Modicon M340 automation platform

Communication modules

M340 Ethernet Modbus/TCP network modules

Presentation

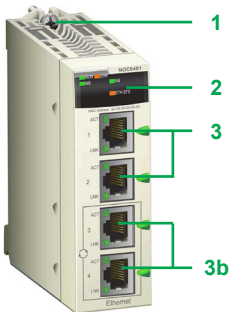
The **BMXNOC0401** network module acts as an interface between the M340 PLC and other Ethernet network devices via the Modbus/TCP and EtherNet/IP communication protocols.

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

Processor selection guide: page 2/2
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Modicon M340 automation platform

Communication modules

M340 Ethernet Modbus/TCP network modules

BMXNOC0401

References

Description	Data rate	Transparent Ready Class	Reference	Weight kg/ *lb*
EtherNet/IP and Modbus/TCP Ethernet module	10/100 Mbps	B30	**BMXNOC0401**	0.345/ *0.761*

Processor selection guide: page 2/2

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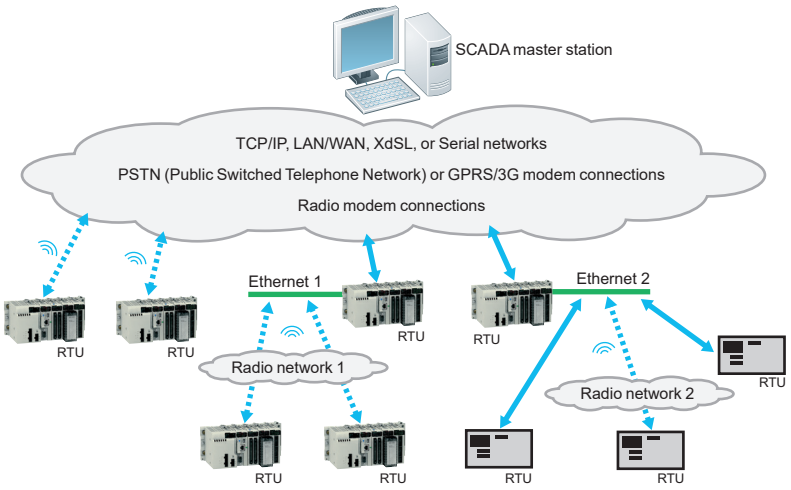
Modicon M340 automation platform
Communication modules
M580/M340 RTU module

Presentation

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

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 effective management of sites and substations spread over a wide geographical area.

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

RTU communication protocols

Currently, people working in the industrial Telemetry sectors use standard protocols for communication between control centers (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 law. 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 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)

Modicon M340 automation platform
Communication modules
M580/M340 RTU module

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 discrete 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
  - □ High reliability with hardened and ATEX range

The **BMXNOR0200H** RTU communication module features the following characterictics:

Features	BMXNOR0200H
Platform support	M340, M580
RTU protocol	DNP3, DNP3 NET, IEC60870-5-101, IEC60870-5-104
Ethernet protocol	SNMP, SNTP, Modbus/TCP, SMTP, FTP, HTTP
Firmware upgrade tool	Unity loader
Cybersecurity	Standard
Web diagnostics	Standard diagnostics
Data logging *(1)*	Yes
Serial port *(1)*	Yes
IP address assignment	DHCP, BootP, Static IP
SD card availability *(1)*	Mandatory
Event buffer size	100,000
Maximum input data	7,000 points totally (including input/output)
Maximum output data	7,000 points (including input/output)
Data attribution	Located/Unlocated
Strings exchange in DNP3	No
DNP3 SA key method	No
DNP3 secure statistics	No
TLS on RTU protocols *(2)*	No

(1) The SD card is only used for the data logging feature.
(2) TLS V1.2 for RTU protocols (DNP3/IEC104)

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Modicon M340 automation platform

Communication modules

M580/M340 RTU module

Presentation

The **BMXNOR0200H** communication module integrates the RTU (remote terminal unit) functions and protocols in the Modicon M340 automation platform for industrial telemetry applications and other widely distributed infrastructures.

The **BMXNOR0200H** module can be used to connect an RTU M340 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) and an extended temperature range (-25 to +70 °C/-*13 to +158 °F*).

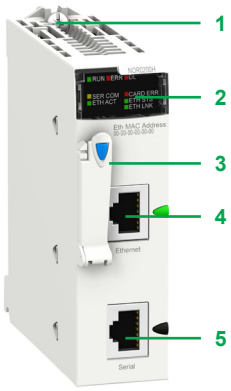
Functions

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●●●●● /BMEP58●●●●** or “ruggedized” **BMXP34●●●●●H/BMEP58●●●●H** processor.

The front panel of the **BMXNOR0200H** module features:

1. A 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 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.

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Modicon M340 automation platform

Communication modules

M580/M340 RTU module

BMXNOR0200H

References

Description	Communication port	Protocol	Reference	Weight kg/*lb*
M580/M340 RTU 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/ *0.452*
	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/*lb*
128 MB Flash memory card supplied as standard with the module	Web pages, storage of data logging files (CSV)	**BMXNOR0200H**	**BMXRWS128MWF**	0.002/ *0.004*

(1) See module for severe environments characteristics, page 5/3.
(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. For further information, please consult our website www.se.com.

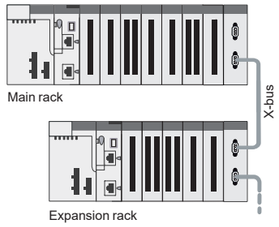
Compatibility table: page 1/6
M340 modules for severe environments: page 5/3

Contents

4 - Architectures

Modicon M340 automation platform
Architectures
Standard I/O architectures

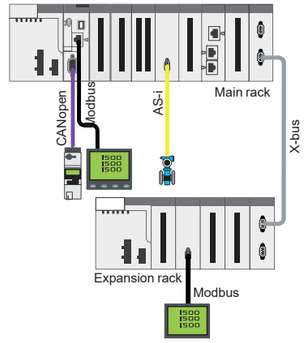
Modicon M340 architecture type *Note: These architectures can be combined with each other*	Architectures with local racks (main rack and expansion racks)
	Hardwired
	Compact topology with devices hardwired on local I/O
	Local I/O architecture

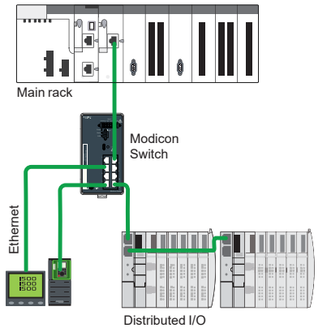


Expanded rack (with X-bus rack expansion module)		Main local rack with up to 4 local expansion racks on X-bus (Modicon X80 or Modicon Premium racks)
Backplane compatibility	BMEXBP●●00 Ethernet + X-bus racks	Compatible for main racks (local or distant)
	BMXXBP●●00 X-bus racks PV02 (or later)	Mandatory for expansion racks (main or distant) Compatible with any rack provided that no Modicon X80 expert modules (such as weighing) are used in the racks
Compatible CPU types		All processors are compatible
CPU Ethernet ports	SERVICE port	One SERVICE port for HMI, EcoStruxure Control Expert *(1)*, control network, variable speed drive, etc.
	Dual port	Dual ports are not used
Communication	AS-Interface and serial link modules	Yes
	BMXNOR0200H RTU module	Yes
	Ethernet modules	Yes
Expert functions	PTO (pulse train output) modules	Yes
	Other expert modules: counter, SSI encoder, etc.	Yes
Time stamping	1 ms max. BMXERT1604T module integrated in the ERT module	Yes
Pages		4/5

(1) Unity Pro software in earlier versions.

Architecture with local racks (main rack and expansion racks)	
Distributed peripherals over fieldbuses	**Distributed peripherals and I/O over Ethernet**
Compact topology with devices distributed over fieldbuses	**Distributed devices and I/O topology over Ethernet**
Integrated fieldbus architecture	**Distributed I/O architecture**





Main local rack with up to 4 local expansion racks on X-bus (Modicon X80 or Modicon Premium racks)	Main local rack with up to 4 local expansion racks on X-bus (Modicon X80 or Modicon Premium racks)
Compatible for main racks (local or distant)	Compatible for main racks (local or distant)
Mandatory for expansion racks (main or distant) Compatible with any rack provided that no Modicon X80 expert modules (such as weighing) are used in the racks	Mandatory for expansion racks (main or distant) Compatible with any rack provided that no Modicon X80 expert modules (such as weighing) are used in the racks
BMXP341000 and **BMXP3420●●●** processors for CANopen fieldbuses **BMXP3420●02** processors for Modbus fieldbuses	All processors are compatible
One SERVICE port for HMI, EcoStruxure Control Expert *(1)*, control network, variable speed drive, etc.	One SERVICE port for HMI, EcoStruxure Control Expert *(1)*, control network, variable speed drive, etc.
Dual ports are used for distributed equipment (DIO scanner)	Dual ports are used for distributed equipment (DIO scanner)
Yes	Yes
Yes	Yes
Yes	Yes
Yes	Yes
Yes	Yes
Yes	Yes
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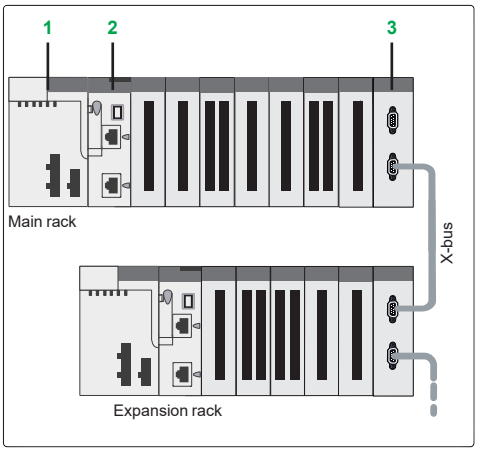
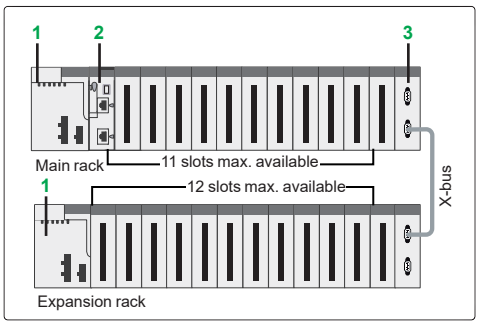
Modicon M340 automation platform
Architectures
Local I/O architecture



Local I/O architecture: devices on local I/O



Local I/O architecture

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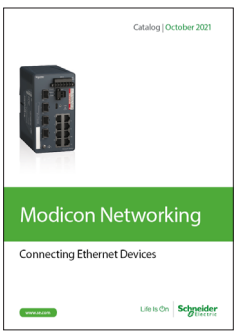

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Presentation

Local I/O architecture is used for control systems that reside in the main control cabinet.

