

**PSS 2A-1C13 K**

**Models IAP10 and IGP10 I/A Series<sup>®</sup> Absolute and Gauge Pressure Transmitters for Sanitary Processes with Digital or Analog Output Signals**



*The Foxboro<sup>®</sup> brand I/A Series Models IAP10 and IGP10 Absolute and Gauge Pressure Transmitters with integral sanitary process connections are two-wire transmitters that provide precise, reliable measurement of absolute or gauge pressure, and provide a digital or analog output signal for local or remote configuration, monitoring, and control. They have been specifically designed for use in sanitary processes.*

**FEATURES**

- ▶ Tri-Clamp type, mini tank spud, and extended mini tank spud integral sanitary process connectors.
- ▶ Conforms to 3A sanitary standards.
- ▶ Digital Output versions with either FoxCom<sup>™</sup>, HART<sup>®</sup>, or FOUNDATION<sup>™</sup> Fieldbus Protocols.
- ▶ Analog Output versions can be either 4 to 20 mA, or 1 to 5 V dc for low power installations.
- ▶ Fieldbus versions FISCO/FNICO compliant.
- ▶ Local configuration available with the optional LCD Indicator with on-board pushbuttons.
- ▶ SIL2-Certified transmitter offered as an option for HART versions.
- ▶ NEOBEE M-20 fill fluid.
- ▶ Characterized with integral process connection for improved performance.
- ▶ Span limits to 4.2 MPa (to 600 psi).
- ▶ 316L ss and nickel alloy<sup>(1)</sup> diaphragm materials.
- ▶ Standard 32 Ra seal surface finish; optional 15 Ra surface finish also offered.
- ▶ Aluminum housing has durable, corrosion-resistant epoxy finish; 316 ss housing also available; both meet NEMA 4X and IP66 ratings.
- ▶ Dual Seal certified by CSA to meet ANSI/ISA 12.27.01-2003 requirements.

1. Equivalent to Hastelloy<sup>®</sup> C-276. Hastelloy is a registered trademark of Haynes International, Inc.

- ▶ Multi-marking is available for HART electronic versions only for FM, CSA, and ATEX intrinsically safe installations. The user determines and permanently marks on the data plate the certification to be applied.
- ▶ Complies with NAMUR NE 21 interference immunity requirement, and NAMUR NE 43 for analog output overrange and underrange annunciations.
- ▶ CE marked; complies with applicable EMC, ATEX, and PED European Union directives.
- ▶ Complies with electromagnetic compatibility requirements of European EMC Directive 2004/108/EC by conforming to the following EN and IEC standards: EN 61326-1, and IEC 61000-4-2 through 61000-4-6.
- ▶ Designed for hazardous areas. Versions available to meet zone requirements.
- ▶ Numerous options and accessories offered.
- ▶ Standard 5-year warranty.

### I/A SERIES PRESSURE TRANSMITTER FAMILY

The I/A Series Electronic Pressure Transmitters are a complete family of d/p Cell<sup>®</sup>, gauge, absolute, multirange, multivariable, and premium performance transmitters, as well as transmitters with remote or direct mount pressure seals, all using field-proven silicon strain gauge sensors and common topworks. The family additionally includes transmitters, also with common topworks, specifically for use in sanitary, and pulp and paper processes.

### DIGITAL AND ANALOG OUTPUT VERSIONS

Digital output versions include transmitters with FoxCom, HART, or FOUNDATION fieldbus communication protocols. Analog output versions include 4 to 20 mA output and 1 to 5 V dc output.

### Digital FoxCom or 4 to 20 mA dc (Version -D Electronics)

#### FoxCom Digital Output

Provides measurement integration with I/A Series systems, transmission of multiple measurements, and workstation configuration and diagnostics. Also provides digital communications with a PC-based configurator or optional LCD indicator with on-board pushbuttons for local configuration and calibration.

#### FoxCom 4 to 20 mA Output

Allows direct analog connection to common receivers while still providing full Intelligent Transmitter Digital Communications with a PC-based configurator, applicable I/A Series system FBMs, or optional LCD indicator with pushbuttons for configuration and calibration.

### Digital HART and 4 to 20 mA dc (Version -T Electronics)

4 to 20 mA with HART communications. Allows direct analog connection to common receivers while still providing full intelligent digital communications using a HART Communicator or PC-based configurator.

### Digital FOUNDATION Fieldbus - FISCO/FNICO Compliant (Version -F Electronics)

This all digital, serial, two-way communication system interconnects field devices, such as transmitters, actuators, and controllers. It is a Local Area Network (LAN) with built-in capability to distribute control application across the network. Fieldbus technology consists of a Physical Layer, a Communication Stack, and User Application Blocks. The communication stack includes an LAS (Link Access Scheduler), and the user application software blocks include AI (Analog Input) and PID (Proportional/Integral/Derivative) function blocks. Interoperability of Fieldbus devices is achieved using device addresses (IDs) and device descriptions (DDs).

### 4 to 20 mA dc Analog Output (Version -A Electronics)

Version -A transmitters are very cost effective analog output transmitters that provide full configuration capability. They provide the greatest functionality for the largest number of applications at the least possible cost to you.

They even provide the ability to rerange to new calibrated ranges, using the standard LCD indicator with on-board pushbuttons, without the need to apply calibration pressure.

They are explosionproof for use in Division 1 locations, and comply with Division 2 requirements.

### 1 to 5 V dc Analog Output (Version -V Electronics)

These low power, low voltage transmitters are both explosionproof and intrinsically safe and provide a standard LCD indicator with on-board pushbuttons for configuration and calibration. They provide:

- ▶ 1 to 5 V dc Output Signal
- ▶ 9 V dc Minimum Voltage
- ▶ 3 mA maximum current

### INTEGRAL SANITARY PROCESS CONNECTORS

All welded, integral, 316L stainless steel process connector with either Tri-Clamp or tank spud type end connection.

Tri-clamp type connections offered in 1 1/2-, 2-, and 3-in sizes with either a 316L ss or nickel alloy<sup>(2)</sup> diaphragm; mini tank spud connections are offered with a 1 1/2-, 6-, or 9-in extension with a 316L ss diaphragm.

### HIGH PERFORMANCE

These transmitters utilize microprocessor-based correction to achieve both excellent accuracy and ambient temperature compensation.

### DEPENDABLE AND EFFICIENT DESIGN

- ▶ Silicon Strain Gauge Technology has been Field-Proven in hundreds of thousands of successful applications.
- ▶ Simple, elegant packaging uses a minimum of parts to achieve exceptionally high reliability.

### EASE OF INSTALLATION

Rotatable Topworks allows transmitter installation in tight places, allows indicator to be positioned in preferred direction, and eases field retrofit.

Two Conduit Entrances offer a choice of entry positions for ease of installation and 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, rugged screw terminals for easy wire termination.

### DIRECT PROCESS MOUNTING

Because of their light weight, these transmitters can be directly connected to the process piping or tank spud without mounting brackets.

### PULP AND PAPER VERSIONS ALSO AVAILABLE

These transmitters are also available with integral process connections for use in pulp and paper installations. See PSS 2A-1C13 L.

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2. Equivalent to Hastelloy C-276.

### OPTIONAL SIL2 CERTIFIED HART TRANSMITTER

Modern industrial processes tend to be technically complex and have the potential to inflict serious harm to persons or property during a mishap. The IEC 61508 standard defines safety as “freedom from unacceptable risk.” SIL2 pressure transmitters with HART communication protocol, in conjunction with Triconex Safety Systems, provide integrated solutions for safety and critical control applications. The integrated solution is certified as interference-free from the 4 to 20 mA loop; this guarantees the integrity of the safety system and the safety of the controlled process. The integrated design allows uninterrupted operation of the safety function, while allowing access to device level information via HART commands. The solution permits interface of device diagnostics with asset management systems without compromising functional safety. Select Option -S2 for a SIL2-certified HART Transmitter. A copy of the certification is available via Auxiliary Specification (AS) Code CERT-S for SIL2 TUV (Rheinland) certified safety pressure transmitters.

### OPTIONAL 15 Ra SEAL SURFACE FINISH

The standard seal surface finish provided is 32 Ra. An optional 15 Ra finish is offered with Transmitter Structure Codes TA, TB, T2 to T5, M1, M6, and M9. The 15 Ra finish is required by such industries as Biopharm and Pharmaceutical.

### OPTIONAL LCD DIGITAL INDICATOR

A two-line indicator with on-board pushbuttons is available to display the measurement with a choice of units. (See Figure 1.) The pushbuttons allow zero and span adjustments as well as local configuration without the need for a PC-based configurator. This indicator is optional with the Digital Output transmitters, and standard with the Analog Output transmitters. When used with Analog Output transmitters, if local process indication is not required or desired, an optional blind (solid) cover can be substituted for the standard window cover.

#### NOTE

When an LCD indicator is used, ensure that the URV (upper range value) in the selected pressure units does not exceed the character capacity on the top line of the display; i.e., five numeric characters, or four with the analog output transmitters. This is especially important with analog output transmitters (Versions -A and -V) since the LCD must be used for data entry.

Figure 1. Topworks with LCD Indicator



FUNCTIONAL SPECIFICATIONS

Span and Range Limits

Span Limit Code	Span Limits			Range Limits (a)		
	kPa	inH <sub>2</sub> O	mbar	kPa	inH <sub>2</sub> O	mbar
B	0.87 and 50	3.5 and 200	87 and 500	0 and 50	0 and 200	0 and 500
Code	MPa	psi	bar	MPa	psi	bar
C	0.007 and 0.21	1 and 30	0.07 and 2.1	0 and 0.21	0 and 30	0 and 2.1
D	0.07 and 2.1	10 and 300	0.7 and 21	0 and 2.1	0 and 300	0 and 21
E (b)	0.7 and 4.2	100 and 600	7 and 42	0 and 4.2	0 and 600	0 and 42

- a. In gauge or absolute pressure units, as applicable.
- b. Span Code E applicable to IGP10 Transmitters except with those having Structure Codes M1, M6, M9.

