

Intelligent Electronic Transmitters

IMP10S Multivariable Transmitter

PSS 2A-1S15 A

Product Specification

Release date December 4, 2023



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Key Features

The Model IMP10S intelligent electronic transmitter measures absolute pressure, differential pressure, and temperature from the process (with an external RTD), sensor, and electronics. Both the HART and Modbus models have a digital signal using HART communication and Modbus RTU, respectively, allowing communication for remote configuration, calibration, and monitoring. The HART model also transmits a 4 to 20 mA analog output signal.

The transmitter offers the following features:

- One transmitter replaces three — meaning less wiring, fewer shutoff valves, and reduced installation costs.
 - Fewer devices and less wiring means less chance of loss from downtime or process upsets.
 - Reduced process penetrations reduce chances of fugitive emissions.
 - Multiple or individual measurements digitally.
 - Individual measurements on a two-wire loop; assign 4 to 20 mA to any measurement. (HART)
- Remote configuration using a host or PC-based configurator.
- Local configuration with the optional LCD indicator with onboard pushbuttons.
- Selection of traditional and low-profile structures.
- Optional mounting bracket sets accommodate pipe or surface mounting of transmitters.
- Aluminum housing has durable, corrosion-resistant epoxy finish; 316 ss housing also available; both meet NEMA 4X and IEC IP66/IP67.
- NACE MR0175 and MR0103 compliant process wetted parts and bolt material available.
- Custody transfer lock and seal options.
- Time in Service meter features cumulative power uptime and time powered since last user reset.
- Field-proven piezoresistive silicon microsensors help ensure excellent measurement performance.
- Simple, elegant sensor design with very few parts achieves exceptional reliability.
- HART 4 to 20 mA and digital communication. (HART)
- Modbus RTU (Remote Terminal Unit) communication over a 2-wire RS-485 multidrop serial connection. (Modbus)
- Dual seal certified by CSA to meet ANSI/ISA 12.27.01-2003 requirements.
- CE marked; complies with EMC, ATEX, and PED European Directives; and NAMUR NE 21 Interference Immunity requirement, and NAMUR 105 overrange and underrange annunciations.
- Designed for hazardous area installations; versions available to meet agency flameproof and zone requirements.
- Standard 5-year warranty.

Digital HART and 4 to 20 mA Communication

4 to 20 mA with HART communication allows direct analog connection to common receivers while still providing full digital communication using a HART Communicator, PC-based configurator, or optional LCD indicator. A minimum loop load of 250 ohms is required for HART communication.

- 4 to 20 mA analog mode: The analog output signal is updated 30 times per second.
- Multidrop mode (fixed current): This mode supports communication with up to 64 transmitters on a single pair of power/signal wires. The output signal is updated 4 times per second.

Analog or Digital Transmission

The 4 to 20 mA analog output can be assigned to differential pressure, absolute pressure, or process temperature.

These properties, along with sensor temperature and electronics temperature, can be read digitally using the HART Communicator.

The digital output can be used for direct communication with a Distributed Control System (DCS). With HART protocol, these measurements are digitally communicated to the DCS along with the 4 to 20 mA current.

Digital Communication

- Digital integration — all communications between applicable DCS and transmitter are digital.
- Measurements are in engineering units (EGU) for ease of use.
- Continual monitoring of transmitter diagnostics.
- Measurements are communicated from the transmitter's lower range to upper range limit, regardless of the calibrated range. This provides more flexibility and information, and virtually eliminates the need to rerange transmitters when conditions change.

Topology

Figure 1 - HART 4 to 20 mA Topology

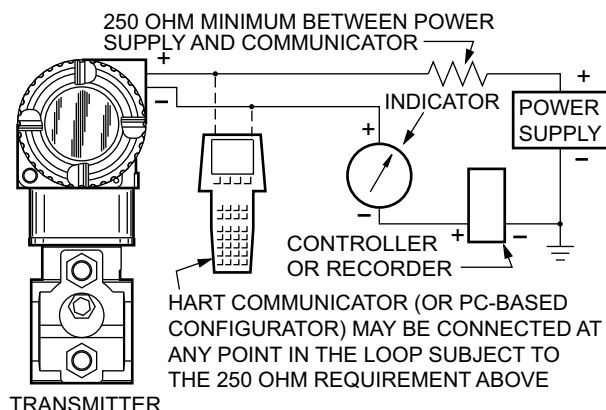
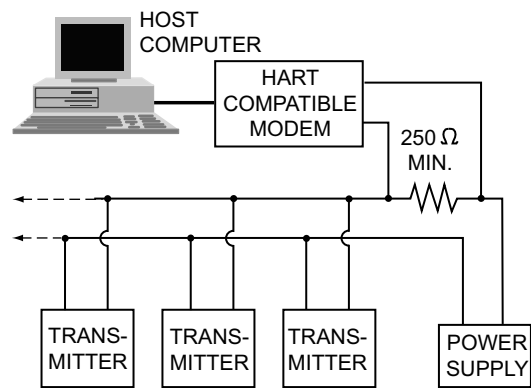
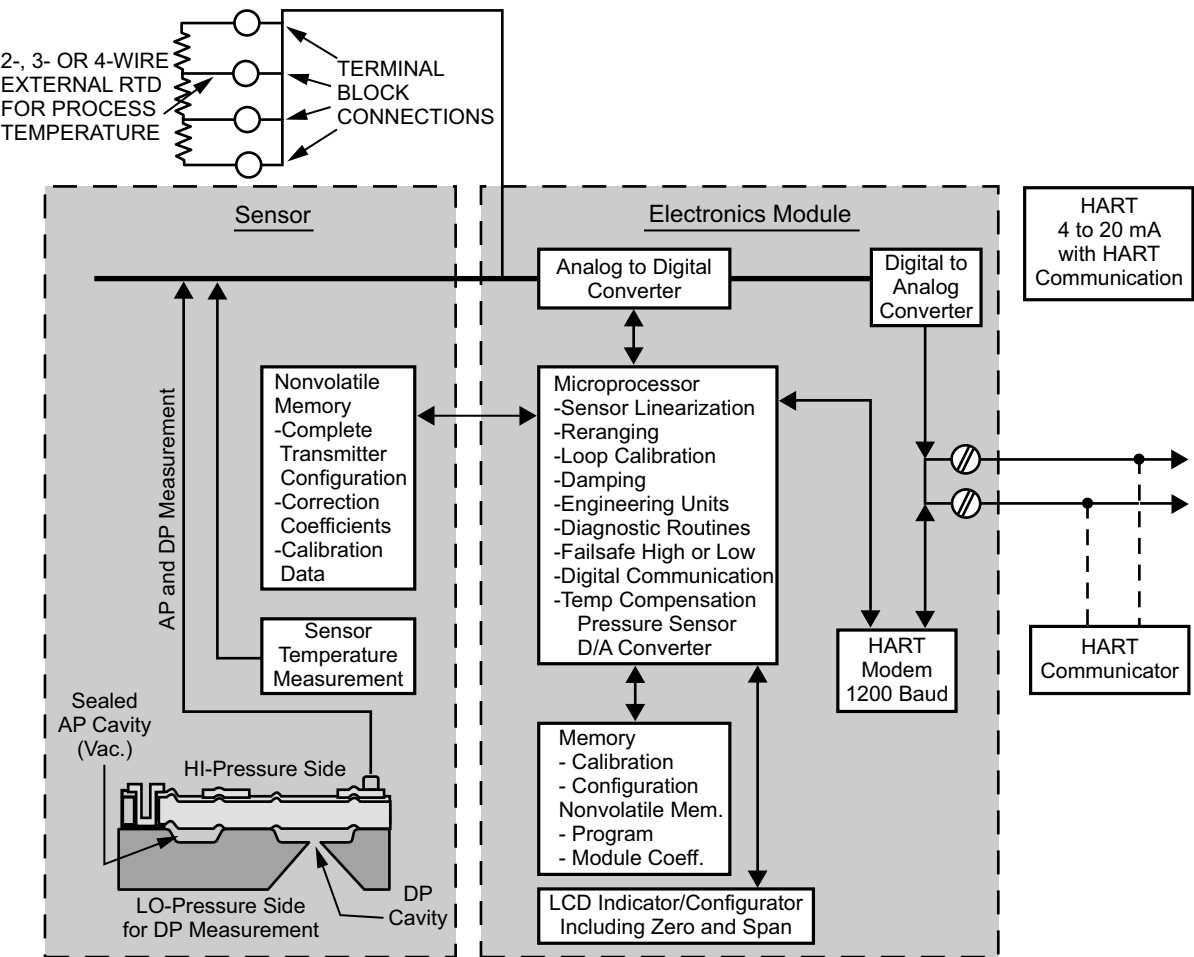


Figure 2 - HART Multidrop Topology



Functional Block Diagram

Figure 3 - HART Functional Block Diagram

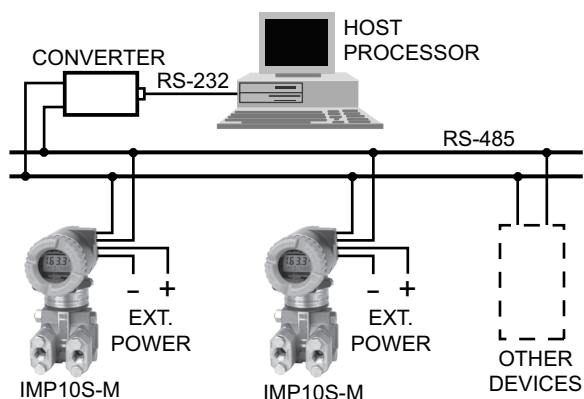


Modbus Communication

This transmitter combines proven multivariable sensing technology with the advanced development of the Modbus protocol. Communication with a host processor is made using the Modbus RTU (Remote Terminal Unit) mode over a 2-wire RS-485 multidrop serial connection.

The transmitter functions as a server device. Server addresses are in the range of 1 to 247.

Figure 4 - Typical Modbus Topology



Code	Description	Purpose
03	Read holding registers	Read the contents of a register in the 4xxxx register address range (holding registers).
04	Read input registers	Read the contents of a register in the 3xxxx register address range (input registers).
06	Preset single holding register	Write data to a single register in the 4xxxx register address range (holding registers).
16	Preset multiple registers	Write data to several holding registers in a continuous block of 4xxxx register addresses.

Design Specifications

Exceptionally High Performance

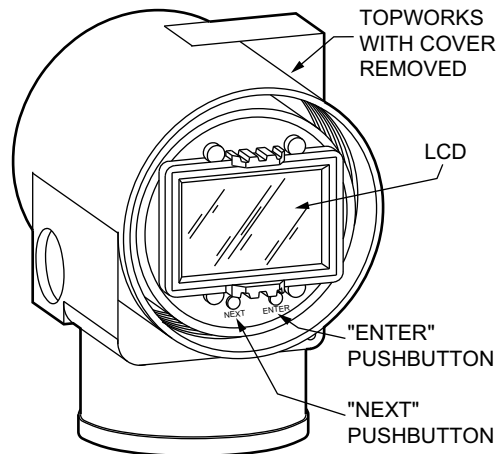
- Absolute pressure and DP accuracy to $\pm 0.05\%$ of span
- Excellent long-term stability with drift less than $\pm 0.05\%$ of URL per year over a 5-year period for DP pressure
- Minimized static pressure effect on DP by using pressure to compensate the DP measurement
- Excellent ambient temperature effect compensation due to characterization and microprocessor-based compensation
- Total Probable Error (TPE) significantly better than typical competitive transmitters

Digital Liquid Crystal Display (LCD)

A two-line local digital display with onboard pushbuttons is offered as an option. The display shows the current measurement with your choice of units, as well as configuration and calibration prompts. You can rotate the display into any of four 90 degree positions.

