

**PSS 2B-1C1 A**

**Models 15A, 13A, and 13HA Pneumatic d/p Cell® Transmitters**



*The Foxboro® brand Models 15A, 13A, and 13HA pneumatic d/p Cell transmitters measure differential pressure and transmit a standard pneumatic signal to receivers which may be several hundred metres or yards away.*

**PROVEN DEPENDABILITY**

Foxboro d/p Cell Transmitters have been the standard of process industry ever since they were developed and introduced for sale more than 30 years ago. Many thousands of successful, trouble-free installations have demonstrated the exceptional dependability of these outstanding transmitters.

**APPLICATION VERSATILITY**

These transmitters are used in flow, liquid level, density, and low pressure measurement applications. They offer wide span adjustability and

broad zero suppression and zero elevation capabilities within the range limits for each series. They are ideal for the most demanding applications.

**EASE OF MAINTENANCE**

The simple design of the topworks and the field-replaceable capsule makes servicing these transmitters exceptionally easy and economical. Interchangeability of most of the topworks parts with other Foxboro pneumatic force balance transmitters provides further savings to the user by minimizing spare parts inventory.

## FUNCTIONAL SPECIFICATIONS

### Span, Range, and Static Pressure Limits

Model	Span Limit Code	Span Limits (a)			Range Limits (b)			Static Pressure Limit		
		kPa $\Delta P$	inH <sub>2</sub> O $\Delta P$	mbar $\Delta P$	kPa $\Delta P$	inH <sub>2</sub> O $\Delta P$	mbar $\Delta P$	MPa	psi	bar or kg/cm <sup>2</sup>
15A	L	0-1.3 and 0-6	0-5 and 0-25	0-13 and 0-60	$\pm 12.5$	$\pm 50$	$\pm 125$	3.5	500	35
13A	M H	0-5 and 0-62 0-50 and 0-210	0-20 and 0-250 0-200 and 0-850	0-50 and 0-620 0-500 and 0-2100	$\pm 62$ $\pm 210$	$\pm 250$ $\pm 850$	$\pm 620$ $\pm 2100$	14	2000	140
13HA	M H	0-5 and 0-62 0-50 and 0-210	0-20 and 0-250 0-200 and 0-850	0-50 and 0-620 0-500 and 0-2100	$\pm 62$ $\pm 210$	$\pm 250$ $\pm 850$	$\pm 620$ $\pm 2100$	40	6000	400

- a. See Optional Capsule Materials Model (13A Only) for span limits of 13A4 (Monel capsule construction).
- b. Nonzero-based ranges require an optional zero elevation or suppression kit. See Suppressed-Zero and Elevated-Zero Ranges. Upper and lower range values must not exceed range limits. Negative numbers indicate a higher pressure on the normal "low side" of the transmitter.

### Mounting

Transmitter mounts direct to the process piping or onto a nominal DN 50 or 2 in pipe. A bracket for pipe mounting is always supplied.

### Air Connections

The supply and output connections are tapped for 1/4 NPT.

### Output Signal

20 to 100 kPa, 3 to 15 psi, or 0.2 to 1.0 bar or kg/cm, as specified.

### Air Consumption Under Normal Operation

0.42 m<sup>3</sup>/h (0.25 cfm) at standard conditions.

### Suppressed-Zero and Elevated-Zero Ranges

The optional zero elevation or zero suppression kits (Model Code Optional Selections -L or -R) allow adjustment of the measured pressure range within the full range limits of the capsule. These kits may be added in the field. Refer to Figure 1 and Figure 2 for examples of suppressed-zero and elevated-zero ranges.

