Standard and Extended Velocity Range
T5 Flare Gas Transducers
Installation Guide
[no content intended for this page]
Information Paragraphs

**Note:** These paragraphs provide information that provides a deeper understanding of the situation, but is not essential to the proper completion of the instructions.

**IMPORTANT:** These paragraphs provide information that emphasizes instructions that are essential to proper setup of the equipment. Failure to follow these instructions carefully may cause unreliable performance.

- **CAUTION!** This symbol indicates a risk of potential minor personal injury and/or severe damage to the equipment, unless these instructions are followed carefully.

- **WARNING!** This symbol indicates a risk of potential serious personal injury, unless these instructions are followed carefully.

Safety Issues

- **WARNING!** It is the responsibility of the user to make sure all local, county, state and national codes, regulations, rules and laws related to safety and safe operating conditions are met for each installation.

- **WARNING!** For installations in potentially hazardous areas, be sure to read the *Certification and Safety Statements* document at the end of this manual before beginning the installation.

Auxiliary Equipment

Local Safety Standards
The user must make sure that he operates all auxiliary equipment in accordance with local codes, standards, regulations, or laws applicable to safety.

Working Area

- **WARNING!** Auxiliary equipment may have both manual and automatic modes of operation. As equipment can move suddenly and without warning, do not enter the work cell of this equipment during automatic operation, and do not enter the work envelope of this equipment during manual operation. If you do, serious injury can result.

- **WARNING!** Make sure that power to the auxiliary equipment is turned OFF and locked out before you perform maintenance procedures on the equipment.
Qualification of Personnel

Make sure that all personnel have manufacturer-approved training applicable to the auxiliary equipment.

Personal Safety Equipment

Make sure that operators and maintenance personnel have all safety equipment applicable to the auxiliary equipment. Examples include safety glasses, protective headgear, safety shoes, etc.

Unauthorized Operation

Make sure that unauthorized personnel cannot gain access to the operation of the equipment.

Environmental Compliance

Waste Electrical and Electronic Equipment (WEEE) Directive

GE Measurement & Control is an active participant in Europe’s Waste Electrical and Electronic Equipment (WEEE) take-back initiative, directive 2012/19/EU.

The equipment that you bought has required the extraction and use of natural resources for its production. It may contain hazardous substances that could impact health and the environment.

In order to avoid the dissemination of those substances in our environment and to diminish the pressure on the natural resources, we encourage you to use the appropriate take-back systems. Those systems will reuse or recycle most of the materials of your end life equipment in a sound way.

The crossed-out wheeled bin symbol invites you to use those systems.

If you need more information on the collection, reuse and recycling systems, please contact your local or regional waste administration.

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Chapter 1. Installing Pipe Nozzles

1.1 Introduction

Before the T5 transducers can be installed into the pipe, you will need to install pipe nozzles. Nozzles may be installed as part of a fabricated spoolpiece or by using the hot or cold tap process with a GE Sensing Nozzle Installation Kit.

IMPORTANT: This procedure only applies if you are using a Nozzle Installation Kit. If you are tapping the pipe without using a Nozzle Installation Kit, refer to the supplied drawings in your shipment. This procedure is written and illustrated for installations on horizontal pipes; however, the procedure is the same for vertical pipe installations.

This section describes how to install nozzles in the following configurations:

1. Bias 90° Installation
   a. Standard spacings of 10” and 9”, with both transducers facing straight at each other, are for gas velocity up to 100 m/s (328 ft/s) applications. This is the standard velocity range.
   b. Shorter spacing of 6.4”, with only the downstream transducer rotated 6° into the flow is for extended range gas velocity up to 120 m/s (394 ft/s) applications.

2. Tilted 45° Installation
   a. Standard transducer face to face spacings, with both transducer body axes concentric and parallel to each other are for gas velocity up to 100 m/s (328 ft/s) applications. This is the standard velocity range.
   b. Shorter transducer face to face spacing of approximately 7.85”, with only the downstream transducer tilted 6° into the flow, is for extended range gas velocity up to 120 m/s (394 ft/s) applications.

1.2 Bias 90° Installation

This procedure contains the following instructions:

- identifying and checking the nozzle installation kit components
- selecting and marking the pipe for nozzle locations
- installing the first welding boss
- installing the first nozzle
- installing the second welding boss
- installing the second nozzle
- hot tapping the pipe
1.2.1 Identifying and Checking the Nozzle Installation Kit Components

The Nozzle Installation Kit contains the materials listed below. Use Figure 1 below to help identify each component.

- 2 Nozzles (if purchased)
- 2 Welding Bosses
- 1 Jig
- 1 Alignment Plate (9 in., 10 in. or 6.4 in. spacing)
- 1 Spacer Flange
- 1 Threaded Rod (1 in. diameter), washer and nut

**IMPORTANT:** You will need to supply eight 5/8” studs with two nuts each, or 3/4” studs with two nuts each; 5/8” studs for a 2” 150# flange, a 2” 300# flange or a 3” 150# flange, and 3/4” studs for a 3” 300# flange.

Once you are familiar with each component, verify that the welding bosses and alignment plate shipped are for the required spacing and pipe size as described in the following steps.

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**Figure 1: Components for Nozzle Installation Kit**
1.2.1 Identifying and Checking the Nozzle Installation Kit Components (cont.)

1. Check the marking on the end of the welding boss. The pipe O.D. and the bias dimension (or spacing) are engraved on the boss as shown below. Typically,

   a. for flow velocity up to 100 m/s (328 ft/s) the 10 in. spacing is used on pipes 18 in. (450 mm) and larger; the 9 in. spacing is used on pipes 16 in. (400 mm) or on larger pipes when attenuating gases are present, and

   b. for up to 120 m/s (394 ft/s) flow velocity, the 6.4 in. spacing is used on pipes 14 in. (356 mm) or larger.

   **Note:** Bias dimension refers to the distance between the center of the nozzle location and the center line of the pipe.

2. Check the spacing between the holes on the alignment plate. The dimensions should correspond to the bias/spacing dimension on the welding boss.
1.2.2 Selecting and Marking the Pipe for Nozzle Locations

**CAUTION!** Correct nozzle alignment is critical to the successful operation of the flowmeter; therefore, all marking, positioning and welding operations must be carried out with the utmost attention to accuracy. Unless otherwise stated, dimensional positioning of the nozzles must be held to a tolerance of ±1/16 in. (1.6 mm) relative to each other and with respect to the pipe centerline. The angular tolerance must be held to ±1°.

All hole cutting in process piping must be performed using hot tapping equipment.

