Foxboro Evo™ Process Automation System

Product Specifications

Foxboro by Schneider Electric

PSS 31H-1FCP280

Field Control Processor 280 (FCP280)

The Field Control Processor 280 is a distributed, optionally fault-tolerant, field-mounted controller that performs process control and alarming functions according to a user-defined control strategy.

OVERVIEW

The Field Control Processor 280 (FCP280) is a distributed, optionally fault-tolerant, field-mounted controller module. The FCP280 performs regulatory, logic, timing, and sequential control together with connected Fieldbus Modules. It also performs data acquisition and alarm detection and notification. The FCP280 connects to the control network via standard fiber optic or copper 100 Mbps Ethernet cables from network adapters installed on its baseplate (shown in Figure 1).

The FCP280 requires Foxboro Evo™ Control Core Services software v9.0 or later. A system with the FCP280 and this software is called a Foxboro Evo Process Automation System.

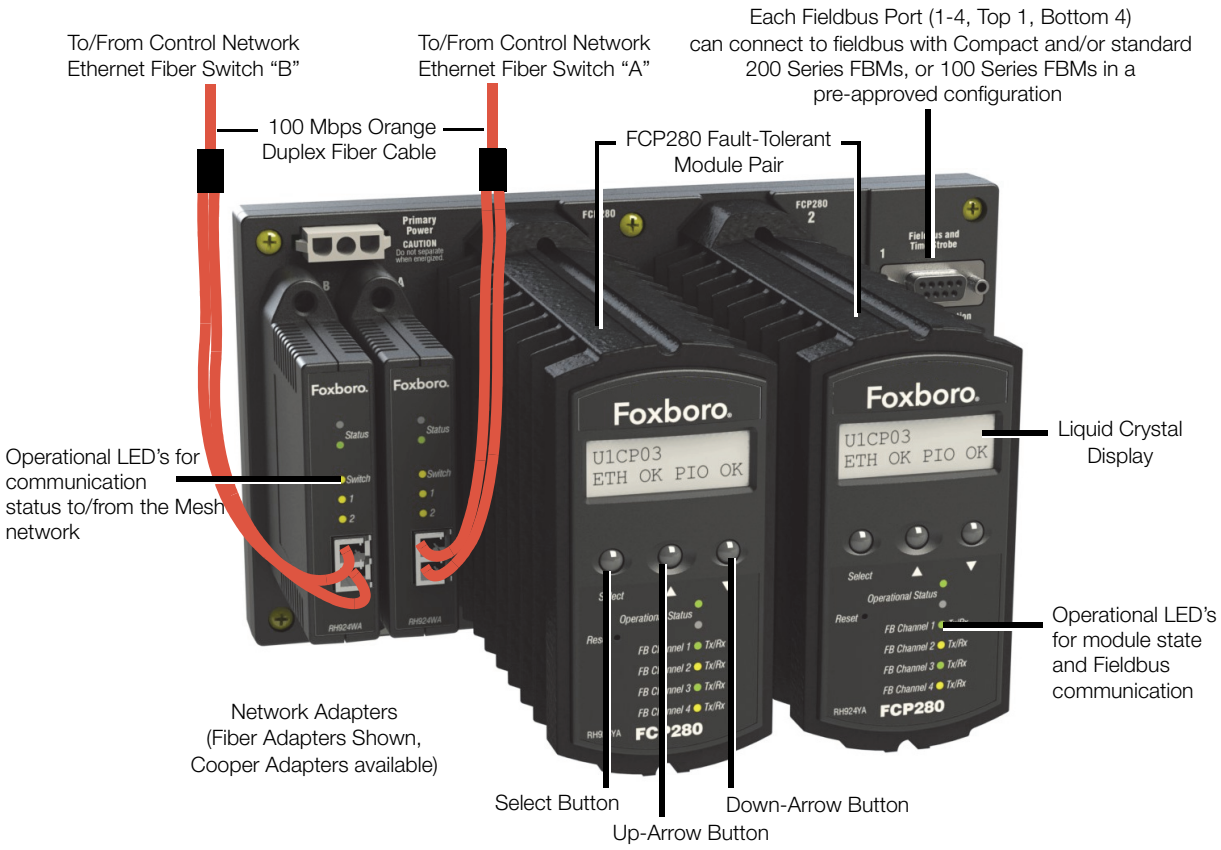


Figure 1. Fault-Tolerant FCP280 Module Pair Mounted on Vertical Mounted 2-Position FCP280 Baseplate

The fault-tolerant version of the FCP280 consists of two processor modules. These modules are installed in adjacent FCP280 slots in dedicated baseplates for high speed communication between the modules.

The FCP280 accepts four PIO channels (that is, four separate HDLC fieldbuses) via the four Fieldbus ports on its baseplate. These four Fieldbuses are referred to collectively as the "Expanded fieldbus."

An optional dual cable baseplate is available that supports four PIO channels, but separate A versus B bus connectors are provided along with dedicated connectors for the optional Time Strobe inputs.

Fieldbus connections from the optional dual cable baseplate to standard or compact 200 Series FBMs require separate A versus B bus cables plus a dual "D" connection adapter on the FBM baseplate (RH926KW).

The number of FBMs that an FCP280 can support varies depending on the types of FBMs used:

- 200 Series FBMs exclusively used with FCP280 - Each Fieldbus port on the FCP280 baseplate can connect to a baseplate chain with up to 32 Compact or standard 200 Series FBMs per chain via the 2 Mbps HDLC fieldbus for up to 128 modules.

- 200 Series and 100 Series FBMs (dual baud configurations) used with FCP280 - The FCP280 can support a total of 128 100 Series FBMs (Y-module) or competitive devices (such as Foxboro Evo System migration FBMs) in one or more baseplate chains, with the remainder of the FCP280's 128 module limit being 200 Series FBMs, depending on the Fieldbus loading of the FCP280. For example, an FCP280 could support 64 100 Series FBMs and 64 200 Series FBMs (as 64 + 64 = 128). Main and expansion FBMs are considered as two FBMs for counting purposes. As well, no more than 64 100 Series FBMs are allowed on each PIO bus/baseplate port. See Figure 2 and Figure 3 below.

  NOTE

  Certain competitive migration or supported third-party modules such as the Foxboro Evo Process Automation System Migration fieldbus Modules and Pepperl+Fuchs™ I/O modules may increase this 128 module maximum per FCP280. For the maximum numbers of each of these migration/third-party modules supported by the FCP280, refer to the supported migration products books in *Field Control Processor 280 (FCP280) User's Guide* (B0700FW).

  NOTE

  The dual cable baseplate does not support connections to 100 Series FBMs or equivalent competitive migration and third-party modules.

When supporting 200 Series and 100 Series FBMs, each Fieldbus port (PIO channel) is dedicated to supporting either a 268 Kbps HDLC fieldbus (for 100 Series FBMs) or a 2 Mbps HDLC fieldbus (for 200 Series FBMs) - not both.

For connections to 100 Series FBMs, an FBI200 pair is required to extend communications up to 1830 m (6000 ft). See Figure 2.

