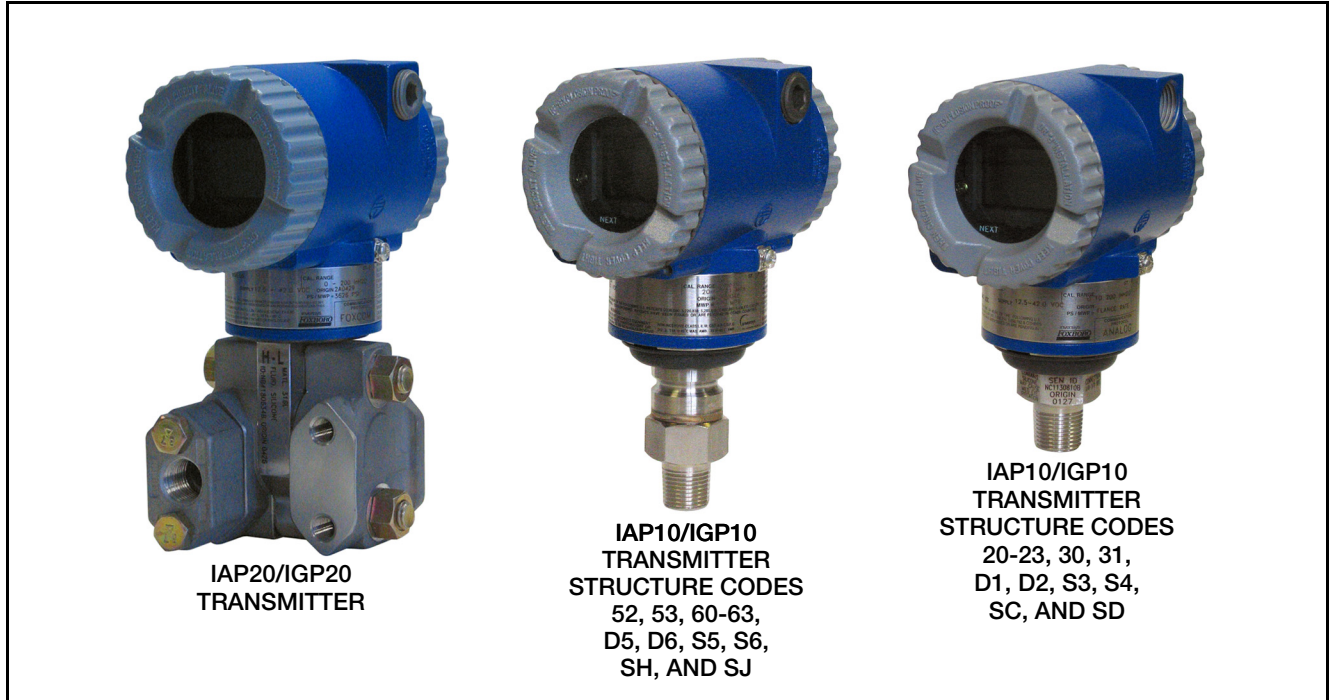


I/A Series[®] Electronic Pressure Transmitters with 4 to 20 mA Analog Output for Absolute and Gauge Pressure Measurement



The IAP10, IGP10, IAP20, and IGP20 Series of electronic analog output, two-wire transmitters provide precise, reliable measurement of absolute or gauge pressure, and transmit a 4 to 20 mA output signal.

HIGH DEPENDABILITY

- Simple, elegant sensor packaging uses very few parts to achieve exceptionally high reliability
- NEMA 4X and IEC IP66 durable epoxy-coated aluminum, or 316 ss housings.
- Co-Ni-Cr, 316L ss, and Hastelloy sensor materials for all transmitters; additional materials available for IAP20/IGP20 Transmitters.
- Can be provided with numerous configurations of direct connect or remote mount seals.
- Integral process connections for sanitary, and pulp/paper installations with IAP10/IGP10.
- CE marked; complies with applicable EMC, ATEX, and PED European Union Directives.
- Meet numerous Agency requirements for hazardous locations. Versions available to meet Agency flameproof and zone requirements.
- Standard 5-year warranty.

INTELLIGENT TRANSMITTER FEATURES AT AN ECONOMICAL PRICE

When you want the flexibility and performance of a configurable, intelligent transmitter but you do not need a digital output signal, these transmitters provide exceptional benefits at a very affordable price:

- Liquid Crystal Display (LCD) digital indicator with on-board pushbuttons
- Pushbutton configuration and calibration:
 - Zero and Span Settings
 - Adjustable Damping
 - Forward or Reverse Output
 - Failsafe Output; Upscale or Downscale
 - Reranging without applying pressure
- Easily upgradeable to FoxCom[™], HART, FOUNDATION fieldbus, or PROFIBUS fully intelligent versions

I/A Series® PRESSURE TRANSMITTER FAMILY

The I/A Series Electronic Pressure Transmitters are a complete family of d/p Cell®, gauge, absolute, multirange, multivariable, and premium performance transmitters, as well as transmitters with remote or direct connect pressure seals, all using field-proven silicon strain gauge sensors and common topworks.

MODULAR ELECTRONICS

A common 4 to 20 mA output electronics module is used with these transmitters. Also, because all configuration and calibration data is stored in the sensor, you can replace this module with another like module without transmitter reconfiguration or recalibration.

Furthermore, if your needs change, the transmitter modular design allows easy migration to other standards, including FoxCom, HART, FOUNDATION Fieldbus, PROFIBUS, and 1 to 5 V dc.

ELECTRONICS VERSION -A TRANSMITTER

This 4 to 20 mA analog output transmitter is a very cost effective analog output transmitter. It provides full configuration capability and represents Invensys Foxboro advancements in providing the greatest functionality for the largest number of applications at the least possible cost to you.

The transmitter even provides the ability to rerange to new calibrated ranges, using the LCD Indicator, without the need to apply calibration pressure.

These transmitters are explosionproof for use in Division 1 hazardous areas and comply with Division 2 requirements. They also provide the flameproof certification for use in Zone 1 hazardous areas.

HIGH PERFORMANCE

Both direct-connected and bracket-mounted transmitters utilize microprocessor-based correction to achieve excellent accuracy and ambient temperature compensation.

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.

STANDARD LCD DIGITAL INDICATOR

A two-line digital indicator with on-board pushbuttons displays the measurement with a choice of units. The pushbuttons allow zero and span adjustments as well as local configuration without the need for a PC-based Configurator.

When local process indication is not required or desired, an optional blind (solid) cover can be substituted for the standard window cover.

CHOOSE MOUNTING CONFIGURATION NEEDED

Direct Connected Transmitter (Figure 1)

Light weight and easy-to-install. Uses 316L ss or Hastelloy C process connections and a choice of either 316L ss, Cobalt-Nickel-Chrome, or Hastelloy C for the sensing diaphragm. See Direct-Connected Transmitters on next page.



Figure 1. Direct Connected Transmitter
(Flameproof Version on Left)

Bracket-Mounted Transmitter (Figure 2)

A large selection of corrosion resistant materials; suitable for applications requiring low spans, vacuum service, and high overrange pressure. See Bracket-Mounted Transmitters on next page.

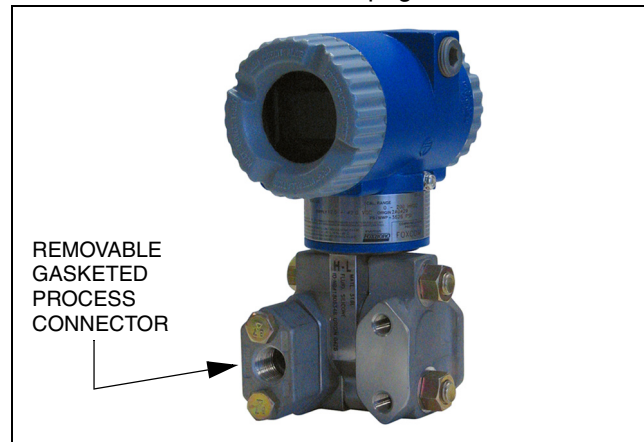


Figure 2. Bracket-Mounted Transmitter with
Conventional Process Connector

DIRECT-CONNECTED TRANSMITTERS — IAP10 AND IGP10 (See Figure 1)

EXCEPTIONAL VALUE

The combination of small size, light weight, direct mounting, standard materials, and wide measurement capability with high performance makes these transmitters an exceptionally cost effective solution for process pressure measurement.

DIRECT PROCESS MOUNTING

Because of their light weight and external threaded connection, these transmitters can be installed directly on process piping without mounting brackets. However, for unique requirements, an optional bracket is offered and connection can be made to the standard 1/4 NPT internal thread.

WIDE RANGEABILITY

Three absolute pressure versions are offered to allow spans from 7 to 21 000 kPa (1 to 3000 psi), and four gauge pressure versions are offered to allow spans from 7 to 42 000 kPa (1 to 6000 psi). Refer to the IGP20 Transmitter section below for gauge pressure vacuum service.

316L ss, HASTELLOY C, AND Co-Ni-Cr PROCESS WETTED PARTS

With process connection of 316L ss or Hastelloy C, and sensor diaphragm available in either 316L ss, Hastelloy C, or highly corrosion resistant Co-Ni-Cr, this transmitter is an excellent choice for the vast majority of process pressure measurements.

HIGH GAUGE PRESSURE VERSIONS

Three high gauge pressure versions with URLs of 52, 105, and 210 MPa (7500, 15 000, and 30 000 psi) are available in the IGP10 line. See PSS 2A-1C13 F.

SANITARY AND PULP AND PAPER VERSIONS

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

FLAMEPROOF DESIGN

The transmitters are designed to meet Agency flameproof and zone requirements.

BRACKET-MOUNTED TRANSMITTERS — IAP20 AND IGP20 (See Figure 2)

SENSOR CORROSION PROTECTION

Choice of Co-Ni-Cr, 316L ss, Gold-Plated 316L ss, Hastelloy C, Monel, or Tantalum materials. High corrosion resistance of Co-Ni-Cr (TI 037-038) means long service life in many difficult applications without the extra cost for exotic materials. Also see TI 37-75b for process application with Co-Ni-Cr and other wetted parts materials.

