BMXDRA1605H**	0.150

Ruggedized mixed discrete I/O modules

Number of I/O	Connection via *(1)*	No. of input channels (common)	No. of output channels (common)	IEC/EN 61131-2 conformity	Reference	Weight kg
16	Screw or spring-type 20-way removable terminal block	8 (positive logic) (1 x 8)	8, transistor **24 V** ⎓ /0.5 A (1 x 8)	Inputs, type 3	**BMXDDM16022H**	0.115
			8, 24 V ⎓ or 24…240 V ∼ relay (1 x 8)	Inputs, type 3	**BMXDDM16025H**	0.135

Standard removable connection blocks

Description	Use	Type	Reference	Weight kg
20-way removable terminal blocks	For module with 20-way removable terminal block	Cage clamp	**BMXFTB2000**	0.093
		Screw clamp	**BMXFTB2010**	0.075
		Spring-type	**BMXFTB2020**	0.060

Standard preformed cordsets for I/O modules with removable terminal block

Description	Composition	Length	Reference	Weight kg
Preassembled cordsets with one end with flying leads	One 20-way spring-type removable terminal block (BMXFTB2020) One end with colour-coded flying leads	3 m	**BMXFTW301**	0.850
		5 m	**BMXFTW501**	1.400
		10 m	**BMXFTW1001**	2.780

(1) By connector, module supplied with cover(s)

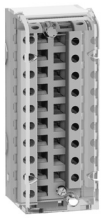
Modicon M340 automation platform

Dedicated parts for severe environments

Ruggedized analog I/O modules

BMXAM●0●●0H

BMXART0414H



BMXFTB20●0

BMXFTW●01S

ABE7CPA41●

BMXFCA●●0

BMXFCA●●2

References

Ruggedized analog input modules

Type of inputs	Input signal range	Resolution	Connection	No. of channels	Reference	Weight kg
Isolated high-level inputs	± 10 V, 0…10 V, 0…5 V, 1…5 V, ± 5 V 0…20 mA, 4…20 mA, ± 20 mA	16 bits	Via cage clamp, screw clamp or spring-type removable terminal block	4 high-speed channels	**BMXAMI0410H**	0.143
			Via cage clamp or spring-type removable terminal block	8 isolated high-speed channels	**BMXAMI0810H**	0.175
Non-isolated high-level inputs	± 10 V, 0…10 V, 0…5 V, 1…5 V, ± 5 V 0…20 mA, 4…20 mA, ± 20 mA	15 bits + sign	Via cage clamp or spring-type removable terminal block	8 isolated high-speed channels	**BMXAMI0800H**	0.175
Isolated low-level inputs	Temperature probe, thermocouple ± 40 mV, ± 80 mV, ± 160 mV, ± 320 mV, ± 640 mV, ± 1.28 V	15 bits + sign	40-way connector	4 channels	**BMXART0414H**	0.135
				8 channels	**BMXART0814H**	0.165

Ruggedized analog output module

Type of outputs	Output signal range	Resolution	Connection	No. of channels	Reference	Weight kg
Isolated high-level outputs	± 10 V, 0…20 mA, 4…20 mA	16 bits	Via cage clamp, screw clamp or spring-type removable terminal block	2 channels	**BMXAMO0210H**	0.144
				4 channels	**BMXAMO0410H**	0.175

Ruggedized mixed analog I/O module

Type of outputs	Signal range	Resolution	Connection	No. of channels	Reference	Weight kg
Mixed I/O, non-isolated	± 10 V, 0…10 V, 0…5 V, 1…5 V, 0…20 mA, 4…20 mA	14 bits or 12 bits depending on the range	Via cage clamp, screw clamp or spring-type removable terminal block	I: 4 channels Q: 2 channels	**BMXAMM0600H**	0.155

Standard connection accessories for analog modules *(1)*

Description	For use with modules	Type, composition	Length	Reference	Weight kg
20-way removable terminal blocks	BMXAMI0410H BMXAMO0210H BMXAMM0600H	Cage clamp	–	**BMXFTB2000**	0.093
		Screw clamp	–	**BMXFTB2010**	0.075
		Spring-type	–	**BMXFTB2020**	0.060
Preassembled cordsets	BMXAMI0410H BMXAMO0210H BMXAMM0600H	One 20-way removable terminal block (BMXFTB2020) One end with colour-coded flying leads	3 m	**BMXFTW301S**	0.470
			5 m	**BMXFTW501S**	0.700
	BMXART0414H BMXART0814H *(2)*	One 40-way connector One end with colour-coded flying leads	3 m	**BMXFCW301S**	0.480
			5 m	**BMXFCW501S**	0.710

Modicon Telefast ABE7 pre-wired system

Modicon Telefast ABE7 sub-bases	BMXAMI0410H	Distribution of isolated power supplies Delivers 4 protected isolated power supplies for 4...20 mA inputs Direct connection of 4 inputs	–	**ABE7CPA410**	0.180
	BMXART0414H BMXART0814H	Connection and provision of cold-junction compensation for thermocouples Direct connection of 4 inputs	–	**ABE7CPA412**	0.180
Preformed cordsets for Modicon Telefast ABE7CPA41●	BMXAMI0410H BMXAMO0210H	One 20-way removable terminal block and one 25-way SUB-D connector for ABE7CPA410/ CPA21 sub-base	1.5 m	**BMXFCA150**	0.320
			3 m	**BMXFCA300**	0.500
			5 m	**BMXFCA500**	0.730
	BMXART0414H BMXART0814H	One 40-way connector and one 25-way SUB-D connector for ABE7CPA412 sub-base	1.5 m	**BMXFCA152**	0.330
			3 m	**BMXFCA302**	0.510
			5 m	**BMXFCA502**	0.740

*(1) The shielding on the cordsets carrying the analog signals must always be connected to the **BMXXSP●●00** shielding connection kit mounted under the rack holding the analog modules (see page 2/7).*

*(2) The **BMXART0814H** 8-channel module requires two **ABE7CPA412** sub-bases and two **BMXFCA●●2** cordsets.*

6

Modicon M340 automation platform

Dedicated parts for severe environments

Ruggedized communication modules and network gateway

BMXNOE0100H/0110H

BMXNOM0200H

BMXNOR0200H

TCSEGPA23F14FK

Communication

BMXNOE0100H/0110H ruggedized Ethernet communication modules

Description	Data rate	Transparent Ready Class	Reference	Weight kg
Ethernet Modbus/ TCP network modules	10/100 Mbps	B30	**BMXNOE0100H**	0.200
		C30	**BMXNOE0110H**	0.200

BMXNOM0200H ruggedized serial link module

Description	Protocol	Physical layer	Reference	Weight kg
Serial link module 2-channels	Modbus master/slave RTU/ASCII, Character mode, Modem GSM/GPRS	1 non-isolated RS 232 channel (SL0) 2 isolated RS 485 channels (SL0 and SL1)	**BMXNOM0200H**	0.230

RTU BMXNOR0200H ruggedized communication module

Description	Protocols	Physical layer	Reference	Weight kg
RTU communication module	Modbus TCP, IEC 60870-5-104 or DNP3 IP (client or server)	1 Ethernet port 10BASE-T/ 100BASE-TX	**BMXNOR0200H**	0.205
	IEC 60870-5-101 or DNP3 serial (master or slave)	1 non-isolated RS 232/485 serial link port		

Ruggedized Profibus DP network gateway

Description	Protocols	Physical layer	Reference	Weight kg
Profibus Remote Master (PRM) module	Modbus TCP	1 Ethernet switch, 2 ports 10BASE-T/ 100BASE-TX	**TCSEGPA23F14FK**	–
	Profibus DP V1 and Profibus PA (via gateway)	1 isolated RS 485 Profibus DP port		

Standard connection accessory

Designation	Description	RS 232 interface	Reference	Weight kg
Cordset for DCE terminal (modem, etc.)	Equipped with 1 x RJ45 connector and 1 x 9-way male SUB-D connector Length 3 m	Simplified 4-wire (RX, TX, RTS and CTS)	**TCSMCN3M4M3S2**	0.150
		Full 8-wire (except RI signal)	**TCSXCN3M4F3S4**	0.165

Modicon M340 automation platform

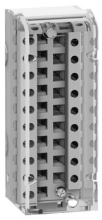
Dedicated parts for severe environments

Ruggedized application-specific modules

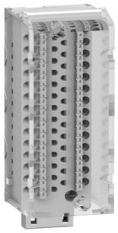
BMXEHC0200H

BMXEHC0800H

BMXEAE0300H



BMXFTB20●0



BMXFTB28●0

Application-specific modules

BMXEHC0200H/0800H ruggedized counter modules

Description	No. of channels	Characteristics	Reference	Weight kg
Counter modules for 24 V ⎓ 2 and 3 wire sensors and 10/30 V ⎓ incremental encoders with push-pull outputs	2	60 kHz counting	**BMXEHC0200H**	0.112
	8	10 kHz counting	**BMXEHC0800H**	0.113

BMXEAE0300H ruggedized SSI encoder interface module

Description	No. of channels	Characteristics	Reference	Weight kg
SSI encoder interface module	3	8 to 31 bits data width 4 ranks of baud rates: 100 kHz, 200 kHz, 500 kHz, 1 MHz	**BMXEAE0300H**	0.138

Standard connection accessories *(1)*

Description	Composition	Unit reference	Weight kg
Connector kit for BMXEHC0200H module	Two 16-way connectors and one 10-way connector	**BMXXTSHSC20**	0.021
20-way removable terminal blocks for BMXEHC0800H module	Cage clamp	**BMXFTB2000**	0.093
	Screw clamp	**BMXFTB2010**	0.075
	Spring-type	**BMXFTB2020**	0.060
28-way removable terminal blocks for BMXEAE0300H module	Cage clamp	**BMXFTB2800**	0.111
	Spring-type	**BMXFTB2820**	0.080
Shielding connection kits for BMXEHC0200H/0800H and BMXEAE0300H modules	Comprising a metal bar and two support bases for mounting on rack	**See page 2/7**	–

*(1) The shielding on the cordsets carrying the counter signals must always be connected to the **BMXXSP●●00** shielding connection kit mounted under the rack holding the **BMXEHC0200H** module (see page 2/7).*

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7

Modicon M340 automation platform

Standards, certifications and environment conditions

Standards and certifications

Modicon M340 PLCs have been developed to comply with the principal national and international standards concerning electronic equipment for industrial automation systems.

■ Requirements specific to programmable controllers: functional characteristics, immunity, resistance, safety, etc.: **IEC/EN 61131-2**, UL and CSA standards for industry (**UL 508, CSA E61131-2**).

■ Requirements specific to power utility automation system: **IEC/EN 61850-3**.

■ Merchant navy requirements of the major international organizations: unified in IACS (International Association of Classification Societies).

■ Compliance with European Directives for CE marking:

□ Low Voltage: 2006/95/EC,

□ Electromagnetic Compatibility: 2004/108/EC.

■ Ex areas:

□ For USA and Canada: Hazardous location class I, division 2, groups A,B,C and D

□ For other countries: CE ATEX (directive 94/9/EC) or IECEx in defined atmosphere Zone 2 (gas) and/or Zone 22 (dust).

□ Up to date information on which certifications have been obtained are available on our website..

Characteristics

Service conditions and recommendations relating to environment

			M340	M340H
Temperature	Operation	**° C**	0...+ 60	- 25...+ 70
	Storage	**° C**	- 40...+ 85	- 40...+ 85
Relative humidity (without condensation)	Cyclical humidity	**%**	+ 5 ... + 95 up to 55°C	+ 5 ... + 95 up to 55 °C
	Continuous humidity	**%**	+ 5 ... + 93 up to 55°C	+ 5 ... + 93 up to 60 °C
Altitude	Operation	**m**	0…2000 (full specification: temperature and isolation) 2000 ... 4000 (temperature derating: 1 °C / 400 m, isolation lost: 150 V ⎓ / 1000 m)	

Supply voltage			**Modicon X80 I/O power supply modules**				
			BMXCPS2010	**BMXCPS3020 BMXCPS3020H**	**BMXCPS3540T**	**BMXCPS2000**	**BMXCPS3500 BMXCPS3500H**
	Nominal voltage	**V**	⎓ 24	⎓ 24...48	⎓ 125	∿ 100...240	∿ 100...240
	Limit voltages	**V**	⎓ 18...31.2	⎓ 18...62.4	⎓ 100…150	∿ 85...264	∿ 85...264
	Nominal frequencies	**Hz**	–	–	–	50/60	50/60
	Limit frequencies	**Hz**	–	–	–	47/63	47/63

Protective treatment of Modicon Premium PLCs

Modicon M340 PLCs meet the requirements of “TC” treatment *(Treatment for all Climates)*.

For installations in industrial production workshops or environments corresponding to “TH” treatment *(treatment for hot and humid environments)*, Modicon M340 PLCs must be embedded in envelopes with a minimum IP 54 protection.

Modicon M340 PLCs themselves offer **protection to IP 20 level** and **protection against pins** (enclosed equipement) *(1)*. They can therefore be installed without an envelope in reserved-access areas which do not exceed **pollution level 2** (control room with no dust-producing machine or activity). The pollution level 2 does not take account of more severe environmental conditions: air pollution by dust, smoke, corrosive or radioactive particles, vapours or salts, attack by fungi, insects, ...

(1) In the case where a position is not occupied by a module, a **BMXXEM010** *protection cover must be installed.*

(CE)*: tests required by European directives* (CE) *and based on IEC/EN 61131-2 standards.*

Modicon M340 automation platform

Standards, certifications and environment conditions

Environment tests

Name of test	Standards	Levels
Immunity to LF interference (CE) *(1)*		
Voltage and frequency variations	**IEC/EN 61131-2; IEC/EN 61000-6-2; IEC 61000-4-11**	0.85...1.10 Un - 0.94...1.04 Fn; 4 steps t = 30 min
	IACS E10; IEC 61000-4-11	0.80 Un...0.90 Fn; 1.20 Un...1.10 Fn; t = 1.5 s/5 s
Direct voltage variations	**EC/EN 61131-2; IEC 61000-4-29;** **IACS E10** (PLC not connected to charging battery)	0.85...1.2 Un + ripple: 5 % peak; 2 steps t = 30 min
Third Harmonic	**IEC/EN 61131-2**	H3 (10 % Un) , 0 ° / 180 °; 2 steps t = 5 min
Immunity to conducted low frequency (only IACS)	**IACS E10**	For ∿ : ■ H2…H15 (10 % Un), H15…H100 (10 %...1 % Un), H100…H200 (1 % Un) For ⎓ : ■ H2…H200 (10 % Un)
Voltage interruptions	**IEC/EN 61131-2; IEC/EN 61000-6-2; IEC 61000-4-11; IEC 61000-4-29; IACS E10**	Power supply immunity: ■ 1ms for c PS1 / 10ms for a/c PS2 ■ Check operating mode for longer interruptions For IACS: ■ 30 s for ∿ or ⎓
	IEC/EN 61131-2; IEC/EN 61000-6-2; IEC 61000-4-11	For ∿ PS2: ■ 20 % Un, t0: ½ period ■ 40 % Un, cycle 10/12 ■ 70 % Un, cycle: 25/30 ■ 0 % Un, cycle 250/300
Voltage shut-down and start-up	**IEC/EN 61131-2**	■ Un…0…Un; t = Un/60 s ■ Umin…0…Umin; t = Umin/5 s ■ Umin…0.9 Udl…Umin; t = Umin/60 s
Magnetic field	**IEC/EN 61131-2; IEC/TS 61000-6-5; IEC 61000-4-8** (for MV power stations: **IEC 61850-3**)	Power frequency: 50/60 Hz, 100 A/m continuous ...1000 A/m; t = 3 s; 3 axes
	IEC 61000-4-10 (for MV power stations: **IEC 61850-3**)	Oscillatory: 100 kHz...1 MHz , 100 A/m; t = 9 s; 3 axes
Conducted common mode disturbances range 0 Hz …150 kHz	**IEC 61000-4-16** (for MV power stations: **IEC 61850-3**)	For remote systems: ■ 50/60 Hz and ⎓, 300 V , t = 1s ■ 50/60 Hz and ⎓, 30 V , t = 1 min ■ 5 Hz…150 kHz, sweep 3 V…30 V

Where:
- PS1 applies to PLC supplied by battery, PS2 applies to PLC energized from ∿ or ⎓ supplies
- Un: nominal voltage, Fn: nominal frequency, Udl: detection level when powered

Name of test	Standards	Levels
Immunity to HF interference. (CE) *(1) (2)*		
Electrostatic discharges	**IEC/EN 61131-2; IEC/EN 61000-6-2; IEC 61000-4-2; IACS E10**	6 kV contact; 8 KV air; 6 KV indirect contact
Radiated radio frequency electromagnetic field	**IEC/EN 61131-2; IEC/EN 61000-6-2; IEC 61000-4-3; IACS E10**	15 V/m , 80 MHz … 3 GHz Sinus amplitude modulated 80 %,1 kHz + internal clock frequencies
Electrical fast transient bursts	**IEC/EN 61131-2; IEC/EN 61000-6-2; IEC 61000-4-4; IACS E10**	For ∿ or ⎓ main supplies: ■ 2 kV in common mode / 2 kV in wire mode For ∿ or ⎓ auxiliary supplies, ∿ unshielded I/Os: ■ 2 kV in common mode For analog, ⎓ unshielded I/Os, communication and all shielded lines: ■ 1 kV in common mode
Surge	**IEC/EN 61131-2; IEC/EN 61000-6-2; IEC 61000-4-5; IACS E10**	For ∿ / ⎓ main and auxiliary supplies, ∿ unshielded I/Os: ■ 2 kV in common mode / 1 kV in differential mode For analog, ⎓ unshielded I/Os: ■ 0.5 kV in common mode / 0.5 kV in differential mode For communication and all shielded lines: ■ 1 kV in common mode
Conducted disturbances induced by radiated electromagnetic fields	**IEC/EN 61131-2; IEC/EN 61000-6-2; IEC 61000-4-6; IACS E10**	10 V; 0,15 MHz...80 MHz Sinus amplitude 80%, 1 kHz + spot frequencies
Damped oscillatory wave	**IEC/EN 61131-2; IEC 61000-4-18; IACS E10**	For ∿ / ⎓ main supplies and ∿ auxiliary supplies, ∿ unshielded I/Os: ■ 2.5 kV in common mode / 1 kV in differential mode For ⎓ auxiliary supplies, analog, ⎓ unshielded I/Os: ■ 1 kV in common mode / 0.5 kV in differential mode For communication and all shielded lines: ■ 0.5 kV in common mode

(1) Devices must be installed, wired and maintained in compliance with the instructions provided in the manual "Grounding and Electromagnetic Compatibility of PLC Systems". standards.
(2) These tests are performed without a cabinet, with devices fixed on a metal grid and wired as per the recommendations in the manual "Grounding and Electromagnetic Compatibility of PLC systems".

