EcoStruxure™

Foxboro™ DCS

FBM206 Pulse Input Module

PSS 41H-2S206

Product Specification

August 2019

Schneider Electric™

www.schneider-electric.com

Legal Information

Overview

Measurement of a machine's rotational speed is often accomplished using a device that transmits high speed pulses. The FBM206 provides the means to accept up to eight of these pulse signals (up to 25kHz) and provide the values to the Foxboro™ DCS. The FBM206b accepts up to four pulse inputs and provides up to four 0 to 20 mA outputs for associated controls.

The FBM206 contains eight pulse input channels, and the FBM206b provides four pulse input channels and four 0 to 20 mA analog output channels. Each input channel accepts a 2-wire, pulse input signal from a sensor. Input devices include vortex and turbine meters, solid state or electromechanical contacts, and other sensors with similar pulse outputs.

The modules perform the signal conversion required to interface the electrical input signals from the field sensors to the redundant fieldbus.

Features

- For the FBM206, eight 7 to 27 V dc, configurable, pulse input channels
- For the FBM206b, four 7 to 27 V dc, configurable, pulse input channels and four 0 to 20 mA analog output channels
- Each input channel accepts a pulse input with a maximum rate of 25 kHz
- Each channel is galvanically isolated from the other channels and ground
- Rugged design suitable for enclosure in Class G3 (harsh) environments
- Execution of the pulse input application program with configurable options for Pulse Rate Totalization and Resolution (on a per module basis) and Meter Scaling Factor
- Termination Assemblies (TAs) for locally or remotely connecting field wiring to the FBM206/206b
- TAs for per channel internally and/or externally loop powered devices

Standard Design

The FBM206/206b module has a rugged extruded aluminum exterior for physical protection of the circuits. Enclosures specially designed for mounting the Fieldbus Modules (FBMs) provide various levels of environmental protection, up to harsh environments, per ISA Standard S71.04.

Visual Indicators

Light-emitting diodes (LEDs) incorporated into the front of the module provide visual status indications of FBM functions.

Easy Removal/Replacement

The modules can be removed/replaced without removing field device termination cabling, power or communication cabling.

Fieldbus Communication

A Fieldbus Communication Module or a Control Processor interfaces the 2 Mbps module Fieldbus used by the FBMs. FBM206 accepts communication from either path (A or B) of the redundant 2 Mbps Module Fieldbus. If one path is unsuccessful or is switched at the system level, the module continues communication over the active path.

Modular Module Mounting

The modules mount on a modular baseplate, which accommodates up to four or eight FBMs. The modular baseplate is either DIN rail mounted or rack mounted, and includes signal connectors for redundant fieldbus, redundant independent DC power, and termination cables.

Termination Assemblies

Field I/O signals connect to the FBM subsystem via DIN rail mounted TAs. The TAs used with FBM206 are described in *Functional Specifications - Termination Assemblies, page 12*.

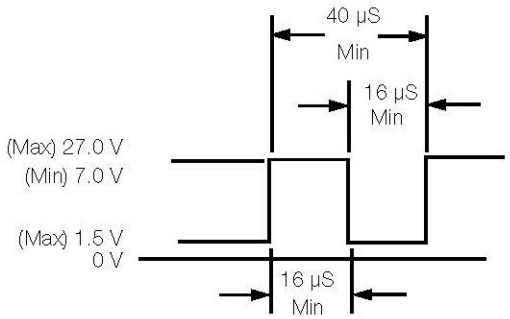
Functional Specifications

Input/Output Channels	• FBM206: 8 isolated independent pulse input channels • FBM206b: 4 isolated independent pulse input channels
Process I/O Communications	Communicates with its associated FCM or FCP via the redundant 2 Mbps module Fieldbus
Input Pulse Rate	10 Hz to 25 kHz
Input Channels (4 or 8)	• Accuracy: ◦ Pulse Count: No missing pulses for pulse rate 10 to 25 kHz ◦ Pulse Rate: 0.01% of reading, independent of rate • Field Device Cabling Distance: Maximum distance of the field device from the FBM is a function of compliance voltage (22.8 V dc), wire resistance, and voltage drop at the field device. • Input Pulse Characteristics: See *Figure 1* • Input Duty Cycle: Minimum pulse width on/off (see *Figure 1*) • Input Channel Impedance: 10 kΩ • Loop Power Supply Protection: Each channel is channel-to-channel galvanically isolated, current limited, and voltage regulated. • Channel Power Supply Input: 24 V dc ±10% at 30 mA maximum to field device