The pushbuttons allow you to locally configure and calibrate the device; for example, by adjusting the zero and span. Pushbutton pads are designed to help protect the transmitter from electrostatic discharge and moisture.

Figure 5 - Digital LCD with Onboard Pushbuttons



Process Connectors

Removable, gasketed process connectors allow a wide range of selections, including 1/4 NPT, 1/2 NPT, Rc 1/4, Rc 1/2, and weld neck connections.

Ease of Installation

These pressure transmitters are lightweight and easy to install, and are offered with:

- **Rotatable topworks** allow transmitter installation in tight places; allow the display to be positioned in a preferred direction; and ease field retrofit.

- **Two conduit entrances** offer a choice of entry positions to facilitate wiring and promote self-draining of condensation regardless of mounting position and topworks rotation.
- **Wiring guides and terminations** provide ease of wire entry and support; plenty of space to work and store excess wire; and large, rugged screw terminals for easy wire termination.
- **Two-valve manifolds**, which isolate and vent pressure, can be easily mounted directly to the transmitter.

Optional Mounting Bracket Sets

Mounting bracket sets allow you to mount the transmitter to a surface, pipe, or manifold. In addition to the standard-style mounting bracket sets available, a unique universal style mounting bracket allows wide flexibility in transmitter mounting configurations consistent with installation requirements. Refer to [Nominal Dimensions](#), page 37.

Unique Process Cover and Cell Body Design

Biplanar construction maintains the traditional horizontal process connections and vertical mounting by providing a cell body contained between two process covers, while still achieving a light weight, small size, and high standard static pressure rating. This design provides easy retrofit of any conventional differential pressure transmitter, and also allows the transmitter to be easily mounted in the horizontal position with vertical process connectors when required.

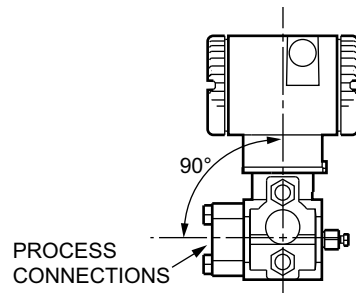
- Process covers are fully supported by the cell body over their entire height. This helps prevent bending and results in a firm seal. It also provides dimensional stability to the process covers, helping them mate properly with three-valve bypass manifolds.
- Process cover bolts are enclosed to minimize corrosion and early elongation with rapid temperature increases. This design makes the transmitter less likely to release process liquid during a fire.
- Process cover gaskets are PTFE as standard; PTFE provides nearly universal corrosion resistance, so you do not need to select and stock various elastomers to provide process compatibility.
- Light weight provides ease of handling, installation, and direct mounting without requiring costly pipe stands.

Transmitter Structures

Traditional and low-profile (LP1) structures are offered to accommodate and provide flexibility in transmitter installations.

- The traditional structure utilizes the right-angle design common to most differential pressure transmitters in use throughout the world. Process connections are oriented 90 degrees from the transmitter's center line. This traditional structure makes it easy to retrofit any transmitters of similar design.

Figure 6 - Process Connections at 90 Degrees



Sensor cavity venting and draining is provided for both vertical and horizontal transmitter installation, using innovative tangential connections to the sensor cavity. Optional side vents are offered for sensor cavity venting in the upright position.

Figure 7 - Vertical Mounting — Cavity Draining

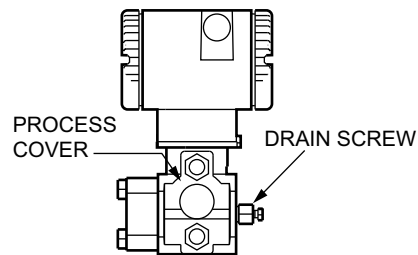
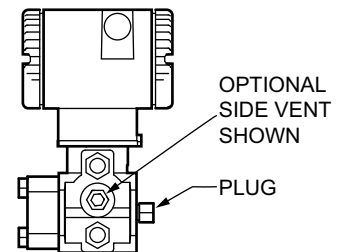
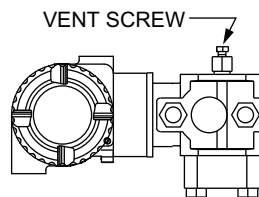


Figure 8 - Cavity Venting, and Self-Draining into the Process Line



- Low profile structure LP1 is a compact, inexpensive, lightweight design that you can mount directly to a separately mounted manifold or to process piping. The LP1 structure uses an inline design, meaning that the process connections are in line with the transmitter's center line. This allows you to mount the transmitter in the upright position with the process connections facing downward for connection to vertical process piping or for mounting directly to a three- or five-valve manifold.

By default, LP1 transmitters are supplied with a single vent/drain screw in the side of each process cover. In conjunction with the standard tangential venting and draining design, they can be mounted either vertically or horizontally, and are suitable for most applications, including liquids, gases, and steam.

In the vertical, upright position, the LP1 transmitter is self-draining and is ideal for gas flow rate service when directly mounted to a manifold located above the horizontal pipeline. If desired, you can omit the vent screw for this and other applications.

Figure 9 - LP1 Vertical Mounting

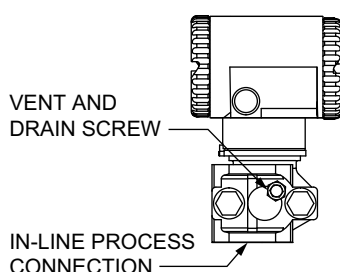
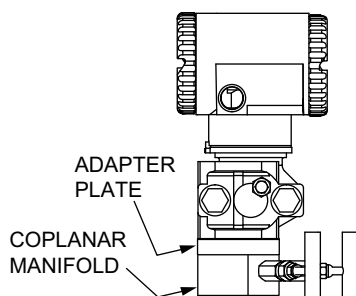


Figure 10 - LP1 Mounted to a Coplanar Manifold with an Optional Intermediate Adapter Plate



For horizontal installations, rotate the transmitter 180 degrees to orient the high and low pressure sides to the preferred locations. You do not need to unbolt the process covers. You can also rotate the topworks housing as shown to orient the conduit connections in the desired position.

Figure 11 - LP1 Horizontal Mounting with Vent Screw

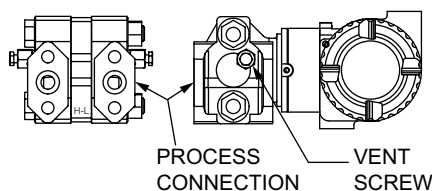
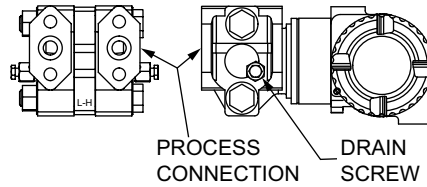


Figure 12 - LP1 Horizontal Mounting with Drain Screw

Optional Custom Factory Calibration (Option -C1)

With the -C1 model code option selected, the factory performs a custom two-point factory calibration on the transmitter based on the calibration range and units you require. A two-point calibration is useful if your application requires nonzero-based ranges with greater than 10:1 turndown, zero-based ranges with greater than 30:1 turndown, or when specifically mandated. Indicate the calibration range and units you require on the sales order. See [Available Units](#), page 23.

Optional Factory Configuration (Option -C2)

You can have the transmitter configured by the factory by selecting model code option -C2. For the transmitter to be custom configured by the factory, you must fill out a data form which allows you to configure all of the transmitter's user-configurable parameters. If you do not select this option, a standard (default) configuration is provided.

Diaphragm Seals

Diaphragm seals are used when it is necessary to keep the transmitter isolated from the process. A sealed system is used for a process fluid that is corrosive, viscous, subject to temperature extremes, toxic, sanitary, or that may tend to collect and solidify.

Diaphragm seals can be used with transmitters that have a traditional structure. They are not compatible with low-profile structures (LP1).

The following table describes the diaphragm seals. To order a transmitter with seals, select both a transmitter model code and a seal model code. See PSS 2A-1Z11 B for pressure seal model codes and specifications.

There is not a direct correlation from legacy pressure seal models to new diaphragm seals. All models can be direct mounted (bolted) to the transmitters, except for Pancake (DS-J). All diaphragm seal models can be direct connected (threaded) except for Pancake (DS-J) and Sanitary (DS-C and DS-P).

In addition the model codes shown in the following table, model code DC- is used to specify instrument connection, seal orientation, capillary length and type, and fill fluid for all diaphragm seal models.

Table 1 - Diaphragm Seals

Legacy Model Code	New Model Code	Description	RJC ¹ /WIK A Model	WIK A Model
PSFAD	DS-N	Flanged attached direct	FWOT - Through Bolt	n/a
	DS-M		FWOS - Stud Bolt	990.41
FSFAR	DS-N	Flanged attached remote	FWOT - Through Bolt	n/a
	DS-M		FWOS - Stud Bolt	990.41
PSFES	DS-H	Flanged extended seal	FWE - Extended Seal	990.29
PSFFD	DS-F	Flanged flush direct	FWGO - One Piece	990.27
	DS-G		FWGM - Multi Piece	990.FR (US only)
PSFFR	DS-F	Flanged flush remote	FWGO - One Piece	990.27
	DS-G		FWGM - Multi Piece	990.FR (US only)
PSFLT	DS-F	Flange level direct connect	FWGO - One Piece	990.27
	DS-G		FWGM - Multi Piece	990.FR (US only)
	DS-H		FWE - Extended Seal	990.29
PSFPS	DS-J	Pancake	FWP - Pancake	990.28
PSISD	DS-L	Inline saddle direct	PWJ - Saddle Seal	990.22
PSISR		Inline saddle remote		
PSSCR	DS-C	Sanitary Tri-Clamp direct	CHL - Sanitary Tri-Clamp	n/a
PSSCT		Sanitary Tri-Clamp remote		
PSSSR	DS-P	Sanitary tank spud direct	CHK - Tank Spud	990.10
PSSST		Sanitary tank spud remote		990.40
PSTAD	DS-K	Threaded attached direct	TWA - Threaded Seal	990.10
PSTAR		Threaded attached remote		990.40

1. RJ Global - WIK A USA Diaphragm Seal Operations.

Physical Specifications

Electronics Housing and Housing Covers

The housing has two compartments to separate the electronics from the field connections. The housing and covers are made from low-copper (0.6% maximum), die-cast aluminum alloy with an epoxy finish, or from 316 ss.

O-rings are used to seal the threaded housing covers, housing neck, and terminal block.

Process Covers and Process Connections (Process Wetted)

316 ss or nickel alloy²

Gaskets for Process Covers and Process Connections (Process Wetted)

Glass-filled PTFE

Process Cover Nuts and Bolts (Process Wetted)

ASTM A193, Grade B7 high strength alloy steel for bolts, and ASTM A194, Grade 2H high strength alloy steel for nuts are standard. Options include NACE Class B7M bolting, 17-4 ss bolting, and 316 ss bolting.

Sensor Diaphragm Material (Process Wetted)

316 ss or nickel alloy²

Sensor Fill Fluids

Silicone fluid (dodecamethylpentasiloxane)

3M™ Fluorinert™ Electronic Liquid FC-43 (perfluorotributylamine)

Environmental Protection

The transmitter is dust-tight and weatherproof per IEC IP66/IP67 and provides the environmental and corrosion resistant protection of NEMA Type 4X.

Electronics Module

Printed wiring assemblies are potted or conformally coated for moisture and dust protection.

2. Equivalent to Hastelloy® C. Hastelloy is a registered trademark of Haynes International, Inc.

Electrical Connections

Field and RTD sensor wires enter through 1/2 NPT or M20 threaded entrances on either side of the electronics housing. Wires terminate under screw terminal assemblies on the terminal block in the field terminals compartment.