**WARNING!** BE SURE TO ADHERE TO ALL APPLICABLE SAFETY REGULATIONS.

1. For optimum performance, you should select a location that has at least 20 pipe diameters of straight, undisturbed pipe upstream and 10 pipe diameters of straight, undisturbed pipe downstream from the point of measurement. Undisturbed pipe means avoiding sources of turbulence such as flanges, elbows and tees; avoiding swirl; and avoiding disturbed flow profiles. Never install the flowmeter downstream of control valves, especially butterfly valves. If you cannot find a proper location, please consult with GE Measurement & Control Flow Application engineering.

![Diagram showing nozzle locations](image)

2. Use a center finder device to locate the center of the pipe. EYEBALLING IS NOT ADEQUATE FOR ACCURATE FLOW MEASUREMENT.

3. Lightly punch two marks approximately 16 in. apart on the top of the pipe running along the centerline. The two nozzle locations will fall between the two center punch marks.

![Top View Diagram](image)

4. Spray the area between the two punch marks on the top of the pipe with a marking dye product. Using a metal edge, scribe a line between the two punch marks.
1.2.2 Selecting and Marking the Pipe for Nozzle Locations (cont.)

5. Along the new scribe line, mark off a 10 in. length (or 9 in., or 6.4 in. depending on spacing) and scribe two perpendicular lines at least 10 in. in length as shown.

6. Along each perpendicular scribe line, lightly punch a mark at a distance of 5 in. (or 4.5 in., or 3.2 in.) from the center line, depending on the bias. Keep in mind that the distance along the arc of the pipe (L) from the pipe centerline is slightly greater. These marks pinpoint the centers for the nozzles. Refer to Table 1 on page 7 for arc distances for the most commonly used pipe sizes. If your pipe size is not shown in Table 1, use the equation in the figure on page 6 to calculate the arc distance.
1.2.2 Selecting and Marking the Pipe for Nozzle Locations (cont.)

**IMPORTANT:** For 3.2 in. bias, the downstream port must be located on the right when a person is looking up against the flow (see the figure below). This convention is mandatory for the 6.4 in. spacing and is optional (not required) for the 10 in. or 9 in. spacing.

**Punch Marks**

\[ \text{S L} = \text{Arc Length along pipe surface} \]

**Flow**

**Downstream Port Location for 3.2 in. bias**

\[ L = \frac{3.142 \times R \times A}{180} \]

Where

- \( A = \sin^{-1} \left( \frac{S}{R} \right) \)
- \( R = \text{Radius in inches} \)
- \( S = \text{Bias in inches} \)
1.2.2 Selecting and Marking the Pipe for Nozzle Locations (cont.)

Table 1: Calculated Arc Distances for Commonly Used Pipes

<table>
<thead>
<tr>
<th>Pipe O.D.</th>
<th>Arc Distance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>5 in. Bias</td>
</tr>
<tr>
<td>18 in. (450 mm)</td>
<td>5.301 in.</td>
</tr>
<tr>
<td>24 in. (600 mm)</td>
<td>5.157 in.</td>
</tr>
<tr>
<td>30 in. (750 mm)</td>
<td>5.098 in.</td>
</tr>
<tr>
<td>36 in. (900 mm)</td>
<td>5.067 in.</td>
</tr>
<tr>
<td>42 in. (1050 mm)</td>
<td>5.048 in.</td>
</tr>
<tr>
<td></td>
<td>4.5 in. Bias</td>
</tr>
<tr>
<td>16 in. (400 mm)</td>
<td>4.779 in.</td>
</tr>
<tr>
<td>18 in. (450 mm)</td>
<td>4.713 in.</td>
</tr>
<tr>
<td>24 in. (600 mm)</td>
<td>4.613 in.</td>
</tr>
<tr>
<td>30 in. (750 mm)</td>
<td>4.571 in.</td>
</tr>
<tr>
<td>36 in. (900 mm)</td>
<td>4.549 in.</td>
</tr>
<tr>
<td>42 in. (1050 mm)</td>
<td>4.536 in.</td>
</tr>
<tr>
<td></td>
<td>3.2 in. Bias</td>
</tr>
<tr>
<td>14 in. (350 mm)</td>
<td>3.323 in.</td>
</tr>
<tr>
<td>16 in. (400 mm)</td>
<td>3.292 in.</td>
</tr>
<tr>
<td>18 in. (450 mm)</td>
<td>2.272 in.</td>
</tr>
<tr>
<td>24 in. (600 mm)</td>
<td>3.239 in.</td>
</tr>
<tr>
<td>30 in. (750 mm)</td>
<td>3.225 in.</td>
</tr>
<tr>
<td>36 in. (900 mm)</td>
<td>3.217 in.</td>
</tr>
<tr>
<td>42 in. (1050 mm)</td>
<td>3.213 in.</td>
</tr>
</tbody>
</table>

7. Scribe a horizontal centerline (6 in. long) through each nozzle center location point parallel to the original centerline.
1.2.3 Installing the First Welding Boss

1. Each welding boss has four scribe marks indicating the center of the bias. Take one welding boss and line up its scribe marks with the horizontal and perpendicular scribe marks on the pipe as shown below. Make sure you position the boss on the pipe so that the contoured end of the boss matches the pipe arc (the shorter side of the boss should be closer to the original scribed pipe centerline).

2. Clamp the boss in place, using a pipe strap or equivalent, so that it cannot move during tack welding.

3. Check the boss alignment again, then tack weld the boss in each of the four grooves between the boss scribe marks. Make sure you keep the boss contour flush with the pipe contour during the entire tacking operation. The boss is constructed of carbon steel.

4. Check the alignment again. If the boss is misaligned by 0.02 in. (0.5 mm) or more, remove the boss, grind off the welds and reinstall.
1.2.4 Installing the First Nozzle

CAUTION! It is essential that the nozzles are set up and fixed in position using the jig and alignment plate provided, prior to welding the nozzle.

1. Screw the threaded rod into the boss that is welded onto the pipe. If necessary, remove the washer and nut from the threaded rod.

2. Insert the pipe section of the jig (the key cut section) into the pipe section of the nozzle, and fasten the assembly using four nuts and bolts.
1.2.4 Installing the First Nozzle (cont.)

3. Slide the jig/nozzle assembly over the threaded rod, fitting the jig into the key cut end of the welding boss while aligning the contoured end of the nozzle to the pipe arc.

4. Align the nozzle scribe marks with the pipe scribe marks and tighten the assembly in place using the 1-in. washer and nut. If slight misalignment occurs between the nozzle scribe marks and pipe scribe marks, loosen the four bolts holding the jig and nozzle assembly, and rotate the nozzle for the best alignment. Once it is aligned, retighten the four bolts.

5. The jig, boss, and nozzle combination is designed to provide a 0.094 in. (2.4 mm) root gap between the beveled edge of the nozzle and the outside diameter of the pipe. If the 0.094 in. (2.4 mm) clearance does not exist all around, the nozzle must be removed and ground appropriately to provide the required clearance. If the root gap is larger than the 0.094 in. (2.4 mm) dimension evenly all around the nozzle, then suitably sized washers may be inserted between the jig and the nozzle in order to reduce the root gap dimension.

