

# Rosemount™ 3300 Level Transmitter

## Guided Wave Radar



- Accurate, direct level measurement virtually unaffected by process conditions
- Minimized maintenance with no moving parts and no re-calibration required
- Fewer process penetrations and reduced installation costs with a MultiVariable™ level and interface transmitter
- Easy installation and commissioning through two-wire technology and user-friendly configuration
- Versatile and easy-to-use transmitter with field proven reliability
- High application flexibility with a wide range of process connections, probe styles, and accessories

# Proven, reliable, and easy to use guided wave radar

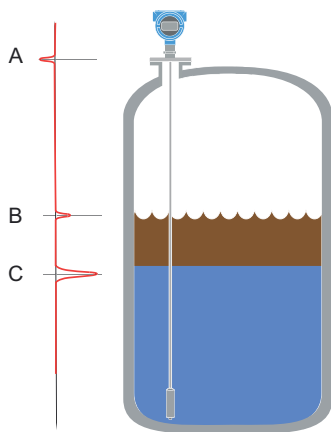
## Measurement principle

Low power, nano-second microwave pulses are guided down a probe submerged in the process media. When a microwave pulse reaches a medium with a different dielectric constant, part of the energy is reflected back to the transmitter.

The transmitter uses the residual wave of the first reflection for measuring the interface level. Part of the wave, which was not reflected at the upper product surface, continues until it is reflected at the lower product surface. The speed of this wave depends fully on the dielectric constant of the upper product.

The time difference between the transmitted and the reflected pulse is converted into a distance, and the total level or interface level is then calculated. The reflection intensity depends on the dielectric constant of the product: the higher dielectric constant value, the stronger reflection.

**Figure 1: Measurement Principle**



- A. Reference pulse
- B. Level
- C. Interface level

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## Guided wave radar technology benefits

- Direct level measurement means no compensation needed for changing process conditions (i.e. density, conductivity, temperature, and pressure)
- No moving parts and no re-calibration result in minimized maintenance
- Handles vapor and turbulence well
- Suitable for small tanks, difficult tank geometry, internal obstacles, and unaffected by the mechanical design of chambers
- Allows for easy upgrade
- Top down installation minimizes risk for leakages

## Special Rosemount 3300 features

### Proven high reliability increases uptime

- First 2-wire level and interface transmitter with field proven reliability
- More than 120,000 units installed
- Advanced signal processing for reliable measurement
- Accurate level unaffected by changing process conditions



### High application flexibility

- Suitable for most liquid storage and monitoring level and interface applications
- A wide selection of process connections and probe styles
- Remote mounting, mounting bracket, Emerson Wireless 775 THUM™ Adapter, HART® Tri-Loop™, and probe centering discs accessories
- Easy retrofit in existing chambers or available as complete assembly with high quality Rosemount chambers

### Robust design reduces costs and increases safety

- Leakage prevention and reliable performance under challenging conditions
- Detachable transmitter head allows tank to remain sealed
- Dual Compartment housing separates cable connections and electronics

**Easy installation and plant integration**

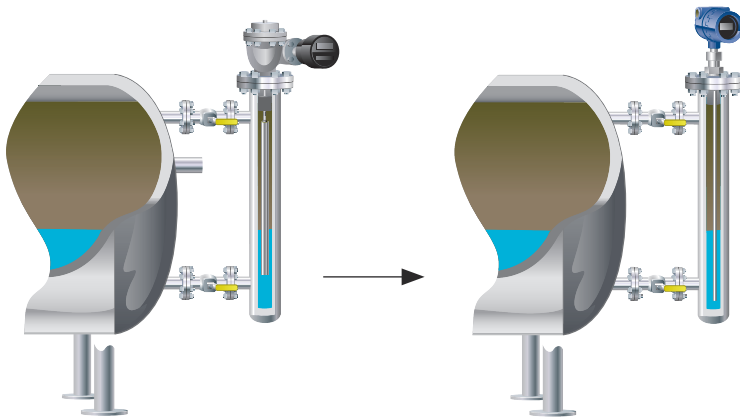
- Seamless system integration with HART, Modbus®, or IEC 62591 (*WirelessHART®*) with the THUM adapter
- Allows for easy swap by matching existing tank connections
- Cut-to-fit probes
- Long lengths of rigid probes for robust measurements becomes cost-effective and practical to ship, store and install with the segmented probe option (code 4S)
- Pre-configured or user-friendly configuration with wizard, autoconnect, dielectric calculator, and on-line help
- MultiVariable – measures simultaneously level and interface, resulting in fewer process penetrations and reduces installation and wiring cost

**Minimized maintenance reduces cost**

- No mechanical moving parts that require maintenance
- User-friendly software provides easy on-line troubleshooting with echo curve tool and logging
- Adjustments without opening tank
- No re-calibration or compensation needed due to changing process conditions

**Easy replacement of old technology and best fit for chambers**

- Less need for maintenance reduces costs and improves measurement availability
- Reliable measurement, independent of density, turbulence, and vibrations
- Unaffected by the mechanical configuration of the chamber
- Wide range of options to find the best fit in existing chamber or a complete assembly with Rosemount CMB high quality chambers

**Access information when you need it with asset tags**

Newly shipped devices include a unique QR code asset tag that enables you to access serialized information directly from the device. With this capability, you can:

- Access device drawings, diagrams, technical documentation, and troubleshooting information in your MyEmerson account
- Improve mean time to repair and maintain efficiency
- Ensure confidence that you have located the correct device
- Eliminate the time-consuming process of locating and transcribing nameplates to view asset information

## Ordering information

### Online product configurator

Many products are configurable online using our product configurator.

Select the **Configure** button or visit [Emerson.com/global](https://emerson.com/global) to start. With this tool's built-in logic and continuous validation, you can configure your products more quickly and accurately.

### Specifications and options

Specification and selection of product materials, options, and/or components must be made by the purchaser of the equipment. See the Material selection section for more information.

### Model codes

Model codes contain the details related to each product. Exact model codes will vary; an example of a typical model code is shown in [Figure 2](#).

#### Figure 2: Model Code Example

|  |                     |
|--|---------------------|
| <u>3302 H S 1 S 1 V 4 B E 10 27 RA I 7</u> | <u>M 5 B 2 WR 3</u> |
| 1  | 2                   |

1. Required model components (choices available on most)
2. Additional options (variety of features and functions that may be added to products)

### Optimizing lead time

The starred offerings (★) represent the most common options and should be selected for the fastest delivery times. The non-starred offerings are subject to additional delivery lead time.

## Rosemount 3300 Level Transmitter



Rosemount 3301 and 3302 Guided Wave Radar Level transmitters are versatile and easy-to-use with field proven measurement capabilities.

- High application flexibility with a wide range of probe styles, process connections, and materials
- HART® 4-20 mA, Modbus®, or IEC 62591 (*WirelessHART®*) with the THUM adapter
- Radar Configuration Tool software package included for easy commissioning and troubleshooting

Rosemount 3301 Level Transmitter:

[CONFIGURE >](#)
[VIEW PRODUCT >](#)

Rosemount 3302 Level Transmitter:

[CONFIGURE >](#)
[VIEW PRODUCT >](#)

### Required model components

#### Model

| Code | Description   |   |
|------|---|---|
| 3301 | Guided Wave Radar Level Transmitter (interface available for fully submerged probe) | ★ |
| 3302 | Guided Wave Radar Level and Interface Transmitter                                   | ★ |

#### Signal output

| Code             | Description   |   |
|------------------|---|---|
| H                | 4-20 mA with digital signal based on HART Revision 5 protocol | ★ |
| M <sup>(1)</sup> | RS-485 with Modbus communication                              | ★ |

(1) Requires external 8-30 Vdc power supply.

#### Related information

[4-20 mA HART](#)  
[Modbus](#)

#### Housing material

| Code | Description                             |   |
|------|---|---|
| A    | Polyurethane-covered Aluminum           | ★ |
| S    | Stainless Steel, Grade CF8M (ASTM A743) |   |

#### Conduit / cable threads

| Code                | Description                    |                                 |
|---------------------|--------------------------------|---------------------------------|
| 1                   | ½-14 NPT                       | 1 plug included ★               |
| 2                   | M20 x 1.5 adapter              | 1 adapter and 1 plug included ★ |
| G <sup>(1)(2)</sup> | Metal cable gland (½ - 14 NPT) | 2 glands and 1 plug included ★  |

(1) Not available with explosion-proof or flameproof approvals.

(2) Minimum temperature is -20 °C (-4 °F).

### Operating temperature and pressure

Process seal rating. Final rating depends on flange and O-ring selection.

| Code | Description   |   | Probe type                            |   |
|------|---|---|---------------------------------------|---|
| S    | Design and operating temperature:<br>-40 to 302 °F<br>(-40 to 150 °C) | Design and operating pressure:<br>-15 to 580 psig<br>(-1 to 40 bar) | 3301: All<br>3302: 3B, 4A, 4B, and 4S | ★ |

### Related information

[Process temperature and pressure rating](#)

### Material of construction; process connection/probe

For other materials, consult the factory.

| Code             | Description   | Probe type   |   |
|------------------|---|--|---|
| 1 <sup>(1)</sup> | 316/316L/EN 1.4404  | 3301: All<br>3302: 3B, 4A, 4B, and 4S                            | ★ |
| 2                | Alloy C-276 (UNS N10276). With plate design if flanged version. | 3301: 3A, 3B, 4A, 4B, 5A, and 5B<br>3302: 3B, 4A, 4B, 5A, and 5B |   |
| 3                | Alloy 400 (UNS N04400). With plate design if flanged version.   | 3301: 3A, 3B, 4A, 4B, 5A, and 5B<br>3302: 3B, 4A, and 4B         |   |
| 7                | PTFE covered probe and flange. With plate design.               | 3301: 4A and 5A, Flanged version<br>3302: 4A, Flanged version    |   |
| 8                | PTFE covered probe  | 3301: 4A and 5A<br>3302: 4A                                      |   |

(1) ASME flanges dual certified 316/316L.

### Sealing O-ring material

For other materials, consult the factory.

| Code | Description                       |   |
|------|-----------------------------------|---|
| V    | Fluoroelastomer (FKM)             | ★ |
| E    | Ethylene Propylene (EPDM)         | ★ |
| K    | Kalrez® Perfluoroelastomer (FFKM) | ★ |
| B    | Nitrile Butadiene (NBR)           | ★ |

### Probe type, model 3301

| Code              | Description   | Process connection                                | Probe lengths  |   |
|-------------------|---|---|--|---|
| 3B                | Coaxial, perforated. For level and interface measurement. | Flange / 1-in., 1½-in., 2-in. Thread              | Min.: 1 ft. 4 in. (0.4 m)<br>Max: 19 ft. 8 in. (6 m)   | ★ |
| 4B <sup>(1)</sup> | Rigid Single Lead 0.5 in. (13 mm)                         | Flange / 1-in., 1½-in., 2-in. Thread / Tri-Clamp® | Min.: 1 ft. 4 in. (0.4 m)<br>Max: 19 ft. 8 in. (6.0 m) | ★ |
| 5A                | Flexible Single Lead with weight                          | Flange / 1-in., 1½-in., 2-in. Thread / Tri-Clamp  | Min.: 3 ft. 4 in. (1 m)<br>Max: 77 ft. (23.5 m)        | ★ |
| 3A                | Coaxial (for level measurement)                           | Flange / 1-in., 1½-in., 2-in. Thread              | Min.: 1 ft. 4 in. (0.4 m)<br>Max: 19 ft. 8 in. (6 m)   |   |

| Code | Description                                 | Process connection                               | Probe lengths  |
|------|---|--|--|
| 4A   | Rigid Single Lead 0.3 in. (8 mm)            | Flange / 1-in., 1½-in., 2-in. Thread / Tri-Clamp | Min.: 1 ft. 4 in. (0.4 m)<br>Max: 9 ft. 10 in. (3 m)   |
| 4S   | Segmented Rigid Single Lead 0.5 in. (13 mm) | Flange / 1-in., 1½-in., 2-in. Thread / Tri-Clamp | Min.: 1 ft. 4 in. (0.4 m)<br>Max: 19 ft. 8 in. (6.0 m) |
| 5B   | Flexible Single Lead with chuck             | Flange / 1-in., 1½-in., 2-in. Thread / Tri-Clamp | Min.: 3 ft. 4 in. (1 m)<br>Max: 77 ft. (23.5 m)        |

(1) Available in SST. Consult the factory for other materials.

**Probe type, model 3302**

| Code              | Description   | Process connection                               | Probe lengths  |
|-------------------|---|--|--|
| 3B                | Coaxial, perforated. For level and interface measurement. | Flange / 1-in., 1½-in., 2-in. Thread             | Min.: 1 ft. 4 in. (0.4 m)<br>Max: 19 ft. 8 in. (6 m) ★   |
| 4B <sup>(1)</sup> | Rigid Single Lead 0.5 in. (13 mm)                         | Flange / 1-in., 1½-in., 2-in. Thread / Tri-Clamp | Min.: 1 ft. 4 in. (0.4 m)<br>Max: 19 ft. 8 in. (6.0 m) ★ |
| 4A                | Rigid Single Lead 0.3 in. (8 mm)                          | Flange / 1-in., 1½-in., 2-in. Thread / Tri-Clamp | Min.: 1 ft. 4 in. (0.4 m)<br>Max: 9 ft. 10 in. (3 m)     |
| 4S                | Segmented Rigid Single Lead 0.5 in. (13 mm)               | Flange / 1-in., 1½-in., 2-in. Thread / Tri-Clamp | Min.: 1 ft. 4 in. (0.4 m)<br>Max: 19 ft. 8 in. (6.0 m)   |

(1) Available in SST. Consult the factory for other materials.

