Networked Meter Block

Bulletin SSET020 Issue/Rev. 0.0 (1/22)

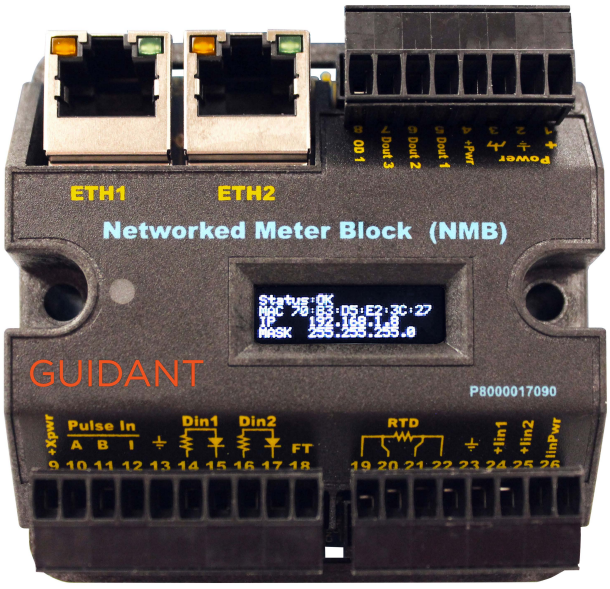
Networked Meter Block

The Networked Meter Block (NMB) is an Ethernet network-enabled field input/output (I/O) device with the ability to connect peripheral devices to standard industrial infrastructure, especially cloud applications. It also is capable of local control, such as basic logic and closed loop algorithms. For example, it can communicate a meter's flow rate and additional data through open communication protocols. Users can access the meter data remotely over the network in near real-time and communicate back to the NMB using common tools, such as a Web browser. The NMB makes it possible to eliminate much of the expense of today's multi-layered hardware infrastructures and specialized tools, reducing the overall cost to achieve total system integration.

Additionally, NMB models with turbine meter diagnostic firmware—developed specifically for liquid turbine meters—ensures the accuracy of measurements by detecting potential issues as they occur in real time.

Features

- American Petroleum Institute (API) Manual of Petroleum Measurement Standards (MPMS) Chapter 5.5 and International Organization for Standardization (ISO) 6551 compliant dual-meter pulse input
- Two direct current (DC) inputs, three DC outputs, one resistance temperature device (RTD) input, and one 4-20 mA input
- Integrated display panel aids in setup and troubleshooting
- Built-in web server enables remote access by personal computer (PC), tablets, and smartphones
- Remote configuration
- Supports hypertext transfer protocol (HTTP) and message queuing telemetry transport (MQTT) protocols
- Optional Turbine Meter Diagnostic functionality monitors meter behavior



Highlights

- Network interface—Aggregates sensor information for upstream consumption, allows for remote command and control
- Raw measurement data streaming—Enables upstream computation, analysis, logging, failure identification, and prediction
- Easy configuration—Does not require specialized end-user programming and requires minimal user configuration
- Generic IoT gateway—Ability to act as a generic Internet of Things (IoT) gateway for various sensors and actuators on a digital oil pad
- Accessibility—Can be accessed using smartphones, tablets, and other Web browser-capable devices
- Security—Securely sends and receives information via standards-based cryptographic methods
- Cost effective—An easily integrated, low-cost, small-footprint device
- Integrated display panel—Simplifies setup and system troubleshooting
- Diagnostics—Alerts operators when potential issues are detected

Applications and Markets

- Interfacing turbine or displacement meter runs to an Ethernet network
- Pipelines, Lease Automatic Custody Transfer (LACT) units, and truck, rail, and transloading terminals
- Generic wells or metering station (I/O) gateway
- Asset monitoring, data gathering for trending/ performance analytics

Electrical Safety Approvals

UL, C-UL, ATEX, IECEx

Zone 2/Division 2 Applications
Module only or optional instrument housing (requires placement into a suitable enclosure)
ATEX/IECEx (EU/Global)
T_{amb} = -40 °C to +70 °C Ex nA IIB T6 Gc
UL/CUL (North American)
UL File E23545
Class I, Division 2, Group C&D T6
Class I, Zone 2, Group IIB T6
T_{amb} = -40 °C to +70 °C

Zone 1/Division 1 Applications
Module enclosed in optional instrument housing
ATEX/IECEx (EU/Global)
T_{amb} = -40 °C to +70 °C Ex d IIB T6 Gb IP66
UL/CUL (North American)
UL File E23545
Class I, Division 1, Group C&D T6
Class I, Zone 1, Group IIB T6
T_{amb} = -40 °C to +70 °C IP66

Note: Optional instrument housing is certified to be used in either Division 1/Division 2 or Zone 1/Zone 2 classified locations following the recommended wiring practices for those classified area's.

Specifications

Instrument Power
DC instrument input power (+VPwr)
Voltage: 9.0 to 30 volts of direct current (VDC)
Current consumption (internal): <150 milliampere (mA)
The DC power input circuitry is reverse current protected and fused.