WARNING! ONLY QUALIFIED PERSONNEL SHOULD WELD BOSSES AND NOZZLES, USING A SUITABLE ASME IX QUALIFIED WELDING PROCEDURE. ALL APPLICABLE SAFETY CODES SHOULD BE OBSERVED.
1.2.4 Installing the First Nozzle (cont.)

6. Tack weld the nozzle to the pipe at four diametrically opposed points, each tack being approximately 0.2 in. (5 mm) in length. Allow to cool for 30 seconds between tacks.

7. Complete the root pass and subsequent filler passes as required.

8. Allow to cool, then remove the threaded rod, washer, nut, and jig.

1.2.5 Installing the Second Welding Boss

1. Bolt the jig to one end of the alignment plate using four bolts.

2. Screw the threaded rod into the second boss. Insert the bolt/boss assembly into the jig key cut grooves and secure with the washer and nut on top.

3. Remember to orient the boss in the jig to maintain the proper contour location to the pipe for installation.
1.2.5 Installing the Second Welding Boss (cont.)

4. Place the spacer flange on top of the welded nozzle and then mount the second end of the alignment plate on top of the spacer flange. Bolt into position using the remaining bolts.

5. The second welding boss should now be positioned over the second nozzle location scribe marks. Align the boss scribe marks with the pipe scribe marks; then tighten all nuts securely.

6. Check the boss alignment again, then tack weld the boss in each of the four grooves between the boss scribe marks.

7. After tacking, check the boss alignment once more. If the boss is misaligned by 0.02 in. (0.5 mm) or more, remove the boss by grinding off the welds, and reinstall.

8. Remove the threaded rod and the jig. Leave the alignment plate bolted to the first nozzle, with the spacer flange sandwiched between them.
1.2.6 Installing the Second Nozzle

1. Insert the jig into the second nozzle and position this assembly over the boss and under the alignment plate. Insert the threaded rod.

2. The jig, boss, and nozzle combination is designed to provide a 0.094 in. (2.4 mm) root gap between the beveled edge of the nozzle and the outside diameter of the pipe. If the 0.094 in. (2.4 mm) clearance does not exist all around, the nozzle must be removed and ground appropriately to provide the required clearance. If the root gap is larger than the 0.094 in. (2.4 mm) dimension, then suitably sized washers may be inserted between the jig and the nozzle in order to reduce the root gap dimension.

3. Secure the alignment plate by replacing the two sets of four bolts on both ends of the plate, and the washer and nut on the threaded rod.

4. Line up the nozzle scribe marks with the pipe scribe marks and tighten all the nuts.

5. Make sure the nozzle is still in alignment.

![Warning]

WARNING! ONLY QUALIFIED PERSONNEL SHOULD WELD BOSSES AND NOZZLES, USING A SUITABLE ASME IX QUALIFIED WELDING PROCEDURE. ALL APPLICABLE SAFETY CODES SHOULD BE OBSERVED.

6. Tack weld the nozzle to the pipe at four diametrically opposed points, each tack being approximately 0.2 in. (5 mm) in length. Allow to cool for 30 seconds between tacks.

7. Proceed to complete the root pass and subsequent filler passes as required.

8. Allow to cool.

9. Remove all nuts and bolts, the alignment plate, jig, spacer flange and threaded rod. The completed installation should appear as shown below.
1.2.7 Hot Tapping the Pipe

**WARNING! HOT TAPPING SHOULD ONLY BE PERFORMED BY QUALIFIED PERSONNEL. FOLLOW ALL APPLICABLE CODE AND SAFETY PRACTICES DURING THESE PROCEDURES.**

**For 3 in. Flanges:**

1. Install 3 in. ANSI flanged isolation valves on both nozzles (full bore and 8 in. face to face 150# RF or 11.125 in. for 300# RF) with gasket and 5/8 in. or 3/4 in. diameter studs and nuts for 150# or 300# flange rating, respectively. Orient valve handles to minimize interference.

2. Hot tap holes in the pipe using a hot tap machine equipped with a 3/4 in. (19.05 mm) drill bit. Then use a coupon retaining hole saw to cut a hole with a diameter of 2.36 in. (60 mm) minimum to 2.875 in. (73 mm) maximum.

**For 2 in. Flanges:**

1. Install 2 in. ANSI flanged isolation valves on both nozzles (full bore and 7 in. face to face 150# RF or 8.50 in. for 300# RF) with gasket and 5/8-in. diameter studs and nuts. Orient valve handles to minimize interference.

2. Hot tap holes in the pipe using a hot tap machine equipped with a 3/4 in. (19.05 mm) drill bit. Then use a coupon retaining hole saw to cut a hole with a diameter of 1.81 in. (46 mm) minimum to 1.89 in. (48 mm) maximum.

1.2.8 Cold Tapping the Pipe

The procedure for cold tapping a pipe is the same as the hot tapping procedure; however, a valve is not necessary during the process. The hot tap medium can be applied directly to the nozzle. Valves will be added after the tapping is complete.

1.3 Tilted 45° Installation

This procedure contains the following instructions:

- Identifying and checking the nozzle installation kit components
- Selecting and marking the first nozzle location
- Determining and marking the second nozzle location
- Installing the first welding boss
- Installing the first nozzle
- Installing the second welding boss and nozzle
- Hot tapping the pipe
1.3.1 Identifying and Checking the Nozzle Installation Kit Components

The nozzle kit consists of various components which you must identify and check as described in the following sub-sections.

The Nozzle Installation Kit contains the materials listed below. Use Figure 2 below to help identify each component.

| 2 Nozzles (if purchased) | 2 Welding bosses | 1 Jig | 1 Threaded rod (1 in. diameter), washer and nut |

**IMPORTANT:** You will need to supply eight 5/8” studs with two nuts each, or 3/4” studs with two nuts each (5/8” studs for a 2” 150# flange, a 2” 300# flange or a 3” 150# flange, and 3/4” studs for a 3” 300# flange).

![Figure 2: Components for Nozzle Installation Kit](image)

Check the marking on the end of the welding boss. The pipe OD and the mounting angle are engraved on the boss as shown below.

![Pipe OD and Mounting Angle](image)
1.3.2 Selecting and Marking the First Nozzle Location

CAUTION! Correct nozzle alignment is critical to the successful operation of the flowmeter; therefore, all marking, positioning and welding operations must be carried out with the utmost attention to accuracy. Unless otherwise stated, dimensional positioning of the nozzles must be held to a tolerance of \( \pm 1/16 \) in. (1.6 mm) relative to each other and with respect to the pipe centerline. The angular tolerance must be held to \( \pm 1^\circ \).

All hole cutting in process piping must be performed using hot tapping equipment.

