Foxboro™ DCS

100 Series Fieldbus Module Upgrade Subsystem Overview

PSS 41H-2W100

Product Specification

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Overview

The 100 Series Fieldbus Module (FBM) Upgrade subsystem provides a complete line of equipment to upgrade sites with existing 100 Series FBMs and Termination Cable Assemblies (TCAs) to their 200 Series equivalents. This allows sites to easily add other 200 Series FBMs, if it becomes necessary to add a wider range of field devices.

The 200 Series FBMs provide a range of functionality discussed in *Standard 200 Series Subsystem Overview* (PSS 41H-2SOV).

As a further enhancement, a HART solution has been provided for the FBM01, FBM04, FBM05 (replacement path only), and FBM37 modules by FBM214b, FBM244, FBM245, and FBM215 respectively.

Depending on the amount of existing 100 Series equipment you want to retain, different sets of equipment are provided. You can choose between the upgrade or replacement paths.

The FBM22 - A/M station, Coriolis FBM, and HTG FBM do not have a replacement 200 Series FBM. As well, any instances of an FBM17 using Equipment Control Block 34 (ECB34) do not have a replacement solution.

Upgrade Path

To minimize plant downtime during the upgrade process and to maintain cost-effectiveness, the upgrade path preserves, where possible, the existing:

- 100 Series Termination Cable Assemblies (TCA) which provide the existing field I/O wiring
- Enclosures (Industrial Enclosures, Metal Enclosures, and Field Enclosures) in which the 100 Series FBMs are installed

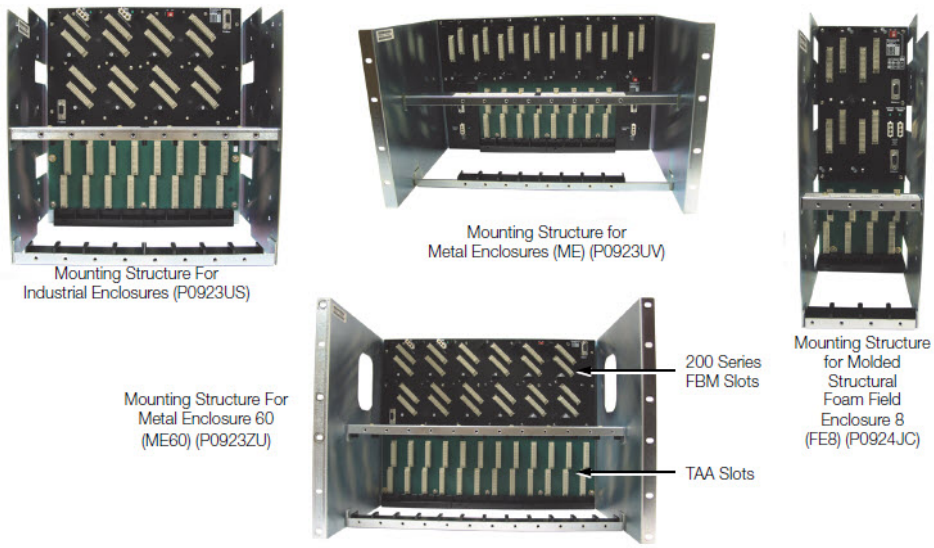
Equipment that is required for the upgrade path, aside from the 200 Series FBMs, includes the following:

- Termination Assembly Adapter (TAA) modules (*Figure 1, page 3*) accept the original 100 Series TCA termination connectors on their fronts. They interface between the field I/O wiring from the TCAs and the 200 Series FBMs in the new conversion mounting structures.

Figure 1 - Termination Assembly Adapter (TAA) Module

- Conversion mounting structures (Figure 2), which provide a communications backplane for mounting the 200 Series FBMs, TAAs, and other support modules. These mounting structures replace the original 100 Series mounting structures, and are provided in a series of upgrade kits. These new mounting structures have reduced depth, as compared with the depth of the mounting structures they replace. After the upgrade process, additional space in the rear of these mounting structures may be available for additional equipment, cabling, or air flow.

Figure 2 - Conversion Mounting Structures (Used in Upgrade Path)



- Fieldbus Isolators (FBI200 and FBI200A) replace the 100 Series FBI and enable distant communications between the 200 Series FBMs in the conversion mounting structures and their FCP280s.
- 240 W power supply (FPS240-24) and 120 W power supply (FPS120-24) are available to support the conversion mounting structures.

Existing sites must upgrade their:

- Control Processors to the FCP280.
- Network to the Foxboro DCS Control Network (the control network) to enable communications for this new hardware. The network and its associated available equipment is discussed in *The Foxboro™ DCS Control Network Ethernet Equipment* (PSS 41H-7NWEQUIP).

Replacement Path

In some sites, it may not be desirable to retain the original infrastructure of TCA cables and power supplies, due to the age and condition of this equipment. In these situations, the replacement path allows sites to replace the equipment used with the original 100 Series FBM subsystem entirely.

This new equipment includes the 200 Series FBMs and the following:

- 200 Series Termination Assemblies (TAs) that accept field I/O wiring and connect directly to the 200 Series FBMs (without the need for TAAs, which are used in the upgrade path). The field I/O wiring must be removed from the existing 100 Series TCAs and attached to the 200 Series TAs.
- New Fieldbus Isolator (FBI200) enables distant communications between the 200 Series FBMs in the conversion mounting structures and their Control Processors.
- 400 W power supplies (FPS400-24) to support the 200 Series baseplates in which the 200 Series FBMs will be installed. The 240 W power supplies (FPS240-24) and 120 W power supplies (FPS120-24) are also available.
- Switches and support equipment to build the control network, discussed in *The Foxboro™ DCS Control Network Ethernet Equipment* (PSS 41H-7NWEQUIP).
- New equipment must be installed in an enclosure that is rated for supporting the 200 Series subsystem equipment. The G-Series enclosures are recommended. Refer to *G-Series Enclosures Overview* (PSS 41H-2GOV) for a list of these enclosures.

Control Processor Upgrade (for Both Paths)

The new upgrade hardware operates with the FCP280 as is, as the FCP280 requires Foxboro DCS Control Core Services software, version 9.0 or later.

As existing sites may have earlier versions of I/A Series software:

- Sites with CP60 or earlier CPs must plan to upgrade their CPs to the FCP280
- Sites which incorporate the new 100 Series upgrade hardware must upgrade their control systems to Control Core Services software v9.0 or later for FCP280s
- Sites may need newer Control Core Services workstations to support this latest software

Features

- Upgrade paths allow replacement of field input/output modules in strategic plant areas with minimal plant downtime
- Retains existing field I/O wiring, and shielded twisted-pair cables between Control Processors and Fieldbus Modules
- Upgrade path preserves, where possible, existing 100 Series Termination Cable Assemblies (TCA), and enclosures, for increased cost-effectiveness
- Replacement path replaces all 100 Series equipment and enclosures in sites requiring replacement of this equipment
- High performance Fieldbus Modules (FBMs) replace lower-performing FBMs, including any Main/Expander FBM pairs
- Optional redundant power and I/O hardware
- Variety of modular mounting configurations
- High performance, high accuracy, fast updates
- Reduced component count, for ultra-high reliability and quality
- Harsh (Class G3 - ISA S71.04) contamination protection
- Maintains existing power security and alarming
- Electrical isolation and field device power
- High-speed system communication

200 Series Fieldbus Module Mounting

The backplane on which the 200 Series Fieldbus Modules mount depends on whether you are using the upgrade or replacement path.