Maximum Overrange Pressure Rating

Span Limit Code	Maximum Overrange Pressure (a)		
	kPa	inH <sub>2</sub> O	mbar
B (b)	1.3	300	750
Code	MPa	psi	bar
C	0.31	45	3.15
D	3.1	450	31.5
E (b) (c)	6.2	900	62

- a. Overrange pressure is maximum pressure that may be applied without causing damage to transmitter. Ratings are in gauge or absolute pressure units, as applicable.
- b. Codes B and E applicable to IGP10 Transmitters only.
- c. Maximum working pressure of transmitter with Tri-Clamp type connections is 4.2 MPa (600 psi), or the pressure rating of the Tri-Clamp type connections, whichever is less. See Accessories section for Tri-Clamp type connection ratings.

Output Signal (as specified)

- ▶ **Version -D Electronics:** Digital FoxCom and/or 4 to 20 mA dc, configurable
- ▶ **Version -T Electronics:** Digital HART and 4 to 20 mA dc
- ▶ **Version -F Electronics:** Digital FOUNDATION fieldbus (FISCO compliant)
- ▶ **Version -A Electronics:** Analog 4 to 20 mA dc
- ▶ **Version -V Electronics:** Analog 1 to 5 V dc, Low Power

Field Wiring Reversal

No transmitter damage.

Suppressed Zero

Suppressed zero ranges are acceptable as long as the Span and Range Limits are not exceeded.

Zero and Span Adjustments

These adjustments can be initiated from the I/A Series Workstation (with applicable FBMs), the PC-based configurator, or the LCD indicator with on-board pushbuttons. Transmitters with Electronic Versions -A or -V require use of the LCD indicator.

### Zeroing for Nonzero-Based Ranges (For IGP10 with -D and -T Versions Only)

Dual Function Zeroing from the LCD pushbuttons allows zeroing with transmitter open to atmosphere, even when there is a nonzero-based range. This greatly simplifies position effect zeroing on many pressure and level applications. It also applies to the Optional External Zero Adjustment (below).

### Optional External Zero Adjustment

An external pushbutton mechanism (Figure 3) is isolated from the electronics compartment and magnetically activates an internal reed switch through the housing. This eliminates a potential leak path for moisture or contaminants to get into the electronics compartment. This zero adjustment can be disabled by a configuration selection.

### Adjustable Damping (Transmitter Response Time)

- ▶ **Versions -D, -T, and -F Electronics:** Normally 0.75 s, and electronically adjustable to 0.00 (none), 0.25, 0.50, 1, 2, 4, 8, 16, or 32 seconds, whichever is greater, for a 90% recovery from an 80% input step as defined in ANSI/ISA S51.1 (for a 63.2% recovery, 0.5 s). Damping can be set in both the transducer and AI blocks with the -F version.
- ▶ **Versions -A and -V Electronics:** Normally 0.75 s, and electronically adjustable to 0 (none), 2, 4, or 8 seconds, whichever is greater, for a 90% recovery from an 80% input step as defined in ANSI/ISA S51.1 (for a 63.2% recovery, 0.5 s).

### Electronics and Sensor Temperatures

Readable from I/A Series system or PC-based configurator only. Measurement is transmitter temperature, not necessarily process temperature.

### Write Protect Jumper (Electronic Versions -D, -F, and -T)

Can be positioned to lock out all configurators from making transmitter database changes. This makes transmitter suitable for Safety Shutdown System Applications that require this feature.

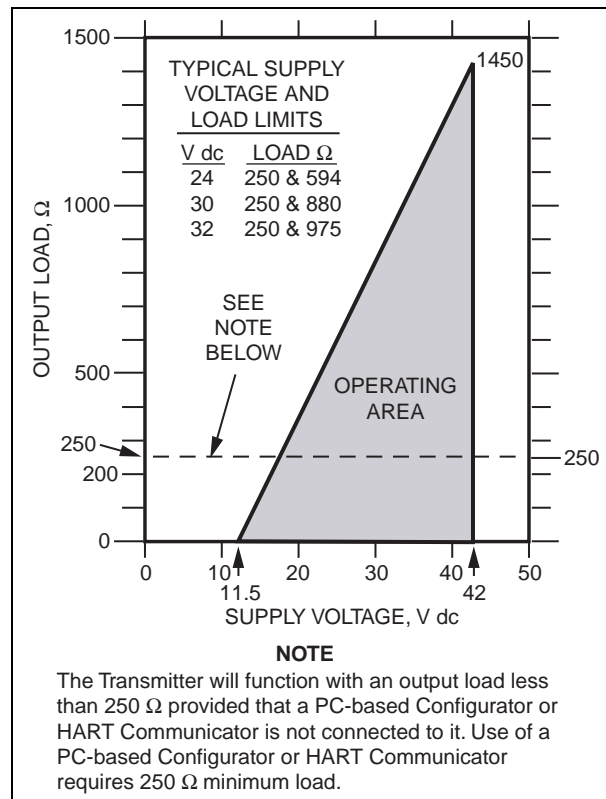
### Supply Voltage

- ▶ **Versions -D, -T, and -F**
  - **Version -D Electronics (FoxCom)**  
Power supplied through I/A Series System.
  - **Version -T Electronics (HART)**  
Bidirectional digital signal superimposed on the 4 to 20 mA current signal.
  - **Version -F Electronics (FOUNDATION Fieldbus)**  
Power supplied through a specific Fieldbus power supply connected to the bus.

### ▶ 4 to 20 mA Output

Nominal minimum supply voltage (Figure 2) is 11.5 V dc for Versions -D, -T, and -A. This value can be reduced to 11 V dc by using a jumper across test receptacles in the field wiring compartment terminal block. See Figure 8.

Figure 2. 4 to 20 mA Output, Supply Voltage vs. Output Load

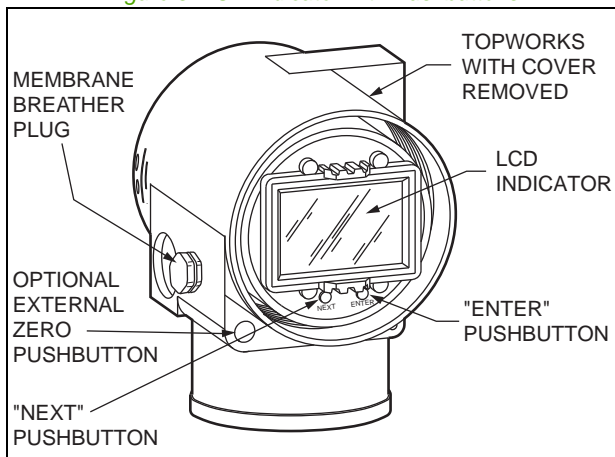


**Liquid Crystal Display (LCD) Indicator with On-Board Pushbuttons (Figure 3)**

This indicator is standard with the -A and -V electronic versions, and optional with the -D, -T, and -F electronic versions. The indicator provides:

- ▶ Two Lines; five numeric characters on top line (four when a minus sign is needed, and for analog output versions) and seven alphanumeric characters on bottom line.
- ▶ Measurement Readout; value on top line and units label on bottom line.
- ▶ Configuration and Calibration Prompts.

Figure 3. LCD Indicator with Pushbuttons



**NOTE**

A membrane breather plug is used only with the IGP10 Transmitters having Span Limit Codes B, C, and D (not with Code E).

**Current Outputs for Overrange, Fail, and Offline Conditions - FoxCom and HART Only**

Parameter	FoxCom	HART
OFFLINE	User configurable between 4 and 20 mA	
SENSOR FAILURE	User configurable to Fail LO or Fail HI	
FAIL LO	3.60 mA	3.60 mA
UNDERRANGE	3.75 mA	3.80 mA
OVERRANGE	21.00 mA	20.50 mA
FAIL HI	22.00 mA	21.00 mA

**Configuration and Calibration Data, and Electronics Upgradeability**

All factory characterization data and user configuration and calibration data are stored in the sensor. This means that the electronics module may be replaced, with one of like type, without the need for reconfiguration or recalibration. Although module replacement can affect accuracy by a maximum of 0.20% of span, this error can be removed by an mA trim without application of pressure (not with Fieldbus).

Changing module types (e.g., from one protocol to another protocol) may require reconfiguration and recalibration, as well as a different terminal block, but all factory characterization data is retained.

**Pressure Units for Calibrated Range**

Table 1. Allowable Pressure Units for Calibrated Range (a)

inH <sub>2</sub> O	mH <sub>2</sub> O (b)	dy/cm <sup>2</sup> (c)	torr	kg/cm <sup>2</sup>
ftH <sub>2</sub> O	inHg	Pa	mbar	psi
mmH <sub>2</sub> O	mmHg	kPa	bar	atm
cmH <sub>2</sub> O	cmHg	MPa	g/cm <sup>2</sup>	

- a. Gauge or absolute pressure units, as applicable.
- b. mH<sub>2</sub>O only available with HART (-T) electronic version.
- c. Dy/cm<sup>2</sup> only available with FoxCom (-D) electronic version.



**FoxCom (Version -D)**

- ▶ **Digital Mode (Fixed Current):** Digital Output signal is updated 10 times per second and carries the pressure, and sensor and electronics temperature measurements. See Table 2 for communication parameters and Figure 4 for block diagram.
- ▶ **4 to 20 mA Analog Mode:** Analog output is updated a minimum of 30 times per second. A minimum loop load of 250 ohms is required. See Table 2 for communication parameters and Figure 5 for 4 to 20 mA output block diagram.