The M340 platform provides interrupt services for this type of application.

Up to 47 slots are possible for I/O modules in a configuration comprising a main rack and 4 expansion racks, connected by **BMXXBE●00●** rack expansion modules.

Description

The Modicon M340 automation platform provides local I/O management for control systems that are wired to the main control cabinet.

Local I/O architecture can comprise a maximum of 11 I/O modules in the main rack, in addition to the CPU **2** and the power supply module **1**.
These local I/O can be extended on an expansion rack by using a **BMXXBE●00●** rack expansion module **3**.

Ethernet slots are only available in the main rack because rack expansion cables only support X-bus.

The choice of appropriate rack depends on the required number of modules for the system. Main racks are available in the following formats: 4, 8, and 12 slots.

As well as discrete and analog I/O modules, the following modules are available:

- Application-specific modules:
  - SSI encoder
  - Counter
  - Pulse train output

If necessary, communication and network modules can be installed in the local rack. The majority of communication and network modules need to be in the local rack.

Local I/O architecture configuration rules

When configuring a local I/O architecture system, the following four parameters should be considered:

- Number of slots available in the 4 local racks (main and expansion racks)
- Slots available for optional modules
- Power consumed by the installed modules
- Addressing words available for configuring the modules

Available slots and power consumption

The local I/O architecture can have a maximum of 46 available slots (with four 12-slot racks) for I/O modules, application-specific modules, and communication modules.

These modules are powered from the power supply included in the rack.

For a valid configuration, simply add together the consumption (in mA) of the modules in the rack and check that the total current is less than that provided by the selected power supply.
This power consumption calculation can easily be performed using EcoStruxure Control Expert *(1)* software.
BMXXEM010 protective covers are also available to occupy unused slots.

Module addressing

With EcoStruxure Control Expert *(1)*, the I/O addressing is unlimited (physical limitation: 47 slots).

(1) Unity Pro software in earlier versions.

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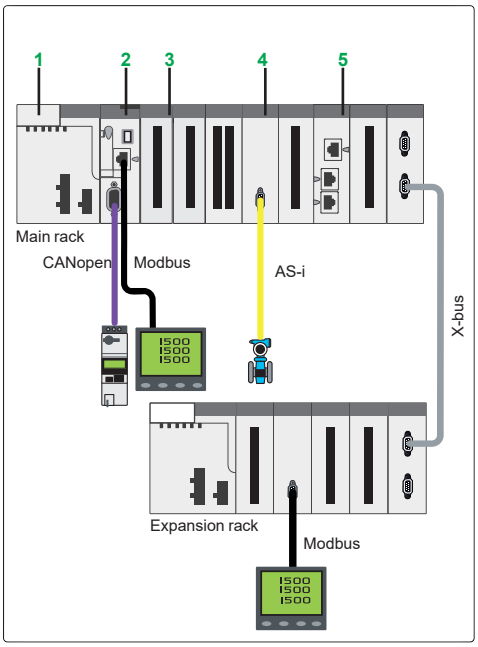
Modicon M340 automation platform

Architectures

Integrated fieldbus architecture



Integrated fieldbus architecture: devices distributed over fieldbuses

Presentation

The integrated fieldbus architecture is based on local I/O architecture with the possibility of adding fieldbuses such as AS-Interface, Modbus SL, PROFIBUS, CANopen.

This kind of architecture is used for control systems that are wired to the main control cabinet.

It consists of a mainly local topology with several peripherals distributed over fieldbuses.

The Modicon M340 automation platform provides interrupt services for this type of application.

Up to 46 slots are possible for I/O and communication modules in a configuration comprising a main rack and 4 expansion racks, connected by **BMXXBE●00●** rack expansion modules.

Description

The Modicon M340 automation platform provides local I/O management for control systems that are wired to the main control cabinet.

The integrated fieldbus architecture can comprise a maximum of 2 I/O and communication modules in the main **BMEXBP●●00** rack, in addition to the CPU **2** and the power supply **1**. These local I/O and communication modules can be extended on expansion racks by using a **BMXXBE●00●** rack expansion module.

The choice of appropriate racks depends on the required number of modules for the system. Main racks are available in the following formats: 4, 8, and 12 slots.

If necessary, communication and network modules can be installed in the main rack. The majority of communication and network modules need to be in the main rack.

As well as discrete and analog I/O modules, the following communication modules are available:
- Serial link **3**
- AS-Interface **4**
- RTU communication module **5**

Some communication modules (Modbus/TCP and EtherNet/IP network module, etc.) require the use of an Ethernet backplane.

Integrated fieldbus architecture configuration rules

When configuring an integrated fieldbus architecture system, the following four parameters should be considered:
- Number of slots available in the 4 local racks
- Slots available for optional modules
- Power consumed by the installed modules
- Addressing words available for configuring the modules

Available slots and power consumption

The integrated fieldbus architecture can have a maximum of 46 available slots (with four 12-slot racks) for I/O modules, application-specific modules, and communication modules.

These modules are powered from the power supply included in the rack.

For a valid configuration, simply add together the consumption (in mA) of the modules in the rack and check that the total current is less than that provided by the selected power supply.

This power consumption calculation can easily be performed using EcoStruxure Control Expert software.

BMXXEM010 protective covers are also available to occupy unused slots.

Module addressing

With EcoStruxure Control Expert *(1)*, the I/O addressing is unlimited (physical limitation: 46 slots).

(1) Unity Pro software in earlier versions.

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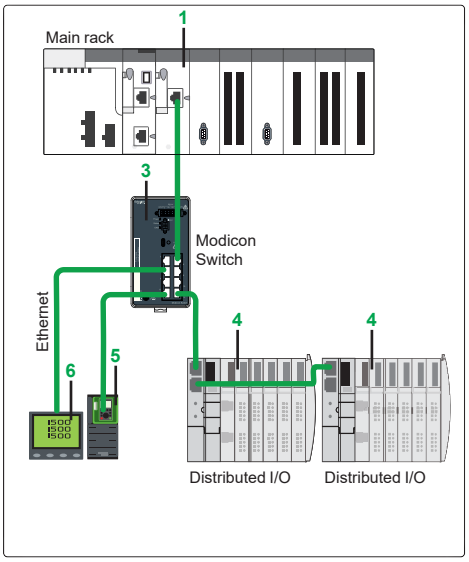
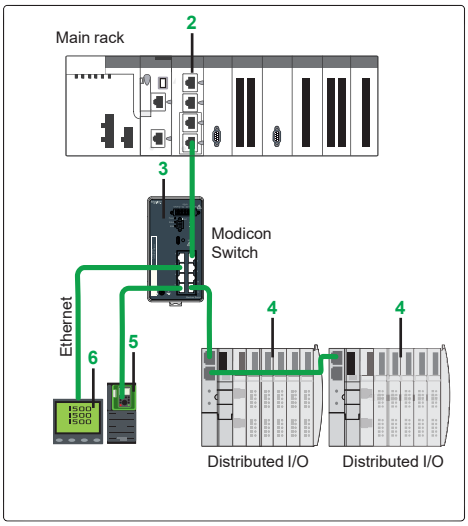
Modicon M340 automation platform

Architectures

Distributed I/O architecture



Distributed I/O architecture: devices distributed over Ethernet with BMXNOE0110 module and Modicon Switch



Distributed I/O architecture: devices distributed over Ethernet with BMXNOC0401 module and Modicon Switch

Presentation

The distributed I/O architecture consists of I/O and devices distributed over Ethernet (DIO).

The Ethernet DIO devices can be connected to Ethernet ports of the **BMXNOE0110** **1** or **BMXNOC0401** **2** modules and a Modicon Switch **3**.

The available Ethernet DIO devices are:
- Modicon STB distributed I/O **4**
- Altivar Process variable speed drive **5**
- Energy supervision **6** and HMI

Modbus serial link devices can be integrated in the distributed I/O architecture via the **BMXNOM0200** serial link module.

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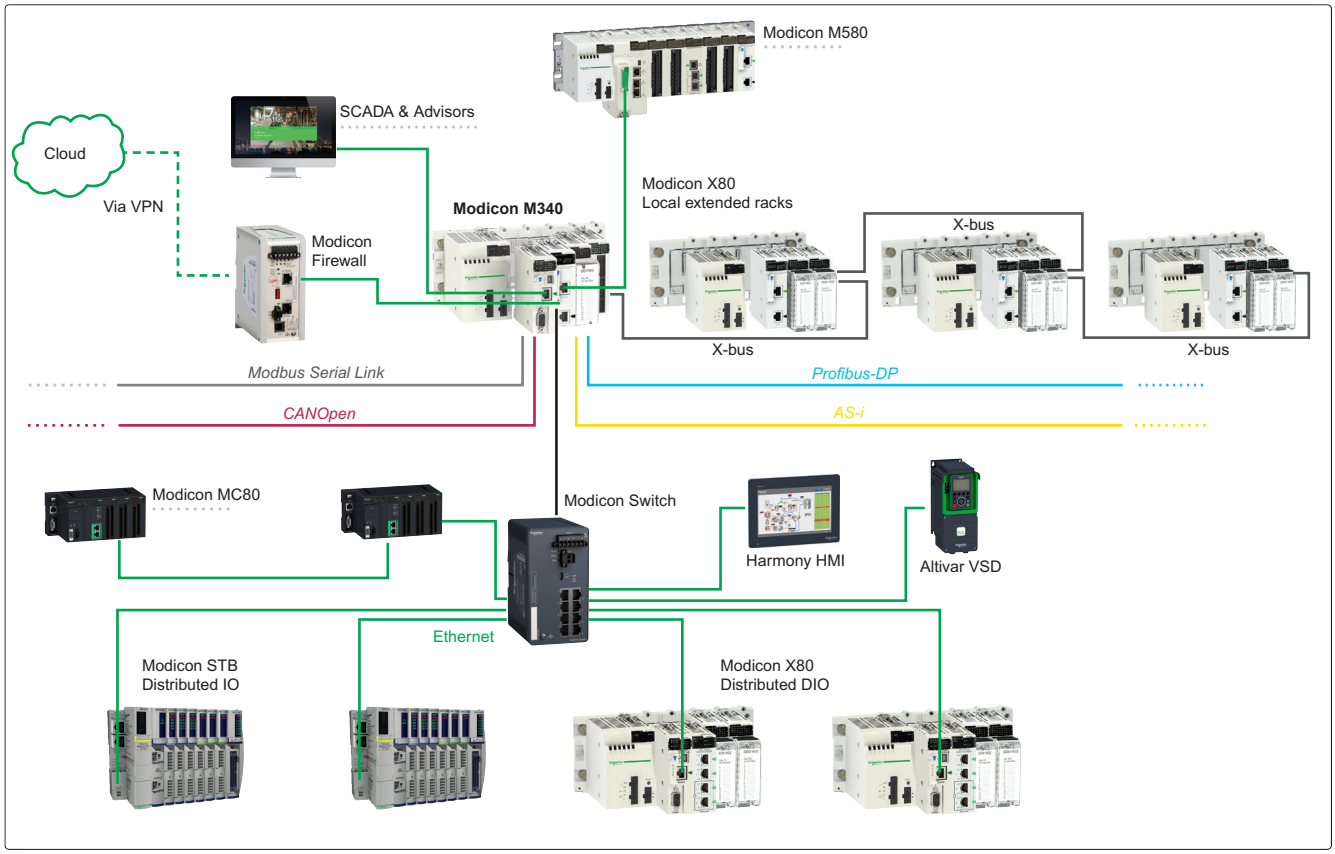
Modicon M340 automation platform
Architectures
Standard architectures