Figure 1. Zero Suppression

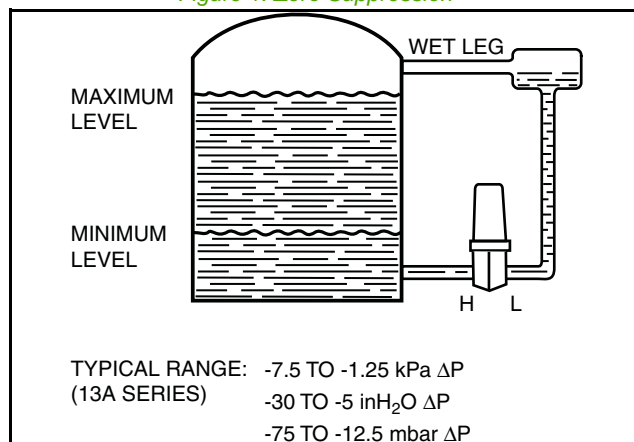
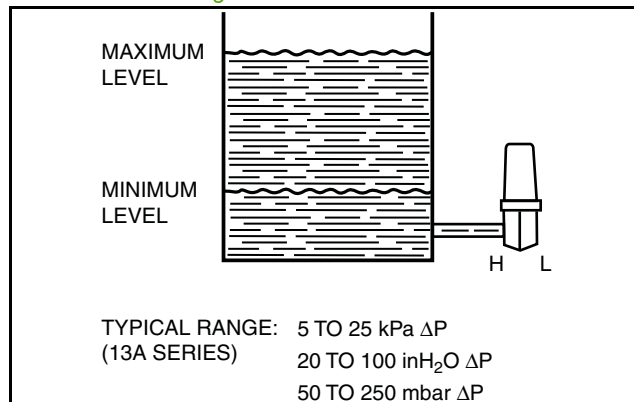


Figure 2. Zero Elevation



## OPERATING CONDITIONS

Influence	Reference Operating Conditions	Normal Operating Condition Limits	Operative Limits
Body Temperature	24 ± 2°C (75 ± 3°F)	–40 and +120°C (–40 and +250°F)	–45 and +175°C (a) (b) (–50 and +350°F)
Ambient Temperature	24 ± 2°C (75 ± 3°F)	–40 and +120°C (–40 and +250°F)	–45 and +140°C (–50 and +280°F)
Supply Pressure	140 ± 1.4 kPa 20 ± 0.2 psi 1.4 ± 0.014 bar or kg/cm <sup>2</sup>	120 and 150 kPa 18 and 22 psi 1.2 and 1.5 bar or kg/cm <sup>2</sup>	Up to 240 kPa Up to 35 psi Up to 2.4 bar or kg/cm <sup>2</sup>

- a. See “Optional Features” on page 6 for higher limits.  
b. Topworks temperature cannot exceed 120°C (250°F).

## PERFORMANCE SPECIFICATIONS

*Performance Stated under Reference Operating Conditions, unless otherwise specified.*

**Accuracy**

Includes Linearity, hysteresis, and repeatability

**Model 15A**

±0.5% of span

**Models 13A and 13hA**

- For Spans between 5 and 130 kPa, 20 and 525 inH<sub>2</sub>O, or 50 and 1300 mbar differential pressure ( $\Delta P$ ): ±0.5% of span
- For Spans between 130 and 210 kPa, 525 and 850 inH<sub>2</sub>O, or 1300 and 2100 mbar  $\Delta P$ : ±0.75% of span

**Dead Band**

0.05% of span

**Repeatability**

0.1% of span

**Hysteresis****Model 15a**

0.0025 kPa, 0.01 inH<sub>2</sub>O, or 0.025 mbar  $\Delta P$ ; or 0.10% of span, whichever is greater

**Models 13a and 13HA**

0.12 kPa, 0.05 inH<sub>2</sub>O, or 0.12 mbar  $\Delta P$ ; or 0.10% of span, whichever is greater

**Reproducibility**

Includes effects of hysteresis, repeatability, dead band, and drift over a one-hour period

**Model 15a**

0.2% of span

**Models 13A and 13HA**

0.15% of span

**Vibration Effect**

The zero shift is less than 1.5% of span for peak-to-peak displacement of 6.4 mm (0.25 in) between 1 and 9 Hz, or constant acceleration of 10 m/s<sup>2</sup> (1 “g”) from 9 to 100 Hz.