Output Channels (4 -FBM206b Only)	• Output Range (Each Channel): 4 isolated independent 0 to 20.4 mA dc analog output channels • Output Load: 735 Ω • Compliance Voltage: 18.6 V nominal at 20 mA dc at I/O field terminals • Accuracy: ±0.05% of span (@25°C) • Output Temperature Coefficient: 100 ppm/°C • Communication: Via a redundant Fieldbus • Settling Time: 100 ms to settle within a 1% band of steady state for a 10 to 90% input step change. • Linearity Error: ±0.025% of span (monotonic) • Resolution: 12 bits
Power Requirements	• Input Voltage Range (Redundant): 24 V dc +5%, -10% • Consumption: 7 W (maximum) • Heat Dissipation: 5 W (maximum)
Calibration Requirements	Calibration of the module and termination assembly is not required.
Regulatory Compliance: Electromagnetic Compatibility (EMC)	• *European EMC Directive 2004/108/EC (Prior to April 20, 2016) and 2014/30/EU (Beginning April 20, 2016)*: 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 I, Groups A-D; Division 2; temperature code T4 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 2006/95/EC (Prior to April 20, 2016) and 2014/35/EU (Beginning April 20, 2016) and Explosive Atmospheres (ATEX) directive 94/9/EC (Prior to April 20, 2016) and 2014/34/EU (Beginning April 20, 2016)*: DEMKO certified as Ex nA IIC T4 for use in certified Zone 2 enclosure when connected to specified processor modules as described in the *Standard and Compact 200 Series Subsystem User's Guide* (B0400FA). Also, see *Table 1*.
RoHS Compliance	Complies with European RoHS Directive 2011/65/EU, including amending Directives 2015/863 and 2017/2102.
Marine Certification	ABS Type Approved and Bureau Veritas Marine certified for Environmental Category EC31.

Figure 1 - Input Pulse Characteristics



Environmental Specifications

	Operating	Storage
Temperature	• Module: -20 to + 70°C (-4 to +158°F) • Termination Assembly — PA: -20 to +70°C (-4 to +158°F)	-40 to +70°C (-40 to +158°F)
Relative Humidity	5 to 95% (noncondensing)	5 to 95% (noncondensing)
Altitude	-300 to +3,000 m (-1,000 to +10,000 ft)	-300 to +12,000 m (-1,000 to +40,000 ft)
Vibration	7.5 m/s^2 (5 to 500 Hz)	
Contamination	Suitable for use in Class G3 (Harsh) environments as defined in ISA Standard S71.04, based on exposure testing according to EIA Standard 364-65, Class III.	

NOTE: 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 type of enclosure to be used.

Physical Specifications

Mounting	• Module: FBM206/206b mounts on a modular baseplate. The baseplate can be mounted on a DIN rail (horizontally or vertically), or horizontally on a 19-inch rack using a mounting kit. Alternatively, FBM206b can be mounted on a 100 Series conversion mounting structure as a direct replacement for a 100 Series FBM06. See *Standard 200 Series Modular Baseplates* (PSS 41H-2SBASPLT) or *100 Series Conversion Mounting Structures* (PSS 41H-2W8) for details. • Termination Assembly: The TA mounts on a DIN rail and accommodates multiple DIN rail styles including 32 mm (1.26 in) and 35 mm 1.38 in).
Weight	• Module: 284 g (10 oz) approximate • Termination Assemblies: ◦ Compression: 181 g (0.40 lb) approximate ◦ Ring Lug: 249 g (0.55 lb) approximate
Dimensions - Module	• Height: 102 mm (4 in),114 mm (4.5 in) including mounting lugs • Width: 45 mm (1.75 in) • Depth: 104 mm (4.11 in)
Dimensions - Termination Assemblies	See *Dimensions - Nominal, page 14*
Part Numbers	• FBM206 Module: RH916CQ • FBM206b Module: RH927AB • Termination Assemblies: See *Functional Specifications - Termination Assemblies, page 12*