Example of a typical standard architecture

The architecture below illustrates the possibilities of the Modicon M340 offer:

- A choice from 6 **BMXP34●0●0** CPUs
- Companionship with M580 automation platform and/or MC80 PLC
- Modicon range provides a large choice of products to connect Ethernet devices and build a complete networking infrastructure (firewalls, switches, distributed solutions)
- Communication with SCADA via Ethernet
- Communication buses and networks available (Modbus Serial Link, CANopen, PROFIBUS DP, AS-interface)
- Long distance optimized by the fiber optic converter installed directly in the Modicon X80 rack
- Simplified integration of devices via a serial link (for example, power meter, variable speed drive, motor starters, protection relays, etc.); FTD/DTM technology makes it possible to configure and debug devices transparently via the Ethernet network, from any supervisor
- Great flexibility due to integration of DIO devices



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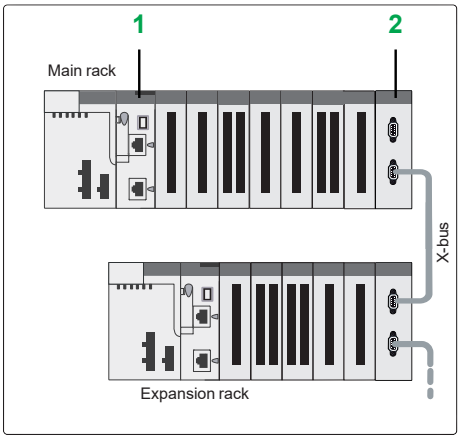
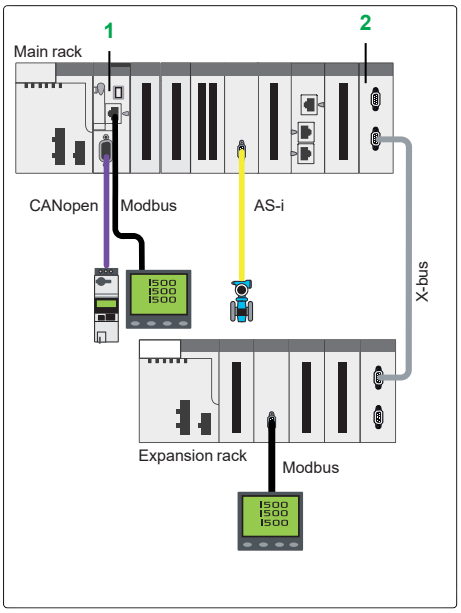
Modicon M340 automation platform
Architectures



Local I/O architecture



Integrated fieldbus architecture

References

Modicon M340 processors

I/O capacity	Integrated communication ports	Item *(2)*	Reference	Weight kg/*lb*
512 discrete I/O **128 analog I/O** **20 application-specific channels**	Modbus serial link	1	BMXP341000	0.200/ *0.441*
1,024 discrete I/O **256 analog I/O** **36 application-specific channels**	Modbus serial link	1	BMXP342000	0.200/ *0.441*
	Modbus serial link CANopen bus	1	BMXP3420102	0.210/ *0.463*
		1	BMXP3420102CL	0.210/ *0.463*
	Modbus serial link Ethernet Modbus/TCP	1	BMXP342020	0.205/ *0.452*
	CANopen bus Ethernet Modbus/TCP	1	BMXP3420302	0.215/ *0.474*
		1	BMXP3420302CL	0.215/ *0.474*

Rack expansion for Modicon X80 drop

Description	Item *(2)*	Reference	Weight kg/*lb*
Modicon X80 rack expansion module Standard module for mounting in each rack (XBE slot) allowing the interconnection of 2 racks max.	2	BMXXBE1000	0.178/ *0.392*
Modicon X80 rack expansion kit Complete kit for 2-rack configuration comprising: - 2 BMXXBE1000 rack expansion modules - 1 BMXXBC008K extension cordset, length 0.8 m/*2.63 ft* - 1 TSXTLYEX line terminator (pack of 2)	2	BMXXBE2005	0.700/ *1.543*

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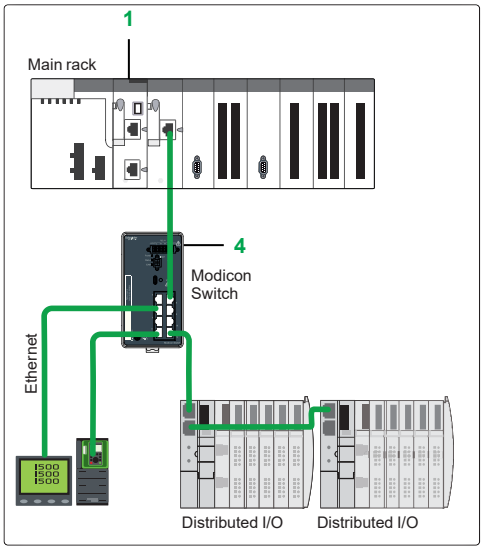
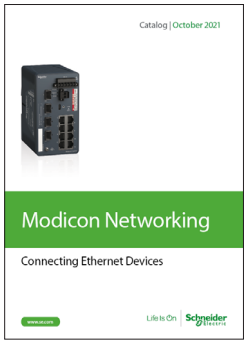
Modicon M340 automation platform
Architectures



Distributed I/O architecture with BMXNOE0110



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References (continued)

M340 Ethernet communication modules

Description	Item	Reference	Weight kg/*lb*
EtherNet/IP and Modbus/TCP network module	–	BMXNOC0401	0.200/ *0.441*
Ethernet Modbus/TCP module	3	BMXNOE0100	0.200/ *0.441*
FactoryCast Ethernet Modbus/TCP module	3	BMXNOE0110	0.200/ *0.441*

4

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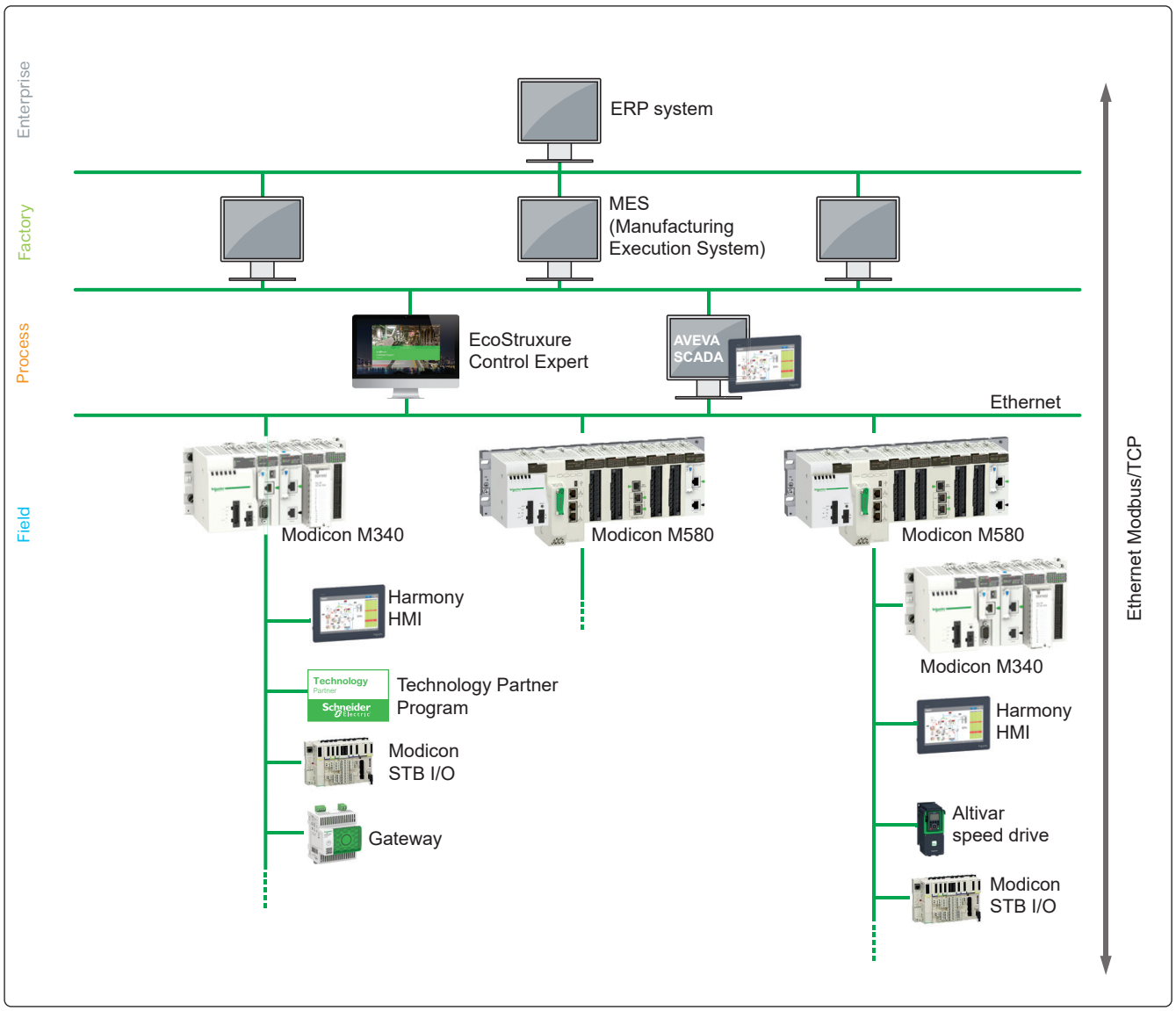
Modicon M340 automation platform