NOTE

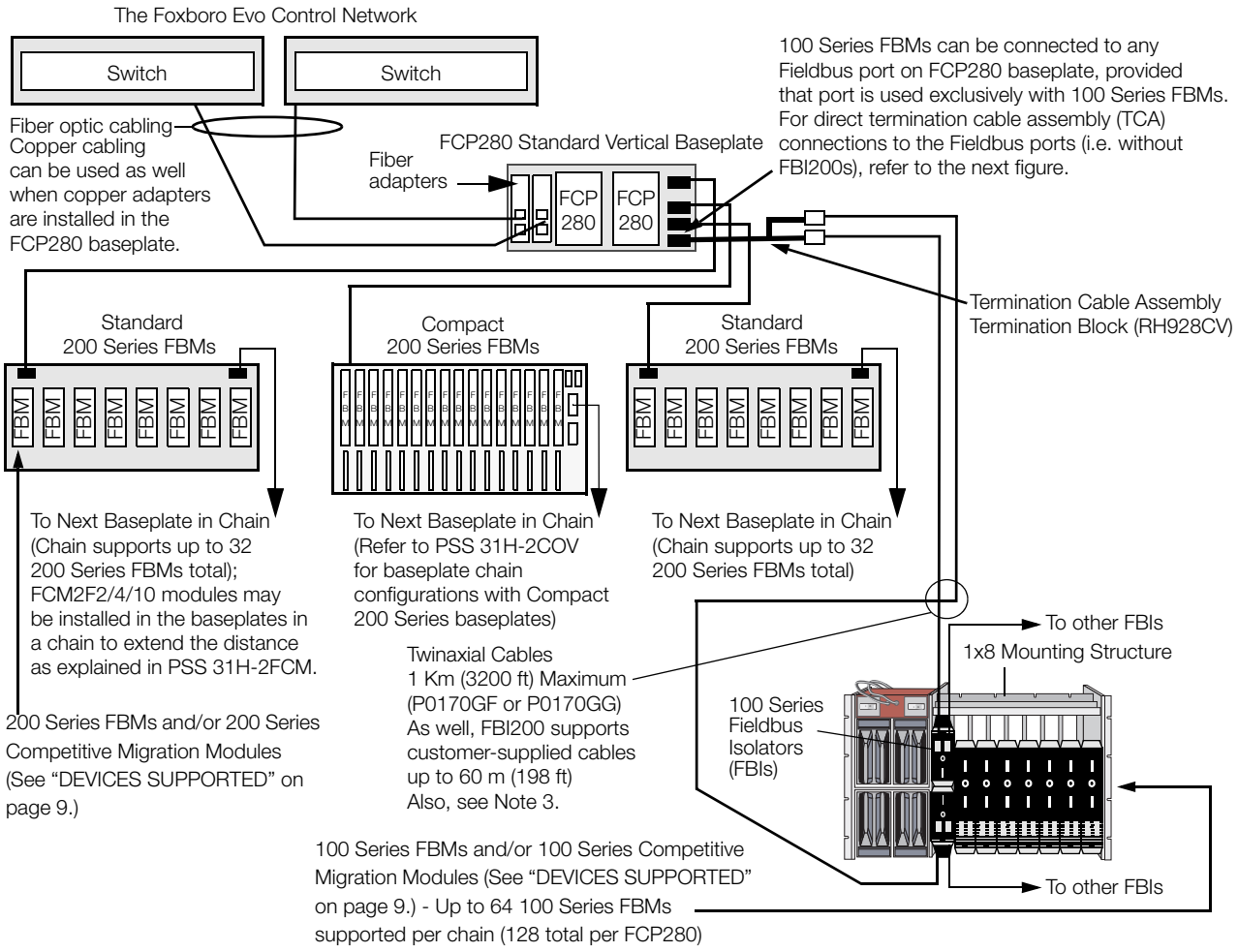
When replacing a CP10, CP30, CP40, or CP60 with a FCP280 and keeping all its 100 Series FBMs, to reduce potential error messages, an FBI200 is required to be installed between the CP and FBMs.

The Fieldbus splitter (RH928CV) is used to directly connect a Fieldbus port to a 268 Kbps HDLC fieldbus. This provides a connector for any Fieldbus port on the FCP280 baseplate, and two Termination Cable Assembly (TCA) termination blocks for the twinaxial cabling from the 100 Series FBMs.

The FCP280 can also communicate with serial and Ethernet devices, such as PLCs, via Field Device System Integrators (special FBMs). This allows you to connect to new device interfaces without any changes to the controller software.

To estimate the FCP280's processor load, refer to *Field Control Processor 280 (FCP280) Sizing Guidelines and Excel Workbook* (B0700FY).

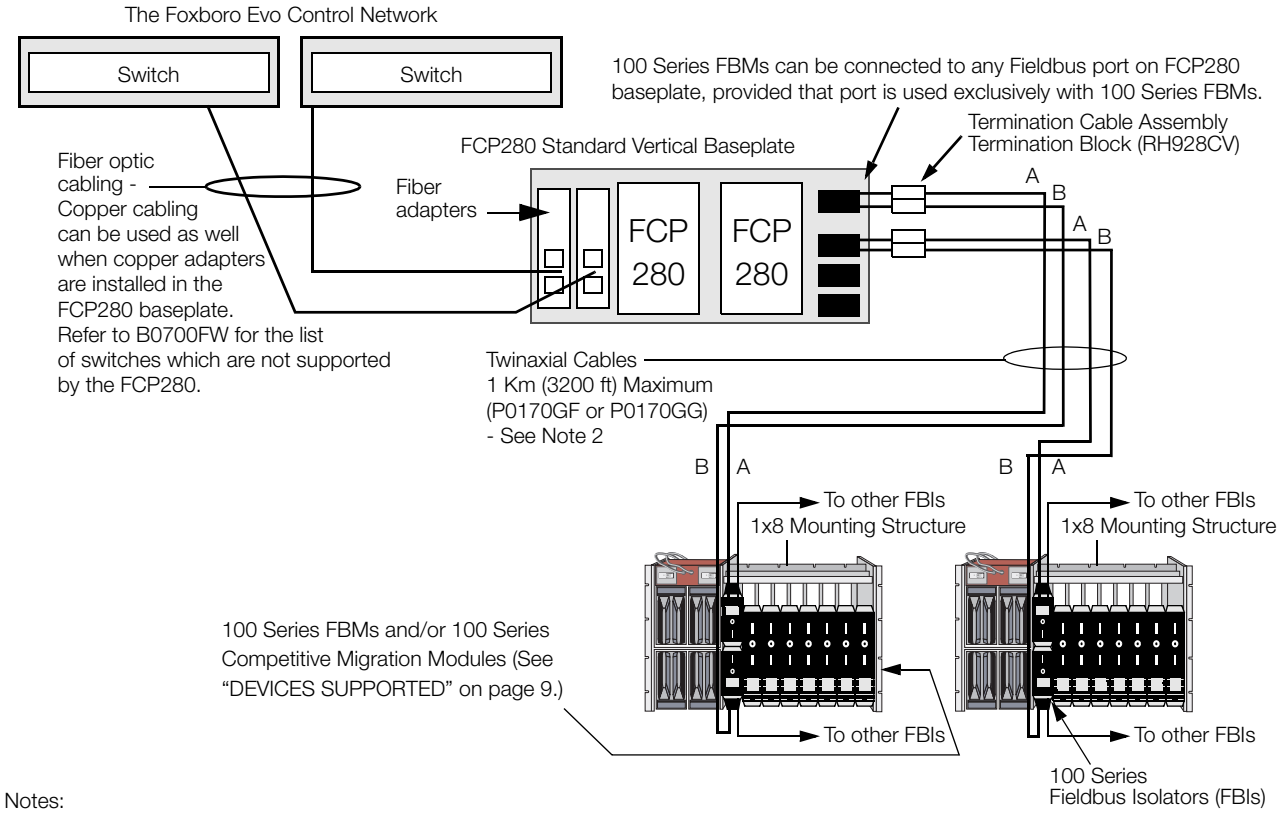
For a description of the FCP280 baseplates, refer to *Standard 200 Series Baseplates* (PSS 31H-2SBASEPLT).