(CE): *tests required by European directives CE and based on IEC/EN 61131-2.*

Environment tests (continued)

Name of test	Standards	Levels
Electromagnetic emissions (CE) *(1)*		
Conducted emission	**IEC/EN 61131-2; FCC part 15; IEC/EN 61000-6-4; CISPR 11 & 22, Class A, Group 1**	150 kHz … 500 kHz : quasi-peak 79 dB (µV/m); average 66 dB (µV/m) 500 kHz … 30 MHz : quasi-peak 73 dB (µV/m); average 60 dB (µV/m)
	IACS E10	■ ∿ / ⎓ power (general power distribution zone): 10 kHz … 150 kHz : quasi-peak 120...69 dB (µV/m); 150 kHz … 0.5 MHz : quasi-peak 79 dB (µV/m) 0.5 MHz … 30 MHz : quasi-peak 73 dB (µV/m) ■ ∿ / ⎓ power (bridge and deck zone for evaluation): 10 kHz … 150 kHz : quasi-peak 96…50 dB (µV/m) 150 kHz … 0,35 MHz : quasi-peak 60…50 dB (µV/m) 0.35 MHz … 30 MHz : quasi-peak 50 dB (µV/m)
Radiated emission	**IEC/EN 61131-2; FCC part 15; IEC/EN 61000-6-4; CISPR 11 & 22, Class A, Group 1**	30 MHz ... 230 MHz : quasi-peak 40 dB (µV/m) (at 10 m); 50 dB (µV/m) (at 3m) 230 MHz ... 1 GHz : quasi-peak 47 dB(µV/m) (at 10 m); 57 dB (µV/m) (at 3m)
	IACS E10	■ For general power distribution zone 0.15 MHz … 30 Mhz: quasi-peak 80…50 dB (µV/m) (at 3m) 30 MHz-100 MHz: quasi-peak 60…54 dB (µV/m) (at 3m) 100 MHz - 2 GHz: quasi-peak 54 dB (µV/m) (at 3m) 156 … 165 MHz: quasi-peak 24 dB (µV /m) (at 3m)
Name of test	**Standards**	**Levels**
Immunity to climatic variations *(1)* (power on)		
Dry heat	**IEC 60068-2-2 (Bb & Bd)**	60 °C , t = 16 h [for ruggedized range: 70 °C , t = 16 h] *(2)*
	IACS E10	60 °C , t = 16 h + 70 °C , t = 2 h [for ruggedized range: 70 °C , t = 18 h] *(2)*
Cold	**IEC 60068-2-1 (Ab & Ad)** **IACS E10**	0 °C … - 25 °C , t = 16 h + power on at 0 °C [for ruggedized range: power on at -25 °C] *(2)*
Damp heat, steady state (continuous humidity)	**IEC 60068-2-78 (Cab);** **IACS E10**	55 °C , 93 % relative humidity , t = 96 h [for ruggedized range: 60 °C] *(2)*
Damp heat, cyclic (cyclical humidity)	**IEC 60068-2-30 (Db);** **IACS E10**	55 °C … 25 °C , 93…95 % relative humidity , 2 cycles t = 12 h +12 h
Change of temperature	**IEC 60068-2-14 (Na & Nb)**	0 °C … 60 °C , 5 cycles t = 6 h + 6 h [for ruggedized range: - 25 … 70 °C] *(2)*
Name of test	**Standards**	**Levels**
Withstand to climatic variations *(1)* (power off)		
Dry heat	**IEC/EN 61131-2; IEC 60068-2-2 (Bb & Bd)** **IEC/EN 60945**	85 °C , t = 96 h
Cold	**IEC/EN 61131-2; IEC 60068-2-1 (Ab & Ad);** **IACS E10**	- 40 °C , t = 96 h
Damp heat, cyclic (cyclical humidity)	**IEC/EN 61131-2; IEC 60068-2-30 (Db)**	55 °C … 25 °C , 93…95 % relative humidity , 2 cycles t = 12 h + 12 h
Change of temperature (thermal shocks)	**IEC/EN 61131-2; IEC 60068-2-14 (Na & Nb)**	- 40 °C ... 85 °C , 5 cycles t = 3 h + 3 h

(1) Devices must be installed, wired and maintained in compliance with the instructions provided in the manual "Grounding and Electromagnetic Compatibility of PLC Systems".
(2) Refer also to chapter "Treatment for severe environments".

(CE)*: tests required by European directives CE and based on IEC/EN 61131-2 standards.*

Environment tests (continued)		
Name of test	**Standards**	**Levels**
Immunity to mechanical constraints *(1)* (power on)		
Sinusoidal vibrations	**IEC/EN 61131-2; IEC 60068-2-6** (Fc)	Basic IEC/EN 61131-2: 5 Hz ... 150 Hz , ± 3.5 mm amplitude (5 Hz …. 8.4 Hz) , 1g (8.4 Hz …. 150 Hz) Specific profile: 5 Hz ... 150 Hz , ± 10.4 mm amplitude (5 Hz …. 8.4 Hz) , 3 g (8.4 Hz …. 150 Hz) For basic and specific, endurance: 10 sweep cycles for each axis
	IACS E10	3 Hz ... 100 Hz , 1 mm amplitude (3 Hz …. 13.2 Hz) , 0.7 g (13.2 Hz …. 100 Hz) Endurance at each resonance frequency : 90 min for each axis , amplification coefficient < 10
	IEC 60068-2-6	Sismic analysis: 3 Hz ... 35 Hz , 22.5 mm amplitude (3 Hz …. 8.1 Hz) , 6 g (8.1 Hz …. 35 Hz)
Shocks	**IEC/EN 61131-2; IEC 60068-2-27** (Ea)	30 g , 11 ms; 3 shocks/direction/axis *(2)* 25 g , 6 ms; 100 bumps/direction/axis (bumps) *(3)*
Free fall during operation	**IEC/EN 61131-2; IEC 60068-2-32** (Ed Method 1)	1 m , 2 falls
Name of test	**Standards**	**Levels**
Withstand to mechanical constraints (power off)		
Random free fall with packaging	**IEC/EN 61131-2; IEC 60068-2-32** (Method 1)	1 m , 5 falls
Flat free fall	**IEC/EN 61131-2; IEC 60068-2-32** (Ed Method 1)	10 cm , 2 falls
Controlled free fall	**IEC/EN 61131-2; IEC 60068-2-31** (Ec)	30 ° or 10 cm , 2 falls
Plugging / Unplugging	**IEC/EN 61131-2**	For modules and connectors: Operations: 50 for permanent connections , 500 for non-permanent connections
Name of test	**Standards**	**Levels**
Equipment and personnel safety *(1)* (CE)		
Dielectric strength and insulation resistance	**IEC/EN 61131-2; IEC 61010-2-201; UL; CSA**	Dielectric: 2 Un + 1000 V; t = 1 min Insulation: Un ⩽ 50 V: 10 MΩ , 50 V ⩽ Un ⩽ 250 V : 100 MΩ
Continuity of earth	**IEC/EN61131-2; IEC 61010-2-201; UL; CSA**	30A , R ⩽ 0,1Ω; t = 2min
Leakage current	**UL; CSA**	⩽ 3.5 mA after disconnecting
Protection offered by enclosures	**IEC/EN 61131-2; IEC61010-2-201;**	IP20 and protection against standardized pins
Impact withstand	**IEC/EN 61131-2; IEC 61010-2-201; UL; CSA**	Sphere of 500 g, fall from 1.30 m (energy 6.8 J minimum)
Stored energy injury risk	**IEC/EN 61131-2; IEC 61010-2-201**	Non permanent connection: 37 % Un after 1 s Permanent connection: 37 % Un after 10 s
Overload	**IEC/EN 61131-2; IEC 61010-2-201; UL; CSA**	50 cycles, Un, 1.5 In; t = 1 s ON + 9 s OFF
Endurance	**IEC/EN 61131-2; IEC 61010-2-201; UL; CSA**	In, Un; 12 cycles: t=100 ms ON + 100 ms OFF, 988 cycles : t = 1 s ON + 1 s OFF, 5000 cycles : t = 1 s ON + 9 s OFF
Temperature rise	**IEC/EN 61131-2; UL; CSA; ATEX; IECEx**	Ambient temperature 60 °C [for ruggedized range: 70 °C] *(4)*
Name of test	**Standards**	**Levels**
Specific Environment *(1)*		
Corrosion areas - gas, salt, dust	**ISAS 71.4**	Mixed flowing gases: class G3 , 25 °C, 75 % relative humidity, t = 14 days *(4)*
	IEC 60721-3-3	Mixed flowing gases: class 3C3 , 25 °C, 75 % relative humidity, t = 14 days *(4)*
	IEC 60068-2-52	Salt spray: test Kb , severity 2 (4)

(1) Devices must be installed, wired and maintained in compliance with the instructions provided in the manual "Grounding and Electromagnetic Compatibility of PLC Systems".
(2) In case of using fast actuators (response time ⩽ 5 ms) driven by relay outputs: 15 g , 11 ms; 3 shocks/direction/axis.
(3) In case of using fast actuators (response time ⩽ 15 ms) driven by relay outputs: 15 g , 6 ms; 100 bumps/direction/axis.
(4) Refer also to chapter "Treatment for severe environments".

(CE): tests required by European directives CE and based on IEC/EN 61131-2 standards.

Technical information
Ethernet network
Infrastructure

Presentation

The ConneXium Industrial Ethernet Offer is comprised of a complete family of products and tools required to build the infrastructure of an Industrial Ethernet network. In the following pages, information for the proper design of a network and the selections of its components is offered.

Office Ethernet versus Industrial Ethernet

There are three main areas of differentiation between Ethernet applications in an office environment and Ethernet applications in an Industrial environment, they are:
- Environment
- Layout (not physical layer specification)
- Performance

Contrary to the office environment and even though ISO/IEC is working on it, there are not yet clearly defined specifications for Ethernet devices targeted to Industrial applications. The specifications of what it is called Industrial Ethernet are defined by different agencies or entities based upon its nature and based upon what the automation market has traditionally used.

The environmental specifications of Industrial Ethernet devices are today defined by the traditional agencies that define the environmental specifications for standard industrial devices (UL, CSA, CE, ...).

The IEEE 802.3 defines the physical layer specifications of the Ethernet network (types of connectors, distance between devices, number of devices, ...) while the 11801 (similarly to the TIAEIA 568B, and CENELEC EN 50173) provide installers the layout guidelines.

The performance specifications are actually being worked on by ISO/IEC.

Ethernet 802.3 principles

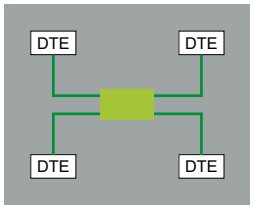
The Ethernet 802.3 Link Layer is based on a collision detection mechanism (CSMA CD): every node whose information has collided on the network realizes the collision and re-sends the information.
The process of re-sending information causes delays in its propagation and could affect the application.

A collision domain is a group of Ethernet end devices interconnected by hubs or repeaters (devices that receive information and send it out to all their other ports, no matter where the destination device is connected): it means that all devices will be affected by collisions.

With the availability of full duplex switches (devices that receive information and send it out just through the port to which the destination device is connected) the collision domains have disappeared.

Therefore, for industrial automation applications it is strongly recommended to use in every case full duplex switches to interconnect devices. In this way the collision domains will be eliminated completely.

Technical information
Ethernet network
Infrastructure



Different network topologies

Star topology

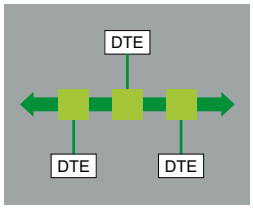
In a star topology, all devices are connected though an intermediate device.

Ethernet Star

In an Ethernet star the intermediate device may be a **hub** or a **switch**. Star is the commonly used topology in corporate networks and as of today is adopted in almost every automation application. As mentioned previously, for industrial Ethernet applications the use of full duplex switches as central device rather than hubs is strongly recommended.

Deploying Star topologies with ConneXium

With any of the hubs and switches offered by the ConneXium offer, star topologies can be implemented.



Bus topology

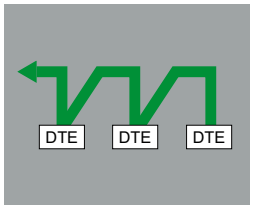
The bus is one of the most adopted topologies in traditional industrial automation networks. A single trunk cable connects all the devices on the network usually via passive or active T-connectors, or directly chained (daisy chain). Devices usually can be installed anywhere along the bus.

Ethernet Bus

An Ethernet bus can be deployed by interconnecting **hubs** and/or **switches** in line and considering every one of them as the connection for a drop device. A limited number of hubs and an unlimited number of switches can be interconnected to achieve this purpose.

Deploying Bus topologies with ConneXium

With any of the hubs and switches offered by the ConneXium offer bus topologies can be implemented.
Specially suitable for this purpose are the switches with 1 or 2 fiber optic ports:
- The 2 fiber optic ports switches could be for connection of inline devices.
- The single fiber optic port switches could be used for the connection of end line devices.



Daisy chain topology

Daisy chain -along bus- is the other most adopted topology in traditional industrial automation networks. Cable segments interconnect multiple devices, being the devices “part ” of the network cable.

Ethernet daisy chain

Daisy chain is not today a very common Ethernet topology, but it will soon become one of the most popular ones when enough quantity of devices is made available.
In Ethernet daisy chain the devices have:
- **2 Ethernet ports** and
- **1 embedded switch**.

Schneider Electric is releasing to the Industrial market Industrial Ethernet devices to be connected in daisy chain architectures.

Deploying daisy chain topologies

To deploy daisy chain topologies, no hubs or switches are required. All devices have an embedded switch.
Dual port Ethernet at the device level is an absolute integral component for daisy chain topologies.
One port of the device connects to one port of the neighboring device on either side of the device. These neighboring connections make up the daisy chain.