**Probe length units**

| Code | Description                    |
|------|--------------------------------|
| E    | English (feet, inches) ★       |
| M    | Metric (meters, centimeters) ★ |

**Total probe length (feet/m)**

Probe weight included if applicable. Give the total probe length in feet and inches or meters and centimeters, depending on selected probe length unit. If tank height is unknown, please round up to an even length when ordering. Probes can be cut to exact length in field. Maximum allowable length is determined by process conditions.

| Code | Description            |
|------|------------------------|
| XX   | 0 - 77 ft. or 0-23 m ★ |

**Total probe length (inch/cm)**

Probe weight included if applicable. Give the total probe length in feet and inches or meters and centimeters, depending on selected probe length unit. If tank height is unknown, please round up to an even length when ordering. Probes can be cut to exact length in field. Maximum allowable length is determined by process conditions.

| Code | Description             |
|------|-------------------------|
| XX   | 0 - 11 in. or 0-99 cm ★ |

**Process connection - size/type**

Consult factory for other process connections.



| Code                                 | Description                            |  |   |
|--------------------------------------|--|--|---|
| ASME B16.5 flanges <sup>(1)(2)</sup> |  |  |   |
| AA <sup>(3)</sup>                    | 2-in. Class 150, RF (Raised Face Type) |  | ★ |
| AB <sup>(3)</sup>                    | 2-in. Class 300, RF (Raised Face Type) |  | ★ |
| BA <sup>(3)</sup>                    | 3-in. Class 150, RF (Raised Face Type) |  | ★ |
| BB <sup>(3)</sup>                    | 3-in. Class 300, RF (Raised Face Type) |  | ★ |
| CA <sup>(3)</sup>                    | 4-in. Class 150, RF (Raised Face Type) |  | ★ |
| CB <sup>(3)</sup>                    | 4-in. Class 300, RF (Raised Face Type) |  | ★ |
| DA                                   | 6-in. Class 150, RF (Raised Face Type) |  |   |
| EN 1092-1 flanges <sup>(1)(4)</sup>  |  |  |   |
| HB                                   | DN50, PN40, Type A flat face           |  | ★ |
| IA                                   | DN80, PN16, Type A flat face           |  | ★ |
| IB                                   | DN80, PN40, Type A flat face           |  | ★ |
| JA                                   | DN100, PN16, Type A flat face          |  | ★ |
| JB                                   | DN100, PN40, Type A flat face          |  | ★ |
| KA                                   | DN150, PN16, Type A flat face          |  |   |
| JIS flanges <sup>(1)(4)</sup>        |  |  |   |
| UA                                   | 50A, 10K, RF (Raised Face Type)        |  | ★ |
| VA                                   | 80A, 10K, RF (Raised Face Type)        |  | ★ |
| XA                                   | 100A, 10K, RF (Raised Face Type)       |  | ★ |
| UB                                   | 50A, 20K, RF (Raised Face Type)        |  |   |
| VB                                   | 80A, 20K, RF (Raised Face Type)        |  |   |
| XB                                   | 100A, 20K, RF (Raised Face Type)       |  |   |
| YA                                   | 150A, 10K, RF (Raised Face Type)       |  |   |
| YB                                   | 150A, 20K, RF (Raised Face Type)       |  |   |
| ZA                                   | 200A, 10K, RF (Raised Face Type)       |  |   |
| ZB                                   | 200A, 20K, RF (Raised Face Type)       |  |   |
| Threaded connections <sup>(1)</sup>  |  | Probe type   |   |
| RA                                   | 1½-in. NPT thread                      | 3301: All<br>3302: 3B, 4A, 4B, and 4S                            | ★ |
| RC                                   | 2-in. NPT thread                       | 3301: 3A, 3B, 4A, 4B, 4S, 5A, and 5B<br>3302: 3B, 4A, 4B, and 4S | ★ |
| RB                                   | 1-in. NPT thread                       | 3301: 3A, 3B, 4A, 4B, 4S, 5A, and 5B<br>3302: 3B, 4A, 4B, and 4S |   |
| SA <sup>(4)</sup>                    | 1½-in. BSP (G 1½-in.) thread           | 3301: All<br>3302: 3B, 4A, 4B, and 4S                            |   |
| SB <sup>(4)</sup>                    | 1-in. BSP (G 1-in.) thread             | 3301: 3A, 3B, 4A, 4B, 4S, 5A, and 5B<br>3302: 3B, 4A, 4B, and 4S |   |
| Tri-Clamp fittings <sup>(1)(5)</sup> |  | Probe type   |   |
| FT                                   | 1½-in. Tri-Clamp                       | 3301: 4A, 4B, 4S, 5A, and 5B<br>3302: 4A, 4B, and 4S             |   |

| Code                | Description   |  |   |
|---------------------|---|--|---|
| AT                  | 2-in. Tri-Clamp   | 3301: 4A, 4B, 4S, 5A, and 5B<br>3302: 4A, 4B, and 4S |   |
| BT                  | 3-in. Tri-Clamp   | 3301: 4A, 4B, 4S, 5A, and 5B<br>3302: 4A, 4B, and 4S |   |
| CT                  | 4-in. Tri-Clamp   | 3301: 4A, 4B, 4S, 5A, and 5B<br>3302: 4A, 4B, and 4S |   |
| Proprietary flanges |   |  |   |
| TF                  | Fisher™ - proprietary 316/316L (for 249B, 259B chambers) Torque Tube Flange |  | ★ |
| TT                  | Fisher - proprietary 316/316L (for 249C chambers) Torque Tube Flange        |  | ★ |
| TM                  | Masoneilan™ - proprietary 316/316L Torque Tube Flange                       |  | ★ |

- (1) Available in material 316/316L and EN 1.4404. For other materials consult the factory.
- (2) Design according to ASME B31.3. No code stamp or ASME certificate available.
- (3) Forged one-piece flange provided for Material of construction code 1, 7 or 8, together with Probe type code 3A, 3B, 4A, 4B, 4S, 5A, or 5B. Welded construction provided for other combinations.
- (4) Not available with Canadian Registration Number (CRN).
- (5) Follows ISO 2852 standard.

**Related information**

[Process temperature and pressure rating](#)

[Flange rating](#)

[Tri Clamp rating](#)

**Hazardous locations certifications**

| Code              | Description                                 |   |
|-------------------|---|---|
| NA                | No Hazardous Locations Certifications       | ★ |
| E1 <sup>(1)</sup> | ATEX Flameproof                             | ★ |
| E3 <sup>(1)</sup> | China Flameproof                            | ★ |
| E5 <sup>(1)</sup> | USA Explosion-proof                         | ★ |
| E6 <sup>(1)</sup> | Canadian Explosion-proof                    | ★ |
| E7 <sup>(1)</sup> | IECEx Flameproof                            | ★ |
| I1                | ATEX Intrinsic Safety                       | ★ |
| I3                | China Intrinsic Safety                      | ★ |
| I5                | USA Intrinsic Safety and Non-Incendive      | ★ |
| I6                | Canadian Intrinsic Safety and Non-Incendive | ★ |
| I7                | IECEx Intrinsic Safety                      | ★ |
| EW                | India PESO Flameproof                       |   |
| IW                | India PESO Intrinsic Safety                 |   |
| KB <sup>(1)</sup> | USA and Canadian Explosion-proof            |   |

- (1) Probes are intrinsically safe.

## Additional options

### Display

| Code | Description              |   |
|------|--------------------------|---|
| M1   | Integral digital display | ★ |

### Hydrostatic testing

Available for tank connection with flange.

| Code | Description                                |   |
|------|--|---|
| P1   | Hydrostatic testing, including certificate | ★ |

### Materials certification

Available for probe type 3A, 3B, 4A, 4B, and 4S.

| Code | Description   |   |
|------|---|---|
| N2   | NACE® material recommendation per NACE MR0175/ISO 15156 and NACE MR0103/ISO 17945 | ★ |

### Installation options

| Code              | Description  |   |
|-------------------|--|---|
| LS <sup>(1)</sup> | Long stud 9.8 in (250 mm) for flexible single lead probe to prevent contact with wall/nozzle. Standard stud length is 3.9 in (100 mm). | ★ |
| BR                | 316L Mounting Bracket for 1½-in. NPT Process Connection (RA)   |   |

(1) *Not available with PTFE covered probes.*

### Weight and anchoring options for flexible single probes

| Code              | Description  |   |
|-------------------|--|---|
| W3                | Heavy Weight (for most applications)                 | ★ |
| W2 <sup>(1)</sup> | Short Weight (when measuring close to the probe end) |   |

(1) *Only for Material of Construction code 1 and Probe Type 5A.*

### Related information

[Dimensional drawings](#)

**Centering disc**

Available for SST, Alloy C-276, and Alloy 400 probes, types 4A, 4B, 4S, and 5A.

Not available with PTFE covered probes (Material of Construction codes 7 and 8).

| Code              | Description               |   |
|-------------------|---------------------------|---|
| S2 <sup>(1)</sup> | 2-in. Centering disc      | ★ |
| S3 <sup>(1)</sup> | 3-in. Centering disc      | ★ |
| S4 <sup>(1)</sup> | 4-in. Centering disc      | ★ |
| P2                | 2-in. Centering disc PTFE | ★ |
| P3                | 3-in. Centering disc PTFE | ★ |
| P4                | 4-in. Centering disc PTFE | ★ |
| S6 <sup>(1)</sup> | 6-in. Centering disc      |   |
| S8 <sup>(1)</sup> | 8-in. Centering disc      |   |
| P6                | 6-in. Centering disc PTFE |   |
| P8                | 8-in. Centering disc PTFE |   |

(1) Centering disc in same material as probe material of construction.

**Related information**

[Centering disc for pipe installations](#)

**Remote housing**

Requires software version 10 or higher.

| Code | Description  |  |
|------|--|--|
| B1   | 1 m/3.2 ft. Remote housing mounting cable and 316L bracket |  |
| B2   | 2 m/6.5 ft. Remote housing mounting cable and 316L bracket |  |
| B3   | 3 m/9.8 ft. Remote housing mounting cable and 316L bracket |  |

**Related information**

[Dimensional drawings](#)

**Factory configuration**

| Code | Description  |   |
|------|--|---|
| C1   | Factory configuration per <a href="#">Configuration Data Sheet</a> | ★ |

**Alarm limits**

| Code              | Description   |   |
|-------------------|---|---|
| C4                | NAMUR alarm and saturation levels, high alarm             | ★ |
| C5                | NAMUR alarm and saturation levels, low alarm              | ★ |
| C8 <sup>(1)</sup> | Standard Rosemount alarm and saturation levels, low alarm | ★ |

(1) The standard alarm setting is high.

**Special quality assurance**

| Code | Description                  |   |
|------|------------------------------|---|
| Q4   | Calibration data certificate | ★ |

**Material traceability certification**

Certificate includes all pressure retaining wetted parts.

| Code | Description  |   |
|------|--|---|
| Q8   | Material traceability certification consistent with ISO10474-3.1:2013 / EN10204-3.1:2004 | ★ |

**Welding procedure qualification record documentation**

Only applies to flanged process connections with welded construction or protective plate design.

Weldings in accordance with EN/ISO standards.

| Code | Description                                   |   |
|------|---|---|
| Q66  | Welding Procedure Qualification Record (WPQR) | ★ |

**Dye penetration test certificate**

Only applies to flanged process connections with welded construction or protective plate design.

| Code | Description                                |   |
|------|--|---|
| Q73  | Certificate of liquid penetrant inspection | ★ |

**Positive material identification certificate**

| Code | Description   |   |
|------|---|---|
| Q76  | Positive material identification certificate of conformance | ★ |

**Overfill prevention**

| Code | Description                              |   |
|------|--|---|
| U1   | Overfill prevention according to WHG/TUV | ★ |

**Assemble/consolidate to chamber**

Selecting the XC option code on the Rosemount 3300 and a Rosemount chamber will result in matching, consolidating, configuring, and shipping of the two products in one crate. Note that the flange bolts are only hand-tightened. Long rigid single lead probes (>8 ft./2.5 m) are ship separately in order to reduce transportation risk damage.

| Code | Description            |   |
|------|------------------------|---|
| XC   | Consolidate to Chamber | ★ |

**Specials**

| Code  | Description   |  |
|-------|---|--|
| RXXXX | Custom engineered solutions beyond standard model codes. Consult factory for details. |  |

## Accessories

### Weight kit

| Item number     | Description                          |  |
|-----------------|--------------------------------------|--|
| 03300-7001-0003 | Weight kit flexible 4 mm single lead |  |
| 03300-7001-0004 | Weight kit flexible 6 mm single lead |  |

### Centering discs for rigid single lead probe (d=0.3 in./8 mm)

If a centering disc is required for a flanged probe, the centering disc can be ordered with options Sx or Px in the model code. If a centering disc is required for a threaded connection, or as a spare part, it should be ordered using the item numbers listed in this table.

For other materials, consult the factory.

| Item number     | Description                     | Outer diameter    |   |
|-----------------|---------------------------------|-------------------|---|
| 03300-1655-0001 | Kit, 2-in. Centering disc, SST  | 1.8 in. (45 mm)   | ★ |
| 03300-1655-0006 | Kit, 2-in. Centering disc, PTFE | 1.8 in. (45 mm)   | ★ |
| 03300-1655-0002 | Kit, 3-in. Centering disc, SST  | 2.7 in. (68 mm)   | ★ |
| 03300-1655-0007 | Kit, 3-in. Centering disc, PTFE | 2.7 in. (68 mm)   | ★ |
| 03300-1655-0003 | Kit, 4-in. Centering disc, SST  | 3.6 in. (92 mm)   | ★ |
| 03300-1655-0008 | Kit, 4-in. Centering disc, PTFE | 3.6 in. (92 mm)   | ★ |
| 03300-1655-0004 | Kit, 6-in. Centering disc, SST  | 5.55 in. (141 mm) |   |
| 03300-1655-0009 | Kit, 6-in. Centering disc, PTFE | 5.55 in. (141 mm) |   |
| 03300-1655-0005 | Kit, 8-in. Centering disc, SST  | 7.40 in. (188 mm) |   |
| 03300-1655-0010 | Kit, 8-in. Centering disc, PTFE | 7.40 in. (188 mm) |   |

### Related information

[Centering disc for pipe installations](#)

### Centering discs for rigid single lead probe (d=0.5 in./13 mm)

If a centering disc is required for a flanged probe, the centering disc can be ordered with options Sx or Px in the model code. If a centering disc is required for a threaded connection, or as a spare part, it should be ordered using the item numbers listed in this table.

For other materials, consult the factory.

| Item number     | Description                     | Outer diameter    |   |
|-----------------|---------------------------------|-------------------|---|
| 03300-1655-0301 | Kit, 2-in. Centering disc, SST  | 1.8 in. (45 mm)   | ★ |
| 03300-1655-0306 | Kit, 2-in. Centering disc, PTFE | 1.8 in. (45 mm)   | ★ |
| 03300-1655-0302 | Kit, 3-in. Centering disc, SST  | 2.7 in. (68 mm)   | ★ |
| 03300-1655-0307 | Kit, 3-in. Centering disc, PTFE | 2.7 in. (68 mm)   | ★ |
| 03300-1655-0303 | Kit, 4-in. Centering disc, SST  | 3.6 in. (92 mm)   | ★ |
| 03300-1655-0308 | Kit, 4-in. Centering disc, PTFE | 3.6 in. (92 mm)   | ★ |
| 03300-1655-0304 | Kit, 6-in. Centering disc, SST  | 5.55 in. (141 mm) |   |
| 03300-1655-0309 | Kit, 6-in. Centering disc, PTFE | 5.55 in. (141 mm) |   |

| Item number     | Description                     | Outer diameter    |  |
|-----------------|---------------------------------|-------------------|--|
| 03300-1655-0305 | Kit, 8-in. Centering disc, SST  | 7.40 in. (188 mm) |  |
| 03300-1655-0310 | Kit, 8-in. Centering disc, PTFE | 7.40 in. (188 mm) |  |

### Related information

[Centering disc for pipe installations](#)

### Snap-on centering discs for flexible single lead probes

Maximum temperature for the snap-on centering discs is 392 °F (200 °C).

| Item number     | Description  |  |  |
|-----------------|--|--|--|
| 03300-1658-0001 | Kit, 2- to 4-in. snap-on centering disc, PEEK, 1 pc  |  |  |
| 03300-1658-0002 | Kit, 2- to 4-in. snap-on centering disc, PEEK, 3 pcs |  |  |
| 03300-1658-0003 | Kit, 2- to 4-in. snap-on centering disc, PEEK, 5 pcs |  |  |

### Centering discs for flexible single lead probes

If a centering disc is required for a flanged probe, the centering disc can be ordered with options Sx or Px in the model code. If a centering disc is required for a threaded connection, or as a spare part, it should be ordered using the item numbers listed in this table.

