Foxboro™ DCS

FBI200 Fieldbus Isolator/Filter

PSS 41H-2FBI200

Product Specification

August 2019

Legal Information

Overview

The FBI200 provides HDLC message isolation, filtering, and repeating functionality. It is able to transmit and receive data from a local HDLC fieldbus and interface with an extended twinaxial bus between 100 Series or 200 Series Fieldbus Modules (FBMs) and their associated Control Processors. The FBI200 allows the twinaxial cable length to extend up to 1830 m (6000 ft) for a 268 Kbps HDLC module Fieldbus and 305 m (1000 ft) for a 2 Mbps HDLC module Fieldbus.

For 200 Series FBMs, it provides galvanic isolation over a 2 Mbps HDLC module Fieldbus.

For 100 Series FBMs, it filters and isolates 2 Mbps communications between FCP270s and 100 Series Fieldbus Isolators (FBIs) which require 268 Kbps signals for 100 Series FBMs and similar migration modules. This allows the FCP270 to communicate with both 200 Series FBMs (over 2 Mbps signals) and 100 Series FBMs (over 268 Kbps signals) simultaneously when the FBI200 is installed as specified. (As the FCP280 does not support dual baud communications on any single fieldbus, the FBI200 is only used to extend the 2 Mbps or 268 Kbps HDLC fieldbus for the FCP280). When installed in a FBI100 2-position baseplate (P0923LR), the FBI200 performs this functionality in an identical manner as the FBI100.

The FBI200 can be used as part of the 100 Series Fieldbus Module Upgrade subsystem. Unlike the 100 Series FBIs or the FBI100, the FBI200 allows the CP270s to communicate with 200 Series FBMs used to replace the 100 Series FBMs at the 2 Mbps network speed, providing a significant communication boost over the 100 Series FBMs' original 268 Kbps Fieldbus.

Redundant FBI200s are installed in a DIN rail mounted modular Two-Position vertical baseplate for FBI200s, which supports twinaxial cabling to the FBIs for the 100 Series FBMs (see Figure 1).

Figure 1 - FBI200 2-Position Baseplate (RH924RT)

Item	Description
A	To/From Twinaxial Fieldbus Cable B*
B	To/From Twinaxial Fieldbus Cable A*
C	FBI200 (Bus A)
D	FBI200 (Bus B)
E	To/From Field Control Processor/FCM100E/Et
F	Terminated With Terminator RH916RB

* Compatible with the standard twinaxial termination assembly (RH903VY)

Features

- Provide galvanically isolated drivers on the 200 Series (2 Mbps) module Fieldbus, supporting twinaxial cabling extensions up to 305 m (1000 ft) for 2 Mbps data (for 200 Series FBMs), and up to 1830 m (6000 ft) for 268 Kbps data (for 100 Series or 100 Series migration FBMs and other migration devices).
- Filters out the FCP270's 2 Mbps signals, to help ensure only the intended 268 Kbps signals reach 100 Series FBMs, SPECTRUM, Fieldbus Cluster I/O cards and other 100 Series-based migration devices.
- Alternately, filters the 268 Kbps signals out to help ensure only the intended 2 Mbps signals reach 200 Series FBMs and other 200 Series-based migration devices.
- Dedicated two-slot vertical baseplate for FBI200 supports 268 Kbps and 2 Mbps HDLC module Fieldbus.
- When mounted in an FBI100 2-position baseplate, FBI200 provides identical functionality as the FBI100 module.
- Harsh (Class G3 - ISA S71.04) contamination protection.

FBI200 on HDLC Module Fieldbus

Remote 100 Series or 200 Series FBMs can be located up to 1830 m (6000 ft) for 268 Kbps data or 305 m (1000 ft) for 2 Mbps data from their associated FCP280, FCP270, or ZCP270/FCM100E pair when used with FBI200s.

FCP280 topologies with FBI200s are shown in Figure 2.

Figure 3 shows how the FBI200 can be used to extend the distance between the FCP270/FCM100E and the 200 Series baseplate from 60 m (198 ft) to 305 m (1000 ft).

FCP270 mixed signal topologies are shown in *Figure 3*, *Figure 4*, and *Figure 6*. (The FCM100E cannot support mixed baud rates - only a 268 Kbps or 2 Mbps fieldbus).

