



HighFive PLC

sales@5gplc.com

+86 13306036024

Foxboro™ DCS

Compact FBM201 Analog Input 0 to 20 mA Interface Module

PSS 41H-2C201

Product Specification

August 2019



Legal Information

HighFive PLC

sales@5gplc.com

+86 13306036024

The Schneider Electric brand and any trademarks of Schneider Electric SE and its subsidiaries referred to in this guide are the property of Schneider Electric SE or its subsidiaries. All other brands may be trademarks of their respective owners.

This guide and its content are protected under applicable copyright laws and furnished for informational use only. No part of this guide may be reproduced or transmitted in any form or by any means (electronic, mechanical, photocopying, recording, or otherwise), for any purpose, without the prior written permission of Schneider Electric.

Schneider Electric does not grant any right or license for commercial use of the guide or its content, except for a non-exclusive and personal license to consult it on an "as is" basis. Schneider Electric products and equipment should be installed, operated, serviced, and maintained only by qualified personnel.

As standards, specifications, and designs change from time to time, information contained in this guide may be subject to change without notice.

To the extent permitted by applicable law, no responsibility or liability is assumed by Schneider Electric and its subsidiaries for any errors or omissions in the informational content of this material or consequences arising out of or resulting from the use of the information contained herein.

HighFive PLC

Compact FBM201 Analog Input (0 to 20 mA) Interface Module
sales@5gplc.com

Overview

Overview

+86 13306036024

The Compact FBM201 Analog Input Interface Module contains eight analog input channels, each channel accepting a 2-wire, 0 to 20 mA dc input from an analog sensor. It is part of the Compact 200 Series I/O subsystem described in *Compact 200 Series I/O Subsystem Overview (PSS 41H-2COV)*.

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

The FBM201 is electrically compatible with standard HART signals.

Features

- 8 channels for input of analog 0 to 20 mA dc sensor signals
- Each analog input channel is galvanically isolated from other channels and ground
- Compact, rugged design suitable for enclosure in Class G3 (harsh) environments
- Execution of an analog input application program that provides conversion time and configurable options for integration time and Rate of Change Limits
- High accuracy achieved by sigma-delta data conversions for each channel
- Termination Assemblies (TAs) for locally or remotely connecting field wiring to the Compact FBM201 module
- Termination Assemblies for per channel internally and/or externally loop powered transmitters

Compact Design

The Compact FBM201's design is narrower than the standard 200 Series Fieldbus Modules (FBMs). It has a rugged Acrylonitrile Butadiene Styrene (ABS) exterior for physical protection of the circuits. Enclosures specially designed for mounting the FBMs provide various levels of environmental protection, up to harsh environments per ISA Standard S71.04.

High Accuracy

For high accuracy, the modules incorporate sigma-delta data conversion on a per-channel basis, which can provide a new analog input reading every 25 ms, and a configurable integration period to remove any process noise and power-line frequency noise.

Each time period, the FBM converts each analog input to a digital value, averages these values over the time period, and provides the averaged value to the controller.

Easy Removal/Replacement

The module mounts on a Compact 200 Series baseplate. Two screws on the FBM attach the module to the baseplate.

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

HighFive PLC

Visual Indicators

Red and green light-emitting diodes (LEDs) incorporated into the front of the module provide visual status indications of the FBM operational status.

sales@5gplc.com

+86 13306036024

Modular Baseplate Mounting

The modules mount on a DIN rail mounted modular baseplate, which accommodates up to 16 compact FBMs. The baseplate is either DIN rail mounted or rack mounted, and includes signal connectors for redundant fieldbus, redundant independent dc power, and termination cables.

Fieldbus Communication

A Fieldbus Communication Module or a Control Processor interfaces the redundant 2 Mbps module Fieldbus used by the FBMs. The FBM201 modules accept communication from either path (A or B) of the redundant 2 Mbps fieldbus. If one path is unsuccessful or is switched at the system level, the module continues communication over the active path.

Termination Assemblies

Field I/O signals connect to the FBM subsystem via DIN rail mounted TAs. The TAs used with the Compact FBM201 modules are described in *Termination Assemblies and Cables*, page 10.

HighFive PLC

Functional Specifications

Compact FBM201 Analog Input 0 to 20 mA Interface Module

Functional Specifications sales@5gplc.com

+86 13306036024

Process I/O Communications	Communicates with its associated PLC or FCP via the optional 2 Mbps module Fieldbus.
Input Channels	8 isolated and independent channels
Input Range (each channel)	0 to 20 mA dc
Input Channels (8)	<ul style="list-style-type: none"> • Analog Accuracy (includes linearity): ±0.03% of span Accuracy temperature coefficient: ±50 ppm/°C • 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 Channel Impedance: 61.5 Ω nominal • Input Signal A/D Conversion: Each channel performs A/D signal conversion using an independent Sigma-Delta converter. • Integration Period: Software configurable • Common Mode Rejection: >100 db at 50 or 60 Hz • Normal Mode Rejection: >95 db at 50 or 60 Hz • Loop Power Supply Protection: Each channel is channel-to-channel galvanically isolated, current limited, and voltage regulated. All analog inputs are limited by their design to less than 40 mA. If the current limit circuit shorted out, the current is limited to about 100 mA. • Input Channel Isolation: Each channel is galvanically isolated from all other channels and earth (ground). The module/TA withstands, without damage, a potential of 600 V ac applied for one minute between any channel and ground, or between a given channel and any other channel. <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p style="text-align: center;">⚠ DANGER</p> <p style="text-align: center;">HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH</p> <p>This does not imply that these channels are intended for permanent connection to voltages of these levels. Exceeding the limits for input voltages, as stated elsewhere in this specification, violates electrical safety codes and may expose users to electric shock.</p> <p>Failure to follow these instructions will result in death or serious injury.</p> </div>