1. For optimum performance, you should select a location that has straight run pipeline at least 20 pipe diameters of straight, undisturbed pipe upstream and 10 pipe diameters of straight, undisturbed pipe downstream from the point of measurement. Undisturbed pipe means avoiding sources of turbulence such as valves, flanges, elbows; avoiding swirl; and avoiding disturbed flow profiles.

2. We recommend that you install the nozzles on a diameter as near as possible to the horizontal plane (i.e., 3 o’clock and 9 o’clock) for horizontal pipe.

Note: If you cannot find a proper location, please consult with GE Flow Application engineering.
1.3.2 Selecting and Marking the First Nozzle Location (cont.)

3. At the 3 o’clock position, center punch the pipe to mark the position for the center of the first nozzle.

4. Spray this area with a marking dye product. Using a metal edge, scribe a vertical and a horizontal line (6 in. long) that intersect at the center punch mark.
1.3.3 Determining and Marking the Second Nozzle Location

1. The position for the second nozzle is typically a distance equal to one pipe outside diameter along the pipe and located on the opposite side of the pipe (i.e., 180° around). Spray this area with a marking dye product. (For installation other than 45°, the distance is equal to the OD times the tangent of the install angle.

2. Due to the possible variation in outside diameter of the pipe, measure the outside diameter of the pipe at four location between the nozzle centers. Calculate the average outside diameter based on these measurements.

3. Using a roll of polyester film (or equivalent), cut a strip of film at the width and length as follows:

   **IMPORTANT:** Ensure that the sides of the film are cut parallel to each other.

   - Width - equal to the average outside diameter calculated in Step 1 above.
   - Length - equal to 4 times the outside diameter of the pipe.
1.3.3 Determining and Marking the Second Nozzle Location (cont.)

4. Wrap the strip of film around the pipe with one edge running along the vertical scribe line at the first nozzle location. Make sure the strip overlaps squarely around the pipe and mark the overlap position of the strip. This equals the circumference of the pipe.

5. Remove the strip of film and fold it as shown below to determine the position which is diametrically opposite the overlap position when the film is reapplied to the pipe.

6. Mark the outside of the fold for reference.
1.3.3 Determining and Marking the Second Nozzle Location (cont.)

7. Place the strip of film on the pipe again; this time, line up the overlap mark with the horizontal and vertical scribe lines. Again, make sure you wrap the strip of film squarely around the pipe.

8. The new position of the center of the second nozzle is now identified as the intersection of the fold line and the second edge of the strip of film. Center punch this location prior to removing the strip of film.

9. Remove the film.

10. Scribe vertical and horizontal lines (each 6 in. long) to intersect at the center-punch mark.
1.3.4 Installing the First Welding Boss

1. Before welding the first boss, you must add another scribe line known as the oblique center line. The oblique center line compensates for the slope or oblique of the boss. The oblique center line is offset from the true center (vertical) scribe line marked earlier by a distance of “X,” which is dependent on the pipe outside diameter as follows:

\[ X = \frac{D}{2} - \frac{d/2}{\tan\left[\sin^{-1}\left(\frac{d}{D}\right)\right]} \]

where,  \( D \) = pipe outside diameter
\( d \) = welding boss outside diameter (1.660 in.)

Table 2 below shows values of X for various pipe sizes.

<table>
<thead>
<tr>
<th>Pipe</th>
<th>O.D.</th>
<th>X Dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>6 in. (150 mm)</td>
<td>6.625 in.</td>
<td>0.106 in. (2.69 mm)</td>
</tr>
<tr>
<td>8 in. (200 mm)</td>
<td>8.625 in.</td>
<td>0.081 in. (2.06 mm)</td>
</tr>
<tr>
<td>10 in. (250 mm)</td>
<td>10.750 in.</td>
<td>0.064 in. (1.62 mm)</td>
</tr>
<tr>
<td>12 in. (300 mm)</td>
<td>12.750 in.</td>
<td>0.054 in. (1.37 mm)</td>
</tr>
<tr>
<td>14 in. (350 mm)</td>
<td>14.000 in.</td>
<td>0.049 in. (1.24 mm)</td>
</tr>
</tbody>
</table>

2. Scribe the oblique center line on the pipe at the prescribed distance from the true center line. The oblique center line should be marked on the side of the true center line that is closer to the second nozzle location.
1.3.4 Installing the First Welding Boss (cont.)

3. Position the welding boss such that the four scribe lines on the welding boss are lined up with the horizontal scribe mark and the oblique center line on the pipe. Make sure you orient the boss as shown below.

4. Clamp the boss in place using a pipe strap or equivalent so that it cannot move during tack welding.

5. Check the boss alignment, then tack weld the carbon steel boss to the pipe in each of the four grooves between the boss scribe marks.

6. Remove the clamp and check the alignment again. If the boss is misaligned by 0.02 in. (0.5 mm) or more, remove the boss, grind off the welds and reinstall.
1.3.5 Installing the First Nozzle

**IMPORTANT:** It is essential that the nozzle is set up and fixed in position using the jig and 1-in. threaded rod provided, prior to welding the nozzle.

1. Screw the threaded rod into boss that is welded onto the pipe. If necessary, remove the washer and nut from the threaded rod.

2. Slide the nozzle over the threaded rod, and align the contoured end of the nozzle so it matches the pipe arc. Then slide the jig over the threaded rod, fitting the jig into the welding boss.
1.3.5 Installing the First Nozzle (cont.)

3. Align the jig and nozzle bolt holes and tighten the assembly in place, using the washer and nut.

4. The jig, boss, and nozzle combination is designed to provide a 0.094 in. (2.4 mm) root gap between the beveled edge of the nozzle and the outside diameter of the pipe. If the 0.094 in. (2.4 mm) clearance does not exist all around, the nozzle must be removed and ground appropriately to provide the required clearance. If the root gap is larger than the 0.094 in. (2.4 mm) dimension, then suitably sized washers may be inserted between the jig and the nozzle in order to reduce the root gap dimension.

WARNING! ONLY QUALIFIED PERSONNEL SHOULD WELD BOSSES AND NOZZLES, USING A SUITABLE ASME IX QUALIFIED WELDING PROCEDURE.

5. Tack weld the nozzle to the pipe at four diametrically opposed points, each tack being approximately 0.6 in. (15 mm) in length. Allow to cool for 30 seconds between tacks.

6. Proceed to complete the root pass and subsequent filler passes as required.

7. Allow to cool, then remove the threaded rod, washer, nut, and jig.
1.3.6 Installing the Second Welding Boss and Nozzle

Install the second welding boss and nozzle at the required position as described in *Installing the First Welding Boss* and *Installing the First Nozzle*.