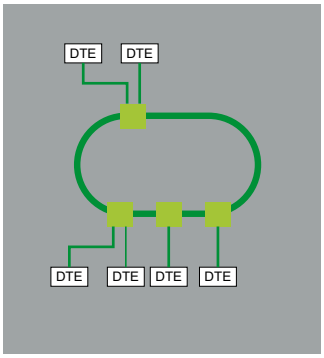
Ethernet switches can be employed in a daisy chain topology when multiple scan chains are in use by the controlling device. It is expected that the Ethernet switch will be located near the controlling device with the different scan chains emanating from the switch.

Different network topologies (continued)

Daisy chain topology (continued)

Limitations of daisy chain:
Limitations of daisy chain to insure the operational integrity of the network and meet performance metrics, are:
- Dual port Ethernet devices only support 10 Mbit/s and/or 100 Mbit/s operational speeds and must use one or the other.
- The network will operate only as fast as the slowest device that is connected to the network
- In order to improve network traffic latency the numbers of devices in a single scan chain, has been limited to 32 devices. Limiting a single scan chain to 32 devices the time for a round trip of a packet through the daisy Chain is expected less than 5 milliseconds.

The maximum packet latency of a packet passing through any device in a scan chain is no more than 10 µs.



Ring topology

In a ring topology, all devices or network infrastructure components are connected in a loop. Through this type of topology, a type of network redundancy is achieved.

Ethernet Ring
Ethernet rings are usually the backbones of applications in which high availability is required. If ring topology is required then switches that support this feature should be ordered.

Deploying Ring topologies using ConneXium.
The ConneXium line offers hubs and switches that allow the deployment of single and coupled self-healing rings. There is additional information about this topic page 7/11.

Distance limitations and number of devices per segment

Based upon the 802.3, the distance limits and the numbers of devices in cascade are the following:

Type	Maximum segment length *(1)*	Maximum segment length (offered by ConneXium devices)	Maximum number of hubs in cascade	Maximum number of switches in cascade
10BASE-T	100 m	100 m	4	Unlimited
100BASE-TX	100 m	100 m	2	Unlimited
1000BASE-T	100 m	100 m	–	Unlimited
10BASE-FL	2000 m	3100 m *(2)*	11 (fiber ring)	–
100BASE-FX	412 m/2000 m	4000 m with multimode fiber, 32.500 m with monomode fiber *(3)*	–	Unlimited
1000BASE-SX	275 m	–	–	Unlimited

(1) Based on 802.3, full duplex/half duplex.
(2) Depends on the optical fiber budget and fiber attenuation.
(3) Depends on the optical fiber budget and fiber attenuation, typical specification is 2 km for multimode and 15 km for monomode.

Physical Media

The Ethernet 802.3 defines the Physical Layer. A summary of the most common ones are shown below:

Type	Data rate	Cable type		Connector type	
		Defined by 802.3	Recommended by Schneider Electric	Defined by 802.3	Recommended by Schneider Electric
10BASE-T	**10 Mbit/s**	CAT 3 - UTP	CAT 5E - STP	RJ45	RJ45
100BASE-TX	**100 Mbit/s**	CAT 5 - UTP	CAT 5E - STP	RJ45	RJ45
1000BASE-T	**1 Gbit/s**	CAT 5 - UTP	CAT 5E - STP	RJ45	RJ45
10BASE-FL	**10 Mbit/s**	Two multimode fiber optic cables typically 62.5/125 µm fiber, 850 nm light wavelength	Two multimode fiber optic cables typically 62.5/125 µm fiber, 850 nm light wavelength	ST	ST
100BASE-FX	**100 Mbit/s**	Two multimode optical fibers typically 62.5/125 µm multimode fiber, 1300 nm light wavelength	Two multimode optical fibers typically 62.5/125 µm multimode fiber, 1300 nm light wavelength	ST	SC
		–	Two monomode optical fibers typically 9/125 µm multimode fiber, 1300 nm light wavelength	–	SC
1000BASE-SX	**1 Gbit/s**	Two 62.5/125 or 50/125 multimode optical fibers, 770 to 860 nm light wavelength	Two 62.5/125 µm or 50/125 m multimode optical fibers , 1300 nm light wavelength	SC	LC
1000BASE-LX	**1 Gbit/s**	–	Two 9/125 µm monomode optical fibers, 1300 nm light wavelength	–	LC

Nota : *The above are the specifications defined by IEEE 802.3. However some of the cables are no longer being developed. For instance, for 10BASE-T and 100BASE-TX, a CAT-5E cable is used.*

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Management

The Ethernet devices in general (end devices and the cabling devices) devices may be divided in two categories: unmanaged and managed devices:
■ **The unmanaged** devices are those which there is no possibility to configure or control any of the parameters of the device.
■ **The managed** devices are those which there is possibility to configure or control the parameters of the device (manage them) and to access to its internal information.

The ConneXium product line offers both types of devices.

There is also a third category of devices not specifically defined but is important to understand the difference. These devices only allow access to its information but can not be controlled and/or configured. Usually these devices are considered in the category of managed devices.

Managed devices

The managed devices offer the following features:
■ **Traffic optimization and filtering,** goal is to increase the bandwidth, or the traffic capacity in a network (some of the features in this area are message and port priority, flow control, multicast filtering, broadcast limiting, IGMP snooping, Vlan, etc.).
■ **VLAN,** a virtual LAN (VLAN) consists of a group of network participants in one or more network segments who can communicate with each other as if they belonged to the same LAN.
VLANs are based on logical (instead of physical) links. The biggest advantage of VLANs is their possibility of forming user groups based on the participant function and not on their physical location or medium.
Since broad/multicast data packets are transmitted exclusively within a virtual LAN, the remaining data network is unaffected. VLAN can also serve as a security mechanism to block unwanted Unicast messages.
■ **Security,** feature that helps the user protect the switch from unauthorized access that could result in changes in its configuration and impact the traffic going through the switch (some of the features in this area are port security, read/write community name, etc.).
User can also set up the switch so that it blocks messages coming from unauthorized “devices” source addresses connected to the switch.
■ **Time Synchronization,** feature that allows all the devices in the network to be synchronized on time.
■ **Network Redundancy,** to develop high availability applications.
■ …

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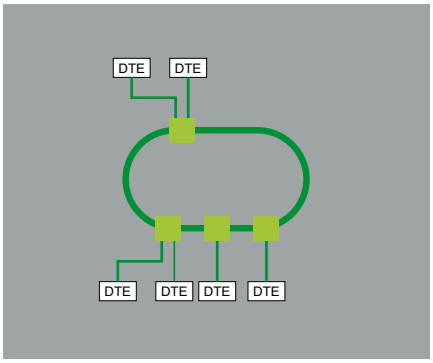
Redundancy

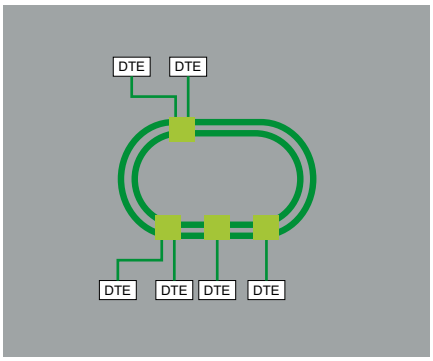
To develop high availability applications, “redundancy” in the networking infrastructure is the answer. By implementing a single ring architecture, or a coupled ring one, can protect themselves against losses of network segments.



Single Ring

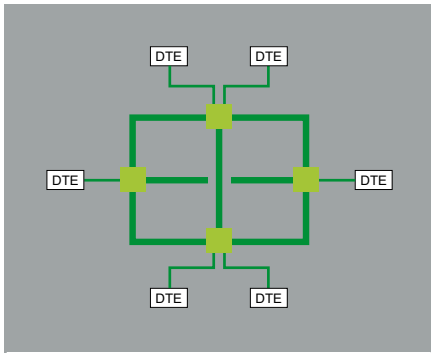
The first level of redundancy is achieved by implementing a single ring. The ConneXium switches allow the set up of backbone ring configurations.

The ring is constructed using the HIPER-Ring ports. If a section of the line fails, a ring structure of up to 50 switches transforms back to a line-type configuration within 0.5 seconds.



Dual Ring

The second level of redundancy is achieved by implementing a dual ring. The control intelligence built into the ConneXium switches allows the redundant coupling of HIPER-Rings and network segments.



Mesh topology using the rapid “Spanning Tree” protocol

A third level of redundancy can be achieved by implementing a mesh topology.
In simple terms,“Spaning Tree” is a protocol that ensures a single path for the signal, when multiple paths exist. If the active path is broken, the “Spanning Tree” protocol enables one of the alternatives paths.

The ConneXium switches offer the possibility.

Some countries require certain electrical components to undergo certification by law. This certification takes the form of a certificate of conformity to the relevant standards and is issued by the official body in question. Where applicable, certified devices must be labelled accordingly. Use of electrical equipment on board merchant vessels generally implies that it has gained prior approval (i.e. certification) by certain shipping classification societies.

Abbreviation	Certification body	Country
CSA	Canadian Standards Association	Canada
RCM (formerly C-Tick)	Australian Communications and Media Authority	Australia, New Zealand
GOST	Scientific research institute for GOST standards	Russia
UL	Underwriters Laboratories	USA

Abbreviation	Classification authority	Country
IACS	International Association of Classification Societies	International
ABS	American Bureau of Shipping	USA
BV	Bureau Veritas	France
DNV	Det Norske Veritas	Norway
GL	Germanischer Lloyd	Germany
LR	Lloyd's Register	UK
RINA	Registro Italiano Navale	Italy
RMRS	Russian Maritime Register of Shipping	Russia
RRR	Russian River Register	Russia
CCS	China Classification Society	China

The tables below provide an overview of the situation as at 1st June 2013 in terms of which certifications (listed next to their respective bodies) have been granted or are pending for our automation products.
Up-to-date information on which certifications have been obtained by products bearing the Schneider Electric brand can be viewed on our website: **www.schneider-electric.com**

Product certifications

Certified
Certification pending

	Certifications						
	UL	CSA	C-Tick ACMA	GOST	Hazardous locations *(1)* Class I, div 2	IEC IECEx Ex *(6)*	TÜV Rheinland
	USA	Canada	Australia	Russia	USA, Canada		
Modicon OTB	■	■			■		
Modicon STB	■	■	■	■	FM	Zone 2 *(2)(5)*	
Modicon Telefast ABE 7	■	■	■				
ConneXium	■	■			*(2)*		
Magelis iPC/GTW	■	*(3)*	■	*(2)*	*(3)*	Zone 2/22 *(2)*	
Magelis XBT GT	■	*(3)*	■	*(2)*	*(2) (3)*	Zone 2/22 *(2)(5)*	
Magelis XBT GK	■	*(3)*	■	■	*(3)*		
Magelis XBT N/R/RT	■	■	■	■	CSA	Zone 2/22 *(2)(5)*	
Magelis HMI GTO	■	*(3)*	■	*(2)*	*(3)*	*(2)*	
Magelis HMI STO/STU	■	*(3)*	■	*(2)*	*(2)(3)*	*(2)*	
Modicon M340	■	■	■	■	CSA	Zone 2/22 *(2)(8)*	
Modicon X80 I/O	■	■	■	■	CSA	Zone 2/22 *(2)(8)*	
Modicon Momentum	■	■	■	■	FM		
Modicon Premium	■	■	■	*(2)*	CSA		
Modicon Quantum	■	■	■	*(2)*	CSA, FM *(2)*	Zone 2/22 *(2)*	
Modicon Quantum Safety	■	■	■	*(2)*	CSA	Zone 2/22 *(2)*	SIL 2, SIL 3 *(7)*
Preventa XPSMF							SIL 3 *(7)*
Modicon TSX Micro	■	■	■	■	CSA		
Phaseo	*(3)*	■	■	■			
Twido	*(4)*	*(4)*		■	CSA/UL *(4)*		

(1) Hazardous locations: According to ANSI/ISA 12.12.01, CSA 22.2 No. 213 and FM 3611, certified products are only approved for use in hazardous locations categorized as Class I, division 2, groups A, B, C and D, or in non-classified locations.
(2) Depends on product; please visit our website: www.schneider-electric.com.
(3) North American certification cULus (Canada and USA).
(4) Except for AS-Interface module TWD NOI 10M3, CE only.
(5) For zones not covered by this specification, Schneider Electric offers a solution as part of the CAPP (Collaborative Automation Partner Program). Please consult our Customer Care Centre.
(6) Refer to the instructions supplied with each ATEX and/or IECEx certified product.
(7) According to IEC 61508. Certified by TÜV Rheinland for integration into a safety function of up to SIL 2 or SIL 3.
(8) Can be used in gassy mines under certain conditions.

Merchant navy certifications

Certified / Certification pending	Shipping classification societies										
	ABS	BV	DNV	GL	KRS	LR	RINA	RMRS	RRR	PRS	CCS
	USA	France	Norway	Germany	Korea	Great Britain	Italy	Russia	Russia	Poland	China
Modicon OTB											
Modicon STB	*(1) (2)*	*(2)*	*(2)*	*(2)*		*(2)*	*(2)*				
Modicon Telefast ABE 7											
ConneXium											
Magelis iPC/GTW				*Bridge (2)*							
Magelis XBT GT	*(2)*	*(2)*	*(2)*	*(2)*		*(2)*	*(2)*	*(2)*	*(2)*		
Magelis XBT GK											
Magelis XBT N/R											
Magelis XBT RT											
Magelis HMI GTO											
Magelis HMI STO/STU		*(2)*	*(2)*								
Modicon M340								*(2)*	*(2)*		
Modicon X80 I/O								*(2)*	*(2)*		
Modicon Momentum											
Modicon Premium											
Modicon Quantum											
Modicon TSX Micro											
Phaseo											
Twido											

(1) Also covers US Navy requirements **ABS-NRV** part 4.
(2) Depends on product; please visit our website: www.schneider-electric.com.

EC regulations

European Directives

The open nature of the European markets assumes harmonization between the regulations set by the member states of the European Union. European Directives are texts whose aim is to remove restrictions on free circulation of goods and which must be applied within all European Union states.
Member states are obligated to incorporate each Directive into their national legislation, and to simultaneously withdraw any regulations that contradict it.
Directives - and particularly those of a technical nature with which we are concerned - merely set out the objectives to be fulfilled (referred to as “essential requirements”). Manufacturers must take all necessary measures to ensure that their products conform to the requirements of each Directive applicable to their equipment.
As a general rule, manufacturers certify compliance with the essential requirements of the Directive(s) that apply to their products by applying a CE mark. The CE mark is affixed to our products where applicable.

Significance of the CE mark

The CE mark on a product indicates the manufacturer's certification that the product conforms to the relevant European Directives; this is a prerequisite for placing a product which is subject to the requirements of one or more Directives on the market and allowing its free circulation within European Union countries. The CE mark is intended for use by those responsible for regulating national markets.
Where electrical equipment is concerned, conformity to standards indicates that the product is fit for use. Only a warranty by a well-known manufacturer can provide assurance of a high level of quality.
As far as our products are concerned, one or more Directives are likely to apply in each case; in particular:

- The Low Voltage Directive (2006/95/EC)
- The Electromagnetic Compatibility Directive (2004/108/EC)
- The ATEX CE Directive (94/9/EC)

Dangerous substances

These products are compatible with:

- The WEEE Directive (2002/96/EC)
- The RoHS Directive ((2011/65/EU)
- The China RoHS Directive (Standard SJ/T 11363-2006)
- The REACH regulations Directive (EC 1907/2006)

Note: *Documentation on sustainable development is available on our website www.schneider-electric.com (product environmental profiles and instructions for use, ROHS and REACH directives) .*

End of life (WEEE)

End of life products containing electronic cards must be dealt with by specific treatment processes.
When products containing backup batteries are unusable or at end of life they must be collected and treated separately. Batteries do not contain a percentage by weight of heavy metals above the limit specified by European Directive 2006/66/EC.

