

## 11A Series Absolute Pressure Transmitters



In 11A Series Transmitters, the reliable force-balance d/p Cell mechanism is used to accurately measure absolute pressure and transmit a standard pneumatic signal to nearby or remote receivers.

### WIDE RANGEABILITY

Spans are adjustable as much as 10 to 1 for broad rangeability in a single instrument. Fewer stand-by transmitters are required.

### PROVEN DEPENDABILITY

The 11A Series Transmitter uses the same topworks as a Foxboro pneumatic d/p Cell. This mechanism, introduced by Foxboro over 30 years ago, is the standard of process industries for differential pressure measurement. Many thousands of successful, trouble-free installations demonstrate the exceptional dependability of these outstanding instruments.

### ON-LINE CALIBRATION

Equipped with a vernier range adjustment, 11A Series Transmitters allow an operator to select one of several predetermined ranges without removing the instrument from the process. No other calibration apparatus is required for the predetermined ranges.

### PRECISE MEASUREMENT

The narrower the span of measurement, the more accurate the measurement and transmission. Precision is retained even in narrow suppressed-zero ranges.

**MAINTENANCE EASE, PARTS COMMONALITY**

Simple topworks design and field-replaceable capsules make servicing these transmitters exceptionally easy and economical. In addition, the topworks mechanism of these transmitters is virtually identical to that used in other Foxboro pneumatic force-balance transmitters (liquid level, buoyancy,

differential, target flow). This design uniformity results in minimizing spare parts inventories and simplifying maintenance routines. The capsules used in 11A Series Pneumatic Transmitters are interchangeable with those used in Foxboro E Series Electronic Absolute Pressure Transmitters, resulting in further savings.

**FUNCTIONAL SPECIFICATIONS**

Table 1. Span and Range Limits (with maximum overrange)

| Type of Unit | Capsule | Span Limits (Absolute Pressure)    | Upper Range Limit (Absolute Pressure) | Maximum Overage (Absolute Pressure) |
|--------------|---------|------------------------------------|---------------------------------------|-------------------------------------|
| AL           | –       | 1.3 and 5.3 kPa (10 and 40 mmHg)   | 9.3 kPa (70 mmHg)                     | 0.8 MPa (115 psi)                   |
| AM           | M       | 5.3 and 53 kPa (40 and 400 mmHg)   | 53 kPa (400 mmHg)                     | 0.8 MPa (115 psi)                   |
|              | H       | 50 and 200 kPa (375 and 1520 mmHg) | 200 kPa (1520 mmHg)                   | 1.1 MPa (165 psi)                   |
| AH           | A       | 0.07 and 0.56 MPa (10 and 80 psi)  | 0.62 MPa (90 psi)                     | 0.7 MPa (100 psi)                   |
|              | B       | 0.14 and 1.4 MPa (20 and 200 psi)  | 2.4 MPa (350 psi)                     | 2.4 MPa (350 psi)                   |
|              | C       | 0.3 and 2.7 MPa (40 and 400 psi)   | 5.2 MPa (750 psi)                     | 5.2 MPa (750 psi)                   |

**Zero Elevation and Suppression**

A built-in zero screw permits zero suppression of up to 10% of span. Additional zero suppression can be achieved within the range limits given in Table 1.

**AL**

The zero point can be suppressed by means of an optional range kit (Model Code suffix -R). With this kit, accuracy may be derated by an additional 0.5% of span. Also, the ambient temperature effect may be increased to 1% per 12°C (25°F).

**AM**

The zero point can be suppressed as much as 900% of the minimum span for Capsule Code M (300% for Capsule Code H) by means of a range adjustment that is standard on the transmitter.

**AH**

The zero point can be suppressed as much as 1000% of minimum span (800% of Capsule Code A) by means of an optional range kit (Model Code suffix -R). For zero suppression of more than three times the minimum span, accuracy may be derated by 0.03% of the amount of suppression.