For the upgrade path, the FBMs use Termination Assembly Adapters (TAAs) to connect to existing 100 Series Termination Cable Assemblies. The FBMs mount on the conversion mounting structures, which also provide mounting connectors for the TAAs, as shown in *Figure 2*.

The conversion mounting structures are compatible with existing I/O subsystems and include the following:

- Primary and secondary 24 V dc power connections
- Two Module Fieldbus connections (for A/B Module Fieldbus daisy chain)
- Power/communication connection and field I/O connection for each FBM
- DIP switch for baseplate identification
- Adding additional baseplates without removing the system from service (requires redundant Module Fieldbus)

Refer to *100 Series Conversion Mounting Structures* (PSS 41H-2W8) for additional information on the conversion mounting structures.

For the replacement path, the 200 Series FBMs mount on specially designed Modular Baseplates described in *Standard 200 Series Baseplates* (PSS 41H-2SBASPLT).

FBMs can be removed from a conversion mounting structure or Modular Baseplate without removing or disturbing external field device wire terminations or internal cable terminations or connections.

Shielded twisted-pair cables for conversion mounting structure and Modular Baseplate interconnections are available in various lengths of 0.25 m (10 in) up to 60 m (198 ft). The maximum shielded twisted-pair cable length interconnecting all baseplates is 305 m (1000 ft). The maximum HDLC cable length is 60 m (198 ft).

Field I/O Terminations

Field I/O signal connections to the 200 Series FBMs are made depending on the type of upgrade.

- For the upgrade path, via existing 100 Series Termination Cable Assemblies (TCA). Remove termination connectors from the 100 Series FBMs and attach them to the new Termination Assembly Adapter (TAA) modules on conversion mounting structures.
- For the replacement path, via 200 Series termination assemblies (TAs) mounted on DIN rails within or external to the enclosure. Termination assemblies are connected to their FBM's Modular Baseplate by dedicated cables, which can be 0.5 m (1.7 ft) up to 30 m (100 ft) in length. These various cable lengths allow the termination assemblies to be mounted in the same enclosure as the FBMs, or in an adjacent enclosure.

Analog and discrete I/O FBMs are used with specific termination assemblies to handle a variety of input/output signals. When used in high voltage applications, discrete I/O termination assemblies adapt the module to 120 V ac, 125 V dc, or 240 V ac inputs and outputs.

Enclosures

Enclosures extend the design of the 200 Series FBMs by providing a range of mounting options to match application requirements.

For the upgrade path, the 100 Series FBM Upgrade subsystem equipment can be installed in existing Foxboro DCS enclosures in the customer's site. These include:

- Industrial Enclosures (IE) - discussed in *Molded Structural Foam Enclosures* (PSS 21H-5B1 B3)
- Industrial Enclosures (IE) - discussed in *Molded Structural Foam Enclosures* (PSS 21H-5B1 B3) and the Industrial Metal Front and Rear Access (IEMFR) - discussed in *System Equipment Installation* (B0193AC)
- Sealed Metal Field Enclosure 8 - discussed in *Metal Field Enclosure 8* and *Metal Enclosures P42, P43 and P371* (PSS 21H-5C1 B3)
- P42, P43 and P371 Metal Enclosures - discussed in *Metal Field Enclosure 8* and *Metal Enclosures P42, P43 and P371* (PSS 21H-5C1 B3)
- Fieldbus Module Metal Enclosure 60 - discussed in *Fieldbus Module Metal Enclosure 60* (PSS 21H-5C1 B4)
- Molded Structural Foam Field Enclosure 8 (FE8) - discussed in *Molded Structural Foam Enclosures* (PSS 21H-5B1 B3)

See *100 Series Conversion Mounting Structures* (PSS 41H-2W8) to determine the conversion mounting structures needed to replace these enclosures.

For the replacement path, the 100 Series Upgrade subsystem equipment can be installed in new G-Series enclosures, which include DIN rails for mounting 200 Series equipment, power supplies, and terminal blocks for connection of line power. For additional information regarding G-Series enclosures, see *G-Series Enclosures Overview* (PSS 41H-2GOV).

