

Rosemount 2088, 2090F, and 2090P Pressure Transmitters

NOTICE

Read this manual before working with the product. For personal and system safety, and for optimum product performance, make sure you thoroughly understand the contents before installing, using, or maintaining this product.

For technical assistance, contacts are listed below:

Customer Central

Technical support, quoting, and order-related questions.

United States - 1-800-999-9307 (7:00 am to 7:00 pm CST)

Asia Pacific- 65 777 8211

Europe/ Middle East/ Africa - 49 (8153) 9390

North American Response Center

Equipment service needs.

1-800-654-7768 (24 hours—includes Canada)

Outside of these areas, contact your local Emerson Process Management representative.

⚠ CAUTION

The products described in this document are NOT designed for nuclear-qualified applications. Using non-nuclear qualified products in applications that require nuclear-qualified hardware or products may cause inaccurate readings.

For information on Rosemount nuclear-qualified products, contact your local Emerson Process Management Sales Representative.

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USING THIS MANUAL

The sections in this manual provide information on installing, operating, and maintaining Rosemount 2088, 2090F, and 2090P pressure transmitters with HART® protocol. The sections are organized as follows:

- **Section 2: Installation** contains mechanical and electrical installation instructions.
- **Section 3: Configuration** provides instruction on commissioning and operating Rosemount 2088, 2090F, and 2090P transmitters. Information on software functions, configuration parameters, and online variables is also included.
- **Section 4: Operation and Maintenance** contains operation and maintenance techniques.
- **Section 5: Troubleshooting** provides troubleshooting techniques for the most common operating information.
- **Appendix A: Reference Data** supplies reference and specification data, as well as ordering information.
- **Appendix B: Approval Information** contains intrinsic safety approval information, European ATEX directive information, and approval drawings.
- **Appendix C: Glossary**

SERVICE SUPPORT

To expedite the return process outside of the United States, contact the nearest Emerson Process Management representative.

Within the United States, call the Emerson Process Management Instrument and Valves Response Center using the 1-800-654-RSMT (7768) toll-free number. This center, available 24 hours a day, will assist you with any needed information or materials.

Rosemount 2088 and 2090

The center will ask for product model and serial numbers and will provide a Return Material Authorization (RMA) number. The center will also ask for the process material to which the product was last exposed.

CAUTION

Individuals who handle products exposed to a hazardous substance can avoid injury if they are informed of and understand the hazard. If the product being returned was exposed to a hazardous substance as defined by OSHA, a copy of the required Material Safety Data Sheet (MSDS) for each hazardous substance identified must be included with the returned goods.

Emerson Process Management Instrument and Valves Response Center representatives will explain the additional information and procedures necessary to return goods exposed to hazardous substances.

MODELS COVERED

The following Rosemount Pressure Transmitters are covered by this manual:

Rosemount 2088 Pressure Transmitter

2088G - Gage Pressure Transmitter

Measures gage pressure up to 4000 psi (275,8 bar)

2088A - Absolute Pressure Transmitter

Measures absolute pressure up to 4000 psi (275,8 bar)

Rosemount 2090F Hygienic Pressure Transmitter

2090FG - Gage Pressure Transmitter

Measures gage pressure up to 300 psi (20,7 bar)

2090FA - Absolute Pressure Transmitter

Measures absolute pressure up to 300 psi (20,7 bar)

Rosemount 2090P Pulp & Paper Pressure Transmitter

2090PG - Gage Pressure Transmitter

Measures gage pressure up to 300 psi (20,7 bar)

2090PA - Absolute Pressure Transmitter

Measures absolute pressure up to 300 psi (20,7 bar)

PRODUCT RECYCLING/DISPOSAL

Recycling of equipment and packaging should be taken into consideration and disposed of in accordance with local and national legislation/regulations.

Section 2 Installation

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OVERVIEW

The information in this section covers installation considerations for the Rosemount 2088, 2090F, and 2090P transmitters with HART protocols. A Quick Installation Guide (document number 00825-0100-4690) is shipped with every transmitter to describe basic pipe-fitting and wiring procedures for initial installation.

Field Communicator and AMS Device Manager instructions are given to perform configuration functions. For convenience, Field Communicator fast key sequences are labeled “Fast Keys” for each software function below the appropriate headings.