**Output Signal**

20 to 100 kPa, 3 to 15 psi or 0.2 to 1.0 bar or kg/cm<sup>2</sup>, as specified.

**Air Consumption**

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

**MODEL CODE**

| <u>Description</u>                                     | <u>Model</u> |
|--|--------------|
| Absolute Pressure Transmitter                          | 11A          |
| <b>Range</b>   |              |
| Low Range  | L            |
| Medium Range   | M            |
| High Range   | H            |
| <b>Span Limits (Type of Capsule)</b>                   |              |
| 1.3 and 5.3 kPa or 10 and 40 mmHg absolute (AL only)   | –L           |
| 5.3 and 53 kPa or 40 and 500 mmHg absolute (AM only)   | –M           |
| 50 and 200 kPa or 375 and 1520 mmHg absolute (AM only) | –H           |
| 70 and 550 kPa or 10 and 80 psi absolute (AH only)     | –A           |

## MODEL CODE (Continued)

| <b>Description</b>                                    | <b>Model</b> |
|---|--------------|
| <b>Span Limits (Type of Capsule) (Continued)</b>      |              |
| 0.14 and 1.4 MPa or 20 and 200 psi absolute (AH only) | -B           |
| 0.3 and 2.7 MPa or 40 and 400 psi absolute (AH only)  | -C           |
| <b>Body Material</b>                                  |              |
| AISI Type 316 stainless steel                         | S            |
| <b>Process Connections</b>                            |              |
| Tapped for 1/4 NPT (AL and AM only)                   | 1            |
| Tapped for 1/2 NPT                                    | 2            |
| Tapped for R 1/4 (AL and AM only)                     | 3            |
| Tapped for R 1/2                                      | 4            |
| 1/2 Schedule 80 welding neck (AL and AM only)         | 6            |
| <b>Optional</b>                                       |              |
| Suppressed zero range kit (AL and AH only)            | -R           |
| <b>Example: 11AM-MS2</b>                              |              |

## Operation Conditions

| <b>Influence</b>                  | <b>Type of Unit</b> | <b>Reference Operating Conditions</b> | <b>Normal Operating Condition Limits</b>   | <b>Operative Limits</b>  | <b>Transportation and Storage Condition Limits</b>   |
|-----------------------------------|---------------------|---------------------------------------|--|--|--|
| Ambient Temperature               | AL                  | 24 ±2°C<br>(75 ±3°F)                  | -40 and +80°C<br>(-40 and +180°F)  | -40 and +120°C<br>(-40 and +250°F)   | -40 and +120°C<br>(-40 and +250°F)   |
|                                   | AM                  | 24 ±2°C<br>(75 ±3°F)                  | -40 and +120°C<br>(-40 and +250°F)   | -45 and +140°C<br>(-50 and +280°F)   | -55 and +140°C<br>(-70 and +280°F)   |
|                                   | AH                  | 24 ±2°C<br>(75 ±3°F)                  | -40 and +80°C<br>(-40 and +180°F)  | -40 and +120°C<br>(-40 and +250°F)   | -40 and +120°C<br>(-40 and +250°F)   |
| Process Temperature               | AL                  | 24 ±2°C<br>(75 ±3°F)                  | -40 and +80°C<br>(-40 and +180°F)  | -40 and +120°C<br>(-40 and +250°F)   | Not Applicable   |
|                                   | AM                  |                                       |  |  |  |
|                                   | AH                  |                                       |  |  |  |
| Vibration ("g" Load In any Plane) | AL                  | 1 m/s <sup>2</sup> (0.1 "g") maximum  | Up to 100 Hz<br>10 m/s <sup>2</sup> (1 "g") or<br>6.4 mm (0.25 in)<br>peak-to-peak<br>amplitude, which-<br>ever is smaller | Up to 100 Hz<br>30 m/s <sup>2</sup> (3 "g") or<br>6.4 mm (0.25 in)<br>peak-to-peak<br>amplitude, which-<br>ever is smaller | Up to 100 Hz<br>50 m/s <sup>2</sup> (5 "g") or<br>6.4 mm (0.25 in)<br>peak-to-peak<br>amplitude, which-<br>ever is smaller |
|                                   | AM                  |                                       |  |  |  |
|                                   | AH                  |                                       |  |  |  |
| Supply Pressure                   | AL                  | 140 ±1.4 kPa<br>or<br>20 ±0.2 psi     | 120 and 150 kPa<br>or<br>18 and 22 psi   | 240 kPa<br>or<br>25 psi  | Not Applicable   |
|                                   | AM                  |                                       |  |  |  |
|                                   | AH                  |                                       |  |  |  |
| Position                          | AL                  | Upright                               | 0 to 90°<br>Tilt<br>(Any plane)  | No Limit   | Not Applicable   |
|                                   | AM                  |                                       |  |  |  |
|                                   | AH                  |                                       |  |  |  |