WIDE RANGEABILITY

Gauge pressure measurement spans may be as low as 0.12 kPa (0.5 inH₂O) to as high as 35 MPa (5000 psi) by choosing one of only six sensors, and absolute pressure spans may be as low as 0.87 kPa (3.5 inH₂O) to as high as 21 MPa (3000 psi) by choosing one of only four sensors. This provides exceptional measurement range capability with a minimum of versions.

EASE OF MOUNTING TWO-VALVE MANIFOLD

Optional two-valve manifold, to isolate transmitter and to vent pressure, is easily mounted directly to the transmitter.

VACUUM SERVICE

A lower range limit of -100 kPa (-14.7 psi, -1 bar or kg/cm²) means that vacuum measurements are easily handled with the versatile IGP20 Gauge Pressure transmitter.

FLAMEPROOF DESIGN

The transmitters are designed to meet Agency flameproof and zone requirements.

PROCESS CONNECTOR

Removable, gasketed process connector (Figure 3) allows a wide range of selections, including 1/4 NPT, 1/2 NPT, Rc 1/4, Rc 1/2, and weld neck connections.

For highly corrosive chemical processes, a 1/2 NPT pvdf (Kynar) insert is installed in the HI-side 316 ss cover and is used as the process connector. In these applications, tantalum is used as the sensor diaphragm material.

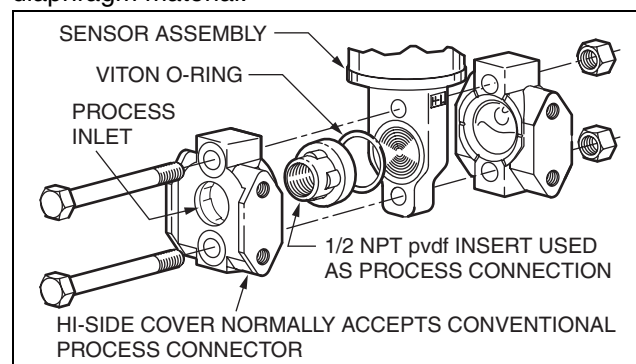


Figure 3. Bracket-Mounted Transmitter Shown with 1/2 NPT pvdf Insert Installed in HI-Side Cover

PRESSURE SEALS

Pressure seals are used with the IAP10, IGP10, IAP20, and IGP20 Series Transmitters when it is necessary to keep the transmitter isolated from the process. A sealed system is used for a process fluid that may be corrosive, viscous, subject to temperature extremes, toxic, sanitary, or tend to collect and solidify.

Tables 1 and 2 list the various seals that can be used with these transmitters. To order a transmitter with seals, both a Transmitter Model Number and Seal Model Number are required. See PSS 2A-1Z11 A for a complete listing of pressure seal models and specifications.

Table 1. Pressure Seals Used with IAP10, IGP10, IAP20, and IGP20 Transmitters

Direct Connect Pressure Seal Assemblies		
Seal Model	Seal Description	Process Connections
PSFLT	Flanged, Direct Connect (Flanged Level), Flush or Extended Diaphragm	ANSI Class 150/300/600 flanges and BS/DIN PN 10/40, 10/16, 25/40 flanges
PSFAD	Flanged, Direct Connect, Recessed Diaphragm	ANSI Class 150, 300, 600, 1500 flanges
PSTAD	Threaded, Direct Connect, Recessed Diaphragm	1/4, 1/2, 3/4, 1, or 1 1/2 NPT internal thread
PSISD	In-Line Saddle Weld, Direct Connect, Recessed Diaphragm	Lower housing of seal is in-line saddle welded to nominal 3- or 4-inch (and larger) Pipe
PSSCT	Sanitary, Direct Connect (Level Seal), Flush Diaphragm	Process Connection to Sanitary Piping with 2- or 3-inch Tri-Clamp
PSSST	Sanitary, Direct Connect (Level Seal), Extended Diaphragm	Process Connection to 2-in Mini Spud or 4-in Standard Spud; Tri-Clamp
Remote Mount, Capillary-Connected Pressure Seal Assemblies		
Seal Model	Seal Description	Process Connections
PSFPS	Flanged, Remote Mount, Flush Diaphragm	ANSI Class 150/300/600 flanges and BS/DIN PN 10/40 flanges
PSFES	Flanged, Remote Mount, Extended Diaphragm	ANSI Class 150/300/600 flanges and BS/DIN PN 10/40, 10/16, 25/40 flanges
PSFAR	Flanged, Remote Mount, Recessed Diaphragm	ANSI Class 150/300/600/1500 flanges
PSTAR	Threaded, Remote Mount, Recessed Diaphragm	1/4, 1/2, 3/4, 1, or 1 1/2 NPT internal thread
PSISR	In-Line Saddle Weld, Remote Mount, Recessed Diaphragm	Lower housing of seal is in-line saddle welded to nominal 3- or 4-inch (and larger) Pipe
PSSCR	Sanitary, Remote Mount, Flush Diaphragm	Process Connection secured with a Tri-Clamp to a 2- or 3-inch pipe
PSSSR	Sanitary, Remote Mount, Extended Diaphragm	Process Connection to 2-in Mini Spud or 4-in Standard Spud; Tri-Clamp

Table 2. I/A Series Pressure Transmitters and Applicable Pressure Seals

Transmitter Model	Used with Pressure Seal Model: (a)												
	FLT	FAD	TAD	ISD	SCT	SST	FPS	FES	FAR	TAR	ISR	SCR	SSR
IAP10	–	✓	✓	✓	–	–	✓	✓	✓	✓	✓	✓	✓
IGP10	–	✓	✓	✓	–	–	✓	✓	✓	✓	✓	✓	✓
IAP20	–	–	–	–	–	–	✓	✓	✓	✓	✓	✓	✓
IGP20	✓	–	–	–	✓	✓	✓	✓	✓	✓	✓	✓	✓

(a) Pressure Seal models are shown with an abbreviated code; all seal codes have a PS prefix; for example, FLT is really PSFLT.

FUNCTIONAL SPECIFICATIONS

Span and Range Limits for IAP10 and IGP10 Transmitters

Span Code	Span Limits			Range Limits (Absolute or Gauge Units)		
	MPa	psi	bar or kg/cm ²	MPa	psi	bar or kg/cm ²
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	0.7 and 21	100 and 3000	7 and 210	0 and 21	0 and 3000	0 and 210
F (a)	14 and 42	2000 and 6000	140 and 420	0 and 42	0 and 6000	0 and 420

(a) Span Limit Code F is applicable to IGP10 Transmitter only.

Maximum Overrange and Proof Pressure Ratings for IAP10 and IGP10 Transmitters

Span Code	Maximum Overrange Pressure Rating (a)			Proof Pressure Rating (a)(b)		
	MPa	psi	bar or kg/cm ²	MPa	psi	bar or kg/cm ²
C	0.31	45	3.15	0.827	120	8.27
D	3.1	450	31.5	8.27	1200	82.7
E	31	4500	315	79.3	11500	793
F (c)	59	8400	588	152	22000	1517

(a) Values listed are in absolute or gauge pressure units, as applicable. Maximum overrange pressure is the maximum pressure that may be applied without causing damage to the transmitter.

(b) Proof pressure ratings meet ANSI/ISA Standard S82.03-1988. Unit may become nonfunctional after application of proof pressure.

(c) Span Limit Code F is applicable to IGP10 Transmitter only.

Span and Range Limits for IAP20 and IGP20 Transmitters

Span Code	Span Limits			Range Limits (Absolute or Gauge Units) (a)		
	kPa	inH ₂ O	mbar	kPa	inH ₂ O	mbar
A (b)	0.12 and 7.5	0.5 and 30	1.2 and 75	-7.5 and +7.5	-30 and +30	-75 and +75
B	0.87(c) and 50	3.5(c) and 200	8.7(c) and 500	-50(a) and +50	-200(a) and +200	-500(a) and +500
	MPa	psi	bar or kg/cm ²	MPa	psi	bar or kg/cm ²
C	0.007 and 0.21	1 and 30	0.07 and 2.1	-0.1(a) and 0.21	-14.7(a) and +30	-1(a) and +2.1
D	0.07 and 2.1	10 and 300	0.7 and 21	-0.1(a) and 2.1	-14.7(a) and +300	-1(a) and +21
E (d)	0.7 and 21	100 and 3000	7 and 210	-0.1(a) and 21	-14.7(a) and +3000	-1(a) and +210
F (b)	1.38 and 35	200 and 5000	13.8 and 350	-0.1 and +35	-14.7 and +5000	-1 and +350

(a) For absolute pressure transmitters (IAP20), the lower range limit is 0.

(b) Span Codes A and F applicable to IGP20 Transmitter only. Also, Span Code A is not available when pressure seals are specified.

(c) For IAP20, the minimum span for factory calibration is 1.2 kPa (5 inH₂O, 12.4 mbar). Can be field reranged within limits shown in table.

(d) When certain options are specified, the upper span and range limit values are reduced as shown in the "Options Impact" table.

Maximum Overrange and Proof Pressure Ratings for IAP 20 and IGP20 Transmitters (a)

Transmitter Configuration (See Model Code for Description of Options)	Overrange Pressure Rating			Proof Pressure Rating (b)		
	MPa	psi	bar or kg/cm ²	MPa	psi	bar or kg/cm ²
Standard with IGP20 Span Code F only	51.8	7500	518	100	14500	1000
Standard (c) or with Option -B2, -D3, or -D7	25	3625	250	100	14500	1000
With Option -B3	20	2900	200	70	11150	700
With Option -D1	16	2320	160	64	9280	640
With Option -B1 or -D5	15	2175	150	60	8700	600
With Option -D2, -D4, -D6, or -D8	10	1500	100	40	6000	400
With Structure Codes 78 and 79 (pvdf insert)	2.1	300	21	8.4	1200	84

(a) Refer to Model Code section for application and restrictions related to the items listed in the table.

(b) Proof pressure ratings meet ANSI/ISA Standard S82.03-1988. Unit may become nonfunctional after application of proof pressure.

(c) Standard with IAP20/IGP20 Span Codes A to E.

FUNCTIONAL SPECIFICATIONS (Cont.)