SAFETY MESSAGES

Instructions and procedures in this section may require special precautions to ensure the safety of the personnel performing the operations. Information that raises potential safety issues is indicated by a warning symbol (⚠). Refer to the following safety messages before performing an operation preceded by this symbol.

Warnings

WARNING

Explosions could result in death or serious injury:

Installation of this transmitter in an explosive environment must be in accordance with the appropriate local, national, and international standards, codes, and practices. Please review the approvals section of the reference manual for any restrictions associated with a safe installation.

- Before connecting a Field Communicator in an explosive atmosphere, ensure the instruments in the loop are installed in accordance with intrinsically safe or non-incendive field wiring practices.
- In an Explosion-Proof/Flameproof installation, do not remove the transmitter covers when power is applied to the unit.

Process leaks may cause harm or result in death.

- Install and tighten process connectors before applying pressure.

Electrical shock can result in death or serious injury.

- Avoid contact with the leads and terminals. High voltage that may be present on leads can cause electrical shock.

Conduit/Cable Entries.

- Unless marked, the conduit/cable entries in the transmitter housing use a 1/2-14 NPT thread form. Only use plugs, adapters, glands, or conduit with a compatible thread form when closing these entries.

WARNING

Electrical shock can result in death or serious injury.

- Avoid contact with the leads and terminals.

Process leaks could result in death or serious injury.

- Install and tighten all four flange bolts before applying pressure.
- Do not attempt to loosen or remove flange bolts while the transmitter is in service.

Replacement equipment or spare parts not approved by Emerson Process Management for use as spare parts could reduce the pressure retaining capabilities of the transmitter and may render the instrument dangerous.

- Use only bolts supplied or sold by Emerson Process Management as spare parts.
- Refer to page A-7 for a complete list of spare parts.

WARNING

Use appropriately rated sanitary clamps and gaskets during installation of the 2090F. The maximum working pressure of the clamp and gasket must be greater than or equal to the working pressure range of the transmitter. Failure to use proper clamps and gaskets can cause process leaks and can result in death or serious injury.

**GENERAL
CONSIDERATIONS**

Measurement accuracy depends on proper installation of the transmitter and impulse piping. Mount the transmitter close to the process and use a minimum of impulse piping to achieve the best accuracy. Also, consider the need for easy access, personnel safety, practical field calibration, and a suitable transmitter environment. Install the transmitter to minimize vibration, shock, and temperature fluctuation.

IMPORTANT

Install the enclosed pipe plug (found in the box) in unused conduit opening with a minimum of five threads engaged to comply with explosion-proof requirements.

For material compatibility considerations, see document number 00816-0100-3045 on www.emersonprocess.com/rosemount.

**MECHANICAL
CONSIDERATIONS**

NOTE

For steam service or for applications with process temperatures greater than the limits of the transmitter, do not blow down impulse piping through the transmitter. Flush lines with the blocking valves closed and refill lines with water before resuming measurement.