Figure 13 - Field Terminal Connections (HART)

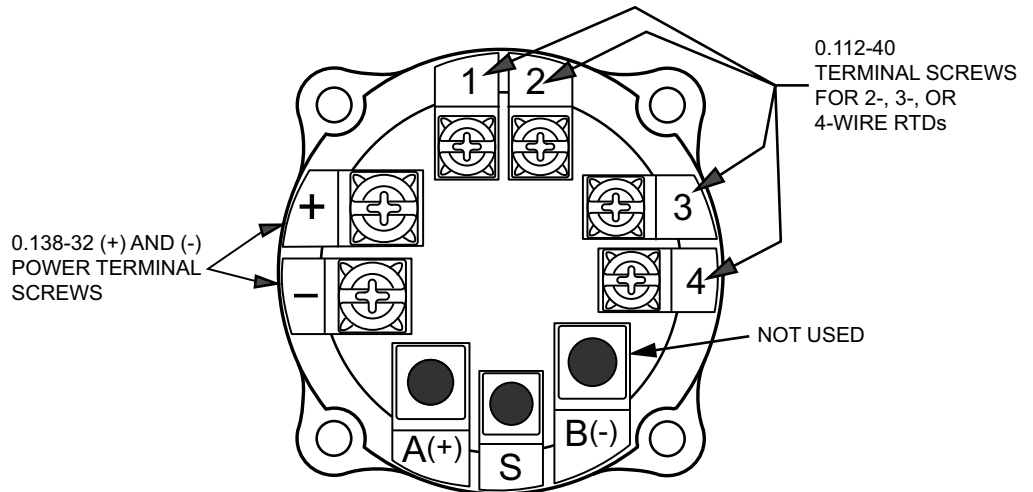
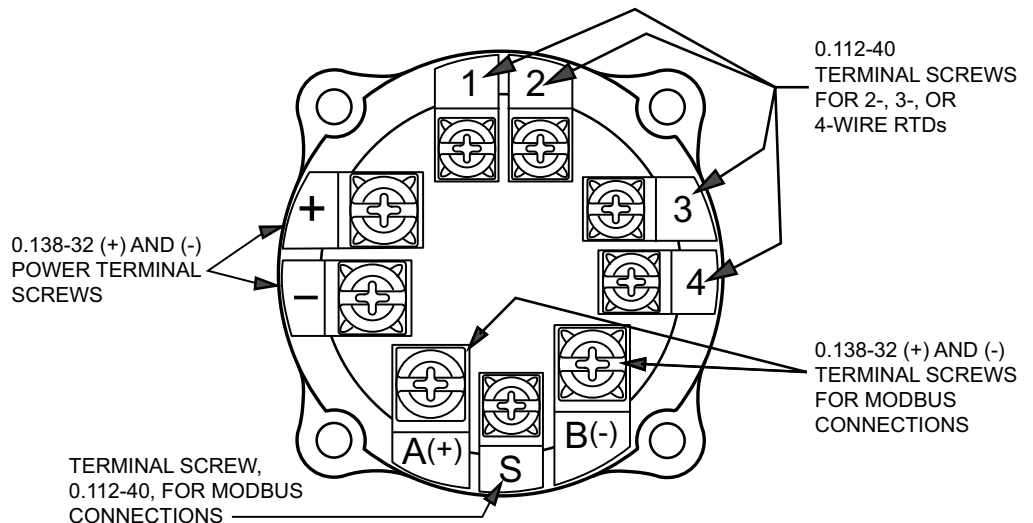


Figure 14 - Field Terminal Connections (Modbus)



Electrical Ground Connections

The transmitter is equipped with an internal ground connection within the field wiring compartment and an external ground connection at the base of the electronics housing. To minimize galvanic corrosion, place the wire lead or contact between the captive washer and the loose washer on the external ground screw.

If shielded cable is used, ground the shield at the field enclosure only.

Mounting Position

You can mount the transmitter in any position. You can rotate the housing up to one full turn to any desired orientation for access to adjustments, display, or conduit

connections. You can also rotate the optional display in 90 degree increments within the housing.

NOTE:

- Mount the transmitter so that any moisture condensing or draining into the field wiring compartment can exit through one of the two threaded conduit connections.
- Use a suitable thread sealant on all connections.
- You can calibrate out any position effect zero shift by readjusting zero output after installation.

Approximate Mass

Transmitter and Option(s)	Approximate Mass
Aluminum housing, traditional structure, without process connectors	3.5 kg (7.8 lb)
Substitute 316 ss housing	+1.1 kg (2.4 lb)
Add process connectors	+0.7 kg (1.4 lb)
Add optional display	+0.2 kg (0.4 lb)
Add low profile (LP1) structure	+0.1 kg (0.2 lb)

Dimensions

Refer to Nominal Dimensions, page 37.

Functional Specifications

Span and Range Limits

Table 2 - Span and Range Limits for Differential Pressure Measurement

Span Code	Span Limits			Range Limits		
	kPa	inH ₂ O	mbar	kPa	inH ₂ O	mbar
L	0.12 and 2.5	0.5 and 10	1.2 and 25	-2.5 and +2.5	-10 and +10	-25 and +25
A	0.75 and 7.5	3 and 30	7.5 and 75	-7.5 and +7.5	-30 and +30	-75 and +75
B	0.5 and 50	2 and 200	5 and 500	-50 and +50	-200 and +200	-500 and +500
C	2.5 and 210	10 and 840	25 and 2,100	-210 and +210	-840 and +840	-2,100 and +2,100

Table 3 - Span and Range Limits for Absolute Pressure Measurement

Span Code	Span Limits			Range Limits		
	MPaa	psia	bara	MPaa	psia	bara
D	0.02 and 2.1	3 and 300	0.21 and 21	0 and 2.1	0 and 300	0 and 21
G	0.07 and 3.5	10 and 500	0.7 and 35	0 and 3.5	0 and 500	0 and 35
E	0.21 and 10	30 and 1,500	2.1 and 100	0 and 10	0 and 1,500	0 and 100
H	0.42 and 21	60 and 3,000	4.2 and 200	0 and 20	0 and 3,000	0 and 200
F	3.4 and 36.5	500 and 5,300	34 and 365	0 and 36.5	0 and 5,300	0 and 365

⚠ DANGER

HAZARD OF EXPLOSION

Exceeding the proof pressure can cause the sensor to rupture forcefully. Avoid exposing the transmitter to the proof pressure limit.

Failure to follow these instructions will result in death or serious injury.

NOTICE

POTENTIAL EQUIPMENT DAMAGE

Exceeding the overrange pressure limit for the transmitter can cause damage to the transmitter, degrading its performance. The transmitter could become nonfunctional after exceeding the overrange pressure. Avoid exposure to the overrange pressure limit.

Failure to follow these instructions can result in equipment damage.

NOTE: The maximum static/working pressure for your transmitter is the *lower* value in the following two tables, based on your transmitter's model code.

Table 4 - Maximum Static and Working Pressure, and Maximum Overage Pressure

Span Code	Maximum Static and Maximum Working Pressure		Maximum Overage Pressure	
	MPaa	psia	MPaa	psia
LG	3.4	500	5.2	750
AG	3.4	500	5.2	750

Table 4 - Maximum Static and Working Pressure, and Maximum Overrange Pressure (Continued)

Span Code	Maximum Static and Maximum Working Pressure		Maximum Overrange Pressure	
	MPaa	psia	MPaa	psia
BD	2.1	300	3.1	450
BE	10	1,500	15	2,250
BH	20	3,000	30	4,500
BF	36.5	5,300	52.3	7,579
CD	2.1	300	3.1	450
CE	10	1,500	15	2,250
CH	20	3,000	30	4,500
CF	36.5	5,300	52.3	7,579

Table 5 - Impact of Options on Maximum Static Pressure and Span and Range Limits

Option ³	Maximum Static Pressure	Maximum Proof Pressure ⁴	Maximum Overrange Pressure
-B2, -D3, -D7, -P3, -P7,	25 MPaa (3,626 psia, 250 bara)	100 MPaa (14,500 psia, 1,000 bara)	38 MPaa (5,439 psia, 375 bara)
-B3, -P4, -P8	20 MPaa (2,900 psia, 200 bara)	70 MPaa (11,150 psia, 700 bara)	30 MPaa (4,350 psia, 300 bara)
-D1	16 MPaa (2,320 psia, 160 bara)	64 MPaa (9,280 psia, 640 bara)	24 MPaa (3,480 psia, 240 bara)
-B1, -D5, -P2, -P6	15 MPaa (2,175 psia, 150 bara)	60 MPaa (8,700 psia, 600 bara)	22.5 MPaa (3,262 psia, 225 bara)
-D2, -D4, -D6, or -D8	10 MPaa (1,500 psia, 100 bara)	40 MPaa (6,000 psia, 400 bara)	15 MPaa (2,250 psia, 150 bara)
-D9	36.5 MPaa (5,300 psia, 365 bara)	91 MPaa (13,250 psia, 910 bara)	53.3 MPaa (7,579 psia, 533 bara)

Process Temperature Measurement and Limits

- Measurement: DIN/IEC, 2-, 3-, or 4-wire, 100 ohm, platinum RTD
- RTD range limits: -200 and +850°C (-328 and +1,562°F); but see [Operating, Storage, and Transportation Limits](#), page 27 for transmitter limits

Output Signal and Configuration

HART: One 4 to 20 mA linear or square root analog output with digital HART communication. When configured for multidrop applications, the mA signal is fixed at 4 mA. Configurable with a HART Communicator, PC-based configurator, or the optional LCD indicator with onboard pushbuttons.

NOTE: HART 7 allows the mA signal to be fixed or live when multidrop is enabled.

Modbus: Digital output. Configurable using an RTU host or the optional LCD indicator with onboard pushbuttons.

3. Refer to [Model Code](#), page 31 for application and restrictions related to the items listed in the table.

4. Meets ANSI/ISA Standard S82.03-1988.

Communication

HART: Configurable for either 4 to 20 mA or multidrop. Digital communication is provided in all modes based upon the FSK (Frequency Shift Keying) technique, which alternately superimposes one of two different frequencies on the uninterrupted current carried by the two power/signal wires. See [Digital HART and 4 to 20 mA Communication](#), page 5 for details.

Parameter	HART	
	Analog Mode	Multidrop Mode
Remote Configurator	HART Communicator	
Communication Rate	1,200 baud	
Communication Distance (Rated) ⁵	3,050 m (10,000 ft)	1,525 m (5,000 ft)

Modbus: Modbus RTU over a 2-wire RS-485 multidrop serial connection.

- Rate: 1200, 2400, 4800, 9600 (default), or 19200 baud.
- Response Delay: User-selectable between 0 and 65,535 ms. The default value is 0 ms.

Refer to [Modbus Communication](#), page 7 for details.