Impact of Certain Options on IAP20/IGP20 Span and Range Limits (a)

Option	Description (Also see Model Code)	Span and Range Limits Derated to:
-B3	B7-M Bolts and Nuts (NACE)	20 MPa (2900 psi, 200 bar, or kg/cm ²)
-D1	DIN Construction	16 MPa (2320 psi, 160 bar or kg/cm ²)
-D5 or -B1	DIN Construction or 316 ss Bolting	15 MPa (2175 psi, 150 bar or kg/cm ²)
-D2, -D4, -D6, or -D8 (a)	DIN Construction (a)	10 MPa (1500 psi, 100 bar or kg/cm ²) (a)

(a) Refer to Model Code section for application and restrictions related to the items listed in the table.

Output Signal

4 to 20 mA, Linear

Field Wiring Reversal

No transmitter damage

Supply Voltage Requirements and External Loop Load Limitations (Figure 4)

Minimum supply voltage is 11.5 V dc. This can be reduced to 11 V dc using a plug-in jumper in the field wiring compartment terminal block as shown in the "Physical Specifications" section.

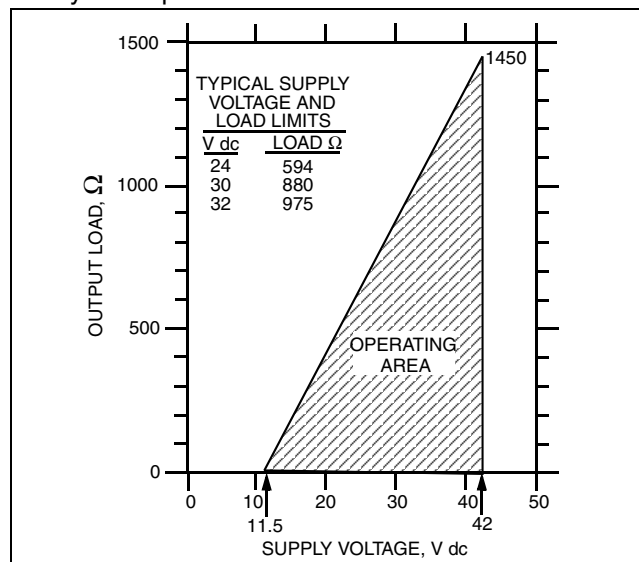


Figure 4. Supply Voltage vs. Output Load

Suppressed Zero and Elevated Zero

Suppressed or elevated zero ranges are acceptable as long as the Span and Range Limits are not exceeded (elevated zero applicable to IGP20 only).

Zeroing for Nonzero-Based Ranges

Dual Function Zeroing is provided to allow zeroing with the 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 applies to the standard LCD Indicator, and External Zero Adjustment option.

Zero and Span Adjustments (See Figure 7)

Zero and span adjustments can be accomplished using the pushbuttons on the LCD indicator.

Optional External Zero Adjustment (See Figure 7)

An external zero pushbutton mechanism 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. The external zero adjustment can be disabled by a configuration selection.

Write Protect Jumper

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

Adjustable Damping

Transmitter response time is normally 0.75 s, or the electronically adjustable setting of 0 (none), 2, 4, or 8 seconds, whichever is greater, for a 90% recovery from an 80% input step per ANSI/ISA S51.1. (For 63.2% recovery, 0.5 s with sensors B to F, and 0.6 s with sensor A.)

FUNCTIONAL SPECIFICATIONS (Cont.)

Minimum Allowable Absolute Pressure vs. Transmitter Temperature

WITH SILICONE FILL FLUID

Full vacuum: up to 121°C (250°F)

WITH FLUORINERT FILL FLUID (FIGURE 5.)

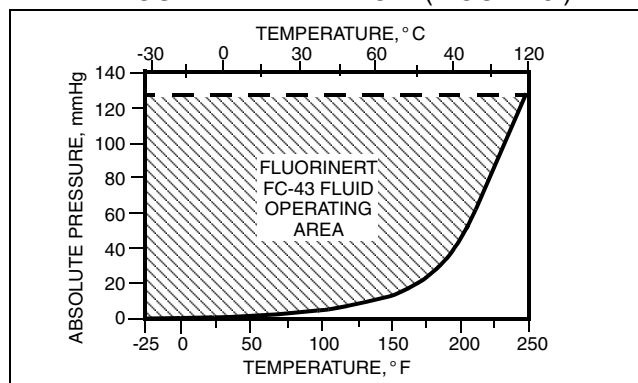


Figure 5. Minimum Allowable Absolute Pressure vs. Transmitter Temperature, Fluorinert FC-43, 2.6 cSt at 25°C (77°F)

European Union Directives

- Complies with Electromagnetic Compatibility Requirements of European EMC Directive 89/336/EEC by conforming to the following CENELEC and IEC Standards: EN 50081-2, EN 50082-2, and IEC 801-2 through 801-6.
- Complies with NAMUR Part 1 Interference Immunity Requirement (EMC).
- Complies with NAMUR 105 overrange and underrange annunciations.
- Conforms to Applicable European Union Directives ("CE" Logo marked on product).

Configuration and Calibration Data, and Electronics Upgradeability

All factory characterization data and user configuration and calibration data are stored in the sensor (Figure 6). 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.

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.

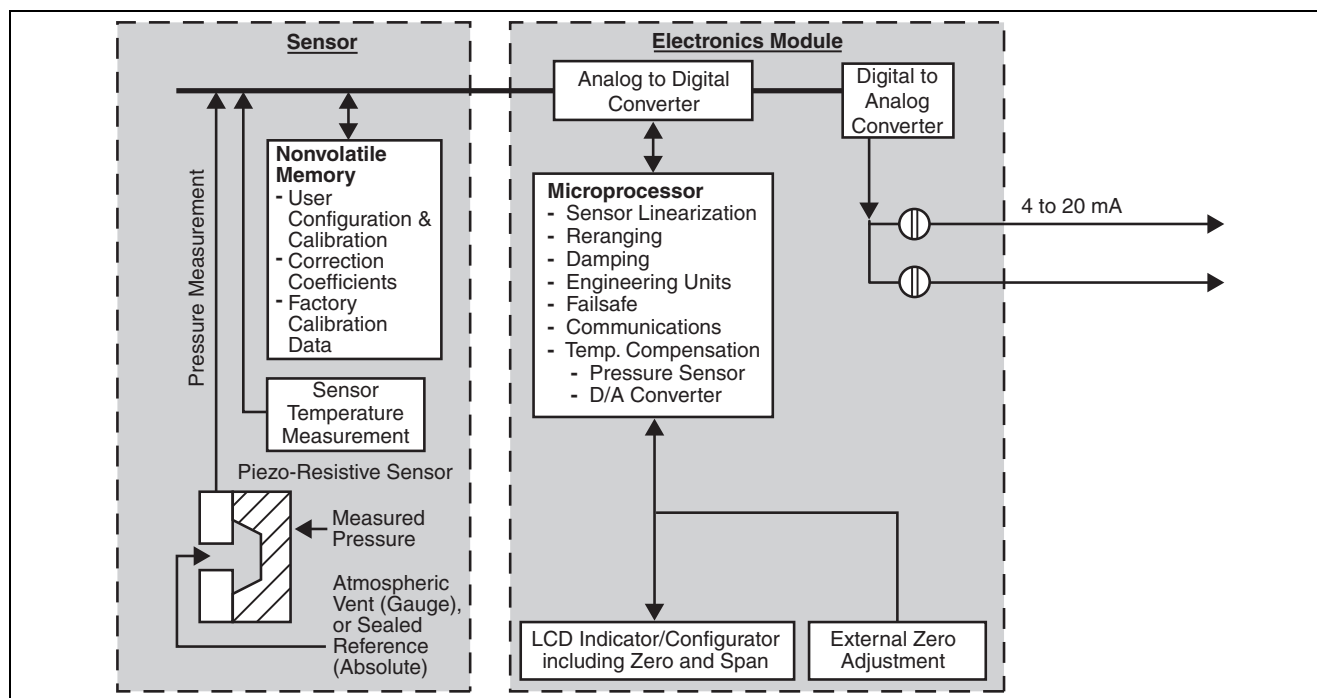


Figure 6. Transmitter Functional Block Diagram

FUNCTIONAL SPECIFICATIONS (Cont.)

Standard LCD Indicator with On-Board Pushbuttons (Figure 7) Provides:

- Two lines; four numeric characters on top line, and seven alphanumeric characters on bottom line.
- Measurement Readout; value on top line and units label on bottom line.
- Configuration and Calibration Prompts.

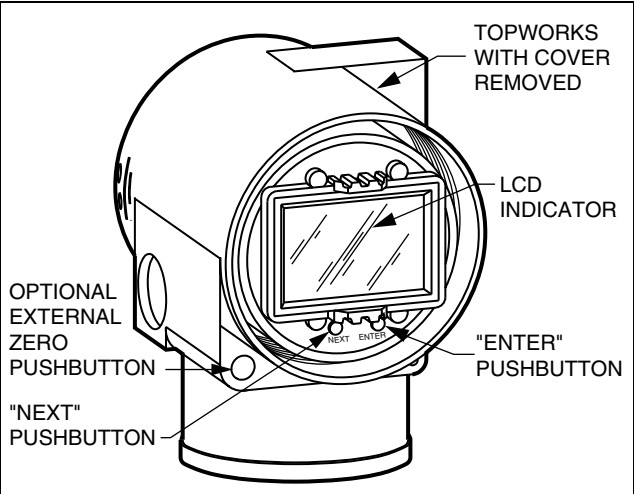


Figure 7. Standard LCD Indicator with Pushbuttons

Optional Custom Configuration (Option -C2)

For the transmitter to be custom configured by the factory, the user must fill out a data form. If this option is not selected, a standard default configuration will be provided. See Tables 3 and 4.

Table 3. Example of Option -C2

Parameter	Standard (Default) Configuration	Example of Custom Configuration Option -C2
Calibrated Range <ul style="list-style-type: none">• Pressure EGU• LRV• URV	per S.O.(a) per S.O. per S.O.	KG/CM2 (a) 0 1
Output Direction	Forward	Forward
Damping	None	2
Failsafe Action	Upscale	Downscale
Ext. Zero Option	Enabled	Disabled
Other <ul style="list-style-type: none">• Label (2nd line)• Display LRV• Display URV	(b) (c) (c)	KG/CM2 (b) 0 (c) 1 (c)

- (a) Select from list in Table 4 below.
(b) Same as pressure units used for calibrated range, or percent.
(c) Same as calibrated range or 0 and 100 for percent.