**PERFORMANCE SPECIFICATIONS**

**Accuracy**

At reference operating conditions.

AL

±1.0% of span

AM

±0.5% of span for spans below 13 kPa (100 mmHg) absolute with M Capsule or for spans below 113 kPa (850 mmHg) absolute with H Capsule, or ±1.0% of span for higher spans.

AH

0.5% of span

**Repeatability**

At reference operating conditions.

| Unit | Span         |
|------|--------------|
| AL   | 0.5% of span |
| AM   | 0.1% of span |
| AH   | 0.1% of span |

**Dead Band**

At reference operating conditions.

| Unit | Span          |
|------|---------------|
| AL   | 0.1% of span  |
| AM   | 0.05% of span |
| AH   | 0.05% of span |

**Hysteresis**

At reference operating conditions.

| Unit | Span          |
|------|---------------|
| AL   | 0.5% of span  |
| AM   | 0.25% of span |
| AH   | 0.15% of span |

**Supply Pressure Effect**

The transmitter is designed to operate at 140 kPa or 20 psi air supply. There is a zero shift of less than 0.25% of span per 5% change in supply pressure for AL and AM units, and a zero shift of less than 0.2% of span per 5% change in supply pressure for AH units.

**Vibration Effect**

There can be a slight vibration effect when an AL unit is calibrated at a span of 1.3 kPa or 10 mmHg absolute, or when an AM unit is calibrated at a span between 5.3 and 50 kPa or 50 and 375 mmHg absolute pressure. With these spans, vibration up to 40 Hz at an amplitude as much as 6.4 mm (0.25 in) causes a zero shift of less than 0.5% of span. For vibration effect specifications on AH units, refer to Foxboro.

**Ambient Temperature Effect**

In an AL unit, there is an ambient temperature change that does not exceed 20°C (40°F), the resulting zero shift is less than 1% of the actual span. In AM or AH units, changes in ambient temperature of 50°C (100°F) cause a zero shift which varies in relation to the span.

| Type of Unit | Absolute Pressure Spans                      | Zero Shift (in % Span) |
|--------------|--|------------------------|
| AM           | 5.3 up to 13.3 kPa or 40 up to 100 mmHg      | ±3%                    |
|              | 13.3 through 53 kPa or 100 through 400 mmHg  | ±2%                    |
|              | 50 up to 113 kPa or 375 up to 850 mmHg       | ±2.5%                  |
|              | 113 through 200 kPa or 850 through 1520 mmHg | ±1%                    |
| AH           | Above 80 through 100% of upper span limit    | ±1%                    |
|              | Above 50 through 80% of upper span limit     | ±1.5%                  |
|              | Above 20 through 50% of upper span limit     | ±2.5%                  |
|              | Above 10 through 20% of upper span limit     | ±3%                    |

**Position Effect**

Transmitters are normally calibrated in the vertical position. Transmitters can be subsequently mounted in a horizontal position with the capsule in a vertical plane. A zero screw adjustment removes any zero shift induced by such horizontal mounting.