For other materials, consult the factory.

| Item number     | Description                     | Outer diameter    |   |
|-----------------|---------------------------------|-------------------|---|
| 03300-1655-1001 | Kit, 2-in. Centering disc, SST  | 1.8 in. (45 mm)   | ★ |
| 03300-1655-1006 | Kit, 2-in. Centering disc, PTFE | 1.8 in. (45 mm)   | ★ |
| 03300-1655-1002 | Kit, 3-in. Centering disc, SST  | 2.7 in. (68 mm)   | ★ |
| 03300-1655-1007 | Kit, 3-in. Centering disc, PTFE | 2.7 in. (68 mm)   | ★ |
| 03300-1655-1003 | Kit, 4-in. Centering disc, SST  | 3.6 in. (92 mm)   | ★ |
| 03300-1655-1008 | Kit, 4-in. Centering disc, PTFE | 3.6 in. (92 mm)   | ★ |
| 03300-1655-1004 | Kit, 6-in. Centering disc, SST  | 5.55 in. (141 mm) |   |
| 03300-1655-1009 | Kit, 6-in. Centering disc, PTFE | 5.55 in. (141 mm) |   |
| 03300-1655-1005 | Kit, 8-in. Centering disc, SST, | 7.40 in. (188 mm) |   |
| 03300-1655-1010 | Kit, 8-in. Centering disc, PTFE | 7.40 in. (188 mm) |   |

### Related information

[Centering disc for pipe installations](#)

### Centering discs for mounting between segments (probe type 4S only)

| Item number     | Description  | Outer diameter    |  |
|-----------------|--|-------------------|--|
| 03300-1656-1002 | 2-in. Centering disc (1 pc), PTFE, Segmented rigid single lead | 1.8 in. (45 mm)   |  |
| 03300-1656-1003 | 3-in. Centering disc (1 pc), PTFE, Segmented rigid single lead | 2.7 in. (68 mm)   |  |
| 03300-1656-1004 | 4-in. Centering disc (1 pc), PTFE, Segmented rigid single lead | 3.6 in. (92 mm)   |  |
| 03300-1656-1006 | 6-in. Centering disc (1 pc), PTFE, Segmented rigid single lead | 5.55 in. (141 mm) |  |

| Item number     | Description   | Outer diameter    |
|-----------------|---|-------------------|
| 03300-1656-1008 | 8-in. Centering disc (1 pc), PTFE, Segmented rigid single lead  | 7.40 in. (188 mm) |
| 03300-1656-3002 | 2-in. Centering disc (3 pcs), PTFE, Segmented rigid single lead | 1.8 in. (45 mm)   |
| 03300-1656-3003 | 3-in. Centering disc (3 pcs), PTFE, Segmented rigid single lead | 2.7 in. (68 mm)   |
| 03300-1656-3004 | 4-in. Centering disc (3 pcs), PTFE, Segmented rigid single lead | 3.6 in. (92 mm)   |
| 03300-1656-3006 | 6-in. Centering disc (3 pcs), PTFE, Segmented rigid single lead | 5.55 in. (141 mm) |
| 03300-1656-3008 | 8-in. Centering disc (3 pcs), PTFE, Segmented rigid single lead | 7.40 in. (188 mm) |
| 03300-1656-5002 | 2-in. Centering disc (5 pcs), PTFE, Segmented rigid single lead | 1.8 in. (45 mm)   |
| 03300-1656-5003 | 3-in. Centering disc (5 pcs), PTFE, Segmented rigid single lead | 2.7 in. (68 mm)   |
| 03300-1656-5004 | 4-in. Centering disc (5 pcs), PTFE, Segmented rigid single lead | 3.6 in. (92 mm)   |
| 03300-1656-5006 | 6-in. Centering disc (5 pcs), PTFE, Segmented rigid single lead | 5.55 in. (141 mm) |
| 03300-1656-5008 | 8-in. Centering disc (5 pcs), PTFE, Segmented rigid single lead | 7.40 in. (188 mm) |

### Segmented rigid single lead probe spare part kit

| Item number     | Description   |
|-----------------|---|
| 03300-0050-0001 | 15.2 in. / 385 mm Segment for Top connection (1 pc) |
| 03300-0050-0002 | 31.5 in. / 800 mm Segment (1 pc)                    |
| 03300-0050-0003 | 31.5 in. / 800 mm Segment (3 pcs)                   |
| 03300-0050-0004 | 31.5 in. / 800 mm Segment (5 pcs)                   |
| 03300-0050-0005 | 31.5 in. / 800 mm Segment (12 pcs)                  |

### Vented flanges

1-½ in. NPT threaded connection (RA) is required.

Not available with Canadian Registration Number (CRN).

| Item number     | Description  |
|-----------------|--|
| 03300-1812-0092 | Fisher™ (249B, 259B), one ¼-in. NPT connection, 316/316L |
| 03300-1812-0093 | Fisher (249C), one ¼-in. NPT connection, 316/316L        |
| 03300-1812-0091 | Masoneilan™, one ¼-in. NPT connection, 316/316L          |

### Flushing connection rings

Not available with Canadian Registration Number (CRN).

| Item number    | Description                                      |
|----------------|--|
| DP0002-2111-S6 | 2-in. ANSI, one ¼-in. NPT connection, 316L       |
| DP0002-3111-S6 | 3-in. ANSI, one ¼-in. NPT connection, 316L       |
| DP0002-4111-S6 | 4-in. ANSI/DN100, one ¼-in. NPT connection, 316L |
| DP0002-5111-S6 | DN50, one ¼-in. NPT connection, 316L             |
| DP0002-8111-S6 | DN80, one ¼-in. NPT connection, 316L             |



**HART modem and cables**

| Item number     | Description  |   |
|-----------------|--|---|
| 03300-7004-0002 | MACTek® VIATOR® HART Modem and cables (USB connection) | ★ |
| 03300-7004-0001 | MACTek VIATOR HART Modem and cables (RS232 connection) | ★ |

**Remote housing mounting spare part kit**

| Item number     | Description  |  |
|-----------------|--|--|
| 03300-7006-0001 | 1 m / 3.2 ft. Remote Housing Mounting Cable and 316L Bracket |  |
| 03300-7006-0002 | 2 m / 6.5 ft. Remote Housing Mounting Cable and 316L Bracket |  |
| 03300-7006-0003 | 3 m / 9.8 ft. Remote Housing Mounting Cable and 316L Bracket |  |

# Specifications

## Performance specifications

### General

#### Reference conditions

Twin Lead probe, 77 °F (25 °C) water

#### Reference accuracy

± 0.2 in. (5 mm) for probes ≤16.4 ft. (5 m)

± 0.1% of measured distance for rigid probes >16.4 ft. (5 m)

± 0.15% of measured distance for flexible probes >16.4 ft. (5 m)

For probes with spacers, the accuracy may deviate close to the spacers. Accuracy may be affected by remote housing.

#### Repeatability

± 0.04 in. (1 mm)<sup>(1)</sup>

#### Ambient temperature effect

Less than 0.01% of measured distance per °C

#### Update interval

Minimum 1 update per second

### Environment

#### Vibration resistance

- Polyurethane-covered aluminum housing: IEC 60770-1
- SST housing: IACS E10

#### Electromagnetic compatibility

Emission and Immunity: meets EN 61326-1:2013, class A equipment intended for use in industrial locations if installed in metallic vessels or still-pipes.

When rigid/flexible single probes are installed in non-metallic or open vessels, influence of strong electromagnetic fields might affect measurements.

#### Related information

[Installation in non-metallic tanks and open-air applications](#)

#### CE-mark

The 4–20 mA HART version (Output Option Code H) complies with applicable directives (EMC and ATEX).

#### Built-in lightning protection

Meets EN 61000-4-4 Severity Level 4 and EN 61000-4-5 Severity Level 4

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(1) In accordance with IEC 60770-1. See the IEC 60770-1 standard for a definition of radar specific performance parameters and if applicable corresponding test procedures.

### Contamination/product build-up

- Single lead probes are preferred when there is a risk of contamination (because build-up can result in the product bridging between the inner lead and outer pipe for the coaxial probe).
- For viscous or sticky applications, PTFE probes are recommended. Periodic cleaning may also be required.
- For viscous or sticky applications, it is not recommended to use centering discs mounted along the single lead probe.
- Maximum error due to coating is 1 to 10% depending on probe type, dielectric constant, coating thickness, and coating height above product surface.

**Table 1: Maximum Recommended Viscosity and Contamination/Build-up**

| Probe type  | Maximum viscosity      | Contamination/build-up |
|-------------|------------------------|------------------------|
| Single lead | 8000 cP <sup>(1)</sup> | Build-up allowed       |
| Coaxial     | 500 cP                 | Not recommended        |

(1) Consult your local Emerson representative in the case of agitation/turbulence and high viscous products.

### Measuring range

#### Measuring range and minimum dielectric constant

See [Table 2](#) and [Table 3](#) for each probe's measuring range and minimum dielectric constant. Due to the measuring range depending on the application and factors described below, the values are a guideline for clean liquids. For more information, ask your local Emerson representative.

#### Note

See [Table 4](#) for the measuring range when using the Remote Housing.

Different parameters (factors) affect the echo and therefore the maximum measuring range differs depending on application according to:

- Disturbing objects close to the probe.
- Media with higher dielectric constant ( $\epsilon_r$ ) gives better reflection and allows a longer measuring range.
- Surface foam and particles in the tank atmosphere may affect measuring performance.
- Heavy product build-up or contamination on the probe should be avoided since it can reduce measuring range and might cause erroneous level readings.

**Table 2: Maximum Measuring Range**

| Probe type                                    | Maximum measuring range  |
|---|--|
| Rigid single lead/segmented rigid single lead | 9 ft. 10 in. (3 m) for 8 mm probes (code 4A)<br>19 ft. 8 in. (6 m) for 13 mm probes (code 4B)<br>19 ft. 8 in. (6 m) for 13 mm probes (code 4S) |
| Flexible single lead                          | 77 ft. 1 in. (23.5 m)  |
| Coaxial                                       | 19 ft. 8 in. (6 m)   |

**Table 3: Minimum Dielectric Constant**

| Probe type                                    | Minimum dielectric constant  |
|---|--|
| Rigid single lead/segmented rigid single lead | 2.5 <sup>(1)</sup><br>(1.7 if installed in a metallic bypass or stilling well) |

**Table 3: Minimum Dielectric Constant (continued)**

| Probe type           | Minimum dielectric constant  |
|----------------------|--|
| Flexible single lead | 2.5 up to 36 ft. (11 m) <sup>(2)</sup><br>5.0 up to 66 ft. (20 m)<br>7.5 up to 77 ft. 1 in. (23.5 m) |
| Coaxial              | 1.5  |

(1) *May be lower depending on installation.*

(2) *In pipes with a diameter less than 8 in. (20 cm), the minimum dielectric constant is 2.0.*

**Table 4: Measuring Range and Minimum Dielectric Constant when using Remote Housing**

|   | Rigid single lead/<br>segmented rigid single<br>lead                           | Flexible single lead   | Coaxial            |
|---|--|--|--------------------|
| Maximum measuring range                             | 9 ft. 10 in. (3 m) for 8 mm probes<br>14 ft. 9 in. (4.5 m) for 13 mm probes    | 77 ft. 1 in. (23.5 m)  | 19 ft. 8 in. (6 m) |
| Minimum dielectric constant with 1 m remote housing | 2.7 <sup>(1)</sup><br>(2.0 if installed in a metallic bypass or stilling well) | 2.7 up to 36 ft. (11 m)<br>6 up to 66 ft. (20 m)<br>10 up to 72 ft. (22 m) | 1.5                |
| Minimum dielectric constant with 2 m remote housing | 3.3 <sup>(1)</sup><br>(2.2 if installed in a metallic bypass or stilling well) | 3.2 up to 36 ft. (11 m)<br>8 up to 67 ft. (20.5 m)                         | 1.6                |
| Minimum dielectric constant with 3 m remote housing | 3.8 <sup>(1)</sup><br>(2.5 if installed in a metallic bypass or stilling well) | 3.7 up to 36 ft. (11 m)<br>11 up to 62 ft. (19 m)                          | 1.7                |

(1) *May be lower depending on installation.*

**Interface measuring range**

The maximum allowable upper product thickness/measuring range is primarily determined by the dielectric constants of the two liquids.

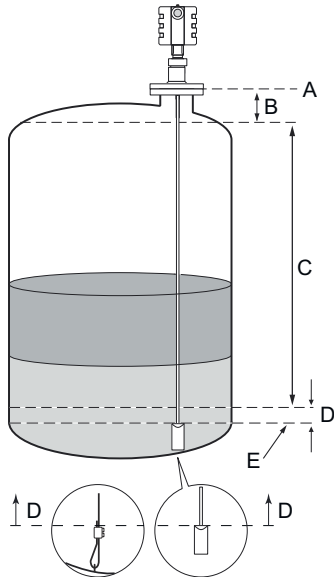
Typical applications include interfaces between oil/oil-like and water/water-like liquids, with a low (<3) dielectric constant for the upper product and a high (>20) dielectric constant for the lower product. For such applications, the maximum measuring range is limited by the length of the coaxial and rigid single lead probes.

**Transition zones**

These zones are areas where measurements are non-linear or have reduced accuracy. If measurements are desired at the very top of a tank, it is possible to mechanically extend the nozzle and use a coaxial probe. The upper transition zone is then moved into the extension. See [Table 5](#).

For a flexible single lead probe with chuck, the lower transition zone is measured upwards from the upper part of the clamp.

Figure 3: Transition Zones



- A. Upper Reference Point
- B. Upper Transition Zone
- C. Maximum Recommended Measuring Range
- D. Lower Transition Zone
- E. Lower Reference Point

Table 5: Transition Zones

|                                      | Dielectric Constant | Rigid single lead/<br>segmented rigid single lead | Flexible single lead   | Coaxial        |
|--------------------------------------|---------------------|---|--|----------------|
| Upper Transition Zone <sup>(1)</sup> | 80                  | 4 in. (10 cm)                                     | 5.9 in. (15 cm)  | 4 in. (10 cm)  |
|                                      | 2                   | 4 in. (10 cm)                                     | 20 in. (50 cm)   | 4 in. (10 cm)  |
| Lower Transition Zone <sup>(2)</sup> | 80                  | 2 in. (5 cm)                                      | 2 in. (5 cm) <sup>(3)(4)</sup>   | 1.2 in. (3 cm) |
|                                      | 2                   | 4 in. (10 cm)                                     | 6.3 in. (16 cm) - long weight, short weight, and chuck <sup>(4)(5)</sup> | 2 in. (5 cm)   |

- (1) The distance from the upper reference point where measurements have reduced accuracy.
- (2) The distance from the lower reference point where measurements have reduced accuracy.
- (3) The measuring range for the PTFE covered Flexible Single Lead probe includes the weight when measuring on a high dielectric media.
- (4) Note that the weight length or chuck fastening length adds to non-measurable area and is not included in the diagram.
- (5) When using a metallic centering disc, the lower transition zone is 8 in. (20 cm), including weight if applicable. When using a PTFE centering disc, the lower transition zone is not affected.

**Note**

The 4–20 mA set points are recommended to be configured between the transition zones, within the measuring range.

## Functional specifications

### General

#### Field of application

Liquids and semi-liquids level or liquid/liquid interfaces

- Model 3301, for level or submerged probe interface measurement
- Model 3302, for level and interface measurements

#### Measurement principle

Time Domain Reflectometry (TDR)

#### Microwave output power

Nominal 50  $\mu$ W, Max. 2 mW

#### EMC

FCC part 15 subpart B and EMC Directive (2014/30/EU). Considered to be an unintentional radiator under the Part 15 rules.

#### Humidity

0 to 100% relative humidity

#### Start-up time

< 10 s

### 4-20 mA HART®

#### Output

Two-wire, 4-20 mA. Digital process variable is superimposed on 4-20 mA signal, and available to any host that conforms to the HART® protocol. The digital HART signal can be used in multidrop mode.