Notes:

1. FCP280 supports up to 128 200 Series FBMs when only 200 Series FBMs are used. When a mix of 100 Series and 200 Series FBMs must be supported, it supports up to 128 100 Series FBMs with the remainder of the 128 module limit being 200 Series FBMs. For example, 64 100 Series FBMs and 64 200 Series FBMs (as 64 + 64 = 128). Each PIO channel must be dedicated to either a 268 Kbps or 2 Mbps HDLC fieldbus. As well, each PIO channel can have no more than 64 100 Series FBMs.
2. 100 Series FBMs can be connected to any Fieldbus port on the FCP280 baseplate, provided that the overall FBM limit of 128 100 Series FBMs is maintained for the FCP280. Up to 64 100 Series FBMs are supported on each PIO channel/baseplate port.
3. An FBI200 may be included on this connection to extend the distance between the 100 Series FBIs and the FCP280 baseplate. In mixed configurations (100 & 200 Series FBMs) the FCP280 can communicate on the 268 Kbps HDLC fieldbus up to 60 m (198 ft). When communicating with a 268 Kbps HDLC fieldbus only, the FCP280 can communicate on this fieldbus up to 1 km (3200 ft). FBI100 pair may be used in place of FBI200s. For sizing constraints and devices supported by the FBI200, refer to PSS 31H-2Y18. For sizing constraints and devices supported by the FBI100, refer to PSS 31H-2Y16. The FBI200/FBI100 extends the distance of the HDLC fieldbus between the FCP280 and the FBMs up to 1830 m (6000 ft). The FBI200/FBI100 can be used with 200 Series FBMs as well to extend the cabling distances to them.

Figure 2. Typical FCP280 Network Configuration with Mixed 100 Series and 200 Series FBM Functionality (Simplified)



Notes:

1. FCP280 supports up to 128 100 Series FBMs total. Up to 64 100 Series FBMs are allowed on each PIO port/Fieldbus port.
2. FBI200 is needed only to extend the distance between the 100 Series FBIs and the FCP280 baseplate.
   When communicating with a 268 Kbps HDLC fieldbus only, the FCP280 can communicate on this fieldbus up to 1 km (3200 ft). FBI100 pair may be used in place of FBI200s. For sizing constraints and devices supported by the FBI200, refer to PSS 31H-2Y18. For sizing constraints and devices supported by the FBI100, refer to PSS 31H-2Y16. The FBI200/FBI100 extends the distance of the HDLC fieldbus between the FCP280 and the FBMs up to 1830 m (6000 ft).
   Twinaxial cables over 1 Km (3200 ft) are customer supplied.
3. The RH928CV splitter has a 3 m (9.8 ft) cable between the Fieldbus port connector and TCA termination block.

Figure 3. Typical FCP280 Network Configuration with Exclusive 100 Series FBM Functionality (Simplified)

FEATURES

- Performs regulatory, logic, timing, and sequential control together with connected Fieldbus Modules (FBMs)
- Performs data acquisition and alarm detection and notification
- Supports up to 128 Compact or standard 200 Series FBMs, 128 100 Series FBMs, or up to 128 of a combination of 100 Series FBMs and 200 Series FBMs. No Fieldbus Communication Module is required. (A maximum of 64 100 Series FBMs are allowed on each PIO bus/baseplate port.)
- No Fieldbus Expansion Module is required for Expanded fieldbus support
- Supports self-hosting mode, which allows the FCP280 to boot itself with a valid control database even without its host workstation being on-line. However, editing control functions will not be possible.
- Offers unique, patented, fault-tolerant operation using two control modules to greatly improve reliability relative to other process controllers
- Offers on-line image upgrade (OLUG) of a fault-tolerant FCP280 without shutting down the process
- Liquid Crystal Display (LCD) displays letterbug and real-time roles and statuses
- Connects to The Foxboro Evo Control Network via standard fiber optic or copper 100 Mbps Ethernet cables
- Uses a rugged, die cast aluminum housing for mounting in a non-vented field enclosure
- Can operate in Class G3 harsh environments
- CE certified for field mounting in enclosures
- Each Fieldbus port on standard FCP280 baseplates supports either a 2 Mbps or 268 Kbps HDLC fieldbus exclusively
- Uses versatile control algorithms and a wide variety of FBMs to provide control capabilities for a broad range of process applications
- Supports time synchronization using optional external time from GPS satellites
- Uses soft letterbugs configurable via the keys on the FCP280 faceplate
- The optional dual cable baseplate enables separate cables to be used for each “A” and “B” bus

FIBER AND COPPER NETWORK ADAPTERS

FCP280 modules connect to a pair of fiber or copper adapters (see Figure 4) which each connect to one Ethernet switch in the Control Network. The FCP280 baseplate passes inbound traffic from either of the two switches to both FCP280s, and pass outbound traffic from the primary FCP280 module to either switch.

Fiber Adapter (RH924WA) Copper Adapter (RH924UQ)

Figure 4. Fiber Optic and Copper Network Adapters

The fiber or copper adapters mount on the FCP280 baseplate as shown in Figure 1 on page 2. They receive their power from the baseplate.

REMOTE MOUNTING

The FCP280 simplifies the Foxboro Evo System architecture, maintaining control while only requiring housing (via field enclosures), host workstations with the Control Core Services v9.0 or later, and Ethernet switches for communication via the Control Network architecture, described in PSS 31H-7NWEQUIP.

The field-mounted FCP280 is an integral part of the highly-distributed control network where controllers are closely aligned to specific process units mounted in close proximity to their I/O and the actual equipment being controlled. Coordination between process units takes place via a fiber optic 100 Mbps Ethernet network.

The FCP280 and its network adapters are packaged in a rugged, die cast aluminum housing that does not require venting due to its efficient design. The FCP280 and its network adapters are CE certified, and it can be mounted without expensive special cabinets to prevent electronic emissions. The FCP280, network adapters, and baseplate can be mounted in Class G3 harsh environments.