**Supply Pressure Effect**

The maximum zero shift is 0.05% of span for 1 kPa (0.01 bar or kg/cm<sup>2</sup>) change in supply pressure. A 1 psi change in supply pressure results in a maximum zero shift of 0.35% of span.

**Position Effect**

The 15A Series must be operated with the capsule in the vertical plane. The 13A and 13HA Series may be mounted up to 90° from vertical and the zero shift may be corrected with the zero adjustment screw.

**Ambient Temperature Effect**

Model	Ambient Temperature Effect (a)
15A	<ul style="list-style-type: none"> <li>▶ For Span at 6 kPa (25 inH<sub>2</sub>O, 60 mbar) <math>\Delta P</math>: 1% of span</li> <li>▶ For Span at 1.3 kPa (5 inH<sub>2</sub>O, 13 mbar) <math>\Delta P</math>: 2.5% of span</li> </ul>
13A	Span Limit Code M: <ul style="list-style-type: none"> <li>▶ For Spans from 12.5 to 62 kPa, (50 to 250 inH<sub>2</sub>O, 125 to 620 mbar) <math>\Delta P</math> span. 1% of span</li> <li>▶ For Spans from 6.2 to 12.5 kPa, (25 to 50 inH<sub>2</sub>O, 62 to 125 mbar) <math>\Delta P</math> span. 2.5% of span</li> </ul> Span Limit Code H: <ul style="list-style-type: none"> <li>▶ 2% for all spans</li> </ul>
13HA	The ambient temperature effect is the same as listed for the Model 13A above.

- a. Maximum zero shift in % of span for a temperature change of 55°C (100°F) within Normal Operating Condition limits.

**Static Pressure Effect**

Model	Ambient Temperature Effect (a)
15A	0.5% of Span.
13A	<ul style="list-style-type: none"> <li>▶ For Spans &gt;12.5 kPa, (&gt;50 inH<sub>2</sub>O, &gt;125 mbar) <math>\Delta P</math>: 0.5% of span</li> <li>▶ For Spans from 5 to 12.5 kPa, (20 to 50 inH<sub>2</sub>O, 50 to 125 mbar) <math>\Delta P</math>: 1% of span</li> </ul>
13HA (b)	<ul style="list-style-type: none"> <li>▶ For Spans &gt;12.5 kPa (&gt;50 inH<sub>2</sub>O, &gt;125 mbar) <math>\Delta P</math>: 1.5% of span</li> <li>▶ For Spans from 5 to 12.5 kPa, 20 to 50 inH<sub>2</sub>O, 50 to 125 mbar) <math>\Delta P</math>: 2% of span</li> </ul>

- a. Zero shift in % of span for any change up to the static pressure limit.
- b. If the process is subject to static pressure cycling of excessive magnitude, contact Global Customer Support.

## PHYSICAL SPECIFICATIONS

## Materials of Construction – Wetted Parts

Item	Transmitter Model		
	15A, 13A, 13HA	13A4	13A5
Body	316 ss	Monel	Nickel alloy (a)
Capsule Diaphragm	316L ss	Monel 400 (b)	Nickel alloy (c)
Other Capsule Pats	316 ss	Monel	Nickel alloy (c)
Force Bar	316 ss	Monel	Nickel alloy (a)
Force Bar Steel	Cobalt-Nickel-Chromium (Co-Ni-Cr)	Cobalt-Nickel-Chromium (Co-Ni-Cr)	Cobalt-Nickel-Chromium (Co-Ni-Cr)
Force Bar Gasket	Silicone elastomer (d)	Viton-A	Viton-A
Capsule Gaskets	Models 15A and 13A: 316 ss Model 13HA: Chemloy	Monel	ptfe
Process Connection Gasket	ptfe (e)	ptfe	(f)

- a. Equivalent to Hastelloy® C. Hastelloy is a registered trademark of Haynes International, Inc.  
b. Duranickel capsule diaphragm material is supplied when Span Limit Code -H is specified.  
c. Equivalent to Hastelloy C276.  
d. Buna-N is standard in the Model 13H.  
e. Glass-filled ptfe is standard in the Model 13H.  
f. Hastelloy C bodies do not have process connectors.