Figure 2 - FCP280 to FBI200 Connections to 200 Series FBMs on 2 Mbps HDLC Module Fieldbus (Conceptual)

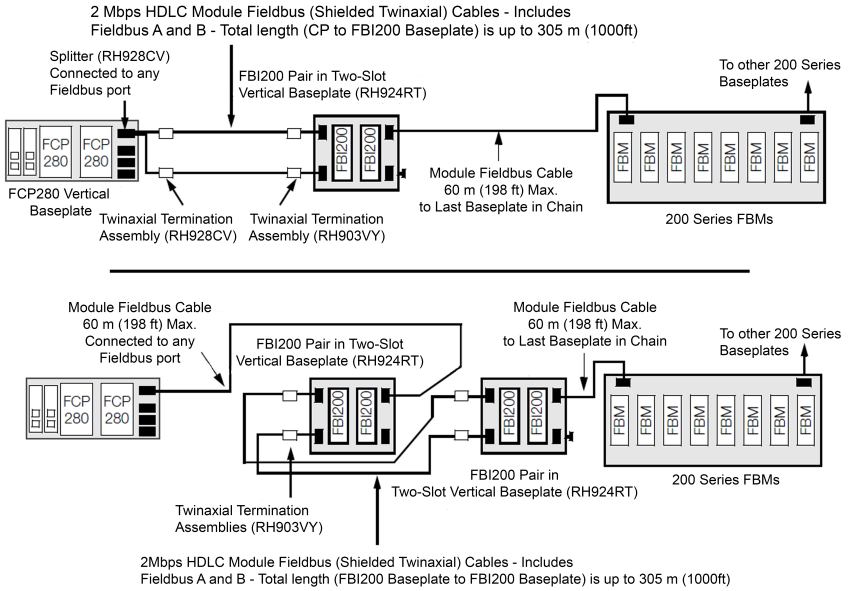
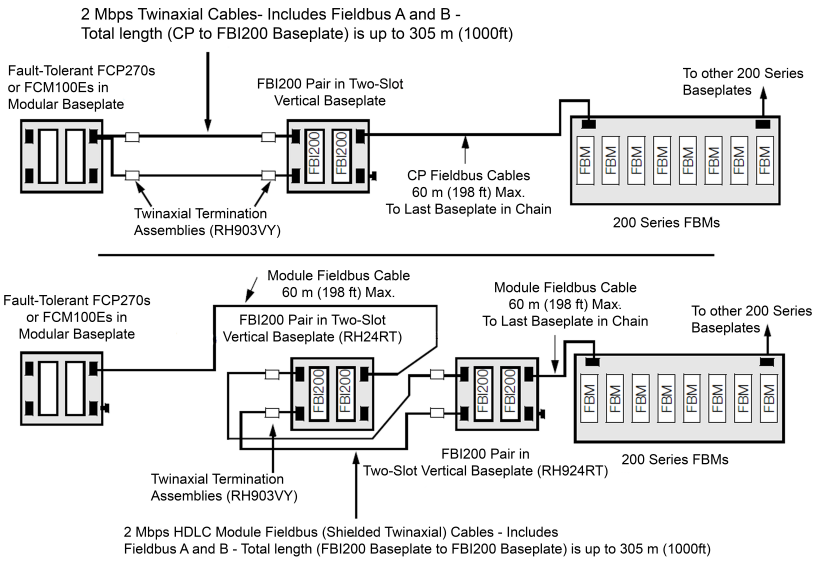
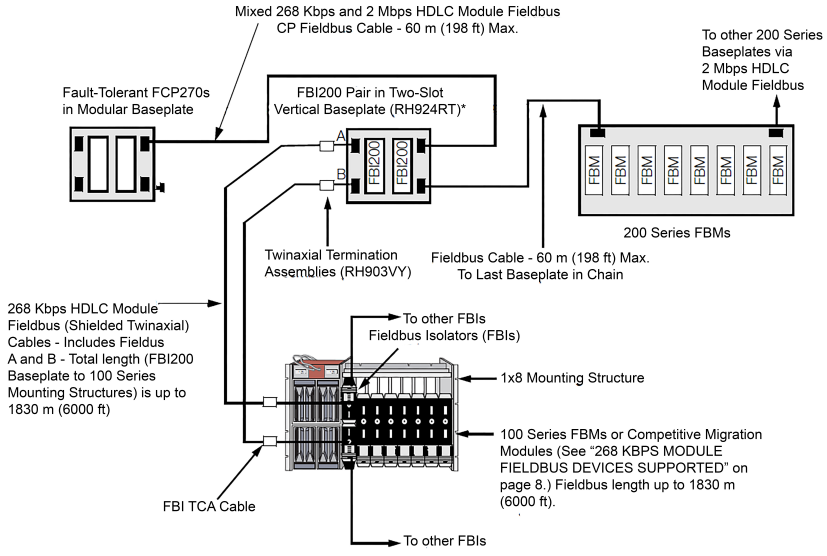


Figure 3 - FCP270 or FCM100E to FBI200 Connections to 200 Series FBMs on 2 Mbps HDLC Module Fieldbus (Conceptual)



Without the FBI 200 pair, the FCP270s or FCM100E connect to the 200 Series Baseplate via the CP Fieldbus Cable (60 m 198 ft).