ENHANCED RELIABILITY (FAULT-TOLERANCE)

The unique and patented fault-tolerant operation of the FCP280 improves reliability relative to legacy process controllers. The fault-tolerant version of the FCP280 consists of two modules operating in parallel, with two Ethernet connections to the Control Network. The two FCP280 modules, married together as a fault-tolerant pair, provide continuous operation of the controller in the event of virtually any hardware failure occurring within one module of the pair.

Both modules receive and process information simultaneously, and faults are detected by the modules themselves. One of the significant methods of fault detection is comparison of communication messages at the module external interfaces. Messages only leave the FCP280 when both FCP280s agree on the message being sent (bit for bit match). Upon detection of a fault, self-diagnostics are run by both modules to determine which module is defective. The non-defective module then assumes control without affecting normal system operations.

This fault-tolerant solution has the following major advantages over controllers that are merely redundant:

- No bad messages are sent to the field or to applications using controller data because no message is allowed out of the controller unless both modules match bit for bit on the message being sent.
- The secondary controller is synchronized with the primary one, which ensures up to the moment data in the event of a primary controller failure.
- The secondary controller will have latent flaws detected prior to any switchover because it is performing exactly the same operations as the primary controller.

UPGRADE OPTIONS

Multiple options are available for replacing existing control processors with the FCP280. A fault-tolerant FCP280 may replace a fault-tolerant FCP270 or ZCP270. It may import the CP database from the CP270 it is replacing, for compatibility and minimal configuration time.

As well the FCP280 provides an increase in performance and block processing capacity over the CP270s. When replacing FCP270s, the FCP280 eliminates the need for FEM100 hardware.

For ease of replacement, the fault-tolerant or non-fault-tolerant FCP280 in the standard baseplate has the same dimensions as the fault-tolerant or non-fault-tolerant FCP270 in its baseplate.

The dual cable baseplate has larger dimensions than the standard baseplate.

Cabling the 100 Series FBMs or Migration products to an FCP280 baseplate consists of extending the remote 268 Kbps fieldbus between enclosures. This is accomplished using termination cable assemblies (TCAs) and Fieldbus Isolators (FBIs) to provide connections between primary and extended fieldbus segments.

The optional FBI200 can extend the 2 Mbps HDLC fieldbus between 200 Series FBMs from 60 m (198 ft) up to 305 m (1000 ft). As well, for standard FCP280 baseplates, it can extend the 268 Kbps HDLC fieldbus between 100 Series FBMs from 60 m (198 ft) in a mixed 100 & 200 Series FBMs configuration (or 300 m (1000 ft) in an exclusive 100 Series FBMs configuration) up to 1830 m (6000 ft).

As with earlier generations of control processors, up to 128 100 Series FBMs (including expansion modules) attach to standard baseplate Fieldbus ports through Fieldbus Isolators (with a maximum of 64 100 Series FBMs per port). Up to 24 100 Series FBMs, excluding expansion modules, can connect to each isolator.

However, the expansion modules are considered 100 Series FBMs in this “128 100 Series FBMs” maximum discussed in this PSS.

Available upgrade scenarios are available in *Field Control Processor 280 (FCP280) User’s Guide* (B0700FW).

FBI200 FIELDBUS ISOLATOR/FILTER

The FBI200 Fieldbus Isolator/Filter extends the length of the 268 Kbps module Fieldbus from the FCP280 to 100 Series FBMs and similar competitive migration modules up to 1830 m (6000 ft) over a twinaxial Fieldbus cable. See Figure 2 on page 4.

It can also extend the 2 Mbps HDLC fieldbus to 200 Series FBMs up to 305 m (1000 ft).

For more information on the FBI200, refer to *FBI200 Fieldbus Isolator/Filter* (PSS 31H-2FBI200).

FIRMWARE UPGRADES WHILE ON-LINE

For fault-tolerant FCP280 modules, on-line image upgrade replaces the executable image (operating system) of a running FCP280 with a newer image without having to shut down the equipment being controlled by the FCP280.

TIME SYNCHRONIZATION, SOE, TDR/TDA

The Foxboro Evo System supports time synchronization using either an externally maintained optional source of Universal Coordinated Time (UTC) from GPS satellites or an internal source using proprietary software. FCP280s that receive time updates via the external time source synchronize their FBMs to 1 ms. For more information on time synchronization, refer to *Time Synchronization Overview* (PSS 31S-1TIME).

Time stamping is used for alarm messages, values sent to the historian, the Sequence Of Events (SOE) and Transient Data Recorder (TDR), and Transient Data Analyzer (TDA) features.

SOE data are discrete points that are time stamped at the FBM, optionally to 1 ms, and sent to the workstation on a change basis. TDR/TDA data are analog or digital points that are time stamped at the FBM and sent to the workstation every 10 ms. These features are supported by client software in the workstation. For information on this new software, refer to *Field Control Processor 280 (FCP280) Integrated Control Software* (PSS 31S-3FCPICS).

Time strobe signals are delivered from custom switches over Ethernet cables. However, the method by which these Ethernet cables connect to the FCP280 baseplates differs depending on the baseplate. The standard vertical and horizontal baseplates’ RH924YF's first HDLC connector (upper right-hand side of the baseplate) accepts time strobe signals via time strobe adapter (RH924ZQ), which is discussed in "Module Fieldbus and Time Strobe Splitters/Terminators" in B0400FA. Receiving the time strobe signals on the standard baseplate requires the use of the RH924ZQ adapter on the first HDLC port on the baseplate, and in this configuration, this port cannot be used for any other purpose. The dual cable baseplate (RH100JX) has two dedicated RJ-45 ports on its upper right-hand side to accept these Ethernet cables directly without the use of the

RH924ZQ adapter.

SOFTWARE CONTROL FEATURES

The FCP280 performs regulatory, logic, timing, and sequential control, as well as data acquisition, alarm detection, and alarm notification. Process variables are controlled using time-proven algorithms (mathematical computations performing specific functions). The algorithms are contained in functional control blocks, which on-site process engineers configure to implement the desired control strategies.

The versatility of the algorithms, coupled with the variety of FBMs available, provides control capabilities suited to a broad range of process applications. Control strategies ranging from simple feedback and cascade loops to highly sophisticated feedforward, nonlinear, and complex characterization control schemes are readily implemented.