Measured and Transmitted Outputs

- Absolute pressure (configurable for gauge pressure: $P_{GP} = P_{AP} - P_{atm}$, where P_{atm} is a user-entered barometric pressure constant)
- Differential pressure
- Sensor temperature (from internal sensor)
- Electronics temperature (from internal sensor)
- Process temperature (from external RTD)

Supply Voltage

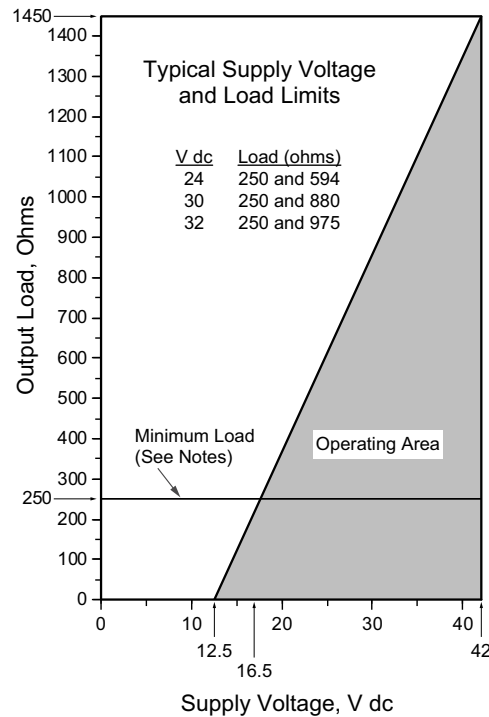
HART: The power supply must be capable of providing 22 mA when the transmitter is configured for 4 to 20 mA output. Ripple of up to 2 V pp (50/60/100/120 Hz) is tolerable, but instantaneous voltage must remain within the specified range.

The supply voltage and loop load must be within specified limits. Nominal minimum supply voltage is 12.5 V dc. The supply output load vs. voltage relationship, shown in the following graph, is: $R_{max} = 47.5 \text{ V dc (V - 12.5 V dc)}$.

You can use any combination of supply voltage and loop load resistance in the shaded area shown in the following graph. To determine the loop load resistance (transmitter output load), add the series resistance of each component in the loop, excluding the transmitter.

	HART Communication	No HART Communication
Minimum Resistance	250 ohms	0 ohms
Minimum Supply Voltage	16.5 V dc	12.5 V dc
Maximum Supply Voltage	42 V dc	

5. Total cable length includes spur length. Maximum spur length is 120 m (394 ft). Minimum spur length is 1 m (3.3 ft). For intrinsically safe installations, maximum spur length is 30 m (98 ft).

**NOTES:**

1. The minimum voltage for HART communication is 16.5 V dc.
2. The minimum load for the HART Communicator is 250 ohms.
3. The transmitter can function with an output load less than the minimum, but using a remote configurator while operating in this area will result in output and/or communication disturbances.

Modbus: 9 to 30 V dc at 250 mW.

Zeroing for Nonzero-Based Ranges

You can zero the transmitter when it is open to atmosphere, even when there is a nonzero-based range. This simplifies position effect zeroing on many applications. To zero the transmitter, you can use the local display, a PC-based configurator, or remote configurator (HART Communicator or Modbus RTU host).

Zero and Span Adjustments

Zero and span adjustments are provided for differential pressure and absolute pressure. Zero adjustment is provided for temperature measurements.

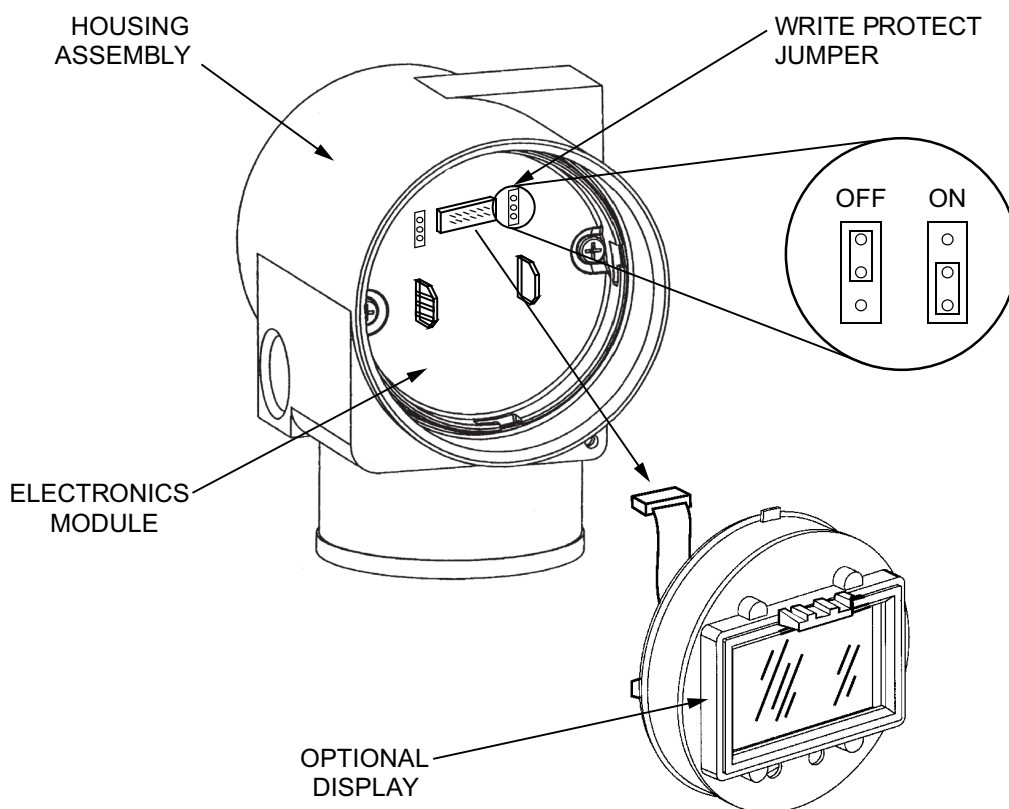
Suppressed Zero and Elevated Zero

For applications requiring a suppressed or elevated zero, do not exceed the maximum span and the upper and lower range limits of the transmitter.

Write Protect Jumper

The transmitter has a write protect jumper that can be positioned to lock out configurators from making transmitter database changes.

Figure 15 - Write Protect Jumper



Current Outputs for Overrange, Fail, and Offline Conditions (HART)

Parameter	Value
Output for Low Alarm	up to 3.60 mA
Output for High Alarm	at least 21.00 mA
Output when underrange	3.80 mA
Output when overrange	20.50 mA
Output if the sensor is potentially bad	User configurable to either the high value or low value
Output when offline	User configurable between 3.6 mA and 21 mA

Square Root Low Flow Cutoff

The square root low flow cutoff is user-configurable to provide:

- Cutoff to zero at flows < 10% of maximum flow (1% of maximum differential pressure).
- Active point-to-point line between zero and 20% of maximum flow (4% of maximum differential pressure).

Adjustable Damping

Damping is user-selectable in values of 0, 0.25, 0.5, 1, 2, 4, 8, 16, or 32 seconds. Selecting a value of **DAMP 0** in the Damping menu provides the fastest response.

Field Wiring Reversal

Reversing the field wiring does not damage the transmitter; the transmitter functions when wired either way. However, the transmitter itself is polarity-sensitive.

NOTE: Sustained currents of 1 A do not damage the electronics module or sensor, but can damage the terminal block assembly and external instruments in the loop.

Configuration and Calibration Data

Factory characterization data, and user configuration and calibration data, are stored in the sensor. This means that you can replace the electronics module without reconfiguring or recalibrating.

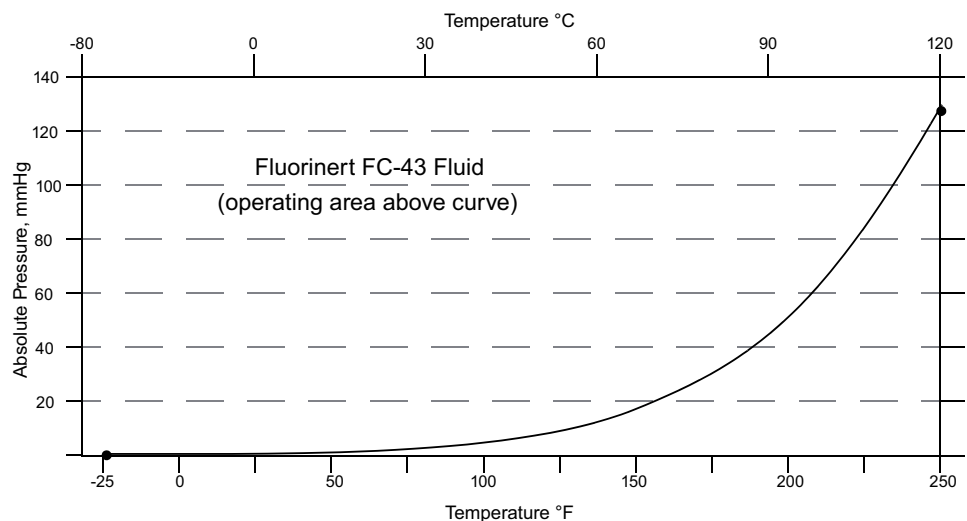
Configuration Capability (HART)

Variable	Measurement
Primary Variable	Differential Pressure
Secondary Variable	Absolute Pressure
Tertiary Variable	Process Temperature
Quaternary Variable	Electronics Temperature

Numerous parameters can be configured and/or displayed, such as electronic damping, transmitter calibration, tag data, etc. See configuration instructions for details.

Minimum Allowable Absolute Pressure vs Transmitter Temperature

- With silicone fill fluid: Full vacuum, up to 121°C (250°F)
- With inert fill fluid: Refer to the graph.



Available Units

- Pressure (linear): mmH₂O, cmH₂O, mH₂O, inH₂O, ftH₂O, mmHg, cmHg, inHg, Pa, kPa, MPa, torr, mbar, bar, psi, atm, g/cm², kg/cm²
- Pressure (square root): % Flow
- Temperature: C, F, R, K

Performance Specifications

Zero-based calibrations; stainless steel sensor with silicone fill fluid; under reference operating conditions unless otherwise specified; URL = upper Range Limit; span = calibrated span

Accuracy (Includes Linearity, Hysteresis, and Repeatability)

Differential Pressure ⁶	Accuracy
Span codes L and A, spans $\geq 10\%$ of URL	$\pm 0.10\%$ of span
Span codes L and A, spans $< 10\%$ of URL	$\pm (0.010) \times (\text{URL}/\text{span})\%$ of span
Span codes B and C, spans $\geq 10\%$ of URL	$\pm 0.05\%$ of span
Span codes B and C, spans $< 10\%$ of URL	$\pm (0.005) \times (\text{URL}/\text{span})\%$ of span
Absolute Pressure ^{7 8}	Accuracy
Span code G, spans $\geq 5\%$ of URL	$\pm 0.05\%$ of span
Span code G, spans $< 5\%$ of URL	$\pm (0.0025) \times (\text{URL}/\text{span})\%$ of span
Span codes D, E, F, H, spans $\geq 10\%$ of URL	$\pm 0.05\%$ of span
Span codes D, E, F, H, spans $< 10\%$ of URL	$\pm (0.005) \times (\text{URL}/\text{span})\%$ of span
Process Temperature Accuracy	$\pm 0.28^\circ\text{C}$ (0.5°F) within 140°C (250°F) of the normal operating point

Stability

Long-term drift less than 0.05% of URL per year over a five-year period.

Calibration Frequency

The rezero calibration frequency is five years. The five years is derived using the values of allowable error (% span), TPE (% span), performance margin (% span), and stability (% span/month), where:

Calibration Frequency = Performance Margin/Stability = Months

Power-Up Time

Less than five seconds for output to reach the first valid measurement.

6. Add $\pm 0.025\%$ to the accuracy to determine the total analog output accuracy if the DP measurement is assigned to the 4 to 20 mA output signal.
7. For gauge pressure accuracy, add the anticipated variation from the user-entered barometric pressure.
8. Add $\pm 0.025\%$ to the accuracy to determine the total analog output accuracy if the AP measurement is assigned to the 4 to 20 mA output signal.