Figure 4 - FCP270-to-FBI200 Connections to 200 Series and 100 Series FBMs on Mixed 2 Mbps and 268 Kbps HDLC Module Fieldbus (Conceptual)



Note: For sizing constraints, refer to the functional specifications at the end of this document.
*Communications Mode in FBI200 Baseplate mut be set to 268 Kbps mode.

Configurations are possible where both FBI200s and FBI200As are used to extend the Fieldbus, as shown in *Figure 6*. For example, an FBI200A pair may use twinaxial cabling, with a maximum of 305 m (1000 ft), to connect to a FBI200 pair on a baseplate, which in turn connects to an FCP280, FCP270, or ZCP270/FCM100E with a CP Fieldbus cable, with a length up to 60 m (198 ft). Refer to the *100 Series Fieldbus Module Upgrade User's Guide* (B0700BQ) for a list of these FBI200/FBI200A configurations.

In addition, the FBI200 can be used to extended the 2 Mbps fieldbus in 305 m (1000 ft) sections using twinaxial cable, twinaxial termination assemblies (RH903VY) and the Fieldbus Splitter/Terminator RH926LC on its baseplate, as shown in *Figure 5*.

Figure 5 - Using FBI200 to Extend 2 Mbps HDLC Module Fieldbus (Conceptual)

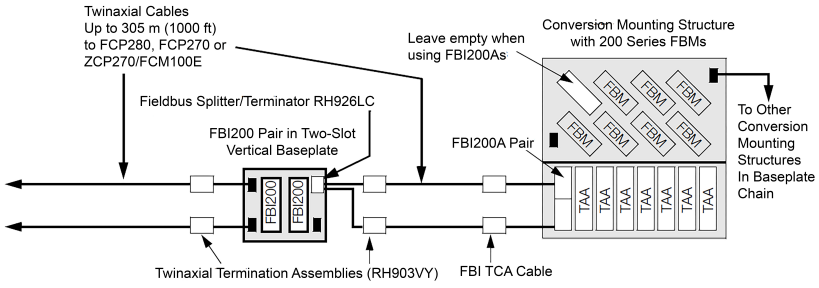
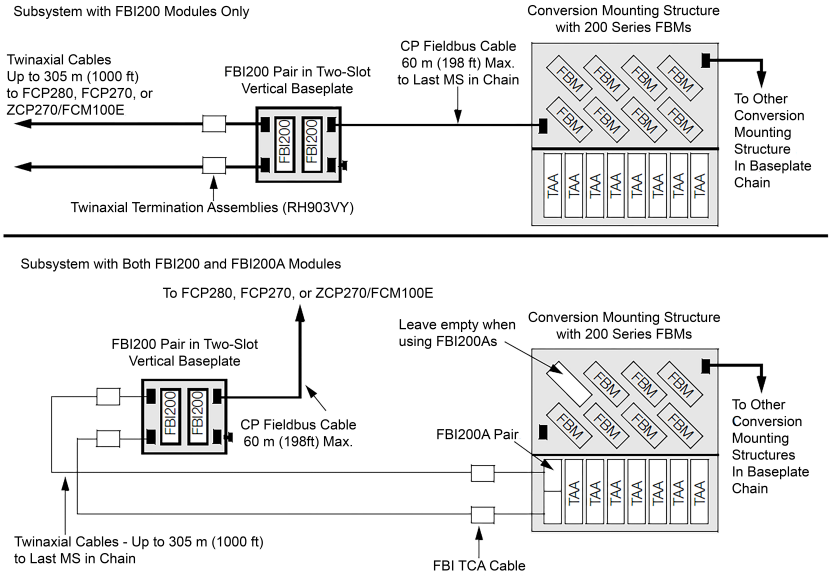