Modicon M340 automation platform

Inputs and OsiSense XU photo-electric sensors

Photo-electric sensors				⎓ Inputs, BMXDDI				
Type			Reference	1602	1603	1604T	3202K	6402K
General purpose								
Design Ø 18	Metal	3 wire, PNP 24V	XUB0/1/2/4/5/9B●P●●●	■			■	■
		3 wire, NPN 24V	XUB0/1/2/4/5/9B●N●●●					
	Plastic	3 wire, PNP 24V	XUB0/1/2/4/5/9A●P●●●	■			■	■
		3 wire, NPN 24V	XUB0/1/2/4/5/9A●N●●●					
Design	Miniature	3 wire, PNP 24V	XUM0/2/5/9AP●●●●	■			■	■
		3 wire, NPN 24V	XUM0/2/5/9AN●●●●					
	Compact 50x50	3 wire, PNP 24V	XUK1/2/5/8/9AP●●●	■			■	■
		3 wire, NPN 24V	XUK1/2/5/8/9AN●●●					
		3 wire, programmable PNP/NPN DC	XUK0AK●●●	■			■	■
		5 wire, programmable AC/DC	XUK0/1/2/5/8/9AR					
	Compact 92x71	3 wire, programmable PNP/NPN DC	XUX0/1/2/5/8/9AK	■			■	■
		5 wire, programmable AC DC	XUX0/1/2/5/8/9AR					
Application								
Material handling	Optical fork	3 wire, PNP 24V	XUVR●●●●P●●	■			■	■
		3 wire, NPN 24V	XUVR●●●●N●●					
		3 wire, PNP 24V	XUVA●●●●P●●	■			■	■
		3 wire, NPN 24V	XUVA●●●●N●●					
		4 wire, PNP or NPN 24V	XUYF●●●●●	■			■	■
		4 wire, PNP or NPN 24V	XUVU06●●●	■			■	■
		4 wire, PNP or NPN 24V	XUVK●●●	■			■	■
		3 wire, PNP 24V	XUVH●●●	■			■	■
		3 wire, NPN 24V	XUVJ●●●					
		4 wire, PNP or NPN 24V	XUVF●●●	■			■	■
Packaging	Fiber	4 wire, PNP or NPN 24V	XUYDCF●●●	■			■	■
	Compact	4 wire, PNP or NPN 24V	XUK●S●●●●	■			■	■
	M 18, threaded	3 wire, PNP 24V	XU5M18U1D	■			■	■
	Fiber	4 wire, PNP or NPN 24V	XUYAFL●●●	■			■	■
	M 18, threaded	3 wire, PNP 24V	XUBT●P●●●	■			■	■
		3 wire, NPN 24V	XUBT●N●●●					
	Compact	4 wire, PNP or NPN 24V	XUKT●●●	■			■	■
		3 wire, PNP 24V	XUKC1N●●●	■			■	■
		3 wire, NPN 24V	XUKC1P●●●					
		3 wire, PNP 24V	XURC3P●●●	■			■	■
		3 wire, NPN 24V	XURC3N●●●					
		4 wire, PNP or NPN 24V	XUMW●●●	■			■	■
	M 18, threaded	3 wire, PNP 24V	XUB0SP●●●	■			■	■
		3 wire, NPN 24V	XUB0SN●●●					
		3 wire, PNP 24V	XU●N18P●●●	■			■	■
		3 wire, NPN 24V	XU●N18N●●●					
	M 8, threaded	3 wire, PNP 24V	XUAH●●●	■			■	■
		3 wire, NPN 24V	XUAJ●●●					
	Miniature	3 wire, PNP 24V	XUYP●●●●P●●	■			■	■
		3 wire, NPN 24V	XUYP●●●●N●●					
		3 wire, PNP 24V	XUM2/5/9BP●●●	■			■	■
		3 wire, NPN 24V	XUM2/5/9BN●●●					
		3 wire, PNP 24V	XUY●●●929●●	■			■	■
Hoisting	M 18, threaded	3 wire, PNP 24V	XUBLBP●●●	■			■	■
		3 wire, NPN 24V	XUBLBN●●●					
	Compact	2 wire 4…20 mA ; 3 wire 0…10V	XUJK803538					
	M 18, threaded	2 wire 4…20 mA	XU5M18AB20D					
		PNP, 2 wire 4…20 mA	XU2M18AB20D					
	Compact	PNP, 2 wire 4…20 mA	XUYP●●●925					
		4 wire, PNP or NPN 24V	XUYPS●●●	■			■	■
	Fiber	3 wire, PNP 24V	XUDA●P●●●	■			■	■
		3 wire, NPN 24V	XUDA●N●●●					
		4 wire, PNP or NPN 24V	XUYAF●●●	■			■	■
	Other formats	3 wire, programmable PNP/NPN DC	XUC2/8/9AK●●●	■	■		■	■
		5 wire, programmable AC/DC	XUC2/8/9ARC●●●					
		3 wire, NPN 24V + analog	XUE●AA●●●					
		2 wire, AC	XULA●●●					
		5 wire, programmable AC/DC	XULM●●●					
		3 wire, programmable PNP/NPN DC	XUYB●●●S	■	■		■	■
		5 wire, programmable AC/DC	XUYB●●●R					
	M 18, threaded	2 wire, AC/DC	XU5/8/9M18MA●●●					

Compatible
Non compatible

	⎓ Inputs, BMXDDM			⎓ Inputs, BMXAMI		∿ Inputs, BMXDAI			
	16022	16025	3202K	0810	0800	1602	1603	1604	0805
	■	■	■						
						■			
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7

Modicon M340 automation platform

Inputs and OsiSense XS inductive proximity sensors

Proximity sensors				⎓ Inputs, BMXDDI			
Type			Reference	1602	1603	1604T	3202K
General purpose							
Cylindrical, flush, sensing distance standard, barel short	Ø 6,5 plain short	3 wire, PNP 24V	XS506B1P●●●	■			■
		3 wire, NPN 24V	XS506B1N●●●				
		2 wire, DC 24V	XS506BSC●●●	■			■
	M8, threaded short	3 wire, PNP 24V	XS508B1P●●●	■			■
		3 wire, NPN 24V	XS508B1N●●●				
		2 wire, DC 24V	XS508BSC●●●	■			■
	M12, threaded short	3 wire, PNP 24V	XS512B1P●●●	■			■
		3 wire, NPN 24V	XS512B1N●●●				
		2 wire, DC 24V	XS512BSD/C●●●	■			■
	M18, threaded short	3 wire, PNP 24V	XS518B1P●●●	■			■
		3 wire, NPN 24V	XS518B1N●●●				
		2 wire, DC 24V	XS518BSD/C●●●	■			■
	M30, threaded short	3 wire, PNP 24V	XS530B1P●●●	■			■
		3 wire, NPN 24V	XS530B1N●●●				
		2 wire, DC 24V	XS530BSD/C●●●	■			■
Cylindrical, flush, sensing distance standard, barel long	M8, threaded long	3 wire, PNP 24V-48V	XS508BLP●●●	■	■		■
		3 wire, NPN 24V-48V	XS508BLN●●●				
		2 wire, DC 24V-48V	XS508B1D/C●●●	■	■		■
	M12, threaded long	3 wire, PNP 24V-48V	XS512BLP●●●	■	■		■
		3 wire, NPN 24V-48V	XS512BLN●●●				
		2 wire, DC 24V-48V	XS512B1D/C●●●	■	■		■
	M18, threaded long	3 wire, PNP 24V-48V	XS518BLP●●●	■	■		■
		3 wire, NPN 24V-48V	XS518BLN●●●				
		2 wire, DC 24V-48V	XS518B1D/C●●●	■	■		■
	M30, threaded long	3 wire, PNP 24V-48V	XS530BLP●●●	■	■		■
		3 wire, NPN 24V-48V	XS530BLN●●●				
		2 wire, DC 24V-48V	XS530B1D/C●●●	■	■		■
	M12, threaded long	2 wire, AC/DC	XS512B1M●●●			■	
	M18, threaded long	2 wire, AC/DC	XS518B1M●●●			■	
	M30, threaded long	2 wire, AC/DC	XS530B1M●●●			■	
Cylindrical, flush, sensing distance extending, barel short	Ø 6,5 plain short	3 wire, PNP 24V	XS106B3P●●●	■			■
		3 wire, NPN 24V	XS106B3N●●●				
		2 wire, DC 24V	XS606B3C●●●	■			■
	M8, threaded short	3 wire, PNP 24V	XS108B3P●●●	■			■
		3 wire, NPN 24V	XS108B3N●●●				
		2 wire, DC 24V	XS608B3C●●●	■			■
	M12, threaded short	3 wire, PNP 24V	XS112B3P●●●	■			■
		3 wire, NPN 24V	XS112B3N●●●				
		2 wire, DC 24V	XS612B3D●●●	■			■
	M18, threaded short	3 wire, PNP 24V	XS118B3P●●●	■			■
		3 wire, NPN 24V	XS118B3N●●●				
		2 wire, DC 24V	XS618B3D●●●	■			■
	M30, threaded short	3 wire, PNP 24V	XS130B3P●●●	■			■
		3 wire, NPN 24V	XS130B3N●●●				
		2 wire, DC 24V	XS630B3D●●●	■			■
Cylindrical, flush, sensing distance extending, barel long	M8, threaded long	3 wire, PNP 24V-48V	XS608B1P●●●	■	■		■
		3 wire, NPN 24V-48V	XS608B1N●●●				
		2 wire, DC 24V-48V	XS608B1D●●●	■	■		■
	M12, threaded long	3 wire, PNP 24V-48V	XS612B1P●●●	■	■		■
		3 wire, NPN 24V-48V	XS612B1N●●●				
		2 wire, DC 24V-48V	XS612B1D●●●	■	■		■
	M18, threaded long	3 wire, PNP 24V-48V	XS618B1P●●●	■	■		■
		3 wire, NPN 24V-48V	XS618B1N●●●				
		2 wire, DC 24V-48V	XS618B1D●●●	■	■		■
	M30, threaded long	3 wire, PNP 24V-48V	XS630B1P●●●	■	■		■
		3 wire, NPN 24V-48V	XS630B1N●●●				
		2 wire, DC 24V-48V	XS630B1D●●●	■	■		■
	M12, threaded long	2 wire, AC/DC	XS612B1M●●●			■	
	M18, threaded long	2 wire, AC/DC	XS618B1M●●●			■	
	M30, threaded long	2 wire, AC/DC	XS630B1M●●●			■	
Cylindrical, non flush, sensing distance extending, barel long	M12, threaded long	3 wire, PNP 24V-48V	XS612B4P●●●	■	■		■
		3 wire, NPN 24V-48V	XS612B4N●●●				
	M18, threaded long	3 wire, PNP 24V-48V	XS618B4P●●●	■	■		■
		3 wire, NPN 24V-48V	XS618B4N●●●				
	M30, threaded long	3 wire, PNP 24V-48V	XS630B4P●●●	■	■		■
		3 wire, NPN 24V-48V	XS630B4N●●●				
	M12, threaded long	2 wire, AC/DC	XS612B4M●●●			■	
	M18, threaded long	2 wire, AC/DC	XS618B4M●●●			■	
	M30, threaded long	2 wire, AC/DC	XS630B4M●●●			■	

■ Compatible
Non compatible

		⎓ Inputs, BMXDDM			⎓ Inputs, BMXAMI		∿ Inputs, BMXDAI			
	6402K	16022	16025	3202K	0810	0800	1602	1603	1604	0805

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Modicon M340 automation platform

Inputs and OsiSense XS inductive proximity sensors *(continued)*

Proximity sensors				⎓ Inputs, BMXDDI			
Type			Reference	1602	1603	1604T	3202K
General purpose							
Flat, flush montable, sensing distance standard	Format J 8x22x8	3 wire, PNP 24V	XS7J1A1P●●●	■			■
		3 wire, NPN 24V	XS7J1A1N●●●				
		2 wire, DC 24V	XS7J1A1D●●●	■			■
	Format F 15x22x8	3 wire, PNP 24V	XS7F1A1P●●●	■			■
		3 wire, NPN 24V	XS7F1A1N●●●				
		2 wire, DC 24V	XS7F1A1D●●●	■			■
	Format E 26x26x13	3 wire, PNP 24V	XS7E1A1P●●●	■			■
		3 wire, NPN 24V	XS7E1A1N●●●				
		2 wire, DC 24V	XS7E1A1D/C●●●	■			■
	Format C 40x40x15	3 wire, PNP 24V	XS7C1A1P●●●	■			■
		3 wire, NPN 24V	XS7C1A1N●●●				
		2 wire, DC 24V	XS7C1A1D/C●●●	■			■
	Format D 80x80x26	3 wire, PNP 24V	XS7D1A1P●●●	■			■
		3 wire, NPN 24V	XS7D1A1N●●●				
		2 wire, DC 24V	XS7D1A1D/C●●●	■			■
Format 40X40X70 and 40X40X117 Plastic, with turret head: 5 positions	NO + NC	4 wire, PNP 24V-48V	XS7/XS8C2/C4A1/A4P●●●	■	■		■
		4 wire, NPN 24V-48V	XS7/XS8C2/C4A1/A4N●●●				
	NO/NC programmable	2 wire, DC 24V-48V	XS7/XS8C2/C4A1/A4D●●●	■	■		■
		2 wire, AC/DC	XS7/XS8C2/C4A1/A4M●●●			■	
Flat, flush montable, sensing distance extending	Format E 26x26x13	3 wire, PNP 24V	XS8E1A1P●●●	■			■
		3 wire, NPN 24V	XS8E1A1N●●●				
		2 wire, AC/DC	XS8E1A1M●●●			■	
	Format C 40x40x15	3 wire, PNP 24V	XS8C1A1P●●●	■			■
		3 wire, NPN 24V	XS8C1A1N●●●				
		2 wire, AC/DC	XS8C1A1M●●●			■	
	Format D 80x80x26	3 wire, PNP 24V	XS8D1A1P●●●	■			■
		3 wire, NPN 24V	XS8D1A1N●●●				
		2 wire, AC/DC	XS8D1A1M●●●			■	
Cylindrical multi tension	M12, threaded	2 wire, AC/DC	XS1/2M12M●250			■	
	M18, threaded	2 wire, AC/DC	XS1/2M18M●250			■	
	M30, threaded	2 wire, AC/DC	XS1/2M30M●250			■	
Cylindrical Metal, 4 wire	Ø 6,5, plain	4 wire, PNP 24V	XS1L06PC410	■			■
		4 wire, NPN 24V	XS1L06NC410				
	M8, threaded	4 wire, PNP 24V	XS1/2M08PC410●	■			■
		4 wire, NPN 24V	XS1/2M08NC410●				
	M12, threaded	4 wire, PNP 24V	XS1/2N12PC410●	■			■
		4 wire, NPN 24V	XS1/2N12NC410●				
	M18, threaded	4 wire, PNP 24V	XS1/2N18PC410●	■			■
		4 wire, NPN 24V	XS1/2N18NC410●				
	M30, threaded	4 wire, PNP 24V	XS1/2N30PC410●	■			■
		4 wire, NPN 24V	XS1/2N30NC410●				
Cylindrical Metal, 4 wire PNP + NPN	M12, threaded	4 wire, PNP+NPN, prog. 24V	XS1/2/4M12KP340●	■			■
	M18, threaded	4 wire, PNP+NPN, prog. 24V	XS1/2/4M18KP340●	■			■
	M30, threaded	4 wire, PNP+NPN, prog. 24V	XS1/2/4M30KP340●	■			■
Cylindrical Plastic, non flush, sensing distance standard	M8, threaded	3 wire, PNP 24V	XS4P08P●340●	■			■
		3 wire, PNP 24V-48V	XS4P08P●370●	■	■		■
		3 wire, NPN 24V	XS4P08N●340●				
		3 wire, NPN 24V-48V	XS4P08N●370●				
		2 wire, AC/DC	XS4P08M●230●●●			■	
	M12, threaded	3 wire, PNP 24V	XS4P12P●340●	■			■
		3 wire, PNP 24V-48V	XS4P12P●370●	■	■		■
		3 wire, NPN 24V	XS4P12N●340●				
		3 wire, NPN 24V-48V	XS4P12N●370●				
		2 wire, AC/DC	XS4P12M●230●●●			■	
	M18, threaded	3 wire, PNP 24V	XS4P18P●340●	■			■
		3 wire, PNP 24V-48V	XS4P18P●370●	■	■		■
		3 wire, NPN 24V	XS4P18N●340●				
		3 wire, NPN 24V-48V	XS4P18N●370●				
		2 wire, AC/DC	XS4P18M●230●●●			■	
	M30, threaded	3 wire, PNP 24V	XS4P30P●340●	■			■
		3 wire, PNP 24V-48V	XS4P30P●370●	■	■		■
		3 wire, NPN 24V	XS4P30N●340●				
		3 wire, NPN 24V-48V	XS4P30N●370●				
		2 wire, AC/DC	XS4P30M●230●●●			■	

Compatible
Non compatible

	⎓ Inputs, BMXDDM				⎓ Inputs, BMXAMI		∿ Inputs, BMXDAI			
	6402K	16022	16025	3202K	0810	0800	1602	1603	1604	0805
	■	■	■	■						
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Modicon M340 automation platform

