FOXBORO®

PSS 21H-2Z13 B4

I/A Series® Hardware
Differential Platinum/Nickel RTD Input Interface Module (FBM213)

The Differential Platinum/Nickel RTD Input Interface Module (FBM213) contains eight resistance temperature detector (RTD) input channels. Each channel accepts a 2- or 3-wire RTD sensor input, within a 0 to 320 ohm resistance range. Each channel has a differential input to allow voltage differences between channels without introducing errors.

FBM213 has a compact design, with a rugged extruded aluminum 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.

The module performs the signal conversion required to interface the electrical input signals from the field sensors to the optionally redundant Fieldbus.

FBM213 executes an analog input application program, which provides configurable options for the Conversion Time and Rate of Change Limits.

For high accuracy, the module incorporates a multiplexed Sigma-Delta converter shared by all channels, providing new analog input readings every 500 ms, and a configurable moving-average filter to remove any process noise and power line frequencies.

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

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

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Product Specifications

FIELDBUS COMMUNICATION

Communication with the host control station is via an optionally redundant 10 Mbps Ethernet trunk Fieldbus. Fieldbus Communication Modules (FCMs) interface the 2 Mbps protocol used by the FBMs with the 10 Mbps protocol used by the Ethernet trunk Fieldbus. FBM213 accepts communication from either path (A or B) of the redundant Ethernet trunk Fieldbus — should one path fail or be switched at the system level, the module continues communication over the active path.

BASEPLATE MODULE MOUNTING

The module mounts on a DIN rail mounted baseplate, which accommodates up to eight Fieldbus Modules. The baseplate is either DIN rail mounted or rack mounted, and includes signal connectors for redundant Fieldbus, redundant independent dc power, and I/O cable connections.

FUNCTIONAL SPECIFICATIONS

Input
8 group isolated differential channels

Input Range (each channel)
0 to 320 ohms

Sensor Current
0.25 mA dc nominal

Accuracy
±0.03% of span
Accuracy temperature coefficient: ±50 ppm/°C

Common Mode Voltage
±2.5 V dc or peak ac between channels

Communication
Via an optionally redundant Fieldbus

Power Requirements
INPUT VOLTAGE RANGE (REDUNDANT)
24 V dc +5%, -10%
CONSUMPTION
3 W (maximum) at 24 V dc
HEAT DISSIPATION
3 W (maximum) at 24 V dc

Calibration Requirements
Calibration of the module is not required.

Vibration
0.75 g (5 to 200 Hz)

Input Circuitry
See Figure 1.

Input Signal A/D Conversion
Each channel performs A/D signal conversion using a multiplexed Sigma-Delta converter.

Input Integration Time (software configurable)
See Table 1.

Typical Resistance Temperature Sensors
Platinum (DIN), Platinum (SAMA), Platinum (IEC), or Nickel (SAMA)
Platinum - 100 ohms nominal at 0°C
Nickel - 235 ohms nominal at 0°C

Input Signal Connections
Supports 2- or 3-wire variable resistance temperature sensors. For 2-wire inputs, there is no correction for lead resistance or lead resistance temperature changes.

Input Channel Isolation
Each channel has a differential input to allow voltage differences between channels without introducing errors. The channels are not galvanically isolated from each other, but are galvanically isolated from ground and module logic. Differential group isolated inputs use the FBM subsystem power supply for field power.
The module withstands, without damage, a potential of 600 V ac applied for one minute between the differential isolated channels and earth (ground).

CAUTION

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.

FUNCTIONAL SPECIFICATIONS (Cont.)

Regulatory Compliance

ELECTROMAGNETIC COMPATIBILITY (EMC)

European EMC Directive 89/336/EEC

EN 50081-2 Emission standard
EN 50082-2 Immunity standard

IEC 61000-4-2 ESD Immunity

Contact 4 kV, air 8 kV

IEC 61000-4-3 Radiated Field Immunity

10 V/m at 80 to 1000 MHz

IEC 61000-4-4 Electrical Fast Transient/Burst Immunity

2 kV

IEC 61000-4-5 Surge Immunity

2 kV

IEC 61000-4-6 Immunity to Conducted Disturbances

10 V

IEC 61000-4-8 Power Frequency Magnetic Field Immunity

30 A/m

IEC 61000-4-11 Voltage Dips, Short Interruptions and Voltage Variations Immunity

Regulatory Compliance (Cont.)

PRODUCT SAFETY

European Low Voltage Directive 73/23/EEC

SAFETY CERTIFICATION

There are no direct user field circuit connections to the Fieldbus Modules. All user connections are made to the associated termination assembles. Safety certification information only applies when these modules are used with specified certified termination assemblies as described in the *DIN Rail Mounted FBM Subsystem User's Guide* (B0400FA).

Underwriters Laboratories (US and Canadian Certification)

UL/UL-C listed as suitable for use in Class I, Groups A-D, Division 2, temperature code T4 enclosure-based systems. For details of UL listing, refer to PSS 21H-2W2 B3.

CENELEC (DEMKO)

CENELEC certified EEx nA IIC T4 for use in CENELEC certified Zone 2 enclosure-based systems. For details of CENELEC certification, refer to PSS 21H-2W2 B3.