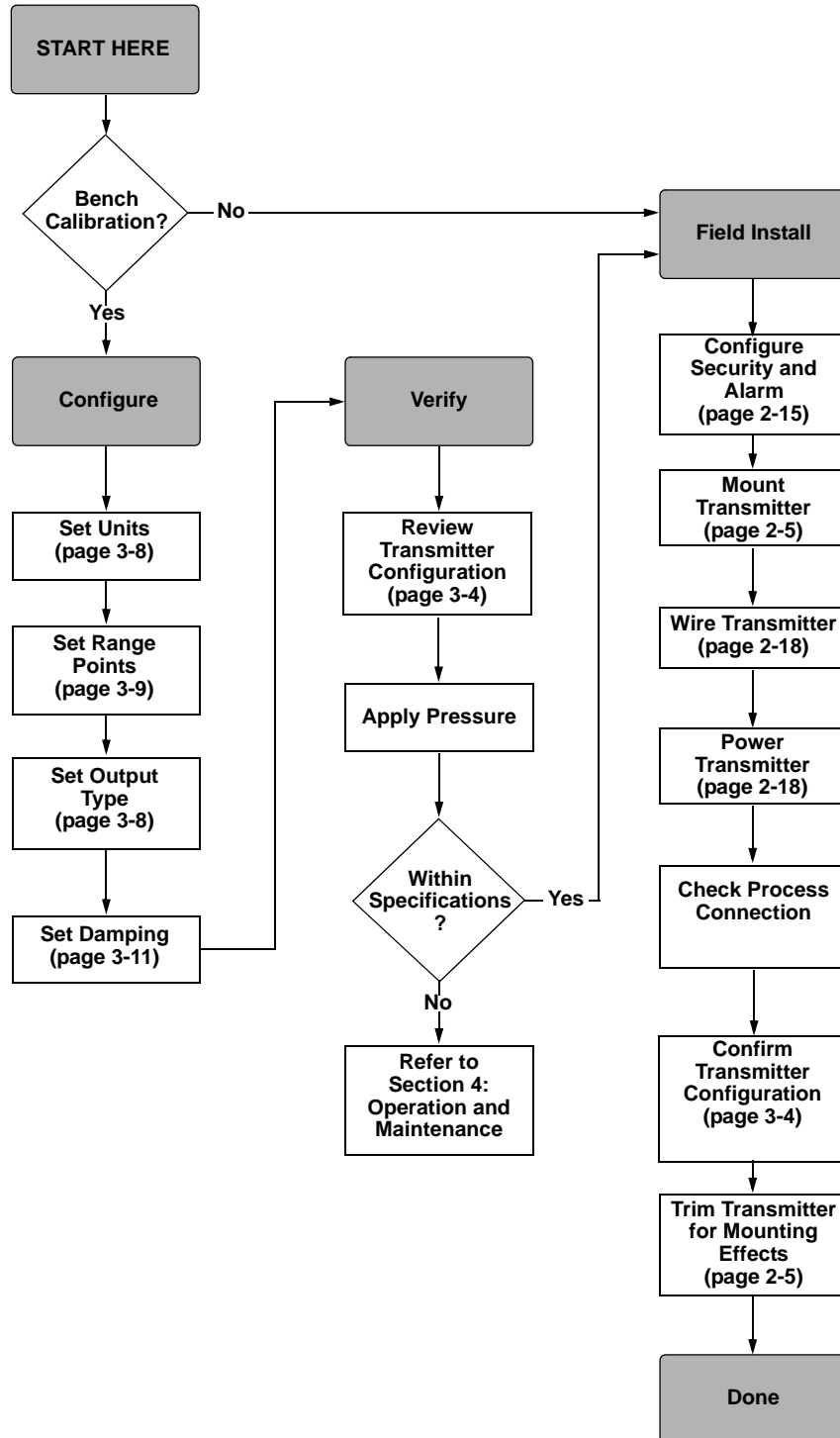
**ENVIRONMENTAL
CONSIDERATIONS**

Best practice is to mount the transmitter in an environment that has minimal ambient temperature change. The transmitter electronics temperature operating limits are -40 to 185 °F (-40 to 85 °C). Refer to Appendix A: Reference Data which lists the sensing element operating limits. Mount the transmitter so that it is not susceptible to vibration and mechanical shock and does not have external contact with corrosive materials.

Rosemount 2088 and 2090

HART INSTALLATION FLOWCHART

Figure 2-1. HART Installation Flowchart



INSTALLATION PROCEDURES

Mount the Transmitter

Rosemount 2088

The Rosemount 2088 Transmitter weighs approximately 2.44 lb. (1,11 kg). In many cases, its compact size and light weight makes it possible to mount the 2088 directly to the impulse line without using an additional mounting bracket. When this is not desirable, mount directly to a wall, panel, or two-inch pipe using the optional mounting bracket (see Figure 2-3).

The 2088 offers several process connections. Use your plant-approved thread sealant to ensure a leak-proof connection.

Rosemount 2090P

The Rosemount 2090P is designed to be mounted directly to the process pipe using a weld spud (see Figure 2-7). Mount the transmitter using an existing weld spud or install a new one using the instructions on page 2-11.

Rosemount 2090F

The Rosemount 2090F is designed to be mounted directly to the process pipe using a standard sanitary fitting (see Figure 2-8). The transmitter is available with either a 1½- or 2-inch Tri-Clamp® connection.

NOTE

Most transmitters are calibrated in the horizontal position. Mounting the transmitter in any other position will shift the zero point to the equivalent amount of liquid head pressure caused by the varied mounting position. To reset zero point, refer to “Sensor Trim” on page 4-8.