Inputs and OsiSense XS inductive proximity sensors *(continued)*

Proximity sensors				⎓ Inputs, BMXDDI			
Type			Reference	1602	1603	1604T	3202K
General purpose							
Cylindrical basic flush or non flush, sensing distance standard, Plastic or Metal	Ø 6,5 plain	3 wire, PNP 24V	XS1/206BLP●●●	■			■
		3 wire, NPN 24V	XS1/206BLN●●●				
	M8, threaded	3 wire, PNP 24V	XS1/208A/BLP●●●	■			■
		3 wire, NPN 24V	XS1/208A/BLN●●●				
	M12, threaded	3 wire, PNP 24V	XS1/212A/BLP●●●	■			■
		3 wire, NPN 24V	XS1/212A/BLN●●●				
	M18, threaded	3 wire, PNP 24V	XS1/218A/BLP●●●	■			■
		3 wire, NPN 24V	XS1/218A/BLN●●●				
	M30, threaded	3 wire, PNP 24V	XS1/230A/BLP●●●	■			■
		3 wire, NPN 24V	XS1/230A/BLN●●●				
Cylindrical, almost flush, sensing distance extending	M18, threaded	3 wire, PNP 24V	XS1N18P●349●	■			■
		3 wire, NPN 24V	XS1N18N●349●				
	M30, threaded	3 wire, PNP 24V	XS1N30P●349●	■			■
		3 wire, NPN 24V	XS1N30N●349●				
Cylindrical, miniature	Ø 4 plain	3 wire, PNP 24V	XS1L04P●31●●	■			■
		3 wire, NPN 24V	XS1L04N●31●●				
	M5, threaded	3 wire, PNP 24V	XS1N05P●31●●	■			■
		3 wire, NPN 24V	XS1N05N●31●●				
	Ø 6,5 plain	3 wire, PNP 24V	XS2L06P●340●	■			■
		3 wire, NPN 24V	XS2L06N●340●				
Application							
Cylindrical, adjustable sensing distance,	M12, threaded	3 wire, PNP 24V	XS612B2P●●●	■			■
		3 wire, NPN 24V	XS612B2N●●●				
	M18, threaded	3 wire, PNP 24V	XS618B2P●●●	■			■
		3 wire, NPN 24V	XS618B2N●●●				
	M30, threaded	3 wire, PNP 24V	XS630B2P●●●	■			■
		3 wire, NPN 24V	XS630B2N●●●				
Rotation monitoring	M18, threaded	3 wire, PNP 24V-48V	XSAV11/2373	■	■		■
		2 wire, AC/DC	XSAV11/2801			■	
	Format E 26x26x13	3 wire, PNP 24V	XS9●11RP●●●●	■			■
	Format C 40x40x15	2 wire, AC/DC	XS9●11RM●●●●			■	
Analog output	M12, threaded	2 wire 4…20mA; 3 wire 0…10V	XS●12AB●●●●				
	M18, threaded	2 wire 4…20mA; 3 wire 0…10V	XS●18AB●●●●				
	M30, threaded	2 wire 4…20mA; 3 wire 0…10V	XS●30AB●●●●				
	Block format	2 wire 4…20mA; 3 wire 0…10V	XS9C2/C4A2A●●●●				
		2 wire 4…20mA; 3 wire 0…10V	XS9●111A●●●●				
Food and beverage	Cylindrical threaded Metal	3 wire, PNP 24V	XS2●●SAP●●●	■			■
		3 wire, PNP 24V	XS908/12/18/30R/S●P●●●	■			■
		3 wire, NPN 24V	XS2●●SAN●●●				
		2 wire, AC/DC	XS2●●SAMA●●●			■	
	Cylindrical threaded Plastic	3 wire, PNP 24V-48V	XS2●●AAP●●●	■	■		■
		3 wire, NPN 24V	XS2●●AAN●●●				
		2 wire, AC/DC	XS2●●AAMA●●●			■	
Factor 1	Cylindrical threaded Metal	4 wire, PNP+NPN 24V	XS1M●●KPM40	■			■
	Forme C, 40 x 117 x 41	4 wire, PNP+NPN 24V	XS9C2/C4A●●●●	■			■
	Cylindrical threaded Metal	3 wire, PNP 24V	XS1M18PAS●●	■			■
Packaging	Format 12x26x40	3 wire, PNP 24V	XS7G12P●140	■			■
		3 wire, NPN 24V	XS7G12N●140				
		4 wire, PNP 24V-48V	XS7G12P●440	■	■		■
		4 wire, NPN 24V-48V	XS7G12N●440				
		2 wire, AC/DC	XS7G12M●230			■	
Material handling	Format C 40x40x40	2 wire, DC 24V-48V	XS7T4DA●●●	■	■		■
		4 wire, PNP 24V-48V	XS7T4PC●●●	■			■
		4 wire, NPN 24V-48V	XS7T4NC●●●				
	Format D 80x80x26	2 wire, DC 24V-48V	XS7D1●●●●	■	■		■
Welding	Cylindrical Metal	3 wire, PNP 24V	XS1M●●PAW●●	■			■
		2 wire, DC 24V-48V	XSLC●●●	■	■		■

Compatible
Non compatible

		⎓ Inputs, BMXDDM			⎓ Inputs, BMXAMI		∿ Inputs, BMXDAI			
	6402K	16022	16025	3202K	0810	0800	1602	1603	1604	0805

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Modicon M340 automation platform

Power consumption table

Presentation

The power required to supply each **BMXXBP●●00** rack depends on the type and number of modules installed in the racks. It is therefore necessary to draw up a power consumption table rack by rack in order to determine the **BMXCPS●●●●●** power supply module most suitable for each rack.

The calculation sheet on the page opposite can be used to calculate the power consumption of the 2 or 3 voltages provided (depending on the model) by the **BMXCPS●●●●●** power supply module: 3.3 V ⎓, 24 V ⎓ (rack) and 24 V ⎓ (sensors).

Method

■ Check and select a power supply module corresponding to the power available on the 2 or 3 voltages.

■ Check that the sum of the absorbed power on these three voltages does not exceed the total power of the power supply module.

■ Values to be entered depending on the Modicon M340 PLC configuration.

Photocopy this document or use the **M340 Design** *software, available on our website:* www.schneider-electric.com

Modicon M340 automation platform

Power consumption table

Calculation sheet

Rack no. 0 - 1 - 2 - 3	Module reference	Format S : Standard D : Double	Number	Consumption in mA *(1)* 3.3 V ⎓ voltage Module	3.3 V ⎓ voltage Total	24 V ⎓ rack voltage Module	24 V ⎓ rack voltage Total	24 V ⎓ sensor voltage Module	24 V ⎓ sensor voltage Total
Rack	**BMXXBP0400(H)**	–		304					
	BMXXBP0600(H)	–		455					
	BMXXBP0800(H)	–		607					
	BMXXBP1200H	–		225					
Processor (rack 0)	**BMXP341000(H)**	S				72			
	BMXP342000	S				72			
	BMXP342010/20102	S				90			
	BMXP342020(H)	S				95			
	BMXP342030/20302H	S				135			
Rack expansion (rack 0, 1, 2 or 3)	**BMXXBE1000**	–		22		160			
Discrete I/O	**BMXDAI0805**	S		76		13			
	BMXDAI1602(H)	S		90		60			
	BMXDAI1603(H)	S		90		60			
	BMXDAI1604(H)	S		90		60			
	BMXDAO1605(H)	S		100		95			
	BMXDDI1602(H)	S		90					
	BMXDDI1603(H)	S		90					
	BMXDDI1604T	S		76					
	BMXDDI3202K	S		140				110	
	BMXDDI6402K	S		200				110	
	BMXDDM16022(H)	S		100				30	
	BMXDDM16025(H)	S		100		50		30	
	BMXDDM3202K	S		150				55	
	BMXDDO1602(H)	S		100					
	BMXDDO1612(H)	S		100					
	BMXDDO3202K	S		150					
	BMXDDO6402K	S		240					
	BMXDRA0804T	S		61		104			
	BMXDRA0805(H)	S		100		55			
	BMXDRA1605(H)	S		100		95			
Analog I/O	**BMXAMI0410(H)**	S		150		45			
	BMXAMI0800	S		150		30			
	BMXAMI0810 (H)	S		150		45			
	BMXAMM0600(H)	S		150		130			
	BMXAMO0210(H)	S		150		110			
	BMXAMO0410(H)	S		150		84			
	BMXAMO0802	S		150		74			
	BMXART0414(H)	S		150		40			
	BMXART0814(H)	S		150		100			
Counting	**BMXEHC0200(H)**	S		200		40		80	
	BMXEHC0800(H)	S		200				80	
SSI encoder interface	**BMXEAE0300(H)**	S		150					
Motion control	**BMXMSP0200**	S		200		150			
Communication	**BMXEIA0100**	S		160					
	BMXNOE0100(H)	S				90			
	BMXNOE0110(H)	S				90			
	BMXNOM0200(H)	S				80			
	BMXNOC0401	S		555					
	BMXNOR0200H	S				95			

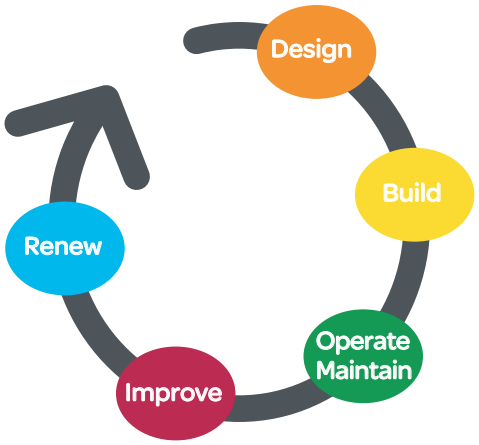
Power consumption

	Courant total (mA)					
		x 3,3 V		x 24 V		x 24 V
Puissance consommée (mW)		+		+		=
	≤		≤		≤	
	Available power (mW)					Total power (mW)

Choice of power supply module								
BMXCPS2010	D	24 V ⎓ isolated	**8250**		**16 800**			**17 000**
BMXCPS3020 (H)	D	24...48 V ⎓ isolated	**14850**		**31 200**			**32 000**
BMXCPS2000	D	100...240 V ∿	**8250**		**16 800**		**10 800**	**20 000**
BMXCPS3500 (H)	D		**14850**		**31 200**		**21 600**	**36 000**
BMXCPS3540T	D	125 V ⎓	**14850**		**31 200**		**21 600**	**36 000**

(1) Typical value given for 100% of inputs or outputs at state 1.

A dedicated services offer for your installed base



Design - Build - Operate/Maintain - Improve - Renew

Schneider Electric, with its experts, products and dedicated tools, provides services such as system design, consultancy, maintenance contracts, modernisation of facilities or delivering projects.

The Schneider Electric services offer is structured around several key areas:
- ■ Maintenance and support services:
  - □ A set of services to help maintain reliability and availability of automated control systems. These services may be the subject of a bespoke maintenance contract to meet your requirements more closely.
- ■ Consultancy services:
  - □ Diagnostics of the installed base
- ■ Modernization solutions:
  - □ Migration solutions including consultancy, expertise, tools and technical support to help ensure a smooth transition to newer technology while keeping the wiring and the encoding in most cases.

Customization services are also available to accommodate specific requirements. For more information, please consult the specific pages on our website www.schneider-electric.com/automationservices.

Maintenance and support services

Spare parts, exchanges and repairs

Everything you need to get equipment working again as quickly as possible

Solutions to respond very quickly to requests for spare parts, exchanges and repairs to your installed automation equipment (automation platforms, Human Machine Interfaces, drives, distributed I/O):
- ■ Spare parts management:
  - □ Identification of critical parts
  - □ Stock of spare parts: a Schneider Electric owned stock of spare parts, on your site or in one of our warehouses, with immediate availability on site or a contractually agreed delivery time if stored off site
  - □ Testing of spare parts stored on site
  - □ Automatic stock filling
- ■ Repairs:
  - □ Broken down products are repaired in a network of worldwide repair centres. For each repaired product, our experts provide a detailed report.
- ■ On-site repair:
  - □ Our experts' knowledge and expertise
  - □ Monitoring of specific repair procedures
  - □ Availability of our teams to respond 24/7
- ■ Exchanges:
  - □ With standard replacements, receive a new or reconditioned product before the broken down product has even been sent back
  - □ Fast exchanges offer the option to receive the replacement product within 24 hours (in Europe)

Preventive maintenance

Improving and guaranteeing the long-term reliability and performance of your installations

Schneider Electric's preventive maintenance expert assesses your site, the equipment to be managed and sets up a maintenance program to accommodate specific requirements. A list is provided of the tasks to be performed and their frequency, including site-specific tasks, describing how preventive maintenance is to be managed.

Extended warranty

An additional manufacturer warranty covering replacement or repair of the equipment

The extended warranty offers the option to take out a 3-year warranty. The warranty period can vary according to the geographical area, consult your Customer Care Centre.

Online support

Access to dedicated experts

Priority access to experts who can answer technical questions promptly concerning equipment and software both on sale and no longer commercially available.

Software subscription

Access to software upgrades and new features

By subscribing to software updates, users are able to:
- ■ Purchase licences
- ■ Receive updates, upgrades, software migrations and transitions
- ■ Download software from Schneider Electric's software library

***Note**: To check availability of services required, please contact our Customer Care Centre.*

A dedicated services offer for your installed base

Consultancy services

M2C (Maintenance and Modernization Consultancy)

Professional tools and methods, proven experience of managing obsolescence and updating installed bases, to reduce downtimes and improve performance.

With our maintenance and modernization consultancy offer, Schneider Electric will help you check the state of your installed base by:
- Defining the scope and depth of the analysis in collaboration with you
- Collecting the technical data without shutting down production
- Analyzing and identifying avenues for improvement
- Producing a recommendation plan

Customer benefits:
- Learning about the components that make up the installed base and how up-to-date they are
- Better downtime anticipation
- Expert advice designed to improve performance

Modernization solutions

Migration to PlantStruxure

Proven expertise, tools and methods to give you a clear vision of the improvement opportunities and guide you toward a successful modernization project

PlantStruxure™

To find out more about PlantStruxure architectures, please visit our website www.schneider-electric.com/PlantStruxure

Schneider Electric offers a gradual program of modernization through a series of products, tools and services that allow you to upgrade to newer technology. There are several stages in this gradual modernization program:
- Partial program: replacement of an old component with a new one
- Staggered program: gradual incorporation of new offers in the system
- Total program: total renovation of the system

The table below lists our various migration offers:

Wide range of migration offers

Solution		Change the CPU	Keep the I/O racks & wiring	Change the I/O racks & keep the wiring	Migrate your application	Manage your project	Execute your project
Platform *(1)*	TSX47 to TSX107	⊖	⊖	⊖	⊖	⊖	⊖
	April series 1000			⊖	⊖	⊖	⊖
	Modicon ●84, Compact	⊖	⊖	⊖	⊖	⊖	⊖
	April SMC				⊖	⊖	⊖
	Merlin Gerin PB				⊖	⊖	⊖
	AEG	⊖	⊖	⊖	⊖	⊖	⊖
	Symax	⊖			⊖	⊖	⊖
	Rockwell SLC500			⊖	⊖	⊖	⊖

⊖ Service available

(1) Our migration service offer also includes SCADA, Human Machine Interfaces, drives, communication networks and distributed I/O.

Customization services

Schneider Electric is able to meet your specific requirements and provide you with adapted products:
- Protective coating for Human Machine Interfaces, automation platforms and distributed I/O modules for use in harsh environments
- Customized cable lengths to match your specific needs
- Customized front panels for Human Machine Interfaces

***Note**: To check availability of services required, please contact our Customer Care Centre.*

Modicon M340 automation platform

Migration solutions

TSX7 PLCs to Modicon X80 I/O platform

Presentation

The quick wiring adaptors comprise a set of connectors designed to simplify the replacement of legacy TSX7 PLCs by automation platforms, integrating the Modicon X80 I/O platform, such as Modicon M340, Quantum Ethernet RIO, etc.

Replacement is carried out using the cabling of the existing installation. The adaptors enable the I/O connectors of the TSX7 automation module in an existing installation to be matched to the equivalent I/O modules of the Modicon X80 I/O by using a corresponding pre-wired cable assembly.

Twenty-eight references (two swing arm rack supports and twenty-six quick wiring adaptors) cover the main migration requirements between the TSX7 I/O modules and the Modicon X80 I/O platform and they conform to the specifications of the Modicon M340 range.