**HART (Version -T)**

- ▶ **4 to 20 mA Analog Mode:** Analog output signal is updated 30 times per second. A minimum loop load of 250 ohms is required. See Table 2 for communication parameters and Figure 5 for 4 to 20 mA output block diagram.
- ▶ **Multidrop Mode (Fixed Current):** This Mode supports communications with up to 15 transmitters on a single pair of signal/power wires. The output signal is updated 4 times/second. A minimum loop load of 250 ohms is required. See Table 2 for communication parameters and Figure 6 for a typical multidrop block diagram.

**FOUNDATION Fieldbus (Version -F)**

The Fieldbus is a serial, two-way communication system that runs at 31.25 kbits/s. The digital output signal is superimposed on the dc power signal on the bus, and controlled by a strict cycle schedule and protocol. Supply voltage, 9 to 32 V dc, is by a specific Fieldbus power source. Current consumption is 19.5 mA. The maximum number of devices on a non-intrinsically safe bus is 3.2. For intrinsically safe bus systems, the maximum number is 5. See Table 2 for communication parameters and Figure 7 for a typical installation topology.

**Analog Output Versions -A and -V**

- ▶ **Version -A:** This version provides a 4 to 20 mA analog output signal and also full configuration capability using the standard LCD indicator. Also, reranging to new calibrated ranges is allowed without the need to apply calibration pressure.
- ▶ **Version -V:** This low power, low voltage version provides a 1 to 5 V output signal. As with Version -A, it allows full configuration capability, and reranging without applying calibration pressure, using the standard LCD indicator with pushbuttons.

**Table 2. Communication Parameters - FoxCom, HART, and FOUNDATION Fieldbus**

Parameter	FoxCom		HART		Fieldbus
	Analog Mode	Digital Mode	Analog Mode	Multidrop Mode	Digital
Remote Configurator	PC-based Configurator, or I/A Series System		HART Communicator or PC-based Configurator		I/A Series System, PC Host, or Fieldbus Certified Host
Communication Rate	600 baud	4800 baud	1200 baud	1200 baud	31.25 kbits/s
Communication Distance (Rated)	1800 m (6000 ft)	600 m (2000 ft)	3050 m (10 000 ft)	1525 m (5000 ft)	1900 m (a) (6235 ft) (a)

a. The total bus length including all spurs. Maximum spur length is 120 m (395 ft). For hybrid installations, the maximum IS spur length is dependent on the field barrier used. For intrinsically safe installations, maximum spur length is 30 m (98 ft).



Figure 4. Digital Output Diagram (FoxCom)

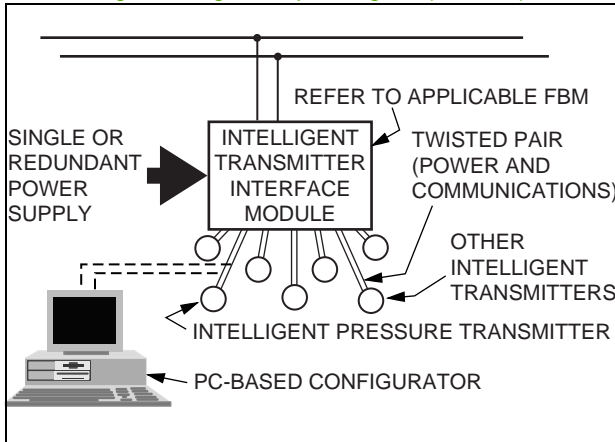


Figure 5. 4 to 20 mA Output Diagram (FoxCom and HART)

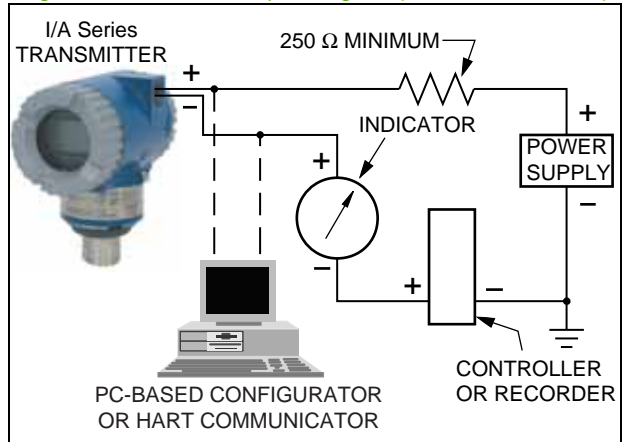


Figure 6. Typical Multidrop Block Diagram (HART – Up to Fifteen Transmitters)

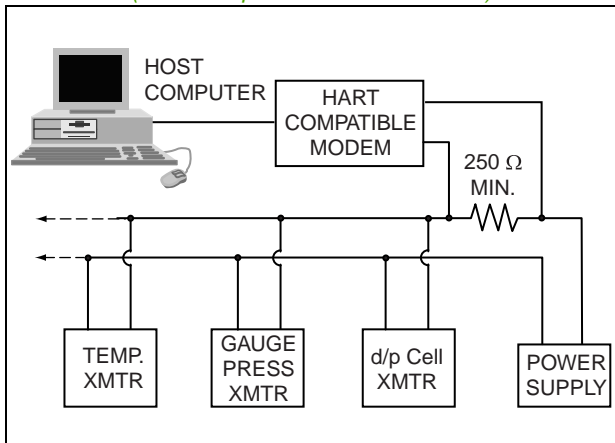
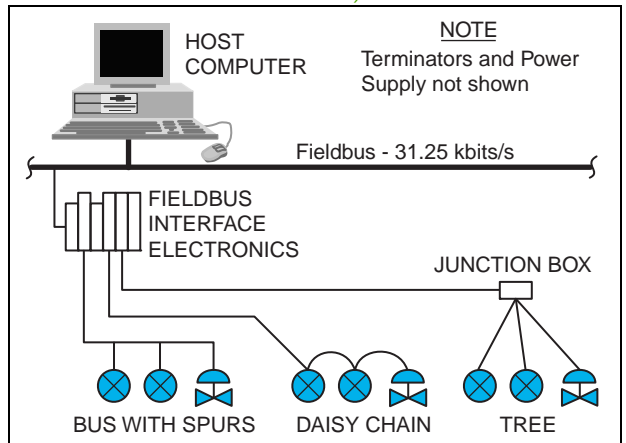


Figure 7. Miscellaneous Installation Topologies (FOUNDATION Fieldbus)



OPERATING, STORAGE, AND TRANSPORTATION CONDITIONS

Influence	Reference Operating Conditions	Normal Operating Conditions (a)	Operative Limits (a)	Transportation/Storage Limits
Process Connection Temp. (Neobee M-20 Fill)	24 ±2°C (75 ±3°F)	-18 to +150°C (0 to 302°F)	-18 and +150°C (0 and 302°F)	Not Applicable
Electronics Temperature	24 ±2°C (75 ±3°F)	-29 to +82°C (c) (-20 to +180°F) (c)	-40 and +85°C (c) (-40 and +185°F) (c)	-54 and +85°C (-65 and +185°F)
▶ with LCD Indicator (b)	24 ±2°C (75 ±3°F)	-20 to +82°C (c) (-4 to +180°F) (c)	-29 and +85°C (c) (-20 and +185°F) (c)	-54 and +85°C (-65 and +185°F)
Relative Humidity (d)	50 ±10%	0 to 100%	0 to 100%	0 to 100% Noncondensing
mA Output				
▶ Supply Voltage	30 ±0.5 V dc	11.5 to 42 V dc (e)	11.5 and 42 V dc (e)	Not Applicable
▶ Output Load	650 Ω	0 to 1450 Ω (f)	0 and 1450 Ω (f)	Not Applicable
Voltage Output				
▶ Supply Voltage	12.5 ±0.5 V dc	9 to 15.5 V dc	9 and 30 V dc	Not Applicable
▶ Supply Current	(g)	(g)	(g)	Not Applicable
▶ Output Load	10 MΩ	1 to 10 MΩ	(h)	Not Applicable
FOUNDATION Fieldbus Supply Voltage (i)	30 ±0.5 V dc	9 to 32 V dc	9 and 32 V dc	Not Applicable
Vibration	1 m/s <sup>2</sup> (0.1 “g”)	6.3 mm (0.25 in) Double Amplitude: from 5 to 15 Hz with Aluminum Housing from 5 to 9 Hz with 316 ss Housing 0 to 30 m/s <sup>2</sup> (0 to 3 “g”) from 15 to 500 Hz with Aluminum Housing 0 to 10 m/s <sup>2</sup> (0 to 1 “g”) from 9 to 500 Hz with 316 ss Housing		11 m/s <sup>2</sup> (1.1 “g”) from 2.5 to 5 Hz (in Shipping Package)
Mounting Position	Upright	Upright	No Limit	Not Applicable

- a. Normal Operating Conditions and Operative Limits are defined per ANSI/ISA 51.1-1979 (R1993).
- b. Although the LCD will not be damaged at any temperature within the Transportation/Storage Limits, updates will be slowed and readability decreased at temperatures outside the Normal Operating Conditions.
- c. Refer the “Electrical Safety Specifications” on page 14 for restriction in electronic temperature limits with certain electrical approvals/certifications.
- d. With topworks covers on and conduit entrances sealed.
- e. 11.5 V dc can be reduced to 11 V dc by using a plug-in shorting bar with -D, -T, and -A electronic versions. See Figure 8.
- f. 250 Ω minimum load required for proper communication with FoxCom and HART Protocol. See Figure 2.
- g. Supply Current: 3 mA maximum demand within operative limits.
- h. Operative limits are 100 kΩ to open circuit, 0.2 μf maximum.
- i. Power supplied by a specific Fieldbus power supply.