## Materials of Construction, NonWetted Parts

## Cover

Blue, high impact, glass-filled polycarbonate.

## Cover Gasket

Silicone rubber and cork composition

## Body Bolts and Nuts

Zinc plated alloy steel per ASTM A 193 grade B7 and ASTM A 194 grade 2H, respectively, or equivalent. 17-4 PH if nickel alloy<sup>(1)</sup> body is specified. See “Optional Features” on page 6 for Monel or 17-4 PH stainless steel bolting.

## Capsule Fill Material

Dow Corning dimethylsiloxane (DC-200) with viscosity of 500 mm<sup>2</sup>/s (500 cSt) at 25°C (77°F).

Some options require other fill materials. See “Optional Features” on page 6.

## Environmental Protection

The transmitter housing has the dusttight and weatherproof rating of IP53 as defined by IEC 60529, and provides the raintight protection rating of NEMA 3.

## Approximate Mass

## Model 15A

13.6 kg (30 lb)

## Model 13A

8.6 kg (19 lb)

## Model 13HA

13 kg (29 lb)

1. Equivalent to Hastelloy® C.

### OPTIONAL FEATURES

*(These options are not included in Model Code and must be ordered separately using the AS Reference.)*

#### Optional Capsule Materials (Model 13A Only)

Diaphragm Material	Span Limits			Other Wetted Capsule Parts	AS Reference (a)
	kPa $\Delta P$	inH <sub>2</sub> O $\Delta P$	mbar $\Delta P$		
Nickel alloy (b)	0-5 and 0-62 0-50 and 0-210	0-20 and 0-250 0-200 and 0-850	0-50 and 0-620 0-500 and 0-2100	Nickel alloy (b)	D-CSC
Monel 400	0-5 and 0-62 0-50 and 0-100	0-20 and 0-250 0-200 and 0-400	0-50 and 0-620 0-500 and 0-1000	Monel	D-MMM (c)
Duranickel	0-5 and 0-62 0-50 and 0-210	0-20 and 0-250 0-200 and 0-850	0-50 and 0-620 0-500 and 0-2100	Monel	D-DMM
Tantalum	0-5 and 0-50	0-20 and 0-200	0-50 and 0-500	Nickel alloy (b)	D-TSC

a. When ordering optional capsule (or any option) add AS Reference to Model Code. Example: 13A-MS1, AS Reference D-CSC.

b. Equivalent to Hastelloy® C276.

c. The ambient temperature effects are double.