Vibration Effect

Per IEC 60770:

- For “field with high vibration level or pipeline with high vibration level”: 0.42 mm peak-to-peak displacement from 10 to 60 Hz, 3 “g” constant acceleration input over a frequency range of 60 to 1000 Hz.
- For “field with general application or pipeline with low vibration level”: 0.3 mm peak-to-peak displacement from 10 to 60 Hz, 2 “g” constant acceleration input over a frequency range of 60 to 1000 Hz.

RFI Effect

The output error is less than 0.1% of span for radio frequencies in the range of 27 to 1000 MHz and field intensity of 30 V/m when the transmitter is properly installed with shielded conduit and grounding, and housing covers are in place (per IEC Std. 61000-4-3).

Supply Voltage Effect

Output changes less than 0.005% of span for each 1 V change within the specified supply voltage requirements. See [Supply Voltage](#), page 19.

Static Pressure Effect on Differential Pressure

For a 0.7 MPa (100 psi) change in static pressure:

- Zero shift

Table 6 - Zero Shift

Span Codes		Zero Shift in % of URL
DP	AP	
L	G	±0.150
A	G	±0.050
B	D	±0.007
B	E	±0.010
B	H	±0.010
B	F	±0.010
C	D	±0.002
C	E	±0.004
C	H	±0.004
C	F	±0.004

- Span shift: ±0.01% of the reading

Position Effect

You can mount the transmitter in any position. If the mounting position causes a zero effect, you can remove the zero effect by rezeroing. There is no span effect.

Ambient Temperature Effect

Total effect for both absolute and differential pressure for a 28°C (50°F) change within normal operating condition limits is $\pm(0.03\% \text{ URL} + 0.06\% \text{ span})$.

- For DP span code A or L, the effect on differential pressure is $\pm(0.18\% \text{ URL} + 0.025\% \text{ span})$.
- For AP span code H, the effect on absolute pressure is $\pm(0.02\% \text{ URL} + 0.06\% \text{ span})$.
- For AP span code F, the effect on absolute pressure is $\pm(0.15\% \text{ URL} + 0.06\% \text{ span})$.

Switching and Indirect Lightning Transients

The transmitter can withstand a transient surge up to 2000 V common mode or 1000 V normal mode without permanent damage. Output shift is <1.0% (per ANSI/IEEE C62.41-1980 and IEC Std. 61000-4-5).

Electromagnetic Compatibility

- Complies with NAMUR NE 21 Interference Immunity requirement.
- Complies with electromagnetic compatibility requirements of European EMC Directive 89/336/EEC by conforming to the following CENELEC and IEC Standards: EN 61326-1:2013, IEC 61326-1:2012, EN 61326-2-3:2013, and IEC 61326-2-3:2012.

Operating, Storage, and Transportation Limits

Table 7 - Operating Conditions/Limits

Description	Reference Operating Conditions	Normal Operating Conditions ⁹	Operative Limits ⁹
Sensor Body Temperature			
Silicone	24 ± 2°C (75 ± 5°F)	-29 to +82°C (-20 to +180°F)	-46 and +121°C (-50 and +250°F) ¹⁰
Fluorinert	24 ± 2°C (75 ± 5°F)	-29 to +82°C (-20 to +180°F)	-29 and +121°C (-20 and +250°F)
Electronics Temperature¹¹			
Without display	24 ± 2°C (75 ± 5°F)	-29 to +82°C (-20 to +180°F)	-40 and +85°C (-40 and +185°F) ¹²
With display ¹³	24 ± 2°C (75 ± 5°F)	-20 to +82°C (-4 to +180°F)	-40 and +85°C (-40 and +185°F) ¹²
Relative Humidity¹⁴	50 ± 10%	0 to 100%	0 and 100%
Ambient Pressure	860 to 1060 mbar	Atmospheric	Atmospheric
Supply Voltage (HART)¹⁵	30 ± 0.5 V dc	16.5 to 42 V dc	12.5 V dc and 42 V dc
Supply Voltage (Modbus)¹⁶	24 ± 0.5 V dc	9 to 30 V dc	9 and 30 V dc
Output Load (HART)¹⁷	650 ohms	0 to 1,450 ohms	0 and 1,450 ohms
Mounting Position	Vertical or Horizontal ¹⁸	Vertical or Horizontal ¹⁸	No limit
Vibration	1 m/s ² (0.1 "g")	Per IEC 60770: <ul style="list-style-type: none"> For "field with high vibration level or pipeline with high vibration level": 0.42 mm peak-to-peak displacement from 10 to 60 Hz, 3 "g" constant acceleration input over a frequency range of 60 to 1000 Hz. For "field with general application or pipeline with low vibration level": 0.3 mm peak-to-peak displacement from 10 to 60 Hz, 2 "g" constant acceleration input over a frequency range of 60 to 1000 Hz. 	

Table 8 - Storage and Transportation Limits

Description	Storage and Transportation Limits
Electronics Temperature	-50 and +85°C (-58 and +185°F)
Relative Humidity	0 to 100% (noncondensing)
Ambient Pressure	Atmospheric

9. Normal operating conditions and operative limits are defined per ANSI/ISA 51.1–1979 (R1993).

10. Selection of Option -J extends the low temperature operative limit of transmitters with silicone filled sensors down to -50°C (-58°F). Performance is not assured below -29°C. Sensor damage may occur if process is frozen. Contact Global Customer Support for availability of this option.

11. Refer to *Electrical Certifications*, page 28 for a restriction in ambient temperature limits with certain electrical approvals/certifications.

12. -40 and +75°C (-40 and +167°F) for transmitters with ATEX flameproof classification.

13. Although the LCD is not damaged by temperatures within the storage and transportation limits, updates are slowed and readability decreased at temperatures less than -20°C (-4°F).

14. Relative humidity refers to transmitters with housing covers installed and conduit entrances sealed. To maintain IEC IP66/IP67 and NEMA Type 4X protection, plug the unused conduit opening with the metal plug provided. Use a suitable thread sealant on both conduit connections. In addition, the threaded housing covers must be installed. Turn covers to seat the o-ring into the housing, then continue to hand-tighten until the cover contacts the housing metal-to-metal.

15. Refer to *Supply Voltage*, page 19.

16. Power supplied by an external Modbus power supply.

17. 250 ohm minimum load is required for communication with a HART Communicator.

18. Sensor process wetted diaphragms in a vertical plane.

Agency Certifications

WARNING

EXPLOSION HAZARD

To help prevent possible explosions and to maintain flameproof, explosionproof, and dust-ignitionproof protection, observe applicable wiring practices. Plug the unused conduit opening with the approved conduit plugs. Both plug and conduit must engage a minimum of five full threads for 1/2 NPT connections; eight full threads for M20 connections.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

WARNING

RISK OF MOISTURE INGRESS

To maintain IEC IP66/IP67 and NEMA Type 4X protection, plug the unused conduit opening with the metal plug provided. Use a suitable thread sealant on both conduit connections. In addition, the threaded housing covers must be installed. Turn covers to seat the o-ring into the housing, then continue to hand-tighten until the cover contacts the housing metal-to-metal.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

Wiring restrictions required to maintain electrical certification of the transmitter are provided in MI 020-621 (HART) or MI 020-623 (Modbus).

Electrical Certifications

This equipment has been designed to meet the electrical safety descriptions listed in this table. Contact Global Customer Support for information or status of testing laboratory approvals or certifications.

Refer to *Model Code*, page 31 for availability of electrical safety design codes with each transmitter, and refer to your product's MI document for connectivity requirements.

DANGER

(HART only) When selecting an electrical certification code that ends in "M" or "P," you must permanently mark (check off in the rectangular block on the data plate) one type of protection only. Do not change this mark once it has been applied.

Failure to follow these instructions will result in death or serious injury.

Agency Certification, Types of Protection, and Area Classification	Application Conditions ¹⁹	Model Code Option
ATEX and UKEX intrinsically safe ²⁰	Temperature Class T4, Ta = -40°C to +80°C	AA
ATEX and UKEX flameproof	Temperature Class T6, T85°C, Ta = -40°C to +75°C	AD
ATEX and UKEX multiple certifications (includes ATEX codes AA and AN) ²⁰	Applies to codes AA and AN	AM
ATEX and UKEX protection type n ²⁰	Temperature Class T4, Ta = -40°C to +80°C	AN
ATEX and UKEX multiple certifications (includes ATEX codes AA, AD, and AN) ²⁰	Applies to codes AA, AD, and AN	AP
INMETRO intrinsically safe ²⁰	Temperature Class T4, Ta = -40°C to +80°C	BA
INMETRO flameproof	Temperature Class T6, T85°C, Ta = -40°C to +75°C	BD
INMETRO multiple certifications (includes INMETRO codes BA and BD) ²⁰	Applies to codes BA and BD	BP
CSA intrinsically safe, Zone certified ²⁰	Temperature Class T4A at 40°C and T3C at 85°C maximum ambient	CA
CSA zone certified flameproof, explosionproof, dust ignitionproof	Temperature Class T6, Maximum Ambient Temperature 75°C	CD
CSA multiple certifications (includes CSA codes CA and CN) ²⁰	Applies to codes CA and CN	CM
CSA nonincendive, Zone certified ²⁰	Temperature Class T4A at 40°C and T3C at 85°C maximum ambient	CN
CSA multiple certifications (includes CSA codes CA, CD, and CN) ²⁰	Applies to codes CA, CD, and CN	CP
Multi-marked ATEX and IECEx intrinsically safe ²⁰	Temperature Class T4, Ta = -40°C to +80°C	DA
Multi-marked ATEX and IECEx flameproof	Temperature Class T6, T85°C, Ta = -40°C to +75°C	DD
Multi-marked ATEX and IECEx multiple certifications (includes ATEX/IECEx codes DA and DN) ²⁰	Applies to codes DA and DN	DM
Multi-marked ATEX and IECEx protection type n ²⁰	Temperature Class T4, Ta = -40°C to +80°C	DN
Multi-marked ATEX and IECEx multiple certifications (includes ATEX/IECEx codes DA, DD, and DN) ²⁰	Applies to codes DA, DD, and DN	DP
IECEx intrinsically safe ²⁰	Temperature Class T4, Ta = -40°C to +80°C	EA
IECEx flameproof	Temperature Class T6, T85°C, Ta = -40°C to +75°C	ED
IECEx multiple certifications (includes IECEx codes EA and EN) ²⁰	Applies to codes EA and EN	EM
IECEx protection type n ²⁰	Temperature Class T4, Ta = -40°C to +80°C	EN
IECEx multiple certifications (includes IECEx codes EA, ED, and EN) ²⁰	Applies to codes EA, ED, and EN	EP
FM Classes I, II, and III Division 1 intrinsically safe ²⁰	Temperature Class T4, Ta = -40°C to +80°C	FA
FM Classes I, II, and III Division 1 explosionproof, dust ignitionproof, Zone approved	Temperature Class T6 at 75°C and T5 at 85°C maximum ambient	FD
FM multiple certifications (includes FM codes FA or FN) ²⁰	Applies to codes FA or FN	FM
FM Classes I, II, and III Division 2 nonincendive, Zone approved ²⁰	Temperature Class T4, Ta = -40°C to +80°C	FN
FM multiple certifications (includes codes FA, FD, or FN) ²⁰	Applies to codes FA, FD, or FN	FP
KOSHA flameproof	Temperature Class T6, T85°C, Ta = -40°C to +75°C	KD
Multi-marked for ATEX, CSA, and FM Intrinsically Safe Application ²⁰	Applies to codes AA, CA, and FA	MA ²¹

19. Selection of Option -J extends the low temperature operative limit of transmitters with silicone filled sensors down to -50°C (-58°F). Performance is not assured below -29°C. Sensor damage may occur if process is frozen. Contact Global Customer Support for availability of this option.