HighFive PLC

Compact FBM201 Analog Input 0 to 20 mA Interface Module

Functional Specifications

sales@5gplc.com

+86 13306036024

Power Requirements	<ul style="list-style-type: none"> • Input Voltage Range (Redundant): 24 V dc +5%, -10% • Consumption: 7 W • Heat Dissipation: 4 W
Calibration Requirements	Calibration of the module and termination assembly is not required.
Regulatory Compliance: Electromagnetic Compatibility (EMC)	<ul style="list-style-type: none"> • <i>European EMC Directive 2014/30/EU:</i> Meets: EN61326-1:2013 Class A Emissions and Industrial Immunity Levels
Regulatory Compliance, Product Safety	<ul style="list-style-type: none"> • <i>Underwriters Laboratories (UL) for U.S. and Canada:</i> 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 <i>Standard and Compact 200 Series Subsystem User's Guide (B0400FA)</i>. • <i>European Low Voltage Directive 2014/35/EU and Explosive Atmospheres (ATEX) Directive 2014/34/EU:</i> DEMKO certified as Ex nA IIC T4 for use in certified Zone 2 enclosure when connected to specified processor modules as described in the <i>Standard and Compact 200 Series Subsystem User's Guide (B0400FA)</i>.
RoHS Compliance	Complies with European RoHS Directive 2011/65/EU, including amending Directives 2015/863 and 2017/2102
Regulatory Compliance, Marine Certification	ABS Type Approved and Bureau Veritas Marine certified for Environmental Category EC31.

HighFive PLC

Environmental Specifications

Compact FBM201 Analog Input 0 to 20 mA Interface Module

Environmental Specifications sales@5gplc.com

+86 13306036024

	Operating	Storage
Temperature	<ul style="list-style-type: none">Compact FBM201: -20 to +60°C (-4 to +140°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)	
Altitude	-300 to +3,000 m (-1,000 to +10,000 ft)	-300 to +12,000 m (-1,000 to +40,000 ft)
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.	
Vibration	7.5 m/s ² (0.75 g) from 5 to 500 Hz	

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.

HighFive PLC

Physical Specifications sales@5gplc.com

+86 13306036024

<p>Mounting</p>	<ul style="list-style-type: none"> • Compact FBM201: The Compact FBM201 mounts on a Compact 200 Series 16-slot horizontal baseplate. The baseplate can be mounted on a horizontal DIN rail, or horizontally on a 19-inch rack using a mounting kit. See <i>Compact 200 Series 16-Slot Horizontal Baseplate</i> (PSS 41H-2C200) 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).
<p>Weight</p>	<ul style="list-style-type: none"> • Compact FBM201: 185 g (6.5 oz) approximate • Termination Assembly: <ul style="list-style-type: none"> ◦ Compression: 181 g (0.40 lb) approximate ◦ Ring Lug: 249 g (0.55 lb) approximate
<p>Dimensions</p>	<ul style="list-style-type: none"> • Compact FBM201: <ul style="list-style-type: none"> ◦ Height: 130 mm (5.12 in) ◦ Width: 25 mm (0.98 in) ◦ Depth: 150 mm (5.9 in) - Including baseplate connectors, 139 mm (5.46 in) • Termination Assembly: See <i>Dimensions - Nominal</i>, page 13.
<p>Part Numbers</p>	<ul style="list-style-type: none"> • Compact FBM201 Module: RH101DA • Termination Assemblies: See <i>Functional Specifications — Termination Assemblies</i>, page 11.
<p>Termination Cables</p>	<ul style="list-style-type: none"> • Cable Lengths: Up to 30 m (98 ft) • Cable Materials: Polyurethane or Low Smoke Zero Halogen (LSZH) • Termination Cable Type: Type 1 – See <i>Table 2</i>, page 12 • Baseplate to Main TA Cable Connection: <ul style="list-style-type: none"> ◦ FBM Baseplate End: 37-pin D-subminiature ◦ Termination Assembly End: 25-pin D-subminiature

HighFive PLC

Physical Specifications

Compact FBM201 Analog Input 0 to 20 mA Interface Module

Construction – Termination Assembly	<ul style="list-style-type: none">• Material: sales@5gplc.com Polyamide (PA), compression PA, ring lug
Field Termination Connections	<ul style="list-style-type: none">• Compressor-Type Accepted Wiring Sizes:<ul style="list-style-type: none">◦ Solid/Stranded/AWG: 0.2 to 4 mm² /0.2 to 2.5 mm² /24 to 12 AWG◦ Stranded with Ferrules: 0.2 to 2.5 mm² with or without plastic collar• Ring-Lug Type Accepted Wiring Sizes:<ul style="list-style-type: none">◦ #6 size connectors (0.375 in (9.5 mm))◦ 0.5 to 4 mm²/22 AWG to 12 AWG

+86 13306036024