PlantStruxure Ethernet Architectures

Logical communication architecture

Logical communication architecture



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M340 modules for severe environments:
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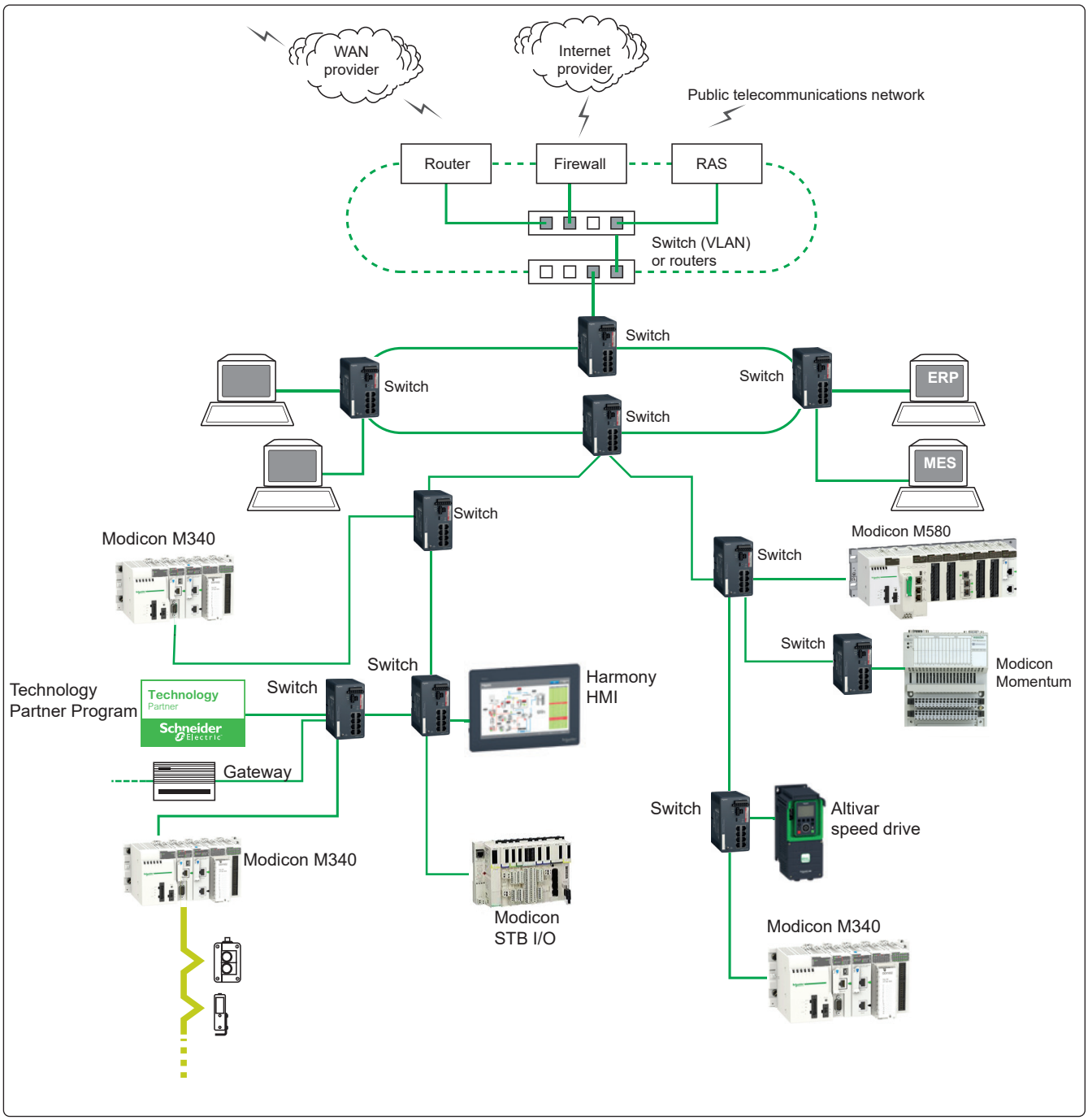
Modicon M340 automation platform

PlantStruxure Ethernet Architectures

Physical communication architecture

Physical communication architecture



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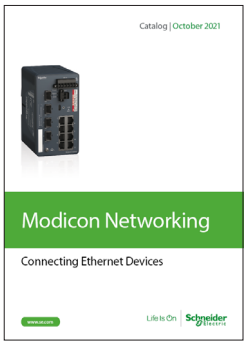
Technical information
Ethernet network Infrastructure



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Presentation

The Modicon Networking offer comprises a complete family of products and tools required to build the infrastructure of an Industrial Ethernet network.

The following pages provide information on network design and component selection.

For more details, please consult our Modicon Networking catalog.

Office Ethernet versus Industrial Ethernet

There are three main areas of differentiation between Ethernet applications in an office environment and those in an industrial environment:
- Environment
- Layout (not physical layer specification)
- Performance

In contrast to the office environment and even though ISO/IEC is working on it, as yet there are no clearly defined specifications for Ethernet devices intended for industrial applications. The specifications for what is called the Industrial Ethernet are defined by different agencies or entities based on its nature and what the automation market has traditionally used.

The environmental specifications of Industrial Ethernet devices are defined by the traditional agencies that define the environmental specifications for standard industrial devices (UL, CSA, CE, etc.).

IEEE 802.3 defines the physical layer specifications of the Ethernet network (types of connector, distance between devices, number of devices, etc.) while standard 11801 (similar to TIAEIA 568B and CENELEC EN 50173) provides layout guidelines for installers.

The performance specifications are currently being drawn up by ISO/IEC.

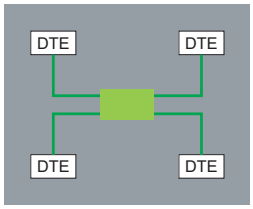
Ethernet 802.3 principles

The Ethernet 802.3 Link Layer is based on a collision detection mechanism (CSMA CD) whereby every node whose information has collided on the network detects 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). This means that all devices will be affected by collisions.

With full duplex switches (devices that receive information and only send it out through the port to which the destination device is connected), there are no collision domains.

Therefore, for industrial automation applications, it is highly advisable to use full duplex switches to interconnect devices. This will help eliminate collision domains.



Star topology

Network topologies

Star topology

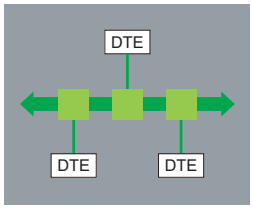
In a star topology, all devices and data terminal equipment (DTE) are connected though an intermediate device.

■ Ethernet star

In an Ethernet star the intermediate device may be a **switch**. The star is the most commonly used topology in corporate networks and is currently adopted in almost every automation application. As mentioned previously, for industrial Ethernet applications the use of full duplex switches as the central device rather than hubs is highly recommended.

■ Deploying star topologies with Modicon Switches

Star topologies can be implemented with any of the switches in the Modicon offer.



Bus topology

Bus topology

The bus is one of the most common topologies in traditional industrial automation networks. A single trunk cable connects all devices on the network usually via passive or active T-connectors, or directly chained (daisy chain). Devices can usually be installed anywhere along the bus.

■ Ethernet bus

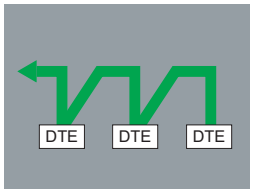
An Ethernet bus can be deployed by interconnecting **switches** in line and considering every one of them as the connection for a drop device. An unlimited number of switches can be interconnected to achieve this purpose.

■ Deploying bus topologies with Modicon Switches

Bus topologies can be implemented with any of the switches in the Modicon offer. Switches with 1 or 2 fiber optic ports are particularly suitable for this purpose:

□ Switches with 2 fiber optic ports can be used to connect in-line devices.

□ Switches with 1 fiber optic port can be used to connect end-of-line devices.



Daisy chain topology

Daisy chain topology

Daisy chain - along the bus - is the other most common 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 currently not a particularly common Ethernet topology, but it is likely to rise in popularity as more devices become available.

Ethernet daisy chain devices have:

□ **2 Ethernet ports** and

□ **1 embedded switch**

Schneider Electric is launching Industrial Ethernet devices on the industrial market for connection in daisy chain architectures.

■ Deploying daisy chain topologies

No switches are required for daisy chain topologies. All devices have an embedded switch.

Dual port Ethernet at device level is an absolute integral component for daisy chain topologies.

One port on the device connects to one port on each of the two neighboring devices. 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.

■ Limitations of the daisy chain:

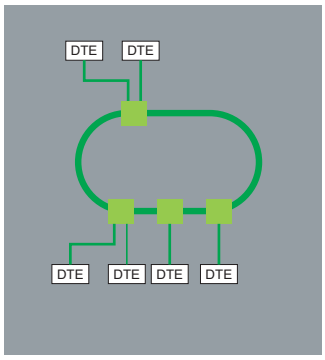
Limitations of the daisy chain topology in terms of operational integrity of the network and performance metrics are as follows:

□ Dual port Ethernet devices only support 10 Mbps and/or 100 Mbps operational speeds and must use one or the other.