**PHYSICAL SPECIFICATIONS**

**Material of Construction – Process Wetted Parts**

AISI TYPE 316 STAINLESS STEEL

Body, Plugs, Vent Screw Assemblies, Process Connections, Diaphragm Capsule, Force Bar, and Gasket (at capsule).

ELASTOMERS

Gasket (at force bar seal), silicone elastomer  
Gasket (at connector), ptf

**Instrument Classification**

Cover sealing satisfies requirements of IEC IP54 and provides the environmental protection of NEMA Type 3, inside air purged.

**Cover Material**

High impact glass-filled blue polycarbonate

**PHYSICAL SPECIFICATIONS (Continued)****Bolting****CAP SCREWS**

Electro-zinc plated (yellow chromate) alloy steel,  
per ASTM A193 grade B7 (extending through body  
and process connectors)

**NUTS**

Per ASTM A194 grade 2H

**Air Connections**

Tapped for 1/4 NPT

**Approximate Mass.**

| Unit | Mass            |
|------|-----------------|
| AL   | 13.6 kg (30 lb) |
| AM   | 8.6 kg (19 lb)  |
| AH   | 4.5 kg (10 lb)  |

**Data Plate**

Stainless steel data plate fastened to topworks cover with tapping screws. Includes space for customer tag data up to a maximum of 67 characters and spaces. For additional space, see optional Customer Tag.

**OPTIONAL FEATURES**

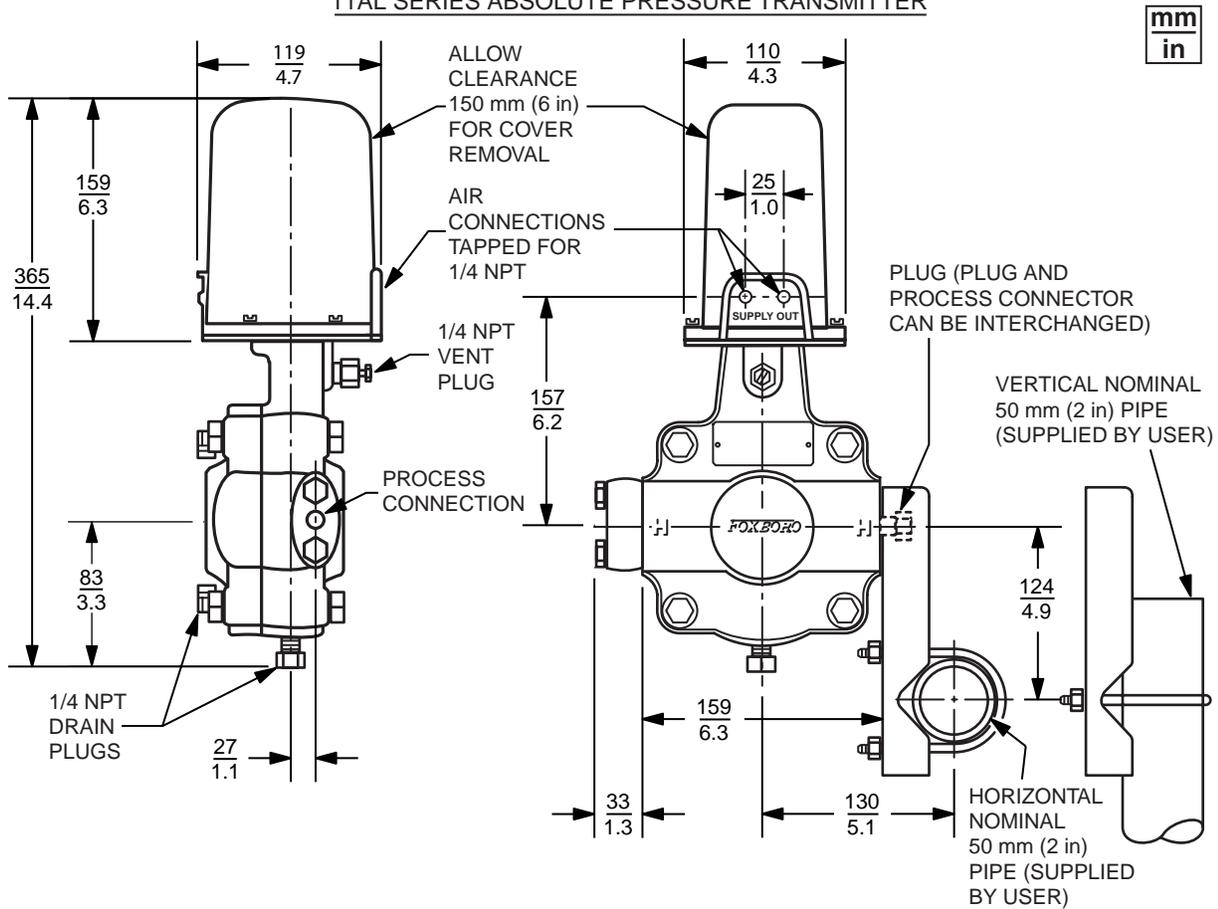
(When ordering an option add AS Reference to Model Code, for example M/11AM-MS2-ACR)