Table 4.
Available Pressure Units in Calibrated Range (a)

inH ₂ O	inHg	kPa	mbar	kg/cm ²
ftH ₂ O	mmHg	MPa	bar	psi
mmH ₂ O	Pa	torr	g/cm ²	atm

- (a) Absolute or gauge pressure units, as applicable.

NOTE

There is a maximum of 4 digits for entering range values.

OPERATING, STORAGE, AND TRANSPORTATION CONDITIONS

Influence	Reference Operating Conditions	Normal Operating Conditions (a)	Operative Limits (a)	Storage and Transportation Limits
Process Connection Temp. • with Silicone Fill Fluid • with Fluorinert Fill Fluid	• 24 \pm 2°C (75 \pm 3°F) • 24 \pm 2°C (75 \pm 3°F)	• -29 to + 82°C (-20 to +180°F) • -29 to + 82°C (-20 to +180°F)	• -46 and +121°C (b) (-50 and +250°F) (b) • -29 and +121°C (-20 and +250°F)	• Not Applicable • Not Applicable
Electronics Temperature • with LCD Indicator (Note c)	• 24 \pm 2°C (75 \pm 3°F) • 24 \pm 2°C (75 \pm 3°F)	• -29 to + 82°C (g) (-20 to +180°F) (g) -20 to + 82°C (g) (-4 to +180°F) (g)	• -40 and +85°C (g) (-40 and +185°F) (g) • -29 and +85°C (g) (-20 and +185°F) (g)	• -54 and +85°C (-65 and +185°F) • -54 and +85°C (-65 and +185°F)
Relative Humidity (Note d)	50 \pm 10%	0 to 100%	0 and 100%	0 and 100% Noncondensing
Supply Voltage - mA Output	30 \pm 0.5 V dc	11.5 to 42 V dc (e)	11.5 and 42 V dc (e)	Not Applicable
Output Load - mA Output	650 Ω	0 to 1450 Ω	0 and 1450 Ω	Not Applicable
Vibration	1 m/s ² (0.1 "g")	6.3 mm (0.25 in) Double Amplitude: from 5 to 15 Hz with Aluminum Housing and from 5 to 9 Hz with 316 ss Housing ----- 0 to 30 m/s ² (0 to 3 "g") from 15 to 500 Hz with Aluminum Housing; and 0 to 10 m/s ² (0 to 1 "g") from 9 to 500 Hz with 316 ss Housing		11 m/s ² (1.1 "g") from 2.5 to 5 Hz (in Shipping Package)
Mounting Position	Upright (f)	Upright (f)	No Limit	Not Applicable

(a) Temperature limits are derated as follows:

IAP20 and IGP20 Transmitters:

to -7 and +82°C (20 and 180°F) when Structure Codes 78/79 (pvd inserts) are used, and
to 0 and 60°C (32 and 140°F) when DIN Construction Options D2/D4/D6/D8 are used.

(b) Selection of Option -J extends the low temperature limit of transmitters with silicone filled sensors down to -50°C (-58°F).

(c) Although the LCD will not be damaged at any temperature within the "Storage and Transportation Limits", updates will be slowed and readability decreased at temperatures outside the "Normal Operating Conditions".

(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; see "Physical Specifications" sections.

(f) Sensor process wetted diaphragms in a vertical plane for IAP20 and IGP20 Transmitter.

(g) Refer to the Electrical Safety Specifications section for a restriction in ambient temperature with certain electrical certifications.

PERFORMANCE SPECIFICATIONS

Zero-Based Calibrations; Cobalt-Nickel-Chromium or Stainless Steel Sensor with Silicone Fluid;
Under Reference Operating Conditions unless otherwise specified;
URL = Upper Range Limit, and Span = Calibrated Span

Accuracy (includes Linearity, Hysteresis, and Repeatability)

±0.20% of Span

Small Span Accuracy for Spans <5% and <6.7% of URL

See Table 5 below.

Table 5. Accuracy with Small Spans

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

(a) See Model Code for Span Codes applicable to each transmitter.

Stability

Long term drift is less than ±0.05% 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:

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

Power-Up Time

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

Supply Voltage Effect

The output changes less than 0.005% of span for each 1 V change within the specified supply voltage requirements. See Figure 4.

Position Effect

The transmitter may be mounted in any position. Any zero effect caused by the mounting position can be eliminated by rezeroing. There is no span effect.

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. 801-3.)

Vibration Effect

Total effect: ±0.2% of URL per “g” for vibrations in the frequency range of 5 to 500 Hz; with double amplitudes of 6.35 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 transmitters with aluminum housings; and with double amplitudes of 6.35 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 transmitters with 316 ss housings.

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. 801-5.)

Ambient Temperature Effect

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

FOR THE IAP10 AND IGP10 TRANSMITTERS

Span Code (a)	Ambient Temperature Effect
C, D, E, and F	±(0.08% URL + 0.1% Span)

(a) Span Limit Code F applicable to IGP10 Transmitter only.

FOR THE IAP20 AND IGP20 TRANSMITTERS

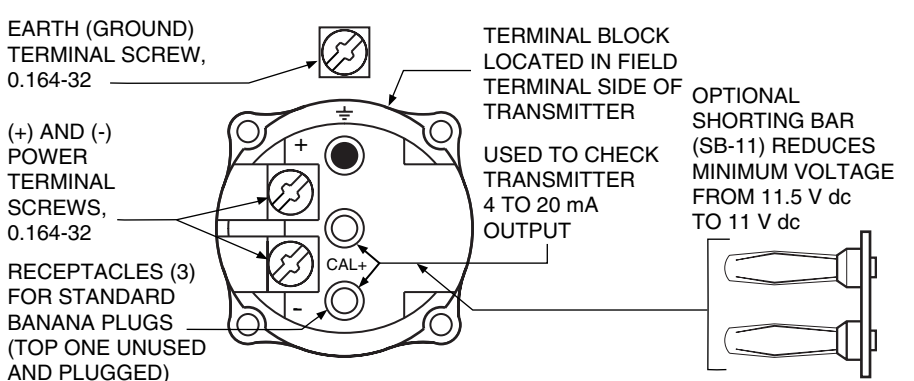
Span Code	Ambient Temperature Effect
A (a)	±(0.18% URL + 0.15% Span)
B and C	±(0.03% URL + 0.20% Span)
D	±(0.05% URL + 0.18% Span)
E and F (a)	±(0.08% URL + 0.15% Span)

(a) Span Limit Codes A and F applicable to IGP20 Transmitter only.

NOTE

For additional ambient temperature effect when pressure seals are used, see PSS 2A-1Z11 A.

PHYSICAL SPECIFICATIONS

Description	Direct Connected Absolute and Gauge Pressure Transmitters IAP10 and IGP10	Bracket-Mounted Absolute and Gauge Pressure Transmitters IAP20 and IGP20
Process Wetted Parts Mat'ls. (High Pressure Side) <ul style="list-style-type: none"> • Process Connection • Gaskets • Sensor Diaphragm 	<ul style="list-style-type: none"> • 316L ss or Hastelloy C • Not Applicable • 316L ss, Co-Ni-Cr, or Hastelloy C 	<ul style="list-style-type: none"> • Carbon Steel, 316 ss, Hastelloy C, Monel, or pvdf (Kynar) • Glass-filled ptfе (Chemloy), Viton • Co-Ni-Cr, 316L ss, Gold-plated 316L ss, Monel, Hastelloy C, or Tantalum
Reference Side Materials (Atmospheric Pressure Side)	IGP10 Transmitter: <ul style="list-style-type: none"> • Silicon, Pyrex, RTV, and 316 ss IAP10 Transmitter: <ul style="list-style-type: none"> • N/A 	Sensor Diaphragm: <ul style="list-style-type: none"> • Same as specified for High Pressure side process wetted material. Cover: <ul style="list-style-type: none"> • 316 ss
Sensor Fill Fluid	Silicone or Fluorinert	Silicone or Fluorinert
Bolts and Nuts for Process Cover and Connector	N/A	Standard Bolting: <ul style="list-style-type: none"> • ASTM A193, Grade B7 Bolts • ASTM A194, Grade 2H Nuts Optional Bolting: <ul style="list-style-type: none"> • 316 ss, Type 17-4 ss, or B7M (NACE)
Electrical Housing and Housing Covers	Two compartments to separate electronics from field connections. Material is low copper (1% maximum) die-cast aluminum alloy with epoxy finish; or 316 ss.	
Environmental Protection	Dusttight and weatherproof per IEC IP66 and NEMA 4X.	
Electronics Module	Printed wiring assemblies are conformally coated for moisture and dust protection.	
Electrical Connections	1/2 NPT, PG 13.5, or M20 entrances on both sides of electronics housing, as specified. Unused entrance must be plugged to ensure moisture and RFI protection (aluminum or 316 ss plug supplied by Invensys Foxboro).	
Mounting Position	The transmitter may be mounted in any orientation.	
Approximate Mass (a)	Standard Transmitter 1.5 kg (3.3 lb) With 316 ss Housing Add 1.1 kg (2.4 lb)	With Process Connectors 4.2 kg (9.2 lb) Without Process Connectors 3.5 kg (7.8 lb) With 316 ss Housing Add 1.1 kg (2.4 lb)
Field Terminal Connections	 <p>EARTH (GROUND) TERMINAL SCREW, 0.164-32</p> <p>(+) AND (-) POWER TERMINAL SCREWS, 0.164-32</p> <p>RECEPTACLES (3) FOR STANDARD BANANA PLUGS (TOP ONE UNUSED AND PLUGGED)</p> <p>TERMINAL BLOCK LOCATED IN FIELD TERMINAL SIDE OF TRANSMITTER</p> <p>USED TO CHECK TRANSMITTER 4 TO 20 mA OUTPUT</p> <p>OPTIONAL SHORTING BAR (SB-11) REDUCES MINIMUM VOLTAGE FROM 11.5 V dc TO 11 V dc</p>	

(a) LCD Indicator is standard with these transmitters. For approximate mass with pressure seals, see PSS 2A-1Z11 A.