Description of the solution

The electromechanical migration solution comprises a migration rack, that includes a hinged door on which the backplane of an M340 rack (8 or 12 slots) is fixed, combined with a set of quick wiring adaptors.

- The rear of the chassis replaces the TSX7 rack. It is designed to accommodate the adaptors according to the modules present in the original TSX7 rack.

- The existing TSX7 wiring connector of the installation is mounted on the matching adaptor fixed on the rack support behind the hinged door. The other end of the adaptor cable is connected to the corresponding I/O module of the Modicon X80 I/O platform.

- The M340 PLC is fixed at the front on the hinged door.

- The adaptors transmit the same control signals to the installations without any changes to the wiring.

Advantages of the solution

This TSX7 PLC to the Modicon X80 I/O platform migration system offers the following advantages:

- Reduced production downtimes. Migration can be made during normal stoppage times (approximately 1 hour installation time per rack), as opposed to manual rewiring which requires a specific stoppage of production. Backtracking possible in the event of a problem.

- Cost savings due to use of all existing wiring to sensors/actuators in the enclosures. Rewiring, tests, validation and update of wiring diagrams no longer required. This solution is therefore more reliable and easier to implement.

This migration solution is part of a full set of TSX7 modernization solutions that comprise methods, dedicated solutions and tools. It can be implemented with the help of our experts so as to optimize suitability with the existing installation.

A correspondence table between TSX7 modules and the Modicon X80 I/O platform modules is shown on the next page. It lists only the possible compatibilities. However, TSX module terminal, modularity, common or power supply differences can be taken into account according to the setting up, installations and configurations. It is therefore recommended that compatibility conditions be checked with our Customer Care Centre.

Modicon M340 automation platform

Migration solutions

TSX7 PLCs to Modicon X80 I/O platform

TSX7 module - X80 I/O platform compatibility

Type of module	TSX7 modules		X80 I/O platform	Quick wiring adaptors	
	Reference	Description	Reference	Description	Reference
Rack	TSXRKN8/RKS8	8-slot rack	BMXXBP0800	8-slot rack	**TSX7SWAXBP1200**
	TSXRKN8/RKS8	8-slot rack	BMXXBP1200	12-slot rack	**TSX7SWAXBP1200**
Discrete inputs	TSXDET802	8-point 24 VAC input	BMXDAI1602	Adaptor, 40 cm, between modules - TSXDET8●● - and BMXDAI16●● or BMXDDI16●●	**DET08XXDXI160X**
	TSXDET803	8-point 48 VAC input	BMXDAI1603		
	TSXDET812	8-point 24 VDC input	BMXDDI1602		
	TSXDET813	8-point 48 VDC input	BMXDDI1603		
	TSXDET814	8-point 130 VDC input	BMXDDI1604T		
	TSXDET824	8-point 110 VDC - 115 VAC input	BMXDAI1604		
	TSXDET1603	16-point 48 VAC input	BMXDAI1603	Adaptor, 40 cm, between modules - TSXDET16●● - and BMXDAI16●● or BMXDDI16●●	**DET16XXDXI160X**
	TSXDET1604	16-point 110/120 VAC input	BMXDAI1604		
	TSXDET1612	16-point 24 VDC input	BMXDDI1602		
	TSXDET1613	16-point 48 VDC input	BMXDDI1603		
	TSXDET1633	16-point 48 VDC input	BMXDDI1603		
	TSXDET3232	32-point 24 VDC input	BMXDDI3202K	Adaptor, 1 m, between modules - TSXDET32●2 - and BMXDDI3202K	**DET32X2DDI3202K**
	TSXDET3242	32-point 24 VDC input	BMXDDI3202K		
	TSXDET3252	32-point 24 VDC input	BMXDDI3202K		
Discrete outputs	TSXDST1632	16-point 24 VDC outputs	BMXDDO1602	Adaptor, 40 cm, between modules TSXDST1632 (24 VDC/MOS) and BMXDDO1602	**DST1632DDO1602**
	TSXDST1632	16-point 24 VDC outputs	BMXDRA1605	Adaptor, 40 cm, between modules TSXDST1632 (24 VDC/RELAY) and BMXDRA1605	**DST1632DRA1605**
	TSXDST1633	16-point 24/240 VAC outputs	BMXDRA1605	Adaptor, 40 cm, between modules TSXDST1633 (24..240 VAC/RELAY) and BMXDRA1605	**DST1633DRA1605**
	TSXDST1634	16-point 48/130 VDC outputs	2 modules BMXDRA0804T	Adaptor, 40 cm, between 1 TSXDST1634 (125 VDC) module and 2 BMXDRA0804T modules	**DST1634DRA0804T**
	TSXDST1635	16-point 24/240 VAC outputs	BMXDAO1605	Adaptor, 40 cm, between modules TSXDST1635 (24..240 VAC/RELAY) and BMXDAO1605	**DST1635DAO1605**
	TSXDST1635	16-point 24/240 VAC outputs	BMXDRA1605	Adaptor, 40 cm, between modules TSXDST1635 (48..240 VAC/TRIAC) and BMXDRA1605	**DST1635DRA1605**
	TSXDST1682	16-point 24 VDC outputs	BMXDDO1602	Adaptor, 40 cm, between modules TSXDST1682 (48..240 VDC/MOS) and BMXDDO1602	**DST1682DDO1602**
	TSXDST2472	24-point 24 VDC outputs	2 modules BMXDDO1602	Adaptor, 50 cm, between 1 TSXDST24 ● 2 (24 VDC) module and 2 BMXDDO1602 modules	**DST24X22DDO1602**
	TSXDST2482	24-point 24 VDC outputs	2 modules BMXDDO1602		
	TSXDST2472	24-point 24 VDC outputs	BMXDDO3202K	Adaptor, 1 m, between modules TSXDST24● 2 (24 VDC) and BMXDDO3202K	**DST24X2DDO3202K**
	TSXDST2482	24-point 24 VDC outputs	BMXDDO3202K		
	TSXDST3292	32-point 24 VDC outputs	BMXDDO3202K	Adaptor, 1 m, between modules TSXDST3292 (24 VDC) and BMXDDO3202K	**DST3292DDO3202K**
Analog Inputs	TSXAEM411	4-channel voltage/current inputs	BMXAMI0410	Adaptor, 40 cm, between modules TSXAEM411 and BMXAMI0410 (Current type)	**AEM0411AMI0410C**
	TSXAEM411	4-channel voltage/current inputs	BMXAMI0410	Adaptor, 40 cm, between modules TSXAEM411 and BMXAMI0410 (Voltage type)	**AEM0411AMI0410V**
	TSXAEM413	4-channel Pt100 inputs 3 or 4-wire	BMXART0414	Adaptor, 40 cm, between modules TSXAEM413 and BMXAMI0414 (RTD type)	**AEM0413ART0414**
	TSXAEM811	8-channel voltage/current inputs	BMXAMI0810	Adaptor, 40 cm, between modules TSXAEM811 and BMXAMI0810 (Current type)	**AEM0811AMI0810C**
	TSXAEM811	8-channel voltage/current inputs	BMXAMI0810	Adaptor, 40 cm, between modules TSXAEM811 and BMXAMI0810 (Voltage type)	**AEM0811AMI0810V**
	TSXAEM821	8-channel voltage/current inputs	BMXAMI0800	Adaptor, 40 cm, between modules TSXAEM821 and BMXAMI0800 (Current type)	**AEM0821AMI0800C**
	TSXAEM821	8-channel voltage/current inputs	BMXAMI0800	Adaptor, 40 cm, between modules TSXAEM821 and BMXAMI0800 (Voltage type)	**AEM0821AMI0800V**
	TSXAEM1601	16-channel inputs	2 modules BMXAMI0800	Adaptor, 50 cm, between 1 TSXAEM1601 module and 2 BMXAMI0800 modules (Voltage type)	**AEM1601AMI0800V**
	TSXAEM1602	16-channel inputs	2 modules BMXAMI0800	Adaptor, 50 cm, between 1 TSXAEM1602 module and 2 BMXAMI0800 (Current type) modules	**AEM1602AMI0800C**
	TSXASR200	2-channel voltage/current output	BMXAMO0210	Adaptor, 50 cm, between modules TSXASR200 and BMXAMO0210	**ASR0200AMO0210**
	2 TSXASR200 modules	2 x 2-channel voltage/current outputs	BMXAMO0410	Adaptor, 50 cm, between 2 TSXASR200 modules and 1 BMXAMO0410 module	2 **ASR0200AMO0410** adaptors
Analog outputs	TSXASR0401	4-channel voltage output	BMXAMO0410	Adaptor, 40 cm, between modules TSXASR040● and BMXAMO0410	**ASR040XAMO0410**
	TSXASR0402	4-channel current output	BMXAMO0410		
	TSXASR0403	4-channel current output	BMXAMO0410		
	TSXAST200	2-channel voltage/current output	BMXAMO0210	Adaptor, 40 cm, between modules TSXAST200 and BMXAMO0210	**AST0200AMO0210**

Modicon M340 automation platform

Migration solutions

Modicon Compact PLCs to Modicon X80 I/O platform

Presentation

The quick wiring adaptors comprise a set of connectors designed to simplify the replacement of legacy Modicon Compact PLCs by automation platforms, integrating the Modicon X80 I/O platform, such as Modicon M340, Quantum Ethernet RIO, etc.
The adaptors enable the I/O field connectors of the Compact PLC in an existing installation to be matched to the equivalent I/O modules of the X80 I/O platform. Thirteen references assure the wiring translations between the I/O modules of Compact PLCs and those of the Modicon M340 platform and they fully meet the mechanical and environmental specifications of the Modicon M340 range.

Quick wiring adaptors features

The quick wiring adaptors have the same look and feel as the standard I/O module connectors of the X80 I/O platform. The new connectors increase the depth and extend below the I/O module.

- The quick wiring adaptors use the same fixing/retaining screws for securing the adaptor to the X80 I/O platform module.
- The sockets of the adaptors accept 2 field wiring connectors of the Compact I/O module.
- A clear cover is sized to retain the wiring harness.
- The cover also has enough room for attaching the wiring label that was used on the Compact module.

Compact module - X80 I/O platform compatibility

Type of module	Compact module		X80 I/O platform		Compact module - X80 I/O platform compatibility	Quick wiring adaptor reference
	Reference	Description	Reference	Description		
Digital input	AS-BDEO216	16-point 24 VDC input module	BMXDDI1602	16-point 24 VDC sink input	OK	990XSM00206
	AS-BDEP208	8-point 230 VAC input module	BMXDAI0805	8-point 200 to 240 VAC input	OK	990XSM00201
	AS-BDEP209	8-point 120 VAC input module	BMXDAI1604	16-point 110 VAC input	OK	990XSM00213
	AS-BDEP210	8-point 115 VAC input module	BMXDAI1604	16-point 110 VAC input	OK	990XSM00213
	AS-BDEP211	8-point 115 VAC input module	BMXDAI1604	16-point 110 VAC input	OK	None
	AS-BDEP214	16-point 12-60 VDC input module	BMXDDI1602 BMXDDI1603	16-point 24 VDC input 16-point 48 VDC input	For the 24 VDC module ensure that the input current threshold at switch on is compatible with the application. The input voltage threshold of BMXDDI1603 is 34 V compared to 12 V for AS-BDEP214. No replacement for 12 VDC and 60 VDC.	990XSM00206
	AS-BDEP215	16-point 5 VDC TTL input module	–	–	No exact replacement but can be replaced with HMI functionality.	None
	AS-BDEP216	16-point 24 VDC input module	BMXDDI1602	16-point 24 VDC sink input	OK	990XSM00206
	AS-BDEP217	16-point 24 VDC input module	BMXDAI1602	16-point 24 VDC sink input	OK but requires negative logic.	990XSM00201
	AS-BDEP218	16-point 115 VAC input module	BMXDAI1604	16-point 110 VAC input	OK	990XSM00201
	AS-BDEP220	16-point 24 VDC fast input module	–	–	The response time is a deciding factor when selecting replacement modules.	None
	AS-BDEP254	16-point 12-60 VDC input module	BMXDDI1602H BMXDDI1603H	16-point 24 VDC input 16-point 48 VDC input	For the 24 VDC module ensure that the input current threshold at switch on is compatible with the application. The input voltage threshold of BMXDDI1603 is 34 V compared to 12 V for AS-BDEP254. The temperature range for BMXDDI1603 is 0 to 60 °C compared to - 40 °C to + 70 °C for ASBDEP254. No replacement for 12 VDC and 60 VDC.	990XSM00206
	AS-BDEP254C	16-point 12-60 VDC input module, extd. temp. + coating	BMXDDI1602H BMXDDI1603H	16-point 24 VDC input 16-point 48 VDC input	For the 24 VDC module ensure that the input current threshold at switch on is compatible with the application. The input voltage threshold of BMXDDI1603 is 34 V compared to 12 V for AS-BDEP254. The temperature range for BMXDDI1603 is 0 to 60 °C compared to - 40 °C to + 70 °C for ASBDEP254. No replacement for 12 VDC and 60 VDC.	990XSM00206
	AS-BDEP256	16-point 24 VDC input module	BMXDDI1602H	16-point 24 VDC sink input	The nominal temperature range of BMXDDI1602 is only 0 to + 60 °C compared to - 40 to + 70 °C for AS-BDEP256.	990XSM00206
	AS-BDEP256C	16-point 24 VDC input module, extd. temp. + coating	BMXDDI1602H	16-point 24 VDC sink input	The nominal temperature range of BMXDDI1602 is only 0 to + 60 °C compared to - 40 to + 70 °C for AS-BDEP256C.	990XSM00206
	AS-BDEP257	16 x 110 VDC inputs, extd. temp.	BMXDDI1604T	16-point 125 VDC input	Nominal input voltage for BMXDDI1604T is 100 to 150 VDC compared to 55 to 170 VDC for AS-BDEP257. Response time for BMXDDI1604T is 9 ms compared to 6 ms for AS-BDEP257. Temperature range for BMXDAI1604T from -25 to + 70 °C compared to - 40 to + 70 °C.	990XSM00206
	AS-BDEP257C	16-point 110 VDC input, extd. temp. + coating	BMXDDI1604T	16-point 125 VDC input	Nominal input voltage for BMXDDI1604T is 100 to 150 VDC compared to 55 to 170 VDC for AS-BDEP257. Response time for BMXDDI1604T is 9 ms compared to 6 ms for AS-BDEP257. Temperature range for BMXDDI1604T from - 25 to + 70 °C compared to - 40 to + 70 °C. No conformal coating available.	990XSM00206
	AS-BDEP296	16 x 60 VDC inputs	–	–	No replacement	–
	AS-BDEP297	16 x 48 VDC inputs	BMXDDI1603	16-point 48 VDC input	OK	990XSM00206

Green background with no comments indicates full functional equivalent between the X80 I/O platform module and the Compact module.
Green background with comments indicates full functional equivalent with differences notes. Check with your application.
Orange background indicates that, in most cases, the inputs of the X80 I/O platform fully replace those of the Compact module but differences are noted. For example, maximum current per point. Check with your application.
Red background indicates that there are no direct replacements but other solutions exist. Please consult Schneider Electric.