| Feature                    | Description  | AS Reference |
|----------------------------|--|--------------|
| Air Connection             | The air supply and output ports are tapped for R 1/4 thread.   | ACR          |
| Chemloy Gasket             | A Chemloy process connection gasket is provided to allow use with process temperatures up to 190°C (375°F). This option is available on AL and AM units only.  | DG-5         |
| Viton-A Gaskets            | Viton-A process wetted force bar seal and capsule gaskets are supplied. This option is available on AH units only  | DG-6         |
| ptfe Gasket                | A ptfe process wetted gasket is supplied to provide corrosion protection. This option is available on AH units only.   | DG-7         |
| Tantalum Washer            | A tantalum washer is provided to protect the force bar from process fluids which might be harmful to the cobalt-nickel alloy standard material. This option is available on AM units only.   | FBP-T        |
| Air Regulator              | A wide selection of air supply regulators is available, assembled to the transmitter by Foxboro, to provide filtered, regulated supply air to the transmitter. Suffix letters denote the type (fixed or adjustable) and whether or not a gauge is included. (Refer to Foxboro.)                            | IAS-XX       |
| Electric Heating           | This option is for integral electric heating of the transmitter. It is approved by FM for use in Class I, Group C and D, Division 1 hazardous area. It is available on AL and AM units only.   | IEH          |
| Steam Tracing              | An integral steam tracing kit is provided to allow use with process temperatures up to 190°C (375°F). Hollow tracing studs are substituted for the conventional body bolts, and glass-filled ptfe gaskets are used for sealing the process connection and the diaphragm                                    | ISTR-        |
| Lower Spans                | A lower span kit, which allows spans from 0.53 to 1.3 kPa or 4 to 10 mmHg absolute, is supplied. With it, performance specifications are reduced by a factor of 2. The option cannot be supplied in combination with the TR 3-27 output signal option. The LD option is available on AL units only.        | LD           |
| Nuclear Service Cleaning   | Nuclear service cleaning includes transmitter assembly and calibration plus cleaning and packing in a Class 10000 Clean Room which meets both mandatory and non mandatory requirements as established by USA Federal Standard 209a. All wetted gaskets used in the transmitter are ptfe.                   | NS-C         |
| Oxygen Service Preparation | Oxygen service preparation (special degreasing) includes transmitter assembly and calibration plus cleaning and packaging in a Class 10000 Clean Room which meets both mandatory and non mandatory requirements as established by USA Federal Standard 209a. All wetted gaskets used in the unit are ptfe. | OS-W         |