The completed installation should appear as shown below.
1.3.7 Hot Tapping the Pipe

**Note:** Hot tapping tilted 45° installation is possible only for the standard range (100 m/s, 328 ft/s) flow gas application. For the extended range (120 m/s, 394 ft/s) application, only the 4” pipe size can be hot topped.

**WARNING! HOT TAPPING SHOULD ONLY BE PERFORMED BY QUALIFIED PERSONNEL. FOLLOW ALL APPLICABLE CODE AND SAFETY PRACTICES DURING THESE PROCEDURES.**

**For 3 in. Flanges:**

1. Install 3 in. ANSI flanged isolation valves on both nozzles (full bore and 8 in. face to face 150# RF or 11.125 in. for 300# RF) with gasket and 5/8 in. or 3/4 in. diameter studs and nuts for 150# or 300# flange rating, respectively. Orient valve handles to minimize interference.
2. Hot tap holes in the pipe using a hot tap machine equipped with a 3/4 in. (19.05 mm) drill bit. Then use a coupon retaining hole saw to cut a hole with a diameter of 2.36 in. (60 mm) minimum.

**For 2 in. Flanges:**

1. Install 2 in. ANSI flanged isolation valves on both nozzles (full bore and 7 in. face to face 150# RF or 8.50 in. for 300# RF) with gasket and 5/8-in. diameter studs and nuts. Orient valve handles to minimize interference.
2. Hot tap holes in the pipe using a hot tap machine equipped with a 3/4 in. (19.05 mm) drill bit. Then use a coupon retaining hole saw to cut a hole with a diameter of 1.81 in. (46 mm) minimum to 1.89 in. (48 mm) maximum.

1.3.8 Cold Tapping the Pipe

**Note:** Cold tapping is the same as the hot top procedure for a standard range (100 m/s, 328 ft/s) flow gas meter. Cold tapping can be performed only before the isolation valve is installed, except for the 4 in. pipe size. This is due to the tilted downstream transducer/insertion mechanism and valve assembly.

**WARNING! COLD TAPPING SHOULD ONLY BE PERFORMED BY QUALIFIED PERSONNEL. FOLLOW ALL APPLICABLE CODE AND SAFETY PRACTICES DURING THESE PROCEDURES.**

**For 3 in. Flanges:**

1. Cold tap holes in the pipe using a hot tap machine equipped with a 3/4 in. (19.05 mm) drill bit. Then use a coupon retaining hole saw to cut a hole with a diameter of 2 7/8 in. (73 mm).
Chapter 2. Installing the Isolation Valve

Note: The following information demonstrates how to install an isolation valve onto a nozzle for applications using the flare gas insertion mechanism.

2.1 Bias 90° Installation (for standard or extended range applications)

2.1.1 For 3 inch Flanges

Install 3 inch ANSI flanged isolation valves on both nozzles (full bore and 8 in. face to face 150# RF or 11.125 in. For 300# RF) with a gasket and 5/8 in. or 3/4 in. diameter studs and nuts for 150# or 300# flange rating, respectively. Orient the valve handles to minimize interference.

Note: This installation of the isolation valve may have been accomplished already during the hot tapping operation.

2.1.2 For 2 inch Flanges

Install 2 in. ANSI flanged isolation valves on both nozzles (full bore and 7 in. face to face 150# RF or 8 1/2 in. for 300# RF) with a gasket and 5/8 in. diameter studs and nuts. Orient the valve handles to minimize interference.

Note: This installation of the isolation valve may have been accomplished already during the hot tapping operation.

2.2 Tilted 45° Installation (for standard range gas flow velocity up to 100 m/s (328 ft/s) applications)

2.2.1 For 3 inch Flanges

Install 3 inch ANSI flanged isolation valves on both nozzles (full bore and 8 in. face to face 150# RF or 11.125 in. For 300# RF) with a gasket and 5/8 in. or 3/4 in. diameter studs and nuts for 150# or 300# flange rating, respectively. Orient the valve handles to minimize interference.

Note: This installation of the isolation valve may have been accomplished already during the hot tapping operation.

2.2.2 For 2 inch Flanges

Install 2 in. ANSI flanged isolation valves on both nozzles (full bore and 7 in. face to face 150# RF or 8 1/2 in. for 300# RF) with a gasket and 5/8 in. diameter studs and nuts. Orient the valve handles to minimize interference.

Note: This installation of the isolation valve may have been accomplished already during the hot tapping operation.
2.3 Tilted 45° Installation (for extended range gas flow velocity up to 120 m/s (394 ft/s) for 3 inch valves)

Note: The upstream valve and transducers are installed without wedges, per normal installation procedures.

To install the downstream valve assembly onto the spoolpiece, the following items are required (see Figure 3 below).

![Figure 3: Parts Used to Install a Valve Assembly](image)

Note: A 150# RF installation is shown.

1. Insert the four bolts into the flange holes.
2. With the Nut Side marking facing the pipe, place the split bolt spacer pieces behind the flange, over the bolts, with the thin ends corresponding to what will be the thickest side of the other wedge (see Figure 4 on the next page).

Note: The wedge positions are based on the need to tilt the transducer 6° against the flow.
2.3 Tilted 45° Installation (for extended range gas flow velocity up to 120 m/s (394 ft/s) for 3 inch valves) (cont.)

3. With the Nozzle Face marking facing the pipe and the Valve Face marking facing outward, hold the gasket/wedge/gasket in line with the insertion hole, and oriented in the required direction (see Figure 4 above).

4. While one person holds the gaskets and wedges in place, another person should line up the valve assembly mounting holes with the bolts already installed, push the valve assembly against the gasket/wedge/gasket, and install the washers and nuts to secure the valve assembly to the spoolpiece (see Figure 5 below).
2.3 Tilted 45° Installation (for extended range gas flow velocity of up to 120 m/s (394 ft/s) for 3 inch valves applications) (cont.)

5. Insert the two adjustment screws into the threaded holes on the wedge (see Figure 6 below) and use them to adjust/rotate the wedge until the scribe line is evenly positioned between the two bolts.

![Figure 6: Inserting the Adjustment Screws](image)

6. When the wedge is positioned correctly, use wrenches to tighten the hardware and secure the components, then remove the adjustment screws.

![Figure 7: The Valve Wedges and Gaskets Installed](image)

**Note:** The upstream valve and transducers are installed without the wedge and bolt spacers, per normal installation procedures.
Chapter 3. Installing Transducer Assemblies

3.1 Introduction

Transducers and their holder assemblies are installed into a meter body. The meter body is a section of pipe that contains the ports where the transducer assemblies will be mounted. The meter body may be prefabricated or created by installing ports on the existing pipe. Transducers can be inserted into the pipes using a number of holder methods:

- Low pressure insertion mechanism
- Barrel holder
- Flanged holder

Note: This manual will describe the low pressure insertion mechanism type only. For other types please see the GE Transducer Installation Guide.