The FCP280 also supports the following features:

- Setting and reading the FCP280 letterbug via the buttons on the faceplate
- Alarm enhancements to function blocks: re-alarming on changes to alarm priority, re-alarming based upon a configurable time delay deadband, and alarm suppression based upon time
- Optional UTC external time synchronization
- Improved controller performance
- Optional self-hosting mode allows the FCP280 to start up and run, executing its configured control scheme using the checkpoint file stored in flash memory. This allows the FCP280 to boot itself with a valid control database even if its host workstation is not present.
- Support for high speed capabilities such as ladder logic, Motor Driven Actuator Controller (MDACT), and Distributed Proportional Integral Derivative functionality (DPIDA)

DEVICES SUPPORTED

The FCP280 supports the following devices on the 2 Mbps fieldbus:

- All Compact and standard 200 Series FBMs (FBM201, FBM202, and so forth), which can support many types of intelligent field devices, including those on FOUNDATION fieldbus, PROFIBUS, HART, and DeviceNet networks
- Field Device Systems Integrator (FDSI) modules
- Intrinsically Safe I/O Subsystem (ISCM) - refer to PSS 31H-2Y6).
- DCS Migration fieldbus Modules for Siemens APACS+ Systems
- DCS Migration fieldbus Modules for Westinghouse WDPF® Systems
- DCS Migration fieldbus Modules for Fisher's PROVOX® Series 20 Migration with HART
- DCS Migration fieldbus Modules for Honeywell® TDC 2000 Systems with HART.

Using the standard baseplate, the FCP280 supports the following devices on the 268 Kbps fieldbus:

- 100 Series FBMs (FBM01, FBM02, and so forth)
- SPECTRUM™ Migration Integrators
- SPEC 200™ Control Integrators
- SPEC 200 MICRO™ Control Integrators
- SPEC 200 CCM Control Integrators

The Foxboro Gas Chromatograph is not supported.

The FCP280 supports the 100 Series Fieldbus Module Upgrade subsystem, with the optional FBI200A modules. Refer to *100 Series Fieldbus Module Upgrade Subsystem Overview* (PSS 31H-2W100).

FCP280 BASEPLATE

The FCP280 is installed on a modular, DIN rail mounted baseplate in a dedicated slot that is keyed for the controller, eliminating the misplacing of modules. The available FCP280 baseplates are shown in Figure 5.

Standard FCP280 Baseplate for a horizontal DIN rail mount (RH924YL)

Standard FCP280 Baseplate for a vertical DIN rail mount (RH924YF)

Dual Cable FCP280 baseplate for a vertical or horizontal DIN rail mount (RH100JX)

Figure 5. FCP280 Baseplates

These 2-position baseplates support a non-fault-tolerant single or fault-tolerant pair of FCP280s, as well as two copper (RH924UQ) or fiber (RH924WA) adapters, required for connection to the control network.

The FCP280 baseplate provides support for four HDLC fieldbuses (PIO channels). On the standard baseplates, Fieldbus port 1 can be terminated, if needed, by the DIP switches provided on the baseplate. Fieldbus ports 2-4 are internally terminated in the FCP280 baseplates and no external hardware or switches are required for their termination. All four Fieldbus port pairs (A/B) on the dual cable baseplate are internally terminated by default without the use of DIP switches.

The FCP280 baseplates can be added in the field to existing or new configurations. The standard FCP280 baseplates have similar dimensions as the FCP270 2-position baseplates for ease of replacement, while the dual cable baseplates are larger and wider.

When upgrading existing CP60 systems to use FCP280s, you can recover an additional two FBM positions after removal of the old FCM10E/FCM10Efs.

The following Splitters and Terminators can be used with FCP280 baseplate:

- The Fieldbus Baseplate Terminator (P0916RB) is used to terminate either the CP end of the HDLC fieldbus or the last 200 Series baseplate in the daisy chain when Time Strobe or split A/B fieldbus cables are not required. (See Figure 6.)
- For standard baseplates only, Fieldbus Baseplate Terminator/Splitter (RH924ZJ for Fieldbus port 1, or RH928CY for the Fieldbus port on a standard FCP280 baseplate) allows splitting of the A and B Module Fieldbus signals into different cables. This splitter can be used to interconnect optional redundant cables between FCP280 baseplates and 200 Series baseplates. It can also be used to

terminate both the fieldbus and time strobe signals. (See Figure 7.)

- Time Strobe Fieldbus Baseplate Terminator (RH924ZQ) connects the optional “A” and/or “B” time strobe signals to the standard FCP280 baseplates only. The Time strobe splitter/terminator RH924ZQ is used on only the first standard baseplate containing an FCP280. This terminator also terminates the fieldbus signals. (See Figure 8.)

NOTE

The RH924ZQ adapter is not used with the dual cable FCP280 baseplate.

- Fieldbus Splitter (RH928CV) (see Figure 9) allows any of the Fieldbus ports on the standard FCP280 baseplates to connect to the twinaxial 268 Kbps fieldbus cables. RH928CV includes both a connector to any of the Fieldbus ports on the FCP280 baseplate, and a termination cable assembly (TCA) termination block similar to two of the P0903VY termination blocks joined together.

(P0916RB)

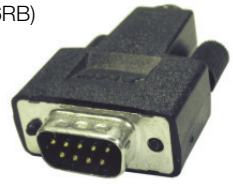
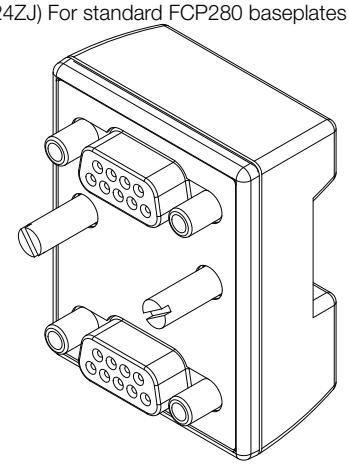


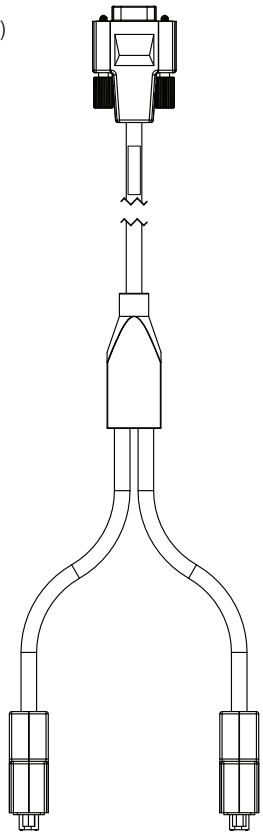
Figure 6. Fieldbus Baseplate Terminator

(RH924ZJ) For standard FCP280 baseplates only



To Fieldbus port on FCP280 baseplate

(RH928CY)