#### Rosemount 333 HART® Tri-Loop™

By sending the digital HART signal to the optional HART Tri-Loop, it is possible to have up to three additional 4–20 mA analog signals.



### Related information

[Rosemount 333 Product Data Sheet](#)

### Emerson Wireless 775 THUM™ Adapter

The optional Emerson Wireless 775 THUM Adapter can be mounted directly on the transmitter or by using a remote mounting kit.



IEC 62591 (*WirelessHART*®) enables access to multivariable data and diagnostics, and adds wireless to almost any measurement point.

**Related information**

[Emerson Wireless 775 THUM Adapter Product Data Sheet](#)

**Power requirements**

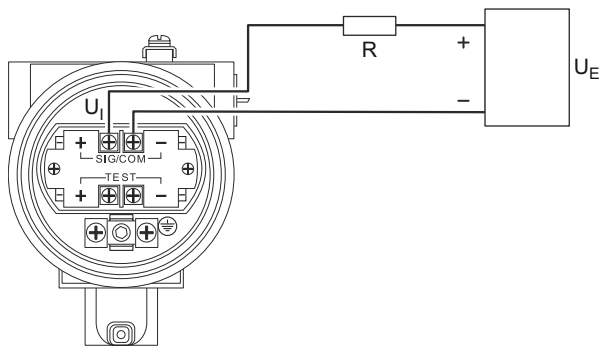
Terminals in the transmitter housing provide connections for signal cables. The Rosemount 3300 Level Transmitter is loop-powered and operates with the following power supplies:

**Table 6: External Power Supply for HART**

| Approval type              | Input voltage ( $U_i$ ) <sup>(1)</sup> |
|----------------------------|--|
| None                       | 11 - 42 Vdc                            |
| Intrinsically Safe         | 11 - 30 Vdc                            |
| Explosion-proof/Flameproof | 16 - 42 Vdc                            |

(1) Reverse polarity protection.

**Figure 4: External Power Supply for HART**



$R$  = Load Resistance ( $\Omega$ )

$U_E$  = External Power Supply Voltage (Vdc)

$U_i$  = Input Voltage (Vdc)

For Flameproof/Explosion-proof installations the Rosemount 3300 Series transmitters have a built-in barrier; no external barrier needed.

When the Emerson Wireless 775 THUM™ Adapter is fitted, it adds a maximum drop of 2.5 Vdc in the connected loop.

**Signal on alarm**

|            | High     | Low     |
|------------|----------|---------|
| Standard   | 21.75 mA | 3.75 mA |
| Namur NE43 | 22.50 mA | 3.60 mA |

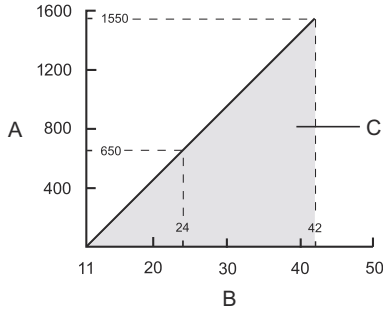
**Saturation levels**

|            | High    | Low    |
|------------|---------|--------|
| Standard   | 20.8 mA | 3.9 mA |
| Namur NE43 | 20.5 mA | 3.8 mA |

**Load limitations**

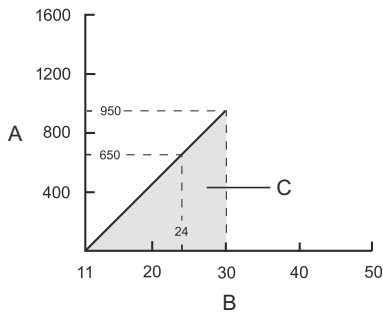
For HART® communication, a minimum loop resistance of 250 Ω is required. Maximum loop resistance is determined by the voltage level of the external power supply, as given by the following diagrams:

**Figure 5: Non-Hazardous Installations**



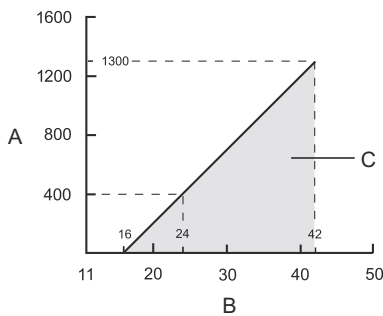
- A. Loop Resistance (Ohms)
- B. External Power Supply Voltage (Vdc)
- C. Operating region

**Figure 6: Intrinsically Safe Installations**



- A. Loop Resistance (Ohms)
- B. External Power Supply Voltage (Vdc)
- C. Operating region

**Figure 7: Explosion-proof/Flameproof Installations**



- A. Loop Resistance (Ohms)
- B. External Power Supply Voltage (Vdc)
- C. Operating region

**Note**

For the Explosion-proof/Flameproof installations the diagram is only valid if the HART load resistance is at the + side, otherwise the load resistance value is limited to 300 Ω.



## Modbus®

### Output

The RS-485 Modbus version communicates by Modbus RTU, Modbus ASCII, and Levelmaster protocols. 8 data bits, 1 start bit, 1 stop bit, and software selectable parity.

**Baud Rate** 1200, 2400, 4800, 9600 (default), and 19200 bits/s

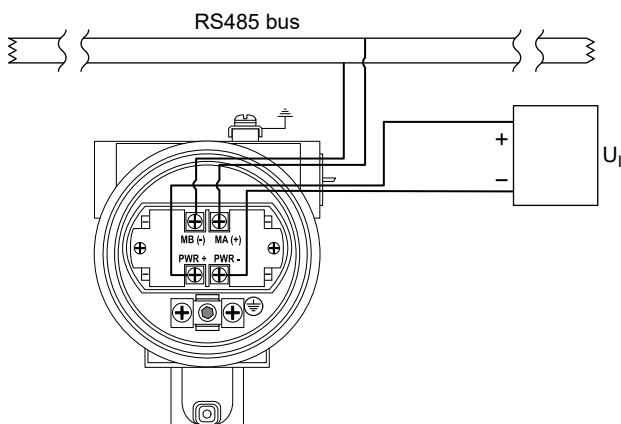
**Address Range** 1 to 255 (default device address is 246)

HART communication is used for configuration via the HART terminals or tunneling via the RS-485.

### External power supply

The input voltage  $U_i$  for Modbus is 8-30 Vdc (max. rating).

**Figure 8: External Power Supply for Modbus**



$U_i$  = Input Voltage (Vdc)

For Flameproof/Explosion-proof installations the Rosemount 3300 Series transmitters have a built-in barrier; no external barrier needed.

### Power consumption

- < 0.5 W (with HART address=1)
- < 1.2 W (incl. four HART slaves)

## Display and configuration

### Integral display

The integral digital display can toggle between: level, distance, volume, internal temperature, interface distance, interface level, peak amplitudes, interface thickness, percentage of range, analog current out.

#### Note

The display cannot be used for configuration purposes.

### Remote display

Data can be read remotely by using the Rosemount 751 Field Signal Indicator, see the corresponding [Product Data Sheet](#) for more information.

**Configuration tools**

- Rosemount Radar Configuration Tool (included in the delivery)
- Device Descriptor (DD) compliant systems
- Device Type Manager (DTM™) compliant systems

**Output units**

- Level, Interface and Distance: ft., in., m, cm, or mm
- Volume: ft.<sup>3</sup>, in.<sup>3</sup>, US gals, Imp gals, barrels, yd<sup>3</sup>, m<sup>3</sup>, or liters

**Output variables**

**Table 7: Output Variables**

| Variable                      | 3301               | 3302 |
|-------------------------------|--------------------|------|
| Level                         | ✓                  | ✓    |
| Distance (to product surface) | ✓                  | ✓    |
| Volume                        | ✓                  | ✓    |
| Internal Temperature          | ✓                  | ✓    |
| Interface Level               | (✓) <sup>(1)</sup> | ✓    |
| Interface Distance            | (✓) <sup>(1)</sup> | ✓    |
| Upper Product Thickness       | N/A                | ✓    |
| Peak Amplitudes               | ✓                  | ✓    |

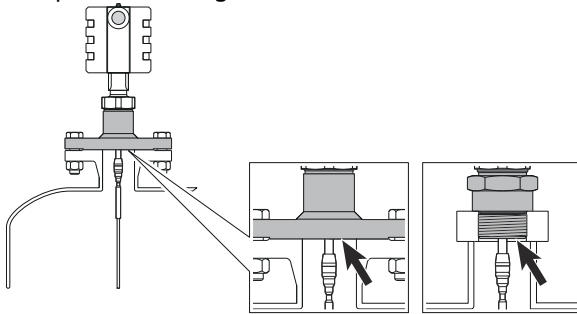
(1) *Interface measurement only for fully submerged probe.*

**Damping**

0-60 s (10 s, default value)

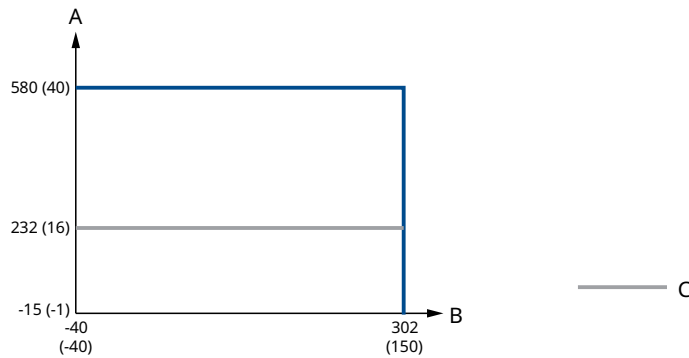
### Process temperature and pressure rating

Figure 9 gives the maximum process temperature (measured at the lower part of the flange or threaded connection) and pressure rating.



Final rating depends on flange, material of construction, and O-ring selection.

**Figure 9: Maximum Rating, Standard Tank Connections**



- A. Pressure psig (bar)
- B. Temperature °F (°C)
- C. Protective plate: PTFE (Material of construction code 7)

**Table 8: Temperature and Pressure Ranges for Standard Tank Seals with Different O-ring Material**

| O-ring material                   | Temperature °F (°C) in air |           | Pressure psig (bar) |
|-----------------------------------|----------------------------|-----------|---------------------|
|                                   | Minimum                    | Maximum   | Maximum             |
| Fluoroelastomer (FKM)             | -22 (-30)                  | 302 (150) | 580 (40)            |
| Ethylene Propylene (EPDM)         | -40 (-40)                  | 266 (130) | 580 (40)            |
| Kalrez® Perfluoroelastomer (FFKM) | 14 (-10)                   | 302 (150) | 580 (40)            |
| Nitrile Butadiene (NBR)           | -31 (-35)                  | 230 (110) | 580 (40)            |

**Note**

Always check the chemical compatibility of the O-ring material with your application. If the O-ring material is not compatible with its chemical environment, the O-ring may eventually malfunction.

## Temperature limits

### Ambient temperature

The maximum and minimum ambient temperature for the electronics depends the approval.

#### Note

In applications where the ambient temperature exceeds the limits of the electronics, a Remote Mounting connection can be used. The maximum temperature for the Remote Mounting connection at the vessel connection point is 302 °F (150 °C).

**Table 9: Ambient Temperature Limits**

| Description              | Operating limit                                   | Storage limit                      |
|--------------------------|---|------------------------------------|
| Without integral display | -40 °F to 185 °F (-40 °C to 85 °C)                | -40 °F to 176 °F (-40 °C to 80 °C) |
| With integral display    | -40 °F to 158 °F (-40 °C to 70 °C) <sup>(1)</sup> | -40 °F to 176 °F (-40 °C to 80 °C) |

(1) *Integral display may not be readable and device display updates will be slower at temperatures below -4 °F (-20 °C).*

### Related information

[Product certifications](#)

## Flange rating

### ASME flange rating

316 according to ASME B16.5 Table 2-2.2:

- Maximum 302 °F/580 psig (150 °C/40 bar)

Alloy C-276 (UNS N10276) according to ASME B16.5 Table 2-3.8:

- Maximum 302 °F/580 psig (150 °C/40 Bar)

### EN flange rating

EN 1.4404 according to EN 1092-1 material group 13E0:

- Maximum 302 °F/580 psig (150 °C/40 Bar)

Alloy C-276 (UNS N10276) according to EN 1092-1 material group 12E0:

- Maximum 302 °F/580 psig (150 °C/40 Bar)

### JIS flange rating

316 according to JIS B2220 material group 2.2:

- Maximum 302 °F/580 psig (150 °C/40 Bar)

### Fisher and Masoneilan flange rating

316 according to ASME B16.5 Table 2-2.2:

- Maximum 302 °F/580 psig (150 °C/40 Bar)

### Tri Clamp rating

**Table 10: Tri Clamp Rating**

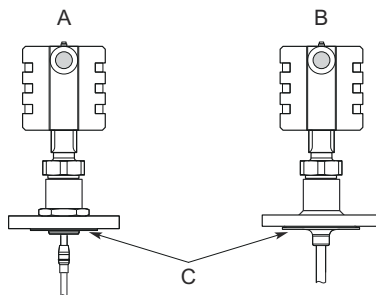
| Size             | Maximum pressure <sup>(1)</sup> |
|------------------|---------------------------------|
| 1½-in. (37.5 mm) | 232 psig (16 bar)               |
| 2-in. (50 mm)    | 232 psig (16 bar)               |
| 3-in. (75 mm)    | 145 psig (10 bar)               |
| 4-in. (100 mm)   | 145 psig (10 bar)               |

(1) The final rating depends on the clamp and gasket.

### Plate design

Certain models of flanged alloy and PTFE covered probes have a tank connection design with a protective flange plate that prevents the backing flange from being exposed to the tank atmosphere. The protective flange plate is manufactured in the same material as the probe. The backing flange is made of 316L/EN 1.4404 for alloy probes, and 316/1.4404 for PTFE covered probes.

**Figure 10: Protective Plate**



- A. Alloy probe and protective plate
- B. PTFE covered probe and protective plate
- C. Protective plate

#### PTFE protective plate

Flange rating according to SST backing flange ASME B16.5 Table 2-2.2, EN 1092-1 material group 13E0, and JIS B2220 material group 2.3.

- Maximum 302 °F/232 psig (150 °C/16 Bar)

#### Alloy C-276 protective plate

Flange rating according to SST backing flange ASME B16.5 Table 2-2.3, EN 1092-1 material group 13E0, and JIS B2220 material group 2.3.

- Maximum 302 °F/580 psig (150 °C/40 Bar)

#### Alloy 400 protective plate

Flange rating according to SST backing flange ASME B16.5 Table 2-2.3, EN 1092-1 material group 13E0, and JIS B2220 material group 2.3.