Terminal Side of Electronics Housing

Mount the transmitter so the terminal side is accessible. Clearance of 0.75-in. (19 mm) is required for cover removal. Use a conduit plug on the unused side of the conduit opening.

Circuit Side of Electronics Housing

Provide 0.75 in. (19 mm) of clearance for units without an LCD display. Provide 3 in. (76 mm) of clearance for units installed with an LCD display.

Cover Installation

Always ensure a proper seal by installing the electronics housing covers so that metal contacts metal. Use Rosemount supplied o-rings.

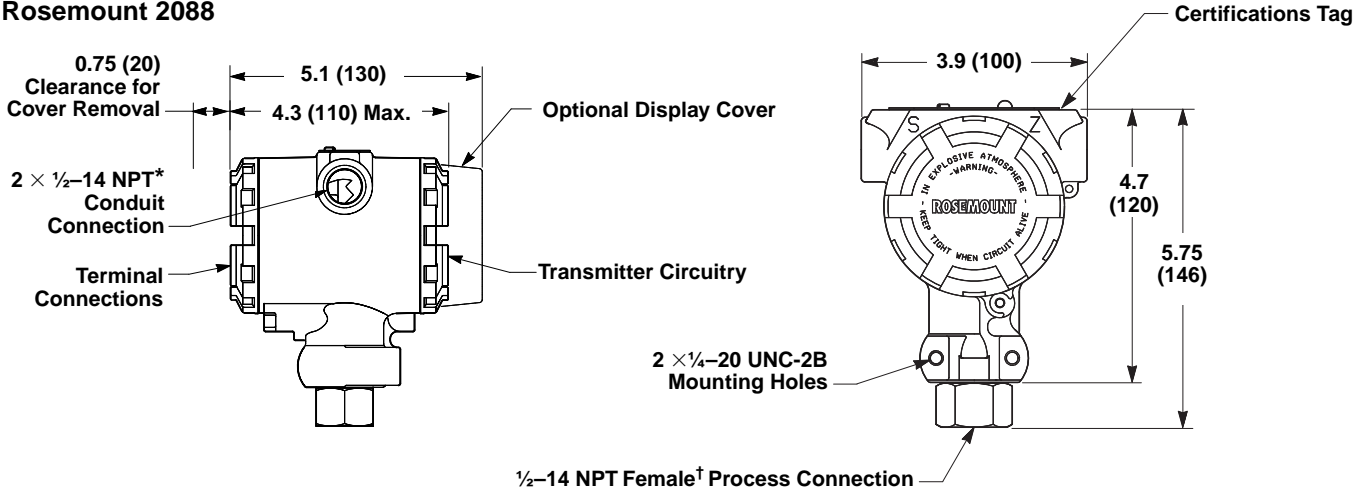
Mounting Brackets

Rosemount 2088/2090 Transmitters may be panel-mounted or pipe-mounted through an optional mounting bracket. See Figure 2-3 on page 2-8 for dimensional and mounting configurations.