ELECTRICAL SAFETY SPECIFICATIONS**IAP10 and IGP10 Transmitters**

Testing Laboratory, Types of Protection, and Area Classification	Application Conditions	Electrical Safety Design Code
ATEX flameproof; II 2 GD EEx d IIC, Zone 1.	Temperature Class T6, T85°C, Ta = -40°C to +75°C.	D
CSA explosionproof for Class I, Division 1, Groups B, C, and D; and dust-ignitionproof for Class II, Division 1, Groups E, F, and G; and Class III, Division 1.	Maximum Ambient Temperature 85°C.	C
CSA Class I, Division 2, Groups A, B, C, and D; Class II, Division 2, Groups F and G; and Class III, Division 2.	Temperature Class T6 at 40°C and T4A at 85°C maximum ambient.	
CSA field device zone certified flameproof Ex d IIC. Also, all certifications of Code C above.	Maximum Ambient Temperature 85°C.	B
FM explosionproof for Class I, Division 1, Groups B, C, and D; and dust-ignitionproof for Class II, Division 1, Groups E, F, and G; and Class III, Division 1.	Temperature Class T6 at 80°C and T5 at 85°C maximum ambient.	F
FM nonincendive for Class I, Division 2, Groups A, B, C, and D; Class II, Division 2, Groups F and G, and Class III, Division 2.	Temperature Class T4A at 40°C and T4 at 85°C maximum ambient.	
FM field device zone certified flameproof AEx d IIC. Also, all certifications of Code F above.	Temperature Class T6 at 75°C maximum ambient.	G
IECEX flameproof, Ex d IIC, Zone 1.	Temperature Class T6, Ta = -40°C to +75°C.	V

NOTES

1. Transmitter has been designed to meet the electrical safety descriptions listed. Contact Invensys Foxboro for information or status of testing laboratory approvals or certifications.
2. See Model Codes section for availability of Electrical Safety Design Codes with particular Transmitter Models and Structures.
3. Refer to applicable Instruction Manual for application conditions and connectivity requirements.

ELECTRICAL SAFETY SPECIFICATIONS (Cont.)**IAP20 and IGP20 Transmitters**

Testing Laboratory, Types of Protection, and Area Classification	Application Conditions	Electrical Safety Design Code
ATEX flameproof; II 2 GD EEx d IIC, Zone 1.	Temperature Class T6, T85°C, Ta = -40°C to +75°C.	D
CSA explosionproof for Class I, Division 1, Groups B, C, and D; and dust-ignitionproof for Class II, Division 1, Groups E, F, and G; and Class III, Division 1.	Maximum Ambient Temperature 85°C.	C
CSA Class I, Division 2, Groups A, B, C, and D; Class II, Division 2, Groups F and G; and Class III, Division 2.	Temperature Class T6 at 40°C and T4A at 85°C maximum ambient.	
CSA field device zone certified flameproof Ex d IIC. Also, all certifications of Code C above.	Maximum Ambient Temperature 85°C.	B
FM explosionproof for Class I, Division 1, Groups B, C, and D; and dust-ignitionproof for Class II, Division 1, Groups E, F, and G; and Class III, Division 1.	Temperature Class T6 at 80°C and T5 at 85°C maximum ambient.	F
FM nonincendive for Class I, Division 2, Groups A, B, C, and D; Class II, Division 2, Groups F and G; and Class III, Division 2.	Temperature Class T4A at 40°C and T4 at 85°C maximum ambient.	
FM field device zone certified flameproof AEx d IIC. Also, all certifications of Code F above.	Temperature Class T6 at 75°C maximum ambient.	G
IECEx flameproof, Ex d IIC, Zone 1.	Temperature Class T6, Ta = -40°C to +75°C	V

NOTE

1. Transmitter has been designed to meet the electrical safety descriptions listed. Contact Invensys Foxboro for information or status of testing laboratory approvals or certifications.
2. See Model Codes section for availability of Electrical Safety Design Codes with particular Transmitter Models and Structures.
3. Refer to applicable Instruction Manual for application conditions and connectivity requirements.

MODEL CODES

IAP10 and IGP10 Transmitters

Description				Model
I/A Series, Electronic, Direct Connected Absolute Pressure Transmitter				IAP10 (a)
I/A Series, Electronic, Direct Connected Gauge Pressure Transmitter				IGP10 (a)
Electronics Versions and Output Signal				
Analog; 4 to 20 mA dc Output (Version -A)				-A
Structure Code - Select from one of the following six groups:				
1. Transmitter Only (no seals)				
Process		Sensor		
Connection	Sensor	Fill Fluid	Connection Type	
316L ss	Co-Ni-Cr	Silicone	1/2 NPT External Thread, 1/4 NPT Internal Thread	20
316L ss	Co-Ni-Cr	Fluorinert	1/2 NPT External Thread, 1/4 NPT Internal Thread	21
316L ss	316L ss	Silicone	1/2 NPT External Thread, 1/4 NPT Internal Thread	22
316L ss	316L ss	Fluorinert	1/2 NPT External Thread, 1/4 NPT Internal Thread	23
316L ss	Hastelloy C	Silicone	1/2 NPT External Thread, 1/4 NPT Internal Thread	30
316L ss	Hastelloy C	Fluorinert	1/2 NPT External Thread, 1/4 NPT Internal Thread	31
2. Transmitter Prepared for Foxboro Model Coded Seals (b)				
Transmitter Prepared for Foxboro Direct Connect Seal; Silicone Fill in Sensor (c)				D1
Transmitter Prepared for Foxboro Direct Connect Seal; Fluorinert Fill in Sensor (IGP10 only) (c)				D2
Transmitter Prepared for Foxboro Remote Mount Seal; Silicone Fill in Sensor (d)				S3
Transmitter Prepared for Foxboro Remote Mount Seal; Fluorinert Fill in Sensor (IGP10 only) (d)				S4
3. Transmitters Prepared for non-Foxboro Seals				
Transmitter Prepared for Remote Seal; Silicone Fill in Sensor (e)				SC
Transmitter Prepared for Remote Seal; Fluorinert Fill in Sensor (f)				SD
4. Flameproof Transmitter Only (no seals)				
Process		Sensor		
Connection	Sensor	Fill Fluid	Connection Type	
316L ss	316L ss	Silicone	1/2 NPT External Thread, 1/4 NPT Internal Thread	52
316L ss	316L ss	Fluorinert	1/2 NPT External Thread, 1/4 NPT Internal Thread	53
316L ss	Hastelloy C	Silicone	1/2 NPT External Thread, 1/4 NPT Internal Thread	60
316L ss	Hastelloy C	Fluorinert	1/2 NPT External Thread, 1/4 NPT Internal Thread	61
Hastelloy C	Hastelloy C	Silicone	1/2 NPT External Thread, 1/4 NPT Internal Thread	62
Hastelloy C	Hastelloy C	Fluorinert	1/2 NPT External Thread, 1/4 NPT Internal Thread	63
5. Flameproof Transmitter Prepared for Foxboro Model Coded Seals (b)				
Flameproof Transmitter Prepared for Direct Connect Seal; Silicone Fill in Sensor (c)				D5
Flameproof Transmitter Prepared for Direct Connect Seal; Fluorinert Fill in Sensor (IGP10 only) (c)				D6
Flameproof Transmitter Prepared for Remote Mount Seal; Silicone Fill in Sensor (d)				S5
Flameproof Transmitter Prepared for Remote Mount Seal; Fluorinert Fill in Sensor (IGP10 only) (d)				S6
6. Flameproof Transmitter Prepared for non-Foxboro Seals				
Flameproof Transmitter Prepared for Remote Seal; Silicone Fill in Sensor (e)				SH
Flameproof Transmitter Prepared for Remote Seal; Fluorinert Fill in Sensor (f)				SJ
Span Limits - Absolute or Gauge Pressure Units, as Applicable				
MPa	psi	bar or kg/cm²		
0.007 and 0.21	1 and 30	0.07 and 2.1		C
0.07 and 2.1	10 and 300	0.7 and 21		D
0.7 and 21	100 and 3000	7 and 210		E
14 and 42	2000 and 6000	140 and 420 (IGP10 only)		F

Model Code continued on next page

MODEL CODES (Cont.)**IAP10 and IGP10 Transmitters (Cont.)**

<u>Description</u>	
<u>Conduit Connection and Housing Material</u>	
1/2 NPT Conduit Connection, Aluminum Housing	1
PG 13.5 Conduit Connection, Aluminum Housing (With Electrical Safety Code D only)	2
1/2 NPT Conduit Connection, 316 ss Housing	3
PG 13.5 Conduit Connection, 316 ss Housing (With Electrical Safety Code D only)	4
M20 Conduit Connection, Both Sides, Aluminum Housing (With Electrical Safety Code D only)	5
M20 Conduit Connection, Both Sides, 316 ss Housing (With Electrical Safety Code D only)	6
<u>Electrical Safety (See Electrical Safety Specifications Section for Description and Approval Status)</u>	
ATEX II 2 GD, EEx d IIC, Zone 1 (g)(j)	D
CSA Certifications: Division 1 explosionproof and dust-ignitionproof (h) Division 2, Classes I, II, and III	C
CSA zone certified flameproof, Ex d IIC. Also all certifications of Code C above. (g)(j)	B
FM Approvals: Division 1 explosionproof and dust-ignitionproof (h) Division 2 nonincendive, Classes I, II, and III	F
FM zone approved flameproof, AEx d IIC. Also all certifications of Code F above. (g)(j)	G
IECEx flameproof, Ex d IIC, Zone 1 (g)(j)	V
<u>Optional Selections</u> See descriptions below.	
<u>Mounting Bracket Set (k)</u>	
Painted Steel Bracket with Plated Steel Bolts, 1/2 NPT (with Conduit Connection Codes 1 and 3 only)	-M1
Stainless Steel Bracket with Stainless Steel Bolts, 1/2 NPT (with Conduit Connection Codes 1 and 3 only)	-M2
Painted Steel Bracket with Plated Steel Bolts, PG 13.5 (with Conduit Connection Codes 2 and 4 only)	-M3
Stainless Steel Bracket with Stainless Steel Bolts, PG 13.5 (with Conduit Connection Codes 2 and 4 only)	-M4
Painted Steel Bracket with Plated Steel Bolts, M20 (with Conduit Connection Codes 5 and 6 only)	-M5
Stainless Steel Bracket with Stainless Steel Bolts, M20 (with Conduit Connection Codes 5 and 6 only)	-M6
Stainless Steel Bracket with Stainless Steel Bolts (with Structure Codes 52, 53, 60-63, S5, S6, SH & SJ only)	-M7
<u>Blind (Solid) Cover over Standard LCD Indicator</u>	
Blind (Solid) Cover replaces Window Cover	-L2
<u>Vent Screw and Block & Bleed Valve</u>	
316 ss Vent Screw in Process Connection (Not with Structure Codes 32 or 33, or Pressure Seals)	-V1
Block and Bleed Valve, Carbon Steel (Not with Pressure Seals)	-V2
Block and Bleed Valve, 316 ss (Not with Pressure Seals)	-V3
Block and Bleed Valve, 316 ss w/Monel Trim (Not with Pressure Seals)	-V4
<u>Conduit Thread Adapters</u>	
Hawke-Type 1/2 NPT Cable Gland for use with Conduit Connection Codes 1 and 3 only (I)	-A1
M20 Connector for use with Conduit Connection Codes 1 and 3 only (I)	-A3
<u>Electronics Housing Features</u>	
External Zero Adjustment	-Z1
Custody Transfer Lock and Seal	-Z2
External Zero Adjustment and Custody Transfer Lock and Seal	-Z3
<u>Custom Factory Configuration</u>	
Full Factory Configuration (Requires Configuration Form to be filled out)	-C2
<u>Cleaning and Preparation</u>	
Unit Degreased - for Silicone Filled Sensors Only Not for Oxygen/Chlorine Service, Option -V1, or Pressure Seals	-X1
Cleaned and Prepared for Oxygen Service - for Fluorinert Filled Sensors Only Not with Option -V1, or Pressure Seals	-X2
Cleaned and Prepared for Chlorine Service - with Structure Code 33 Only Not with Option -V1, or Pressure Seals	-X3