#### Miscellaneous Options

Optional Feature	Description	AS Reference
Preparation for Oxygen Service	Transmitter is cleaned, assembled, calibrated, and packaged in a clean room, or using acceptable alternative facilities. Includes Fluorolube fill for capsules. Available for instruments with 316 ss body and capsule material.	OS-FC
Special Degreasing	Transmitter is cleaned and packaged same as above, but the capsule has standard fill. NOT FOR USE ON OXYGEN, CHLORINE, OR OTHER FLUIDS THAT MAY REACT WITH SILICONE OIL.	OS-W
Preparation for Chlorine Service	Transmitter is cleaned, assembled, calibrated, and packaged in a clean room, or using acceptable alternative facilities. Only Fluorolube filled nickel alloy (a) capsules are used. Includes 17-4 PH stainless steel body bolts, ptfе gaskets, a dashpot kit, and tantalum sheath over the force bar diaphragm. Available with body materials 316 ss, Monel, or nickel alloy (b). The ambient temperature limits are -20 and +120°C (0 and 250°F). Available with 13A Series only.	CLS
Nuclear Service Cleaning	Transmitter is cleaned, assembled, calibrated, and packaged in a clean room, or using acceptable alternative facilities.	NS-C
High Damping	Low and medium range capsules are available filled with high viscosity silicone fluid which increases the damping. Note: Corner frequency 3 dB down at 0.3 to 0.4 Hz. The damping is greatly increased below 25°C (75°F). The lower ambient temperature limit is -20°C (0°F). Formerly AS Reference D-SSS-2H.	D-SSS-2V4
Optional Output Signal	Output signal is 3 to 27 psi. Air supply is between 29.5 and 30.5 psi	TR 3-27
Reverse Output	100 to 20 kPa, 15 to 30 psi, or 1.0 to 0.2 bar or kg/cm <sup>2</sup> , as specified. Accomplished by adding zero elevation kit and reversing high and low process connections.	TR 15-3
High Process Temperature	Glass reinforced process connector gaskets are fitted for operation at process temperatures up to 190°C (375°F). Multiply operating condition effects by 2 for body temperature above 120°C (250°F).	DG-5
Hydrogen Service	Transmitter is supplied with gold plated 316 ss capsule to retard hydrogen penetration. Not for corrosion protection.	D-SSS-G

## Miscellaneous Options (Continued)

Optional Feature	Description	AS Reference
Lower Differential Spans	<p>For Models 13A and 13H: Provides for minimum span of 2.5 kPa, 10 inH<sub>2</sub>O, or 25 mbar <math>\Delta P</math>.</p> <p>For Model 15A: Provides for minimum span of 0.5 kPa, 2.0 inH<sub>2</sub>O, or 5 mbar <math>\Delta P</math>.</p> <p>The maximum calibrated spans are reduced by a factor of 2. The performance specifications and operating conditions effects are reduced by factors of up to 3. This option is not available with the Optional Output Signal feature (AS Reference TR 3-27).</p>	LD
Tantalum Force Bar Steel Protection	Tantalum sheath protection over cobalt-nickel-chromium alloy force bar diaphragm.	FBP-T
Monel Force Bar	Available with Monel, nickel alloy (a), or Duranickel diaphragm capsules. Standard with transmitters having Monel body and capsule.	Add Suffix –3 to AS Reference for Capsule (c)
Monel Bolting	K-Monel studs and Monel nuts for both body and process connectors. This option is not available for the Models 15A and 13H.	MMB
Stainless Steel Bolting	Type 17-4 PH stainless steel cap screws for the process connectors, and cap screws and nuts of the same material for the body bolting.	SSB
Stainless Steel Mounting Bracket Bolting	316 ss bolting through mounting brackets to transmitter.	SSB-A
Integral Orifice	For the measurement of extremely low flow rates. Selection of six standard orifice bores is available.	Refer to PSS 2B-1Z3 A
Bypass Manifolds for Integral Mounting	A variety of 1-, 3-, and 5-valve manifolds is available. Some manifold assemblies are not rated to the full MWP of the Model 13H.	Refer to Foxboro
Air Supply Sets	A wide selection of air supply sets is available to provide filtered, regulated air supply to the transmitter.	Refer to Foxboro
R1/4 Air Connections	Air connections tapped for R1/4	ACR
Test Tee	A T-connector tapped for 1/4 NPT and fitted with a shut-off valve is mounted on the transmitter for monitoring the output signal.	OTT
Compliance to NACE Standard MR-01-75	The National Association of Corrosion Engineers (NACE) Standard MR-01-75 (1980 revision) covers metallic requirements for resistance to sulfide stress cracking. This option includes process wetted parts selected to comply with the standard. Non-process wetted bolting complying with NACE MR-01-75 Class II is also available.	Refer to Foxboro

a. Equivalent to Hastelloy® C276.

b. Equivalent to Hastelloy® C.

c. For example: specify AS Reference D-CSC-3, or D-MMM-3, or D-DMM-3.