Rosemount 2088 and 2090

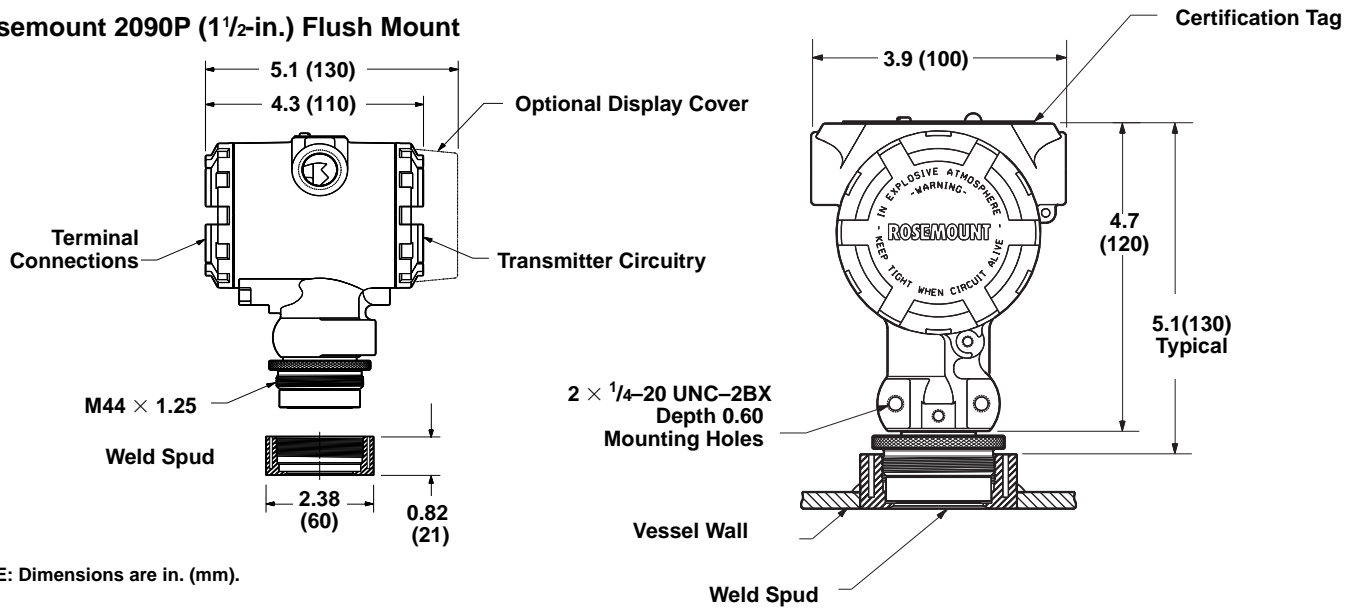
Dimensional Drawings

Figure 2-2. Transmitter Dimensional Drawings
Rosemount 2088



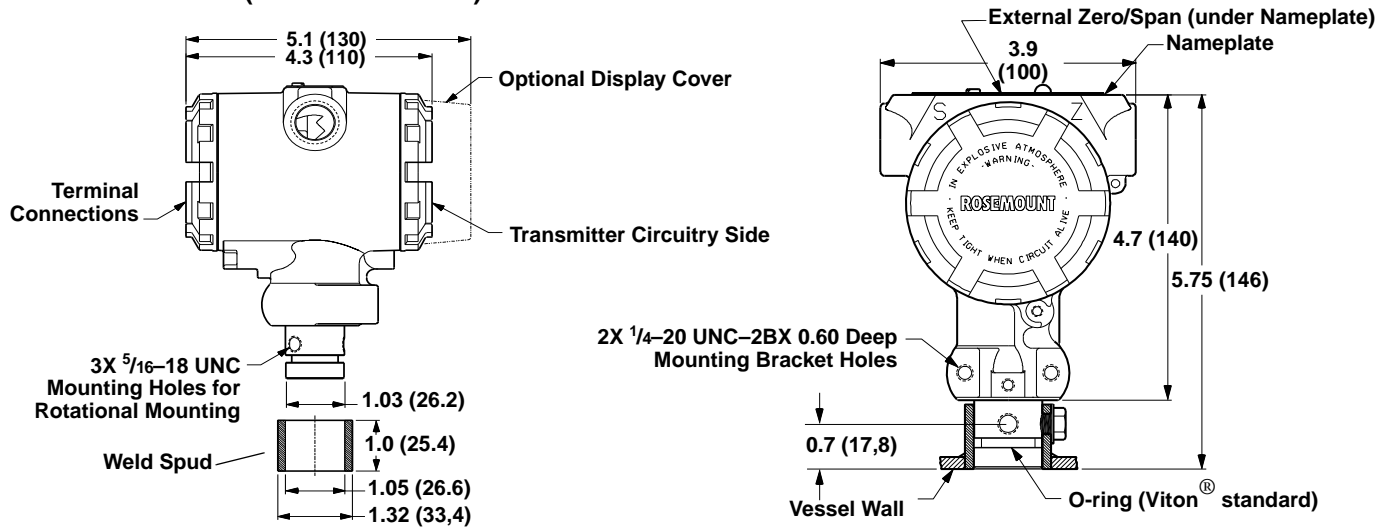
* M20 × 1.5 Female and G 1/2 Female (PF 1/2) also available as options.
 † DIN 16288 G 1/2 Male, RC 1/2 Female (PT 1/2), and M20 × 1.5 Male also available.