20. Not available with Modbus (-M) electronics version.

21. When selecting Electrical Safety Design Code MA, you must permanently mark (check off in the rectangular block on the data plate) intrinsically safe certifications for ATEX, CSA, or FM, as applicable. Do not change this mark once it has been applied.

Agency Certification, Types of Protection, and Area Classification	Application Conditions ²²	Model Code Option
NEPSI intrinsically safe ²³	Temperature Class T4, Ta = -40°C to +80°C	NA
NEPSI flameproof	Temperature Class T6, T85°C, Ta = -40°C to +75°C	ND
EAC intrinsically safe ²³	Temperature Class T4, Ta = -40°C to +80°C	RA
EAC flameproof	Temperature Class T4, Ta = -40°C to +75°C	RD
EAC protection type n ²³	Temperature Class T4, Ta = -40°C to +80°C	RN
No extra certification		ZZ

22. Selection of Option -J extends the low temperature operative limit of transmitters with silicone filled sensors down to -50°C (-58°F). Performance is not assured below -29°C. Sensor damage may occur if process is frozen. Contact Global Customer Support for availability of this option.

23. Not available with Modbus (-M) electronics version.

Model Code

This table lists the available options for the transmitters described in this document.

Table 9 - Model Code for IMP10S

Code	Description
Model	
IMP10S	Multivariable Transmitter with Differential Pressure, Absolute Pressure, and Temperature Measurement
Electronics Version	
-T	HART and 4 to 20 mA
-M	Modbus RTU
Structures	
Traditional (Standard Mount) Structures	
22	316 ss process cover material, 316L ss diaphragm material, silicone fill fluid
2G	316 ss process cover material, 316L ss gold-plated diaphragm material, silicone fill fluid
23	316 ss process cover material, 316L ss diaphragm material, inert fill fluid
26	316 ss process cover material, C276 diaphragm material, silicone fill fluid
27	316 ss process cover material, C276 diaphragm material, inert fill fluid
46	C276 process cover material, C276 diaphragm material, silicone fill fluid
47	C276 process cover material, C276 diaphragm material, inert fill fluid
LP1 (Low Profile Type 1 Direct Mount) Structures²⁴	
LL	316 ss process cover material, 316L ss diaphragm material, silicone fill fluid
LM	316 ss process cover material, 316L ss diaphragm material, inert fill fluid
LC	316 ss process cover material, C276 diaphragm material, silicone fill fluid
LD	316 ss process cover material, C276 diaphragm material, inert fill fluid
Structures Prepared for Schneider Electric Diaphragm Seals (static pressure rating limited by seals)^{25 26 27}	
S1	Remote seals, both sides; 316 ss process cover, 316L ss diaphragm, silicone fill fluid
S2	Remote seals, both sides; 316 ss process cover, 316L ss diaphragm, inert fill fluid
S3	Remote seal, high side; 316 ss process cover (1/2 NPT), 316L ss diaphragm, silicone fill fluid
S4	Remote seal, high side; 316 ss process cover (1/2 NPT), 316L ss diaphragm, inert fill fluid
S5	Remote seal, low side; 316 ss process cover (1/2 NPT), 316L ss diaphragm, silicone fill fluid
S6	Remote seal, low side; 316 ss process cover (1/2 NPT), 316L ss diaphragm, inert fill fluid
F1	Direct connect seal, high side; 316 ss process cover (1/2 NPT), 316L ss diaphragm, silicone fill fluid
F2	Direct connect seal, high side; 316 ss process cover (1/2 NPT), 316L ss diaphragm, inert fill fluid
F3	Direct connect seal, high side, and remote seal, low side; 316 ss process cover, 316L ss diaphragm, silicone fill fluid
F4	Direct connect seal, high side, and remote seal, low side; 316 ss process cover, 316L ss diaphragm, inert fill fluid

24. Not available with diaphragm seals.

25. Both transmitter and diaphragm seal model numbers are required. See PSS 2A-1Z11 B for the diaphragm seal model codes.

26. Not available with options -X1, -X2, and -X3.

27. Requires Process Connector Type 0.

Table 9 - Model Code for IMP10S (Continued)

Code	Description	
Structures Prepared for Non-Schneider Electric Diaphragm Seals (static pressure rating limited by seals) ^{28 29}		
SA	Remote seals, both sides; 316 ss process cover, 316L ss diaphragm, silicone fill fluid	
SB	Remote seals, both sides; 316 ss process cover, 316L ss diaphragm, inert fill fluid	
SC	Remote seal, high side; 316 ss process cover (1/2 NPT), 316L ss diaphragm, silicone fill fluid	
SD	Remote seal, high side; 316 ss process cover (1/2 NPT), 316L ss diaphragm, inert fill fluid	
SE	Remote seal, low side; 316 ss process cover (1/2 NPT), 316L ss diaphragm, silicone fill fluid	
SF	Remote seal, low side; 316 ss process cover (1/2 NPT), 316L ss diaphragm, inert fill fluid	
Span Limits		
Code	Differential Pressure	Absolute Pressure
LG ³⁰	0.12 and 2.5 kPa; 0.5 and 10 inH ₂ O; 1.2 and 25 mbar	0.07 and 3.5 MPaa; 10 and 500 psia; 0.7 and 35 bara
AG ³⁰	0.75 and 7.5 kPa; 3 and 30 inH ₂ O; 7.5 and 75 mbar	0.07 and 3.5 MPaa; 10 and 500 psia; 0.7 and 35 bara
BD	0.5 and 50 kPa; 2 and 200 inH ₂ O; 5 and 500 mbar	0.02 and 2.1 MPaa; 3 and 300 psia; 0.21 and 21 bara
BE	0.5 and 50 kPa; 2 and 200 inH ₂ O; 5 and 500 mbar	0.21 and 10 MPaa; 30 and 1,500 psia; 2.1 and 100 bara
BH	0.5 and 50 kPa; 2 and 200 inH ₂ O; 5 and 500 mbar	0.42 and 21 MPaa; 60 and 3,000 psia; 4.2 and 200 bara
BF ³¹	0.5 and 50 kPa; 2 and 200 inH ₂ O; 5 and 500 mbar	3.4 and 36.5 MPaa; 500 and 5,300 psia; 34 and 365 bara
CD	2.5 and 210 kPa; 10 and 840 inH ₂ O; 25 and 2,100 mbar	0.02 and 2.1 MPaa; 3 and 300 psia; 0.21 and 21 bara
CE	2.5 and 210 kPa; 10 and 840 inH ₂ O; 25 and 2,100 mbar	0.21 and 10 MPaa; 30 and 1,500 psia; 2.1 and 100 bara
CH	2.5 and 210 kPa; 10 and 840 inH ₂ O; 25 and 2,100 mbar	0.42 and 21 MPaa; 60 and 3,000 psia; 4.2 and 200 bara
CF ³¹	2.5 and 210 kPa; 10 and 840 inH ₂ O; 25 and 2,100 mbar	3.4 and 36.5 MPaa; 500 and 5,300 psia; 34 and 365 bara
Process Connector Type (material is same as Process Cover material)		
0	None	
1	1/4 NPT ^{32 33}	
2	1/2 NPT ³²	
3	RC 1/4 ^{32 33}	
4	RC 1/2 ³²	
6	1/2 Schedule 80 weld neck ^{32 33}	
Conduit Connection and Housing Material		
1	1/2 NPT conduit connection; aluminum housing	
3	1/2 NPT conduit connection; 316 housing	
5	M20 conduit connection; aluminum housing	
6	M20 conduit connection; 316 housing	

28. Not available with options -X1, -X2, and -X3.

29. Requires Process Connector Type 0.

30. Span limit codes A and L not available with diaphragm seals, except for sanitary spud seal models DS-P4.

31. Options -B1, -B2, and -B3 not available with Span Code BF or CF.

32. Not available with structure codes SA, SB, S2, S2, F3, and F4.

33. Not available with structures that have C276 process covers.

Table 9 - Model Code for IMP10S (Continued)

Code	Description
Electrical Certifications³⁴	
AA	ATEX and UKEX intrinsically safe ³⁵
AD	ATEX and UKEX flameproof
AM	ATEX and UKEX multiple certifications (includes ATEX codes AA and AN) ³⁵
AN	ATEX and UKEX protection type n ³⁵
AP	ATEX and UKEX multiple certifications (includes ATEX codes AA, AD, and AN) ³⁵
BA	INMETRO intrinsically safe ³⁵
BD	INMETRO flameproof
BP	INMETRO multiple certifications (includes INMETRO codes BA and BD) ³⁵
CA	CSA intrinsically safe, Zone certified ³⁵
CD	CSA zone certified flameproof, explosionproof, dust ignitionproof
CM	CSA multiple certifications (includes CSA codes CA and CN) ³⁵
CN	CSA nonincendive, Zone certified ³⁵
CP	CSA multiple certifications (includes CSA codes CA, CD, and CN) ³⁵
DA	Multi-marked ATEX and IECEx intrinsically safe ³⁵
DD	Multi-marked ATEX and IECEx flameproof
DM	Multi-marked ATEX and IECEx multiple certifications (includes ATEX/IECEx codes DA and DN) ³⁵
DN	Multi-marked ATEX and IECEx protection type n ³⁵
DP	Multi-marked ATEX and IECEx multiple certifications (includes ATEX/IECEx codes DA, DD, and DN) ³⁵
EA	IECEx intrinsically safe ³⁵
ED	IECEx flameproof
EM	IECEx multiple certifications (includes IECEx codes EA and EN) ³⁵
EN	IECEx protection type n ³⁵
EP	IECEx multiple certifications (includes IECEx codes EA, ED, and EN) ³⁵
FA	FM Classes I, II, and III Division 1 intrinsically safe ³⁵
FD	FM Classes I, II, and III Division 1 explosionproof, dust ignitionproof, Zone approved
FM	FM multiple certifications (includes FM codes FA or FN) ³⁵
FN	FM Classes I, II, and III Division 2 nonincendive, Zone approved ³⁵
FP	FM multiple certifications (includes codes FA, FD, or FN) ³⁵
KD	KOSHA flameproof
MA	Multi-marked for ATEX, CSA, and FM Intrinsically Safe Application ³⁵
NA	NEPSI intrinsically safe ³⁵
ND	NEPSI flameproof

34. Contact Global Customer Support for availability.

35. Not available with Modbus (-M) electronics version.

Table 9 - Model Code for IMP10S (Continued)

Code	Description
RA	EAC intrinsically safe ³⁶
RD	EAC flameproof
RN	EAC protection type n ³⁶
ZZ	No extra certification
Optional Mounting Sets³⁷	
-M1	Standard style painted steel bracket with plated steel bolts
-M2	Standard style stainless steel bracket with stainless steel bolts
-M3	Universal style stainless steel bracket with stainless steel bolts
Optional Adapter Plates^{38 39} Only available with LP1 direct mount structures (LL, LM, LC, LD).	
-P1	Adapter set for MC Coplanar manifolds, B7 bolts ⁴⁰
-P2	Adapter set for MC Coplanar manifolds, 316 ss bolts ⁴¹
-P3	Adapter set for MC Coplanar manifolds, 17-4 ss bolts ⁴²
-P4	Adapter set for MC Coplanar manifolds, B7M bolts ⁴³
-P5	Adapter set for MT3 Coplanar manifolds, traditional flange, B7 bolts ⁴⁰
-P6	Adapter set for MT3 Coplanar manifolds, traditional flange, 316 ss bolts ⁴¹
-P7	Adapter set for MT3 Coplanar manifolds, traditional flange, 17-4 ss bolts ⁴²
-P8	Adapter set for MT3 Coplanar manifolds, traditional flange, B7M bolts ⁴³
Optional Display with Pushbuttons and Window Cover	
-L1	Digital display, pushbuttons, and window cover
Optional IEC 61518 Construction^{39 44}	
-D1	Single-ended process covers with B7 bolts; no blind connectors; 2320 psi ⁴⁵
-D2	Double-ended process covers with B7 bolts; blind connectors with size M10 steel screw; 1500 psi ^{46 47}
-D3	Single-ended process covers with B7 bolts; no blind connectors; 3000 psi ⁴⁵
-D4	Double-ended process covers with B7 bolts; blind connectors with size 7/16 steel screw; 1500 psi ^{46 47}
-D5	Single-ended process covers with 316 ss bolts; no blind connectors; 2175 psi ⁴⁵
-D6	Double-ended process covers with 316 ss bolts; blind connectors with size 7/16 316 ss screw; 1500 psi ^{46 47}
-D7	Single-ended process covers with 17-4 PH bolts; no blind connectors; 3000 psi ⁴⁵
-D8	Double-ended process covers with 17-4 PH bolts; blind connectors with size 7/16 17-4 PH screw; 1500 psi ^{46 47}
-D9	Single-ended process covers with 17-4 PH bolts; no blind connectors; 5300 psi ⁴⁵

36. Not available with Modbus (-M) electronics version.

37. Not available with structures prepared for direct connect seals. Requires Process Connector code 0 for LP1 structures.

