Foxboro FBM202 P0926EQ

01 Temperature-input architecture

Measurement function

Eight low-level analog inputs and a separate terminal-temperature reference form the measurement front end. The module converts the sensor signals and communicates digital results over the I/A Series module Fieldbus.

Four engineering characteristics

Independent channels
Galvanic isolation separates the inputs from each other and earth.

Dedicated conversion
Each channel uses its own sigma-delta converter.

Thermocouple fault response
An open thermocouple is detected through upscale burnout indication.

Software processing
Integration time and rate-of-change limits are configurable.

Acquisition boundaries

Boundary	Interface
Signal input	Thermocouple or millivolt circuit
Temperature reference	TA-mounted four-wire Pt100
Digital transport	Redundant 2 Mbps module Fieldbus
Controller-side interface	Associated FCM or FCP
Front indication	Red and green operational-status LEDs

Reference-junction context

Thermocouple temperature calculation depends on the terminal junction as well as the measured millivolts. Locating the RTD in the termination assembly provides a reference at the point where the field conductors enter the system.

Modular connection

The baseplate carries power, Fieldbus and termination interfaces. A field-wiring change should be distinguished from a module exchange, because the removable termination arrangement allows the wiring to remain assigned to its original circuits.

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02 Electrical and conversion data

Input and reference performance

Parameter	Value
Thermocouple/mV inputs	8 isolated channels
Reference-junction inputs	1 isolated RTD channel
Input voltage range	-10.5 to +69.5 mV DC
Raw-count mapping	0-64000 over the specified input range
Full-scale input	71.419 mV = 65535 raw counts
Millivolt accuracy at 25 °C	±0.03% of span (±27 µV)
Differential input impedance	10 MΩ
Accuracy temperature coefficient	±50 ppm/°C
Reference sensor	4-wire Pt100; IEC 751 Class B
RTD reference conformity	±0.25 °C
Thermocouple conformity	±0.25 °C
Reference-junction accuracy	±0.50 °C with the internal TA RTD
Common-mode voltage limit	30 V AC or 60 V DC
Dielectric withstand	600 V AC for 1 minute
Open-circuit detection source	250 mV DC through 10 MΩ

Raw range and engineering units

The specified -10.5 to +69.5 mV input span maps to 0-64000 counts. The full converter range continues to 65535 counts at 71.419 mV. Temperature interpretation also depends on the selected thermocouple characteristic and reference compensation.

Interpret insulation correctly

Dielectric withstand is a test condition, not a permissible continuous input voltage. Keep field-circuit common mode within 30 V AC or 60 V DC even though the isolation test uses a substantially higher voltage.

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03 Power, environment and system interfaces

Module operating data

Parameter	Value
Input update capability	New readings every 25 ms
Module Fieldbus	Redundant 2 Mbps
Supply voltage	24 V DC; +5%, -10%
Maximum consumption	3 W
Operating temperature	-20 to +70 °C, module
Storage temperature	-40 to +70 °C
Relative humidity	5-95%, noncondensing
Thermocouple types	B, E, J, K, N, R, S, T
Termination cable	Type 2; up to 30 m

Termination architecture

Arrangement	Technical role
DIN-rail TA	Eight two-wire input signals; one associated module
Baseplate-mounted TA	Sixteen two-wire input signals; two associated modules
Reference separation	A separate integral RTD for each module on the two-module TA
Passive termination	The TA provides signal feedthrough and the temperature-reference connection
Mounting options	Baseplate on DIN rail or rack; suitable 100 Series conversion structure

Fieldbus continuity

Either redundant communication path can carry the module traffic. Loss of one path does not require the sensor signal to move to a different input channel; communication continues on the active path.

Environmental assembly

A component-level rating cannot be applied to the whole cabinet without considering termination material and enclosure conditions. In particular, PVC TA operation stops at +50 °C, while PA and PC/ABS options extend to +70 °C.

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04 Applications and engineering decisions

Application examples

Thermocouple instrumentation
Multiple process-temperature circuits can enter the control system through individually isolated analog channels.

Millivolt acquisition
A scaled voltage measurement can be used when its electrical span remains inside the input capability.

Separated termination
A cable-connected TA allows the field conductors to terminate away from the module position.

Legacy I/O conversion
Suitable FBM02 upgrade arrangements can use the FBM202 function with the appropriate TA or termination adapter.

Useful engineering distinctions

Decision	Interpretation
Millivolt versus temperature	A correctly measured voltage does not by itself confirm the thermocouple type used for linearization.
One channel versus a group	Inspect a single sensor path for a local fault; investigate the shared reference when several compensated readings shift together.
Averaging versus response	The integration period affects noise suppression and the speed of the reported value.
Module versus termination	Changing the module does not automatically correct a damaged cable or reference sensor.
Burnout versus process excursion	An upscale value requires investigation of both the sensor circuit and actual process condition.

Field verification

Use the sensor’s intended range and the configured application limits to select test points. Confirm the channel identity at the controller, because a correct module response can still be assigned to the wrong plant measurement.

Module service

No calibration of the module or termination assembly is required. Functional validation still checks the complete installed measurement path and the settings used by the application.

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05 Technical questions and catalogue navigation

Reference and signal decisions

Terminal temperature is part of the measurement
The four-wire Pt100 belongs to the reference-junction circuit. Its location at the TA connects the compensation to the actual terminal temperature.

Interpret a full-upscale indication
Check for an interrupted thermocouple circuit before assuming the temperature has exceeded the process span. Burnout detection deliberately produces an upscale response.

Distinguish the nominal span from full conversion
The nominal millivolt span uses 64000 counts. A value of 65535 corresponds to 71.419 mV and therefore lies beyond the +69.5 mV nominal endpoint.

Choose averaging deliberately
Independent conversions are averaged over a configured integration period. That choice affects rejection of unwanted signal components as well as the reported response to a genuine process change.

Two-module termination

The direct-mounted assembly groups two modules mechanically while retaining a separate temperature reference for each. Keep this distinction in the wiring schedule and diagnostic records.

Operational indication

Module LEDs show the operating state. Combine them with actual channel values and controller communications when investigating a fault; they do not replace an end-to-end sensor test.

Explore other Foxboro catalogue pages

Foxboro P0923RK

Foxboro AD908AC FBM202

Technical basis

Foxboro PSS 21H-2Z2 B4, FBM202 Thermocouple/mV Input Interface Module, March 2013, pp. 1-9.