Compact module - X80 I/O platform compatibility

Type of module	Compact module		X80 I/O platform		Compact module - X80 I/O platform compatibility	Quick wiring adaptor reference
	Reference	Description	Reference	Description		
Digital output	AS-BDAO216	16-point 24 VDC output module	BMXDDO1602	16-point 24 VDC output	OK, but with slightly slower response time. BMXDDO1602 response time of 1.2 ms compared to < 1 ms for AS-BDAO216.	990XSM00206
	AS-BDAP204	4-point relay (NO) module	BMXDRA0805	8-point relay outputs	OK, 4 relays on Compact, 8 on X80 I/O.	990XSM00203
	AS-BDAP204	4-point relay (NO) module	BMXDRA0804T	8-point 125 VDC output relay	OK, 4 relays on Compact, 8 on X80 I/O.	990XSM00203
	AS-BDAP208	8-point relay (NO) module	BMXDRA0805	8-point relay outputs	OK	990XSM00206
	AS-BDAP258	8-point relay (NO) module	BMXDRA0805H	8-point relay outputs	OK, but different extended temperatures.	990XSM00206
	AS-BDAP258C	8-point 24 VDC relay (NO) module, extd. temp. + coating	BMXDRA0805H	8-point relay outputs	OK. Temperature between 0 and + 60°C compared to - 40 to + 70°C for BMXDRA0805H.	990XSM00206
	AS-BDAP209	8-point, 1 A, 120 VAC output module	BMXDAO1605	16-point 110 VAC to 230 VAC output	Lower current availability. BMXDAO1605 is limited to 600 mA compared to 1 A for AS-BDAP210. For AS-BDAP210, the nominal voltage goes down to 85 V compared to 100 V for BMXDAO1605.	990XSM00204
	AS-BDAP210	8-point, 24-230 VAC output module	BMXDAO1605	16-point 110 VAC to 230 VAC output	Lower current availability. BMXDAO1605 is limited to 600 mA compared to 1 A for AS-BDAP210. For AS-BDAP210, the nominal voltage goes down to 85 V compared to 100 V for BMXDAO1605.	990XSM00204
	AS-BDAP212	8-point 24 VDC input/4-point 2 A output	BMXDDM16025	8-point 24 VDC input + 8-point relay output	Compact: 2 groups of 2 outputs; X80 I/O: 1 group of 8. Consequently, issue regarding different inputs isolation.	990XSM00205
	AS-BDAP252	8-point 24 VDC input/4-point 2 A output	BMXDDM16025H	8-point 24 VDC input + 8-point relay output	Compact: 2 groups of 2 outputs; X80 I/O: 1 group of 8. Consequently, issue regarding different inputs isolation. Different extended temperatures.	990XSM00205
	AS-BDAP216	16-point 24 VDC output module	BMXDDO1602	16-point 24 VDC output	Compact: 2 groups of 8; X80 I/O: 1 group of 16. Consequently, different inputs isolation.	990XSM00206
	AS-BDAP256	16-point 24 VDC output module	BMXDDO1602H	16-point 24 VDC output	Compact: 2 groups of 8; X80 I/O: 1 group of 16. Consequently, different inputs isolation. Different extended temperatures.	990XSM00206
	AS-BDAP217	16-point 5-24 VDC output module	BMXDDO1612	16-point 24 VDC sink output	Slightly slower response time. BMXDDO1612 response time of 1.2 ms compared to < 1 ms for AS-BDAP217. Also, Compact: 2 groups of 8; X80 I/O: 1 group of 16.	990XSM00206
	AS-BDAP218	16-point 24-240 VAC output module	BMXDAO1605	16-point 110 VAC to 230 VAC module	Lower current availability. BMXDAO1605 is limited to 600 mA compared to 1 A for AS-BDAP210. For AS-BDAP210, the nominal voltage goes down to 24 V compared to 100 V for BMXDAO1605. If 24 V is required, select a different module.	990XSM00202
	AS-BDAP211	Combined press and stamp module, 120 VAC, inputs controlling the outputs	–	–	None	None
Digital input/output	AS-BDAP220	8-point 24 VDC, 2 A, input/output module	BMXDDM16022	8-point 24 VDC input + 8-point 24 VDC output	BMXDDM16022 is limited to 0.625 A per channel compared to 2 A for AS-BDAP220. Also, the response time is 1.2 ms compared to < 1 ms for AS-BDAP220.	990XSM00207
	AS-BDAP250	8-point, 24 VDC, input/output module	BMXDDM16022H	8-point 24 VDC input + 8-point 24 VDC output	BMXDDM16022 is limited to 0.625 A per channel compared to 2 A for AS-BDAP220 and is not conformally coated. Also, the response time is 1.2 ms compared to < 1 ms for AS-BDAP220. BMXDDM16022 temperature range of 0 to + 60 °C compared to - 40 to + 70 °C for AS-BDAP250C.	990XSM00207
	AS-BDAP250C	8-point, 24 VDC, input/output module, extd. temp. + coating	BMXDDM16022H	8-point 24 VDC input + 8-point 24 VDC output	BMXDDM16022 is limited to per channel compared to 2 A for AS-BDAP250. Also, the response time is 1.2 ms compared to < 1 ms for AS-BDAP220. DDM16022 temperature range of 0 to + 60 °C compared to - 40 to + 70 °C for AS-BDAP250C.	990XSM00207
	AS-BDAP212	8 inputs, 4 outputs, 24 VDC	BMXDDM16025	8-point 24 VDC input + 8-point relay output	Compact: 2 groups of 2 outputs; X80 I/O: 1 group of 8. Consequently, different inputs isolation.	990XSM00205
	AS-BDAP252	8 inputs, 4 outputs, 24 VDC	BMXDDM16025H	8-point 24 VDC input + 8-point relay output	BMXDDM16025 temperature range of 0 to + 60 °C compared to - 40 to + 70 °C. Compact: 2 groups of 2 outputs; X80 I/O: 1 group of 8. Consequently, different inputs isolation.	990XSM00205
	AS-BDAP252C	8 inputs, 4 outputs, 24 VDC, extd. temp. + coating	BMXDDM16025H	8-point 24 VDC input + 8-point relay output	BMXDDM16025 temperature range of 0 to + 60 °C compared to - 40 to + 70 °C. Compact: 2 groups of 2 outputs; X80 I/O: 1 group of 8. Consequently, different inputs isolation.	990XSM00205
	AS-BDAP253	8 inputs, 4 outputs, 110 VDC	BMXDDM16025H	8-point 24 VDC input + 8-point relay output	1) Compact inputs: 110 VDC; X80 I/O: 24 VDC. 2) Compact: 2 groups of 2 outputs; X80 I/O: 1 group of 8. a) Isolation issue b) 4 unused references	None
	AS-BDAP253C	8 inputs, 4 outputs, 110 VDC, extd. temp. + coating	BMXDDM16025H	8-point 24 VDC input + 8-point relay output	1) Compact inputs: 110 VDC; X80 I/O: 24 VDC. 2) Compact: 2 groups of 2 outputs; X80 I/O: 1 group of 8. a) Isolation issue b) 4 unused references	None
	AS-BDAP292	8 inputs, 4 outputs, 60 VDC	–	–	No exact replacement. Please consult Schneider Electric for a solution.	None

Compact module - X80 I/O platform compatibility

Type of module	Compact module		X80 I/O platform		Compact module - X80 I/O platform compatibility	Quick wiring adaptor reference
	Reference	Description	Reference	Description		
Analog input	AS-BADU204	4-channel ± 0.5 V register, PT100, 11-bit	BMXART0414	4-channel TC/RTD, isolated, analog inputs	OK, but ± 0.5 V missing. Also, X80 I/O has channel to channel and channel to bus isolation.	None
	AS-BADU205	4-channel register input	BMXAMI0410	4-channel, isolated, analog current/voltage input	OK, scaling differences.	990XSM00208
	AS-BADU205	4-channel register input	BMXAMM0600	4-channel, non-isolated, analog current/voltage input and 2-channel, non-isolated, 2-channel current/voltage output	OK, scaling differences.	990XSM00209
	AS-BADU206	4-channel, isolated, register input	BMXAMI0410	4-channel, isolated, analog current/voltage input	OK, but X80 I/O does not have ± 1 V range.	990XSM00210
	AS-BADU206	4-channel, isolated, register input	BMXAMM0600	4-channel, non-isolated, analog current/voltage input and 2-channel, non-isolated, 2-channel current/voltage output	OK, but X80 I/O does not have ± 1 V range. No isolation.	990XSM00211
	AS-BADU210	4-channel, isolated, analog voltage/current input	BMXAMI0410	4-channel, isolated, analog current/voltage input	OK, scaling differences. X80 I/O does not have all the corresponding voltage ranges.	990XSM00210
	AS-BADU210	4-channel, isolated, analog voltage/current input	BMXAMM0600	4-channel, non-isolated, analog current/voltage input and 2-channel, non-isolated, 2-channel current/voltage output	OK, scaling differences. X80 I/O does not have all the corresponding voltage ranges. No isolation.	990XSM00211
	AS-BADU211	8-channel analog input thermal module	BMXART0814	8-channel TC/RTD, isolated, analog inputs	OK, X80 I/O does not have 2, 5 or 10 V inputs nor 4-20 mA, ± 20 mA, nor the 24 V external voltage,	None
	AS-BADU212	8-channel analog input thermal module	BMXART0814	8-channel TC/RTD, isolated, analog inputs	OK, X80 I/O does not have 2, 5 or 10 V inputs nor 4-20 mA, ± 20 mA, nor the 24 V external voltage.	None
	AS-BADU214	4/8-channel multi-range Analog/Digital inputs	BMXART0414	4-channel TC/RTD, isolated, analog inputs	X80 I/O has no 0 - 10 V, 1 - 5 V, 2 - 10 V voltage ranges nor loop capability.	None
	AS-BADU216	4/8-channel, isolated, thermocouple	BMXART0814	8-channel TC/RTD, isolated, analog inputs	OK	None
	AS-BADU254	4-channel register input	BMXAMI0410H	4-channel, isolated, analog current/voltage input	OK and X80 I/O has CAN/CAN and CAN/bus isolation whereas Compact has none. Different extended temperatures.	None
	AS-BADU254	4-channel register input	BMXAMM0600H	4-channel analog current/voltage input and 2-channel current/voltage output	OK, X80 I/O has 4 inputs and 2 outputs. Different extended temperatures.	None
	AS-BADU254C	4-channel register input, extd. temp. + coating	BMXAMI0410H	4-channel, isolated, analog current/voltage input	OK and X80 I/O has CAN/CAN and CAN/bus isolation whereas Compact has none. Different extended temperatures.	None
	AS-BADU254C	4-channel register input, extd. temp. + coating	BMXAMM0600H	4-channel analog current/voltage input and 2-channel current/voltage output	OK, X80 I/O has 4 inputs and 2 outputs. No isolation. Different extended temperatures.	None
	AS-BADU256	4-channel, isolated, register input	BMXAMI0410H	4-channel, isolated, analog current/voltage input	OK, but different extended temperatures.	None
	AS-BADU256	4-channel, isolated, register input	BMXAMM0600H	4-channel analog current/voltage input and 2-channel current/voltage output	OK, X80 I/O has 4 inputs and 2 outputs. No isolation. Different extended temperatures.	None
	AS-BADU256C	4-channel, isolated, register input, extd. temp. + coating	BMXAMI0410H	4-channel, isolated, analog current/voltage input	OK, but different extended temperatures.	990XSM00210
	AS-BADU256C	4-channel, isolated, register input, extd. temp. + coating	BMXAMM0600H	4-channel analog current/voltage input and 2-channel current/voltage output	OK, X80 I/O has 4 inputs and 2 outputs without isolation.	990XSM00211
	AS-BADU257	8-channel thermocouple	BMXART0814H	8-channel TC/RTD, isolated, analog inputs	OK, but different extended temperatures.	None
	AS-BADU257C	8-channel thermocouple, extd. temp. + coating	BMXART0814H	8-channel TC/RTD, isolated, analog inputs	OK, but different extended temperatures.	None

Green background with no comments indicates full functional equivalent between the X80 I/O platform module and the Compact module.
Green background with comments indicates full functional equivalent with differences notes. Check with your application.
Orange background indicates that, in most cases, the inputs of the X80 I/O platform fully replace those of the Compact module but differences are noted. For example, maximum current per point. Check with your application.
Red background indicates that there are no direct replacements but other solutions exist. Please consult Schneider Electric.

Compact module - X80 I/O platform compatibility

Type of module	Compact module		X80 I/O platform		Compact module - X80 I/O platform compatibility	Quick wiring adaptor reference
	Reference	Description	Reference	Description		
Analog output	AS-BDAU202	2-point analog outputs, ± 10 V, ± 20 mA	BMXAMO0210	2-channel, isolated, analog current/voltage output	X80 I/O has no negative 20 mA capability.	990XSM00212
	AS-BDAU204	4-channel, opto-isolated, analog output	BMXAMO0210	2-channel, isolated, analog current/voltage output	X80 I/O does not support 0 to 1 V, 0 to 5 V, ± 1 V ranges. +- 5 V.	None
	AS-BDAU204	4-channel, opto-isolated, analog output	BMXAMO0410	4-channel, isolated, analog current/voltage output	X80 I/O does not support 0 to 1 V, 0 to 5 V, ± 1 V ranges. +- 5 V.	990XSM00214
	AS-BDAU208	8-channel register output	–	–	No 8-point analog output. Two modules need to be used.	None
	AS-BDAU252	2-point analog outputs, ± 10 V, ± 20 mA. extd. temp.	BMXAMO0210H	2-channel, isolated, analog current/voltage output	X80 I/O has no negative 20 mA capability. Different extended temperatures.	990XSM00212
	AS-BDAU252C	2-point analog outputs, ± 10 V, ± 20 mA, extd. temp. + coating	BMXAMO0210H	2-channel, isolated, analog current/voltage output	X80 I/O has no negative 20 mA capability. Different extended temperatures.	990XSM00212
Communi-cation	AS-BBKF202	INTERBUS S slave	–	–	No replacement	None
	AS-BBKF201-16	16 word INTERBUS S Master	–	–	No replacement	None
	AS-BBKF201-64	64 word INTERBUS S Master	–	–	No replacement	None
	CM900	Auto interface	–	–	No replacement	None
Service communi-cation	AS-BKOS260-24	24 word universal communication	–	–	Please consult Schneider Electric for assistance in finding the best solution. READ_VAR functionality could be a replacement solution.	None
	AS-BKOS260-64	64 word universal communication	–	–	Please consult Schneider Electric for assistance in finding the best solution. READ_VAR functionality could be a replacement solution.	None
	M7251	Programmable limit switch	–	–	No replacement, no movement	None
	M7350	Resolver-decoder	–	–	No replacement, no movement	None
Motion	AS-BMOT201	Axis motion control encoder module	–	–	Please consult Schneider Electric for assistance in finding the best solution.	None
	AS-BMOT202	Axis motion control resolver encoder module	–	–	Please consult Schneider Electric for assistance in finding the best solution.	None
Counter	AS-BFRQ204	4-point frequency module	BMXEHC0200	2-channel high speed counter	No 5 V input. Please consult Schneider Electric for the exact replacement.	None
	AS-BFRQ254C	4-channel frequency module, extd. temp. + coating	BMXEHC0200H	2-channel high speed counter	No 5 V input. Please consult Schneider Electric for the exact replacement.	None
	AS-BVIC200 VRC200	4 high speed pulse or 4 VRC inputs	–	–	Please consult Schneider Electric for assistance in finding the best solution.	None
	AS-BVIC205 CTR205	4 high speed pulse or 4 x 5 V TTL inputs	–	–	Please consult Schneider Electric for assistance in finding the best solution.	None
	AS-BVIC212 CTR212	4 high speed pulse or 12 VDC inputs	–	–	Please consult Schneider Electric for assistance in finding the best solution.	None
	AS-BVIC224 CTR224	4 high speed pulse or 24 VDC inputs	BMXEHC0800	8-channel high speed counter	Please consult Schneider Electric for assistance in finding the best solution.	None
	AS-BZAE201	High speed counter/ positioner (2 relays)	BMXEHC0200	2-channel high speed counter	12 V counter OK, no relay outputs, no 5 V, no positioning.	None
	AS-BZAE204	4-channel high speed counter/positioner	BMXEHC0800	8-channel high speed counter	OK. No outputs.	None
CPU	AS-B984-A145 up to E984-285	–	BMXP342020 + BMXCPS3020	–	Only 1 Modbus port on CPU 2-port NOM serial module available.	None
	AS-P120000	105...240 VAC inputs, 24 VDC 1.0 A outputs	BMXCPS2000/ BMXCPS3500	–	–	None

Note:
- *Extended temperature modules for the X80 I/O platform are distinguished by having the suffix H added to the reference.*
- *The Modicon Compact range of PLCs had an extended temperature range of - 40 °C to + 70 °C. The extended temperature range of the X80 I/O platform is - 25 °C to + 70 °C. Derating of the temperature incurs the risk of imposing limits to some applications.*
- *As with any PLC migration, even an exact module to module replacement might not provide identical results (due to scan time, etc.).*

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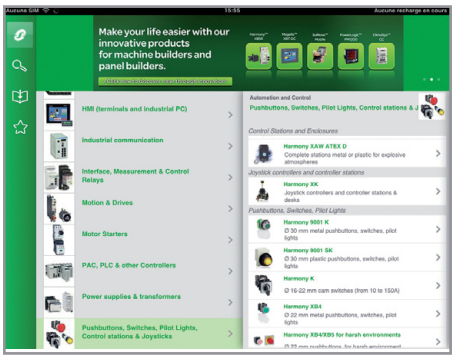
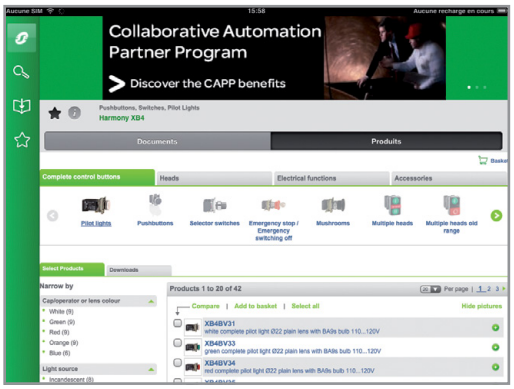
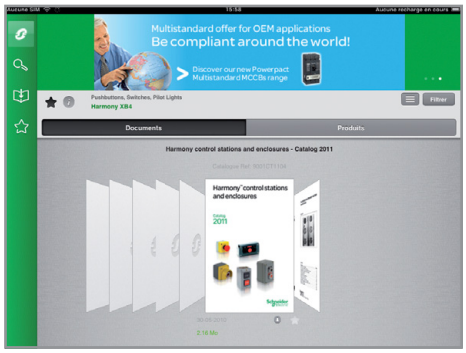
Tablets

Application name: “Automation Library by Schneider Electric”



Product ranges
displayed by function



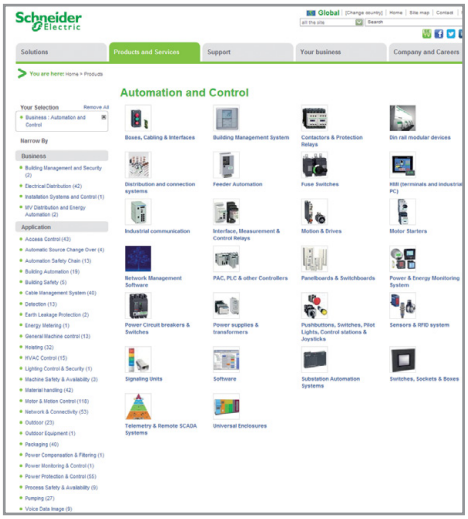


Dynamic catalogs
(hyperlinks, video, ...)