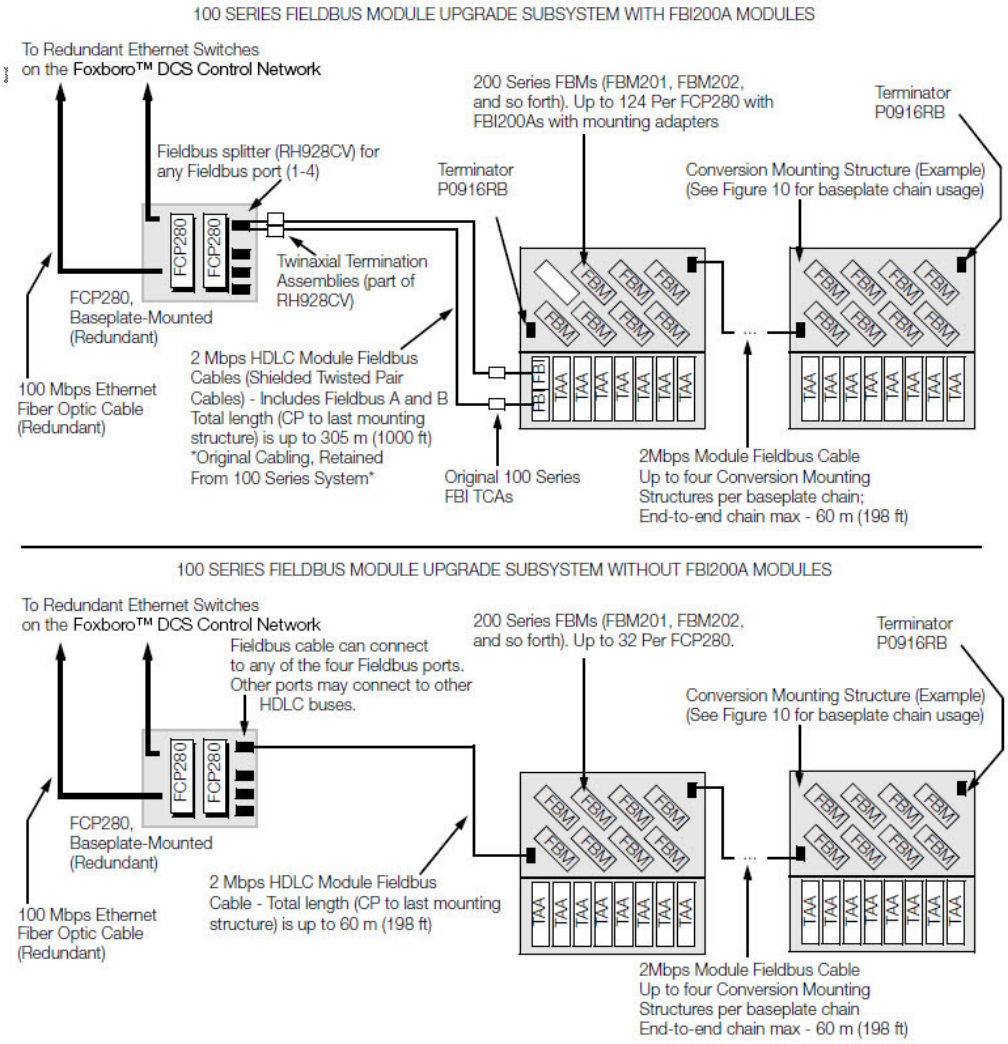
Distributed Local/Remote Mounting

Innovative design of the equipment packaging allows the 200 Series Fieldbus Modules to be distributed closer to the process without special environmentally conditioned control or equipment rooms. Multiple control network configurations can be designed using the Ethernet fiber optic cables and switches. This allows construction of small-to-large size systems located within one or more mounting areas.

For the upgrade path, two basic network configurations can be implemented for the 100 Series Fieldbus Module Upgrade subsystem, using conversion mounting structures. Both of these configurations allow the FBMs to be remotely mounted with the Foxboro DCS control processor mounted in a separate location.

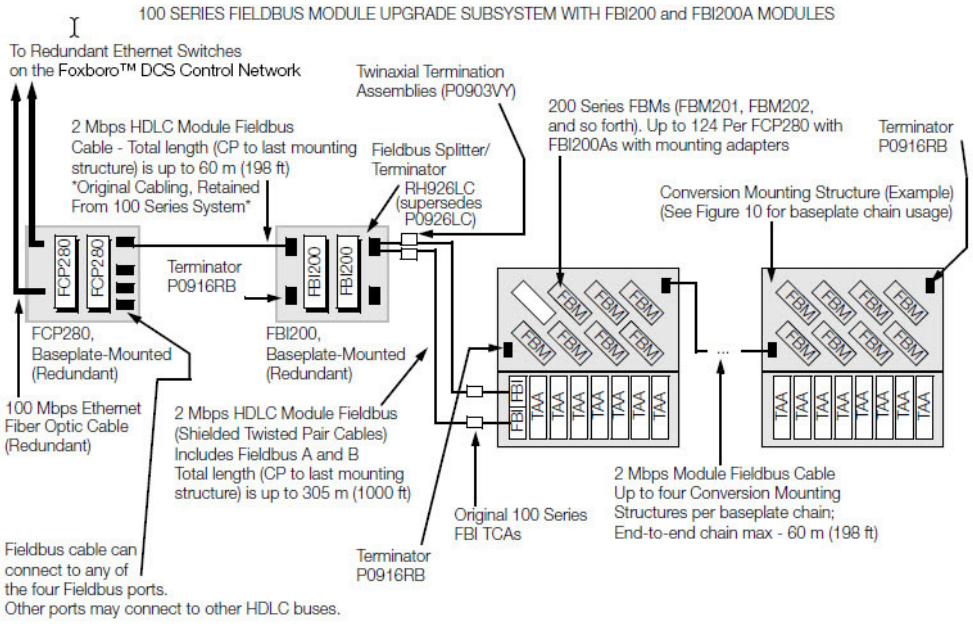
For the replacement path, similar configurations use Modular Baseplates, as described in *Standard 200 Series Subsystem Overview* (PSS 41H-2SOV).

Figure 3 - 100 Series Upgrade Subsystem, Typical FCP280 Configurations, Upgrade Path (Conceptual), Part 1



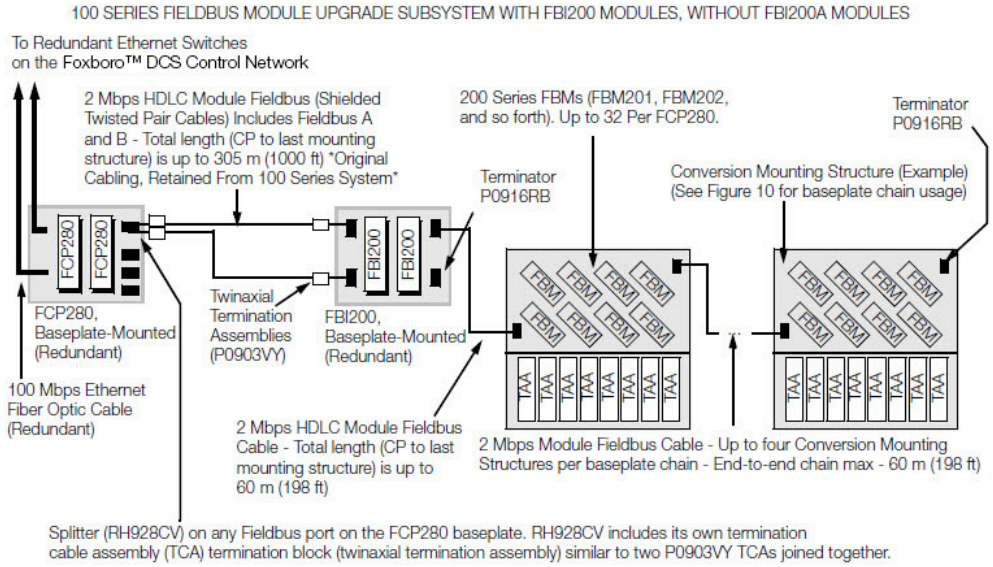
NOTE: Conversion mounting structures may be installed in existing enclosures in the field to replace existing 100 Series mounting structures. New FCP280 pair must be installed in separate location to replace existing control processors.

Figure 4 - 100 Series Upgrade Subsystem, Typical FCP280 Configurations, Upgrade Path (Conceptual), Part 2



NOTE: Conversion mounting structures may be installed in existing enclosures in the field to replace existing 100 Series mounting structures. New FCP280 pair must be installed in separate location to replace existing control processors.