**PERFORMANCE SPECIFICATIONS**

Zero-Based Calibrations; Under Reference Operating Conditions Unless Otherwise Specified; URL = Upper Range Limit; Span = Calibrated Span

**Accuracy (Includes Linearity, Hysteresis, and Repeatability)**

±0.20% of Span

For Span Code	If Span is:	Then Small Span Accuracy in % of Span is:
B (a)	<5% of URL	$\pm \left[ (0.10) + (0.005) \left( \frac{\text{URL}}{\text{Span}} \right) \right]$
C, D, and E (a)	<6.7% of URL	$\pm \left[ (0.10) + (0.0067) \left( \frac{\text{URL}}{\text{Span}} \right) \right]$

a. Span Codes B and E are applicable to IGP10 Transmitter only.

**Power-Up Time**

Less than 5 seconds for output to reach first valid measurement.

**Stability**

Long term drift is less than ±0.02% of URL per year over a 5-year period.

**Calibration Frequency**

The 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:

$$\text{Calibration Frequency} = \frac{\text{Performance Margin}}{\text{Stability}} = \text{Months}$$

**Supply Voltage Effect**

The output changes less than 0.005% of span for each 1 V change within the specified supply voltage requirements.

**Vibration Effect**

Total effect is ±0.2% of URL per “g” for vibrations in the frequency range of 5 to 500 Hz; with double amplitudes of 6.3 mm (0.25 in) in the range of 5 to 15 Hz, or accelerations of 3 “g” in the range of 15 to 500 Hz, whichever is smaller, for aluminum housings; and with double amplitudes of 6.3 mm (0.25 in) in the range of 5 to 9 Hz, or accelerations of 1 “g” in the range of 9 to 500 Hz, whichever is smaller, for 316 ss housings.

**Position Effect**

Any zero effect caused by the mounting position can be eliminated by rezeroing. There is no span effect.

**Ambient Temperature Effect**

Total effect for a 28°C (50°F) change within Normal Operating Condition limits is:

- ▶ For Electronics Versions -D, -T, or -F  
±(0.06% URL + 0.12% Span)
- ▶ For Electronics Versions -A or -V  
±(0.10% URL + 0.15% span)

**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 10 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.)

**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. The output shift is less than 1.0%. (Per ANSI/IEEE C62.41-1980 and IEC Std. 61000-4-5.)

## PHYSICAL SPECIFICATIONS

### Environmental Protection

The enclosure has the dusttight and weatherproof rating of IP66 as defined by IEC 60529, and provides the environmental and corrosion resistant protection rating of NEMA 4X.

### Electronics Housing and Housing Covers

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. Buna-N O-ring seals are used to seal the threaded housing covers, housing neck, and terminal block.

### Process Connectors

Selection of Tri-clamp type or mini-tank process connectors. Refer to "Model Code" on page 19.

### Process Wetted Parts

- ▶ 316L ss
- ▶ Nickel alloy<sup>(3)</sup> diaphragm material also available - see "Model Code" on page 19

### Process O-Rings (Mini Tank Spud Versions)

EPDM

### Sensor Fill Fluid

Neobee M-20

### Mounting Position

The transmitter should be mounted in such a way that nonprocess wetted surfaces are self draining. It should be installed horizontal to vertical, so that the crevice at the feature where the housing is attached to the sensor (neck) is self draining. Process wetted surface (diaphragm convolutions) should be installed so that process does not pool between convolutions when the vessel is empty.

### Electronics Module

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

### Electrical Conduit Connections

Field wires enter through 1/2 NPT, PG 13.5, or M20 conduit connections on both sides of transmitter housing. Unused connection must be plugged (metal plug supplied by Foxboro) to ensure moisture and RFI protection. Optional conduit thread adapters are also offered.

### Electrical Terminations

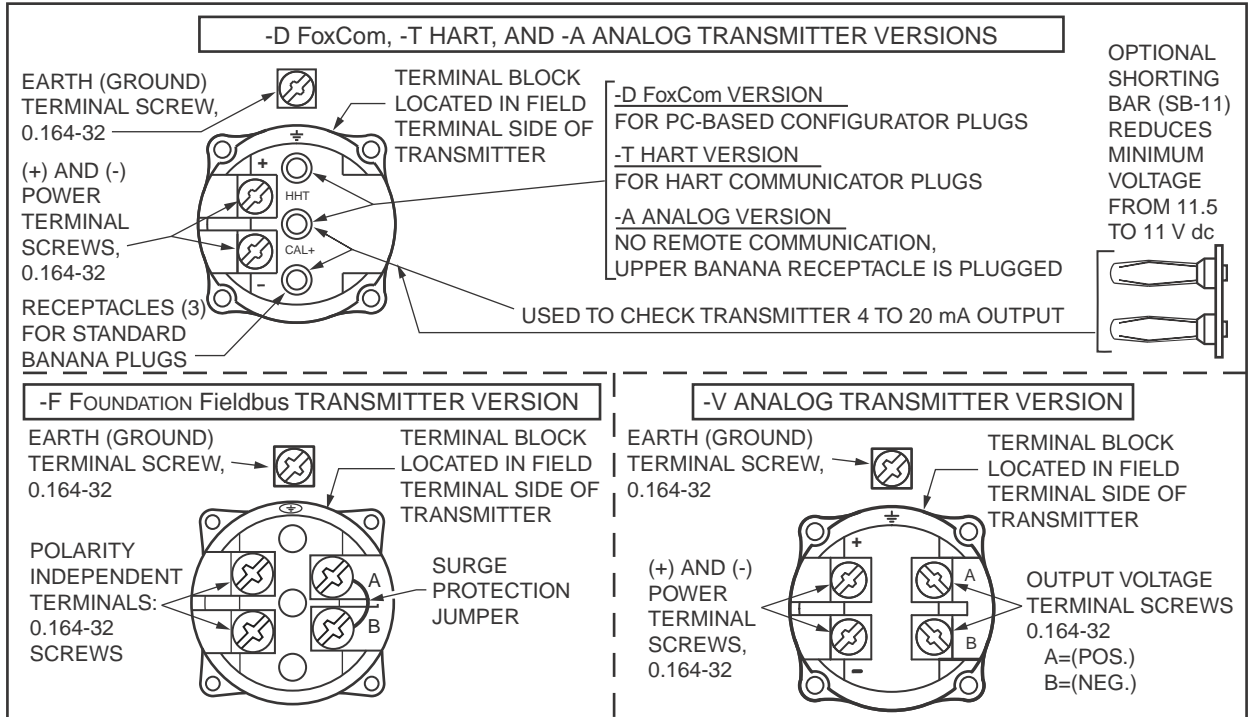
Field wires enter through the conduit connections described above and terminate under screw terminals and washers on the terminal block in the field terminals compartment. See Figure 8 for the terminal block configuration for the different transmitter electronic versions offered.

### Approximate Mass

- ▶ 1.5 to 3 kg (3.3 to 6.7 lb), depending on process connector type and size selected, when aluminum housing is used.
- ▶ Add 1.1 kg (2.4 lb) if 316 ss housing is used
- ▶ Add 0.2 kg (0.4 lb) if LCD indicator is used

3. Equivalent to Hastelloy C-276.

Figure 8. Field Terminals Compartment for the Electronic Versions Offered



**ELECTRICAL SAFETY SPECIFICATIONS**

Transmitter has been designed to meet the Electrical Safety Specifications listed in the tables below. Contact Global Customer Support for information or status of testing laboratory approvals or certifications.

Refer to “Model Code” on page 19 for any restrictions applicable to the Electrical Safety Specifications listed in the tables that follow.

Refer to applicable instruction manual for application conditions and connectivity requirements.

**Electronic Version -D (FoxCom)**

Testing Laboratory, Types of Protection, and Area Classification	Application Conditions	Elec. Safety Design Code
ATEX intrinsically safe; II 1 GD, EEx ia IIC, Zone 0, or II 1/2 GD EEx ib IIC, Zone 0 and 1.	Temperature Class T4; Ta = -40 to +80°C Temperature Class T5; Ta = -40 to +40°C Temperature Class T6; Ta = -40 to +40°C	E
ATEX protection n; II 3 GD, EEx nL IIC, Zone 2.	Temperature Class T4; Ta = -40 to +80°C Temperature Class T5; Ta = -40 to +70°C Temperature Class T6; Ta = -40 to +40°C	N
ATEX multiple certifications, ia & ib, and n. Refer to Codes E and N for details.	Applies to Codes E and N.	M (a)
CSA intrinsically safe for Class I, Div. 1, Groups A, B, C, and D, Class II, Div. 1, Groups E, F, and G, and Class III, Div. 1.	Temperature Class T6 at 40°C, and T4A at 85°C maximum ambient.	C (IAP10 only)
CSA explosionproof for Class I, Div. 1, Groups B, C, and D; dust-ignitionproof for Class II, Div. 1, Groups E, F, and G; Class III, Div. 1.	Maximum Ambient Temperature 85°C.	C (IAP10 only)
CSA for Class I, Div. 2, Groups A, B, C, and D; Class II, Div. 2, Groups F and G; Class III, Div. 2.	Temperature Class T6 at 40°C and T4A at 85°C maximum ambient.	C (IAP10 only)
CSA intrinsically safe for Class I, Div. 1, Groups A, B, C, and D, Class II, Div. 1, Groups E, F, and G, and Class III, Div. 1.	Temperature Class T6 at 40°C, and T4A at 85°C maximum ambient.	L (IGP10 only)
CSA for Class I, Div. 2, Groups A, B, C, and D; Class II, Div. 2, Groups F and G; Class III, Div. 2.	Temperature Class T6 at 40°C and T4A at 85°C maximum ambient.	L (IGP10 only)
FM intrinsically safe for Class I, Div. 1, Groups A, B, C, and D; Class II, Div. 1, Groups E, F, and G; and Class III, Div. 1.	Temperature Class T4A at 40°C and T4 at 85°C maximum ambient.	F (IAP10 only)
FM explosionproof for Class I, Div. 1, Groups B, C, and D; dust-ignitionproof for Class II, Div. 1, Groups E, F, and G; Class III, Div. 1.	Temperature Class T6 at 80°C and T5 at 85°C maximum ambient.	F (IAP10 only)
FM nonincendive for Class I, Div. 2, Groups A, B, C, and D; Class II, Div. 2, Groups F and G; Class III, Div. 2.	Temperature Class T4A at 40°C and T4 at 85°C maximum ambient.	F (IAP10 only)
FM intrinsically safe for Class I, Div. 1, Groups A, B, C, and D; Class II, Div. 1, Groups E, F, and G; Class III, Div. 1.	Temperature Class T4A at 40°C and T4 at 85°C maximum ambient.	R (IGP10 only)
FM nonincendive for Class I, Div. 2, Groups A, B, C, and D; Class II, Div. 2, Groups F and G; Class III, Div. 2.	Temperature Class T4A at 40°C and T4 at 85°C maximum ambient.	R (IGP10 only)

- a. With ATEX Electrical Safety Design Code M, the user must permanently mark (check off on rectangular box on data plate) one type of protection only (ia and ib, or n). Do not change this mark once it has been applied.

