Catalog | April 2021

Modicon M580 automation platform

PLC/PAC for process, high-availability, and safety solutions

www.se.com

Life Is On Schneider Electric

Modicon

Discover Modicon

Industrial Edge control for IIoT

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

Explore our offer

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

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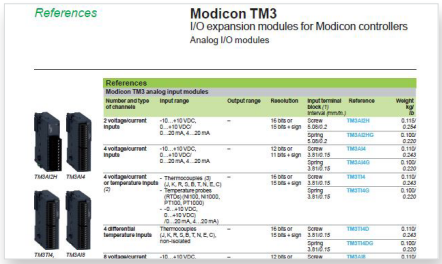
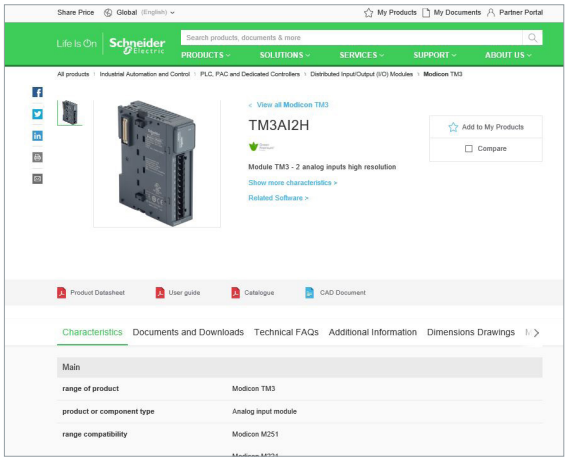
Quick access to product information

Get technical information about your product

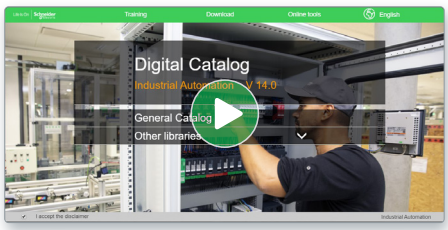




Each commercial reference presented in a catalog contains a hyperlink. Click on it to obtain the technical information of the product:

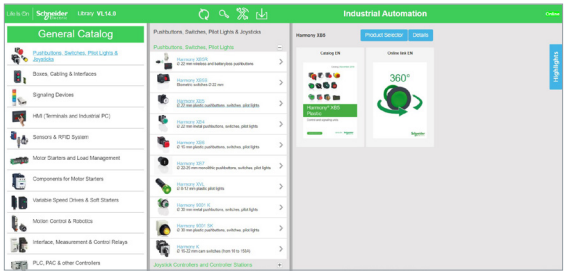
- Characteristics, Dimensions and drawings, Mounting and clearance, Connections and schemas, Performance curves
- Product image, Instruction sheet, User guide, Product certifications, End of life manual

Find your catalog



> With just 3 clicks, you can access the Industrial Automation and Control catalogs, in both English and French

> Consult digital automation catalogs at Digi-Cat Online

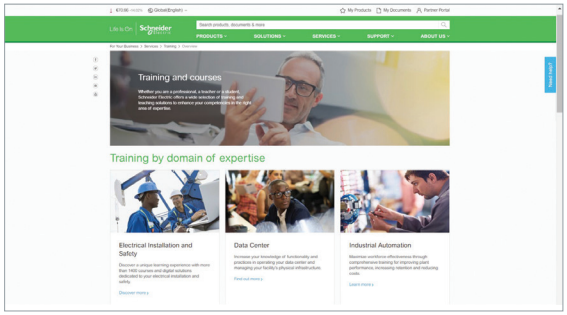


- Up-to-date catalogs
- Embedded product selectors,360° pictures
- Optimized search by commercial references

Select your training

> Find the right Training for your needs on our Global website

> Locate the training center with the selector tool, using this link



Life Is On Schneider Electric

General contents

EcoStruxure™
Innovation At Every Level

Schneider Electric's IoT-enabled, plug-and-play, open, secure, interoperable architecture and platform, in Industries, Infrastructures, Data Centers, and Buildings.

Innovation at every level

EcoStruxure is based on a three-tiered technology stack delivering innovation at every level, from connected products to edge control and apps, analytics, and services.

Together with our hybrid segments approach, this enhances your value around safety, reliability, operational efficiency, sustainability, and connectivity across 6 domains of expertise:

- Power
- IT
- Building
- Machine
- Plant
- Grid

Dedicated architectures and IoT

We tailor our solutions in the form of dedicated reference architectures for plants:

- Management systems
- Power systems
- Data center systems
- Industrial plant and machine systems
- Smart grid systems

The Industrial Internet of Things (IIoT) gives an additional boost to technologies. That's why we provide our customers with an IoT-enabled architecture and platform offering simple, reliable, productive, and cost-efficient solutions.

Cybersecurity solutions

Robust cybersecurity protection is a must, and Schneider Electric's solutions can deliver it, regardless of business type or industry.

The vendor-agnostic services provided by our skilled professionals help to protect your entire critical infrastructure. We help to assess your risk, implement cyber-specific solutions, and maintain your onsite defenses over time, while integrating appropriate IT policies and requirements.

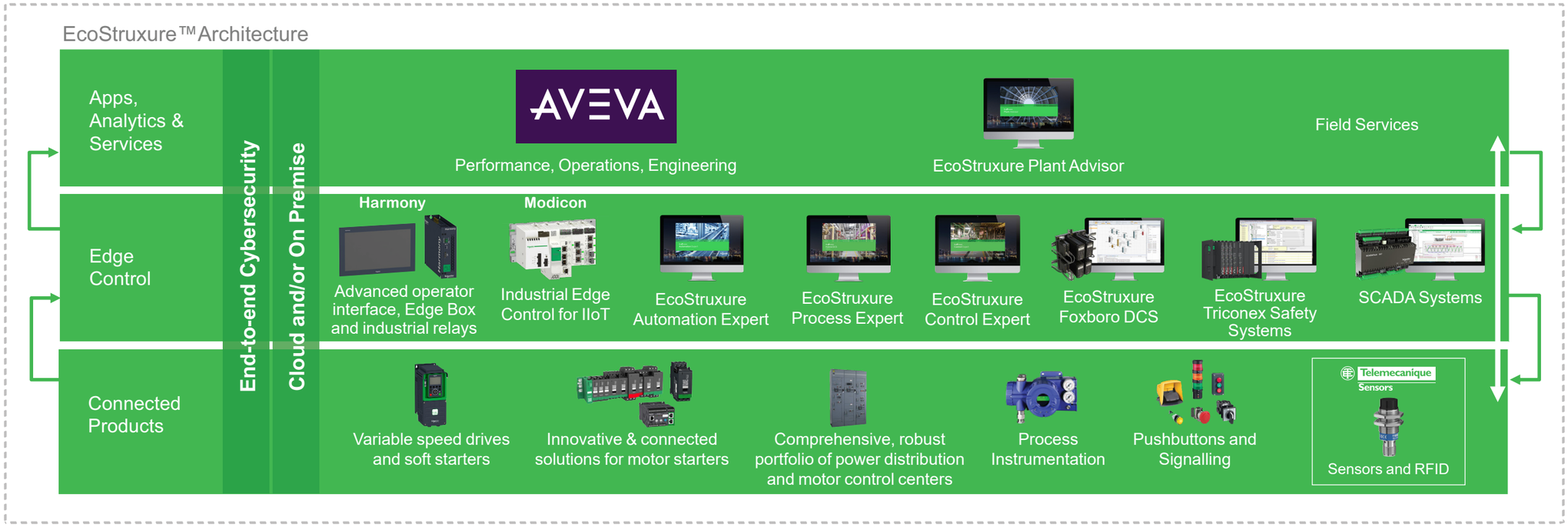
This is our difference and your advantage.

Enhanced safety

With the release of M580 Safety, Schneider Electric further expands the EcoStruxure platform.

This consolidates our position as one of the most trusted industrial safety vendor, with thousands of Modicon and Triconex safety systems protecting the most critical industrial processes globally.

EcoStruxure™ Innovation At Every Level **for Plant**



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Contents

1 - Presentation

Modicon M580 automation platform
Innovative

1

Modicon M580 ePAC
Edge Control at the heart of EcoStruxure Plant

Modicon M580 ePACs (Ethernet programmable automation controllers) offer openness, flexibility, robustness, and sustainability. They are designed with an Ethernet backbone to optimize connectivity and communications. They support X80 common modules, which can be easily integrated into its architecture. The powerful processors offer high levels of computation for complex networked communication, display, and control applications.

Modicon M580 combines Modicon PAC's existing features with innovative technologies to deliver Schneider Electric's complete Ethernet-based PAC

Direct Ethernet connection backplane
- Ethernet
- X-bus

ODVA organization: Supports network technologies built on EtherNet/IP

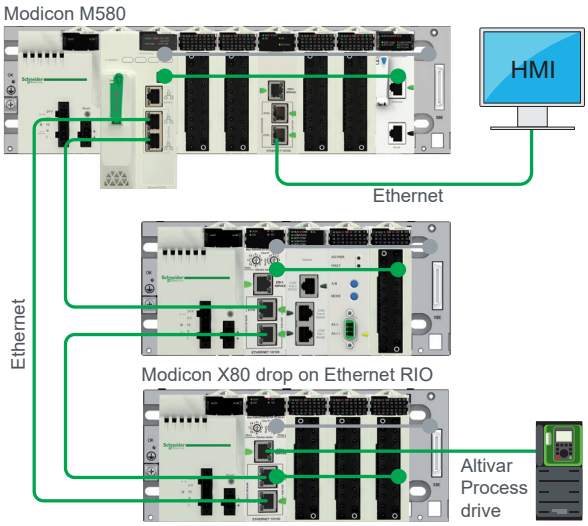
FDT technology: A widely accepted international standard in the automation industry

Innovative

ePAC concept

> Top-to-bottom standard Ethernet network

> Open architecture with direct Ethernet connection on backplane



Cybersecurity ready

> Cybersecurity ready with Achilles Level 2 certification and advanced built-in cybersecurity features

> Embedded security features as defined by standard IEC 62443

> M580 hardware platform:
  > Unused services can be disabled
  > Remote access to PLC can be controlled
  > Implementation of standard IPSEC protocol helps to secure communication between control network and PLC/devices

> M580 programming software with integrity check of EcoStruxure Control Expert executable files

> Traceability for security events:
  > PLC and EcoStruxure Control Expert implement a SYSLOG client

> Secure SCADA protocols such as OPC UA, DNP3, IEC 60870-5-104

Open and secure solution based on standards

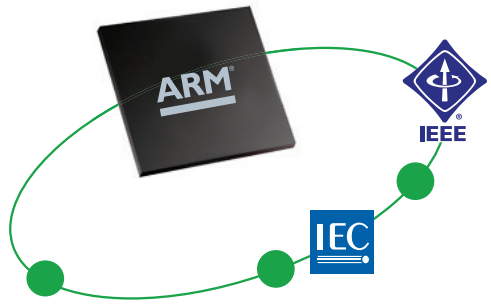
Modicon M580 automation platform
Innovative

Innovative (continued)

Advanced technologies

- Based on high-speed dual-core processor (ARM® type)
- High-speed communication, application, and execution
- Innovative mechanical and electronic design for high EMC immunity and ruggedness that is superior to the required IEC standards
- Supports extended temperature range from -25 °C to +70 °C/*-13 °F to +158 °F*

Modicon M580 design is compliant with automation standards



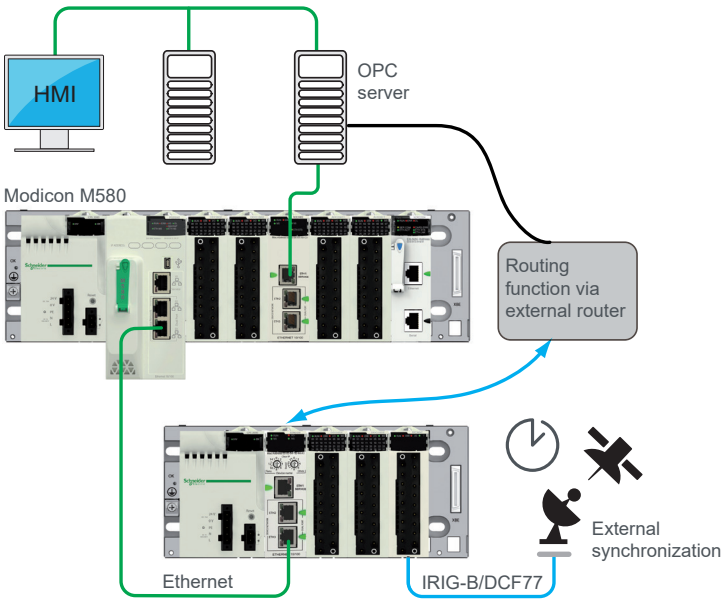
Ethernet & Web

W3C®

High precision

- Native deterministic Ethernet network
- Ability to deliver 1 ms I/O resolution through native time stamping at source with specific time-stamping modules via OPC server
- Applications include functions such as:
  - sequence of events recording (SER)
  - utility substation automation
  - protective relay trip history
  - alarm/event logs
  - time stamping of power monitoring data logs
  - time stamping of internal data

No program required with time-stamping solution mode



Modicon X80 adapter on Ethernet RIO

+ Modify your process and architecture during runtime

Modicon M580 automation platform

Simple and flexible

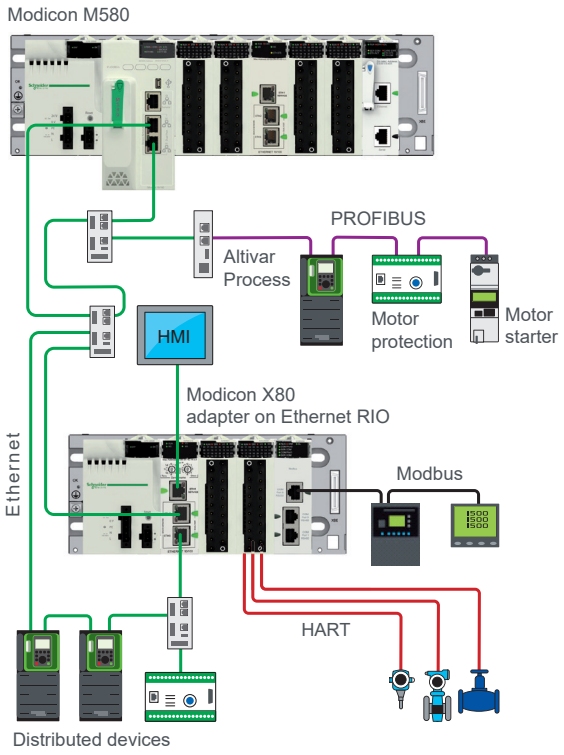
1

Simple and flexible

Flexibility in design

> Flexible topology allows simple integration of devices
> Ability to mix remote equipment, distributed equipment, and other devices on the same Ethernet field network with complete software integration
> Transparent access to data through Ethernet backbone
> Simple HMI integration via third port on remote I/O head
> Interface to other popular fieldbus and device networks including AS-Interface, Modbus, PROFIBUS, CANopen, HART, etc.

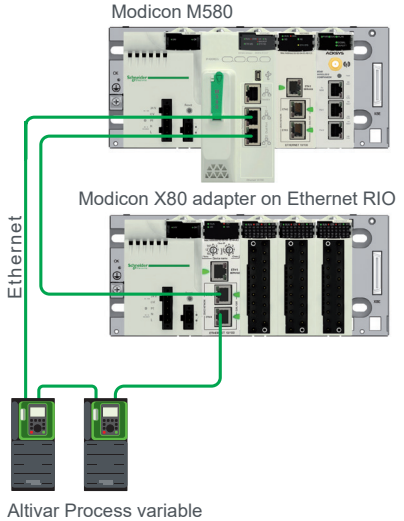
Extend your process or application easily with flexible Modicon M580 topology



Optimized architecture

> Simple daisy chain loop

No switches required for simple main loop



Design your architecture without constraints

Modicon M580 automation platform

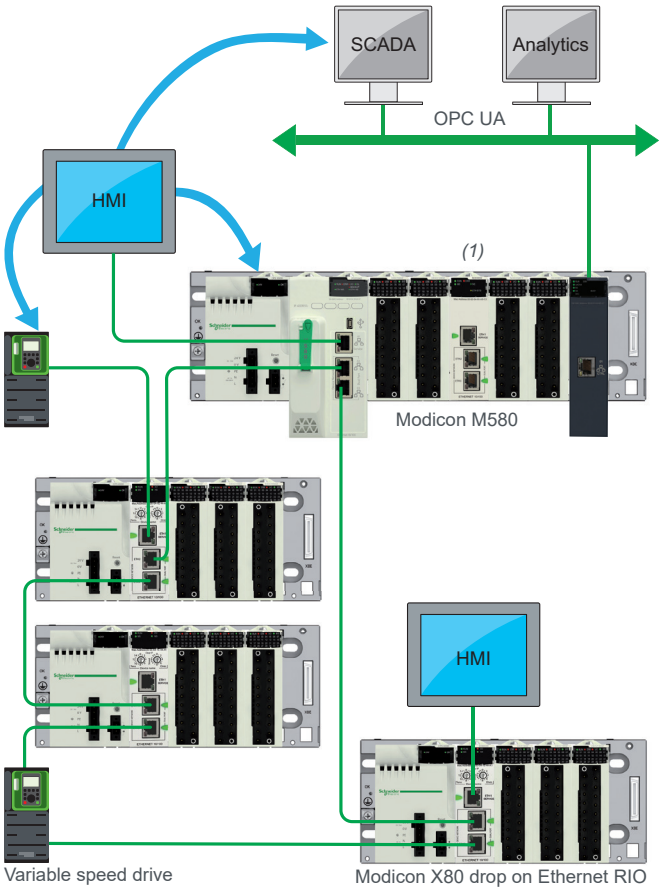
Simple and flexible

Simple and flexible (continued)

Easy diagnostics

> Ethernet delivers information everywhere
> Simple, remote, and mobile diagnostics (smartphone, tablet, etc.)
> Embedded Web server for Web access
> Manage supervision screens on HMI and access HMI screens
> Built-in AVEVA Plant SCADA objects for advanced integrated diagnostics

Data at your fingertips wherever you are

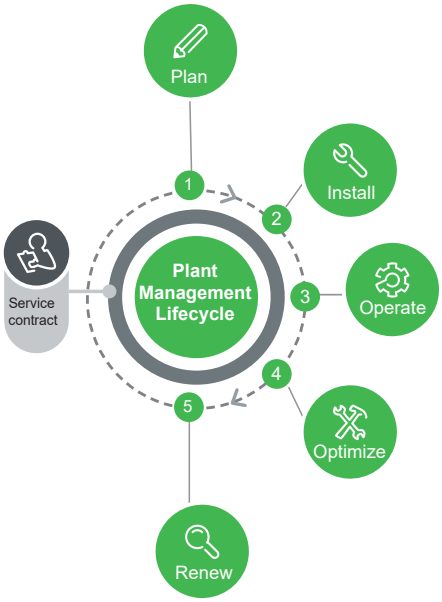


Change configuration on the fly without stopping the process

> Add or remove discrete and analog I/O modules on RIO adapter (not time-stamped) or local I/O rack
> Add a new RIO drop adapter

> Modify channel configuration parameters
> Automatic reconfiguration of modules on hotswap
> Online application changes during process runtime including adding new variables shared with HMI (human/machine interfaces)

(1) This schematic diagram operates with BMENUA0100 module with complete Ethernet transparency via connection to the Ethernet backplane.



+ Diagnose remotely

Modicon M580 automation platform
Common Safety

Clear distinction between safety and process

Common safety

Regulatory requirements
Good practices dictate that control systems must be designed to keep process control functions separate and operationally independent from safety functions. This is usually done using a controller for the process and a separate system for safety.

Our solution offers more than required by industry standards
- Dual processing capability to control safety and process functions independently
- Unifying independent plant safety and process control to help protect the entire operating environment
- Minimized impact of standard process failure on plant safety, its people and assets

No compromise for a safe running process
- Best-in-class Modicon M580 performance, networking, and cybersecurity
- No need to design, install, and maintain different PACs for process control and safety
- Same tools, wiring methods, and I/O structures as Modicon M580 controller

Modicon M580 Safety

Mix standard process and safety in a single M580 Safety project

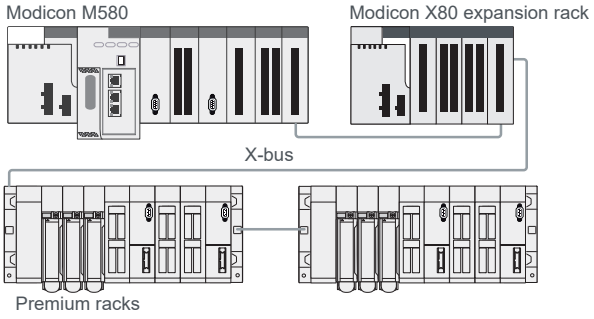
Modicon M580 automation platform
Sustainable

Sustainable

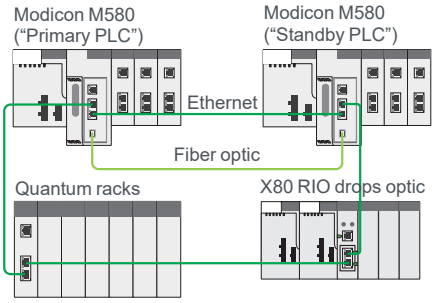
Helping to protect investments

> Keep your existing Modicon Premium I/O or Quantum I/O and wiring

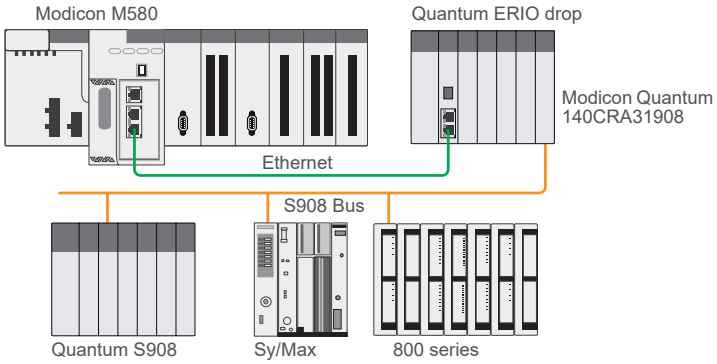
Installed base modernization: keep your existing Modicon Premium I/O and wiring



Installed base modernization: keep your existing Modicon Quantum I/O and wiring



Modernize your installed base smoothly and stepwise according to your budget with our tailored solutions



Integration of M580 ePAC into your EcoStruxure Plant architecture

Modicon M580 automation platform
Sustainable

1

Sustainable (continued)

Helping to protect investments (continued)

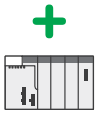
> Standardize on the Modicon family with common X80 modules and reduce training and maintenance costs

Modicon family with common X80 modules

Modicon Quantum Ethernet I/O

Modicon M340

Modicon M580



Modicon X80

> Smooth migration paths for both hardware (quick wiring adapter) and software (software converters)

See our catalogs:

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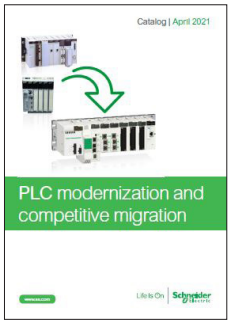

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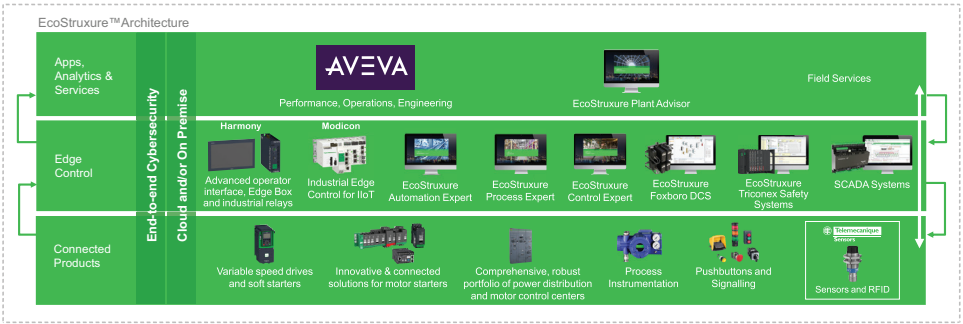
Smooth modernization of your installed base

Modicon M580 automation platform

Winning associations in EcoStruxure Plant architecture

Winning associations in EcoStruxure Plant architecture

EcoStruxure™ for Plant
Innovation At Every Level



Modicon M580 Ethernet PACs, at the Edge Control layer of our EcoStruxure architecture have strong associations with:

Apps, Analytics and Services layer

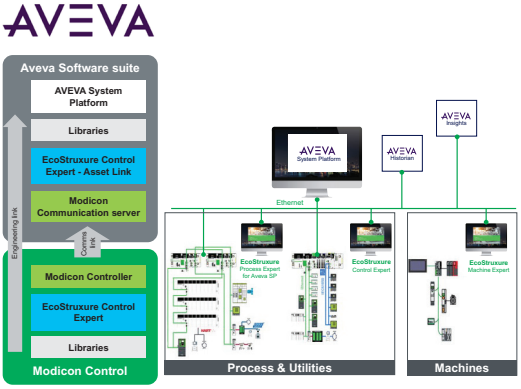
- Integrated Control and Software Solutions with AVEVA System platform. For more details, see our website www.se.com.
- Modicon Installed Base Services
  - Schneider Electric provides smooth modernization paths to migrate existing wired legacy I/O to Modicon M580. For more details, contact our Customer Care Center or our website www.se.com.
  - See PLCs modernization and migration solutions catalog.

Edge Control layer

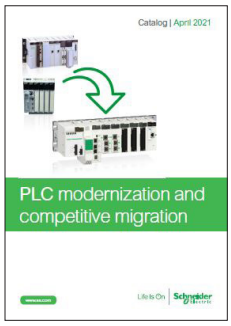
- EcoStruxure Process Expert:
  - DCS for hybrid industries: Single automation system, based on Modicon M580 controllers, to engineer, operate, and maintain the entire infrastructure for a sustainable, productive and market-agile plant
- AVEVA Plant SCADA (formerly Citect)
  - Manages time-stamped events through OPC server in a system approach
  - Displays Ecostruxure Control Expert diagnostics buffers
  - Integrates objects quickly and easily to provide advanced diagnostic information
- Ecostruxure Foxboro DCS
  - Integration of Modicon M580 PAC systems (used in packaged units or utilities) into the main DCS to reduce engineering costs

Connected products layer

- X80 Partners modules
  - See our website partner page
- HMI Harmony range
  - Web server access, multiple screens on Ethernet backbone, diagnostic buffers supported by Vijeo Designer, export of EcoStruxure Control Export data to Vijeo Designer
- Altivar variable speed drives and Tesys Motor Management system
  - Integration of a tool for setup, commissioning, and diagnostic through FDT/DTM
  - Single entry point, DFB function blocks, predefined profiles, and implicit data structure (DDT) to reduce engineering time
  - Integrated Ethernet port for integration into many network topologies (ring, star, tree, and linear)
  - Dual port offers easy connection and media redundancy (ring topology)
  - Standard and proven Ethernet protocols: Modbus TCP and EtherNet/IP
  - Fast device replacement (FDR) and main standard Ethernet services (RSTP, SNMP, DHCP, QoS, HTTP web server)
- Pact Series and Power Logic (IEDs)
  - Integration of Schneider Electric Pact series breakers and switches, as well as Power Logic power meters and protection relays via IEC 61850 protocol support into Modicon M580



Integrated control and software solutions easily connect Modicon controllers to AVEVA System Platform



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Technology Partner
Schneider Electric

Helping to protect existing and future investments

Modicon M580 automation platform

Modicon M580 automation platform

Presentation

The Modicon M580 automation platform allows two types of architecture - standard applications and high-availability applications. Those architectures can be declined for both standard or Safety applications.

The processors can manage the Modicon X80 modules platform in a single-rack or multi-rack Ethernet PAC station. Their slots can be equipped with:

- ■ Discrete I/O modules
- ■ Analog and HART I/O modules
- ■ Expert modules (weighing, time-stamping, counting, etc.)
- ■ Communication modules
- □ EtherNet/IP and Modbus/TCP, OPC UA, IEC 61850, RTU (DNP3, IEC 60870)
- □ AS-Interface, Serial link (Modbus), PROFIBUS and CANopen

Backplanes exist in two declinations (X-bus or dual profile X-bus and Ethernet). Several power supplies options are provided (standalone or redundant).

Modicon M580 automation platform applications are designed and programmed by EcoStruxure Control Expert engineering tool.

The Modicon M580 automation platform meets the needs of specialist applications such as:

- ■ Manufacturing and large infrastructure
- ■ Water and Waste Water (WWW)
- ■ Consumer Packaged Goods (CPG)
- ■ Mining, Minerals, Metals (MMM)
- ■ Oil & Gas (O&G)
- ■ Data centers
- ■ Power generation

Processors

The **BMEP58●●●●/BMEH58●●●●** processor range constitutes the core of a complete control solution based on Modicon M580 specific and compatible modules and racks. The QR code provides access to the product datasheet.

BMEP582020 processor

BMEH584040 processor

Standalone processors

The standalone **BMEP58●●●●** processor is a modular automation processor that physically occupies two module slots on a backplane.

BMEP58●●●● processors can be installed on **BMEXBP●●●●** Ethernet + X-bus racks and **BMXXBP●●●●** (PV02 or later) X-bus racks. Use of the redundant power supply **BMXCPS4002●** in the dual power supply backplane **BMEXBP0602/1002** provides higher system availability.

The nine processors in this range have different memory capacities, processing speeds, number of I/O, number of supported local racks, and embedded Ethernet port functions (see page 2/10).

Redundant processors

The redundant **BMEH58●●●●** processors are dedicated to the Hot Standby architecture that physically occupies two module slots on a backplane.

BMEH58●●●● processors can be installed on **BMEXBP●●●●** X-bus Ethernet + racks, **BMXXBP●●●●** (PV02 or later) X-bus racks, and the dual power supply racks **BMEXBP0602/1002** (allowing the use of redundant power supplies **BMXCPS4002●**).

BMEP582040S processor

BMEH584040S processor

Safety processors

The standalone BMEP58●040S Safety processors are an extension of the standard processors allowing integration of Safety related functions for Process and Machine. Safety processors with using safety I/O modules are compliant up to SIL3 (IEC61508/IEC61511/EN62061), Category 4, PLe (ISO13849-1).

The safety processors are having the same characteristics and performances as their corresponding and respective non-safety related processors.

The Safety processors, based on Common Safety, are able to manage Safety I/O modules for Safety functions described in the Safety logic and non-interfering X80 I/O modules for non-safety related functions. Safety Processors can communicate over Ethernet with using Safety messages. Standalone processors also embeds the CIP Safety protocol to allow openness to third party devices.

Redundant Safety processors

The redundant BMEH58●040S Safety processors are dedicated to the Hot Standby architecture. A Hot Standby architecture provides a Safety (SIL3/PLe) and high available solution for critical process.

Modicon M580 automation platform

BMEP586040 processor

Processor performance

The M580 standalone processor supports up to 8 local racks (depending on the CPU performance level), using existing X80 modules and accessories. The M580 processor must be installed in the main rack, which can be a dual (Ethernet + X-bus) bus rack. M580 PLCs can support up to 7 expansion racks of 4, 6, 8, or 12 slots for single power supply and 6 or 10 slots for dual power supply. These standalone and Hot Standby processors physically occupy two module slots on a backplane.

The processors can manage the Modicon X80 modules platform in a single-rack or multi-rack Ethernet PAC station. Their slots can be equipped with:

- Discrete I/O modules
- Analog I/O modules
- Counter modules
- Communication modules: Ethernet Modbus/TCP network, EtherNet/IP network, Modbus SL
- AS-Interface actuator/sensor buses and RTU (remote terminal unit) serial link
- Expert modules

The 9 standalone processors and the 3 Hot Standby processors have different memory capacities, processing speeds, number of I/O, number of supported local racks, and embedded Ethernet port functions (see page 2/10).

The M580 processor range offers the choice of 6 memory levels from 4 MB to 64 MB (see page 2/6 for more information).

It also offers the choice of two types of Ethernet device network port:

- For **BMEP58●●20** processors: distributed I/O ports (DIO) to connect distributed equipment
- For **BMEP58●●40** and **BMEH58●●40** processors: distributed I/O ports (DIO) to connect distributed equipment and remote I/O ports (RIO) to connect remote equipment

This range also offers different performance levels: **BMEP5840●●** processors are twice as fast as **BMEP5830●●** processors, which are themselves twice as fast as **BMEP5810●●** and **BMEP5820●●** processors. With the new processor models, **BMEP585040/BMEP586040** processors have 20% higher calculating speed than **BMEP5840●●** processors.

An optional 4 GB SD memory card **BMXRMS004GPF** is used with M580 processors for application and data storage.

Cybersecurity ready

The Modicon M580 is Schneider Electric's most cyber-secure platform thanks to the Achilles Level 2 certification and its advanced built-in cybersecurity features.
The Achilles L2 cybersecurity certification demonstrates the robustness of the Modicon M580 platform under both extreme and common Ethernet conditions. The Modicon M580 automation platform also offers the following features:

- Extended access control for the PLC via an access control list allowing IP addresses and TCP ports to be controlled
- Password protection for remote programming changes
- Possibility to disable any unused service (FTP, HTTP, DHCP, etc.)
- Firmware Integrity check
- Possibility to lock remote write commands
- Integrity check of EcoStruxure Control Expert executable files
- Any security events can be logged in a SYSLOG database
- Communications with EcoStruxure Control Expert secured via IPSEC
- Communications with SCADA via OPC UA Secure or RTU secured protocols (DNP3 NET or IEC60870-5-104)
- Modicon M580 Controller is aligned with IEC 62443-4-2 Security Level 1 (SL1)

Achiles Level 2 certification

For more information around cybersecurity solutions and services, please consult our website at following pages :

- Industrial Cybersecurity
- Industrial Cybersecurity solutions

Modicon M580 automation platform

Modicon X80 modules platform

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Modicon X80 modules platform

The Modicon X80 modules platform serves as the common base for automation platforms by simply adding a dedicated processor such as the M580 or M340.
It may also:

- Form part of a Quantum Ethernet I/O architecture as an Ethernet RIO (EIO) drop with a CRA bus terminal module
- Form an Ethernet Modbus/TCP DIO drop with a PRA module

The Modicon X80 modules platform is available in a single-rack or multi-rack configuration. This platform may also accept automation platform-dedicated modules (communication, application-specific, etc.).
One Modicon X80 drop may support two racks separated by a distance of up to 30 m/*98 ft*.

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 modules platform offers:

- High-quality ruggedness and compactness
- Compliance with international certifications (ATEX, IEC, etc.)
- A wide selection of modules: Discrete or analog I/O, expert modules, communication modules, etc.

Note: *For further information, please consult the "Modicon X80 modules platform" catalog available on our website www.se.com.*

Dedicated modules

HART integrated analog I/O modules

HART integrated analog input module

The Highway Addressable Remote Transducer (HART) protocol is the global standard for sending and receiving digital information across analog wires between smart devices and a control or monitoring system. The standard is controlled by the HART Communications Foundation.

HART integrated analog I/O modules can be added on the backplane of the Modicon M580 processor.

These HART modules offer 8 channels per input module and 4 channels per output module. HART integrated analog I/O modules allow the integration of HART-enabled instruments to the network architecture.

Each M580 main rack can support up to 6 HART I/O modules and each X80 RIO drop can support up to 7 HART I/O modules.

HART analog I/O modules are only supported by Ethernet + X-bus backplanes (main rack or RIO drop).

Note: *For further information, please consult the "Modicon X80 modules platform" catalog available on our website www.se.com.*

IEC 61850 Module

IEC 61850 module

The **BMENOP0300** module is used to implement an engineering approach by enabling IEC 61850-compliant data exchange across industrial automation and energy management applications.