EUROPEAN UNION COMPLIANCE

Meets all applicable European Union directives including the Explosive Atmospheres (ATEX) directive 94/9/EC, and bears the CE mark.

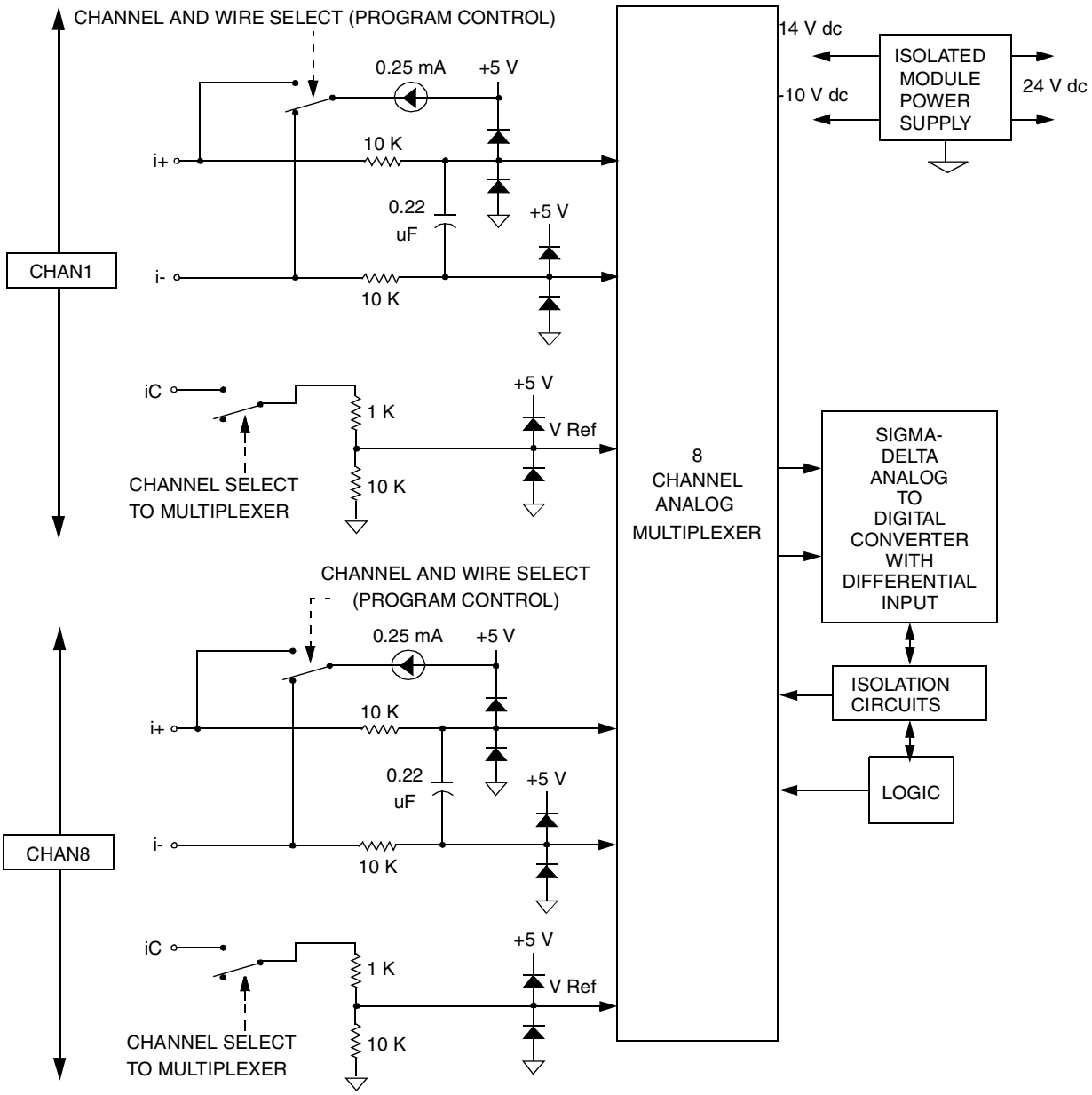

Figure 1. Input Circuitry, Simplified Schematic

Table 1. Input Specifications

Integration Period (Milliseconds)	Update Time (Milliseconds)	Settling Time (a) (Milliseconds)	Resolution (Bits)
500	500	500	15
1000	500	1000	15

(a) Value settles within a 1% band of steady state for an input step change of 30 to 320 ohms.

ENVIRONMENTAL SPECIFICATIONS(a)

Operating

TEMPERATURE
-20 to +70°C (-4 to +158°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

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

(a) 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.]

PHYSICAL SPECIFICATIONS

Mounting

FBM213 mounts on a baseplate. The baseplate can be mounted on a DIN rail (horizontally or vertically), or horizontally on a 19-inch rack using a mounting kit. Refer to PSS 21H-2X2 B4 for details.

Mass

284 g (10 oz) approximate

Dimensions

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)

Indicators (mounted on front of module)

Red and green light-emitting diodes (LEDs) provide indication of the FBM operational status.

Field Termination Connections

Refer to PSS 21H-2Y4 B3.

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