Termination Cables	• Cable Lengths: Up to 30 m (98 ft) • Cable Materials: Polyurethane or Low Smoke Zero Halogen (LSZH) • Termination Cable Type: Type 1 — See *Table 2* • Baseplate to Main TA Cable Connection: ◦ FBM Baseplate End: 37-pin D-subminiature ◦ Termination Assembly End: 25-pin D-subminiature
Termination Assembly Construction	• Material: Polyamide (PA), compression
Field Termination Connections	• Compression-Type Accepted Wiring Sizes: ◦ Solid/Stranded/AWG: 0.2 to 4 mm^2/0.2 to 2.5 mm^2/24 to 12 AWG ◦ Stranded with Ferrules: 0.2 to 2.5 mm^2 with or without plastic collar • Ring-Lug Type Accepted Wiring Sizes: #6 size connectors (0.375 in (9.5 mm)) 0.5 to 4 mm^2/22 AWG to 12 AWG

Termination Assemblies and Cables

Field input signals connect to the FBM subsystem via DIN rail mounted Termination Assemblies, which are electrically passive. TAs for the FBM206 are available in the following forms:

- Compression screw type using Polyamide (PA) material
- Ring lug type using Polyamide (PA) material

See *Functional Specifications - Termination Assemblies, page 12* for a list of TAs used with the FBM206.

A removable termination cable connects the DIN rail mounted TA to the FBM via a field connector on the baseplate in which the FBM is installed. Termination cables are available in the following materials:

- Polyurethane
- Low Smoke Zero Halogen (LSZH)

Termination cables are available in a variety of lengths, up to 30 meters (98 feet), allowing the Termination Assembly to be mounted in either the enclosure or in an adjacent enclosure. See *Table 2* for a list of termination cables used with the TAs for the FBM206 and FBM206b.

Functional Specifications - Termination Assemblies

FBM Type	Input Signal	TA Part No. PA[a]	Term. Type[b]	TA Cable Type[c]	TA Cert. Type [d]
FBM206	Eight channels, pulse input, passive feedthrough with FBM206 channel isolation	RH916XM P0917JQ[e]	C RL	1	1, 2
FBM206b	Four pulse input channels, Four 0 to 20 mA analog output channels, passive feedthrough with FBM206b channel isolation	RH924QN RH924QP[f]	C C	1	1, 2

[a] PA is Polyamide rated from -20 to +70°C (-4 to +158°F).

[b] C = TA with compression terminals, RL = TA with ring lug terminals. Knife has compression terminals.

[c] See *Table 2, page 13* for cable part numbers and specifications.

[d] See *Table 1, page 12* for Termination Assembly certification definitions.

[e] Polyamide RL supersedes the PVC RL, note this is not a RoHS part.

[f] RH924QP includes output bypass jacks.

Table 1 - Certifications for Termination Assemblies

Type	Certification
Type 1	TAs are UL/UL-C listed as suitable for use in Class I; Groups A-D; Division 2 temperature code T4 hazardous locations. They are DEMKO certified EEx nA IIC T4 for use in Zone 2 potentially explosive atmospheres.
Type 2	TAs are UL/UL-C listed as associated apparatus for supplying non-incendive field circuits Class I; Groups A-D; Division 2 hazardous locations when connected to specified 200 Series FBMs and field circuits meeting entity parameter constraints specified in *Standard and Compact 200 Series Subsystem User's Guide* (B0400FA). They are also DEMKO certified as associated apparatus for supplying field circuits for Group IIC, Zone 2 potentially explosive atmospheres. Field circuits are also Class 2 limited energy (60 V dc, 30 V ac, 100 VA or less) if customer-supplied equipment meets Class 2 limits.

[a] All TAs are UL/UL-C listed to comply with applicable ordinary location safety standards for fire and shock hazards. Hazardous location types comply with ATEX directive for II 3 G use. They also comply with the requirements of the European Low Voltage Directive. All listings/certifications require installation and use within the constraints specified in *Standard and Compact 200 Series Subsystem User's Guide* (B0400FA) and the conditions stated in UL and DEMKO reports.