**Electronic Version -T (HART)**

Testing Laboratory, Types of Protection, and Area Classification	Application Conditions	Elec. Safety Design Code
ATEX intrinsically safe; II 1 GD, EEx ia IIC, Zone 0, or II 1/2 GD EEx ib IIC, Zone 0 and 1.	Temperature Class T4; Ta = -40 to +80°C Temperature Class T5; Ta = -40 to +40°C Temperature Class T6; Ta = -40 to +40°C	E
ATEX protection n; II 3 GD, EEx nL IIC, Zone 2.	Temperature Class T4; Ta = -40 to +80°C Temperature Class T5; Ta = -40 to +70°C Temperature Class T6; Ta = -40 to +40°C	N
ATEX multiple certifications, ia & ib, and n. Refer to Codes E and N for details.	Applies to Codes E and N.	M (a)
CSA explosionproof for Class I, Div. 1, Groups B, C, and D; dust-ignitionproof for Class II, Div. 1, Groups E, F, and G; Class III, Div. 1.	Maximum Ambient Temperature 85°C.	C (IAP10 only)
CSA for Class I, Div. 2, Groups A, B, C, and D; Class II, Div. 2, Groups F and G; Class III, Div. 2.	Temperature Class T6 at 40°C and T4A at 85°C maximum ambient.	C (IAP10 only)
CSA zone certified intrinsically safe Ex ia IIC, and energy limited Ex nA II.	Temperature Class T4 at 40°C, and T3 at 85°C maximum ambient.	B (IAP10 only)
CSA intrinsically safe for Class I, Div. 1, Groups A, B, C, and D; Class II, Div. 1, Groups E, F, and G; Class III, Div.1.	Temperature Class T6 at 40°C and T4A at 85°C maximum ambient.	L (IGP10 only)
CSA for Class I, Div. 2, Groups A, B, C, and D; Class II, Div. 2, Groups F and G; Class III, Div. 2.	Temperature Class T6 at 40°C and T4A at 85°C maximum ambient.	L (IGP10 only)
CSA zone certified intrinsically safe Ex ia IIC and energy limited Ex nA II.	Temperature Class T4 at 40°C and T3 at 85°C maximum ambient.	L (IGP10 only)
FM intrinsically safe for Class I, Div. 1, Groups A, B, C, and D; Class II, Div. 1, Groups E, F, and G; and Class III, Div. 1.	Temperature Class T4A at 40°C and T4 at 85°C maximum ambient.	F (IAP10 only)
FM explosionproof for Class I, Div. 1, Groups B, C, and D; dust-ignitionproof for Class II, Div. 1, Groups E, F, and G; Class III, Div. 1.	Temperature Class T6 at 80°C and T5 at 85°C maximum ambient.	F (IAP10 only)
FM nonincendive Class I, Div. 2, Groups A, B, C, and D; Class II, Div. 2, Groups F and G; and Class III, Div. 2.	Temperature Class T4A at 40°C and T4 at 85°C maximum ambient.	F (IAP10 only)
FM zone certified intrinsically safe AEx ia IIC.	Temperature Class T4 at 85°C maximum ambient.	F (IAP10 only)
FM intrinsically safe for Class I, Div. 1, Groups A, B, C, and D; Class II, Div. 1, Groups E, F, and G; Class III, Div. 1.	Temperature Class T4A at 40°C and T4 at 85°C maximum ambient.	R (IGP10 only)
FM nonincendive for Class I, Div. 2, Groups A, B, C, and D; Class II, Div. 2, Groups F and G; Class III, Div. 2.	Temperature Class T4A at 40°C and T4 at 85°C maximum ambient.	R (IGP10 only)
FM zone certified intrinsically safe AEx ia IIC.	Temperature Class T4 at 85°C maximum ambient.	R (IGP10 only)
IECEX field device intrinsically safe; Ex ia IIC, Zone 0.	Temperature Class T4; Ta = -40 to +80°C.	T



**Electronic Version -T (HART) (Continued)**

Testing Laboratory, Types of Protection, and Area Classification	Application Conditions	Elec. Safety Design Code
IECEX field device protection n; Ex nL IIC, Zone 2.	Temperature Class T4; Ta = -40 to +80°C.	U
Multi-marked for HART as follows:  <ul style="list-style-type: none"> <li>▶ CSA intrinsically safe, Cl. I, Div. 1, Groups A, B, C, D; Class II, Div. 1, Groups E, F, G; Class III, Div. 1; also CSA zone certified intrinsically safe Ex ia IIC.</li> <li>▶ FM intrinsically safe, Cl. I, Div. 1, Groups A, B, C, D; Class II, Div. 1, Groups E, F, G; Class III, Div. 1; also FM zone certified intrinsically safe AEx ia IIC.</li> <li>▶ ATEX intrinsically safe, II 1 GD, EEx ia IIC, Zone 0.</li> </ul>	<ul style="list-style-type: none"> <li>▶ See application conditions for Code C intrinsically safe applications.</li> <li>▶ See application conditions for Code C intrinsically safe applications.</li> <li>▶ See application conditions for Code E intrinsically safe applications.</li> </ul>	W (b)

- a. With ATEX Electrical Safety Design Code M, the user must permanently mark (check off on rectangular box on data plate) one type of protection only (ia and ib, or n). Do not change this mark once it has been applied.
- b. When selecting Safety Design Code W (for HART only), the user must permanently mark (check off in rectangular block on data plate) intrinsically safe certifications for ATEX, CSA, or FM, as applicable. Do not change this mark once it has been applied.

**Electronic Version -F (FOUNDATION Fieldbus)**

Testing Laboratory, Types of Protection, and Area Classification	Application Conditions	Elec. Safety Design Code
ATEX FISCO field device intrinsically safe; II 1 G, EEx ia IIC, Zone 0.	Temperature Class T4; Ta = -40 to +80°C.	E
ATEX FNICO field device protection n: II 3, G EEx nL IIC, Zone 2.	Temperature Class T4; Ta = -40 to +80°C.	N
CSA explosionproof for Class I, Div. 1, Groups B, C, and D; dust-ignitionproof for Class II, Div. 1, Groups E, F, and G; Class III, Div. 1.	Maximum Ambient Temperature 85°C.	C (IAP10 only)
CSA zone certified intrinsically safe Ex ia IIC and energy limited Ex nA II.	Temperature Class T4 at 40°C and T3 at 85°C maximum ambient.	C (IAP10 only)
CSA FISCO field device intrinsically safe for Class I, Div. 1, Groups A, B, C, and D; Class II, Div. 1, Groups E, F, G; Class III Div. 1.	Temperature Class T6 at 40°C and T4A at 85°C maximum ambient.	C (IAP10 only)
CSA FNICO field device for Class I, Div. 2, Groups A, B, C, and D; Class II, Div. 2, Groups F and G; Class III Div. 2.	Temperature Class T6 at 40°C and T4A at 85°C maximum ambient.	C (IAP10 only)
CSA zone certified intrinsically safe Ex ia IIC and energy limited Ex nA II.	Temperature Class T4 at 40°C and T3 at 85°C maximum ambient.	L (IGP10 only)
CSA FISCO field device intrinsically safe for Class I, Div. 1, Groups A, B, C, and D; Class II, Div. 1, Groups E, F, G; Class III Div. 1.	Temperature Class T6 at 40°C and T4A at 85°C maximum ambient.	L (IGP10 only)
CSA FNICO field device for Class I, Div. 2, Groups A, B, C, and D; Class II, Div. 2, Groups F and G; Class III Div. 2.	Temperature Class T6 at 40°C and T4A at 85°C maximum ambient.	L (IGP10 only)