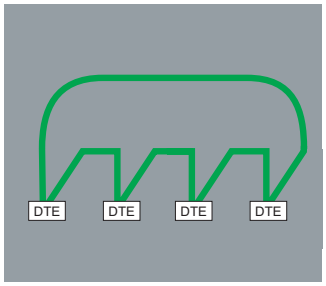
□ The network will operate only as fast as the slowest device that is connected to the network.

□ In order to improve network traffic latency, the number of devices in a single scan chain is limited to 32 devices. This means that the time for a round trip of a packet through the daisy chain is likely to be less than 5 milliseconds.

The maximum latency of a packet passing through any device in a scan chain is no more than 10 µs.



Ethernet ring topology



Daisy chain ring topology

Different network topologies (continued)

Ring topology

In a ring topology, all devices or network infrastructure components are connected in a loop. Through this type of topology, network redundancy is achieved.

Ring topologies also help to improve the availability of the network and its communication with devices.

- Ethernet ring

Ethernet rings are usually the backbones of applications in which high availability is required. If ring topology is required, switches that support this feature should be ordered.

- Deploying ring topologies using Modicon Switches

Modicon Networking offer comprises switches that allow the deployment of single and coupled self-healing rings (see page 4/12 for more information).

- Daisy chain loop

A daisy chain loop consists of several daisy chain devices that are placed in a ring topology.

When an Ethernet network forms a loop, all the devices in that loop must use the same protocol (RSTP, MRP, or HIPER-Ring).

Physical characteristics

Distance limits and number of devices per segment

Based on standard 802.3, the distance limits and number of devices in cascade are as follows:

Type	Maximum segment length *(1)*	Maximum segment length (offered by Modicon switches)	Maximum number of hubs in cascade	Maximum number of switches in cascade
10BASE-T	100 m/*328 ft*	100 m/*328 ft*	4	Unlimited
100BASE-TX	100 m/*328 ft*	100 m/*328 ft*	2	Unlimited
1000BASE-T	100 m/*328 ft*	100 m/*328 ft*	–	Unlimited
10BASE-FL	2,000 m/*6,561 ft*	3,100 m/*10,170 ft (2)*	11 (fiber ring)	–
100BASE-FX	412 m/*1,351 ft* 2,000 m/*6,561 ft*	4,000 m/*13,123 ft* with multimode fiber, 32,500 m/*106,627 ft* with singlemode fiber *(3)*	–	Unlimited
1000BASE-SX	275 m/*902 ft*	–	–	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 2,000 m/6,561 ft for multimode and 15,000 m/49,212 ft for singlemode.

Physical media

The Ethernet 802.3 standard defines the physical layer. A summary of the most common media is given 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 Mbps**	CAT 3 - UTP	CAT 5E - STP	RJ45	RJ45
100BASE-TX	**100 Mbps**	CAT 5 - UTP	CAT 5E - STP	RJ45	RJ45
1000BASE-T	**1 Gbps**	CAT 5 - UTP	CAT 5E - STP	RJ45	RJ45
10BASE-FL	**10 Mbps**	Two multimode optical fiber cables typically 62.5/125 µm fiber, 850 nm light wavelength	Two multimode optical fiber cables typically 62.5/125 µm fiber, 850 nm light wavelength	ST	ST
100BASE-FX	**100 Mbps**	Two multimode optical fibers typically 62.5/125 µm multimode fiber, 1,300 nm light wavelength	Two multimode optical fibers typically 62.5/125 µm multimode fiber, 1,300 nm light wavelength	ST	SC
		–	Two monomode optical fibers typically 9/125 µm multimode fiber, 1,300 nm light wavelength	–	SC
1000BASE-SX	**1 Gbps**	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, 1,300 nm light wavelength	SC	LC
1000BASE-LX	**1 Gbps**	–	Two 9/125 µm singlemode optical fibers, 1,300 nm light wavelength	–	LC

Note: *These specifications are defined by IEEE 802.3. However, some cables are no longer being developed. For instance, for 10BASE-T and 100BASE-TX, a CAT-5E cable is used.*

Device management

Ethernet devices in general (end-of-line devices and cabling devices) can be divided into two categories: unmanaged and managed devices.

- **Unmanaged** devices are devices for which there is no option to configure or control any of the device parameters.
- **Managed** devices are devices whose parameters can be configured or controlled (managed) and their internal data can be accessed.

The Modicon Networking product line offers both types of device.

There is also a third, unspecified category of device, which is normally classified as a “managed device”. However, there is one major difference: although this device allows access to its internal data, it cannot be controlled and/or configured.

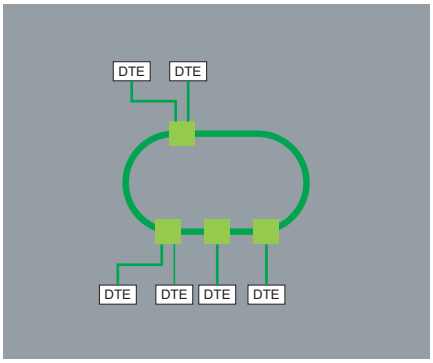
Managed devices

Managed devices offer the following features:

- **Traffic optimization and filtering** - The aim 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 that 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** - This feature 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.).
  Users can also set up the switch so that it blocks messages coming from unauthorized “device” source addresses connected to the switch.
- **Time synchronization** - This feature allows all devices in a network to be synchronized according to the time.
- **Network redundancy** - This helps to develop high availability applications.
- **Dual ring switch (DRS)** - These switches are provided with predefined settings to optimize communication performance and help save time in Ethernet RIO architectures with Modicon Quantum and Modicon M580 automation platforms. DRSs are mandatory for building Ethernet RIO architectures in which sub-rings have to be connected to the main Ethernet ring.

Redundancy

To develop high-availability applications, “redundancy” in the networking infrastructure is the answer. Developers can help avoid losing network segments by implementing a single ring or a coupled ring architecture.



Single ring topology

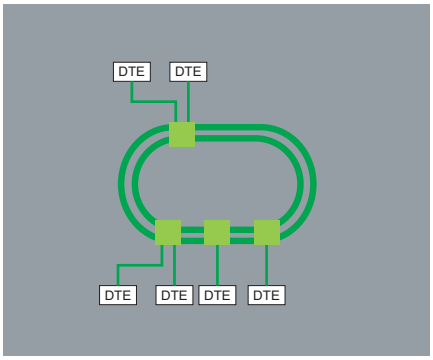
Single ring

The first level of redundancy is achieved by implementing a single ring. Modicon switches allow the set up of backbone ring configurations.

Modicon switches support three redundancy protocols: HIPER-Ring, MRP, and RSTP.

The ring is constructed using HIPER-Ring ports. If an error is detected in one section of the line, a ring structure of up to 50 switches transforms back to a line-type configuration within 0.5 seconds.

With a Modicon Quantum or a Modicon M580 Ethernet RIO architecture, the recovery loop can be optimized to less than 50 ms thanks to the RSTP protocol implemented in the different devices.

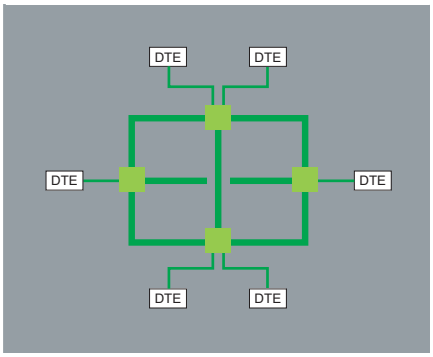


Dual ring topology

Dual ring

The second level of redundancy is achieved by implementing a dual ring. The control intelligence built into Modicon switches allows the redundant coupling of HIPER-Rings and network segments.

As for a single ring, the recovery time can be optimized to less than 50 ms for 16 switches or 32 RIO drop adapters thanks to the RSTP protocol.



Mesh topology

Mesh topology using the rapid “Spanning Tree” protocol

A third level of redundancy can be achieved by implementing a mesh topology. In simple terms,“Spanning Tree” is a protocol that provides a single path for the signal, when multiple paths exist. If the active path is broken, the “Spanning Tree” protocol enables one of the alternative paths.

Modicon switches offer this possibility.

Security

Modicon firewalls help improve security for industrial networks while meeting the needs for cybersecurity.

Firewall rules can be defined to control access levels at the host, protocol, and port levels.

Further rules can be defined for other purposes, such as protecting access to Modbus/TCP function codes and register levels, or EtherNet/IP CIP objects and service codes.

ConneXium firewalls can also offer layer 3 routing, network address translation (NAT), and virtual private networks (VPN) for advanced security zoning of critical industrial networks.

Contents

5 - Dedicated parts for severe environments

5

Modicon M340 automation platform
Treatment for severe environments

Presentation

Protective treatment for Modicon M340 automation platform

The Modicon M340 automation platform complies with “TC” treatment requirements (treatment for all climates). It is designed as standard to operate in temperatures ranging from 0 to +60 °C/*32 to 140 °F*.

For installations in industrial environments corresponding to “TH” (treatment for hot and humid environments), devices must be housed in enclosures providing at least IP54 protection as specified by standard IEC/EN 60529, or an equivalent level of protection according to NEMA 250.

The Modicon M340 automation platform offers **IP20 protection** *(1)*. It can therefore be installed without an enclosure in reserved access areas that do not exceed **pollution level 2** (control room with no conductive dust). **Pollution level 2** does not take account of harsher environments, such as those where the air is polluted with conductive dust, fumes, corrosive or radioactive particles, vapors or salts, molds, insects, etc.

Treatment for 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/*-13 °F to 158 °F*** *(only H or T version)*, the “***ruggedized***” offer features industrially hardened processors, power supply modules, communication modules, I/O modules, and racks that have a protective coating on their circuit boards.