To Module Fieldbus Cable A To Module Fieldbus Cable B

Figure 7. Fieldbus Baseplate Terminator/Splitters - for FCP280 Baseplates

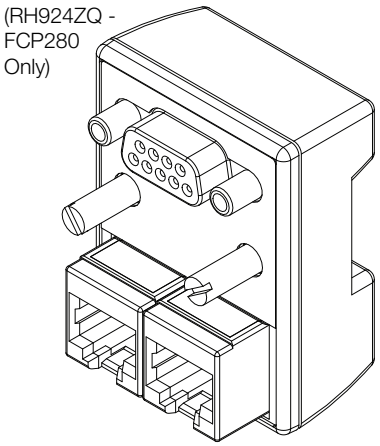


Figure 8. Time Strobe Fieldbus Baseplate Terminator

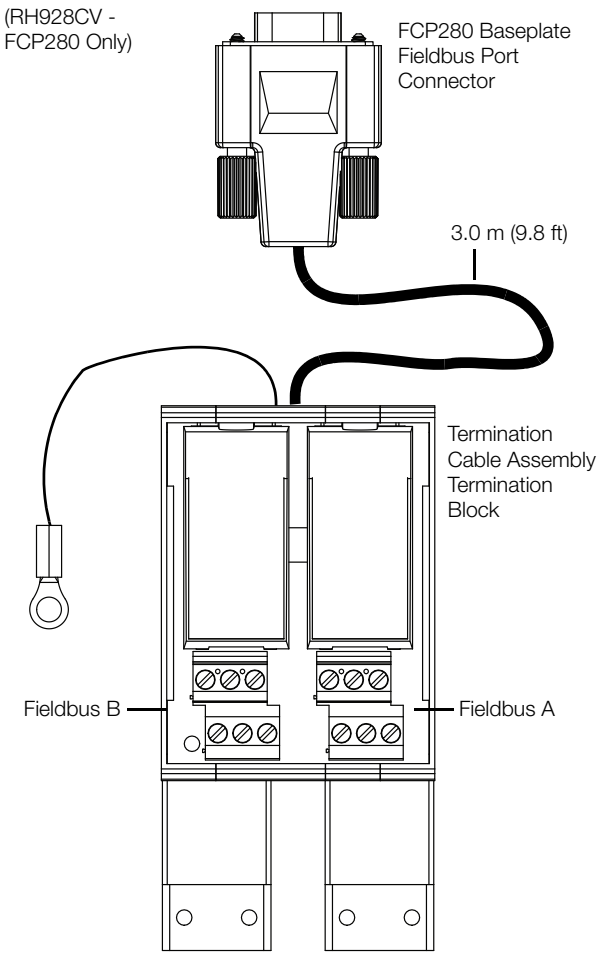


Figure 9. Extended Fieldbus Splitter for FCP280 Baseplate (Fieldbus Ports 1-4)

LIQUID CRYSTAL DISPLAY (LCD)

The FCP280 has a liquid crystal display (LCD) on its faceplate, which displays various status and identification information:

- The first line typically displays the FCP280's letterbug and role (Primary/Shadow/Single).
- The second line displays the FCP280's part number, hardware revision information, manufacturing date, OS version, and its status on the Control Network.

LED INDICATORS

Light-emitting diodes (LEDs) on the front of the FCP280 module provide visual indication of the:

- FCP280 operational status
- Transmit/receive communications activity of four Expanded fieldbus channels, fieldbus A and B for each.

LED indicators on the copper or fiber network adapters provide visual indication for:

- Internal and external power supply health status
- Communications activity to the Control Network A and B links, and to the FCP280(s).

FCP280 FUNCTIONAL SPECIFICATIONS

Processor Type

CONTROL PROCESSOR
ARM® System on a Chip (SOC) with stored programs, using high-speed communication capability.

SIZE
128 MB SDRAM
128 MB flash memory

ERROR DETECTION
ECC providing single-bit error detection and correction as well as multiple-bit error detection.

Process I/O Communications (with FBMs)

MODULE FIELDBUS

Type
HDLC

Transmission Rate
2 Mbps for 200 Series FBMs or
268 Kbps for 100 Series FBMs

Process I/O Capacity

200 SERIES FBMS

Up to 32 per Expanded fieldbus - up to 128 FBMs over all four Expanded fieldbuses when used exclusively with 200 Series FBMs. When used with a mix of 100 Series and 200 Series FBMs, up to 128 100 Series FBMs (Y-module) or competitive devices (such as Foxboro Evo System migration FBMs) with the remainder of this 128 module limit being 200 Series FBMs, depending on the Fieldbus loading of the FCP280.
For example, an FCP280 may support 64 100 Series FBMs and 64 200 Series FBMs (as 64 + 64 = 128) over separate Expanded fieldbuses.
As well, a maximum of 64 100 Series FBMs are allowed on each PIO bus/baseplate port.
Refer to *Field Control Processor 280 (FCP280) Sizing Guidelines and Excel Workbook* (B0700FY) for sizing constraints.
Competitive Migration Modules
Refer to the device specific Product Specification Sheets.

Process I/O Capacity (Cont.)

100 SERIES FBMS—STANDARD FCP280 BASEPLATES ONLY

A maximum of 64 100 Series FBMs are allowed on each PIO bus/baseplate port, with a total of 128 allowed per FCP280, depending on control processor sizing constraints (refer to *Field Control Processor 280 (FCP280) Sizing Guidelines and Excel Workbook* (B0700FY)).
Competitive Migration Modules
Refer to the device specific Product Specification Sheets.

Memory Allocation for Blocks

15.75 MB

Maximum Number of Blocks Configured

The maximum number of control blocks that can be configured for the FCP280 (or fault-tolerant FCP280 pair) is 8000(1).

Block Executions Per Second

16,000 blocks/second, maximum

Maximum Number of Blocks Processed

The number of blocks that can be processed per block processing cycle (BPC) time interval depends on scan periods and block type selection. These blocks include all types (control blocks, ECBs, compounds, data blocks, and so forth). For sizing guidelines, refer to *Field Control Processor 280 (FCP280) Sizing Guidelines and Excel Workbook* (B0700FY).

Minimum Block Processing Cycle (BPC)

50 ms

Sequence Block Size

32 KB maximum for each block

(1) Seven of these 8000 blocks are pre-defined, leaving a total of 7993 blocks that you can configure for the FCP280. Compounds and ECBs all count as blocks as well.

FCP280 FUNCTIONAL SPECIFICATIONS (CONTINUED)

Maximum Number of IPC Connections
231; 200 connections for source points; 30 connections for sink points; 1 connection for internal use only.

An IPC connection provides the means to exchange continuous process control information. A Source point is defined as a connection to a destination device that can have data sourced by a given CP. Thus an FCP280 can provide data to up to 200 destination stations.
A Sink point is defined as an external point to which the FCP280 can connect to acquire process control data. The FCP280 can receive continuous updates from up to 30 other data sources.

Maximum Number of OM Sink Lists
75
A Sink list is a list of items to be delivered to particular destination. These lists provide an efficient way to group updates to a given destination.

Maximum OM Scanner Database
18,000 points for BPC ≥ 200 ms
7,500 points for BPC ≤100 ms
The Object Manager (OM) scanner database is the total of all points in the control scheme for which the CP is scanning and providing updates.

Maximum Number of OM Sink Points
11,250
The OM sink point limitations refer to the number of points that can be received from outside sources.

Configurable Block Periods
0.05, 0.1, 0.2, 0.5, 0.6, 1, 2, 5, 6, 10, 30 seconds
1, 10, 60 minutes

Block Processing Cycle
0.05, 0.1, 0.2, 0.5 and 1.0 seconds, selectable at system configuration time

Time to Marry Fault-Tolerant Modules
Less than 0.5 seconds

Internal Diagnostics
Self-checking performed at power-up. Run-time checks and the watchdog timer function performed during operation.
When FCP280s are configured as an fault-tolerant pair, constant synchronization checking and message compare operations are also used to detect hardware faults.