## ELECTRICAL SAFETY SPECIFICATIONS

## Electronic Version -F (FOUNDATION Fieldbus) (Continued)

Testing Laboratory, Types of Protection, and Area Classification	Application Conditions	Elec. Safety Design Code
FM explosionproof for Class I, Div. 1, Groups B, C, and D; dust-ignitionproof for Class II, Div. 1, Groups E, F, and G; Class III, Div. 1.	Temperature Class T6 at 80°C and T5 at 85°C maximum ambient.	F (IAP10 only)
FM zone certified intrinsically safe AEx ia IIC.	Temperature Class T4 at 85°C maximum ambient.	F (IAP10 only)
FM FISCO field device intrinsically safe for Class I, Div. 1, Groups A, B, C, and D; Class II, Div. 1, Groups E, F, G; Class III Div. 1.	Temperature Class T4A at 40°C and T4 at 85°C maximum ambient.	F (IAP10 only)
FM FNICO field device nonincendive for Class I, Div.2, Groups A, B, C, and D; Class II, Div. 2, Groups F and G; Class III, Div. 2.	Temperature Class T4A at 40°C and T4 at 85°C maximum ambient.	F (IAP10 only)
FM zone certified intrinsically safe AEx ia IIC.	Temperature Class T4 at 85°C maximum ambient.	R (IGP10 only)
FM FISCO field device intrinsically safe for Class I, Div. 1, Groups A, B, C, and D; Class II, Div. 1, Groups E, F, G; Class III Div. 1.	Temperature Class T4A at 40°C and T4 at 85°C maximum ambient.	R (IGP10 only)
FM FNICO field device nonincendive for Class I, Div.2, Groups A, B, C, and D; Class II, Div. 2, Groups F and G; Class III, Div. 2.	Temperature Class T4A at 40°C and T4 at 85°C maximum ambient.	R (IGP10 only)
IECEX FISCO field device intrinsically safe; Ex ia IIC, Zone 0.	Temperature Class T4; Ta = -40 to +80°C.	T
IECEX FNICO field device protection n; Ex nL IIC, Zone 2.	Temperature Class T4; Ta = -40 to +80°C.	U

## Electronic Version -A (4 to 20 V dc Analog Output)

Testing Laboratory, Types of Protection, and Area Classification	Application Conditions	Elec. Safety Design Code
CSA explosionproof for Class I, Div. 1, Groups B, C, and D; dust-ignitionproof for Class II, Div. 1, Groups E, F, and G; Class III, Div. 1.	Maximum Ambient Temperature 85°C.	C (IAP10 only)
CSA for Class I, Div. 2, Groups A, B, C, and D; Class II, Div. 2, Groups F and G; Class III, Div. 2.	Temperature Class T6 at 40°C and T4A at 85°C maximum ambient.	C (IAP10 only)
CSA for Class I, Div. 2, Groups A, B, C, and D; Class II, Div. 2, Groups F and G; Class III, Div. 2.	Temperature Class T6 at 40°C and T4A at 85°C maximum ambient.	L (IGP10 only)
FM explosionproof for Class I, Div. 1, Groups B, C, and D; dust-ignitionproof for Class II, Div. 1, Groups E, F, and G; Class III, Div. 1.	Temperature Class T6 at 80°C and T5 at 85°C maximum ambient.	F (IAP10 only)
FM nonincendive for Class I, Div. 2, Groups A, B, C, and D; Class II, Div. 2, Groups F and G; Class III, Div. 2.	Temperature Class T4A at 40°C and T4 at 85°C maximum ambient.	F (IAP10 only)
FM nonincendive for Class I, Div. 2, Groups A, B, C, and D; Class II, Div. 2, Groups F and G; Class III, Div. 2.	Temperature Class T4A at 40°C and T4 at 85°C maximum ambient.	R (IGP10 only)

**Electronic Version -V (1 to 5 V dc Analog Output)**

Testing Laboratory, Types of Protection, and Area Classification	Application Conditions	Elec. Safety Design Code
CSA intrinsically safe for Class I, Div. 1, Groups A, B, C, and D; Class II, Div. 1, Groups E, F, and G; Class III, Div.1.	Temperature Class T6 at 40°C and T4A at 85°C maximum ambient.	C (IAP10 only)
CSA explosionproof for Class I, Div. 1, Groups B, C, and D; dust-ignitionproof for Class II, Div. 1, Groups E, F, and G; Class III, Div. 1.	Maximum Ambient Temperature 85°C.	C (IAP10 only)
CSA zone certified intrinsically safe Ex ia IIC and energy limited Ex nA II.	Temperature Class T4 at 40°C and T3 at 85°C maximum ambient.	C (IAP10 only)
CSA intrinsically safe for Class I, Div. 1, Groups A, B, C, and D; Class II, Div. 1, Groups E, F, and G; Class III, Div.1.	Temperature Class T6 at 40°C and T4A at 85°C maximum ambient.	L (IGP10 only)
CSA zone certified intrinsically safe Ex ia IIC and energy limited Ex nA II.	Temperature Class T4 at 40°C and T3 at 85°C maximum ambient.	L (IGP10 only)
FM intrinsically safe for Class I, Div. 1, Groups A, B, C, and D; Class II, Div. 1, Groups E, F, and G; Class III, Div. 1.	Temperature Class T4A at 40°C and T4 at 85°C maximum ambient.	F (IAP10 only)
FM explosionproof for Class I, Div. 1, Groups B, C, and D; dust-ignitionproof for Class II, Div. 1, Groups E, F, and G; Class III, Div. 1.	Temperature Class T6 at 80°C and T5 at 85°C maximum ambient.	F (IAP10 only)
FM nonincendive for Class I, Div. 2, Groups A, B, C, and D; Class II, Div. 2, Groups F and G; Class III, Div. 2.	Temperature Class T4A at 40°C and T4 at 85°C maximum ambient.	F (IAP10 only)
FM zone certified intrinsically safe AEx ia IIC.	Temperature Class T4 at 85°C maximum ambient.	F (IAP10 only)
FM intrinsically safe for Class I, Div. 1, Groups A, B, C, and D; Class II, Div. 1, Groups E, F, and G; Class III, Div. 1.	Temperature Class T4A at 40°C and T4 at 85°C maximum ambient.	R (IGP10 only)
FM nonincendive for Class I, Div. 2, Groups A, B, C, and D; Class II, Div. 2, Groups F and G; Class III, Div. 2.	Temperature Class T4A at 40°C and T4 at 85°C maximum ambient.	R (IGP10 only)
FM zone certified intrinsically safe AEx ia IIC.	Temperature Class T4 at 85°C maximum ambient.	R (IGP10 only)

MODEL CODE

MODEL CODE

<u>Description</u>					<u>Model</u>
Gauge Pressure Transmitter with Sanitary Process Connections					IGP10
Absolute Pressure Transmitter with Sanitary Process Connections					IAP10
<b>Electronics Versions and Output Signal</b>					
Intelligent; Digital FoxCom and 4 to 20 mA dc, Configurable (Version -D)					-D
Intelligent; Digital HART and 4 to 20 mA (Version -T)					-T
Intelligent; Digital FOUNDATION fieldbus (Version -F)					-F
Electronic; 4 to 20 mA Analog Output, (Version -A)					-A
Electronic; 1 to 5 V dc Analog Output, Low Power (Version -V)					-V
<b>Structure Code – Materials, Fill Fluid, and Process Connector Type (a)</b>					
<b>Connection Material</b>	<b>Diaphragm Material</b>	<b>Fill Fluid</b>	<b>Process Connector</b>		
316L ss	316L ss	NEOBEE M-20	1.5-in Tri-Clamp Type, Sanitary (b) (c)		TA
316L ss	316L ss	NEOBEE M-20	2.0-in Tri-Clamp Type, Sanitary (b) (c)		T2
316L ss	316L ss	NEOBEE M-20	3.0-in Tri-Clamp Type, Sanitary (b) (c)		T3
316L ss	Nickel alloy (d)	NEOBEE M-20	1.5-in Tri-Clamp Type, Sanitary (b) (c)		TB
316L ss	Nickel alloy (d)	NEOBEE M-20	2.0-in Tri-Clamp Type, Sanitary (b) (c)		T4
316L ss	Nickel alloy (d)	NEOBEE M-20	3.0-in Tri-Clamp Type, Sanitary (b) (c)		T5
316L ss	316L ss	NEOBEE M-20	Mini Tank Spud Seal, 1-in extension (b) (e)		M1
316L ss	316L ss	NEOBEE M-20	Mini Tank Spud Seal, 6-in extension (b) (e)		M6
316L ss	316L ss	NEOBEE M-20	Mini Tank Spud Seal, 9-in extension (b) (e)		M9
<b>Span Limits – Absolute or Gauge Pressure Units, as applicable</b>					
<b>kPa</b>	<b>inH<sub>2</sub>O</b>	<b>mbar</b>	<b>mmHg</b>	<b>Used with:</b>	
0.87 and 50	3.5 and 200	8.7 and 500	6.5 and 375	IGP10 only	B
<b>MPa</b>	<b>psi</b>	<b>bar</b>	<b>mHg</b>	<b>Used with:</b>	
0.007 and 0.21	1 and 30	0.07 and 2.1	0.05 and 1.5	IAP10 and IGP10	C
0.07 and 2.1	10 and 300	0.7 and 21	0.5 and 15	IAP10 and IGP10	D
0.7 and 4.2	100 and 600	7 and 42	5 and 30	IGP10 only (f)	E
<b>Conduit Connection and Housing Material</b>					
1/2 NPT Conduit Connection, Both Sides, Aluminum Housing					1
PG 13.5 Conduit Connection, Both Sides, Aluminum Housing (with Electrical Safety Codes E, M, and N only)					2
1/2 NPT Conduit Connection, Both Sides, 316 ss Housing					3
PG 13.5 Conduit Connection, Both Sides, 316 ss Housing (with Electrical Safety Codes E, M, and N only)					4
M20 Conduit Connection, Both Sides, Aluminum Housing (with Electrical Safety Codes E, M, and N only)					5
M20 Conduit Connection, Both Sides, 316 ss Housing (with Electrical Safety Codes E, M, and N only)					6
<b>Electrical Safety (See “Electrical Safety Specifications” on page 14 for Description)</b>					
ATEX II 1 GD, EEx ia IIC, or II 1/2 GD, EEx ib IIC (with Versions D and T only)					E
ATEX FISCO II 1 GD, EEx ia IIC (with Electronics Version -F only)					E
ATEX II 3 GD, EEx nL IIC (with Versions D and T only)					N
ATEX FNICO II 3 GD, EEx nL IIC (with Version F only)					N
ATEX Multiple Certifications (customer marks data plate) (includes ATEX Codes E and N)					M

MODEL CODE (CONTINUED)