Figure 5 - 100 Series Upgrade Subsystem, Typical FCP280 Configurations, Upgrade Path (Conceptual), Part 3

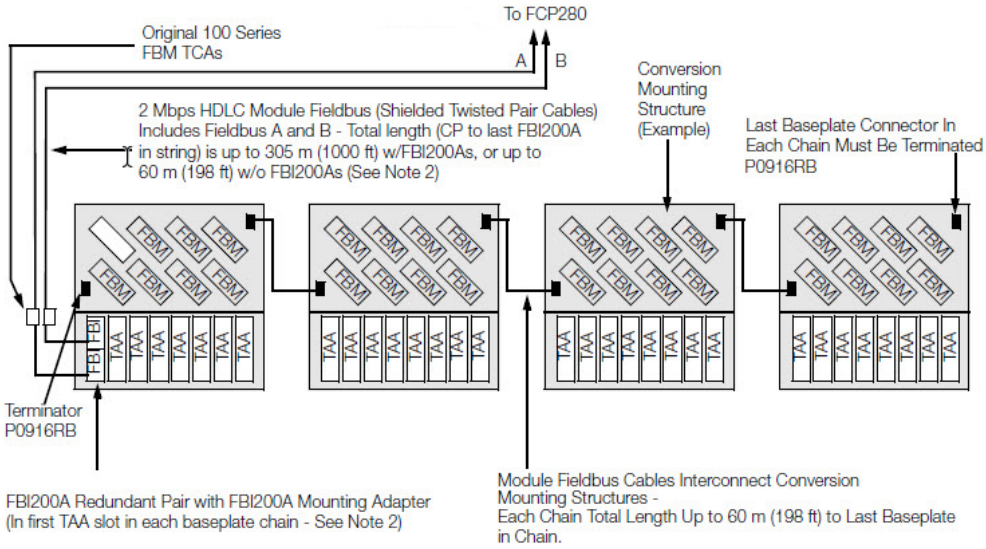


NOTE: Conversion mounting structures may be installed in existing enclosures in the field to replace existing 100 Series mounting structures. New FCP280 pair must be installed in separate location to replace existing control processors.

Conversion Mounting Structure Implementation in Upgrade Path

Conversion mounting structures, which provide for convenient physical grouping of the modules, are interconnected by cables. *Figure 6* shows the basic mounting structure configuration using shielded twisted-pair connections. Optional redundant cables for the Module Fieldbus can be used by connecting the cables to A/B Module Fieldbus splitter/terminators. This configuration is used when the mounting structures are mounted within an enclosure or enclosures in the same location (for example, in multiple enclosures in the same area). Shielded twisted-pair cables (for interconnecting the Modular Baseplates) are available in lengths of 0.25 to 60 meters.

Figure 6 - Conversion Mounting Structure Implementation Example (Upgrade Path)



NOTE:

1. Maximum Fieldbus Module quantity is listed in conversion mounting structure functional specifications.

2. If FBI200As are not installed, a baseplate chain can have a 200 Series FBM/TAA pair installed in FBM/TAA Slot 1 of the first conversion mounting structure, increasing the total number of 200 Series FBMs per baseplate chain from 31 to 32. Without FBI200As, the conversion mounting structure connects to the FCP280 via standard 2 Mbps HDLC Module Fieldbus cables.

Modular Baseplates can be implemented in a baseplate chain as discussed in *Standard 200 Series Subsystem Overview* (PSS 41H-2SOV).

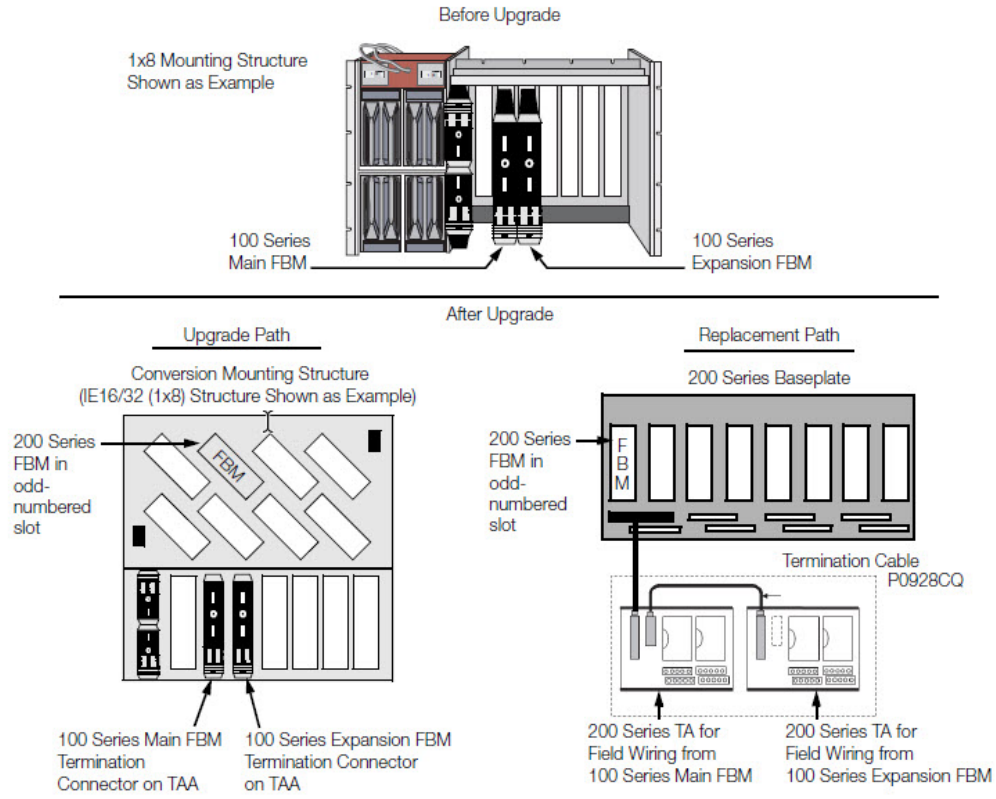
Fieldbus Modules

Each 200 Series Fieldbus Module is configurable for operation with the applicable field sensors and/or actuators.

Separate tables for replacement hardware are provided below, depending on whether you are replacing:

- A standalone 100 Series FBM - requires one 200 Series FBM and:
  - For the upgrade path, one Termination Assembly Adapter (TAA) module
  - For the replacement path, one 200 Series termination assembly (TA) and one 200 Series TA cable
- A 100 Series Main/Expander FBM pair (one Main FBM and one Expansion FBM), as illustrated in *Figure 7* - requires one 200 Series FBM, and either:
  - For the upgrade path, one Main TAA and one Expansion TAA
  - For the replacement path, one 200 Series Main TA and one Expansion TA connected with an expander cable

Figure 7 - Upgrade for 100 Series Main/Expansion Pair



In both the upgrade and replacement paths, the main/expansion FBM/TAA/TA pair must mount in an odd/even pair of adjacent FBM/TAA slots, as shown in *Figure 11*. A TAA's associated FBM must be placed in the FBM position which correlates with the slot which holds the main TAA.

Replacement Hardware for Standalone 100 Series FBMs and TCAs

Table 1 lists the 200 Series FBMs and Termination Assembly Adapter (TAA) modules (for the upgrade path) and Termination Assemblies (TAs) (for the replacement path) which replace the standalone 100 Series FBMs (which do not use expansion FBMs). It also lists the Product Specification Sheets which provide additional information about each 200 Series FBM.

For the replacement path, 200 Series FBMs must use Termination Assemblies (TAs) instead of TAAs.

NOTE: For the list of termination assemblies (TAs) used with each 200 Series FBM to support the appropriate signals, refer to the appropriate 200 Series FBM PSS in Table 1.