The **BMENOP0300** module can provide different services under different roles, serving primarily in the following use case:

- Electrical device integration (module acts as a MMS client to communicate with IEDs and supports GOOSE)
- IEC 61850 based process control (Process control objects modeled with IEC61850 (hydro, DERs, etc.)). Module acts at the same type as a Server to communicate to SCADA and as a Client to communicate to IEDs
- Integration of a Modicon M580 acting as a data concentrator into other electrical automation systems. (module uses the IEC61850 server functionality)

OPC UA module

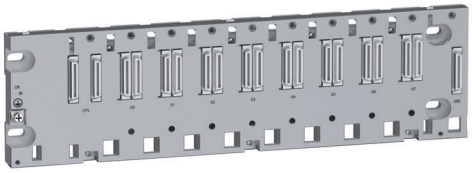
OPC UA module

The **BMENUA0100** OPC UA module is an Ethernet communications module with an embedded OPC UA server for communication with OPC UA clients, including SCADA.

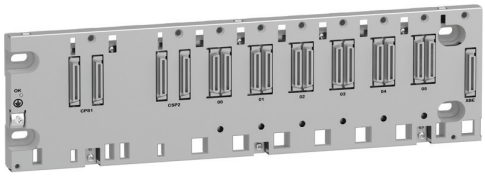
It brings high-performance OPC UA capabilities to Modicon M580 ePAC systems allowing up to 10 OPC UA clients, 50.000 monitored items and managing hot redundancy in non-transparent modes as well as certificate authority for cybersecure authentication.

With its dual cybersecurity and transparency capabilities, it provides also a platform of choice to connect a Modicon M580 system securely to the engineering, control or reliability network. It supports IPV6.

Modicon M580 automation platform



8-slot Ethernet + X-bus rack



6-slot dual power supply backplane

Three rack types

Standard applications

M580 processors can work in either an X-bus rack or a dual (Ethernet + X-bus) rack.

Ethernet backplanes are available with 4, 8, and 12 slots.

The M580 Ethernet backplanes provide X-bus connection and Ethernet connectivity.

A single configuration can support up to 7 standard BMX racks used as expansion racks in addition to the main rack, separated by a cumulative distance of up to 30 m/*98 ft*.

An Ethernet RIO (EIO) drop is composed of one or two racks that can be either a BMX X-bus rack or a BME Ethernet rack. The expansion rack can only be a BMX X-bus rack. All the Ethernet racks are available in a version suitable for use in harsh environments.

An Ethernet switch is embedded in the Ethernet backplane. This switch is connected to several slots on the backplane. In the case of 12-slot backplanes, not all slots have Ethernet connectivity. Only 8 slots are available for Ethernet, but they are placed in several locations along the rack for maximum flexibility of use (see page 2/10).

High-availability applications

- For higher availability, M580 processors or X80 drops can work in a dual power supply backplane **BMEXBP●●02**, which supports the redundant power supply **BMXCPS4002●** in pairs.
- Dual power supply backplanes are available with 6 and 10 dual (Ethernet + X-bus) slots, in which a maximum of 4 out of the 6 slots and 8 out of the 10 slots are available for Ethernet.

***Note**: It is not possible to plug a standard power supply into a dual power supply backplane; the dual power supply backplane is only compatible with the redundant power supply. However, a single redundant power supply can be plugged into the standard backplane.*

Backplanes

Ethernet backplanes

The M580 dual backplanes provide X-bus connection and Ethernet connectivity. One Ethernet switch is embedded in the backplane with connectivity to some slots on the backplane. There are two types of Ethernet backplane: for standard applications with one power supply module inserted, up to 12 modules will be supported. For high-availability applications with 2 power supply modules for redundancy, 6 or 10 modules will be supported. Not all slots have Ethernet connectivity in the case of 12-slot backplanes.

Using such connectivity, Ethernet-based modules (both Schneider Electric and third-party) can communicate with any other module or device that is reachable via the Ethernet and IP networks.

An additional connector is added to some slots of the backplane, next to the X-bus connector.

The Ethernet backplane provides multiple communication buses compared with the X-bus backplane to improve connectivity on the backplane. These buses can be connected to Ethernet modules and used to communicate different types of data for different purposes (see page 2/11).

The following communication buses are present in Ethernet backplanes:

- X-bus
- Ethernet

Expanded backplanes

To expand the configuration using additional racks, a bus expansion module (**BMXXBE1000**) and X-bus cables are required (see Modicon X80 modules platform catalog, chapter 2).

The expanded backplane can be either a standard backplane, including a power supply module and supporting up to 12 modules, or a dual power supply backplane, including 2 redundant power supply modules and supporting up to 10 modules.

However, an expanded backplane can only be an X-bus rack, plugged with the basic I/O modules, and is not compatible with all the advanced function modules (such as HART or weighing). Please refer to the compatibility table for more information (see page 1/18).

It is also possible to expand a drop's backplane.

Each rack will be assigned a physical address using 4 micro switches located in the bus expansion module:

- The main rack containing the processor will be assigned address 0.
- The other racks will be assigned addresses 1 to 7.

Modicon M580 automation platform

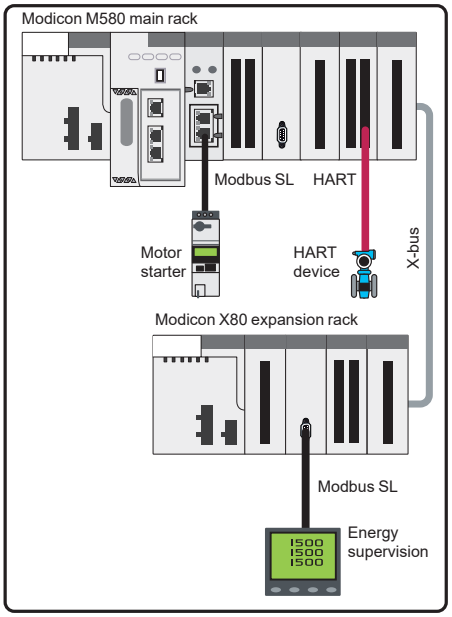
Different architectures

The Modicon M580 ePAC offers different embedded networks to meet various architecture needs:

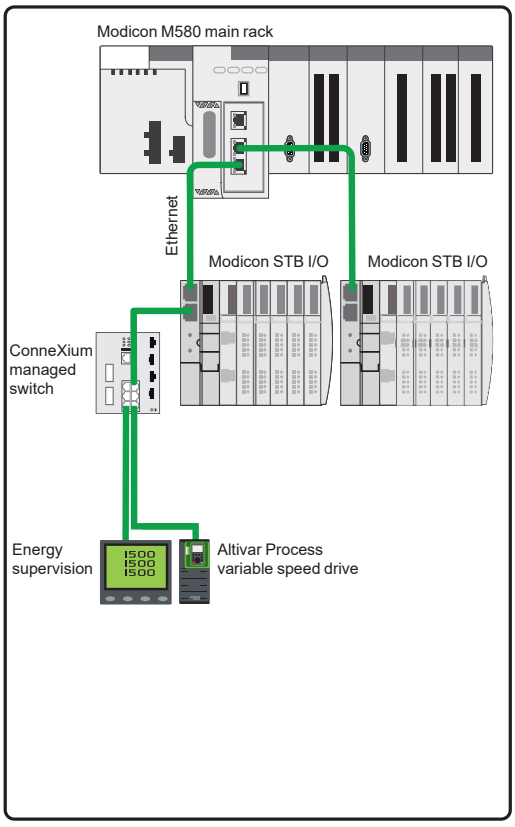
- Standard Ethernet DIO ports on **BMEP58●●20** processors for local I/O architecture, integrated fieldbus architecture, and distributed I/O architecture
- Dual Ethernet RIO ports on **BMEP58●●40** processors for remote I/O architecture

Local I/O architecture: Composed of hard-wired I/O; mainly compact topology

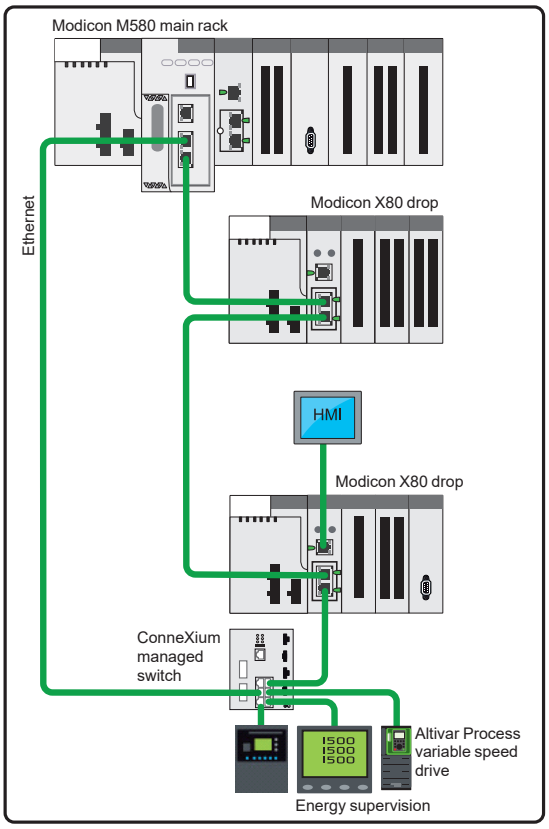
Integrated fieldbus architecture: Composed of devices distributed over fieldbuses; mainly compact topology



Distributed I/O architecture: Composed of devices distributed over Ethernet; ideal for mainly distributed topologies



Remote I/O architecture: Uses Ethernet racks. Composed of remote devices and featuring remote functions, such as fieldbus master

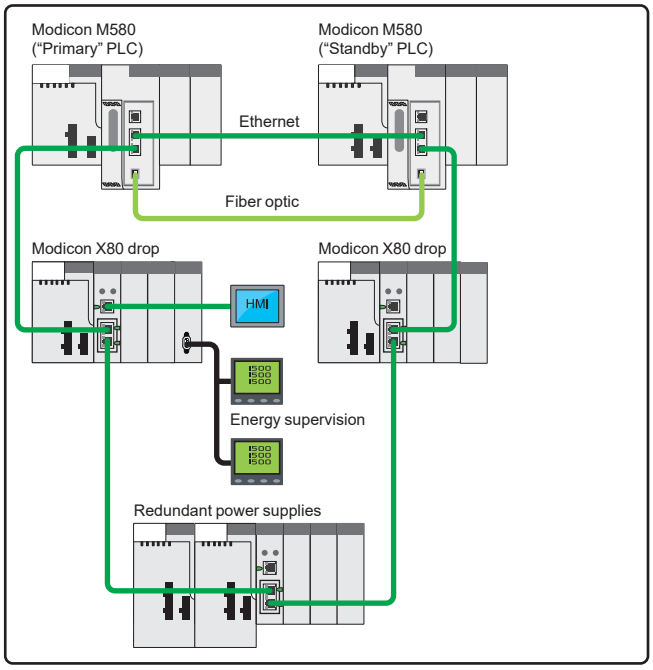


High-availability architectures

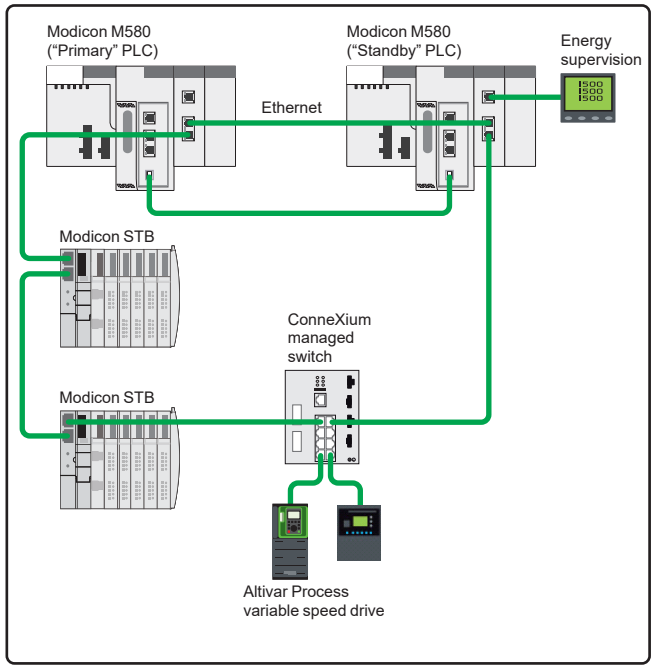
With **BMEH58●●40** processors dedicated to the Hot Standby system, high-availability architectures are used for more demanding applications:

- Remote I/O
- Distributed I/O
- Mixed RIO/DIO

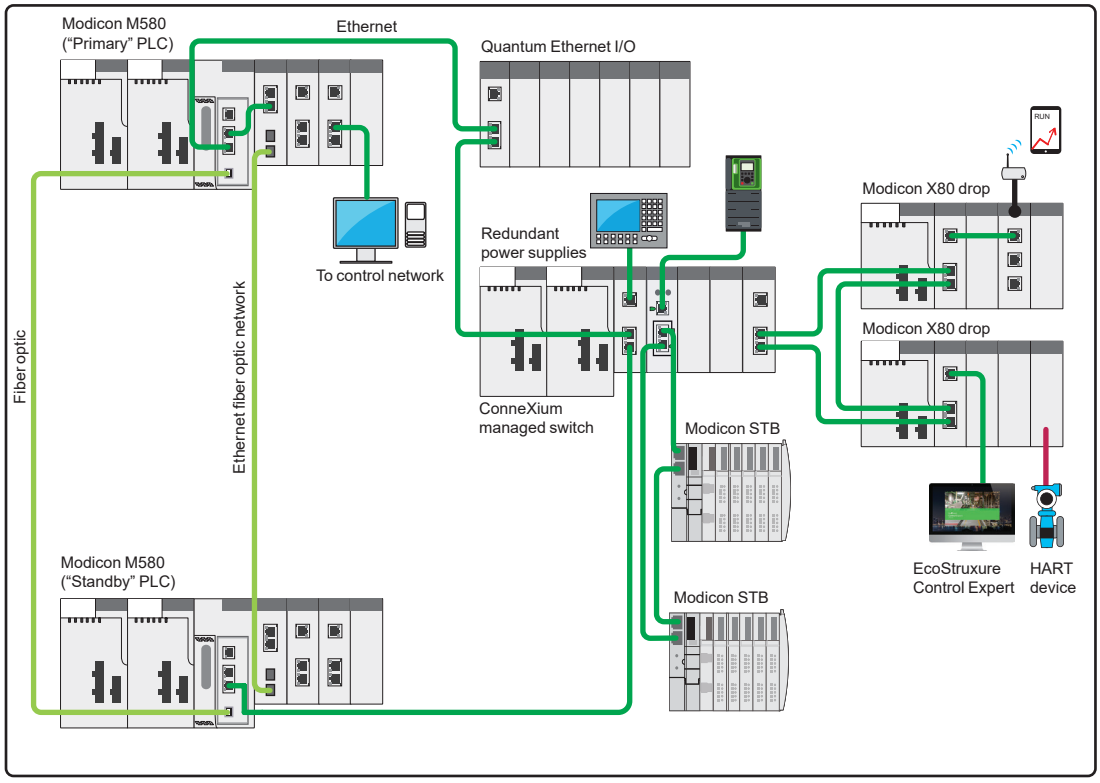
Remote I/O architecture: Composed of remote devices and featuring remote functions



Distributed I/O architecture: Composed of distributed devices under HSBY structure



Mixed RIO/DIO architecture: Composed of a complex architecture with remote I/O and distributed I/O, making it a particularly flexible solution for connection to a wider range of devices

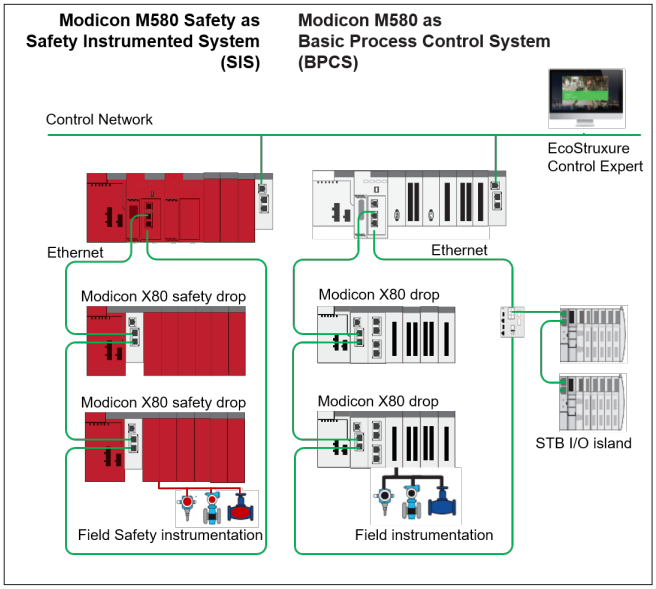


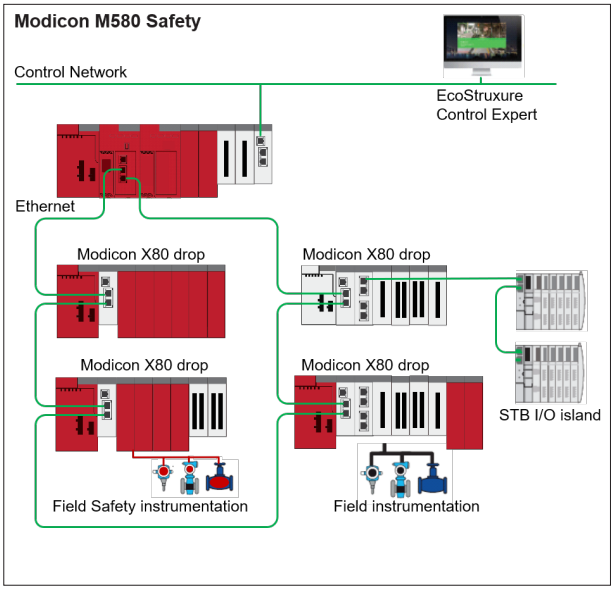
Modicon M580 automation platform

Safety architectures

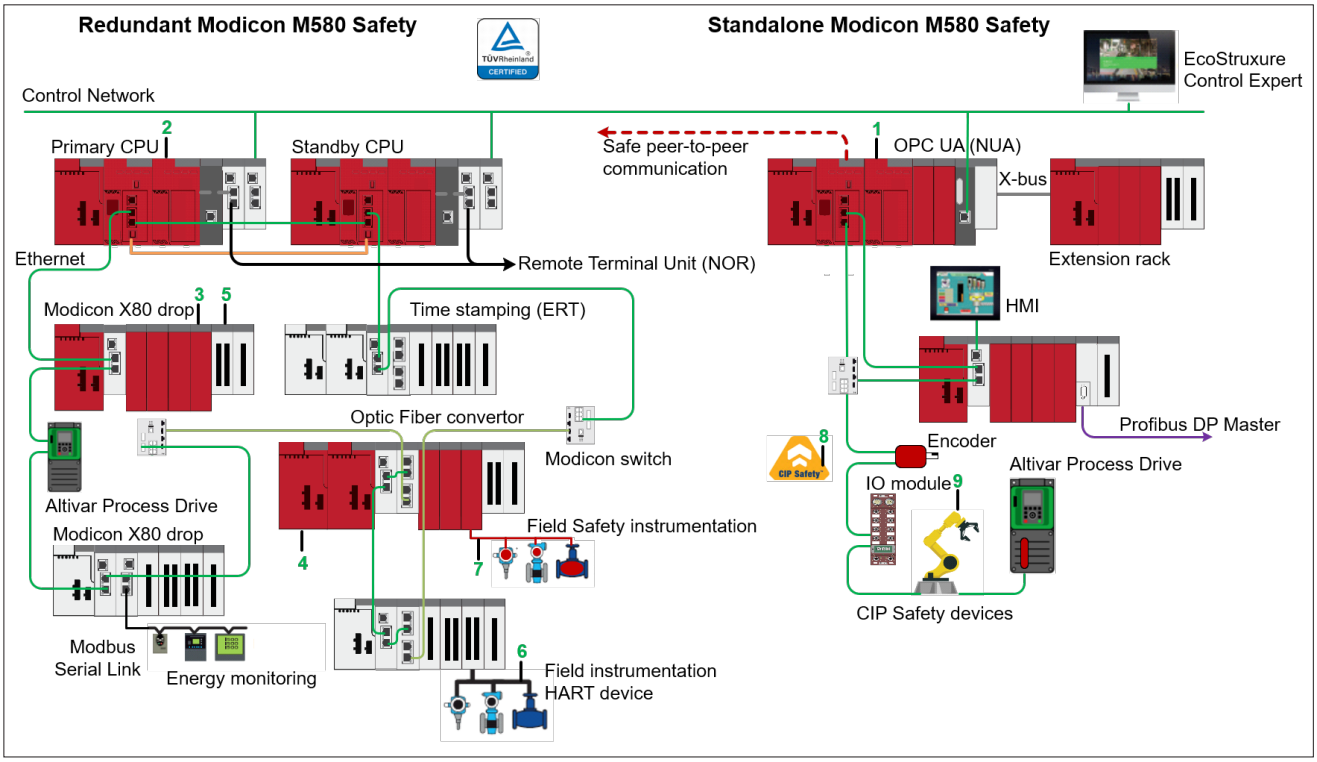
Integrated Safety architecture: based on two separed systems: Modicon M580 Safety as a Safety Instrumented System (SIS) and a Modicon M580 as Basic Process Control System (BPCS), both engineered with EcoStruxure Control Expert

Common Safety architecture: based on a single Modicon M580 Safety PAC acting as a Safety Instrumented system (SIS) with X80 Safety I/O as well as Basic Process Control System (BPCS) with X80 I/O





Complex Safety architecture: mixed standard and high-availability Safety architecture with RIO, DIO and CIP Safety devices



Modicon M580 automation platform

EcoStruxure Control Expert engineering station

MKTED2140504EN

Design and setup of Modicon M580 applications

EcoStruxure Control Expert *(1)* is required to set up an application with all Modicon M580 controllers. The EcoStruxure Control Expert and 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)
- Consumer Packaged Goods (CPG)
- Mining, Minerals, Metals (MMM)
- Oil & Gas (O&G)

To set up Modicon M580 automation platform processors, you need EcoStruxure Control Expert or Unity Pro Large or Extra Large programming software identical to the one used to set up Modicon M340, Modicon Premium, and Modicon Quantum automation platforms.

Depending on requirements, you may also need:

- Unity EFB toolkit software for developing EF and EFB libraries in C language
- Unity SFC View software for viewing and diagnostics of applications written in Sequential Function Chart (SFC) or Grafcet language
- Graphical Unity DIF matching software for comparing two applications configured with EcoStruxure Control Expert or Unity Pro
- Unity Loader software or EcoStruxure Automation Device Maintenance for updating EcoStruxure Control Expert and Unity Pro projects and device firmware

The function block software libraries provide Modicon M580 processors with the processing capability required to meet the needs of specialist applications in the field of process control via programmable control loops (EF and EFB libraries).

This software also offers the following features:

- References
- Implicit type conversion, IEC 61131-3 proposition
- Security Editor on server
- Improved log file
- A trending tool that is synchronized on each PLC scan
- DFB providing information on users logged on to the PLC
- Data file (dtx) backup with application backup (sta/stu or zef)
- Password protection for the application running on the PLC
- Macro function

Note: *For further information, please consult the "EcoStruxure™ Control Expert and OPC software" catalog available on our website www.se.com.*

Treatment for harsh environments

If the Modicon M580 automation platform needs to be used in a harsh environment, the ruggedized offer provides processors, power supply modules, and I/O modules on X-bus and racks with a protective coating applied to their electronic cards (see page 6/2).

This treatment improves the cards' insulation qualities and their resistance to:

- Condensation
- Dusty atmospheres (conducting foreign particles)
- Chemical corrosion, in particular when used in sulfurous atmospheres (oil refinery, purification plant, etc.) or atmospheres containing halogens (chlorine, etc.)

This protection, combined with appropriate installation and maintenance, enables Modicon M580 products to be used in harsh chemical environments such as types 3C2 and 3C3 as described in standard IEC/EN 60721-3-3.

The functional and electrical characteristics of the coated modules are identical to those of the non-coated versions.

With coated modules, the Modicon M580 automation platform may be used in harsh environments or within a range of operating temperatures from -25 °C to +70 °C/ *-13 °F to +158 °F*.

Some Modicon M580 modules are also ATEX-certified.

(1) EcoStruxure Control Expert software continues the range of Unity Pro software and corresponds to versions ⩾ 14 of Unity Pro.

Modicon X80 modules platform
Product compatibility according to network architecture

Product type	Commercial reference	Module type	M340	M580 – Local rack with CPU – Standalone – X-bus rack (1) BMXXBP●●●●	M580 – Local rack with CPU – Standalone – X-bus + Ethernet rack BMEXBP●●●●	M580 – Local rack with CPU – HSBY – X-bus rack (1) BMXXBP●●●●	M580 – Local rack with CPU – HSBY – X-bus + Ethernet rack BMEXBP●●●●	M580 – X80 drops on Ethernet remote I/O – Standalone or HSBY – X-bus rack BMXXBP●●●● – BMXCRA31200	M580 – X80 drops on Ethernet remote I/O – Standalone or HSBY – X-bus rack BMXXBP●●●● – BMXCRA31210	M580 – X80 drops on Ethernet remote I/O – Standalone – X-bus + Ethernet rack BMEXBP●●●● – BMECRA31210	M580 – X80 drops on Ethernet remote I/O – HSBY – X-bus + Ethernet rack BMEXBP●●●● – BMECRA31210	M340 + M580 + Quantum + Premium – X80 drops on distributed I/O – X-bus rack BMXXBP●●●● – BMXPRA0100
Power supplies	BMXCPS2000	X80 Power supply										
	BMXCPS2010	X80 Power supply										
	BMXCPS3020 (H)	X80 Power supply										
	BMXCPS3500 (H)	X80 Power supply										
	BMXCPS3540 (T)	X80 Power supply										
	BMXCPS4002 (H)	X80 Redundant power supply										
	BMXCPS4022 (H)	X80 Redundant power supply										
	BMXCPS3522 (H)	X80 Redundant power supply										
Backplanes	BMXXBP0400 (H)	X80 X-bus backplane										
	BMXXBP0600 (H)	X80 X-bus backplane										
	BMXXBP0800 (H)	X80 X-bus backplane										
	BMXXBP1200 (H)	X80 X-bus backplane										
	BMXXBE1000 (H) *(2)*	X80 X-bus rack expansion module										
	BMXXBE2005 *(3)*	X80 X-bus rack expansion kit										
	BMEXBP0400 (H)	X80 X-bus+Eth backplane										
	BMEXBP0800 (H)	X80 X-bus+Eth backplane										
	BMEXBP1200 (H)	X80 X-bus+Eth backplane										
	BMEXBP0602 (H) *(4)*	X80 X-bus+Eth dual power supplies backplane										
	BMEXBP1002 (H) *(4)*	X80 X-bus+Eth dual power supplies backplane										
	BMXXEM010 *(5)*	Protective cover										
I/O	BMXAMI0410 (H)	X80 Analog I/O										
	BMXAMI0800	X80 Analog I/O										
	BMXAMI0810 (H)	X80 Analog I/O										
	BMXAMM0600 (H)	X80 Analog I/O										
	BMXAMO0210 (H)	X80 Analog I/O										
	BMXAMO0410 (H)	X80 Analog I/O										
	BMXAMO0802 (H)	X80 Analog I/O										
	BMXART0414 (H)	X80 Analog I/O										
	BMXART0814 (H)	X80 Analog I/O										
	BMEAHI0812 (H)	X80 Analog HART I/O										
	BMEAHO0412 (C)	X80 Analog HART I/O										
	BMXDAI0805	X80 Discrete I/O										
	BMXDAI0814	X80 Discrete I/O										
	BMXDAI1602 (H)	X80 Discrete I/O										
	BMXDAI1603 (H)	X80 Discrete I/O										
	BMXDAI1604 (H)	X80 Discrete I/O										
	BMXDAI1614 (H)	X80 Discrete I/O										
	BMXDAI16142	X80 Discrete I/O										
	BMXDAI1615 (H)	X80 Discrete I/O										
	BMXDAO1605 (H)	X80 Discrete I/O										
	BMXDAO1615 (H)	X80 Discrete I/O										
	BMXDDI1602 (H)	X80 Discrete I/O										
	BMXDDI1603 (H)	X80 Discrete I/O										
	BMXDDI1604T	X80 Discrete I/O										
	BMXDDI3202K (H)	X80 Discrete I/O										
	BMXDDI3203 (H)	X80 Discrete I/O										
	BMXDDI3232 (H)	X80 Discrete I/O										
	BMXDDI6402K (H)	X80 Discrete I/O										
	BMXDDM16022 (H)	X80 Discrete I/O										
	BMXDDM16025 (H)	X80 Discrete I/O										
	BMXDDM3202K	X80 Discrete I/O										
	BMXDDO1602 (H)	X80 Discrete I/O										
	BMXDDO1612 (H)	X80 Discrete I/O										
	BMXDDO3202K (C)	X80 Discrete I/O										
	BMXDDO6402K (C)	X80 Discrete I/O										
	BMXDRA0804T	X80 Discrete I/O										
	BMXDRA0805 (H)	X80 Discrete I/O										
	BMXDRA0815 (H)	X80 Discrete I/O										
	BMXDRA1605 (H)	X80 Discrete I/O										
	BMXDRC0805 (H)	X80 Discrete I/O										

(1) **BMXXBP●●●●** *with PV02 or later required*
(2) Extended rack can be any type of rack, but only X-bus modules (BMX) can be used
(3) Extended rack kit
(4) Not compatible with single power supplies
(5) Protective cover for all X-bus or Eth bus connectors

Compatible	Not compatible

Note: *Optional versions are (C) - "Coated ", (H) - "Hardened ", and (T) - "Extended Temperature"*

Modicon X80 modules platform

Product compatibility according to network architecture

Product type	Commercial reference	Module type	M340	M580	
				Local rack with CPU	
				Standalone	
				X-bus rack *(1)* BMXXBP●●●●	X-bus + Ethernet rack BMEXBP●●●●
Expert modules	BMXEAE0300 (H)	X80 SSI encoder interface module	■	■	■
	BMXEHC0200 (H)	X80 Counter module	■	■	■
	BMXEHC0800 (H)	X80 Counter module	■	■	■
	BMXERT1604T/H	X80 Time-stamping module	■	■	■
	BMXMSP0200	X80 Motion control module	■	■	■
	BMXETM0200H	X80 Frequency input module	■	■	■
	PMESWT0100	X80 Weighing module *(2)*			■
Communication modules *(3)*	BMXNOM0200 (H)	X80 Serial link module	■	■	■
	BMXEIA0100	X80 AS-Interface module	■	■	■
	BMECXM0100 (H)	X80 CANopen master module			■
	BMXNRP0200 (C)	X80 Fiber converter module	■	■	■
	BMXNRP0201 (C)	X80 Fiber converter module	■	■	■
	PMEPXM0100 (H)	X80 PROFIBUS DP Master module			■
	BMENOS0300 (C)	X80 Ethernet switch module			■
	BMENOC0301 (C)	M580 Modbus/TCP and EtherNet/IP network module			■
	BMENOC0311 (C)	M580 Ethernet FactoryCast module			■
	BMENOC0321 (C)	M580 Ethernet control router			■
	BMENOP0300	M580 IEC 61850 module			■
	BMXNGD0100	M580 Ethernet Global Data module			■
	BMENUA0100	M580 OPC UA module			■
	BMXNOR0200H	M580/M340 RTU module	■	■	■
	BMENOR2200H	M580 Advanced RTU module			■
	BMXNOC0401	M340 Ethernet module	■		
	BMXNOE0100 (H)	M340 Ethernet module	■		
	BMXNOE0110 (H)	M340 Ethernet module	■		
I/O expansion modules	BMXCRA31200	X80 Remote I/O drop adapter			
	BMXCRA31210 (C)	X80 Remote I/O drop adapter			
	BMECRA31210 (C)	X80 Remote I/O drop adapter			
	BMXPRA0100	X80 Peripheral remote I/O adapter			

M580						M340 + M580 + Quantum + Premium
Local rack with CPU		X80 drops on Ethernet remote I/O				X80 drops on distributed I/O
HSBY		Standalone or HSBY X-bus rack BMXXBP●●●●		Standalone	HSBY	X-bus rack BMXXBP●●●●
				X-bus + Ethernet rack BMEXBP●●●●		
X-bus rack *(1)* BMXXBP●●●●	X-bus + Ethernet rack BMEXBP●●●●	BMXCRA31200	BMXCRA31210	BMECRA31210		BMXPRA0100
		■	■	■	■	
			■	■	■	
			■	■	■	
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(1) ***BMXXBP●●●●*** *with PV02 or later required*
(2) Products by our Technology Partners; see more information on our partner website page
(3) According to the module type, communication modules description is included within X80 catalog, M580 catalog, or M340 catalog.

Note*: Optional versions are (C) - "Coated ", (H) - "Hardened ", and (T) - "Extended Temperature"*

Compatible	Not compatible

Contents

2 - Processors

2

Modicon M580 automation platform

Modicon M580 standalone processors

Modicon M580 automation platform			BMEP5810 model	BMEP5820 models	
					
Racks		Local racks (main + extension)	4	4	4
		Remote I/O drops *(1)*	Not supported	Not supported	8
Local X80 I/O *(2) (3)*		Discrete I/O channels	1024	2048	
		Safe discrete I/O channels	Not supported		
		Analog I/O channels	256	512	
		Safe analog I/O channels	Not supported		
		Application-specific channels *(4)*	36	72	
Combined Local and Remote X80 I/O *(3)*		Discrete I/O channels	1024	2048	10240
		Safe discrete I/O channels	Not supported		
		Analog I/O channels	256	512	2560
		Safe analog I/O channels	Not supported		
		Application-specific channels *(4)*	36	72	360
Distributed equipment (DIO, CSIO)	EtherNet/IP or Modbus TCP devices (scanned by CPU)		61	125	61
	EtherNet/IP or Modbus TCP devices (scanned by CPU and Ethernet modules (BMENOC301/BMENOC311))		317	381	317
	CIP safety devices (scanned by CPU)		Not supported		
Integrated communication ports		Ethernet service port (RJ45)	Engineering and Maintenance console (EcoStruxure Control Expert, Web browser, external tools), HMI, SCADA, Distributed equipment (DIO)		
		Ethernet device network dual ports (RJ45) - RSTP	DIO network (DIO scanner)	DIO network (DIO scanner)	RIO network (RIO/ DIO scanner)
		USB type mini B port	Programming port for Engineering Console (EcoStruxure Control Expert)		
Communication	Ethernet networks	Cumulative max number of Ethernet networks modules (BMENOC/BMENOP/ BMENOR)	2		
	EtherNet/IP and Modbus TCP	EtherNet/IP and Modbus TCP module (BMENOC0301)	2		
	FactoryCast	FactoryCast module (BMENOC0311)	2		
	IP Forwarding	Ethernet control router (BMENOC0321)	2		
	IEC 61850	IEC 61850 module (BMENOP0300)	2		
	OPC UA	OPC UA module (BMENUA0100)	2		
	DNP3 NET / IEC 60870-5-104	Advanced RTU module (BMENOR2200H)	2		
	DNP3 Serial / IEC 60870-5-101	RTU module (BMXNOR0200H) *(5)*	2		
	Global Data	Global Data module (BMXNGD0100)	2		
	AS-Interface	AS-Interface module (BMXEIA0100)	2	4	
	Serial Link (Modbus and Character)	Serial link module (BMXNOM0200)	Each BMXNOM0200 channel counts as an application-specific channel		
	CANopen	CANopen module (BMECXM0100)	Each BMECXM0100 counts as a Distributed equipment (DIO)		
	PROFIBUS DP	PROFIBUS DP module (PMEPXM0100)	2		
Internal memory capacity		Program process (MB)	4	8	
		Data process (KB)	384	768	
		Data storage (GB)	4		
No. of K instructions executed per ms		100% Boolean (Kinstr/ms)	10		
		65% Boolean + 35% fixed arithmetic (Kinstr/ms)	7.5		
Product compatibility with Quantum		Support of Quantum Ethernet I/O (QEIO) and LL984 Editor	No	No	No
References			**BMEP581020**	**BMEP582020**	**BMEP582040**
Pages			2/7		

(1) A Remote I/O drop can be either a X80 RIO Drop (RIO) or Quantum Ethernet I/O drop (QEIO). One X80 RIO Drop can support up to 2 racks (via X-bus extension).
(2) Local X80 I/O are localized in local racks (main or extension). Redundant controllers do not not support Local X80 IO.
(3) Maximum number of I/O channels (Discrete, Safe Discrete, Analog and Safe Analog) as well as application-specific channels is not cumulative.
(4) Application-specific channels include counters, time-stamping, SSI encoder, Motion control, Serial and Frequency input modules.
(5) Maximum number of BMXNOR modules is not cumulative with other Ethernet network modules.