Model Code continued on next page

MODEL CODES (Cont.)**IAP10 and IGP10 Transmitters (Cont.)**

Description	
<u>Instruction Books (Common MI, Brochure, and Full Documentation Set on CD-ROM is Standard)</u> Without Instruction Book and CD - Only "Getting Started" Brochure is supplied	-K1
<u>Miscellaneous Optional Selections</u> G 1/2 B Manometer Process Connection (Not Available with Option -V1 or Pressure Seals) Low Temperature Operative Limit of Electronics Housing Extended Down to -50°C (-58°F) (m) R 1/2 Process Connection (1/2 NPT to R 1/2 Adapter) (n) Supplemental Customer Tag (Stainless Steel Tag wired onto Transmitter)	-G -J -R -T

- (a) Refer to PSS 2A-1C13 F for very high GP versions with upper range limits of 52, 105, and 210 MPa (7500, 15000, and 30000 psi). Refer to PSS 2A-1C13 K and PSS 2A-1C13 L for AP and GP versions for sanitary and pulp/paper industries, respectively.
- (b) Both transmitter and pressure seal Model Numbers are required. Refer to PSS 2A-1Z11 A for pressure seal Model Codes.
- (c) Direct Connect Seal Models that may be specified are PSTAD, PSFAD, and PSISD.
- (d) Remote Mount Seal Models that may be specified are PSFPS, PSFES, PSFAR, PSTAR, PSISR, PSSCR, and PSSSR.
- (e) For transmitters with Silicone fill prepared for remote seal by others, specify Structure Code 22 or 52.
- (f) For transmitters with Fluorinert fill prepared for remote seal by others, specify Structure Code 23 or 53.
- (g) Electrical Safety Codes D, B, G and V are only available with flameproof Structure Codes 52, 53, D5, D6, S5, S6, SH, and SJ.
- (h) Electrical Safety Codes C and F are not available with flameproof Structure Codes 52, 53, D5, D6, S5, S6, SH, and SJ.
- (j) A cover lock is standard construction with Electrical Safety Codes D, B, G and V.
- (k) Mounting sets not offered with direct mounted seals. However, if a direct mounted PSTAD threaded seal with a 1/4 NPT process connection is used, then a mounting set is recommended.
- (l) Available with Electrical Safety CodeD only.
- (m) Not available with Fluorinert fill in sensor or seal.
- (n) Not available with pressure seals, or Hastelloy C sensors.

MODEL CODES (Cont.)**IAP20 and IGP20 Transmitters**

Description			Model
I/A Series, Electronic, Bracket-Mounted Absolute Pressure Transmitter			IAP20
I/A Series, Electronic, Bracket-Mounted Gauge Pressure Transmitter			IGP20
Electronics Versions and Output Signal			
Analog; 4 to 20 mA dc Output (Version -A)			-A
Structure Code - Select from one of the following three groups:			
1. Transmitter			
Hi-Side Cover	Sensor	Sensor Fill Fluid	
Steel	Co-Ni-Cr	Silicone	10
Steel	Co-Ni-Cr	Fluorinert	11
Steel	316L ss	Silicone	12
Steel	316L ss	Fluorinert	13
Steel	Hastelloy C	Silicone	16
Steel	Hastelloy C	Fluorinert	17
316 ss	Co-Ni-Cr	Silicone	20
316 ss	Co-Ni-Cr	Fluorinert	21
316 ss	316L ss	Silicone	22
316 ss	316L ss	Fluorinert	23
316 ss	316L ss, Gold Plated	Silicone	2G
316 ss	Monel	Silicone	24
316 ss	Monel	Fluorinert	25
316 ss	Hastelloy C	Silicone	26
316 ss	Hastelloy C	Fluorinert	27
Monel	Monel	Silicone	34
Monel	Monel	Fluorinert	35
Hastelloy C	Hastelloy C	Silicone	46
Hastelloy C	Hastelloy C	Fluorinert	47
Hastelloy C	Tantalum	Silicone	48
Hastelloy C	Tantalum	Fluorinert	49
pvd Insert (Kynar)	Tantalum	Silicone (Used with Process Connector Type 7 below)	78 (a)
pvd Insert (Kynar)	Tantalum	Fluorinert (Used with Process Connector Type 7 below)	79 (a)
2. Transmitter Prepared for Foxboro Model Coded Seals (b)			
Transmitter Prepared for Remote Seal on HI Side; Silicone fill in sensor			S3 (c)
Transmitter Prepared for Remote Seal on HI Side; Fluorinert fill in sensor (IGP20 only)			S4 (c)
Transmitter Prepared for PSFLT, PSSCT, or PSSST Seal, HI Side; Silicone fill in sensor (IGP20 only)			F1
Transmitter Prepared for PSFLT, PSSCT, or PSSST Seal, HI Side; Fluorinert fill in sensor (IGP20 only)			F2
3. Transmitter Prepared for non-Foxboro Seals			
Transmitter Prepared for Remote Seal; Silicone Fill in Sensor			SC
Transmitter Prepared for Remote Seal; Fluorinert Fill in Sensor			SD
Span Limits (Absolute or Gauge Pressure Units)			
kPa	inH₂O	mbar	
0.12 and 7.5	0.5 and 30	1.2 and 75 (IGP20 only)	A (d)
0.87 and 50	3.5 and 200	8.7 and 500	B
MPa	psi	bar or kg/cm²	
0.007 and 0.21	1 and 30	0.07 and 2.1	C
0.07 and 2.1	10 and 300	0.7 and 21	D
0.7 and 21	100 and 3000	7 and 210	E (e)
1.38 and 35	200 and 5000	13.8 and 350 (IGP20 only)	F (e)

Model Code continued on next page

MODEL CODES (Cont.)**IAP20 and IGP20 Transmitters (Cont.)**

Process Connector Type (Material Same as Process Cover Material)				
None; connect directly to process cover (not available with Structure Codes 78 and 79)				0
1/4 NPT (not available with Structure Codes 46, 47, 48, 49, 78, 79)				1
1/2 NPT (not available with Structure Codes 78, 79)				2
Rc 1/4 (not available with Structure Codes 46, 47, 48, 49, 78, 79)				3
Rc 1/2 (not available with Structure Codes 78, 79)				4
1/2 Schedule 80 Welding Neck (not available with Structure Codes 46, 47, 48, 49, 78, 79)				6
None; pvdf (Kynar) insert tapped for 1/2 NPT on side of 316 ss Process Cover (only with Codes 78/79)				7
Conduit Connection and Housing Material				
1/2 NPT Conduit Connection, Aluminum Housing				1
PG 13.5 Conduit Connection, Aluminum Housing (With Electrical Safety Code D only)				2
1/2 NPT Conduit Connection, 316 ss Housing				3
PG 13.5 Conduit Connection, 316 ss Housing (With Electrical Safety Code D only)				4
M20 Conduit Connection, Both Sides, Aluminum Housing				5
M20 Conduit Connection, Both Sides, 316 ss Housing				6
Electrical Safety (Also see Electrical Safety Specifications section for descriptions and approval status)				
ATEX II 2 GD, EEx d IIC, Zone 1 (h)				D
CSA Certifications: Division 1 explosionproof and dust-ignitionproof Division 2, Classes I, II, and III				C
CSA zone certified flameproof, Ex d IIC. Also all certifications of Code C above. (h)				B
FM Approvals: Division 1 explosionproof and dust-ignitionproof (h) Division 2 nonincendive, Classes I, II, and III				F
FM zone approved flameproof, AEx d IIC. Also all approvals of Code F above. (h)				G
IECEx flameproof, Ex d IIC, Zone 1 (h)				V
Optional Selections				
Refer to Optional Selection descriptions below.				
Mounting Bracket Set - Not available with Direct Connect Seals, Structure Codes F1 and F2				
Standard Style Painted Steel Bracket with Plated Steel Bolts				-M1
Standard Style Stainless Steel Bracket with Stainless Steel Bolts				-M2
Universal Style Stainless Steel Bracket with Stainless Steel Bolts				-M3
Blind (Solid) Cover over Standard LCD Indicator				
Blind (Solid) Cover replaces Window Cover				-L2
DIN 19213 Construction used with Process Connector Code "0" and 316 ss Process Covers Only (h)				
Process	Cover	Connector Screw		
Cover	Screw			
Type	Material	Size	Material	
Single Ended (f)	Steel	M10 (by User)	N/A	-D1
Double Ended (f)(g) (Blind Kidney Flange on back)	Steel	M10	Steel	-D2
Single Ended	Steel	7/16 (by User)	N/A	-D3
Double Ended (f)(g) (Blind Kidney Flange on back)	Steel	7/16	Steel	-D4
Single Ended (f)	316 ss	7/16 (by User)	N/A	-D5
Double Ended (f)(g) (Blind Kidney Flange on back)	316 ss	7/16	316 ss	-D6
Single Ended	17-4 ss	7/16 (by User)	N/A	-D7
Double Ended (f)(g) (Blind Kidney Flange on back)	17-4 ss	7/16	17-4 ss	-D8