3.2 Inserting Transducers Using a Low Pressure Insertion Mechanism - Common Steps

Note: The Insertion Mechanism is designed for manual (non-assisted) transducer insertion into operating or low pressurized pipes. The mechanism uses an isolation valve and a packing gland for sealing.

Inserting the transducers into the pipe consists of the following:

- Preparing for Installation
- Mounting the Insertion Mechanism
- Inserting the Transducer into the Pipe
- Aligning the Transducers

WARNING! THE MANUAL INSERTION MECHANISM SYSTEM IS FOR LOW PRESSURE APPLICATIONS [80 PSIG/6.5 BAR (absolute) OR LESS]. USE THE APPROPRIATE SAFETY PRECAUTIONS WHEN INSERTING OR WITHDRAWING THE INSERTION MECHANISM.

3.2.1 Preparing for Installation

Before you begin, you should find an area where you can place the insertion mechanism upright without placing any weight on the transducer (e.g., a bench with a cutout large enough to slide the transducer through).

You will need the following items for installation:

- a packing tool (may be shipped with the electronics)
- a gasket to place on the isolation valve
- a straight edge ruler/scale
- a tag to place on the isolation valve
- bolts
3.2.2  Mounting the Insertion Mechanism

1. Before mounting the mechanism to the isolation valve you should familiarize yourself with its components (see the figure below):
   - junction box
   - barrel
   - packing gland
   - transducer

*Note:* Explosion-proof boxes are not mounted on the end of the transducer when shipped.
3.2.2 Mounting the Insertion Mechanism (cont.)

2. Visually inspect the transducer. Make sure the top compression fitting is not loose.

**IMPORTANT:** The stop ring at the end of the barrel is supposed to be loose. *DO NOT* tighten the compression fitting or you could change the transducer alignment.

3. Remove the four bolts that fasten the barrel to the packing gland.
3.2.2 Mounting the Insertion Mechanism (cont.)

4. Retract the barrel from the packing gland so that the transducer head is recessed in the packing gland. You will hear the stop ring click when the transducer is fully recessed.
3.2.2 Mounting the Insertion Mechanism (cont.)

5. Visually inspect the mechanism. Make sure the transducer is recessed in the packing gland. Again, make sure the top compression fitting is secure and hand tight.
3.3 Mounting the Bias 90 Insertion Mechanism Transducer Assembly

1. Lift the gasket and insert the packing tool into the packing nut. Turning the packing tool clockwise, tighten the packing material so that the barrel will stay up without support.

2. Check and make sure the isolation valves are securely installed with gaskets and hardware, then place a gasket on the face of each isolation valve.
3.3 Mounting the Bias 90 Insertion Mechanism Transducer Assembly (cont.)

3. For the Standard Velocity Range application, the upstream and downstream nozzle designations are interchangeable. The system is bi-directional.

For the Extended Velocity Range application, the system is not bi-directional. Note which valve is designated upstream and downstream on the pipe. Identify the upstream and downstream insertion mechanism assemblies. The downstream assembly is labeled with a ring marked Downstream, located at the end of the assembly near the junction box. See the figure below.

4. Proceed with either the upstream or downstream assembly.

5. Lift the insertion mechanism by the barrel and place the insertion mechanism on the isolation valve.
3.3 Mounting the Bias 90 Insertion Mechanism Transducer Assembly (cont.)

6. Line up the flange holes and bolt the packing gland to the isolation valve.

7. Using the packing tool, tighten the packing nut again so the nut is recessed.

WARNING! THE PACKING MATERIAL MUST BE SECURELY PACKED BEFORE THE ISOLATION VALVE IS OPENED.
3.4 Inserting the Bias 90 Transducer into the Pipe

1. Before you open the isolation valve carefully check the following:
   - the barrel is pulled up as far as it can go;
   - all bolts are secure
   - the transducer head is recessed in the packing gland.

   ![Diagram of Barrel, Packing Gland, and Bolts]

   WARNING! FOLLOW ALL APPLICABLE SAFETY CODES AND PRACTICES BEFORE OPENING THE ISOLATION VALVE.

2. Open the isolation valve.
3.4 Inserting the Bias 90 Transducer into the Pipe (cont.)

3. Placing your hands on top of the barrel, push the barrel/transducer down into the pipe so that the barrel flange and the packing gland flange meet. You may have to twist the barrel to get it moving.

4. For this bias 90 configuration, orient the alignment marks on each barrel flange so that they are facing each other. The alignment mark is scribed on the top and outside of the flange. It will also be marked with paint.
3.4 Inserting the Bias 90 Transducer into the Pipe (cont.)

5. Place two bolts into the flange in holes opposite each other, but not in the hole with the scribe mark. Hand tighten.  

Note: *DO NOT insert the remaining bolts until instructed to do so in the following section.*
Chapter 3. Installing Transducer Assemblies

3.4 Inserting the Bias 90 Transducer into the Pipe (cont.)

6. Install the second insertion mechanism by repeating the steps in the two previous sections. After the second mechanism is installed proceed to the following section.

3.5 Aligning the Transducers (for applications with gas flow velocity up to 100 m/s)

1. Use a straight edge to line up the alignment marks.
2. Place the remaining bolts into the flanges and tighten securely.
3. Place a tag on the isolation valve stating the following:

   DO NOT OPERATE (CLOSE) WHEN
   TRANSDUCER IS INSERTED INTO PIPE.

4. Refer to your Startup Guide or User’s Manual to make transducer electrical connections.
5. This applies to both upstream and downstream assemblies equally.
3.6 Aligning the Transducers (for applications with gas flow velocity 120 m/s)

**Note:** The downstream transducer is pre-set at the factory, in the barrel of the downstream insertion mechanism, to shift the signal direction 6° away from the upstream transducer signal.

1. Verify that the downstream transducer is located on the right when a person is looking up against the flow (see Figure 8 below). Contact a representative or the factory if the port locations do not follow this convention.

2. Slide the end slot of the guide plate around the upstream transducer, and rotate the plate until the side slot is around the downstream transducer (see Figure 9 below). Align the transducer mark on the upstream barrel with the guide plate mark. Moderately tighten the upstream barrel bolts to maintain the alignment.
3.6 Aligning the Transducers (for applications with gas flow velocity 120 m/s)

3. Place the cover plate on top of the guide plate and slide it as far as possible (until it is positioned around the upstream transducer) as shown in Figure 10 below. Then tighten the screws to secure it.

![Figure 10: Installing the Cover Plate](image)

4. Slide the locking collar down the downstream transducer to the cavity on top of the guide plate, align the 6° mark on the top of the collar with the line on the transducer (see Figure 11 below). Then tighten the collar set screws until it is secure around the transducer.

![Figure 11: Locking Collar 6° Mark Aligned with Line on Transducer Tube](image)
3.6 Aligning the Transducers (for applications with gas flow velocity 120 m/s) (cont.)