BMEP5830 models		BMEP5840 models		BMEP5850 model	BMEP5860 model
					
8	8	8	8	8	8
Not supported	16	Not supported	16	31	31
3072		4096		5120	6144
Not supported					
768	768	1024	1024	1280	1536
Not supported					
108	108	144	144	180	216
3072	19456	4096	20480	36864	37888
Not supported					
768	4864	1024	5120	9216	9472
Not supported					
108	684	144	720	1296	1332
125	61	125	61	61	61
509	445	637	573	573	573
Not supported					
Engineering and Maintenance console (EcoStruxure Control Expert, Web browser, external tools), HMI, SCADA, Distributed equipment (DIO)					
DIO network (DIO scanner)	RIO network (RIO/DIO scanner)	DIO network (DIO scanner)	RIO network (RIO/DIO scanner)		
Programming port for Engineering Console (EcoStruxure Control Expert)					
3		4			
3		4			
3		4			
2					
3		4			
2					
3		4			
3		4		8	
3		4			
6		8			
Each BMXNOM0200 channel counts as an application-specific channel					
Each BMECXM0100 counts as a Distributed equipment (DIO)					
4		6			10
12		16		24	64
1024		2048		4096	Up to 64MB
4					
20		40		50	
15		30		40	
No	No	No	Yes	Yes	Yes
BMEP583020	**BMEP583040**	**BMEP584020**	**BMEP584040**	**BMEP585040**	**BMEP586040**
2/7					

Modicon M580 automation platform

Modicon M580 redundant processors

Modicon M580 automation platform			BMEH5820 model	BMEH5840 model	BMEH5860 model
					
Racks		Local racks (main + extension)	1	1	1
		Remote I/O drops *(1)*	8	16	31
Local X80 I/O *(2) (3)*		Discrete I/O channels	Not supported	Not supported	
		Safe discrete I/O channels			
		Analog I/O channels			
		Safe analog I/O channels			
		Application-specific channels *(4)*			
Combined Local and Remote X80 I/O *(3)*		Discrete I/O channels	8192	16384	31744
		Safe discrete I/O channels	Not supported	Not supported	
		Analog I/O channels	2048	4096	7936
		Safe analog I/O channels	Not supported	Not supported	
		Application-specific channels *(4)*	288	576	1116
Distributed equipment (DIO, CSIO)	EtherNet/IP or Modbus TCP devices (scanned by CPU)		61	61	61
	EtherNet/IP or Modbus TCP devices (scanned by CPU and Ethernet modules (BMENOC301/BMENOC311))		317	573	573
	CIP safety devices (scanned by CPU)		Not supported	Not supported	
Integrated communication ports		Ethernet service port (RJ45)	Engineering and Maintenance console (EcoStruxure Control Expert, Web browser, external tools), HMI, SCADA, Distributed equipment (DIO)	Engineering and Maintenance console (EcoStruxure Control Expert, Web browser, external tools), HMI, SCADA, Distributed equipment (DIO)	
		Ethernet device network dual ports (RJ45) - RSTP	RIO network (RIO/DIO scanner)	RIO network (RIO/DIO scanner)	
		USB type mini B port	Programming port for Engineering Console (EcoStruxure Control Expert)	Programming port for Engineering Console (EcoStruxure Control Expert)	
Communication	Ethernet networks	Cumulative max number of Ethernet networks modules (BMENOC/BMENOP/BMENOR)	2	4	4
	EtherNet/IP and Modbus TCP	EtherNet/IP and Modbus TCP module (BMENOC0301)	2	4	4
	FactoryCast	FactoryCast module (BMENOC0311)	2	4	4
	IP Forwarding	Ethernet control router (BMENOC0321)	2	2	2
	IEC 61850	IEC 61850 module (BMENOP0300)	2	4	4
	OPC UA	OPC UA module (BMENUA0100)	2	2	2
	DNP3 NET / IEC 60870-5-104	Advanced RTU module (BMENOR2200H)	2	4	4
	DNP3 Serial / IEC 60870-5-101	RTU module (BMXNOR0200H) *(5)*	– *(6)*	– *(6)*	
	Global Data	Global Data module (BMXNGD0100)	– *(6)*	– *(6)*	
	AS-Interface	AS-Interface module (BMXEIA0100)	*(7)*	*(7)*	
	Serial Link (Modbus and Character)	Serial link module (BMXNOM0200)	*(7)*	*(7)*	
	CANopen	CANopen module (BMECXM0100)	– *(6)*	– *(6)*	
	PROFIBUS DP	PROFIBUS DP module (PMEPXM0100)	2	6	10
Internal memory capacity		Program process (MB)	8	16	64
		Data process (KB)	768	2048	Up to 64MB
		Data storage (GB)	4	4	4
No. of K instructions executed per ms		100% Boolean (Kinstr/ms)	10	40	50
		65% Boolean + 35% fixed arithmetic (Kinstr/ms)	7.5	30	40
Product compatibility with Quantum		Support of Quantum Ethernet I/O and LL984 Editor	No	Yes	Yes
References			BMEH582040	BMEH584040	BMEH586040
Pages			2/8	2/8	

(1) A Remote I/O drop can be either a X80 RIO Drop (RIO) or Quantum Ethernet I/O drop (QEIO). One X80 RIO Drop can support up to 2 racks (via X-bus extension).
(2) Local X80 I/O are localized in local racks (main or extension). Redundant controllers do not not support Local X80 I/O.
(3) Maximum number of I/O channels (Discrete, Safe Discrete, Analog and Safe Analog) as well as application-specific channels is not cumulative.
(4) Application-specific channels include counters, time-stamping, SSI encoder, Motion control, Serial and Frequency input modules.
(5) Maximum number of BMXNOR modules is not cumulative with other Ethernet network modules.
(6) Not supported with redundant controllers.
(7) Only supported in Remote I/O drops.

Modicon M580 automation platform
M580 processors

Modicon M580 configuration

Presentation

Modicon M580 **BMEP58** modular processors form the core of a complete control solution based on Modicon M580 specific and compatible modules and racks. These standalone processors physically occupy 2 module slots (0 and 1) on a backplane.

Modicon M580 **BMEH58** redundant modular processors form the core of High-availability architectures (Hot Standby system) for more demanding applications, to provide overall higher availability *(1)*.

The processors can manage the Modicon X80 I/O platform in a single-rack or multi-rack Ethernet PAC station. Their slots can be equipped with:
- Discrete I/O modules
- Analog I/O modules
- Counter modules
- Communication modules: Ethernet Modbus/TCP network, EtherNet/IP network, Modbus serial link, AS-Interface actuator/sensor buses, and RTU (temote terminal unit) serial link
- Expert modules

The M580 processor range offers the choice of 6 memory levels:
- 4 MB for **BMEP581020** processor
- 8 MB for **BMEP5820●●** and **BMEH582040** processors
- 12 MB for **BMEP5830●●** processors
- 16 MB for **BMEP5840●●** and **BMEH584040** processors
- 24 MB for **BMEP585040** processor
- 64 MB for **BMEP586040** and **BMEH586040** processors

An optional 4 GB SD memory card **BMXRMS004GPF** is used with M580 processors for application and data storage. Each processor has a USB terminal port for connecting to a programming terminal. A temporary connection to an HMI is possible via the USB port *(2)*.

In addition, depending on the model, these processors offer the following (non-cumulative) maximums on their local racks:
- Up to 6,144 discrete I/O
- Up to 1,536 analog I/O
- Up to 216 application-specific channels *(3)* (process counter, motion control, and serial link or RTU)
- 1 Ethernet service port
- 2 Ethernet device network ports
- ◻ DIO ports (distributed equipment) for all processors
- ◻ RIO ports (remote equipment) for **BMEP58●●40/BMEH58●●40** processors
- 4 extended master AS-Interface V3 actuator/sensor buses, profile M4.0

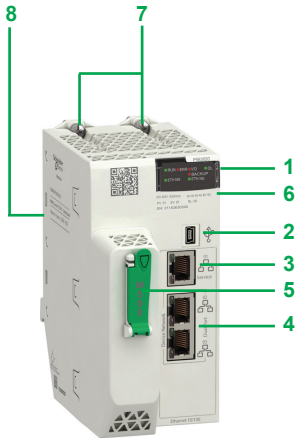
Applications can be downloaded to the M580 processor when EcoStruxure Control Expert *(4)* is connected either via a local communication module, or directly to the processor through USB or Ethernet, or to the Ethernet ports of **BMECRA31210** Ethernet drop adapters and ConneXium DRS (dual ring switch) switches.

(1) The application in a standalone processor can be migrated into a redundant processor as easy as one click in EcoStruxure Control Expert.
(2) Please refer to the HMI catalogs on www.se.com.
(3) By using remote drops, these limits can be extended to the maximum configuration managed by one M580 station.
(4) Unity Pro software in earlier versions.

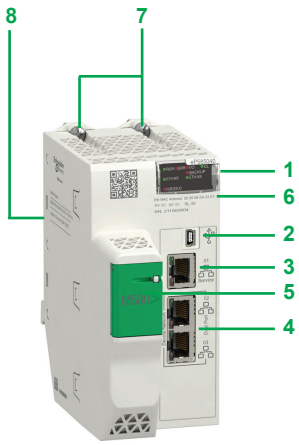
Modicon M580 automation platform

M580 processors

Standalone processors



BMEP5810●●/20●●/30●●/40●●



BMEP585040/6040

Description of BMEP58●●●● processors

BMEP58●●●● processors include:

1 Display block comprising 8 LEDs with various combinations to provide quick diagnostics of the processor status:
- RUN LED (green): processor in operation (program execution)
- ERR LED (red): processor or system detected error
- I/O LED (red): detected I/O module error
- DL LED (green): firmware download in progress
- BACKUP LED (red): backup memory (internal or card)
- ETH MS LED (bi-color green/red): indicates the Ethernet port configuration status
- ETH NS LED (bi-color green/red): indicates the Ethernet connection status
- FORCED I/O (bi-color green/red): I/O status forced by the processor

2 Mini-B USB port for connecting to a programming terminal

3 RJ45 Ethernet port that allows diagnosis of Ethernet ports and provides access to external tools, devices, and distributed I/O devices

5 Slot equipped with an optional SD memory card for application and data storage (an LED, located behind the door, indicates access to the memory card) *(1)*

6 Printed serial number, product version, and MAC address on the front panel of the processor

7 2 hooks and 2 screws for mechanical attachment and grounding connection to backplane

8 2 connectors for electrical connection to an M580 backplane (X-bus only or Ethernet backplane)

BMEP58●●20 processors

4 **BMEP58●●20** processors have dual RJ45 Ethernet ports for connection to the distributed equipment (DIO).

BMEP58●●40 processors

4 **BMEP58●●40** processors have dual RJ45 Ethernet ports for connection to the remote I/O drops (EIO) and distributed equipment (through DRS) *(2)*.

USB terminal port

The USB port **2**, offering a useful data rate of 480 Mbps, is compatible with EcoStruxure Control Expert *(4)* programming software, OPC Factory Server (OFS), and Harmony HMI terminals *(3)*.

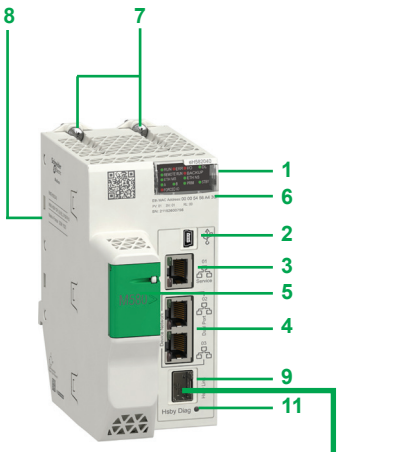
BMEP58 processors can be connected to a USB bus comprising several peripheral devices. However:
- Only one processor can be connected to the USB bus.
- No device on the USB bus can be controlled by the PLC (modem, printer).

Ethernet backplanes

The new range of Ethernet backplanes feature embedded Ethernet and X-bus connectivity. With 4, 8, and 12 slots for standard power supply or 6 and 10 slots for redundant power supply, these two connectors allow the existing M580/X80 modules to be incorporated into an M580 architecture (see page 4/4).

*(1) The **BMEP**585040/**BMEP586040** models have a different door, which can be locked to prevent removal of the SD card.*
*(2) DRS: Dual ring switches. Supported ConneXium switches: **TCSESM083F23F1/063F2CU1/063F2CS1**.*
(3) Please refer to the HMI catalogs on www.se.com.
(4) Unity Pro software in earlier versions.

Modicon M580 automation platform
M580 processors
Redundant processors



BMEH58●●40

BMEH58●●40

490NAC0100

490NAC0201

Description of BMEH58●●●● processors

BMEH58●●●● processors include:

1 Display block comprising 13 LEDs with various combinations to provide quick diagnostics of the processor status:
- RUN LED (green): processor in operation (program execution)
- ERR LED (red): processor or system detected error
- I/O LED (red): detected I/O module malfunction
- DL LED (green): firmware download in progress
- REMOTE RUN (green): indicates the RUN status of the remote processor
- BACKUP LED (red): backup memory (internal or card)
- ETH MS LED (bi-color green/red): indicates the Ethernet port configuration status
- ETH NS LED (bi-color green/red): indicates the Ethernet connection status
- A (green): indicates the local CPU A/B/Clear rotary switch is set to “A”
- B (green): indicates the local CPU A/B/Clear rotary switch is set to “B”
- PRIM (green): indicates the primary status of the processor
- STBY (green): indicates the standby status of the processor
- FORCED I/O (red): I/O status forced by the processor

2 Mini-B USB port for connecting to a programming terminal

3 RJ45 Ethernet port that allows diagnosis of Ethernet ports and provides access to external tools, devices, and distributed I/O devices

5 Slot equipped with an optional SD memory card for application and data storage (an LED, located behind the door, indicates access to the memory card; the door can be locked to prevent removal of the SD card)

6 Printed serial number, product version, and MAC address on the front panel of the processor

7 2 hooks and 2 screws for mechanical attachment and grounding connection to backplane

8 2 connectors for electrical connection to an M580 backplane (X-bus only or Ethernet backplane)

9 Slot for SFP socket supporting copper or fiber-optic Hot Standby link connection

10 Hot Standby communication link cable (copper or fiber optic depending on SFP socket type)

11 LED indicating the Hot Standby link status

BMEH58●●40 processors

4 **BMEH58●●40** processors have dual RJ45 Ethernet ports for connection to the remote I/O drops (EIO) and distributed equipment.

USB terminal port

The USB port **2**, offering a useful data rate of 480 Mbps, is compatible with EcoStruxure Control Expert *(2)* programming software, OPC Factory Server (OFS), and Harmony HMI terminals *(1)*.

BMEH58 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).

SFP sockets

SFP sockets are used to choose the medium of the Hot Standby link. The two types each have a unique reference. Transmission between the primary CPU and the redundant CPU can be either:
- Copper if the **490NAC0100** SFP socket is used
- Fiber optic if the **490NAC0201** SFP socket is used

Ethernet backplanes

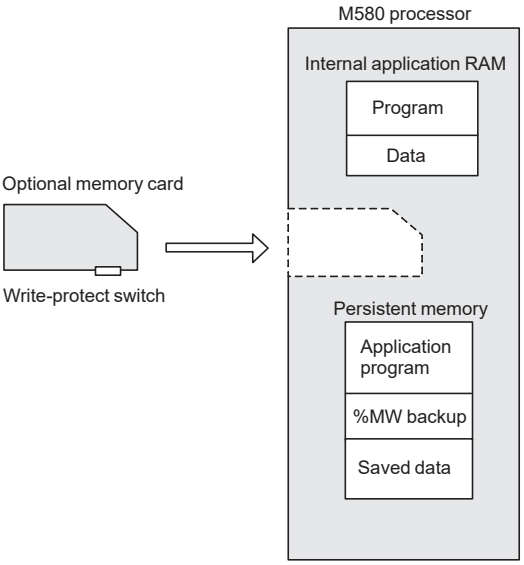
The new range of Ethernet backplanes feature embedded Ethernet and X-bus connectivity. With 4, 8, and 12 slots for standard power supply or 6 and 10 slots for redundant power supply, these two connectors allow the existing M580/X80 modules to be incorporated into an M580 architecture (see page 4/4).

(1) Please refer to the HMI catalogs on www.se.com.
(2) Unity Pro software in earlier versions.

Modicon M580 automation platform

M580 processors

Memory structure



Modicon M580 application storage

Memory structure

Internal memory capacity

The internal application RAM of Modicon M580 processors stores and executes the application program. This RAM has no battery backup, which means data could be lost in the event of a power outage. To avoid data loss, the application can be backed up in the persistent memory. The internal memory provides a maximum capacity of 64 MB for program and data, and 4 GB for data storage.

The internal persistent memory is used by the firmware to register:

- the value of application variables
- the system state
- application backup
- a copy of %MW values

An optional memory card, **BMXRMS004GPF**, is used for application backup and data storage. It is formatted by Schneider Electric.

BMXRMS004GPF SD memory card

Modicon M580 processors support an optional 4 GB memory card **BMXRMS004GPF**. The SD memory card is of "industrial grade" and formatted for use with Modicon M580 only. The Modicon M580 does not support memory cards from Modicon M340. This card withstands operating temperatures of -40 to +85 ºC/ *-40 to +185 °F* and has 10 years of file retention capacity.
EcoStruxure Control Expert *(1)* programming software helps the application designer manage the structure and memory space of the Modicon M580 automation platform.

Protecting the application

If necessary, it is possible to limit 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 help prevent any program modification (via the programming terminal or downloading).
The user has function blocks for protecting know-how by means of a signature that can be loaded and stored in the M580 processor module's Flash memory card (code not executed if the signature is not present).

Modifying the program in online mode

As with the Modicon Premium and Quantum platforms (with EcoStruxure Control Expert *(1)* software), the online program modification function is available on the Modicon M580 automation platform. It has the option of adding or modifying the program code and data in different places in the application in a single modification session (thus helping to ensure that 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.

The CCOTF (Change Configuration On The Fly) function is used to add or remove discrete or analog I/O modules to/from a Modicon M580 CPU in a local or remote I/O drop in RUN mode. It enables Ethernet RIO drops to be added in RUN mode. The addition of a complete M580 Ethernet RIO drop in RUN mode requires EcoStruxure Control Expert or Unity Pro V8.0 or higher on standalone processors and EcoStruxure Control Expert or Unity Pro V11.0 or higher on redundant processors.

The CCOTF function avoids interrupting processes and helps to reduce production costs. It also enables the configuration parameters of pre-existing and new Modicon M580 analog and discrete I/O modules to be modified online in both a local or remote I/O drop.

(1) Unity Pro software in earlier versions.

Modicon M580 automation platform

M580 processors

Standalone processors

PF122512

BMEP58●●●●

References

Modicon M580 standalone processors

Local I/O capacity	Maximum number of Ethernet modules	Device ports	Service port	Reference	Weight kg/*lb*
1,024 discrete I/O **256 analog I/O** **24 application-specific channels** 4 MB integrated (memory program)	2 Ethernet networks	2 DIO	1	BMEP581020	0.849/*1.872*
2,048 discrete I/O **512 analog I/O** **32 application-specific channels** 8 MB integrated (memory program)	2 Ethernet networks	2 DIO	1	BMEP582020	0.849/*1.872*
		2 RIO	1	BMEP582040	0.849/*1.872*
3,072 discrete I/O **768 analog I/O** **64 application-specific channels** 12 MB integrated (memory program)	3 Ethernet networks	2 DIO	1	BMEP583020	0.849/*1.872*
		2 RIO	1	BMEP583040	0.849/*1.872*
4,096 discrete I/O **1,024 analog I/O** **64 application-specific channels** 16 MB integrated (memory program)	4 Ethernet networks	2 DIO	1	BMEP584020	0.849/*1.872*
		2 RIO	1	BMEP584040	0.849/*1.872*
5,120 discrete I/O **1,280 analog I/O** **180 application-specific channels** 24 MB integrated (memory program)	4 Ethernet networks	2 DIO	1	BMEP585040	0.849/*1.872*
6,144 discrete I/O **1,536 analog I/O** **216 application-specific channels** 64 MB integrated (memory program)	4 Ethernet networks	2 RIO	1	BMEP586040	0.849/*1.872*

PF106120

BMXRMS004GPF

SD memory card

Description	Processor compatibility	Capacity	Reference	Weight kg/*lb*
SD memory card (optional) *(1)*	All processors	4 GB (for application backup and data storage)	BMXRMS004GPF	0.002/*0.004*

PF106185

BMXXCAUSBH0●●

Separate parts

Description	Use		Length m/*ft.*	Reference	Weight kg/*lb*
	From	To			
Terminal port/ USB cordsets	Mini-B USB port on Modicon M580 processor	Type A USB port on: - PC terminal - Harmony HMI graphic terminal	1.8/*5.905*	BMXXCAUSBH018	0.065/*0.143*
			4.5/*14.764*	BMXXCAUSBH045	0.110/*0.243*

(1) Memory card, used for:
- *Backing up the program, constants, symbols, and data*
- *File storage*

Modicon M580 automation platform

M580 processors

Redundant processors

PF151916A

BMEH58●●●●

BMEH58●040K Hot Standby kits

References (continued) *(1)*

Modicon M580 redundant processors

Memory capacity	Maximum number of Ethernet modules	Device ports	Service port	Reference	Weight kg/*lb*
8 MB integrated (memory program)	2 Ethernet networks	2 RIO	1	BMEH582040	0.849/ *1.872*
16 MB integrated (memory program)	4 Ethernet networks	2 RIO	1	BMEH584040	0.849/ *1.872*
64 MB integrated (memory program)	4 Ethernet networks	2 RIO	1	BMEH586040	0.849/ *1.872*

Accessories

Description	Use	Cable medium	Reference	Weight kg/*lb*
HSBY link SFP socket (one reference for one socket)	To be inserted in pair in 2 **BMEH58●●40** redundant processors	RJ45 copper	490NAC0100	–
	To be inserted in pair in 2 **BMEH58●●40** redundant processors	Single-mode fiber	490NAC0201	–

Hot Standby kits

Description	Composition	Reference	Weight kg/*lb*
Hot Standby kits with 2 HSBY processors and 2 SFP sockets	- 2 **BMEH582040** redundant M580 processors - 2 **490NAC0100** RJ45 SFP sockets	BMEH582040K	–
	- 2 **BMEH584040** redundant M580 processors - 2 **490NAC0100** RJ45 SFP sockets	BMEH584040K	–

(1) For additional characteristics, see our website www.se.com.

Contents

3 - Safety

3

Modicon M580 automation platform

Modicon M580 Safety standalone processors

Modicon M580 automation platform			BMEP582040S +BMEP58CPROS3 mandatory coprocessor	BMEP584040S + BMEP58CPROS3 mandatory coprocessor
				
Racks		Local racks (main + extension)	4	8
		Remote I/O drops *(1)*	8	16
Local X80 I/O *(2) (3)*		Discrete I/O channels	2048	4096
		Safe discrete I/O channels	668	1456
		Analog I/O channels	512	1024
		Safe analog I/O channels	128	272
		Application-specific channels *(4)*	72	144
Combined Local and Remote X80 I/O *(3)*		Discrete I/O channels	10240	20480
		Safe discrete I/O channels	3632	7344
		Analog I/O channels	2560	5120
		Safe analog I/O channels	672	1360
		Application-specific channels *(4)*	360	720
Distributed equipment (DIO, CSIO)	EtherNet/IP or Modbus TCP devices (scanned by CPU)		61	61
	EtherNet/IP or Modbus TCP devices (scanned by CPU and Ethernet modules (BMENOC301/BMENOC311))		317	445
	CIP safety devices (scanned by CPU)		16	64
Integrated communication ports		Ethernet service port (RJ45)	Engineering and Maintenance console (EcoStruxure Control Expert, Web browser, external tools), HMI, SCADA, Distributed equipment (DIO, CSIO)	Engineering and Maintenance console (EcoStruxure Control Expert, Web browser, external tools), HMI, SCADA, Distributed equipment (DIO, CSIO)
		Ethernet device network dual ports (RJ45) - RSTP	RIO network (RIO/DIO/CSIO scanner)	RIO network (RIO/DIO/CSIO scanner)
		USB type mini B port	Programming port for Engineering Console (EcoStruxure Control Expert)	Programming port for Engineering Console (EcoStruxure Control Expert)
Communication	Ethernet networks	Cumulative max number of Ethernet networks modules (BMENOC/ BMENOP/BMENOR)	2	4
	EtherNet/IP and Modbus TCP	EtherNet/IP and Modbus TCP module (BMENOC0301)	2	3
	FactoryCast	FactoryCast module (BMENOC0311)	2	3
	IP Forwarding	Ethernet control router (BMENOC0321)	2	2
	IEC 61850	IEC 61850 module (BMENOP0300)	2	3
	OPC UA	OPC UA module (BMENUA0100)	2	2
	DNP3 NET / IEC 60870-5-104	Advanced RTU module (BMENOR2200H)	2	4
	DNP3 Serial / IEC 60870-5-101	RTU module (BMXNOR0200H) *(5)*	– *(6)*	– *(6)*
	Global Data	Global Data module (BMXNGD0100)	2	4
	AS-Interface	AS-Interface module (BMXEIA0100)	4	8
	Serial Link (Modbus and Character)	Serial link module (BMXNOM0200)	Each BMXNOM0200 channel counts as an application-specific channel (7)	Each BMXNOM0200 channel counts as an application-specific channel (7)
	CANopen	CANopen module (BMECXM0100)	Each BMECXM0100 counts as a Distributed equipment (DIO)	Each BMECXM0100 counts as a Distributed equipment (DIO)
	PROFIBUS DP	PROFIBUS DP module (PMEPXM0100)	2	6
Internal memory capacity		Program process (MB)	8	16
		Program safe (MB)	2	4
		Data process (KB)	768	2048
		Data safe (KB)	512	1024
		Data storage (GB)	4	4
No. of K instructions executed per ms		100% Boolean (Kinstr/ms)	10	40
		65% Boolean + 35% fixed arithmetic (Kinstr/ms)	7.5	30
Product compatibility with Quantum		Support of Quantum Ethernet I/O (QEIO) and LL984 Editor	No	Yes
References			**BMEP582040S**	**BMEP584040S**
Pages			3/9	3/9

(1) A Remote I/O drop can be either a X80 RIO Drop (RIO) or Quantum Ethernet I/O drop (QEIO). One X80 RIO Drop can support up to 2 racks (via X-bus extension).
(2) Local X80 I/O are localized in local racks (main or extension). Redundant controllers do not not support Local X80 I/O.
(3) Maximum number of I/O channels (Discrete, Safe Discrete, Analog and Safe Analog) as well as application-specific channels is not cumulative.
(4) Application-specific channels include counters, time-stamping, SSI encoder, Motion control, Serial and Frequency input modules.
(5) Maximum number of BMXNOR modules is not cumulative with other Ethernet network modules.
(6) Not supported with safety controllers.
(7) Only supported in Remote I/O drops.

Modicon M580 automation platform

Modicon M580 Safety redundant processors

Modicon M580 automation platform			BMEH582040S + BMEP58CPROS3 mandatory coprocessor	BMEH584040S + BMEP58CPROS3 mandatory coprocessor	BMEH586040S + BMEP58CPROS3 mandatory coprocessor
					
Racks		Local racks (main + extension)	1	1	1
		Remote I/O drops *(1)*	8	16	31
Local X80 I/O *(2) (3)*		Discrete I/O channels	Not supported	Not supported	Not supported
		Safe discrete I/O channels			
		Analog I/O channels			
		Safe analog I/O channels			
		Application-specific channels *(4)*			
Combined Local and Remote X80 I/O *(3)*		Discrete I/O channels	8192	16384	31744
		Safe discrete I/O channels	2944	5888	11408
		Analog I/O channels	2048	4096	7936
		Safe analog I/O channels	544	1088	2108
		Application-specific channels *(4)*	288	576	1116
Distributed equipment (DIO, CSIO)	EtherNet/IP or Modbus TCP devices (scanned by CPU)		61	61	61
	EtherNet/IP or Modbus TCP devices (scanned by CPU and Ethernet modules (BMENOC301/BMENOC311))		317	436	436
	CIP safety devices (scanned by CPU)		–	–	–
Integrated communication ports		Ethernet service port (RJ45)	Engineering and Maintenance console (EcoStruxure Control Expert, Web browser, external tools), HMI, SCADA, Distributed equipment (DIO)		
		Ethernet device network dual ports (RJ45) - RSTP	RIO network (RIO/DIO scanner)		
		USB type mini B port	Programming port for Engineering Console (EcoStruxure Control Expert)		
Communication	Ethernet networks	Cumulative max number of Ethernet networks modules (BMENOC/ BMENOP/BMENOR)	2	4	4
	EtherNet/IP and Modbus TCP	EtherNet/IP and Modbus TCP module (BMENOC0301)	2	3	3
	FactoryCast	FactoryCast module (BMENOC0311)	2	3	3
	IP Forwarding	Ethernet control router (BMENOC0321)	2	2	2
	IEC 61850	IEC 61850 module (BMENOP0300)	2	3	3
	OPC UA	OPC UA module (BMENUA0100)	2	2	2
	DNP3 NET / IEC 60870-5-104	Advanced RTU module (BMENOR2200H)	2	4	4
	DNP3 Serial / IEC 60870-5-101	RTU module (BMXNOR0200H) *(5)*	– *(6)*	– *(6)*	
	Global Data	Global Data module (BMXNGD0100)	– *(8)*	– *(8)*	
	AS-Interface	AS-Interface module (BMXEIA0100)	*(7)*	*(7)*	
	Serial Link (Modbus and Character)	Serial link module (BMXNOM0200)	Each BMXNOM0200 channel counts as an application-specific channel *(7)*	Each BMXNOM0200 channel counts as an application-specific channel *(7)*	
	CANopen	CANopen module (BMECXM0100)	– *(8)*	– *(8)*	
	PROFIBUS DP	PROFIBUS DP module (PMEPXM0100)	2	6	10
Internal memory capacity		Program process (MB)	8	16	64
		Program safe (MB)	2	4	16
		Data process (KB)	768	2048	Up to 64MB
		Data safe (KB)	512	1024	1024
		Data storage (GB)	4	4	4
No. of K instructions executed per ms		100% Boolean (Kinstr/ms)	10	40	50
		65% Boolean + 35% fixed arithmetic (Kinstr/ms)	7.5	30	40
Product compatibility with Quantum		Support of Quantum Ethernet I/O (QEIO) and LL984 Editor	No	Yes	Yes
References			**BMEH582040S**	**BMEH584040S**	**BMEH586040S**
Pages			3/11	3/11	

(1)A Remote I/O drop can be either a X80 RIO Drop (RIO) or Quantum Ethernet I/O drop (QEIO). One X80 RIO Drop can support up to 2 racks (via X-bus extension).
(2) Local X80 I/O are localized in local racks (main or extension). Redundant controllers do not not support Local X80 IO.
(3) Maximum number of I/O channels (Discrete, Safe Discrete, Analog and Safe Analog) as well as application-specific channels is not cumulative.
(4) Application-specific channels include counters, time-stamping, SSI encoder, Motion control, Serial and Frequency input modules.
(5) Maximum number of BMXNOR modules is not cumulative with other Ethernet network modules.
(6) Not supported with safety controllers.
(7) Only supported in Remote I/O drops.
(8) Not supported with safety redundant controllers.

Modicon M580 automation platform

Safety

M580 Safety product compatibility

Table of compatibility for Safety X80 Modicon PAC module

Product type	X80 module reference *(1)*	Short description of X80 module	M580 Safety				
			Local rack with Safety CPU and coprocessor (X-bus + Ethernet rack BMEXBP are mandatory for Safety CPU and coprocessor)		X80 drops on Ethernet Remote I/O		
			Standalone	Redundant (HSBY)	Standalone or redundant (HSBY)		
			X-bus + Ethernet rack BMEXBP●●●●		X-bus rack BMXXBP●●●●		X-bus + Ethernet rack
					BMXCRA31200	BMXCRA31210	BMECRA31210
Safety power supplies	BMXCPS4002S	Redundant safety power supply	■	■		■	■
	BMXCPS4022S	Redundant safety power supply	■	■		■	■
	BMXCPS3522S	Redundant safety power supply	■	■		■	■
Backplanes	BMXXBP0400 (H)	X-bus backplane			■	■	
	BMXXBP0600 (H)	X-bus backplane			■	■	
	BMXXBP0800 (H)	X-bus backplane			■	■	
	BMXXBP1200 (H)	X-bus backplane			■	■	
	BMXXBE1000 (H) *(2)*	X-bus rack expansion module	■	■	■	■	■
	BMXXBE2005 *(3)*	X-bus rack expansion kit	■	■	■	■	■
	BMEXBP0400 (H)	X-bus+Eth backplane	■	■			■
	BMEXBP0800 (H)	X-bus+Eth backplane	■	■			■
	BMEXBP1200 (H)	X-bus+Eth backplane	■	■			■
	BMEXBP0602 (H) *(4)*	X-bus+Eth dual power supplies backplane	■	■			■
	BMEXBP1002 (H) *(4)*	X-bus+Eth dual power supplies backplane	■	■			■
	BMXXEM010 *(5)*	Protective cover connector	■	■	■	■	■
Safety I/O	BMXSAI0410	Safety analog input	■			■	■
	BMXSDI1602	Safety discrete input	■			■	■
	BMXSDO0802	Safety discrete output	■			■	■
	BMXSRA0405	Safety relay output	■			■	■
Com Head	BMXCRA31200	RIO drop X-bus adapter			■		
	BMXCRA31210 (C)	RIO drop X-bus adapter				■	
	BMECRA31210 (C)	RIO drop X-bus+Eth adapter					■
	BMXPRA0100	DIO drop adapter					

(1) Optional versions: (C) - "Coated", (H) - "Hardened"
(2) Extended rack can be any type of rack, but only X-bus modules (BMX) can be used
(3) Extended rack kit
(4) Not compatible with single power supplies
(5) Protective cover for all X-bus or Eth bus connectors

Compatible	Not compatible

Note: *All X80 Safety modules are compatible with the Modicon M580 Safety ePAC only.*

Modicon M580 automation platform
Safety
M580 Safety standalone processors

Modicon M580 Safety configuration with a mix of standard X80 & Safety I/O

Presentation

Overview

The Modicon M580 Safety is a M580 programmable automation controller (PAC) with embedded safety modules and functions; it is available as a standalone PAC or a redundant (HSBY) PAC.

A standalone PAC includes a single CPU with a safety coprocessor that is mandatory for dual execution.