Model Code continued on next page

MODEL CODES (Cont.)**IAP20 and IGP20 Transmitters (Cont.)**

<u>Optional Selections (Cont.)</u>	
<u>Cleaning and Preparation - Not Available w/Gold-Plated Sensor, Structure 2G (h)</u>	
Unit Degreased - for Silicone Filled Sensors Only (Not for Oxygen/Chlorine/Other Fluids that may react with Silicone)	-X1
Cleaned and Prepared for Oxygen Service - for Fluorinert Filled Sensors Only (Not available with Carbon Steel Covers or with Silicone Filled Sensors)	-X2
Cleaned and Prepared for Chlorine Service - for Fluorinert Filled Sensors Only (j) (Not available with Carbon Steel Covers or with Silicone Filled Sensors)	-X3
<u>Bolting for Process Covers/Connectors (k)</u>	
316 ss Bolts and Nuts (Pressure Derated) (f)	-B1
17-4 ss Bolts and Nuts (j)	-B2
B7M Bolts and Nuts (NACE)(Pressure Derated) (f)	-B3
<u>Conduit Thread Adapters</u>	
Hawke-Type 1/2 NPT Cable Gland for use with Conduit Connection Codes 1 and 3 (l)	-A1
M20 Connector for use with Conduit Connection Codes 1 and 3 (l)	-A3
<u>Electronics Housing Features</u>	
External Zero Adjustment	-Z1
Custody Transfer Lock and Seal	-Z2
External Zero Adjustment and Custody Transfer Lock and Seal	-Z3
<u>Custom Factory Configuration</u>	
Full Factory Configuration (Requires Configuration Form to be filled out)	-C2
<u>Tubing Connectors - Specify Only One (Only 316 ss process covers; no side vents on cover) (h)</u>	
Steel, Connecting 6 mm Tubing to 1/4 NPT Process Connector	-E1
Steel, Connecting 12 mm Tubing to 1/2 NPT Process Connector	-E2
316 ss, Connecting 6 mm Tubing to 1/4 NPT Process Connector	-E3
316 ss, Connecting 12 mm Tubing to 1/2 NPT Process Connector	-E4
<u>Gaskets</u>	
Gasket for Vacuum Service with Pressure Seals (m)	-G1
<u>Instruction Books (Common MI, Brochure, and Full Documentation Set on CD-ROM is Standard)</u>	
Without Instruction Book and CD - Only "Getting Started" Brochure is supplied	-K1
<u>Miscellaneous Optional Selections</u>	
Low Temperature Operative Limit of Electronics Housing Extended Down to -50°C (-58°F) Not available with sensors and seals with fluorinert fill, Structure Codes 78 and 79, or DIN Options -D2, -D4, -D6, and -D8	-J
Vent Screw in side of Process Cover (with 316 ss process covers only) Not available with seals, DIN construction options, or Structure Codes 78 and 79	-V (h)
Supplemental Customer Tag (Stainless Steel Tag wired onto Transmitter)	-T
Examples: IGP20-A20B21F-M1Z2; IAP20-AS3C11F-T	

(a) Maximum overrange pressure is 2.1 MPa (300 psi); temperature limits are -7 and +82°C (20 and 180°F).

(b) Transmitter and Pressure Seal Model Codes are both required. See PSS 2A-1Z11 A for the various pressure seal model codes.

(c) Remote Seal Models that may be specified are PSFPS, PSFES, PSFAR, PSTAR, PSISR, PSSCR, and PSSSR.

(d) Span Limit Code A is not available with pressure seals (Structure Codes F1, F2, S3, S4, SC, SD).

(e) Span Limit Codes E and F are not available with Structure Codes 78 and 79 (pvdf insert in HI Side Cover).

(f) Pressure derated. See derating table in specifications section.

(g) Temperature limits derated to 0 and 60°C (32 and 140°F). Also Mounting Sets -M1 and -M2 not available.

(h) Not available when Remote Mount or Direct Connect Pressure Seals are specified.

(j) When -X3 is specified, the standard bolting is replaced with 17-4 ss bolts and nuts. Therefore, there is no need to specify Option -B2 when selecting the Chlorine Service Option -X3.

(k) Not available with DIN construction options. For stainless steel bolts with DIN construction, specify -D5 to -D8, as required.

(l) Available with Electrical Safety Code D only.

(m) Standard offering with IAP20 Transmitters with pressure seals. However, -G1 is a required option with IGP20 Transmitters when pressure seal (Structure Codes S3, S4, F1, F2, SC, and SD) will be used in vacuum applications. This option substitutes vacuum service metal gasket for standard ptfе process cover gasket.

(n) A cover lock is standard construction with Electrical Safety Codes D, B, G, and V.

SUGGESTED RFQ SPECIFICATIONS

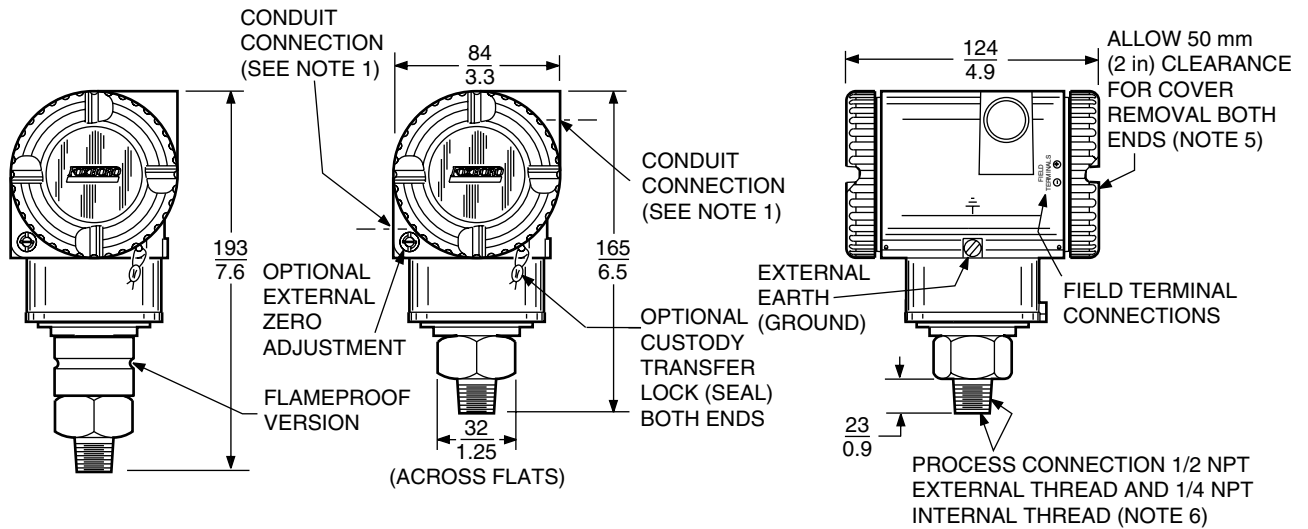
The manufacturer shall provide two-wire, 4 to 20 mA dc analog output pressure transmitter(s) suitable for field mounting. These transmitters shall also be provided (as required) with direct connect pressure seals, or remote capillary connected pressure seals. The specifications for these transmitters are as follows:

Accuracy:	±0.20% of calibrated span.
Span Limits:	From 1 to 6000 psi for standard direct-connected transmitters, and from 0.5 inH ₂ O to 5000 psi for standard bracket-mounted transmitters, as specified; or SI and Metric equivalents.
Damping:	Settable for a range of none to 8 seconds.
RFI Protection:	The maximum error shall be no more than an additional ±0.1% of calibrated span for 30 V/m field intensity between 27 and 1000 MHz.
Electronics Housing:	IEC IP66 (NEMA 4X); 316 ss or aluminum housing with Epoxy finish; two compartments (field wiring and electronics); housing sealed with O-rings for double protection against moisture or other contaminants.
Modular Electronics:	Easily replaceable modular electronics standard.
LCD Indicator:	Liquid Crystal Display (LCD) Indicator, with on-board pushbuttons for calibration and configuration, is standard.
Mounting:	Direct to process or bracket mounted to pipe or surface.
Process Connection:	IAP10/IGP10 Transmitters: Direct to process piping or pressure seal with 1/2 NPT; optional Rc 1/2 or G 1/2 B external threads to process piping. Internal 1/4 NPT thread also provided as plumbing connection to process; or prepared for a direct connect seal or capillary connected seal. IAP20/IGP20 Transmitters: Used with process connectors to accept 1/4 NPT, 1/2 NPT, Rc 1/4, Rc 1/2, Schedule 80 welding neck; or a pvdf insert (tapped for 1/2 NPT) in HI side process cover is used as process connection. Process connection can also be prepared to accept a direct connect seal; or prepared for a remote capillary connected seal.
Process Cover Materials Available:	Applicable to IAP20/IGP20 transmitters only. Industry Standard 316 ss, Carbon Steel, Monel, and Hastelloy C.
Sensor Materials:	Co-Ni-Cr, 316L ss, and Hastelloy C for IAP10/IGP10 transmitters; and Co-Ni-Cr, 316L ss, Hastelloy C, Monel, Tantalum, and Gold-Plated 316L ss for IAP20/IGP20 transmitters.
Electrical Classification:	Nonincendive for Class I and Class II, Division 2 locations, and explosionproof for Class I and Class II, Division 1 locations. Versions available to meet Agency flameproof and zone requirements; comply with applicable European Union Directives.
Approximate Mass:	Direct Connected Transmitter: 1.5 kg (3.3 lb) Bracket-Mounted Transmitter: 3.5 kg (7.8 lb) w/o process connector 4.2 kg (9.2 lb) w/process connector With 316 ss Electronics Housing: Add 1.1 kg (2.4 lb) With Pressure Seals: See PSS 2A-1Z11 A
Model Codes:	I/A Series IAP10-A or IGP10-A, Direct Connected Absolute or Gauge Pressure Transmitters; or IAP20-A or IGP20-A Bracket Mounted Absolute or Gauge Pressure Transmitters; with or without pressure seals; or equivalent.