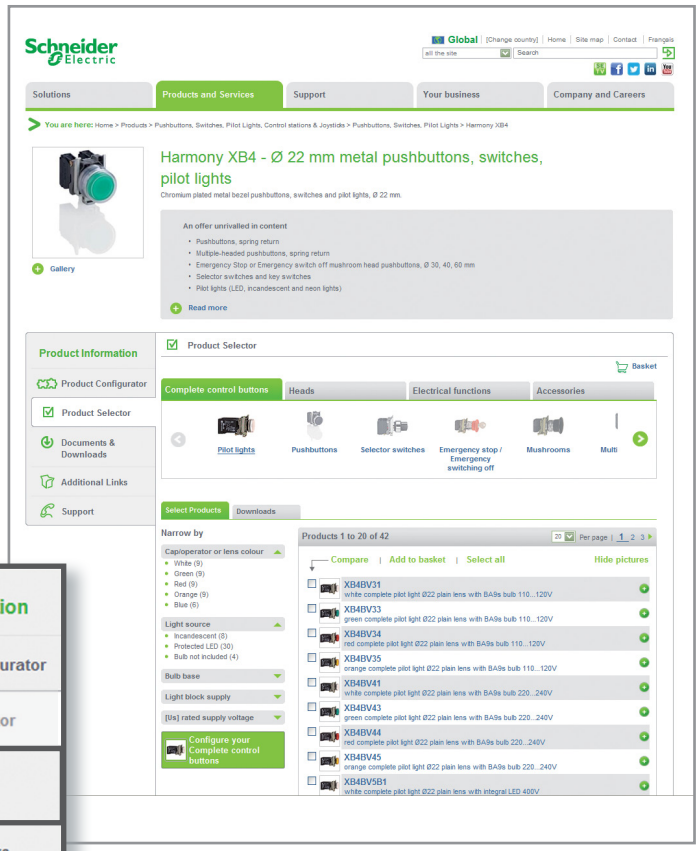
Product selector: dynamic filters to get easily your part number

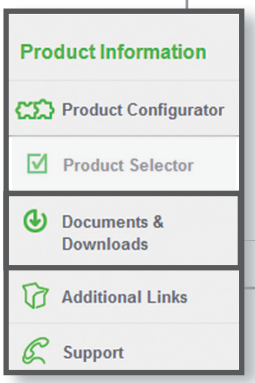
Personal computer

Path: www.schneider-electric.com > **Products and Services** > Automation and control > Product offer



Product ranges
displayed by function



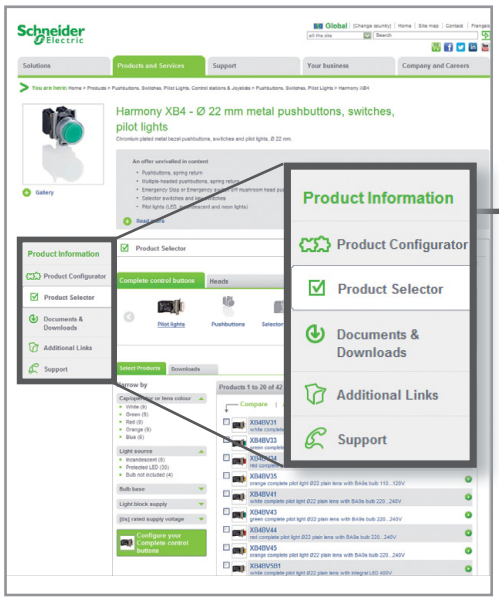


Dynamic catalogs
(hyperlinks, video, ...)

Product selector: dynamic filters to get easily your part number

Access product references with adapted tools

Path: www.schneider-electric.com > **Products and Services** > Automation and control > ... > Product offer



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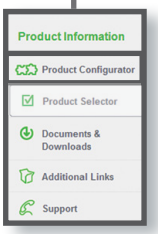
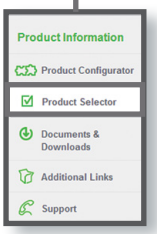
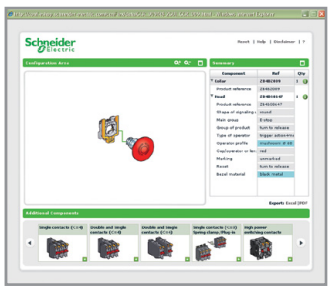
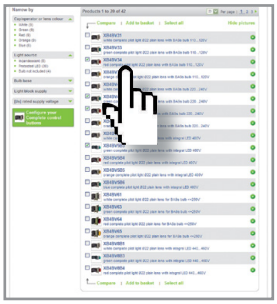
Select the right product with just a few clicks

Dynamic product selector
Visualize product characteristics and dimensions







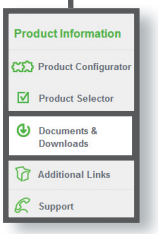


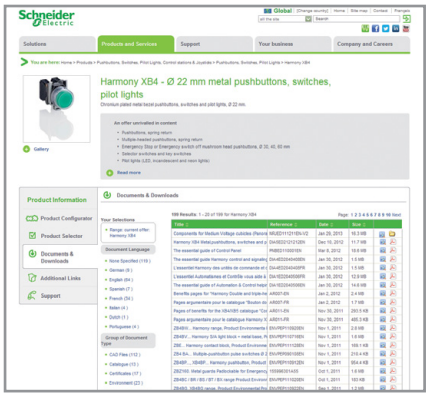
Product data sheet
with technical characteristics and dimensions

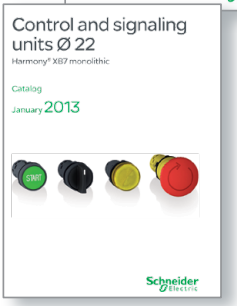
Dimensions

Technical characteristics

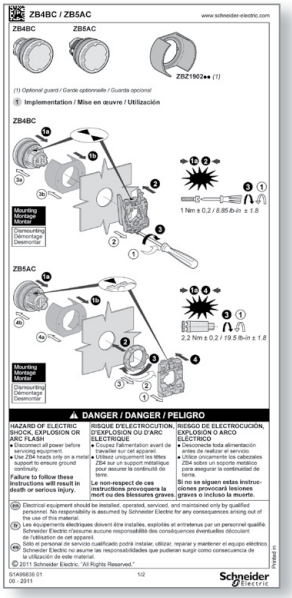
Documents and downloads
Visualize and download catalogs, technical publications, certificates, etc.







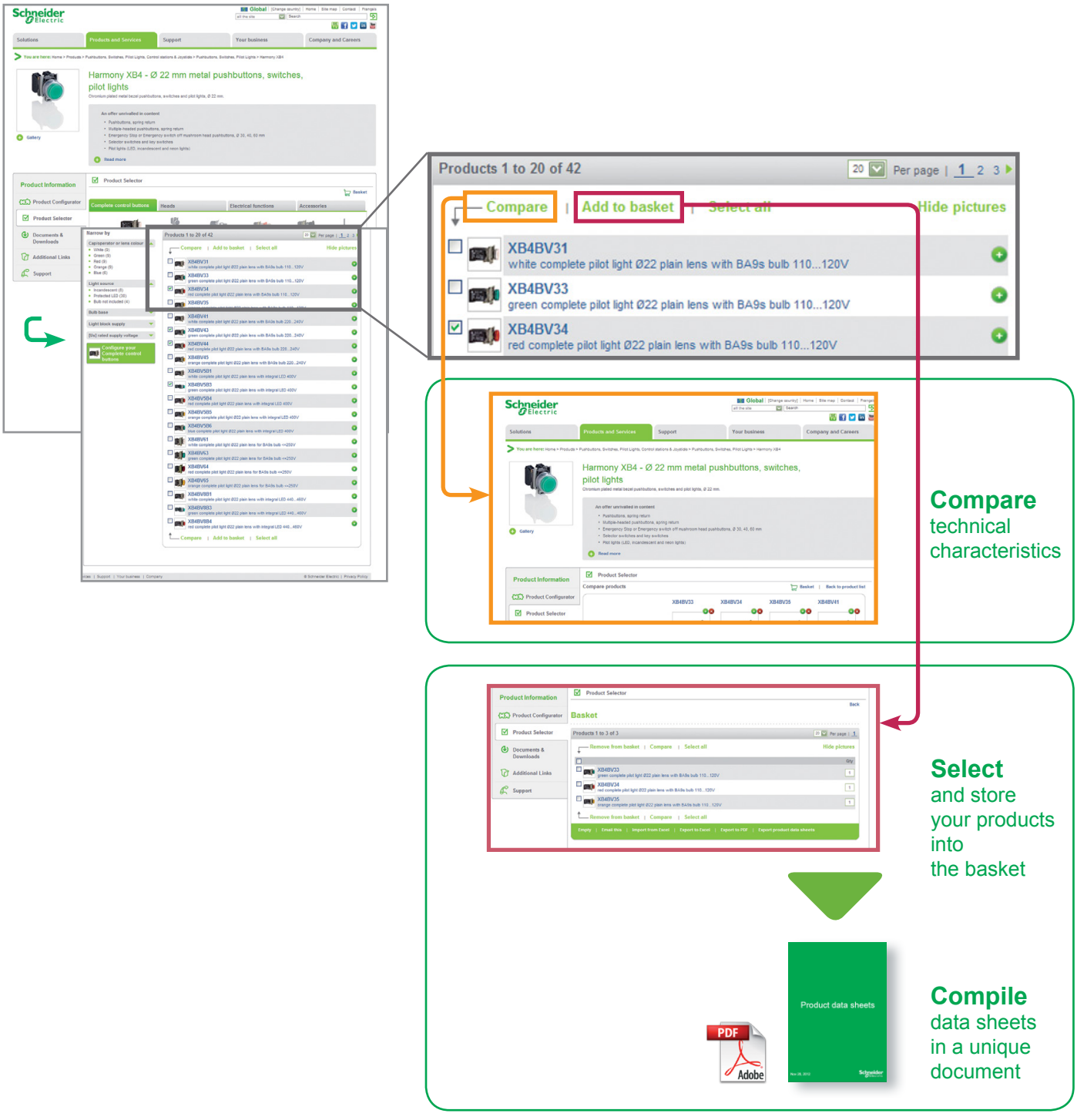
Essential guides



Dynamic catalogs | **Certificates** | **Technical publications**

Compare, select, and compile

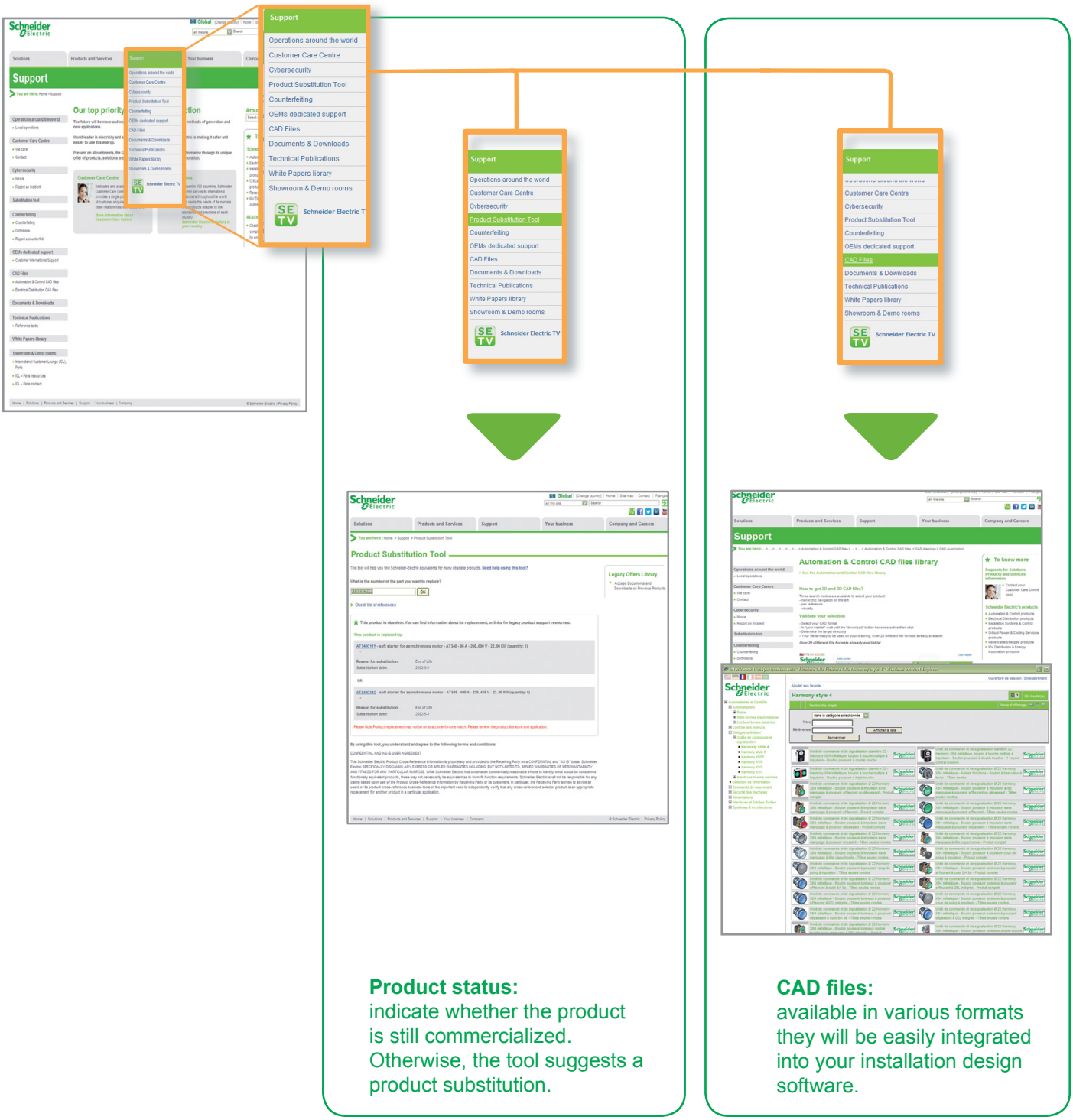
Path: www.schneider-electric.com > **Products and Services** > Automation and control > ... > Harmony XB4*



* Example of research on a product

Check the product status, design your equipment

Path: www.schneider-electric.com > **Support** > Product Substitution Tool
Path: www.schneider-electric.com > **Support** > CAD files



Product status:
indicate whether the product is still commercialized. Otherwise, the tool suggests a product substitution.

CAD files:
available in various formats they will be easily integrated into your installation design software.

Please note that references to products and services are just examples.

Product reference index

Product reference index

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