Table 2 - Cable Types and Part Numbers

Cable Length m (ft)	Type 1 P/PVC[a]	Type 1 LSZH[b]
0.5 (1.6)	RH916DA	RH928AA
1.0 (3.2)	RH916DB	RH928AB
2.0 (6.6)	RH931RM	RH928AC
3.0 (9.8)	RH916DC	RH928AD
5.0 (16.4)	RH916DD	RH928AE
10.0 (32.8)	RH916DE	RH928AF
15.0 (49.2)	RH916DF	RH928AG
20.0 (65.6)	RH916DG	RH928AH
25.0 (82.0)	RH916DH	RH928AJ
30.0 (98.4)	RH916DJ	RH928AK

[a] P/PVC is polyurethane outer jacket and semi-rigid PVC primary conductor insulation. Temperature range: -20 to +80°C (-4 to +176°F).

[b] Low smoke zero halogen or low smoke free of halogen (LSZH) is a material classification used for cable jacketing. LSZH is composed of thermoplastic or thermoset compounds that emit limited smoke and no halogen when exposed to high sources of heat. Temperature range: -40 to +105°C (-40 to +221°F).

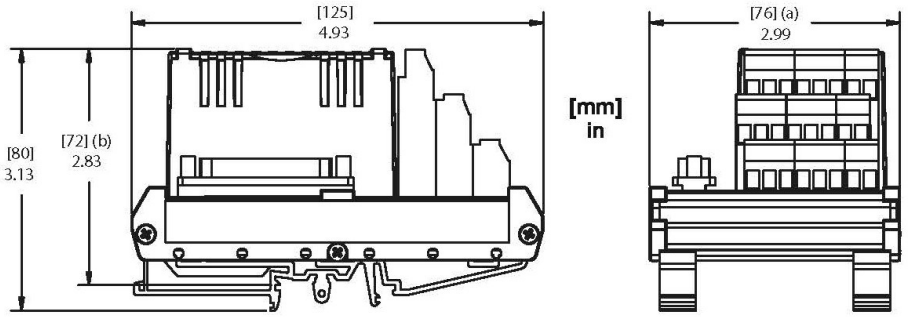
Use of Termination Assemblies in 100 Series Upgrade Subsystem

When an FBM206b is used to replace the 100 Series FBM06, it may use any of the appropriate termination assemblies listed above for the FBM06's field I/O wiring.

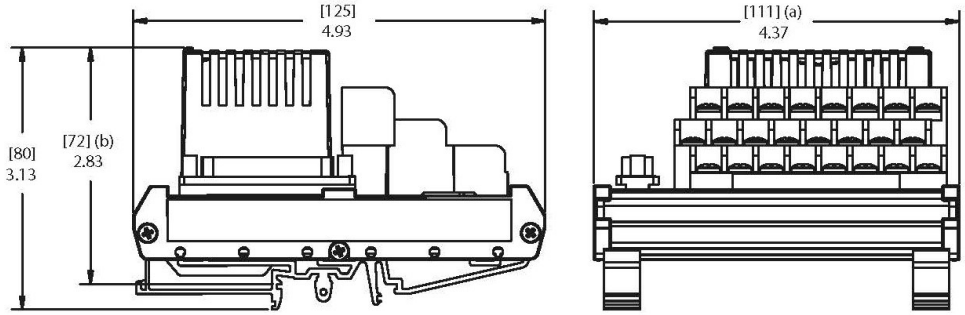
Alternatively, the FBM206b can accept this field wiring through a Termination Assembly Adapter (TAA) instead of a termination assembly. This is discussed in *Termination Assembly Adapter Modules for 100 Series Upgrade* (PSS 41H-2W4).

Dimensions - Nominal

Compression Termination Assembly - RH916XM, RH924QN, RH924QP (with Output Bypass Jacks)



Ring Lug Termination Assembly - P0917JQ(c)



(a) Overall width — for determining DIN rail loading.

(b) Height above DIN rail (add to DIN rail height for total).

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

Related Product Documents

Document Number	Description
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-2W4	*Termination Assembly Adapter Modules for 100 Series Upgrade*
PSS 41H-2SBASPLT	*Standard 200 Series Baseplates*
PSS 41H-2W8	*100 Series Conversion Mounting Structures*
PSS 41S-3FCPICS	*Field Control Processor 280 (CP280) Integrated Control Software*
B0400FA	*Standard and Compact 200 Series Subsystem User's Guide*

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/.

Schneider Electric Systems USA, Inc.
38 Neponset Avenue
Foxboro, Massachusetts 02035–2037
United States of America

Global Customer Support: https://pasupport.schneider-electric.com

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

PSS 41H-2S206, Rev A