Table 1 - Upgrade 200 Series Fieldbus Modules for Standalone 100 Series FBMs

100 Series FBM	Upgrade with 200 Series FBM	Function(s)	Upgrade TAA	Replacement TA	PSS Number
FBM01 (field I/O to non-HART devices)	FBM201	8-Channel 0 to 20 mA Input, Channel Isolated	TAA01 (P0923RA)	RH916XG, P0917JK [(a)]/P0916AB	PSS 41H-2S201
FBM01 (field I/O to HART devices)	FBM214b	8-Channel 0 to 20 mA, HART® Input	TAA01 (P0923RA)	RH924JH/P0924JH	PSS 41H-2S214
FBM02 and FBM36	FBM202	8-Channel Thermocouple/ Millivolt Input, Channel Isolated	TAA02 (P0923RB)	RH916XH[(a)], P0917JL/P0916AD	PSS 41H-2S202
FBM03A	FBM203	8-Channel RTD Input (platinum or nickel), Channel Isolated, 0 to 320 Ω, 3-wire	TAA03A (P0923RC)	RH916XJ, P0917JM [(a)]/P0916AF	PSS 41H-2S203
FBM03B	FBM203d [(b)]	8-Channel RTD Input (platinum), Channel Isolated, 0 to 320 Ω, 2-4 wire	TAA03B (P0924GX)	RH924EX/P0924EX	PSS 41H-2S203
FBM04 (to non-HART devices)	FBM204	8-Channel 0 to 20 mA I/O (4 Input, 4 Output), Channel Isolated	TAA04 (P0923RD)	RH916XK, P0916AH, RH917QW/ P0917QW (with output bypass jacks)	PSS 41H-2S204
FBM04 (to HART devices)	FBM244	4-Channel 0 to 20 mA Input and 4-Channel 0 to 20 mA Output (with HART® Support on All Channels)	TAA04 (P0923RD)	RH924QU/ P0924QU, or RH924QZ/P0924QZ (with output bypass jacks)	PSS 41H-2S244
FBM05 (to non-HART devices)	FBM208b (Upgrade Path Only)	Redundant with Readback, 0 to 20 mA Input/Output (4 Input and 4 Output), Channel Isolated	TAA05 (P0923RE)	n/a	PSS 41H-2S208

Table 1 - Upgrade 200 Series Fieldbus Modules for Standalone 100 Series FBMs (Continued)

100 Series FBM	Upgrade with 200 Series FBM	Function(s)	Upgrade TAA	Replacement TA	PSS Number
FBM05 (to non-HART devices)	FBM208 (Replacement Path Only)	Redundant with Readback, 0 to 20 mA Input/Output (4 Input and 4 Output), Channel Isolated	n/a	RH916XL, P0917JP [a]/P0916AK	PSS 41H-2S208
FBM05 (to HART devices)	FBM245[c]	Redundant 4-Channel 0 to 20 mA Input and 4-Channel 0 to 20 mA Output (with HART® Support on All Channels)	n/a	RH924QU/ P0924QU, or RH924QZ/P0924QZ (with output bypass jacks)	PSS 41H-2S245
FBM06	FBM206b	4-Channel Pulse Input, 4-Channel 0 to 20 mA Output, Channel Isolated	TAA06 (P0923RF)	RH924QN/ P0924QN, or RH924QP[d]/ P0924QP (with output bypass jacks)	PSS 41H-2S206
FBM17	FBM227	4-Channel 0 to 10 V dc Input, 4-Channel Discrete Input 2-Channel 0 to 10 V dc Output, 4-Channel Discrete Output, Channel Isolated	TAA17 (P0923RS)	RH924DB/P0924DB (with compression terminals), RH924DE (with ring-lug terminals)	PSS 41H-2S227
FBM18	FBM243	8-Channel Bi-directional FoxCom™ Dual Baud Rate Intelligent Device Interface Communication	TAA18 (P0924QA)	RH931KJ, RH917XW/ P0917XW	PSS 41H-2S243
FBM33A	FBM203c	8-Channel RTD Input (copper), Channel Isolated, 0 to 30 Ω, 3-wire	TAA03A (P0923RC)	RH916XJ, P0917JM [a]/P0916AF, P0917JM	PSS 41H-2S203
FBM33B	FBM203d [b]	8-Channel RTD Input (copper), Channel Isolated, 0 to 30 Ω, 2-4 wire	TAA03B (P0924GX)	RH924EX/P0924EX	PSS 41H-2S203
FBM37 (to non-HART devices) [e]	FBM237	8-Channel 0 to 20 mA Output, Channel Isolated	TAA37 (P0924EP)	RH916YE, P0916QC, RH917QZ/P0917QZ (with output bypass jacks)	PSS 41H-2S237
FBM37 (to HART devices)	FBM215[f]	8-Channel 0 to 20 mA, HART Output	TAA37 (P0924EP)	RH926SP, P0926EK	PSS 41H-2S215
FBM39	FBM243b	4-Channel Bi-directional FoxCom™ Dual Baud Rate	TAA39 (P0923SE)	RH924QQ/ P0924QQ, or RH924QY/P0924QY	PSS 41H-2S243

Table 1 - Upgrade 200 Series Fieldbus Modules for Standalone 100 Series FBMs (Continued)

100 Series FBM	Upgrade with 200 Series FBM	Function(s)	Upgrade TAA	Replacement TA	PSS Number
		Intelligent Device Interface Communication, Plus 4-Channel 0 to 20 mA, Output		(with output bypass jacks)	
FBM43	FBM243	8-Channel Bi-directional FoxCom™ Dual Baud Rate Intelligent Device Interface Communication	TAA01 (P0923RA)	RH931KJ, RH917XW/ P0917XW	PSS 41H-2S243
FBM44	FBM243b	4-Channel Bi-directional FoxCom™ Dual Baud Rate Intelligent Device Interface Communication, Plus 4-Channel 0 to 20 mA, Output	TAA44 (P0923SG)	RH924QQ/ P0924QQ, or RH924QY/P0924QY (with output bypass jacks)	PSS 41H-2S243
FBM46	FBM246b	Redundant, 4-Channel Bi-directional FoxCom Dual Baud Rate Intelligent Device Interface Communication, Plus 4-Channel 0 to 20 mA, Output	TAA46 (P0924SN)	RH924QQ/ P0924QQ, or RH924QY/P0924QY (with output bypass jacks)	PSS 41H-2S246

(a) Polyamide RL supersedes the PVC RL, note this is not a RoHS part.

(b) The accuracy of FBM203d is ±0.32% of span for 0 to 30 Ω input. The measurement accuracy of this configuration is less than the original ±0.125% of span for the FBM33B. FBM203d is the only 4-wire RTD FBM available in the 200 Series set of FBMs.

(c) FBM245 may only replace FBM05 in the replacement path. This is not supported for the upgrade path. FBM245 may also be used to replace FBM05 when the FBM05 is used with non-HART devices.

(d) RH924QP/P0924QP includes output bypass jacks.

(e) In the replacement path, FBM37 can also be converted to a redundant solution, with a redundant FBM237pair.

(f) FBM215 may also be used with FBM37 when used with non-HART devices.