Rosemount 2090P (1 1/2-in.) Flush Mount

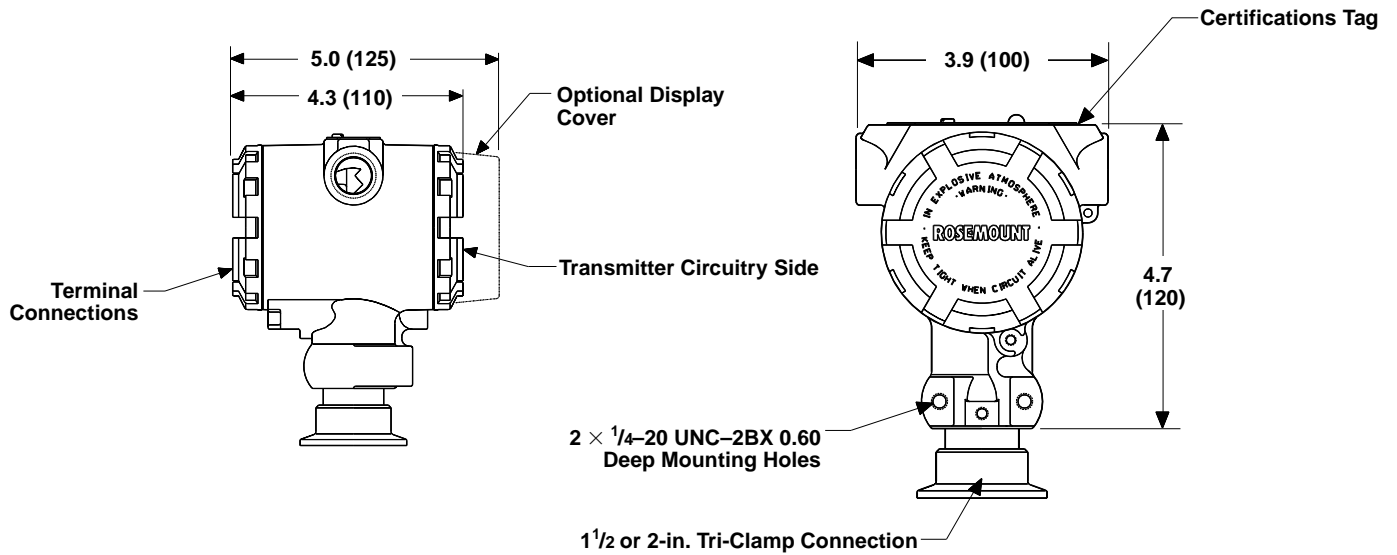


NOTE: Dimensions are in. (mm).

Rosemount 2090P (1-in. Flush Mount)