It is based on the X80 platform, and the EcoStruxure Control Expert *(1)* environment:
- M580 Safety CPU and coprocessor
- Redundant safety power supplies
- Safety local and remote I/O
- Safety communications
- Software libraries for process and machine safety

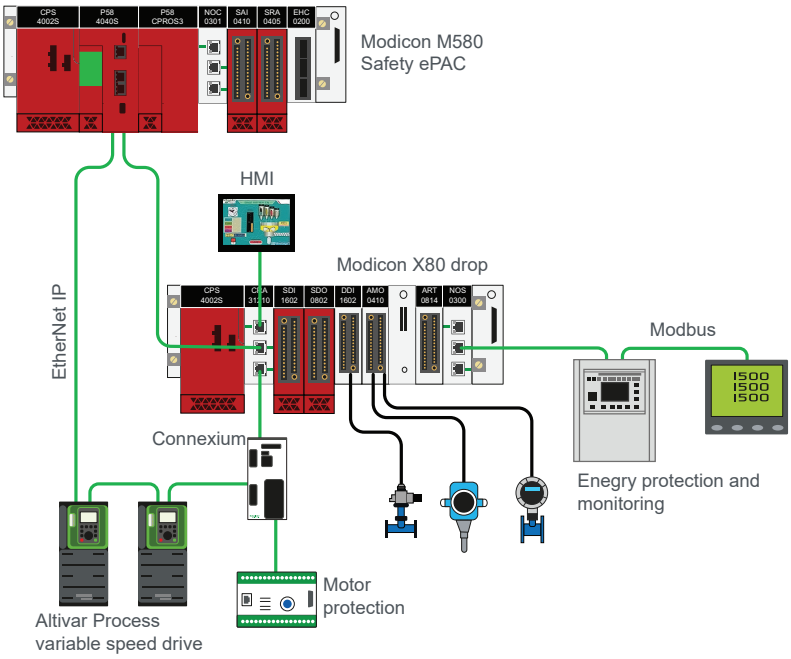
X80 Safety modules are compatible with the M580 Safety only.

Architecture

The M580 Safety PAC is a safety-related system certified by TÜV Rheinland for use in applications up to SIL3 (Safety Integrity Level 3), Cat.4/PLe (Performance Level e).

The Modicon M580 Safety PAC ensures safe operation while optimizing costs.

The Modicon M580 Safety allows a mix of architectures:
- It manages both safety and non-safety applications.
- Safety and process control functions are separate.
- It integrates process and machine safety functions.



Modicon M580 Safety standalone topology

Safety level

The Modicon M580 Safety PAC improves system reliability thanks to a unique combination between built-in cybersecurity and safety features:
- Isolated safety memory cells
- Online error code correction
- Security watchdog
- Clock monitoring
- Safety application executed in a dedicated core
- Memory isolation helping to secure access to safety and non-safety memory
- Safety memory different from the standard CPU

Any failure in the standard application does not impact the safety application.

SIL3 is achieved by dual execution of the safety application, using both the BMEP58●040S processor and the BMEP58CPROS3 coprocessor.

(1) Unity Pro software in earlier versions.

Modicon M580 automation platform
Safety
M580 Safety standalone processors

Presentation

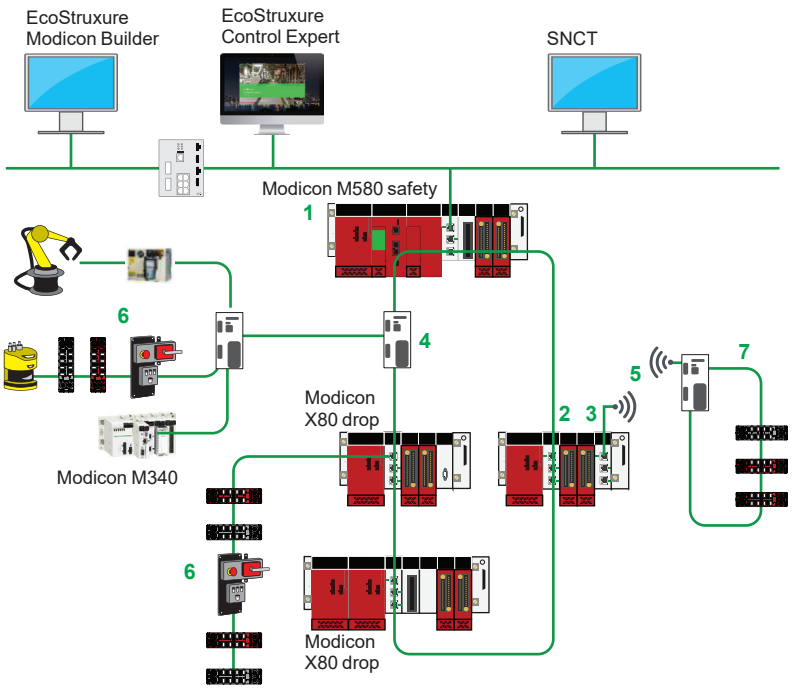
CIP Safety

M580 Safety standalone CPUs embed a CIP Safety service over EtherNet/IP protocol in order to facilitate integration of smart safety devices in the M580 Safety architecture, with a unique software platform for M580 processes.

As an ODVA-conformant service, CIP Safety opens access, over EtherNet/IP, to third-party Safety products compliant up to SIL3/PLe.
A full ready-to-use DTM catalog is provided for the sake of device configuration, including most devices available on CIP Safety. If a new device must be installed and is not included in the DTM catalog, an ESD file from the device supplier can be imported.

In order to guarantee CIP Safety compliance, CIP Safety devices ("targets") **6** must be placed so as to be accessible as DIO devices, according to the following rules:
- Placed through the service ports of M580 Safety CPU **1** and X80 CRA modules **2**
- Placed through an X80 BMENOS module **3** or the dual ring switches (DRS) **4**
- A CIP Safety target cannot be scanned by a X80 BMENOC Ethernet module.
- The target must be placed in the same Ethernet network and IP domain as the M580S CPU.

The ring topology **7** is enabled with DLR protocol.

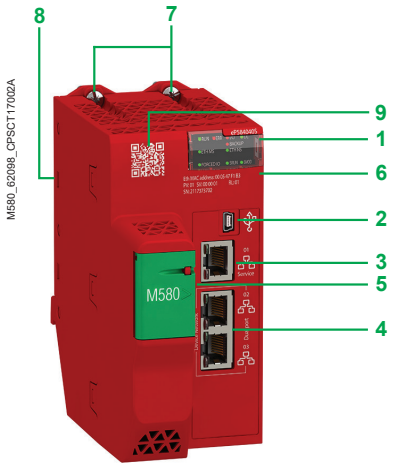


The CIP Safety service is available with standalone *(1)* Safety CPUs with firmware version V3.10 or later and EcoStruxure Control Expert V14.1. Depending on the CPU type, up to 16/64 CIP Safety devices can be connected to the CPU, in addition to other DIO devices. To ensure optimum performance of this architecture, a compromise must be made between the maximum number of CIP Safety I/O (up to 64) and the maximum number of RIO drops (up to 16). Recommended topologies are detailed in the table below:

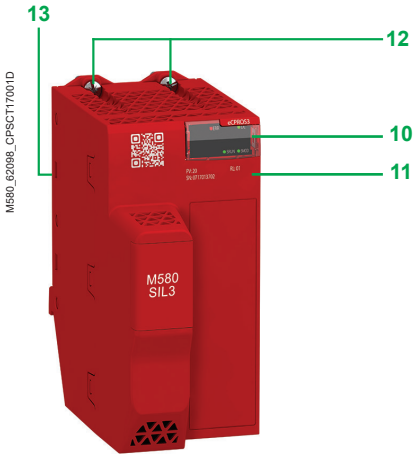
Description	BEMP582040S			BEMP584040S		
	CSIO devices	DIO devices	RIO drops	CSIO devices	DIO devices	RIO drops
Maximum recommended remote topology	10	10	8	32	10	16
Maximum recommended distributed topology	16	61	2	64	61	2

(1) M580 Safety redundant (HSBY) CPUs do not support CIP Safety.

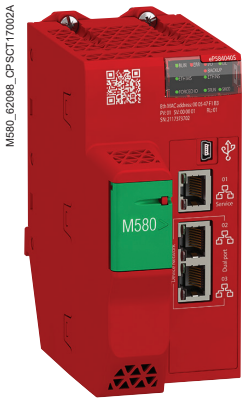
Modicon M580 automation platform
Safety
M580 Safety standalone processors



BMEP58●040S



BMEP58CPROS3



BMEP58●040S

Description of M580S processor and coprocessor

BMEP58●040S processor

BMEP58●040S processors include:

1 Display block comprising 8 LEDs with various combinations to provide quick diagnostics of the processor status:
- RUN LED (green): processor in operation (program execution)
- ERR LED (red): processor or system detected error
- I/O LED (red): detected I/O module error
- DL LED (green): firmware download in progress
- BACKUP LED (red): backup memory (internal or card)
- ETH MS LED (bi-color green/red): indicates the Ethernet port configuration status
- ETH NS LED (bi-color green/red): indicates the Ethernet connection status
- FORCED I/O (bi-color green/red): I/O status forced by the processor

2 Mini-B USB port for connecting to a programming terminal

3 RJ45 Ethernet port that allows diagnosis of Ethernet ports and provides access to external tools, devices, and distributed I/O devices

4 Dual RJ45 Ethernet ports for connection to the remote I/O drops (EIO) and distributed equipment (through DRS) *(1)*

5 Slot equipped with an optional SD memory card for application and data storage: an LED, located behind the door, indicates access to the memory card *(2)*

6 Printed serial number, product version, and MAC address on the front panel of the processor

7 2 hooks and 2 screws for mechanical attachment and grounding connection to backplane

8 2 connectors for electrical connection to an M580 backplane (X-bus and Ethernet backplane)

9 QR code that provides access to the product datasheet

BMEP58CPROS3 coprocessor

The coprocessor is mandatory with the Safety processor. The **BMEP58CPROS3** coprocessor includes:

10 Display block comprising 2 LEDs to provide quick diagnostics of the coprocessor status:
- ERR LED (red): coprocessor or system detected error
- DL LED (green): firmware download in progress

11 Printed serial number and product version on the front panel of the coprocessor

12 2 hooks and 2 screws for mechanical attachment and grounding connection to backplane

13 2 connectors for electrical connection to an M580 backplane (X-bus and Ethernet backplane)

References

Modicon M580 processors

Local I/O capacity	Maximum number of Ethernet modules	Device ports	Service port	Reference	Weight kg/*lb*
2,048 discrete I/O 512 analog I/O 72 application-specific channels 2/8 MB integrated (safety/non-safety memory program)	2 Ethernet networks	2 RIO/DIO	1	BMEP582040S	0.849/ *1.872*
4,096 discrete I/O 1,024 analog I/O 144 application-specific channels 4/16 MB integrated (safety/non-safety memory program)	4 Ethernet networks	2 RIO/DIO	1	BMEP584040S	0.849/ *1.872*
	–	–	–	BMEP58CPROS3	0.849/ *1.872*

(1) DRS: Dual ring switches. Supported ConneXium switches: ***TCSESM083F23F1/063F2CU1/063F2CS1***

(2) ***BMEP58●040S*** *processors have a door that can be locked to prevent removal of the SD card.*

Modicon M580 automation platform
Safety
M580 Safety redundant (HSBY) processors

Modicon M580 Safety configuration with the full safety rack

Presentation

Overview

The Modicon M580 Safety is a M580 programmable automation controller (PAC) with embedded safety modules and functions; it is available as a standalone PAC or a redundant (HSBY) PAC.

A redundant (HSBY) PAC is based on two identically configured CPUs linked to each other and to the same remote I/O network. A safety coprocessor is mandatory for dual execution; if one CPU stops communications, the other assumes control of the I/O system. It is based on the X80 platform and the EcoStruxure Control Expert *(1)* environment:

- M580 Safety CPU and coprocessor
- Redundant safety power supplies
- Safety local and remote I/O
- Safety communications
- Software libraries for process and machine safety

X80 Safety modules are compatible with M580 Safety only.

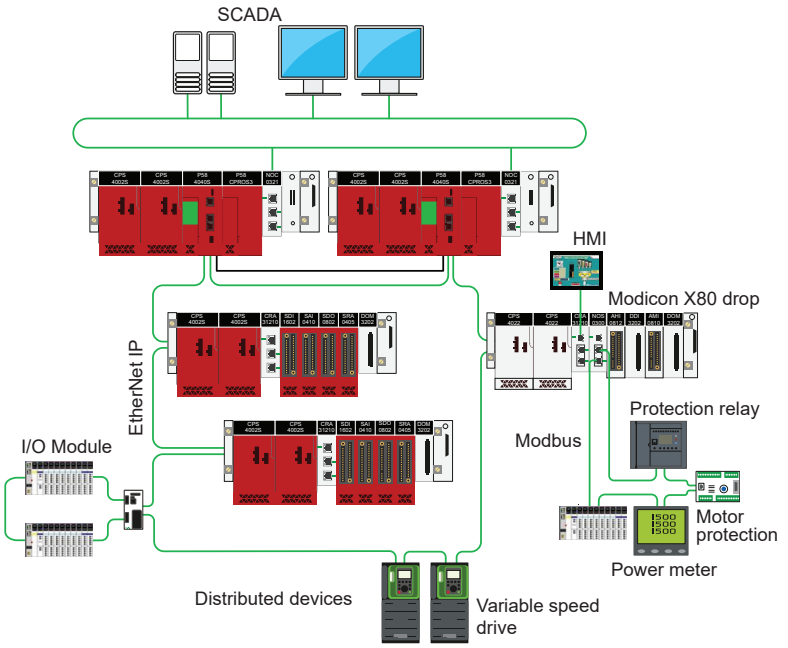
In a redundant (HSBY) architecture, it is not possible to place I/O and Expert modules in the local rack (together with a CPU).

Architecture

The M580 Safety PAC is a safety-related system certified by TÜV Rheinland to be used for applications up to SIL3 (Safety Integrity Level 3), Cat.4/PLe (Performance Level e).

The Modicon M580 Safety PAC ensures safe operation while optimizing costs. It allows a mix of architectures:

- It manages both safety and non-safety applications.
- Safety and process control functions are separate.
- It integrates process and machine safety functions.



Modicon M580 Safety HSBY topology

Safety level

Modicon M580 Safety improves system reliability thanks to a unique combination of built-in cybersecurity and safety features:

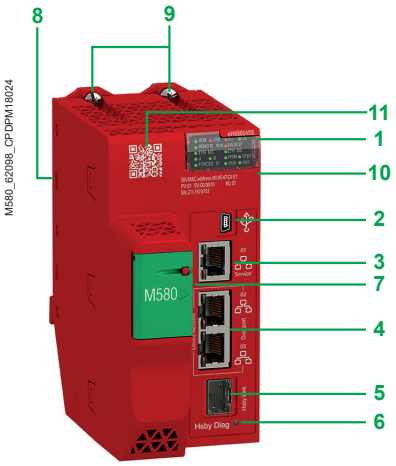
- Isolated safety memory cells
- Online error code correction
- Security watchdog
- Clock monitoring
- Safety application executed in a dedicated core
- Memory isolation helping to secure access to safety and non-safety memory
- Safety memory different from the standard CPU

Any failure in the standard application does not impact the safety application.

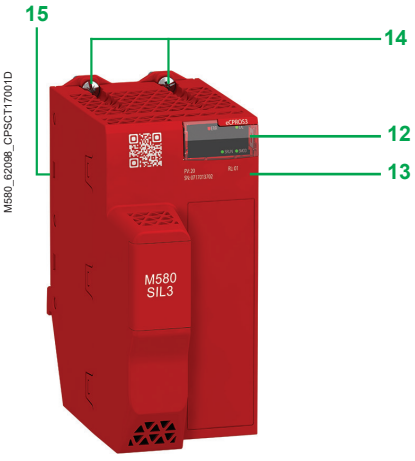
SIL3 is achieved by dual execution of the safety application, using both the **BMEH58●040S** processor and the **BMEP58CPROS3** coprocessor.

(1) Unity Pro software in earlier versions.

Modicon M580 automation platform
Safety
M580 Safety redundant (HSBY) processors



BMEH58●040S



BMEP58CPROS3

BMEH58●040S

Description of M580S redundant (HSBY) processor and coprocessor

BMEH58●040S processor

BMEH58●040S processors include:

1 Display block comprising 14 LEDs with various combinations to provide quick diagnostics of the processor status:
- RUN LED (green): processor in operation (program execution)
- ERR LED (red): processor or system detected error
- I/O LED (red): detected I/O module error
- DL LED (green): firmware download in progress
- REMOTE RUN LED (green): peer processor in operation (program execution)
- BACKUP LED (red): backup memory (internal or card)
- ETH MS LED (bi-color green/red): indicates the Ethernet port configuration status
- ETH NS LED (bi-color green/red): indicates the Ethernet connection status
- A LED (green): processor ID set to A
- B LED (green): processor ID set to B
- PRIM LED (green): processor acting as primary
- STBY LED (green): processor acting as standby
- FORCED I/O (red): I/O values overridden by the user
- SRUN LED (green): processor in safety mode
- SMOD LED (green): processor in maintenance mode

2 Mini-B USB port for module configuration via PC running EcoStruxure Control Expert

3 RJ45 Ethernet port that allows diagnosis of Ethernet ports and provides access to external tools, devices, and distributed I/O devices

4 Dual RJ45 Ethernet ports for connection to the remote I/O drops (EIO) and distributed equipment (through DRS) *(1)*

5 SFP socket for copper or fiber-optic Hot Standby link connection

6 Hot Standby status link LED

7 Slot equipped with an optional SD memory card for application and data storage: an LED, located behind the door, indicates access to the memory card *(2)*

8 Printed serial number, product version, and MAC address on the front panel of the processor

9 2 hooks and 2 screws for mechanical attachment and grounding connection to backplane

10 2 connectors for electrical connection to an M580 backplane (X-bus and Ethernet backplane)

11 QR code that provides access to the product datasheet

BMEP58CPROS3 coprocessor

The coprocessor is mandatory with the Safety processor. The **BMEP58CPROS3** coprocessor includes:

12 Display block comprising 2 LEDs to provide quick diagnostics of the coprocessor status:
- ERR LED (red): coprocessor or system detected error
- DL LED (green): firmware download in progress

13 Printed serial number and product version on the front panel of the coprocessor

14 2 hooks and 2 screws for mechanical attachment and grounding connection to backplane

15 2 connectors for electrical connection to an M580 backplane (X-bus and Ethernet backplane)

References

Modicon M580 redundant (HSBY) processors

Local I/O capacity	Maximum number of Ethernet modules	Device ports	Service port	Reference	Weight kg/*lb*
8 MB integrated (safety/non-safety memory program)	2 Ethernet networks	2 RIO/DIO	1	BMEH582040S	0.849/ *1.872*
16 MB integrated (safety/non-safety memory program)	4 Ethernet networks	2 RIO/DIO	1	BMEH584040S	0.849/ *1.872*
64 MB integrated (safety/non-safety memory program)	4 Ethernet networks	2 RIO/DIO	1	BMEH586040S	0.849/ *1.872*

(1) DRS: Dual ring switches. Supported ConneXium switches: ***TCSESM083F23F1/063F2CU1/ 063F2CS1***

(2) ***BMEP58●040S*** *processors have a door that can be locked to prevent removal of the SD card.*

4

Contents

4 - Communication modules*

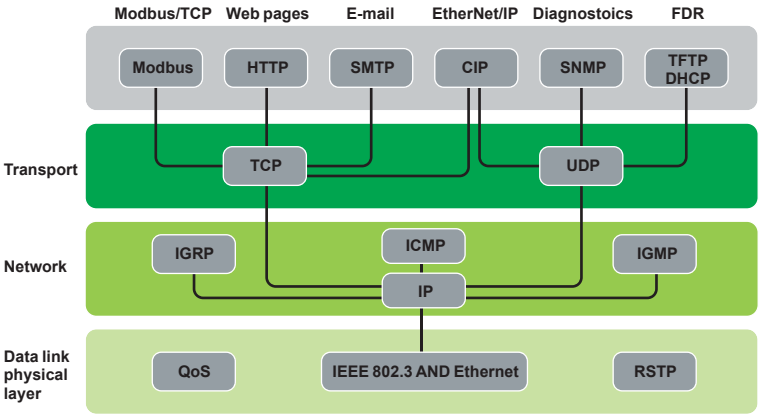
* For all remaining communication modules compatible with Modicon M580, please refer to X80 catalog .

4

Modicon M580 automation platform
Industrial Ethernet services
Modicon M580 communication services

Presentation

EcoStruxure Plant Ethernet architectures provide transparent communication services to the entire operation through the implementation of standard, unmodified Ethernet protocols and services.



In addition to the typical Ethernet services (HTTP, BOOTP, DHCP, etc.) Ethernet communication modules are equipped with automation-specific services, such as:
- Device scanning using Modbus TCP and EtherNet/IP
- Messaging using Modbus TCP and EtherNet/IP
- Automatic replacement device configuration using FDR (Fast Device Replacement)
- Extensive diagnostics through SNMP
- Clock synchronization using NTP
- E-mail alarm notification via SMTP
- Packet prioritization using QoS
- Ring topology redundancy through RSTP

Note: *The above services may not be offered in all devices. Please refer to the Selection Guide and Reference pages for a comprehensive list of the services offered by each device.*

4

Processors: page 2/2
I/O architectures: page 5/2
Modules for severe environments: page 6/2

Modicon M580 automation platform
Industrial Ethernet services
Modicon M580 communication services

Functions

Ethernet basic services

HTTP (RFC 1945)

HTTP (HyperText Transfer Protocol) is used to transmit web pages between a server and a browser. HTTP has been used on the Web since 1990. Web servers embedded in Schneider Electric automation products provide easy access to information and diagnostics from anywhere in the network.

BOOTP/DHCP (RFC1531)

BOOTP/DHCP is 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.
DHCP (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, allowing the IP address to be retrieved automatically from a server, or
- BOOTP servers, allowing the device to distribute IP addresses to the network stations.

FTP (File Transfer Protocol) & TFTP (Trivial File Transfer Protocol) (RFCs 959, 2228, and 2640)

File transfer protocols such as FTP and TFTP provide the basic elements for file sharing. In an automation device, FTP or TFTP are often used to deliver firmware updates.

NTP (Network Time Protocol) (RFC 1305)

NTP (Network Time Protocol) is used to synchronize the time of a client device from a time server.

SMTP (Simple Mail Transfer Protocol) (RFC 0821)

SMTP (Simple Mail Transfer Protocol) is an e-mail transmission service. It is used to send e-mail between a sender and a recipient via an SMTP e-mail server.

SNMP (Simple Network Management Protocol) (RFCs 1155, 1156, and 1157)

Simple Network Management Protocol (SNMP) is an Internet protocol used to manage IP-based network devices. SNMP is used to:
- Monitor network components such as computer workstations, routers, switches, bridges, and end devices to view their status
- Obtain statistics about the network such as bandwidth utilization and detected network errors
- Change information in the device SNMP database such as when to report a high temperature condition

SNMP comprises a network manager (usually running on a computer) and agents (running on the network devices). Network management systems (NMS) are software applications used to manage SNMP managed devices.

QoS (Quality of Service) (RFC 2474)

QoS provides the ability to mark or “tag” packets of a specific type or origin so that in a congested network the switches will give higher priority to the most important packets.

RSTP (Rapid Spanning Tree Protocol)

RSTP has been implemented in Schneider Electric automation products to allow multi-port devices to be connected in ring configurations.
RSTP helps to prevent the formation of broadcast storms and monitors the state of the ring. Should a link in the ring become disconnected, the protocol routes packets in a different direction to help ensure continuity of service.

Schneider Electric offers a network management software application tailored for the industrial control environment. ConneXium Network Manager has been developed with the Automation and Controls professional in mind. ConneXium Network Manager provides a window on network equipment operation to help improve plant productivity. The software can be used to:
- Discover network devices and generate a network map
- Set network performance thresholds and provide alerts on detected anomalies to help prevent downtime
- Manage ports (multiple ports at once)
- Baseline network performance
- Document the network
- Generate a report to send to technical support
- Interface to SCADA via the built-in OPC server
- The software is compatible with third-party products as well as with Schneider Electric network devices.

Processors: page 2/2
I/O architectures: page 5/2
Modules for severe environments: page 6/2

Functions (continued)

Modbus standard communication protocol

Modbus, 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/IP communication stack. The specifications can be obtained free of charge from the following website: www.modbus.org.

Modbus/TCP, simple and open

The Modbus application layer is very simple and universally familiar with its 9 million installed connections. Thousands of manufacturers have already implemented this protocol. Many have already developed a Modbus/TCP connection and numerous products are currently available.
The simplicity of Modbus/TCP enables any field device, such as an I/O module, to communicate on Ethernet without the need for a powerful microprocessor or a lot of internal memory.

Modbus/TCP, high performance

Due to the simplicity of its protocol and the fast speed of 100 Mbps Ethernet, the performance of Modbus/TCP is excellent. This allows this type of network to be used in real-time applications such as I/O scanning.

Modbus/TCP function codes		dec	hex
Bit access	Read n input bits	02	02
	Read n output bits	01	01
	Read exception status	07	07
	Write 1 output bit	05	05
	Write n output bits	15	0F
	Read 1 input word	04	04
	Read n input words	03	03
	Write 1 output word	06	06
	Write n output words	16	10
	Read device ID	43/14	2B/0E

Examples of Modbus/TCP function codes for accessing data and diagnostics

Modbus/TCP, a standard

The application protocol is identical on Modbus serial link, Modbus Plus, or Modbus/TCP. This means that messages can be routed from one network to the other without converting protocol.
Since Modbus is implemented on top of the TCP/IP layer, users can also benefit from IP routing enabling devices located anywhere in the world to communicate without worrying about the distance between them.
Schneider Electric offers a complete range of gateways for interconnecting a Modbus/TCP network to existing Modbus Plus or Modbus serial link networks.

The IANA organization (Internet Assigned Numbers Authority) has allocated the fixed port TCP 502 (well-known port) to the Modbus protocol. Thus Modbus has become an Internet standard.

Modbus and Modbus/TCP are recognized by the IEC/EN 61158 international standard as a fieldbus. They are also compliant with the “Chinese National Standard” managed by ITEI.

Interfacing CANopen with Modbus/TCP

CiA DSP 309-2 provides standardized mapping of CANopen data for transport on Ethernet Modbus/TCP networks. The specification reserves Modbus function code 43/13 for this purpose. This function code is reserved exclusively for CANopen.

Modbus TCP/IP characteristics

Maximum size of data:
- Read: 125 words or registers
- Write: 100 words or registers

EtherNet/IP

Functions (continued)

EtherNet/IP standard communication protocol

EtherNet/IP is an industrial communications protocol based on the Common Industrial Protocol (CIP) which is owned and managed by ODVA, an international, independent standards organization **(www.odva.org).**

Standard, unmodified Ethernet

Schneider Electric added EtherNet/IP as a core network in 2007. EtherNet/IP is very similar to Modbus TCP in many aspects. In particular, it shares the same principles of standardization and interoperability. EtherNet/IP operates on the same equipment and infrastructure as Modbus TCP, and both protocols can operate simultaneously on the network at any time.

Advanced services and high performance

EtherNet/IP is built on an object-based model. Data in each EtherNet/IP device is grouped in objects, and each device may have different types of objects, depending on the purpose of the device.

EtherNet/IP objects

The Ethernet modules implement the standard set of objects prescribed by ODVA. The most common objects are listed below:

Communication	Identity Object (01hex)
	Message Router Object (02hex)
	Assembly Object (04hex)
	Connection Object (05hex)
	Connection Configuration Object (F3hex)
	Connection Manager Object (06hex)
	Modbus Object (44hex)
EtherNet/IP Network	QoS Object (48hex)
	Port Object (F4hex)
	TCP/IP Interface Object (F5hex)
	Ethernet Link Object (F6hex)
Diagnostics	EtherNet/IP Interface Diagnostic Object (350hex)
	EtherNet/IP IO Scanner Diagnostic Object (351hex)
	IO Connection Diagnostic Object (352hex)
	EtherNet/IP Explicit Connection Diagnostic Object (353hex)

Processors: page 2/2
I/O architectures: page 5/2
Modules for severe environments: page 6/2

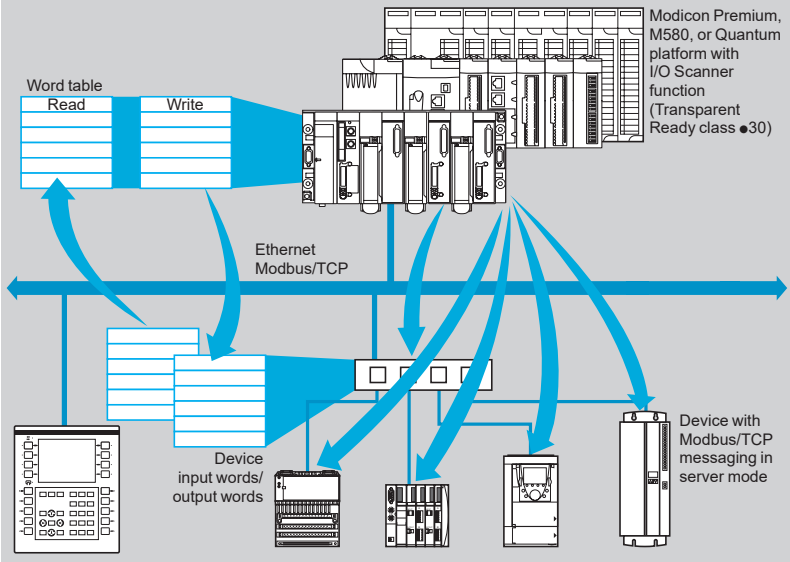
Modicon M580 automation platform

Industrial Ethernet services

Modicon M580 communication services

Functions (continued)

I/O Scanning service



The I/O Scanning service is used to manage the exchange of remote I/O states on the Ethernet network after simple configuration, without the need for any special programming.
I/O scanning is performed transparently by means of read/write requests according to the Modbus client/server protocol on the TCP/IP profile.
This principle of scanning via a standard protocol enables communication with any device supporting Modbus TCP messaging in server mode.
This service can be used to define:

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

During operation, the module:

- Manages TCP/IP connections with each remote device
- Scans devices and copies the I/O to the configured %MW 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 error is detected

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.

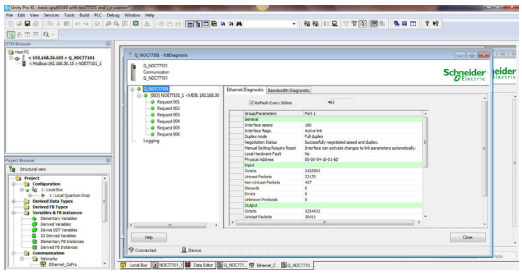
Characteristics

- Under EcoStruxure Control Expert (1) software, each station can exchange a maximum of:
  - 120 write words
  - 125 read words
- Maximum size in the PLC managing the service:
  - For BME●58●●40 processors, 1 Kword %MW in inputs and 1 Kword %MW in outputs with the manager PLC limited to 64 stations
  - For BME●58●●20 processors and Ethernet communication module BMENOC03●●, 2 or 4 Kwords %MW in inputs and 2 or 4 Kwords %MW in outputs with the manager PLC limited to 128 stations

I/O Scanning service diagnostics

I/O Scanning service diagnostics can be performed in one of four 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 a Web browser on a PC station
- Using standard SNMP network management software



I/O Scanning service diagnostics

(1) Unity Pro software in earlier versions.

Modicon M580 automation platform
Industrial Ethernet services
Modicon M580 communication services

FDR client device example (ATV630)

Functions (continued)

FDR (Fast Device Replacement) service

The FDR 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.

It is used to replace an existing device with a new device that will be detected, reconfigured, and automatically restarted by the system.

The main steps in replacement are:

1. The device to be replaced is identified.
2. Another similar device is taken from the maintenance store, preconfigured with the device name for the existing device, then reinstalled on the network. Depending on the device, addressing can be performed using rotary selector switches 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 replacement device checks that all these parameters are indeed compatible with its own characteristics and switches to operational mode.

The FDR server can be:

- A Modicon M580 Ethernet network module, **BMENOC03●1**
- A Modicon M580 processor with integrated Ethernet port, **BME●58●●●●**

Processors: page 2/2
I/O architectures: page 5/2
Modules for severe environments: page 6/2

Modicon M580 automation platform

Industrial Ethernet services

Modicon M580 web services

Embedded web pages presentation

The M580 CPU includes a Hypertext Transfer Protocol (HTTP) server. The server transmits web pages for the purpose of monitoring, diagnosing, and controlling remote access to the communication module. The server provides easy access to the CPU from standard Internet browsers.

The embedded Web server pages are used to display real-time diagnostic data for the M580 CPU.

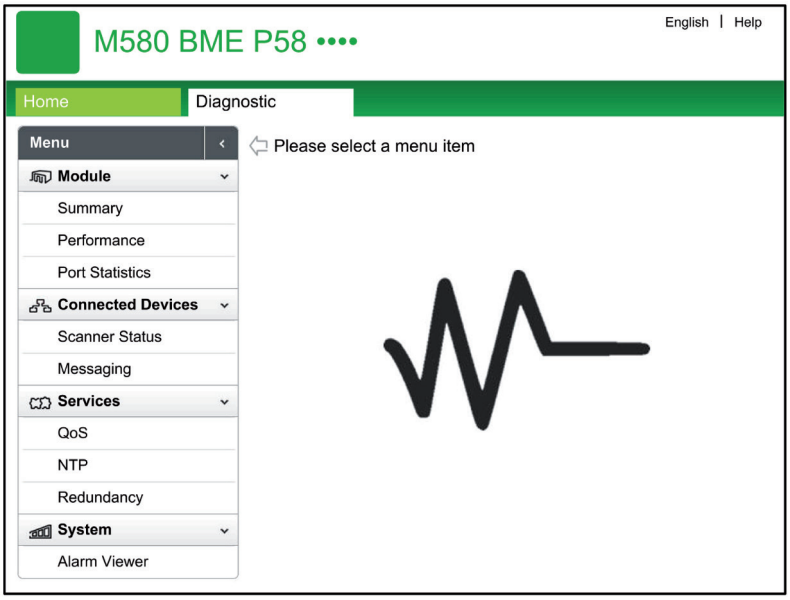
Requirements

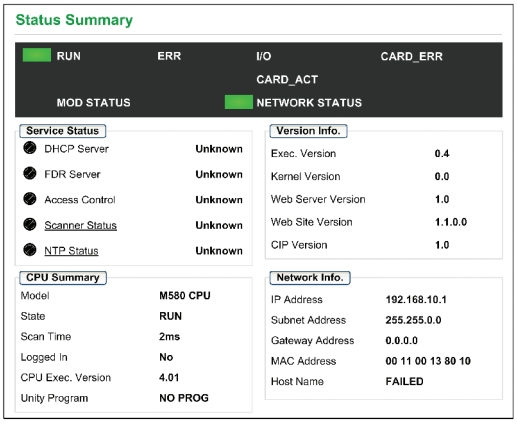
The embedded Web server in M580 CPUs displays data in standard HTML web pages. The embedded web pages can be accessed on a PC, iPad®, or Android® tablet with the following browsers:

- Internet Explorer® (V8 or later)
- Google Chrome® (V11 or later)
- Mozilla Firefox® (V4 or later)
- Safari® (V5.1.7 or later)

Diagnostic web pages

The M580 CPU diagnostic web pages provide information on Status Summary, Performance, Port Statistics, I/O Scanner, Messaging, QoS (quality of service), Network Time Service, Redundancy and Alarm Viewer. All these pages are updated every 5 seconds to get the latest information.





Status Summary page

Status Summary page

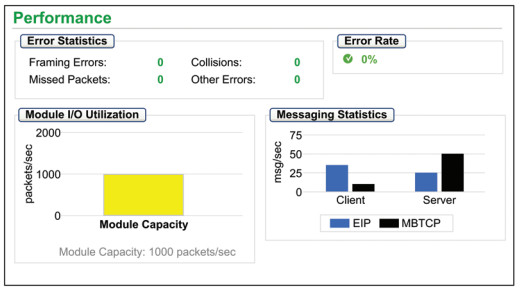
The objects on this page provide status information.