Upgrade Hardware for 100 Series Main/Expansion FBM and TCA Pairs

When upgrading a 100 Series main/expansion FBM pair, you will need to choose:

- One 200 Series FBM
- One of the following equipment pairs for the field I/O wiring:
  - For the upgrade path, one main TAA and one expansion TAA
  - For the replacement path, one 200 Series main TA and one expansion TA, connected with an expansion termination cable

Table 2 lists the 200 Series FBMs and applicable TAAs or TAs which are used to upgrade 100 Series main FBMs. This table also lists the expansion FBMs which can be used with these main FBMs.

To determine which 200 Series FBMs and applicable TAAs or TAs upgrade the expansion FBMs used with the main FBMs, refer to *Table 3*.

These tables also list the Product Specification Sheets which provide additional information about each 200 Series FBM, and its associated TAs.

Table 2 - Upgrade 200 Series FBMs for 100 Series Main FBMs

100 Series Main FBM	100 Series Expansion FBM[(a)]	Upgrade with 200 Series FBM[(b)]	Function(s)	Upgrade TAA	Replace-ment TA	PSS Number
FBM07A and FBM07B	None, or FBM12, FBM13, FBM21 or FBM25	FBM217	32-Channel Discrete Input, Group Isolated	TAA07 (P0923RG)	RH924H-A/ P0924HA	PSS 41H-2S217
FBM07A and FBM07B	FBM14, FBM15, FBM16, FBM27 or FBM42	FBM219	24-Channel Voltage Monitor, Plus 8-Channel Discrete Output, External Source, Group Isolated	TAA07 (P0923RG)	RH924H-A/ P0924HA	PSS 41H-2S219
FBM08	None, or FBM12, FBM13, FBM21 or FBM25	FBM217	32-Channel Discrete Input, Group Isolated	TAA08 (P0923RH)	RH924H-C/ P0924HC	PSS 41H-2S217
FBM08	FBM14, FBM15, FBM16, FBM27 or FBM42	FBM219	24-Channel Voltage Monitor, Plus 8-Channel Discrete Output, External Source, Group Isolated	TAA08 (P0923RH)	RH924H-C/ P0924HC	PSS 41H-2S219
FBM09A, FBM09B, FBM09C and FBM09D	FBM12, FBM13, FBM21 or FBM25	FBM238	24-Channel Voltage Monitor or Contact Sense, Plus 8-Channel Discrete Output, External or Internal Source, Group Isolated	TAA09 (P0923RJ)	RH924H-E/ P0924HE	PSS 41H-2S238
FBM09A, FBM09B, FBM09C and FBM09D	None, or FBM14, FBM15, FBM16, FBM27 or FBM42	FBM239	16-Channel Voltage Monitor or Contact Sense, Plus 16-Channel Discrete Output, External or Internal Source, Group Isolated	TAA09 (P0923RJ)	RH924H-E/ P0924HE	PSS 41H-2S239

Table 2 - Upgrade 200 Series FBMs for 100 Series Main FBMs (Continued)

100 Series Main FBM	100 Series Expansion FBM[a]	Upgrade with 200 Series FBM[b]	Function(s)	Upgrade TAA	Replace-ment TA	PSS Number
FBM10	FBM12, FBM13, FBM21 or FBM25	FBM238	24-Channel Voltage Monitor or Contact Sense, Plus 8-Channel Discrete Output, External or Internal Source, Group Isolated	TAA10 (P0923RK)	RH924H-G/ P0924HG	PSS 41H-2S238
FBM10	None, or FBM14, FBM15, FBM16, FBM27 or FBM42	FBM239	16-Channel Voltage Monitor or Contact Sense, Plus 16-Channel Discrete Output, External or Internal Source, Group Isolated	TAA10 (P0923RK)	RH924H-G/ P0924HG	PSS 41H-2S239
FBM11	FBM12, FBM13, FBM21 or FBM25	FBM238	24-Channel Voltage Monitor or Contact Sense, Plus 8-Channel Discrete Output, External or Internal Source, Group Isolated	TAA11 (P0923RL)	RH924H-J/ P0924HJ	PSS 41H-2S238
FBM11	None, or FBM14, FBM15, FBM16, FBM27 or FBM42	FBM239	16-Channel Voltage Monitor or Contact Sense, Plus 16-Channel Discrete Output, External or Internal Source, Group Isolated	TAA11 (P0923RL)	RH924H-J/ P0924HJ	PSS 41H-2S239
FBM20	None, or FBM12, FBM13, FBM21 or FBM25	FBM217	32-Channel Discrete Input, Group Isolated	TAA20 (P0923RU)	RH924H-L/ P0924HL	PSS 41H-2S217
FBM20	FBM14, FBM15, FBM16, FBM27 or FBM42	FBM219	24-Channel Voltage Monitor, Plus 8-Channel Discrete Output, External Source, Group Isolated	TAA20 (P0923RU)	RH924H-L/ P0924HL	PSS 41H-2S219
FBM24A	None, or FBM12, FBM13, FBM21 or FBM25	FBM217	32-Channel Discrete Input, Group Isolated	TAA24 (P0923RW)	RH924H-N/ P0924HN	PSS 41H-2S217
FBM24B	None, or FBM12, FBM13, FBM21 or FBM25	FBM217	32-Channel Discrete Input, Group Isolated	TAA24 (P0923RW)	RH924H-P/ P0924HP	PSS 41H-2S217
FBM24C	None, or FBM12, FBM13, FBM21 or FBM25	FBM217	32-Channel Discrete Input, Group Isolated	TAA24 (P0923RW)	RH924H-Q/ P0924HQ	PSS 41H-2S217
FBM24A	FBM14, FBM15, FBM16,	FBM219	24-Channel Voltage Monitor, Plus 8-Channel	TAA24 (P0923RW)	RH924H-N/ P0924HN	PSS 41H-2S219

Table 2 - Upgrade 200 Series FBMs for 100 Series Main FBMs (Continued)