***Note**: Capable of **starting** within an extended temperature range (from **-25 °C to +70 °C/-13 °F to 158 °F**, a single-rack configuration is also able to **operate at extremely low temperatures** (as low as **-40 °C/-40 °F**) if placed in an appropriate enclosure. Please contact our Customer Care Center.*

The coated/harsh offer provides the CPU/coprocessor and modules with “AVR 80” coating on their electronic cards.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 sulfurous atmospheres (oil refinery, purification plant, etc.) or atmospheres containing halogens (chlorine, etc.) or chemical vapors

This protection, combined with appropriate installation and maintenance, enables Modicon M340 automation platform products to be used in the following environments:

Harsh chemical environments (products with suffix ‘H’ and ‘C’)

Products with suffix ‘H’ and ‘C’ meet the following requirements :

- **IEC/EN 60721-3-3 class 3C1, 3C2, 3C3, 3C4:**
  - 7 days; 25 °C/*77 °F* relative humidity 75%
  - Concentrations (ppb): H_2S: 9,900/SO_2: 4,800/Cl_2: 200
- **ISA S71.04 classes G1, G2, G3, Gx:**
  - 14 days; 25 °C/*77 °F* relative humidity 75%
  - Concentrations (ppb): H_2S: 60/SO_2: 350/Cl_2: 1,450/NO_2: 12
- **IEC/EN 60068-2-52 salt mist, Kb test severity level 2:**
  - 3 x 24-hour cycles
  - 5% NaCl
  - 40 °C/*104 °F* relative humidity 93%

The use of contact grease protection on connectors and removal blocks is mandatory to meet these requirements. The lubricant protection seals electrical contacts from oxygen, moisture, aggressive gasses, and other hostile elements.

Extreme climate environments (products with suffix ‘H’ and ‘T’)

Products with suffix ‘H’ and ‘T’ meet the following environment conditions :

- Temperatures ranging from -25 to +70 °C/*-13 to 158 °F*
- Relative humidity levels up to 93% from -25 °C/*-13 °F* to +60 °C/*140 °F*
- Formation of ice
- Altitudes from 0 to 5,000 m/*0 to 16,404 ft*

***Note**: Some products with the suffix ‘C’ also operate in an extended temperature range (from **-25 °C to +60 °C/-13 °F to 140 °F**). Please contact our Customer Care Center*

Corrosive environments

A protective gel is needed to cover all electrical connections on M340 products used in corrosive environments. This gel comes in a 25 g tube and can be ordered separately under the reference **BMXGEL0025**.

F19_ACC_CPMFS17008

Protective gel BMXGEL0025

*(1) Each slot in a **BM●XBP●●00** 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).*

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Communication modules: page 3/20

Modicon M340 automation platform

Dedicated parts for severe environments

M340 Processors and communication modules

M340 offer composition for severe environments

To order ruggedized processors and modules, see the reference tables below:

- References of available ruggedized products include the suffix "**H**"

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.se.com.

In this chapter, note that only M340 products are described.

- For X80 or M580 ruggedized products (racks, power supplies, modules, etc.) please refer to related catalog:

DIA6ED2131203EN

DIA6ED2151012EN

- For additional M340 standard accessories, please refer to page 2/7.

Modicon M340 processors for severe environments *(1)*

PF106117

BMXP3420302H

I/O capacity	Max. no. of communication modules	Integrated communication ports	Memory card	Reference	Weight kg/ *lb*
Standard BMXP3410, 2 racks					
512 discrete I/O **128 analog I/O** **20 application-specific channels**	2 Ethernet modules 2 AS-Interface modules	Modbus serial link	Included	**BMXP341000H**	0.200/ *0.441*
Performance BMXP3420, 4 racks					
1024 discrete I/O **256 analog I/O** **36 application-specific channels**	2 Ethernet modules 4 AS-Interface modules	Modbus serial link Ethernet Modbus/TCP	Included	**BMXP342020H**	0.205/ *0.452*
		CANopen bus Ethernet Modbus/TCP	Included	**BMXP3420302H**	0.215/ *0.474*

PF106119

BMXNOE0100H

Communication modules for severe environments

Ethernet communication

Description	Data rate	Transparent ready class	Reference	Weight kg/ *lb*
Ethernet Modbus/TCP module	10/100 Mbps	B30	**BMXNOE0100H**	0.200/ *0.441*
FactoryCast Ethernet Modbus/ TCP module	10/100 Mbps	C30	**BMXNOE0110H**	0.200/ *0.441*

PF100285

BMXNOR0200H

RTU communication

Description	Communication port	Protocol	Reference	Weight kg/ *lb*
M580/M340 RTU module	1 Ethernet port 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**	0.205/ *0.452*
	Serial, external modems	■ DNP3 serial (master or slave) ■ IEC 60870-5-101 (master or slave)		

(1) General characteristics are the same as those of the standard equivalent versions (see page 2/2).

Compatibility table:
page 1/6

Communication modules:
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Contents

6 - Standards and Certifications

Technical appendices

Modicon M340 automation platform

Standards, certifications, and environment conditions

Standards and certifications

Per region

The Modicon M340 automation platform has been developed to comply with the principal national and international standards concerning electronic equipment for industrial automation systems. Up-to-date information on which certifications have been obtained is available on our website: consult commercial references directly.

- Compliance with European Directives for CE marking:
  - WEEE: 2012/19/EU
  - Low voltage: 2014/35/EU
  - Electromagnetic compatibility: 2014/30/EU
  - Machinery: 2006/42/EC (check EU DoC on our website www.se.com)
  - ATEX: 2014/34/EU (check EU DoC on our website www.se.com)
- Requirements specific to programmable controllers (functional characteristics, immunity, resistance, safety, etc.):
  - IEC/EN 61131-2
  - IEC/EN/UL/CSA 61010-2-201
- Country specific passport:
  - RCM
  - EAC
  - UKCA

For other countries certifications, please refer to technical appendix page 6/8.

M340 PACs are considered as open equipment and are designed for use in industrial environments, in pollution degree 2, overvoltage category II (IEC 60664-1), and in low-voltage installations, where the main power branch is protected on both wires by devices such as fuses or circuit breakers limiting the current to 15A for North America and 16A for the rest of the world.

Per application

Power generation

- EC/EN 61000-6-5 for interfaces type 1 and 2
- IEC/EN 61850-3 for locations G

Merchant navy

Merchant navy requirements of the major international organizations are unified in IACS (International Association of Classification Societies) IACS E10 rules: ABS, BV, DNV, LR, RINA, RMRS, RRR, CCS, KRS, Class NK (refer to page 6/8).

Hazardous areas

- For USA and Canada: Hazardous location class I, division 2, groups A,B,C, and D
- For European Union: ATEX for atmosphere Zone 2 (gas) and Zone 22 (dust)
- For United Kingdom: UKEX for atmosphere Zone 2 (gas) and Zone 22 (dust)
- For other countries: IECEx for atmosphere Zone 2 (gas) and/or Zone 22 (dust)

Railway

- EN 50155/IEC 60571: Railway applications - Rolling stock - Electronic equipment
- EN 50121-3-2/IEC 62236-3-2: Railway applications - Electromagnetic compatibility - Part 3-2: Rolling stock - Apparatus
- EN 50121-4/IEC 62236-4: Railway applications - Electromagnetic compatibility - Part 4: Emission and immunity of the signalling and telecommunications apparatus
- EN 50121-5/IEC 62236-5: Railway applications - Electromagnetic compatibility - Part 5: Emission and immunity of fixed power supply installations and apparatus

Modicon M340 automation platform

Standards, certifications, and environment conditions

Environmental characteristics

Service conditions and recommendations relating to the environment

			Modicon M340 automation platform	Modicon M340 modules for severe environments
Temperature	Operation	**°C/*°F***	0...+60/*32...140*	-25...+70/*-13...+158*
	Storage	**°C/*°F***	-40...+85/*-40...+185*	-40...+85/*-40...+185*
Relative humidity (without condensation)	Cyclical humidity	**%**	+5 ... +95 up to 55 °C/*131 °F*	+5 ... +95 up to 55 °C/*131 °F*
	Continuous humidity	**%**	+5 ... +93 up to 55 °C/*131 °F*	+5 ... +93 up to 60 °C/*140 °F*
Altitude	Operation	**m/*ft***	0…2,000/*0...6,562* (full specification: temperature and isolation) 2,000...5,000/*6,562...16,404* (temperature derating: approx. 1 °C/400 m *(33.8 °F/1,312 ft)*, isolation 150 V/1,000 m/*3,281 ft* For accurate temperature derating calculation, refer to IEC 61131-2 Ed4.0 Annex A	

			Modicon X80 power supplies				
Supply voltage			**BMXCPS2010**	**BMXCPS3020 BMXCPS3020H BMXCPS4022 BMXCPS4022H**	**BMXCPS3540T BMXCP3522**	**BMXCPS2000**	**BMXCPS3500 BMXCPS3500H BMXCPS4002 BMXCPS4002H**
	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 the Modicon M340 automation platform

The Modicon M340 platform meets 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 automation platform must be embedded in enclosures with minimum IP54 protection.

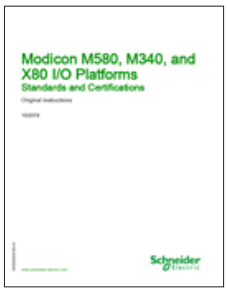
The Modicon M340 platform offers **protection to IP20 level** and **protection against access to terminals** (enclosed equipment) (1). They can therefore be installed without an enclosure in reserved-access areas that do not exceed **pollution level 2** (control room with no dust-producing machine or activity). Pollution level 2 does not take account of more severe environmental conditions: air pollution by dust, smoke, corrosive or radioactive particles, vapors or salts, molds, insects, etc.

Installation restrictions and recommendations

Please note that in order to fulfill the international certification conditions:

- Devices must be installed, wired, and maintained in accordance with the instructions provided in the manual “Grounding and Electromagnetic Compatibility of PLC Systems”
- Installation restrictions are provided in the manual “Modicon M580, M340, X80 I/O Platforms, Standards and Certifications“.

Download manuals for further details:



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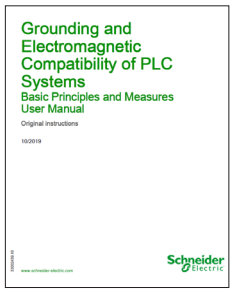

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(1) In cases where a slot is not occupied by a module, a BMXXEM010 protective cover must be installed.