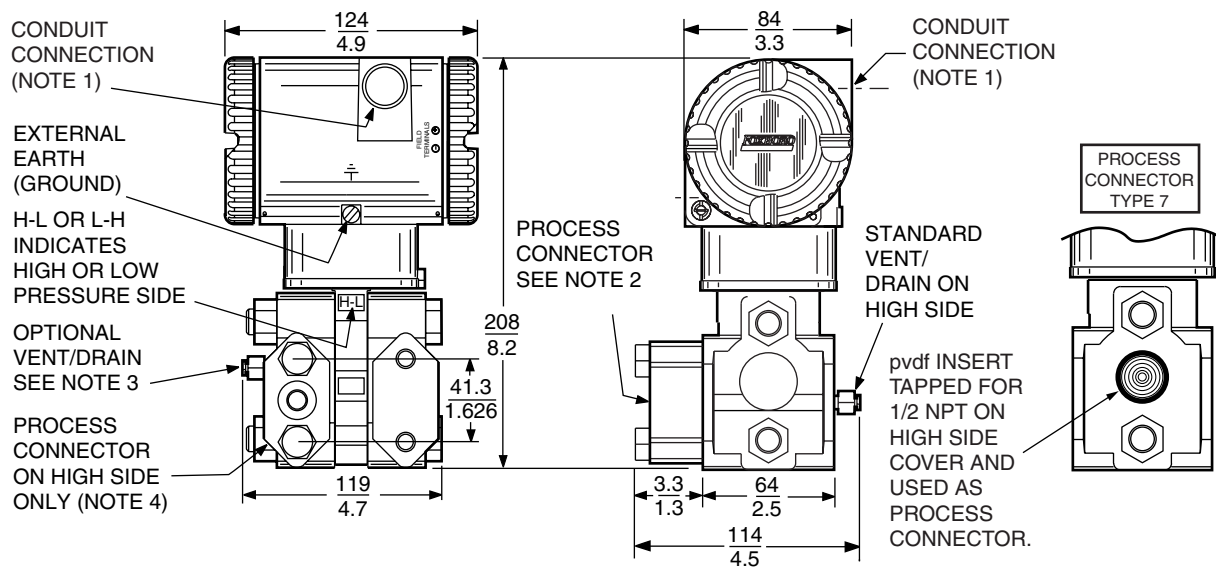
DIMENSIONS-NOMINAL

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

IAP10 AND IGP10 DIRECT CONNECTED TRANSMITTERS



IAP20 AND IGP20 BRACKET MOUNTED TRANSMITTERS



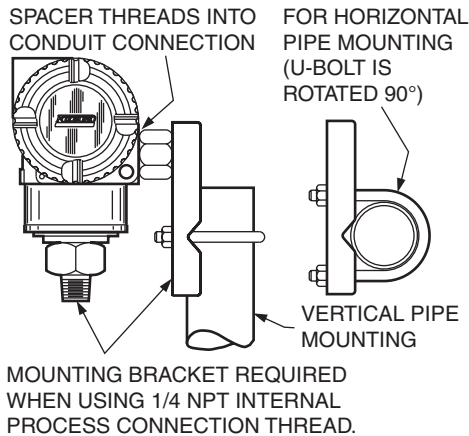
NOTES

1. CONDUIT CONNECTION 1/2 NPT, PG 13.5, OR M20, BOTH SIDES : PLUG UNUSED CONNECTION WITH METAL PLUG (SUPPLIED).
2. PROCESS CONNECTOR CAN BE REMOVED AND CONNECTION MADE DIRECTLY TO PROCESS COVER USING 1/4 NPT INTERNAL THREAD IN PROCESS COVER. NOTE THAT WITH PROCESS CONNECTION CODE "0", THERE IS NO CONNECTOR.
3. PROCESS COVER CAN BE INVERTED MAKING OPTIONAL SIDE VENT A SIDE DRAIN.
4. FOR USERS WHO DESIRE THE PROCESS CONNECTOR ON THE RIGHT SIDE, MERELY ROTATE TRANSMITTER 180° AND RELOCATE PROCESS CONNECTOR SHOWN TO THE RIGHT SIDE.
5. TOPWORKS ROTATABLE TO ANY POSITION WITHIN ONE TURN COUNTERCLOCKWISE OF FULLY TIGHTENED POSITION.
6. DO NOT USE THE 1/4 NPT INTERNAL THREAD TO DIRECT-CONNECT THE TRANSMITTER.

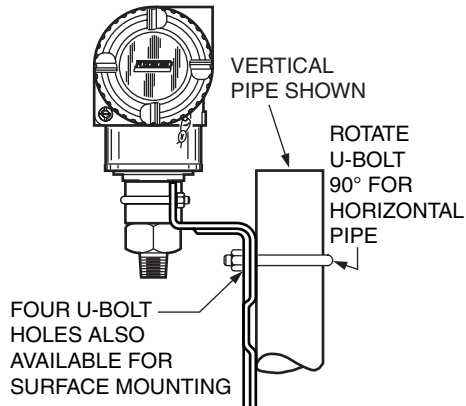
DIMENSIONS-NOMINAL (Cont.)

mm
in

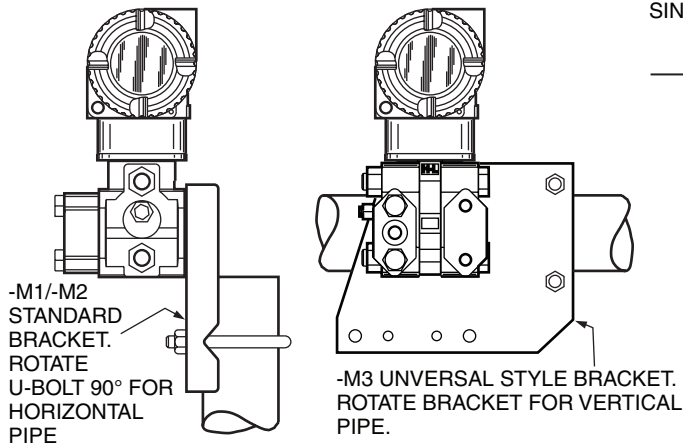
IAP10/IGP10 WITH OPTIONS -M1 TO -M6



IAP10/IGP10 WITH OPTION -M7

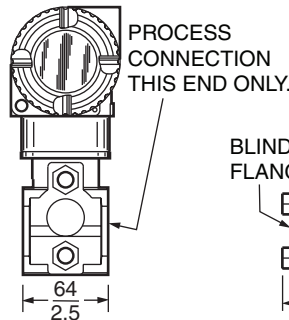


IAP20/IGP20 WITH OPTIONS -M1, -M2, AND -M3

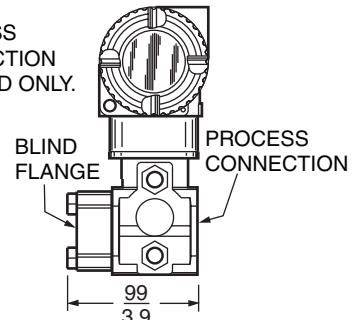


IAP20/IGP20 WITH DIN CONSTRUCTION OPTIONS

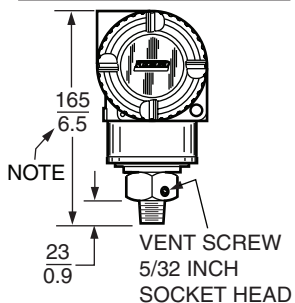
SINGLE ENDED PROCESS COVER OPTIONS -D1, -D3, -D5, -D7



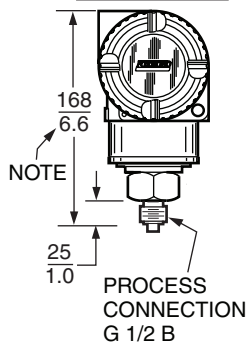
DOUBLE ENDED PROCESS COVER OPTIONS -D2, -D4, -D6, -D8



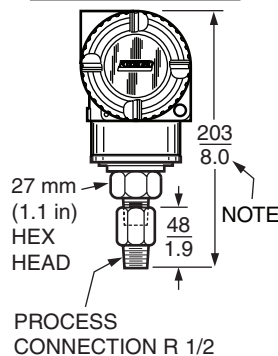
IAP10/IGP10 VENT SCREW IN PROCESS CONNECTOR OPTION -V1



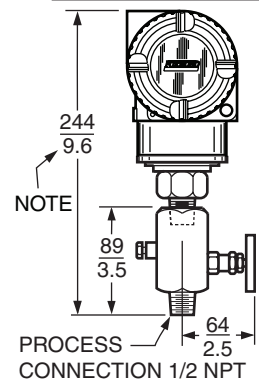
IAP10/IGP10 PROCESS CONNECTION OPTION -G



IAP10/IGP10 METRIC PROCESS CONNECTOR OPTION -R



IAP10/IGP10 BLOCK AND BLEED VALVE OPTIONS -V2, -V3, OR -V4



NOTES

1. FOR FLAMEPROOF TRANSMITTERS, ADD 28 mm (1.1 in) TO OVERALL HEIGHT DIMENSION.
2. REFER TO DIMENSIONAL PRINT DP 020-447 FOR FURTHER INFORMATION.

ORDERING INSTRUCTIONS

1. Model Number(s) as follows:
 - Transmitter only if pressure seals are not selected
 - Both transmitter and pressure seal if pressure seal is selected.
 See PSS 2A-1Z11 A.
2. Calibrated Pressure Range (using Allowable Pressure Units from the table below).
3. Configuration Data Form when Factory Calibration Option -C2 is specified.
4. Options and Accessories not in Model Code (see PSS 2A-1Z9 E).
5. User Tag Data - Data Plate; 32 characters maximum. For additional tag data, specify Optional Supplemental Tag -T.

Allowable Pressure Units for Calibrated Range (a)

inH ₂ O	inHg	kPa	mbar	kg/cm ²
ftH ₂ O	mmHg	MPa	bar	psi
mmH ₂ O	Pa	torr	g/cm ²	atm

(a) Absolute or gauge pressure units, as applicable.

OTHER M&I PRODUCTS

Invensys Foxboro provides a broad range of measurement and instrument products, including solutions for pressure, flow, analytical, positioners, temperature, controlling and recording. For a listing of these offerings, visit the Invensys Foxboro web site at:

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