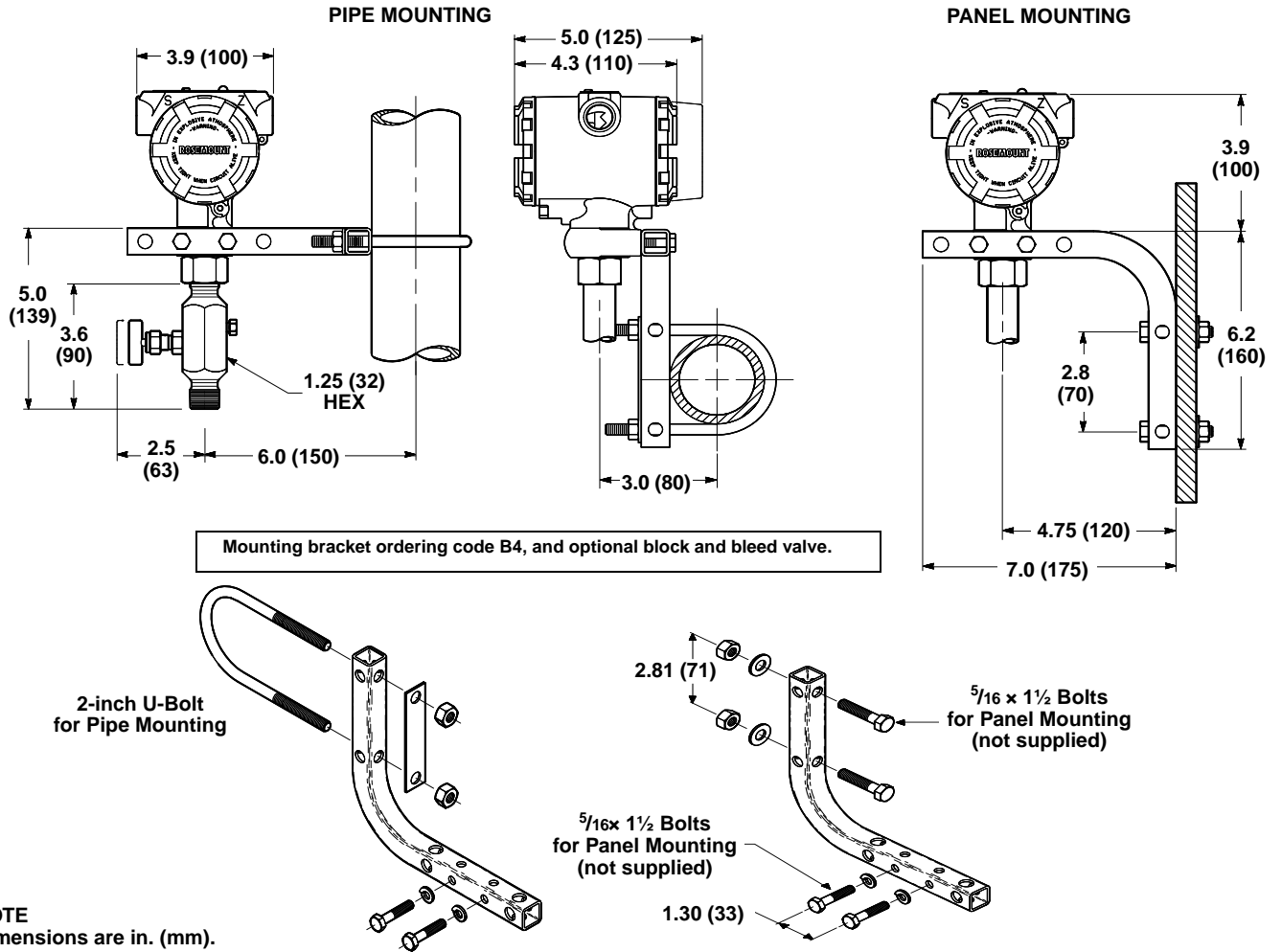
Rosemount 2090F



* M20 x 1.5 Female also available.
 NOTE: Dimensions are in inches (millimeters).

Rosemount 2088 and 2090

Figure 2-3. Transmitter Mounting Configurations with Optional Bracket.



NOTE
 Dimensions are in. (mm).

Impulse Piping

The piping between the process and the transmitter must accurately transfer the pressure to obtain accurate measurements. There are six possible sources of impulse piping error: pressure transfer, leaks, friction loss (particularly if purging is used), trapped gas in a liquid line, liquid in a gas line, and density variations between the legs.

The best location for the transmitter in relation to the process pipe is dependent on the process. Use the following guidelines to determine transmitter location and placement of impulse piping:

- Keep impulse piping as short as possible.
- For liquid service, slope the impulse piping at least 1 in./foot (8 cm/m) upward from the transmitter toward the process connection.
- For gas service, slope the impulse piping at least 1 in./foot (8 cm/m) downward from the transmitter toward the process connection.
- Avoid high points in liquid lines and low points in gas lines.
- Make sure both impulse legs are the same temperature.
- Use impulse piping large enough to avoid friction effects and blockage.
- Vent all gas from liquid piping legs.
- When using a sealing fluid, fill both piping legs to the same level.
- When purging, make the purge connection close to the process taps and purge through equal lengths of the same size pipe. Avoid purging through the transmitter.
- Keep corrosive or hot (above 250 °F [121 °C]) process material out of direct contact with the sensor module and flanges.
- Prevent sediment deposits in the impulse piping.
- Maintain equal leg of head pressure on both legs of the impulse piping.
- Avoid conditions that might allow process fluid to freeze within the process flange.

Mounting Requirements

Impulse piping configurations depend on specific measurement conditions. Refer to Figure 2-4 for examples of the following mounting configurations:

Liquid Flow Measurement

- Place taps to the side of the line to prevent sediment deposits on the process isolators.
- Mount the transmitter beside or below the taps so gases vent into the process line.
- Mount drain/vent valve upward to allow gases to vent.

Gas Flow Measurement

- Place taps in the top or side of the line.
- Mount the transmitter beside or above the taps so to drain liquid into the process line.

Rosemount 2088 and 2090

Rosemount 2088 and 2090