## MODEL CODES

## Model 15A Pneumatic d/p Cell Transmitter

<b>Description</b> Transmitter; AISI Type 316 Stainless Steel (316 ss) Body	<b>Model</b> 15A
<b>Span Limits</b> 0-5 and 0-25 inH <sub>2</sub> O or 0-1.3 and 0-6 kPa or 0-13 and 0-62 mbar or 0-125 and 0-635 mmH <sub>2</sub> O	-L
<b>Body Material</b> 316 ss	S
<b>Process Connectors (a)</b> Tapped for 1/4 NPT Tapped for 1/2 NPT Tapped for R 1/4 Tapped for R 1/2 Weld neck for 14 x 21 mm tube (1/2 in Schedule 80 pipe) None. Body tapped for 1/4 NPT	1 2 3 4 6 0
<b>Optional Selections</b> Zero Elevation Kit Zero Suppression Kit	-L -R
Example: 15A-LS1-L	

a. Body is always tapped for 1/4 NPT.

## Model 13A Pneumatic d/p Cell Transmitter

<b>Description</b> Transmitter; 316 ss body Transmitter; Monel Body Transmitter; Nickel alloy (a) Body (Process Connector Code 0 must be specified)	<b>Model</b> 13A 13A4 13A5
<b>Span Limits</b> 0-5 and 0-62 kPa (0-20 and 0-250 inH <sub>2</sub> O, 0-50 and 0-620 mbar or 0-500 and 0-6350 mmH <sub>2</sub> O or 0-0.5 and 0-6.35 mH <sub>2</sub> O) $\Delta P$ 0-50 and 0-210 kPa (0-200 and 0-850 inH <sub>2</sub> O, 0-0.5 and 0-2.1 bar or 0-5.0 and 0-21.6 mH <sub>2</sub> O) $\Delta P$	-M -H
<b>Body Material</b> 316 ss (13A only) Monel (13A4 only) Nickel alloy (a) (13A5 only)	S M C
<b>Process Connectors (b)</b> Tapped for 1/4 NPT Tapped for 1/2 NPT Tapped for R 1/4 Tapped for R 1/2 Weld neck for 14 x 21 mm tube (1/2 in Schedule 80 pipe) None. Body tapped for 1/4 NPT	1 2 3 4 6 0
<b>Optional Suffix</b> Zero Elevation Kit Zero Suppression Kit	-L -R
Example: 13A-MS2-L	

a. Equivalent to Hastelloy® C.



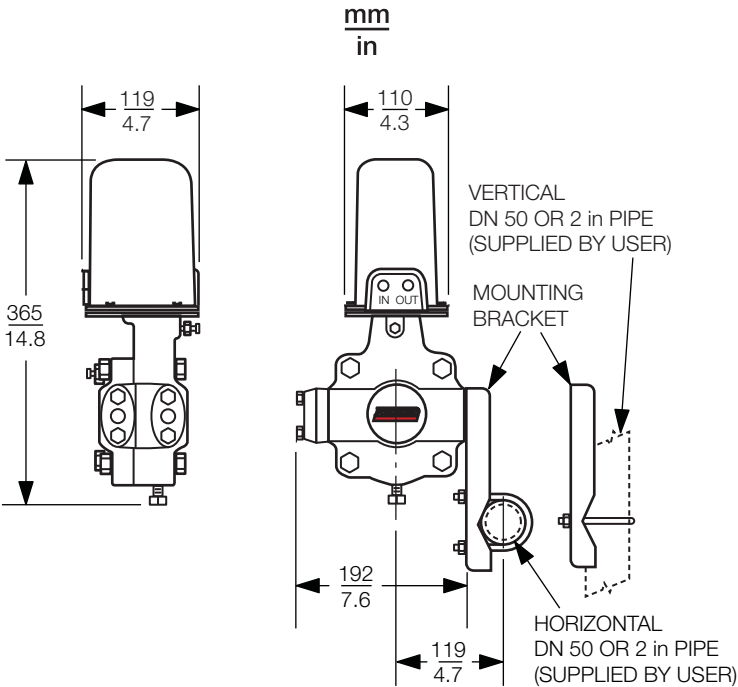
b. Body is always tapped for 1/4 NPT.