Parameters	Description	
LEDs	The black field contains LED indicators (RUN, ERR, etc.)	
Service Status	Green	The available service is operational and running
	Red	An error is detected in an available service
	Black	The available service is not present or not configured
Version Info.	This field describes the software versions that are running on the CPU	
CPU Summary	This field describes the CPU hardware and the applications that are running on the CPU	
Network Info.	This field contains network and hardware address information and connectivity that corresponds to the CPU	

Modicon M580 automation platform

Industrial Ethernet services

Modicon M580 web services



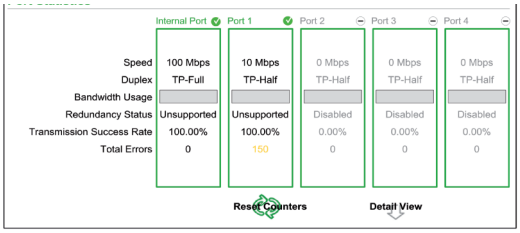
Performance page

Diagnostic web pages (continued)

Performance page

The objects on this page provide information on performance statistics.

Field	Description
Error Statistics	This area contains the detected errors in the diagnostics data for the CPU (these counters can be reset to 0 with the Reset Counters button)
Error Rate	This percentage represents the total number of packets divided by the number of packets that are not associated with detected errors
Total Bandwidth Utilization	This value indicates the percentage of the available bandwidth that the CPU is using
Module I/O Utilization	This graph shows the total number of packets (per second) the CPU can handle at once *(1)*
Processor Utilization	This graph shows the number of Modbus/TCP or EtherNet/IP messages per second for the client or server *(1)*
System Bandwidth Monitor	These graphs show the percentage of bandwidth consumed by the Modbus messaging and I/O Scanning services *(1)*



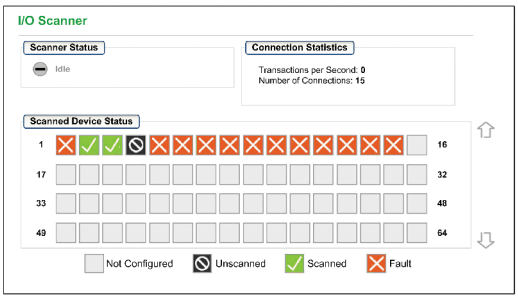
Port Statistics page

Port Statistics page

This page shows the statistics for each port on the CPU.
This information is associated with the configuration of the Ethernet ports and the configuration of the service/extended port.

The names of active ports are green. The names of inactive ports are gray.
The information is reset or expanded using these buttons:

- Reset Counters: Resets all dynamic counters to 0.
- Detail View: Expands the list of port statistics.



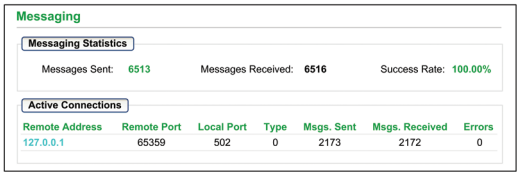
I/O Scanner page

I/O Scanner page

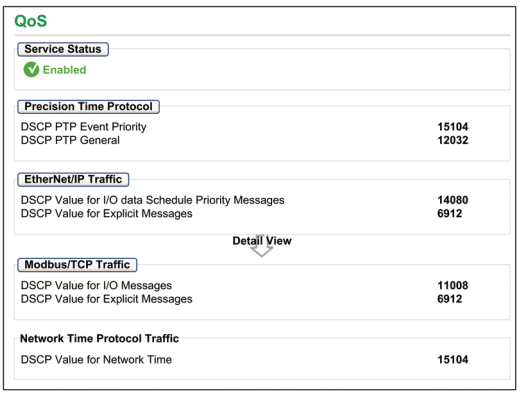
The objects on this page provide information on the scanner status and connection statistics.

Field	Description	
Scanner Status	Enabled	The I/O scanner is enabled
	Disabled	The I/O scanner is disabled
	Idle	The I/O scanner is enabled but not running
	Unknown	The I/O scanner returns unexpected values from the device
Connection Statistics	Transactions per second	
	Number of connections	
Scanned Device Status	Colors that appear in each block indicate these states for specific remote devices	
	Gray	There is an unconfigured device
	Black	The scanning of the specific device has been intentionally disabled
	Green	A device is being scanned successfully
	Red	A device that is being scanned is returning detected errors

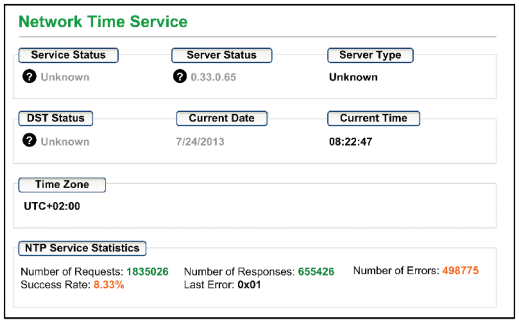
(1) Move the mouse over the dynamic graphs to see the current numeric values.



Messaging page



QoS page



Network Time Service page

Diagnostic web pages (continued)

Messaging page

This page shows current information for open TCP connections on port 502:

- Messaging Statistics: this field contains the total number of sent and received messages on port 502. These values are not reset when the port 502 connection is closed. Therefore, the values indicate the number of messages that have been sent or received since the module was started.
- Active Connections: this field shows the connections that are active when the Messaging page is refreshed.

QoS (quality of service) page

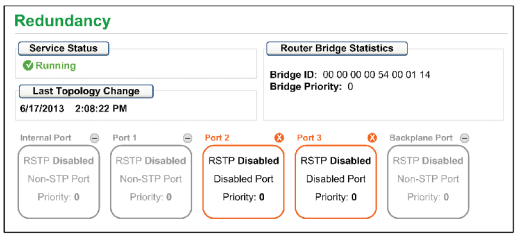
This page displays information about the QoS service. This service is configured in EcoStruxure Control Expert *(1)*. When QoS is enabled, the module adds a differentiated services code point (DSCP) tag to each Ethernet packet it transmits, thereby indicating the priority of that packet.

Network Time Service page

This page displays information about the NTP service. This service is configured in EcoStruxure Control Expert *(1)*. The Network Time Service synchronizes computer clocks over the Internet for the purposes of event recording (sequencing events), event synchronization (triggering simultaneous events), or alarm and I/O synchronization (time-stamping alarms).

Field	Description	
Service Status	Running	The NTP service is correctly configured and running
	Disabled	The NTP service is disabled
	Unknown	The NTP service status is unknown
Server Status	Green	The server is connected and running
	Red	A bad server connection is detected
	Gray	The server status is unknown
Server Type	Primary	A primary server polls a master time server for the current time
	Secondary	A secondary server requests the current time only from a primary server
DST Status	Running	DST (daylight saving time) is configured and running
	Disabled	DST (daylight saving time) is disabled
	Unknown	The DST status is unknown
Current Date	This is the current date in the selected time zone	
Current Time	This is the current time in the selected time zone	
Time Zone	This field shows the time zone in terms of plus or minus Universal Time Coordinated (UTC)	
NTP Service Statistics	These fields show the current values for service statistics	
	Number of Requests	This field shows the total number of requests sent to the NTP server
	Success Rate	This field shows the percentage of successful requests out of the total number of requests
	Number of Responses	This field shows the total number of responses received from the NTP server
	Last Error	This field contains the code of the last error that was detected during the transmission of an e-mail message to the network
	Number of Errors	This field contains the total number of e-mail messages that could not be sent to the network or that have been sent but not acknowledged by the server

(1) Unity Pro software in earlier versions.



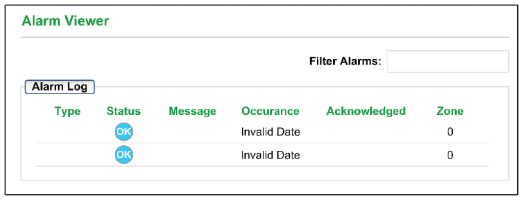
Redundancy page

Diagnostic web pages (continued)

Redundancy page

This page displays values from the RSTP configuration in EcoStruxure Control Expert *(1)*.

Parameters	Description	
Service Status	This is the status (enabled or disabled) of the RSTP bridge on the corresponding CPU	
Last Topology Change	These values represent the date and time that the last topology change was received for the corresponding Bridge ID	
Redundancy Status	Green	The designated Ethernet port is learning or formatting information
	Yellow	The designated Ethernet port is discarding information
	Gray	RSTP is disabled for the designated Ethernet port
Router Bridge Statistics	Bridge ID	This unique bridge identifier is the concatenation of the bridge RSTP priority and the MAC address
	Bridge Priority	In EcoStruxure Control Expert *(1)*, configure the RSTP operating state of the Bridge ID



Alarm Viewer page

Alarm Viewer page

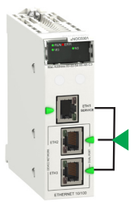
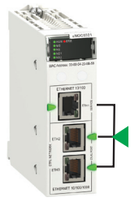
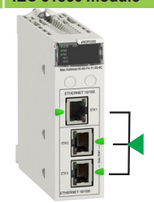
The Alarm Viewer page reports detected errors in the application. Information about alarm objects can be read, filtered, and sorted on this page. The type of information displayed by the Alarm Viewer is adjusted in the Filter Alarms box.

Field	Description	
Type	This column describes the alarm type	
Status	STOP	An alarm needs to be acknowledged
	ACK	An alarm has been acknowledged
	OK	An alarm does not require acknowledgment
Message	This column contains the text of the alarm message	
Occurrence	This column contains the date and time that the alarm occurred	
Acknowledged	This column reports the acknowledged status of the alarm	
Zone	This column contains the area or geographical zone from which the alarm comes (0: common area)	

(1) Unity Pro software in earlier versions.

Modicon M580 automation platform

Communication integrated ports and modules

Applications	Ethernet communication			Ethernet communication		OPC UA communication	IEC 61850 communication
Type of device	**Processors with integrated EtherNet/IP and Modbus/TCP**			**Ethernet modules**		**OPC UA module**	**IEC 61850 module**
							
Network protocols	**EtherNet/IP and Modbus/TCP**			**EtherNet/IP and Modbus/TCP**		**OPC UA**	**IEC 61850**
Structure – Physical interface	10BASE-T/100BASE-TX			10BASE-T/100BASE-TX	10-BASE-T/100-BASE-TX/1000 BASE-TX	10-BASE-T/100-BASE-TX/1000 BASE-TX	10BASE-T/100BASE-TX
Type of connector	3xRJ45 connectors: 1 connector for service and 2 connectors for a RSTP ring topology Ethernet backplane connection			3xRJ45 connectors: 1 for service and 2 for a RSTP ring topology (devices) Ethernet backplane connection	3xRJ45 connectors: 1 for service and 2 for a RSTP ring topology (control) Ethernet backplane connection	1xRJ45 connector (control port) Ethernet backplane connection	3xRJ45 connectors: 1 for service and 2 for a RSTP ring topology (device/control) Ethernet backplane connection
Access method	CSMA-CD			CSMA-CD		CSMA-CD	CSMA-CD
Data rate	10/100 Mbps			10/100 Mbps	10 Mbps/100 Mbps/1 Gbps	10 Mbps/100 Mbps/1 Gbps	10/100 Mbps
Medium	Double shielded twisted pair copper cable, category CAT 5E			Double shielded twisted pair copper cable, category CAT 5E		Double shielded twisted pair copper cable, category CAT 5E	Double shielded twisted pair copper cable, category CAT 5E
Configuration – Maximum number of devices when module acts as Client/Scanner	Up to 125 DIOs *(1)*	31 RIO drops and 61 DIOs		128 DIOs (EtherNet/IP or Modbus/TCP)	112 DIOs (EtherNet/IP or Modbus/TCP)	–	32 IED servers
Maximum number of devices when module acts as Server/Adapter	3 EtherNet/IP adapter instances			16 EtherNet/IP adapter instances	12 EtherNet/IP adapter instances	10 OPC UA Clients	16 IEC 61850 clients
Number of modules of the same type per station	1			Up to 4 Ethernet modules depending on processor level *(4)*	Up to 2 Ethernet modules	Up to 2 OPC UA modules	Up to 4 Ethernet modules depending on processor level (1)
Web services – Standard services	Standard level PLC web diagnostics Alarm Viewer			Standard level PLC web diagnostics Alarm viewer		Module diagnostics (OPC UA) Cybersecurity settings	
Advanced services	Rack Viewer *(2)*			–	Rack Viewer, PLC Program Viewer, Customizable dashboard (Trend Viewer), Data Editor access to PLC data and variables, Factory Cast Custom Web Pages	–	–
Web page protocol	HTTP (HTML5)			HTTP (HTML5)	HTTP (HTML5, JAVA *(3)*)	HTTPS (HTML5)	HTTP (HTML5)
Communi-cation services – Modbus TCP scanner (IO scanning)	Yes			Yes		No	No
EtherNet/IP scanner (IO scanning)	Yes			Yes		No	No
I/O scanning memory (data exchange with CPU)	–			8KB IN / 8KB OUT	4KB IN / 4KB OUT	–	–
Modbus TCP client (messaging)	Yes			Yes		Yes	Yes
EtherNet/IP client (messaging)	Yes			Yes		No	No
EtherNet/IP adapter (local slave)	Yes			Yes		No	No
RIO scanner (EtherNet/IP scanner for X80 RIO drops)	No	Yes		No		No	No
IP Forwarding	No			No	Yes (if enabled, no IPsec)	Yes	Yes (if enabled, no IPsec)
QoS (Quality of Service)	Yes			Yes		No	Yes
RSTP media redundancy	Yes			Yes		No	Yes
NTP/ SNTP time synchronization	Yes (client and server)			Yes (client), clock synchronization to CPU	Yes (client)	Yes (client and server)	Yes (client)
FDR Service	Yes (server)			Yes (server)		Yes (client)	No
SNMP network management	Yes (agent)			Yes (agent)		Yes (agent)	Yes (agent)
Syslog	Yes (client)			Yes (client)		Yes (client)	Yes
OPC UA Server	No			No		Yes	No
IPsec	No			Yes	Yes (if enabled, no IP forwarding)	Yes	Yes (if enabled, no IP forwarding)
TLS	No			No		Yes (OPC UA)	No
IEC 61850	No			No		No	MMS Client and Server GOOSE Publisher and Subscriber
IPV6	No			No		Yes	No
Compatibility with processor	–	–	–	All Modicon M580 processors		All Modicon M580 processors	All Modicon M580 processors
Reference	**BMEP58•020**	**BMEP58•040**	**BMEH58•040**	**BMENOC0301**	**BMENOC0311**	**BMENOC0321**	**BMENUA0100**	**BMENOP0300**
Pages	2/7	2/7	2/8	4/16	4/16	4/16	4/18	4/22

(1) Depends on CPU level, BMEP581020: 61 DIO max
(2) Only for BM•584040/BM•585040/BM•586040 processors
(3) Only for Factory Cast custom web pages
(4) See Modicon M580 processors selection guide page 2/2

Modicon M580 automation platform

Communication integrated ports and modules

Applications	RTU communication	
Type of device	**RTU modules**	
		
Network protocols	**IEC 60870-5-104 (IEC 104), DNP3 NET (Subset level 3), Modbus/TCP**	**IEC 60870-5-101 (IEC 101), DNP3 Serial (Subset level 3), Serial link, external modem link**
Structure — Physical interface	10BASE-T/100BASE-TX, PPPoE (Point-to-Point Protocol over Ethernet) for ADSL external modem link	Non-isolated RS-232/RS-485 (serial link), Non-isolated RS 232 (radio, PSTN, GSM, GPRS/3G external modem link)
Type of connector	1xRJ45	1xRJ45
Access method	CSMA/CD	Master/slave
Data rate	10/100 Mbps	0.3…38.4 Kbps (serial link)
Medium	Double shielded twisted pair copper cable, category CAT 5E	Double shielded twisted pair copper cable, crossover serial cable (serial link), direct serial cable (external modem link)
Configuration — Maximum number of devices when module acts as Client/Master	64 (IEC 104) 32 (DNP3 NET)	32
Maximum number of devices when module acts as Server/Slave	4 (1 main channel + 3 virtual channels)	1
Number of modules of the same type per station	Up to 8 BMXNOR0200H RTU modules depending on processor level *(2)*	
Web services — Standard services	Rack Viewer Data Editor access to PLC data and variables	
Advanced services	Factory Cast Custom Web Pages	
Web page protocol	HTTP (JAVA)	
Web page service	SOAP/XML	
Communication services — Modbus TCP Client (messaging)	Yes	Reading/writing discrete and analog I/O, counters
SNMP network management	Yes (agent)	–
NTP time synchronization	Yes	–
FDR Service	Yes (client)	–
Syslog	No	
SMTP e-mail notification	Yes	
TLS	–	
RTU communication services — Client or Server configuration	Yes (IEC104/DNP3 NET)	Yes (IEC101/DNP3)
Time- and date-stamped data exchange	Interrogation via polling and exchanges on change of status (RBE), unsolicited messaging	
DNP3 Secure authentication Version 2 and Version 5	No	–
IEC 60870-5-104 Channel Redundancy	No	–
Event Routing	Yes	No
RTU time synchronization	Yes (IEC104/DNP3 NET)	Yes (IEC101/DNP3)
Management and buffering of time- and date-stamped events	Yes (IEC104/DNP3 NET)	Yes (IEC101/DNP3)
Automatic transfer of time- and date-stamped events to the Client/SCADA	Yes (IEC104/DNP3 NET)	Yes (IEC101/DNP3)
Event Buffer Size	100,000 events (65,535 events per client, 4 clients max.)	
Data logging service	Yes, on 128 MB SD memory card, in CSV files, access via FTP, or sent by e-mail	
Compatibility with processor	All Modicon M340 processors, Modicon M580 standalone processors only	
Reference	**BMXNOR0200H**	
Pages	4/24	

(1) Reserved for future release

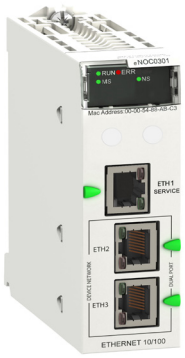
RTU communication	
Advanced RTU module	
	
IEC60870-5-104 (IEC 104), DNP3 NET (Subset level 3), Modbus/TCP, Isolated Serial link *(1)*	
100BASE-TX (Backplane port) Isolated RS-232/RS-485 (serial link)	
1xRJ45 (serial link) *(1)* Ethernet backplane connection	
CSMA/CD	
100 Mbps	
– – accessible via Ethernet backplane	
64	
4 (1 main channel + 3 virtual channels)	
Up to 4 BMXNOR0220H Advanced RTU modules depending on processor level *(2)*	
RTU module diagnostics Cybersecurity Settings	
–	
HTTPS (HTML5)	
No	
Yes	
Yes (agent)	
Yes	
Yes (client)	
Yes (client)	
No	
Yes (DNP3 NET and IEC 104)	
Yes (IEC104/DNP3 NET)	
Interrogation via polling and exchanges on change of status (RBE), unsolicited messaging	
Yes	
Yes	
Yes	
Yes (IEC104/DNP3 NET)	
Yes (IEC104/DNP3 NET)	
Yes (IEC104/DNP3 NET)	
150,000 events (65,535 events per client, 4 clients max.) 40,000 events for DNP3 SAv5 events (10,000 events per clients, 4 clients max.)	
–. *(1)*	
All Modicon M580 processors	
BMENOR0220H	
4/28	

(2) See Modicon M580 processors selection guide page 2/2

Modicon M580 automation platform

M580 Communication modules

Modbus/TCP and EtherNet/IP network modules



BMENOC0301

Presentation

BMENOC03●1 network modules act as an interface between the M580 PLC and other Ethernet network devices via the Modbus/TCP and EtherNet/IP communication protocols.

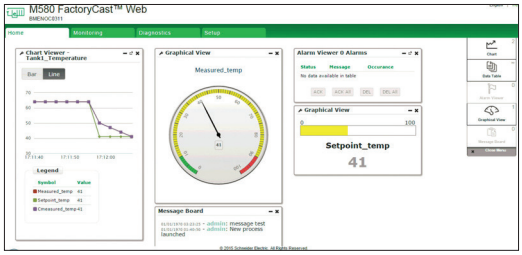
BMENOC03●1 network modules are standard format and occupy a single slot in the rack of the Modicon M580 platform. They have to be installed in the main Ethernet + X-bus backplane rack.

Functions

EtherNet/IP and Modbus/TCP network module

The **BMENOC0301** 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 (Fast Device Replacement) service
- Embedded Web server for application monitoring and module diagnostics: this is an HTML5 Web server that can be read by any device (PC, tablet, smartphone) with the majority of operating systems (Android, iOS, Windows)
- Sharing data between PLCs
- Network management using SNMP (Simple Network Management Protocol)

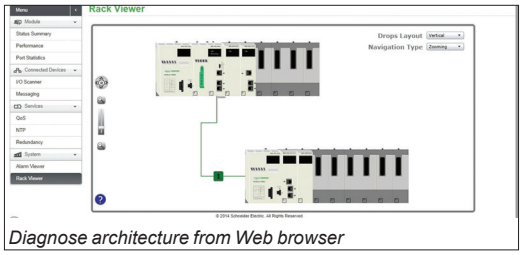


Customizable HTML5 Home page

Ethernet FactoryCast module

The **BMENOC0311** FactoryCast module provides additional web-based visualization of ePAC diagnostics and system data, such as:

- Custom web pages: allow the user to define a personalized interface
- Rack Viewer: provides a graphical representation of the configured ePAC system including all modules and I/O status
- ePAC Program Viewer: provides a web-based view of the EcoStruxure Control Expert *(1)* program code that animates logical states and variable values
- Customizable dashboard: allows a customized widget to be added to provide an optimum overview of the process data
- Trend Viewer: provides a graphical visualization of the variables
- Easy brand labeling: website logo and colors can be ajusted online



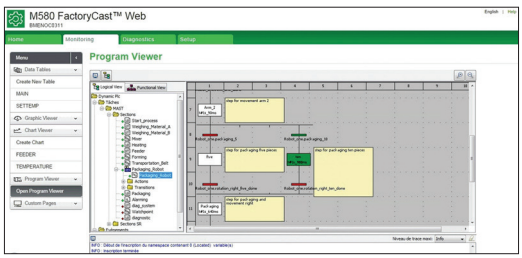
Diagnose architecture from Web browser

The customizable HTML5 Home page can display process values. It is compatible with the majority of operating systems on smartphones and tablets, such as Android, IOS, and Windows. By logging in from a common Web browser, it is easy to diagnose the architecture, and perform simple maintenance without EcoStruxure Control Expert *(1)* software.

Ethernet control router

The **BMENOC0321** Ethernet control router provides bridge transparency from the control network to the device network and connectivity with functions such as:

- Embedded IP forwarding: enables communication from the control network to PACs, PLCs, PCs, HMIs, etc.
- IPSec feature: applicable when the IP forwarding function is disabled
- Time synchronization: to be able to synchronize with external time servers and update the internal clock
- SMTP (Email): to send messages and alerts about the ePAC system
- Switch embedded in the M580 platform: provides a direct connection to the processor without any cable, and no separate power supply is required
- Fast Device Replacement service
- Multiple diagnostics: supports advanced web pages to FactoryCast, MB Diagnostics, EIP Diagnostics, and CNM (ConneXium Network Manager)



Simple application maintenance from Web browser

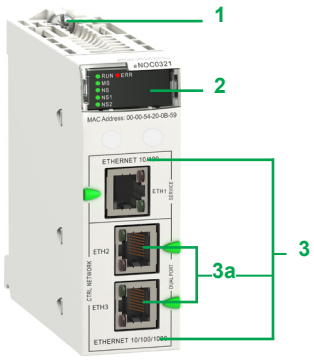
(1) Unity Pro software in earlier versions.

Processors: page 2/2
I/O architectures: page 5/2
Modules for severe environments: page 6/2

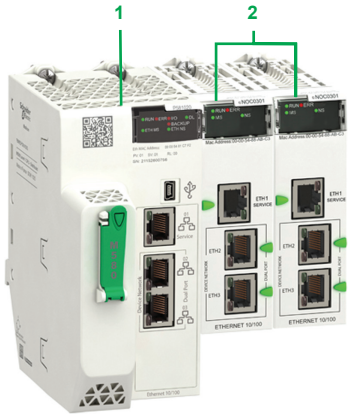
Modicon M580 automation platform

M580 Communication modules

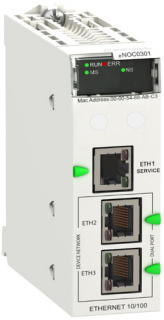
Modbus/TCP and EtherNet/IP network modules



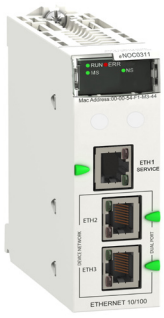
BMENOC03●1



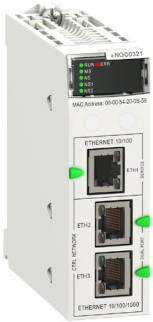
Example of BMEP58 and NOC module combination: BMEP581020/BMENOC0301/BMENOC0301



BMENOC0301



BMENOC0311



BMENOC0321

Description

The front panel of **BMENOC03●1** modules features:

1 Screw for locking the module in a slot in the rack

2 Display block with 4 LEDs:
- RUN LED (green): Operating status
- ERR LED (red): Error detected
- MS LED (green/red): Module status
- NS LED (green/red): Network connection status

BMENOC0321 modules have 2 additional LEDs:
- NS1 LED (green/red): Ethernet network status
- NS2 LED (green/red): Ethernet network status

3 3 RJ45 connectors for connection to the Ethernet network (the bottom two connectors **3a** support ring topologies (RSTP protocol))

Each RJ45 connector has 2 associated LEDs:
- LNK LED (yellow): Ethernet link established
- ACT LED (green): Transmission/reception activity

Combination of Ethernet modules and BMEP58 CPU

It is possible to combine Ethernet modules with the Modicon M580 CPU in order to increase its connectivity.
In this example, the 3 NOC EtherNet/IP, Modbus/TCP network modules **2** are linked to the BMEP58p0p0 CPU module **1**:

1 BMEP581020 CPU

2 BMENOC03●1 EtherNet/IP and Modbus/TCP network module

References

Description	Data rate	Reference	Weight kg/*lb*
M580 EtherNet/IP and Modbus/TCP network module	10/100 Mbps	**BMENOC0301**	0.200/ *0.441*
M580 Ethernet FactoryCast module	10/100 Mbps	**BMENOC0311**	0.200/ *0.441*
M580 Ethernet Control router	10/100 Mbps	**BMENOC0321**	0.200/ *0.441*

Processors: page 2/2
I/O architectures: page 5/2
Modules for severe environments: page 6/2

Modicon M580 automation platform

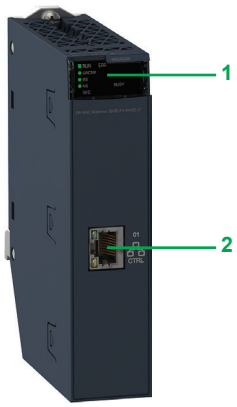
M580 Communication modules

OPC UA module

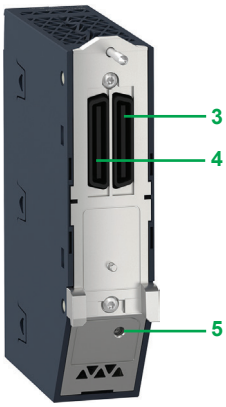
Presentation

The **BMENUA0100** OPC UA module is an Ethernet communications module with an embedded OPC UA server for communication with OPC UA clients, including SCADA. It brings high-performance OPC UA capabilities to Modicon M580 ePAC systems via the Modicon X80 modules platform.

OPC UA (Open Platform Communications Unified Architecture) is a modern, secure, open, reliable standard for industrial communications. It defines a common infrastructure model to facilitate information exchange for industrial processes, including information context via meta-data, helping to ensure open interoperability, eliminating engineering repetition, simplifying system configuration, and reducing maintenance overhead.



Front view



Rear view

BMENUA0100

Description

1 LED array
2 Control port with Ethernet link and activity LEDs
3 Ethernet backplane port
4 X-bus backplane port
5 Cybersecurity mode rotary switch. The three switch positions are:
- Secured
- Standard
- Security reset

The **BMENUA0100** module can be installed in any X80 Ethernet backplane slot in the head rack of a Modicon M580 ePAC system.

Modicon M580 automation platform

M580 Communication modules

OPC UA module

Features

The OPC UA module is available in two designs:
- **BMENUA0100** for standard environments
- **BMENUA0100H** for severe environments

The module includes the following features:
- Cybersecurity: Improved security by design features including encrypted firmware, network isolation, IPSEC integration, and full implementation of OPC UA cybersecurity features.
- Scalable performance: The module is designed to provide scalable performance from low bandwidth IIoT connectivity through to highly demanding operational SCADA connections with thousands of monitored variables without impacting M580 CPU scan rate.
- Simplified engineering: Integrated access to M580 ePAC data dictionary including simple or structured data types, online variable changes with no break in system communications and advanced, predefined diagnostic information.

OPC UA services

- Server Stack services (read/write, browse, call, publish, etc.)
- Server Stack Data Access Services
- Data Access Server Facet
- ComplexType 2017 Server Facet
- Core 2017 Server Facet
- Server Stack Discovery and Security Services
- Server Stack Publish and Subscribe Services
- Server Stack Transport Services

References

M580 OPC UA modules

Description	Reference	Weight kg/*lb*
OPC UA module for standard environments *(1)*	BMENUA0100	0.384/ *0.847*

(1) For severe environments, see page 6/5

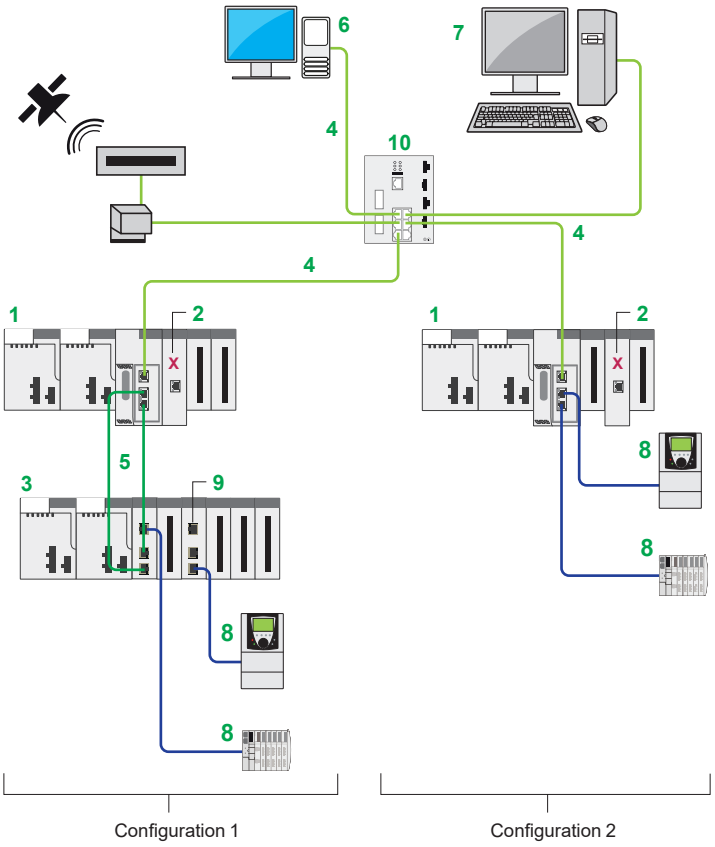
Modicon M580 automation platform

M580 Communication modules

OPC UA module

Example architectures

Flat network with multiple M580 Standalone CPUs and single SCADA



1 Standalone PAC
2 BMENUA0100 with control port disabled
3 X80 Ethernet RIO drop
4 Control network
5 Ethernet RIO main ring
6 OPC UA client (SCADA system)
7 Engineering workstation with single Ethernet connection
8 Distributed equipment
9 BMENOS0300 switch
10 Dual ring switch (DRS)

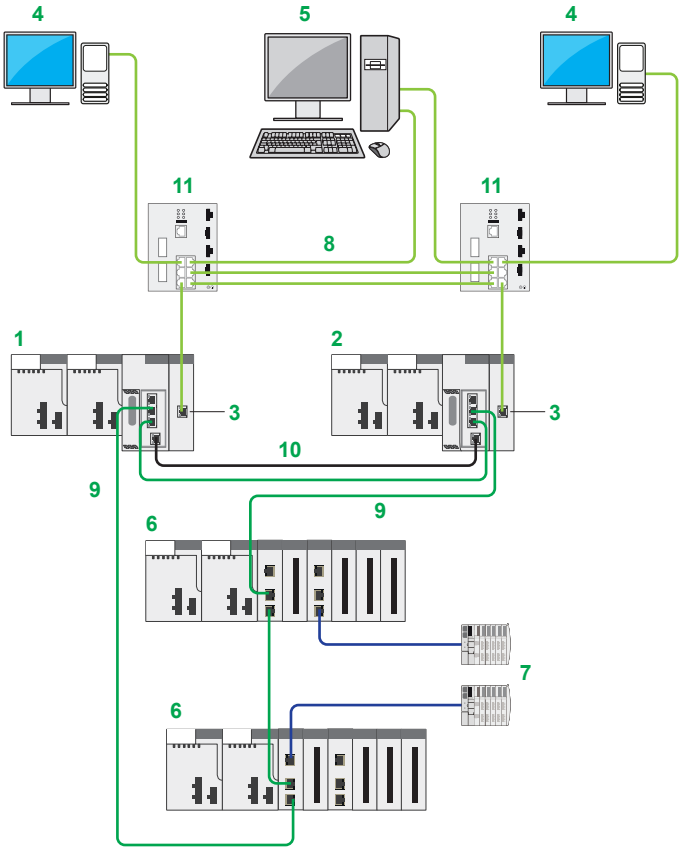
Modicon M580 automation platform

M580 Communication modules

OPC UA module

Example architectures (continued)

Isolated control network with M580 Hot Standby PACs



1 Primary Hot Standby PAC
2 Standby Hot Standby PAC
3 BMENUA0100 Ethernet communications module with embedded OPC UA server
4 OPC UA client (SCADA system)
5 Engineering workstation with dual Ethernet connections
6 X80 Ethernet RIO drop
7 Distributed equipment
8 Control network
9 Ethernet RIO main ring
10 Hot Standby communication link
11 Dual ring switch (DRS)

Modicon M580 automation platform

M580 Communication modules

IEC 61850 module

Presentation

IEC 61850 is the latest worldwide standard for electrical utilities. It covers information modeling, configuration language, and communication networks. Initially developed for communication in substations, implementation of the standard has advanced at a remarkable rate since its introduction, with huge numbers of IEC 61850 devices having been installed. Now considered to be the de facto standard for substation automation, it is encompassing an increasing number of new application areas, such as:

- Wind power (IEC 61400-25)
- Distributed energy resources (IEC 61850-7-420)
- Hydro power (IEC 61850-7-410)

The long-term active participation of Schneider Electric experts in IEC and UCA working groups has resulted in a state-of-the-art Schneider Electric IEC 61850 offer with full IEC 61850-8-1 functionality.
IEC 61850 with M580 helps reduce customer investment and operational costs by easily connecting their power device to the process systems.
M580 IEC 61850 helps to improve system reliability and security by:

- Getting the right data at the right time to be able to act proactively, thus increasing the reliability and availability of both the process and the power system
- Implementing robust M580 cybersecurity features to help ensure secure communication

Functionality

IEC 61850 MMS server, client, and GOOSE services can work in either Ed. 2.0 or Ed. 1.0 mode. M580 controllers support IEC 61850 standard engineering process and data objects. They also support the following data models:

- Substation automation systems (IEC 61850-7-4)
- Hydroelectric power plants (IEC 61850-7-410)
- Distributed energy resources (IEC 61850-7-420)

The **BMENOP0300** module from the Schneider Electric EcoStruxure platform is used to implement an engineering approach by enabling IEC 61850-compliant data exchange across industrial, energy, and power system applications. This offer helps our existing PLC customers from both process and energy applications to modernize smoothly and sustainably to the new IEC 61850 standard.