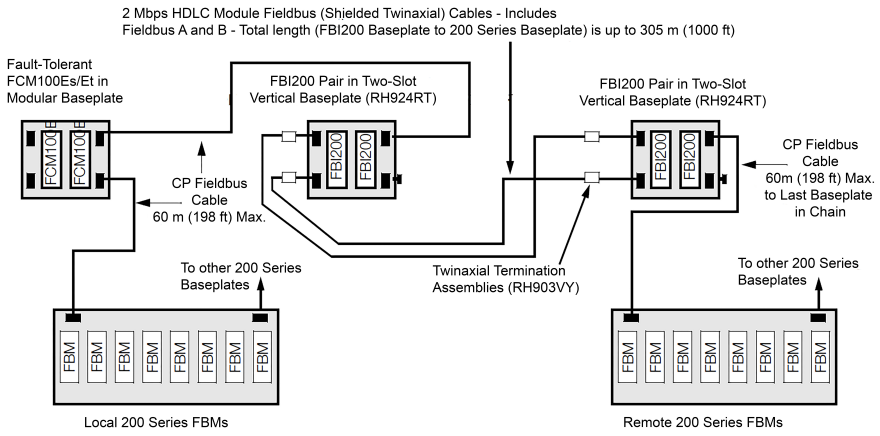
Figure 6 - FBI200 and FBI200A Connections on 2 Mbps HDLC Module Fieldbus (Conceptual)



As well, as shown in *Figure 7*, the FBI200 can enable a configuration in which an FCM100E/Et connects to both local 200 Series FBMs (within 60 m (197 ft)) and remote 200 Series FBMs, up to 305 m (1000 ft) away.

Two sets of redundant FBI200s are used in this configuration.

Figure 7 - FBI200 Enabling FCM100E/Et Connection to Local and Remote 200 Series FBMs on 2 Mbps HDLC Module Fieldbus (Conceptual)



FBI200 2-Position Baseplate

The FBI200 2-position vertical baseplate (RH924RT) supports a redundant pair of FBI200s. This Modular Baseplate does not have a baseplate identification DIP switch, as it does not require a hardwired address. However, it does have two DIP switches for fieldbus baud rate selection.

The FBI200 can also be mounted in the FBI100 2-Position Baseplate (P0923LR).

FBI200 Module Design

FBI200 modules have a molded metal exterior for physical protection of the electronics. Enclosures specially designed for mounting of DIN rail mounted Fieldbus equipment provide various levels of environmental protection for the FBI200 modules, up to harsh environments per ISA Standard S71.04.

The FBI200 can be removed/replaced from their baseplate without removing power. Light-emitting diodes (LEDs) incorporated into the front of the module indicate Fieldbus communications activity, module status and mode.

FBI200 Module Fieldbus Communication

The FBI200 supports 268 Kbps and 2 Mbps module Fieldbus communications to all 100 Series and 200 Series FBMs.

The 2-position baseplate for FBI200s has two 2-position switches which set the operational filter mode of the redundant FBI200s, to one of the following:

- 2 Mbps HDLC communications only
- 268 Kbps HDLC communications only
- Both 268 Kbps and 2 Mbps HDLC communications
- Disable communications

The 2 Mbps module Fieldbus is redundant and all 200 Series modules can receive/transmit messages over both bus A and bus B. The Fieldbus Splitter/Terminator (RH926LC) may be used on the FBI200 2-Position Baseplate (RH924RT) to split the 2 Mbps signal into bus A and bus B.

268 Kbps Module Fieldbus Devices Supported

The FBI200 supports the following devices on the 268 Kbps module Fieldbus:

- All 100 Series FBMs (FBM01, FBM02, and so forth)
- SPECTRUM cards
- Fieldbus Cluster I/O cards
- Other 100 Series competitive migration devices including Honeywell, Bailey, and Fisher PROVOX

LED Indicators

Light-emitting diodes (LEDs) on the front of the FBI200 module provides visual indication of the modules:

- Operational Status - red and green LEDs indicate the health of the FBI200. When both green and red LEDs are lit, the FBI200 is in the disable mode set by the baseplate mode switches.
- Local Fieldbus (receive) - amber LED indicates 268 Kbps or 2 Mbps CP Fieldbus traffic received from the FCP280, FCP270, or FCM100E Fieldbus.
- Extended Fieldbus (receive) - amber LED indicates 268 Kbps or 2 Mbps FBM traffic received from the FBM's Fieldbus.
- Mode - Indicates the communications mode for this FBI200 - 2 Mbps, 268 Kbps or both 2 Mbps and 268 Kbps modes. (The communications mode is set from a switch on the FBI200 2-Position Baseplate (RH924RT)).