Pulse Inputs (A, B, and I) (NMB only)
Type: Voltage input, single/dual channel
Voltage range:
De-asserted: 0.0 to 1.5 VDC
Asserted: 4.0 to input voltage (V_{IN})
Hysteresis: >1.25 VDC
Impedance: >5 kiloohms (kΩ) referenced to ground (GND)
Frequency: 10 kilohertz (kHz)
Isolation: Not isolated—referenced to GND

Pulse Transmitter Power (+Xpwr) (NMB only)
Voltage: Vpwr-1.8 volts (V)
Current: <100 mA maximum

Preamplifier Inputs (NMT only)
Type: Voltage input, single/dual channel
Input sensitivity:
Gain: Switch selectable: 10x/50x/100x
Impedance: >10 kΩ differential; 10 kΩ typical to GND
Frequency: 0 to 3 kHz
Isolation: Not isolated

Digital Inputs (DIN1, DIN2)
Quantity: Two
Type: User configurable
Type: Voltage input
Voltage levels:
De-asserted: 0.0 to 1.25 VDC
Asserted: 8.25 to 28 VDC
Hysteresis: 0.65 VDC type
Input impedance: 3.2 kiloohms (kΩ) typical
Isolation: Optically isolated (<500 V)

Digital Outputs (DO1, DO2, and DO3)
Quantity: Three
Type: Metal–oxide–semiconductor field-effect transistor (MOSFET) open drain
Breakdown voltage: >30 VDC
Off-state current: <20 microamperes (µA)
On-state resistance: <0.10 ohms (Ω)
Max current: 1.0 ampere (A)
Output capacitance: <0.12 microfarad (µF)
Isolation: Not isolated—Referenced to GND

Digital Outputs (OD1)

Quantity: One

Type: MOSFET open drain

Breakdown voltage: >40 VDC

Off-state current: <4 microampere (µA)

On-state resistance: <0.60 Ω

Max current: 0.1 Amps (A)

Output capacitance: <200 picofarads (pF)

Isolation: Not isolated—Referenced to ground

Analog Inputs

RTD

Type: Four-wire, 100 Ω, Platinum, IEC 60751
Quantity: One
Range: -120 °C to 380 °C
Accuracy: +/-0.2 °C

4-20 mA inputs (In1 and In2)

Type: Passive (sinking)
Quantity: Two
Input impedance: (passive) 50 Ω typical referenced to GND
Range: 0 to 22 mA
Precision: 22.89 µA
Accuracy: +/- 0.27 mA
Isolation: Not isolated—Referenced to GND

Analog Current-Input Loop/Transmitter Power (IinPwr)

Voltage: Vpwr-1.0 volts
Current: <50 mA maximum (2x 4-20 mA transducers)
Isolation: Not isolated (referenced to GND)

Communications

Ethernet

Type: 10/100 BaseTX (IEEE 802.3u)
Port Connections: RJ45
Quantity: Two
Port relationship: Three-port switch (ETH1, ETH2, and internal processor)
Port light-emitting diodes (LEDs): Speed and activity

Enclosure (Optional)

Aluminum alloy, powder-coated protected from total dust ingress (IP66), NEMA 4X

Weight

Module alone: 5 ounces (oz.) (145 grams (g))
In optional aluminum instrument housing: Approximately 3 kilograms (kg) (6.6 pounds (lb.))

Environmental

Ambient Operating Temperature: -40 °F to +158 °F (-40 °C to +70 °C)
Humidity: 5 to 95% with condensation

European Union (EU) Directives

Low voltage (2014/35/EU)
ATEX (2014/34/EU)
RoHs (2011/65/EU)

Weights and Measures

Consult factory

Modeling Code

Example: Networked Meter Block with Instrument Housing

Position	1	2	3	4
	NMT	XP	TMD	–

Position 1: Block Type

NMB—Networked meter block
NMT—Networked meter block with low-level signal preamplifier inputs

Position 2: Packaging

PM—Panel-mount, Class I, Division 2 (Zone 2) module
XP[1]—Explosion-proof Class I, Division 1 (Zone 1)/Division 2 (Zone 2) aluminum instrument enclosure with three ¾" National Pipe Thread (NPT) conduit entrances

Position 3: Application

STD—Standard application for raw I/O, meter, and communications
TMD—STD with Turbine Meter Diagnostics software

Position 4[1]: Accessories—Interface Adapters and Low-Level Signal Preamplifier Inputs

Blank—No meter pulse transmitter or interface adapter
01—½" NPT adapter (Genesis Positive Displacement (PD) meter)
02—¾" NPT adapter (PRIME 4 PD meter)
06—PA-6 turbine meter transmitter included in a larger instrument enclosure with 1" NPT adapter, requires NMB (turbine meter)

Options: DIN rail mount kit—Designed for use with a single panel-mount meter block. Order part number P8000019076.