Description						Model	
CSA Certifications for IAP10 only						C	
Description	Electronic Version						
	A	D	F	T	V		
Intrinsically Safe		X			X		
Explosionproof	X	X	X	X	X		
Class I, II, III; Div. 2	X	X	X	X	X		
Zone Certified: Ex ia IIC; Ex nA II			X	X	X		
FISCO Intrinsically Safe			X				
FNICO, Class I, II, III, Div. 2			X				
CSA Certifications for IGP10 only							L
Description	Electronic Version						
	A	D	F	T	V		
Intrinsically Safe		X			X		
Explosionproof (*)	X	X	X	X	X		
Class I, II, III; Div. 2	X	X	X	X	X		
Zone Certified: Ex ia IIC; Ex nA II			X	X	X		
FISCO Intrinsically Safe			X				
FNICO, Class I, II, III, Div. 2			X				
(*) IGP10 explosionproof rating available with Span Limit Code E only.							
FM Certifications for IAP10 only						F	
Description	Electronic Version						
	A	D	F	T	V		
Intrinsically Safe		X		X	X		
Explosionproof	X	X	X	X	X		
Nonincendive; Div. 2	X	X	X	X	X		
Zone Approved: AEx ia IIC			X	X	X		
FISCO Intrinsically Safe			X				
FNICO, Class I, II, III, Div. 2			X				
FM Certifications for IGP10 only							R
Description	Electronic Version						
	A	D	F	T	V		
Intrinsically Safe		X			X		
Explosionproof (*)	X	X	X	X	X		
Nonincendive; Div. 2	X	X	X	X	X		
Zone Approved: AEx ia IIC			X	X	X		
FISCO Intrinsically Safe			X				
FNICO, Class I, II, III, Div. 2			X				
(*) IGP10 explosionproof rating available with Span Limit Code E only.							

MODEL CODE

MODEL CODE (CONTINUED)

Description	Model
IECEX Certifications: FISCO, Ex ia IIC (with Electronic Version -F only) Intrinsically Safe, Ex ia IIC (with Electronic Version -T only)	T
IECEX Certifications: FNICO, Ex nL IIC (with Electronic Version -F only) Protection n, Ex nL IIC (with Electronic Version -T only)	U
Multi-marked for ATEX, CSA, and PM Intrinsically Safe Applications - HART Electronic Version only	W
<b>Optional Selections - See Descriptions below.</b>	
<b>Digital Indicator with Pushbuttons or Blind Solid Cover over Standard LCD Indicator</b>	
Digital Indicator, Pushbuttons, and Window Cover, Electronic Versions -D, T, and -F only	-L1
Blind (Solid Cover) is substituted for Glass Window Cover, Electronic Versions -A and -V only	-L2
<b>Conduit Thread Adapters (not available with Conduit Connector Codes 5 and 6)</b>	
Hawke-Type 1/2 NPT Cable Gland for use with Conduit Connection Codes 1 and 3 (g)	-A1
Plastic PG 13.5 Cable Gland for use with Conduit Connection Codes 2 and 4 (h)	-A2
M20 Connector for use with Conduit Connection Codes 1 and 3 (g)	-A3
Brass PG 13.5 Cable Gland (Trumpet-Shaped) for use with Conduit Connection Codes 2 and 4 (h)	-A4
<b>Electronics Housing Features</b>	
External Zero Adjustment	-Z1
Custody Transfer Lock and Seal	-Z2
External Zero Adjustment and Custody Transfer Lock and Seal	-Z3
<b>Custom Factory Configuration</b>	
Digital Output (4 to 20 mA Default if not selected) - available with Electronics Version -D only	-C1
Full Factory Configuration (Requires Configuration Form to be filled out)	-C2
<b>SIL2 Transmitters for HART Versions Only</b>	
SIL2-Certified HART Transmitter	-S2
<b>Seal Surface Finish</b>	
15 Ra Seal Surface Finish (b)	-F1
<b>Instruction Books (Common MI, Brochure, and Full Documentation Set on DVD is Standard)</b>	
Without Instruction Book and DVD - Only "Getting Started" Brochure is supplied	-K1
<b>Miscellaneous Optional Selections</b>	
Supplemental Customer Tag (Stainless Steel Tag wired onto Transmitter)	-T
<b>EXAMPLE: IGP10-DT2C1M-L1Z1C1</b>	

- a. The maximum working pressure for transmitters with Tri-Clamp type connections is limited to 2100 kPa (300 psi).
- b. Option -F1 (15 Ra seal surface finish) is available with Structure Codes TA, TB, T2 to T5, M1, M6 and M9. The standard seal surface finish is 32 Ra.
- c. Tri-Clamp type transmitters (TA, TB, and T2 to T5) rely on user-supplied clamp and gaskets.
- d. Equivalent to Hastelloy C-276.
- e. Mini tank spud type transmitters (M1, M6, M9) are supplied with clamps and gaskets. All spuds are accessories that are specified by part number; see Accessories table.
- f. IGP10 Span Limit Code E is not available with Structure Codes M1, M6, M9.
- g. Available with Electrical Safety Codes E, M, and N only.
- h. Available with Electrical Safety Code E only.

**ACCESSORIES**

Refer to “Dimensions-Nominal” on page 24 for configuration and dimensions of accessories listed. Accessories are ordered and supplied separately.

**Weld Spuds and O-Rings**

Description	Used with Structure Code	Part Number
For use with Mini Tank Spud Connector		
Weld Spud, 1-inch Extension (a)	M1	N1212GG
Weld Spud, 6-inch Extension (a)	M6	N1214BP
Weld Spud, 9-inch Extension (a)	M9	N1214BQ
Package of 5 spare O-rings (b)	M1, M6, M9	N1212LB

- a. Weld spuds are supplied by user.
- b. Each transmitter is shipped with its required O-rings. Part number listed is for a package of five O-rings. This package of O-rings is recommended as extras or spares.

**Tri-Clamp Type Connectors Supplied by User Unless Otherwise Noted (a)**

Nominal Tube O.D.	MWP at 70°F	MWP at 250°F	Part Number
1.5 in Tube	500 psi	300 psi	N1212DA
2 in Tube	450 psi	300 psi	N1212DB
3 in Tube	350 psi	195 psi	N1212DC
1.5 in Tube	600 psi	300 psi	N1211PP
2 in Tube	550 psi	275 psi	N1211PQ
2.5 in Tube (b)	450 psi	225 psi	N1212HG
3 in Tube	350 psi	175 psi	N1211PR
1.5 in Tube	1500 psi	1200 psi	N1212FV
2 in Tube	1000 psi	800 psi	N1212FW

- a. The maximum working pressure (MWP) of the transmitter system is 4.2 MPa (600 psi), or the MWP of the Tri-Clamp type connector, whichever is less.
- b. The Foxboro N1212HG Tri-Clamp type connector for a 2.5 in Tube is used with Mini Tank Spud connectors M1, M6, and M9.



### SUGGESTED RFQ SPECIFICATIONS

The manufacturer shall provide direct connected gauge or absolute pressure transmitters that transmit a digital or analog output signal for use in a standard two-wire dc supply voltage system. The transmitter shall have integral process connectors for use in sanitary processes. Specifications for these transmitters are as follows:

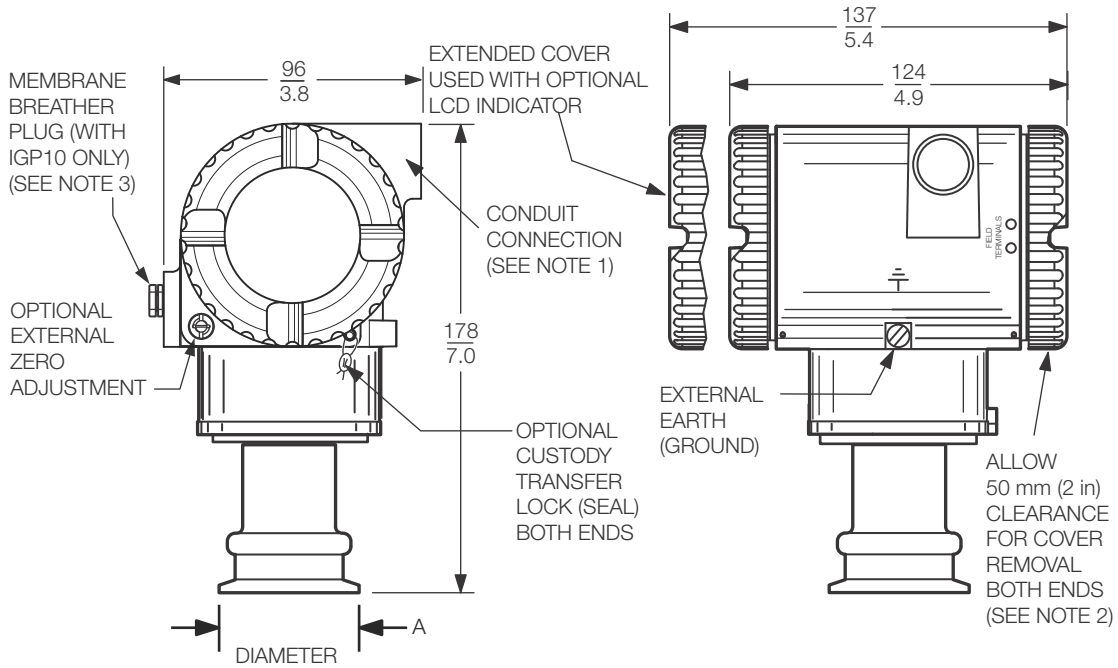
<b>Digital Output Signal:</b>	FoxCom digital and/or 4 to 20 mA dc output signal; HART digital signal superimposed on a 4 to 20 mA output signal; FOUNDATION fieldbus (FISCO/FNICO) digital signal, 31.25 kbits/s
<b>Analog Output Signal:</b>	4 to 20 mA dc, or 1 to 5 V dc (low power)
<b>Remote Communications:</b>	FoxCom, HART, or FISCO/FNICO compliant Fieldbus Remote Communications must not interfere with the output signal.
<b>RFI Protection:</b>	0.1% error between 27 and 1000 MHz at 10 V/m field intensity
<b>Span Limits:</b>	IAP10: from 0.007 to 2.1 MPa (1 to 300 psi) IGP10: from 0.87 kPa to 4.2 MPa (3.5 inH <sub>2</sub> O to 600 psi)
<b>Proof Pressure:</b>	1.5 times Full Scale Pressure Range
<b>Process Connectors:</b>	Direct to process piping or tank spud: <ul style="list-style-type: none"> <li>▶ 1.5-, 2-, or 3-in Tri-Clamp Type</li> <li>▶ 2.5-in Tri-Clamp type for mini tank spud with 1-, 6-, or 9-in extension</li> </ul>
<b>Diaphragm Materials:</b>	316L ss or nickel alloy (a) (for Tri-Clamp Type connectors;
<b>Housing:</b>	316 ss, or Aluminum housing with Epoxy finish
<b>Electronics:</b>	Enclosed in a NEMA 4X (IEC IP66) housing sealed with O-rings for double protection against moisture or other contaminants. Integral LCD Digital Indicator with on-board configuration pushbuttons; standard with analog output transmitters, and optional with digital output transmitters.
<b>Approximate Mass:</b>	With Aluminum Housing: 1.5 to 3 kg (3.3 to 6.7 lb), depending on process connector type and size With 316 ss Housing: Add 1.1 kg (2.4 lb) With LCD Indicator: Add 0.2 kg (0.4 lb)
<b>Model Code:</b>	I/A Series IGP10/IAP10 Direct Connected, Gauge or Absolute Pressure Transmitter having an integral Sanitary Process connector; with FoxCom Communication Protocol, HART Communication Protocol, FISCO and FNICO compliant FOUNDATION Fieldbus Communication Protocol, 4 to 20 mA dc Analog Output Signal, or a Low Power Transmitter with a 1 to 5 V dc Analog Output Signal, or equivalent.