| Feature               | Description   | AS Reference |
|-----------------------|---|--------------|
| Test Tee              | The transmitter is equipped with an output signal test tee.   | OTT          |
| Body Bolts            | The bolts which extent through the body and the process connectors are 17-4 PH stainless steel.   | SSB          |
| Bracket Bolts         | Mounting bracket bolts are AISI type 316 ss.  | SSB-A        |
| Output Signal         | The output signal is 3 to 27 psi.   | TR 3-27      |
| Hastelloy C and Parts | In this option, a Hastelloy C diaphragm and AISI type 316 ss diaphragm backup plate is provided with Hastelloy C hardware. It is available on the AM unit with M Capsule only.        | D-CSC        |
| Customer Tag          | Stainless steel tag wired to transmitter for customer tag data that doesn't fit on the data plate. There can be a maximum of 10 lines of data with 40 characters and spaces per line. | MTS          |

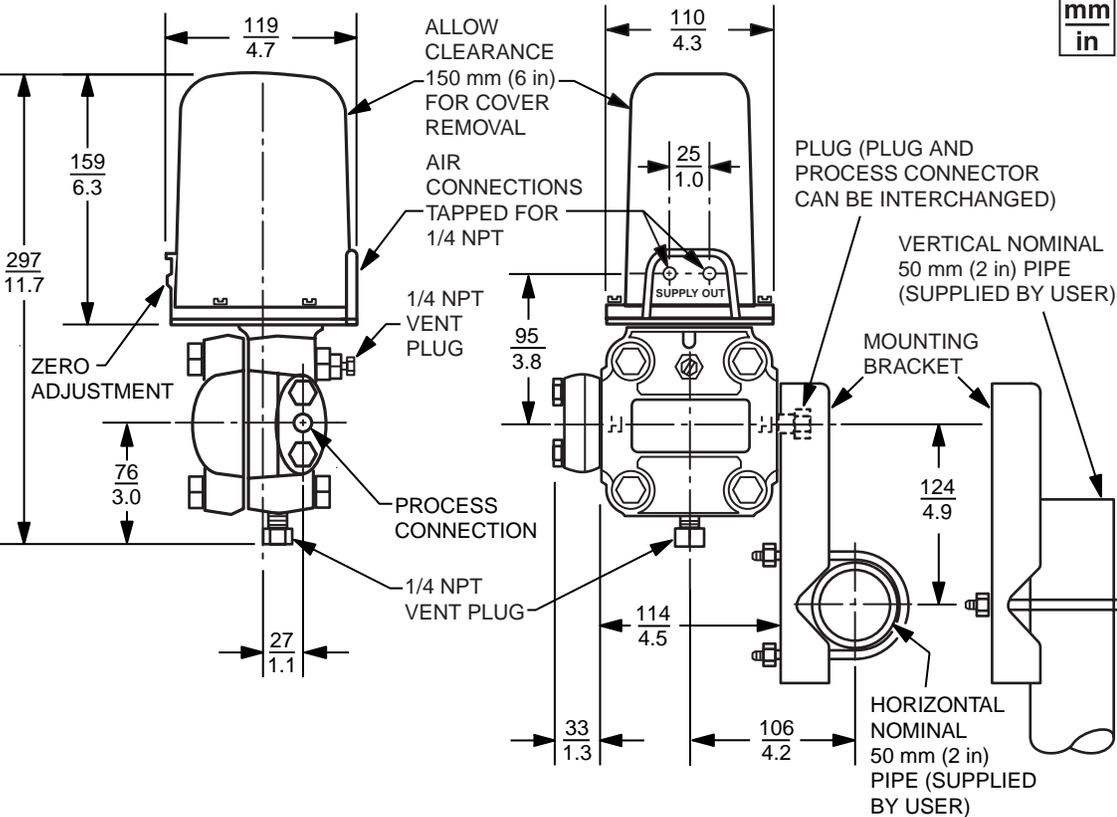
**DIMENSIONS – NOMINAL**

11AL SERIES ABSOLUTE PRESSURE TRANSMITTER



**DIMENSIONS – NOMINAL (Cont.)**

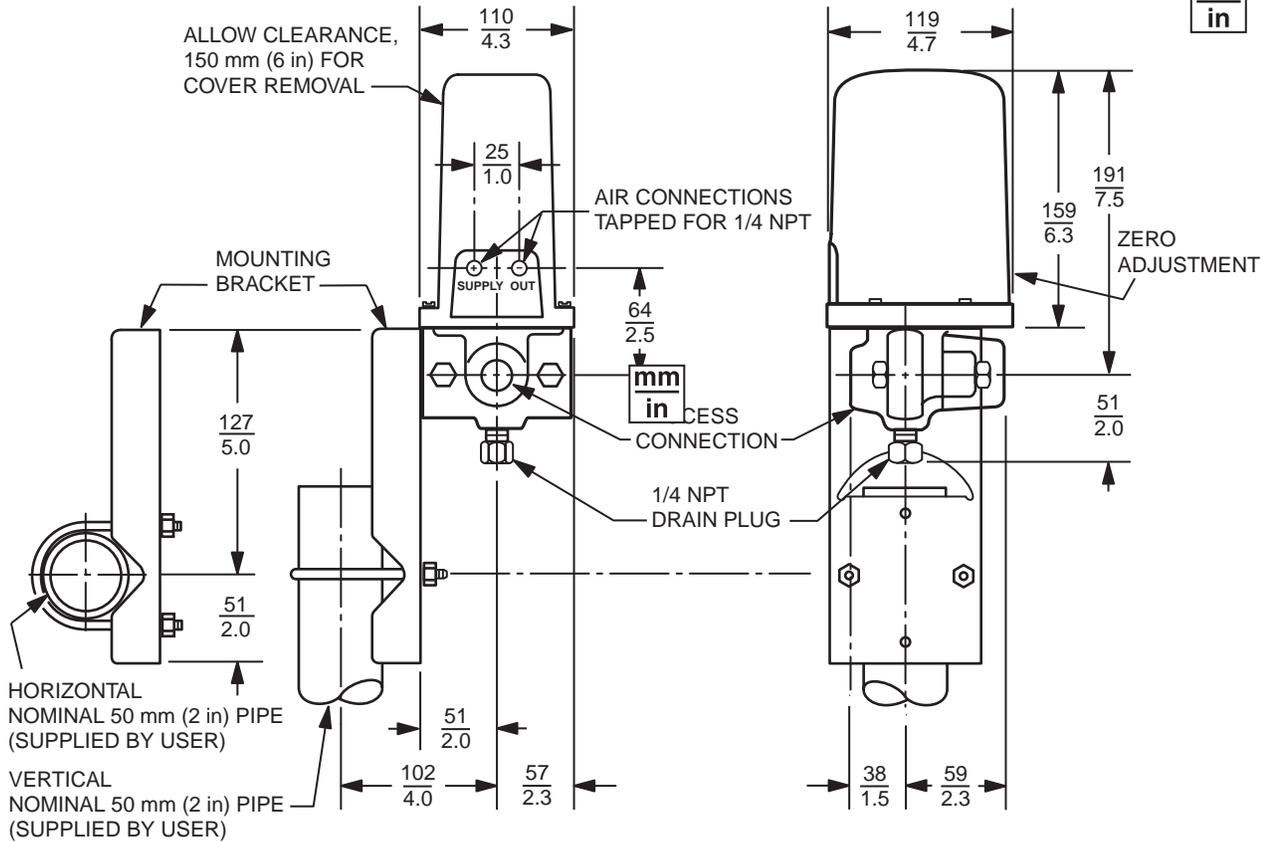
**11AM SERIES ABSOLUTE PRESSURE TRANSMITTER**



**DIMENSIONS – NOMINAL (Cont.)**

**11AH SERIES ABSOLUTE PRESSURE TRANSMITTER**

**mm  
in**



**ORDERING INSTRUCTIONS**

1. Model Number
2. Output Signal
3. Calibrated Absolute Pressure Range
4. Optional Features
5. Application and Tag Information

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