Power Requirements (FCP280 Module)

INPUT VOLTAGE (REDUNDANT)
24 V dc typical

CONSUMPTION (SINGLE MODULE WITH REDUNDANT NETWORK ADAPTERS)
11 W, maximum

CONSUMPTION (FAULT-TOLERANT PAIR WITH REDUNDANT NETWORK ADAPTERS)
20 W, maximum

FCP280 FUNCTIONAL SPECIFICATIONS (CONTINUED)

Regulatory Compliance

ELECTROMAGNETIC COMPATIBILITY (EMC)

European EMC Directive 2014/30/EU
Meets: EN 61326-1 Class A Emissions and Industrial Immunity Levels.

PRODUCT SAFETY

Underwriters Laboratories (UL) for U.S. and Canada
Underwriters Laboratories (UL) for U.S. and Canada UL/UL-C listed as suitable for use in Class I, Groups A-D; Division 2; enclosure based systems when connected to specified 200 Series Fieldbus Modules as described in the *Standard and Compact 200 Series Subsystem User's Guide* (B0400FA) Communications circuits also meet the requirements for Class 2 as defined in Article 725 of the National Electrical Code (NFPA No.70) and Section 16 of the Canadian Electrical Code (CSA C22.1). Conditions for use are as specified in the *Standard and Compact 200 Series Subsystem User's Guide* (B0400FA).

EUROPEAN LOW VOLTAGE DIRECTIVE 2014/35/EU AND EXPLOSIVE ATMOSPHERES (ATEX) DIRECTIVE 2014/34/EU

ATEX (DEMKO) Ex nA IIC T4 Gc certified when connected as described in the *Standard and Compact 200 Series Subsystem User's Guide* (B0400FA). For use in an enclosure suited for an ATEX Zone 2 classified area.
ABS Type Approved and Bureau Veritas Marine Certification for Environmental Category EC31.

SECURITY

Wurldtech Achilles Certification™ Level 1
ISASecure™ Certification, EDSA Level 1

FCP280 ENVIRONMENTAL SPECIFICATIONS(2)

Operating

TEMPERATURE
-20 to 60°C (-4 to 140°F)

NOTE
Schneider Electric recommends the use of the FCP280 vertically-mounted baseplate (RH924YF) on vertical DIN rails for more efficient cooling of the FCP280.

RELATIVE HUMIDITY
5 to 95% (Noncondensing)

ALTITUDE
-300 to +3,000 m (-1,000 to +10,000 ft)

CONTAMINATION
Class G3 (Harsh) as defined in ISA Standard, S71.04. No effect on functionality after simulated 10-year exposure to mixed gas testing per EIA Standard 364-65A, Class III.
The FCP280 has Conformal Coating.

VIBRATION
0.5 g (5 to 500 Hz)

Storage

TEMPERATURE
-40 to +70°C (-40 to +158°F)

RELATIVE HUMIDITY
5 to 95% (Noncondensing)

ALTITUDE
-300 to +12,000 m (-1,000 to +40,000 ft)

(2) The environmental limits of this module may be enhanced by the type of enclosure containing the module. (Refer to the applicable Product Specification Sheet (PSS) which describes the specific type of enclosure that is to be used.)

FCP280 PHYSICAL SPECIFICATIONS

Configuration
Single processor module. The fault-tolerant version consists of two processor modules, with an interconnecting fault-tolerant connector integral to the baseplate.

Mounting
May be placed in device specific 2-position baseplates designed for horizontal or vertical mounting - see Figure 5 on page 10.
For the fault-tolerant FCP280, the two modules must be mounted in dedicated slots to allow for interconnecting fault-tolerant communication.

Dimensions - Module
HEIGHT
105 mm (4.13 in)
116 mm (4.59 in) including mounting lugs

WIDTH
51.8 mm (2.04 in)

DEPTH
147 mm (5.80 in)

Figure 10. FCP280 Dimensions

Weight (Maximum)
0.8 kg (1.78 lb) for a single, non-fault-tolerant module.

Part Number
FCP280
RH924YA

FCP280 HORIZONTAL-MOUNTED BASEPLATE
RH924YL

FCP280 VERTICAL-MOUNTED BASEPLATE
RH924YF

FCP280 DUAL CABLE BASEPLATE
(Horizontal or Vertical mount)
RH100JX

FIBER ADAPTER
RH924WA

COPPER ADAPTER
RH924UQ

SPLITTER ADAPTERS

Twinaxial Fieldbus Splitter
RH928CV

Redundant Module Fieldbus Cable Adapter
RH924ZJ - For use when the FCP280 is in the middle of a 200 Series baseplate chain
RH928CY - Enables the use of redundant module Fieldbus cables between baseplates to split and terminate the Modular Fieldbus and optional time strobe signals

Time Strobe Adapter
RH924ZQ

FCP280 PHYSICAL SPECIFICATIONS (CONTINUED)

Ethernet Switch to FCP280 Cabling

CABLING CONNECTORS

Fiber Adapter

Two ceramic type LC connectors on one end (for network adapters) with an MT-RJ connector on the other end (for switch)

Copper Adapter

RJ-45 connectors on both ends

FIBER OPTIC CABLE

Cable Material

Multimode fiber (MMF) 62.5/125 µm plenum

Cable Lengths

Up to 50 m (164 ft) – Schneider Electric supplied. Refer to "Network Cabling for FCP280 Network Adapters" in B0700FW for the appropriate specifications of allowed fiber optic cabling.

Greater than 50 m – user supplied

Maximum Length

2 km (6,560 ft) from the Ethernet switch to the FCP280.

COPPER CABLE

Cable Material

1000Base-T CAT5 copper Ethernet cable

Cable Lengths

Up to 100 m (328 ft) – Schneider Electric supplied. Refer to "Network Cabling for FCP280 Network Adapters" in B0700FW for the appropriate specifications of allowed copper cabling.

Greater than 100 m – user supplied

Maximum Length

100 m (328 ft) from the Ethernet switch to the FCP280.

Cabling – 2 Mbps Fieldbus

FCP280 FIELDBUS WITHOUT FCM2Fs

The cable length of each individual Expanded fieldbus cannot exceed 60 m (198 ft).

FCP280 FIELDBUS WITH FCM2Fs

Each FCP/FCM drives a segment of interconnected baseplates of up to 60 m (198 ft). Up to four pairs of FCM2F*x*s can be used in each individual fieldbus in the Expanded fieldbus.

FCP280 FIELDBUS WITH FBI200

The cable length from the FCP280 to FBI200 is up to 305 m (1000 ft), and the length from the FBI200 to the last baseplate in the chain is 60 m (198 ft).

(This represents the distance for one HDLC fieldbus in the Expanded Fieldbus.)

Refer to *FBI200 Fieldbus Isolator/Filter* (PSS 31H-2FBI) for additional FBI200 configurations and restrictions.