a. Equivalent to Hastelloy C-276,

DIMENSIONS-NOMINAL

$\frac{\text{mm}}{\text{in}}$

TRANSMITTERS WITH TRI-CLAMP PROCESS CONNECTORS



Structure Code	Diaphragm Material	Process Connector	Diameter "A"
TA	316L ss	1 1/2 in Tri-Clamp Type Connector	50.8 mm (2.00 in)
T2	316L ss	2 in Tri-Clamp Type Connector	63.5 mm (2.50 in)
T3	316L ss	3 in Tri-Clamp Type Connector	90.9 mm (3.58 in)
TB	Nickel alloy (a)	1 1/2 in Tri-Clamp Type Connector	50.8 mm (2.00 in)
T4	Nickel alloy (a)	2 in Tri-Clamp Type Connector	63.5 mm (2.50 in)
T5	Nickel alloy (a)	3 in Tri-Clamp Type Connector	90.9 mm (3.58 in)

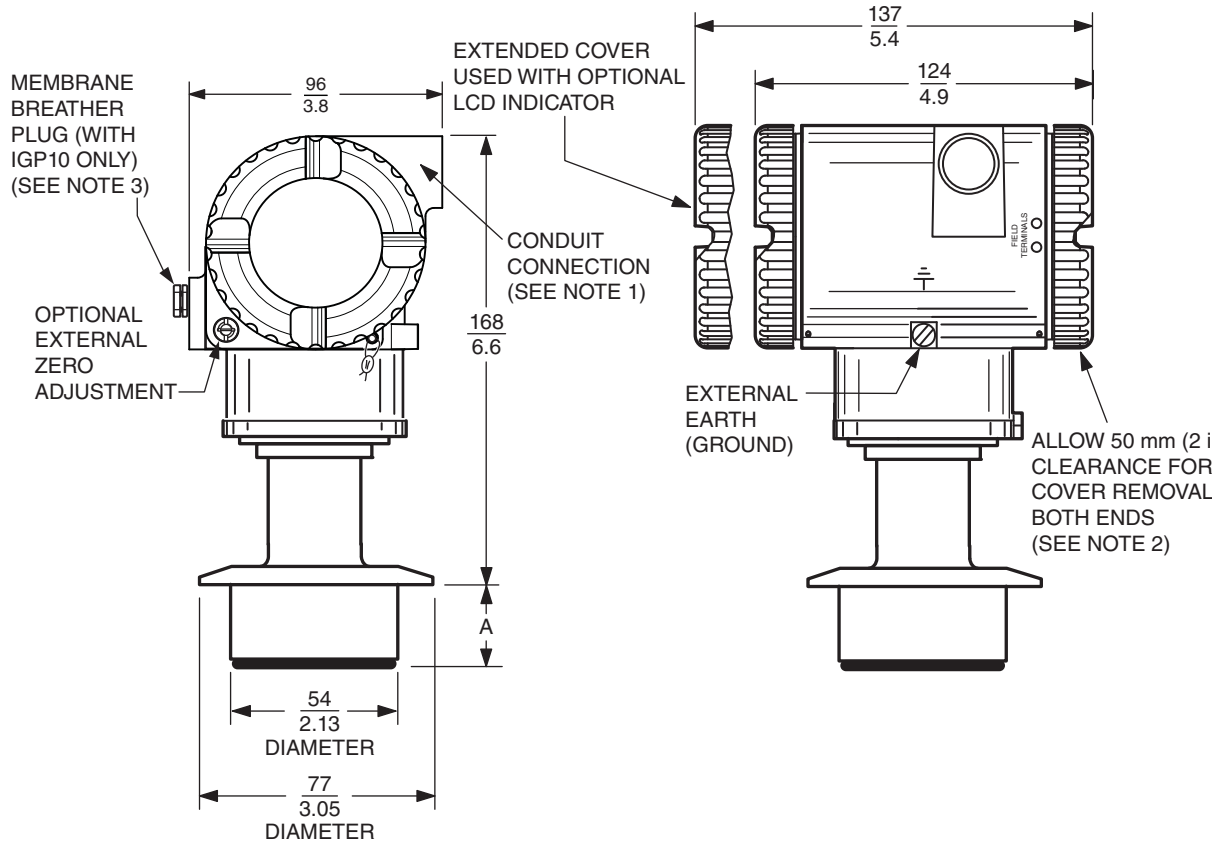
a. Equivalent to Hastelloy C-276.

NOTES

1. Conduit connection, 1/2 NPT, PG 13.5, or M20, both sides; plug unused connection with metal plug (supplied).
2. Topworks rotatable to any position within one turn counterclockwise of fully tightened position.
3. IGP10 transmitters with Span Limit Code E do not require a breather plug.

$\frac{\text{mm}}{\text{in}}$

**TRANSMITTERS WITH MINI TANK SPUD DIAPHRAGM SEALS  
WITH A TRI-CLAMP PROCESS CONNECTOR**

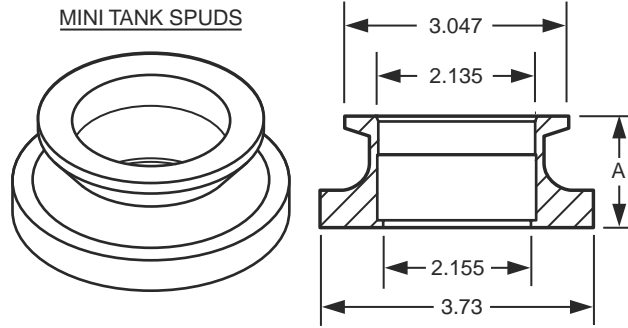


Structure Code	Diaphragm Material	Process Connector	Tank Spud Extension	Dimension "A"
M1	316L ss	2 1/2 in Tri-Clamp Type Connector	1 inch	38 mm (1.5 in)
M6	316L ss	2 1/2 in Tri-Clamp Type Connector	6 inch	152 mm (6.0 in)
M9	316L ss	2 1/2 in Tri-Clamp Type Connector	9 inch	229 mm (9.0 in)

NOTES

1. Conduit connection, 1/2 NPT, PG 13.5, or M20, both sides; plug unused connection with metal plug (supplied).
2. Topworks rotatable to any position within one turn counterclockwise of fully tightened position.
3. IGP10 transmitters with Span Limit Code E do not require a breather plug.

ACCESSORIES



Part No.	A (Spud Extension)	Structure Code
N1212GG	1.50	M1
N1214BP	6.00	M6
N1214BQ	9.00	M9

NOTES

## ORDERING INSTRUCTIONS

1. Model Number.
2. Calibrated Pressure Range using pressure units from Table 1.
3. Configuration Data Form when Factory Configuration Option -C2 is specified.
4. Process Connection Accessories (see "Accessories" on page 22).
5. If Option -S2 (SIL-Certified HART Transmitter) is selected, a copy of the certification can be provided by specifying AS Code CERT-L.
6. Other Transmitter Options and Accessories not in Model Code; see PSS 2A-1Z9 E.
7. User Tag Data - Data Plate: 32 characters maximum.  
For additional tag data, specify optional Customer Tag -T.
8. User Tag Data - Software (Database);
  - ▶ Version -D: 12 characters maximum.
  - ▶ Version -T: 8 characters maximum.
  - ▶ Versions -F: 32 characters maximum.
  - ▶ Versions -A and -V: not applicable.

## OTHER FOXBORO PRODUCTS

The Foxboro product lines offer a broad range of measurement and instrument products, including solutions for pressure, flow, analytical, temperature, positioning, controlling, and recording.  
For a list of these offerings, visit our web site at:

[www.fielddevices.foxboro.com](http://www.fielddevices.foxboro.com)