- Maximum 302 °F/580 psig (150 °C/40 Bar)

Conditions used for flange strength calculations

Table 11: 316/316L Flanges

| Standard | Bolting material               | Gasket                                      | Flange material                                     | Hub material                                    |
|----------|--------------------------------|---|---|---|
| ASME     | Stainless steel SA193 B8M Cl.2 | Soft (1a) with min. thickness 1.6 mm        | Stainless steel A182 Gr. F316                       | Stainless steel SA479M 316                      |
| EN, JIS  | EN 1515-1/-2 group 13E0, A4-70 | Soft (EN 1514-1) with min. thickness 1.6 mm | Stainless steel A182 Gr. F316 and EN 10222-5-1.4404 | Stainless steel SA479M 316, and EN 10272-1.4404 |

Table 12: Process Connection with Plate Design

| Standard | Bolting material               | Gasket                                      | Flange material   | Hub material                         |
|----------|--------------------------------|---|---|--------------------------------------|
| ASME     | Stainless steel SA193 B8M Cl.2 | Soft (1a) with min. thickness 1.6 mm        | Stainless steel A182 Gr. F316L/F316                       | SB574 Gr. N10276 or SB164 Gr. N04400 |
| EN, JIS  | EN 1515-1/-2 group 13E0, A4-70 | Soft (EN 1514-1) with min. thickness 1.6 mm | Stainless steel A182 Gr. F316L/F316 and EN 10222-5-1.4404 |                                      |

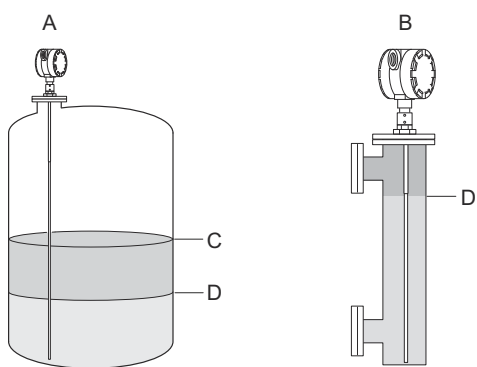
Table 13: Alloy C-276 Flanges

| Standard | Bolting material | Gasket                                      | Flange material  | Hub material     |
|----------|------------------|---|--|------------------|
| ASME     | UNS N10276       | Soft (1a) with min. thickness 1.6 mm        | SB462 Gr. N10276 (solution annealed condition) or SB575 Gr. N10276 (solution annealed condition) | SB574 Gr. N10276 |
| EN, JIS  |                  | Soft (EN 1514-1) with min. thickness 1.6 mm |  |                  |

Interface measurements

The Rosemount 3302 is a good choice for measuring the interface of oil and water, or other liquids with significant dielectric differences. It is also possible to measure interfaces with a Rosemount 3301 in applications where the probe is fully submerged in the liquid.

Figure 11: Interface Level Measurement



- A. Rosemount 3302
- B. Rosemount 3301 (fully submerged)
- C. Product level
- D. Interface level

Interface measurement considerations

If interface is to be measured, follow these criteria:

- The dielectric constant of the upper product should be known and should not vary. The Radar Configuration Tools software has a built-in dielectric constant calculator to assist the user in determining the dielectric constant of the upper product.
- The dielectric constant of the upper product must have a lower dielectric constant than the lower product to have a distinct reflection.
- The difference between the dielectric constants for the two products must be larger than 10.
- Maximum dielectric constant for the upper product is 10 for the coaxial probe.
- The upper product thickness must be larger than 4 in. (0.1 m) for the coaxial probe in order to distinguish the echoes of the two liquids.

### Emulsion layers

Sometimes there is an emulsion layer (mix of the products) between the two products which can affect interface measurements. For guidelines on emulsion situations, consult your local Emerson representative.

## Physical specifications

### Material selection

Emerson provides a variety of Rosemount products with various product options and configurations, including materials of construction that can be expected to perform well in a wide range of applications.

The product information presented is intended as a guide for the purchaser to make an appropriate selection for the application. It is the purchaser's sole responsibility to make a careful analysis of all process parameters (such as all chemical components, temperature, pressure, flow rate, abrasives, contaminants, etc.), when specifying product, materials, options, and components for the particular application. Emerson is not in a position to evaluate or guarantee the compatibility of the process fluid or other process parameters with the product, options, configuration, or materials of construction selected.

### Engineered solutions

When standard model codes are not sufficient to fulfill requirements, please consult the factory to explore possible Engineered Solutions. This is typically, but not exclusively, related to the choice of wetted materials or the design of a process connection. These Engineered Solutions are part of the expanded offerings and may be subject to additional delivery lead time. For ordering, factory will supply a special R-labeled numeric option code that should be added at the end of the standard model string.

### Housing and enclosure

#### Type

Dual compartment (removable without opening the tank). Electronics and cabling are separated. Two entries for conduit or cable connections. The transmitter housing can be rotated in any direction.

#### Electrical connection

½ - 14 NPT for cable glands or conduit entries.

Optional: M20 x 1.5 conduit/cable adapter or PG 13.5 conduit/cable adapter.

Recommended output cabling is twisted shielded pairs, 18-12 AWG.

#### Housing material

Polyurethane-covered Aluminum or SST Grade CF8M (ASTM A743)

#### Ingress protection

NEMA® 4X, IP 66, IP 67

**Factory sealed**

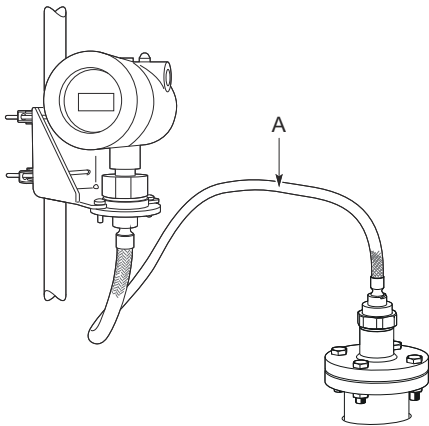
Yes

**Weight**

- Aluminum transmitter head: 5.5 lb (2.5 kg)
- SST transmitter head: 11 lb (5 kg)

**Remote housing mounting**

Kit that includes a flexible armored extension cable and a bracket for wall or pipe mounting.

**Figure 12: Remote Housing Mounting**

A. Remote Housing Mounting Cable: 3, 6, or 9 ft (1, 2, or 3 m)

**Tank connection**

The tank connection consists of a tank seal, a flange, Tri Clamp, or NPT or BSPP (G) threads.

**Flange dimensions**

Follows ASME B16.5, JIS B2220, and EN 1092-1 standards for blind flanges.

**Related information**

[Standard flanges](#)

[Proprietary flanges](#)

**Vented flanges**

Available with Masoneilan and Fisher vented flanges. Vented flanges must be ordered as accessories with a 1½-in. NPT threaded process connection (code RA). As an alternative to a vented flange, it is possible to use a flushing connection ring on top of the standard nozzle.

**Tri Clamp connection**

Follows ISO 2852 standard.

**Pressure Equipment Directive (PED)**

Complies with 2014/68/EU article 4.3



## Probes

### Probe versions

Coaxial, rigid single lead, and flexible single lead.

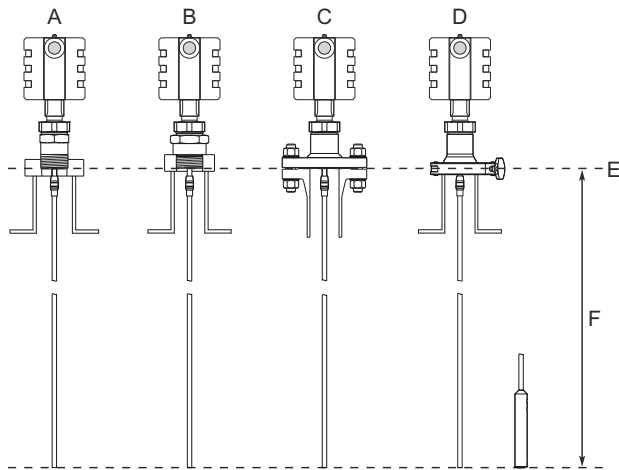
For interface measurements, rigid single probe is the best choice for chamber mounting. The coaxial probe is the preferred choice for clean, low dielectric constant liquids.

For guidelines on which probe to select depending on application, see the Rosemount 3300 [Reference Manual](#).

### Total probe length

This is defined from the Upper Reference Point to the end of the probe (weight included, if applicable).

**Figure 13: Total Probe Length**



- A. NPT
- B. BSPP (G)
- C. Flange
- D. Tri Clamp
- E. Upper reference point
- F. Total probe length

Select the probe length according to the required measuring range (the probe must be hung and fully extended through the entire distance where level readings are desired).

### Cut-to-fit probes

All probes can be cut in field except for the PTFE covered probe.

However, there are some restrictions for the coaxial probe: Probes over 4.1 ft. (1.25 m) can be cut up to 2 ft. (0.6 m). Shorter probes can be cut to the minimum length of 1.3 ft. (0.4 m).

### Minimum and maximum probe length

| Probe type                        | Probe length                  |
|-----------------------------------|-------------------------------|
| Flexible single lead              | 3.3 to 77.1 ft. (1 to 23.5 m) |
| Rigid single lead (0.3 in./8 mm)  | 1.3 to 9.8 ft. (0.4 to 3 m)   |
| Rigid single lead (0.5 in./13 mm) | 1.3 to 19.7 ft. (0.4 to 6 m)  |
| Segmented rigid single lead       | 1.3 to 19.7 ft. (0.4 to 6 m)  |
| Coaxial                           | 1.3 to 19.7 ft. (0.4 to 6 m)  |

**Probe angle**

0 to 90 degrees from vertical axis

**Tensile strength**

- 0.16 in. (4 mm) Flexible single lead SST: 2698 lb (12 kN)
- 0.16 in. (4 mm) Flexible single lead Alloy C-276: 1574 lb (7 kN)
- 0.16 in. (4 mm) Flexible single lead Alloy 400: 1124 lb (5 kN)

**Collapse load**

- 0.16 in. (4 mm) Flexible single lead SST: 3597 lb (16 kN)
- 0.16 in. (4 mm) Flexible single lead Alloy C-276: 1798 lb (8 kN)
- 0.16 in. (4 mm) Flexible single lead Alloy 400: 1349 lb (6 kN)

**Sideway capacity**

- Rigid single lead/Segmented rigid single lead: 4.4 ft. lbf, 0.44 lb at 9.8 ft. (6 Nm, 0.2 kg at 3 m)
- Coaxial: 73.7 ft. lbf, 3.7 lb at 19.7 ft. (100 Nm, 1.67 kg at 6 m)

**Material exposed to tank atmosphere**

**Table 14: Standard Probe (Operating Temperature and Pressure Code S)**

| Material of construction code | Material exposed to tank atmosphere   |
|-------------------------------|---|
| 1                             | 316L/316 (EN 1.4404), PTFE, PFA, silicone grease, and O-ring materials                            |
| 2                             | Alloy C-276 (UNS N10276), PTFE, PFA, silicone grease, and O-ring materials                        |
| 3                             | Alloy 400 (UNS N04400), Alloy K500 (UNS N05500), PTFE, PFA, silicone grease, and O-ring materials |
| 7                             | PTFE (1 mm PTFE cover)  |
| 8                             | 316L/316 (EN 1.4404), PTFE, silicone grease, and O-ring materials                                 |

**Weight**

**Table 15: Flange and Probes**

| Item                                    | Weight                  |
|---|-------------------------|
| Flange                                  | Depends on flange size  |
| Flexible single lead probe              | 0.05 lb/ft. (0.08 kg/m) |
| Rigid single lead probe (0.3-in./8 mm)  | 0.27 lb/ft. (0.4 kg/m)  |
| Rigid single lead probe (0.5-in./13 mm) | 0.71 lb/ft. (1.06 kg/m) |
| Segmented rigid single lead probe       | 0.71 lb/ft. (1.06 kg/m) |
| Coaxial probe                           | 0.67 lb/ft. (1 kg/m)    |

**Table 16: End Weight**

| Item   | Weight            |
|--|-------------------|
| Standard weight for flexible single lead probe (0.16-in./4 mm)   | 0.88 lb (0.40 kg) |
| Short weight (W2) for flexible single lead probe (0.16-in./4 mm) | 0.88 lb (0.40 kg) |
| Heavy weight (W3) for flexible single lead probe (0.16-in./4 mm) | 2.43 lb (1.10 kg) |
| Weight for PTFE covered flexible single lead                     | 2.2 lb (1 kg)     |

### End weight options

A short weight is available for the single flexible probe. It is used for measuring close to the probe end and shall be used where the measuring range must be maximized. The height is 2 in. (50 mm) and the diameter is 1.5 in. (37.5 mm). The option code is W2.

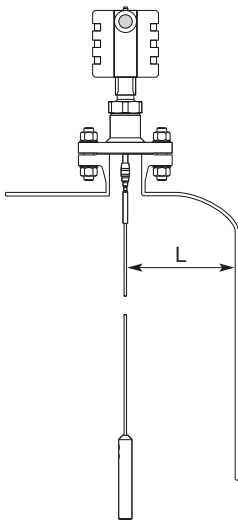
If a heavier weight is needed, option code W3 can be used. The height is 5.5 in. (140 mm) and the diameter is 1.5 in. (37.5 mm).

## Installation and mounting considerations

### Free space requirement

If the probe is mounted close to a wall, nozzle or other tank obstruction, noise might appear in the level signal. Therefore the following minimum clearance, according to [Table 17](#), must be maintained.

**Figure 14: Free Space Requirement**



L. Clearance to tank wall

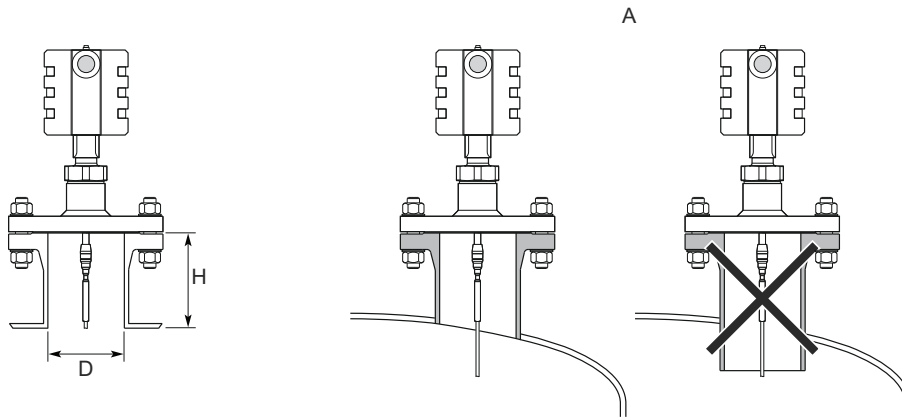
**Table 17: Recommended Minimum Free Space for Optimal Performance**

| Probe type   | Condition   | Minimum clearance (L) |
|--|---|-----------------------|
| Rigid single lead/Segmented rigid single lead <sup>(1)</sup> | Smooth metal tank wall  | 4 in. (100 mm)        |
|  | Disturbing objects such as pipes and beams<br>Plastic, concrete or rugged metal tank wall | 12 in. (300 mm)       |
| Flexible single  | Smooth metal tank wall  | 4 in. (100 mm)        |
|  | Disturbing objects such as pipes and beams<br>Plastic, concrete or rugged metal tank wall | 12 in. (300 mm)       |
| Coaxial <sup>(1)</sup>                                       | N/A   | 0 in. (0 mm)          |

<sup>(1)</sup> Minimum clearance from tank bottom for the coaxial and rigid single probes is 0.2 in. (5 mm).

## Flange connection on nozzles

Figure 15: Mounting in Nozzles



A. Confirm the nozzle does not extend into the tank.

The transmitter can be mounted in nozzles by using an appropriate flange. It is recommended that the nozzle size is within the dimensions given in [Table 18](#).