100 Series Main FBM	100 Series Expansion FBM[(a)]	Upgrade with 200 Series FBM[(b)]	Function(s)	Upgrade TAA	Replace-ment TA	PSS Number
	FBM27 or FBM42		Discrete Output, External Source, Group Isolated			
FBM24B	FBM14, FBM15, FBM16, FBM27 or FBM42	FBM219	24-Channel Voltage Monitor, Plus 8-Channel Discrete Output, External Source, Group Isolated	TAA24 (P0923RW)	RH924H-P/ P0924HP	PSS 41H-2S219
FBM24C	FBM14, FBM15, FBM16, FBM27 or FBM42	FBM219	24-Channel Voltage Monitor, Plus 8-Channel Discrete Output, External Source, Group Isolated	TAA24 (P0923RW)	RH924H-Q/ P0924HQ	PSS 41H-2S219
FBM26A	FBM12, FBM13, FBM21 or FBM25	FBM238	24-Channel Voltage Monitor or Contact Sense, Plus 8-Channel Discrete Output, External or Internal Source, Group Isolated	TAA26 (P0923RY)	RH924H-U/ P0924HU	PSS 41H-2S238
FBM26A	None, or FBM14, FBM15, FBM16, FBM27 or FBM42	FBM239	16-Channel Voltage Monitor or Contact Sense, Plus 16-Channel Discrete Output, External or Internal Source, Group Isolated	TAA26 (P0923RY)	RH924H-U/ P0924HU	PSS 41H-2S239
FBM26B	FBM12, FBM13, FBM21 or FBM25	FBM238	24-Channel Voltage Monitor or Contact Sense, Plus 8-Channel Discrete Output, External or Internal Source, Group Isolated	TAA26 (P0923RY)	RH924H-V/ P0924HV	PSS 41H-2S238
FBM26B	None, or FBM14, FBM15, FBM16, FBM27 or FBM42	FBM239	16-Channel Voltage Monitor or Contact Sense, Plus 16-Channel Discrete Output, External or Internal Source, Group Isolated	TAA26 (P0923RY)	RH924H-V/ P0924HV	PSS 41H-2S239
FBM26C	FBM12, FBM13, FBM21 or FBM25	FBM238	24-Channel Voltage Monitor or Contact Sense, Plus 8-Channel Discrete Output, External or Internal Source, Group Isolated	TAA26 (P0923RY)	RH924H-W/ P0924H-W	PSS 41H-2S238
FBM26C	None, or FBM14, FBM15, FBM16, FBM27 or FBM42	FBM239	16-Channel Voltage Monitor or Contact Sense, Plus 16-Channel Discrete Output, External or Internal Source, Group Isolated	TAA26 (P0923RY)	RH924H-W/ P0924H-W	PSS 41H-2S239
FBM41A and FBM41C	FBM12, FBM13, FBM21 or FBM25	FBM238	24-Channel Voltage Monitor or Contact Sense, Plus 8-Channel Discrete Output, External	TAA41 (P0923SC)	RH924J-A/ P0924JA	PSS 41H-2S238

Table 2 - Upgrade 200 Series FBMs for 100 Series Main FBMs (Continued)

100 Series Main FBM	100 Series Expansion FBM[a]	Upgrade with 200 Series FBM[b]	Function(s)	Upgrade TAA	Replace-ment TA	PSS Number
			or Internal Source, Group Isolated			
FBM41A and FBM41C	None, or FBM14, FBM15, FBM16, FBM27 or FBM42	FBM239	16-Channel Voltage Monitor or Contact Sense, Plus 16-Channel Discrete Output, External or Internal Source, Group Isolated	TAA41 (P0923SC)	RH924J-A/ P0924JA	PSS 41H-2S239

[a] The TAA module which upgrades the Expansion FBM is listed in *Table 3*.

[b] Each Main FBM can optionally be used with one Expansion FBM as indicated in the above table. The types of Expansion FBMs associated with each Main FBM are listed with the Main FBM. Expansion FBMs do not require an additional 200 Series FBM. Expansion FBMs are always used with a Main FBM. Each 100 Series Main FBM can be combined with any of the nine Expansion FBMs listed in the second column of this table.

Table 3 lists the equipment which is used to upgrade 100 Series expansion FBMs associated with the main FBMs listed in *Table 2*.

Table 3 - Upgrade 200 Series FBMs for Expansion FBMs

100 Series Expansion FBM	Upgrade with 200 Series FBM[a]	Upgrade TAA	Replacement TA	PSS Number
FBM12A and FBM12B	FBM217 or FBM238	TAA12 (P0923RM)	RH924HB/P0924HB	PSS 41H-2S217 PSS 41H-2S238
FBM13	FBM217 or FBM238	TAA13 (P0923RN)	RH924HD/P0924HD	PSS 41H-2S217 PSS 41H-2S238
FBM14A, FBM14B, FBM14C and FBM14D	FBM219 or FBM239	TAA14 (P0923RP)	RH924HF/P0924HF	PSS 41H-2S219 PSS 41H-2S239
FBM15	FBM219 or FBM239	TAA15 (P0923RQ)	RH924HH/P0924HH	PSS 41H-2S219 PSS 41H-2S239
FBM16	FBM219 or FBM239	TAA16 (P0923RR)	RH924HK/P0924HK	PSS 41H-2S219 PSS 41H-2S239
FBM21	FBM217 or FBM238	TAA21 (P0923RV)	RH924HM/ P0924HM	PSS 41H-2S217 PSS 41H-2S238
FBM25A	FBM217 or FBM238	TAA25 (P0923RX)	RH924HR/P0924HR	PSS 41H-2S217 PSS 41H-2S238
FBM25B	FBM217 or FBM238	TAA25 (P0923RX)	RH924HS/P0924HS	PSS 41H-2S217 PSS 41H-2S238
FBM25C	FBM217 or FBM238	TAA25 (P0923RX)	RH924HT/P0924HT	PSS 41H-2S217 PSS 41H-2S238
FBM27A	FBM219 or FBM239	TAA27 (P0923RZ)	RH924HX/P0924HX	PSS 41H-2S219 PSS 41H-2S239

Table 3 - Upgrade 200 Series FBMs for Expansion FBMs (Continued)

100 Series Expansion FBM	Upgrade with 200 Series FBM[a]	Upgrade TAA	Replacement TA	PSS Number
FBM27B	FBM219 or FBM239	TAA27 (P0923RZ)	RH924HY/P0924HY	PSS 41H-2S219 PSS 41H-2S239
FBM27C	FBM219 or FBM239	TAA27 (P0923RZ)	RH924HZ/P0924HZ	PSS 41H-2S219 PSS 41H-2S239
FBM42A and FBM42C	FBM219 or FBM239	TAA42 (P0923SD)	RH924JB/P0924JB	PSS 41H-2S219 PSS 41H-2S239

[a] The 200 Series FBM type depends on the main FBM attached to this expansion FBM. See *Table 2* above.

Termination Assembly Adapter (TAA) Modules (For Upgrade Path)

For the upgrade path, field I/O wiring is upgraded to the replacement 200 Series FBMs using the existing Termination Cable Assemblies (TCAs), which can be removed from the 100 Series FBMs and attached to Termination Assembly Adapter (TAA) modules.

The TAA modules have a similar form factor to the 100 Series FBMs. They are installed in the new conversion mounting structures and allow the 200 Series FBMs to interface with existing field I/O wiring via the existing TCAs, formerly used by the 100 Series FBMs.

TAAs are discussed in *Termination Assembly Adapter Modules for 100 Series Upgrade* (PSS 41H-2W4).

Fieldbus Isolator/Filter (FBI200) (for Upgrade or Replacement Path)

The FBI200 (P0927AP) provides HDLC message isolation, filtering, and repeating functionality and is able to transmit and receive data from a local HDLC fieldbus and interface with an extended twinaxial bus. The twinaxial cable length can extend to 1,830 m (6,000 ft) for 268 Kbps data and 305 m (1,000 ft) for 2 Mbps data.

Figure 8 - Fieldbus Isolator/Filter (FBI200)

Two FBI200s (one for the “A” bus and one for the “B” bus) mount on a vertically mounted 2-position baseplate (P0924RT). This baseplate connects to the conversion mounting structure via a Module Fieldbus cable.