38. Not available with IEC Construction options -D1 through -D9.

39. Requires Process Connector selection 0.

40. Not available with bolting options -B1, -B2, and -B3.

41. Requires option -B1.

42. Requires option -B2.

43. Requires option -B3.

44. See Impact of Options on Maximum Static Pressure and Span and Range Limits, page 18 for pressure deratings when certain IEC61518 versions or Bolting Options -B1 or -B3 are specified. MWP is either the absolute pressure span limit or the MWP listed in the table, whichever is less.

45. Requires Structure Codes 22 through 27, LL, LM, LC, or LD; not available with options -V or -V1.

46. Requires Structure Codes 22 through 27; not available with -V or -V1.

47. Temperature limits are de-rated to -10 and +80°C (14 and 176°F) due to gaskets. Not available with Mounting Bracket Set options -M1, -M2, and -M3.

Table 9 - Model Code for IMP10S (Continued)

Code	Description
Optional Cleaning and Preparation	
-X1	Unit degreased ⁴⁸
-X2	Unit cleaned and prepared for oxygen service ^{49 50}
-X3	Unit cleaned and prepared for chlorine service ^{49 51}
Optional Bolting (process covers and process connectors; specify one selection)⁵²	
-B1	316 ss bolts and nuts (MWP derated to 2175 psi) ^{53 54}
-B2	17–4 ss bolts and nuts ⁵⁴
-B3	B7M bolts and nuts (NACE) (MWP derated to 2900 psi) ^{53 55}
Optional Conduit Thread Adapters⁵⁶	
-A1	Hawke-type 1/2 NPT cable gland
-A3	M20 conduit thread adapter
Optional Custom Calibration or Configuration	
-C1	Custom factory calibration (calibration and unit tags required)
-C2	Full factory configuration (requires completed configuration form)
Optional Electronics Housing Features	
-Z2	Custody transfer lock and seal ⁵⁷
Optional Ermeto Connectors	
-E3	316 ss, connecting 6 mm tubing to 1/4 NPT process connector ⁵⁸
-E4	316 ss, connecting 12 mm tubing to 1/2 NPT process connector ⁵⁹
Optional Manifold Configurations	
-H1	Manifold mounted to transmitter and pressure tested (1.5 times transmitter range or 1.5 times manifold rating; whichever is less)
-H2	Manifold mounted to transmitter and pressure tested (certificate)

48. Not available with structures prepared for seals. Not available with structures that have inert fill.

49. Requires Structure Code 23, 27, 47, LM, or LD (inert fill).

50. After units are cleaned and reassembled for oxygen service, they are not rechecked for accuracy. This may affect performance.

51. For -X3, standard bolting is replaced with 17–4 PH ss nuts and bolts. Therefore, Optional Bolting codes -B1 through -B3 are not available with -X3.

52. MWP is either the absolute pressure span limit or the MWP listed in the table, whichever is less.

53. See Impact of Options on Maximum Static Pressure and Span and Range Limits, page 18 for pressure deratings when certain IEC61518 versions or Bolting Options -B1 or -B3 are specified.

54. Not available with IEC Construction options -D1 through -D9. For stainless steel bolts with IEC construction, specify -D5 to -D9, as required, instead of -B1 or -B2.

55. Not available with IEC Construction options -D1 through -D9.

56. Requires Conduit Connection Code 1 or 3. Available only with Electrical Certification ZZ.

57. Cover locks are provided as standard with Electrical Certifications that end in D or P.

58. Requires Structure Code 22 to 37 and Process Connector Code 0 or 1.

59. Requires Structure Code 22 to 37 and Process Connector Code 2.

Table 9 - Model Code for IMP10S (Continued)

Code	Description
Other Optional Selections	
-G1	Metal o-ring for diaphragm seals in vacuum service ⁶⁰
-J	Low temperature operative limit -50°C (-58°F) ⁶¹
-T	Supplemental customer tag (stainless steel tag wired onto transmitter)
-V	Vent screw in side of each process cover ⁶²
-V1	Omit vent screw in side of each process cover ⁶³
Example: IMP10S-T2223AA-M1L1X3	

60. If the diaphragm seal is used in vacuum applications, -G1 is required. This option substitutes the vacuum service metal gasket for the standard PTFE process cover gasket. Requires Structure Codes prepared for use with seals.

61. Not available with structures that have inert fill. Not available with options -D2, -D4, -D6, and -D8. Not available with Electrical Certification KD.

62. Requires a Traditional Structure Code.

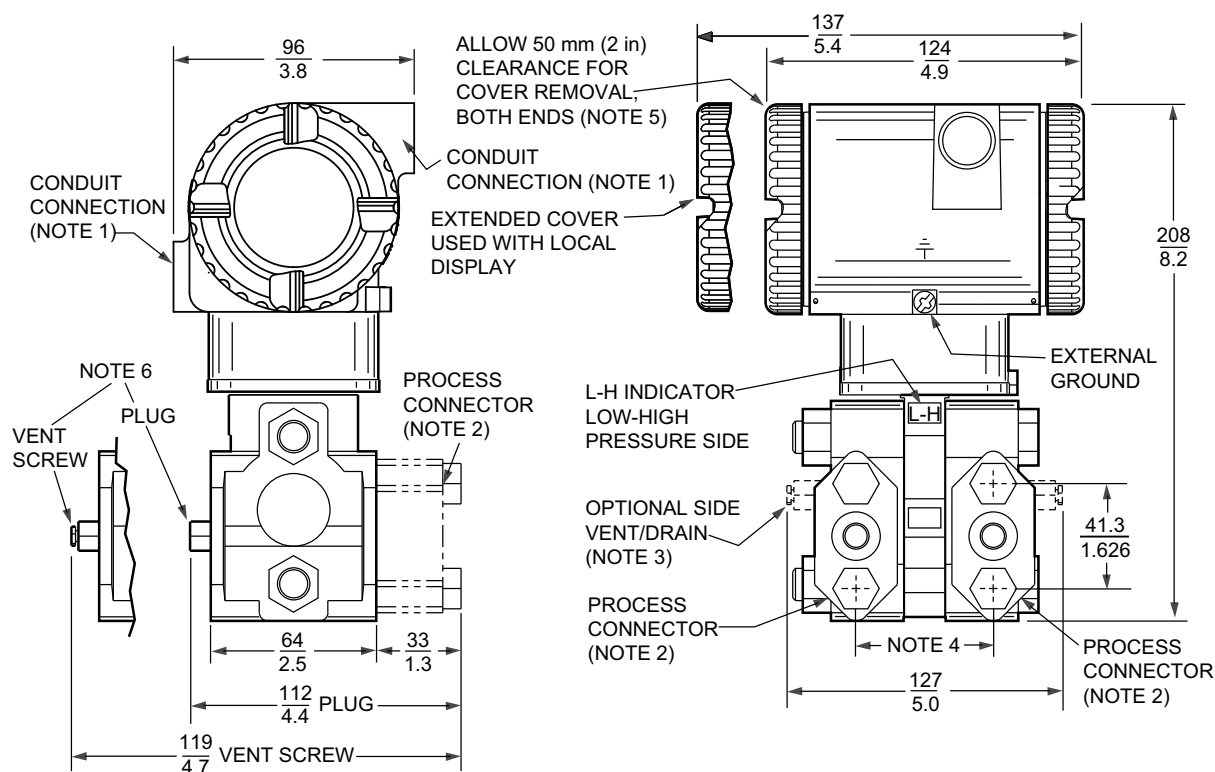
63. Requires a low-profile LP1 Structure Code.

Nominal Dimensions

For dimensional information specific to your sales order, contact your sales representative to order a Certified Dimensional Print (CDP).

All dimensions in diagrams are shown in millimeters over inches ($\frac{\text{mm}}{\text{in}}$).

Figure 16 - Transmitters with Traditional Structure



NOTES:

1. CONDUIT CONNECTION 1/2 NPT, BOTH SIDES: PLUG UNUSED CONNECTION WITH SUPPLIED METAL PLUG.
2. PROCESS CONNECTORS MAY BE REMOVED AND TRANSMITTER MOUNTED DIRECTLY ON A MANIFOLD, OR CONNECTIONS MADE DIRECTLY TO PROCESS COVER USING 1/4 NPT INTERNAL THREAD IN PROCESS COVER.
3. PROCESS COVER CAN BE INVERTED MAKING OPTIONAL SIDE VENTS OR SIDE DRAINS.
4. PROCESS CONNECTORS CAN BE INVERTED TO GIVE EITHER 51, 54, OR 57 mm (2.0, 2.125, OR 2.25 in) CENTER-TO-CENTER DISTANCE BETWEEN HIGH AND LOW PRESSURE CONNECTIONS.
5. TOPWORKS CAN BE ROTATED TO ANY POSITION WITHIN ONE TURN COUNTERCLOCKWISE OF THE FULLY TIGHTENED POSITION.
6. PROCESS COVER END PLUGS ARE SUBSTITUTED FOR VENT SCREWS WHEN OPTIONAL SIDE VENTS (NOTE 3) ARE SPECIFIED.