(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	**IEC/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** For functional safety (DS criteria): **IEC 61000-6-7; IEC 61326-3-1**	Power supply immunity: ■ 1 ms for ⎓ PS1/10 ms for ∿ PS2 (20 ms DS criteria), 85% Un ■ Check operating mode for longer interruptions ■ up to 5s, 85% Un ■ for IACS, 3 times 30 s in 5 min, 85% Un
	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 61000-4-8; IEC 61000-6-5;** **IEC 61850-3** For functional safety (DS criteria): **IEC 61000-6-7; IEC 61326-3-1**	Power frequency: 50/60 Hz, 100 A/m continuous ...1000 A/m; t = 3 s; 3 axes
	IEC 61000-4-10	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;** **IEC 61000-6-5; IEC 61850-3** For functional safety (DS criteria): **IEC 61000-6-7; IEC 61326-3-1**	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 ■ For AC: 10 V ■ For DC: 10 V cont. or 100 V, t = 1 s

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

(1) These tests are performed without an enclosure, with devices fixed on a metal grid, and installed, wired and maintained in accordance with the instructions provided in the "Grounding and Electromagnetic Compatibility of PLC systems" manual (see page 6/3).

(CE)*: Tests required by European CE directives and based on IEC/EN 61131-2.*

Environment tests (continued)		
Name of test	**Standards**	**Levels**
Immunity to HF interference (CE) *(1)*		
Electrostatic discharges	**IEC/EN 61131-2; IEC/EN 61000-6-2; IEC 61000-6-5; IEC 61850-3; IEC 61000-4-2; IACS E10** For functional safety (DS criteria): **IEC 61000-6-7; IEC 61326-3-1**	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 61000-6-5; IEC 61850-3; IEC 61000-4-3; IACS E10** For functional safety (DS criteria): **IEC 61000-6-7; IEC 61326-3-1**	80MHz…1GHz: 10/15 V/m (20 V/m DS criteria); 3 V/m, 1.4 GHz...2 GHz: 3V/m (10 V/m DS criteria) 2 GHz...6 GHz: 3V/m Sinus amplitude modulated 80%,1 kHz + internal clock frequencies
Electrical fast transient bursts	**IEC/EN 61131-2; IEC/EN 61000-6-2; IEC 61000-6-5; IEC 61850-3; IEC 61000-4-4; IACS E10** For functional safety (DS criteria): **IEC 61000-6-7; IEC 61326-3-1**	For ~ or ⎓ main supplies: ■ 2 kV in common mode/2 kV in wire mode (4 kV DS criteria with external protection) For ~ or ⎓ auxiliary supplies, ~ unshielded I/O: ■ 2 kV in common mode For analog, ⎓ unshielded I/O, communication and shielded lines: ■ 1 kV in common mode (3 kV DS criteria)
Surge	**IEC/EN 61131-2; IEC/EN 61000-6-2; IEC 61000-6-5; IEC 61850-3; IEC 61000-4-5; IACS E10** For functional safety (DS criteria): **IEC 61000-6-7; IEC 61326-3-1**	For ~/⎓ main and auxiliary supplies, ~ unshielded I/O: ■ 2 kV in common mode/1 kV in differential mode (4 kV DS criteria with external protection) For analog, ⎓ unshielded I/O: ■ 2 kV in common mode/2 kV in differential mode For communication and shielded lines: ■ 1 kV in common mode (3 kV DS criteria)
Conducted disturbances induced by radiated electromagnetic fields	**IEC/EN 61131-2; IEC/EN 61000-6-2; IEC 61000-6-5; IEC 61850-3; IEC 61000-4-6; IACS E10** For functional safety (DS criteria): **IEC 61000-6-7; IEC 61326-3-1**	10 V; 0.15 MHz...80 MHz (20 V DS criteria) Sinus amplitude 80%, 1 kHz + spot frequencies
Damped oscillatory wave	**IEC/EN 61131-2; IEC 61000-6-5; IEC 61850-3; IEC 61000-4-18; IACS E10**	For ~/⎓ main supplies and ~ auxiliary supplies, ~ unshielded I/O: ■ 2.5 kV in common mode/1 kV in differential mode For ⎓ auxiliary supplies, analog, ⎓ unshielded I/O: ■ 1 kV in common mode/0.5 kV in differential mode For communication and shielded lines: ■ 0.5 kV in common mode

(1) These tests are performed without an enclosure, with devices fixed on a metal grid, and installed, wired and maintained in accordance with the instructions provided in the "Grounding and Electromagnetic Compatibility of PLC systems" manual (see page 6/3).

(CE)*: Tests required by European CE directives and based on IEC/EN 61131-2.*

Environment tests (continued)

Name of test	Standards	Levels
Electromagnetic emissions (CE) *(1)*		
Conducted emissions	**IEC/EN 61131-2; 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 emissions	**IEC/EN 61131-2; 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/*33 ft*) 230 MHz ... 1 GHz: quasi-peak 47 dB (µV/m) (at 10 m/*33 ft*) 1 GHz ... 3 GHz: quasi-peak 76 dB (µV/m) (at 3 m/*9.84 ft*) 3 GHz ... 6 GHz: quasi-peak 80 dB (µV/m) (at 3 m/*9.84 ft*)
	IACS E10	■ For general power distribution zone 0.15 MHz … 30 Mhz: quasi-peak 80…50 dB (µV/m) (at 3 m/*9.84 ft*) 30 MHz-100 MHz: quasi-peak 60…54 dB (µV/m) (at 3 m/*9.84 ft*) 100 MHz - 2 GHz: quasi-peak 54 dB (µV/m) (at 3 m/*9.84 ft*) 156 … 165 MHz: quasi-peak 24 dB (µV/m) (at 3 m/*9.84 ft*)

Name of test	Standards	Levels
Immunity to climatic variations *(1)* (power on)		
Dry heat	**IEC 60068-2-2 (Bb & Bd)**	60 °C/*140 °F*, t = 16 hrs [for ruggedized range: 70 °C/*158 °F*, t = 16 hrs] *(2)*
	IACS E10	70 °C/*140 °F*, t = 16 hrs
Cold	**IEC 60068-2-1 (Ab & Ad); IACS E10**	0 °C…- 25 °C/*32 °F...-13 °F*, t = 16 hrs + power on at 0 °C/*32 °F* [for ruggedized range: power on at -25 °C/*-13 °F*] *(2)*
Damp heat, steady state (continuous humidity)	**IEC 60068-2-78 (Cab); IACS E10**	55 °C/*131 °F*, 93% relative humidity, t = 96 hrs [for ruggedized range: 60 °C/*140 °F*] *(2)*
Damp heat, cyclic (cyclical humidity)	**IEC 60068-2-30 (Db); IACS E10**	55 °C…25 °C/*131 °F...77 °F*, 93…95% relative humidity, 2 cycles t = 12 hrs +12 hrs
Change of temperature	**IEC 60068-2-14 (Nb)**	0 °C … 60 °C/*32 °F...140 °F*, 5 cycles t = 6 hrs + 6 hrs [for ruggedized range: - 25 °C…70 °C/*-13 °F...158 °F*] *(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/*185 °F*, t = 96 hrs
Cold	**IEC/EN 61131-2; IEC 60068-2-1 (Ab & Ad); IACS E10**	-40 °C/*-40 °F*, t = 96 hrs
Damp heat, cyclic (cyclical humidity)	**IEC/EN 61131-2; IEC 60068-2-30 (Db)**	55 °C…25 °C/*77 °F...131 °F*, 93…95% relative humidity, 2 cycles t = 12 hrs + 12 hrs
Change of temperature (thermal shocks)	**IEC/EN 61131-2; IEC 60068-2-14 (Na)**	-40 °C...85 °C/*-40 °F...185 °F*, 5 cycles t = 3 hrs + 3 hrs

(1) Devices must be installed, wired, and maintained in accordance with the instructions provided in the manual "Grounding and Electromagnetic Compatibility of PLC Systems" (see page 6/3).
(2) Refer also to the section "Treatment for severe environments" (see page 5/2).

(CE): *Tests required by European CE directives 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/*0.14 in.* amplitude (5 Hz …. 8.4 Hz), 1 g (8.4 Hz …. 150 Hz) Specific profile: 5 Hz ... 150 Hz, ± 10.4 mm/*0.41 in.* amplitude (5 Hz …. 8.4 Hz), 3 g (8.4 Hz …. 150 Hz) For basic and specific: endurance: 10 sweep cycles for each axis
	IEC 60870-2-2; **IEC 60068-2-6** **(Class Cm)**	2 Hz ... 500 Hz, 7 mm/*0.28 in.* amplitude (2 Hz … 9 Hz), 2 g (9 Hz … 200 Hz), 1.5 g (200 Hz … 500 Hz) endurance: 10 sweep cycles for each axis
	IACS E10	3 Hz ... 100 Hz, 1 mm/*0.04 in.* 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	Seismic analysis: 3 Hz ... 35 Hz, 22.5 mm/*0.89 in.* 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)*
Free fall during operation	**IEC/EN 61131-2;** **IEC 60068-2-32** (Ed Method 1)	1 m/*3.28 ft*, 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/*3.28 ft*, 5 falls
Flat free fall	**IEC/EN 61131-2;** **IEC 60068-2-32** (Ed Method 1)	10 cm/*0.33 ft*, 2 falls
Controlled free fall	**IEC/EN 61131-2;** **IEC 60068-2-31** (Ec)	30° or 10 cm/*0.33 ft*, 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
Ground continuity	**IEC/EN 61131-2;** **IEC 61010-2-201; UL; CSA**	30A, R ⩽ 0,1Ω; t = 2 min
Leakage current	**IEC/EN 61131-2;** **IEC 61010-2-201; UL; CSA**	⩽ 0.5 mA in normal condition ⩽ 3.5 mA in single fault condition
Protection offered by enclosures	**IEC/EN 61131-2;** **IEC 61010-2-201**	IP20 and protection against standardized pins
Impact withstand	**IEC/EN 61131-2;** **IEC 61010-2-201; UL; CSA**	Sphere of 500 g, fall from 1.3 m/*4.27 ft* (energy 6.8 J minimum)
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; 6,000 cycles: t = 1 s ON + 9 s OFF
Temperature rise	**IEC/EN 61131-2; UL; CSA; ATEX; IECEx**	Ambient temperature 60 °C/*140 °F* [for ruggedized range: 70 °C/*158 °F*] *(4)*
Name of test	**Standards**	**Levels**
Specific environment *(4)*		
Corrosion areas - gas, salt, dust	**ISA S71.4**	Flowing mixed gas; class Gx, 25 °C/*77 °F*, 75% relative humidity, t = 14 days
	IEC/EN 60721-3-3; **IEC 60068-2-60**	Flowing mixed gas; class 3C3, 25 °C/*77 °F*, 75% relative humidity, t = 14 days
	IEC/EN 60721-3-3; **IEC 60068-2-60**	Flowing mixed gas; class 3C4, 25 °C/*77 °F*, 75% relative humidity, t = 7 days
	IEC 60068-2-52	Salt spray: test Kb, severity 2
	IEC/EN 60721-3-3; **IEC 60068-2-68**	Dust and sand, Arizona dust, class 3S4, 20 cycles
	IEC/EN 60721-3-3; **IEC 60068-2-10**	Mold growth, fungal spore, class 3B2, t=28 days

(1) Devices must be installed, wired, and maintained in accordance with the instructions provided in the manual "Grounding and Electromagnetic Compatibility of PLC Systems" (see page 6/3).
(2) When using fast actuators (response time ⩽ 5 ms) driven by relay outputs: 15 g, 11 ms; 3 shocks/direction/axis.
(3) When using fast actuators (response time ⩽ 15 ms) driven by relay outputs: 15 g, 6 ms; 100 bumps/direction/axis.
(4) Refer also to the section "Treatment for severe environments" (see page 5/2).