The baseplate has a two-position switch that sets the operational filter mode of the redundant FBI200s. The switch combinations provide for the following communication types:

- 268 Kbps HDLC communications only
- 2 Mbps HDLC communications only
- Mixed 268 Kbps and 2 Mbps HDLC communications

The FBI200 has three yellow LEDs on its front panel that indicate which of these modes is selected. The FBI200 has two additional yellow LEDs that indicate receive (Rx) data activity; one LED is for local fieldbus data and the other is for extended fieldbus data.

The physical layer of the HDLC fieldbus is RS-485 protocol, providing up to 32 unit-loads on the bus. The FBI200’s integrated repeater functionality removes any pulse width distortion and regenerates the message, including its full length preamble. This allows the FBI200 to be used as a series repeater to increase the overall HDLC fieldbus length at 2 Mbps of 305 m (1000 ft) sections. The message delay is less than 10 bit times.

Fieldbus Isolator/Filter (FBI200A) (for Upgrade Path)

The FBI200A (P0923XL), shown in *Figure 9*, provides extended module Fieldbus communications between the conversion mounting structures and their Control Processors, supporting up to 305 m (1,000 ft) of twinaxial cabling. Two FBI200As (one for each bus) must be mounted on an FBI200A mounting adapter (P0923XM) in the left-most slot for 100 Series modules in the first conversion mounting structure in a baseplate chain. The original 100 Series FBI TCAs can be attached to the front of the FBI200As to retain the existing field I/O “A” and “B” bus wiring.

Configurations are possible where both FBI200s and FBI200As are used in the same configuration to extend the Fieldbus. For example, the FBI200A pair can connect to the FBI200 pair on its baseplate, which in turn connects to the FCP280s’ baseplate via a Module Fieldbus cable.

A redundant pair of FBI200As support up to thirty-one 200 Series FBMs in a baseplate chain. However, they can enable their associated FCP280 to support up to one hundred twenty-four 200 Series FBMs from one baseplate port.

The FBI200A is discussed in *FBI200A Fieldbus Isolator/Filter* (PSS 41H-2Y17)

Figure 9 - Fieldbus Isolator/Filter (FBI200A) and Adapter

200 Series Termination Assemblies (for Replacement Path)

For the replacement path, field I/O wiring is upgraded to the new 200 Series FBMs by stripping the wiring from its TCAs and attaching it to the 200 Series Termination Assemblies (TAs).

This enables direct connection of field I/O wiring to the 200 Series FBMs without the need for Termination Assembly Adapter (TAA) modules.

Upgrade for FBM22 and the FBM17/ECB34 Combination

The FBM22, which supports the A/M station, Coriolis, HTG and gas chromatograph products, does not have a replacement 200 Series FBM.

Any instances of an FBM17 using Equipment Control Block 34 (ECB34) do not have any upgrade solutions. Upgrade solutions are available for FBM17 when it is used with any of its other supported ECBs though.

FBM22 and FBM/ECB34 can be upgraded as 100 Series FBMs to a new/existing FCP280.

Configuration options for maintaining 100 Series FBMs, such as FBM22, with the supported control processors are discussed in *Field Control Processor 280 (FCP280)* (PSS 41H-1FCP280).

Calibration

The analog FBMs are calibrated at the factory prior to shipment and do not require field calibration. In addition, discrete input/output FBMs do not require field adjustments. Therefore, the FBMs do not contain local (that is, module-mounted) manual controls or jumpers.

Functional Specifications

Software Requirements	• FCP280: Control Core Services software v9.0 or higher • FCP270 OR ZCP270: I/A Series software v8.6 to v8.8 or Control Core Services software v9.0 or higher
Compatible Foxboro DCS Control Processor	Control Processor FCP280, FCP270, or ZCP270
Equipment Quantities	FBMs hosted by FCP280(2): • 200 Series FBMs only: 128 maximum when used exclusively with 200 Series FBMs • Mix of 100 Series and 200 Series FBMs: Up to 96 200 Series FBMs and up to 64 100 Series FBMs • 100 Series FBMs only: 64 maximum when used exclusively with 100 Series FBMs • Each Fieldbus port on the FCP280 baseplate supports up to 32 200 Series FBMs without FBI200A and mounting adapter, or up to 124 with FBI200As and FBI200A mounting adapter. However, the FCP280 cannot support more than 124 200 Series FBMs (that is, the total number of FBMs connected to all Fieldbus ports on the FCP280 baseplate) in this configuration. FBMs hosted by FCP270(3): • 200 Series FBMs: 32 maximum (without FBI200A and mounting adapter) or 124 maximum (with FBI200As and FBI200A mounting adapters) FBMs hosted by ZCP270(4): • Up to 128 200 Series FBMs per ZCP270 with FCM100E (dependent upon the number of FCM100Es implemented) FBMs hosted by FCM100E(4): • 200 Series FBMs: 32 maximum
RoHS Compliance	Complies with European RoHS Directive 2002/95/EC and Recast RoHS Directive 2011/65/EU.

(2) Depending on control processor sizing constraints (see *Field Control Processor 280 (FCP280) Sizing Guidelines and Excel Workbook* (B0700FY).)

(3) Depending on control processor sizing constraints (see *Field Control Processor 270 (FCP270) Sizing Guidelines and Excel Workbook* (B0700AV).)

(4) Depending on control processor sizing constraints (see *Z-Module Control Processor 270 (ZCP270) Sizing Guidelines and Excel Workbook* (B0700AW).)

Related Product Documents

For reference purposes, this table lists the documents for additional hardware and software elements in the standard 200 Series subsystem. Product Specification Sheets (PSSs) for the FBMs are listed in *Table 1, page 12* and *Table 2, page 15*.

Document Number	Description
PSS 41H-2SOV	*Standard 200 Series Subsystem Overview*
B0400FA	*Standard and Compact 200 Series Subsystem User's Guide*
PSS 41H-2CERTS	*Standard and Compact 200 Series I/O, Agency Certification*
PSS 41H-2FPS400	*Standard 200 Series Power Supply -FPS400-24*
PSS 41H-2W4	*Termination Assembly Adapter Modules for 100 Series Upgrade*
PSS 41H-2SBASPLT	*Standard 200 Series Baseplates*
PSS 41H-2FPS	*Standard 200 Series Power Supplies - FPS240-24 and FPS120-24*
PSS 41H-2W8	*100 Series Conversion Mounting Structures*
PSS 41H-2Y17	*FBI200A Fieldbus Isolator/Filter*
PSS 41H-2FBI200	*FBI200 Fieldbus Isolator/Filter*
PSS 21H-2X1 B3	*DIN Rail Mounted FBM Enclosures, Overview - (for legacy Enclosures)*
PSS 41H-2GOV	*G-Series Enclosures Overview - (for current Enclosures)*
PSS 41H-1FCP280	*Field Control Processor 280 (FCP280)*

WARNING: This product can expose you to chemicals including lead and lead compounds, which are known to the State of California to cause cancer and birth defects or other reproductive harm. For more information, go to www.p65warnings.ca.gov/.

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