Table 18: Nozzle Considerations for Optimal Performance

|  | Single (rigid/segmented/flexible)               | Coaxial          |
|--|---|------------------|
| Recommended nozzle diameter (D)              | 6 in. (150 mm)                                  | > probe diameter |
| Minimum nozzle diameter (D) <sup>(1)</sup>   | 2 in. (50 mm)                                   | > probe diameter |
| Recommended nozzle height (H) <sup>(2)</sup> | 4 in. (100 mm) + nozzle diameter <sup>(3)</sup> | N/A              |

(1) The Trim Near Zone (TNZ) function may be necessary or an Hold Off Distance/Upper Null Zone (UNZ) setup may be required to mask the nozzle.

(2) Longer nozzles may be used in certain applications. Consult your local Emerson representative for details.

(3) For nozzles taller than 4 in. (100 mm), the long stud version is recommended (option code LS) to prevent the flexible portion from touching the edge of the nozzle.

### Note

The probe must not be in contact with the nozzle (except for the coaxial probe).

## Installation in still pipe/chamber

### General chamber considerations

Dimensioning the chamber/pipe correctly and selecting the appropriate probe is key to the success in these applications. When selecting a smaller chamber/pipe diameter, such as 2-in., a flexible probe is not suitable due to the chance of it coming into contact with the walls. Also, relatively large side inlets may interfere with the signal.

When gas lift and/or turbulence may occur (e.g. boiling hydrocarbons), a 3- or 4-in. chamber/pipe diameter is recommended for maximum measurement reliability. This is especially true in high pressure and high temperature installations.

**Table 19: Recommended and Minimum Chamber/Still Pipe Diameters for Different Probes**

| Probe type                          | Recommended diameter      | Minimum diameter                          |
|-------------------------------------|---------------------------|---|
| Rigid single/segmented rigid single | 3 or 4 in. (75 or 100 mm) | 2 in. (50 mm)                             |
| Flexible single                     | 4 in. (100 mm)            | Consult your local Emerson representative |
| Coaxial                             | 3 or 4 in. (75 or 100 mm) | 1.5 in. (37.5 mm)                         |

**Note**

Metal pipes are preferred, especially in applications with low dielectric constant, to avoid disturbances from objects near the pipe.

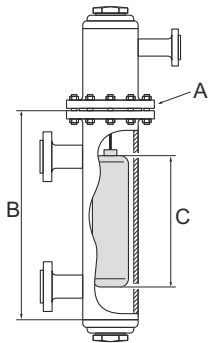
**Rosemount chamber**

A Rosemount chamber allows external mounting of process level instrumentation. It supports a variety of process connections, and optional drain and vent connections. The standard Rosemount chambers are designed according to ASME B31.3. Rosemount chambers compliant with the Pressure Equipment Directive (PED) are available. Customer specific engineered solutions for Rosemount chambers are available upon request. Use option code XC to order together with the Rosemount 3300 Series Transmitters.

Use a centering disc the same diameter as the chamber if the probe length >3.3 ft. (1 m). See [Table 22](#) for which disc to use.

**Existing chamber**

A Rosemount 3300 Level Transmitter is the perfect replacement in an existing displacer chamber. Proprietary flanges are offered, enabling use of existing chambers to make installation easy.

**Figure 16: Existing Displacer Chamber**

- A. Replace chamber flange
- B. Probe length
- C. Displacer length

Considerations when changing to Rosemount 3300:

- The Rosemount 3300 Level Transmitter flange choice and probe length must be correctly matched to the chamber. Both standard ASME and EN (DIN), as well as proprietary chamber flanges, are available. See [Proprietary flanges](#) to identify the proprietary flanges.
- See [Table 22](#) for guidelines on which disc size to use.
- See [Table 20](#) for guidelines on the required probe length.

**Table 20: Required Probe Length in Chambers**

| Chamber manufacturer   | Probe length <sup>(1)</sup>                             |
|--|---|
| Major torque-tube manufacture (249B, 249C, 249K, 249N, 259B) | Displacer + 9 in. (229 mm)                              |
| Masoneilan™ (torque tube operated), proprietary flange       | Displacer + 8 in. (203 mm)                              |
| Other - torque tube <sup>(2)</sup>                           | Displacer + 8 in. (203 mm)                              |
| Magnetrol® (spring operated) <sup>(3)</sup>                  | Displacer + between 7.8 in. (195 mm) to 15 in. (383 mm) |
| Others - spring operated <sup>(2)</sup>                      | Displacer + 19.7 in. (500 mm)                           |

(1) *If flushing ring is used, add the ring height to the probe length.*

(2) *For other manufacturers, there are small variations. This is an approximate value; actual length should be verified.*

(3) *Lengths vary depending on model, SG, and rating, and should be verified.*

For additional information, see the Replacing Displacers with Guided Wave Radar [Technical Note](#).

### Probe type in chamber considerations

When installing a Rosemount 3300 in a chamber, the single lead probe is recommended.

The probe must not touch the chamber wall, should extend the full height of the chamber, but not touch the bottom of the chamber.

The probe length determines if a single rigid or single flexible probe should be used:

- Less than 19.7 ft. (6.0 m): Rigid single probe is recommended. Use a centering disc for probe > 3.3 ft. (1 m). When mounting space is limited, use a flexible single probe with a weight and centering disc.
- More than 19.7 ft. (6.0 m): Use flexible single probe with a weight and centering disc.

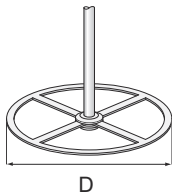
### Centering disc for pipe installations

To prevent the probe from contacting the chamber or pipe wall, centering discs are available for flexible single and rigid single probes. The disc is attached to the end of the probe. Discs are made of stainless steel, Alloy C-276, Alloy 400, or PTFE.

For the segmented rigid single lead probe, up to five PTFE centering discs can be mounted along the probe, but keep a minimum distance of two segments between the discs. Additionally, a disc in SST or PTFE (part number 03300-1655-xxxx) can be attached to the end of the probe.

When mounting a centering disc, it is important that it fits correctly in the chamber/pipe. See [Figure 17](#) for Dimension D. [Table 22](#) shows which centering disc diameter to choose for a particular pipe.

**Figure 17: Dimension D for Centering Discs**



**Table 21: Centering Disc Dimensions**

| Disc size | Actual disc diameter (D) |
|-----------|--------------------------|
| 2-in.     | 1.8 in. (45 mm)          |
| 3-in.     | 2.7 in. (68 mm)          |
| 4-in.     | 3.6 in. (92 mm)          |
| 6-in.     | 5.55 in. (141 mm)        |
| 8-in.     | 7.40 in. (188 mm)        |

**Table 22: Centering Disc Size Recommendation for Different Pipe Schedules**

| Pipe size | Pipe schedule      |                     |                    |                    |
|-----------|--------------------|---------------------|--------------------|--------------------|
|           | 5s, 5 and 10s,10   | 40s, 40 and 80s, 80 | 120                | 160                |
| 2-in.     | 2-in.              | 2-in.               | N/A <sup>(1)</sup> | N/A <sup>(2)</sup> |
| 3-in.     | 3-in.              | 3-in.               | N/A <sup>(1)</sup> | 2-in.              |
| 4-in.     | 4-in.              | 4-in.               | 3-in.              | 3-in.              |
| 5-in.     | 4-in.              | 4-in.               | 4-in.              | 4-in.              |
| 6-in.     | 6-in.              | 6-in.               | 4-in.              | 4-in.              |
| 7-in.     | N/A <sup>(1)</sup> | 6-in.               | N/A <sup>(1)</sup> | N/A <sup>(1)</sup> |
| 8-in.     | 8-in.              | 8-in.               | 6-in.              | 6-in.              |

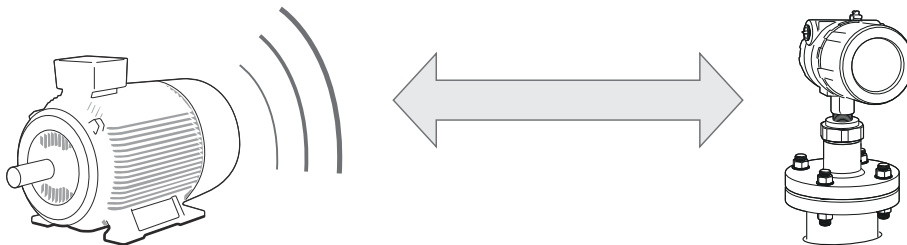
(1) Schedule is not available for pipe size.

(2) No centering disc is available.

## Installation in non-metallic tanks and open-air applications

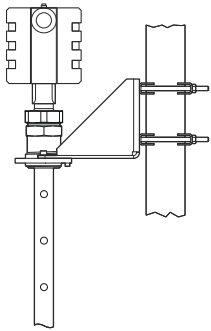
Avoid major sources of electrical disturbance in proximity of the installation (e.g. electrical motors, stirrers, servo mechanisms).

**Figure 18: Avoid Electromagnetic Disturbances**



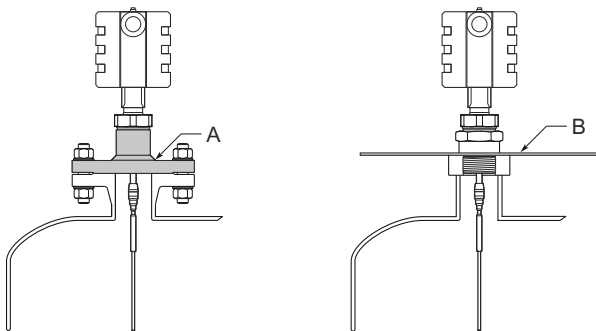
For clean liquids, use a coaxial probe to reduce effect of potential electrical disturbances.

**Figure 19: Coaxial Probe in an Open-Air Application**



For optimal single lead probe performance in non-metallic tanks, the probe must be mounted with a metal flange, or screwed in to a metal sheet ( $d > 14$  in./350 mm) if a threaded version is used.

**Figure 20: Mounting in Non-Metallic Tanks**



- A. Metal flange
- B. Metal sheet ( $d > 14$  in./350 mm)

## Minimum distance between two single probes

When installing multiple Rosemount 3300 Level Transmitters with single probes in the same tank, ensure to place the devices at proper distance from each other to avoid the risk of interference caused by cross-talk. [Table 23](#) provides recommended minimum distance between two probes. A coaxial probe or a probe installed in a still pipe will not cause any cross-talk.

**Table 23: Minimum Distance between Single Probes**

| Product         | Minimum distance between probes |
|-----------------|---------------------------------|
| Oil (DC = 2.1)  | 5.2 ft. (1.6 m)                 |
| Water (DC = 80) | 3.3 ft. (1.0 m)                 |

## Other mechanical considerations

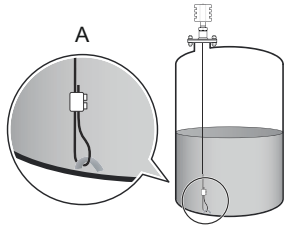
To get best possible performance, the following must be considered before installing the transmitter:

- Inlets should be kept at a distance in order to avoid product filling on the probe
- Avoid physical contact between probes and agitators, as well as applications with strong fluid movement unless the probe is anchored



- Probe tie-down is recommended if the probe can move to within 1 ft. (30 cm) of any object during operations
- In order to stabilize the probe for side forces, it is possible to fix or guide the probe to the tank bottom

**Figure 21: Stabilize the Probe for Side Forces**



*A. Flexible single lead probe with chuck.*

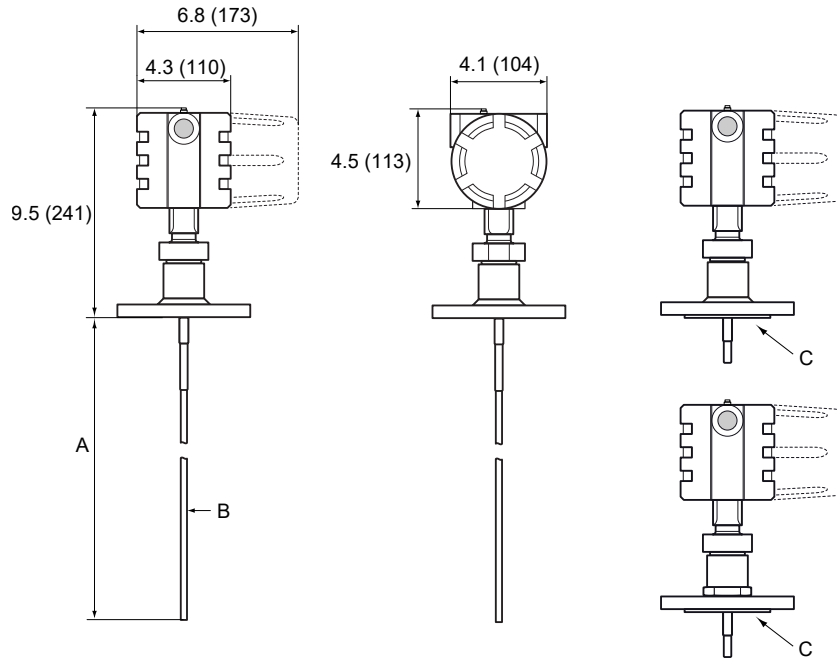
See the Rosemount 3300 [Reference Manual](#) for more mechanical installation information.

## Product certifications

See the Rosemount 3300 [Product Certifications](#) document for detailed information on the existing approvals and certifications.

# Dimensional drawings

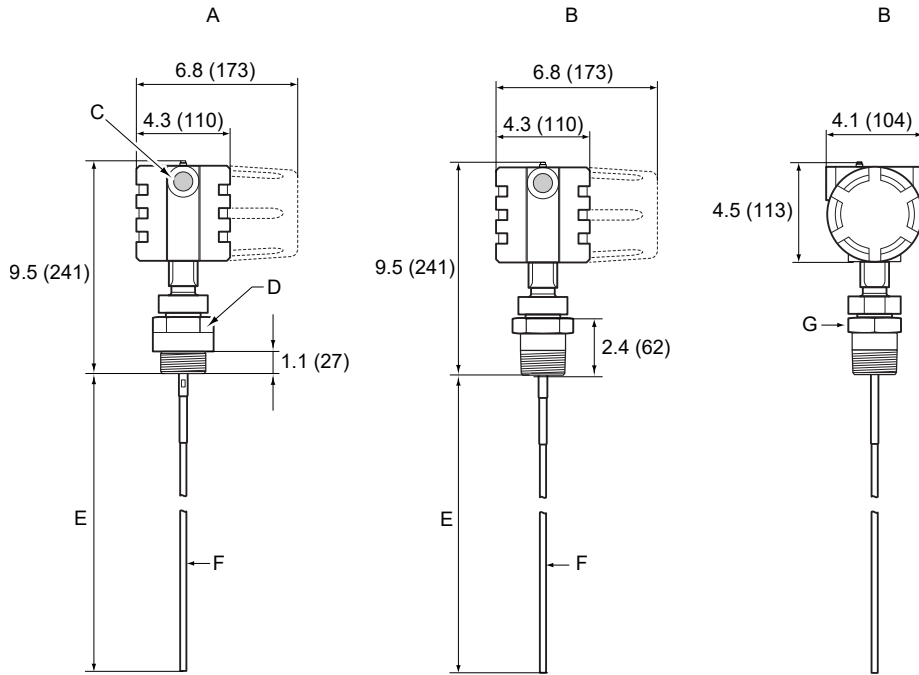
**Figure 22: Rigid Single Lead Probe with Flange Connection**



- A.  $L \leq 10 \text{ ft. (3 m)}$ ;  $L \leq 20 \text{ ft. (6 m)}$  for  $\text{Ø } 0.51 \text{ (13)}$
- B.  $\text{Ø } 0.31 \text{ (8)}$  or  $\text{Ø } 0.51 \text{ (13)}$  for SST and Alloy probes;  $\text{Ø } 0.47 \text{ (12)}$  for PTFE covered probe
- C. The PTFE and alloy probes are designed with a protective plate.