Functional Specifications

Process I/O Communications	Module Fieldbus Communications: • 268 Kbps for 100 Series FBMs • 2 Mbps for 200 Series FBMs
Process I/O Capacity (2 Mbps Fieldbus)	Cable Length: • With FCP280/FCP270/FCM100E/Et and 100 Series FBMs Only: ◦ Between FCP280/FCP270/FCM100E/Et and FBI200: 60 m (198 ft) maximum ◦ From FBI200s to 100 Series FBMs: 1830 m (6000 ft) maximum (see *Figure 4*) • With FCP280/FCP270/FCM100E/Et, 100 Series and 200 Series FBMs: ◦ Total Length of Cabling Between FCP280/FCP270/FCM100E/Et and FBI200: 305 m (1000 ft) maximum using twinaxial cable or 60 m (198 ft) using HDLC fieldbus cables ◦ From FBI200s to 100 Series FBMs 1830 m (6000 ft) maximum (see *Figure 4*) 100 Series FBMs (Used Alone or with 200 Series FBMs): • 64 FBMs with FBI200 maximum, depending on control processor sizing constraints. When an FCP270 uses a FBI200 in conjunction with 200 Series FBMs, the total FBM count for typical usage may vary but must not exceed 64. (Refer to *Field Control Processor 280 (FCP280) Sizing Guidelines and Excel Workbook* [B0700FY] or *Field Control Processor 270 (FCP270) Sizing Guidelines and Excel Workbook* [B0700AV]). Competitive Migration Modules: • Refer to the device specific Product Specification Sheets. 200 Series FBMs: • If FBI200As are not used, 32 FBMs per FBI200 pair on one baseplate chain maximum. • If FBI200As are used, 31 FBMs per FBI200 pair on one baseplate chain maximum. • Total FBMs in both instances depend on control processor sizing constraints. See *Field Control Processor 270 (FCP270) Sizing Guidelines and Excel Workbook* (B0700AV).
Power Requirements for FBI200	• Input Voltage Range (Redundant): 24 V Nominal, range of -10% to +5% • Current: 75 mA (maximum) per module • Consumption: 1.5 W (maximum) dissipation per module
Regulatory Compliance: Electromagnetic Compatibility (EMC)	• *European EMC Directive 2014/30/EU*: Meets: EN61326-1:2013 Class A Emissions and Industrial Immunity Levels

Regulatory Compliance: Product Safety	• *Underwriters Laboratories (UL) for U.S. and Canada* UL/UL-C listed as suitable for use in UL/UL-C listed Class 1, Groups A-D; Division 2; temperature code T5 enclosure based systems when connected to specified Foxboro DCS processor modules. 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). For more information, see *Standard and Compact 200 Series Subsystem User's Guide* (B0400FA). • *European Low Voltage Directive 2014/35/EU*
RoHS Compliance	Complies with European RoHS Directive 2011/65/EU, including amending Directives 2015/863 and 2017/2102.
Calibration Requirements	Calibration of the module is not required.

Environmental Specifications

	Operating	Storage
Temperature	-20 to +70°C (-4 to +158°F)	-40 to +85°C (-40 to +185°F)
Relative Humidity	5 to 95% (noncondensing)	5 to 95% (noncondensing)
Altitude	-300 to +3000 m (-1000 to +10,000 ft)	-300 to +12,000 m (-1000 to +40,000 ft)
Contamination	Suitable for Class G3 (harsh) environments as defined in ISA Standard S71.04. Pollution degree 2 as defined in IEC 664-1.	
Vibration	7.5 m/s^2 (0.75g) from 5 to 500 Hz	

(1) 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) that describes the specific type of enclosure that is to be used.

Physical Specifications

Mounting	The redundant installation consists of two modules. A single FBI200 module can also be used. FBI200 mounts on a FBI200 2-Position Baseplate (RH924RT). It can also be used with a FBI100 2-Position Baseplate (P0923LR) with limited functionality. Both these baseplates can be mounted on a vertical DIN rail. See *Standard 200 Series Baseplates* (PSS 41H-2SBASPLT) for details.
Weight	0.36 kg (0.8 lb) approximate (each module)
Part Number	• FBI200: RH927AP • FBI200 2–Position Baseplate: RH924RT
Dimensions	• Height: 99 mm (3.9 in) 114 mm (4.5 in) including mounting lugs • Width: 44.6 mm (1.75 in) • Depth: 105 mm (4.12 in)

Related Product Documents

Document Number	Description
PSS 41H-1FCP280	*Field Control Processor 280 (FCP280)*
B0400FA	*Standard and Compact 200 Series Subsystem User's Guide*
PSS 41H-2SOV	*Standard 200 Series Subsystem Overview*
PSS 41H-2W100	*100 Series Fieldbus Module Upgrade Subsystem Overview*
PSS 41H-2CERTS	*Standard and Compact 200 Series I/O, Agency Certifications*
PSS 41H-2SBASPLT	*Standard 200 Series Baseplates*
PSS 41H-2W8	*100 Series Conversion Mounting Structures*

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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As standards, specifications, and design change from time to time, please ask for confirmation of the information given in this publication.

PSS 41H-2FBI200, Rev A