5. Check to see if the 0° mark on the side of the collar is aligned with the line on the guide plate. If they are not aligned, then loosen the nuts on top of the barrel and rotate the barrel/transducer assembly until the two lines are aligned (see Figure 12 below). Then retighten the nuts.

6. Check to see if the line on the upstream transducer tube is aligned with the line on the cover plate. If they are not aligned, loosen the nuts on top of the barrel and rotate the barrel/transducer assembly until the two lines are aligned (see Figure 13 below). Retighten the nuts.
3.6 Aligning the Transducers (for applications with gas flow velocity 120 m/s) (cont.)

7. Upon completion of the above steps, remove the cover plate, locking collar and guide plate from the transducer assemblies.

8. Place the remaining bolts into the flanges and tighten securely.

9. Place a tag on the isolation valve stating the following:

   DO NOT OPERATE (CLOSE) WHEN TRANSUDER IS INSERTED INTO PIPE

10. Refer to your *Startup Guide* or *User’s Manual* to make transducer electrical connections.

3.7 Mounting the Tilted 45 Insertion Mechanism Transducer Assembly

1. Lift the gasket and insert the packing tool into the packing nut. Turning the packing tool clockwise, tighten the packing material so that the barrel will stay up without support.
3.7 Mounting the Tilted 45 Insertion Mechanism Transducer Assembly (cont.)

2. Check and make sure the isolation valves are securely installed with gaskets and hardware, then place a gasket on the face of each isolation valve.
3.7 Mounting the Tilted 45 Insertion Mechanism Transducer Assembly (cont.)
3.7 Mounting the Tilted 45 Insertion Mechanism Transducer Assembly (cont.)

3. For the **Standard Velocity Range** application, the upstream and downstream nozzle designations are interchangeable. The system is bi-directional.

For the **Extended Velocity Range** application, the system is not bi-directional. Note which valve is designated upstream and downstream on the pipe. Identify the upstream and downstream insertion mechanism assemblies. The downstream assembly is labeled with a ring marked *Downstream*, located at the end of the assembly near the junction box. See the figure below.

4. Proceed with either the upstream or downstream assembly.

5. Lift the insertion mechanism by the barrel and place the insertion mechanism on the isolation valve.

![Downstream Transducer Assembly Identification Ring](image)

6. Line up the flange holes and bolt the packing gland to the isolation valve.

![Bolts](image)
3.7 Mounting the Tilted 45 Insertion Mechanism Transducer Assembly (cont.)

7. Using the packing tool, tighten the packing nut again so the nut is recessed.

![Diagram showing the transducer assembly and packing tool]

**WARNING!** THE PACKING MATERIAL MUST BE SECURELY PACKED BEFORE THE ISOLATION VALVE IS OPENED.

3.7.1 Inserting the Tilted 45 Transducer into the Pipe

1. Before you open the isolation valve carefully check the following:
   - the barrel is pulled as far up as it can go;
   - all bolts are secure
   - the transducer head is recessed in the packing gland.

![Diagram showing the transducer assembly with labeled parts]
3.7.1 Inserting the Tilted 45 Transducer into the Pipe (cont.)

**WARNING! FOLLOW ALL APPLICABLE SAFETY CODES AND PRACTICES BEFORE OPENING THE ISOLATION VALVE.**

2. Open the isolation valve.

3. Placing your hands at the end of the barrel, push the barrel/transducer into the pipe so that the barrel flange and the packing gland flange meet. You may have to twist the barrel to get it moving.

4. Place the bolts into the flange joining the barrel flange to the packing gland flange.

5. Tighten the bolts securely.
3.7.1 Inserting the Tilted 45 Transducer into the Pipe (cont.)

6. Install the second insertion mechanism by repeating the steps in the previous sections. Confirm that the downstream transducer assembly is in the downstream port and the upstream assembly is in the upstream port.

7. Place a tag on the isolation valve stating the following:

   DO NOT OPERATE (CLOSE) WHEN TRANSUDER IS INSERTED INTO PIPE.

8. Refer to your *Startup Guide* or *User’s Manual* to make transducer electrical connections.

9. This applies to both upstream and downstream assemblies equally.
3.8 Connecting an XAMP

The following section explains how to correctly install and assemble an XAMP into a transducer junction box. It applies to all three possible junction box options (refer to drawing #752-063, Figure 22 on page 57), despite one junction box being used as an example in the steps below.

1. Place a 3/4” NPT compression fitting on the stem of the transducer closest to the BNC end.

2. Torque the fitting into one of the 3/4” NPT ports of the junction box with at least 5 threads engaged. Once the fitting is torqued into place, ensure that the BNC head of the transducer extends slightly past the ground screw bosses as shown below:

3. If the BNC head extends too far into the junction box, it will make the assembly more difficult by reducing the amount of area needed to properly store the excess cable. If the BNC head is not positioned approximately where it is pictured in the image above, loosen the compression fitting and adjust the transducer. Tighten the compression fitting after this is completed.

4. Torque the cable gland provided coming from the electronics main housing into the other 3/4” NPT port until there are at least 5 threads of engagement.
3.8 Connecting an XAMP (cont.)

With the transducer and the cable gland assembled, the junction box should now resemble Figure 16 below:

![Figure 16: Assembled Transducer and Cable Gland](image)

5. First connect the right angle male BNC plug to the exposed BNC cable from the cable gland assembly as shown in Figure 17 below.

![Figure 17: Connecting BNC Plug to Cable](image)
3.8 Connecting an XAMP (cont.)

6. Connect the female BNC plug of the XAMP to the male BNC transducer head as shown in Figure 18 below:

![Figure 18: Female Plug to Male BNC Head](image)

7. Wrap the extra length of cable around the perimeter of the junction box such that the BNC heads do not rest on other cables or on each other. An image of this can be seen in Figure 19 below.

![Figure 19: BNC Heads](image)
3.8 Connecting an XAMP (cont.)

8. Place the XAMP body into the junction box, resting the puck gently on the cables below it. Ensure that the cables of the XAMP rest naturally according to the slant at which they exit the epoxy (to reduce stress and strain on the joint). The XAMP should remain still, and the cap of the junction box should rotate freely around the XAMP.

![Figure 20: Junction Box Cap](image)

9. Place the lid of the junction box over top of the XAMP and tighten the lid until the unit is closed and secure. Engage the set screw to prevent it from being tampered or removed.