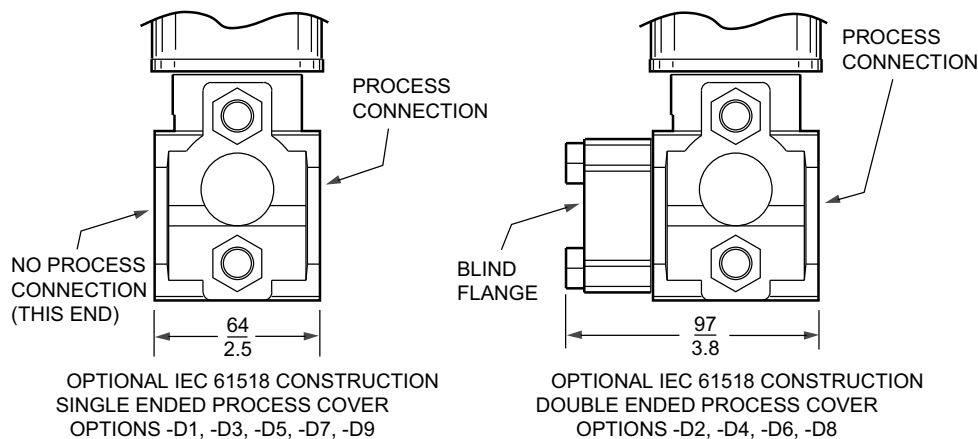
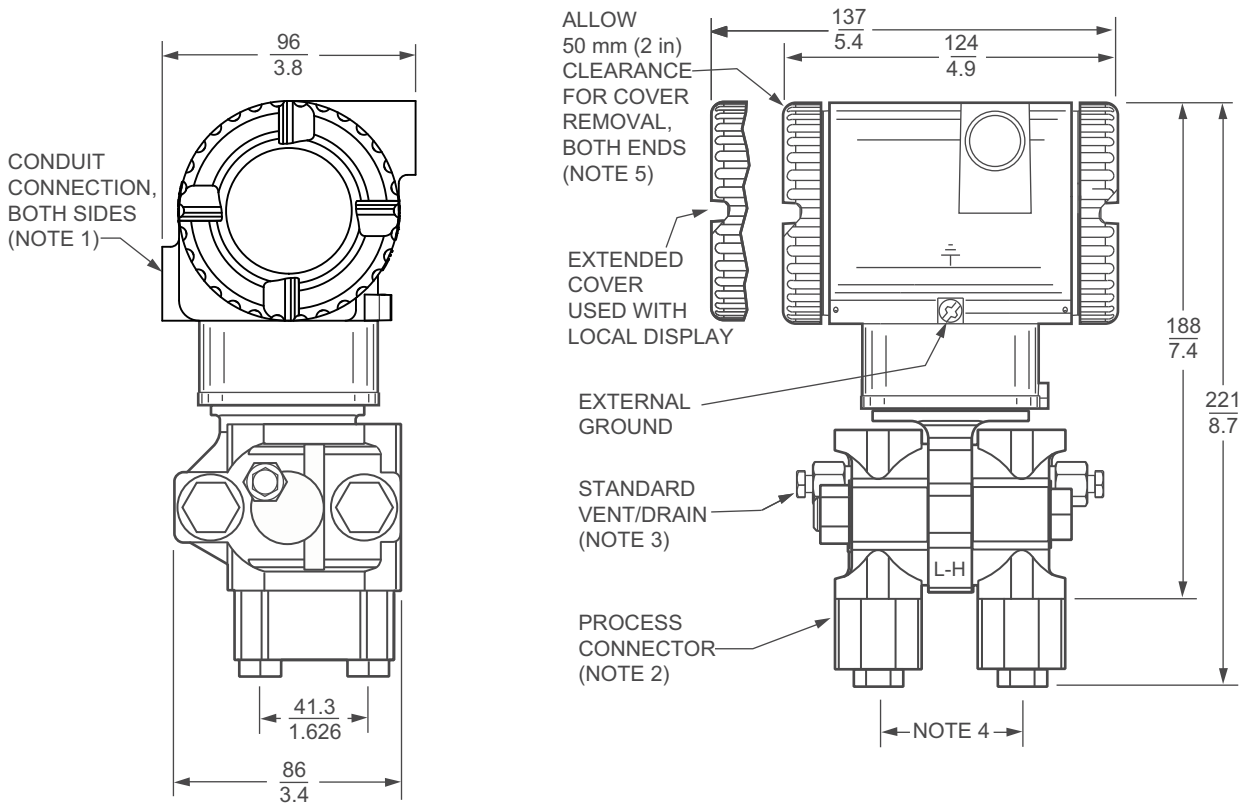


Figure 17 - Transmitters with Low Profile (LP1) Structure**NOTES:**

1. CONDUIT CONNECTION 1/2 NPT OR M20, BOTH SIDES: PLUG UNUSED CONNECTION WITH SUPPLIED METAL PLUG.
2. PROCESS CONNECTORS MAY BE REMOVED AND TRANSMITTER MOUNTED DIRECTLY ON A MANIFOLD, OR CONNECTIONS MADE DIRECTLY TO PROCESS COVER USING 1/4 NPT INTERNAL THREAD IN PROCESS COVER.
3. THE TRANSMITTER'S LOW PROFILE STRUCTURE LP1 IS SHOWN IN THE VERTICALLY UPRIGHT POSITION. NOTE THE LOCATION OF THE STANDARD VENT/DRAIN SCREW. IN THIS CONFIGURATION, THE TRANSMITTER CAN BE VENTED OR IS SELF-DRAINING. ALSO RECOMMENDED IS A HORIZONTAL INSTALLATION WHERE THE INSTALLED ORIENTATION CAN BE SET TO ALLOW FOR VENTING OR DRAINING.
4. PROCESS CONNECTORS CAN BE INVERTED TO GIVE EITHER 51, 54, OR 57 mm (2.0, 2.125, OR 2.25 in) CENTER-TO-CENTER DISTANCE BETWEEN HIGH AND LOW PRESSURE CONNECTIONS.
5. TOPWORKS CAN BE ROTATED TO ANY POSITION WITHIN ONE TURN COUNTERCLOCKWISE OF THE FULLY TIGHTENED POSITION.

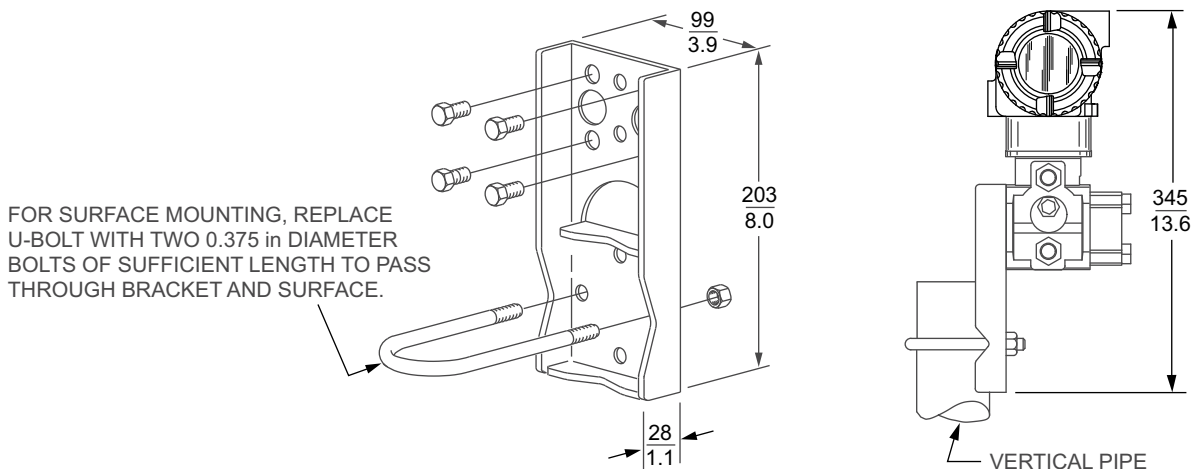
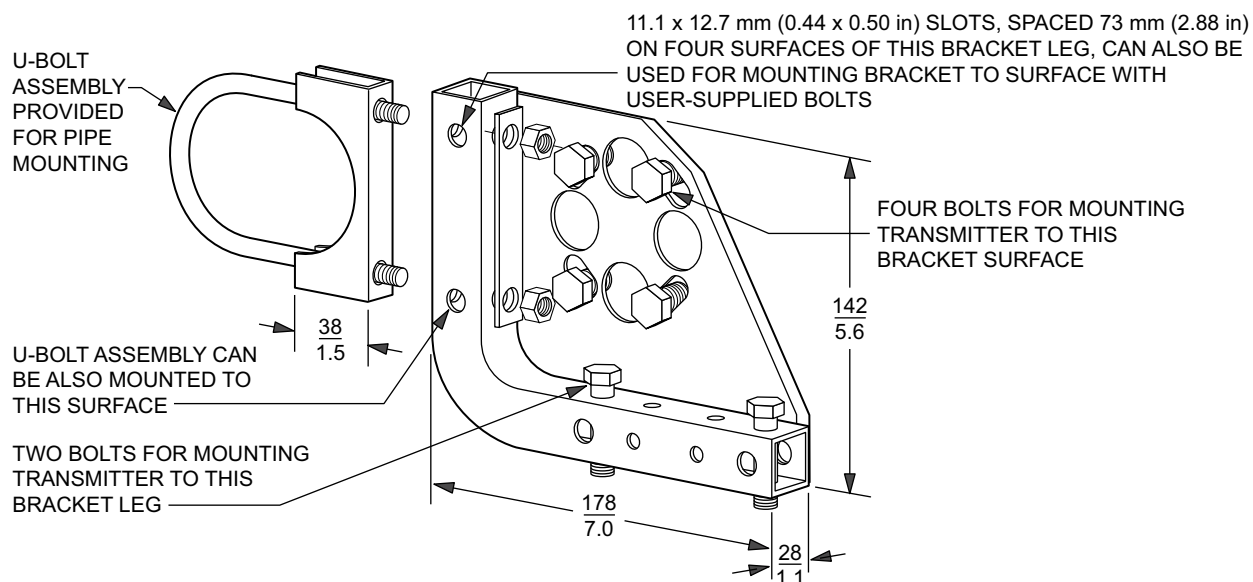
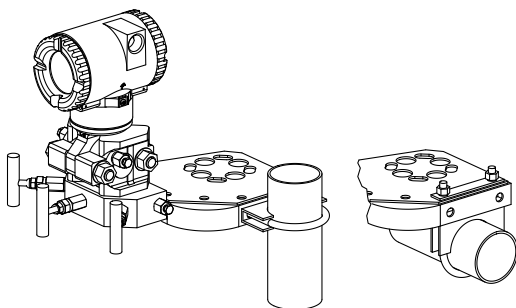
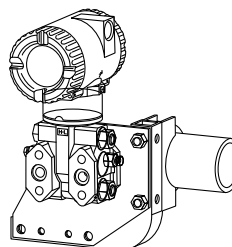
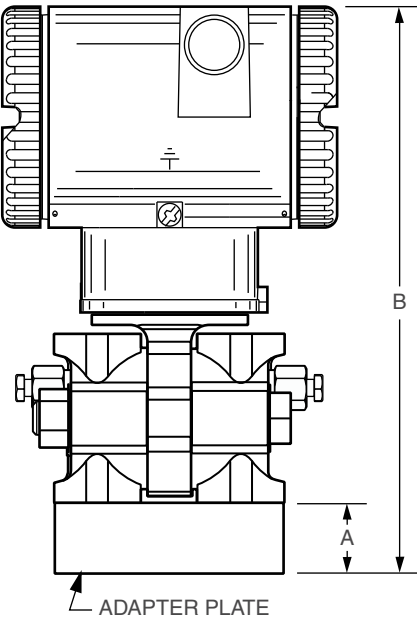
Figure 18 - Standard Style Mounting Bracket Kit (Options -M1 and -M2)

Figure 19 - Universal Style Mounting Bracket Kit (Option -M3)**TYPICAL PIPE MOUNTING
LOW PROFILE STRUCTURE LP1****TYPICAL PIPE MOUNTING
WITH TRADITIONAL STRUCTURE****NOTE:**

FOR SURFACE MOUNTING CONFIGURATIONS, USE THE U-BOLT MOUNTING HOLES FOR ATTACHING THE BRACKET TO A SURFACE RATHER THAN TO THE U-BOLT ASSEMBLY. SURFACE MOUNTING BOLTS FOR ATTACHING THE BRACKET TO A SURFACE ARE USER SUPPLIED.

Figure 20 - Transmitter Mounted on a Coplanar™ Manifold (Options -MC and -MT3)



Manifold	Dimension A	Dimension B
MC	11 mm (0.5 in)	199 mm (7.9 in)
MT3	22 mm (0.9 in)	210 mm (8.3 in)

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

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