### Model 13HA Pneumatic d/p Cell Transmitter

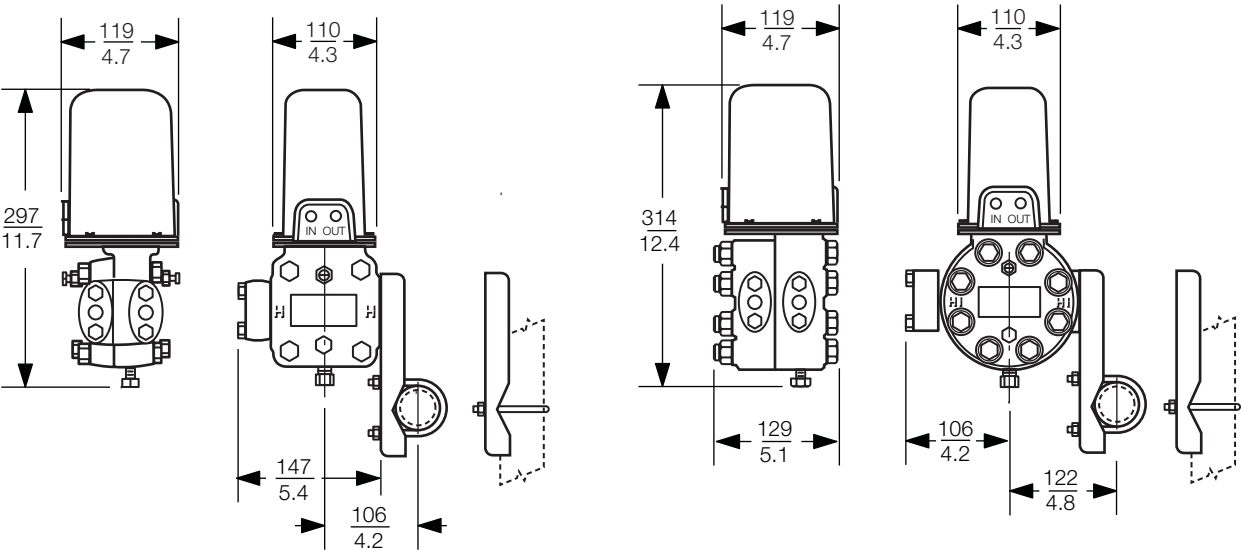
<b>Description</b> Transmitter; 316 ss body	<b>Model</b> 13HA
<b>Span Limits</b> 0-5 and 0-62 kPa (0-20 and 0-250 inH <sub>2</sub> O, 0-50 and 0-620 mbar or 0-500 and 0-6350 mmH <sub>2</sub> O or 0-0.5 and 0-6.35 mH <sub>2</sub> O) $\Delta$ P	-M
0-50 and 0-210 kPa (0-200 and 0-850 inH <sub>2</sub> O, 0-0.5 and 0-2.1 bar or 0-5.0 and 0-21.6 mH <sub>2</sub> O) $\Delta$ P	-H
<b>Body Material</b> 316 ss	S
<b>Process Connectors (a)</b> Tapped for 1/4 NPT	1
Tapped for 1/2 NPT	2
Tapped for R 1/4	3
Tapped for R 1/2	4
Machined for 9/16-18 Aminco fitting	5
None. Body tapped for 1/4 NPT	0
<b>Optional Suffix</b> Zero Elevation Kit	-L
Zero Suppression Kit	-R
Example: 13HA-HS2-L	

a. Body is always tapped for 1/4 NPT

DIMENSIONS – NOMINAL



MODEL 15A



NOTES

### ORDERING INSTRUCTIONS

1. Model Code
2. Output Signal
3. Calibrated Differential Pressure Range
4. Optional Features not in Model Code. Specify using AS Reference Code.
5. Tag

### 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)