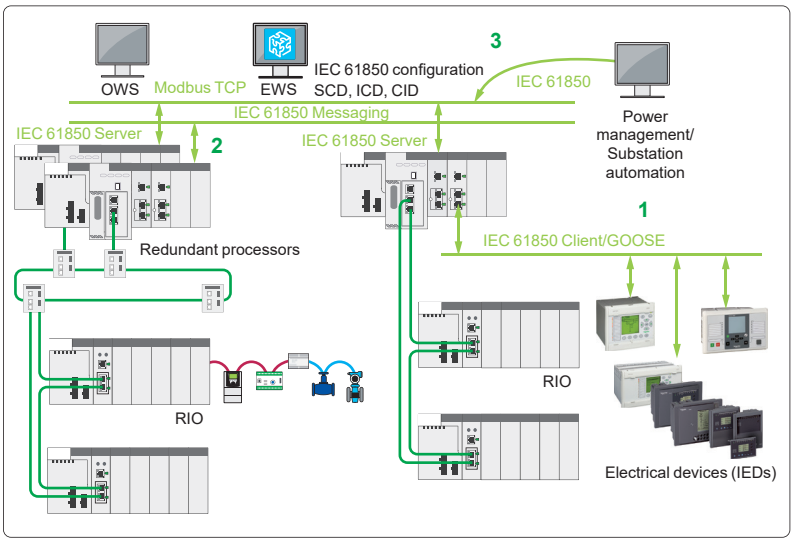
Application cases

The **BMENOP0300** module can provide different services under different roles, primarily in the following three areas:

1 Electrical device integration
   - IEC 61850 Client is used for communication with IEDs.
   - GOOSE is also possible.

2 IEC 61850 based process control
   - Process control objects are modeled with IEC61850 (hydro, DERs, etc.).
   - Server to SCADA and Client to IEDs is possible when needed.

3 M580 provides information to other systems
   - IEC 61850 Server is used.

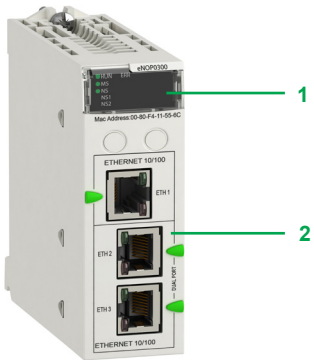


*Different services that **BMENOP0300** can provide*

Modicon M580 automation platform

M580 Communication modules

IEC 61850 module



BMENOP0300

Description

The **BMENOP0300** IEC 61850 module is installed on the local Ethernet backplane of a M580 system.

The 6 LEDs on the front panel **1** are used to diagnose operating conditions:
- RUN LED (green): Operating status
- ERR LED (red): Error detected
- MS LED (green/red): Module status
- NS LED (green/red): Network connection status
- NS1 LED (green/red): Ethernet network status
- NS2 LED (green/red): Ethernet network status

With three Ethernet ports **2** to link external intelligent electrical devices (IEDs), the module provides interfaces for IEC 61850 communication as well as device management software that utilizes the IEC 61850 standard *(1)*.

The maximum number of **BMENOP0300** modules that can be mounted on a local rack is determined by the M580 processor model:

Standalone processor model	**BMEP581020** **BMEP582020** **BMEP582040(S)**	**BMEP583020** **BMEP583040**	**BMEP584020** **BMEP584040(S)** **BMEP585040** **BMEP586040**
High-availability processor model	**BMEH582040(S)**		**BMEH584040(S)** **BMEH586040(S)**
Maximum number	**2**	**3**	**4**

Main features

The main features of the **BMENOP0300** module are as follows:
- Compatible with the entire range of M580 CPUs, in both standalone and redundant configuration:
  - Ring topologies on 2 Ethernet ports using RSTP (Rapid Spanning Tree Protocol)
- Cybersecurity features:
  - IEC 62443/ISA99 Achilles Level 2 certification
  - IPSec for IP-based communication
- IEC 61850 services:
  - MMS messaging server and client
  - GOOSE publisher and subscriber
- Network management using SNMP (Simple Network Management Protocol)
- Time synchronization: to be able to synchronize with external time servers and update the internal clock
- Modbus TCP support (limited, no I/O scanning)

Capabilities

The capabilities *(2)* per module are:
- 16 logical devices
- MMS server: 16 concurrent connections, 64 report control block instances, 8 instances for one report control block, 68 data sets, 256 data attributes/data set, URCB and BRCB reports
- Control model: DOes, SBOes, DOns, SBOns
- MMS client: 32 concurrent connections
- GOOSE: 4 control blocks for GOOSE publish and 32 control blocks for GOOSE subscribe, up to 256 inputs/data set

References

Description	Usage	Reference	Weight kg/*lb*
M580 IEC 61850 communication module	IEC 61850 communication module used in M580 local rack Ethernet backplanes	BMENOP0300 *(3)*	0.345/ *0.761*

(1) Requires EcoStruxure Control Expert or Unity Pro software V12.0 or later (see our website www.se.com).
(2) Depends on the data model complexity. Maximum value has to be balanced with module performance behavior (loop latency, response time, etc.)
(3) For the BMENOP0300C version with conformal coating, see page 6/5.

Modicon M580 automation platform

M580 Communication modules

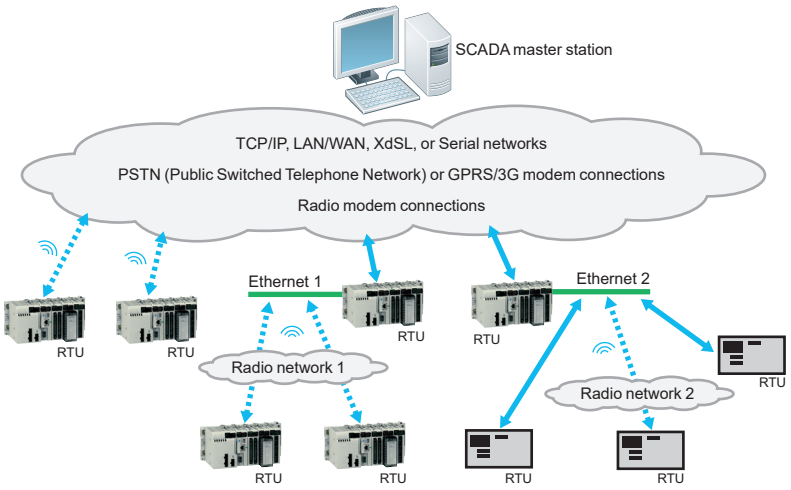
RTU communication

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 M580 automation platform
M580 Communication modules
RTU modules

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

■ Advanced RTU systems also feature (see page 4/28):
- □ Cybersecurity functions
- □ Simplified architecture
- □ Integrating RTU DTM in Control Expert for easier configuration
- □ Compliance with M580 Hot Standby
- □ Certificates under M580 Safety (Non-interfering Type1)
- □ Bulk configuration via Excel format

Two RTU communication modules are included in Schneider Electric offer with the following characterictics :

Features	BMENOR2200H	BMXNOR0200H
Platform support	M580(S)	M340, M580
Compliance with M580 Hot Standby	Yes	No
RTU protocol *(1)*	DNP3 NET IEC60870-5-104	DNP3, DNP3 NET, IEC60870-5-101, IEC60870-5-104
Ethernet protocol *(1)*	SNMP, SNTP, Modbus TCP, HTTPS	SNMP, SNTP, Modbus TCP, SMTP, FTP, HTTP
Firmware upgrade tool	Automation Device Maintenance	Unity loader
Cyber secure	Enhanced	Standard
Web diagnostics	Enhanced diagnostics	Standard diagnostics
Safety system support	Non-interfering Type 1	Not supported
Data logging *(1)*	No	Yes
Serial port *(1)*	No	Yes
IP address assignment	Static IP	DHCP, BootP, Static IP
SD card availability *(2)*	Optional	Mandatory
Event buffer size	150,000 + 40,000 *(3)*	100,000
Maximum input data	8,000 bytes	7,000 points totally (including input/output)
Maximum output data	8,000 bytes	7,000 points (including input/output)
Data attribution	Unlocated *(4)*	Located/Unlocated
Strings exchange in DNP3	Supported	No
DNP3 SA key method	Pre-shared key	No
DNP3 secure statistics	Yes	No
TLS on RTU protocols *(5)*	Self-signed & CA	No

(1) The BMENOR module will be improved later for supporting more functions in future release. Update will be achieved by upgrading firmware and DTM.
(2) The SD card is only used for the data logging feature.
(3) 40,000 event buffer used for DNP3 SAv5 security statistics events.
(4) When the user selects "On-Demand" mode for output type in DNP3/IEC104 Server, the value will be generated as a located variable.
(5) TLS V1.2 for RTU protocols (DNP3/IEC104)

Compatibility: page 1/18
Modules for severe environments: page 6/2

Modicon M580 automation platform

M580 Communication modules

RTU module

Presentation

The **BMXNOR0200H** communication module integrates the RTU (remote terminal unit) functions and protocols in the Modicon M580 automation platform for industrial telemetry applications and other widely distributed infrastructures.

The **BMXNOR0200H** module can be used to connect an RTU M580 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/*-13 to +158 °F*).

Functions

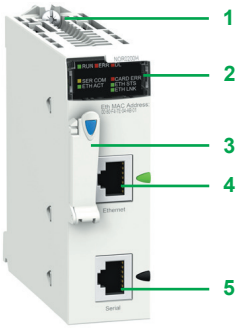
The **BMXNOR0200H** module offers the following functions:

- 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.

Compatibility:
page 1/18

Modules for severe environments:
page 6/2

Modicon M580 automation platform

M580 Communication modules

RTU module

BMXNOR0200H

References

Description	Communication port	Protocol	Reference	Weight kg/*lb*
M580 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 6/2.

(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:
page 1/18

Modules for severe environments:
page 6/2

Modicon M580 automation platform

M580 Communication modules

Advanced RTU module

Front view

Rear view

BMENOR2200H

Presentation

The **BMENOR2200H** Advanced RTU module is a communication module fully based on the Schneider Electric Ethernet backbone to address advanced use cases and complex configurations and reach new levels or architecture connectivity and simplicity:

- Optimum level of cybersecurity is reached from RTU protocol (DNP3 secure) to global Schneider architecture (RBAC).
- Configuration, operating mode, and diagnostics are fully integrated inside EcoStruxure Control Expert. Cybersecurity settings are configured on embedded web page based on HTTPS.

The **BMENOR2200H** module is designed to operate in large infrastructures such as Water & Waste Water, pipelines, power generation plants, and transportation. It supports harsh environments (extended temperature range: -25 to +70 °C/*-13 to +158 °F*).

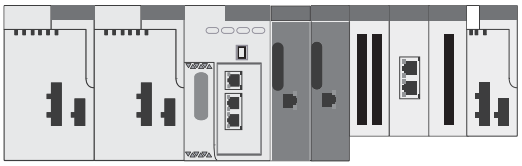
Functions

BMENOR2200H features the following key functions:

- DNP3 Net SAv2/5 by pre-shared key, Server/Client
- System log for cybersecurity
- Time synchronized by CPU or RTU protocol
- Web page (HTTPS) for diagnostics and cybersecurity setting
- SNTP Client
- SNMP Agent
- RBAC Management
- IEC60870-5-104, Server/Client
- Channel Redundancy for IEC104
- TLS on RTU Protocols
- Bulk configuration for RTU points
- Secure firmware download
- Sequence of Events (SOE)
- Modbus TCP Client/Server
- Other enhanced cybersecurity functions:
  - Enhanced password policy and login policy
  - System hardening, server services can be disabled/enabled
  - Rotary switch for selecting secure mode/standard mode
  - Secure boot

Description

BMENOR2200H is installed on an Ethernet rack only (supports up to 4 Advanced RTU modules per CPU, including other Ethernet module, based on different CPU levels).



The front panel of the **BMENOR2200H** module presents:

1. A screw for locking the module in a slot in the rack
2. A display block with 7 LEDs (hardware diagnostic information: RUN, detected error, download firmware, serial data status, detected SD Card error, Ethernet communication status, cybersecurity status)
3. A slot for a Flash memory card (4 GB SD card), with green protective cover *(1)*
4. A RJ45 serial port supporting RS485 and RS232 *(2)*

The back panel of the **BMENOR2200H** module features:

5. A rotary switch for cybersecurity (Secure mode, Standard mode and Reset) (a dedicated screwdriver is shipped in the box from factory)
6. A dual port for X-bus and Ethernet communication

(1) SD Card is only used for data logging feature, not implemented yet.
(2) Not implemented yet; dust cover is provided.

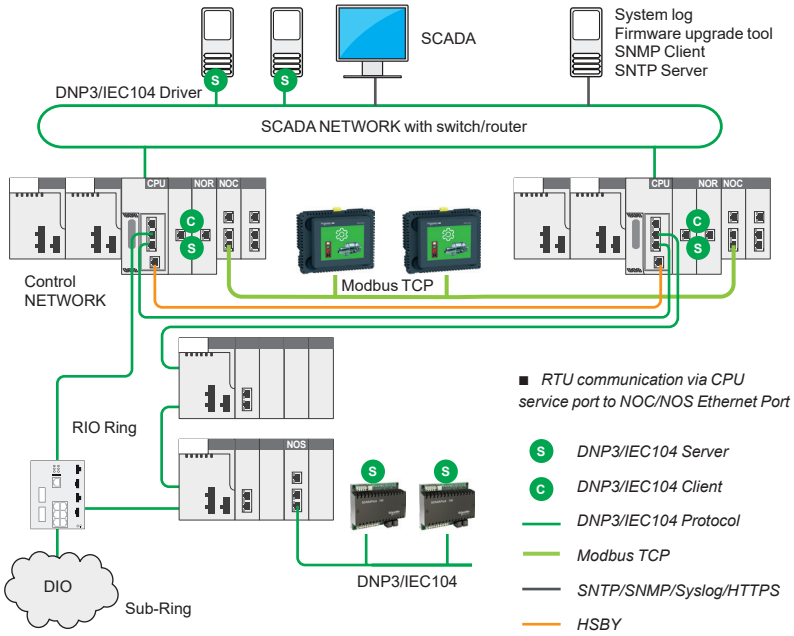
Modicon M580 automation platform

M580 Communication modules

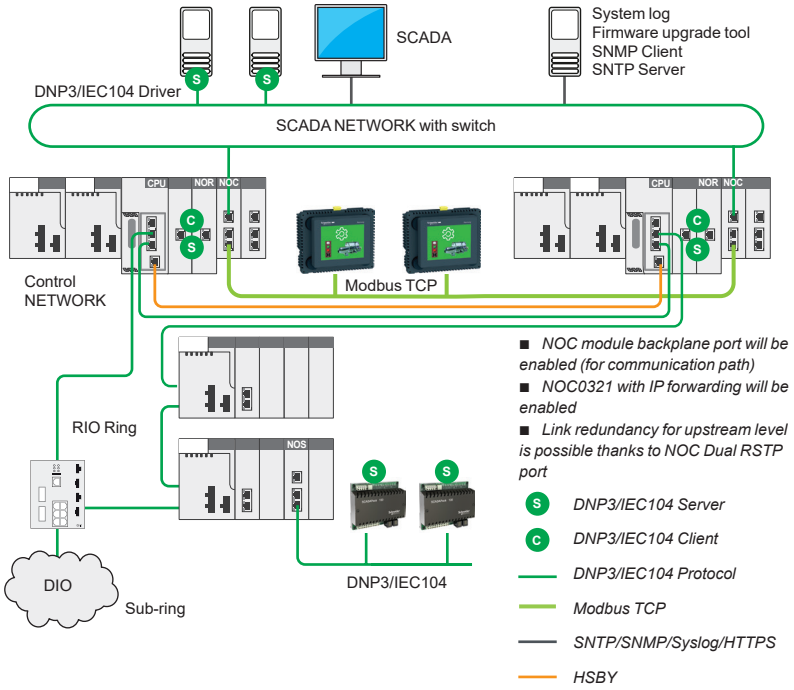
Advanced RTU module

Architecture

Example of architecture: Flat network



Example of architecture: Isolated network



References

Description	Communication port	Protocol	Reference	Weight kg/ *lb*
M580 Advanced RTU module, Ethernet-based, 1 serial port, hardened *(1)*	Ethernet	DNP3 SAv2/SAv5, IEC60870-5-104, Modbus TCP, SNMP, HTTPS, SNTP	BMENOR2200H	0.380/ *0.837*

(1) See module with severe environments characteristics, page 6/2.

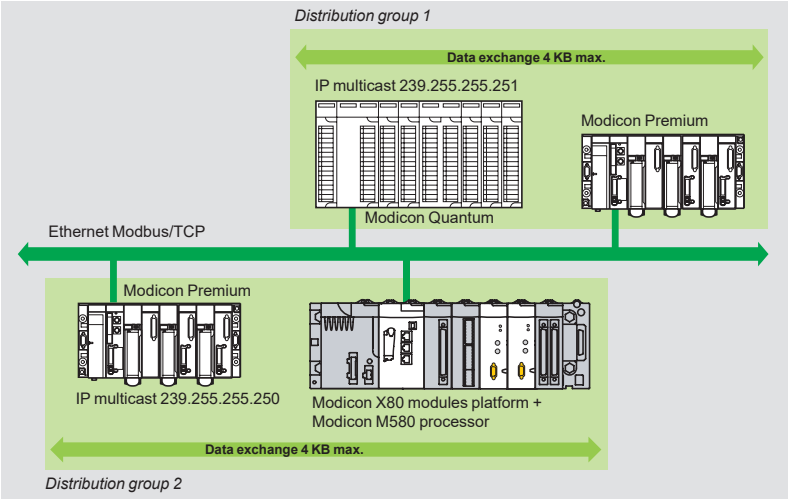
Modicon M580 automation platform

M580 Communication modules

Ethernet Global Data module

Presentation

Global Data service



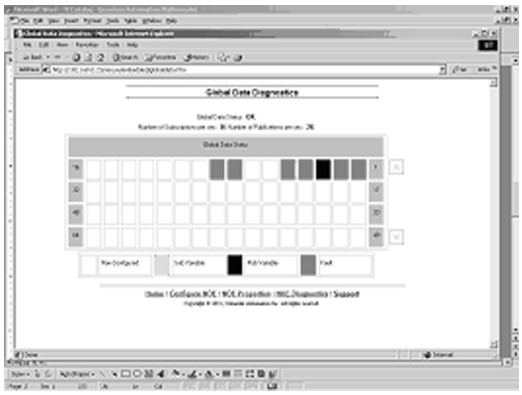
The Global Data service performs data exchanges in real time between stations belonging to the same distribution group. It is used to synchronize remote applications, or to share a common database between a number of distributed applications. Exchanges are based on a standard producer/consumer protocol, helping to ensure 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 rate can be configured between 10 ms and 1,500 ms in increments of 10 ms.
- Subscribe to between 1 and 64 variables. The validity of each variable is controlled by health status bits linked to a refresh timeout configurable between 50 ms and 15 s. 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, 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 diagnostics

Global Data service diagnostics

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

- Configured/not configured/detected fault
- Published/subscribed

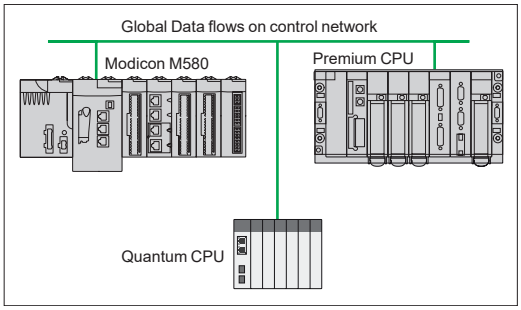
Global Data service diagnostics can be performed in one of four ways:

- 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 a Web browser on a PC station
- Using standard SNMP manager software

Modicon M580 automation platform

M580 Communication modules

Ethernet Global Data module



Example of architecture to implement BMXNGD0100

BMXNGD0100

Description

BMXNGD0100

The **BMXNGD0100** Ethernet Global Data module is specifically designed to modernize the large and complex Modicon installed base (mainly Premium and Quantum) by running the Global Data service more easily.

In addition to the Global Data service, the **BMXNGD0100** module also has the following embedded services, as it can also be used for inter-controller communication to provide solutions for complex processing and high-end applications:

- Ipconfig
- Modbus TCP explicit messaging (client and server)

Designed as a neat solution specifically for the Global Data service, some services, such as IO-Scanner, Web, FDR, and NTP, are not supported by the **BMXNGD0100** module. This module is only compatible with **BMEXBP●●●●** Ethernet racks in standalone architectures on the X80 platform, to keep the global data transferring internally only, isolated from the external world to help ensure a strict level of cybersecurity.

If these functions are required, please check with our Customer Care Center for alternative products that can fulfill these needs.

References

Description	Use	Reference	Weight kg/lb
X80 Ethernet Global Data module supplied Flash memory card (BMXRWSC016M)	Inter-controller communication service to transfer global data between each controller for complex multi-controller architectures	BMXNGD0100	0.200/ *0.440*
Flash memory card	Store global data for applications	BMXRWSC016M	0.002/ *0.004*

5

Contents

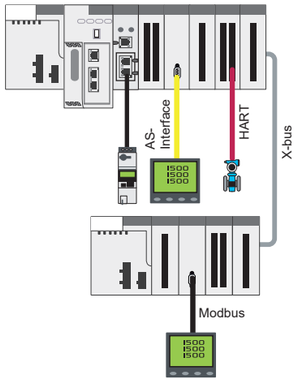
5 - Architectures

5

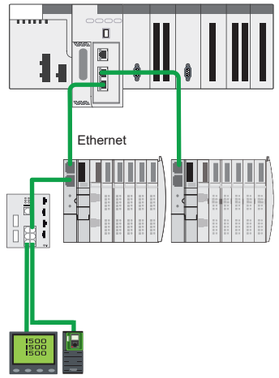
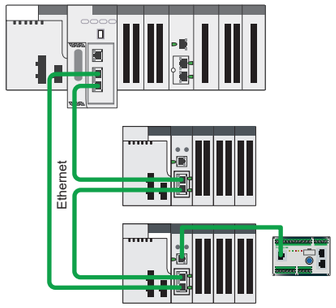
Modicon M580 automation platform

Architectures

Standard I/O architectures

Modicon M580 architecture type *Note: These architectures can be combined with each other*	Architectures with local racks (main rack and expansion racks)	
	Hardwired	Distributed peripherals over fieldbuses
	Compact topology with devices hardwired on local I/O	Compact topology with devices distributed over fieldbuses
	Local I/O architecture	Integrated fieldbus architecture
		
Expanded rack (with X-bus rack expansion module)		Main local rack with up to 7 local expansion racks on X-bus (Modicon Premium or Modicon X80 racks)
Backplane compatibility	BMEXBP●●00 Ethernet + X-bus racks	Compatible for main racks (local or remote)
	BMXXBP●●00 X-bus racks PV02 (or later)	Mandatory for expansion racks (main or remote) Compatible with any rack provided that no Modicon X80 I/O Ethernet modules (such as weighing, HART, and BMECRA31210 modules) are used in the racks
Compatible CPU types		All standalone processors are compatible *(1)*
CPU Ethernet ports	SERVICE port	One SERVICE port for HMI, EcoStruxure Control Expert *(2)*, control network, variable speed drive, etc.
	Dual port	Dual ports are not used
RIO drops		–
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
	10 ms with BMECRA31210 combined with discrete I/O modules in the RIO drop	–
Pages		5/7 5/8

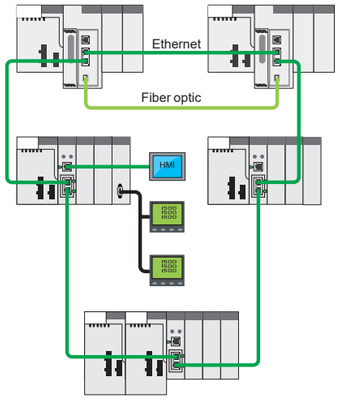
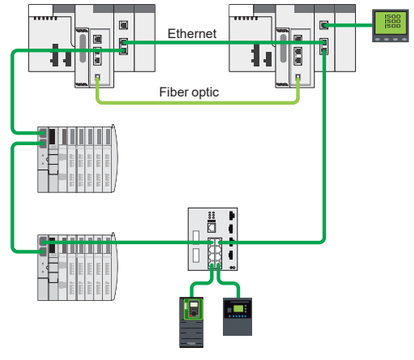
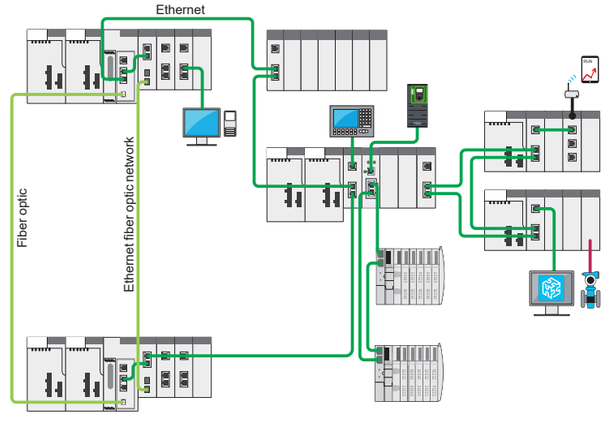
*(1) **BMEP58●●40** CPUs are not mandatory.*
(2) Unity Pro software in earlier versions.
*(3) **BMXCRA31210** modules are also compatible.*

Architecture with local racks (main rack and expansion racks)	Architecture with racks in remote drops
Distributed peripherals and I/O over Ethernet	Remote over Ethernet
Distributed devices and I/O topology over Ethernet	Remote I/O + remote functions (including fieldbus master)
Distributed I/O architecture	Remote I/O architecture
	
Main local rack with up to 7 local expansion racks on X-bus (Modicon Premium or Modicon X80 racks)	Main local rack with up to 7 local expansion racks on X-bus (Modicon Premium or Modicon X80 racks), RIO drop with up to 1 remote expanded rack on X-bus (only Modicon X80 racks)
Compatible for main racks (local or remote)	
Mandatory for expansion racks (main or remote) Compatible with any rack provided that no Modicon X80 I/O Ethernet modules (such as weighing, HART, and BMECRA31210 modules) are used in the racks	
All standalone processors compatible *(1)*	BMEP58●●40 CPUs are required to manage RIO
One SERVICE port for HMI, EcoStruxure Control Expert *(2)*, control network, variable speed drive, etc.	
Dual ports are used for distributed equipment (DIO scanner)	Dual ports are used for remote equipment (RIO scanner), BMECRA31210 Ethernet drop adapter is mandatory in RIO drop *(3)*
–	A maximum of 16 RIO drops can be supported in an M580 network
Yes	Yes, in a local rack or RIO drop
Yes	Yes, only in a local rack
Yes	Yes, only in a local rack
Yes	Yes, only in a local rack
Yes	Yes, in a local rack or RIO drop
Yes	Yes, in a local rack or RIO drop
–	Yes, only in the RIO drop, system mode with OFS *(3)*
5/9	5/10

Modicon M580 automation platform

Architectures

High-availability I/O architectures

Modicon M580 type of architecture	High-availability architectures for remote I/O (primary CPU and redundant CPU)	High-availability architectures for distributed I/O (primary CPU and redundant CPU)	High-availability architectures for hybrid I/O (primary CPU and redundant CPU)
	Remote over Ethernet	Distributed over Ethernet	Distributed and remote I/O over Ethernet
	Hot Standby topology with devices hardwired on remote I/O over Ethernet	Hot Standby topology with devices linked to distributed I/O over Ethernet	Hot Standby topology with devices available on distributed and remote I/O over Ethernet
	Remote I/O architecture	Distributed I/O architecture	Mixed RIO/DIO architecture
			
Expanded rack (with X-bus rack expansion module)	No local I/O on high-availability architecture	No local I/O on high-availability architecture	
Backplane compatibility BMEXBP●●00 Ethernet + X-bus racks	Compatible for main racks (remote only)	Compatible for main racks (remote only)	
Backplane compatibility BMXXBP●●00 X-bus racks PV02 (or later)	Mandatory for expansion racks (main or remote) Compatible with any rack provided that no Modicon X80 I/O Ethernet modules (such as weighing, HART, and BMECRA31210 modules) are used in the racks	Mandatory for expansion racks (main or remote) Compatible with any rack provided that no Modicon X80 I/O Ethernet modules (such as weighing, HART, and BMECRA31210 modules) are used in the racks	
Compatible CPU types	All redundant processors are compatible	All redundant processors are compatible	
CPU Ethernet ports SERVICE port	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.	
CPU Ethernet ports Dual port	Dual ports are used for remote equipment	Dual ports are used for distributed equipment (DIO scanner)	Dual ports are used for remote equipment (RIO scanner), BMECRA31210 Ethernet drop adapter is mandatory in RIO drop *(2)*
RIO drops	A maximum of 31 RIO drops can be supported in an M580 network	–	A maximum of 31 RIO drops can be supported in an M580 network
Communication AS-Interface and serial link modules	Yes	Yes	Yes, in a local rack or RIO drop
Communication BMXNOR0200H RTU module	Yes	Yes	Yes, only in a local rack
Communication Ethernet modules	Yes	Yes	Yes, only in a local rack
Expert functions PTO (pulse train output) modules	No	No	
Expert functions Other expert modules: counter, SSI encoder, etc.	Yes, in an RIO drop	No	Yes, in an RIO drop
Time stamping 1 ms max. BMXERT1604T module integrated in the ERT module	Yes, in an RIO drop	Yes	Yes, in an RIO drop
Time stamping 10 ms with BMECRA31210 combined with discrete I/O modules in the RIO drop	Yes, only in the RIO drop, system mode with OFS *(2)*	–	Yes, only in the RIO drop, system mode with OFS *(2)*
Pages	5/16	5/16	5/16

(1) Unity Pro software in earlier versions.
*(2) **BMXCRA31210** modules are also compatible.*

Modicon M580 automation platform
Architectures

Presentation

The Modicon M580 automation platform offers an I/O architecture solution over local racks, fieldbuses, and Ethernet, connecting the M580 main rack to remote I/O (RIO) drops, installed on a Modicon X80 rack *(1),* and distributed I/O (DIO) devices. The Modicon M580 solution comprises:

- RIO drops on a Modicon X80 drop
- Ethernet DIO devices
- A choice of 3 CRA Ethernet drop adapters (standard or high-performance) in each Modicon X80 RIO drop
- 2 fiber optic repeaters, for single-mode or multimode optical fiber, on Modicon X80 RIO drop
- A choice of three types of managed dual ring switches (DRS) from the ConneXium offer *(2)*, configurable by means of predefined configuration files for immediate setup

Different architectures are therefore possible, such as:

- Ethernet RIO architectures with or without ConneXium managed switches *(2)*
- Architectures with separate or combined Ethernet RIO and Ethernet DIO devices on the same physical medium

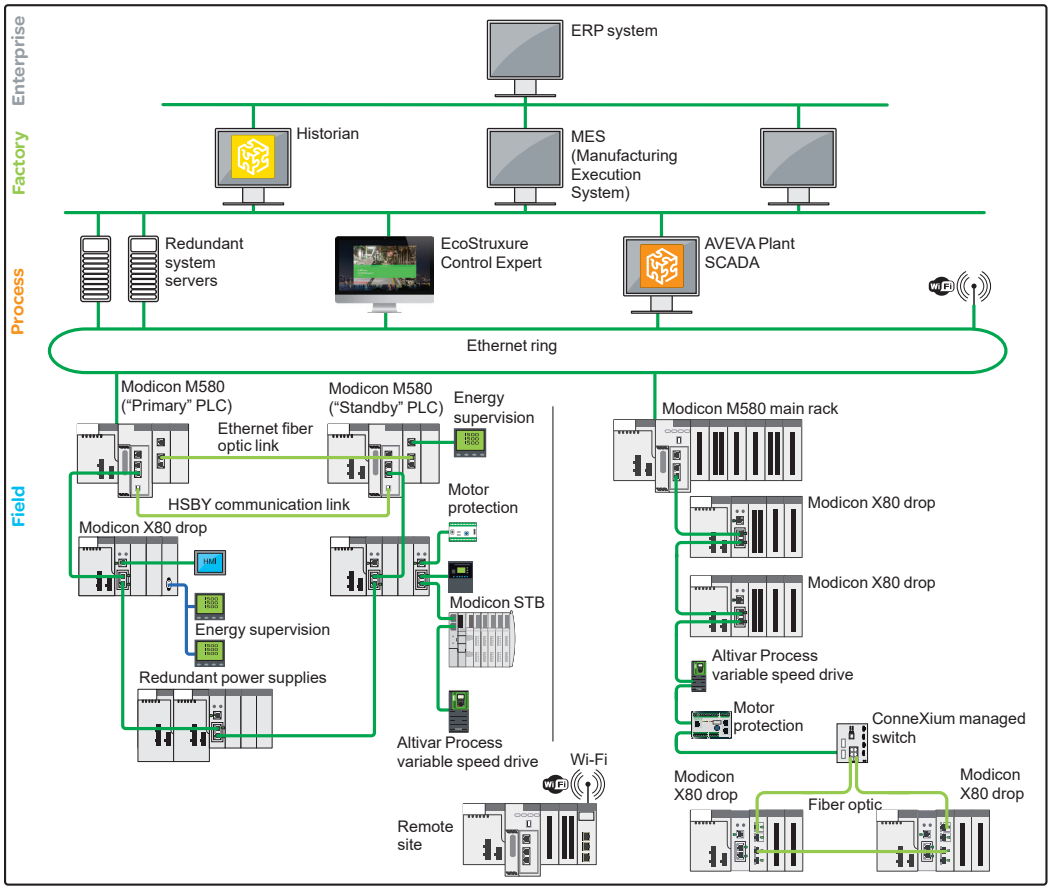
The following pages present 4 different types of architecture.

This solution also includes numerous options and functions as standard, providing:

- High process availability, with the option of connecting Ethernet RIO and Ethernet DIO in a daisy chain loop
- Deterministic data exchanges between the PLC and the Ethernet RIO
- Remote service, with a SERVICE port available on the M580 CPU or Modicon X80 CRA Ethernet drop adapters

Note

- The validated and tested architectures are shown in the technical documentation available on our website www.se.com.
- The use of switches other than those detailed in these architecture I/O pages (pages 5/6 to 5/15) is not supported *(2)*.



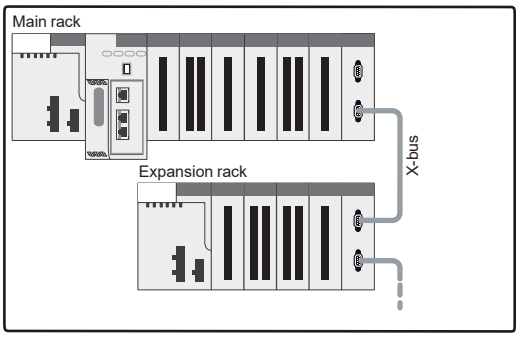
Typical architecture (3)

(1) The Modicon X80 range offers common I/O modules that can be used in Ethernet RIO drops connected in Modicon M580 automation platforms.
(2) Supported ConneXium switches: TCSESM083F23F1/063F2CU1/063F2CS1 (see page 5/12).
(3) This typical architecture representation is a conceptual network diagram and does not represent the actual wiring specifications.

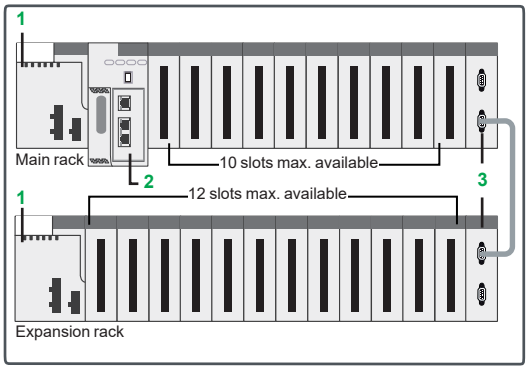
Processors:
page 2/2

M580 modules for severe environments:
page 6/2

Modicon M580 automation platform
Architectures
Local I/O architecture



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



For rack accessory references, see Modicon X80 modules platform catalog, chapter 2

Presentation

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

The M580 platform provides interrupt services for this type of application.