FCP280 PHYSICAL SPECIFICATIONS (CONTINUED)

Cabling – 268 Kbps Fieldbus[3]

MAXIMUM LENGTH

To 200 Series FBMs via FBI200

Total Length of Cabling between FCP280 and FBI200 Plus the Total Length of the 2 Mbps Module Fieldbus (for 200 Series FBMs) - 60 m (198 ft) maximum

To 100 Series FBMs via FBI200

Between FCP280 and FBI200 - 60 m (198 ft) maximum

From FBI200s to 100 Series FBMs in last Mounting Structure - 1830 m (6000 ft) maximum

To 100 Series FBMs, Direct Connection

2 Mbps and 268 Kbps Mixed Configurations

From FCP280 to 100 Series FBMs in last Mounting Structure - 60 m (198 ft) maximum

268 Kbps Only Configurations

From FCP280 to 100 Series FBMs in last Mounting Structure - 1 Km (3200 ft) maximum

CABLE

Twinaxial, shielded

(3) The FCP280 baseplate Fieldbus ports support direct connection to the 268 Kbps fieldbus via the splitter (RH928CV).

FCP280 BASEPLATE FUNCTIONAL SPECIFICATIONS

Power Requirements (Baseplate)

INPUT VOLTAGE RANGE (REDUNDANT)

24 V dc

POWER CABLING

Cable Lengths

0.4 m (16 in) up to 2.1 m (7 ft)

Regulatory Compliance

ELECTROMAGNETIC COMPATIBILITY (EMC)

European EMC Directive 2014/30/EU

Meets: EN 61326-1 Class A Emissions and Industrial Immunity Levels.

Regulatory Compliance (Cont.)

PRODUCT SAFETY

Underwriters Laboratories (UL) for U.S. and Canada

UL/UL-C listed as suitable for use in Class I, Groups A-D; Division 2; temperature code T4 enclosure based systems. Communications circuits also meet the requirements for Class 2 as defined in Article 725 of the National Electrical Code (NFPA No.70) and Section 16 of the Canadian Electrical Code (CSA C22.1). Conditions for use are as specified in the *Standard and Compact 200 Series Subsystem User's Guide* (B0400FA).

EUROPEAN LOW VOLTAGE DIRECTIVE 2014/35/EU AND EXPLOSIVE ATMOSPHERES (ATEX) DIRECTIVE 2014/34/EU

ATEX (DEMKO) Ex nA IIC T4 Gc certified when connected as described in the *Standard and Compact 200 Series Subsystem User's Guide* (B0400FA). For use in an enclosure suited for an ATEX Zone 2 classified area.

Marine Certification

Bureau Veritas Marine Certification for Environmental Category EC31C.

Note, the following products are NOT marine certified: Dual Cable FCP280 Baseplate (RH100JX).

FCP280 BASEPLATE ENVIRONMENTAL SPECIFICATIONS(4)

Operating

TEMPERATURE
-20 to +60° C (-4 to +140° F)

RELATIVE HUMIDITY
5 to 95% (noncondensing)

ALTITUDE
-300 to +3,000 m (-1,000 to +10,000 ft)

Storage

TEMPERATURE
-40 to +70° C (-40 to +158° F)

RELATIVE HUMIDITY
5 to 95% (noncondensing)

ALTITUDE
-300 to +12,000 m (-1,000 to +40,000 ft)

Contamination (Non-Enclosure Mounted)

Class G3 (Harsh) as defined in ISA Standard S71.04

Contamination (Enclosure Mounted)

Class G3 (Harsh) as defined in ISA Standard S71.04.
Pollution degree 2 as defined in IEC 664-1.

FCP280 BASEPLATE PHYSICAL SPECIFICATIONS

Mounting

DIN RAIL
FCP280 baseplates mount on a non-isolated, mechanically supported vertical DIN rail, which can be internal to, or external to an enclosure. The FCP280 baseplate attaches to the DIN rail by means of fasteners.

RACK MOUNT
A mounting kit (P0930AS) is available for horizontal mounting of the FCP280 baseplate in a standard, 483 mm (19-inch) rack. This kit provides a 25.4 mm (1 inch) mounting depth.

NOTE
Mounting kit (P0930AS) is not available for the optional dual cable baseplate.

DUAL CABLE BASEPLATE MOUNT
The optional dual cable baseplate has built-in vertical or horizontal DIN rail mounting supports.

Rack Mounting Bracket

Material: Steel, Cold-Rolled, 0.0598 mm (16 Gauge)

Mass (Without Modules)

~0.45 kg (1.0 lb)

Size

HEIGHT
120 mm (4.74 in)

WIDTH
216 mm (8.5 in)

DEPTH
27.1 mm (1.07 in)

Dual Cable Baseplate Size

HEIGHT
150 mm (5.90 in)

WIDTH
247 mm (9.72 in)

DEPTH
31.5 mm (1.24 in)

Construction

MATERIAL
PC and ABS, inflammability UL94 V0

COLOR
Black

Module Fieldbus Cabling

CABLE LENGTHS
0.125 m (5 in) up to 60 m (198 ft)

OVERALL CABLE LENGTH
60 m (198 ft) total allowable cable length

(4) The environmental limits of the 200 Series baseplates may be enhanced by the type of enclosure containing the 200 Series baseplate.[Refer to the applicable Product Specification Sheet (PSS) which describes the specific type of enclosure that is to be used.

RELATED PRODUCT SPECIFICATION SHEETS

For reference purposes, Table 1 lists the Product Specification Sheets (PSSes) for additional hardware and software elements in the 200 Series subsystem.

Table 1. Related Product Specification Sheets

PSS Number	Title
PSS 31H-2SOV	Standard 200 Series Subsystem Overview
PSS 31H-2W100	100 Series Fieldbus Module Upgrade Subsystem Overview
PSS 31H-2CERTS	Standard and Compact 200 Series I/O - Agency Certifications
PSS 31H-2W3	Standard 200 Series Power Supply
PSS 31H-2W4	Termination Assembly Adapter Modules for 100 Series Upgrade
PSS 31H-2SBASPLT	Standard 200 Series Baseplates
PSS 31H-2FPS	Standard 200 Series Power Supplies - FPS240-24 and FPS120-24
PSS 31H-2W8	100 Series Conversion Mounting Structures
PSS 31H-2COV	Compact 200 Series I/O Subsystem Overview
PSS 31H-2W12 B3	DIN Rail Mounted High Density I/O Equipment, Agency Certifications
PSS 31H-2C480 B4	Compact Power Supply - FPS480-24
PSS 31H-2Y6	Intrinsically Safe I/O System
PSS 31H-2Y17	FBI200A Fieldbus Isolator/Filter
PSS 31H-2FBI200	FBI200 Fieldbus Isolator/Filter
PSS 31H-2GOV	G-Series Enclosures Overview
PSS 31H-7NwEquip	The MESH Control Network Architecture
PSS 31S-1TIME	Time Synchronization Overview
PSS 31S-3FCPICS	Field Control Processor 280 (FCP280) Integrated Control Software

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