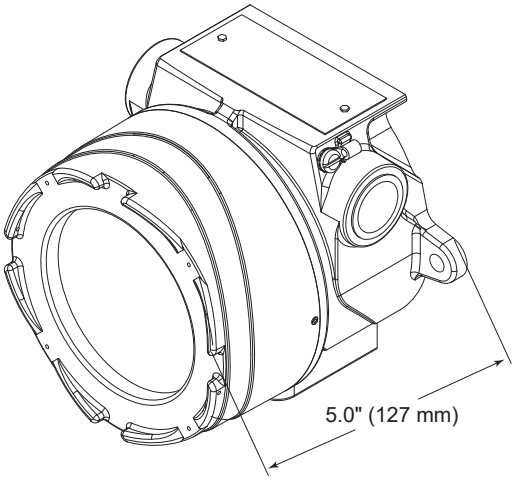
These models represent standalone versions of the NMB and are designed to be used for retrofit applications. The NMB is also available as an option when purchasing any of our turbine or PD meters as an option. See the appropriate meter specification sheets for additional NMB offerings.

1 Position 4 only applies if Position 2 selection is XP.

Dimensions

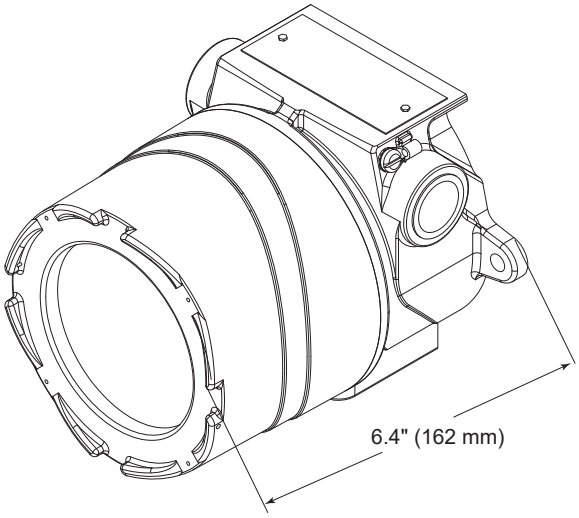
Inches (millimeters)

Standard Instrument Housing



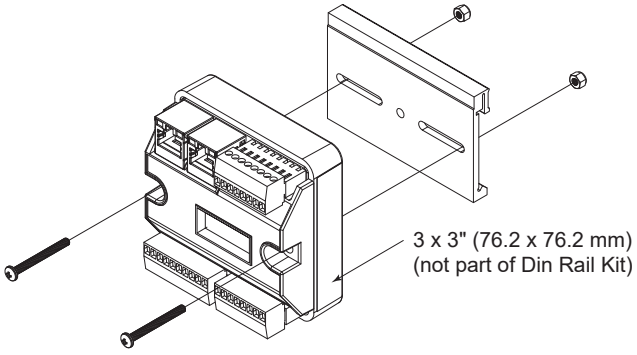
Modeling Code: Position 2, Option XP

Extended Instrument Housing

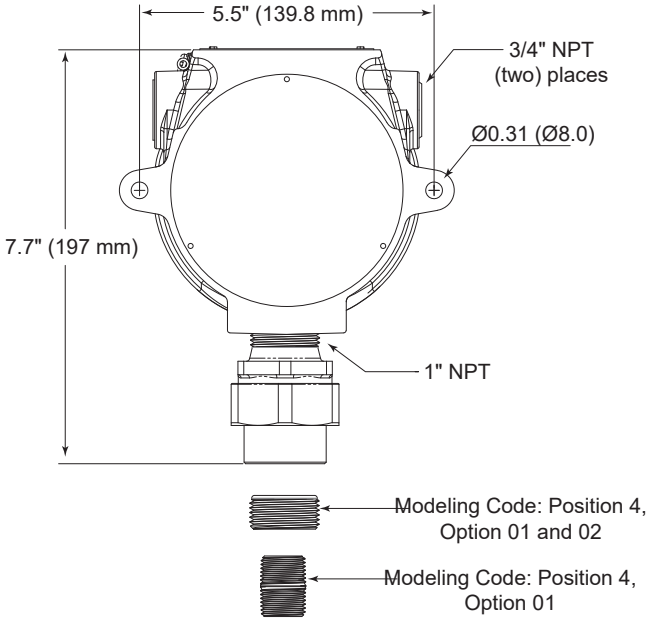


Modeling Code: Position 4, Option 06

DIN Rail Mounting Kit Hardware (Part Number P80000019076)



Requires Module Modeling Code: Position 2, Option PM



Note: Dimensions—Inches to the nearest tenth (millimeters to the nearest whole mm), each independently dimensioned from respective engineering drawings.

The specifications contained herein are subject to change without notice and any user of said specifications should verify from the manufacturer that the specifications are currently in effect. Otherwise, the manufacturer assumes no responsibility for the use of specifications which may have been changed and are no longer in effect.

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