![Figure 21: Set Screw of Junction Box](image)

To disconnect or uninstall the XAMP from the assembly, users can reverse the procedures above.
Figure 22: Transducer Arrangement (dwg. #752-063, rev. L)
[no content intended for this page]
## Chapter 4. Specifications

### Table 3: T5 Transducer Specifications

<table>
<thead>
<tr>
<th>Transducer</th>
<th>T5 Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Designation</strong></td>
<td>Hazardous area applications; flare gas, hydrocarbon gases, saturated steam.</td>
</tr>
<tr>
<td><strong>Installation Type</strong></td>
<td>Wetted</td>
</tr>
<tr>
<td><strong>Material</strong></td>
<td><em>Standard: Titanium Optional: 316SS, Monel® or Hastelloy®</em></td>
</tr>
<tr>
<td><strong>Field Mounting</strong></td>
<td>Flowcell, hot or cold tap</td>
</tr>
<tr>
<td><strong>Process Connection</strong></td>
<td>1.5 in. to 3 in. (40 mm to 80 mm) flanged</td>
</tr>
<tr>
<td><strong>Holder Type</strong></td>
<td>Insertion mechanism</td>
</tr>
<tr>
<td><strong>Holder Ratings</strong></td>
<td>150#, 300#, 600#</td>
</tr>
<tr>
<td><strong>Operating Frequency</strong></td>
<td><em>Standard: 100 kHz Optional: 50 kHz and 200 kHz</em></td>
</tr>
<tr>
<td><strong>Pressure Range</strong></td>
<td>0 to 2700 psig</td>
</tr>
<tr>
<td><strong>Electrical Rating</strong></td>
<td>200 V peak-to-peak, 5 mA</td>
</tr>
<tr>
<td><strong>Ambient Temperature Range</strong></td>
<td><em>Europe: −40° to +140°F (−40° to +60°C) North America: −40° to +140°F (−40° to +60°C)</em></td>
</tr>
<tr>
<td><strong>Process Temperature Range</strong></td>
<td>−364° to +500°F (−220° to +260°C)</td>
</tr>
<tr>
<td><strong>North American Certifications - Explosion proof</strong></td>
<td>Class I, Division 1, Group C, D, Class II, Class III, Division 1, Group E, F, G</td>
</tr>
<tr>
<td><strong>European / International Certifications - Flameproof</strong></td>
<td>II 2 G Ex d IIC T6...T2 Gb (T code dependent on Process Temperature) Tamb −40° to +140°F (−40° to +60°C) KEMA 01ATEX2045X: IECEx KEM09.0009X Standards used: EN 60079-0:2012, EN 60079-1:2007, IEC 60079-0:2011, IEC 60079-1:2007, Ed. 6.</td>
</tr>
<tr>
<td><strong>North American Certifications - Weatherproof</strong></td>
<td>IP66, TYPE 4X, 200Vpp, 5mA</td>
</tr>
<tr>
<td><strong>European / International Certifications - Weatherproof</strong></td>
<td>IP 66</td>
</tr>
</tbody>
</table>
[no content intended for this page]
Warranty

Each instrument manufactured by GE Sensing is warranted to be free from defects in material and workmanship. Liability under this warranty is limited to restoring the instrument to normal operation or replacing the instrument, at the sole discretion of GE Sensing. Fuses and batteries are specifically excluded from any liability. This warranty is effective from the date of delivery to the original purchaser. If GE Sensing determines that the equipment was defective, the warranty period is:

- one year from delivery for electronic or mechanical failures
- one year from delivery for sensor shelf life

If GE Sensing determines that the equipment was damaged by misuse, improper installation, the use of unauthorized replacement parts, or operating conditions outside the guidelines specified by GE Sensing, the repairs are not covered under this warranty.

The warranties set forth herein are exclusive and are in lieu of all other warranties whether statutory, express or implied (including warranties of merchantability and fitness for a particular purpose, and warranties arising from course of dealing or usage or trade).

Return Policy

If a GE Sensing instrument malfunctions within the warranty period, the following procedure must be completed:

1. Notify GE Sensing, giving full details of the problem, and provide the model number and serial number of the instrument. If the nature of the problem indicates the need for factory service, GE Sensing will issue a RETURN AUTHORIZATION NUMBER (RAN), and shipping instructions for the return of the instrument to a service center will be provided.

2. If GE Sensing instructs you to send your instrument to a service center, it must be shipped prepaid to the authorized repair station indicated in the shipping instructions.

3. Upon receipt, GE Sensing will evaluate the instrument to determine the cause of the malfunction.

Then, one of the following courses of action will then be taken:

- If the damage is covered under the terms of the warranty, the instrument will be repaired at no cost to the owner and returned.

- If GE Sensing determines that the damage is not covered under the terms of the warranty, or if the warranty has expired, an estimate for the cost of the repairs at standard rates will be provided. Upon receipt of the owner’s approval to proceed, the instrument will be repaired and returned.
[no content intended for this page]
We, GE Sensing
1100 Technology Park Drive
Billerica, MA 01821
USA

declare under our sole responsibility that the

Models T3, T5, T8, T11, T14 and T17 Wetted Ultrasonic Flow Transducers
Series BWT1 / F...PA / XAMP... Ultrasonic Flowmeter Transducer Assembly
to which this declaration relates, are in conformity with the following standards:

- EN 60079-0: 2012
- EN 60079-1: 2007
- II 2 G Ex d IIC T6...615°C Gb
  - T3: KEMA06ATEX0052,
  - T5: KEMA01ATEX2045X,
  - T8: KEMA02ATEX2283X,
  - T11: KEMA02ATEX2252,
  - T14: KEMA04ATEX2054X,
  - T17: KEMA01ATEX2045X
  Series BWT1 / F...PA / XAMP...: KEMA01ATEX2051X; IEC Ex KEM09.0010X
  (DEKRA, Utrechtseweg, 310 Arnhem, The Netherlands - NoBo 0344)
- EN 61326-1: 2006, Class A, Table 2, Industrial Locations
- EN 61326-2-3: 2006
- EN 61010-1: 2012, Overvoltage Category II

Other standards used:
- EN 50014: 1997 + A1, A2
- EN 50018: 2000

following the provisions of the 2004/108/EC EMC and 94/9/EC ATEX Directives.

Where products were initially assessed for compliance with the Essential Health and Safety Requirements of the
ATEX Directive 94/9/EC using earlier harmonized standards, a subsequent review has determined that "technical
knowledge" is unaffected by the current harmonized standards listed above.

The units listed above and any ancillary equipment supplied with them do not bear CE marking for the Pressure
Equipment Directive. They are supplied in accordance with Article 3, Section 3 (sound engineering practices and

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Issued

Mr. Gary Kozinski
Certification & Standards, Lead Engineer
Customer Support Centers

U.S.A.
The Boston Center
1100 Technology Park Drive
Billerica, MA 01821
U.S.A.
Tel: 800 833 9438 (toll-free)
978 437 1000
E-mail: sensing@ge.com

Ireland
Sensing House
Shannon Free Zone East
Shannon, County Clare
Ireland
Tel: +353 (0)61 470200
E-mail: gesensingsnnservices@ge.com

An ISO 9001-2008 Certified Company

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