Up to 94 slots are possible for I/O modules in a configuration comprising a main rack and 7 expansion racks, connected by **BMXXBE●00●** rack expansion modules.

Description

The Modicon M580 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 10 I/O modules in the main rack, in addition to the CPU module **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
  - Weighing

Some application-specific modules (weighing, etc.) require the use of an Ethernet backplane.

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 8 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 94 available slots (with eight 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.
Empty **BMXXEM010** modules are also available to occupy unused slots.

Module addressing

With EcoStruxure Control Expert *(1)*, the I/O addressing is unlimited (physical limitation: 94 slots).

(1) Unity Pro software in earlier versions.

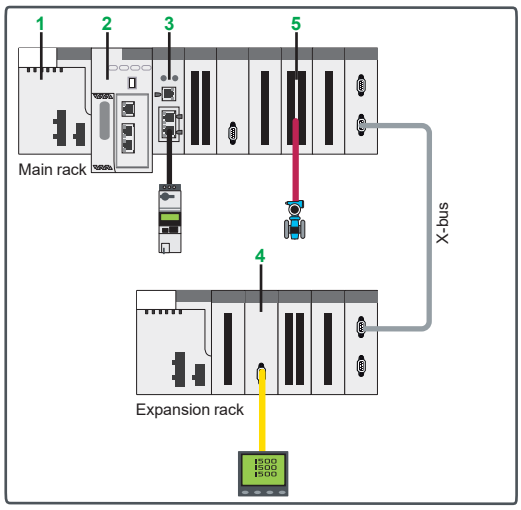
Processors:
page 2/2

M580 modules for severe environments:
page 6/2

Modicon M580 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, HART, 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 M580 automation platform provides interrupt services for this type of application.

Up to 94 slots are possible for I/O and communication modules in a configuration comprising a main rack and 7 expansion racks, connected by **BMXXBE●00●** rack expansion modules.

Description

The Modicon M580 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 10 I/O and communication modules in the main **BMEXBP●●00** rack, in addition to the CPU module **2** and the power supply module **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 modules are available:

- Communication modules:
  - Serial link **3**
  - AS-Interface **4**
  - HART **5**
  - PROFIBUS DP **6**
  - CANopen **7**

Some communication modules (Modbus/TCP and EtherNet/IP network module, HART analog I/O modules, 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 8 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 94 available slots (with eight 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.

Empty **BMXXEM010** modules are also available to occupy unused slots.

Module addressing

With EcoStruxure Control Expert *(1)*, the I/O addressing is unlimited (physical limitation: 94 slots).

(1) Unity Pro software in earlier versions.

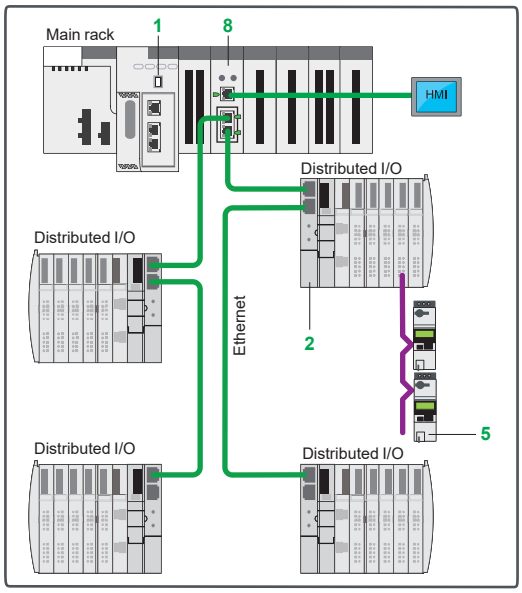
Processors: page 2/2

M580 modules for severe environments: page 6/2

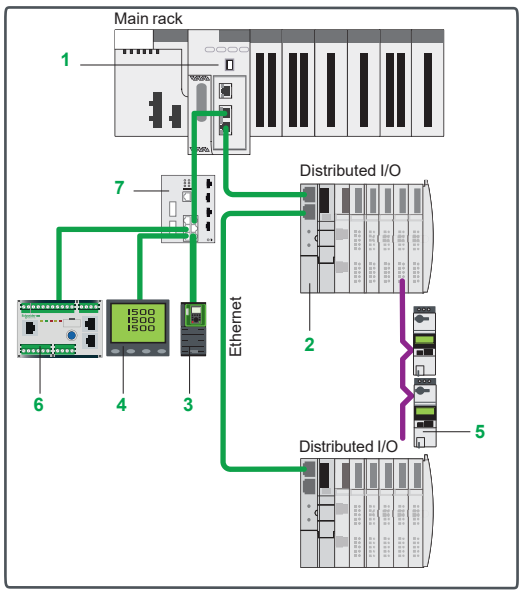
Modicon M580 automation platform

Architectures

Distributed I/O architecture



Distributed I/O architecture: devices distributed over Ethernet with BMENOS0300



Distributed I/O architecture: devices distributed over Ethernet with DRS

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 **BMEP58●0●0** CPU **1** or a ConneXium DRS (dual ring switch).

The available Ethernet DIO devices are:
- Modicon STB distributed I/O **2**
- Altivar Process variable speed drive **3**
- Energy supervision **4** and HMI
- Tesys U **5** connected via CANopen to a Modicon STB I/O Island and Tesys T/ Tesys Island **6** motor protection, etc.

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

High availability and expanded integration capacity

The distributed I/O architecture can use the embedded switching module or the external switches to expand the integration capacity.

The **BMENOS0300** Ethernet switch module **8** can be installed on a local or remote **BMEXBP●●●●** Ethernet main rack in the Modicon M580 platform. The external ConneXium DRSs **7** *(1)* can be loaded with 15 predefined configurations to simplify their implementation.

The use of these switches provides enhanced capacity for integrating the following devices:
- DIO sub-rings
- DIO clouds

The advantages of this architecture are:
- High availability of the Ethernet DIO devices

Maximum distance between each ConneXium managed switch:
- 100 m/*328 ft* with copper medium
- 2 km/*1.25 mi* with multimode optical fiber medium
- 16 km/*9.94 mi* with single-mode optical fiber medium

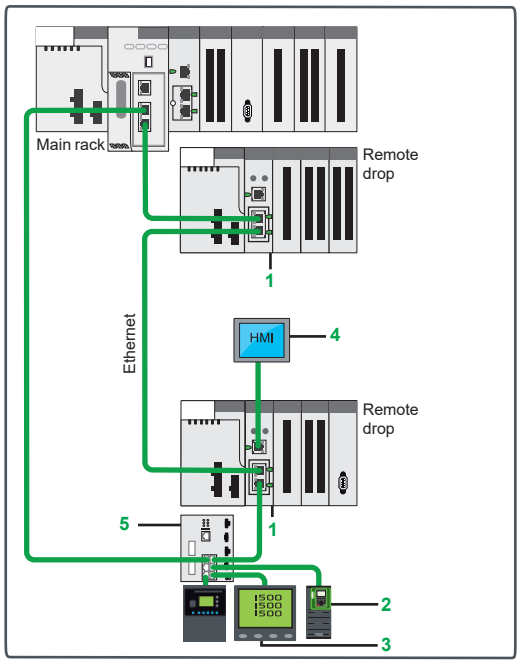
(1) Supported ConneXium switches: TCSESM083F23F1, TCSESM063F2CU1, and TCSESM063F2CS1.

5

Processors:
page 2/2

M580 modules for severe environments:
page 6/2

Modicon M580 automation platform
Architectures
Remote I/O architecture



Remote I/O architecture: devices on remote I/O

DIA6ED2131203EN

DIA6ED2140903EN

Presentation

The remote I/O architecture consists of remote I/O and remote functions (including fieldbus masters).

This type of architecture is fully compatible with the references in the Modicon M580 automation platform and Modicon X80 modules platform offers. The capacity of Modicon X80 I/O drops depends on the CRA Ethernet drop adapter used. A maximum of 16 RIO drops **1** can be supported in a remote I/O architecture system.

The available Ethernet devices are:

- Altivar Process variable speed drive **2**
- Energy supervision **3** and HMI **4**
- Tesys T motor protection, etc.

It is possible to include DIO devices in a remote I/O architecture via the SERVICE port of the CPU or the **BMECRA31210** drop adapter **1**, or via ConneXium DRSs **5**.

Rack Viewer function

The Rack Viewer function provides access to Ethernet RIO data via a Web browser.

Predefined configurations for ConneXium managed switches

The use of ConneXium managed switches specifically for Modicon M580 architectures is simplified using 15 predefined configuration files.

Standard remote I/O architecture

This is composed of a daisy chain loop consisting of a Modicon M580 main rack and several Modicon X80 I/O drops containing an Ethernet drop adapter:

- **BMECRA31210** Modicon X80 Remote I/O performance adapter, with SERVICE port
- **BMXCRA31210** Modicon X80 Remote I/O drop adapter, with SERVICE port
- **BMXCRA31200** Modicon X80 Remote I/O drop adapter, without SERVICE port

Long distance remote I/O architecture

Similar to the standard remote I/O architecture, this variant comprises one or more remotely located Modicon X80 I/O drops connected via integrated NRP fiber converter modules.

There are two types of NRP fiber converter modules:

- **BMXNRP0200**: multimode fiber converter module (remote location up to 2 km/*1.25 mi*)
- **BMXNRP0201**: single-mode fiber converter module (remote location up to 16 km/*9.94 mi*)

The NRP repeaters are linked to CRA drop adapters by means of Ethernet Interlink cables.

High availability and expanded integration capacity

The remote I/O architecture can use the embedded switching module or the external switches to expand the integration capacity.

The **BMENOS0300** Ethernet switch module can be installed on a local or remote **MEXBP●●●●** Ethernet main rack in the Modicon M580 platform. The external ConneXium DRSs **7** *(1)* can be loaded with 15 predefined configurations to simplify their implementation.

The use of these switches provides enhanced capacity for integrating the following devices:

- RIO sub-rings
- Fiber optic media for long distance remote location, etc.
- DIO integration in remote I/O architectures

The advantages of this architecture are:

- Reduced wiring costs
- Deterministic data exchanges between the PLC and the EIO devices
- Secondary rings can be linked to the main ring by two DRSs, which improve availability

Maximum distance between each ConneXium managed switch:

- 100 m/*328 ft* with copper (twisted pair) medium
- 2 km/*1.25 mi* with multimode optical fiber medium
- 16 km/*9.94 mi* with single-mode optical fiber medium

(1) Supported ConneXium switches: TCSESM083F23F1, TCSESM063F2CU1, and TCSESM063F2CS1.

Processors:
page 2/2

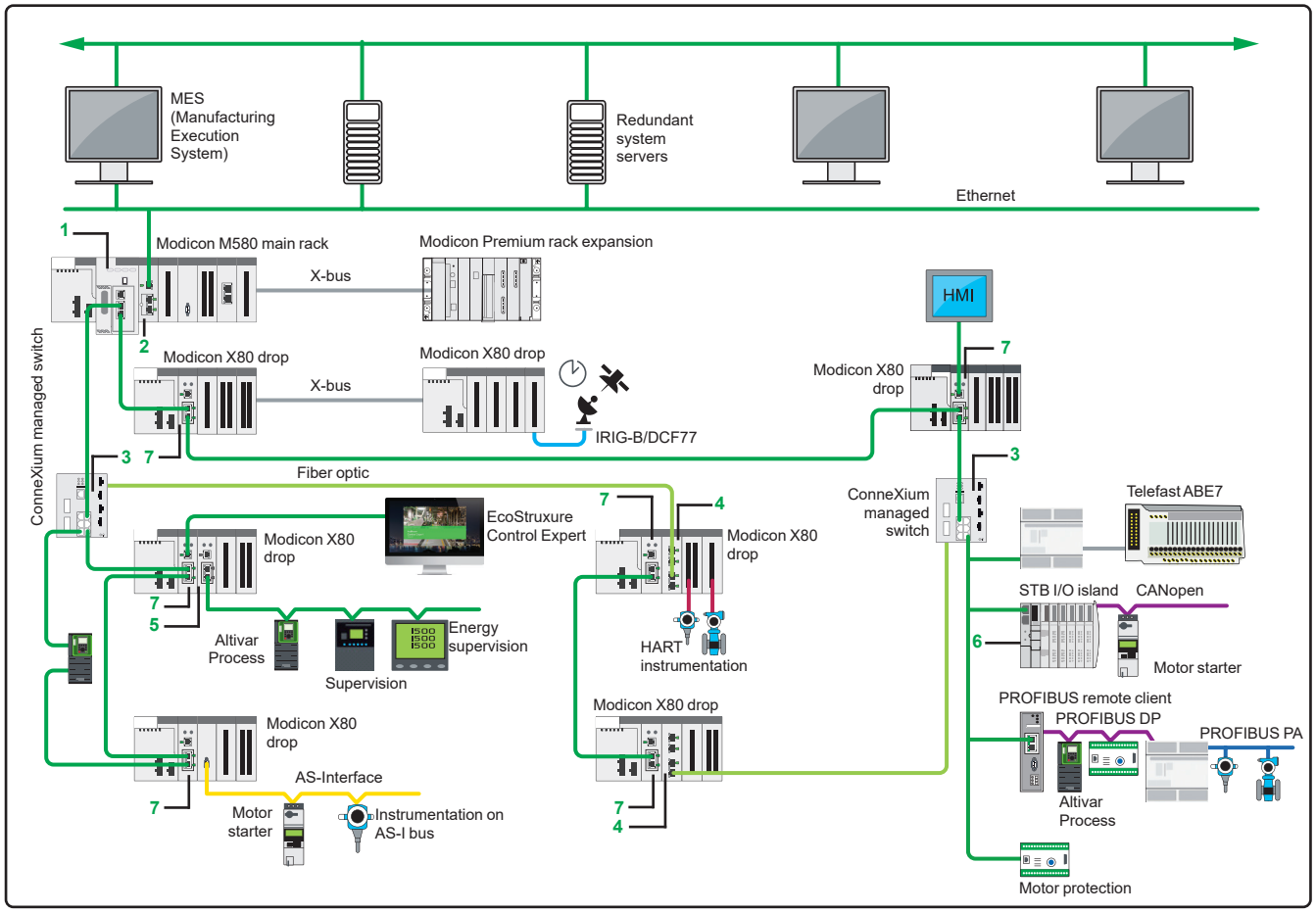
M580 modules for severe environments:
page 6/2

Modicon M580 automation platform
Architectures
Standard architectures

Example of a complex standard architecture

The complex architecture below illustrates the extensive possibilities of the Modicon M580 offer:

- A choice between 9 **BMEP58●0●0** CPUs **1**
- Easy integration of the I/O network with supervisors in the control network, due to the **BMENOC03●1** Ethernet module **2**
- Optimized wiring with RIO and DIO control via a single medium: the DIO are controlled via the CPU
- High availability of secondary rings with ConneXium managed switches **3**
- Long distance optimized by the fiber optic converter **4** installed directly in the Modicon X80 rack
- Simplified integration of devices via a serial link **5** (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 **6** or other diagnostic/configuration tools on any drop SERVICE port or on the DIO port of a managed switch
- Easy integration of Modicon X80 I/O drops on Ethernet with **BMECRA31210** drop adapters **7**



Example of a complex architecture

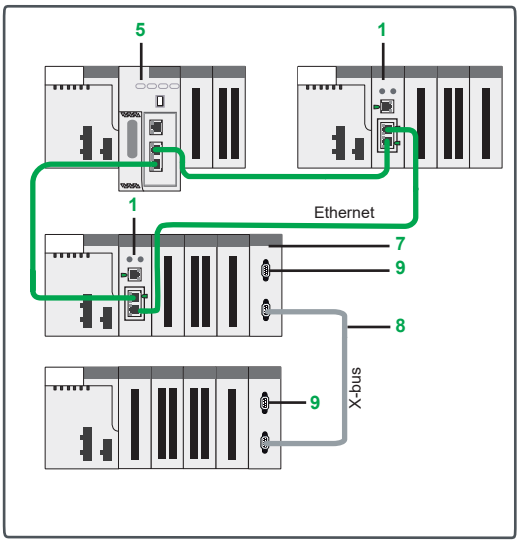
Processors:
page 2/2

M580 modules for severe environments:
page 6/2

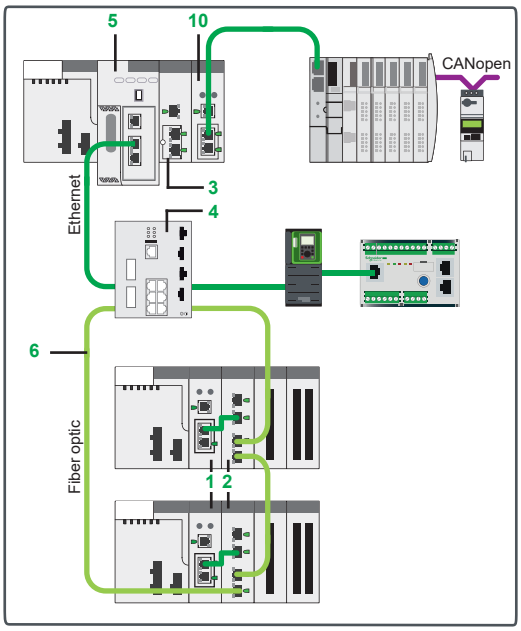
Modicon M580 automation platform

Architectures

Standard architectures



Local I/O architecture + Remote I/O architecture



Distributed I/O architecture + Remote I/O architecture

References *(1)*

Ethernet head and drop adapters *(2)*

Description	SERVICE port	Item *(3)*	Reference	Weight kg/*lb*
Modicon X80 EIO drop adapter Provide 1 module per Modicon X80 EIO drop	–	1	BMXCRA31200	0.200/ *0.441*
	1	1	BMXCRA31210 *(4)*	0.234/ *0.516*
	1	1	BMECRA31210 *(4)*	0.234/ *0.516*

Modicon X80 Ethernet RIO fiber converter modules *(2)*

Description	Optical fiber	Item *(3)*	Reference	Weight kg/*lb*
Modicon X80 Ethernet converter modules	Multimode	2	BMXNRP0200	0.203/ *0.448*
	Single-mode	2	BMXNRP0201	0.203/ *0.448*

Description		Item *(3)*	Reference	Weight kg/*lb*
Ethernet Interlink cables Length 1 m/*3.28 ft*	Standard version	–	TCSECN3M3M1S4	–
	UL version	–	TCSECN3M3M1S4U	–

Ethernet communication modules and cordsets *(2)*

Description	Item *(3)*	Reference	Weight kg/*lb*
EtherNet/IP, Modbus/TCP network module	3	BMENOC0301	0.200/ *0.441*
FactoryCast network module	3	BMENOC0311	0.200/ *0.441*
Embedded router network module	3	BMENOC0321	0.200/ *0.441*

Ethernet switch

Description	SERVICE port	Device network port (Ethernet)	Item *(3)*	Reference	Weight kg/*lb*
X80 Ethernet switch module	1	2	10	BMENOS0300	–

Dedicated ConneXium managed switches *(5)*

Copper port	Multimode fiber optic port	Single-mode fiber optic port	Item *(3)*	Reference *(4)*	Weight kg/*lb*
RJ45 shielded connectors	Duplex SC connectors				
8 x 10/100 BASE-TX ports	–	–	–	TCSESM083F23F1	1.000/ *2.205*
6 x 10/100 BASE-TX ports	2 x 10/100 BASE-FX ports	–	4	TCSESM063F2CU1	1.000/ *2.205*
	–	2 x 10/100 BASE-FX ports	4	TCSESM063F2CS1	1.000/ *2.205*

(1) For additional characteristics, see our website www.se.com.
(2) Requires EcoStruxure Control Expert or Unity Pro Extra Large software ≥ V8.0 (see page 5/15).
*(3) For items **5** to **9**, see page 5/13.*
(4) Conformal coating version for harsh environments. In this case, add the letter "C" to the end of the reference.
(5) ConneXium managed switches validated for Modicon M580 architectures.

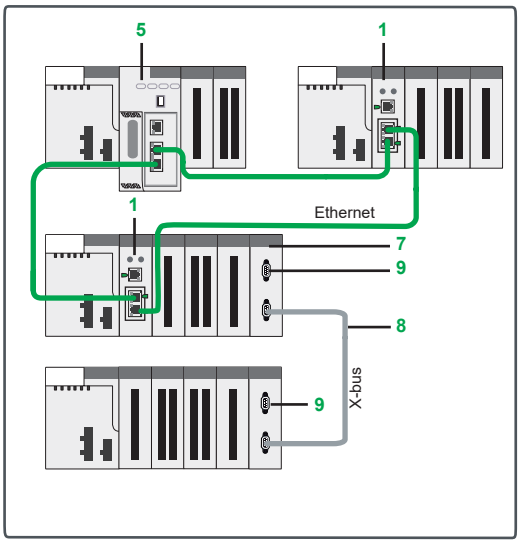
Processors:
page 2/2

M580 modules for severe environments:
page 6/2

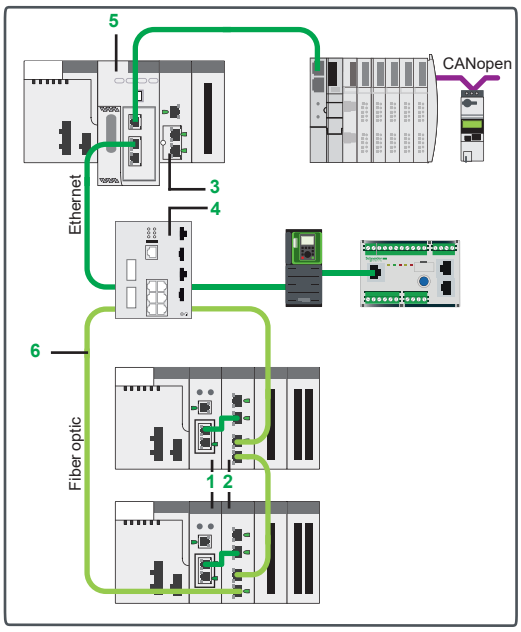
Modicon M580 automation platform

Architectures

Standard architectures



Local I/O architecture + Remote I/O architecture



Distributed I/O architecture + Remote I/O architecture

References (continued) *(1)*

Modicon M580 processors *(2)*

I/O capacity	Device ports	SERVICE port	Item *(2)*	Reference	Weight kg/*lb*
1,024 discrete I/O **256 analog I/O** **24 application-specific channels** 4 MB integrated (memory program)	2 DIO	1	5	BMEP581020	–
2,048 discrete I/O **512 analog I/O** **32 application-specific channels** 8 MB integrated (memory program)	2 DIO	1	5	BMEP582020	–
	2 RIO	1	5	BMEP582040	–
3,072 discrete I/O **768 analog I/O** **64 application-specific channels** 12 MB integrated (memory program)	2 DIO	1	5	BMEP583020	–
	2 RIO	1	5	BMEP583040	–
4,096 discrete I/O **1,024 analog I/O** **64 application-specific channels** 16 MB integrated (memory program)	2 DIO	1	5	BMEP584020	–
	2 RIO	1	5	BMEP584040	–

Fiber optic cable

Description	Length m/*ft*	Item *(2)*	Reference	Weight kg/*lb*
62.5/125 µm multimode fiber optic cables equipped with MT-RJ connectors For interconnection of the Ethernet port on the CPU or BMECRA adapter **1**	3/*9.84*	6	490NOR00003	–
	5/*16.40*	6	490NOR00005	–

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.	7	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)	 7 8 9	BMXXBE2005	0.700/ *1.543*

(1) For additional characteristics, see our website www.se.com.
*(2) For items **1** to **4**, see page 5/12.*

5

References (continued) (1)

Description	Type of connector	Length m/ft	Item (2)	Reference	Weight kg/lb
X-bus preformed extension cordsets with two 9-pin SUB-D connectors	Elbowed	0.8/2.63	8	BMXXBC008K	0.165/0.364
		1.5/4.92	8	BMXXBC015K	0.250/0.551
		3/9.84	8	BMXXBC030K	0.420/0.926
		5/16.4	8	BMXXBC050K	0.650/1.433
		12/39	8	BMXXBC120K	1.440/3.175
	Straight	1/3.28	8	TSXCBY010K	0.160/0.353
		3/9.84	8	TSXCBY030K	0.260/0.573
		5/16.4	8	TSXCBY050K	0.360/0.794
		12/39	8	TSXCBY120K	1,260/2.778
		18/59	8	TSXCBY180K	1,860/4.101
		28/92	8	TSXCBY280KT (3)	2.860/6.305

Description	Use	Length m/ft	Item (2)	Reference	Weight kg/lb
Cable on reel Cable with free ends, 2 line testers	To be equipped with 2 TSXCBYK9 connectors	100/328	–	TSXCBY1000	12,320/27.161

Description	Use	Sold in lots of	Item (2)	Reference	Weight kg/lb
Line terminator 2 x 9-way SUB-D connectors marked A/ and /B	Required on the 2 BM●XBP●●●0 modules located at either end of the daisy chain	2	9	TSXTLYEX	0.050/0.110
X-bus straight connectors 2 x 9-way SUB-D connectors	For TSXCBY1000 cable ends	2	–	TSXCBYK9	0.080/0.176
Connector installation kit 2 crimping pliers, 1 pen (4)	For fixing TSXCBYK9 connectors	–	–	TSXCBYACC10	–

(1) For additional characteristics, see our website www.se.com.
*(2) For items **1** to **4**, see page 5/12 and for items **5** to **7**, see page 5/13*
(3) Cable supplied with a set of 2 TSXTVSY100 electrical transient suppressors.
(4) Installation of connectors on the cable also requires a wire stripper, a pair of scissors, and a digital ohmmeter.

Requirements for a Modicon M580 Ethernet I/O architecture (1)

The table below gives the minimum hardware and software requirements for setting up a Modicon M580 I/O architecture.

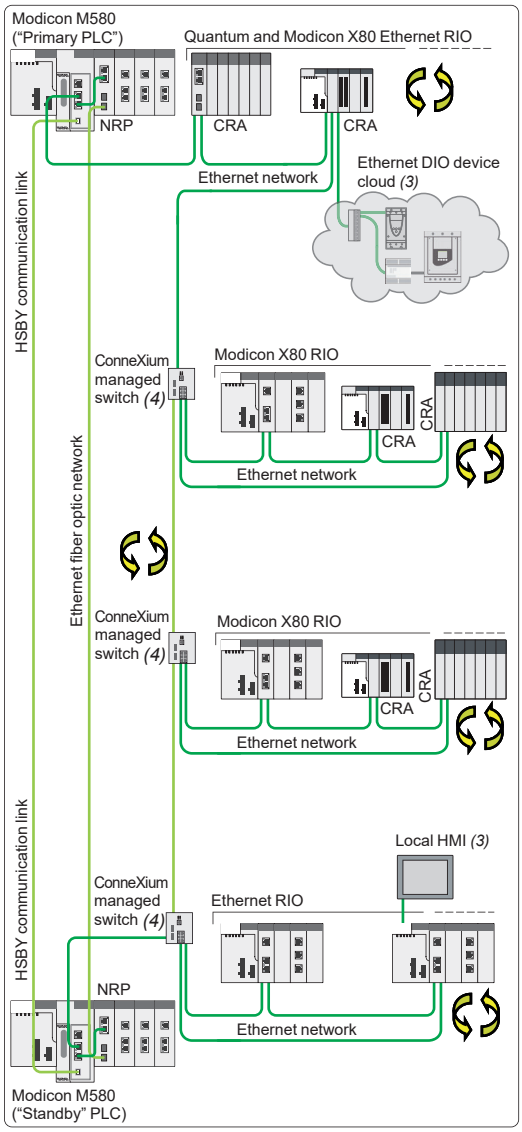
Description of the hardware or software required	Reference	Version	Item (2)
Unity Pro Extra Large software	**UNISPUEF●CD80**	≥ 8.0	–
Modicon X80 Remote I/O drop adapter	**BMECRA31210**	≥ 2.0	1
	BMXCRA31200	≥ 2.0	1
	BMXCRA31210	≥ 2.0	1
Modicon X80 Fiber converter modules	**BMXNRP0200**	–	2
	BMXNRP0201	–	2
ConneXium managed switches	**TCSESM083F23F1**	Firmware ≥ 6.0	4
	TCSESM063F2CU1	Firmware ≥ 6.0	4
	TCSESM063F2CS1	Firmware ≥ 6.0	4
M580 CPUs	**BMEP581020**	Firmware ≥ 1.0	5
	BMEP582020	Firmware ≥ 1.0	5
	BMEP582040	Firmware ≥ 1.0	5
	BMEP583020	Firmware ≥ 1.0	5
	BMEP583040	Firmware ≥ 1.0	5
	BMEP584020	Firmware ≥ 1.0	5
	BMEP584040	Firmware ≥ 1.0	5
	BMEP585040	Firmware ≥ 1.0	5
	BMEP586040	Firmware ≥ 1.0	5

(1) For additional characteristics, see our website www.se.com.

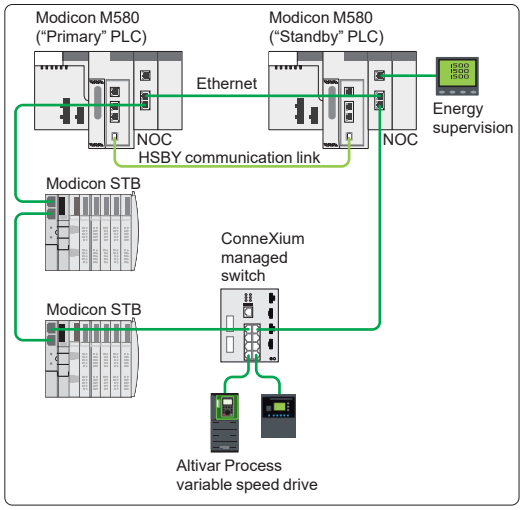
Modicon M580 automation platform

Architectures

High-availability architectures



Modicon M580 Hot Standby Ethernet I/O architecture, long distance



Modicon M580 Hot Standby Ethernet I/O architecture with Ethernet DIO devices, without CRA Ethernet drop adapter

Types of M580 high-availability architecture *(1)*

High-availability system

The EcoStruxure Modicon PAC high-availability system is used for more demanding applications, in terms of the availability of their control/command system, as no interruption of the process can be tolerated. This system helps to ensure global availability of the redundant CPU and Ethernet I/O devices.

At the heart of this architecture are two PLC racks ("Primary" and "Standby") with identical hardware configurations, based on **BMEH58●●40** EcoStruxure Control Expert redundant CPUs, connected via a high-speed (1 Gbps) link (copper or fiber optic). The volume of data exchanged between the "Primary" and "Standby" PLCs can reach 4 MB depending on the CPU.

The "Primary" PLC executes the application program and controls the I/O, while the "Standby" PLC remains in the background.
In the event of a detected error affecting the "Primary" PLC, the "Standby" system switches over automatically, changing over execution of the application program and control of the I/O to the "Standby" PLC with an up-to-date data context.
Once the changeover is complete, the "Standby" PLC becomes the "Primary" PLC.
Once the detected error has been cleared on the other PLC and it has been reconnected to the standby system, it acts as the "Standby" PLC.
The changeover is performed smoothly at the outputs and is completely transparent to the process.

The high-availability system with EcoStruxure Control Expert *(2)* software thus increases productivity by minimizing process downtime.

High-availability system based on remote I/O architecture

The high-availability system based on the remote I/O (RIO) architecture is used for sensitive processes that require an I/O control takeover time within the region of the PLC scan time.
As the Ethernet RIO drops are synchronized with the PLC CPU scan time, the CPU changeover is carried out smoothly at the outputs, i.e. it is bumpless.

Due to the built-in Ethernet technology of Modicon M580 controllers, the remote I/O architecture is simple to realize. There is no need to insert an Ethernet head adapter module twice in the "Primary" PLC and the "Standby" PLC. The capacity of Modicon X80 I/O drops depends on the CRA Ethernet drop adapter used.
A maximum of 31 RIO drops can be supported in a Hot Standby remote I/O architecture. Automatic switching of the IP address of these modules helps to ensure transparent addressing to SCADA, even in the event of a CPU changeover.

High-availability system based on Ethernet DIO device architecture

In this type of high-availability architecture without Ethernet RIO drops, the CRA Ethernet drop adapter is not required.
Only one M580 Ethernet module **BMENOC03●1** or X80 **BMENOS0300** (if less than 61 DIO) is required in each "Primary" and "Standby" PLC using distributed devices.
The changeover from "Primary" to "Standby" processor might not be bumpless depending on the type of DIO used. Please contact our Customer Care Center for more information.

(1) Requires EcoStruxure Control Expert or Unity Pro Extra Large software ≥ V11.0.
(2) Unity Pro software in earlier versions.
(3) Please refer to the relevant product catalogs on our website www.se.com.
(4) As well as the secondary ring, an Ethernet DIO device cloud can be connected to each managed switch.