Dimensions are in inches (millimeters).

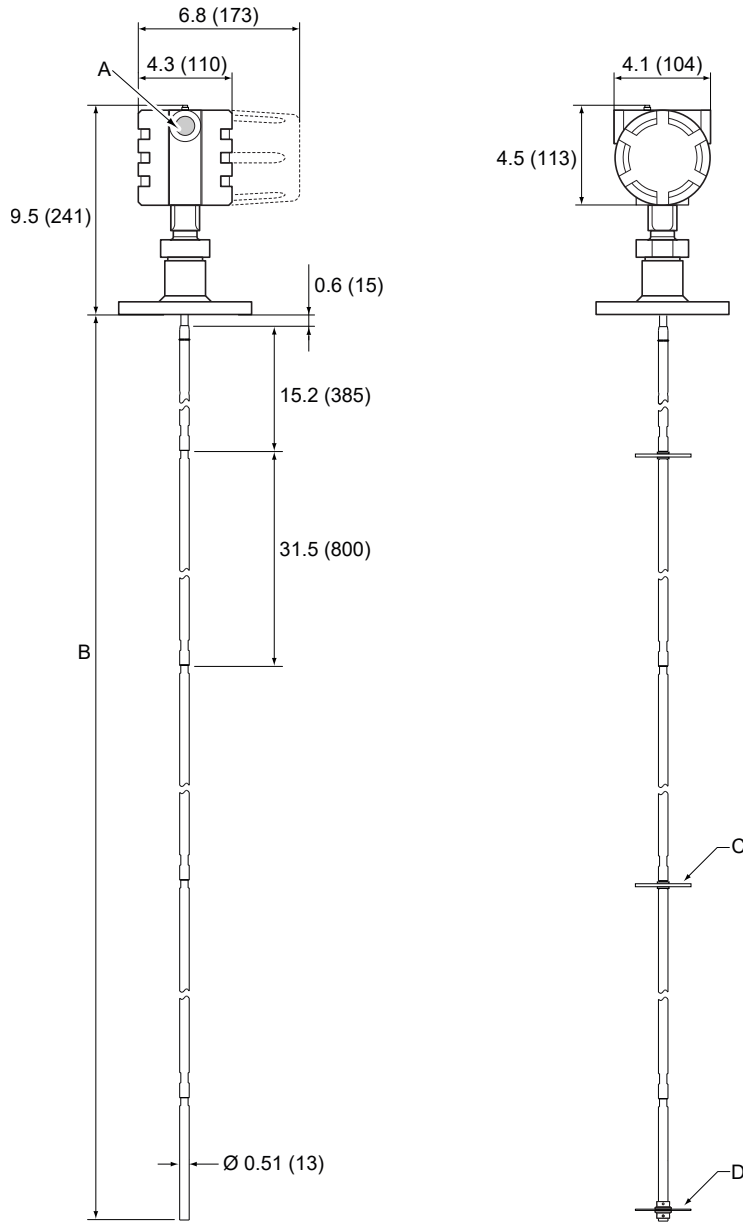
Figure 23: Rigid Single Lead Probe with Threaded Connection



- A. G 1/1½ inch
- B. NPT 1/1½/2 inch
- C. ½ - 14 NPT; optional adapters: M20x1.5
- D. s52/s60
- E. L ≤ 10 ft. (3 m); L ≤ 20 ft. (6 m) for Ø 0.51 (13)
- F. Ø 0.31 (8) or Ø 0.51 (13) for SST and Alloy probes; Ø 0.47 (12) for PTFE covered probe
- G. s52

Dimensions are in inches (millimeters).

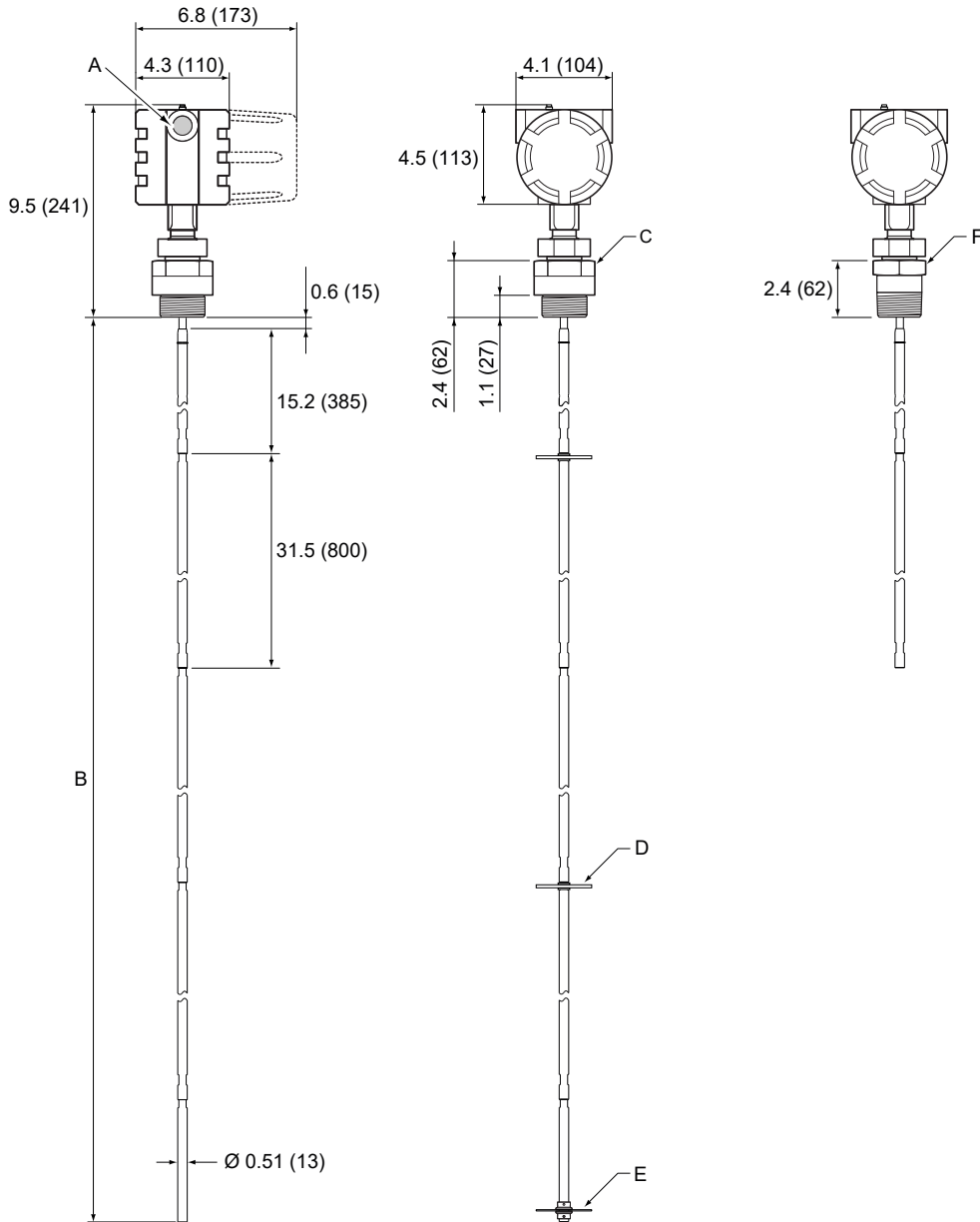
Figure 24: Segmented Rigid Single Lead Probe with Flange Connection



- A. ½ - 14 NPT; optional adapters: M20x1.5
- B.  $L \leq 20$  ft. (6 m)
- C. Optional: PTFE centering disc
- D. Optional: Bottom centering disc (SST or PTFE)

Dimensions are in inches (millimeters).

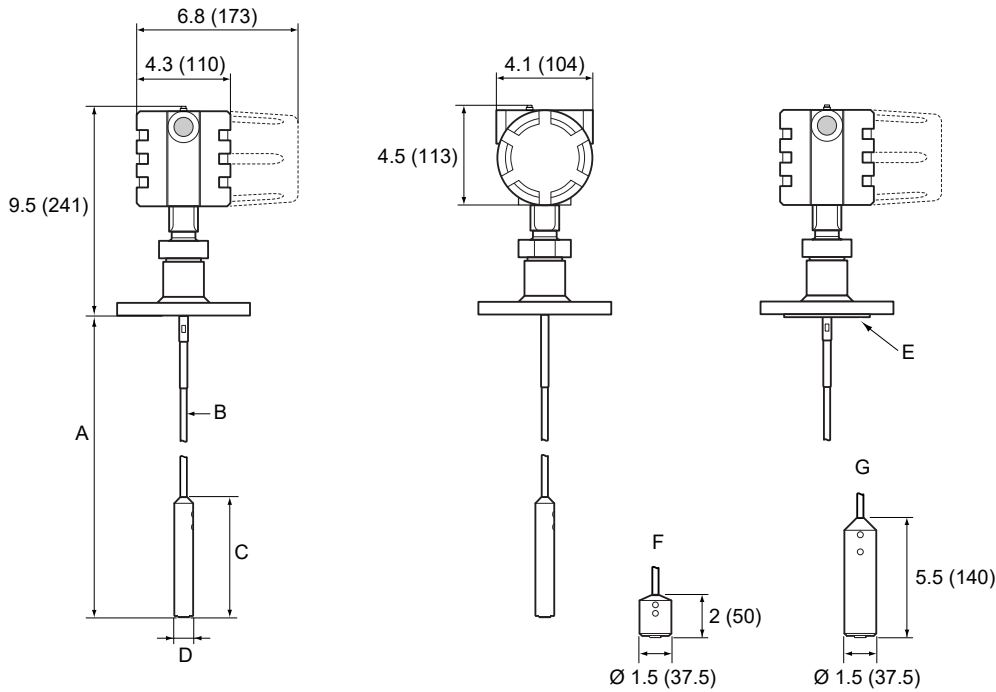
Figure 25: Segmented Rigid Single Lead Probe with Threaded Connection



- A. 1/2 - 14 NPT; optional adapters: M20x1.5, PG 13.5
- B. L ≤ 20 ft. (6 m)
- C. BSP-G 1 in., s52; BSP-G 1 1/2 in., s60
- D. Optional: PTFE centering disc
- E. Optional: Bottom centering disc (SST or PTFE)
- F. NPT 1 in., s52; NPT 1 1/2 in., s52; NPT 2 in., s60

Dimensions are in inches (millimeters).

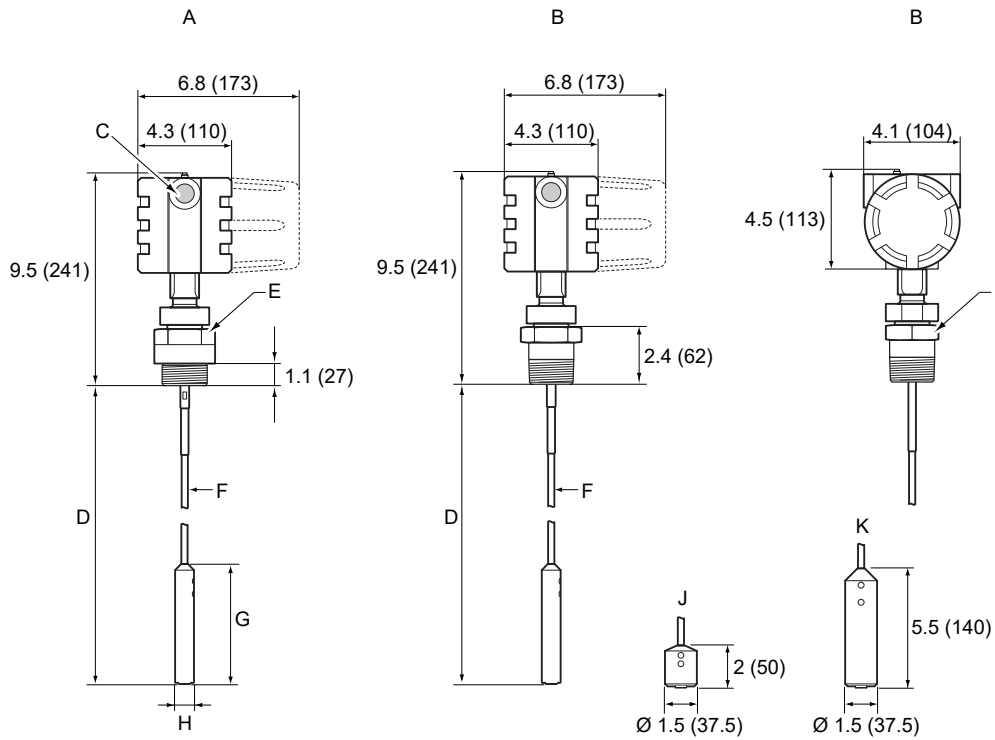
Figure 26: Flexible Single Lead Probe with Flange Connection



- A.  $L \leq 77$  ft. (23.5 m)
- B.  $\varnothing 0.16$  (4) for SST probe;  $\varnothing 0.28$  (7) for PTFE covered probe
- C. 5.5 (140) for SST probe; 17.1 (435) for PTFE covered probe
- D.  $\varnothing 0.86$  (22) for SST probe;  $\varnothing 0.88$  (22.5) for PTFE covered probe
- E. The PTFE covered probe is designed with a protective plate.
- F. Short weight (option W2)
- G. Heavy weight (option W3)

Dimensions are in inches (millimeters).

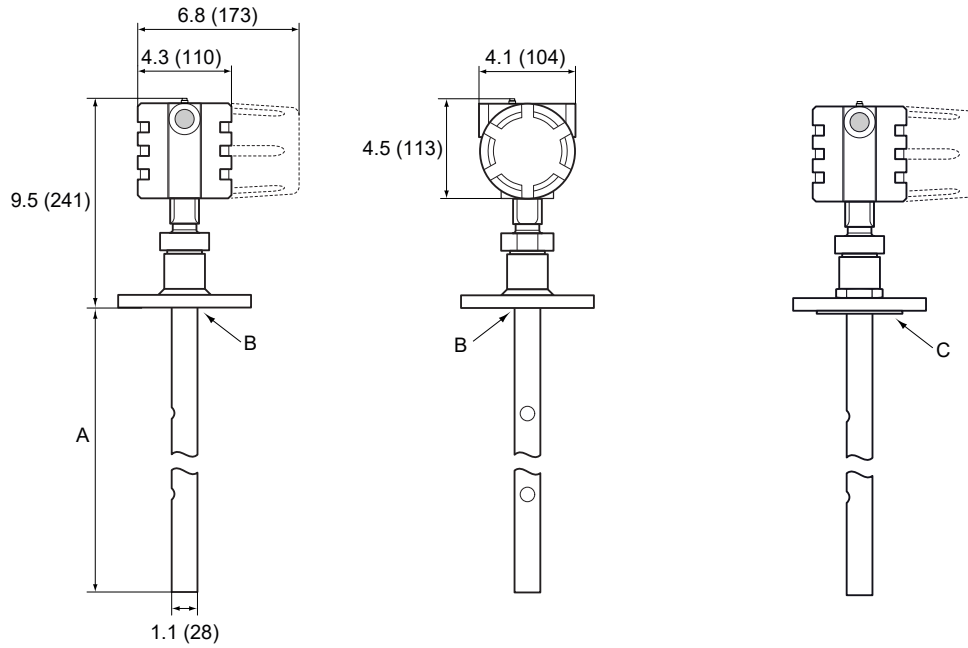
Figure 27: Flexible Single Lead Probe with Threaded Connection



- A. G 1/1½ in.
- B. NPT 1/1½/2 in.
- C. ½ - 14 NPT; optional adapters: M20x1.5
- D. L ≤ 77 ft. (23.5 m)
- E. s52/s60
- F. Ø 0.16 (4) for SST probe; Ø 0.28 (7) for PTFE covered probe
- G. 5.5 (140) for SST probe; 17.1 (435) for PTFE covered probe
- H. Ø 0.86 (22) for SST probe; Ø 0.88 (22.5) for PTFE covered probe
- I. 1 in./1½ in.: s52; 2 in.: s60
- J. Short weight (option W2)
- K. Heavy weight (option W3)

Dimensions are in inches (millimeters).