(CE): *Tests required by European CE directives and based on IEC/EN 61131-2 standards.*

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 labeled 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 / authority	Country
CE	European Community	European Union
UL	Underwriters Laboratories	USA
CSA	Canadian Standards Association	Canada
RCM	Australian Communications and Media Authority	Australia, New Zealand
EAC	Eurasian conformity	Russia and Eurasian Economic Union
UKCA	United Kingdom Central Authority	United Kingdom
cULus	Underwriters Laboratories	USA, Canada
cCSAus	Canadian Standards Association	Canada, USA
IECEx	International Electrotechnical Commission Explosive	International
ATEX	ATmosphères EXplosives	International
TÜV Rheinland (Functional Safety)	Technischer Überwachungsverein Rheinland	International
ABS	American Bureau of Shipping	USA
BV	Bureau Veritas	France
DNV	Det Norske Veritas	Norway, 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
KRS	Korean Register of Shipping	Korea
Class NK	Nippon Kaiji Kyokai	Japan

***Note**: Although DNV GL rebranded to DNV as of March 1st, 2021, all certificates with DNV GL name and logo keep their initial validity date. Only rules in force on or after March 1st, 2021, are rebranded to DNV.*

The following tables provide an overview of the situation as of September 2021, 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.se.com.

Product certifications

Certified / *Certification pending*	Certifications								
	CE	UL	CSA	RCM	EAC	UKCA	UL - CSA Hazardous locations *(1)*	ATEX - IECEx	TÜV Rheinland
	EU	USA	Canada	Australia	Russia	UK	USA, Canada	International	Germany
Modicon STB							Cl. I, Div. 2, Grps ABCD	Zone 2 *(2) (4)*	
Modicon Telefast ABE 7									
Modicon Switch			*(3)*				Cl. I, Div. 2, Grps ABCD *(2)*	Zone 2 *(2)*	
Modicon MC80							Cl. I, Div. 2, Grps ABCD		
Modicon M340							Cl. I, Div. 2, Grps ABCD	Zone 2/22 *(2) (5)*	
Modicon M580							Cl. I, Div. 2, Grps ABCD	Zone 2/22 *(2) (5)*	
Modicon M580 Safety							Cl. I, Div. 2, Grps ABCD	Zone 2/22 *(2) (5)*	SIL3, SILCL3, SIL4, Cat.4/PLe *(6)*
Modicon X80							Cl. I, Div. 2, Grps ABCD	Zone 2/22 *(2) (5)*	
Modicon Momentum							Cl. I, Div. 2, Grps ABCD		
Modicon Quantum					*(2)*		Cl. I, Div. 2, Grps ABCD	Zone 2/22 *(2) (5)*	

(1) Refer to user manual for installation in hazardous locations.
(2) Depends on product; Refer to the product certificates at www.se.com.
(3) North American certification cULus (Canada and USA).
(4) For zones not covered by this specification, Schneider Electric offers a solution as part of the TPP (Technology Partner Program). Please contact our Customer Care Center.
(5) Certified by INERIS. Refer to the instructions supplied with each ATEX and/or IECEx certified product.
(6) Certified by TÜV Rheinland for integration into a Safety function:
- up to SIL2 or SIL3 regarding IEC61508/61511 for Process,
- up to SILCL3 regarding IEC62061 and up to Cat.4/PLe regarding ISO13849 for Machine,
- up to SIL4 regarding EN50126/50128/50129 for Railway.

Merchant navy certifications

	Shipping classification societies									
Certified / *Certification pending* / *Only part of range certified*	ABS	BV	DNV	LR	RINA	RMRS	RRR	CCS	KRS	Class NK
	USA	France	Norway/ Germany	Great Britain	Italy	Russia	Russia	China	Korea	Japan
Modicon STB	■	■	■	■	■					
Modicon Telefast ABE 7		■	■	■		■	■			
Modicon Switch		*(1)*	*(1)*	*(1)*						
Modicon MC80										
Modicon M340	■	■	■	■	■	■		■	■	■
Modicon M580	■	■	■	■	■	■		■	■	■
Modicon M580 Safety	■	■	■	■					■	■
Modicon X80	■	■	■	■	■	■		■	■	■
Modicon Momentum										
Modicon Quantum	■	■	■	■	■	■				

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 intended to remove restrictions on free circulation of goods and 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 are responsible for taking the necessary measures to establish 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 that 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 reassurance 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 (2014/35/EU)
- The Electromagnetic Compatibility Directive (2014/30/EU)
- The ATEX CE Directive (2014/34/EU)
- The Machinery Directive (2006/42/EU)

Hazardous substances

These products are compatible with:
- The WEEE Directive (2012/19/EU)
- The RoHS Directive (2011/65/EU)
- The China RoHS Directive (Standard GB/T 26572-2011)
- REACH regulations (EC No. 1907/2006)

Note: *Documentation on sustainable development is available on our website www.se.com (product environmental profiles and instructions for use, RoHS and REACH directives).*

End of life (WEEE)

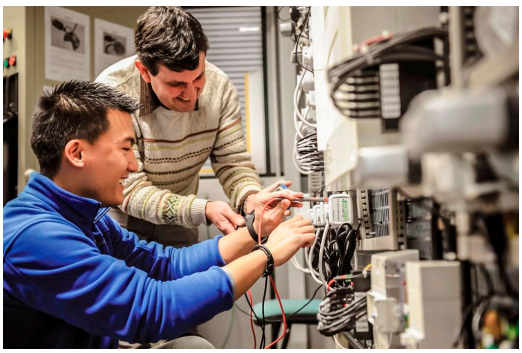
End of life products containing electronic cards must be dealt with by specific treatment processes.
When products containing backup batteries are unusable or at end of life they must be collected and treated separately. Batteries do not contain a percentage by weight of heavy metals above the limit specified by European Directive 2013/56/EU.

(1) Please refer to the Modicon Networking catalog for more details.

Contents

7 - Services

Dedicated service offers for your installed base



Schneider Electric, with its experts, products, and dedicated tools, provides services such as system design, consultancy, maintenance contracts, modernization of facilities, and project delivery.

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 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.se.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:
  - Products that have broken down are repaired in a network of worldwide repair centers. 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 product that has broken down has even been sent back
  - Fast exchanges offer the option to receive the replacement product within 24 hours (in Europe)

Preventive maintenance

Improving and helping to ensure the long-term reliability and performance of your installations

Schneider Electric's preventive maintenance expert assesses your site and the equipment to be managed and sets up a maintenance program to accommodate your 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 (please contact your Customer Care Center for more information).

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

Dedicated service offers for your installed base

Consultancy services

M2C (Maintenance and Modernization Consultancy)

Professional tools and methods, proven experience of managing obsolescence and updating installed bases, helping 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 EcoStruxure

Proven expertise, tools, and methods to give you a clear vision of the improvement opportunities and guide you towards a successful modernization project

EcoStruxure™

Find out more about EcoStruxure architectures on our website www.se.com

Schneider Electric offers gradual solutions of modernization through a set of products, tools, and services that allow you to upgrade your installations with our latest technologies. Our solutions offer you the choice to plan your modernization:

- Partial modernization: replacement of an old set of components with a new one
- Step-by-step modernization: gradual incorporation of new solutions or offers in the system
- Complete modernization: total renovation of the system

The table below lists our various migration offers:

Wide range of migration offers		**Moving to M580/M340/X80 platform**						
Solution		**Solution type**			**Tools**	**Solution services**		
		Change the CPU and retain the I/O racks and wiring	**Change the CPU and the I/O racks and retain I/O field wiring with wiring system**	**Change the CPU, the I/O racks and the I/O wiring**	**SoftWare application conversion tool**	**Modernization/ migration service**	**Manage your project**	**Execute your project**
Platform	Premium	☑	☑	☑	☑	☑	☑	☑
	TSX47 to TSX107		☑	☑	☑	☑	☑	☑
	Quantum	☑	☑	☑	☑	☑	☑	☑
	Modicon 984 & 800 Series I/O	☑	☑	☑	☑	☑	☑	☑
	Modicon Compact		☑	☑	☑	☑	☑	☑
	Symax	☑	*(1)*	☑	☑	☑	☑	☑
	April series 1000		*(2)*	☑	☑	☑	☑	☑
	April SMC			☑	☑	☑	☑	☑
	Merlin Gerin PB			☑		☑	☑	☑
	AEG		*(1)*	☑		☑	☑	☑
	Rockwell SLC500		☑	☑	☑	☑	☑	☑
	Rockwell PLC 5	☑	☑	☑	☑	☑	☑	☑
	Siemens S5 et S7			☑	☑	☑	☑	☑

☑ Service available

(1) Consult Schneider Services - project-specific solution is possible
(2) For April Series 1000 (April 5000-7000 and April 2000-3000) Consult Schneider Services - project-specific solution is possible

Customization services

Schneider Electric is able to meet your specific requirements and provide you with adapted products:

- Protective coating for HMIs, automation platforms, and distributed I/O modules for use in harsh environments
- Customized cable lengths to match your specific needs
- Customized front panels for HMIs
- The preparation of the multi-use flying lead I/O adapter can be made in the factory before use on request.

***Note**: To check availability of services required, please contact our Customer Care Center.*

Product reference index

Life Is On | Schneider Electric

Learn more about our products at
www.se.com

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Photos: Schneider Electric

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