Modicon M580 automation platform

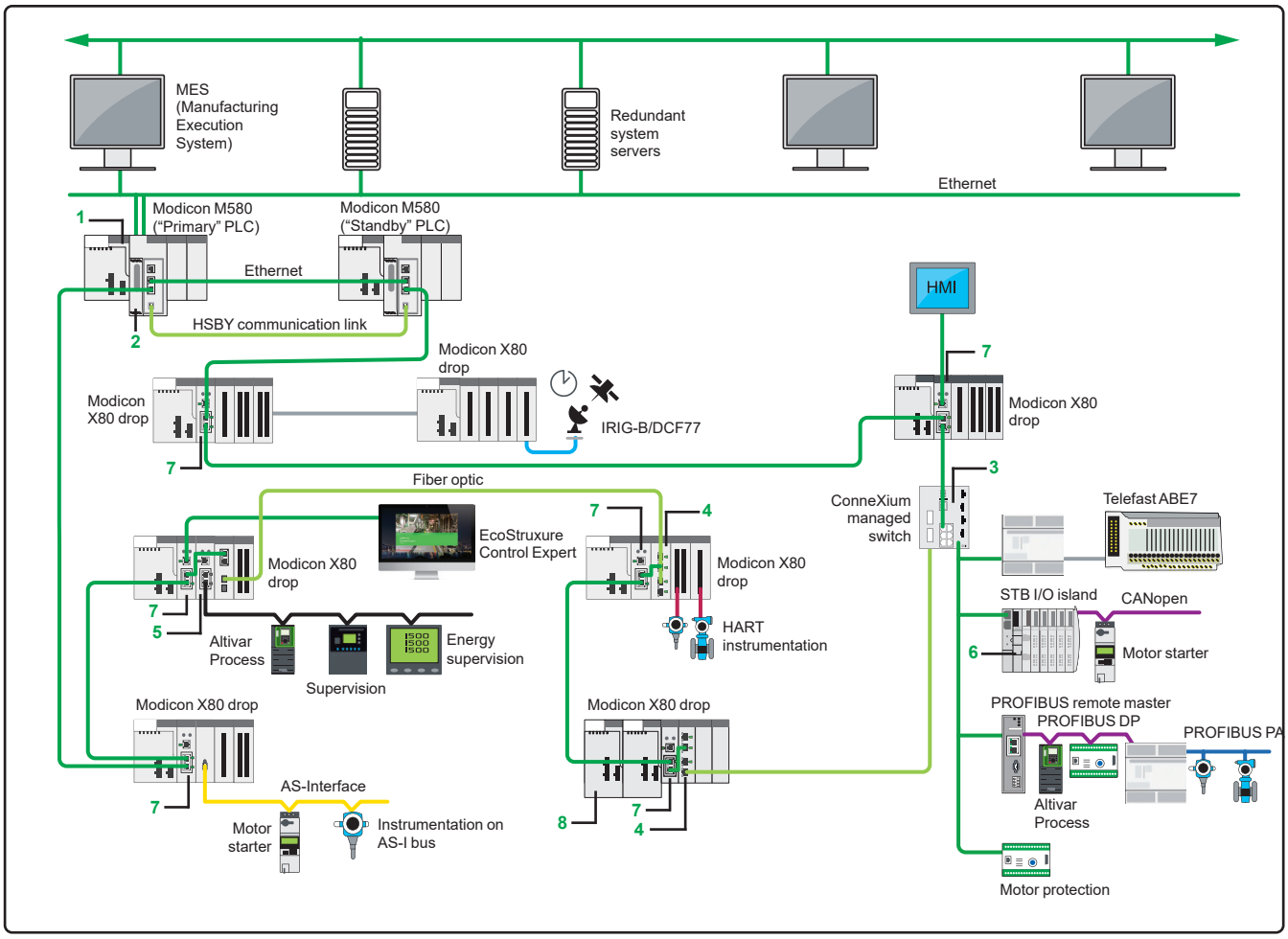
Architectures

High-availability architectures

Example of a complex high-availability architecture

The complex architecture below illustrates the extensive possibilities of the Modicon M580 offer:

- A choice between 3 **BMEH58●040** M580 redundant CPUs **1**
- Easy integration of the I/O network with supervisors in the control network, due to the **BMENOC03●1** Ethernet module **2**
- Optimized wiring with RIO and DIO control via a single medium: the DIO are controlled via the CPU
- High availability of secondary rings with ConneXium managed switches **3**
- Long distance optimized by the fiber optic converter **4** installed directly in the Modicon X80 rack
- Simplified integration of devices via a serial link **5** (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 **6** or other diagnostic/configuration tools on any drop SERVICE port or on the DIO port of a managed switch
- Easy integration of Modicon X80 I/O drops on Ethernet with **BMECRA31210** drop adapters **7**
- The redundant power supplies are compatible with both single power supply racks for standard applications, and the dual power supply racks are compatible with high-availability applications **8**



Example of a complex architecture

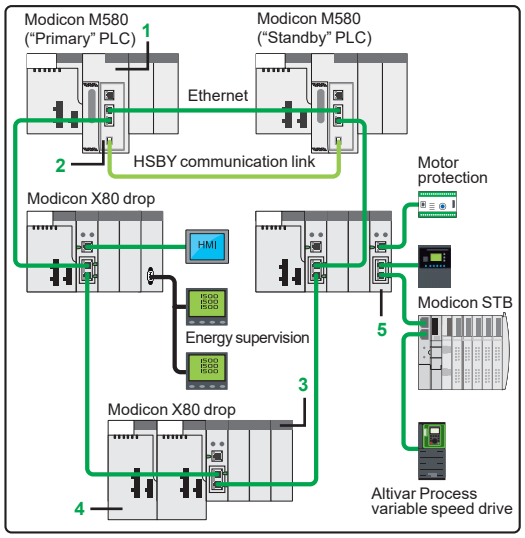
Processors:
page 2/2

M580 modules for severe environments:
page 6/2

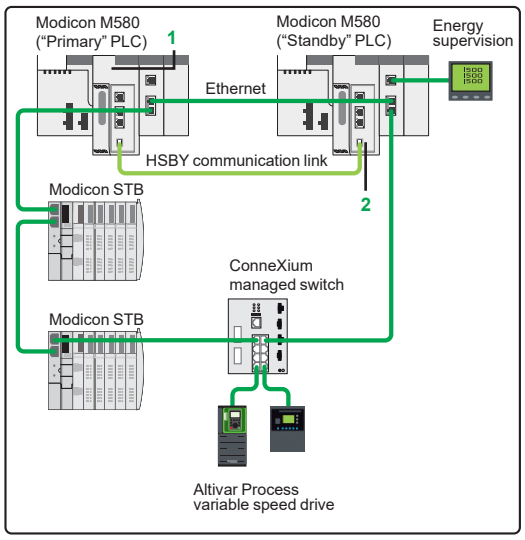
Modicon M580 automation platform

Architectures

High-availability architectures



Remote I/O architecture



Distributed I/O architecture

References *(1)*

Modicon M580 redundant processors *(2)*

Memory capacity	Device ports	SERVICE port	Item *(3)*	Reference	Weight kg/*lb*
8 MB integrated (memory program)	2 RIO	1	1	BMEH582040	0.849/ *1.872*
16 MB integrated (memory program)	2 RIO	1	1	BMEH584040	0.849/ *1.872*
64 MB integrated (memory program)	2 RIO	1	1	BMEH586040	0.849/ *1.872*

Accessories

Description	Use	Cable medium	Item	Reference	Weight kg/*lb*
HSBY link SFP socket (one reference for one socket)	To be inserted in pair in 2 **BMEH58●●40** redundant processors for short distance	RJ45 copper	2	490NAC0100	–
	To be inserted in pair in 2 **BMEH58●●40** redundant processors for long distance	Single-mode fiber	2	490NAC0201	–

Ethernet + X-bus dual power supply racks

Description	Type of module to be inserted	Ethernet connectors	X-bus connectors	Power consumption	Item *(3)*	Reference	Weight kg/*lb*
6-slot Ethernet + X-bus dual power supply backplane	**BMXCPS4002●** redundant power supply, **BMEP58/ BMEH58** processor, I/O modules, communication modules, and application-specific modules (counter, motion control, and serial)	4	6	3.9 W	3	BMEXBP0602	1.377/ *3.036*
10-slot Ethernet + X-bus dual power supply backplane		8	10	3.9 W	3	BMEXBP1002	1.377/ *3.036*

Redundancy power supply modules

Line supply	Available power			Nominal current	Item *(3)*	Reference	Weight kg/*lb*
	3.3 V ⎓ *(3)*	24 V ⎓ *(3)*	Total	24 V ⎓ rack			
100...240 V ∼	18 W	40 W	40 W	1.67 A	4	BMXCPS4002	0.360/ *0.794*
100...240 V ∼	18 W	40 W	40 W	1.67 A	4	BMXCPS4002H	0.360/ *0.794*

Ethernet switch module

Description	SERVICE port	Device network port (Ethernet)	Item	Reference	Weight kg/*lb*
Ethernet switch module	1	2	5	BMENOS0300	–

(1) For additional characteristics, see our website www.se.com.
(2) For additional characteristics, refer to our Redundant processors selection guide page 2/4.
(3) 3.3 V ⎓ and 24 V ⎓ rack voltages for powering modules in the Modicon X80 I/O rack.

Processors:
page 2/2

Ruggedized Modicon M580 modules:
page 6/2

Modicon M580 automation platform

Architectures

High-availability architectures

BMEH58●040K Hot Standby kits

References (continued) *(1)*

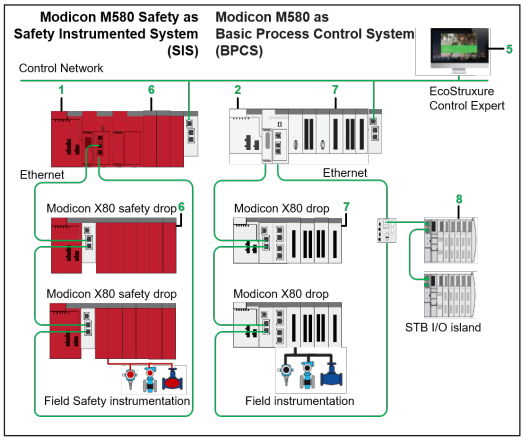
Hot Standby kits

Description	Composition	Reference	Weight kg/*lb*
M580 Hot Standby kit	- 2 Modicon M580 **BMEH582020** redundant processors - 2 RJ45 SFP sockets **490NAC0100**	BMEH582040K	–
	- 2 Modicon M580 **BMEH584020** redundant processors - 2 RJ45 SFP sockets **490NAC0100**	BMEH584040K	–

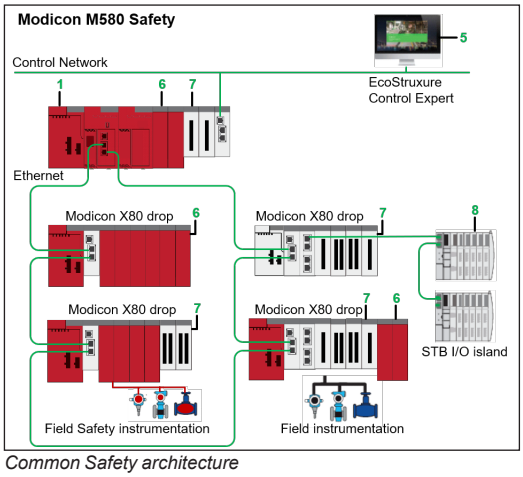
(1) For additional characteristics, see our website www.se.com.

5

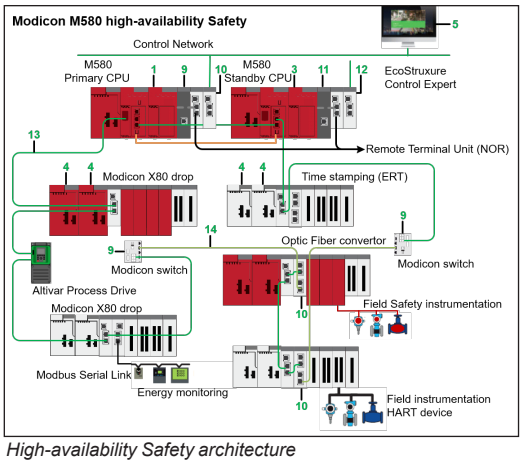
Modicon M580 automation platform
Safety architectures



Integrated Safety architecture



Common Safety architecture



High-availability Safety architecture

Types of M580 Safety architecture

Integrated Safety

This architecture is based on a Modicon M580 Safety PAC **1** monitoring Safety Instrumented Functions with X80 Safety I/O **4** and a Modicon M580 PAC **2** operating the Process with X80 **5** and STB **6** I/O. Both PAC are engineered with EcoStruxure Control Expert **3**.

The Modicon M580 Safety PAC inherits all the Modicon M580 characteristics in term of features, performance, and architecture.

This Integrated solution in most useful for medium to large architecture, or if a physical separation is required in between the Basic Process Control System (BPCS) and the Safety Integrity System (SIS).

Common Safety

This architecture is based on a single Modicon M580 Safety PAC **1** monitoring Safety Instrumented Functions with X80 Safety I/O **2** and operating the process with X80 **4** and STB **5** I/O.

The same PAC is managing both Process and Safety. Logics are separated but integrated in the same EcoStruxure Control Expert application **3**.

This Common Safety solution in most useful for small to medium architecture. In this case the Basic Process Control System and the Safety Integrity System are integrated in the same hardware but independent from each other. The non-safety related X80 I/O modules as the DIO islands are classified as non-interfering with Safety.

High-availability safety

The Modicon M580 Safety PAC can be used in standard or high-availability architectures using respectively standalone or redundant controllers (Hot Standby system).

The high-availability architecture provides the same reliability level (SIL3) as the single architecture and provides features for critical processes to configure with EcoStruxure Control Expert **3**.

To increase availability, the Modicon PAC allows to use in a simple way:
- Redundant processors, named “Primary CPU” **1** and “Standby CPU” **2**
- Redundant Power Supply **4**
- Ethernet ring network topology **8**

The ring can be made of copper **8** and optical fiber links **7** with using DRS Modicon switches **5** and X80 optical converters **6**.

Primary and Standby CPU racks do not support X80 I/O but only communication modules as for example **9** with Remote Terminal Unit (**BMENOR2200H**) and **10** with the control network (**BMENOC03●1**).
Other types of communication may be used for OPC UA (**BMENUA0100**), IEC61850 (**BMENOP0300**), PROFIBUS DP (**PMEPXM0100**) communication.

Modicon M580 automation platform

Safety architectures

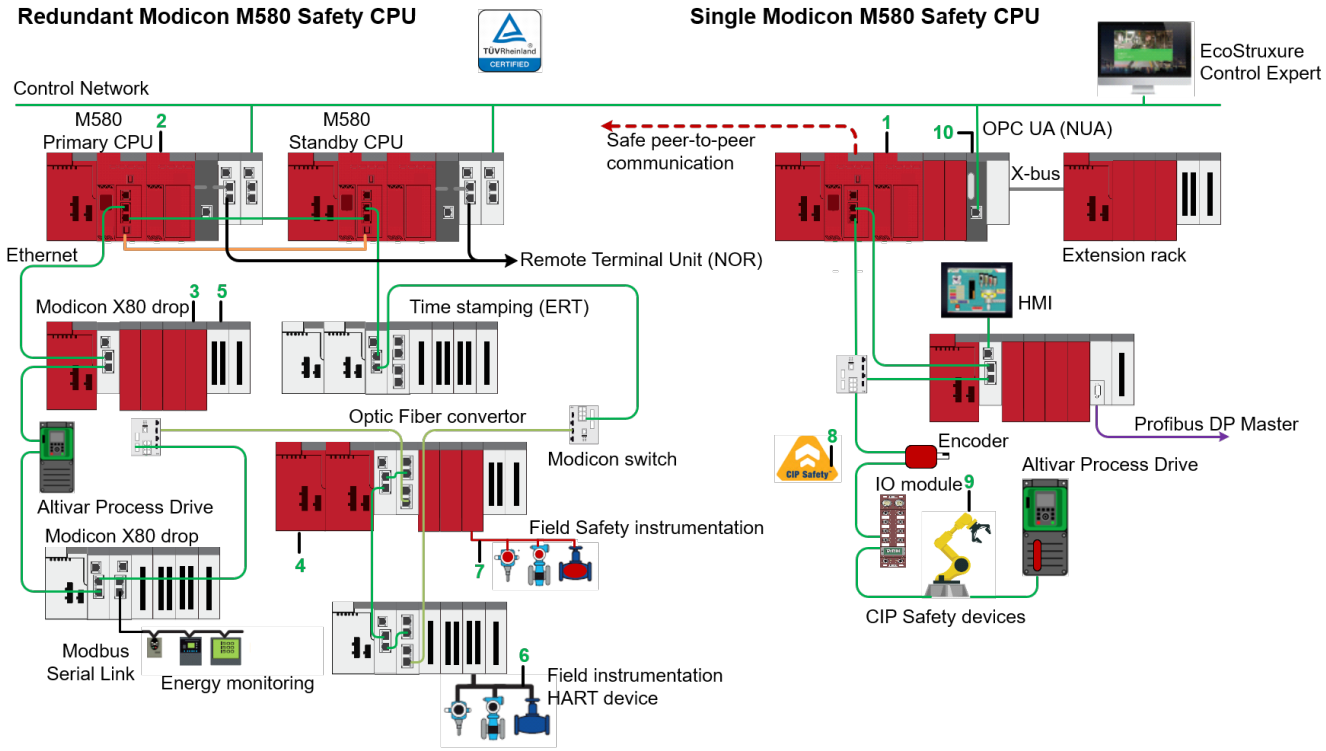
Example of a safety complex architecture

Example of a Safety complex architecture

The bellow Safety architecture illustrates the extensive possibilities of the Modicon M580 offer:

- A choice between **BMEP58●040S** Standalone M580 Safety CPU **1** and **BMEH58●040S** Redundant M580 Safety CPU **2**.
- The possibility to integrate in the same architecture Modicon M580 and Modicon M580 Safety PAC with a physical separation between the Control and the Safety part of the system.
- The possibility to use Common Safety mixing Process control and Safety in the same PAC with a logical separation. The Safety CPU can manage the Process part of the application with using standard, non-safety related, X80 IO **5** connected to non-safety related Safety instrumentation **6** and the Safety part of the application with using Safety IO **3**, connected to Safety instrumentation **7**.
- Standalone CPU can be using third-party Safety devices **9** over CIP Safety **8**.

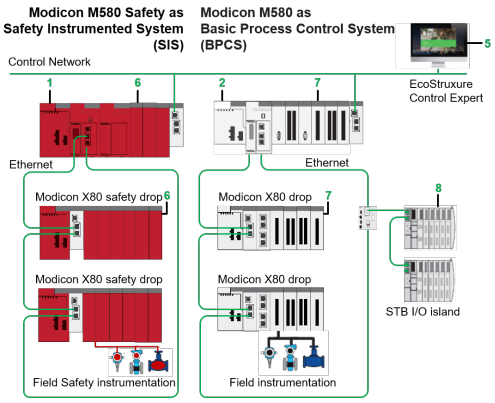
A Modicon M580 Safety architecture inherits all Modicon M580 features in term of architecture and performance. Hence, all previous architecture descriptions can apply to Safety CPU with the restriction about usage of non-interfering X80 IO modules. The simple rule is X80 non-interfering Type-1 modules can be located as required but non-interfering Type-2 modules can only be in non-safety related racks (without any safety module in). The complete and official list of non-interfering modules is in the TÜV Certificate Revision List (Certificate 01/205/5610/01/19). Please consult TÜV website for more details.

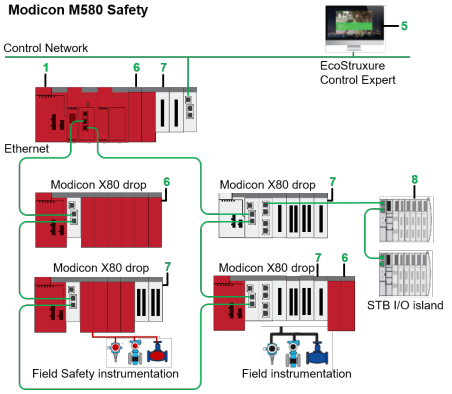


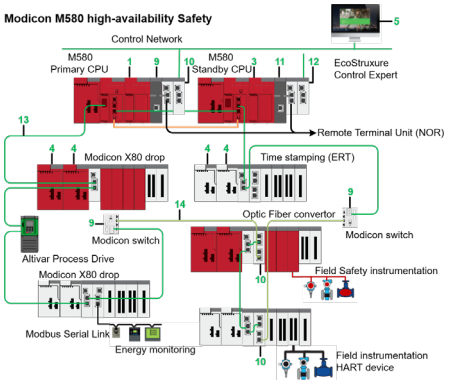
Safety complex architecture

5

Modicon M580 automation platform
Safety architectures







References *(1)*

Modicon M580 Safety standalone processors

Memory capacity	Maximum number of networks	Device ports	SERVICE port	Item *(2)*	Reference	Weight kg/*lb*
2/8 MB integrated (safety/non-safety memory program)	2 Ethernet networks	2 RIO/DIO	1	1	BMEP582040S	0.849/ *1.872*
4/16 MB integrated (safety/non-safety memory program)	4 Ethernet networks	2 RIO/DIO	1	1	BMEP584040S	0.849/ *1.872*

Modicon M580 Safety redundant processors

Memory capacity	Maximum number of networks	Device ports	SERVICE port	Item *(2)*	Reference	Weight kg/*lb*
8 MB integrated (memory program)	2 Ethernet networks	2 RIO/DIO	1	2	BMEH582040S	0.849/ *1.872*
16 MB integrated (memory program)	4 Ethernet networks	2 RIO/DIO	1	2	BMEH584040S	0.849/ *1.872*
64 MB integrated (memory program)	4 Ethernet networks	2 RIO/DIO	1	2	BMEH586040S	0.849/ *1.872*

Modicon M580 Safety mandatory coprocessor

Reference	Weight kg/*lb*
BMEP58CPROS3	*0.849/ 1.872*

Safety input et output modules *(3)*

Description	Type of current	Input voltage	IEC/EN 61131-2 conformity	Number of channels (common)	Item *(2)*	Reference	Weight kg/*lb*
Safety discrete input module	DC	24 V (logic positive)	Type 3	16 non-isolated inputs (1 x 16)	3	BMXSDI1602	*0.115/ 0.254*
Safety discrete output module	DC	24 V (logic positive)	Yes	8 non-isolated outputs (1 x 8)	3	BMXSDO0802	
Safety analog input module	Current	-		4 isolated inputs	3	BMXSAI0410	
Safety relay output module	AC/DC relay	24 Vdc/ 24..230 Vac	Yes	4 isolated outputs (1 x 4)	3	BMXSRA0405	*0.145/ 0.320*

(1) For additional characteristics, see our website www.se.com.
(2) 3.3 V ⎓ and 24 V ⎓ rack voltages for powering modules in the Modicon X80 I/O rack.
(3) Connection via caged, screw clamp, or spring-type 20-way removable terminal block

Processors: page 2/2
M580 modules for severe environments: page 6/2

Modicon M580 automation platform
Safety architectures

BMXCPS4002S power supply

References (continued) *(1)*

Safety and redundant power supplies

Line supply	Available power			Nominal current *(2)*	Item	Reference	Weight kg/*lb*
	3.3 V ⎓ *(2)*	24 V ⎓ *(2)*	Total	24 V ⎓ rack			
100...240 V ~	18 W	40 W	40 W	1.67 A	4	BMXCPS4002S	*0.510/ 1.124*
20...48 V ⎓	18 W	40 W	40 W	1.67 A	4	BMXCPS4022S	*0.810/ 1.786*
100...150 V ⎓	18 W	40 W	40 W	1.67 A	4	BMXCPS3522S	*0.610/ 1.345*

(1) For additional characteristics, see our website www.se.com.
(2) 3.3 V ⎓ and 24 V ⎓ rack voltages for powering modules in the Modicon X80 I/O rack.

5

Processors:
page 2/2

M580 modules for severe environments:
page 6/2

Contents

6 - Dedicated parts for severe environments

6

Modicon M580 automation platform
Treatment for severe environments

Presentation

Protective treatment for Modicon M580 automation platform

The Modicon M580 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 M580 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. All the safety hardware in-rack modules colored red (processor, coprocessor, modules) are conformal coated for use in severe environments.

Treatment for severe environments

If the Modicon M580 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 processor and power supply modules, X-bus and Ethernet 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 Safety CPU/coprocessor and Safety I/O 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 M580 automation platform products to be used in the following environments:

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

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

- **IEC/EN 60721-3-3 class 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 to 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%

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

- 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.*

*(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).*

Compatibility: page 1/18
Communication modules: page 4/12

Modicon M580 automation platform
Treatment for severe environments

Protective gel BMXGEL0025

Presentation (continued)

Specific characteristics for Safety modules

All Safety modules are coated and only exist with this surface treatment. There is no T, C, or H extension in the product references. Safety modules are compatible with:
- a temperature range from -25...+60 °C/*-13...140 °F*
- corrosive environments using common H components

A protective gel is needed to cover all electrical connections on M580 products used in corrosive environments.

This gel comes in a 25 g tube and can be ordered separately under the reference **BMXGEL0025**.

M580 offer composition for severe environments

To order ruggedized or conformal coated processors and modules, see the reference tables from page 6/4 to page 6/5 :
- References of available ruggedized products include the suffix "**H**"
- References of available conformal coated products include the suffix "**C**".

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 M580 products are described.
- For X80 or M340 products, please refer to related catalog:

DIA6ED2131203EN

DIA6ED2110104EN

- For additional accessories, please refer to:
  - Standard accessories for standalone processors, page 2/10
  - Standard accessories for redundant processors, page 2/11

6

PF122552

BMEP58●●●●H

M580 processors for severe environments

M580 standalone processors for severe environments

I/O capacity	Maximum number of networks	Device ports	Service port	Reference	Weight kg/lb
1,024 discrete I/O, 256 analog I/O 24 application-specific channels 4 MB integrated (memory program)	2 Ethernet networks	2 DIO	1	BMEP581020H	–
2,048 discrete I/O, 512 analog I/O 32 application-specific channels 8 MB integrated (memory program)	2 Ethernet networks	2 DIO	1	BMEP582020H	–
		2 RIO/DIO	1	BMEP582040H	–

M580 standalone processors with conformal coating

I/O capacity	Maximum number of networks	Device ports	Service port	Reference	Weight kg/lb
5,120 discrete I/O, 1,280 analog I/O 180 application-specific channels 24 MB integrated (memory program)	4 Ethernet networks	2 RIO/DIO	1	BMEP585040C	–
6,144 discrete I/O, 1,536 analog I/O 216 application-specific channels 64 MB integrated (memory program)	4 Ethernet networks	2 RIO/DIO	1	BMEP586040C	–

M580 redundant processors with conformal coating

I/O capacity	Maximum number of networks	Device ports	Service port	Reference	Weight kg/lb
8 MB integrated (memory program)	2 Ethernet networks	2 RIO/DIO	1	BMEH582040C	–
16 MB integrated (memory program)	4 Ethernet networks	2 RIO/DIO	1	BMEH584040C	–
64 MB integrated (memory program)	4 Ethernet networks	2 RIO/DIO	1	BMEH586040C	–

Modicon M580 automation platform

Dedicated parts for severe environments

M580 Communication modules for severe environments

BMENOC0321C

Communication

M580 Ethernet communication modules with conformal coating

Description	SERVICE port	Device network port (Ethernet)	Reference	Weight kg/*lb*
EtherNet/IP, Modbus/TCP network module	1	2	BMENOC0301C	0.345/ *0.761*
FactoryCast network module	1	2	BMENOC0311C	0.345/ *0.761*
EtherNet control router	1	2	BMENOC0321C	0.345/ *0.761*

BMENUA0100H

M580 OPC UA communication module for severe environments

Description	Reference	Weight kg/*lb*
OPC UA module for severe environments	BMENUA0100H	0.384/ *0.847*

BMENOP0300C

M580 IEC 61850 communication module with conformal coating

Description	Protocols	Physical layer	Reference	Weight kg/*lb*
IEC 61850 communication module	IEC 61850 standard	10BASE-T/ 100BASE-TX	BMENOP0300C	0.345/ *0.761*

BMXNOR0200H

BMENOR2200H

M580 RTU communication modules for severe environments

Description	Protocols	Physical layer	Reference	Weight kg/*lb*
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/ *0.452*
	IEC 60870-5-101 or DNP3 serial (master or slave)	1 non-isolated RS 232/485 serial link port		
Advanced RTU communication module	DNP3 SAv2/SAv5, Modbus TCP, SNMP, HTTPS, SNTP (Client or Server)	1 Ethernet port 100BASE-TX *(2)*	BMENOR2200H	0.380/ *0.837*
	IEC 60870-5-101 or DNP3 serial (master or slave) *(1)*	1 isolated RS 232/485 serial link port		

(1) Not implemented yet.
(2) On backplane port.

Compatibility: page 1/18
Processors: page 2/10
Communication modules: page 4/12

7

Contents

7 - Standards and certifications

Technical appendices

Modicon M580 automation platform

Standards, certifications, and environment conditions

Standards and certifications

Per region

The Modicon M580 automation and M580 Safety platforms have 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
- □ KC

For other countries certifications, please refer to technical appendix page 7/8.

M580 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 segment

Power generation

- ■ IEC/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: BV, DNV-GL, ABS, LR, RINA (refer to page 7/8).

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 other countries: IECEx for atmosphere Zone 2 (gas) and/or Zone 22 (dust)

Functional safety

All Safety modules are certified by TÜV Rheinland.

The certificate reviews the following standards:

- ■ **Functional safety**
- □ IEC/EN 61508: Functional safety of electrical/electronic/programmable electronic safety-related systems
  - IEC/EN 61508-1 - Part 1: General requirements
  - IEC/EN 61508-2 - Part 2: Requirements for electrical/electronic/programmable electronic safety-related systems
  - IEC/EN 61508-3 - Part 3: Software requirements
- ■ **Process safety**
- □ IEC/EN 61511: Functional safety - Safety instrumented systems for the process industry sector
  - IEC/EN 61511-1 - Part 1: Framework, definitions, system, hardware and software requirements
  - IEC/EN 61511-2 - Part 2: Guidelines for the application of IEC 61511-1
  - IEC/EN 61511-3 - Part 3: Guidance for the determination of the required safety integrity levels
- ■ **Machine safety**
- □ IEC/EN 62061: Safety of machinery - Functional safety of safety-related electrical, electronic and programmable electronic control systems
- □ ISO/EN 13849-1: Safety of machinery - Safety-related parts of control systems - Part 1: General principles for design
- □ ISO/EN 13849-2: Safety-related parts of control systems - Part 2: Validation

Modicon M580 automation platform

Standards, certifications, and environment conditions

Fire & Gas

- EN 54.2 Fire detection and fire alarms systems – Part 2: Control and indicating equipment
- EN 50156-1 Electrical equipment for furnaces and ancillary equipment - Part 1: Requirements for application design and installation
- EN 50130-4 Immunity requirements components of fire, intruder, holdup, CCTV, access control and social alarms systems
- EN 298 Automatic burner control systems for burners and appliances burning gaseous or liquid fuels
- NFPA 85 Boiler and Combustion Systems Hazards Code
- NFPA 86 Standard for Ovens and Furnaces
- NFPA 72 National Fire Alarm and Signaling Code

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

Refer to “Modicon M580 Safety, Standards and Certifications” for installation restrictions.

EIO0000002750

Environmental characteristics

Service conditions and recommendations relating to the environment

			Modicon M580 automation platform	Modicon M580 Safety platform	Modicon M580 modules for severe environments
Temperature	Operation	**°C/*°F***	0...+60/*32...140*	-25...+60/*-13...+140*	-25...+70/*-13...+158*
	Storage	**°C/*°F***	-40...+85/*-40...+185*	-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*	+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*	+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**	**BMXCPS3540T BMXCP3522 BMXCP3522S**	**BMXCPS2000**	**BMXCPS3500 BMXCPS3500H BMXCPS4002 BMXCPS4002S BMXCPS4002H BMXCPS4022S**
	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 M580 automation platform

The Modicon M580 and M580 Safety platforms 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 M580 automation platform must be embedded in enclosures with minimum IP54 protection.

The Modicon M580 and M580 Safety platforms offer **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.

BMXXEM010 protective cover

(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 M580 automation plaftorm

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) Devices must be installed, wired, and maintained in accordance with the instructions provided in the manual "Grounding and Electromagnetic Compatibility of PLC Systems".
(2) These tests are performed without an enclosure, 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 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) Devices must be installed, wired, and maintained in accordance with the instructions provided in the manual "Grounding and Electromagnetic Compatibility of PLC Systems".
(2) These tests are performed without an enclosure, 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 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".
(2) Refer also to the section "Treatment for severe environments".

(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)
Shock	**IEC/EN 61131-2;** **IEC 60068-2-27** (Ea)	30 g, 11 ms; 3 shocks/direction/axis *(2)* For M580 Safety: 15 g, 11 ms; 3 shocks/direction/axis 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/*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;** **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 1.3 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 **IEC60068-2-60**	Flowing mixed gas; class 3C3, 25 °C/77 °F, 75% relative humidity, t = 14 days
	IEC/EN 60721-3-3 **IEC60068-2-60**	Flowing mixed gas; class 3C4, 25 °C/77 °F, 75% relative humidity, t = 7 days
	IEC60068-2-52	Salt spray: test Kb, severity 2
	IEC/EN 60721-3-3 **IEC60068-2-68**	Dust and sand, Arizona dust, class 3S4, 20 cycles
	IEC/EN 60721-3-3 **IEC60068-2-10**	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".
(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".

(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	Country
CSA	Canadian Standards Association	Canada
RCM	Australian Communications and Media Authority	Australia, New Zealand
EAC	Eurasian conformity	Russia and customs union
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-GL	Det Norske Veritas / Germanischer Lloyd	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**: Following the merger of the DNV and GL certification bodies, DNV/GL has been issued as a single certificate since 2016.*

The following tables provide an overview of the situation as of December 2018, 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						
	UL	CSA	RCM	EAC	Hazardous locations *(1)* UL - CSA	ATEX - IECEx	TÜV Rheinland
	USA	Canada	Australia	Russia	USA, Canada		
Modicon STB	■	■	■	■	Cl. I, Div. 2, Grps ABCD	Zone 2 *(2) (4)*	
Modicon Telefast ABE 7	■	■	■				
ConneXium	■	■			Cl. I, Div. 2, Grps ABCD *(2)*		
Modicon Switch							
Harmony iPC/GTW	■	*(3)*	■	*(2)*	Cl. I, Div. 2, Grps ABCD	Zone 2/22 *(2)*	
Magelis XBT GT	■	*(3)*	■	*(2)*	Cl. I, Div. 2, Grps ABCD *(2)*	Zone 2/22 *(2) (4) (5)*	
Magelis XBT GK	■	*(3)*	■	■	Cl. I, Div. 2, Grps ABCD		
Magelis XBT N/R/RT	■	■	■	■	Cl. I, Div. 2, Grps ABCD	Zone 2/22 *(2) (4)(5)*	
Harmony HMI GTO	■	*(3)*	■	*(2)*	Cl. I, Div. 2, Grps ABCD	Zone 2/22 *(2) (5)*	
Harmony HMI STO/STU	■	*(3)*	■	*(2)*	Cl. I, Div. 2, Grps ABCD *(2)*	Zone 2/22 *(2) (5)*	
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)*	SIL 3, Cat.4, PLe
Modicon X80	■	■	■	■	Cl. I, Div. 2, Grps ABCD	Zone 2/22 *(2) (5)*	
Modicon Momentum	■	■	■	■	Cl. I, Div. 2, Grps ABCD		
Modicon Premium	■	■	■	*(2)*	Cl. I, Div. 2, Grps ABCD		
Modicon Quantum	■	■	■	*(2)*	Cl. I, Div. 2, Grps ABCD	Zone 2/22 *(2) (5)*	
Modicon Quantum Safety	■	■	■	*(2)*	Cl. I, Div. 2, Grps ABCD	Zone 2/22 *(2) (5)*	SIL 2, SIL 3 *(6)*
Modicon TSX Micro	■	■	■	■	Cl. I, Div. 2, Grps ABCD		

(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) According to IEC 61508. Certified by TÜV Rheinland for integration into a safety function of up to SIL 2 or SIL 3.

Merchant navy certifications

Certified / Certification pending	Shipping classification societies										
	ABS	BV	DNVGL		KRS	LR	RINA	RMRS	RRR	CCS	Class NK
	USA	France	Norway	Germany	Korea	Great Britain	Italy	Russia	Russia	China	Japan
Modicon STB	■	■	■	■		■	■				
Modicon Telefast ABE 7		■	■	■		■		▒	■		
ConneXium		■	■	■		■					
Modicon Switch				■							
Harmony iPC/GTW				■							
Magelis XBT GT	■	■	■	■		■	■	■	■		
Magelis XBT GK				■					■		
Magelis XBT N/R		■	■	■			■				
Magelis XBT RT									■		
Harmony HMI GTO	▒	▒	▒	▒		▒	▒				
Harmony HMI STO/STU	▒	■	■	▒		▒	▒				
Modicon MC80											
Modicon M340	■	■	■	■	■	■	■	■		■	■
Modicon M580	■	■	■	■	■	■	■	■		■	■
Modicon M580 Safety	■	■	■	■	■	■					■
Modicon X80	■	■	■	■	■	■	■	■		■	■
Modicon Momentum											
Modicon Premium		■	■	■				■			
Modicon Quantum	■	■	■	■		■	■	■			
Modicon TSX Micro	■	■	■	■		■		■			

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)

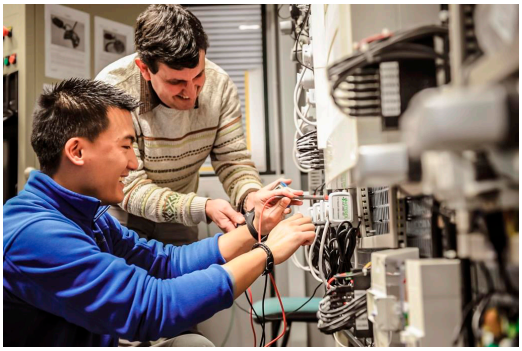
End of life products containing electronic cards must be dealt with by specific treatment processes.
When products containing backup batteries are unusable or at end of life they must be collected and treated separately. Batteries do not contain a percentage by weight of heavy metals above the limit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

Contents

8 - Services

8

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 retaining 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.

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 our 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 downtime 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 what their life cycle state is (i.e. commercialized or obsolete)
- 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 and 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 multi-use flying lead I/O adapter can be prepared 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

Design: Schneider Electric
Photos: Schneider Electric

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DIA6ED2151012EN
April 2021 - V7.0