Figure 28: Coaxial Probe with Flange Connection

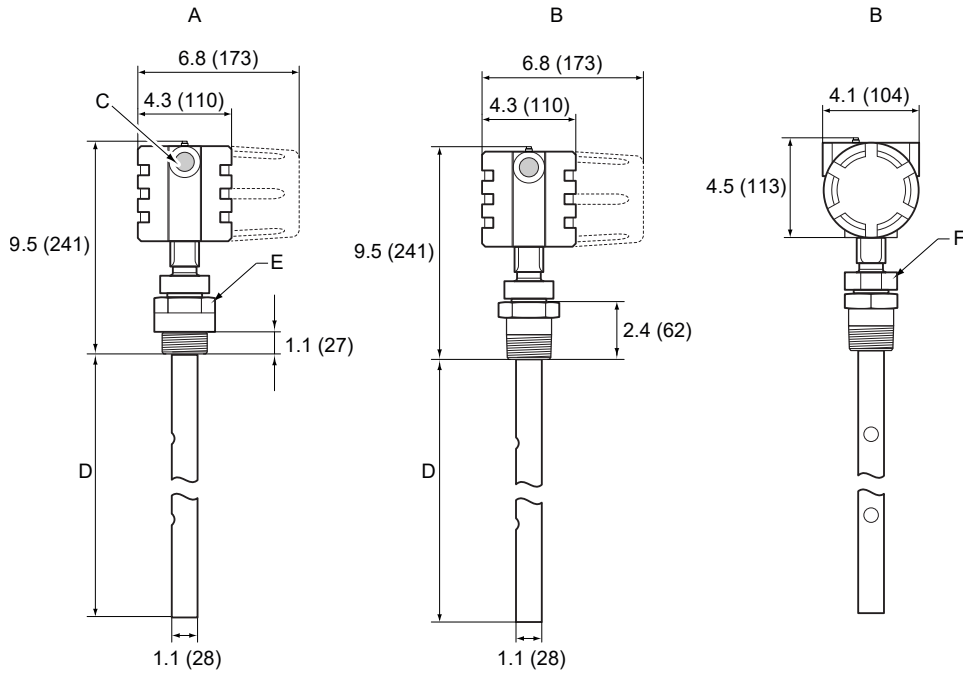


- A.  $L \leq 20$  ft. (6 m)
- B. For stainless steel the probe is welded to the flange.
- C. The alloy probes are designed with a protective plate.

Dimensions are in inches (millimeters).



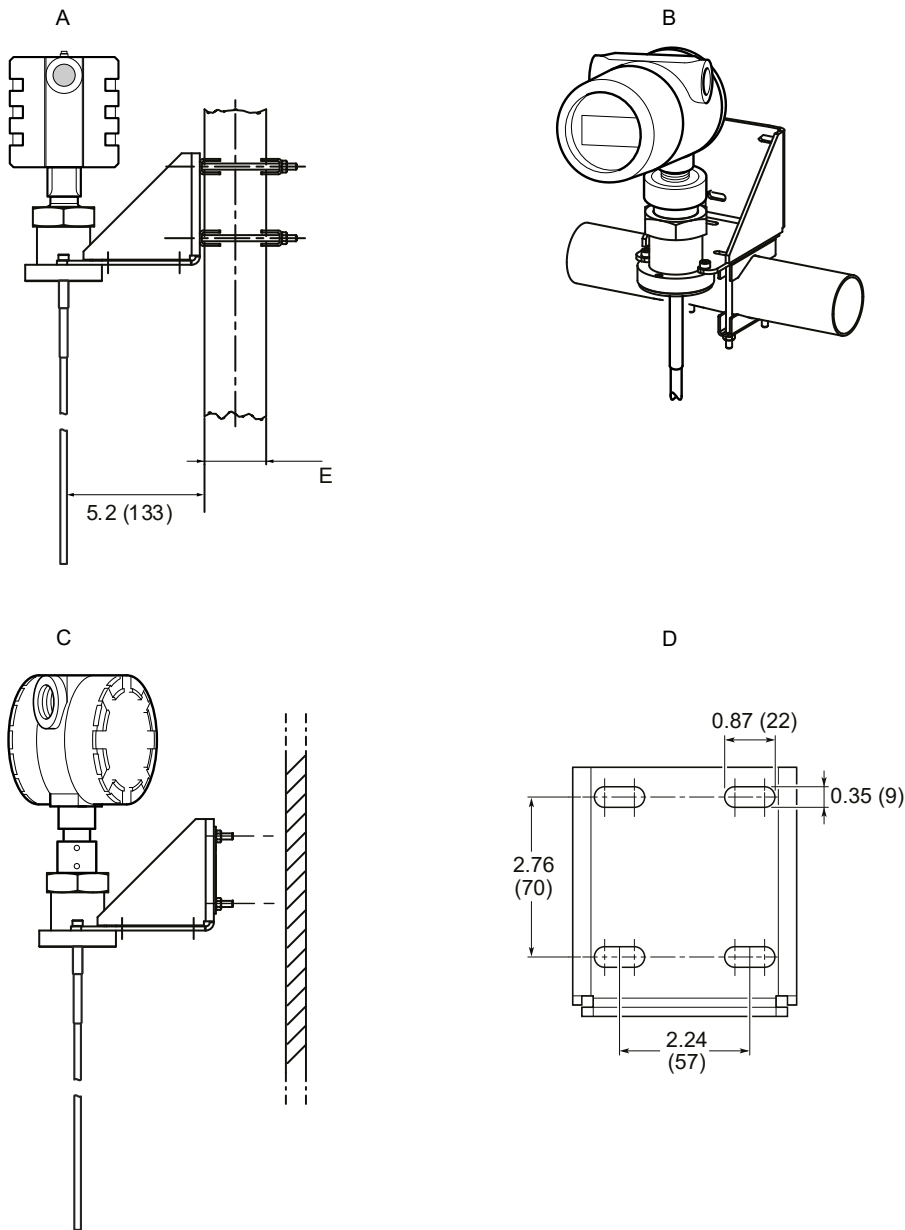
**Figure 29: Coaxial Probe with Threaded Connection**



- A. G 1/1½ in.
- B. NPT 1/1½/2 in.
- C. ½ - 14 NPT; optional adapters: M20x1.5
- D. L ≤ 20 ft. (6 m)
- E. s52/s60
- F. 1 in./1½ in.: s52; 2 in.: s60

Dimensions are in inches (millimeters).

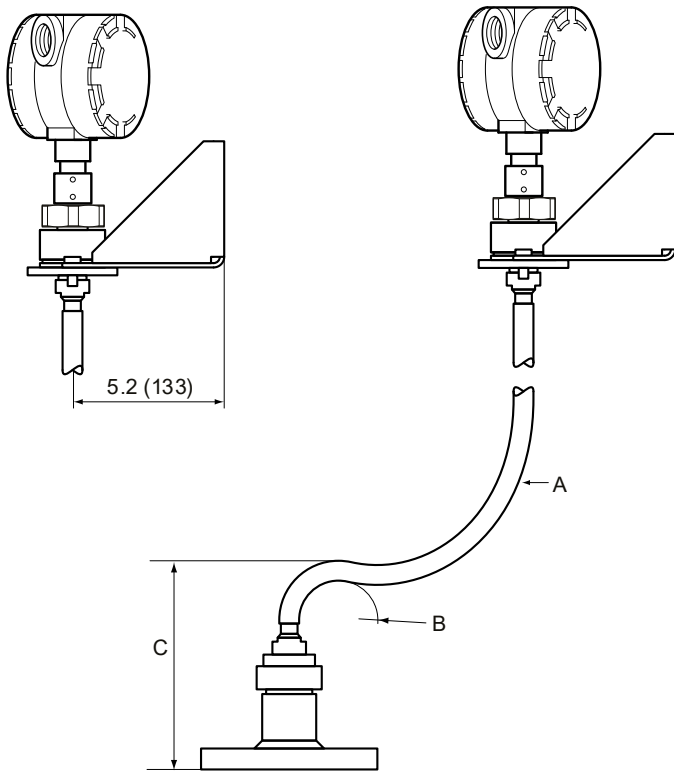
Figure 30: Bracket Mounting



- A. Pipe mounting (vertical pipe)
- B. Pipe mounting (horizontal pipe)
- C. Wall mounting
- D. Hole pattern for wall mounting
- E. Pipe diameter: maximum 2.5 in. (64 mm)

Dimensions are in inches (millimeters).

**Figure 31: Remote Housing**

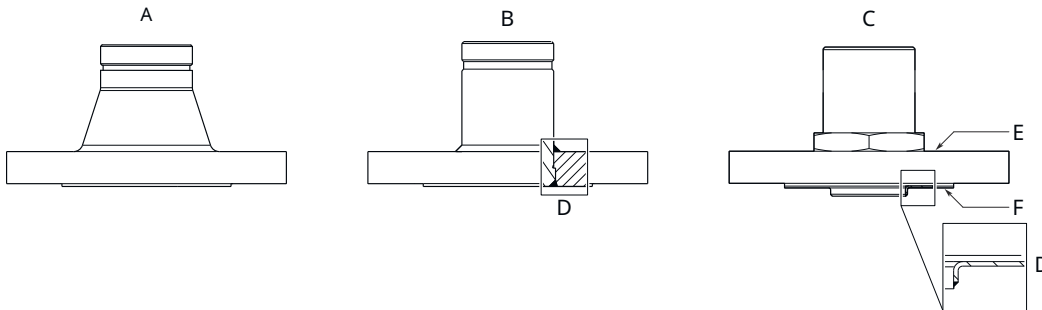


- A. 3, 6, 9 ft. (1, 2, or 3 m)
- B.  $R_{min}$ : 1.4 (35)
- C.  $H_{min}$ : 7.3 (185)

Dimensions are in inches (millimeters).

## Standard flanges

**Figure 32: Flange Connection**



- A. Forged one-piece
- B. Welded construction
- C. Protective plate design
- D. Weld
- E. Backing flange
- F. Protective plate

**Table 24: Standard Flanges**

| Standard   | Face type <sup>(1)</sup> | Plate surface finish, R <sub>a</sub> |
|------------|--------------------------|--------------------------------------|
| ASME B16.5 | Raised face              | 125-250 μin                          |
| EN 1092-1  | Type A flat face         | 3.2-12.5 μm                          |
| JIS B2220  | Raised face              | 3.2-6.3 μm                           |

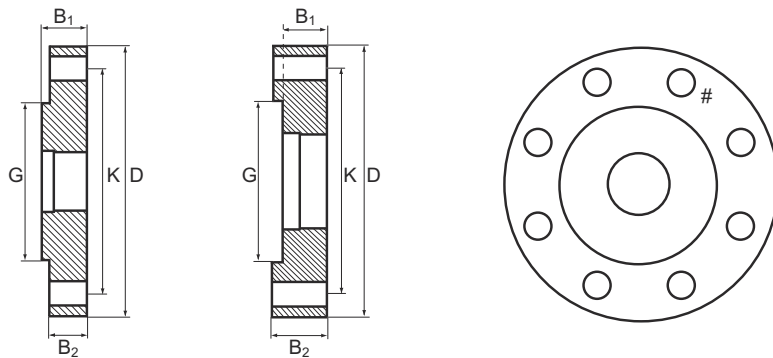
(1) Face gasket surface is serrated per mating standard.

**Table 25: Standard Flanges, Protective Plate**

| Standard   | Face type including protective plate | Plate surface finish, R <sub>a</sub> |
|------------|--------------------------------------|--------------------------------------|
| ASME B16.5 | Raised face                          | 3.2-6.3 μm                           |
| EN 1092-1  | Raised face                          | 3.2-6.3 μm                           |
| JIS B2220  | Raised face                          | 3.2-6.3 μm                           |

## Proprietary flanges

**Figure 33: Proprietary Flanges**



D: Outside diameter

B<sub>1</sub>: Flange thickness with gasket surface

B<sub>2</sub>: Flange thickness without gasket surface

F=B<sub>1</sub>-B<sub>2</sub>: Gasket surface thickness

G: Gasket surface diameter

# Bolts: Number of bolts

K: Bolt hole circle diameter

Dimensions are in inches (millimeters).

### Note

Dimensions may be used to aid in the identification of installed flanges. It is not intended for manufacturing use.

**Table 26: Dimensions of Proprietary Flanges**

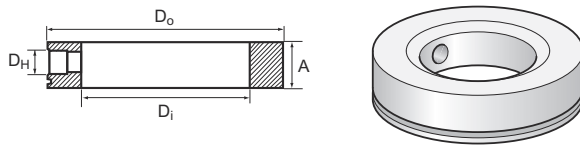
| Special flanges <sup>(1)</sup>   | D            | B <sub>1</sub> | B <sub>2</sub> | F            | G            | # Bolts | K             |
|----------------------------------|--------------|----------------|----------------|--------------|--------------|---------|---------------|
| Fisher™ 249B/259B <sup>(2)</sup> | 9.00 (228.6) | 1.50 (38.2)    | 1.25 (31.8)    | 0.25 (6.4)   | 5.23 (132.8) | 8       | 7.25 (184.2)  |
| Fisher 249C <sup>(3)</sup>       | 5.69 (144.5) | 0.94 (23.8)    | 1.13 (28.6)    | -0.19 (-4.8) | 3.37 (85.7)  | 8       | 4.75 (120.65) |
| Masoneilan™ <sup>(2)</sup>       | 7.51(191.0)  | 1.54 (39.0)    | 1.30 (33.0)    | 0.24 (6.0)   | 4.02 (102.0) | 8       | 5.87 (149.0)  |

- (1) These flanges are also available in a vented version.
- (2) Flange with raised face.
- (3) Flange with recessed face.

For information about flange temperature and pressure ratings, see [Fisher and Masoneilan flange rating](#).

## Flushing connection rings

**Figure 34: Flushing Connection Rings**



A. Height: 0.97 in. (24.6 mm)

**Table 27: Dimensions of Flushing Connection Rings**

| Flushing connection rings | D <sub>i</sub> | D <sub>o</sub> | D <sub>H</sub> |
|---------------------------|----------------|----------------|----------------|
| 2-in. ANSI                | 2.12 (53.8)    | 3.62 (91.9)    | ¼-in. NPT      |
| 3-in. ANSI                | 3.60 (91.4)    | 5.00 (127.0)   | ¼-in. NPT      |
| 4-in. ANSI/DN100          | 3.60 (91.4)    | 6.20 (157.5)   | ¼-in. NPT      |
| DN50                      | 2.40 (61.0)    | 4.00 (102.0)   | ¼-in. NPT      |
| DN80                      | 3.60 (91.4)    | 5.43 (138.0)   | ¼-in. NPT      |





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